SACRAMENTO MUNICIPAL UTILITY DISTRICT
UPPER AMERICAN RIVER PROJECT
(FERC NO. 2101)

PHYSICAL HABITAT SIMULATION
TECHNICAL REPORT
VOLUME 1

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4.14 PHABSIM Study Plan

This Physical Habitat Simulation (PHABSIM) Study Plan was developed at the direction of the Aquatic TWG to address a portion of the overall plan for instream flow evaluation of the Upper American River Project. An "overarching" instream flow plan is currently in development. This PHABSIM plan provides a description of methodological details associated with site selection, field data collection, and analysis in reaches where PHABSIM has already been identified as an appropriate tool for evaluation of flow and habitat relationships. This independent plan has been developed to facilitate timely start-up of field data collection activities, and includes some background on the decision making process for arriving at the proposed study reaches.

4.14.1 Pertinent Issue Questions

This PHABSIM Study Plan is directed toward the following Aquatic Issue Questions:

20. "What effect do flows have on species during critical life stages?"
36. "What are the limiting features of a natural (unimpaired/pre-project) hydrograph on aquatic species?"
37. "Are the minimum stream flows defined under the existing license adequate for protecting aquatic resources?

4.14.2 Background

Instream flows in the Upper American River Drainage have been altered by the construction and operation of the Project. In general, flows in many of the reaches during the spring period have been reduced due to storage at the reservoirs, while late summer/early fall flows have been supplemented by releases from the reservoirs. There has been concern expressed that current instream flow release requirements may be adversely affecting the fish populations, amphibians, and other aquatic species and their habitats in the Project area.

This study plan focuses on developing the information necessary to make aquatic resource decisions regarding flow in Project-affected stream reaches. Where applicable and resource values warrant, the Instream Flow Incremental Method (IFIM) is proposed, along with use of the associated PHABSIM System models. This approach provides a quantitative estimate of habitat conditions over a range of flows, and can be useful for evaluating potential flow regime effects on aquatic resource habitats. There are, however, limitations to the use of PHABSIM models.. The stream reaches to be evaluated must be modelable with PHABSIM programs, which requires that certain assumptions be met regarding channel stability, flow characteristics (including sub-critical flow velocities) and associated channel gradient, predictable stage-discharge relationships, etc. An overarching consideration in identifying reaches warranting specific instream flow studies are the assumptions that 1) project operations have or are capable of influencing the quantity and/or quality of flow within a specific reach, 2) flows are controllable, and 3) controllable flows and existing minimum instream flow requirements are potentially limiting aquatic resource productivity. If the assumptions are unmet, as for example they would be for headwater streams that are above the influence of any project operations, then PHABSIM studies are not warranted. For streams and reaches where the assumptions apply, but constraints in methods application exist due to access or sampling limitations, alternate methods of analysis (or different studies) must be considered. Alternate approaches could include a more biological focus (e.g., emphasizing populations over physical habitat), emphasis on macrohabitat conditions rather than microhabitat, or a hydrologic analysis in lieu of a hydraulic focus.

Because of these sampling considerations, the TWG is applying a phased approach to performing instream flow studies in the Project-affected reaches of river. In general, the use of PHABSIM is emphasized in reaches where it is most appropriate (i.e., "Phase 1" reaches), based on a combination of modeling assumptions and requirements, watershed characteristics, project facility or operational factors, and resource importance. Other tools or analytical approaches to instream flows are proposed in areas where PHABSIM may be inappropriate, or where any studies of flow conditions might best be delayed until after other studies have been completed (i.e., "Phase 2" reaches). For amphibians and other aquatic biota, a more site-specific approach may be utilized at known sites or ideal habitat sites for their reproductive activities.

Instream flow studies to assess potential effects of flow regimes on aquatic resources have previously been conducted in the South Fork Rubicon River (EA 1982). In addition, the South Fork American River downstream of the Silver Creek confluence was included in an IFIM study conducted several years ago for the El Dorado Project (Payne 2000). Pages E3-23 through E3-30 of SMUD's Initial Information Package (SMUD 2001) summarize other current information regarding the aquatic resources in the UARP affected reaches.

Due to the different nature of the flow regime and facilities in the reach below Chili Bar Dam, it is being addressed in a separate study plan.

4.14.3 Study Objectives

The PHABSIM study objectives are to:

1) Describe existing habitat conditions for target fish, and other aquatic species in the Project-affected stream reaches as defined in Table 1, particularly indicator species.
2) Determine the effects of existing streamflows on target fish, and other aquatic species in Project-affected stream reaches.
3) Evaluate aquatic habitat suitability in relation to a range of flows associated with the UARP project.
4) Identify any flow related constraints to critical life stages of target species.

4.14.4 Study Area

The study area will include all Project-affected stream reaches as described in Table 1.

The suitability of each particular reach for inclusion in the instream flow study using the PHABSIM models is dependent on several factors. These factors include the following, among others: 1) availability of upstream storage and/or control (see Table 1), 2) length of the reach (see Table 1), 3) hydraulic modelability of the reach, 4) reach responsiveness to flow changes, 5) potential for controllable flows to be a limiting factor, 6) safety and accessibility of sites for study, and 7) constraints on access to sites or execution of field tasks.

The reaches listed in Table 1 were evaluated against the following sequential criteria to determine their suitability as "Phase 1" sites for PHABSIM analysis in the instream flow study.

Limited upstream control at Rubicon Reservoir restricts flow management actions in the Rubicon River Reach, Rubicon Tunnel Outlet Reach, Rockbound Dam Reach, and Buck Island Dam Reach. In addition, the Rubicon Tunnel Outlet Reach (a constructed channel) and Rockbound Dam Reach are quite short.

The Gerle Creek Dam Reach may also be too short to warrant an independent PHABSIM analysis, and may be able to be evaluated using data from upstream or downstream areas, or from other studies (e.g., fish population, invertebrates). On June 17, 2002 the Aquatic TWG decided to defer on a determination of PHABSIM suitability until after additional information on habitat mapping and fish populations is developed for this reach. In March 2003, the Aquatic TWG subsequently agreed to include a few transects in this reach to supplement a larger study site below the confluence of Gerle Creek and South Fork Rubicon River.

Table 1. River reaches in the Sacramento Municipal Utility District's Upper American River Project.

Reach Number	Reach	Length (mi)	Upstream Reservoir Capacity (ac-ft)	Comments
1	Rubicon Dam	5.7	1,435	Rubicon River downstream of Rubicon Reservoir. Reach extends to confluence with Miller Creek. Reservoir capacity limits downstream flow control during part of the year. Study constraints include wilderness area at upstream end of reach.
2	Rubicon Tunnel Outlet Reach	0.3	N/A	Outlet channel from Rubicon Tunnel. Reach extends to Rockbound Lake. Receives "pass-through" flow from Rubicon Reservoir during high flow periods when reservoir elevation exceeds tunnel elevation, but does not draw on "stored" water. May stay wet during non-diversion periods due to inlet leakage and/or groundwater accretion in tunnel.
3	Rockbound Dam Reach	0.3	N/A	Little Rubicon River between Rockbound Lake and Buck Island Reservoir. Rockbound Lake has no releasable storage capacity.
4	Buck Island Dam	3.0	1,070	Little Rubicon River downstream of Buck Island Reservoir. Reach extends to confluence with Rubicon River. Reservoir capacity limits downstream flow control during part of the year.
5	Loon Lake Dam	8.5	76,200	Gerle Creek downstream of Loon Lake. Flow control in the reach. No major study constraints.
6	Gerle Creek Dam	1.2	1,260	Gerle Creek downstream of Gerle Reservoir. Reach extends to confluence with South Fork Rubicon River. Flow control in the reach. No major study constraints.
7	Robbs Peak Dam	5.6	30	South Fork Rubicon River downstream of Robbs Peak Reservoir. Reach extends to confluence with Rubicon River. Robbs Peak Reservoir is a headwater forebay that receives most of its flow from Gerle Creek. Flow control in the reach. No major study constraints at upper end of reach. Lower portion of the reach is too steep and confined for safe access.
8	Ice House Dam	11.5	45,960	South Fork Silver Creek downstream of Ice House Reservoir. Flow control in the reach. No major study constraints.
9	Junction Dam	8.3	280,540*	Silver Creek downstream of Junction Reservoir. Flow control in the reach. Access limited.
10	Camino Dam	6.2	825	Silver Creek downstream of Camino Reservoir. Flow control in the reach. Access limited.
11	S.F. American River Reach	2.8	N/A	S.F. American River from Silver Creek confluence to Slab Creek Reservoir. PHABSIM study in this reach previously conducted for the EID project. Limited flow control in the reach, due to South Fork American River flows. Access limited.
12	Brush Creek Dam	2.2	1,530	Brush Creek downstream of Brush Creek Reservoir. Flow control in the reach. Safe access limited by high (over 9%) gradient.
13	Slab Creek Dam	8.0	16,600	S.F. American River downstream of Slab Creek Reservoir. Flow control in the reach.

*Includes storage in Union Valley Reservoir

Table 2. River Reach Criteria

Criteria No.	Criteria	Reaches That Meet Criteria
1	Are flows in the reach affected by project facilities?	All
2	Is there sufficient upstream control of flows in the bypass reach?	Loon Lake Dam, Gerle Creek Dam, Robbs Peak Dam, Ice House Dam, Junction Dam, Camino Dam, S.F. American River, Brush Creek Dam, Slab Creek Dam
3	Is the reach sufficiently long (e.g., >2 miles) relative to the total miles of project affect streams to merit an independent analysis of flow/habitat relationships?	Loon Lake Dam, Robbs Peak Dam, Ice House Dam, Junction Dam, Camino Dam, S.F. American River, Brush Creek Dam, Slab Creek Dam
4	Is the majority of habitat in the reach sufficiently low gradient to be modelable, responsive to flow changes, and safely accessible for study?	Loon Lake Dam, upper portion of Robbs Peak Dam, Ice House Dam, Junction Dam, Camino Dam, S.F. American River, Slab Creek Dam

Portions of the Robbs Peak Dam Reach are too steep to be suitable for PHABSIM analysis, but other portions may be suitable. On June 17, 2002 the Aquatic TWG decided to defer on a determination of PHABSIM suitability until after additional information on habitat mapping and fish populations is developed for this reach. Since that time, aerial habitat mapping and ground reconnaissance have identified the upper portion of the reach (below the Gerle Creek confluence) as sufficiently low gradient and accessible to be potentially suitable for PHABSIM analysis. In March, 2003, the Aquatic TWG agreed to establish a PHABSIM site below the Gerle and South Fork Rubicon River confluence, with a few transects placed on the South Fork Rubicon River above the Gerle Creek confluence.

Much of the Brush Creek Dam Reach is over 9% gradient, and expected to be dominated by stream habitat types that are either unmodelable or unresponsive to flow change (e.g., cascades, high gradient riffles, deep pools). Habitat mapping of safely accessible portions of the reach is being considered to provide information about the suitability of the reach for application of PHABSIM methods. A site visit to the area by Aquatic TWG members will be conducted prior to any final decisions about analysis of this reach.

Reaches that met each of these criteria were, after discussion with the Aquatic TWG, identified as "Phase 1" reaches that would be most suitable for application of PHABSIM. Other reaches were considered "Phase 2" reaches where additional information such as habitat mapping data, fish survey results, or hydrologic data would be required before an assessment could be made of the suitability of the reach for PHABSIM analysis.

Based on review of topographic maps, hydrologic information, and videotape coverage of the river and canyon, reaches 9 (below Junction Dam) and 10 (below Camino Dam) are potentially similar enough in terms of channel characteristics and flow regime to be combined into one study reach. In addition, instream flow data has already been collected for the S.F. American River Reach. Thus, Phase 1 study reaches that are being considered for application of PHABSIM analysis include the following.

- Loon Lake Dam Reach (Gerle Creek downstream of Loon Lake)
- Gerle Creek Dam Reach (a few transects on Gerle Creek downstream of Gerle Reservoir)
- Robbs Peak Dam Reach (upper portion, S.F. Rubicon River downstream of the Gerle Creek confluence; and a few transects in the uppermost section above the Gerle Creek confluence)
- Ice House Dam Reach (South Fork Silver Creek downstream of Ice House Reservoir)
- Junction Dam and Camino Dam Reaches (Silver Creek downstream of Junction Reservoir and Camino Reservoir).
- Analysis of South Fork American River downstream of Silver Creek confluence.
- Slab Creek Dam Reach (S.F. American River downstream of Slab Creek Reservoir)

Certain of these reaches may require sub-reach delineation and evaluation. Sample locations will be proposed on the basis of results of the habitat mapping task (described below), input from the hydrology and geomorphology tasks, and consideration of safety and accessibility.

Reaches that are not currently considered suitable for a Phase 1 PHABSIM analysis (Rubicon Dam, Rubicon Tunnel Outlet, Rockbound Dam, Buck Island Dam, Brush Creek Dam) would be evaluated in Phase 2 after review of other study results (such as habitat mapping, fish populations, geomorphology, etc.), and are candidates for using alternative methods to PHABSIM. Alternative habitat evaluations could include review of physical habitat data from the habitat mapping task (including barriers, spawning gravel availability, stream size, habitat type, etc.), hydrologic regime evaluation, and/or biological data (fisheries, amphibian, riparian, invertebrates) assessment to provide an assessment of instream flow needs and opportunities.

4.14.5 Information Needed From Other Studies

The following information will be used in conjunction with the PHABSIM studies:

- Hydrology (mean monthly flows; reach –specific project operations: existing and proposed)
- Channel Morphology (identification of response reaches, channel condition, channel morphology, substrate characteristics, etc.)
- Habitat Mapping (extent and distribution of major habitat types at base flows; identification of critical habitats)
- Fish Surveys (species composition and distribution; life stage periodicities)

4.14.6 Study Methods And Schedule

Although specific methods and data collection techniques may vary by stream/reach/sub-reach, the following methods will generally be applied as part of Phase 1 PHABSIM studies:

A) HABITAT MAPPING: Habitat types (i.e., pool, riffle, run, pocket water) and other characteristics (e.g., spawning habitat, pool depth, fish barriers, etc.) found in Project-affected stream reaches have been quantified using a combination of on-the-ground field surveys, low-level helicopter overflights, and aerial photographs combined with ground truthing, under normal summertime conditions. Mapping has been conducted for all Project-affected stream reaches, whether they are proposed for Phase 1 PHABSIM analyses or not.

B) STUDY SITE IDENTIFICATION: Study sites will be established in a stepwise process, following guidelines from Bovee (1982). In the first step, each project reach will be reviewed for possible segmentation into subreaches. Subreach segmentation will be based primarily on changes in stream gradient (associated with geomorphic condition) and/or hydrology that may cause habitat types in one subreach to display significant hydraulic differences from the same habitat type in another subreach (e.g., low gradient riffles in one subreach have consistently greater depth or velocity than low gradient riffles in another subreach). Stream gradient will be determined using a GIS system and displayed as a longitudinal profile of elevation versus river mile within each reach. Hydrology will initially be based on the presence of significant tributary inflow within the reach. In the second step, areas for potential study sites will be identified that contain the full complement of necessary (representative) habitat unit types in a safely accessible section of stream. Within these areas, study sites will be established by randomly selecting a starting habitat unit. Candidate site locations will be identified and marked on reach maps/aerial photos and provided to the TWG for review. From the starting habitat unit, transects will be established in adjacent units (heading upstream or downstream) until the requisite transects are placed in the specified habitat units, as described below.

C) TRANSECT SELECTION

- Select representative transects based upon percentage of existing major habitat type (e.g., length >10 -15% of reach) in the identified Project-affected stream reaches. Major habitat types include riffles, runs, pools, and pocket water. Candidate site locations will be identified and marked on reach maps/aerial photos and provided to the TWG for review.
- Establish sufficient transects to model *approximately* three replicates of each major habitat type in each reach or subreach (the number of replicates may be modified based on the frequency of the habitat types, the amount of variation observed between habitat types, and/or any subreach segmentation). Up to three transects per habitat replicate will initially be considered, with the assumption that hydraulically homogeneous habitat types (i.e., riffles and runs) will require relatively fewer transects per replicate and relatively heterogeneous habitat types (i.e., pools and pocket water) will require relatively more transects per replicate. The final number of transects proposed for each site will depend on habitat complexity as well as target resource values. Actual transect selection will be completed as a collaborative field effort that includes members of the TWG. Transects will be placed in a stratified random manner, subject to professional judgment, with participation and concurrence of agencies and NGOs. All decisions and rationale on the number and placement of transects will be fully documented.

- "Critical" habitat transects may be placed, where warranted, in sensitive or critical habitat areas in order to analyze specific habitat/flow conditions at a desired (not random) location. The applicability, usefulness, and cost-effectiveness of two-dimensional modeling or other methods in such areas would be considered.
- Potential spawning habitat areas would be considered for alternative habitat assessment approaches, since transect and/or random placement methods are frequently inadequate for this type of habitat.

D) FIELD METHODS

- Conduct instream flow studies using established IFIM techniques (Bovee and Milhous 1978; Bovee 1982).
- A total of three calibration flows and associated water surface elevations will be collected per transect. Establishment of high flow calibration measurements will be limited by safety considerations. Velocity calibration at each transect will be conducted at the highest flow that is safely workable.
- Target calibration flows will be selected with the goal of having relatively even spacing of flows along a log scale, starting from the current minimum flow up to the greater of: a) approximately 4-5 times the current minimum flow (subject to safety considerations and feasibility), or b) 10-20 cfs. Suggested target calibration flows are listed in Table 3 (prior to finalizing target calibration flows, unimpaired hydrology and other factors will be reviewed). These ranges are operationally feasible, allow for some overlap of hydraulic predictions from each calibration data set, and concentrate the data collection on flow ranges where future flow regime discussions are likely to be focused. They also maximize the potential to make velocity calibration measurements at the highest flow.
- Field data collection will not enable prediction of weighted usable area during high spring flood conditions or during periods of spill. These magnitudes of flows will need to be evaluated separately.
- Study sites will be established with permanent benchmarks and transect endpoints. Transect survey points will include some additional measurements above the bank-full elevation to facilitate geomorphic analyses, and ensure that headpins are located above the water surface of the highest modeled flow. Benchmark and transect locations will be recorded with a GPS, where feasible.
- Transect cross section profiles will include closely spaced measurements in wetted areas, and in out-of-water areas with breaks in slope.
- Surveying level loops will be closed among closely grouped transects, and tied to a common benchmark.
- Velocity measurements will typically be made with electronic Marsh-McBirney flow meters, with measurements recorded at 0.6 or 0.8/0.2 of the total depth.
- Photos or video will be taken of each transect at each calibration flow.

E) HYDRAULIC MODELING: PHABSIM models (Milhous et al. 1989) will be run for several life stages and species, based on the results of the fish surveys. The program IFG-4 will be used for hydraulic simulation using one velocity calibration flow. Other hydraulic models may be considered, depending on site conditions, but field data collection will be conducted to support an IFG-4 model.

Table 3. Proposed target calibration flows for Phase 1 PHABSIM Study Reaches[1]									
Reach	**Stream**	**Current Minimum Flow**	**Low Flow**		**Middle Flow**		**High Flow**		**Dam outlet capacity**
		(cfs)	(cfs)	*(log)*	(cfs)	*(log)*	(cfs)	*(log)*	(cfs)
Loon Lake Dam	Gerle Creek	8	**8**	*0.90*	**18**	*1.26*	**40**	*1.60*	41
Ice House Dam	S.F. Silver Creek	3-15	**5**	*0.70*	**15**	*1.18*	**45**	*1.65*	47
Junction/Camino Dam	Silver Creek	5-20	**10**	*1.00*	**32**	*1.51*	**100**	*2.00*	112
Slab Creek Dam	S.F. American River	10-36	**36**	*1.56*	**74**	*1.87*	**150**	*2.18*	263
Gerle Creek Dam	Gerle Creek	4-7	**4 or 7**[a]	*0.60 or 0.85*	**8 or 10**[a]	*0.90 or 1.00*	**14**	*1.15*	14
Robbs Peak Dam	S.F. Rubicon River abv Gerle	1-3	**--**	--	**4**[b]	--	**--**	--	4
Robbs Peak Dam	S.F. Rubicon River blw Gerle	5 - 10	**5 or 10**[a]	*0.70 or 1.00*	**10 or 14**[a]	*1.00 or 1.14*	**18**	*1.26*	18

[1]Log values are presented to aid in evenly spacing the target flows along the log scale that water surface and discharge relationships are computed.
[a] Dependent upon water year type requirements for minimum flow.
[b] One flow measurement only.

F) HABITAT ANALYSIS: The program HABTAV will be used for calculation of weighted usable area, based on output from the hydraulic simulation model and use of appropriate habitat suitability criteria. Weighted usable area versus flow curves will be generated for each river reach/sub-reach. A time series analysis will be conducted for summer, fall, and where possible, winter flows based on a monthly time step. The time series analysis will compare WUA by month under natural versus regulated flow regimes for different water year types.

Data tables and figures will be prepared that present the WUA versus flow curve coordinates by reach, including WUA by separate habitat types.

Proposed target species for the habitat analysis will include but are not limited to hardhead, rainbow trout, brown trout in Gerle Creek, since these species are USFS Management Indicator Species or USFS sensitive species, and the primary management species of interest for CDFG. Target species will be identified on a reach-specific basis.

G) HABITAT SUITABILITY CRITERIA: Selection of habitat suitability criteria (HSC) will continue to be discussed with the Aquatic TWG, and final criteria will be used with the hydraulic modeling results.

Additional consultation with the TWG will be necessary to review habitat mapping results, review reach-specific scoping activities, select study sites and target flows, and select transect locations. The study plan needs to be finalized in early 2003 in order to facilitate transect selection and possible initiation of Phase 1 fieldwork in spring

2003. Hydraulic data collection would begin in Spring 2003. Data analysis would occur in Fall 2003 through Winter 2004.

4.14.7 Analysis

Analytical tasks will include a description of existing aquatic habitat in the Project-affected stream reaches. The information from the habitat mapping will be used for a variety or purposes, including determination of transect weighting for PHABSIM transects. Information from the Fisheries Surveys will be used to describe current fish species population presence and distribution in the Project-affected stream reaches, which will aid in selection of appropriate indicator species in each reach. Hydraulic models (PHABSIM) will be calibrated to established protocols. The PHABSIM modeling results and associated transect weighting will be combined with approved HSC curves into HABTAV program to generate Weighted Usable Area (WUA) curves for the species and life stages of interest. A set of time series tables and graphs will be generated on a monthly time step (by water year type) to depict WUA habitat values on a monthly basis under various low-to-moderate flow regimes (no attempt will be made to estimate WUA under very high, or spill, flow conditions).

4.14.8 Study Output

The output of the PHABSIM study will be a written report that includes a description of the issue question(s) addressed, objectives, study area, methods, analysis, and results. The output for this study will also include PHABSIM analysis and results, weighted usable area (WUA), and time series curves for species and life stages of interest. The habitat time series analysis results will be displayed in both graphic and tabular form, including the results from Payne (2000). It is expected that the report will be prepared by early 2004, and be prepared in a format that can be directly incorporated into the Licensee's draft environmental assessment that will be submitted to FERC with the Licensee's application for a new license.

4.14.9 Preliminary Estimated Study Cost

A preliminary estimated study cost will be prepared after the TWG approves the plan and prior to submittal to the Plenary Group.

4.14.10 TWG Endorsement

The Aquatics TWG approved this plan on April 22, 2003. There were no participants at the meeting who indicated they could not "live with" this plan. The Plenary Group approved the plan on May 7, 2003. The participants at the meeting who said they could "live with" the study plan were: Taxpayers of EDC, Friends of EDC, ENF, Camp Lotus/ARRA, EDC Water Agency, SMUD, PG&E, EDC Citizens for Water, Placer County Water Agency, NPS, California Outdoors, City of Sacramento and Paul Helman. None of the participants at the meeting said they could not "live with" the study plan.

4.14.11 Literature Cited

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PHYSICAL HABITAT SIMULATION TECHNICAL REPORT

SUMMARY

The Aquatic TWG identified seven stream reaches in which to conduct Physical Habitat Simulation studies in 2003:

- Loon Lake Dam Reach (three sites on Gerle Creek downstream of Loon Lake)
- Gerle Creek Dam Reach (one site on Gerle Creek downstream of Gerle Reservoir)
- Robbs Peak Dam Reach (one site on the S.F. Rubicon River above the Gerle Creek confluence and one
- site downstream of the Gerle Creek confluence)
- Ice House Dam Reach (two sites on S.F. Silver Creek downstream of Ice House Reservoir)
- Junction Dam and Camino Dam Reaches (one site on Silver Creek downstream of Junction Reservoir)
- Brush Creek Dam Reach (one site on Brush Creek downstream of Brush Creek Reservoir)
- Slab Creek Dam Reach (one split site on the S.F. American River downstream of Slab Creek Reservoir)

The purpose of the study was to: describe existing habitat conditions for target fish and other aquatic species in the study reaches, determine the effects of existing streamflows on target fish and other aquatic species, evaluate aquatic habitat suitability in relation to a range of flows associated with the UARP, and identify any flow related constraints to critical life stages of target species.

Field studies were conducted in the summer and fall of 2003 in all of the stream reaches. Habitat suitability criteria were developed from existing data, primarily from the S.F. American River basin. Weighted usable area versus flow relationships were developed for all reaches and subreaches, for rainbow and brown trout juvenile, adult, and spawning life stages. Habitat time series analyses were conducted to compare the effects of different flow regimes on aquatic habitat at various locations along each reach.

1.0 INTRODUCTION

This technical report is one in a series of reports prepared by Devine Tarbell & Associates, Inc., (DTA) and Stillwater Sciences for the Sacramento Municipal Utility District (SMUD) as an appendix to SMUD's application to the Federal Energy Regulatory Commission (FERC) for a new license for the Upper American River Project (UARP or Project). The report addresses instream flows in UARP reaches and includes the following sections:

- **BACKGROUND** – Summarizes the applicable study plan approved by the UARP Relicensing Plenary Group; a brief description of the issue questions addressed, in part, by the study plan; the objectives of the study plan; the study area, and agency information requests. In addition, requests by resource agencies for additions to this technical report are described in this section.
- **METHODS** – A description of the methods used in the study, including a listing of study sites.
- **RESULTS** – A description of the most important data results. Raw data, where copious, and detailed model results are provided by request in a separate compact disc (CD) for additional data analysis and review by interested parties. Included in the Appendix E (CD by request) are the data decks necessary for a third-party to independently run the Physical Habitat Simulation (PHABSIM) analysis.

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- **LITERATURE CITED** – A listing of all literature cited in the report.

This technical report does not include a detailed description of the UARP Alternative Licensing Process (ALP) or the UARP itself, which can be found in the following sections of the SMUD's application for a new license: The UARP Relicensing Process, Exhibit A (Project Description), Exhibit B (Project Operations), and Exhibit C (Construction).

Also, this technical report does not include a discussion regarding instream flow management or effects on associated environmental resources, nor does the report include a discussion of appropriate protection, mitigation, and enhancement measures. An impacts discussion regarding the UARP is included in the applicant-prepared preliminary draft environmental assessment (PDEA) document, which is part of SMUD's application for a new license. Development of resource measures will occur in settlement discussions, which will commence in early 2004, and will be reported in the PDEA.

Volume 2 of this report includes two binders of data sheets from the field studies. Volume 3 of this report is a supplement of quality control information from the hydraulic simulations.

2.0 BACKGROUND

2.1 Study Plan

On May 7, 2003, the UARP Relicensing Plenary Group approved the PHABSIM (Instream Flow) Study Plan that was developed by and approved by the UARP Relicensing Aquatic Technical Working Group (TWG) on April 22, 2003. The study plan was designed to address, in part, the following issue questions developed by the Plenary Group:

Issue Question 20.	What effect do flows have on species during critical life stages?
Issue Question 36.	What are the limiting features of a natural (unimpaired/pre-project) hydrograph on aquatic species?
Issue Question 37.	Are the minimum stream flows defined under the existing license adequate for protecting aquatic resources?

The objectives of the study were:

1. Describe existing habitat conditions for target fish, and other aquatic species, in the selected stream reaches in the UARP area.
2. Determine the effects of existing streamflows on target fish, and other aquatic species, in the selected stream reaches in the UARP area.
3. Evaluate aquatic habitat suitability in relation to a range of flows associated with the UARP.
4. Identify any flow related constraints to critical life stages of target species.

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The study area included 13 project reaches:

- Rubicon Dam
- Rockbound Tunnel Outlet
- Rockbound Dam
- Buck Island Dam
- Loon Lake Dam
- Gerle Creek Dam
- Robbs Peak Dam
- Ice House Dam
- Junction Dam
- Camino Dam
- South Fork American River
- Brush Creek Dam
- Slab Creek Dam

As part of the scoping process, these reaches were evaluated in two phases. Each phase of the scoping process, and the resulting PHABSIM study reach selections, are discussed in Section 3.2.1 of this technical report.

2.2 Water Year Type

As described in the *Water Temperature Technical Report*, the UARP Relicensing Water Balance Model Subcommittee established five water year types to be applied to all preliminary analysis with the understanding that the UARP Relicensing Plenary Group, with cause, may modify the current water year types in the future. For reference purposes, the water year types that would have applied to the period when the *Physical Habitat Simulation* study was performed (2002) are included below (Table 2.2-1). See the *Water Temperature Technical Report* for a detailed discussion of water year type designations.

Table 2.2-1. Water year types applied to individual months of years 2001-2004.*

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
2001	AN	D	D	D	D	D	D	D	D	D	D	D
2002	D	BN	BN	BN	BN	BN	BN	BN	BN	BN	BN	BN
2003	BN	BN	BN	D	BN	BN	BN	BN	BN	BN	BN	BN
2004	BN	BN	BN	-	-	-	-	-	-	-	-	-

*CD=Critically Dry; D=Dry; BN=Below Normal; AN=Above Normal; W=Wet

2.3 Agency Requested Information

In a letter dated December 17, 2003 to SMUD regarding content of technical reports, the agencies requested that the following information be included in this *Physical Habitat Simulation Technical Report*.

- Site location map with GPS coordinates.

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- Site description including location, habitat type, percentages of habitat type, weighting, and flows measured.
- Methodology including QA/QC, hydraulic simulation, criteria curves, habitat simulation, time series, network habitat analysis (if included).
- Species preferences curves.
- IFG-4 data decks (electronic) for each site and reach.
- Weighted Usable Area (WUA) series (XY graphs) for each species and life stage that were agreed to by the TWG for each site.
- WUA tables for each species and life stage (hard copy and electronic) for each site.
- Calibration techniques to predict water surface elevations (WSEL) (hard copy and electronic).

In a letter dated June 5, 2003, the Forest Service requested the following information be provided related to the Physical Habitat Simulation analysis:

- Model calibration data for stage-discharge relationships, velocity determinations, and habitat calculations.
- Weighted usable area versus discharge relationships for each transect.
- Description of habitat suitability curves and method(s) used to develop or modify curves.
- Copy of data decks.
- Report summarizing habitat mapping procedures and results.

In a May 13, 2004 letter, the agencies stated in regards to the *Physical Habitat Simulation Technical Report and Data* (February and March 2004) the following:

We have previously supplied comments on the first step (calibration) of the PHABSIM process in a memo composed by R2 Resource Consultants dated March 15, 2004, and will continue to provide comments as we complete future steps in the process.

3.0 METHODS

SMUD's methods were those approved by the Aquatic TWG and the UARP Relicensing Plenary Group. Performance of the UARP PHABSIM analysis involved several steps of field data collection and analysis. The first step was to perform a detailed pedestrian or aerial survey, or habitat mapping, of each of UARP reaches to determine the extent and distribution of habitat types (Section 3.1). Following habitat mapping, individual study reaches and PHABSIM transect locations were established (Section 3.2). Transect data collection was performed using standard techniques employed in PHABSIM modeling studies (Section 3.3). The transect data were then processed through the appropriate hydraulic simulation submodels within the PHABSIM system, generating simulations of depth and velocity distributions over a broad range of streamflows (Section 3.4). Literature-derived habitat suitability criteria (HSC) were then applied to the predicted hydraulic parameters to produce functional relationships between streamflow and fish habitat (Section 3.5).

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The Aquatic TWG members participated in the different phases of the PHABSIM study, including review and comment on the study plan, transect selection, and selection of appropriate HSC. USDA, Forest Service and the California Department of Fish and Game (CDFG) staff helped select transects in the field.

3.1 Habitat Mapping

Habitat mapping was conducted by pedestrian and/or aerial surveys throughout the study area. One purpose of the mapping was to determine the composition and distribution of different mesohabitat types in the study reaches for use in study reach delineation and transect weighting for the PHABSIM modeling (Morhardt et al. 1983). Habitat types used for the habitat mapping are described in Table 3.1-1. Additional information gathered during the habitat mapping study is presented in detail in the *Stream Habitat Technical Report*.

Table 3.1-1. Habitat classification key used for the UARP relicensing stream habitat mapping study (Adapted from McCain et al. 1990, Armantrout 1998, Payne 1992).

Habitat Type	Description
Low Gradient Riffle	Shallow with swift flowing, turbulent water. Partially exposed substrate dominated by cobble. Gradient moderate (less than 4 percent).
High Gradient Riffle	Moderately deep with swift flowing, turbulent water. Partially exposed substrate dominated by boulder. Gradient steep (greater than 4 percent).
Cascade	Steep "riffle" consisting of small waterfalls and shallow pools or pockets, substrate usually composed of bedrock and boulders. Gradient high (greater than 4 percent).
Run/Glide	Fairly smooth water surface, low gradient, and few flow obstructions. Mean column velocity generally greater than one foot per second (fps).
Pocket Water	Swift flowing water with large boulder or bedrock obstructions creating eddies or scour holes. Gradient low to moderate.
Pool	Slow flowing, tranquil water with mean column water velocity less than one fps.

Table 3.1-2 provides a summary of the results for the habitat mapping performed during the pedestrian and aerial surveys. The results of the surveys were used to ensure that a sufficient number of PHABSIM transects were placed in the different mesohabitats (e.g., riffle, run, pool) to adequately represent the reach.

Table 3.1-2. Habitat percentage (by length) in UARP reaches surveyed by foot and by air in 2002 and 2003.

Mesohabitat Type	Length of Habitat Type	Percent of Total Mapped Distance
Loon Lake Dam – 9.3 mi (49,104 ft) mapped by pedestrian survey		
Low Gradient Riffle	1.757 mi (9,281 ft)	18.9
High Gradient Riffle	0.725 mi (3,830 ft)	7.8
Cascade	0.967 (5,107 ft)	10.4
Run	2.408 (12,718 ft)	25.9
Pocket Water	0.102 (540 ft)	1.1
Pool	3.338 (17,628 ft)	35.9
Gerle Creek Dam – 1.2 miles (6,336 ft) mapped by pedestrian survey		
Low Gradient Riffle	0.055 mi (292 ft)	4.6
High Gradient Riffle	0 mi (0 ft)	0.0
Cascade	0.217 mi (1,147 ft)	18.1

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Table 3.1-2. Habitat percentage (by length) in UARP reaches surveyed by foot and by air in 2002 and 2003.		
Mesohabitat Type	**Length of Habitat Type**	**Percent of Total Mapped Distance**
Run	0.013 mi (70 ft)	1.1
Pocket Water	0.472 mi (2,496 ft)	39.4
Pool	0.440 mi (2,325 ft)	36.7
Robbs Peak Dam – 5.6 miles (29,568 ft) mapped by aerial survey		
Low Gradient Riffle	1.052 mi (5,559 ft)	18.8
High Gradient Riffle	0.644 mi (3,400 ft)	11.5
Cascade	1.411 mi (7,451 ft)	25.2
Run	0.884 mi (4,675 ft)	15.8
Pocket Water	0.190 mi (1,005 ft)	3.4
Pool	1.411 mi (7,451 ft)	25.2
Ice House Dam – 12.3 miles (64,944 ft) mapped by pedestrian survey		
Low Gradient Riffle	5.362 mi (28,316 ft)	43.6
High Gradient Riffle	0.405 mi (2,143 ft)	3.3
Cascade	0.172 mi (909 ft)	1.4
Run	5.190mi (27,406 ft)	42.2
Pocket Water	0 mi (0 ft)	0.0
Pool	1.1685 mi (6,170 ft)	9.5
Table 3.1-2. (continued)		
Mesohabitat Type	**Length of Habitat Type**	**Percent of Total Mapped Distance**
Junction Dam – 8.3 miles (43,824 ft) mapped by aerial survey		
Low Gradient Riffle	1.444 mi (7,625 ft)	17.4
High Gradient Riffle	0.332 mi (1,753 ft)	4.0
Cascade	1.983 mi (10,474 ft)	23.9
Run	2.282 mi (12,052 ft)	27.5
Pocket Water	0.273 mi (1,446 ft)	3.3
Pool	1.983 mi (10,474 ft)	23.9
Brush Creek Dam – 2.3 miles (12,144 ft) mapped by pedestrian survey		
Low Gradient Riffle	0.503 mi (2,660 ft)	21.9
High Gradient Riffle	0.243 mi (1,287 ft)	10.6
Cascade	0.391 mi (2,065 ft)	17.0
Run	0.441 mi (2,332 ft)	19.2
Pocket Water	0 mi (0 ft)	0.0
Pool	0.719 mi (3,801 ft)	31.3
Slab Creek Dam – 8.0 miles (42,240 ft) mapped by aerial survey		
Low Gradient Riffle	1.512 mi (7,983 ft)	18.9
High Gradient Riffle	1.064 mi (5,618 ft)	13.3
Cascade	0.392 mi (2,070 ft)	4.9
Run	2.304 mi (12,165 ft)	28.8
Pocket Water	0.64 mi (3,379 ft)	8.0
Pool	2.088 mi (11,025 ft)	26.1

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3.2 Study Site and Transect Selection

3.2.1 Reaches and Subreaches for PHABSIM

Accurate modeling of stream reaches with PHABSIM programs requires that certain assumptions be met regarding channel stability, flow characteristics (including sub-critical flow velocities) and associated channel gradient, predictable stage-discharge relationships, etc. Overarching assumptions regarding the reaches that warrant PHABSIM analysis are that: 1) UARP operations are capable of influencing the quantity and/or quality of flow within a specific reach; 2) flows are controllable; and 3) controllable flows and existing minimum instream flow requirements are potentially limiting aquatic resource productivity. If the assumptions are unmet in a particular reach, as for example they would be for headwater streams that are above the influence of any UARP operations, then selecting PHABSIM study sites in that reach is unnecessary.

The suitability of each UARP reach for inclusion in the PHABSIM study was dependent on several factors. These factors included the following, among others: 1) availability of upstream storage and/or control; 2) length of the reach; 3) hydraulic modelability of the reach; 4) reach responsiveness to flow changes; 5) potential for controllable flows to be a limiting factor; 6) safety and accessibility of sites for study; and 7) constraints on access to sites or execution of field tasks.

Each of the 13 UARP reaches in the study area was evaluated using the assumptions and factors discussed above, and designated as either a "Phase 1" reach suitable for immediate initiation of PHABSIM studies, or a "Phase 2" reach where PHABSIM studies were not yet considered appropriate. Potential study sites within a reach were identified based on results of the habitat mapping task, input from the hydrology and geomorphology tasks, and consideration of safety and accessibility.

Portions of the Robbs Peak Dam Reach were too steep to be suitable for PHABSIM analysis, but other portions were considered potentially suitable. Aerial habitat mapping and ground reconnaissance identified the upper portion of the reach (near the Gerle Creek confluence) as sufficiently low gradient and accessible to be suitable for PHABSIM analysis. In March, 2003, the Aquatic TWG decided to establish a PHABSIM site below the Gerle and South Fork Rubicon River confluence, with a few transects placed on the South Fork Rubicon River just below Robbs Peak Dam.

Based on review of topographic maps, hydrologic information, and videotape coverage of the river and canyon, reaches below Junction Dam and below Camino Dam were considered similar enough in terms of channel characteristics and flow regime to be combined into one study reach.

Thus, the Aquatic TWG determined that the following six "Phase 1" reaches were suitable for immediate initiation of PHABSIM studies:

- Loon Lake Dam Reach (Gerle Creek downstream of Loon Lake)

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- Robbs Peak Dam Reach (S.F. Rubicon River downstream of the Gerle Creek confluence; S.F. Rubicon River above the Gerle Creek confluence)
- Ice House Dam Reach (South Fork Silver Creek downstream of Ice House Reservoir)
- Junction Dam and Camino Dam Reaches (Silver Creek downstream of Junction Reservoir and Camino Reservoir)
- Slab Creek Dam Reach (S.F. American River downstream of Slab Creek Reservoir)

Seven "Phase 2" reaches were not initially included for PHABSIM analysis for a variety of reasons. Limited upstream control at Rubicon Reservoir restricts flow management actions in the Rubicon River Reach, Rubicon Tunnel Outlet Reach, Rockbound Dam Reach, and Buck Island Dam Reach. In addition, the Rubicon Tunnel Outlet Reach (a constructed channel) and Rockbound Dam Reach are quite short. As a result, these reaches were not included in the PHABSIM analysis.

The Gerle Creek Dam Reach was relatively short for an independent PHABSIM analysis. However, in March 2003, the Aquatic TWG decided to include a few transects in this reach to supplement a larger study site below the confluence of Gerle Creek and South Fork Rubicon River.

Much of the Brush Creek Dam Reach is over 9% gradient, and is dominated by stream habitat types that are either unmodelable or unresponsive to flow change (e.g., cascades, high gradient riffles, deep pools). Habitat mapping of the reach was conducted to provide information about the suitability of the reach for application of PHABSIM methods. In September, 2003, the Aquatic TWG decided to establish a PHABSIM site with transects in the upper portion of the reach, within a half-mile of the dam, in order to provide at least limited data on habitat and flow relationships in that area.

The South Fork American River Reach downstream of the Silver Creek confluence was already addressed by a prior instream flow study for EID Project 184.

Thus, two additional "Phase 2" reaches were included in the PHABSIM analysis:

- Gerle Creek Dam Reach (Gerle Creek downstream of Gerle Reservoir)
- Brush Creek Dam Reach (Brush Creek downstream of Brush Creek Dam)

Study site names and locations for all the PHABSIM sites are listed in Table 3.2-1, and a map is provided in Figure A-1.

Table 3.2-1. Upper American River Project PHABSIM study site locations, 2003.

Stream	Reach	Site Name	Site Description	UTM (NAD 27) Upper Transect		UTM (NAD 27) Lower Transect	
				Easting	Northing	Easting	Northing
Gerle Creek	Loon Lake Dam	Wentworth Springs	Gerle Creek at Wentworth Springs	730415	4321279	730349	4321332
Gerle Creek	Loon Lake Dam	Gerle Meadow	Gerle Creek at Gerle Meadow	729219	4321299	729155	4321314

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Table 3.2-1. Upper American River Project PHABSIM study site locations, 2003.

Stream	Reach	Site Name	Site Description	UTM (NAD 27) Upper Transect		UTM (NAD 27) Lower Transect	
				Easting	Northing	Easting	Northing
Gerle Creek	Loon Lake Dam	Below Ice House Bridge	Gerle Creek Below Ice House Road Bridge	726230	4317921	726080	4317878
Gerle Creek	Gerle Creek Dam	Lower Gerle	Upstream of S.F. Rubicon River confluence	726015	4314998	725995	4314950
S.F. Rubicon	Robbs Peak Dam	Upper S.F. Rubicon	Upstream of Gerle Creek confluence	725771	4314117	725720	4314045
S.F. Rubicon	Robbs Peak Dam	Lower S.F. Rubicon	Downstream of Gerle Creek confluence	724019	4314605	723869	4314791
S.F. Silver Creek	Ice House Dam	Upper S.F. Silver	Silver Creek Campground	727478	4299499	727116	4299352
S.F. Silver Creek	Ice House Dam	Lower S.F. Silver	Near Bryant Springs	722123	4302061	722433	4302248
Silver Creek	Junction Dam	Silver Creek	Approximately 1 mi below dam	719244	4302555	719137	4302711
Brush Creek	Brush Creek Dam	Brush Creek	Approximately 0.25 mi below dam	706385	4298267	706382	4298222
S.F. American	Slab Creek Dam	S.F. American River (SFAR)	Near Rock Creek confluence	693428	4294874	692758	4294816

Certain of the study reaches required sub-reach delineation and evaluation. Subreach segmentation was based primarily on changes in stream gradient (associated with geomorphic condition) and/or hydrology that may cause habitat types in one subreach to display significant hydraulic differences from the same habitat type in another subreach (e.g., low gradient riffles in one subreach have consistently greater depth or velocity than low gradient riffles in another subreach). Significant tributary inflow within a reach was the hydrological basis for subreach segmentation. Proposed subreach delineations were presented during TWG meeting discussions regarding site selection (see Appendix A figures), and finalized with TWG concurrence of study sites.

Three subreaches were delineated for the Loon Lake Dam Reach of Gerle Creek. The upper subreach (Wentworth Springs) extends from Loon Lake Dam to Gerle Meadow. This subreach has the lowest flows, and a generally steeper gradient than other portions of the reach (Appendix A), although there are some lower gradient sections. The Gerle Meadow subreach is in the middle, and has very flat topography with seasonal inflows from Jerrett Creek. The lowest subreach (Gerle Creek below Ice House Road Bridge) has higher flows due to inflow from Barts, Dellar, and Rocky Basin creeks, and a steeper gradient. For modeling purposes, pool habitats in the upper subreach were represented by pool transects placed in the middle (Gerle Meadow) subreach.

Two subreaches were identified for the Robbs Peak Dam Reach. The upper subreach is short, and extends downstream to the Gerle Creek confluence. The lower subreach extends from the

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Gerle Creek confluence to confluence with the Rubicon River. However, the portion of this subreach beginning in a steep gorge approximately 2 miles downstream of the Gerle Creek confluence, was excluded from consideration for PHABSIM site selection due to the high gradient and inaccessibility.

Two subreaches were identified in the Ice House Dam Reach. The upper subreach was steeper, more confined, and dominated by boulder and bedrock substrates. The lower subreach was wider, flatter, and less confined, and had smaller substrates and more accretion. It also corresponded closely with the boundaries of the 1992 Cleveland Fire area.

Habitat in the Camino Dam Reach was modeled using results from transects placed in the Junction Dam Reach.

Areas for potential study sites were identified that contained the full complement of necessary (representative) habitat unit types in a safely accessible section of stream. Potential study site areas (Appendix A) were confirmed or modified in consultation with the Aquatic TWG. Study sites were finalized during field visits by the TWG members prior to transect selection (Appendix A).

3.2.2 Transect Selection

Representative transects were selected based upon percentage of existing major habitat type (e.g., length >10 -15% of reach) within selected stream reaches. Major habitat types include riffles, runs, pools, and pocket water. A sufficient number of transects to model approximately three replicates of each major habitat type in each reach or subreach were chosen at each sampling location. Up to three transects per habitat replicate were considered, with the assumption that hydraulically homogeneous habitat types (i.e., riffles and runs) required relatively fewer transects per replicate and relatively heterogeneous habitat types (i.e., pools and pocket water) required relatively more transects per replicate. The final number of transects chosen for each site was dependent on habitat complexity as well as target resource values.

Within each study site, transects were established by randomly selecting a starting habitat unit. From the starting habitat unit, transects were established in adjacent units (heading upstream or downstream) until the requisite transects are placed in the specified habitat units. Transect selection was completed as a collaborative field effort that included members of the TWG. Transects were placed in a stratified random manner, subject to professional judgment, with participation and concurrence of the TWG members.

"Critical" habitat transects (i.e., special transects placed for evaluation of specific habitat areas, separate from representation of the overall reach) were placed, where warranted, in sensitive or critical habitat areas in order to analyze specific habitat/flow conditions at a desired (not random) location. For this study, two transects were placed in a designated spawning riffle at the Upper S.F. Silver Creek site.

Table 3.2-2 lists transects used in the study by sampling location (subreach) and habitat type. Study locations are presented in Appendix Figure A-1.

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Table 3.2-2. Transect placement by sample location and habitat type.				
Stream	**Reach**	**Site**	**Habitat Type**	**Number of Transects**
Gerle Creek	Loon Lake Dam	Gerle Creek at Wentworth Springs	Low Gradient Riffle	2
			Run	2
Gerle Creek	Loon Lake Dam	Gerle Creek at Gerle Meadow	Run	4
			Pool	6
Gerle Creek	Loon Lake Dam	Gerle Creek below Ice House Bridge	Low Gradient Riffle	4
			Run	6
Gerle Creek	Gerle Creek Dam	Lower Gerle Creek	Pool	3
			Pocket Water	2
S.F. Rubicon River	Robbs Peak Dam	Upper S.F. Rubicon River	Low Gradient Riffle	2
			Run	3
S.F. Rubicon River	Robbs Peak Dam	Lower S.F. Rubicon River	Low Gradient Riffle	2
			Run	2
			Pool	4
S.F. Silver Creek	Ice House Dam	Upper S.F. Silver Creek	Low Gradient Riffle	1
			Run	4
			Pool	4
			Spawning	2
S.F. Silver Creek	Ice House Dam	Lower S.F. Silver Creek	Low Gradient Riffle	3
			Run	4
Silver Creek	Junction Dam	Silver Creek	Low Gradient Riffle	4
			Run	4
			Pool	5
Brush Creek	Brush Creek Dam	Brush Creek	Low Gradient Riffle	3
			Run	2
			Pool	2
South Fork American River	Slab Creek Dam	S.F. American River at Rock Creek	Low Gradient Riffle	3
			Run	5
			Pool	4

Based on the habitat mapping results (Table 3.1-2), each habitat type where transects were placed represents a percentage of the total subreach. Table 3.2-3 lists the percentage of habitat types by subreach for habitat types being modeled. These percentages were used to "scale" model output for the subreach by multiplying habitat-specific model results by the percentage of that habitat type found in the subreach, and summing the different habitat type results to get the total habitat for the subreach.

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Table 3.2-3. Percentage of modeled habitat types represented at PHABSIM sites.*				
Stream	**Reach**	**Site**	**Habitat Type**	**Habitat Percentage**
Gerle Creek	Loon Lake Dam	Gerle Creek at Wentworth Springs	Low Gradient Riffle	34.1
			Run	43.0
Gerle Creek	Loon Lake Dam	Gerle Creek at Gerle Meadow	Run	22.7
			Pool	72.8
Gerle Creek	Loon Lake Dam	Gerle Creek below Ice House Bridge	Low Gradient Riffle	28.6
			Run	18.5
Gerle Creek	Gerle Creek Dam	Lower Gerle Creek	Pool	36.7
			Pocket Water	39.4
S.F. Rubicon River	Robbs Peak Dam	Upper S.F. Rubicon River	Low Gradient Riffle	29.8
			Run	23.4
S.F. Rubicon River	Robbs Peak Dam	Lower S.F. Rubicon River	Low Gradient Riffle	16.0
			Run	13.9
			Pool	25.7
S.F. Silver Creek	Ice House Dam	Upper S.F. Silver Creek	Low Gradient Riffle	35.0
			Run	31.9
			Pool	25.0
			Spawning	n/a
S.F. Silver Creek	Ice House Dam	Lower S.F. Silver Creek	Low Gradient Riffle	46.6
			Run	45.9
Silver Creek	Junction Dam	Silver Creek	Low Gradient Riffle	17.4
			Run	27.5
			Pool	23.9
Brush Creek	Brush Creek Dam	Brush Creek	Low Gradient Riffle	27.5
			Run	29.0
			Pool	20.9
South Fork American River	Slab Creek Dam	S.F. American River at Rock Creek	Low Gradient Riffle	18.9
			Run	28.8
			Pool	26.1

*Note that because not all habitat types present were modeled, totals will not equal 100 percent.

3.3 Field Methods

Field measurements were made at each sampling location under three flow scenarios (low, mid, and high) following established Instream Flow Incremental Methodology (IFIM) techniques for transect sampling using the single-velocity IFG-4 model (Bovee and Milhous 1978; Bovee 1982; Milhous et al. 1989). Velocity calibration at each transect was conducted at the highest flow that was safely workable. In most cases, mid- and high-flow datasets were collected in late May and early June 2003, and low-flow datasets collected in July 2003. The sampling design dictated that water surface elevation data be collected at each flow, and water velocity data collected at the high flow. Substrate and cover data were generally gathered at the lowest flow.

Study sites were established with permanent benchmarks and transect endpoints. Transect endpoints (headstakes) consisted of rebar or stout nails pounded into tree bases or drilled in boulders or bedrock. Benchmark and transect locations were recorded with a GPS, where feasible. GPS coordinates of each study site are included in Table 3.2-1.

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A series of temporary staff gages were installed along the bank in order to confirm that flows were stable during field data collection. The gages were checked regularly during collection of water surface elevation and velocity data.

Data collected at each transect can be grouped into two categories: transect-specific and cell-specific. A brief discussion of each of these categories follows below.

3.3.1 Transect-specific Data

The elevations of headstakes were surveyed using a level and stadia rod at each flow to serve as a reference for water surface elevations and other transect specific data. Headstake elevations were referenced to one of a series of benchmarks (each with an arbitrarily defined elevation of 100.00 ft) established along the bank. Multiple headstakes were surveyed at each flow so their relative elevations could be compared against each other and against the bed elevations in the event that one of the headstakes had moved between sampling events. Surveying level loops were closed among closely grouped transects, and tied to a common benchmark where feasible.

Water surface elevations were surveyed at or near the edge of water at both banks. Elevations were also surveyed at additional points along the transect line where the water surface differed from that at the water's edges by more than 0.10 ft.

Stage-of-zero-flow was determined for pools, and for runs that were influenced by a downstream hydraulic control. The stage-of-zero-flow was found by surveying the thalweg of the hydraulic control downstream of the transect. For all riffle and run habitats that were not influenced by a downstream hydraulic control, the stage-of-zero-flow was established as the deepest point along the transect.

3.3.2 Cell-specific Data

Cell-specific data consisted of the following parameters: distance from the headstake designated as the zero point, streambed elevation, depth, mean column velocity, substrate, cover, and any station-specific comments.

Linear distances from the headstake (zero point) established the position of the “verticals” or “cells” across each transect. The zero point headstake (left or right) was also recorded on the data sheets for each transect to prevent setting up transects backwards on subsequent sampling activities at the transect.

Streambed elevations (profiles) were surveyed at each cell using a level and stadia rod. The profiles included closely spaced measurements in wetted areas, and in out-of-water areas with breaks in slope. Additional profile measurements were made above the bank-full elevation to facilitate possible geomorphic analyses, and ensure that headpins were located above the water surface of the highest modeled flow. Elevations were referenced to the benchmark whose elevation was arbitrarily set at 100.00 ft to simplify calculations.

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Water depth at each cell was measured using a top-setting wading rod. The mean column velocity at each transect cell was measured with either a Marsh-McBirney or Swoffer flow meter. Mean column velocity measurements were taken at a point 0.6 times the total depth, measured down from the surface, if the depth was less than 2.5 ft. If the depth was equal to or greater than 2.5 ft, two measurements were taken: one at 0.2 times the depth and one at 0.8 times the depth. These measurements were subsequently averaged to compute the mean column velocity. In particularly turbulent cells, measurements were taken at the 0.2, 0.6, and 0.8 depths and mean velocity was calculated using a weighted average (Bovee and Milhous 1978).

Cell-specific comments were also recorded on the data sheets regarding any features of the cell which were thought to be pertinent in analyzing the data or needed to aid in the return to the exact cell location on subsequent sampling efforts. This included information such as the cell being located on the top or side of a boulder, or in a velocity break.

Substrate type was visually assessed for all transect cells using substrate type categories based on a modified Wentworth particle size scale (Bovee and Cochnauer 1977), shown in Table 3.3-1.

Cover was described narratively in field notes at each site and transect (Table 3.3-2) as requested by the Aquatic TWG, but was not used as a channel index in the PHABSIM modeling.

Photographs were taken of each transect at each calibration flow.

Table 3.3-1. Substrate types used in the UARP PHABSIM analysis.

Code	Substrate Description	Particle Size (mm)
1	Organic material	–
1.1	Woody debris	–
2	Mud / Clay	–
3	Silt	–
4	Sand	–
5.1	Small gravel	4-16
5.2	Large gravel	16-64
6	Cobble	64-250
7.1	Rubble	250-400
7.2	Boulder	>400
8	Bedrock	–

3.3.3 Data Management

All field data was collected on data sheets designed specifically for the PHABSIM study. A Quality Control / Quality Assurance (QA/QC) checklist was provided to help assure all necessary data was collected at each site. This list was reviewed in the field prior to leaving the site.

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Field data was entered from data sheets into electronic spreadsheets and then verified against the field data sheets. The electronic spreadsheets were then used for performing calculations and creating formatted input files for the PHABSIM model.

PHABSIM model runs were made with each dataset, using standard procedures for calibration and review of the data. Any irregular hydraulic results were reviewed by other modelers and/or field scientists familiar with the site, and possible adjustments to modeling approaches or parameters investigated.

The model output files were organized by PHABSIM study site (subreach) and habitat type. Model output was copied electronically to spreadsheets organized by study site and habitat type to create report tables and graphics.

Table 3.3-2. Cover descriptions at PHABSIM transects for the SMUD UARP.

Site	Transect	Habitat type	Cover description
Gerle Creek – Loon Lake Dam Reach			
Wentworth Springs	1	LGR	<5% overhanging vegetation
	2	Run	20% overhanging vegetation
	3	Run	10% overhanging vegetation
	4	LGR	10% overhanging vegetation; 5% instream vegetation
Gerle Meadow	1	Pool	10% overhanging vegetation; <5% undercut bank
	2	Run	50% overhanging vegetation
	3	Run	40% overhanging vegetation; 5 % instream vegetation
	4	Pool	10% overhanging vegetation; <5% undercut bank
	5	Pool	30% overhanging vegetation; <5% undercut bank
	6	Run	5% overhanging vegetation; <5% undercut bank
	7	Pool	5% overhanging vegetation; <5% undercut bank
	8	Pool	5% overhanging vegetation
	9	Pool	20% overhanging vegetation
	10	Run	40% overhanging vegetation
Below Ice House Bridge	1	Run	10% overhanging vegetation; 10% boulder cover
	2	Run	25% overhanging vegetation; <5% boulder cover (willlow, alder, pine)
	3	LGR	15% overhanging vegetation; <5% boulder cover
	4	Run	25% overhanging vegetation; 5% boulder cover
	5	Run	40% overhanging vegetation (willow, alder)
	6	LGR	10% overhanging vegetation (willow, alder)
	7	LGR	15% overhanging vegetation (willow, alder)
	8	Run	30% overhanging vegetation (willow, alder, lg pine)
	9	Run	50% overhanging vegetation; 5% boulder cover (willow, alder)
	10	LGR	25% overhanging vegetation (willow, alder, lg pine)
Gerle Creek – Gerle Dam Reach			
Lower Gerle	1	Pool	5% boulder cover
	2	Pocket water	5% boulder cover
	3	Pool	40% boulder cover
	4	Pocket water	15% boulder cover
	5	Pool	30% boulder cover
South Fork Rubicon River – Robbs Peak Dam Reach			
Upper S.F. Rubicon	1	LGR	30% overhanging vegetation; 5% instream vegetation
	2	LGR	30% overhanging vegetation; <5% instream vegetation
	3	Run	30% overhanging vegetation; 5% instream vegetation

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Table 3.3-2. Cover descriptions at PHABSIM transects for the SMUD UARP.			
Site	**Transect**	**Habitat type**	**Cover description**
	4	Run	30% overhanging vegetation; 5% instream vegetation
	5	Run	100% overhanging vegetation
Lower S.F. Rubicon	1	Pool	No significant cover
	2	Pool	No significant cover
	3	Pool	5% overhanging vegetation; <5% boulder cover
	4	Pool	5% overhanging vegetation
	5	Run	No significant cover
	6	LGR	5% boulder cover
	7	Run	10% boulder cover
	8	LGR	15% overhanging vegetation
South Fork Silver Creek – Ice House Dam Reach			
Upper S.F. Silver	1	Run	<5% boulder cover
	2	Run	No significant cover
	3	LGR	5% boulder cover; <5% instream vegetation
	4	Pool	5% overhanging vegetation
	5	Pool	5% boulder cover
	6	Run	15% overhanging vegetation; 5% boulder cover
	7	Run	<5% overhanging vegetation; 5% boulder cover
	8	Pool	No significant cover
	9	Pool	10% overhanging vegetation; 5% undercut bank
	10	LGR	5% overhanging vegetation; <5% wood
	11	LGR	15% overhanging vegetation
Lower S.F. Silver	1	Run	No significant cover; <5% instream vegetation, <5% boulder cover
	2	Run	No significant cover
	3	LGR	No significant cover
	4	LGR	No significant cover; <5% overhanging vegetation
	5	LGR	No significant cover; <5% overhanging vegetation
	6	Run	No significant cover; <5% overhanging vegetation
	7	Run	No significant cover; <5% overhanging vegetation, <5% boulder cover
Silver Creek – Junction Dam Reach			
Silver Creek	1	Pool	No significant cover
	2	Pool	No significant cover
	3	Pool	No significant cover
	4	Run	No significant cover
	5	LGR	No significant cover; <5% instream vegetation
	6	Run	No significant cover
	7	Pool	No significant cover
	8	Pool	No significant cover; <5% boulder cover
	9	Run	No significant cover; <5% boulder cover
	10	LGR	No significant cover
	11	Run	No significant cover; <5% boulder cover
	12	LGR	No significant cover; <5% boulder cover
	13	LGR	No significant cover; <5% boulder cover
Brush Creek – Brush Creek Dam Reach			
Upper Brush Creek	1	Run	25% overhanging vegetation
	2	LGR	25% overhanging vegetation
	3	Pool	15% boulder cover
	4	LGR	No significant cover
	5	LGR	20% boulder cover
	6	Run	15% overhanging vegetation

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Table 3.3-2. Cover descriptions at PHABSIM transects for the SMUD UARP.			
Site	**Transect**	**Habitat type**	**Cover description**
	7	Pool	5% boulder cover; <5% bubble cover
South Fork American River – Slab Creek Dam Reach			
S.F. American River	1	Run	No significant cover
	2	Run	5% overhanging vegetation, 20% boulder cover
	3	LGR	5% boulder cover
	4	LGR	10% boulder cover
	5	Run	No significant cover
	6	Run	No significant cover : <5% overhanging vegetation, <5% boulder cover
	7	Run	5% overhanging vegetation, 5% boulder cover
	8	Pool	5% overhanging vegetation, <5% boulder cover
	9	Pool	5% boulder cover
	10	Pool	15% overhanging vegetation, <5% boulder cover
	11	Pool	5% boulder cover
	12	LGR	No significant cover; boulder <5%

3.4 Data Reduction and Hydraulic Simulation

3.4.1 Calibration Flows

Target calibration flows were initially selected with the goal of having relatively even spacing of flows along a log scale, starting from the current minimum flow up to the greater of: a) approximately 4-5 times the current minimum flow (subject to safety considerations and feasibility), or b) 10-20 cfs. These ranges were operationally feasible, allowed for some overlap of hydraulic predictions from each calibration data set, and concentrated the data collection on flow ranges where future flow regime discussions were likely to be focused. They also maximized the potential to make velocity calibration measurements at the highest flow. These general guidelines for target calibration flows were subsequently modified by the Aquatic TWG, as necessary to facilitate flow simulation goals, and were included in the final study plan.

Calibration flows were developed for each transect within the simulation model using water surface and bed elevations along with velocity data from the different transects. For the high-flow data set where flows were measured at each transect, the calibration flow for the entire site was computed by averaging results from all transects. For the low-flow and mid-flow data sets, an average flow was calculated from available flow measurement transects. The only exception to this procedure was at the Gerle Creek site below Ice House Bridge in the Loon Lake Dam Reach, where flows at each transect were measured during mid-flow rather than high flow. Calibration flows for each of the streams are documented in Table 3.4-1.

Table 3.4-1. Calibration flows for the UARP PHABSIM analysis.			
Stream Reach / Site	**Low flow (cfs)**	**Middle flow (cfs)**	**High flow (cfs)**
Loon Lake Dam / Gerle Creek below Ice House Bridge	11.13	34.41	131.37
Loon Lake Dam / Gerle Creek at Gerle Meadow	10.03	20.74	40.20
Loon Lake Dam / Gerle Creek at Wentworth Springs	10.82	21.93	37.43

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Table 3.4-1. Calibration flows for the UARP PHABSIM analysis.			
Stream Reach / Site	**Low flow (cfs)**	**Middle flow (cfs)**	**High flow (cfs)**
Gerle Creek Dam / Lower Gerle Creek	7.25	12.43	18.84
Robbs Peak Dam / Lower S.F. Rubicon	23.36	27.85	50.72
Robbs Peak Dam / Upper S.F. Rubicon	3.98	7.49	17.06
Ice House Dam / Lower S.F. Silver Creek	31.31	49.65	76.27
Ice House Dam / Upper S.F. Silver Creek	23.98	28.36	53.41
Junction Dam / Silver Creek	20.27	45.25	97.84
Slab Creek Dam / S.F. American River	41.32	71.77	155.21
Brush Creek Dam / Brush Creek	3.86	8.86	17.55

3.4.2 Hydraulic Simulation Range

Flows were simulated from approximately 0.5 times the low calibration flow to approximately 2.5 times the high calibration flow on each stream, with the exception of the Gerle Creek site below Ice House Road Bridge in the Loon Lake Dam Reach. Since the mid-flow was used for calibration velocities at the Gerle Creek site below Ice House Road Bridge, simulated high flows were only extrapolated up to approximately 150 cfs (just above the highest calibration flow).

3.4.3 Water Surface Elevation Level Prediction

Hydraulic simulations of water surface elevation and cell velocities were conducted using a version of the PHABSIM models (Milhous et al. 1989) developed by Dr. Thomas Hardy (PHABWin-2002). These models allow for a variety of stage and velocity prediction techniques. The primary feature of the single-velocity version of the IFG-4 submodel is its ability to simulate a broad range of flow conditions for each transect with a single set of velocity data. A key element of the model that influences the range of simulation is the stage/discharge relationship. This relationship represents the change in stream stage, or water surface elevation, at each transect as a function of streamflow. The stage/discharge relationship can be defined in the PHABSIM model in several different ways, including regression analysis or through an energy-balancing approach. For the current study, the regression analysis of the IFG-4 submodel was selected as the means of predicting stage because of the potential limitation of the energy-balancing approach, where transects must be hydraulically linked. The random sampling design employed in this study would preclude the use of transects that were linked in this way.

Water surface elevation predictions were calibrated at each transect by specifying an observed water surface elevation, within the range of measured values, which resulted in the lowest stage prediction error. In most cases, the average of all the measured values (i.e., right bank and left bank, and sometimes mid-channel) was specified as the "observed" stage, but in some cases the use of a right or left bank measurement resulted in a better simulation. It should be noted that the "best" calibration of stage in some cases can result in less accurate predictions of cell velocities, so trade-offs between the two variables are sometimes necessary. A summary of the stage predictions for each transect at the calibration flows is presented in Table 3.4-2. Measured

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versus predicted river stage and regression summary statistics for each transect in the Physical Habitat Simulation study are provided electronically in the supporting appendices.

Table 3.4-2. Stage prediction errors for the SMUD UARP PHABSIM analysis.

Site	Habitat Type	Transect Number	Stage Prediction Error (ft)		
			Low Flow	Middle Flow	High Flow
Gerle Creek at Wentworth Springs	Low Gradient Riffle	1	0.00	0.01	0.01
	Run	2	0.00	0.00	0.00
	Run	3	0.00	0.01	0.00
	Low Gradient Riffle	4	0.00	0.01	0.01
Gerle Creek at Gerle Meadow	Run	1	0.00	0.00	0.00
	Run	2	0.00	0.00	0.01
	Run	3	0.01	0.01	0.01
	Pool	4	0.01	0.02	0.01
	Pool	5	0.00	0.01	0.01
	Run	6	0.01	0.03	0.01
	Pool	7	0.01	0.03	0.03
	Pool	8	0.00	0.01	0.01
	Pool	9	0.02	0.04	0.02
	Run	10	0.02	0.05	0.02
Gerle Creek Below Ice House Bridge	Run	1	0.00	0.01	0.00
	Run	2	0.01	0.02	0.02
	Low Gradient Riffle	3	0.00	0.01	0.01
	Run	4	0.02	0.05	0.02
	Run	5	0.02	0.04	0.02
	Low Gradient Riffle	6	0.01	0.01	0.00
	Low Gradient Riffle	7	0.00	0.00	0.00
	Run	8	0.01	0.02	0.01
	Run	9	0.01	0.02	0.02
	Low Gradient Riffle	10	0.00	0.02	0.02
Lower Gerle Creek	Pocket Water	1	0.00	0.00	0.00
	Pocket Water	2	0.00	0.01	0.01
	Pool	3	0.01	0.04	0.03
	Pool	4	0.00	0.03	0.03
	Pool	5	0.00	0.03	0.02
Upper S.F. Rubicon River	Low Gradient Riffle	1	0.01	0.02	0.01
	Low Gradient Riffle	2	0.01	0.00	0.00
	Run	3	0.01	0.02	0.01
	Run	4	0.01	0.02	0.01
	Run	5	0.01	0.02	0.02
Lower S.F. Rubicon River	Pool	1	0.01	0.02	0.00
	Pool	2	0.01	0.02	0.01
	Pool	3	0.01	0.02	0.01
	Pool	4	0.03	0.05	0.02
	Run	5	0.03	0.06	0.03
	Low Gradient Riffle	6	0.01	0.02	0.00
	Run	7	0.02	0.05	0.02
	Low Gradient Riffle	8	0.00	0.00	0.01
Upper S.F. Silver	Run	1	0.01	0.02	0.00

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Table 3.4-2. Stage prediction errors for the SMUD UARP PHABSIM analysis.

Site	Habitat Type	Transect Number	Stage Prediction Error (ft)		
			Low Flow	Middle Flow	High Flow
	Run	2	0.02	0.02	0.00
	Low Gradient Riffle	3	0.01	0.02	0.00
	Pool	4	0.01	0.01	0.00
	Pool	5	0.02	0.02	0.00
	Run	6	0.02	0.04	0.03
	Run	7	0.02	0.05	0.03
	Pool	8	0.02	0.03	0.02
	Pool	9	0.03	0.04	0.02
	Spawning	10	0.00	0.01	0.00
	Spawning	11	0.01	0.01	0.00
Lower S.F. Silver Creek	Run	1	0.00	0.01	0.00
	Run	2	0.00	0.00	0.00
	Low Gradient Riffle	3	0.00	0.01	0.00
	Low Gradient Riffle	4	0.01	0.01	0.01
	Low Gradient Riffle	5	0.01	0.01	0.01
	Run	6	0.00	0.00	0.00
	Run	7	0.01	0.00	0.00
Junction	Pool	1	0.00	0.00	0.01
	Pool	2	0.02	0.05	0.04
	Pool	3	0.02	0.07	0.05
	Run	4	0.01	0.02	0.01
	Low Gradient Riffle	5	0.01	0.01	0.01
	Run	6	0.00	0.02	0.01
	Pool	7	0.00	0.01	0.01
	Pool	8	0.00	0.00	0.00
	Run	9	0.01	0.02	0.02
	Low Gradient Riffle	10	0.04	0.08	0.03
	Run	11	0.00	0.01	0.00
	Low Gradient Riffle	12	0.01	0.03	0.02
	Low Gradient Riffle	13	0.02	0.06	0.05
Brush Creek	Run	1	0.01	0.00	0.00
	Low Gradient Riffle	2	0.00	0.00	0.00
	Pool	3	0.01	0.00	0.00
	Low Gradient Riffle	4	0.01	0.03	0.01
	Low Gradient Riffle	5	0.00	0.01	0.00
	Run	6	0.00	0.01	0.01
	Pool	7	0.00	0.01	0.01
S.F. American River	Run	1	0.01	0.01	0.00
	Run	2	0.00	0.01	0.01
	Low Gradient Riffle	3	0.01	0.01	0.00
	Low Gradient Riffle	4	0.03	0.05	0.02
	Run	5	0.00	0.01	0.00
	Run	6	0.00	0.01	0.00
	Run	7	0.02	0.04	0.02
	Pool	8	0.01	0.03	0.01
	Pool	9	0.00	0.02	0.01
	Pool	10	0.00	0.01	0.00
	Pool	11	0.00	0.02	0.01
	Low Gradient Riffle	12	0.02	0.04	0.03

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3.4.4 Velocity Prediction

The second major element of the single-velocity IFG-4 submodel is the prediction of mean column velocity at each cell, or station, along the transect. This is accomplished by invoking a modified version of the Manning equation:

$$v = 1.49/n * d^{2/3} * s^{1/2}$$

where

n	=	roughness coefficient of transect cell, dimensionless
v	=	mean column velocity for transect cell, ft per second
d	=	mean depth for transect cell, ft
s	=	slope of the energy gradient.

Cell-specific velocities measured at calibration discharges are applied to the Manning equation to predict 'n,' the roughness coefficient. During simulation, the roughness coefficient and velocity term in the equation are interchanged, and velocity is predicted over a range of streamflows as mean depth, 'd,' increases and roughness is held constant. This computation belies real conditions, however, as roughness is known to change with different streamflows. To incorporate this change, adjustments are made to all predicted velocity values, using the formula:

$$VAF = Q\ comp / Q\ sim$$

where

VAF	=	Velocity Adjustment Factor
Q comp	=	streamflow computed by summing cell-specific flow
Q sim	=	simulation streamflow.

A separate velocity adjustment factor is computed for each simulation flow.

Velocity simulations were evaluated by comparing measured and predicted cell velocities, and by reviewing the shape and dynamics of the transect specific VAF values. Results were reviewed to determine whether the VAF curves exhibited a monotonic pattern rising from a value of less than 1.0, passing 1.0 near the calibration discharge value, and rising to a high value of less than 5.0. Transects exhibiting deviations from this pattern were inspected for errors in water surface elevation and stage-of-zero-flow estimates. Measured and simulated depths, velocities, computed roughness coefficients, and VAF values are provided electronically in the supporting appendices.

3.4.5 Roughness Coefficients

One of the difficulties encountered in using the single-velocity IFG-4 submodel is the assignment of roughness coefficients to transect cells that were not underwater at the calibration

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discharge volume. Generally, this includes transect cells on the banks of the stream or on islands. When the model predicts high water surface elevations at the upper range of simulated discharges, the roughness coefficients that are assigned to these cells may have a significant effect on predictions of fish habitat. Unless values for the roughness coefficient for these cells are supplied during model simulation, the default feature of the single-velocity model is to use a nearest "wet" neighbor value for any out-of-the-water cells. This means that roughness coefficients calculated for transect cells on the edge of the stream are used to assign roughness values for cells on the stream bank.

The problem that often arises in this situation is that the cells on the edge of the stream often exhibit low velocities, due more to an edge effect than to the roughness characteristic of the cell itself. These low velocities, often coupled with shallow depth, result in unreasonably high roughness values for the edge cells, which then become projected to the out-of-the-water cells on the stream bank.

This occurrence was avoided in simulations for the PHABSIM in three ways. The first was to collect velocity data at a sufficiently high calibration flow that the wetted area under the transect is near its maximum width. Although velocity data was collected at the middle flow (versus a high flow) at one site, the stream channel was typically so confined that wetted width did not appreciably increase at modestly higher flows. Secondly, a maximum roughness coefficient, or "cap," was placed on some transects when some of the calculated roughness coefficients were so large that no appreciable velocity could ever be simulated. Thirdly, roughness coefficients were manually entered for selected cells, via professional judgment, to provide reasonable simulated velocities at that cell and maintain a good fit of velocity distribution over the entire transect.

3.4.6 Hydraulic Simulation Quality

The hydraulic simulation results for the UARP area streams were generally good. Selected transects on various streams exhibited some hydraulic simulation irregularities, although these irregularities were not serious enough to warrant dropping any transects from the analysis. These transects included: transect 4 at the lower Gerle Creek site; transect 6 at the Upper S.F. Silver Creek site; transect 12 at the Silver Creek site; transect 7 on Gerle Creek below Ice House Road Bridge; transect 2 at the Upper S.F. Rubicon site; transect 4 at the Slab Creek Dam SFAR site; and transect 7 on Brush Creek. The irregularities occurred largely as a result of transect placement in hydraulically complex areas that are not as accurately modeled using the PHABSIM system. In some cases flows were in high velocity areas where stream depths were relatively shallow even at higher flows, or were in areas where shifts in the velocity distribution occurred between flows. All of these transects were calibrated to give the best possible hydraulic simulation with the available data, and the results were considered sufficiently accurate to include in the overall analysis.

Hydraulic simulation accuracy typically begins to decline between 2 and 2.5 times the high calibration flow. Despite some reduction in accuracy at the highest simulated flows, flows greater than 2 times the highest calibration flow were simulated to facilitate the time series

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analysis and achieve the simulation range goals requested by the Aquatic TWG. Results at the upper end of the simulated flow range are potentially less accurate than results at lower flows.

3.4.7 Habitat Simulation

The HABTAE model was used to integrate the hydraulic simulation results with the HSC, resulting in calculation of WUA for each simulated flow. The HABTAE program defines the habitat computational cell as centered on the vertical where velocity measurements are made.

Dominate and subdominant substrate data were combined to define a single "channel index" (CI) value for each cell. The CI value for each cell consisted of a decimal value where the integer represented the code for dominant substrate, and the decimal portion represented the subdominant substrate. Due to the fact the some substrate codes contained decimal values (see Table 3.3-1), a conversion was made to allow the data to fit the CI format used by the model. The formula to convert substrate codes was to multiply the dominate substrate code by 10, divide the subdominant substrate by 10, then sum the two values. For example, if the dominate substrate was boulder (code 7.2) and the subdominant substrate was small gravel (code 5.1), the resulting CI value would be (7.2 x 10) + (5.1 / 10) and represented as 72.51. Both the simplified substrate suitability curve approved by the Aquatic TWG and the more complex CI coding are documented in Appendix B.

Appropriate weighting factors for each transect, and distances between transects, were included in the HABTAE model input in order to properly extrapolate the results. The proportions (percentages) for each transect within a habitat type are presented in Table 3.4-3, and are included in the HABTAE model input structure. The percentage for all transects representing a habitat type (e.g., "pool") in a subreach sum to 100. The relative contribution of different transects is therefore reflected in the "raw" output from the HABTAE model for each habitat type. The HABTAE model output values by habitat type were then multiplied by the proportion of that habitat type in the reach or subreach (from Table 3.2-3), and summed to provide WUA for the entire reach or subreach.

Table 3.4-3. Transect weighting by habitat type for the SMUD UARP PHABSIM analysis.

Site	Habitat Type	Transect Number	Transect Weight by Habitat Type (%)
Gerle Creek at Wentworth Springs	Low Gradient Riffle	1	50
	Run	2	50
	Run	3	50
	Low Gradient Riffle	4	50
Gerle Creek at Gerle Meadow	Pool	1	25
	Run	2	16.65
	Run	3	16.65
	Pool	4	12.5
	Pool	5	12.5
	Run	6	33.3
	Pool	7	25
	Pool	8	12.5
	Pool	9	12.5
	Run	10	33.3

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Table 3.4-3. Transect weighting by habitat type for the SMUD UARP PHABSIM analysis.			
Site	**Habitat Type**	**Transect Number**	**Transect Weight by Habitat Type (%)**
Gerle Creek below Ice House Bridge	Run	1	16.65
	Run	2	16.65
	Low Gradient Riffle	3	33.3
	Run	4	16.65
	Run	5	16.65
	Low Gradient Riffle	6	16.65
	Low Gradient Riffle	7	16.65
	Run	8	16.65
	Run	9	16.65
	Low Gradient Riffle	10	33.3
Lower Gerle Creek	Pocket Water	1	50
	Pocket Water	2	50
	Pool	3	33.3
	Pool	4	33.3
	Pool	5	33.3
Upper S.F. Rubicon River	Low Gradient Riffle	1	50
	Low Gradient Riffle	2	50
	Run	3	33.3
	Run	4	33.3
	Run	5	33.3
Lower S.F. Rubicon River	Pool	1	25
	Pool	2	25
	Pool	3	25
	Pool	4	25
	Run	5	50
	Low Gradient Riffle	6	50
	Run	7	50
	Low Gradient Riffle	8	50
Upper S.F. Silver Creek	Run	1	16.65
	Run	2	16.65
	Low Gradient Riffle	3	100
	Pool	4	25
	Pool	5	25
	Run	6	33.3
	Run	7	33.3
	Pool	8	25
	Pool	9	25
	Spawning	10	50
	Spawning	11	50
Lower S.F. Silver Creek	Run	1	16.65
	Run	2	16.65
	Low Gradient Riffle	3	33.3
	Low Gradient Riffle	4	33.3
	Low Gradient Riffle	5	33.3
	Run	6	33.3
	Run	7	33.3
Junction	Pool	1	33.3
	Pool	2	16.5
	Pool	3	16.5
	Run	4	25

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Table 3.4-3. Transect weighting by habitat type for the SMUD UARP PHABSIM analysis.			
Site	**Habitat Type**	**Transect Number**	**Transect Weight by Habitat Type (%)**
	Low Gradient Riffle	5	33.3
	Run	6	25
	Pool	7	16.65
	Pool	8	16.65
	Run	9	25
	Low Gradient Riffle	10	33.3
	Run	11	25
	Low Gradient Riffle	12	16.65
	Low Gradient Riffle	13	16.65
Brush Creek	Run	1	50
	Low Gradient Riffle	2	50
	Pool	3	50
	Low Gradient Riffle	4	25
	Low Gradient Riffle	5	25
	Run	6	50
	Pool	7	50
S.F. American River	Run	1	16.65
	Run	2	16.65
	Low Gradient Riffle	3	25
	Low Gradient Riffle	4	25
	Run	5	16.65
	Run	6	16.65
	Run	7	33.3
	Pool	8	25
	Pool	9	25
	Pool	10	25
	Pool	11	25
	Low Gradient Riffle	12	50

3.5 Habitat Suitability Criteria

Habitat suitability criteria for the SMUD UARP were developed by the Aquatic TWG from existing data sources through a collaborative and iterative process during a series of meetings, workshops, and conference calls between February and November 2003. The primary empirical data set upon which the final UARP curves were based is from licensing studies for El Dorado Irrigation District's Project 184. These EID curves were developed for the same primary species (rainbow and brown trout), in the same watershed (South Fork American River), with input from many of the same stakeholders. The iterative process of curve development and finalization, and the resulting HSC curves for use on the SMUD UARP, are presented in Appendix B.

Hardhead were the primary non-trout species for which development of HSC curves was considered. Due to limited availability of data on certain aspects of the life history of this species, additional expert opinion was sought from Dr. Peter Moyle of the University of California at Davis on November 17, 2003. The following points about relevant aspects of hardhead life history were summarized from discussions with Dr. Moyle and review of his recent revision of "Inland Fishes of California."

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- Hardhead adults usually use deep, cooler water for holding, but feed in a variety of habitats including swift waters.
- Hardhead probably spawn in flowing water over gravel beds in riffles, runs, or at the heads of pools.
- Flows for successful spawning in rivers are probably more critical than flows for other life stages; there may also be a relationship between minimum flow required for spawning and temperature.
- Spawning occurs with the declining spring hydrograph and associated changes in water temperature.
- During the daytime adults tend to "cruise" in deeper water, as opposed to holding near some feeding lane.
- There may be significant changes in diel behavior and habitat use, but this is not yet understood.
- The juvenile life stage is not well understood. Young hardhead inhabit shallow edges, backwaters, runs, and riffles; they generally are not found in areas that are highly suitable for adult pikeminnow, presumably to avoid depredation.
- Reservoir level management may be an issue, both for excluding predatory centrarchids (through constraints on spawning) and for maintaining margin habitat for juveniles; the former effect, however, is likely more critical.
- Water temperature seems to be a more important factor than flow, yet exact temperature limits are not yet known. Hardhead prefer streams with summer temperatures exceeding 20°C; lab choice studies indicate a preferred range of 24-28°C.
- Habitat preference for adults (over 15 cm) is for clear, deep pools and runs with slow velocities.
- Generally, the upstream, more riverine portions of reservoirs may be more suitable than the slower, lacustrine habitats, especially in the presence of centrarchid populations.
- Although hardhead habitat use appears to have some relationship with depth and water velocity, it appears to be broad and secondarily limiting.

As a result of the information summarized above, the PHABSIM analysis was not conducted with hardhead HSC, since habitat suitability for hardhead was unlikely to be closely related to changes in depths and velocities modeled with such an approach.

Several of the curves are specific to the size of the stream channel. For the SMUD UARP, stream channel sizes were defined as follows.

- Small channels: Gerle Creek, S.F. Rubicon River, S.F. Silver Creek, Brush Creek
- Medium channels: Silver Creek
- Large channels: S.F. American River

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3.6 Time Series Methods

Habitat time series analyses were performed for all reaches where PHABSIM simulations generated WUA curves. The times series analyses are designed to graphically display WUA dynamics over time for a given species/life stage under different water year types, e.g., wet water years vs. dry water years. A principal value of the habitat time series is that it allows for a visual assessment of when habitat is abundant and when it may be limiting over the course of a water year. Habitat time series analyses are also highly valuable in that they allow for a comparison of habitat under different flow regimes. For example, habitat time series can be generated for the historical flow regime, i.e., the flow regime that has occurred in recent history resulting from the operation of the UARP. A separate habitat time series analysis can be generated for the synthesized unimpaired flow regime. When data exists over the same period of time for both flow regimes, as they do for the UARP (1975-2001), a comparison of the paired habitat time series analyses is possible, which yields useful information for assessing changes in fish habitat associated with the operation of the UARP.

Habitat time series analyses can also be used as an analytical tool for evaluating possible alternative minimum flow regimes. In similar fashion to the comparisons of historical vs. unimpaired described above, a habitat time series analysis comparing a proposed flow regime to that of the unimpaired flow regimes is useful in PM&E development.

The remaining portion of this section describes the analysis that was performed to develop a comparison of habitat time series between the historical vs. unimpaired flow regimes. Each subsection below describes a different step in the process, from developing a hydrologic time series, to converting hydrologic data to habitat data, to computing percent change in total yearly habitat between the historic and unimpaired flow regimes. Section 3.6.4 also describes an Excel spreadsheet available to all Aquatic TWG participants that allows a user to perform comparisons of habitat time series between a used-designated proposed UARP reservoir release schedules and the unimpaired flow regime.

3.6.1 Hydrologic Time Series Analysis

The process to develop time habitat time series analyses starts with the development of a hydrologic time series. The hydrology study that was performed for the UARP relicensing has provided a wealth of data and information on streamflows throughout the UARP system. The hydrology study has generated both historic and unimpaired streamflow information below all project reservoir dams. This information serves as the beginning point for the hydrologic time series analysis. Accretion flows downstream of each project dam have been developed under the hydrology study and serve to augment the hydrologic times series by providing estimates of flow throughout the UARP bypass reaches, which in some cases are greater than 10 miles (see Table 3.1-2). The hydrology study has generated streamflow data as daily averages, and this level of precision was directly transferred into the hydrologic time series analysis.

Because of the high degree of variability in natural streamflow of the UARP area, it was necessary to generate separate hydrologic time series for different water year types. This is

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consistent with the current operations of the UARP, where reservoir releases are governed by water year type. The streamflows in the UARP bypass reaches that have occurred over the period 1975-2001 were the product of water releases made from each UARP reservoir on the basis of total annual inflow to Folsom Lake, as projected by the California Department of Water Resources (Table 3.6-1). In keeping with the conditions controlling reservoir releases, and the resulting bypass reach streamflows, four separate water year types were identified for the hydrologic time series analysis.

Table 3.6-1. Four water year types that governed releases from UARP reservoirs during the historic time period (1975-2001), and the associated DWR projections of total annual inflow to Folsom Lake.

Water Year Type	Total Inflow to Folsom Reservoir (acre-feet per year)
Critical	Less than 1 million
Above Normal	Between 1.0 and 1.499 million
Below Normal	Between 1.5 and 1.999 million
Wet	Greater than 2.0 million

Once the water year types are established, two basic options exist to develop a representative hydrologic time series analysis for each water year type. One option is to select a single water year as a representative of each water year type. This option has two drawbacks. The first is that only a few water years are consistently classified as the same water year type from October through September. The reason for this is that under the current UARP operational regime, release schedules for each reservoir are established in April of each year, based on the April 1 DWR projected total yearly inflow to Folsom Lake. Thus, for a given water year, the first six months (October-March) may be classified as one water year type, with the following six months (April-September) classified as a different water year type. This switching of water year types mid-way through the water year complicates the selection of a single year as representative of any given water year type. A second drawback of the single year representative water year type is that does not make maximum use of the robust hydrologic database available for this analysis.

The second option for developing a representative water year for each water year type, and the one selected for this analysis, makes use of the all the data available for the historical period. Following this option, the first step is to classify all years within the historical database into to one of the four water year types, using the actual DWR April projections for the years 1975-2001. All years of common classification are then grouped together, with some water years represented by the first six months of the year, others by the last six months of the water year, and some by the full water year. From the collection of representative years, a median flow value is calculated for every day of the water year, which yields a single representative flow regime, from October through September, for each water year type. This basic analysis was performed for the historical flow condition as well as the unimpaired condition. The product of this first step of the hydrologic analysis were two sets of four flow regimes at each UARP reservoir, one set for the historical flow condition, reflecting the actual releases from each reservoir, and four flow regimes for the unimpaired condition, reflecting the natural flow that would have occurred without the UARP at each reservoir site.

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As stated above, the hydrologic time series analysis included hydrology data for the period 1974-2001. This complete dataset was not available for the Brush Creek Dam and Junction Dam reaches. For both these reaches, the historic hydrologic record did not include the period 1974-1986. This limited historic record created complications in preparing a hydrologic time series analysis for the Above Normal water year type, where the only representative years falling into this category occurred prior to 1987. Thus, no historic record of reservoir releases for these two sites existed for that water year type. To overcome the limitation, the license-mandated release pattern was used as a surrogate for the historic releases that would have likely occurred during those years.

In keeping with the water flow nodes established throughout the UARP system by the Water Balance Model Subcommittee, the hydrologic time series were expanded to include segments of each bypass reach downstream of the UARP reservoirs. This is an important consideration due to the fact that during several times of the year, particularly winter and spring, accretion flows downstream of UARP reservoirs substantially add to the controlled releases and the unimpaired streamflow at the reservoir sites. It also recognizes that the PHABSIM analysis for many UARP reaches was broken down by subreach, with independent transect placement and WUA results in each subreach (see Section 3.2.1). Accordingly, daily accretion data from the hydrology study were added to the reservoir streamflows (both historic and unimpaired) to compute streamflows at downstream points. The nodes for which independent hydrologic time series were generated, by bypass reach, are provided in Table 3.6-2. At total of 28 nodes, throughout the UARP system, were included in the hydrologic time series analysis.

Table 3.6-2. UARP bypass reach nodes used in development of hydrologic time series information.
Project Bypass Reach and Hydrologic Time Series Analysis Nodes
Loon Lake Dam Reach – Gerle Creek
Below Loon Lake Dam
Below Jerrett Creek
Below Barts/Dellar Creeks
Below Rocky Basin Creek
Above Gerle Creek Reservoir
Robbs Peak Dam Reach – South Fork Rubicon River
Below confluence with Gerle Creek
Above confluence with Rubicon River
Ice House Dam Reach – South Fork Silver Creek
Below Ice House Dam
Below Peavine Creek
Below Windmiller Ravine
Below Big Hill Canyon Creek
Above Junction Reservoir
Junction Dam Reach – Silver Creek
Below Junction Dam
Below Gray Horse Creek
Below Onion Creek
Below Sugar Pine Creek
Above Camino Reservoir
Camino Dam Reach – Silver Creek
Below Camino Dam

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Table 3.6-2. UARP bypass reach nodes used in development of hydrologic time series information.
Project Bypass Reach and Hydrologic Time Series Analysis Nodes
Below Round Tent Creek
Halfway point, below No Name Creek
Above confluence with SFAR
Brush Creek Dam Reach – Brush Creek
Below Brush Creek Dam
Above Slab Creek Reservoir
Slab Creek Dam Reach – South Fork American River
Below Slab Creek Dam
Below Iowa Canyon Creek
At Mosquito Road Bridge
Below Rock Creek
Above White Rock Powerhouse

The combination of historic vs. unimpaired conditions, four different water year types, and 28 hydrologic nodes yielded a total of 224 independent hydrologic time series.

3.6.2 Habitat Time Series

The habitat time series analysis consisted of converting each of the 224 hydrologic time series into a habitat time series for each species/life stage included in the PHABSIM analysis. Thus, each daily flow value of each hydrologic time series was converted into a daily habitat value for each key species and life stage. The flow-to-habitat conversions were limited to a degree by the range of flows simulated in the PHABSIM analysis. This was particularly true of the high flows that existed in the unimpaired hydrologic database. No attempt was made to extend the habitat values above the highest simulated flow of the PHABSIM analysis. Extending habitat values above the highest simulated flow runs the risk of incorrectly assessing habitat at high flows. Changes in streambed geometry not measured in the transect profiles above the highest simulated water surface elevation can alter the calculations of WUA at higher flow levels in a way that cannot be predicted by the PHABSIM model. Thus, despite an apparent downward trend in habitat values as flows reach higher levels, an extension of the WUA curves may produce inaccurate estimates of habitat. Extensions of habitat values below the lowest simulated flow were performed for the purposes of the habitat simulations because they are inherently less likely to reflect inaccurate estimates of habitat. The extensions made to the WUA curves essentially anchored the curves at zero flow and zero habitat. This allows for simulations of the amount of habitat that results from low releases (e.g., Ice House dam releases during winter months) and at unimpaired low summer flow levels (e.g., Loon Lake Reach). Thus, plots of habitat time series analyses exhibit breaks when daily stream flow values exceed the highest simulated flow of the PHABSIM analysis.

The PHABSIM analysis generated WUA curves for different subreaches within the UARP bypass reach. The Loon Lake Dam Reach, for example, contained three separate subreaches, with independent transects and WUA curves, while the Ice House Dam Reach contained two subreaches each with independent transects and WUA curves. In these instances, the appropriate WUA curves were applied to the different hydrologic nodes within the reach.

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A separate habitat time series analysis was performed for adult, juvenile, and spawning life stages of both rainbow and brown trout. This generated a total of 1,344 separate habitat time series plots. The habitat time series plots produced for this analysis extended throughout the entire water year, from October through September. It should be remembered in review of these plots that a periodicity of use by the different species/life stages occurs in the UARP bypass reaches. Specifically, spawning activities by rainbow and brown trout are limited to important months of the water year. Brown trout spawning generally occurs in fall months when water temperatures range between 6-10 C (Moyle 2003). This translates generally to brown trout spawning in the months of October and November. Rainbow trout are spring spawners, generally most active in April, May, and June. Adult and juvenile life stages, while present in UARP bypass reaches year round, are not actively feeding and utilizing the water column (i.e., depths and velocities) during winter months as they are in non-winter months (Bjorn 1971; Campbell and Neuner 1985). Since the standard habitat suitability criteria used in the PHABSIM analysis reflect the non-winter months depth and velocity use patterns, WUA time series analyses during winter months do not realistically portrayal flow/habitat relationships in this period. The comparative analyses described below in Section 3.6.3 treat the issue of periodicity.

3.6.3 Comparing Historic vs. Unimpaired Flow Habitat Time Series

Because of the difficulty in reviewing the large number of habitat time series plots, and visually differentiating between unimpaired vs. historic time series plots, a useful analytical tool is to compare the area under the time series curves between the two flow regimes. The area under a time series curve was developed by simply adding each of the daily WUA values across all days of the water year. This yields an integrated habitat value for the entire water year, in units of WUA-days. In this way, a yearly habitat value can be developed for the unimpaired and the historic results, and a percentage change can be computed. Percentage change was computed as the difference in total yearly habitat between the unimpaired and the historic habitat, with the unimpaired serving as the reference habitat value. Thus, a negative percent change reflects a reduction in overall yearly habitat provided by the historic flow regime compared to the unimpaired flows. Conversely, a positive percent change reflects an increase in overall yearly habitat provided by the historic flow regime.

The comparative yearly habitat value evaluation was conditioned on the days of the year when the flow-to-habitat conversion was possible. As discussed in Section 3.6.2, high flows occurring during the winter or spring months that are outside the range of the habitat simulations result in a break in the habitat time series. This condition more typically occurs during the unimpaired flow condition. For these days, there are no habitat values to add to the estimated total yearly value for the unimpaired flow regime. To ensure comparable results, the equivalent days were not added to the historic WUA time series analysis, even if there were WUA values for those days to add to the total.

As described in Section 3.6.2, habitat time series analyses should consider the periodicity of the species/life stages use patterns of the river. While the habitat time series plots can show habitat for the entire year, the yearly habitat comparative analyses of the different flow regimes should

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take periodicity into consideration. For the purposes of the comparative analysis two sets of computations were performed: 1) adding all days of the year together (Full Year Summary); and 2) adding only those days of the year that represent months when life stages are active in the river (Partial Year Summary). The partial year computation was performed on the basis of the months of activity described in Table 3.6-3.

Table 3.6-3. Months of Use and/or Primary Activity, by species/life stage, used in comparing total yearly habitat between different flow regimes.	
Species/Life Stage	**Months of Use of Primary Activity**
Brown Trout	
Adult	April through November
Juvenile	April through November
Spawning	October and November
Rainbow Trout	
Adult	April through November
Juvenile	April through November
Spawning	April through June

3.6.4 Comparing New PM&E Measure vs. Unimpaired Flow Habitat Time Series

A separate analytical tool was developed that allows for comparisons of the habitat time series between unimpaired flows at project facilities and any set of proposed PM&E flow measures for each of the project facilities. The tool is a set of user-friendly Excel spreadsheets that allow a user to input a set of flow releases, by month and at half-month dates. A separate spreadsheet is available for each of the bypass reaches contained in this report. The spreadsheets perform a similar analysis to that described in the above sections. The only difference is that historic flow information is replaced by actual proposed releases entered by the user. Unimpaired flows and accretion flows are the same. One distinct feature of the "unimpaired vs. PM&E" spreadsheets is that they include five water year types instead of the four historic water year types. The use of five water year types is consistent with the recommendations of the relicensing Water Balance Subcommittee. Table 3.6-4 highlights the different water year types developed by the Water Balance Subcommittee. The hydrologic time series analysis also reflects the subcommittee's proposed timing within the water year of the designation of the water year type.

Table 3.6-4. Five water year types used in the hydrologic time series of the unimpaired vs. PM&E comparative analysis.	
Water Year Type	**Total Inflow to Folsom Reservoir (acre-feet per year)**
Critical	Less than 0.9 million
Dry	Between 0.9 and 1.7 million
Above Normal	Between 1.7 and 2.6 million
Below Normal	Between 2.6 and 3.5 million
Wet	Greater than 3.5 million

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4.0 RESULTS

The WUA versus flow results are discussed, by subreach, in sections 4.1 through 4.8. Time series analysis results are discussed, by reach, in sections 4.9 through 4.16.

The standard output of the PHABSIM model consists of a curve defining the functional relationship between streamflow and WUA, presented in units of square feet per 1,000 feet of stream. This form of output was produced for all life stages of rainbow and brown trout, using HSC developed for this study by the Aquatic TWG. Although rainbow and brown trout are not found in comparable numbers in all the UARP reaches, and brown trout may not be a management species of interest in some areas, results are presented at all sites for both species in order to provide complete information for subsequent resource management discussions.

Habitat type-specific WUA versus streamflow results were generated, then summed and weighted using the habitat mapping results (Table 3.2-3) to produce results for the entire stream reach or subreach. Figures of the WUA versus flow relationships are presented in the results section. All WUA versus flow results are also presented in tabular format in Appendix C.

Figures depicting the WUA versus flow relationships using a normalized scale ("percent of maximum") on the y-axis were also generated, in order to facilitate interpretation and appropriate use of the results. WUA values were normalized by dividing by the highest WUA value over the range of simulated flows.

Habitat type specific WUA information is also included in the results section. The figures present WUA versus flow results by habitat type as a percentage of the total WUA, and facilitate evaluation of: 1) what proportion of the WUA is provided by each habitat type, and 2) whether the WUA contribution from each habitat type changes with flow. Habitat type specific WUA curves that are "flat" indicate that the proportion of WUA provided by that habitat type does not change with flow. Habitat specific WUA results are presented in tabular format in Appendix D.

Wetted area versus flow results were generated by setting all HSC equal to 1.0 to depict wetted surface area for each subreach in square feet per 1,000 feet of stream.

The results for the Upper S.F. Silver Creek site include WUA versus flow results for the two spawning-specific transects established at that site.

Habitat time series analysis results are provided in sections 4.9 through 4.15. Each section focuses on one of the bypass reaches. A general discussion of the habitat time series results is included in each section, supported by a summary table. Each reach-specific table contains a summary of the total yearly habitat (full-year) under the historic and unimpaired flow regime (by water year type and hydrologic node), as well as the percent change between the two. The partial-year tables, where spawning habitat was restricted to the appropriate months for the two trout species, and where juvenile and adult habitat was not analyzed during winter months, is not included in sections 4.9-4.15. However, a complete set of hydrologic and habitat time series graphs as well as full-year and partial-year summary tables is provided in Appendix F.

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4.1 Loon Lake Dam Reach

There are three PHABSIM study sites in the Loon Lake Dam Reach. The fish population in this reach in 2002-2003 was approximately 15 percent rainbow trout and 85 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.1.1 Gerle Creek at Wentworth Springs

Results for this subreach are based on transects placed in low-gradient riffle and run habitats. For both rainbow and brown trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages (Figures 4.1.1-1 and 4.1.1-5).

The juvenile rainbow trout results show WUA increases slightly with flow up to approximately 15-20 cfs, then begins to decrease and level off near 45 cfs and remain relatively constant as flows increase to 95 cfs (Figure 4.1.1-2). The juvenile brown trout results show WUA peaks at approximately 5 cfs, then decreases gradually and begins to level off near 35 cfs and remains relatively constant as flows increase to 95 cfs (Figure 4.1.1-6).

The adult rainbow trout results show WUA increases sharply with flow increases from 5 to 10 cfs, then remains at a high plateau as flows increase to 95 cfs (Figure 4.1.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.1.1-6).

The rainbow trout spawning results show WUA increases steadily from 5 cfs, peaking at approximately 15-20 cfs, then declines steadily as flows increase to 95 cfs (Figure 4.1.1-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.1.1-6).

The results indicate that run habitat provides the majority of WUA for both adult and juvenile rainbow trout, especially for adults at flows under 20 cfs where the percentage of total WUA from run habitat ranges from 90-98 percent (Figures 4.1.1-3 and 4.1.1-4). This percentage decreases to approximately 70 percent and remains relatively constant as flows increase over 30 cfs. Results are similar for adult and juvenile brown trout (Figures 4.1.1-7 and 4.1.1-8).

Wetted area increases steadily from approximately 15,000 square feet (per 1,000 feet of stream) at 5 cfs to approximately 26,000 sq. ft./1,000 ft. at 95 cfs (Figure 4.1.1-9).

4.1.2 Gerle Creek at Gerle Meadow

Results for this subreach are based on transects placed in pool and run habitats. For rainbow trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages (Figure 4.1.2-1). For brown trout, WUA is slightly greater for juveniles when compared with adults at flows less than 15 cfs, then becomes similar as flows increase up to 70 cfs (Figure 4.1.2-5). The amount of WUA for the brown trout spawning lifestage becomes similar to both juvenile and adult at flows between 35-55 cfs (Figure 4.1.2-5).

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The juvenile rainbow trout results show WUA peaks at approximately 7 cfs, then begins to decrease steadily and level off near 55 cfs and remain relatively constant as flows increase to 95 cfs (Figure 4.1.2-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.1.2-6).

The adult rainbow trout results show WUA increases from 5 cfs to a peak at approximately 15-20 cfs, then gradually declines as flows increase to 95 cfs (Figures 4.1.2-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.1.2-6).
The rainbow trout spawning results show WUA increases gradually from 5 cfs to a high plateau between 20-40 cfs, then declines gradually as flows increase to 95 cfs (Figures 4.1.2-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.1.2-6).

The results indicate that pool habitat provides approximately 75 percent and run habitat 25 percent of total WUA for both adult and juvenile rainbow trout over the entire range of flow (Figures 4.1.2-3 and 4.1.1-4). Results are similar for adult and juvenile brown trout (Figures 4.1.2-7 and 4.1.2-8).

Wetted area for the subreach increases steadily from approximately 19,000 sq. ft./1,000 ft. at 5 cfs to approximately 32,000 sq. ft./1,000 ft. at 95 cfs (Figure 4.1.2-9).

4.1.3 Gerle Creek Below Ice House Bridge

Results for this subreach are based on transects placed in low-gradient riffle and run habitats. For both rainbow and brown trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages (Figures 4.1.3-1 and 4.1.3-5).

The juvenile rainbow trout results show WUA increases gradually from 5 cfs to a high plateau between 30-60 cfs, then begins to decrease very gradually as flows increase to 150 cfs (Figure 4.1.3-2). The juvenile brown trout results show WUA increases gradually from 5 cfs to a peak near 25 cfs, then begins to decrease very gradually as flows increase to 150 cfs (Figure 4.1.3-6).

The adult rainbow trout results show WUA increases steadily from 5 cfs, peaks between 50 – 80 cfs, and gradually decreases as flows increase to 150 cfs (Figure 4.1.3-2). The adult brown trout results show WUA increases steadily from 5 cfs to 40 cfs, then decreases very gradually as flows increase to 150 cfs (Figure 4.1.3-6).

The rainbow trout spawning results show WUA increases from 5 cfs to a peak near 25 cfs where they drop slightly and then continue to increase gradually as flows increase to 70 cfs (Figures 4.1.3-1 and 4.1.3-2). They then decrease very gradually as flows approach 150 cfs. The brown trout spawning results are similar to those of rainbow trout (Figure 4.1.3-6). The uneven nature of the spawning curves is due to the patchy distribution of appropriately sized substrate.

The results indicate that both runs and riffles provide important habitat adult and juvenile rainbow trout. At 5 cfs run habitat accounts for over 80 percent of WUA for adults and juveniles. For juveniles, however, riffle habitat accounts for the majority of WUA at flows

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above 50 cfs; the results are similar for adults at flows above 70 cfs. (Figures 4.1.3-3 and 4.1.3-4). Results are similar for adult and juvenile brown trout, although the contribution of run habitat to total WUA for adult brown trout only decreases to near 70 percent at flows from 60-150 cfs (Figures 4.1.3-7 and 4.1.3-8).

Wetted area for the subreach increases steadily from approximately 15,000 sq. ft./1,000 ft. at 5 cfs to approximately 25,000 sq. ft./1,000 ft. at 150 cfs (Figure 4.1.3-9).

4.2 Gerle Creek Dam Reach

There is one PHABSIM study site in the Gerle Creek Dam reach. The fish population in this reach in 2002-2003 was approximately 60 percent rainbow trout and 40 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.2.1 Lower Gerle Creek

Results for this reach are based on transects placed in pool and pocket water habitats. For rainbow trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages (Figure 4.2.1-1). For brown trout, WUA is greater for juveniles when compared with adults at flows less than 25 cfs, then becomes similar as flows increase to 45 cfs (Figure 4.2.1-5). The amount of WUA for the spawning lifestage is very low for both rainbow trout and brown trout over the entire range of flows (Figures 4.2.1-1 and 4.2.1-5).

The juvenile rainbow trout results show WUA increases steadily from 3 cfs to a peak at approximately 13 cfs, then decreases gradually as flows increase to 45 cfs (Figures 4.2.1-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.2.1-6).

The adult rainbow trout results show WUA increases steadily from 5 cfs to a peak at 15 cfs, then decreases slightly and levels off at flows from 15-30 cfs before decreasing gradually as flows increase to 45 cfs (Figure 4.2.1-2). The adult brown trout results show WUA increases steadily from 5 cfs to a peak at 15 cfs, then levels off as flows increase to 45 cfs (Figure 4.2.1-6).

The rainbow trout spawning results show WUA increases steadily from 3 cfs to a peak near 10 cfs, then decreases gradually as flows increase to 20 cfs before increasing again as flows increase to 45 cfs (Figures 4.2.1-2). The brown trout spawning results show WUA increases steadily from 3 cfs to a peak near 10 cfs, then decreases gradually as flows increase to 20 cfs, then level off as flows increase to 45 cfs (Figures 4.2.1-6).

The results indicate that pocket water habitat provides approximately 60 percent and pool habitat 40 percent of total WUA for both adult and juvenile rainbow trout over the entire range of flow (Figures 4.2.1-3 and 4.2.1-4). Results are similar for juvenile brown trout; for brown trout adults, however, the pocket water and pool habitats contribute almost equally to total WUA (Figures 4.2.1-7 and 4.2.1-8).

Wetted area for the reach increases steadily from approximately 13,000 sq. ft./1,000 ft. at 5 cfs to approximately 20,000 sq. ft./1,000 ft. at 45 cfs (Figure 4.2.1-9).

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4.3 Robbs Peak Dam Reach

There are two PHABSIM study sites in the Robbs Peak Dam Reach. The fish population in this reach in 2002-2003 was approximately 60 percent rainbow trout and 40 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.3.1 Upper South Fork Rubicon River

Results for this subreach are based on transects placed in low-gradient riffle and run habitats. For both rainbow and brown trout, WUA is greatest for the spawning lifestage, followed by juvenile and adult lifestages (Figures 4.3.1-1 and 4.3.1-5).

The juvenile rainbow trout results indicate a generally flat WUA curve over the entire range of flows from 2-39 cfs with a small peak at approximately 4 cfs (Figure 4.3.1-2). The juvenile brown trout results show WUA decreases as flows increase from 2-10 cfs, plateau from 10 – 20 cfs, and then increase gradually as flow increases to approximately 40 cfs (Figure 4.3.1-6).

The adult rainbow trout results show WUA increases steadily from 2 cfs to a peak at 6 cfs, then declines steadily and levels off at flows of approximately 15-40 cfs (Figure 4.3.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.3.1-6).

The rainbow trout spawning results show WUA increases from 2 cfs to a peak at 13 cfs, then decreases gradually as flows increase to 39 cfs (Figure 4.3.1-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.3.1-6).

The results indicate that run habitat provides over 95 percent of total WUA for adult rainbow and brown trout (Figures 4.3.1-3 and 4.3.1-7). For juvenile rainbow and brown trout, run habitat provides over 90 percent of total WUA at flows from approximately 2-10 cfs, then decreases to approximately 80-85 percent at flows from 15-40 cfs (Figures 4.3.1-4 and 4.3.1-8).

Wetted area increases steadily from approximately 7,000 sq. ft./1,000 ft. at 2 cfs to approximately 13,000 sq. ft./1,000 ft. at 39 cfs (Figure 4.3.1-9).

4.3.2 Lower South Fork Rubicon River

Results for this subreach are based on transects placed in low-gradient riffle, run, and pool habitats. For rainbow trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages (Figure 4.3.2-1). For brown trout, WUA is greater for juveniles when compared with adults at flows less than 20 cfs, then becomes similar as flows increase to 125 cfs (Figure 4.3.2-5). The amount of WUA for the spawning lifestage is very low for both rainbow trout and brown trout over the entire range of flows (Figures 4.3.2-1 and 4.3.2-5).

The juvenile rainbow trout results show WUA peaks at approximately 10 cfs, then begins to decrease steadily and level off near 70 cfs and remain relatively constant as flows increase to 125

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cfs (Figure 4.3.2-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.3.2-6).

The adult rainbow trout results show WUA increases steadily from 5 cfs to a peak near 20 cfs, then decreases gradually as flows increase to 125 cfs (Figure 4.3.2-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.3.2-6).

The rainbow trout spawning results show WUA increases as flows increase from 5 cfs to near 100 cfs and level off as flows increase to 125 cfs (Figures 4.3.2-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.3.2-6). Irregularities in the spawning curve are likely due to limited occurrence and patchy distribution of spawning gravels.

The results indicate that pool habitat provides approximately 50-60 percent of total WUA for adult and juvenile rainbow trout, with run habitat providing approximately 20-30 percent and low-gradient riffle providing 10-20 percent over the entire flow range (Figures 4.3.2-3 and 4.3.2-4). Results are similar for adult and juvenile brown trout (Figures 4.3.2-7 and 4.3.2-8).

Wetted area in this subreach increases steadily from approximately 15,000 sq. ft./1,000 ft. at 5 cfs to approximately 21,000 sq. ft./1,000 ft. at 125 cfs (Figure 4.3.2-9).

4.4 Ice House Dam Reach

There are two PHABSIM study sites in the Ice House Dam Reach. The fish population in the upper subreach in 2002-2003 was approximately 70 percent rainbow trout and 30 percent brown trout. The fish population in the lower subreach was dominated by Sacramento sucker (approximately 70 percent) with rainbow trout and brown trout each estimated at approximately 15 percent as reported in the *Stream Fisheries Technical Report*.

4.4.1 Upper South Fork Silver Creek

Results for this subreach are based on transects placed in low-gradient riffle, run, and pool habitats. For both rainbow and brown trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages, with juvenile and adult WUA becoming similar at flows near 80 cfs (Figures 4.4.1-1 and 4.4.1-5).

The juvenile rainbow trout results show WUA increases with flow increases from 6 cfs to a peak near 30 cfs, then begins to decrease gradually as flows increase to 130 cfs (Figure 4.4.1-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.4.1-6).

The adult rainbow trout results show WUA increases steadily with flow increases from 6 cfs to a peak near 60 cfs, then begins to decrease gradually as flows increase to 130 cfs (Figure 4.4.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.4.1-6).

The rainbow trout spawning results show WUA increases with flow increases from 6-10 cfs, levels off from approximately 20-40 cfs, then decreases steadily as flows increase to 130 cfs (Figure 4.4.1-2). The brown trout spawning results are similar to those of rainbow trout (Figure

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4.4.1-6). The amount of WUA for spawning within the subreach was very low for both rainbow and brown trout (Figures 4.4.1-1 and 4.4.1-5).

The results indicate that run habitat provides the majority of the total WUA for adult and juvenile rainbow trout in this subreach, ranging from approximately 40-50 percent over the entire flow range. The percent of total WUA from pool habitat decreases from approximately 45 percent to near 30 percent over the range of flows. Low-gradient riffle habitat provides less than 30 percent of total WUA at all flows (Figures 4.4.1-3 and 4.4.1-4). Results are similar for adult and juvenile brown trout (Figures 4.4.1-7 and 4.4.1-8).

Wetted area in this subreach increases steadily from approximately 23,000 sq. ft./1,000 ft. at 6 cfs to approximately 36,000 sq. ft./1,000 ft. at 130 cfs (Figure 4.4.1-9).

In this subreach, transects were also placed in a specially selected spawning riffle. WUA results for this location are shown in Figure 4.4.1-10 for both rainbow and brown trout. Results show WUA for rainbow spawning is slightly greater than for brown trout. For both rainbow and brown trout, WUA increases sharply with flow increases from 6 cfs to a peak near 20 cfs, then decreases steadily as flows increase to 130 cfs. Results for these transects were generated independently and not included in results for the subreach.

4.4.2 Lower South Fork Silver Creek

Results for this subreach are based on transects placed in low-gradient riffle and run habitats. For both rainbow and brown trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages, with juvenile and adult WUA becoming similar at flows near 120 cfs (Figures 4.4.2-1 and 4.4.2-5).

The juvenile rainbow trout results show WUA increases with flow increases from 5 cfs to a peak near 30 cfs, then begins to decrease gradually as flows increase to 185 cfs (Figure 4.4.2-2). The juvenile brown trout results are similar to those of juvenile rainbow trout, although peak WUA occurs closer to 20 cfs (Figure 4.4.2-6).

The adult rainbow trout results show WUA increases steadily with flow increases from 5 cfs to a peak near 35 cfs, then begins to decrease gradually as flows increase to 185 cfs (Figure 4.4.2-2). The adult brown trout results show WUA increases steadily with flow increases from 5 cfs to 50 cfs, then level off as flows increase to near 130 cfs, then decrease gradually as flows increase to 185 cfs (Figure 4.4.2-6).

The rainbow trout spawning results show WUA increases with flow increases from 5 cfs to a peak near 25 cfs, then decreases steadily as flows increase to 185 cfs (Figure 4.4.2-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.4.2-6).

The results indicate that run habitat provides the majority of the total WUA for both adult and juvenile rainbow trout, with 80-90 percent of total WUA at 8 cfs, decreasing to 60-70 percent at flows above 80 cfs (Figures 4.4.2-3 and 4.4.2-4). Results are similar for adult and juvenile

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brown trout (Figures 4.4.2-7 and 4.4.2-8). For both species, riffle habitat provides a greater percentage of the overall WUA as flows increase.

Wetted area increases steadily from approximately 32,000 sq. ft./1,000 ft. at 5 cfs to approximately 50,000 sq. ft./1,000 ft. at 185 cfs (Figure 4.4.1-9).

4.5 Junction Dam Reach

There is one PHABSIM study site in the Junction Dam reach. The fish population in this reach in 2002-2003 was approximately 70 percent rainbow trout and 30 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.5.1 Silver Creek Below Junction Dam

Results for this reach are based on transects placed in low-gradient riffle, run, and pool habitats. For rainbow trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages, with WUA for adult and juvenile becoming similar as flows increase above approximately 40 cfs (Figure 4.5.1-1). For brown trout, WUA is greater for juveniles when compared with adults at flows less than 25 cfs. WUA for adults becomes greater than for juveniles at flows between approximately 25-90 cfs; they are then similar as flows increase to 250 cfs (Figure 4.5.1-5).

The juvenile rainbow trout results show WUA peaks at approximately 15 cfs, then begins to decrease and level off near 80 cfs and remain relatively constant as flows increase to 250 cfs (Figure 4.5.1-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.5.1-6).

The adult rainbow trout results show WUA increases steadily from 6 cfs to a peak near 25 cfs, then decreases gradually as flows increase to near 100 cfs and level off as flows increase to 250 cfs (Figure 4.5.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.5.1-6).

The rainbow trout spawning results show WUA increases steadily from 6 cfs to a peak near 25 cfs, then decreases steadily as flows increase to near 100 cfs and level off as flows increase to 250 cfs (Figure 4.5.1-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.5.1-6).

The results indicate that pool habitat provides approximately 50 percent of total WUA for adult rainbow trout, with run habitat providing approximately 40 percent and low-gradient riffle providing approximately 10 percent over the entire flow range (Figure 4.5.1-3). Run habitat provides approximately 45 percent of total WUA for juvenile rainbow trout, with pool habitat providing approximately 35 percent and low-gradient riffle providing approximately 20 percent over the entire flow range (Figures 4.5.1-4). Results are similar for adult and juvenile brown trout (Figures 4.5.1-7 and 4.5.1-8).

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Wetted area in the Junction Dam Reach increases steadily from approximately 22,000 sq. ft./1,000 ft. at 6 cfs to approximately 35,000 sq. ft./1,000 ft. at 250 cfs (Figure 4.5.1-9).

4.6 Camino Dam Reach

The results for the Camino Dam reach are based on modeling from the PHABSIM study site in the Junction Dam Reach, due to the similarity in channel conditions and hydrology between the two reaches. The results are reported separately due to differences in the habitat type extrapolation in the Camino Dam Reach. The fish population in the Camino Dam Reach in 2002-2003 was approximately 90 percent rainbow trout and 10 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.6.1 Silver Creek Below Camino Dam

Results for this reach are based on transects placed in low-gradient riffle, run, and pool habitats. For rainbow trout, WUA is lowest for spawning and is greater for juveniles when compared with adults at flows less than approximately 30 cfs. WUA for adults becomes greater than for juveniles at flows between 40-200 cfs; then they become similar as flows increase to 250 cfs (Figure 4.6.1-1). WUA for brown trout lifestages is similar to that of rainbow trout (Figure 4.6.1-5).

The juvenile rainbow trout results show WUA peaks at approximately 15 cfs, then begins to decrease and level off near 80 cfs and remain relatively constant as flows increase to 250 cfs (Figure 4.6.1-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.6.1-6).

The adult rainbow trout results show WUA increases steadily from 6 cfs to a peak near 25-40 cfs, then decreases gradually as flows increase to near 100 cfs and level off as flows increase to 250 cfs (Figure 4.6.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.6.1-6).

The rainbow trout spawning results show WUA increases steadily from 6 cfs to a peak near 40 cfs, then decreases gradually as flows increase to near 100 cfs, level off as flows increase from 100-200 cfs, then increase as flows increase to 250 cfs (Figure 4.6.1-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.6.1-6).

The results indicate that pool habitat provides approximately 75-85 percent of total WUA for adult and juvenile rainbow trout, with run habitat providing approximately 10-20 percent and low-gradient riffle providing less than 5 percent over the entire flow range (Figures 4.6.1-3 and 4.6.1-4). Results are similar for adult and juvenile brown trout (Figures 4.6.1-7 and 4.6.1-8).

Wetted area increases steadily from approximately 28,000 sq. ft./1,000 ft. at 6 cfs to approximately 42,000 sq. ft./1,000 ft. at 250 cfs (Figure 4.6.1-9).

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4.7 Brush Creek Dam Reach

There is one PHABSIM study site in the Brush Creek Dam reach. The fish population in this reach in 2003 was approximately 65 percent rainbow trout and 35 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.7.1 Brush Creek

Results for this reach are based on transects placed in low-gradient riffle, run, and pool habitats. For both rainbow and brown trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages (Figures 4.7.1-1 and 4.7.1-5).

The juvenile rainbow trout results show WUA increases steadily from 2 cfs to a peak at approximately 6 cfs, then begins to decrease very gradually as flows increase to 45 cfs (Figure 4.7.1-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.7.1-6).

The adult rainbow trout results show WUA increases from 2 cfs to a peak near 25 cfs, then levels off as flows increase to 45 cfs (Figure 4.7.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.7.1-6). Review of the hydraulic model output and HSC curves revealed that the Brush Creek site was generally too shallow for good rainbow and brown trout adult habitat. As depth suitability increased with flow, the confined, high gradient channel caused velocities to become excessive for maximum velocity suitability. Thus, the WUA versus flow relationship stays relatively "flat" as the depth and velocity suitabilities "cancel each other out."

The rainbow trout spawning results show WUA increases steadily from 2 cfs to a peak near 7 cfs, then decreases as flows increase to near 20 cfs and level off as flows increase to 45 cfs (Figure 4.7.1-2). The brown trout spawning results show WUA increases steadily from 2 cfs to a peak near 7 cfs, then decreases as flows increase to near 20 cfs, and increases again as flows increase to 45 cfs (Figure 4.7.1-6).

The results indicate that run habitat provides approximately 70 percent of total WUA for adult rainbow trout, with pool habitat providing approximately 30 percent at flows less than approximately 6 cfs. At flows greater than 15 cfs, run and pool habitat both provide approximately 40 percent each of total WUA for adult rainbow trout, with low-gradient riffle providing approximately 20 percent (Figure 4.7.1-3).

Both run and pool habitat provide approximately 40 percent of total WUA for juvenile rainbow trout. Low-gradient riffle habitat provides approximately 20 percent over the entire flow range (Figures 4.7.1-4). Results are similar for adult and juvenile brown trout, with the exception that run and pool habitats each provide approximately 45 percent of total WUA for adults over the entire range of flows (Figures 4.7.1-7 and 4.7.1-8).

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Wetted area increases steadily from approximately 11,000 sq. ft./1,000 ft. at 2 cfs to approximately 15,500 sq. ft./1,000 ft. at 45 cfs (Figure 4.7.1-9).

4.8 Slab Creek Dam Reach

There is one PHABSIM study site in the Slab Creek Dam reach. The fish population in this reach in 2002-2003 was dominated by transition zone species (approximately 70 percent) with approximately 20 percent rainbow trout and 10 percent brown trout, as reported in the *Stream Fisheries Technical Report*.

4.8.1 South Fork American River

Results for this reach are based on transects placed in low-gradient riffle, run, and pool habitats above and below the Rock Creek confluence. For rainbow trout, WUA is greatest for the juvenile lifestage, followed by adult and spawning lifestages at flows less than approximately 75 cfs. At flows greater than 75 cfs, WUA is greatest for the adult lifestage, followed by juvenile and spawning lifestages (Figure 4.8.1-1). Results for brown trout are similar to those for rainbow trout (Figure 4.8.1-5).

The juvenile rainbow trout results show WUA increases steadily from 12 cfs to a peak at approximately 25 cfs, then begins to decrease steadily as flows increase to 380 cfs (Figure 4.8.1-2). The juvenile brown trout results are similar to those of juvenile rainbow trout (Figure 4.8.1-6).

The adult rainbow trout results show WUA increases from 12 cfs to a peak near 125 cfs, then decreases very gradually as flows increase to 380 cfs (Figure 4.8.1-2). The adult brown trout results are similar to those of adult rainbow trout (Figure 4.8.1-6).

The rainbow trout spawning results show WUA increases steadily from 12 cfs to 175 cfs, then continues to increase very gradually as flows increase to 380 cfs (Figure 4.8.1-2). The brown trout spawning results are similar to those of rainbow trout (Figure 4.8.1-6). Irregularities in the spawning curve are likely due to limited occurrence and patchy distribution of spawning gravels.

The results indicate that run habitat provides approximately 55 percent of total WUA for adult rainbow trout, with pools providing approximately 35 percent and riffle habitat providing approximately 5-10 percent over the entire range of flows (Figure 4.8.1-3). For juvenile rainbow trout, run habitat provides approximately 50-60 percent of total WUA, with pool and riffle habitats each providing approximately 20 percent over the entire range of flows (Figure 4.8.1-4). Adult brown trout results are similar to adult rainbow trout (Figure 4.8.1-7). For juvenile brown trout, run habitat provides approximately 50 – 60 percent of total WUA; riffle and pool habitat each account for approximately 20 percent (Figure 4.8.1-8).

Wetted area in this reach increases steadily from approximately 41,000 sq. ft./1,000 ft. at 12 cfs to approximately 54,000 sq. ft./1,000 ft. at 388 cfs (Figure 4.8.1-9).

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4.9 Loon Lake Reach Time Series – Gerle Creek

In general, the results of the Loon Lake Reach habitat time series analysis demonstrate that the historic flow regime has provided more habitat for rainbow and brown trout than the unimpaired flow regime (Table 4.9-1, Table 4.9-2, and Appendix F figures). Throughout all water year types and nodes within the Gerle Creek bypass reach, more habitat has been available under the historic flow condition than would have been available under the unimpaired condition.

This result is due largely to the fact that the historic operation of the UARP has increased fish habitat over unimpaired conditions during summer/fall months, essentially between July through October. Natural flows at Loon Lake Dam under most water year types are generally near 1 cfs, while the historic flows are above 8 cfs at all times during this same period of the year. Flows in the neighborhood of 8 cfs provide good habitat for most species/life stages. This is especially important for brown trout, which spawn during a natural low-flow period of the year (October and November).

Another factor that becomes evident upon review of the hydrologic time series plots is the substantial amount of water that enters Gerle Creek during winter and spring months downstream of Loon Lake due to accretion input from Jerrett, Barts, Dellar, and Rocky Basin creeks. The high inflow from these tributaries during spring runoff quickly raises streamflow levels throughout the bypass reach nodes to levels that are favorable to the various species and life stages.

A review of the partial-year time series results (Table 4.9-2), reveal that the historic flow regime provides increases in brown trout spawning habitat over unimpaired conditions across all water year types and hydrologic nodes. Unimpaired flows during October and November are typically low (less than 5 cfs) with little to no accretion, while the historic releases of 8 cfs provide flows that are near to optimal 15-20 cfs spawning flows. Rainbow trout spawning habitat is also higher under the historic flow regime than under the unimpaired flow regime. Again, the 8 cfs releases, augmented by the more substantial accretion that occurs in April-June, provides flows that are near to the optimal spawning flows for rainbow trout. The unimpaired flows are higher during the spawning period, and provided less habitat than the optimal flows.

4.10 Robbs Peak Dam Reach – South Fork Rubicon River

The results of the habitat time series analysis for the Robbs Peak Dam Reach (Table 4.10-1, Table 4.10-2, and Appendix F figures) are similar to that of the Loon Lake Dam Reach. For all water year types and both nodes in this reach, juvenile and adult trout habitat was generally more plentiful under the historical flow regime than it would have been under the unimpaired flow regime. This results stems from the fact that the historical flows released from Gerle Creek and Robbs Peak reservoirs, which have generated a combined flow of either 5 or 10 cfs, generally coincide with near-optimal WUA. A review of the WUA curves for this reach reveal that peak WUA is generally achieved at flows ranging between 5 cfs for juveniles and 15 cfs for adult trout. The unimpaired flows are lower than these levels during the low-flow period (August

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through October). However, the unimpaired flows provide more habitat during the transitional months of June and November.

The results of the spawning simulations are less valuable because very little spawning habitat was predicted to occur in the Robbs Peak Dam Reach. While the fish population surveys identified the presence of spawning in the reach, the habitat transects predicted little habitat in the reach (see Figure 4.3.2-1). This is a common result of PHABSIM analyses in Sierra Nevada streams, where spawning opportunities are generally available in small pockets in the lee of boulders, and not adequately reflected in reach-wide WUA computations.

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Table 4.9-1. Summary of rainbow and brown trout habitat time series analysis for the Loon Lake Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

Gerle Creek below Loon Lake

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,091,932	1,870,459	71.30	1,103,135	1,909,989	73.14	1,210,686	1,777,504	46.82	1,320,942	1,852,844	40.27
Brown Trout - Juvenile	1,439,790	2,603,973	80.86	1,465,021	2,626,795	79.30	1,559,320	2,466,198	58.16	1,758,690	2,538,992	44.37
Brown Trout - Spawning	816,600	1,449,941	77.56	800,519	1,490,946	86.25	766,049	1,380,026	80.15	905,138	1,449,090	60.10
Rainbow Trout - Adult	1,085,549	1,811,677	66.89	1,110,694	1,847,111	66.30	1,236,464	1,721,897	39.26	1,328,307	1,791,454	34.87
Rainbow Trout - Juvenile	1,701,570	2,899,379	70.39	1,719,071	2,937,613	70.88	1,833,111	2,750,223	50.03	2,043,868	2,843,509	39.12
Rainbow Trout - Spawning	868,674	1,493,744	71.96	855,898	1,531,619	78.95	825,152	1,420,880	72.20	963,245	1,487,551	54.43

Gerle Creek below Jerrett Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,103,013	1,883,367	70.75	1,179,855	1,962,656	66.35	1,075,444	1,610,819	49.78	1,264,320	1,742,889	37.85
Brown Trout - Juvenile	1,432,879	2,475,875	72.79	1,549,699	2,551,293	64.63	1,396,439	2,104,148	50.68	1,678,416	2,233,446	33.07
Brown Trout - Spawning	803,092	1,499,999	86.78	807,859	1,570,675	94.42	685,043	1,268,358	85.15	896,089	1,401,243	56.37
Rainbow Trout - Adult	1,110,746	1,825,516	64.35	1,192,306	1,905,087	59.78	1,094,015	1,581,767	44.58	1,268,757	1,694,507	33.56
Rainbow Trout - Juvenile	1,709,007	2,867,158	67.77	1,819,137	2,984,381	64.05	1,632,389	2,471,268	51.39	1,953,428	2,632,546	34.77
Rainbow Trout - Spawning	860,828	1,558,668	81.07	865,901	1,634,736	88.79	733,823	1,329,696	81.20	953,137	1,458,309	53.00

Gerle Creek below Barts & Dellar Creeks

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,549,417	2,898,983	87.10	1,607,618	2,897,743	80.25	1,285,947	2,169,463	68.71	1,809,220	2,549,031	40.89
Brown Trout - Juvenile	1,686,970	3,138,238	86.03	1,808,502	3,120,972	72.57	1,444,638	2,364,115	63.65	2,018,547	2,690,892	33.31
Brown Trout - Spawning	1,078,685	1,941,214	79.96	1,045,302	1,958,229	87.34	827,461	1,440,951	74.14	1,170,273	1,765,603	50.87
Rainbow Trout - Adult	1,605,038	3,010,935	87.59	1,625,982	3,016,187	85.50	1,300,480	2,238,605	72.14	1,833,862	2,692,382	46.81
Rainbow Trout - Juvenile	2,066,053	3,823,696	85.07	2,183,061	3,805,266	74.31	1,737,958	2,865,581	64.88	2,435,251	3,314,685	36.11
Rainbow Trout - Spawning	1,117,235	1,899,726	70.04	1,097,922	1,911,468	74.10	859,760	1,411,612	64.19	1,203,195	1,719,042	42.87

Gerle Creek below Rocky Basin Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,130,517	1,623,115	43.57	1,194,630	1,711,016	43.23	1,015,680	1,361,608	34.06	1,229,220	1,554,960	26.50
Brown Trout - Juvenile	1,634,021	2,483,796	52.01	1,741,251	2,585,832	48.50	1,463,576	2,039,202	39.33	1,815,175	2,311,672	27.35
Brown Trout - Spawning	384,064	531,148	38.30	405,100	571,550	41.09	350,437	461,684	31.75	419,959	535,234	27.45
Rainbow Trout - Adult	1,290,480	1,726,217	33.77	1,357,350	1,851,788	36.43	1,164,653	1,501,994	28.96	1,375,550	1,691,586	22.98
Rainbow Trout - Juvenile	1,860,745	2,724,595	46.42	1,976,404	2,851,933	44.30	1,662,192	2,262,233	36.10	2,036,826	2,556,552	25.52
Rainbow Trout - Spawning	393,237	542,850	38.05	417,356	582,750	39.63	360,379	471,031	30.70	430,598	539,467	25.28

Gerle Creek Inflow above Gerle Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,123,841	1,616,881	43.87	1,208,960	1,718,711	42.16	999,347	1,340,279	34.12	1,238,938	1,559,899	25.91
Brown Trout - Juvenile	1,621,676	2,465,186	52.01	1,762,613	2,582,944	46.54	1,443,991	2,004,385	38.81	1,823,129	2,305,909	26.48
Brown Trout - Spawning	382,954	529,344	38.23	407,923	576,505	41.33	343,955	455,318	32.38	423,735	539,541	27.33
Rainbow Trout - Adult	1,288,227	1,727,806	34.12	1,375,478	1,871,086	36.03	1,142,541	1,480,062	29.54	1,387,561	1,704,880	22.87
Rainbow Trout - Juvenile	1,848,222	2,710,312	46.64	2,002,066	2,855,958	42.65	1,638,035	2,223,799	35.76	2,048,034	2,556,576	24.83
Rainbow Trout - Spawning	391,994	541,330	38.10	421,537	587,614	39.40	353,841	464,292	31.21	434,240	543,167	25.08

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Table 4.9-2. Summary of rainbow and brown trout habitat time series analysis for the Loon Lake Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

Gerle Creek below Loon Lake

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	478,197	1,260,939	163.69	492,693	1,277,338	159.26	658,218	1,244,893	89.13	688,478	1,218,859	77.04
Brown Trout - Juvenile	647,897	1,761,049	171.81	662,519	1,755,828	165.02	878,807	1,731,520	97.03	925,333	1,668,450	80.31
Brown Trout - Spawning	36,953	243,343	558.53	35,183	244,354	594.52	105,058	243,849	132.11	71,854	245,112	241.12
Rainbow Trout - Adult	472,333	1,221,800	158.67	501,584	1,235,209	146.26	669,395	1,206,241	80.20	700,500	1,178,461	68.23
Rainbow Trout - Juvenile	761,348	1,958,596	157.25	770,716	1,963,945	154.82	1,013,316	1,928,977	90.36	1,061,252	1,869,406	76.15
Rainbow Trout - Spawning	352,178	376,373	6.87	305,504	388,458	27.15	299,912	366,317	22.14	260,703	341,800	31.11

Gerle Creek below Jerrett Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	527,116	1,294,377	145.56	550,432	1,296,882	135.61	599,958	1,143,839	90.65	610,615	1,075,743	76.17
Brown Trout - Juvenile	711,862	1,737,590	144.09	750,304	1,714,966	128.57	823,822	1,525,963	85.23	861,511	1,400,822	62.60
Brown Trout - Spawning	53,789	248,903	362.74	52,147	253,199	385.55	134,899	257,707	91.04	102,749	261,141	154.15
Rainbow Trout - Adult	529,985	1,251,727	136.18	560,106	1,261,771	125.27	604,449	1,119,480	85.21	611,919	1,047,542	71.19
Rainbow Trout - Juvenile	837,713	1,982,249	136.63	860,098	1,979,233	130.12	940,306	1,756,828	86.84	971,321	1,628,323	67.64
Rainbow Trout - Spawning	356,180	426,136	19.64	291,695	413,048	41.60	225,540	286,151	26.87	162,593	214,336	31.82

Gerle Creek below Barts & Dellar Creeks

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	873,117	2,141,227	145.24	773,725	1,971,732	154.84	890,394	1,723,351	93.55	974,946	1,642,977	68.52
Brown Trout - Juvenile	988,944	2,384,540	141.12	924,024	2,197,233	137.79	1,035,239	1,923,648	85.82	1,157,316	1,790,491	54.71
Brown Trout - Spawning	91,136	332,654	265.01	89,712	333,324	271.55	206,209	351,225	70.32	157,293	351,089	123.21
Rainbow Trout - Adult	867,942	2,173,799	150.45	731,233	1,996,593	173.04	864,302	1,743,397	101.71	929,635	1,690,322	81.83
Rainbow Trout - Juvenile	1,191,872	2,857,693	139.77	1,086,713	2,623,227	141.39	1,226,909	2,297,812	87.28	1,359,676	2,160,072	58.87
Rainbow Trout - Spawning	465,458	541,166	16.27	322,070	395,885	22.92	219,958	240,515	9.35	154,971	190,332	22.82

Gerle Creek below Rocky Basin Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	564,962	1,047,883	85.48	562,071	1,052,263	87.21	586,270	919,507	56.84	583,325	893,052	53.10
Brown Trout - Juvenile	869,359	1,687,763	94.14	865,476	1,666,783	92.59	911,901	1,452,302	59.26	928,664	1,387,137	49.37
Brown Trout - Spawning	19,018	68,354	259.41	17,374	69,259	298.62	54,492	86,167	58.13	32,856	79,819	142.93
Rainbow Trout - Adult	622,032	1,071,652	72.28	622,608	1,107,269	77.84	634,155	964,941	52.16	623,813	942,959	51.16
Rainbow Trout - Juvenile	971,241	1,814,487	86.82	966,589	1,803,142	86.55	1,005,875	1,570,182	56.10	1,017,354	1,504,444	47.88
Rainbow Trout - Spawning	159,385	166,719	4.60	157,838	171,545	8.68	112,610	116,071	3.07	94,065	94,803	0.78

Gerle Creek Inflow above Gerle Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	571,925	1,054,661	84.41	575,247	1,055,953	83.56	575,103	904,324	57.25	589,366	894,097	51.70
Brown Trout - Juvenile	876,638	1,690,273	92.81	889,877	1,665,939	87.21	901,471	1,429,318	58.55	938,137	1,382,850	47.40
Brown Trout - Spawning	20,420	69,140	238.60	18,353	70,140	282.17	56,120	86,997	55.02	34,531	80,969	134.48
Rainbow Trout - Adult	633,205	1,085,705	71.46	635,283	1,114,943	75.50	618,183	947,028	53.20	628,332	946,135	50.58
Rainbow Trout - Juvenile	980,638	1,821,553	85.75	992,427	1,804,243	81.80	991,479	1,543,780	55.70	1,027,128	1,501,429	46.18
Rainbow Trout - Spawning	161,085	168,224	4.43	157,842	172,915	9.55	105,084	107,979	2.76	91,695	92,757	1.16

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Table 4.10-1. Summary of rainbow and brown trout habitat time series analysis for the Robbs Peak Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and two hydrologic nodes.

SF Rubicon At Confluence with Gerle Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,263,561	1,568,889	24.16	1,329,574	1,564,870	17.70	1,026,883	1,309,740	27.55	1,397,013	1,586,194	13.54
Brown Trout - Juvenile	1,527,833	2,517,210	64.76	1,640,757	2,445,847	49.07	1,257,372	1,703,791	35.50	1,615,333	2,085,854	29.13
Brown Trout - Spawning	65,576	22,368	-65.89	60,606	24,271	-59.95	45,697	31,267	-31.58	70,448	36,885	-47.64
Rainbow Trout - Adult	1,216,490	1,213,351	-0.26	1,247,887	1,227,502	-1.63	953,839	1,118,061	17.22	1,336,685	1,346,982	0.77
Rainbow Trout - Juvenile	1,791,427	2,783,017	55.35	1,919,471	2,722,608	41.84	1,473,289	1,989,729	35.05	1,919,007	2,428,109	26.53
Rainbow Trout - Spawning	86,020	58,322	-32.20	83,011	60,183	-27.50	61,511	59,055	-3.99	90,249	70,693	-21.67

SF Rubicon Above Rubicon River

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,527,441	1,805,825	18.23	1,597,650	1,848,285	15.69	1,212,539	1,393,543	14.93	1,450,310	1,651,486	13.87
Brown Trout - Juvenile	1,937,341	2,213,046	14.23	1,957,893	2,195,749	12.15	1,418,723	1,493,328	5.26	1,544,285	1,718,012	11.25
Brown Trout - Spawning	67,318	50,252	-25.35	69,281	53,504	-22.77	54,044	46,608	-13.76	77,503	59,046	-23.81
Rainbow Trout - Adult	1,413,770	1,578,801	11.67	1,484,926	1,633,040	9.97	1,138,693	1,272,570	11.76	1,428,894	1,526,784	6.85
Rainbow Trout - Juvenile	2,250,167	2,628,333	16.81	2,298,996	2,630,399	14.42	1,687,287	1,842,080	9.17	1,879,117	2,138,097	13.78
Rainbow Trout - Spawning	94,038	86,069	-8.47	96,658	88,942	-7.98	73,266	69,936	-4.55	96,986	84,254	-13.13

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Table 4.10-2. Summary of rainbow and brown trout habitat time series analysis for the Robbs Peak Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and two hydrologic nodes.

SF Rubicon At Confluence with Gerle Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	883,784	1,179,571	33.47	873,884	1,096,352	25.46	871,382	1,145,983	31.51	924,410	1,094,505	18.40
Brown Trout - Juvenile	1,140,478	1,905,354	67.07	1,170,188	1,742,661	48.92	1,101,952	1,455,211	32.06	1,143,105	1,357,290	18.74
Brown Trout - Spawning	6,699	4,509	-32.68	6,650	4,746	-28.64	14,231	7,944	-44.18	10,734	8,685	-19.08
Rainbow Trout - Adult	804,546	909,002	12.98	763,492	852,136	11.61	781,945	987,676	26.31	830,839	950,891	14.45
Rainbow Trout - Juvenile	1,321,437	2,102,911	59.14	1,347,586	1,931,378	43.32	1,284,892	1,710,957	33.16	1,343,384	1,605,427	19.51
Rainbow Trout - Spawning	31,013	13,030	-57.98	21,265	10,374	-51.21	12,375	8,056	-34.90	6,687	4,162	-37.76

SF Rubicon Above Rubicon River

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,225,150	1,415,918	15.57	1,176,820	1,308,519	11.19	1,078,857	1,212,221	12.36	1,063,880	1,144,908	7.62
Brown Trout - Juvenile	1,630,202	1,789,851	9.79	1,524,602	1,610,044	5.60	1,282,735	1,299,781	1.33	1,157,224	1,188,366	2.69
Brown Trout - Spawning	9,677	9,811	1.39	10,285	10,242	-0.41	17,578	13,047	-25.78	16,017	13,777	-13.98
Rainbow Trout - Adult	1,084,342	1,220,961	12.60	1,031,591	1,140,214	10.53	988,011	1,106,350	11.98	1,002,054	1,059,706	5.75
Rainbow Trout - Juvenile	1,878,386	2,109,169	12.29	1,773,493	1,911,212	7.77	1,523,831	1,603,220	5.21	1,410,057	1,479,685	4.94
Rainbow Trout - Spawning	29,692	20,526	-30.87	20,266	15,495	-23.54	11,219	8,711	-22.36	5,191	4,156	-19.93

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4.11 Ice House Dam Reach – South Fork Silver Creek

The habitat time series of the Ice House Reach reveal a mixture of increases and decreases in habitat, depending upon the species/life stage, water year type, and bypass reach node (Table 4.11-1, Table 4.11-2, and Appendix F figures). The habitat time series analysis for this reach is also influenced by historic water management practices of SMUD prior to the 1986 construction and operation of the Jones Fork Powerhouse. Prior to 1986, water was released from Ice House Reservoir into South Fork Silver Creek to regulate flows into Junction Reservoir for use in power generation throughout the lower portion of the UARP. Thus, the historic hydrologic time series the Ice House Dam Reach is a combination of regulated flow conditions (pre-1986) and minimum flow conditions (post-1986).

In general, the results of the historic vs. unimpaired flows reveal a reduction in fish habitat from unimpaired to historic flow conditions in the dry water year types. This is particularly true for adult rainbow and brown trout, which show approximately 5-50 percent reductions in habitat under historic conditions directly downstream of Ice House Dam across all water year types. This reduction results from the fact that the unimpaired low-flow regime generally provides good habitat for adult trout in the winter and spring months, while the historic releases provide lower flows, and less habitat. However, as discussed above, this bypass reach is somewhat different than the others, in that during part of the historic period, regulated flow releases augmented flows by 100-400 cfs. Under the partial-year analysis, which removes the winter months from the analysis, the percent reductions still exist but are lower values. As the analysis progresses to downstream nodes, the percent reduction in habitat decreases for both adult and juvenile life stages of brown and rainbow trout generally due to the fact that accretion is entering the stream during the winter and spring months, thereby increasing the amount of habitat in the historic case.

The dynamics of juvenile trout are somewhat different than those of the adult trout. In the case of the rainbow trout, historic flows provide an increase in habitat compared to unimpaired flows at the top of the reach, then a decrease in habitat at the lower part of the reach. This difference is due to the changing shape of the rainbow trout WUA curve between the upper and lower study of the South Fork Silver Creek reach. In general though, the same phenomenon of increasing flows, through accretion, increases the amount of habitat at downstream nodes.

The spawning time series analysis for the Ice House Dam Reach is particularly meaningful for the hydrologic node downstream of Peavine Creek (Table 4.11-2). This is the general location of a pair of critical habitat spawning transects that were placed near the Silver Creek Campground. These transects were added because the main transects placed in the upper subreach had little visible spawning gravels. By contrast, there were no critical spawning transects in the lower reach, because the substrate size was generally smaller, and spawning gravels were more common. The partial-year time series analysis for the Ice House Reach shows more historic levels of brown trout habitat as improvements over unimpaired conditions, but historic levels of rainbow trout habitat as reductions over unimpaired conditions. However, the reductions in spawning rainbow trout habitat were reduced in the wetter water years and/or in the lower hydrologic nodes.

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Table 4.11-1. Summary of rainbow and brown trout habitat time series analysis for the Ice House Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

SF Silver Creek Below Ice House Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,094,521	1,325,922	-36.70	1,933,705	1,278,636	-33.88	1,661,319	1,901,325	14.45	1,964,204	1,475,592	-24.88
Brown Trout - Juvenile	2,939,334	2,968,724	1.00	2,921,798	2,902,221	-0.67	2,487,255	2,707,410	8.85	3,009,583	2,846,065	-5.43
Brown Trout - Spawning	2,110,587	2,135,006	1.16	2,248,966	2,082,753	-7.39	1,841,109	2,091,983	13.63	2,384,688	2,628,731	10.23
Rainbow Trout - Adult	2,377,681	1,251,497	-47.36	2,179,794	1,196,688	-45.10	1,855,512	2,177,687	17.36	2,223,754	1,604,457	-27.85
Rainbow Trout - Juvenile	3,403,482	2,963,257	-12.93	3,308,844	2,886,408	-12.77	2,816,196	3,135,997	11.36	3,401,006	3,006,411	-11.60
Rainbow Trout - Spawning	2,495,779	2,117,185	-15.17	2,565,210	2,055,409	-19.87	2,104,919	2,438,001	15.82	2,706,026	2,696,204	-0.36

SF Silver Creek below Peavine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,145,447	1,778,608	-17.10	2,083,605	1,710,544	-17.90	1,662,191	1,868,096	12.39	2,047,597	1,910,500	-6.70
Brown Trout - Juvenile	3,045,567	3,603,662	18.32	3,139,095	3,497,926	11.43	2,546,991	2,638,056	3.58	3,091,075	3,297,200	6.67
Brown Trout - Spawning	2,181,512	2,961,587	35.76	2,394,292	3,005,379	25.52	1,943,983	2,149,634	10.58	2,481,513	3,368,489	35.74
Rainbow Trout - Adult	2,417,320	1,841,664	-23.81	2,350,719	1,783,257	-24.14	1,856,030	2,164,887	16.64	2,332,000	2,207,688	-5.33
Rainbow Trout - Juvenile	3,508,545	3,722,093	6.09	3,557,275	3,608,487	1.44	2,865,677	3,073,025	7.24	3,509,565	3,618,740	3.11
Rainbow Trout - Spawning	2,558,149	3,043,921	18.99	2,740,008	3,075,783	12.25	2,196,614	2,485,012	13.13	2,828,591	3,567,897	26.14

SF Silver Creek below Windmiller Ravine

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,110,143	1,886,548	-10.60	2,181,686	1,927,303	-11.66	1,731,076	1,990,028	14.96	2,108,321	2,223,308	5.45
Brown Trout - Juvenile	3,600,650	4,593,166	27.56	3,889,186	4,844,167	24.55	3,170,240	3,233,215	1.99	3,714,506	4,115,953	10.81
Brown Trout - Spawning	1,902,303	2,580,964	35.68	2,090,653	2,771,538	32.57	1,674,393	1,812,804	8.27	2,065,089	2,526,595	22.35
Rainbow Trout - Adult	2,692,373	2,497,180	-7.25	2,818,383	2,578,846	-8.50	2,218,946	2,562,968	15.50	2,749,858	2,985,370	8.56
Rainbow Trout - Juvenile	4,070,825	4,671,612	14.76	4,334,195	4,876,660	12.52	3,472,421	3,728,387	7.37	4,167,784	4,606,202	10.52
Rainbow Trout - Spawning	1,891,350	2,414,594	27.67	2,058,370	2,574,498	25.07	1,634,400	1,802,250	10.27	2,026,276	2,440,617	20.45

SF Silver Creek below Big Hill Canyon

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,155,345	2,082,215	-3.39	2,327,575	2,258,500	-2.97	1,751,242	1,929,606	10.19	2,171,919	2,316,259	6.65
Brown Trout - Juvenile	3,782,705	4,707,329	24.44	4,121,575	4,935,641	19.75	3,215,151	3,031,468	-5.71	3,602,440	3,809,432	5.75
Brown Trout - Spawning	2,000,913	2,689,598	34.42	2,198,524	2,888,030	31.36	1,731,158	1,731,695	0.03	2,029,545	2,350,746	15.83
Rainbow Trout - Adult	2,751,131	2,758,247	0.26	3,005,286	3,025,179	0.66	2,261,493	2,491,287	10.16	2,832,245	3,088,547	9.05
Rainbow Trout - Juvenile	4,235,940	4,878,500	15.17	4,595,795	5,188,344	12.89	3,524,825	3,555,832	0.88	4,131,626	4,476,475	8.35
Rainbow Trout - Spawning	1,979,064	2,533,189	28.00	2,167,368	2,730,706	25.99	1,685,169	1,727,566	2.52	2,012,543	2,318,066	15.18

SF Silver Creek at Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,198,708	2,159,131	-1.80	2,358,826	2,324,335	-1.46	1,761,231	1,870,357	6.20	2,190,032	2,337,605	6.74
Brown Trout - Juvenile	3,873,628	4,724,401	21.96	4,164,975	4,896,996	17.58	3,198,255	2,922,128	-8.63	3,557,850	3,709,866	4.27
Brown Trout - Spawning	2,038,124	2,716,361	33.28	2,225,595	2,885,009	29.63	1,736,529	1,691,327	-2.60	2,012,712	2,264,477	12.51
Rainbow Trout - Adult	2,807,086	2,860,982	1.92	3,044,399	3,103,709	1.95	2,279,787	2,421,820	6.23	2,853,692	3,117,641	9.25
Rainbow Trout - Juvenile	4,326,500	4,943,464	14.26	4,646,829	5,212,023	12.16	3,520,364	3,447,986	-2.06	4,114,222	4,418,422	7.39
Rainbow Trout - Spawning	2,015,009	2,566,028	27.35	2,194,109	2,740,054	24.88	1,690,557	1,688,142	-0.14	2,003,201	2,253,756	12.51

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Table 4.11-2. Summary of rainbow and brown trout habitat time series analysis for the Ice House Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

SF Silver Creek Below Ice House Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,132,683	843,013	-25.57	918,452	807,597	-12.07	917,413	1,349,500	47.10	921,364	1,049,380	13.89
Brown Trout - Juvenile	1,596,037	1,879,943	17.79	1,481,982	1,833,067	23.69	1,582,756	2,042,028	29.02	1,546,079	1,878,658	21.51
Brown Trout - Spawning	253,480	359,382	41.78	321,874	366,249	13.79	468,014	594,510	27.03	445,814	650,870	46.00
Rainbow Trout - Adult	1,255,920	795,567	-36.65	991,040	755,838	-23.73	990,443	1,560,471	57.55	993,592	1,205,561	21.33
Rainbow Trout - Juvenile	1,831,264	1,878,351	2.57	1,628,620	1,823,079	11.94	1,712,891	2,336,039	36.38	1,683,320	2,044,275	21.44
Rainbow Trout - Spawning	745,494	443,794	-40.47	540,237	394,611	-26.96	244,401	261,698	7.08	48,553	70,963	46.16

SF Silver Creek below Peavine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,238,670	1,101,972	-11.04	1,028,638	1,016,845	-1.15	1,008,524	1,382,906	37.12	974,025	1,120,716	15.06
Brown Trout - Juvenile	1,821,737	2,390,614	31.23	1,704,609	2,158,997	26.66	1,761,183	2,044,282	16.07	1,666,772	1,892,132	13.52
Brown Trout - Spawning	319,870	460,677	44.02	408,220	474,657	16.27	547,141	642,015	17.34	562,705	728,936	29.54
Rainbow Trout - Adult	1,359,395	1,077,654	-20.73	1,107,138	1,026,293	-7.30	1,090,855	1,612,109	47.78	1,065,639	1,308,762	22.81
Rainbow Trout - Juvenile	2,059,769	2,408,844	16.95	1,858,404	2,195,632	18.15	1,902,539	2,359,672	24.03	1,810,290	2,093,286	15.63
Rainbow Trout - Spawning	732,901	692,059	-5.57	525,470	599,962	14.18	217,643	247,205	13.58	14,317	38,668	170.09

SF Silver Creek below Windmiller Ravine

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,174,556	1,036,974	-11.71	1,164,260	1,128,906	-3.04	1,087,416	1,477,241	35.85	1,056,512	1,260,327	19.29
Brown Trout - Juvenile	2,236,826	3,056,141	36.63	2,329,283	3,122,397	34.05	2,313,850	2,524,310	9.10	2,203,493	2,454,460	11.39
Brown Trout - Spawning	294,113	402,696	36.92	374,450	424,479	13.36	469,948	500,383	6.48	492,126	551,807	12.13
Rainbow Trout - Adult	1,496,022	1,371,585	-8.32	1,485,341	1,503,311	1.21	1,410,797	1,929,887	36.79	1,376,913	1,703,279	23.70
Rainbow Trout - Juvenile	2,431,726	2,936,307	20.75	2,464,878	3,055,811	23.97	2,421,678	2,892,718	19.45	2,315,273	2,694,024	16.36
Rainbow Trout - Spawning	529,710	625,636	18.11	416,205	664,701	59.71	190,189	258,017	35.66	38,551	111,785	189.97

SF Silver Creek below Big Hill Canyon

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,314,129	1,279,679	-2.62	1,277,181	1,328,890	4.05	1,153,245	1,458,339	26.46	1,115,044	1,297,602	16.37
Brown Trout - Juvenile	2,594,643	3,399,952	31.04	2,621,566	3,252,059	24.05	2,451,454	2,400,529	-2.08	2,189,319	2,299,519	5.03
Brown Trout - Spawning	365,684	457,100	25.00	449,174	485,563	8.10	507,907	505,978	-0.38	538,001	572,862	6.48
Rainbow Trout - Adult	1,675,414	1,704,138	1.71	1,640,730	1,788,253	8.99	1,508,202	1,906,826	26.43	1,465,979	1,770,670	20.78
Rainbow Trout - Juvenile	2,780,948	3,347,367	20.37	2,754,484	3,290,876	19.47	2,574,684	2,803,507	8.89	2,358,984	2,629,447	11.47
Rainbow Trout - Spawning	512,375	727,308	41.95	389,866	661,209	69.60	156,556	200,573	28.12	15,214	48,703	220.12

SF Silver Creek at Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,362,773	1,348,522	-1.05	1,300,176	1,364,871	4.98	1,178,839	1,458,728	23.74	1,144,953	1,322,878	15.54
Brown Trout - Juvenile	2,713,364	3,452,510	27.24	2,687,284	3,235,307	20.39	2,463,868	2,361,956	-4.14	2,187,197	2,260,218	3.34
Brown Trout - Spawning	390,159	465,534	19.32	467,276	498,820	6.75	516,146	505,459	-2.07	548,573	575,239	4.86
Rainbow Trout - Adult	1,738,097	1,802,237	3.69	1,674,677	1,834,492	9.54	1,547,340	1,907,918	23.30	1,507,932	1,806,109	19.77
Rainbow Trout - Juvenile	2,897,879	3,434,143	18.51	2,819,866	3,304,817	17.20	2,603,205	2,779,185	6.76	2,382,374	2,624,876	10.18
Rainbow Trout - Spawning	506,768	749,742	47.95	377,085	638,533	69.33	147,928	181,101	22.42	12,754	39,351	208.53

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4.12 Junction Dam Reach – Silver Creek

The habitat time series dynamics of the Junction Dam Reach are restricted to the low-flow periods of the water year, such as the early summer, summer, fall, and early winter. Unimpaired flows in the reach between January and May are generally higher than the WUA simulations, thus creating substantial periods of the water year when a habitat time series value cannot be ascribed. Nevertheless, the habitat time series analyses describe a condition that is not dissimilar from that of the Ice House Dam Reach.

In general, the historic flow regime in the Junction Dam Reach, directly downstream of the dam, results in reductions in habitat compared to the unimpaired flow regime (Table 4.12-1, Table 4.12-2, and Appendix F figures). The habitat reductions are more evident in the drier water year types, when Junction Dam releases were set at 5 cfs year round. In the driest year, percent reductions in habitat directly downstream of the dam reached upwards of 64 percent, with the higher values occurring for the adult life stages. These reductions in habitat occur at all times of the year, June through December. However, the analyses reveal that in the wetter water years, the historic flows create a diminished reduction in adult habitat below the dam under the historic condition and an increase in habitat for the juvenile life stages. This is due to higher instream flow releases from Junction Reservoir that have occurred historically in the wetter water years and the effect of accretion throughout the reach. These higher releases provide optimal habitat for juveniles, but less than optimal habitat for adults.

The results also reveal a gradual narrowing of the difference in adult habitat reductions between the two flow regimes moving downstream through the different bypass reach nodes. In the driest water year, the change in the reduction is quite dramatic by the time the Sugar Pine Creek hydrologic node is reached. This is largely due to accretion during the winter months, with tributary streams adding flow to the reach from low-elevation rainfall. Little accretion enters the stream during the summer months.

In general, historical juvenile habitat for both species represents a percent increase over unimpaired habitat in all water year types except the drier years. This results from the fact that the historic release flows have provided good habitat for juvenile trout through the reach.

The partial-year analysis (Table 4.12-2) also reveals that spawning habitat for brown trout is reduced under the historic flow condition. The results indicate a general reduction in habitat across most water years and hydrologic nodes. This is due to the fact that the historic releases have been generally lower than the optimal brown trout spawning habitat flow, coupled with the fact that little accretion occurs during the October and November spawning period. Analyses of spawning rainbow trout habitat time series is of little value because such a small fraction of the spawning period (April-June) lies within the WUA versus flow curve range.

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Table 4.12-1. Summary of rainbow and brown trout habitat time series analysis for the Junction Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

Silver Creek below Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,676,094	912,019	-45.59	2,042,483	1,530,827	-25.05	1,508,713	1,306,050	-13.43	1,542,990	1,464,822	-5.07
Brown Trout - Juvenile	1,909,221	1,807,724	-5.32	2,187,124	2,643,120	20.85	1,566,919	1,938,235	23.70	1,539,680	1,927,689	25.20
Brown Trout - Spawning	702,190	439,726	-37.38	823,800	793,307	-3.70	594,648	677,047	13.86	549,026	746,963	36.05
Rainbow Trout - Adult	1,669,511	598,426	-64.16	2,073,214	1,149,546	-44.55	1,565,231	1,086,578	-30.58	1,655,771	1,291,365	-22.01
Rainbow Trout - Juvenile	2,177,711	1,798,076	-17.43	2,525,217	2,745,194	8.71	1,817,988	2,099,084	15.46	1,797,774	2,138,127	18.93
Rainbow Trout - Spawning	725,350	461,279	-36.41	860,933	796,855	-7.44	617,288	683,737	10.76	576,686	756,985	31.26

Silver Creek below Grey Horse Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,679,408	1,161,182	-30.86	2,053,434	1,654,906	-19.41	1,503,627	1,377,666	-8.38	1,528,113	1,533,881	0.38
Brown Trout - Juvenile	1,875,740	2,187,845	16.64	2,168,224	2,665,075	22.92	1,545,362	1,906,416	23.36	1,520,275	1,860,773	22.40
Brown Trout - Spawning	701,204	586,804	-16.31	822,022	871,411	6.01	588,107	706,884	20.20	529,396	777,536	46.87
Rainbow Trout - Adult	1,683,165	812,202	-51.75	2,097,233	1,308,669	-37.60	1,568,721	1,188,352	-24.25	1,648,918	1,402,631	-14.94
Rainbow Trout - Juvenile	2,147,663	2,215,985	3.18	2,510,047	2,827,033	12.63	1,796,384	2,099,063	16.85	1,774,435	2,105,167	18.64
Rainbow Trout - Spawning	724,891	596,966	-17.65	859,096	868,605	1.11	610,352	717,532	17.56	558,407	788,469	41.20

Silver Creek below Onion Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,689,304	1,523,938	-9.79	2,061,735	1,977,896	-4.07	1,469,299	1,540,222	4.83	1,482,438	1,644,774	10.95
Brown Trout - Juvenile	1,781,785	2,148,240	20.57	2,099,363	2,498,425	19.01	1,472,928	1,702,845	15.61	1,479,281	1,662,039	12.35
Brown Trout - Spawning	696,485	790,039	13.43	802,667	1,000,459	24.64	549,035	763,797	39.12	457,135	768,741	68.17
Rainbow Trout - Adult	1,728,380	1,301,047	-24.72	2,146,183	1,781,672	-16.98	1,562,055	1,464,249	-6.26	1,627,151	1,640,973	0.85
Rainbow Trout - Juvenile	2,061,099	2,354,728	14.25	2,446,041	2,805,720	14.70	1,719,021	1,964,741	14.29	1,719,188	1,949,402	13.39
Rainbow Trout - Spawning	718,353	796,010	10.81	837,840	1,018,857	21.61	571,900	778,415	36.11	492,731	785,743	59.47

Silver Creek below Sugar Pine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,692,601	1,580,793	-6.61	2,054,495	2,016,252	-1.86	1,460,453	1,549,052	6.07	1,466,184	1,639,604	11.83
Brown Trout - Juvenile	1,769,538	2,113,885	19.46	2,080,616	2,447,845	17.65	1,458,340	1,665,396	14.20	1,466,138	1,624,996	10.84
Brown Trout - Spawning	694,841	811,522	16.79	794,235	1,011,334	27.33	537,975	762,662	41.77	442,156	742,481	67.92
Rainbow Trout - Adult	1,739,102	1,385,857	-20.31	2,146,419	1,847,825	-13.91	1,558,168	1,492,537	-4.21	1,614,589	1,654,973	2.50
Rainbow Trout - Juvenile	2,050,001	2,345,568	14.42	2,426,735	2,771,601	14.21	1,702,481	1,930,909	13.42	1,702,986	1,910,596	12.19
Rainbow Trout - Spawning	716,400	821,749	14.71	829,179	1,031,564	24.41	561,272	776,583	38.36	478,133	763,064	59.59

Silver Creek above Camino Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,693,157	1,589,562	-6.12	2,054,508	2,021,403	-1.61	1,460,013	1,551,360	6.26	1,465,130	1,639,641	11.91
Brown Trout - Juvenile	1,767,562	2,107,630	19.24	2,079,092	2,443,244	17.51	1,457,470	1,661,228	13.98	1,465,645	1,620,789	10.59
Brown Trout - Spawning	694,392	814,355	17.28	793,495	1,012,907	27.65	536,821	762,864	42.11	440,643	738,510	67.60
Rainbow Trout - Adult	1,740,959	1,399,309	-19.62	2,147,582	1,856,032	-13.58	1,558,375	1,497,480	-3.91	1,614,057	1,657,834	2.71
Rainbow Trout - Juvenile	2,048,270	2,342,934	14.39	2,425,286	2,768,823	14.16	1,701,366	1,927,454	13.29	1,702,230	1,906,222	11.98
Rainbow Trout - Spawning	715,942	825,458	15.30	828,388	1,033,350	24.74	560,216	776,692	38.64	476,627	759,763	59.40

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Table 4.12-2. Summary of rainbow and brown trout habitat time series analysis for the Junction Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

Silver Creek below Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,676,094	912,019	-45.59	2,042,483	1,530,827	-25.05	1,508,713	1,306,050	-13.43	1,542,990	1,464,822	-5.07
Brown Trout - Juvenile	1,909,221	1,807,724	-5.32	2,187,124	2,643,120	20.85	1,566,919	1,938,235	23.70	1,539,680	1,927,689	25.20
Brown Trout - Spawning	702,190	439,726	-37.38	823,800	793,307	-3.70	594,648	677,047	13.86	549,026	746,963	36.05
Rainbow Trout - Adult	1,669,511	598,426	-64.16	2,073,214	1,149,546	-44.55	1,565,231	1,086,578	-30.58	1,655,771	1,291,365	-22.01
Rainbow Trout - Juvenile	2,177,711	1,798,076	-17.43	2,525,217	2,745,194	8.71	1,817,988	2,099,084	15.46	1,797,774	2,138,127	18.93
Rainbow Trout - Spawning	725,350	461,279	-36.41	860,933	796,855	-7.44	617,288	683,737	10.76	576,686	756,985	31.26

Silver Creek below Grey Horse Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,679,408	1,161,182	-30.86	2,053,434	1,654,906	-19.41	1,503,627	1,377,666	-8.38	1,528,113	1,533,881	0.38
Brown Trout - Juvenile	1,875,740	2,187,845	16.64	2,168,224	2,665,075	22.92	1,545,362	1,906,416	23.36	1,520,275	1,860,773	22.40
Brown Trout - Spawning	701,204	586,804	-16.31	822,022	871,411	6.01	588,107	706,884	20.20	529,396	777,536	46.87
Rainbow Trout - Adult	1,683,165	812,202	-51.75	2,097,233	1,308,669	-37.60	1,568,721	1,188,352	-24.25	1,648,918	1,402,631	-14.94
Rainbow Trout - Juvenile	2,147,663	2,215,985	3.18	2,510,047	2,827,033	12.63	1,796,384	2,099,063	16.85	1,774,435	2,105,167	18.64
Rainbow Trout - Spawning	724,891	596,966	-17.65	859,096	868,605	1.11	610,352	717,532	17.56	558,407	788,469	41.20

Silver Creek below Onion Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,689,304	1,523,938	-9.79	2,061,735	1,977,896	-4.07	1,469,299	1,540,222	4.83	1,482,438	1,644,774	10.95
Brown Trout - Juvenile	1,781,785	2,148,240	20.57	2,099,363	2,498,425	19.01	1,472,928	1,702,845	15.61	1,479,281	1,662,039	12.35
Brown Trout - Spawning	696,485	790,039	13.43	802,667	1,000,459	24.64	549,035	763,797	39.12	457,135	768,741	68.17
Rainbow Trout - Adult	1,728,380	1,301,047	-24.72	2,146,183	1,781,672	-16.98	1,562,055	1,464,249	-6.26	1,627,151	1,640,973	0.85
Rainbow Trout - Juvenile	2,061,099	2,354,728	14.25	2,446,041	2,805,720	14.70	1,719,021	1,964,741	14.29	1,719,188	1,949,402	13.39
Rainbow Trout - Spawning	718,353	796,010	10.81	837,840	1,018,857	21.61	571,900	778,415	36.11	492,731	785,743	59.47

Silver Creek below Sugar Pine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,692,601	1,580,793	-6.61	2,054,495	2,016,252	-1.86	1,460,453	1,549,052	6.07	1,466,184	1,639,604	11.83
Brown Trout - Juvenile	1,769,538	2,113,885	19.46	2,080,616	2,447,845	17.65	1,458,340	1,665,396	14.20	1,466,138	1,624,996	10.84
Brown Trout - Spawning	694,841	811,522	16.79	794,235	1,011,334	27.33	537,975	762,662	41.77	442,156	742,481	67.92
Rainbow Trout - Adult	1,739,102	1,385,857	-20.31	2,146,419	1,847,825	-13.91	1,558,168	1,492,537	-4.21	1,614,589	1,654,973	2.50
Rainbow Trout - Juvenile	2,050,001	2,345,568	14.42	2,426,735	2,771,601	14.21	1,702,481	1,930,909	13.42	1,702,986	1,910,596	12.19
Rainbow Trout - Spawning	716,400	821,749	14.71	829,179	1,031,564	24.41	561,272	776,583	38.36	478,133	763,064	59.59

Silver Creek above Camino Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,693,157	1,589,562	-6.12	2,054,508	2,021,403	-1.61	1,460,013	1,551,360	6.26	1,465,130	1,639,641	11.91
Brown Trout - Juvenile	1,767,562	2,107,630	19.24	2,079,092	2,443,244	17.51	1,457,470	1,661,228	13.98	1,465,645	1,620,789	10.59
Brown Trout - Spawning	694,392	814,355	17.28	793,495	1,012,907	27.65	536,821	762,864	42.11	440,643	738,510	67.60
Rainbow Trout - Adult	1,740,959	1,399,309	-19.62	2,147,582	1,856,032	-13.58	1,558,375	1,497,480	-3.91	1,614,057	1,657,834	2.71
Rainbow Trout - Juvenile	2,048,270	2,342,934	14.39	2,425,286	2,768,823	14.16	1,701,366	1,927,454	13.29	1,702,230	1,906,222	11.98
Rainbow Trout - Spawning	715,942	825,458	15.30	828,388	1,033,350	24.74	560,216	776,692	38.64	476,627	759,763	59.40

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4.13 Camino Dam Reach Time Series – Silver Creek

The results of the Camino Dam Reach are similar to those of the Junction Dam Reach (Table 4.13-1, Table 4.13-2, and Appendix F figures). As is the case for the Junction Dam Reach, the habitat time series dynamics of the Camino Dam Reach are restricted to the same low-flow periods of the water year, such as the early summer, summer, fall, and early winter. In general, the historic flow regime in the Camino Dam Reach, directly downstream of the dam, results in reductions in habitat compared to the unimpaired flow regime. This is more evident in the drier water year types, when Camino Dam releases were set at 5 cfs year-round. In the driest year, percent reductions in habitat directly downstream of the dam range between 30 and 60 percent, with the higher values occurring for the adult life stages. Again, like the Junction Reach, the analyses reveal that in the wetter water years, the historic flows create a smaller reduction in adult habitat below the dam under the historic condition and an increase in habitat for the juvenile life stages. In fact, in the wettest water year adult brown trout habitat downstream of Camino Dam under historic conditions represents an increase over unimpaired conditions. This is due, in part, to the higher minimum flow releases emanating from Camino Dam.

The results also reveal a gradual narrowing of the difference in adult habitat reductions between the two flow regimes moving downstream through the different bypass reach nodes. In the driest water year, the change in the reduction is quite dramatic by the time the Grey Horse Creek hydrologic node is reached. This is largely due to accretion during the winter months, with tributary streams adding flow to the reach from low-elevation rainfall. Little accretion enters the stream during the summer months.

The results of the analyses also reveal the general level of increase in juvenile habitat associated with the historic flows. Historic flows provided increased in juvenile habitat for both species of trout in all water year types and/or hydrologic nodes except for the driest year and most upstream node.

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Table 4.13-1. Summary of rainbow and brown trout habitat time series analysis for the Camino Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and four hydrologic nodes.

Silver Creek Below Camino Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,905,752	1,829,572	-37.04	3,153,048	2,633,158	-16.49	2,253,217	2,140,745	-4.99	2,401,715	2,514,116	4.68
Brown Trout - Juvenile	2,416,703	2,390,613	-1.08	2,563,212	3,187,788	24.37	1,782,283	2,286,522	28.29	1,904,668	2,534,768	33.08
Brown Trout - Spawning	709,762	253,580	-64.27	770,259	442,104	-42.60	560,436	405,256	-27.69	591,904	509,390	-13.94
Rainbow Trout - Adult	2,764,507	1,072,256	-61.21	3,075,119	1,790,078	-41.79	2,244,786	1,658,433	-26.12	2,480,445	2,015,448	-18.75
Rainbow Trout - Juvenile	2,747,522	2,490,985	-9.34	2,920,460	3,402,717	16.51	2,045,363	2,498,080	22.13	2,183,184	2,792,198	27.90
Rainbow Trout - Spawning	727,253	351,077	-51.73	786,138	549,427	-30.11	565,776	478,912	-15.35	600,587	574,621	-4.32

Silver Creek below Round Tent

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,884,296	1,961,131	-32.01	3,147,721	2,727,166	-13.36	2,238,593	2,189,661	-2.19	2,389,981	2,597,391	8.68
Brown Trout - Juvenile	2,392,420	2,519,391	5.31	2,556,416	3,213,642	25.71	1,766,349	2,266,143	28.30	1,900,079	2,514,140	32.32
Brown Trout - Spawning	704,233	283,088	-59.80	770,681	479,877	-37.73	556,910	424,837	-23.72	590,971	541,761	-8.33
Rainbow Trout - Adult	2,746,024	1,185,977	-56.81	3,074,818	1,926,255	-37.35	2,234,458	1,736,482	-22.29	2,472,882	2,140,928	-13.42
Rainbow Trout - Juvenile	2,721,461	2,636,276	-3.13	2,913,700	3,454,611	18.56	2,027,966	2,487,945	22.68	2,177,304	2,787,832	28.04
Rainbow Trout - Spawning	721,393	382,759	-46.94	786,021	581,790	-25.98	562,120	494,704	-11.99	599,375	602,626	0.54

Silver Creek Half Way below No Name Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,852,896	2,128,531	-25.39	3,141,307	2,826,429	-10.02	2,222,641	2,244,026	0.96	2,367,698	2,666,118	12.60
Brown Trout - Juvenile	2,359,923	2,680,963	13.60	2,549,758	3,213,565	26.03	1,747,945	2,233,768	27.79	1,886,475	2,458,950	30.35
Brown Trout - Spawning	695,272	318,655	-54.17	771,439	520,441	-32.54	552,813	445,454	-19.42	587,049	575,174	-2.02
Rainbow Trout - Adult	2,716,615	1,328,811	-51.09	3,074,582	2,074,296	-32.53	2,223,691	1,822,922	-18.02	2,454,367	2,264,690	-7.73
Rainbow Trout - Juvenile	2,685,705	2,817,677	4.91	2,906,487	3,477,796	19.66	2,008,108	2,466,321	22.82	2,160,985	2,747,510	27.14
Rainbow Trout - Spawning	712,176	422,377	-40.69	786,204	616,266	-21.61	558,071	511,177	-8.40	595,271	627,030	5.34

Silver Creek at SFAR

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,832,538	2,161,927	-23.68	3,137,598	2,879,638	-8.22	2,217,990	2,278,415	2.72	2,359,975	2,699,073	14.37
Brown Trout - Juvenile	2,338,127	2,698,422	15.41	2,546,192	3,206,311	25.93	1,742,179	2,218,736	27.35	1,883,977	2,430,215	28.99
Brown Trout - Spawning	689,636	328,926	-52.30	772,176	543,970	-29.55	551,971	453,943	-17.76	586,126	594,805	1.48
Rainbow Trout - Adult	2,698,255	1,369,421	-49.25	3,074,068	2,155,986	-29.87	2,222,552	1,874,670	-15.65	2,448,990	2,325,346	-5.05
Rainbow Trout - Juvenile	2,661,914	2,842,350	6.78	2,902,545	3,482,162	19.97	2,002,133	2,457,611	22.75	2,157,271	2,726,158	26.37
Rainbow Trout - Spawning	706,274	432,037	-38.83	786,536	635,449	-19.21	557,283	519,350	-6.81	594,294	639,402	7.59

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Table 4.13-2. Summary of rainbow and brown trout habitat time series analysis for the Camino Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and four hydrologic nodes.

Silver Creek Below Camino Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,378,863	1,393,456	-41.42	2,356,618	1,907,164	-19.07	1,999,311	1,876,813	-6.13	1,698,876	1,751,609	3.10
Brown Trout - Juvenile	1,969,513	1,830,780	-7.04	1,889,458	2,270,809	20.18	1,561,155	1,974,480	26.48	1,295,100	1,671,644	29.07
Brown Trout - Spawning	186,906	63,494	-66.03	193,501	96,957	-49.89	166,651	116,058	-30.36	182,048	144,500	-20.63
Rainbow Trout - Adult	2,206,873	804,579	-63.54	2,234,671	1,331,574	-40.41	1,976,834	1,471,708	-25.55	1,739,397	1,450,780	-16.59
Rainbow Trout - Juvenile	2,243,315	1,902,927	-15.17	2,165,827	2,435,514	12.45	1,800,432	2,162,338	20.10	1,508,320	1,856,461	23.08
Rainbow Trout - Spawning	92,295	46,128	-50.02	83,037	68,985	-16.92	32,750	32,401	-1.07	0	0	0.00

Silver Creek below Round Tent

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,378,350	1,474,494	-38.00	2,355,264	1,924,239	-18.30	1,985,118	1,907,236	-3.92	1,690,012	1,778,507	5.24
Brown Trout - Juvenile	1,963,870	1,934,260	-1.51	1,883,954	2,278,790	20.96	1,545,107	1,954,638	26.51	1,290,823	1,662,375	28.78
Brown Trout - Spawning	187,682	69,596	-62.92	193,184	101,795	-47.31	163,109	120,644	-26.03	181,589	154,272	-15.04
Rainbow Trout - Adult	2,211,179	855,588	-61.31	2,238,050	1,356,018	-39.41	1,967,213	1,522,776	-22.59	1,735,486	1,493,707	-13.93
Rainbow Trout - Juvenile	2,238,375	2,012,283	-10.10	2,160,816	2,448,959	13.33	1,783,101	2,149,009	20.52	1,503,804	1,852,980	23.22
Rainbow Trout - Spawning	92,252	52,356	-43.25	83,016	71,138	-14.31	32,774	33,502	2.22	0	0	0.00

Silver Creek Half Way below No Name Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,377,369	1,636,184	-31.18	2,353,388	1,961,070	-16.67	1,969,793	1,942,748	-1.37	1,680,123	1,811,489	7.82
Brown Trout - Juvenile	1,958,986	2,133,389	8.90	1,877,590	2,286,996	21.80	1,526,664	1,927,095	26.23	1,286,395	1,641,676	27.62
Brown Trout - Spawning	188,433	80,880	-57.08	192,658	109,459	-43.18	159,378	125,764	-21.09	180,937	162,677	-10.09
Rainbow Trout - Adult	2,214,495	964,640	-56.44	2,242,017	1,409,072	-37.15	1,957,413	1,581,394	-19.21	1,730,804	1,552,872	-10.28
Rainbow Trout - Juvenile	2,233,972	2,225,193	-0.39	2,154,882	2,466,743	14.47	1,763,415	2,128,678	20.71	1,498,585	1,839,409	22.74
Rainbow Trout - Spawning	92,227	56,890	-38.31	82,924	75,823	-8.56	32,862	34,405	4.70	0	0	0.00

Silver Creek at SFAR

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,367,599	1,669,669	-29.48	2,352,437	1,990,075	-15.40	1,965,688	1,968,698	0.15	1,673,629	1,826,442	9.13
Brown Trout - Juvenile	1,946,350	2,167,303	11.35	1,873,954	2,288,983	22.15	1,521,006	1,915,792	25.96	1,284,021	1,626,693	26.69
Brown Trout - Spawning	189,070	83,562	-55.80	192,404	113,926	-40.79	158,820	129,808	-18.27	180,535	167,469	-7.24
Rainbow Trout - Adult	2,207,507	995,884	-54.89	2,244,075	1,451,201	-35.33	1,956,948	1,620,091	-17.21	1,727,244	1,582,728	-8.37
Rainbow Trout - Juvenile	2,220,791	2,265,080	1.99	2,151,574	2,474,890	15.03	1,757,715	2,122,131	20.73	1,495,413	1,828,067	22.24
Rainbow Trout - Spawning	89,018	58,117	-34.71	82,794	76,974	-7.03	32,865	34,880	6.13	0	0	0.00

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4.14 Brush Creek Dam Reach Times Series – Brush Creek

The results of the Brush Creek time series reveal a general increase in adult habitat for the historic flow regime compared to the unimpaired for the drier water years, but a general decreases in adult habitat for the wetter water years (Table 4.14-1, Table 4.14-2, and Appendix F figures). In the dry years, the greatest increase in habitat occurs in the July through October time period, when natural flows in Brush Creek drop to approximately 1 cfs. On the other hand, in these dry years, there are slight decreases in habitat under historic conditions during winter months. The trends are different in the wet water years. In the wetter water years, historic flow conditions result in reductions in habitat for adult trout. This results from the fact that the wetter water years under unimpaired conditions produce more summer flow, which improves habitat.

Juvenile habitat under the historic condition is increased across all water year types and hydrologic nodes. Review of the partial year analysis reveals that spawning habitat is also generally increased under the historic flow condition. Rainbow trout spawning habitat is reduced under the historic condition only under wetter water years and only by a small percentage (0.3 to 2.3 percent).

4.15 Slab Creek Dam Reach Time Series – South Fork American River

The results for the Slab Creek Dam Reach are consistent with those of the Camino and Junction Dam reaches (Table 4.15-1, Table 4.15-2, and Appendix F figures). As in the upper reaches, high spring flows remove a substantial portion of information from the habitat time series curves. Nevertheless, adult trout habitat under historic flows represents a reduction of habitat over unimpaired flows throughout most of the water years and at most of the hydrologic nodes. Percent reductions in adult habitat reach as high as 50 percent in the case of adult rainbow trout habitat in the drier water year types. The percentage reductions are somewhat lessened in the lower hydrologic nodes, as accretion add to the streamflows in the lower part of the reach. These reductions generally result from the fact the optimal habitat for adult trout occurs at 100-150 cfs. The 36 cfs historical releases from Slab Creek Reservoir provide approximately 70 percent of optimal habitat.

Juvenile habitat is increased throughout all water years and at all nodes under the historic hydrologic regime. These results from the fact that the historic 36 cfs releases from Slab Creek Reservoir generally provide near optimal habitat for juvenile life stages.

The partial-year analysis also reveals that spawning habitat for brown trout is reduced under the historic flow condition. The results indicate a general reduction in habitat across most water years and hydrologic nodes. This is due to the fact that the historic releases have been generally lower than the optimal brown trout spawning habitat coupled with the fact that little accretion occurs during the October and November spawning period. Analyses of spawning rainbow trout habitat time series is of little value because such a small fraction of the spawning period (April-June) lies within the WUA versus flow curve range.

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Table 4.14-1. Summary of rainbow and brown trout habitat time series analysis for the Brush Creek Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and two hydrologic nodes.

Brush Creek below Brush Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	684,973	843,140	23.09	853,117	953,390	11.75	978,730	914,228	-6.59	1,174,265	1,039,239	-11.50
Brown Trout - Juvenile	1,238,483	1,727,121	39.45	1,608,660	1,942,306	20.74	1,679,067	1,751,756	4.33	1,890,568	1,973,057	4.36
Brown Trout - Spawning	140,942	173,502	23.10	175,966	197,110	12.02	200,444	202,609	1.08	247,911	232,007	-6.42
Rainbow Trout - Adult	676,237	697,054	3.08	804,887	796,917	-0.99	1,023,014	858,148	-16.12	1,310,566	988,780	-24.55
Rainbow Trout - Juvenile	1,328,829	1,811,681	36.34	1,714,626	2,040,435	19.00	1,814,542	1,874,141	3.28	2,081,265	2,117,465	1.74
Rainbow Trout - Spawning	154,166	193,441	25.48	194,603	220,135	13.12	216,195	224,569	3.87	265,435	256,862	-3.23

Brush Creek above Slab Creek Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	738,803	881,314	19.29	939,842	1,038,663	10.51	977,044	944,571	-3.32	1,102,981	1,057,650	-4.11
Brown Trout - Juvenile	1,299,610	1,669,474	28.46	1,692,784	1,952,866	15.36	1,588,508	1,643,605	3.47	1,690,983	1,761,831	4.19
Brown Trout - Spawning	152,296	186,933	22.74	195,262	224,300	14.87	207,293	198,543	-4.22	234,467	223,426	-4.71
Rainbow Trout - Adult	755,299	831,476	10.09	938,142	996,168	6.19	1,072,413	999,702	-6.78	1,278,406	1,173,920	-8.17
Rainbow Trout - Juvenile	1,402,936	1,785,456	27.27	1,820,721	2,095,109	15.07	1,743,849	1,786,545	2.45	1,885,316	1,935,970	2.69
Rainbow Trout - Spawning	166,249	207,503	24.81	213,993	250,098	16.87	221,315	222,224	0.41	249,109	248,108	-0.40

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Table 4.14-2. Summary of rainbow and brown trout habitat time series analysis for the Brush Creek Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and two hydrologic nodes.

Brush Creek below Brush Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	684,973	843,140	23.09	853,117	953,390	11.75	978,730	914,228	-6.59	1,174,265	1,039,239	-11.50
Brown Trout - Juvenile	1,238,483	1,727,121	39.45	1,608,660	1,942,306	20.74	1,679,067	1,751,756	4.33	1,890,568	1,973,057	4.36
Brown Trout - Spawning	140,942	173,502	23.10	175,966	197,110	12.02	200,444	202,609	1.08	247,911	232,007	-6.42
Rainbow Trout - Adult	676,237	697,054	3.08	804,887	796,917	-0.99	1,023,014	858,148	-16.12	1,310,566	988,780	-24.55
Rainbow Trout - Juvenile	1,328,829	1,811,681	36.34	1,714,626	2,040,435	19.00	1,814,542	1,874,141	3.28	2,081,265	2,117,465	1.74
Rainbow Trout - Spawning	154,166	193,441	25.48	194,603	220,135	13.12	216,195	224,569	3.87	265,435	256,862	-3.23

Brush Creek above Slab Creek Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	738,803	881,314	19.29	939,842	1,038,663	10.51	977,044	944,571	-3.32	1,102,981	1,057,650	-4.11
Brown Trout - Juvenile	1,299,610	1,669,474	28.46	1,692,784	1,952,866	15.36	1,588,508	1,643,605	3.47	1,690,983	1,761,831	4.19
Brown Trout - Spawning	152,296	186,933	22.74	195,262	224,300	14.87	207,293	198,543	-4.22	234,467	223,426	-4.71
Rainbow Trout - Adult	755,299	831,476	10.09	938,142	996,168	6.19	1,072,413	999,702	-6.78	1,278,406	1,173,920	-8.17
Rainbow Trout - Juvenile	1,402,936	1,785,456	27.27	1,820,721	2,095,109	15.07	1,743,849	1,786,545	2.45	1,885,316	1,935,970	2.69
Rainbow Trout - Spawning	166,249	207,503	24.81	213,993	250,098	16.87	221,315	222,224	0.41	249,109	248,108	-0.40

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Table 4.15-1. Summary of rainbow and brown trout habitat time series analysis for the Slab Creek Dam Reach, with total yearly habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

SFAR Below Slab Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,863,836	3,338,662	-31.36	5,347,007	3,766,291	-29.56	4,097,808	3,119,729	-23.87	4,702,892	3,839,063	-18.37
Brown Trout - Juvenile	3,476,002	4,533,757	30.43	3,649,601	4,730,201	29.61	2,250,184	3,737,195	66.08	1,987,951	4,205,443	111.55
Brown Trout - Spawning	461,364	315,769	-31.56	506,953	365,151	-27.97	396,331	311,376	-21.44	477,517	378,140	-20.81
Rainbow Trout - Adult	4,721,431	2,531,547	-46.38	5,266,161	2,962,970	-43.74	4,277,871	2,480,348	-42.02	5,229,793	3,152,124	-39.73
Rainbow Trout - Juvenile	4,309,997	5,128,309	18.99	4,563,989	5,408,393	18.50	2,881,011	4,331,426	50.34	2,556,431	4,950,478	93.65
Rainbow Trout - Spawning	296,777	169,962	-42.73	331,994	197,018	-40.66	283,257	165,605	-41.54	373,577	201,802	-45.98

SFAR below Iowa Canyon Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,829,173	3,488,411	-27.76	5,316,408	3,940,661	-25.88	4,104,599	3,232,882	-21.24	4,690,688	4,006,219	-14.59
Brown Trout - Juvenile	3,442,808	4,668,596	35.60	3,609,344	4,916,105	36.20	2,227,240	3,692,269	65.78	1,971,192	4,139,090	109.98
Brown Trout - Spawning	457,113	334,615	-26.80	502,882	375,844	-25.26	397,803	323,902	-18.58	477,467	360,630	-24.47
Rainbow Trout - Adult	4,689,421	2,664,648	-43.18	5,242,184	3,110,342	-40.67	4,296,145	2,615,541	-39.12	5,224,034	3,368,020	-35.53
Rainbow Trout - Juvenile	4,273,742	5,300,848	24.03	4,520,743	5,631,216	24.56	2,855,918	4,314,352	51.07	2,530,486	4,919,597	94.41
Rainbow Trout - Spawning	293,851	179,381	-38.96	329,700	201,782	-38.80	285,279	173,078	-39.33	374,096	187,371	-49.91

SFAR below Mosquito Rd Bridge

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,839,127	3,613,975	-25.32	5,332,008	4,111,990	-22.88	4,088,830	3,339,625	-18.32	4,609,868	4,115,299	-10.73
Brown Trout - Juvenile	3,422,974	4,668,177	36.38	3,581,452	4,926,590	37.56	2,193,199	3,617,169	64.93	1,929,622	3,987,978	106.67
Brown Trout - Spawning	458,068	354,693	-22.57	504,390	385,184	-23.63	396,664	322,673	-18.65	469,752	361,461	-23.05
Rainbow Trout - Adult	4,709,314	2,798,969	-40.57	5,273,522	3,295,379	-37.51	4,289,283	2,757,100	-35.72	5,139,756	3,554,177	-30.85
Rainbow Trout - Juvenile	4,253,768	5,338,643	25.50	4,492,674	5,693,727	26.73	2,817,598	4,265,194	51.38	2,473,853	4,793,523	93.77
Rainbow Trout - Spawning	295,268	188,776	-36.07	331,899	205,143	-38.19	285,526	170,895	-40.15	368,574	188,148	-48.95

SFAR below Rock Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,828,963	4,028,806	-16.57	5,272,011	4,577,785	-13.17	4,043,081	3,763,010	-6.93	4,139,199	4,217,696	1.90
Brown Trout - Juvenile	3,293,820	4,450,519	35.12	3,383,967	4,619,301	36.51	2,037,429	3,249,372	59.48	1,695,297	3,113,756	83.67
Brown Trout - Spawning	456,947	393,231	-13.94	497,001	413,162	-16.87	396,795	333,220	-16.02	423,646	381,263	-10.00
Rainbow Trout - Adult	4,743,975	3,306,818	-30.29	5,271,141	3,899,605	-26.02	4,296,177	3,387,566	-21.15	4,635,563	3,965,337	-14.46
Rainbow Trout - Juvenile	4,120,355	5,229,249	26.91	4,281,424	5,509,481	28.68	2,636,441	3,996,256	51.58	2,159,265	3,965,079	83.63
Rainbow Trout - Spawning	296,942	209,938	-29.30	330,926	219,176	-33.77	291,395	180,519	-38.05	335,269	228,384	-31.88

SFAR above Chili Bar Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,790,757	4,023,711	-16.01	5,257,501	4,601,974	-12.47	4,021,394	3,780,877	-5.98	4,087,153	4,205,981	2.91
Brown Trout - Juvenile	3,265,694	4,389,890	34.42	3,358,595	4,575,802	36.24	2,014,416	3,189,959	58.36	1,669,632	3,018,831	80.81
Brown Trout - Spawning	452,442	390,789	-13.63	495,505	416,031	-16.04	394,962	336,442	-14.82	418,560	381,815	-8.78
Rainbow Trout - Adult	4,705,674	3,318,068	-29.49	5,262,032	3,942,255	-25.08	4,278,499	3,429,320	-19.85	4,579,068	3,983,596	-13.00
Rainbow Trout - Juvenile	4,089,217	5,169,175	26.41	4,253,783	5,472,204	28.64	2,608,605	3,942,380	51.13	2,125,171	3,867,998	82.01
Rainbow Trout - Spawning	293,773	208,491	-29.03	330,482	220,233	-33.36	290,591	184,956	-36.35	331,499	232,141	-29.97

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Table 4.15-2. Summary of rainbow and brown trout habitat time series analysis for the Slab Creek Dam Reach, with partial year habitat under historic and unimpaired flow conditions and percent change, for four water year types and five hydrologic nodes.

SFAR Below Slab Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,863,836	3,338,662	-31.36	5,347,007	3,766,291	-29.56	4,097,808	3,119,729	-23.87	4,702,892	3,839,063	-18.37
Brown Trout - Juvenile	3,476,002	4,533,757	30.43	3,649,601	4,730,201	29.61	2,250,184	3,737,195	66.08	1,987,951	4,205,443	111.55
Brown Trout - Spawning	461,364	315,769	-31.56	506,953	365,151	-27.97	396,331	311,376	-21.44	477,517	378,140	-20.81
Rainbow Trout - Adult	4,721,431	2,531,547	-46.38	5,266,161	2,962,970	-43.74	4,277,871	2,480,348	-42.02	5,229,793	3,152,124	-39.73
Rainbow Trout - Juvenile	4,309,997	5,128,309	18.99	4,563,989	5,408,393	18.50	2,881,011	4,331,426	50.34	2,556,431	4,950,478	93.65
Rainbow Trout - Spawning	296,777	169,962	-42.73	331,994	197,018	-40.66	283,257	165,605	-41.54	373,577	201,802	-45.98

SFAR below Iowa Canyon Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,829,173	3,488,411	-27.76	5,316,408	3,940,661	-25.88	4,104,599	3,232,882	-21.24	4,690,688	4,006,219	-14.59
Brown Trout - Juvenile	3,442,808	4,668,596	35.60	3,609,344	4,916,105	36.20	2,227,240	3,692,269	65.78	1,971,192	4,139,090	109.98
Brown Trout - Spawning	457,113	334,615	-26.80	502,882	375,844	-25.26	397,803	323,902	-18.58	477,467	360,630	-24.47
Rainbow Trout - Adult	4,689,421	2,664,648	-43.18	5,242,184	3,110,342	-40.67	4,296,145	2,615,541	-39.12	5,224,034	3,368,020	-35.53
Rainbow Trout - Juvenile	4,273,742	5,300,848	24.03	4,520,743	5,631,216	24.56	2,855,918	4,314,352	51.07	2,530,486	4,919,597	94.41
Rainbow Trout - Spawning	293,851	179,381	-38.96	329,700	201,782	-38.80	285,279	173,078	-39.33	374,096	187,371	-49.91

SFAR below Mosquito Rd Bridge

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,839,127	3,613,975	-25.32	5,332,008	4,111,990	-22.88	4,088,830	3,339,625	-18.32	4,609,868	4,115,299	-10.73
Brown Trout - Juvenile	3,422,974	4,668,177	36.38	3,581,452	4,926,590	37.56	2,193,199	3,617,169	64.93	1,929,622	3,987,978	106.67
Brown Trout - Spawning	458,068	354,693	-22.57	504,390	385,184	-23.63	396,664	322,673	-18.65	469,752	361,461	-23.05
Rainbow Trout - Adult	4,709,314	2,798,969	-40.57	5,273,522	3,295,379	-37.51	4,289,283	2,757,100	-35.72	5,139,756	3,554,177	-30.85
Rainbow Trout - Juvenile	4,253,768	5,338,643	25.50	4,492,674	5,693,727	26.73	2,817,598	4,265,194	51.38	2,473,853	4,793,523	93.77
Rainbow Trout - Spawning	295,268	188,776	-36.07	331,899	205,143	-38.19	285,526	170,895	-40.15	368,574	188,148	-48.95

SFAR below Rock Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,828,963	4,028,806	-16.57	5,272,011	4,577,785	-13.17	4,043,081	3,763,010	-6.93	4,139,199	4,217,696	1.90
Brown Trout - Juvenile	3,293,820	4,450,519	35.12	3,383,967	4,619,301	36.51	2,037,429	3,249,372	59.48	1,695,297	3,113,756	83.67
Brown Trout - Spawning	456,947	393,231	-13.94	497,001	413,162	-16.87	396,795	333,220	-16.02	423,646	381,263	-10.00
Rainbow Trout - Adult	4,743,975	3,306,818	-30.29	5,271,141	3,899,605	-26.02	4,296,177	3,387,566	-21.15	4,635,563	3,965,337	-14.46
Rainbow Trout - Juvenile	4,120,355	5,229,249	26.91	4,281,424	5,509,481	28.68	2,636,441	3,996,256	51.58	2,159,265	3,965,079	83.63
Rainbow Trout - Spawning	296,942	209,938	-29.30	330,926	219,176	-33.77	291,395	180,519	-38.05	335,269	228,384	-31.88

SFAR above Chili Bar Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,790,757	4,023,711	-16.01	5,257,501	4,601,974	-12.47	4,021,394	3,780,877	-5.98	4,087,153	4,205,981	2.91
Brown Trout - Juvenile	3,265,694	4,389,890	34.42	3,358,595	4,575,802	36.24	2,014,416	3,189,959	58.36	1,669,632	3,018,831	80.81
Brown Trout - Spawning	452,442	390,789	-13.63	495,505	416,031	-16.04	394,962	336,442	-14.82	418,560	381,815	-8.78
Rainbow Trout - Adult	4,705,674	3,318,068	-29.49	5,262,032	3,942,255	-25.08	4,278,499	3,429,320	-19.85	4,579,068	3,983,596	-13.00
Rainbow Trout - Juvenile	4,089,217	5,169,175	26.41	4,253,783	5,472,204	28.64	2,608,605	3,942,380	51.13	2,125,171	3,867,998	82.01
Rainbow Trout - Spawning	293,773	208,491	-29.03	330,482	220,233	-33.36	290,591	184,956	-36.35	331,499	232,141	-29.97

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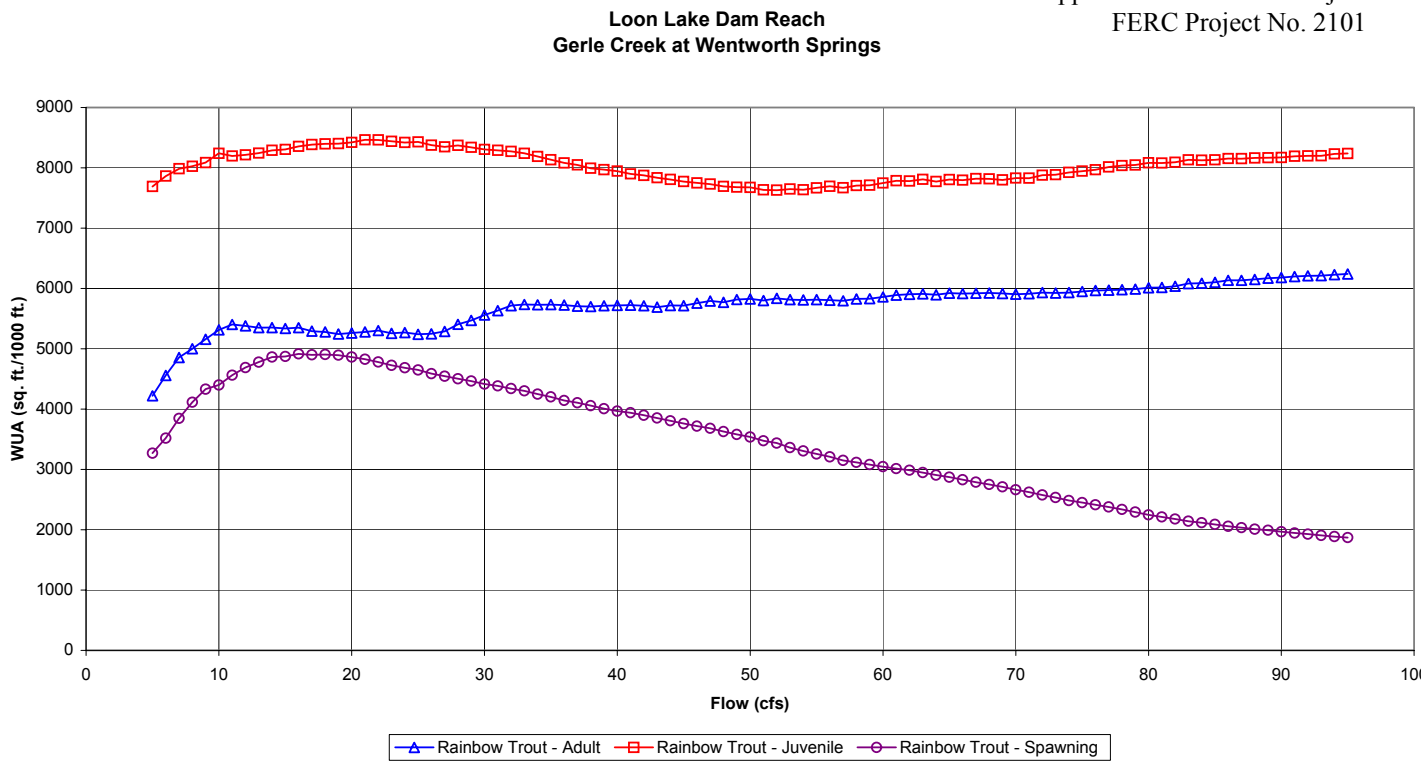

Figure 4.1.1-1. WUA versus flow for Gerle Creek at Wentworth Springs: rainbow trout.

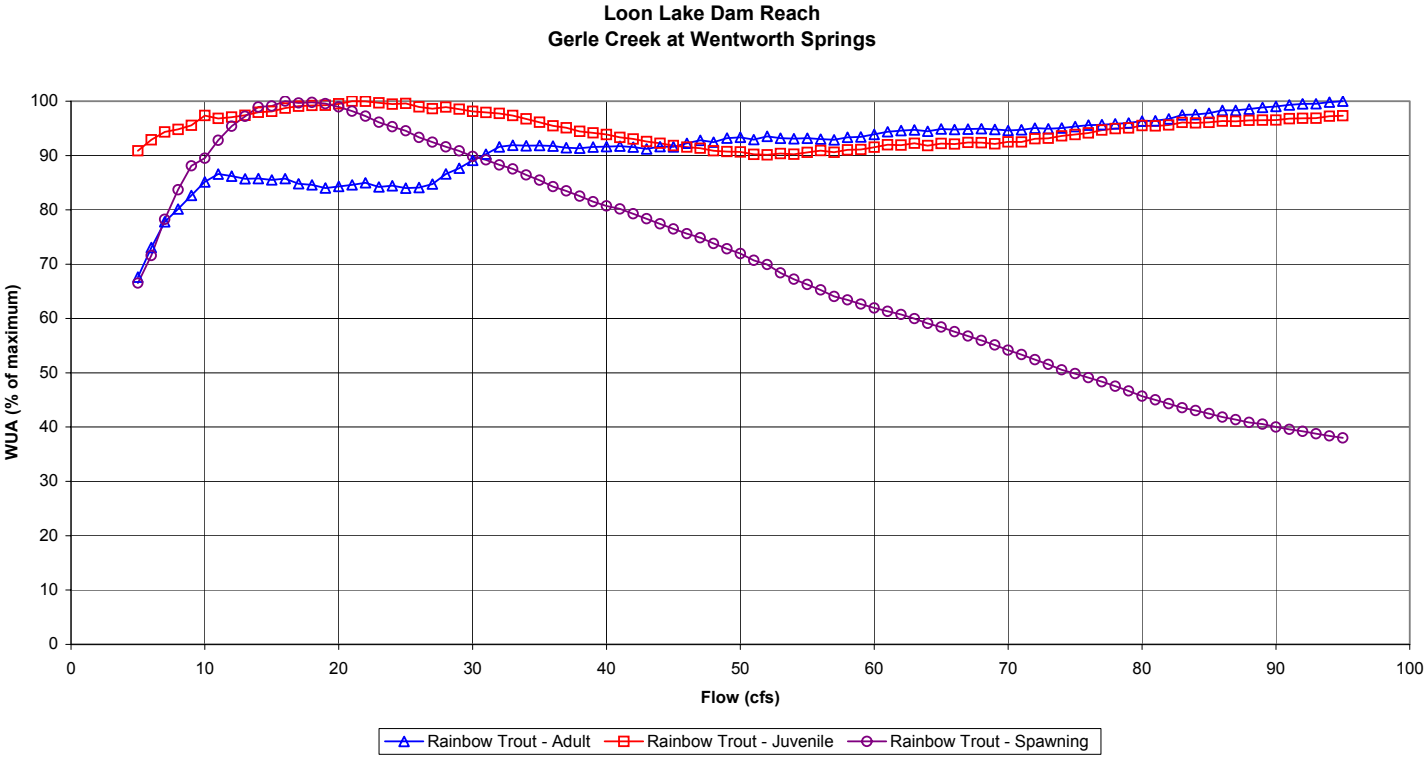

Figure 4.1.1-2. Percent of maximum WUA versus flow for Gerle Creek at Wentworth Springs: rainbow trout.

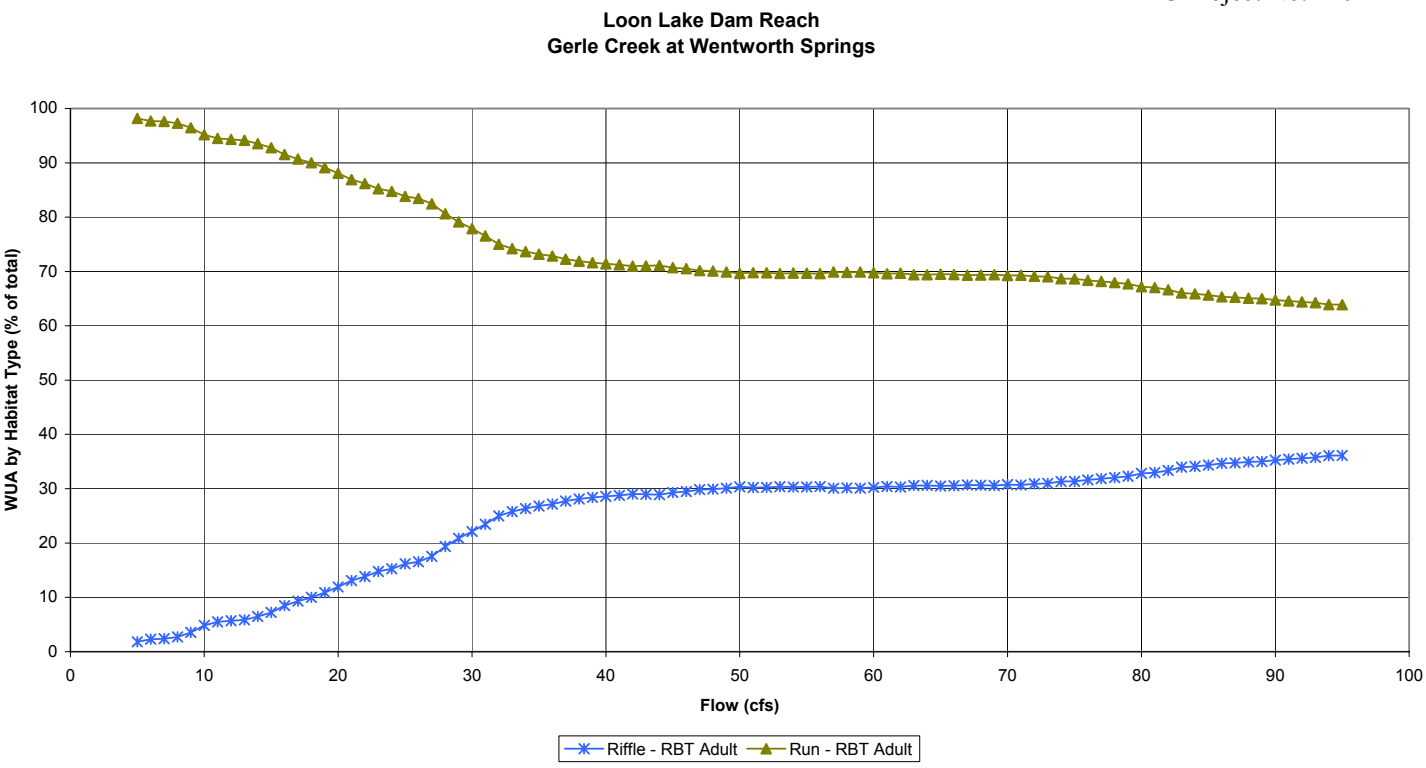

Figure 4.1.1-3. WUA by habitat type for Gerle Creek at Wentworth Springs: rainbow trout adult.

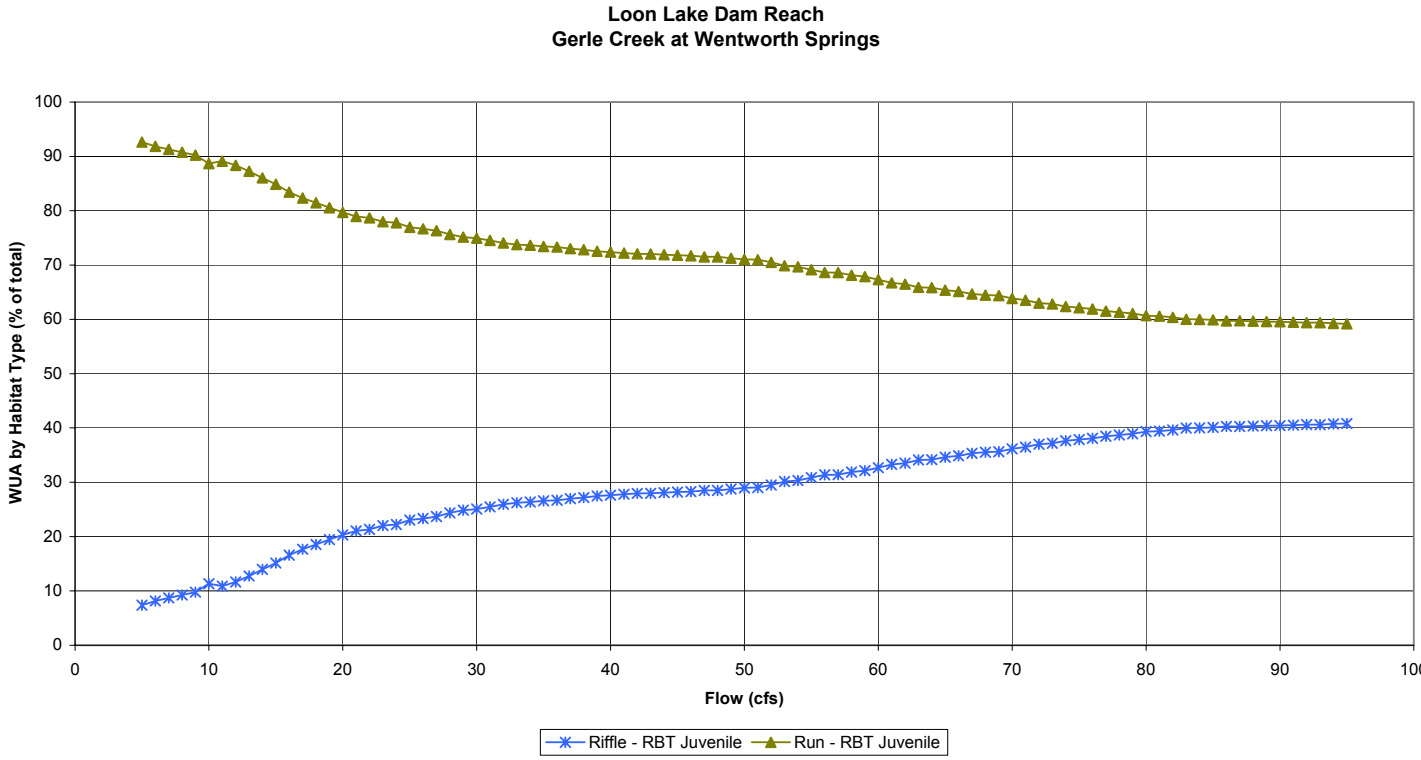

Figure 4.1.1-4. WUA by habitat type for Gerle Creek at Wentworth Springs: rainbow trout juvenile.

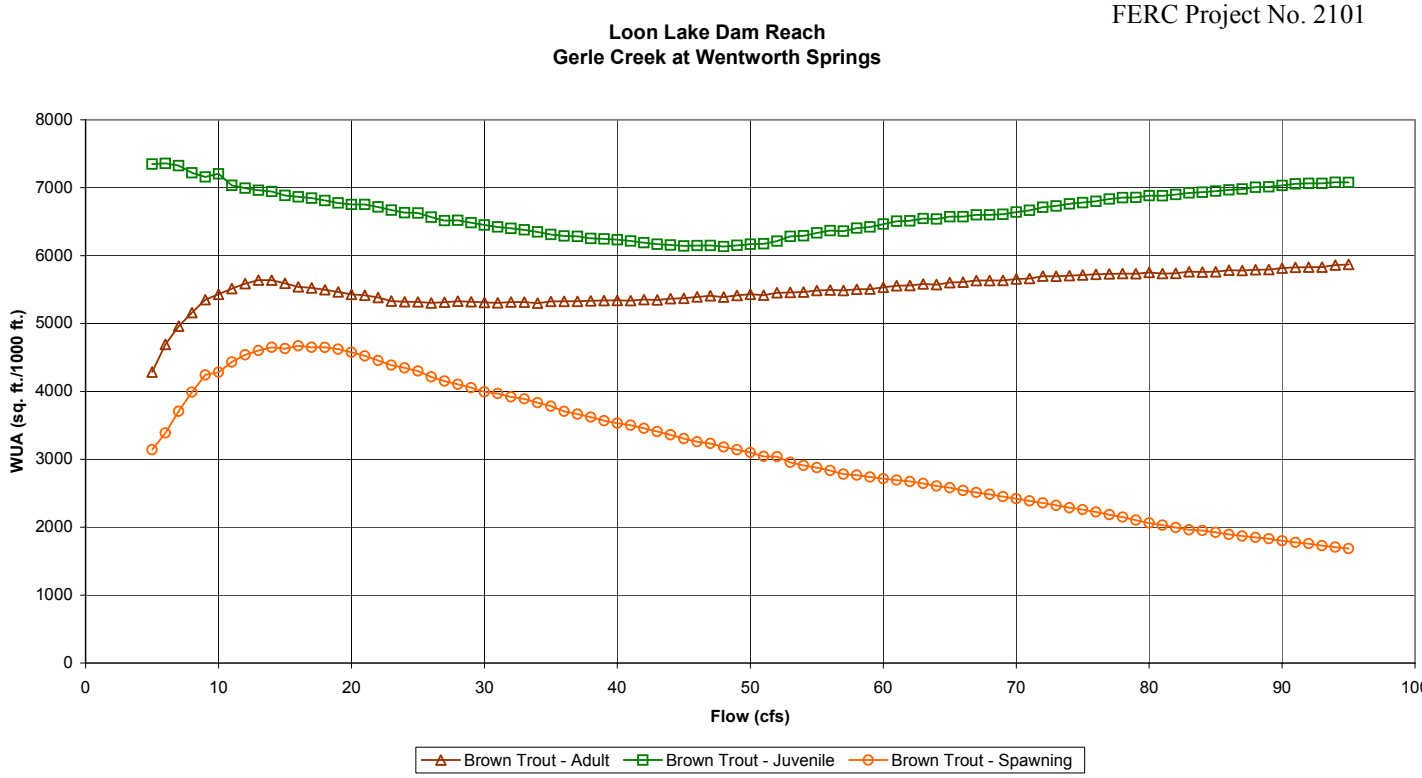

Figure 4.1.1-5. WUA versus flow for Gerle Creek at Wentworth Springs: brown trout.

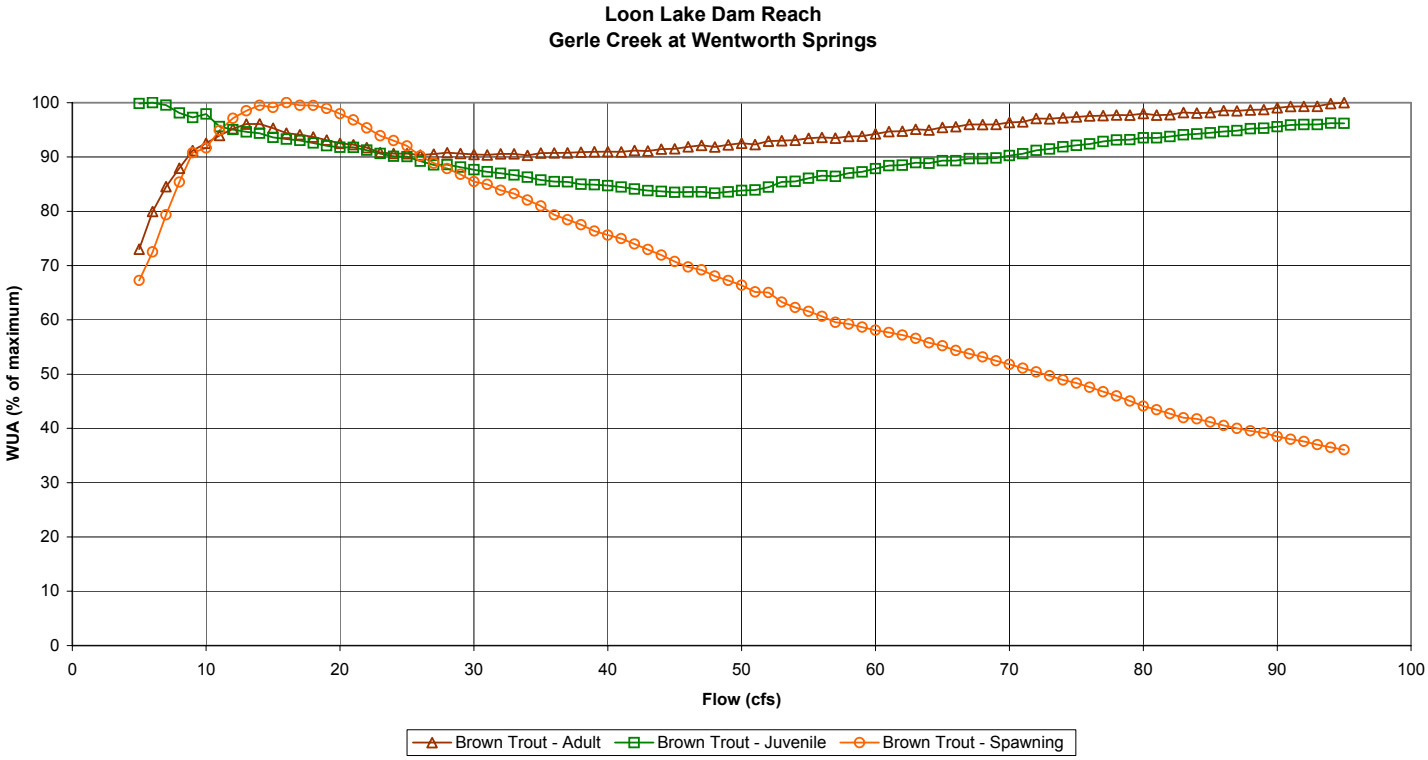

Figure 4.1.1-6. Percent of maximum WUA versus flow for Gerle Creek at Wentworth Springs: brown trout.

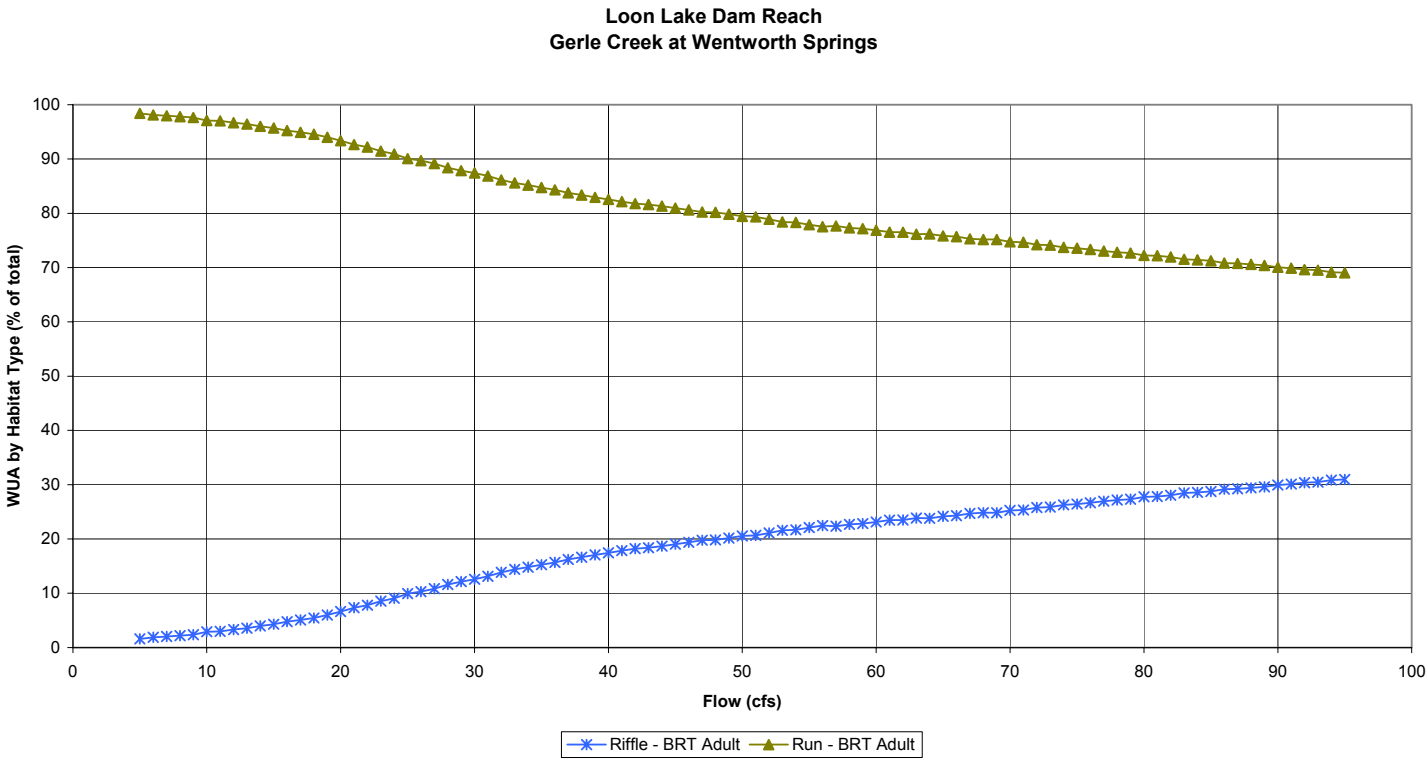

Figure 4.1.1-7. WUA by habitat type for Gerle Creek at Wentworth Springs: brown trout adult.

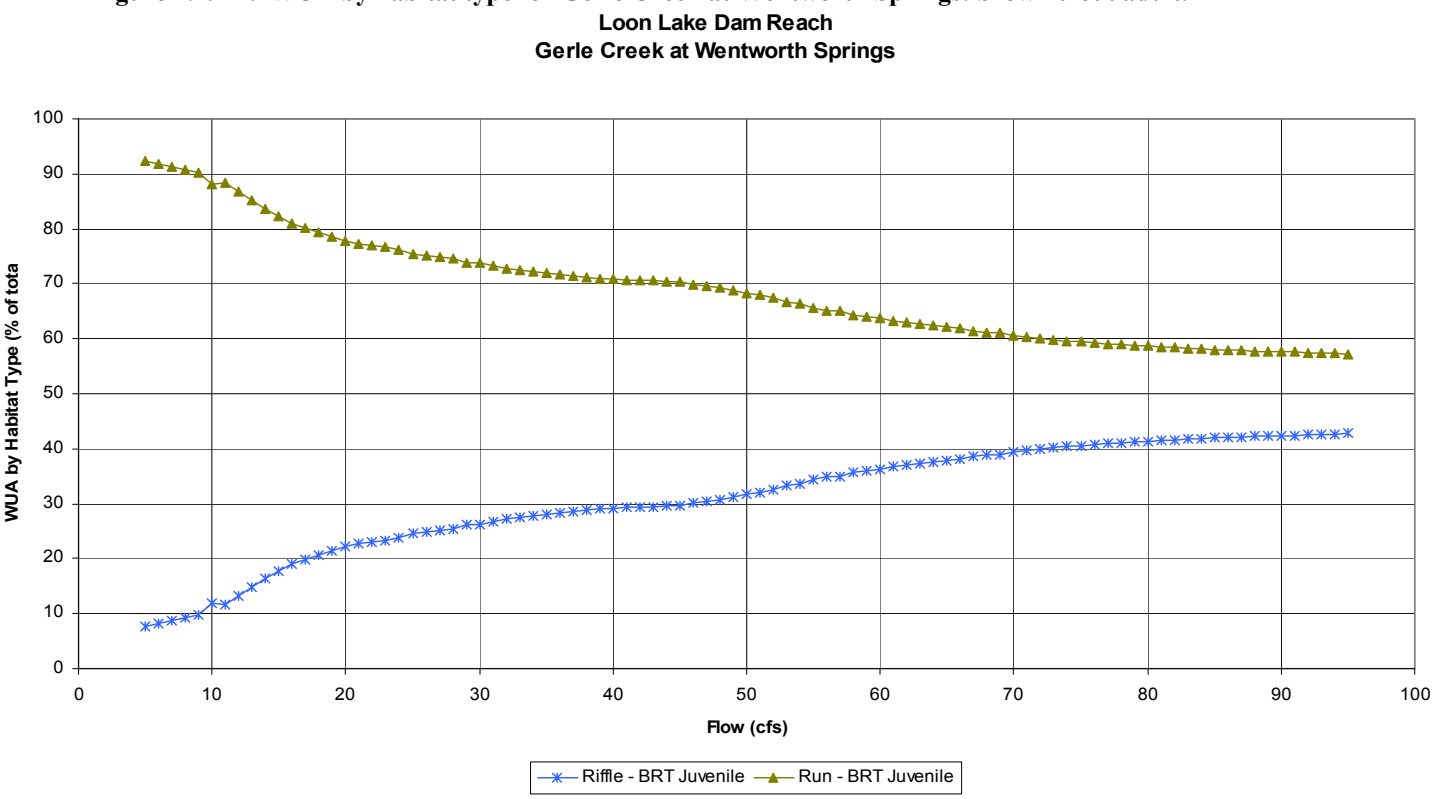

Figure 4.1.1-8. WUA by habitat type for Gerle Creek at Wentworth Springs: brown trout juvenile.

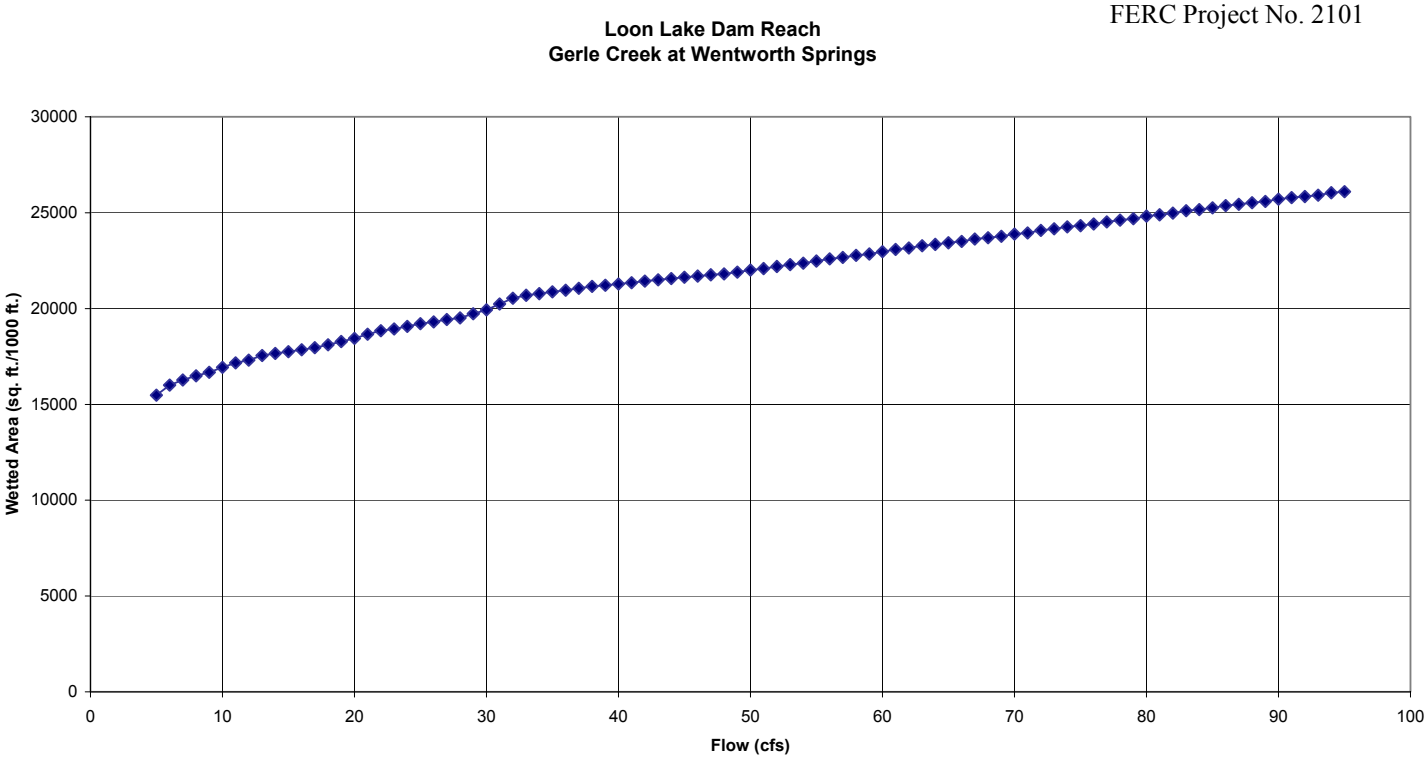

Figure 4.1.1-9. Wetted area versus flow for Gerle Creek at Wentworth Springs.

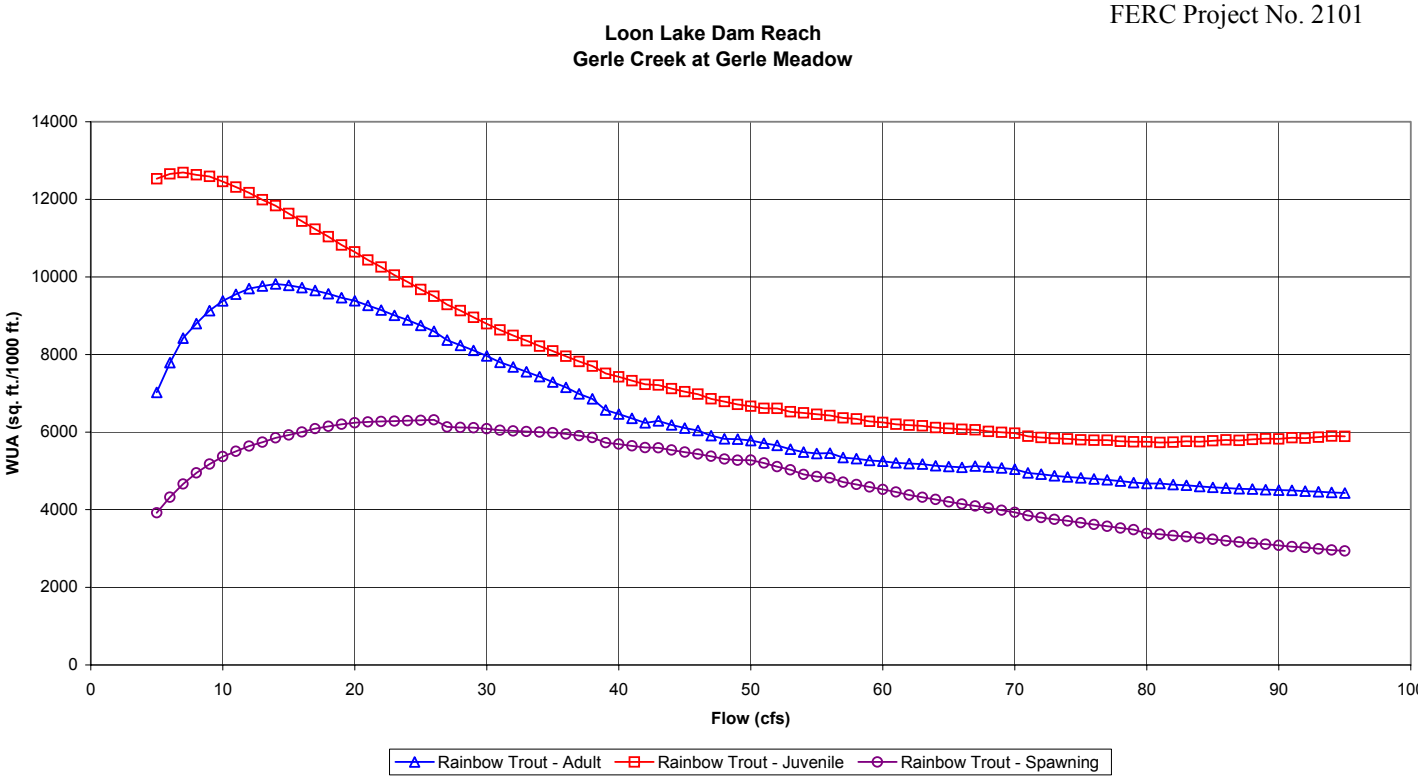

Figure 4.1.2-1. WUA versus flow for Gerle Creek at Gerle Meadow: rainbow trout.

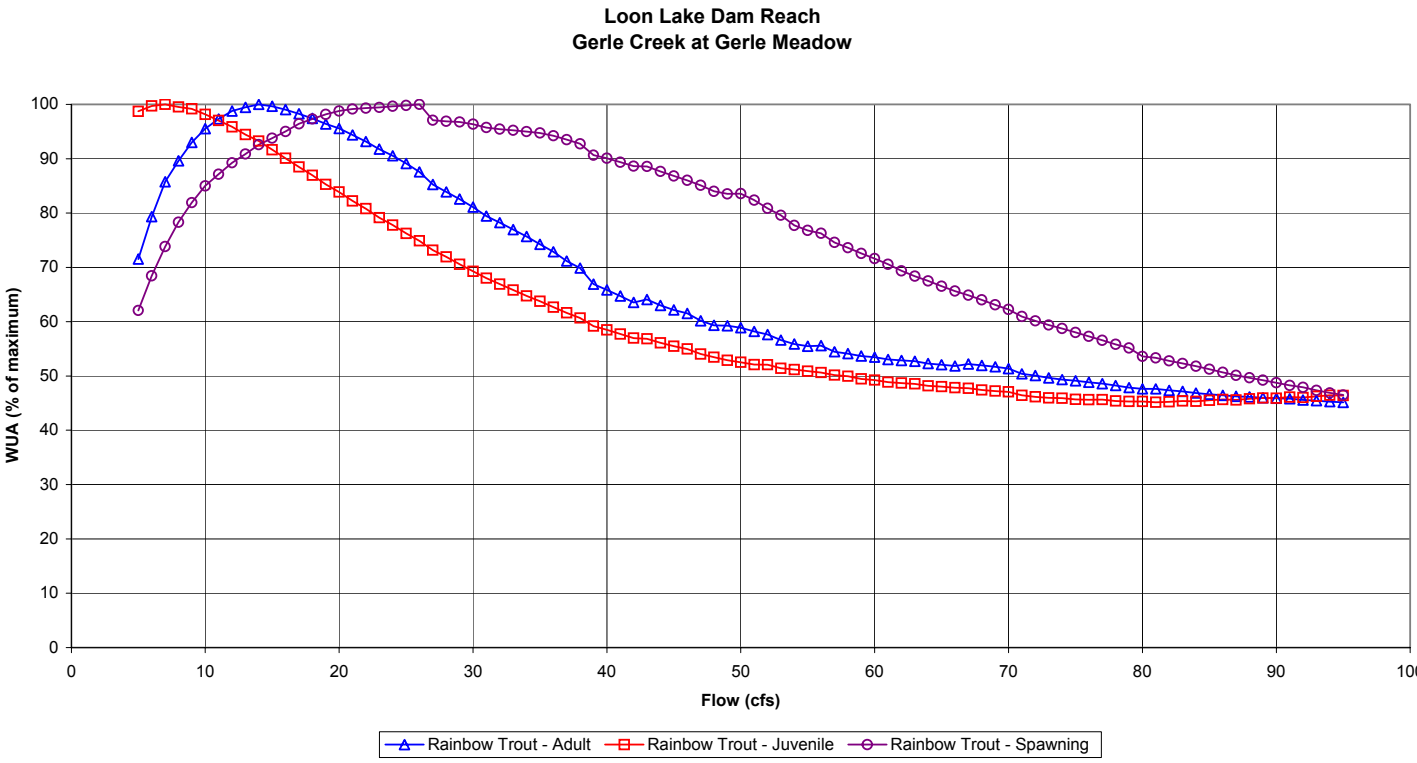

Figure 4.1.2-2. Percent of maximum WUA versus flow for Gerle Creek at Gerle Meadow: rainbow trout.

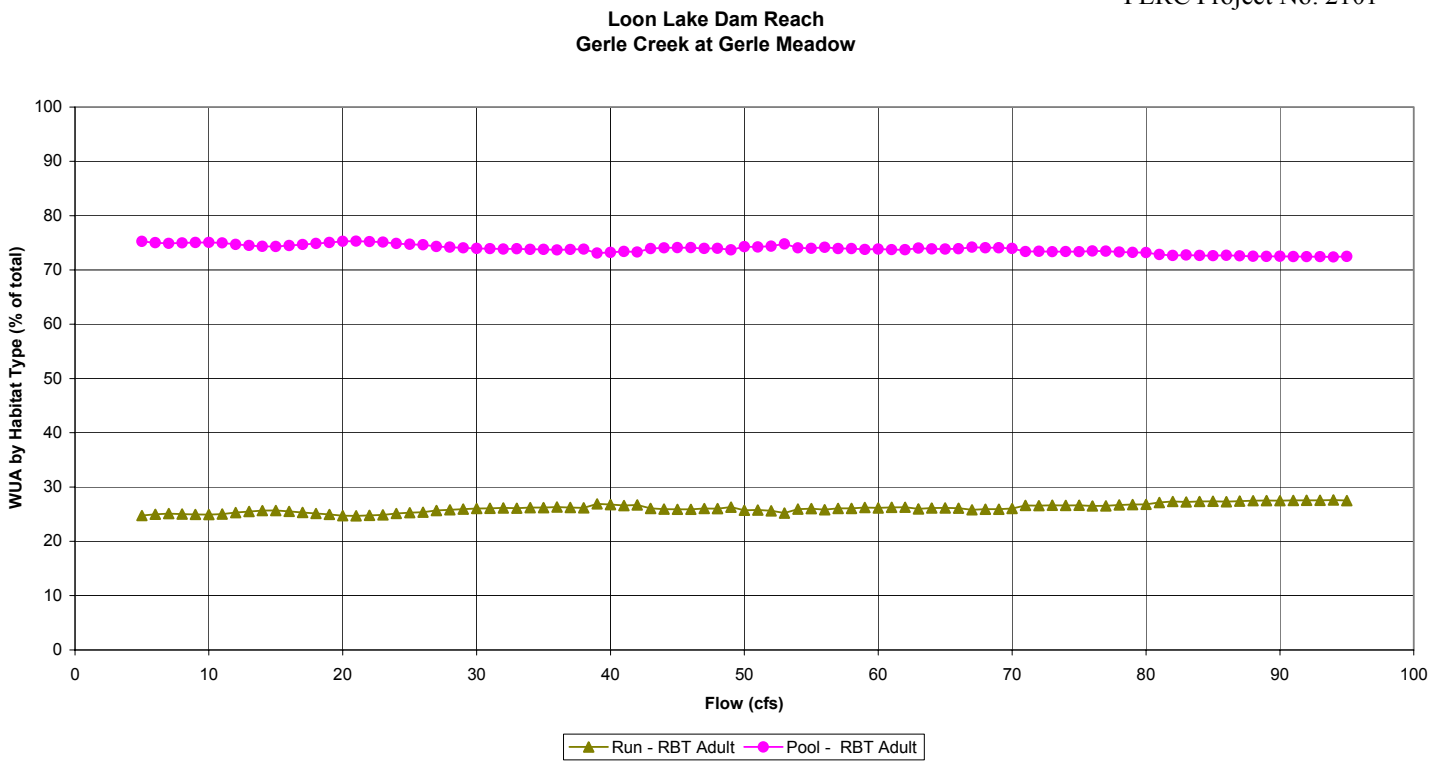

Figure 4.1.2-3. WUA by habitat type for Gerle Creek at Gerle Meadow: rainbow trout adult.

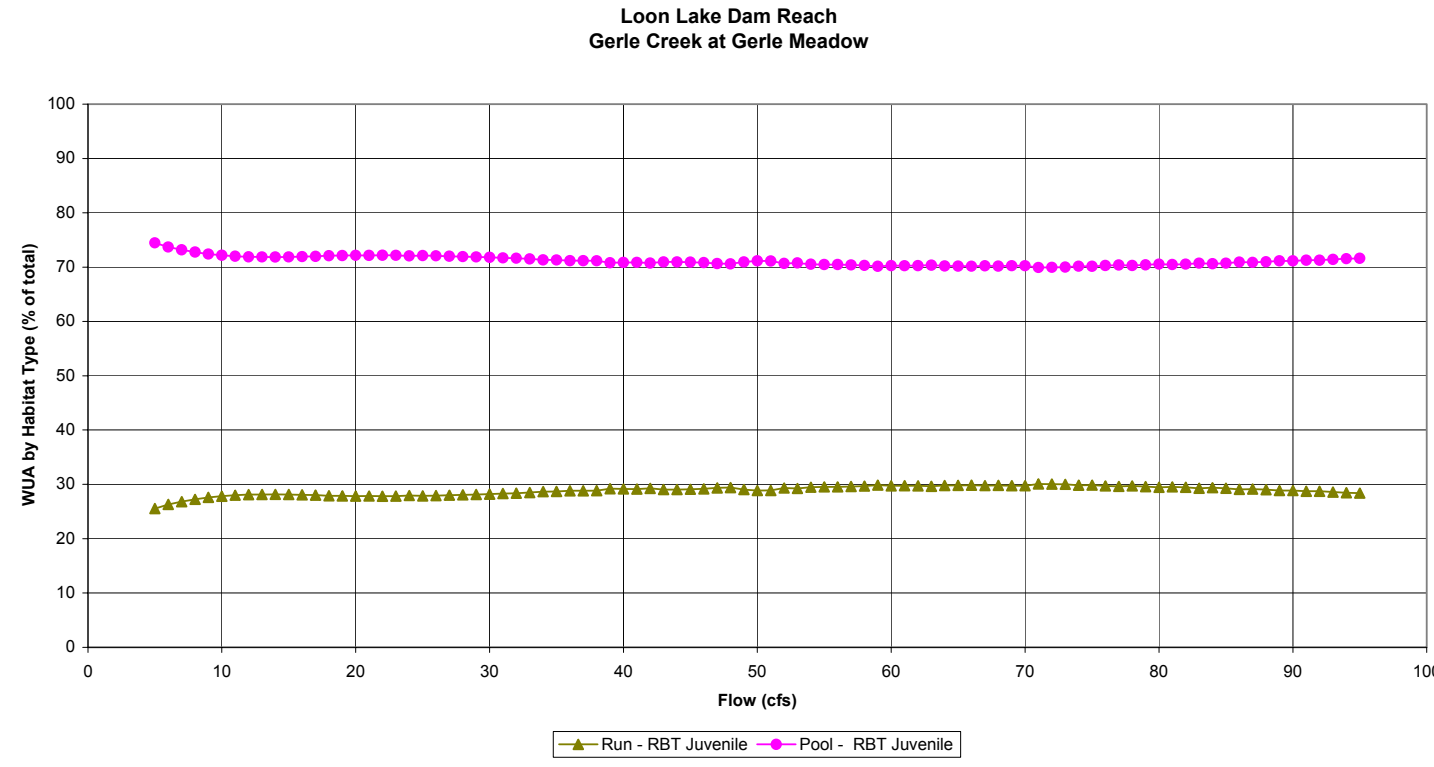

Figure 4.1.2-4. WUA by habitat type for Gerle Creek at Gerle Meadow: rainbow trout juvenile.

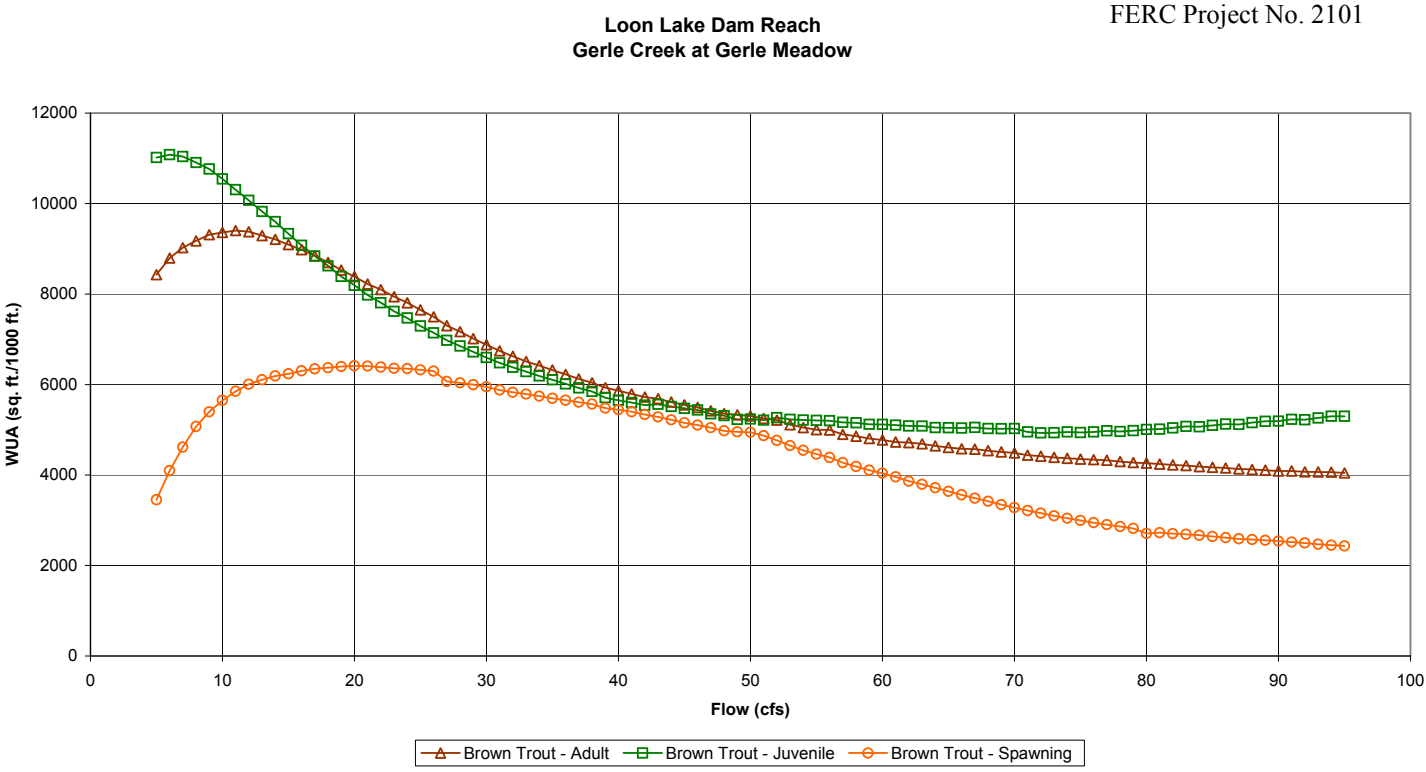

Figure 4.1.2-5. WUA versus flow for Gerle Creek at Gerle Meadow: brown trout.

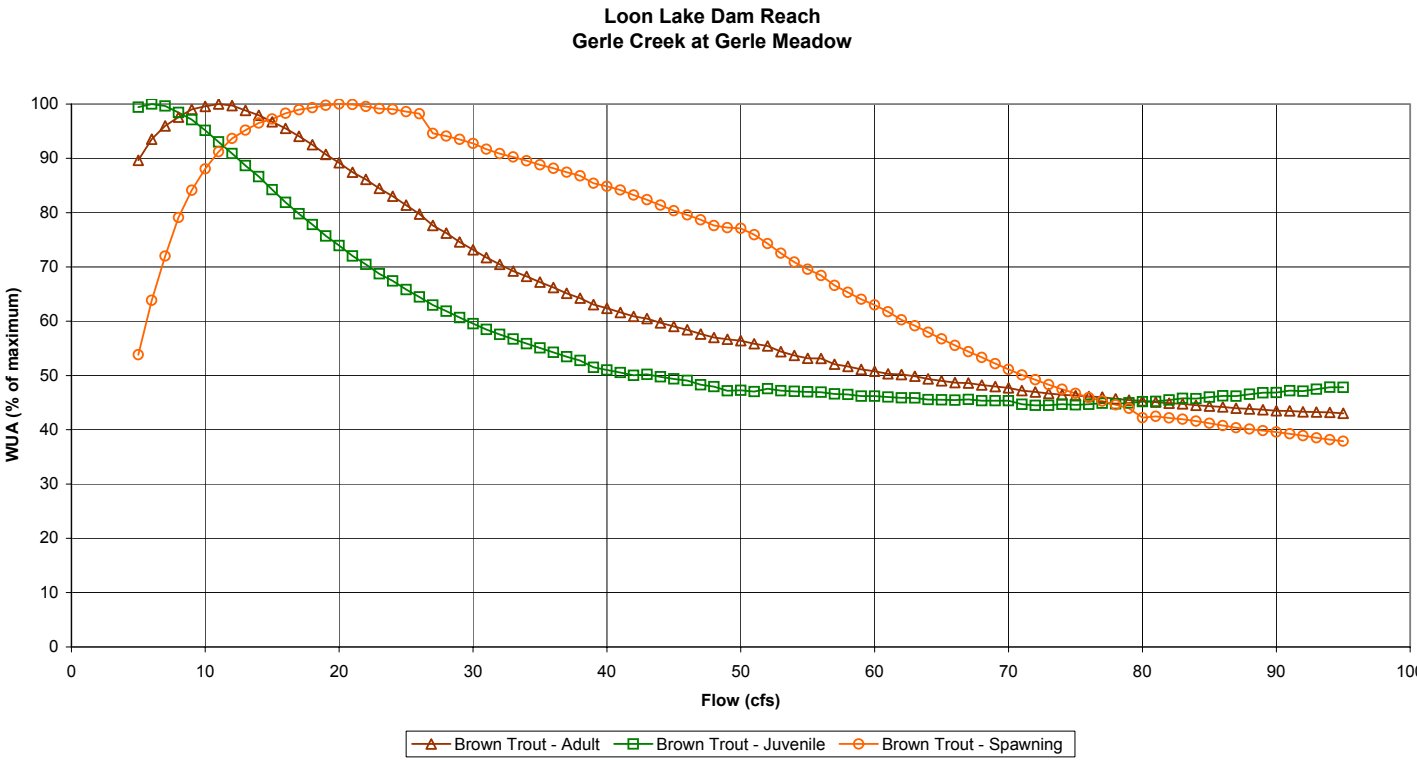

Figure 4.1.2-6. Percent of maximum WUA versus flow for Gerle Creek at Gerle Meadow: brown trout.

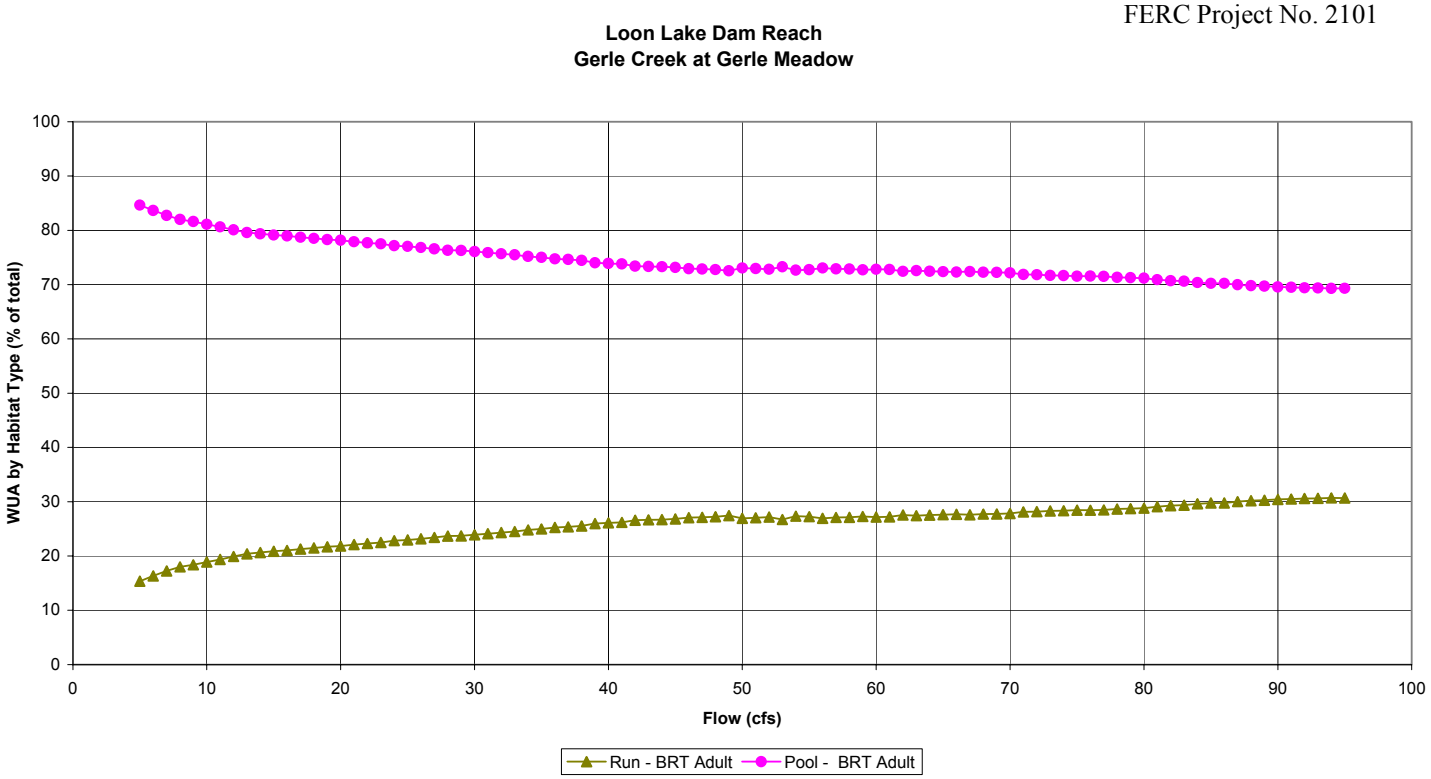

Figure 4.1.2-7. WUA by habitat type for Gerle Creek at Gerle Meadow: brown trout adult.

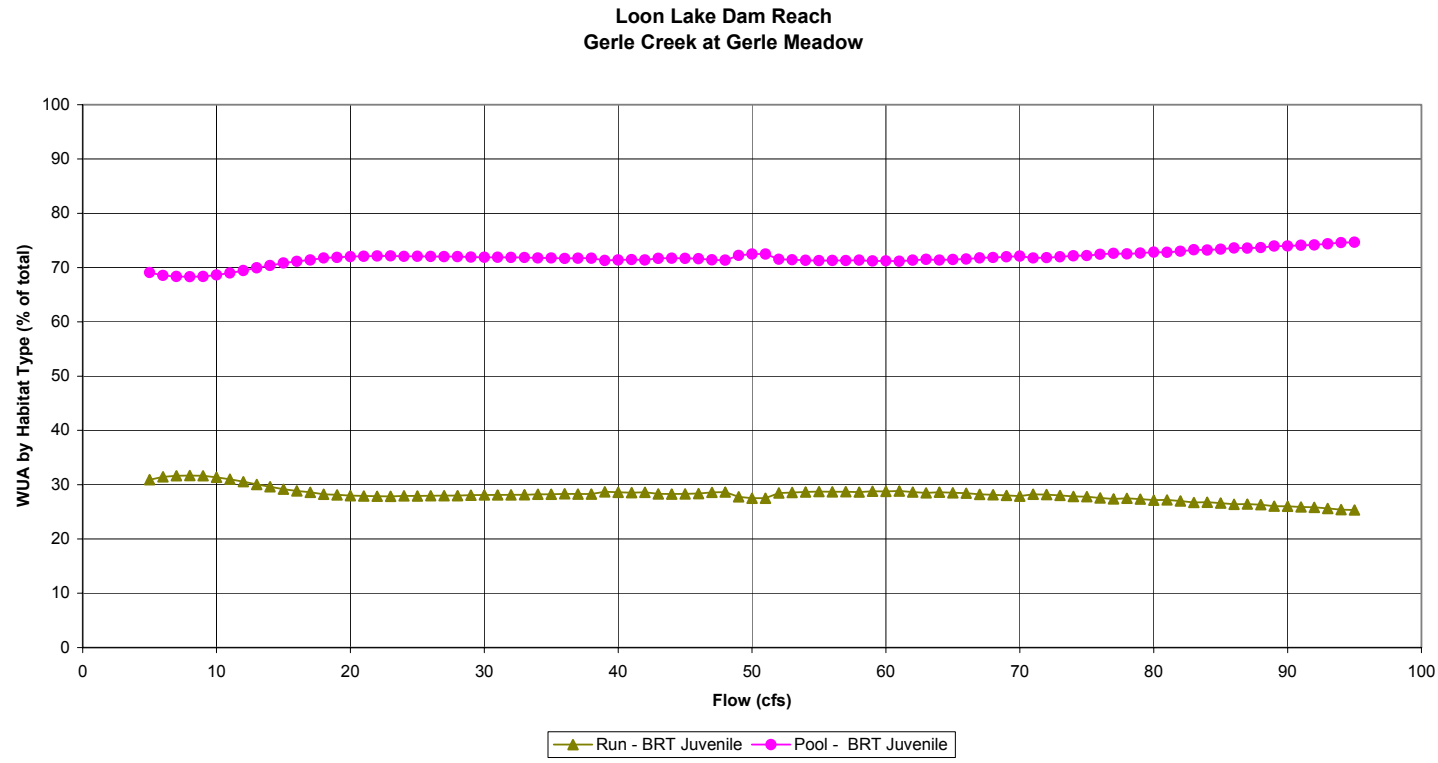

Figure 4.1.2-8. WUA by habitat type for Gerle Creek at Gerle Meadow: brown trout juvenile.

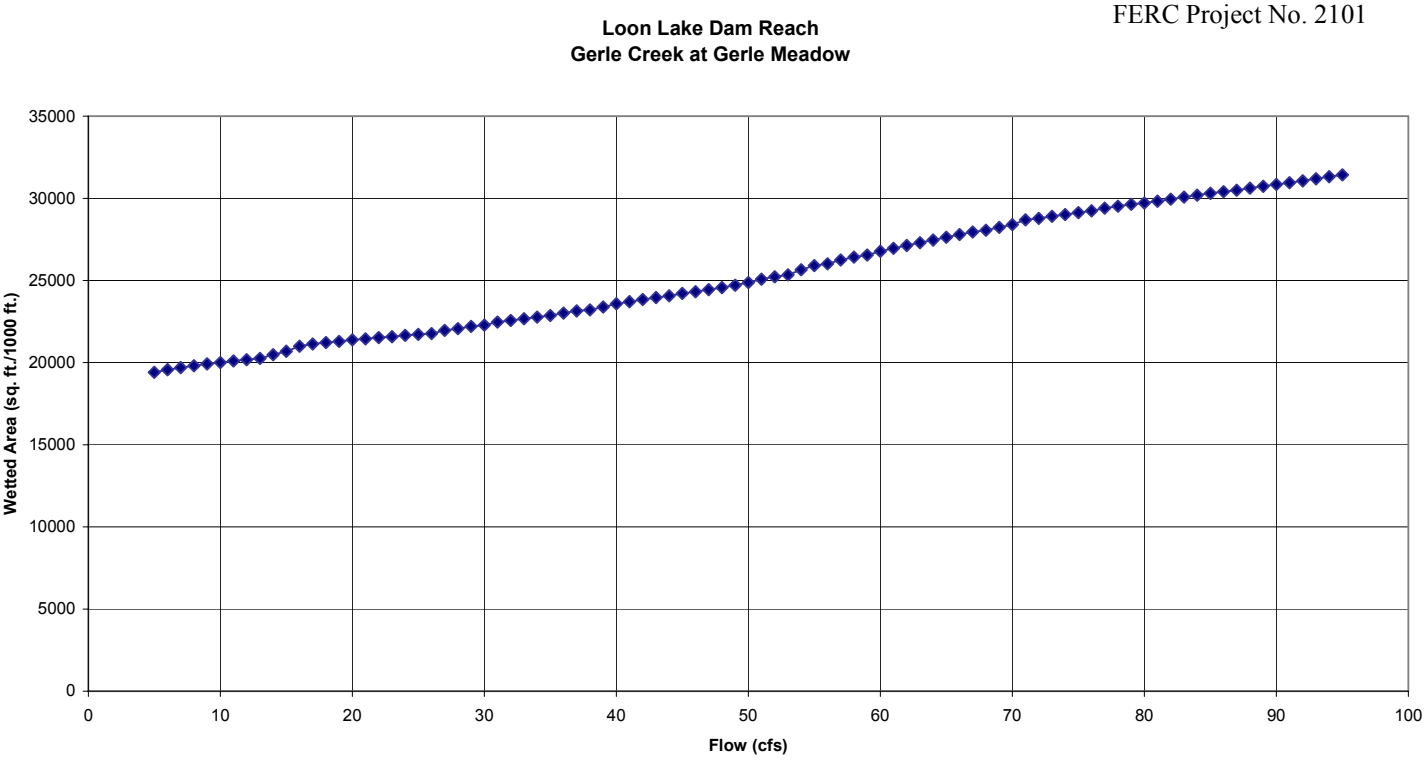

Figure 4.1.2-9. Wetted area versus flow for Gerle Creek at Gerle Meadow.

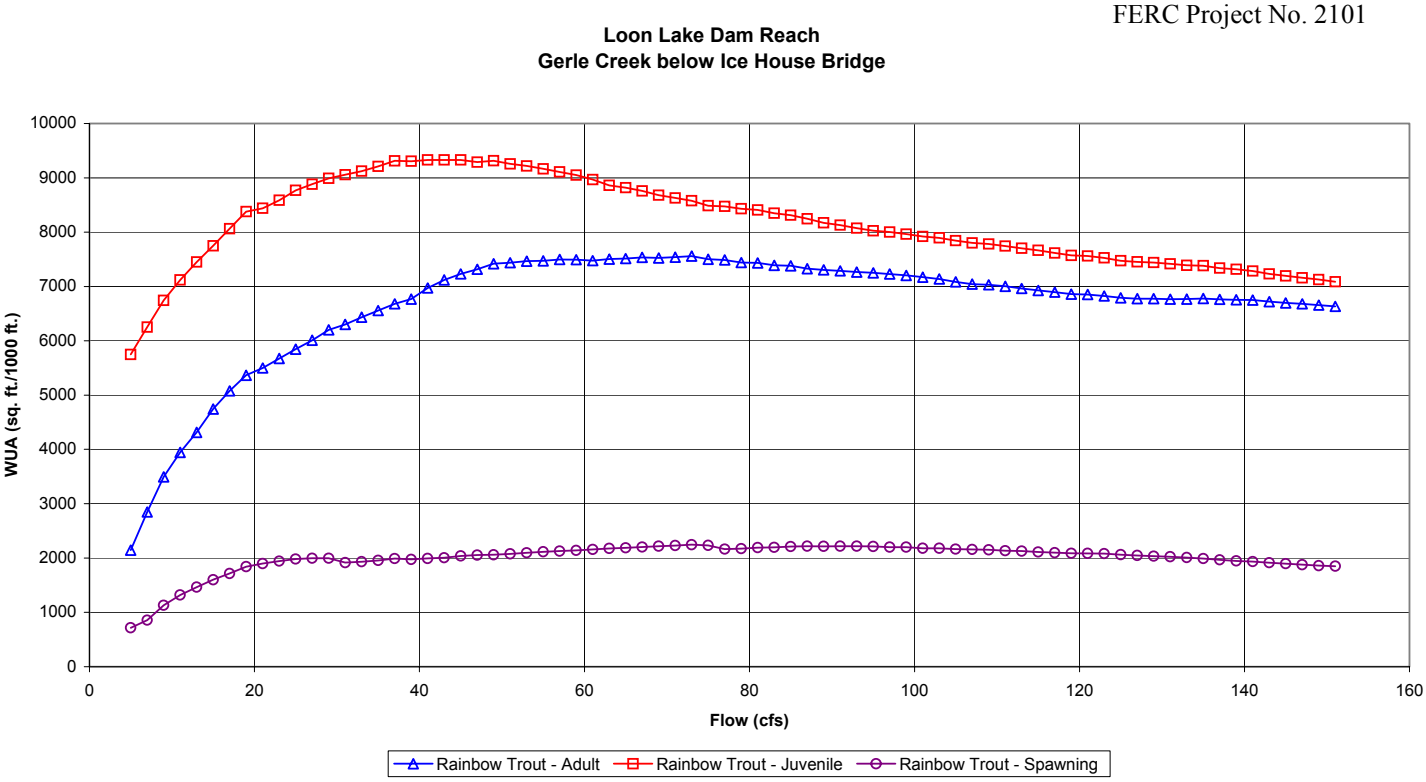

Figure 4.1.3-1. WUA versus flow for Gerle Creek below Ice House bridge: rainbow trout.

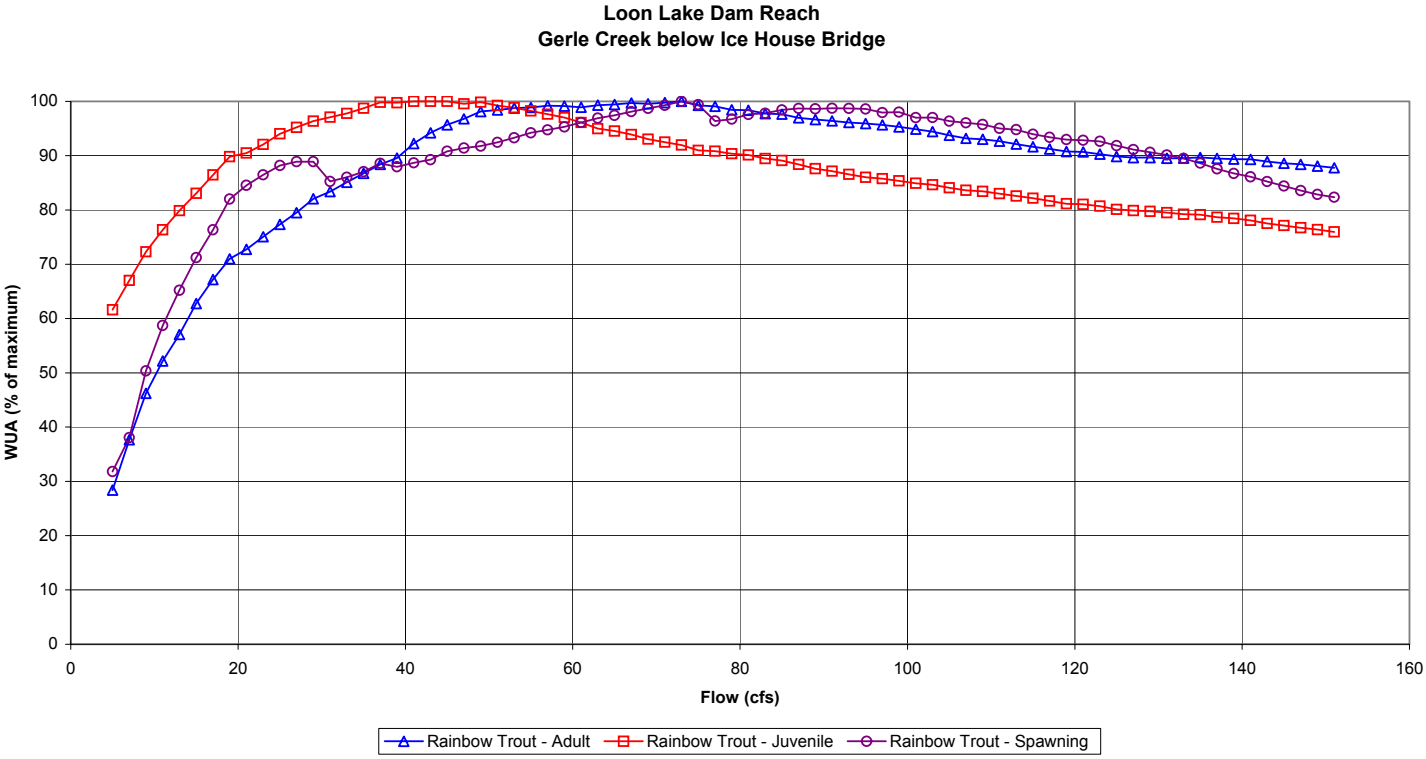

Figure 4.1.3-2. Percent of maximum WUA versus flow for Gerle Creek below Ice House bridge: rainbow trout.

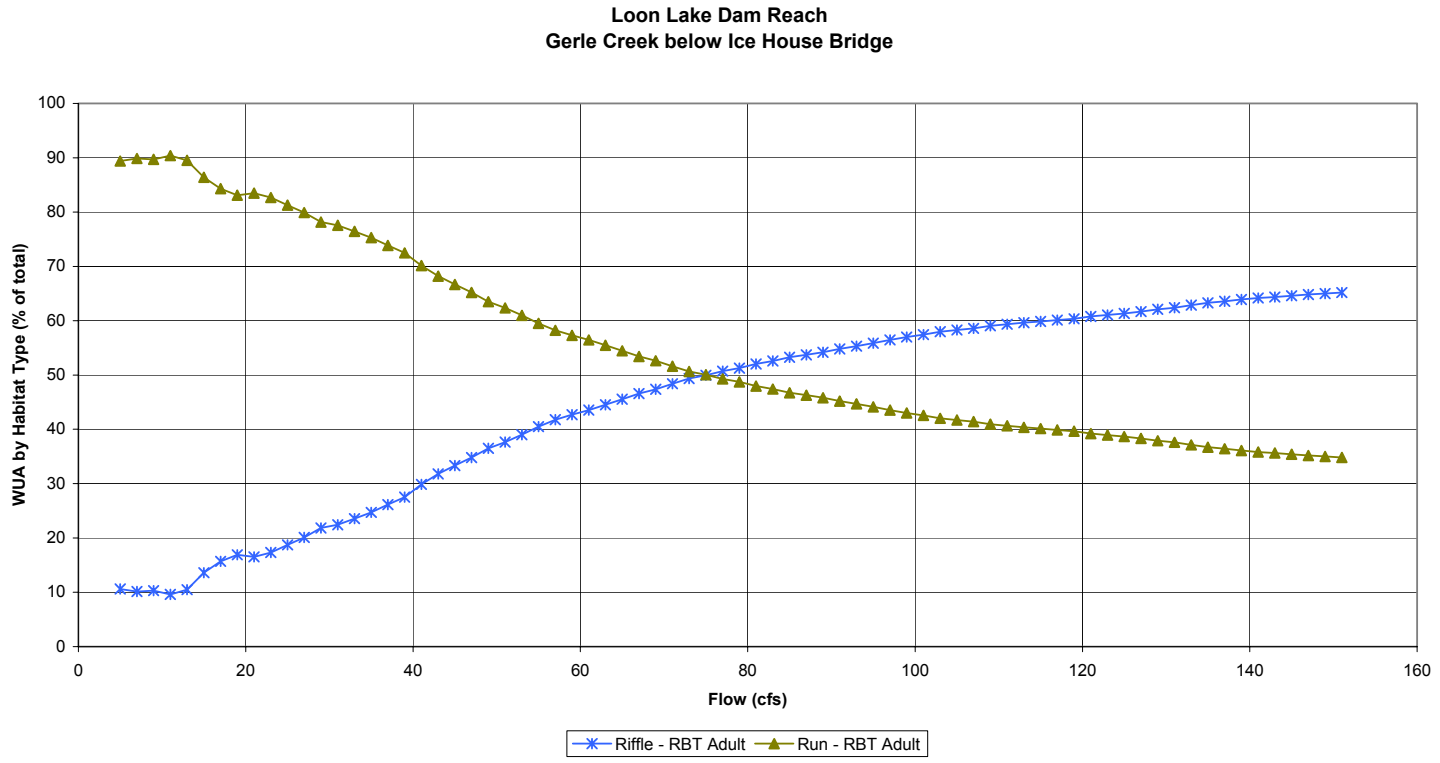

Figure 4.1.3-3. WUA by habitat type for Gerle Creek below Ice House bridge: rainbow trout adult.

Figure 4.1.3-4. WUA by habitat type for Gerle Creek below Ice House bridge: rainbow trout juvenile.

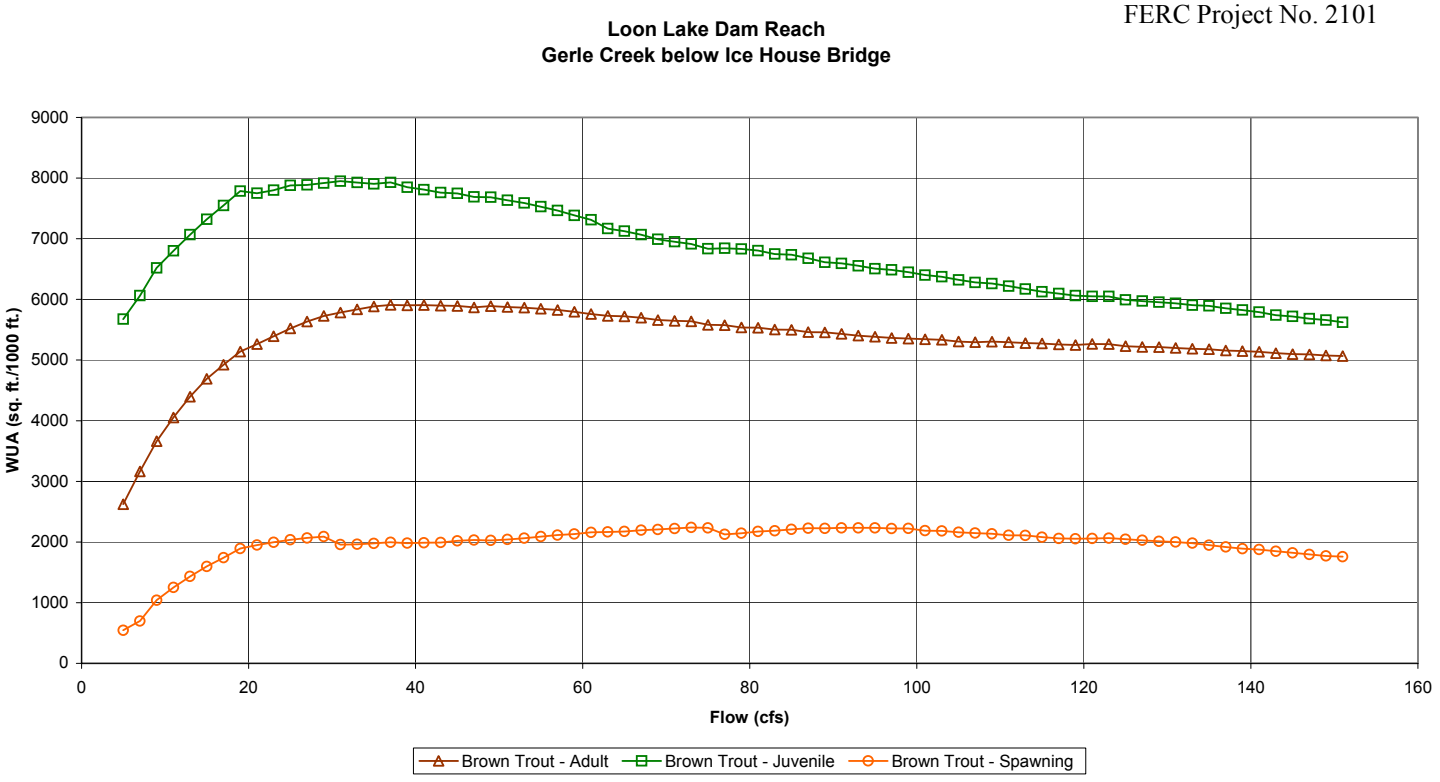

Figure 4.1.3-5. WUA versus flow for Gerle Creek below Ice House bridge: brown trout.

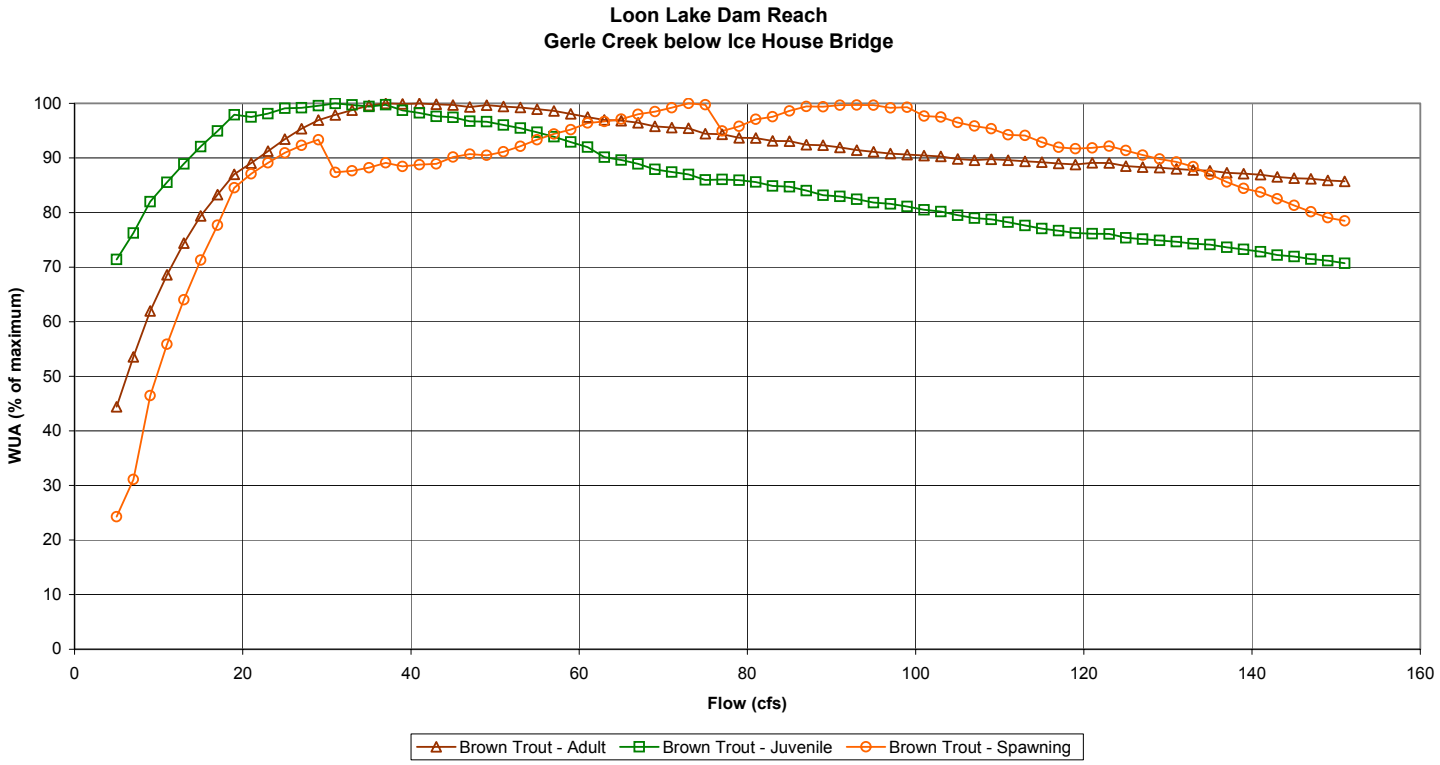

Figure 4.1.3-6. Percent of maximum WUA versus flow for Gerle Creek below Ice House bridge: brown trout.

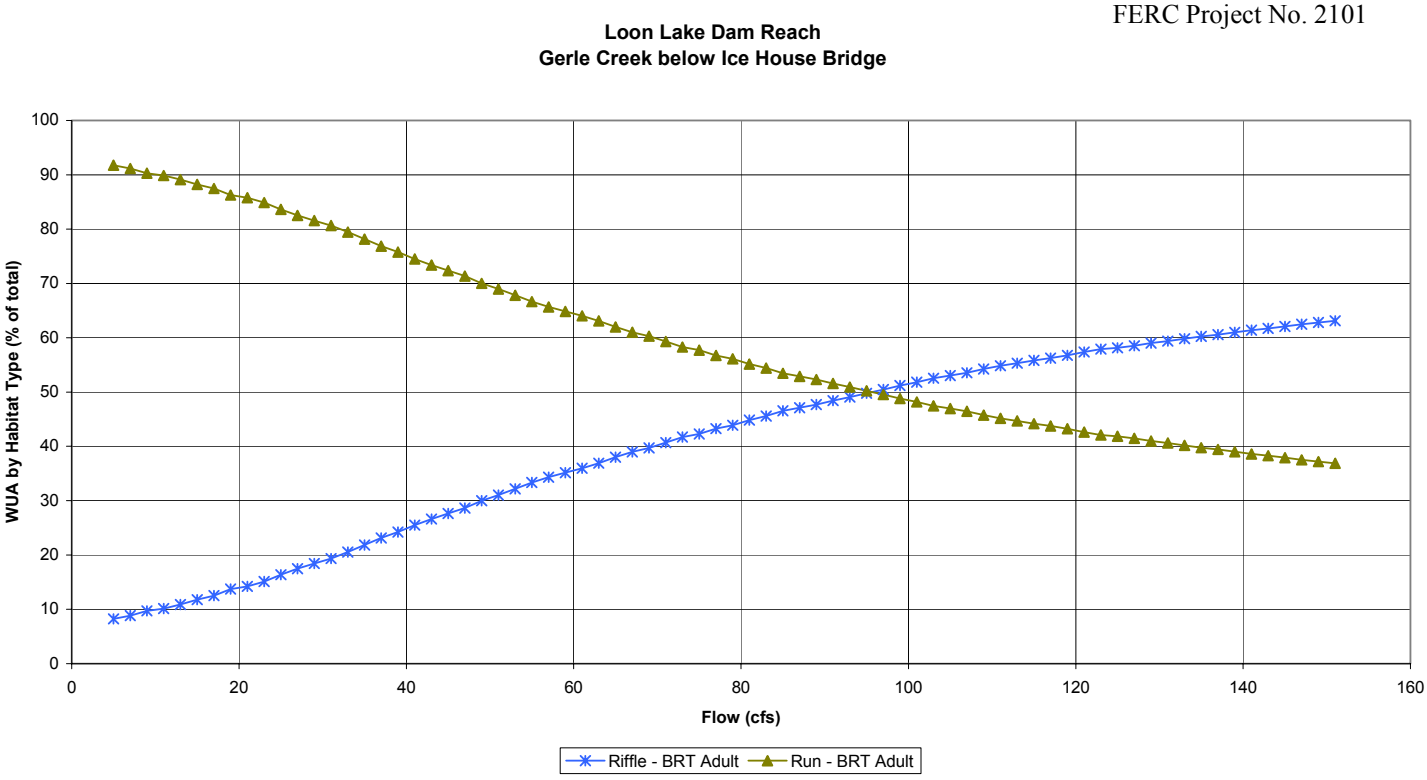

Figure 4.1.3-7. WUA by habitat type for Gerle Creek below Ice House bridge: brown trout adult.

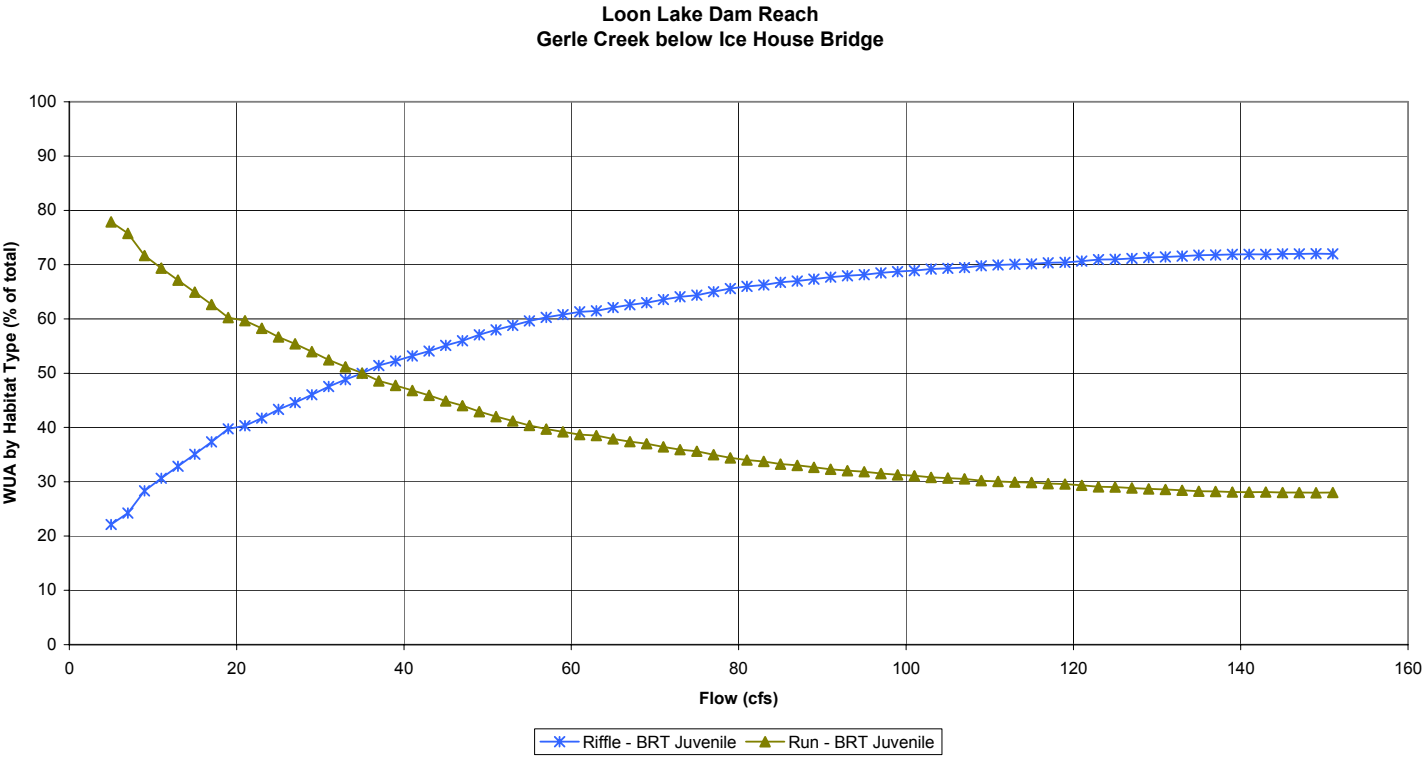

Figure 4.1.3-8. WUA by habitat type for Gerle Creek below Ice House bridge: brown trout juvenile.

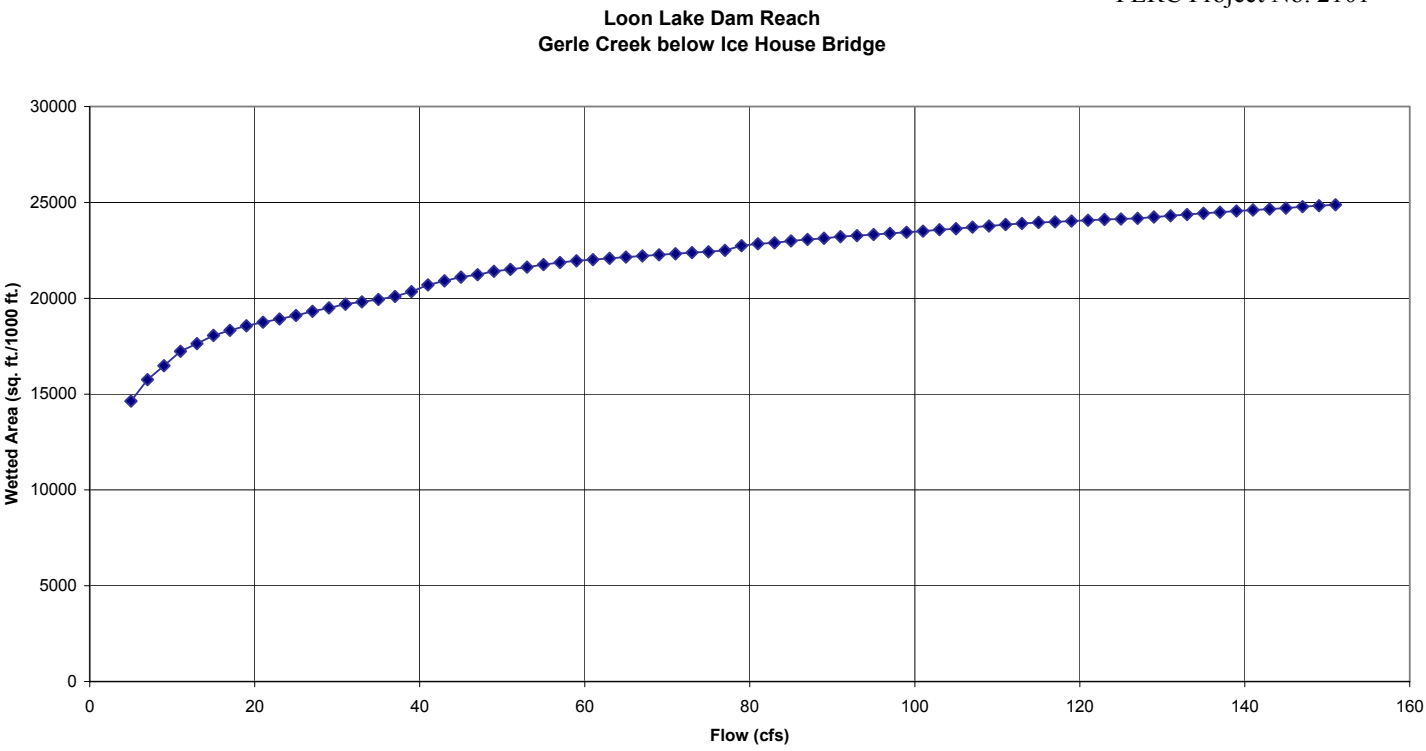

Figure 4.1.3-9. Wetted area versus flow for Gerle Creek below Ice House bridge.

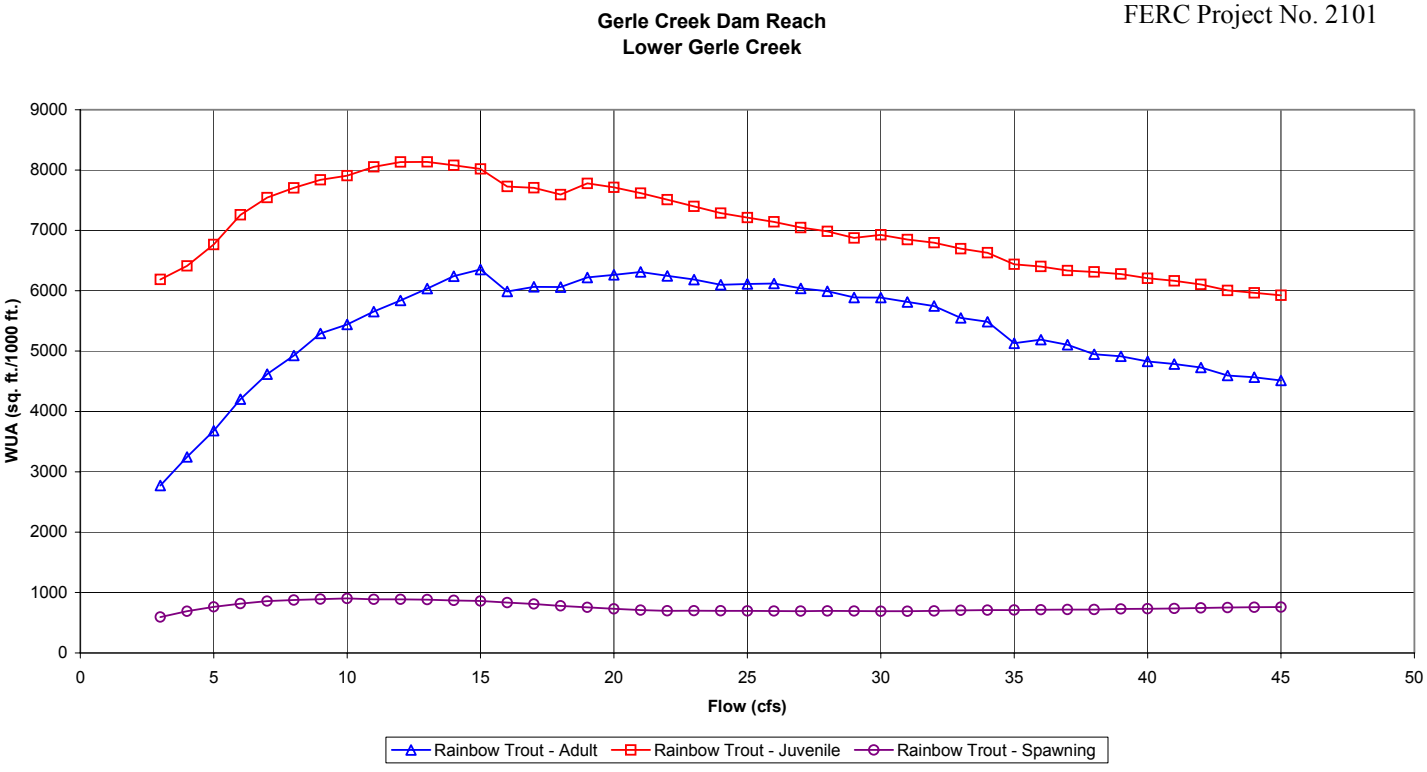

Figure 4.2.1-1. WUA versus flow for Gerle Creek Dam Reach: rainbow trout.

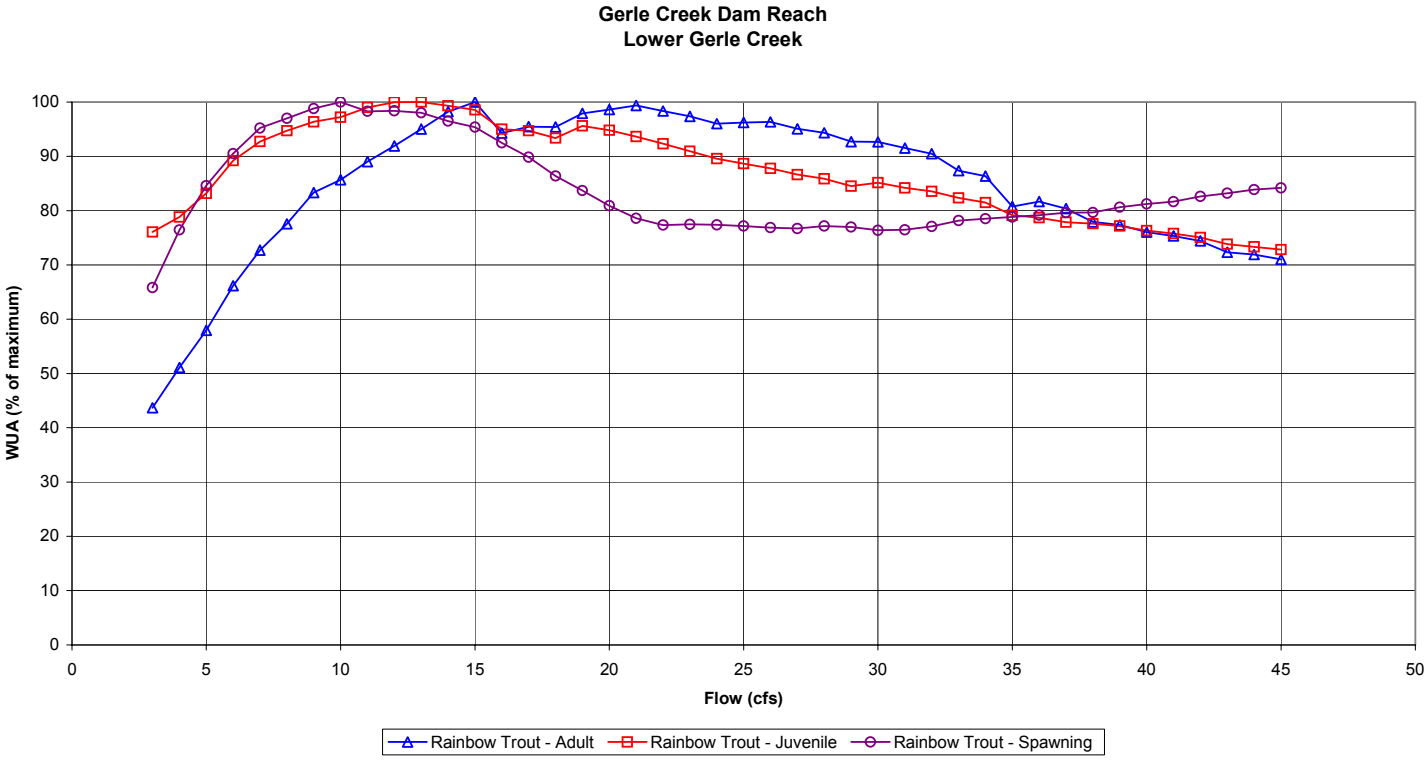

Figure 4.2.1-2. Percent of maximum WUA versus flow for Gerle Creek Dam Reach: rainbow trout.

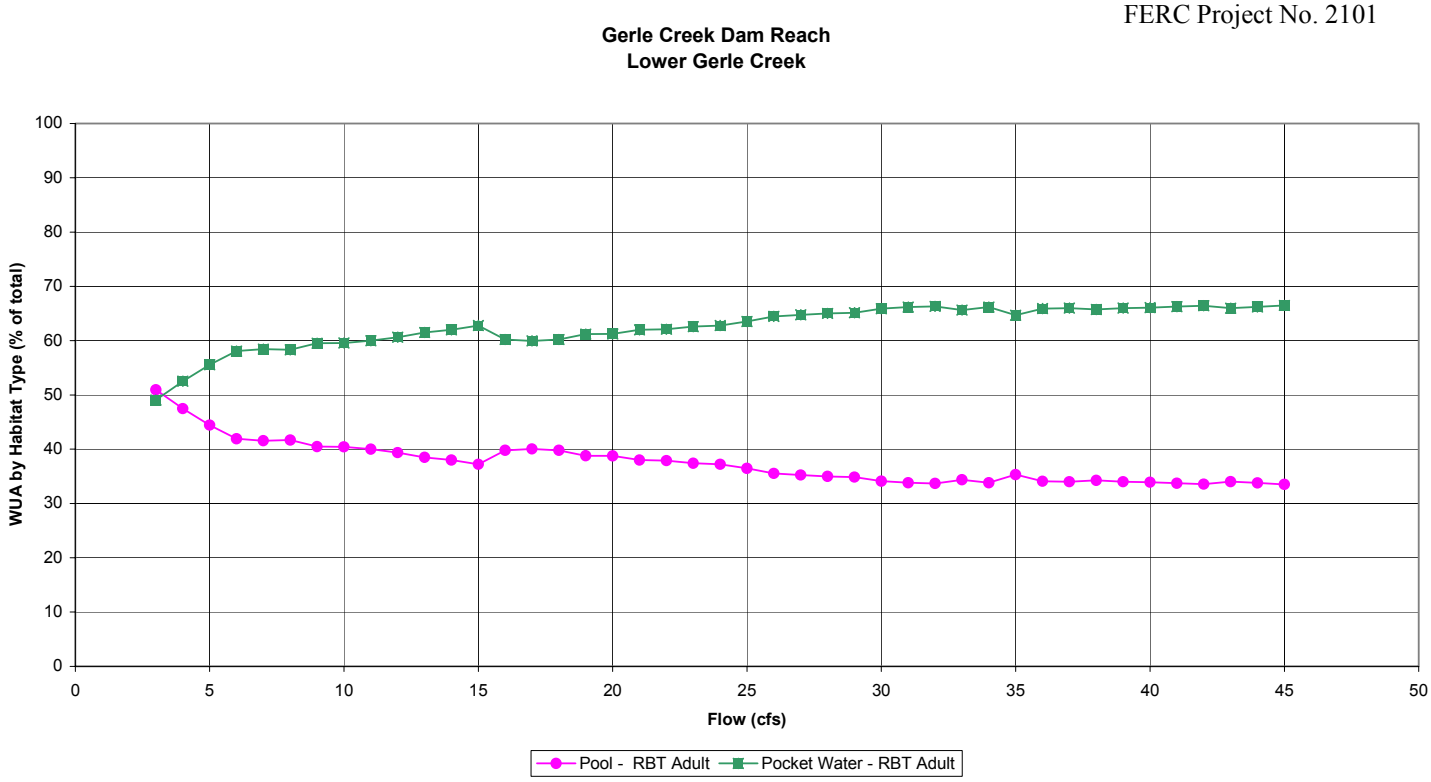

Figure 4.2.1-3. WUA by habitat type for Gerle Creek Dam Reach: rainbow trout adult.

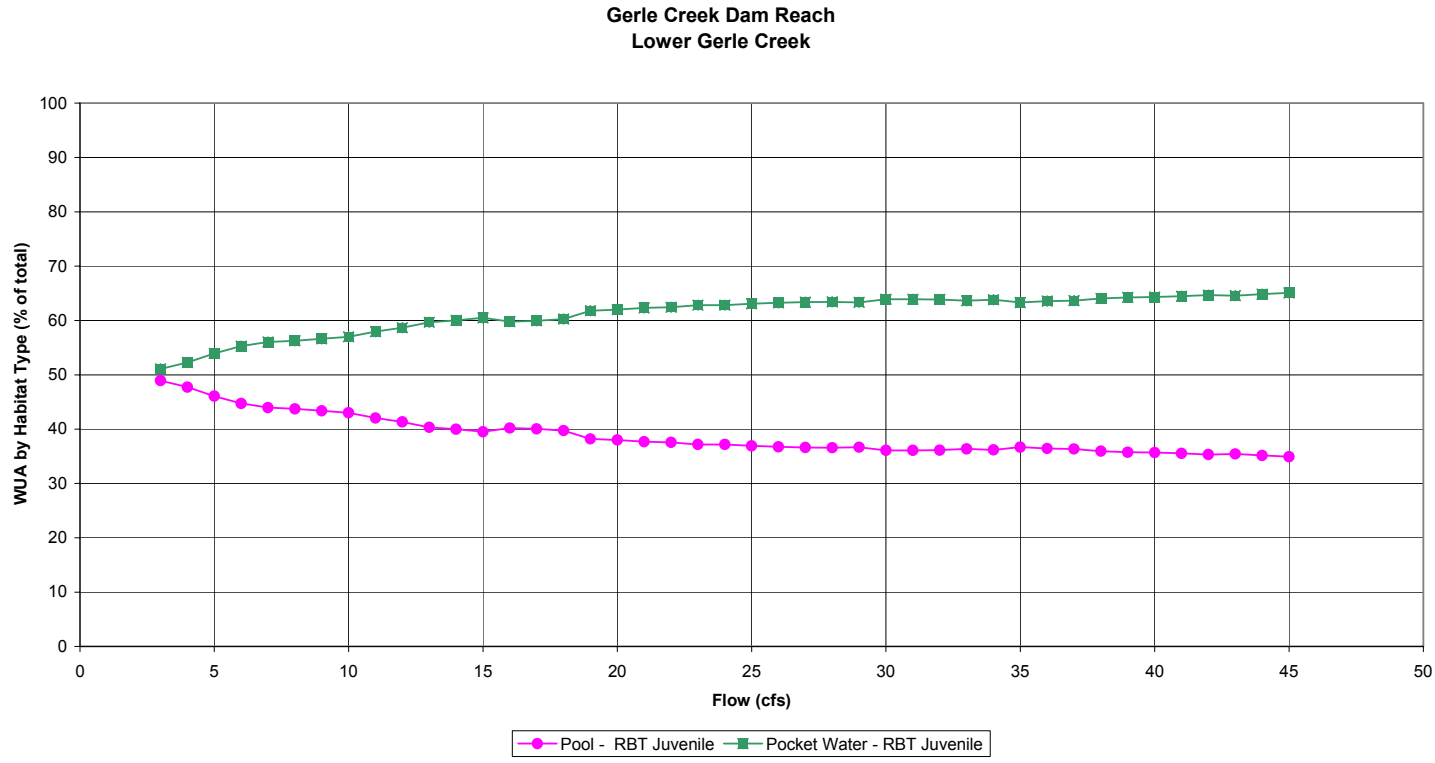

Figure 4.2.1-4. WUA by habitat type for Gerle Creek Dam Reach: rainbow trout juvenile.

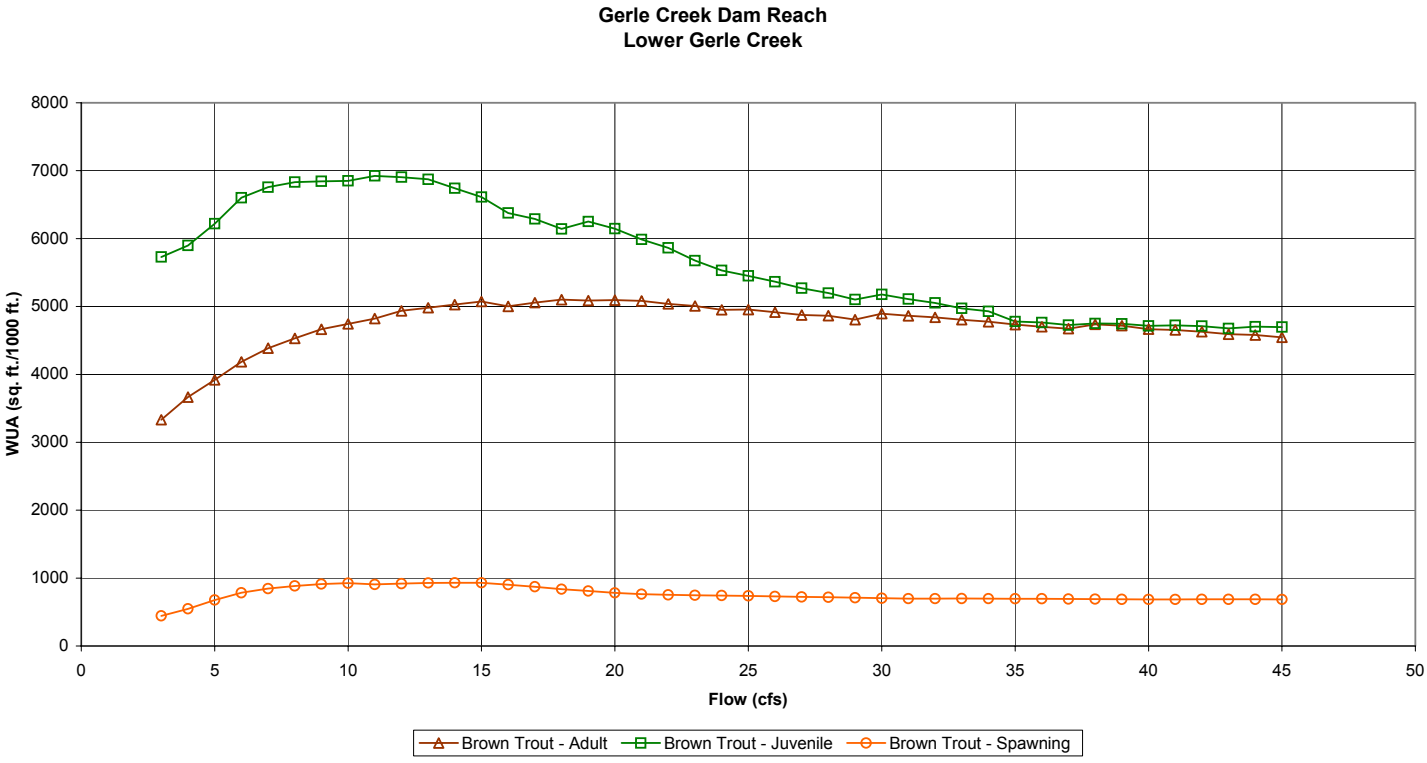

Figure 4.2.1-5. WUA versus flow for Gerle Creek Dam Reach: brown trout.

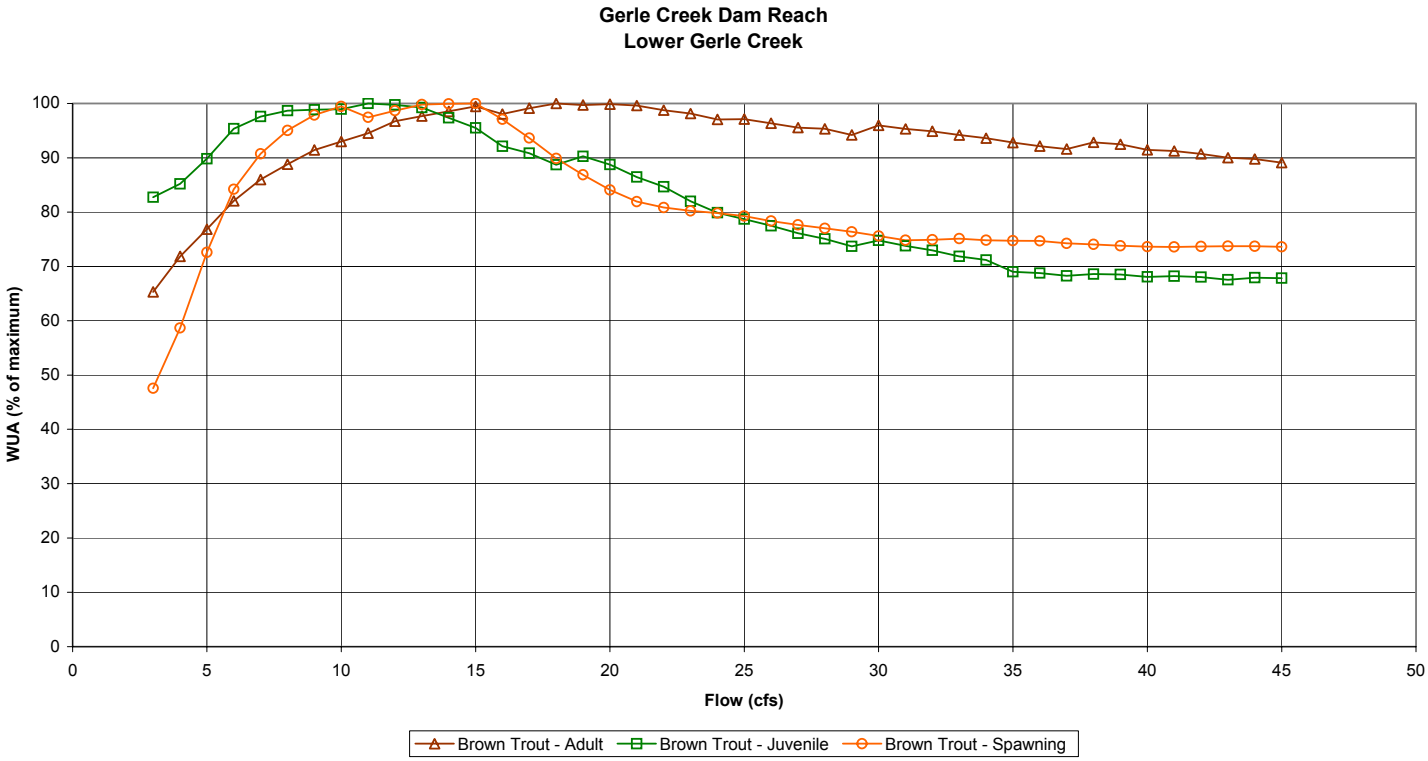

Figure 4.2.1-6. Percent of maximum WUA versus flow for Gerle Creek Dam Reach: brown trout.

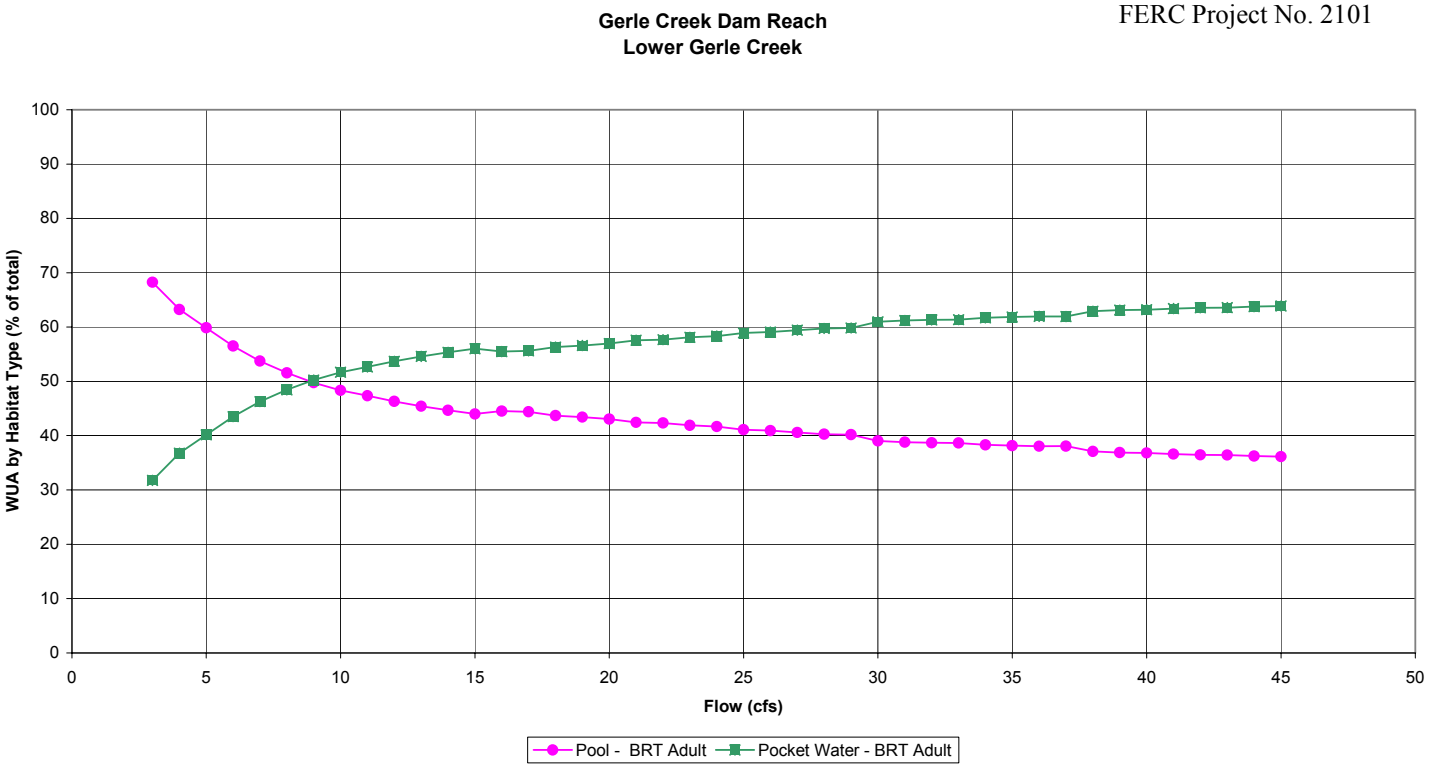

Figure 4.2.1-7. WUA by habitat type for Gerle Creek Dam Reach: brown trout adult.

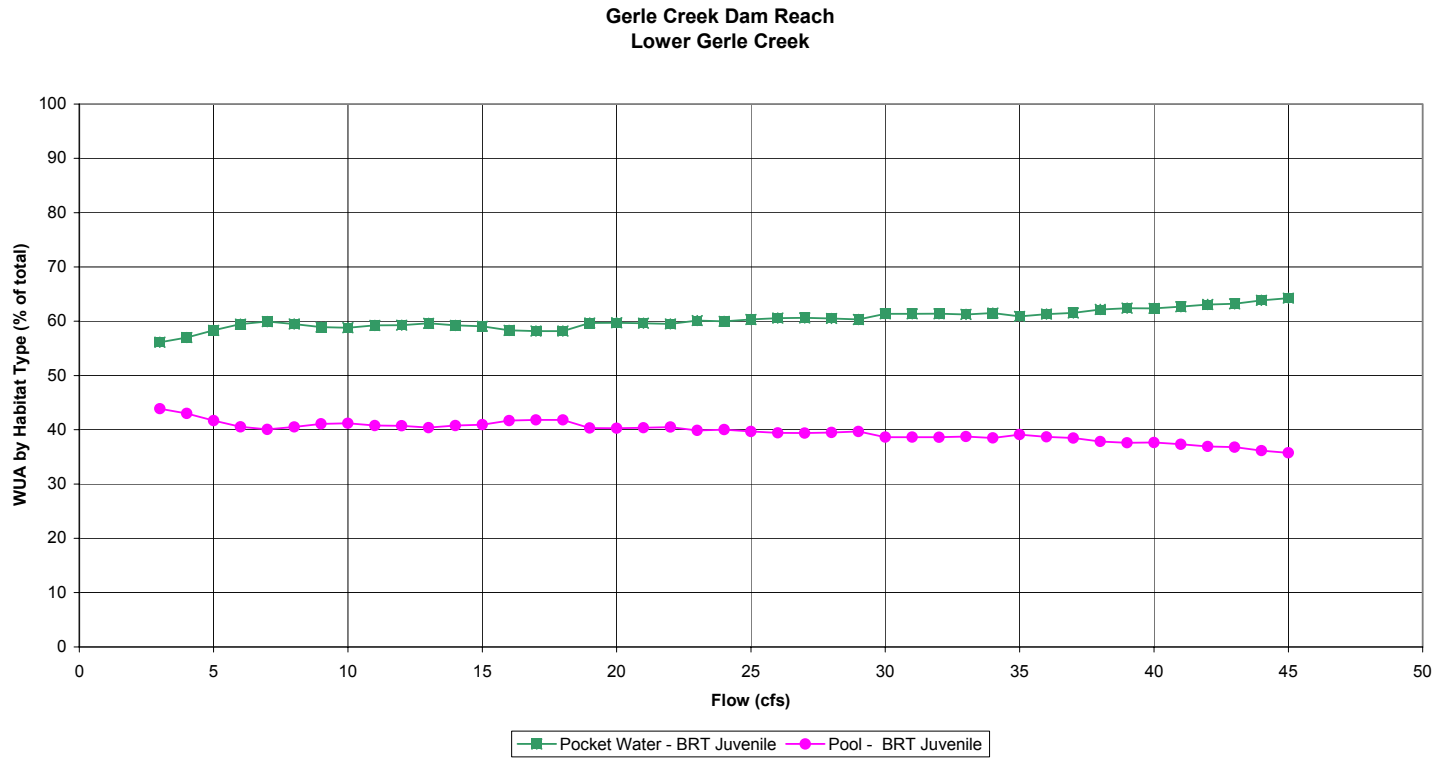

Figure 4.2.1-8. WUA by habitat type for Gerle Creek Dam Reach: brown trout juvenile.

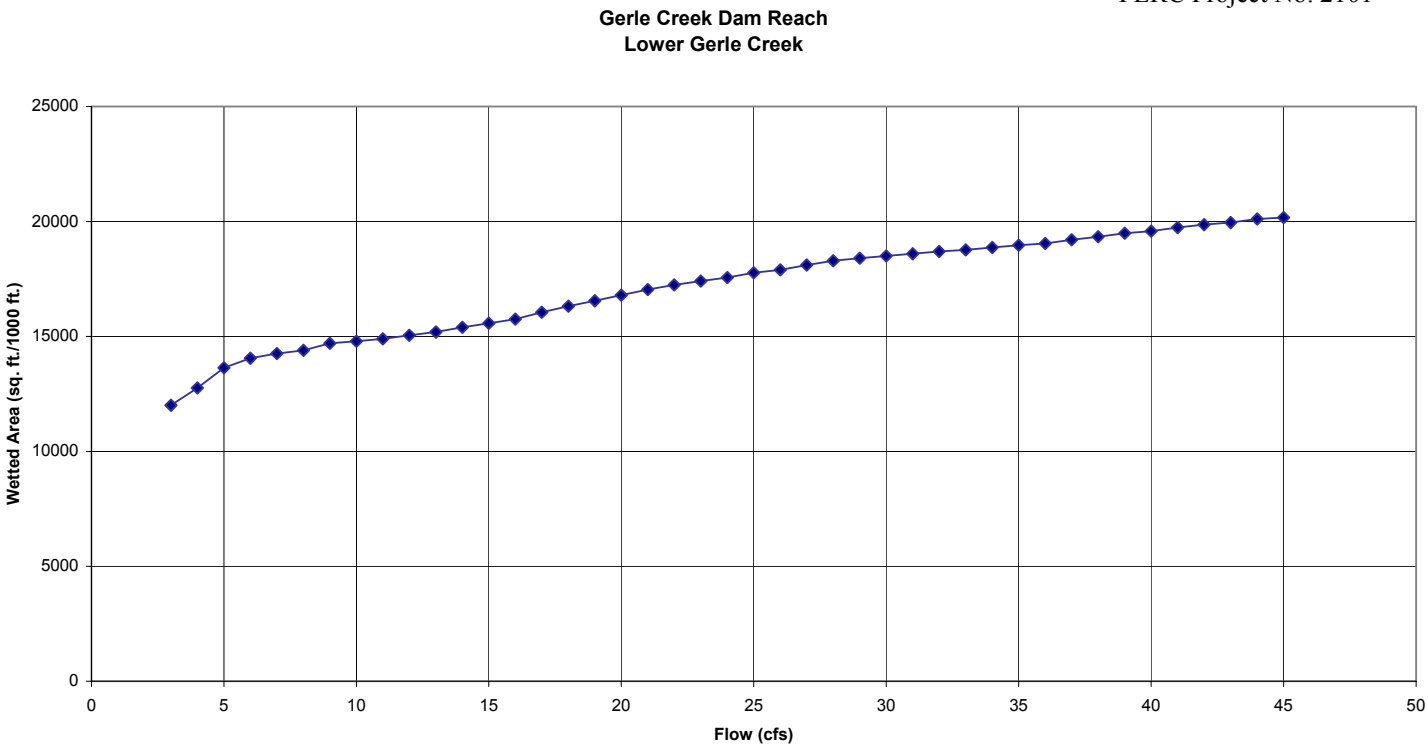

Figure 4.2.1-9. Wetted area versus flow for Gerle Creek Dam Reach.

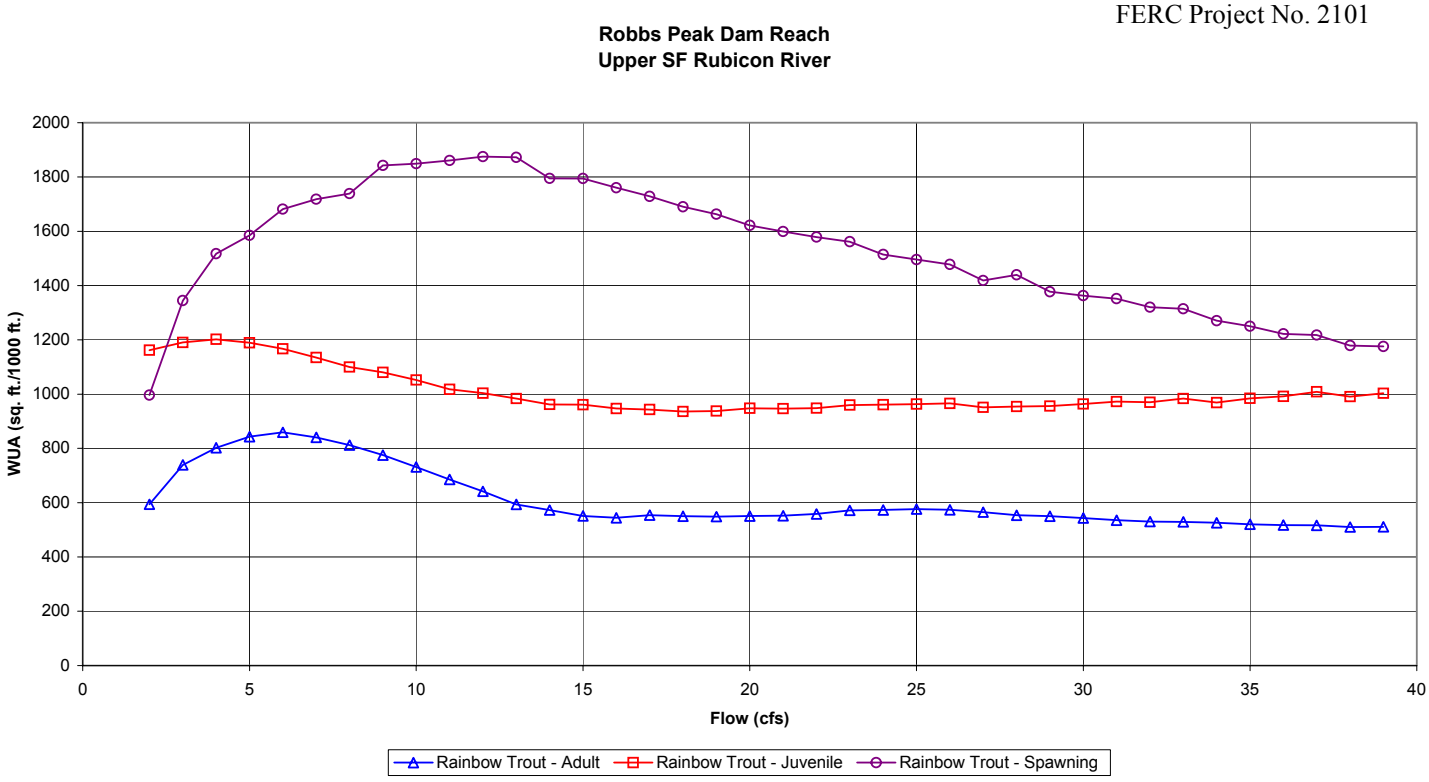

Figure 4.3.1-1. WUA versus flow for Upper S.F. Rubicon River: rainbow trout.

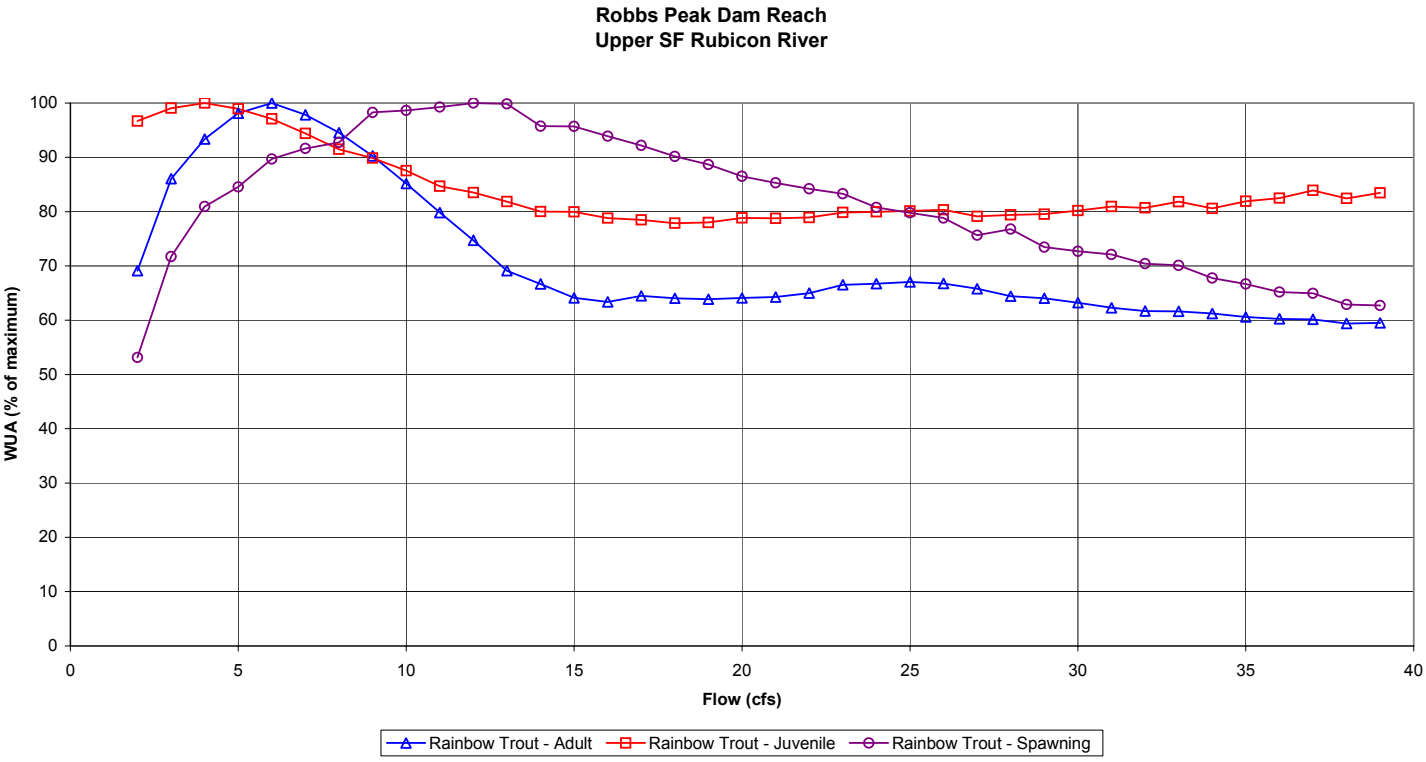

Figure 4.3.1-2. Percent of maximum WUA versus flow for Upper S.F. Rubicon River: rainbow trout.

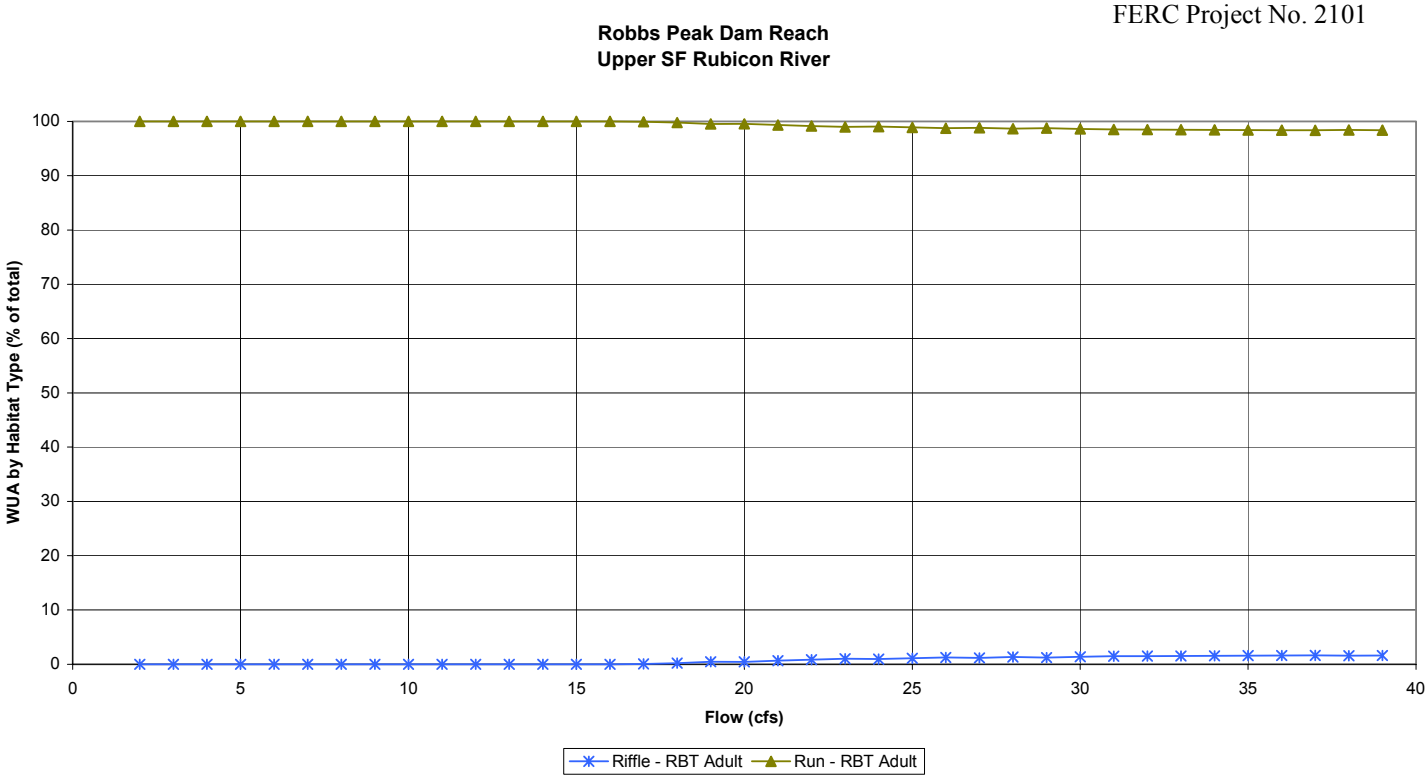

Figure 4.3.1-3. WUA by habitat type for Upper S.F. Rubicon River: rainbow trout adult.

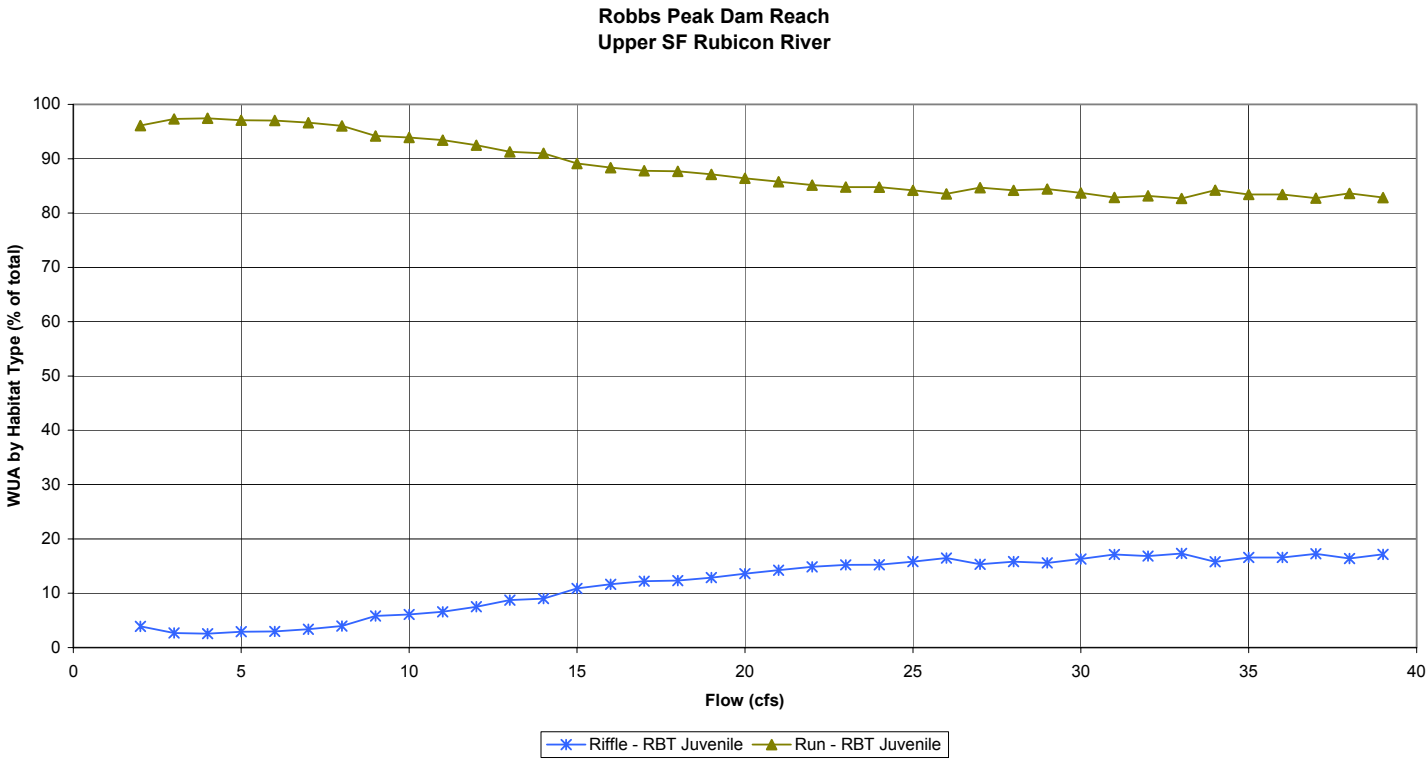

Figure 4.3.1-4. WUA by habitat type for Upper S.F. Rubicon River: rainbow trout juvenile.

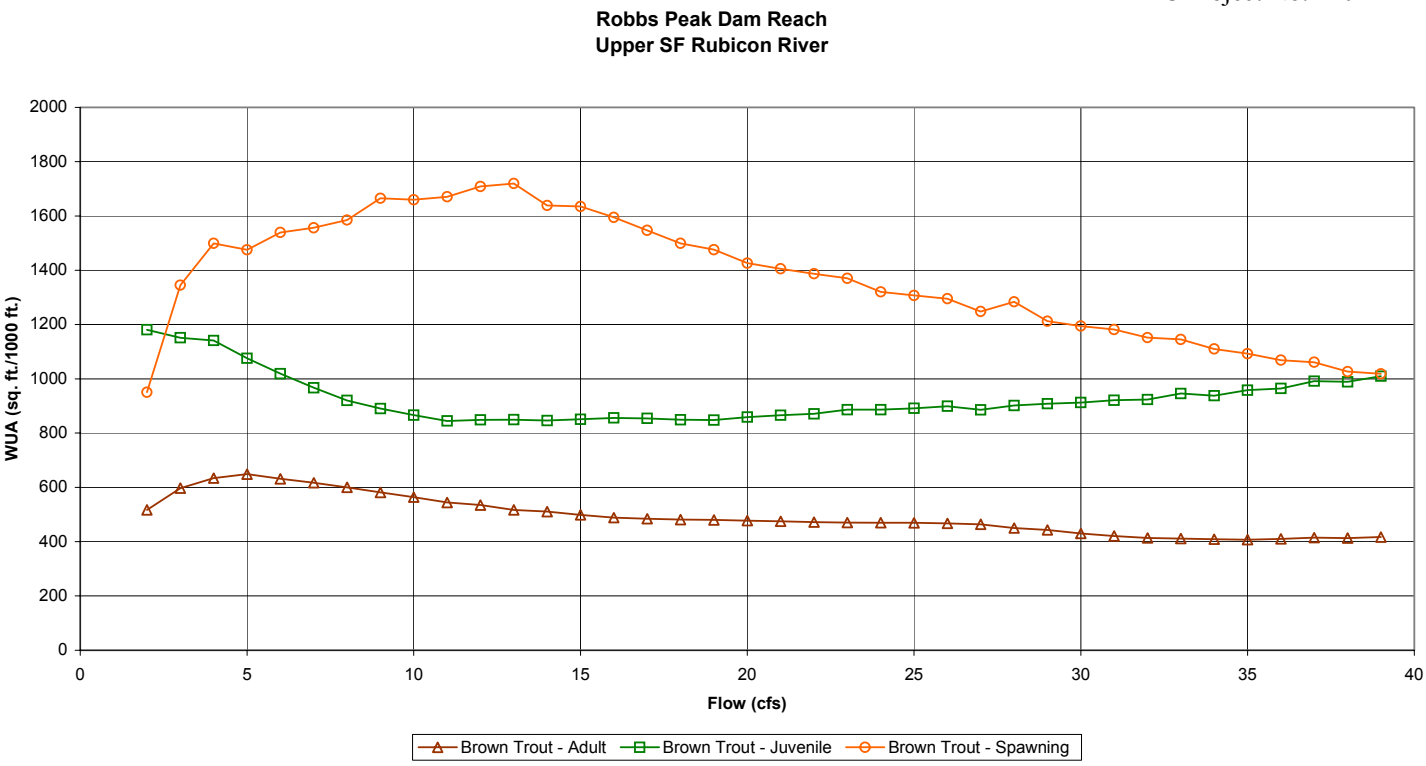

Figure 4.3.1-5. WUA versus flow for Upper S.F. Rubicon River: brown trout.

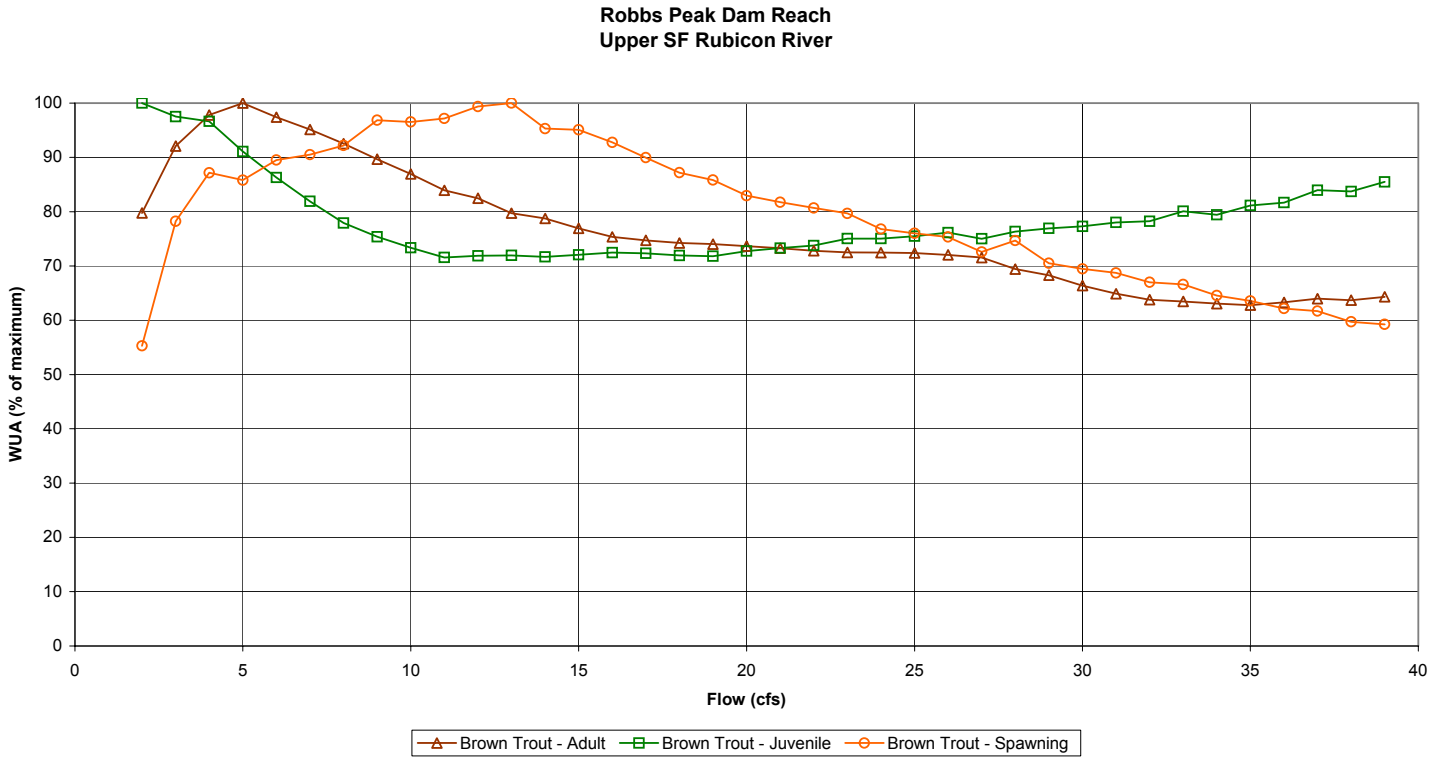

Figure 4.3.1-6. Percent of maximum WUA versus flow for Upper S.F. Rubicon River: brown trout.

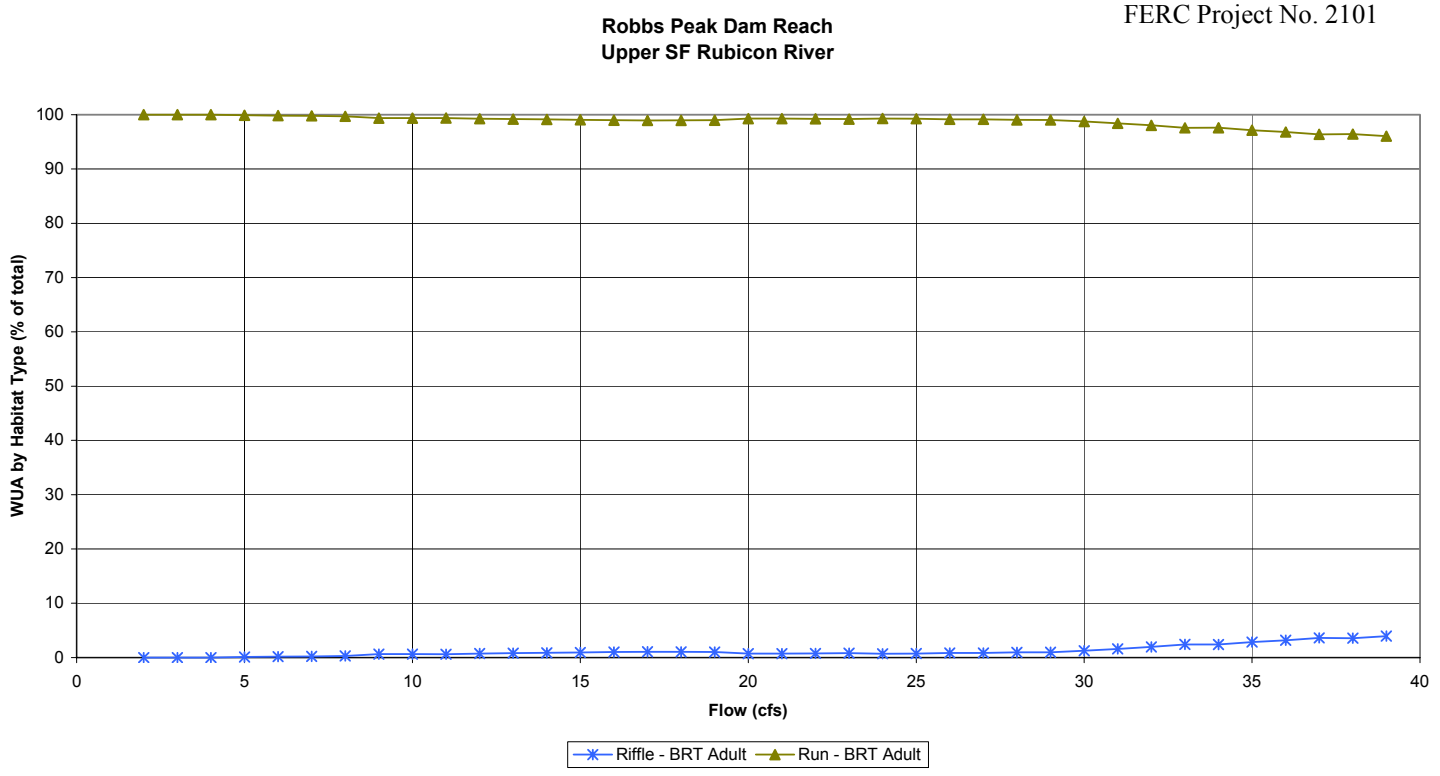

Figure 4.3.1-7. WUA by habitat type for Upper S.F. Rubicon River: brown trout adult.

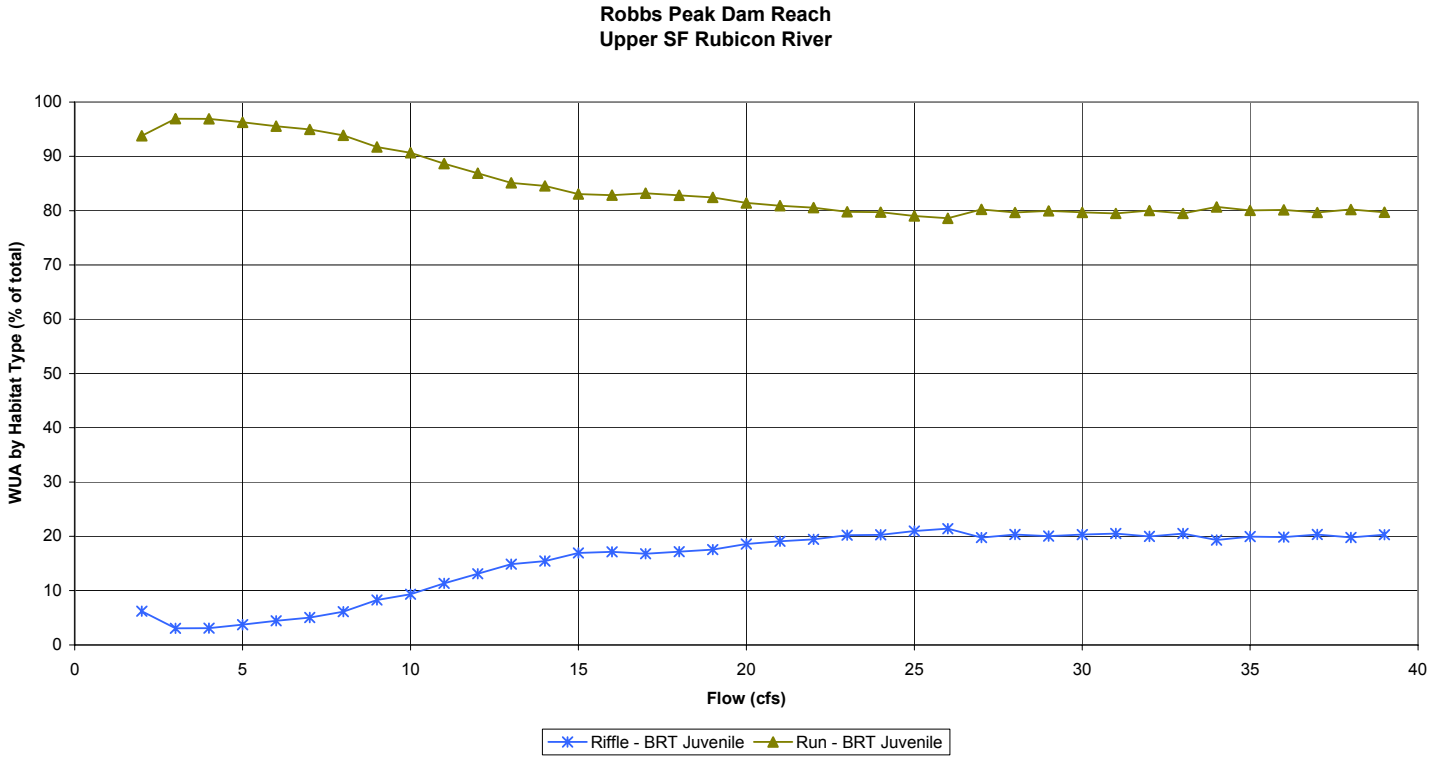

Figure 4.3.1-8. WUA by habitat type for Upper S.F. Rubicon River: brown trout juvenile.

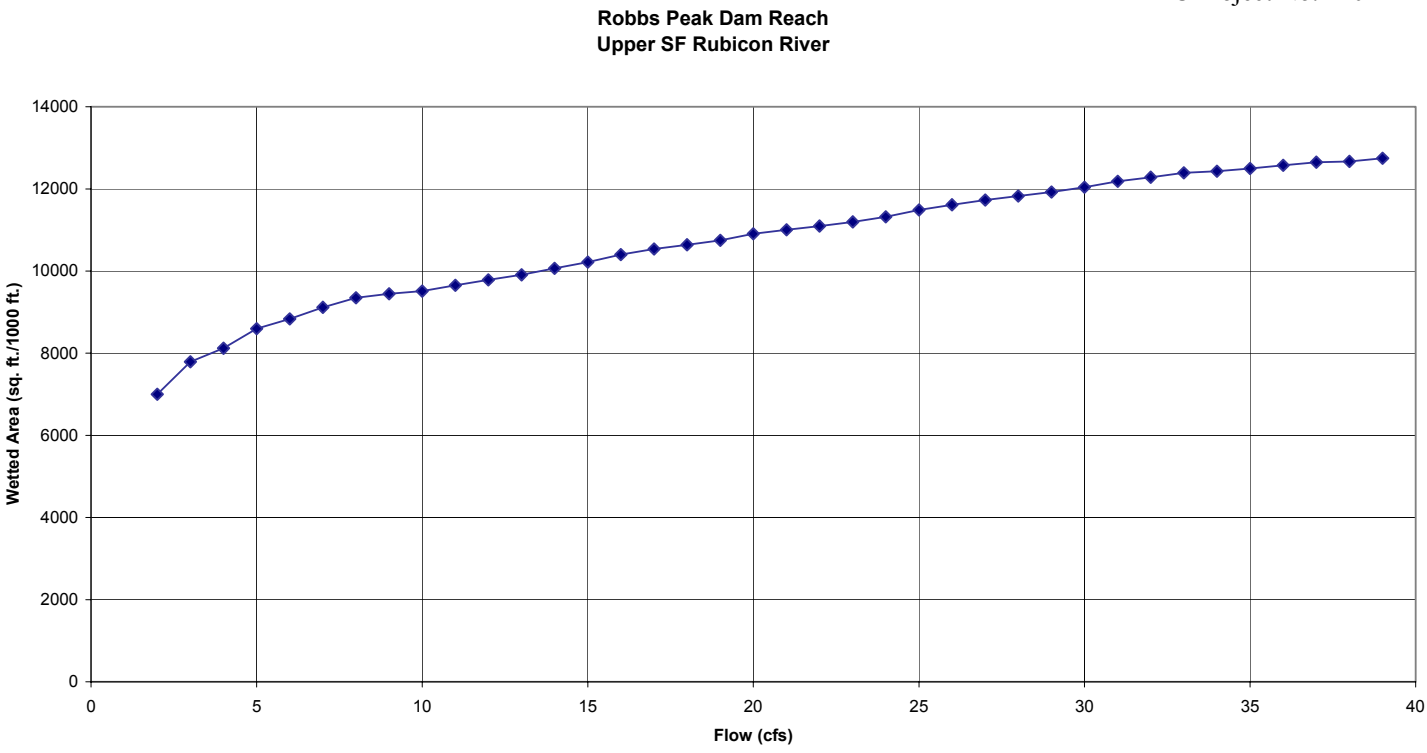

Figure 4.3.1-9. Wetted area versus flow for Upper S.F. Rubicon River.

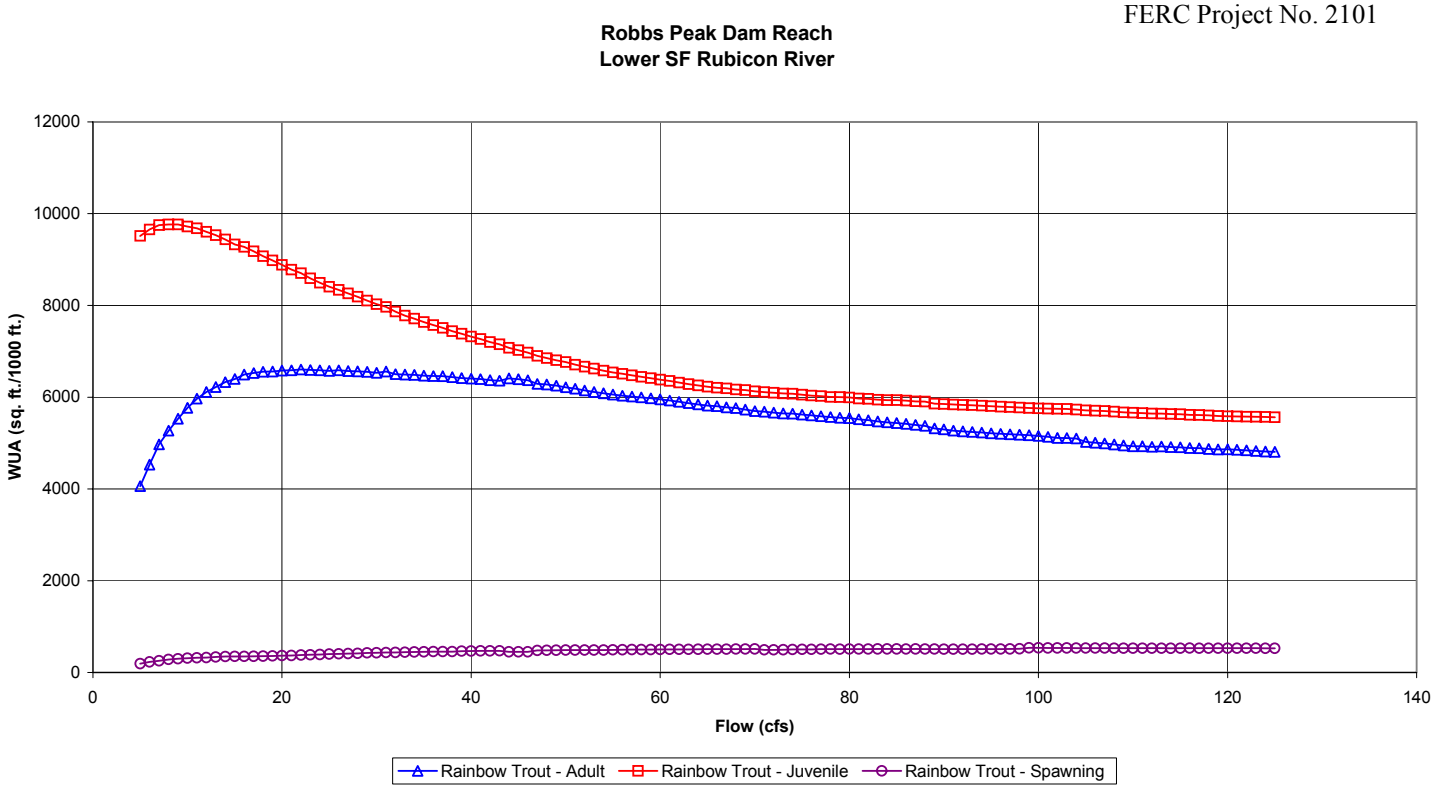

Figure 4.3.2-1. WUA versus flow for Lower S.F. Rubicon River: rainbow trout.

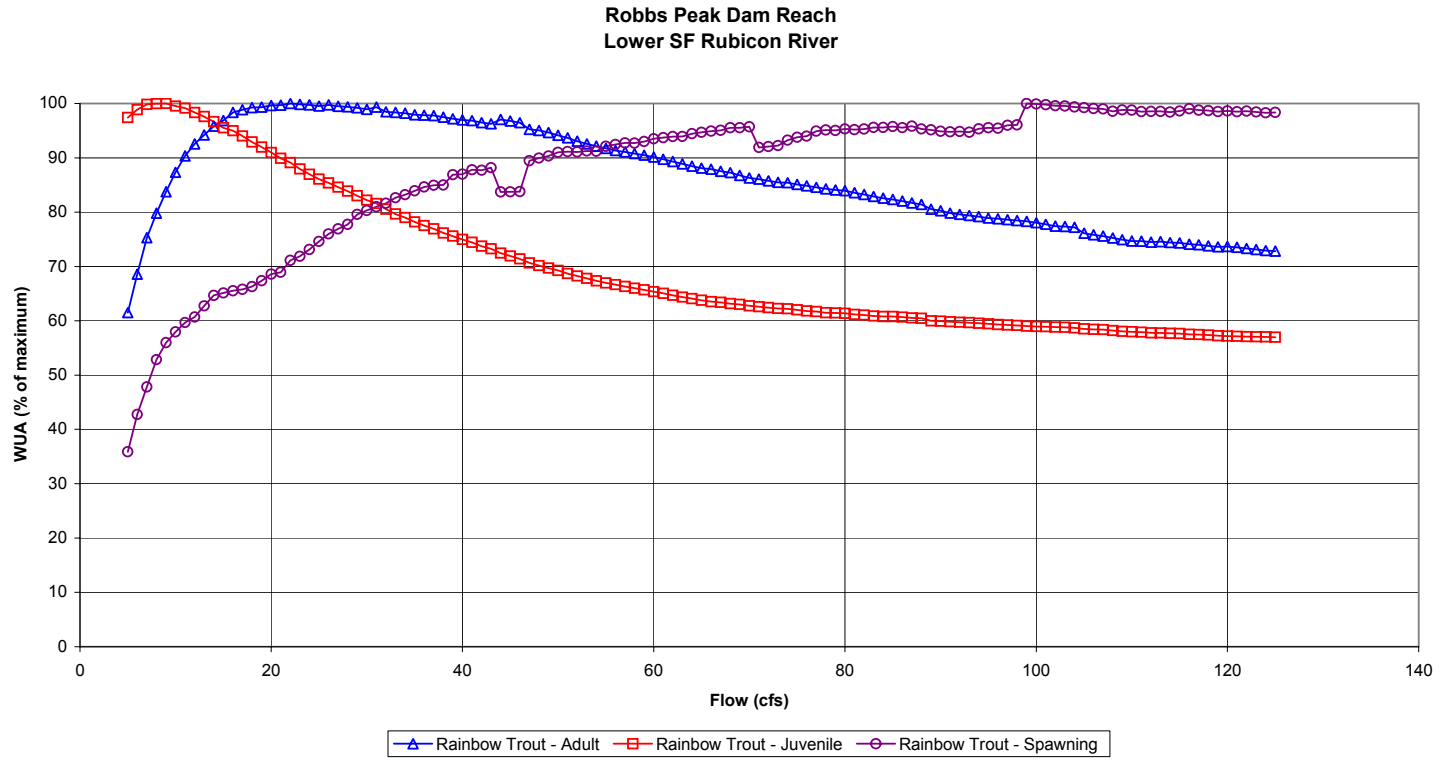

Figure 4.3.2-2. Percent of maximum WUA versus flow for Lower S.F. Rubicon River: rainbow trout.

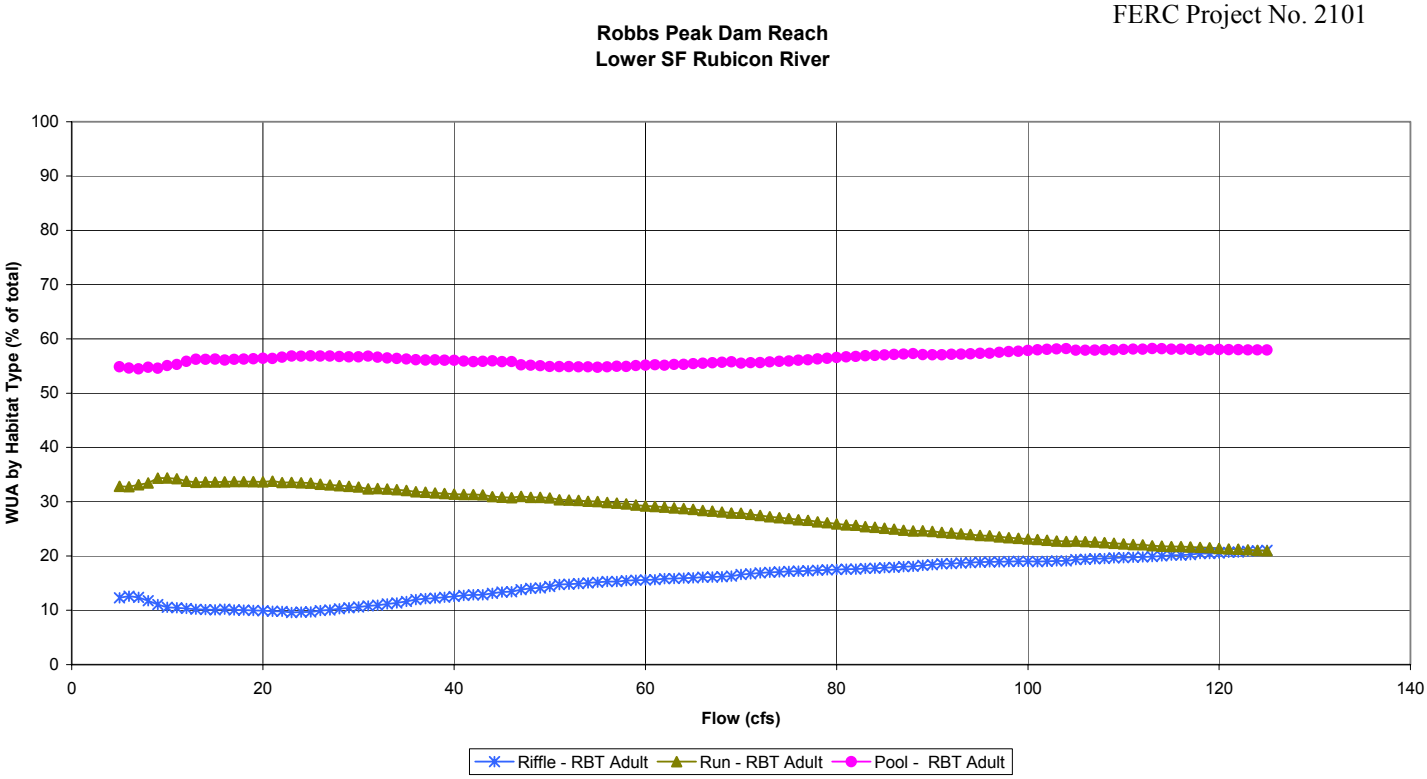

Figure 4.3.2-3. WUA by habitat type for Lower S.F. Rubicon River: rainbow trout adult.

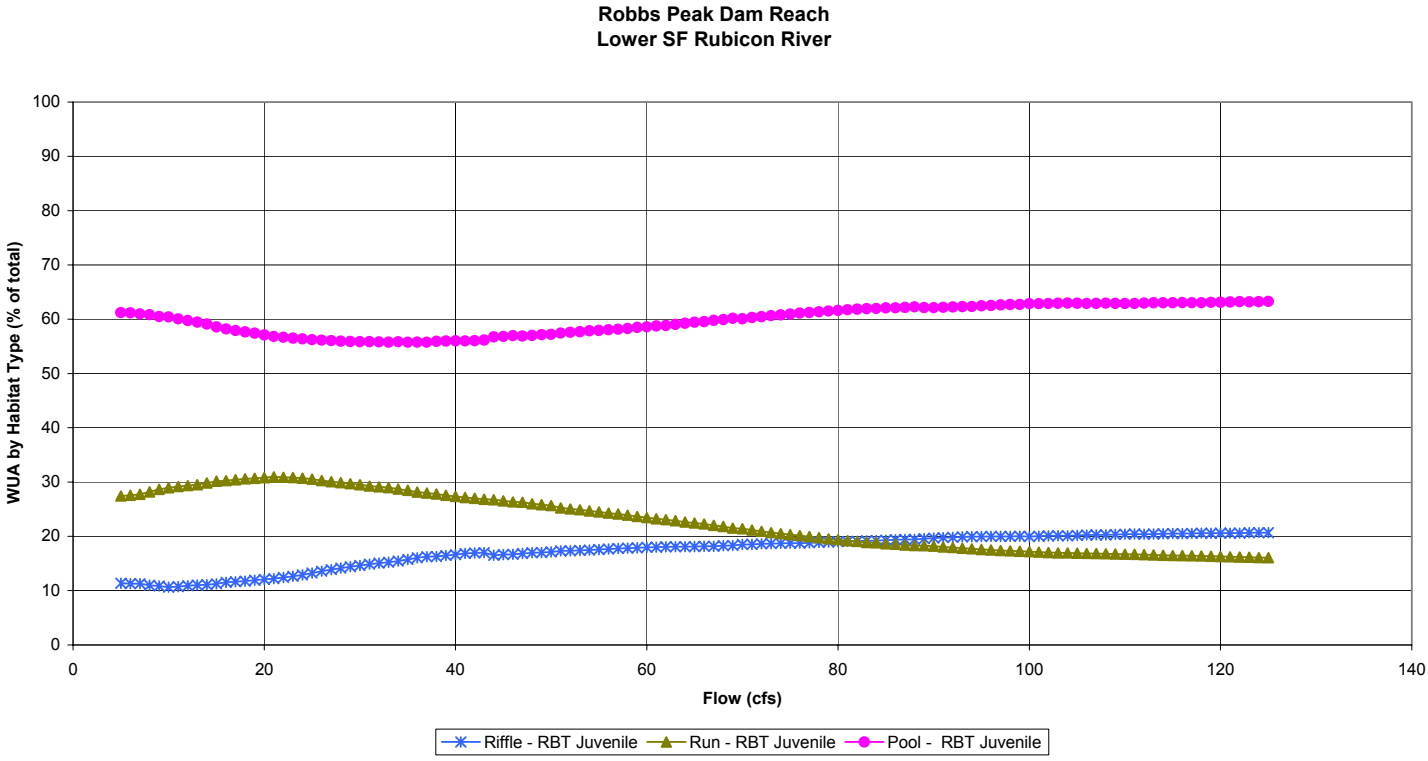

Figure 4.3.2-4. WUA by habitat type for Lower S.F. Rubicon River: rainbow trout juvenile.

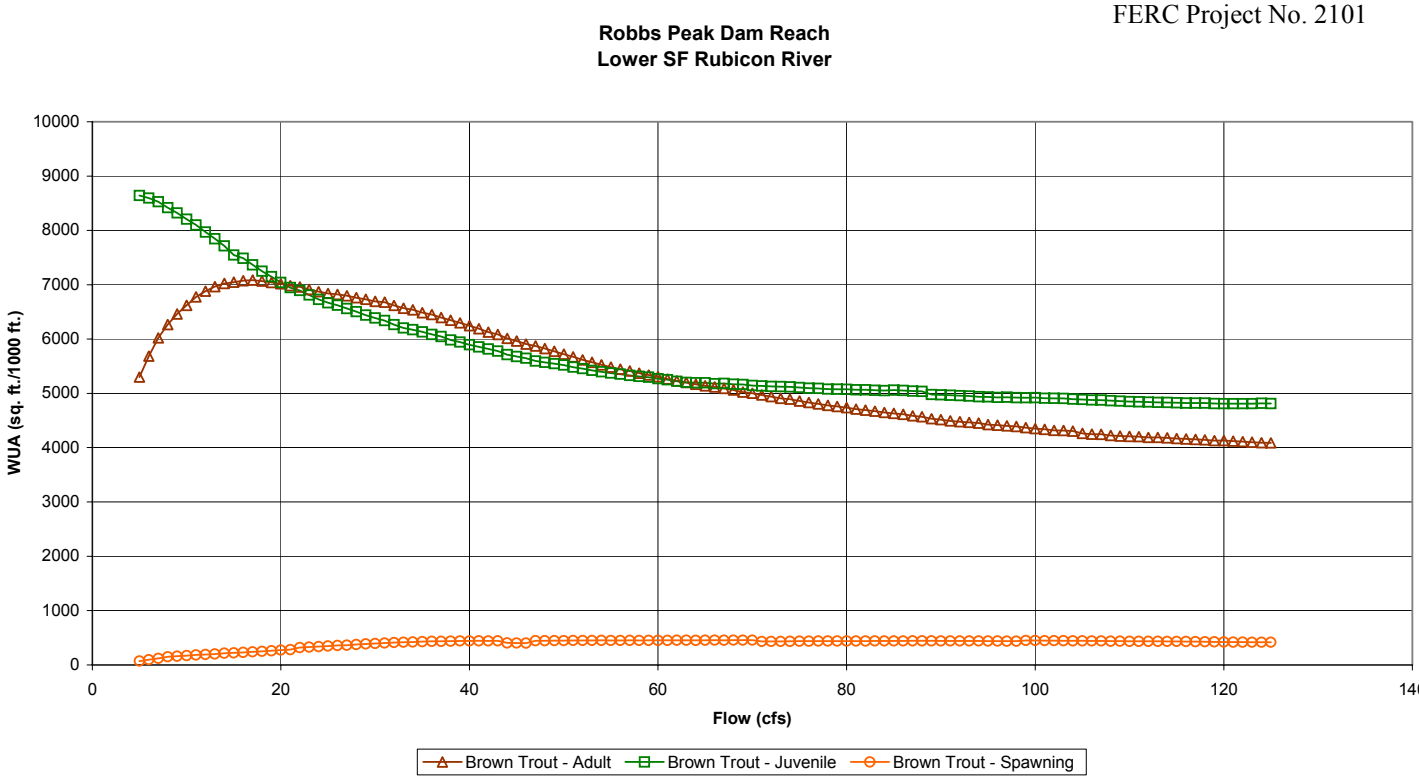

Figure 4.3.2-5. WUA versus flow for Lower S.F. Rubicon River: brown trout.

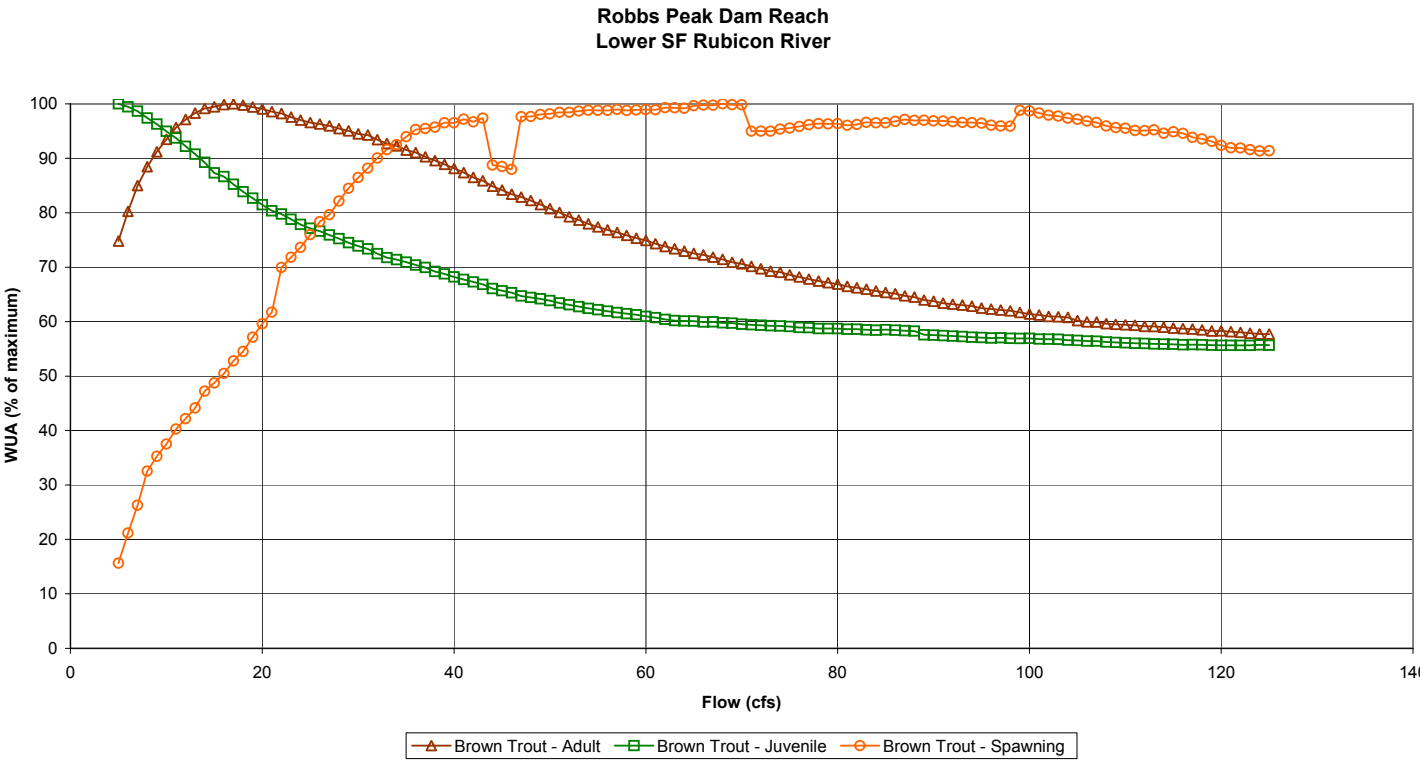

Figure 4.3.2-6. Percent of maximum WUA versus flow for Lower S.F. Rubicon River: brown trout.

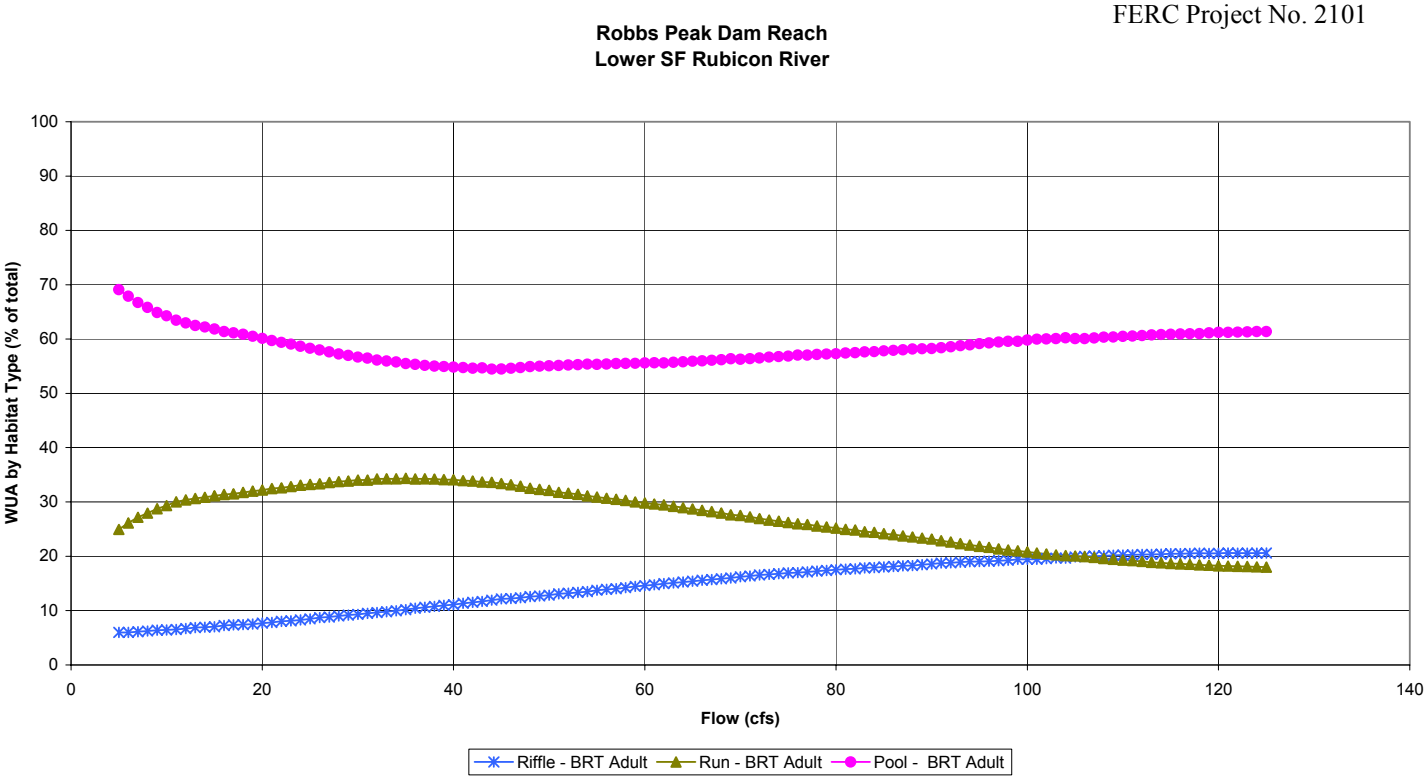

Figure 4.3.2-7. WUA by habitat type for Lower S.F. Rubicon River: brown trout adult.

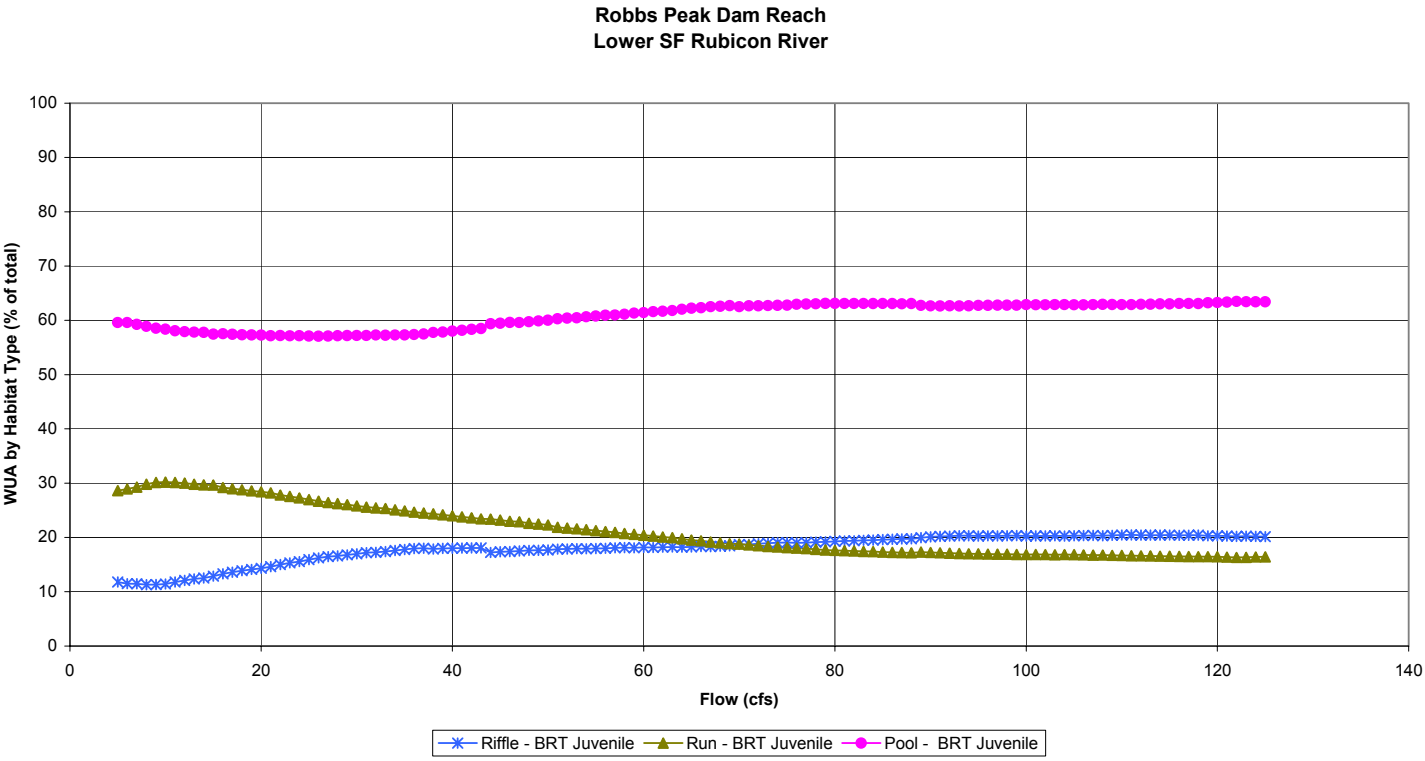

Figure 4.3.2-8. WUA by habitat type for Lower S.F. Rubicon River: brown trout juvenile.

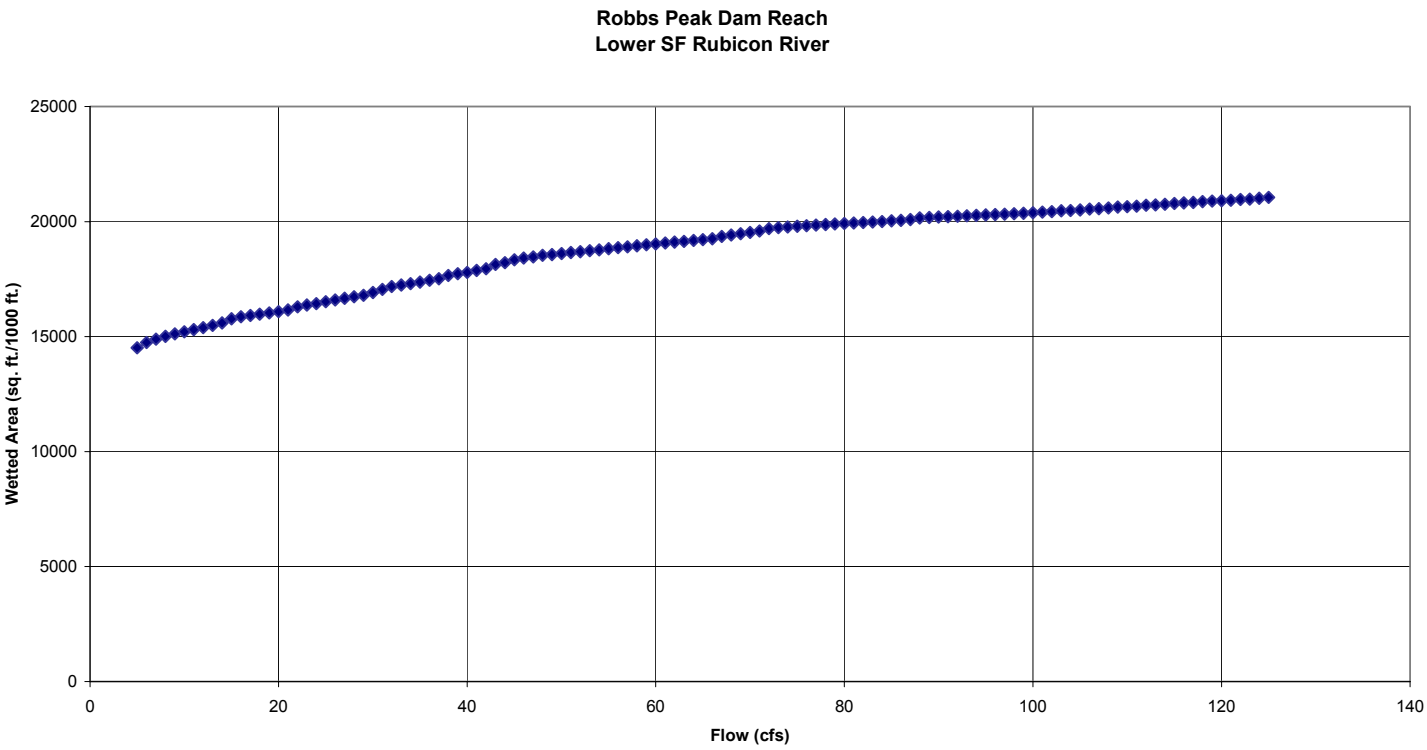

Figure 4.3.2-9. Wetted area versus flow for Lower S.F. Rubicon River.

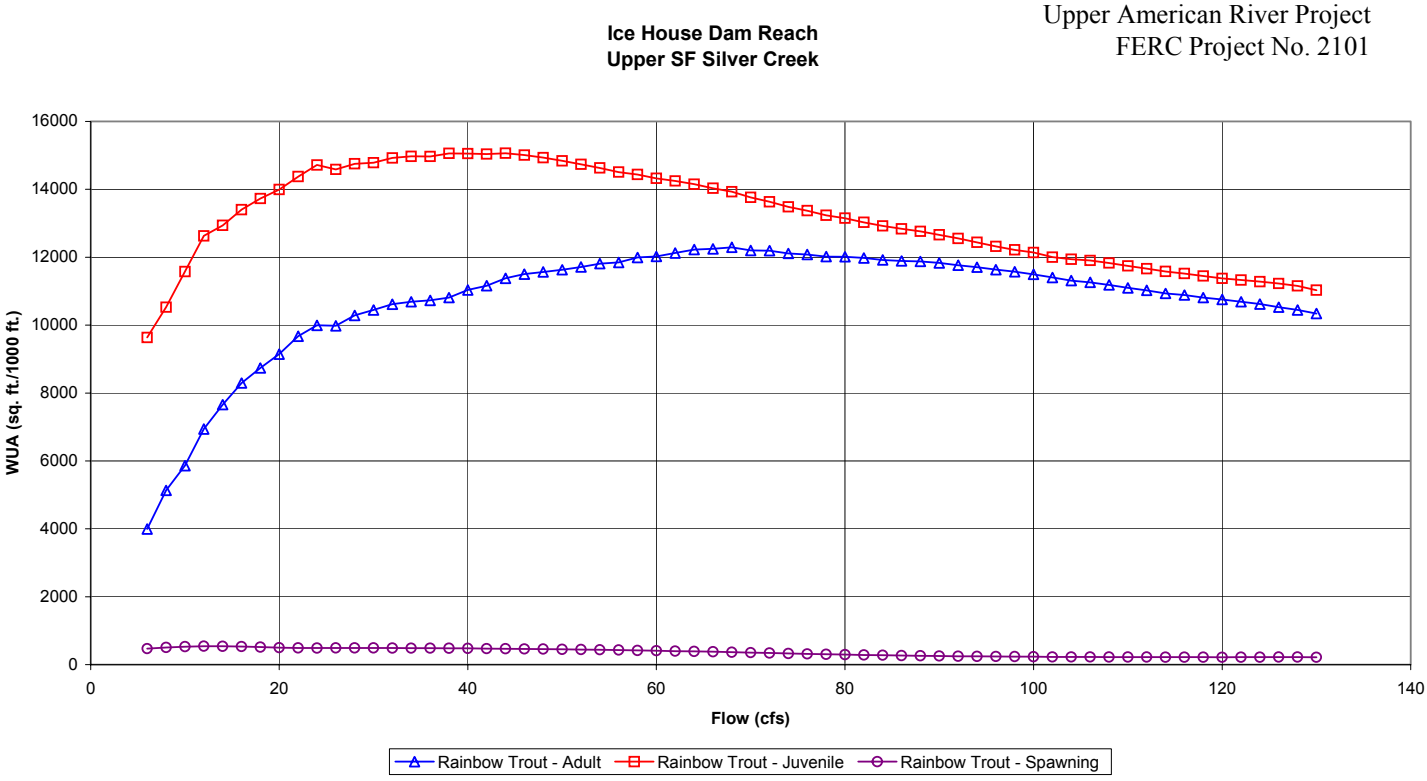

Figure 4.4.1-1. WUA versus flow for Upper S.F. Silver Creek: rainbow trout.

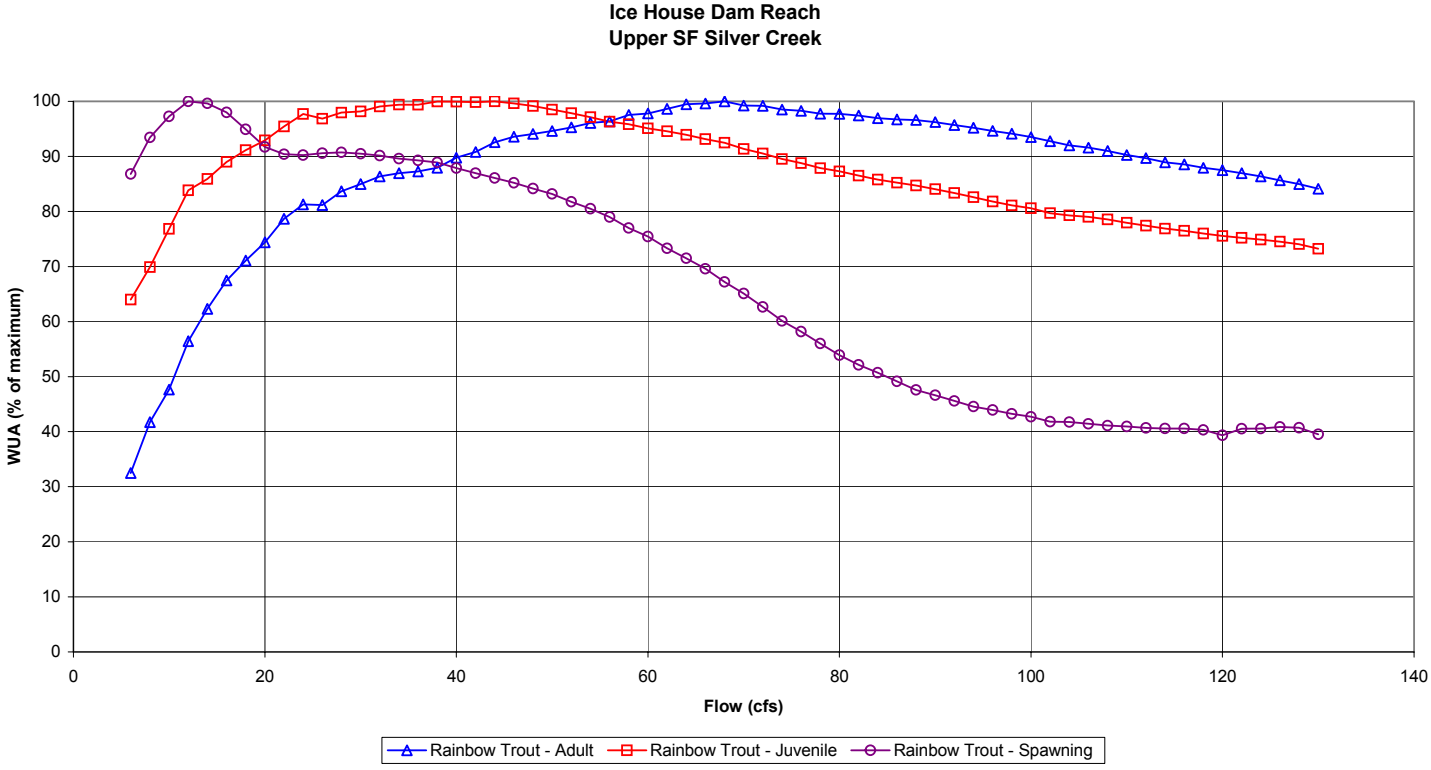

Figure 4.4.1-2. Percent of maximum WUA versus flow for Upper S.F. Silver Creek: rainbow trout.

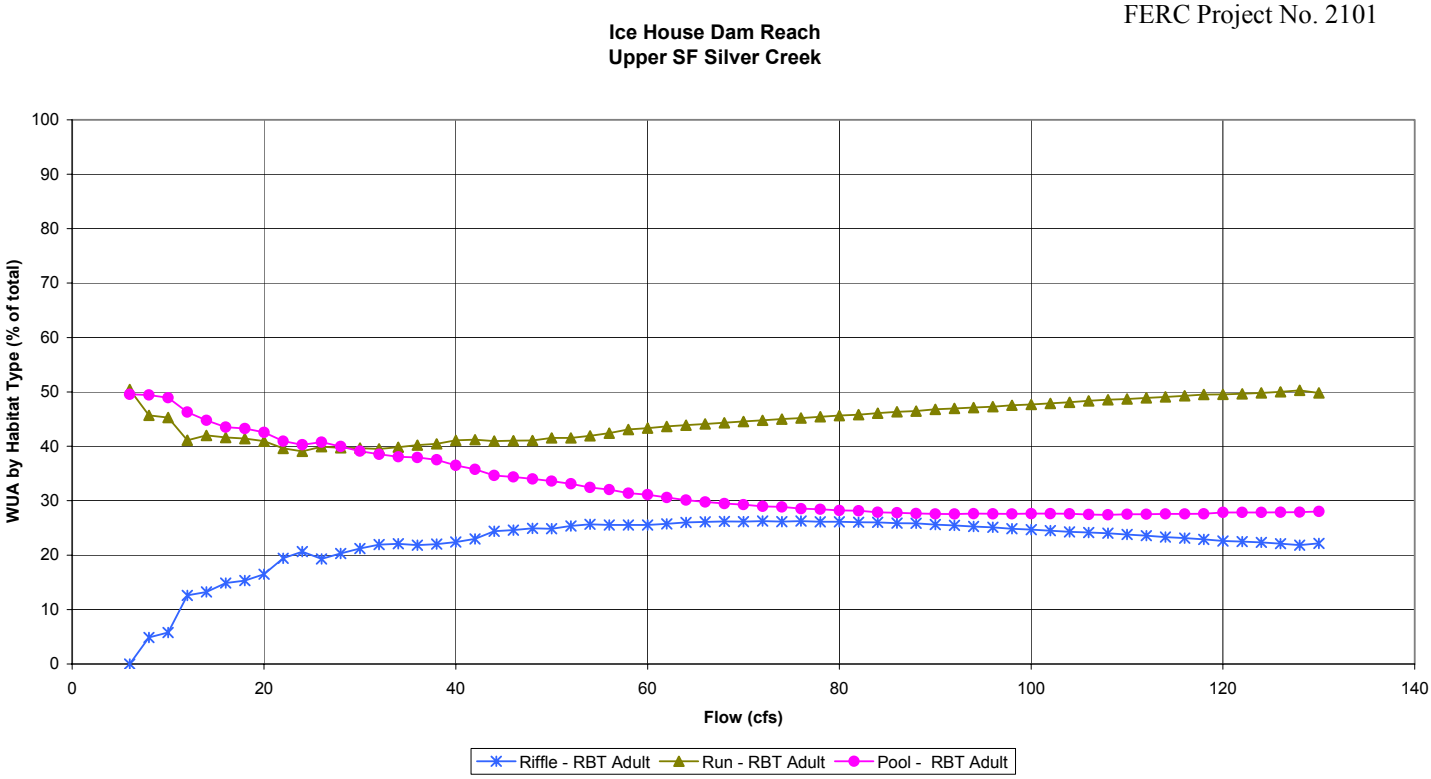

Figure 4.4.1-3. WUA by habitat type for Upper S.F. Silver Creek: rainbow trout adult.

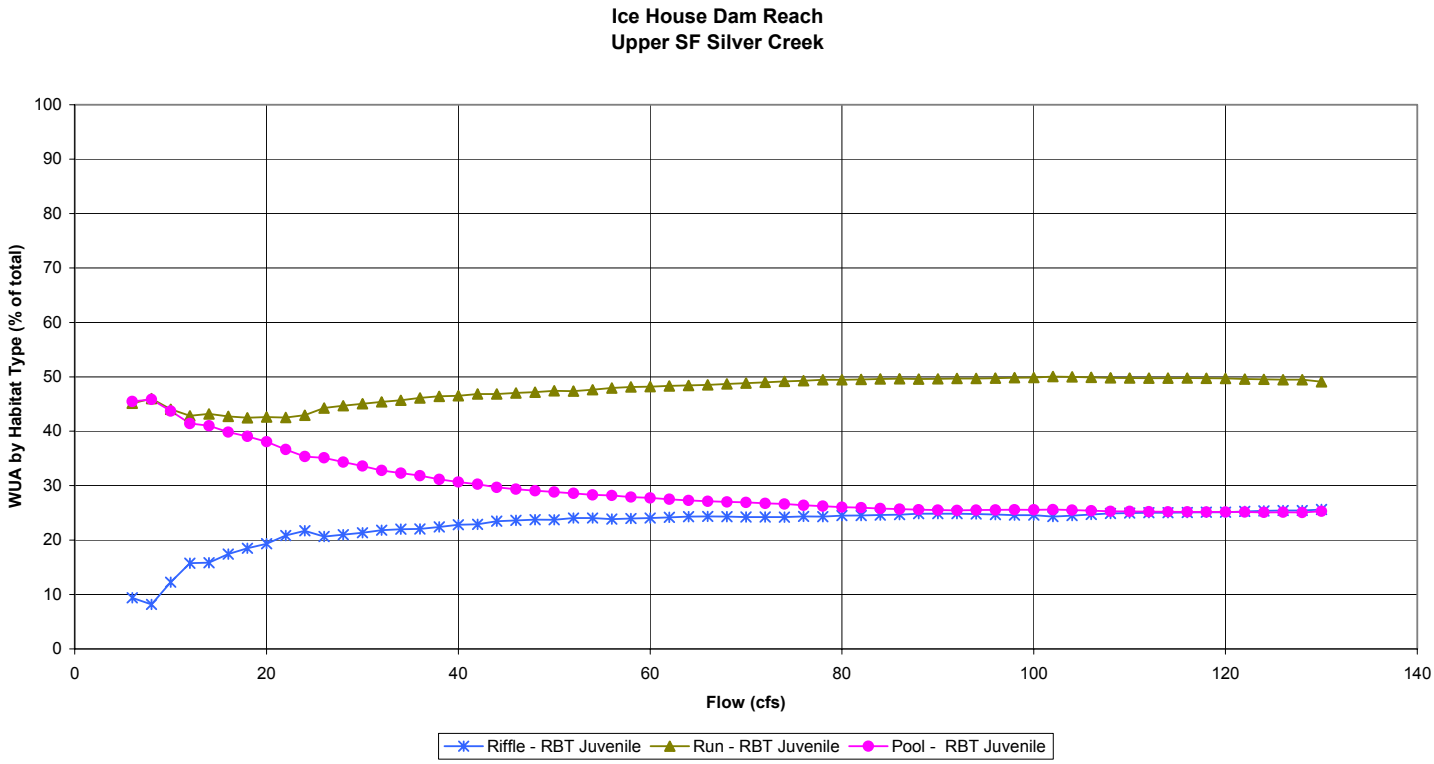

Figure 4.4.1-4. WUA by habitat type for Upper S.F. Silver Creek: rainbow trout juvenile.

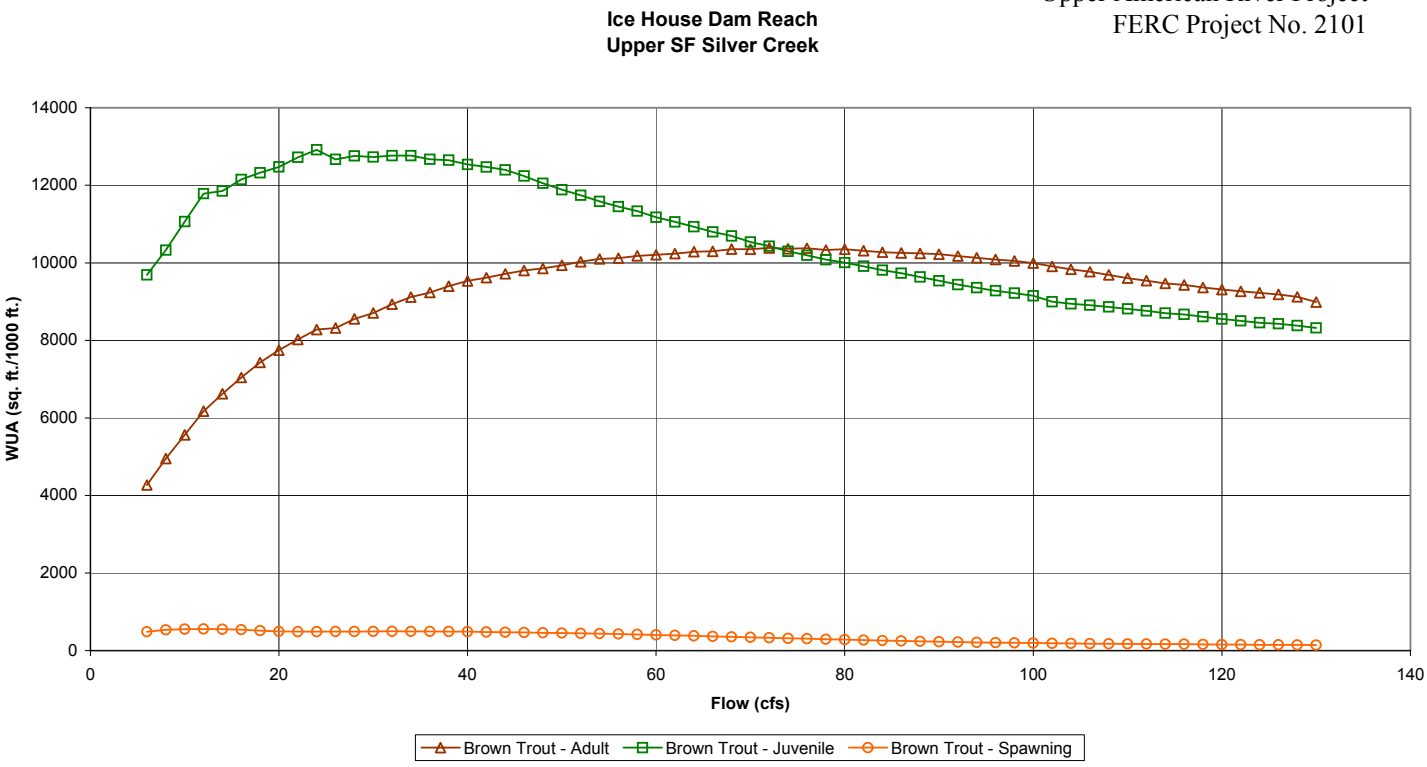

Figure 4.4.1-5. WUA versus flow for Upper S.F. Silver Creek: brown trout.

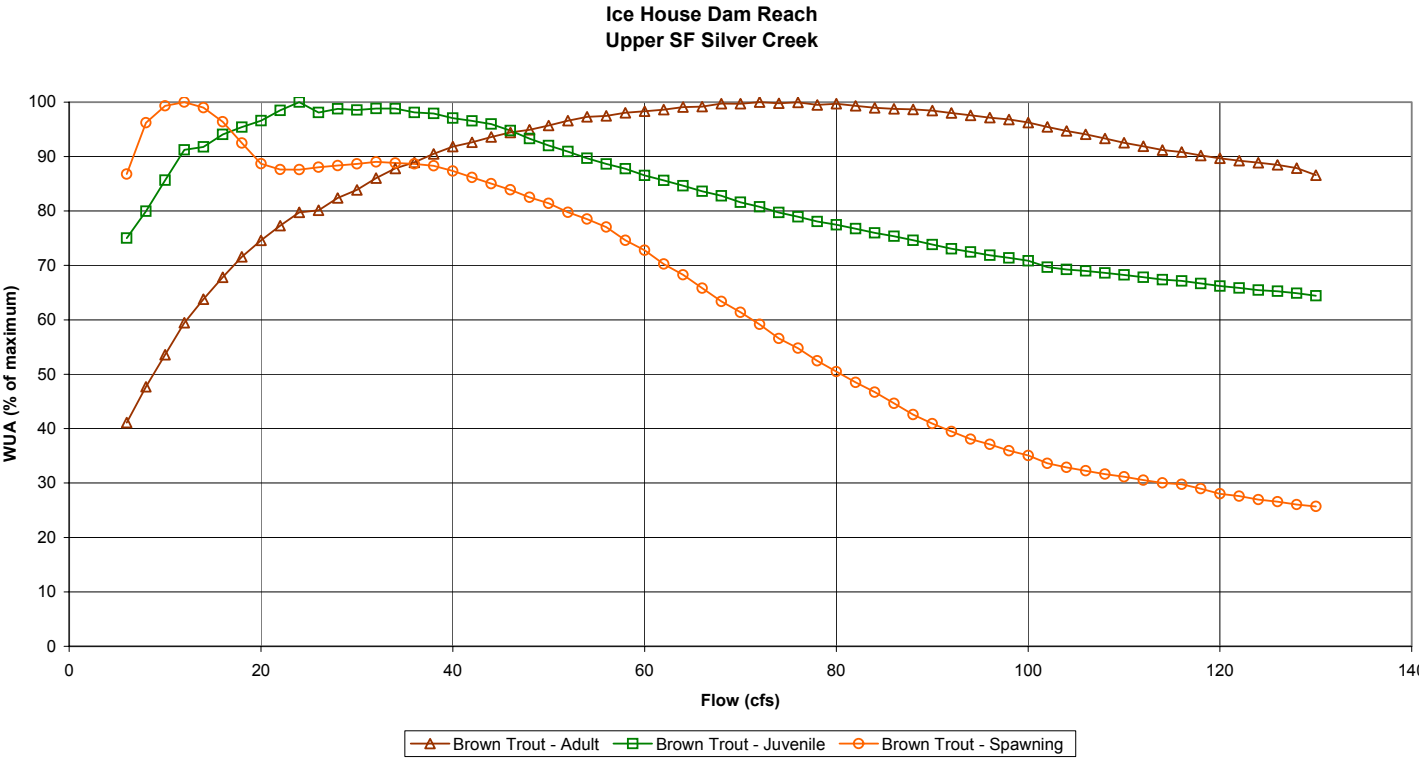

Figure 4.4.1-6. Percent of maximum WUA versus flow for Upper S.F. Silver Creek: brown trout.

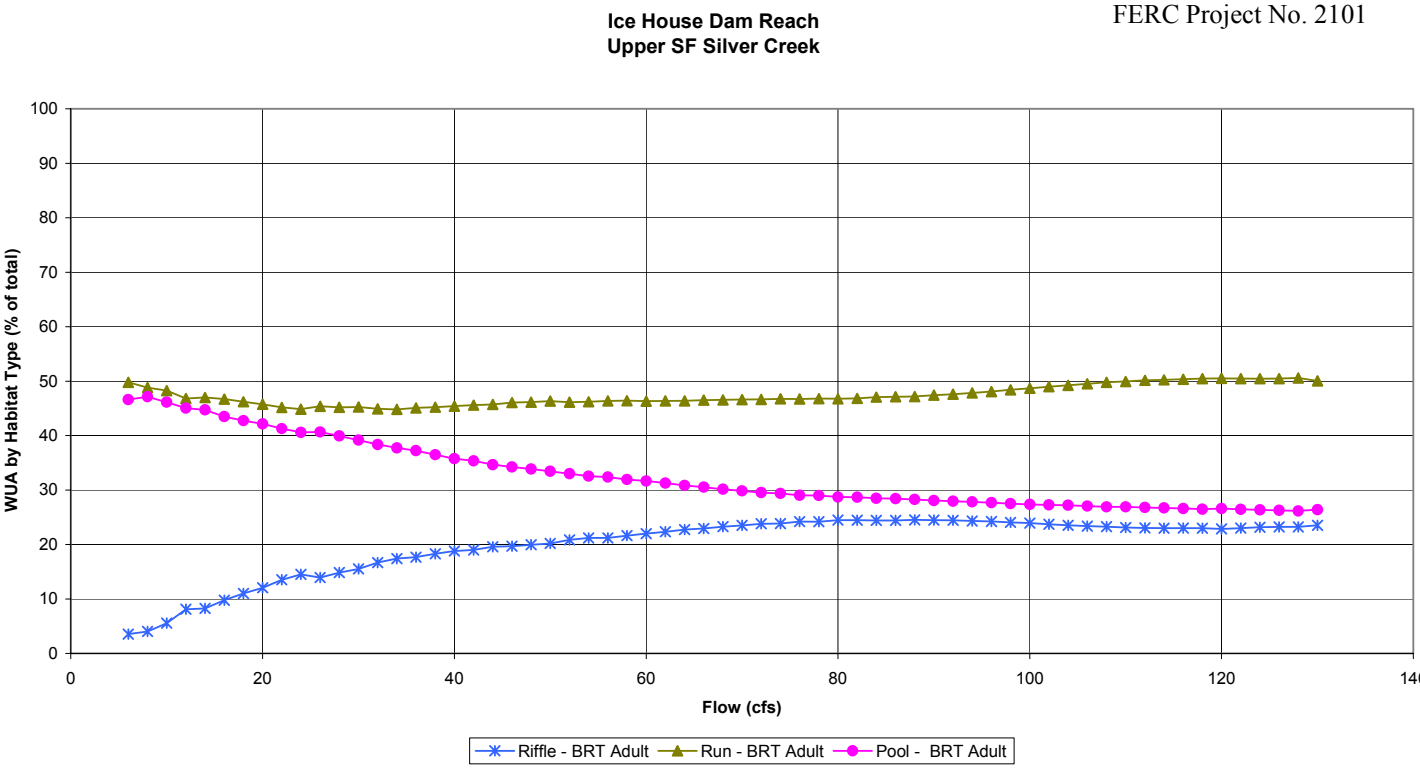

Figure 4.4.1-7. WUA by habitat type for Upper S.F. Silver Creek: brown trout adult.

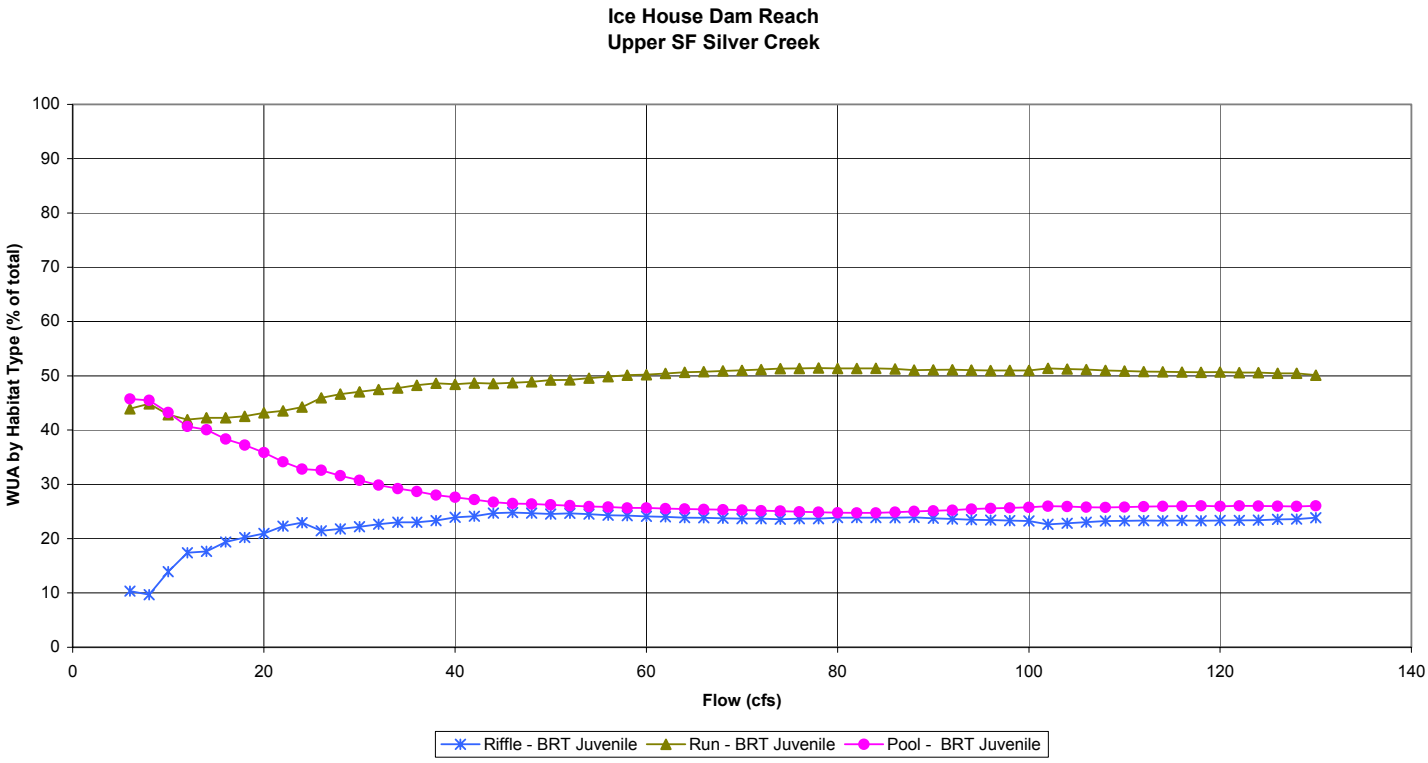

Figure 4.4.1-8. WUA by habitat type for Upper S.F. Silver Creek: brown trout juvenile.

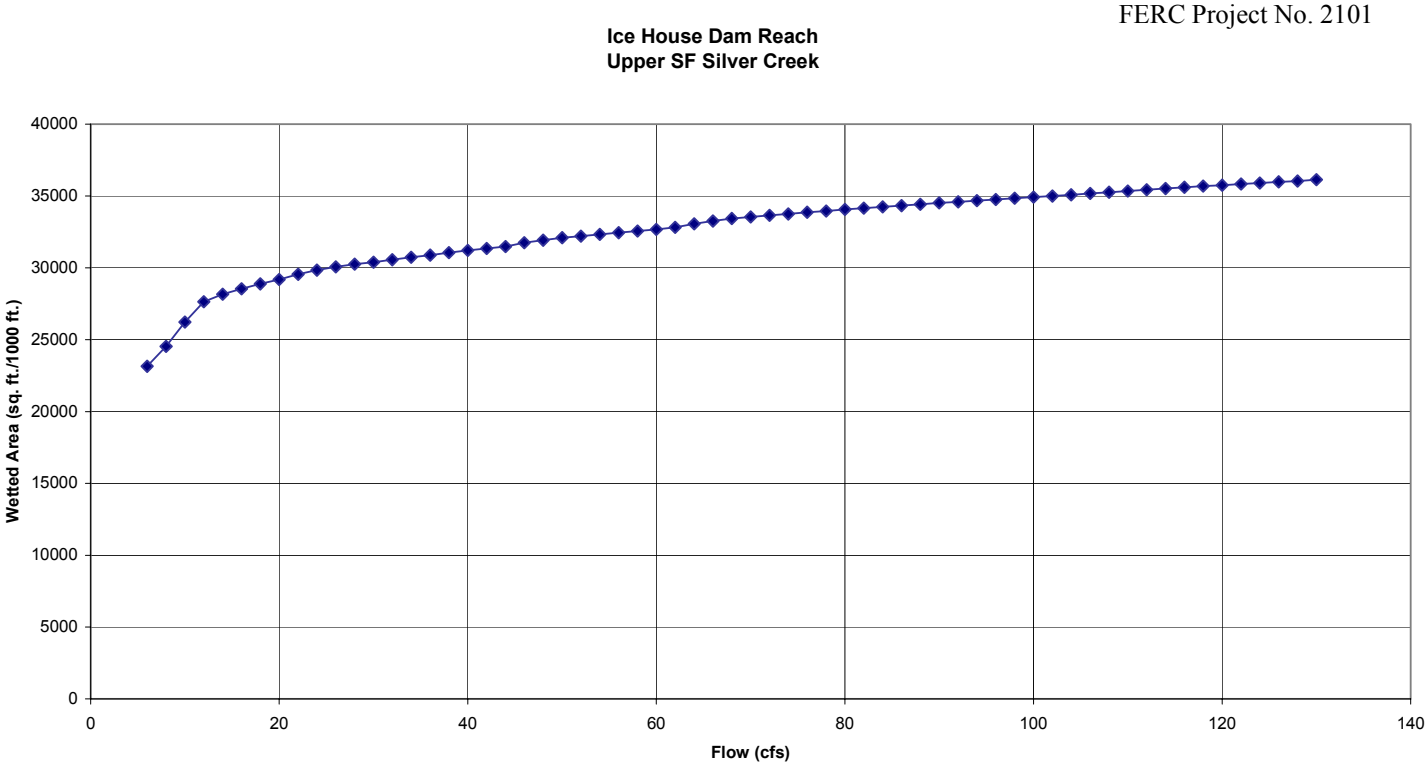

Figure 4.4.1-9. Wetted area versus flow for Upper S.F. Silver Creek.

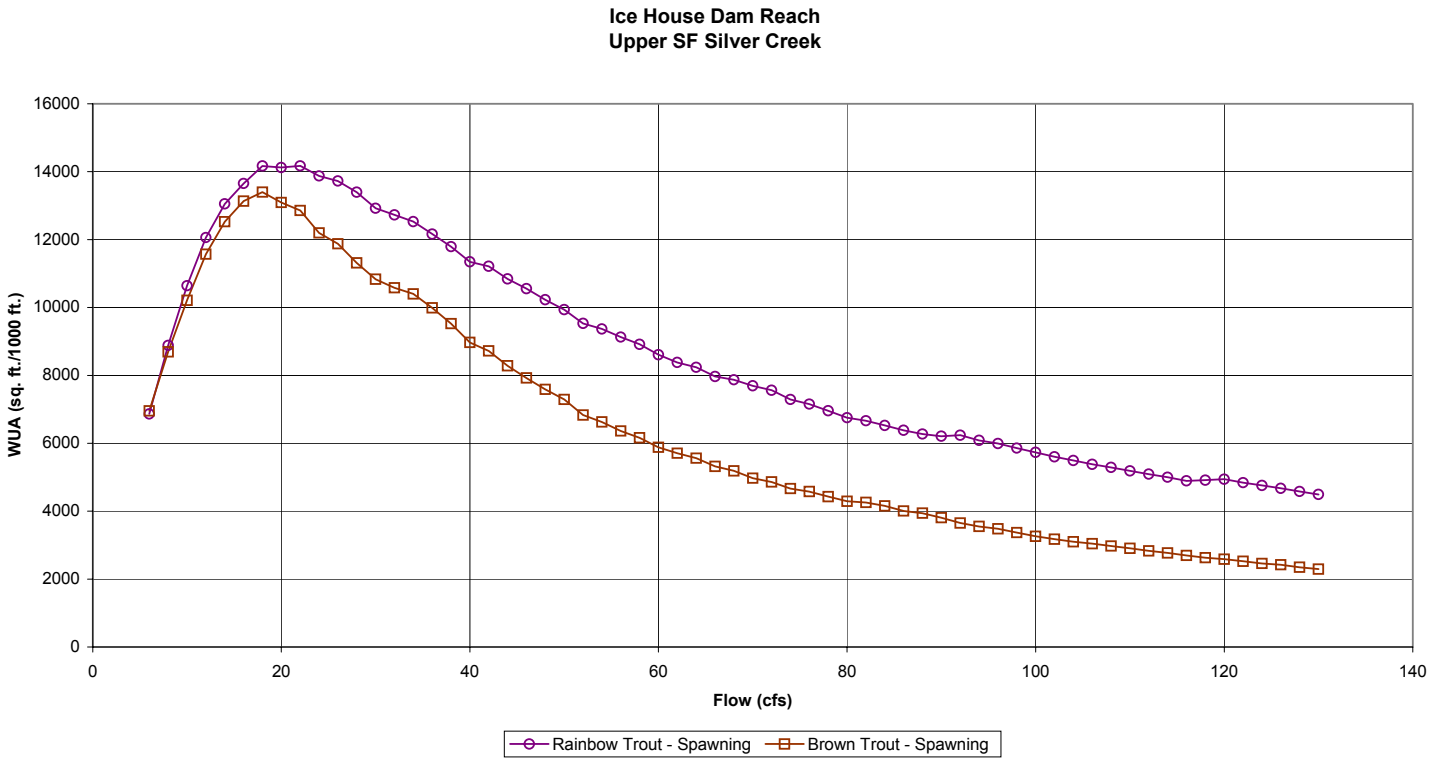

Figure 4.4.1-10. WUA versus flow for Upper S.F. Silver Creek spawning site.

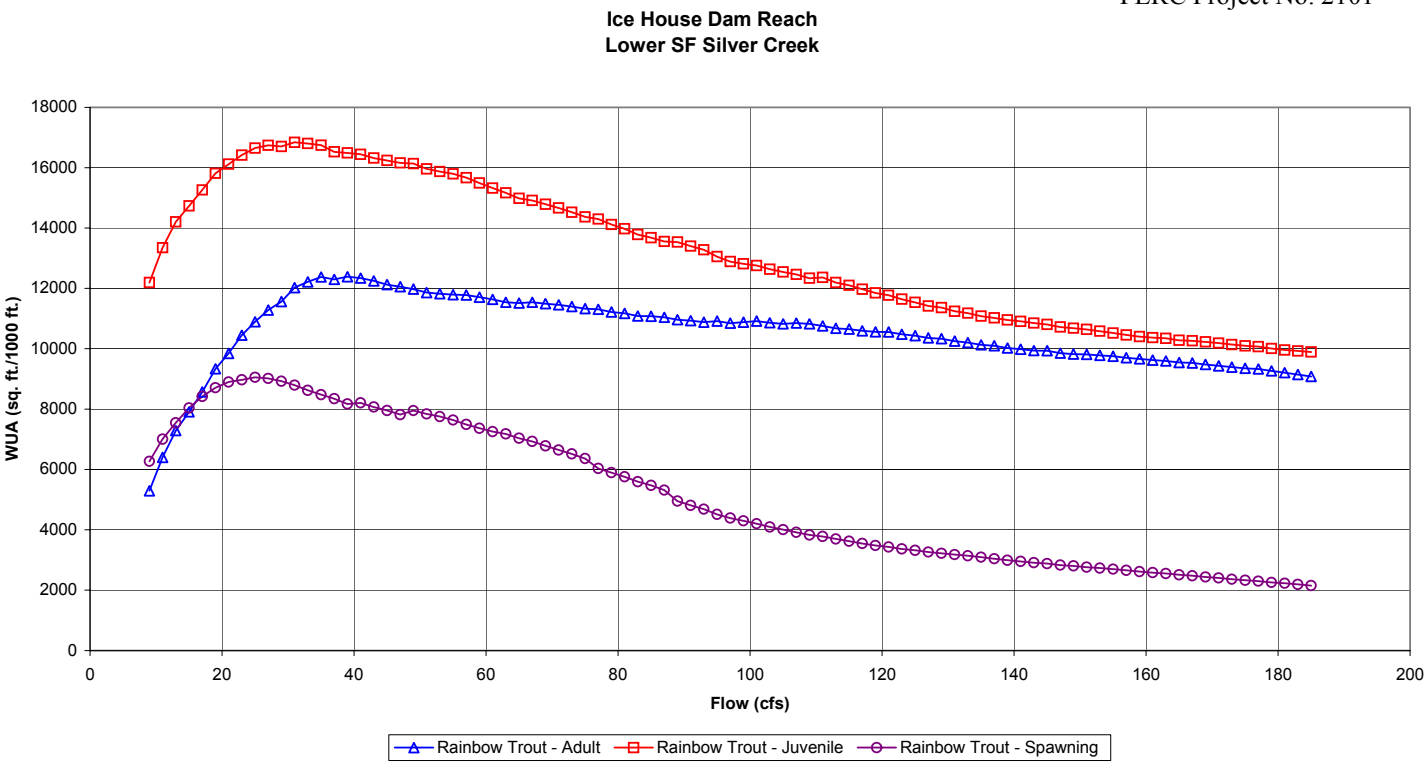

Figure 4.4.2-1. WUA versus flow for Lower S.F. Silver Creek: rainbow trout .

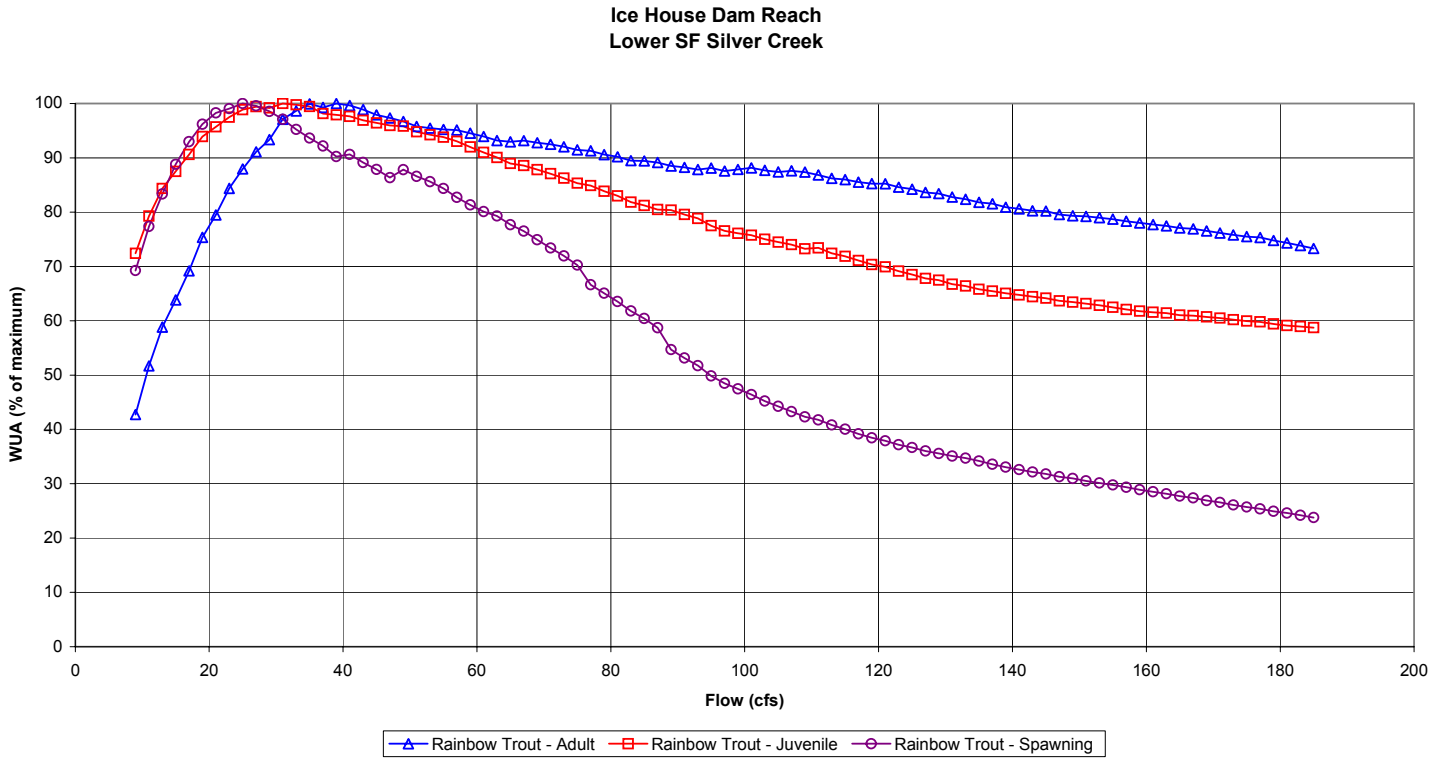

Figure 4.4.2-2. Percent of maximum WUA versus flow for Lower S.F. Silver Creek: rainbow trout

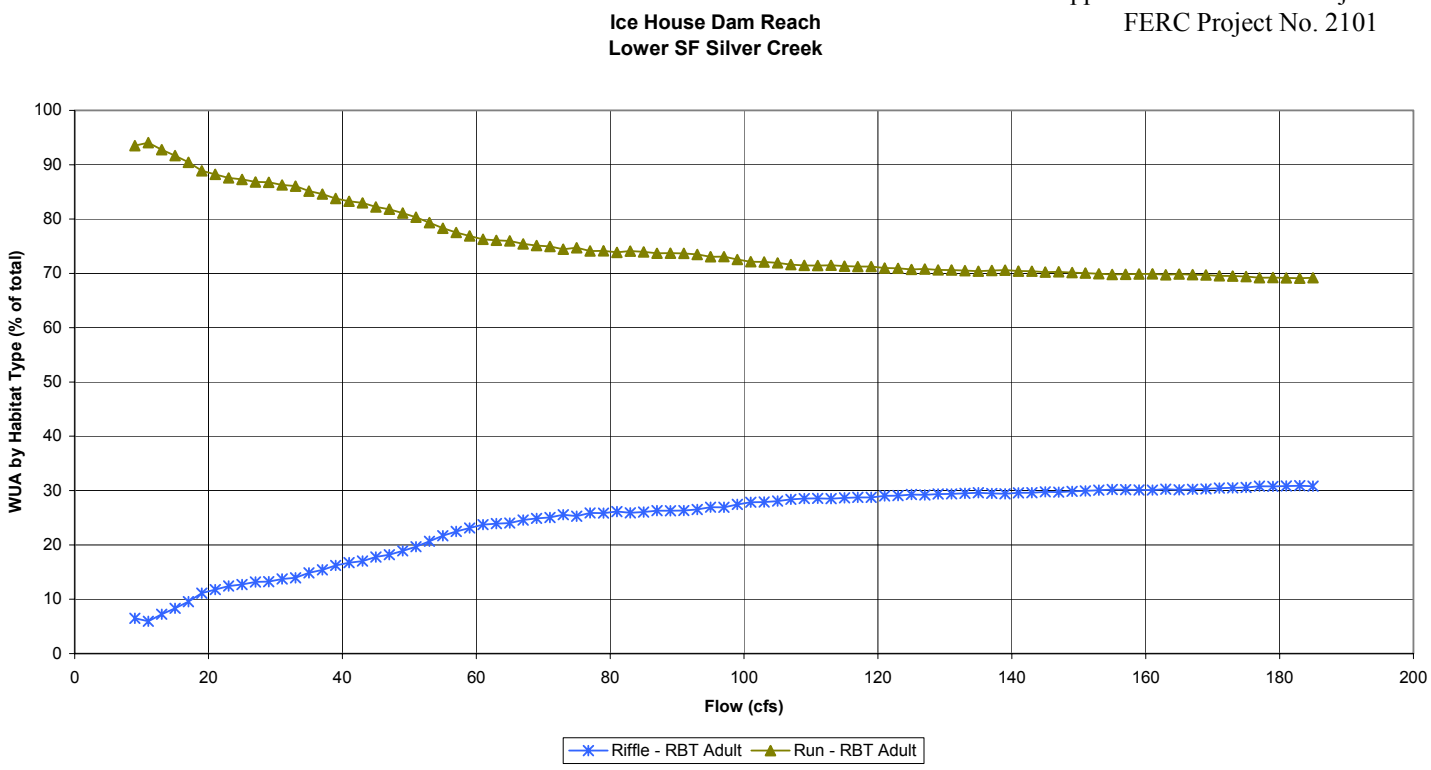

Figure 4.4.2-3. WUA by habitat type for Lower S.F. Silver Creek: rainbow trout adult.

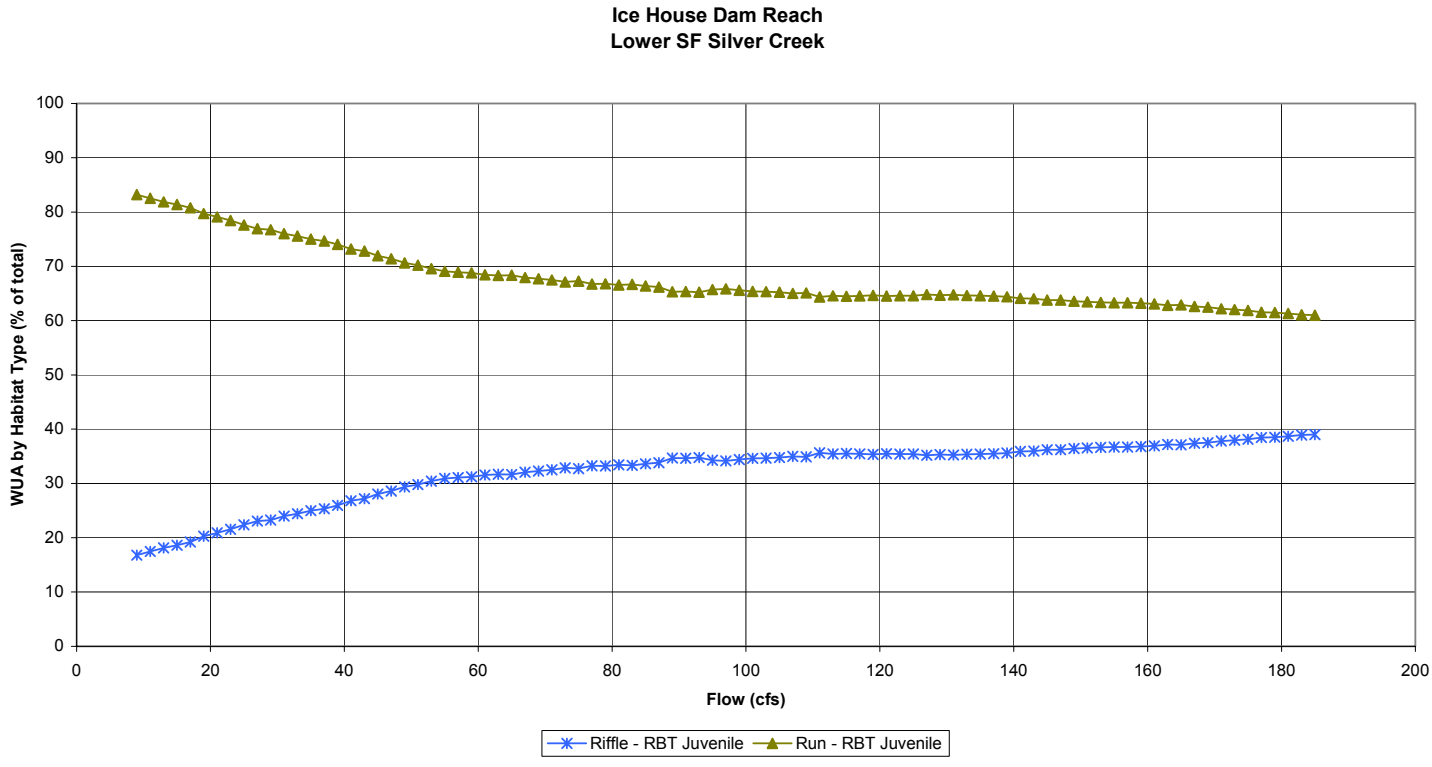

Figure 4.4.2-4. WUA by habitat type for Lower S.F. Silver Creek: rainbow trout juvenile.

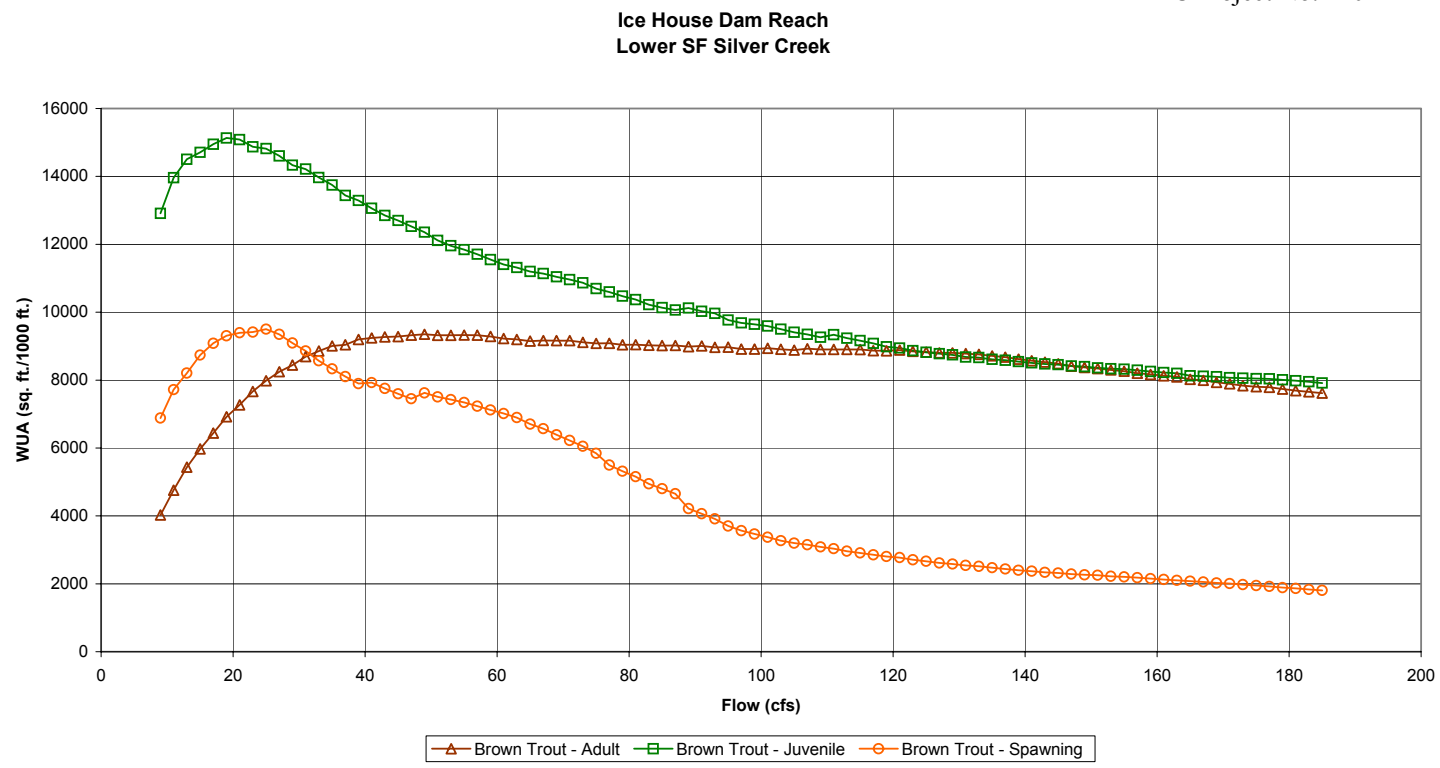

Figure 4.4.2-5. WUA versus flow for Lower S.F. Silver Creek: brown trout.

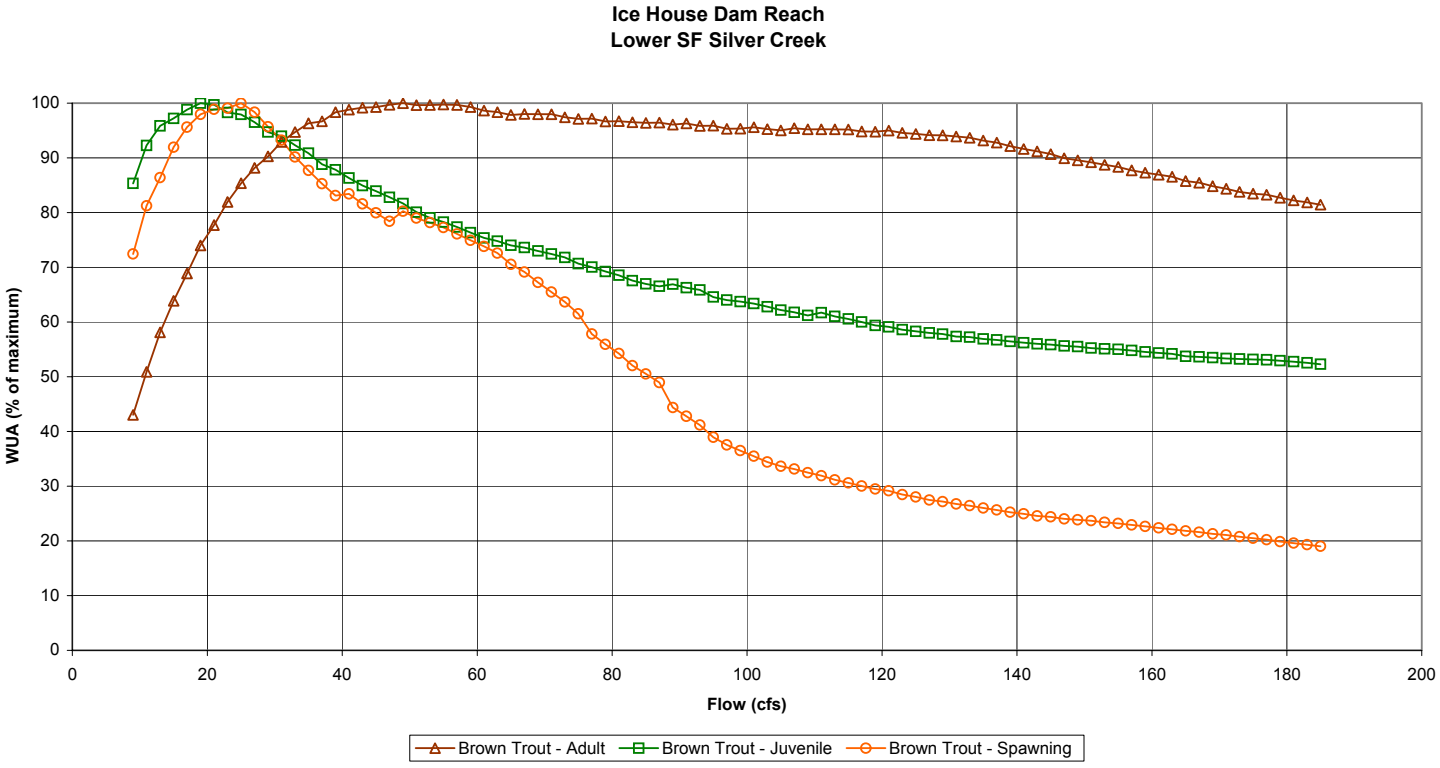

Figure 4.4.2-6. Percent of maximum WUA versus flow for Lower S.F. Silver Creek: brown trout.

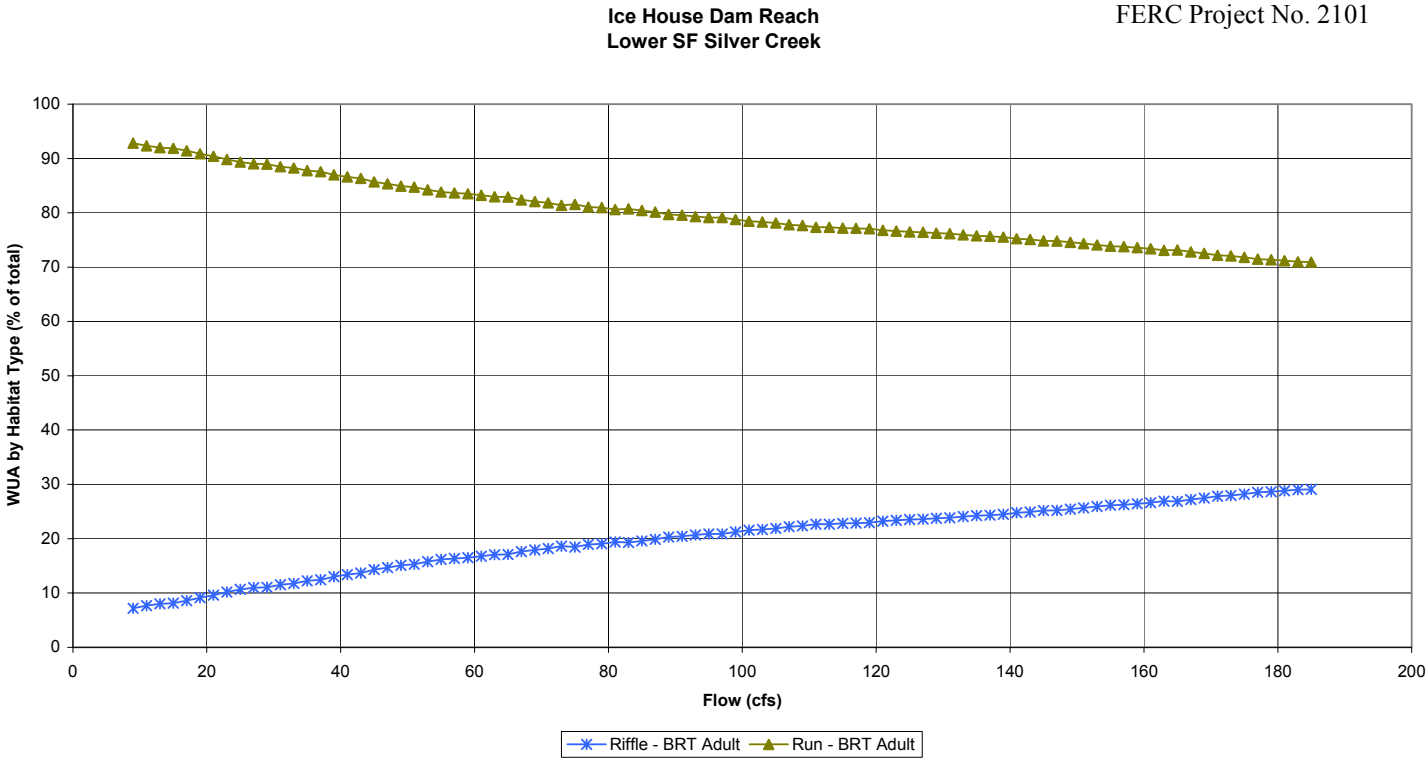

Figure 4.4.2-7. WUA by habitat type for Lower S.F. Silver Creek: brown trout adult.

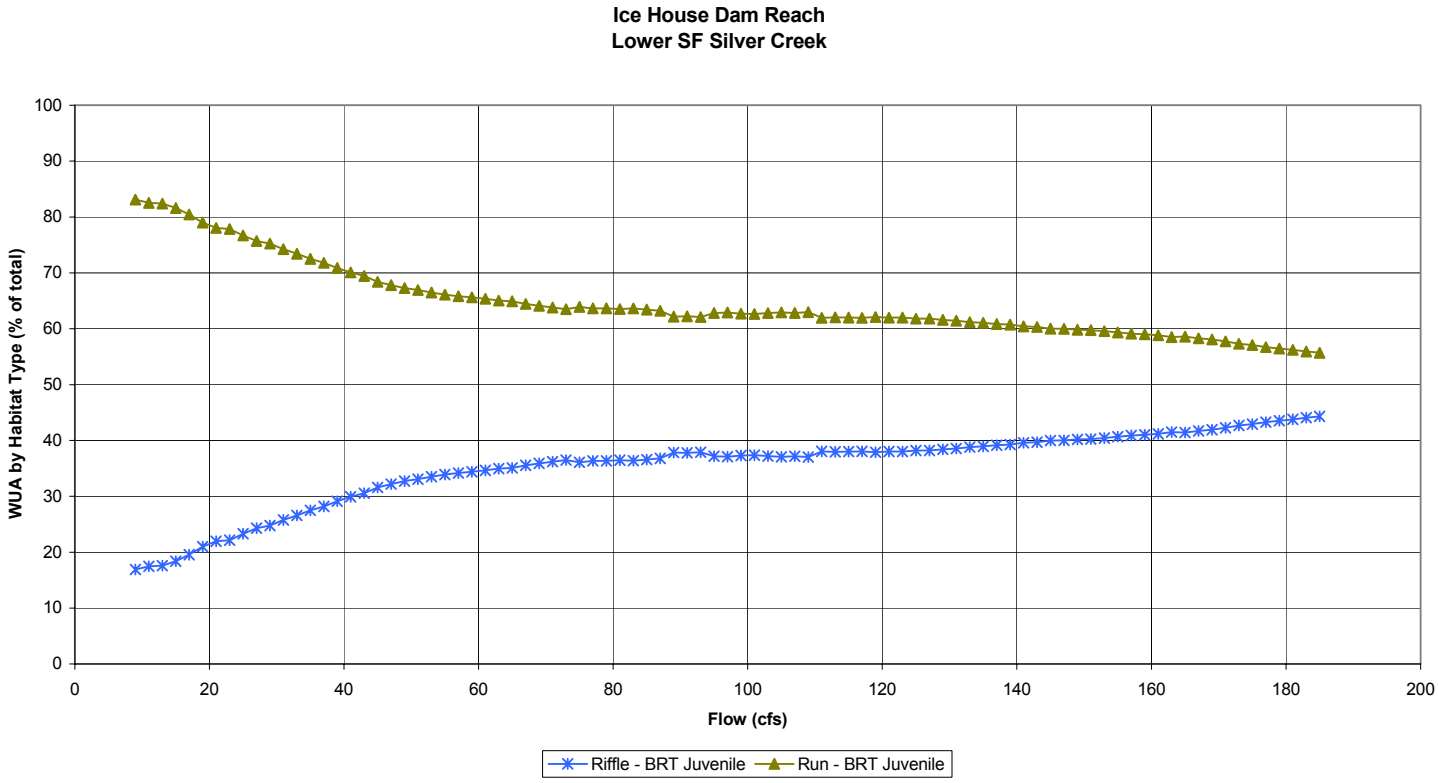

Figure 4.4.2-8. WUA by habitat type for Lower S.F. Silver Creek: brown trout juvenile.

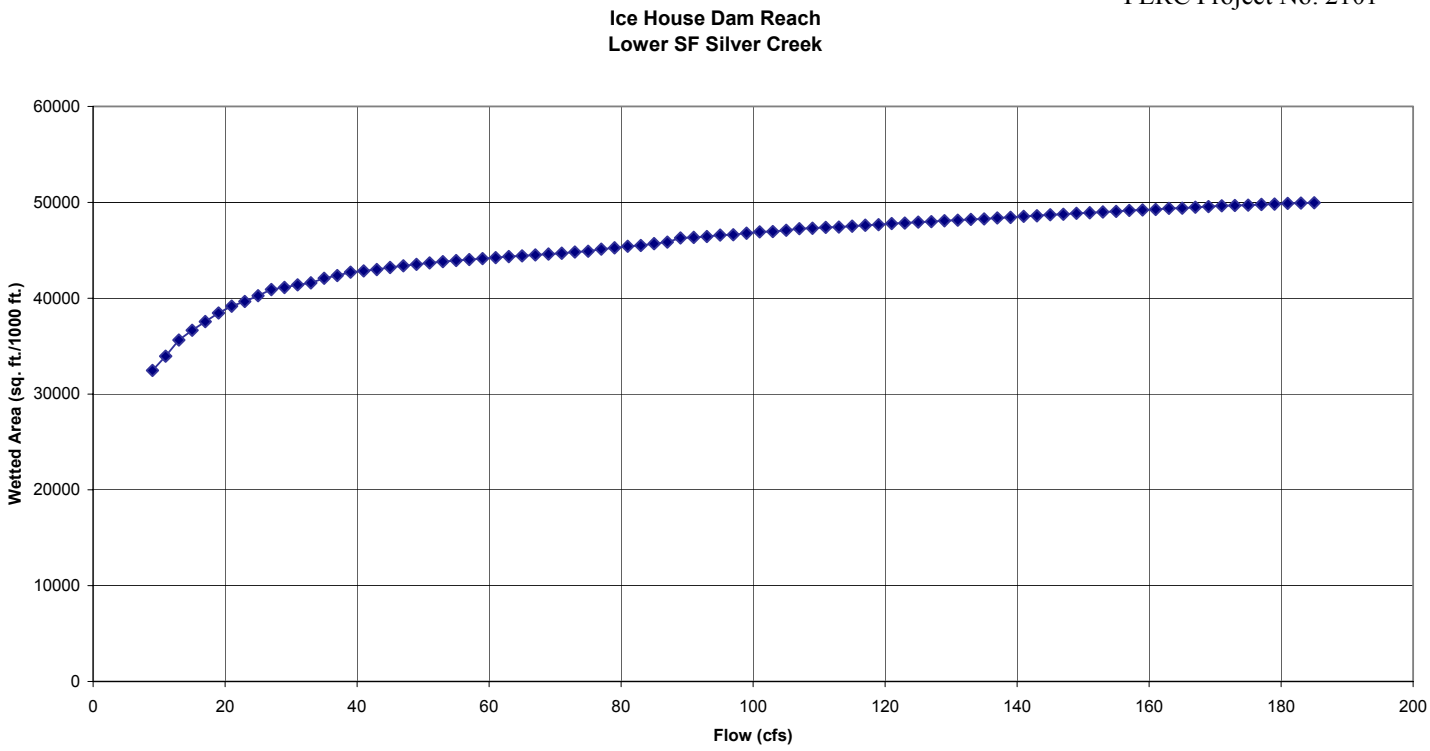

Figure 4.4.2-9. Wetted area versus flow for Lower S.F. Silver Creek.

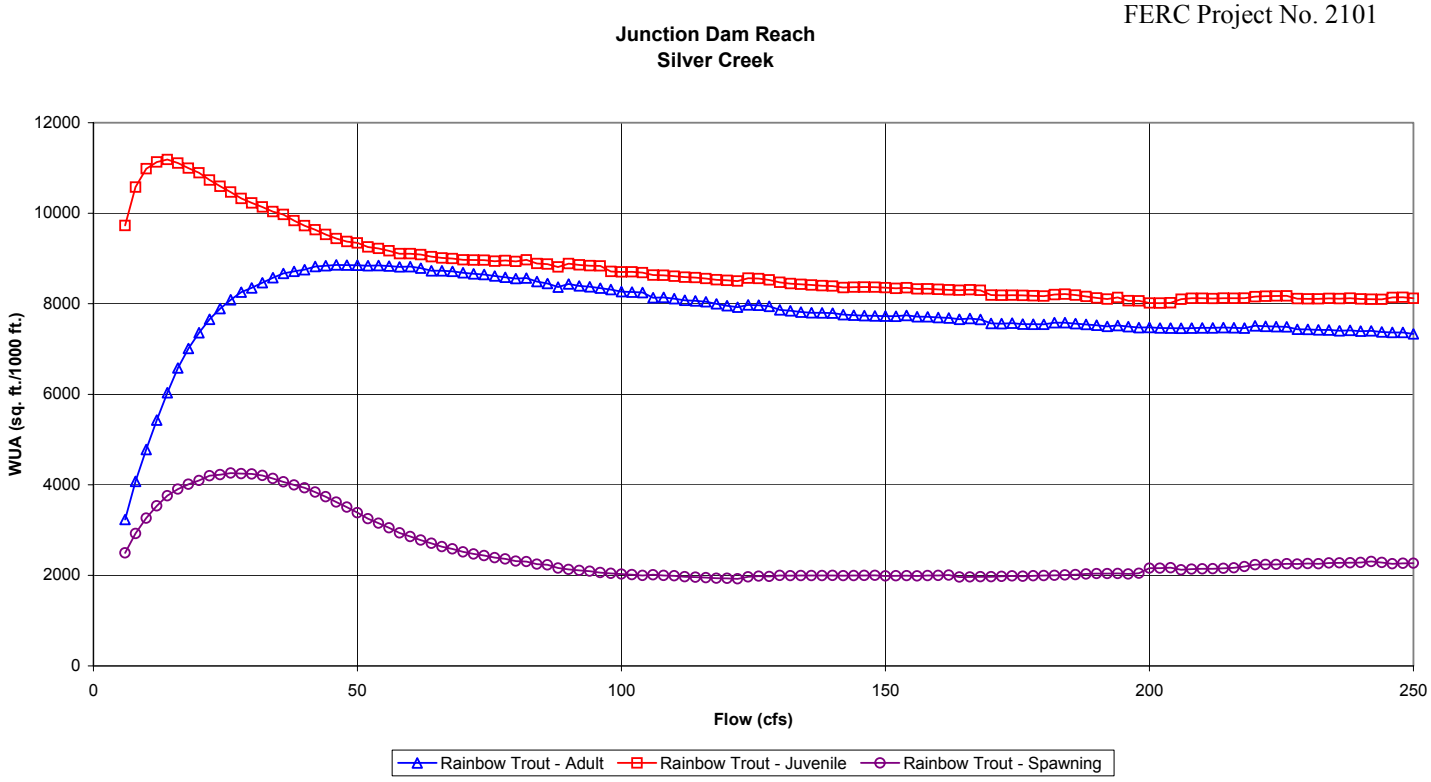

Figure 4.5.1-1. WUA versus flow for Junction Dam Reach: rainbow trout.

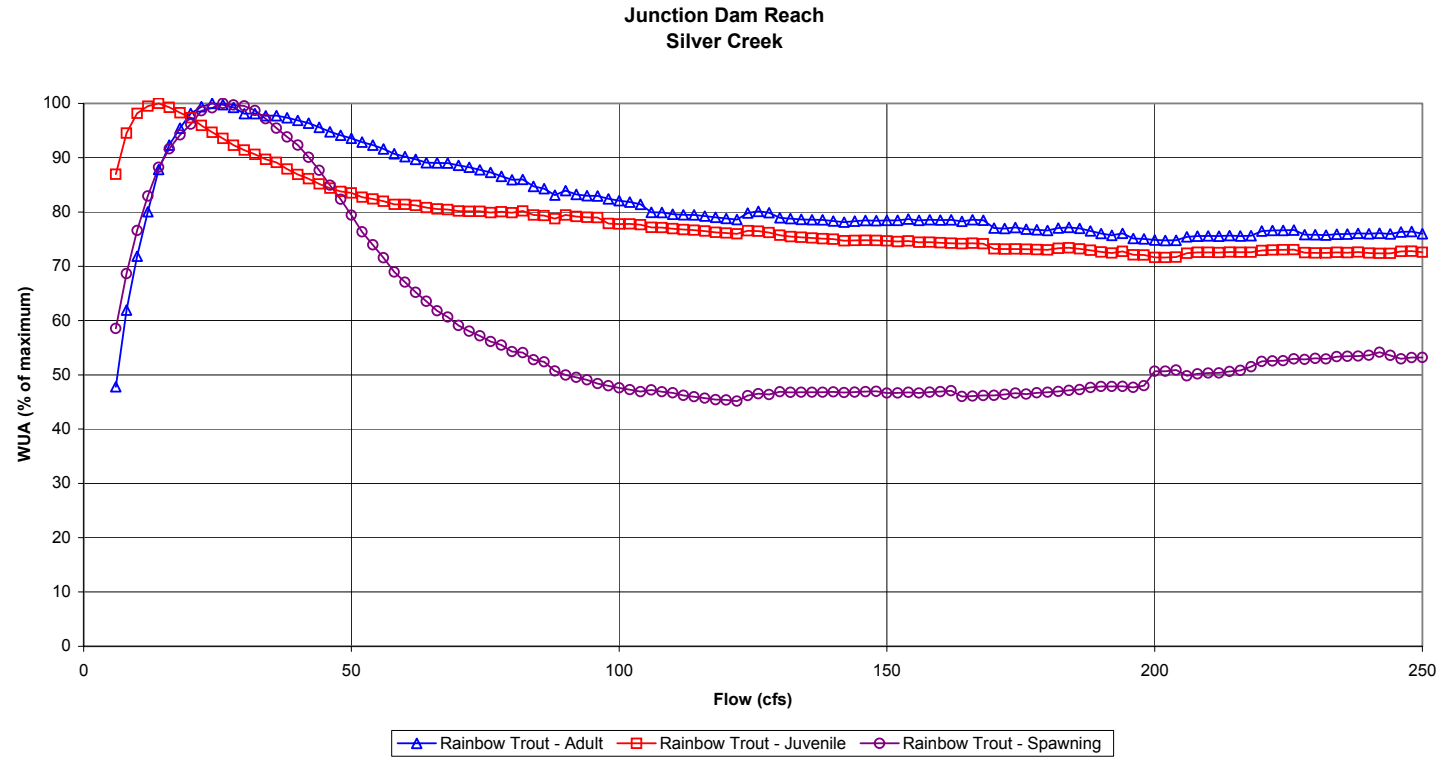

Figure 4.5.1-2. Percent of maximum WUA versus flow for Junction Dam Reach: rainbow trout.

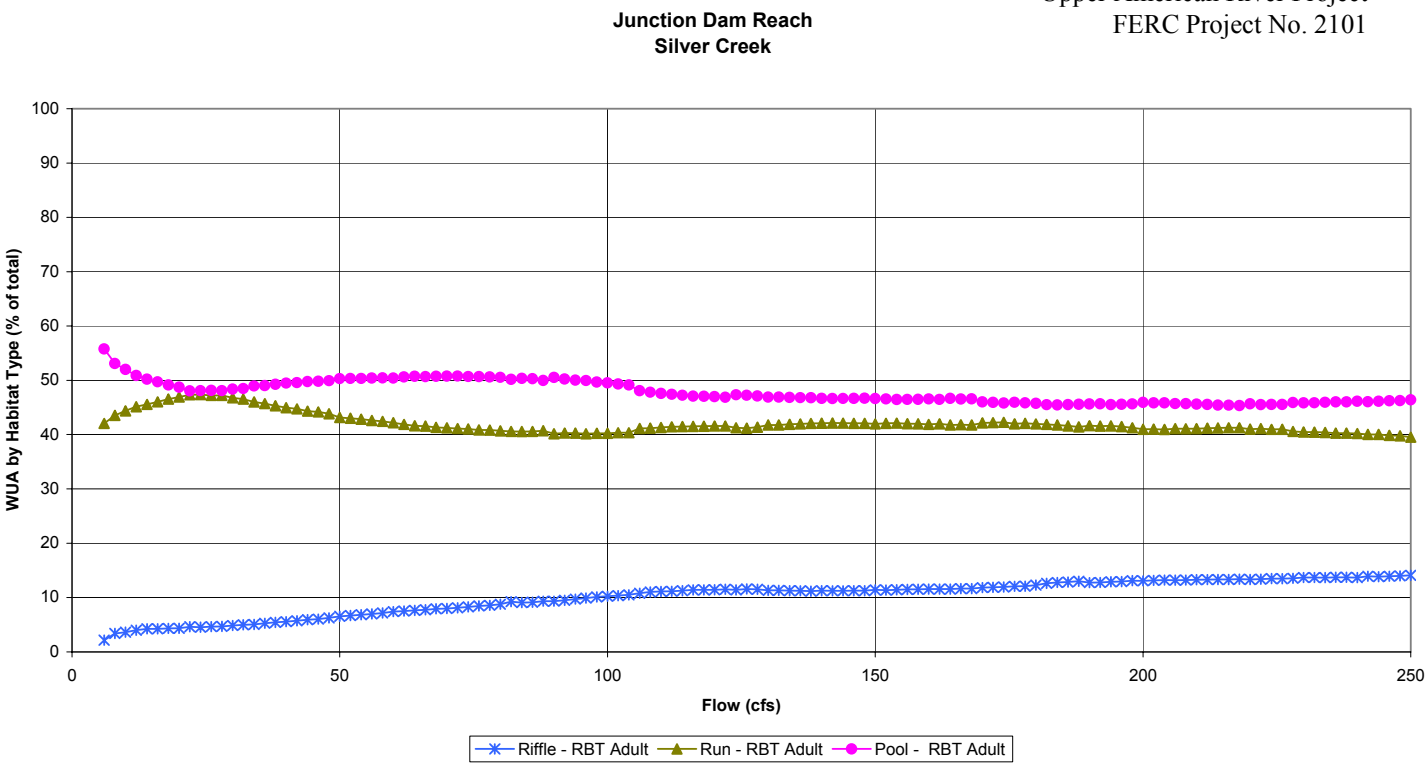

Figure 4.5.1-3. WUA by habitat type for Junction Dam Reach: rainbow trout adult.

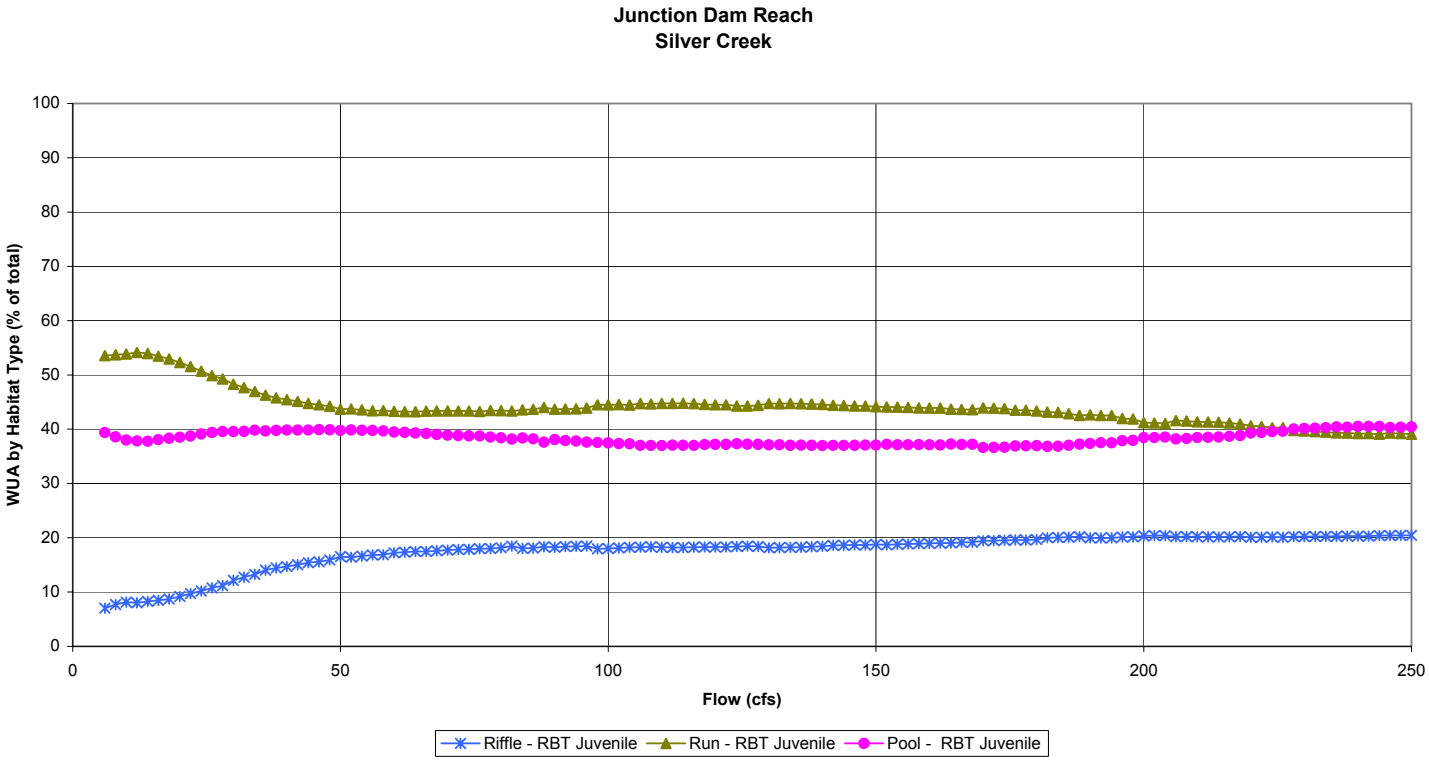

Figure 4.5.1-4. WUA by habitat type for Junction Dam Reach: rainbow trout juvenile.

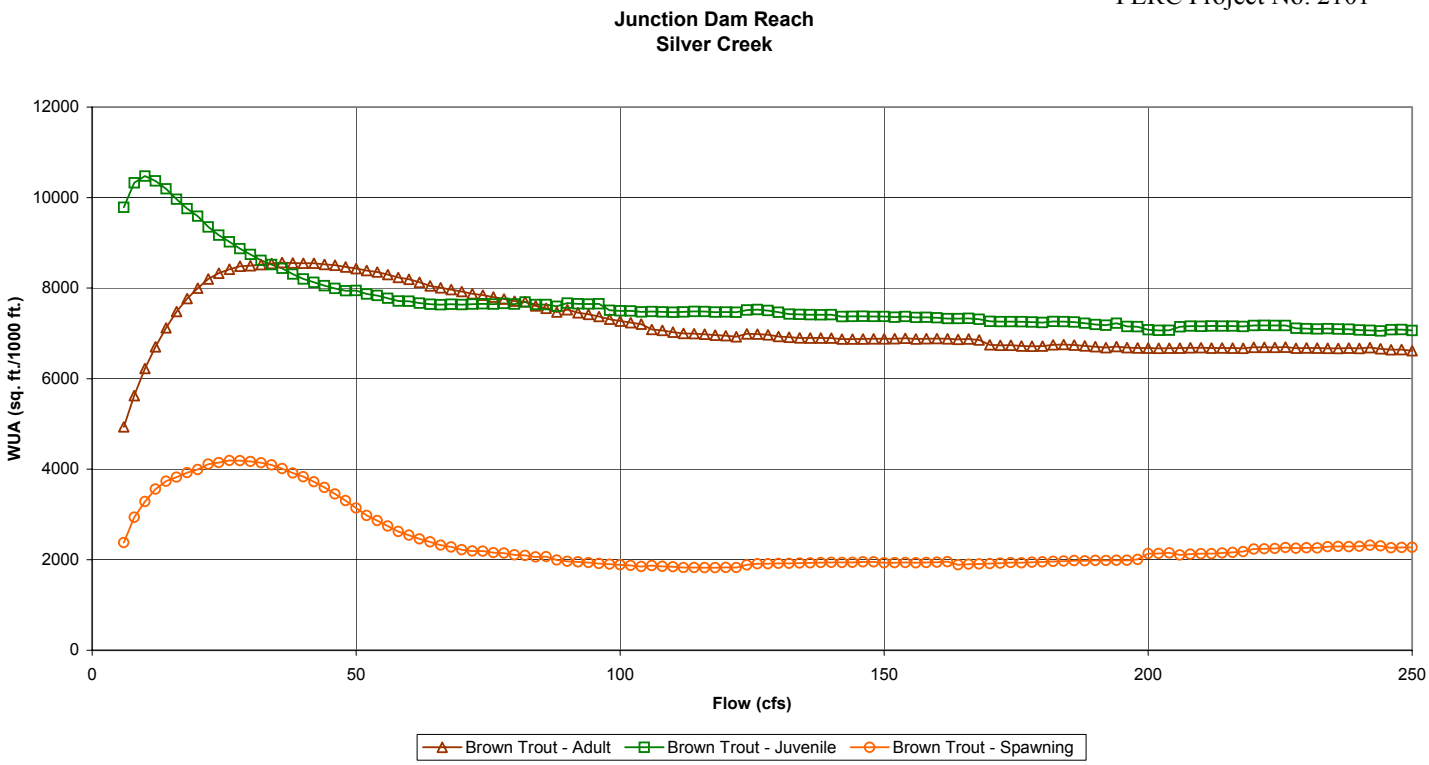

Figure 4.5.1-5. WUA versus flow for Junction Dam Reach: brown trout.

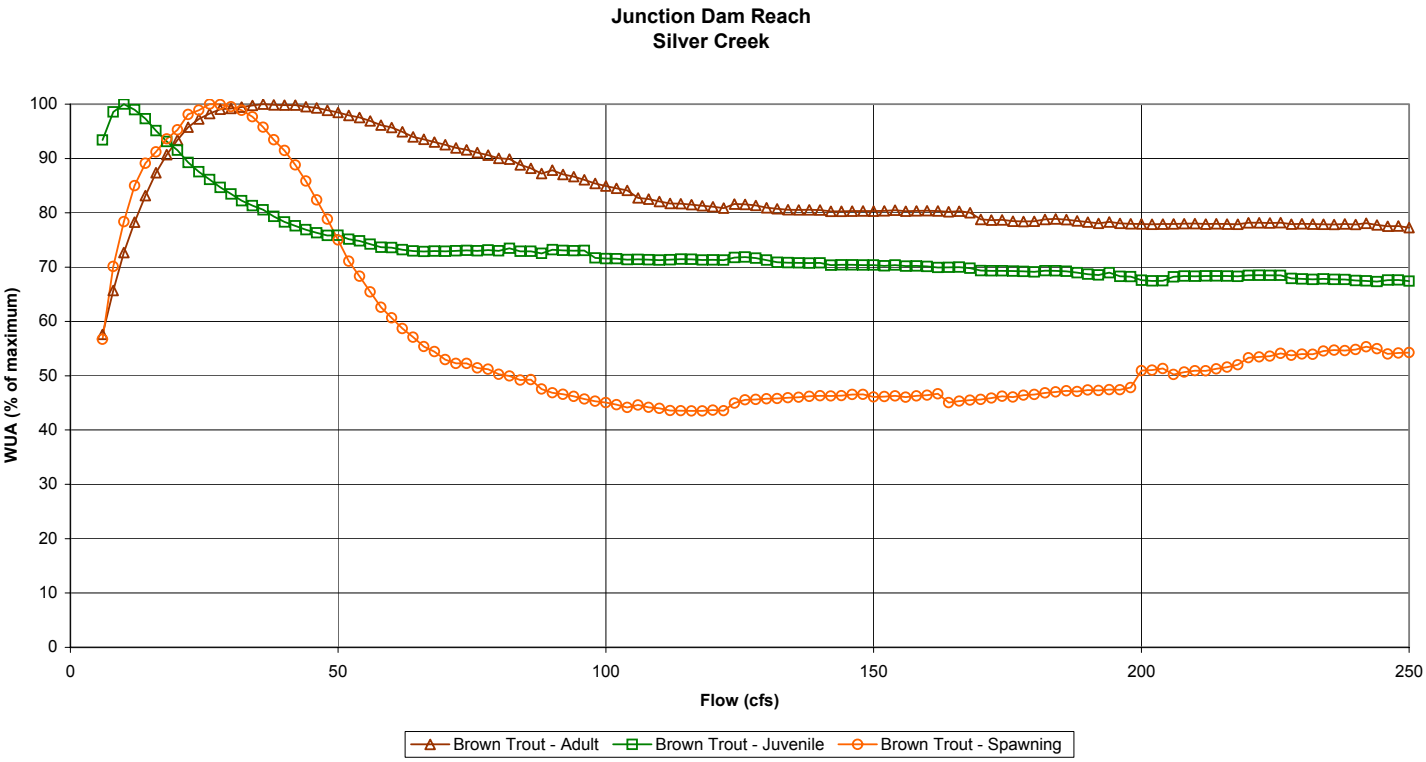

Figure 4.5.1-6. Percent of maximum WUA versus flow for Junction Dam Reach: brown trout.

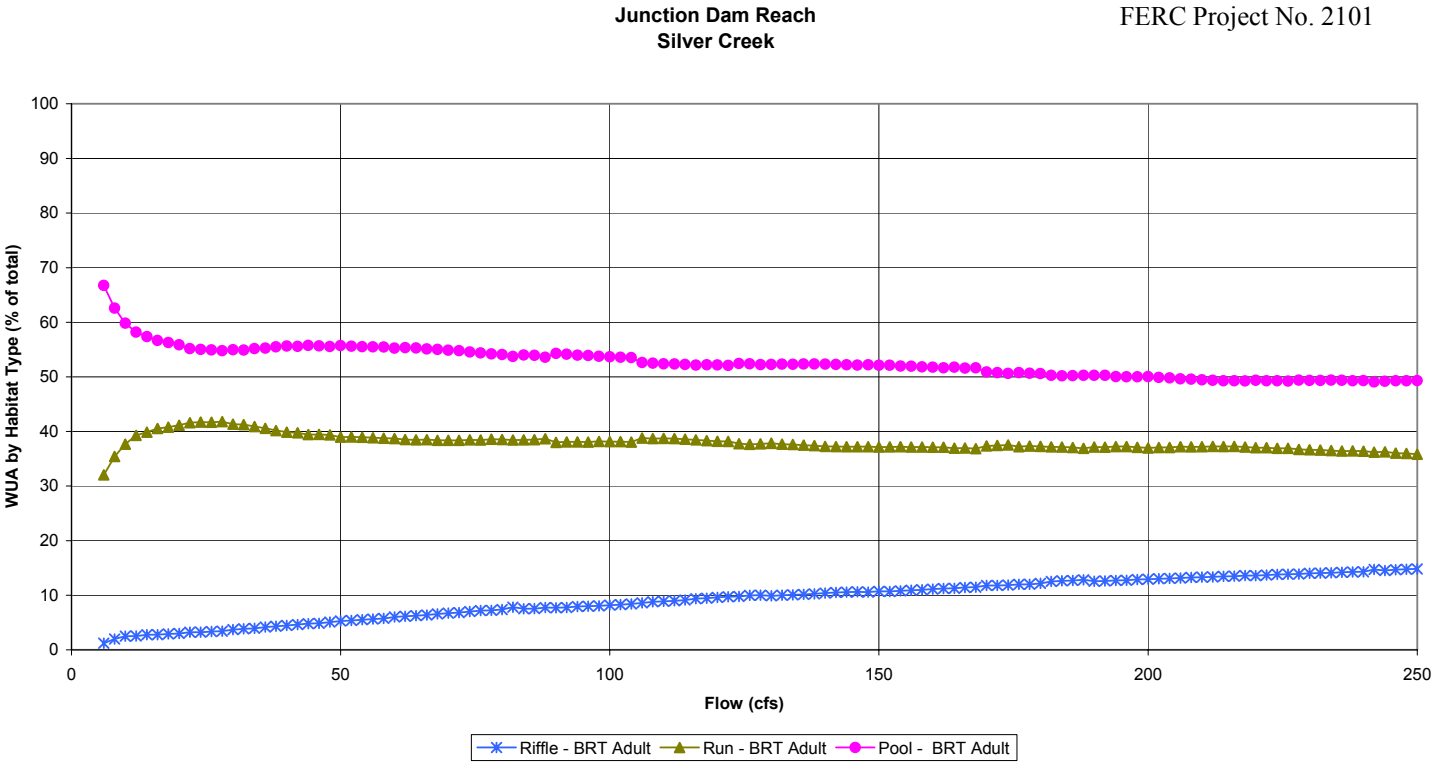

Figure 4.5.1-7. WUA by habitat type for Junction Dam Reach: brown trout adult.

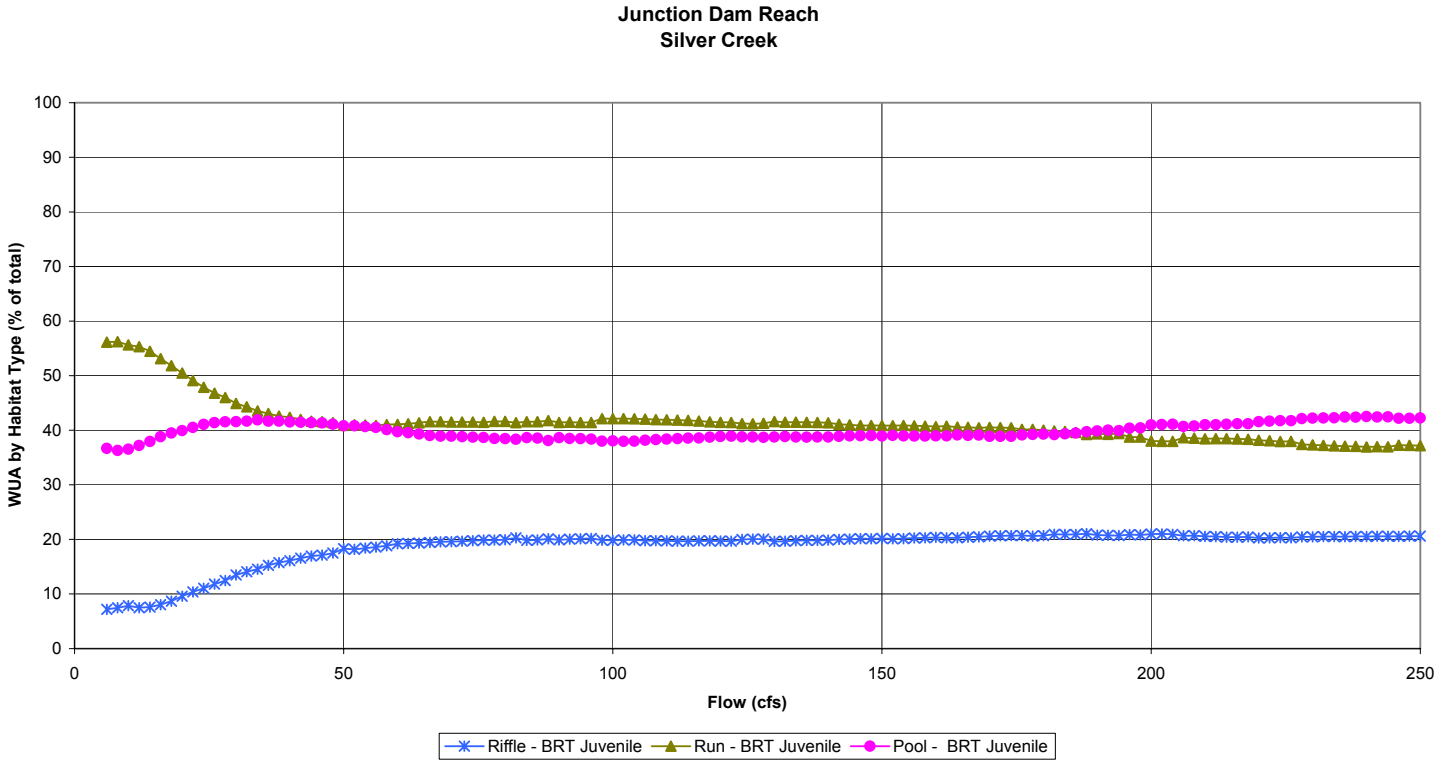

Figure 4.5.1-8. WUA by habitat type for Junction Dam Reach: brown trout juvenile.

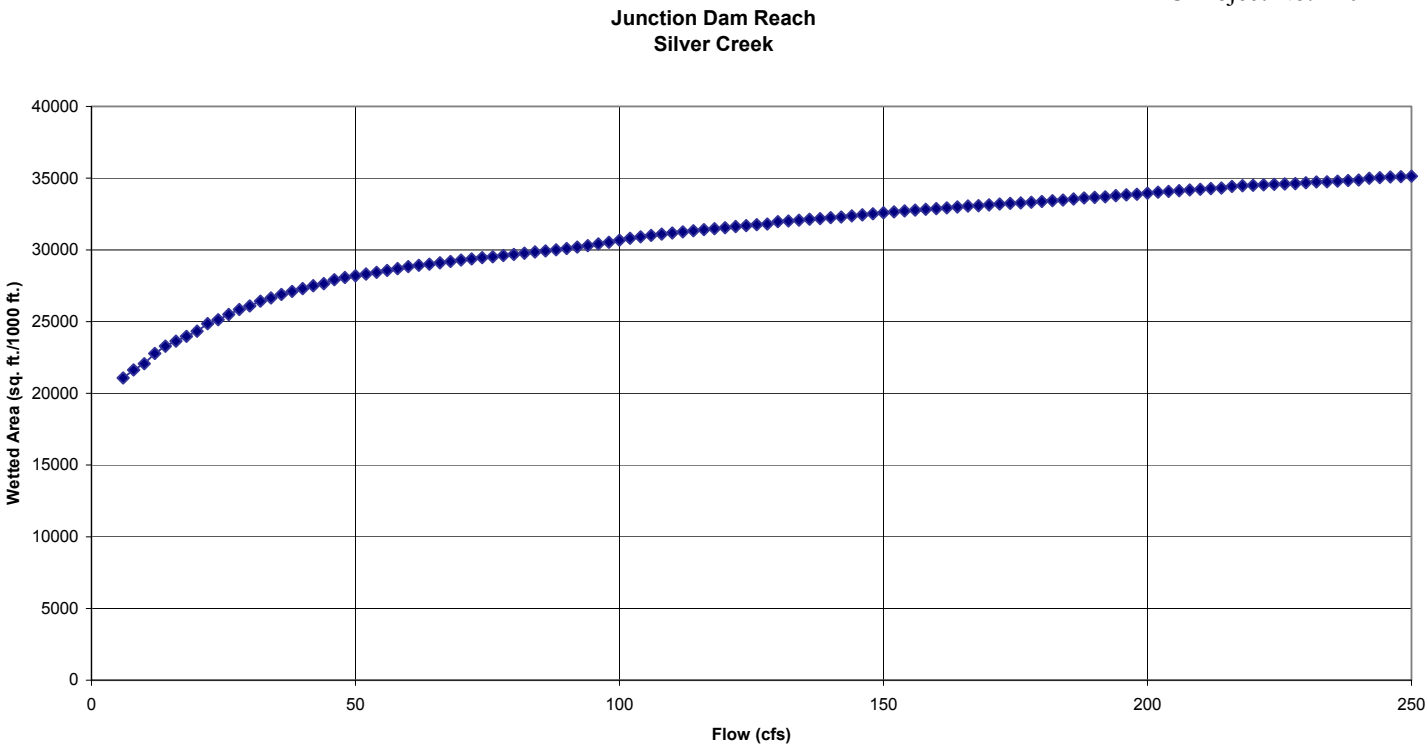

Figure 4.5.1-9. Wetted area versus flow for Junction Dam Reach.

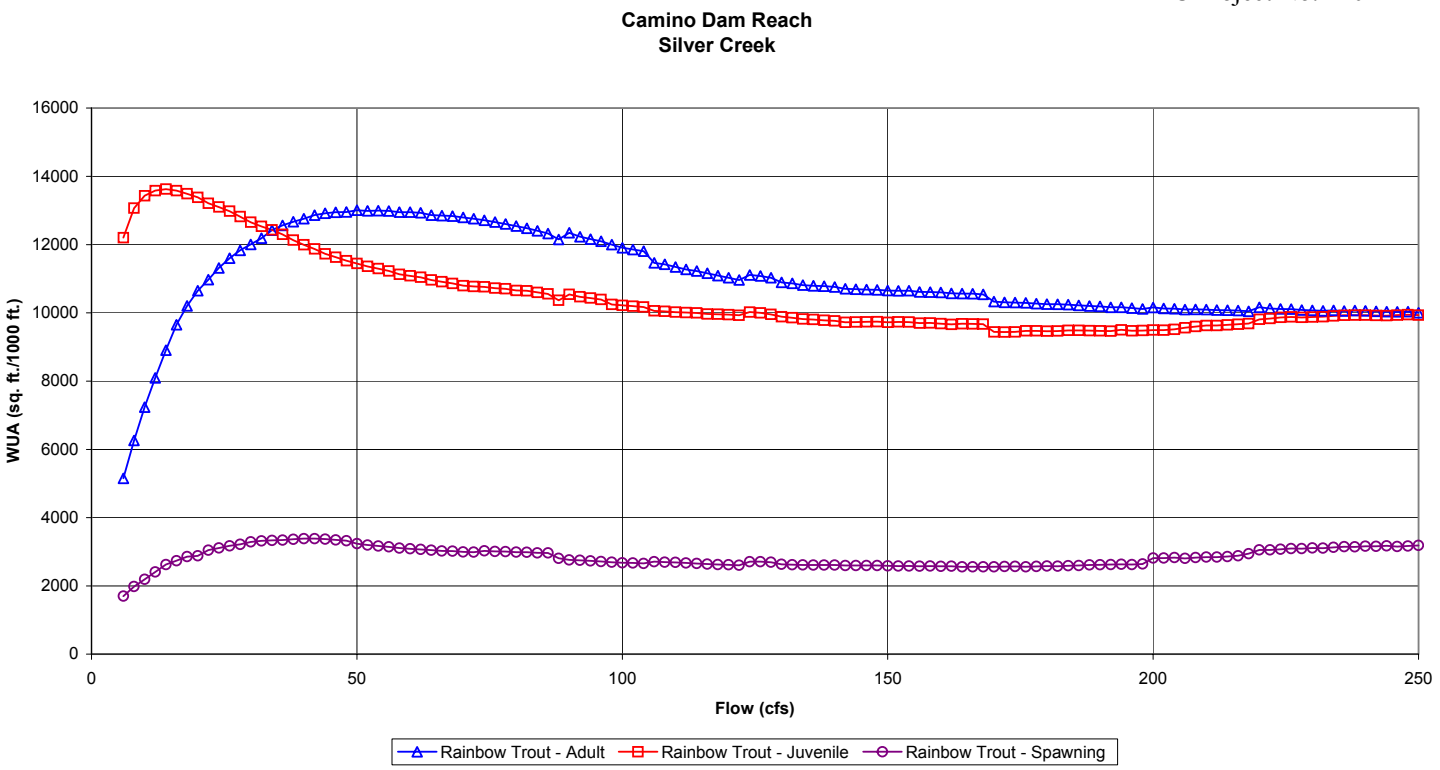

Figure 4.6.1-1. WUA versus flow for Camino Dam: rainbow trout.

Figure 4.6.1-2. Percent of maximum WUA versus flow for Camino Dam: rainbow trout.

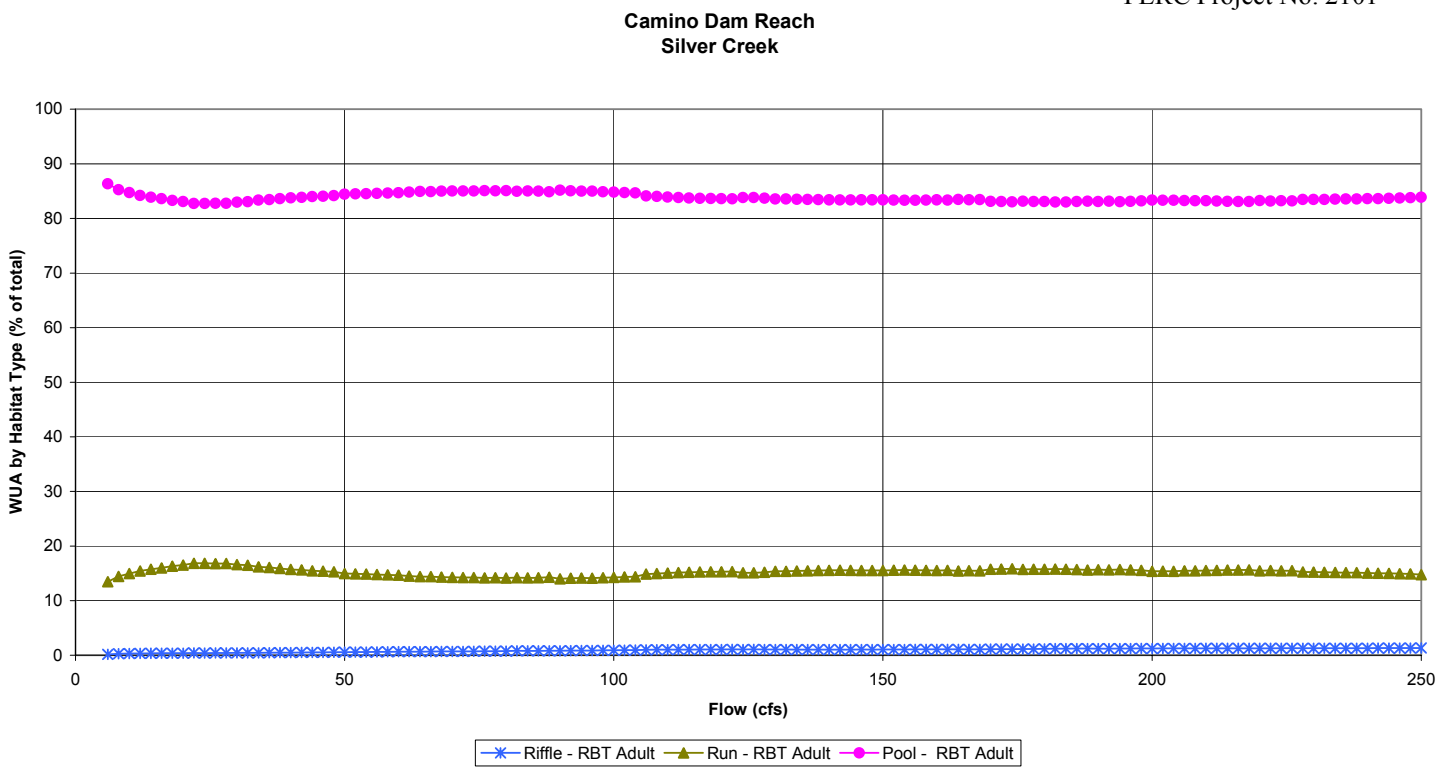

Figure 4.6.1-3. WUA by habitat type for Camino Dam: rainbow trout adult.

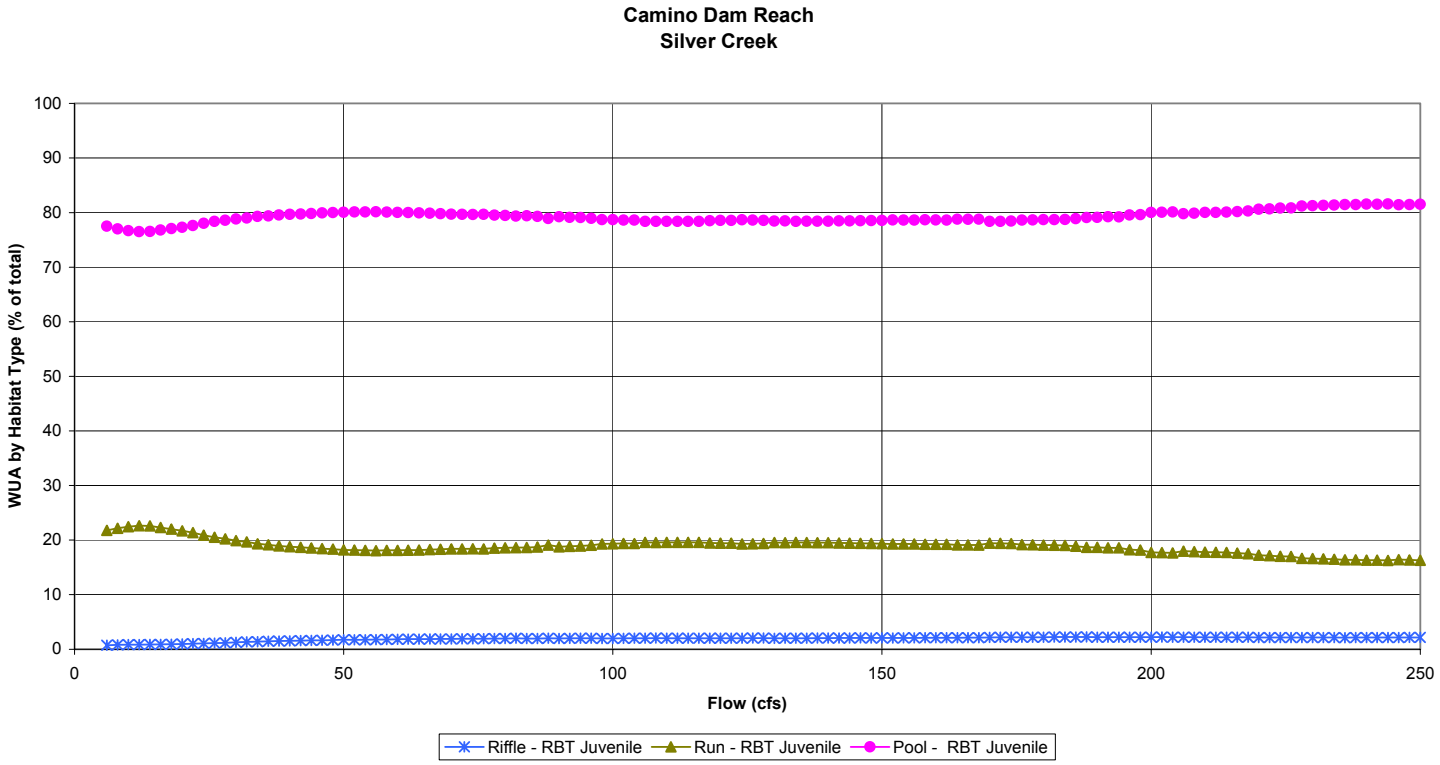

Figure 4.6.1-4. WUA by habitat type for Camino Dam: rainbow trout juvenile.

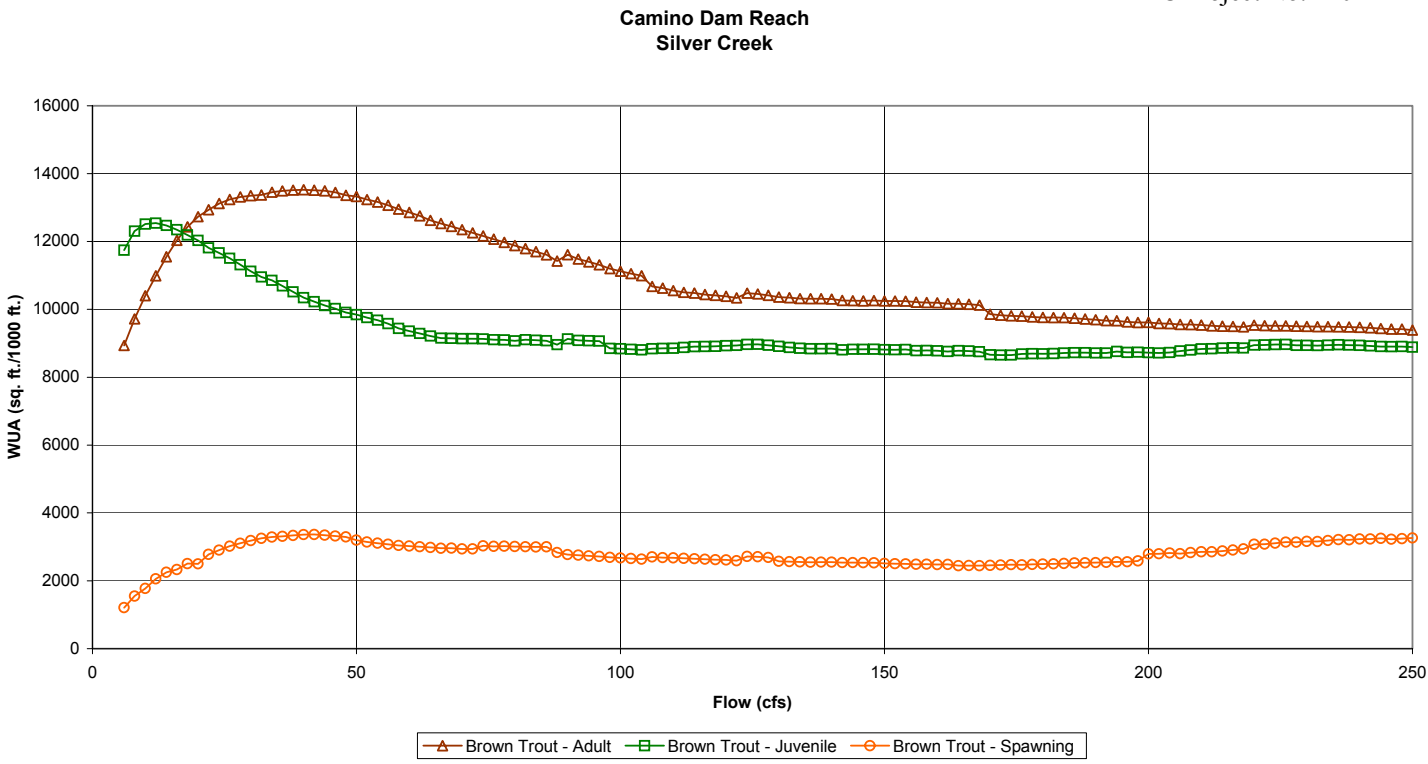

Figure 4.6.1-5. WUA versus flow for Camino Dam: brown trout.

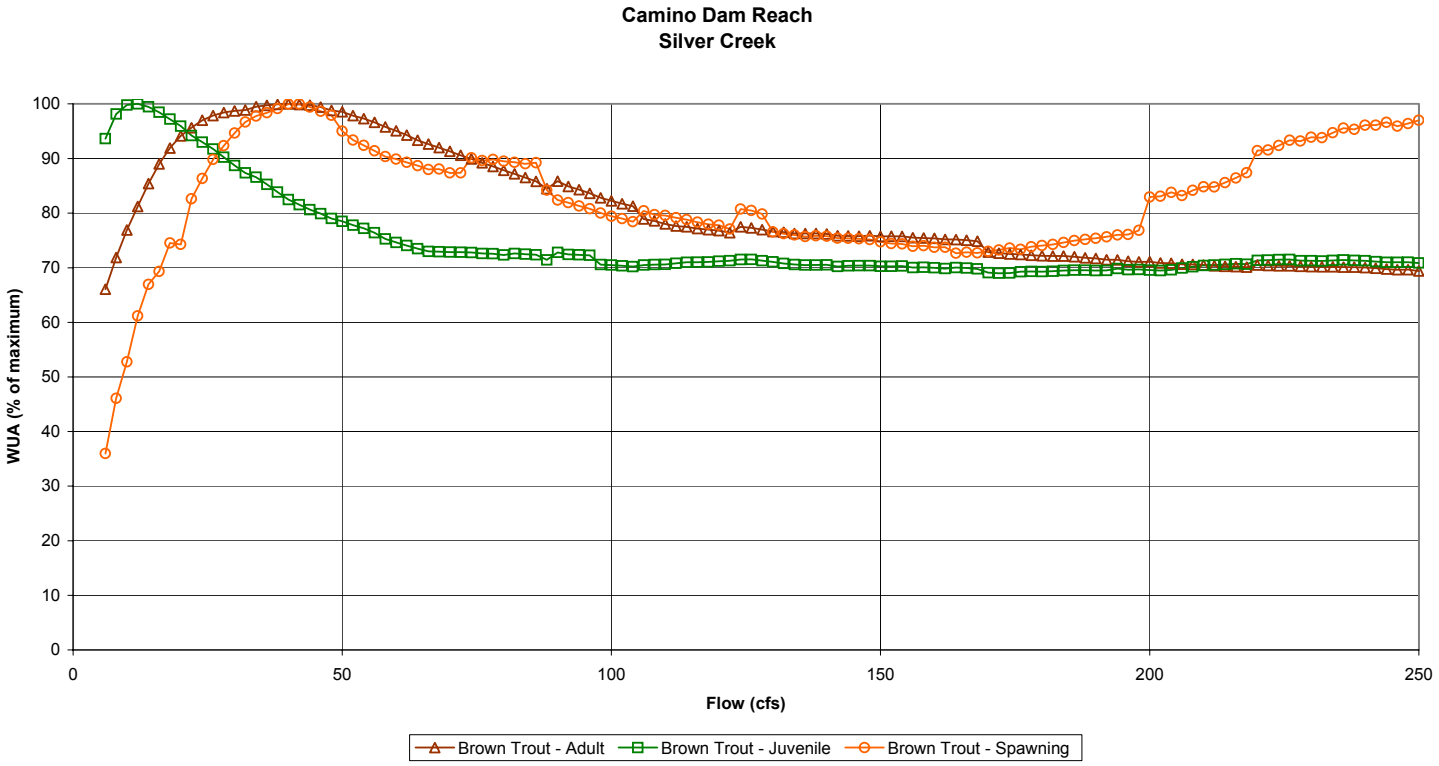

Figure 4.6.1-6. Percent of maximum WUA versus flow for Camino Dam: brown trout.

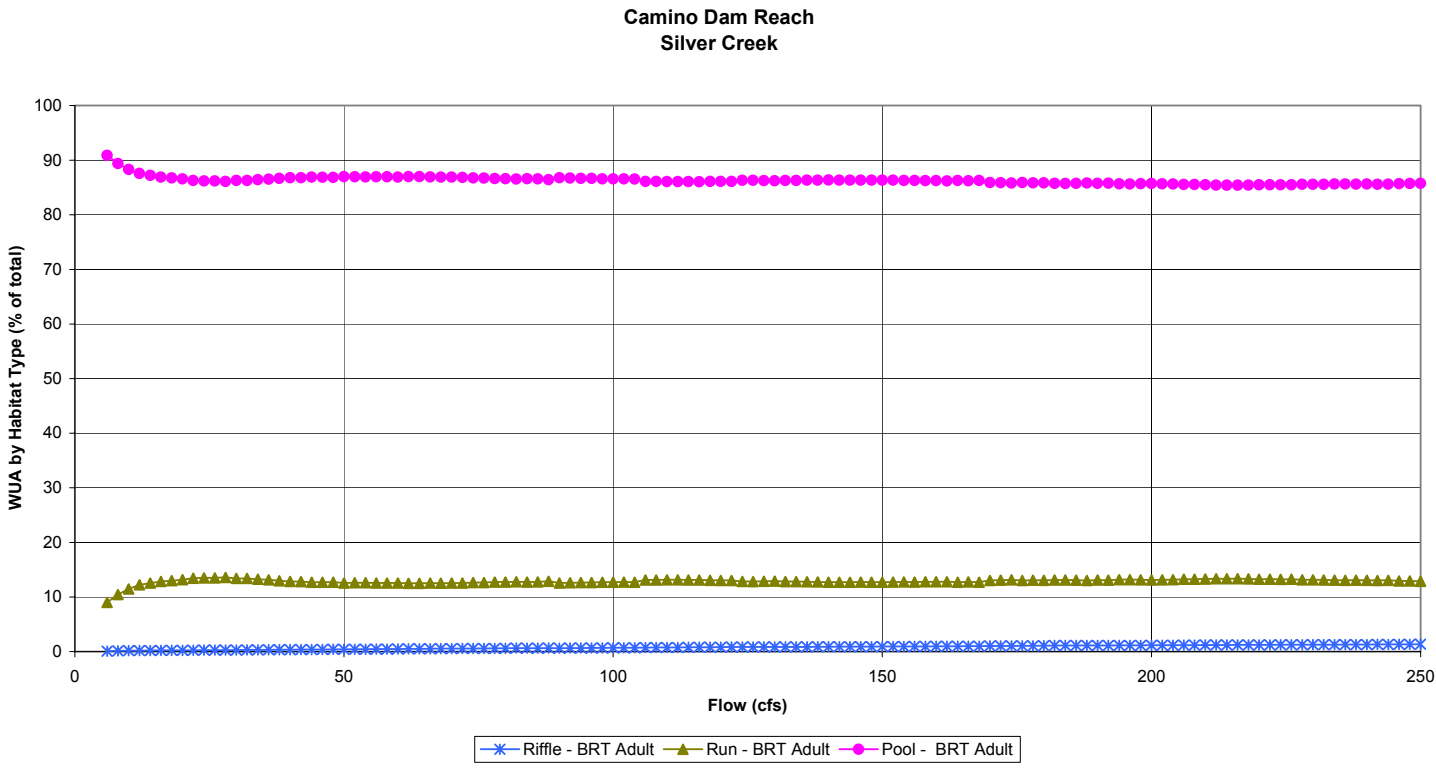

Figure 4.6.1-7. WUA by habitat type for Camino Dam: brown trout adult.

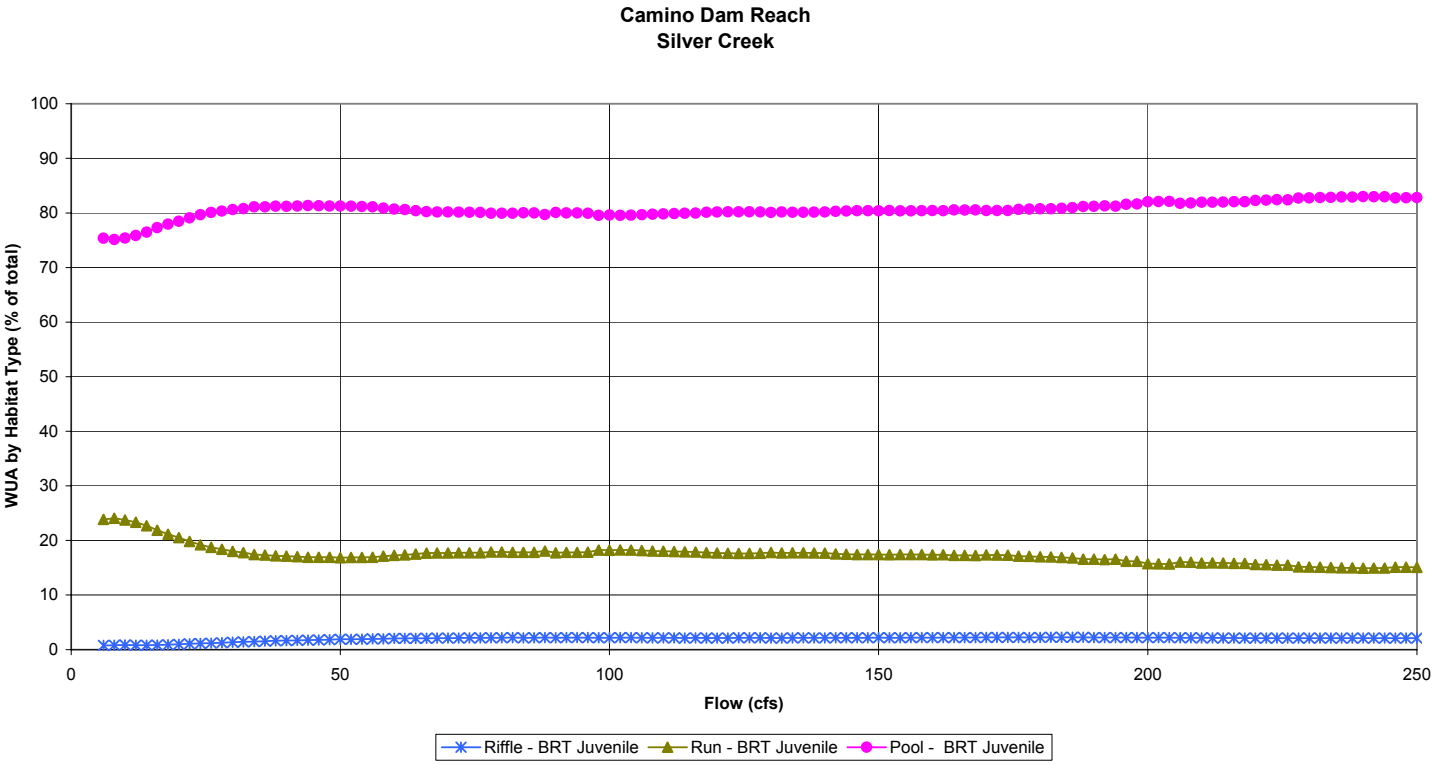

Figure 4.6.1-8. WUA by habitat type for Camino Dam: brown trout juvenile.

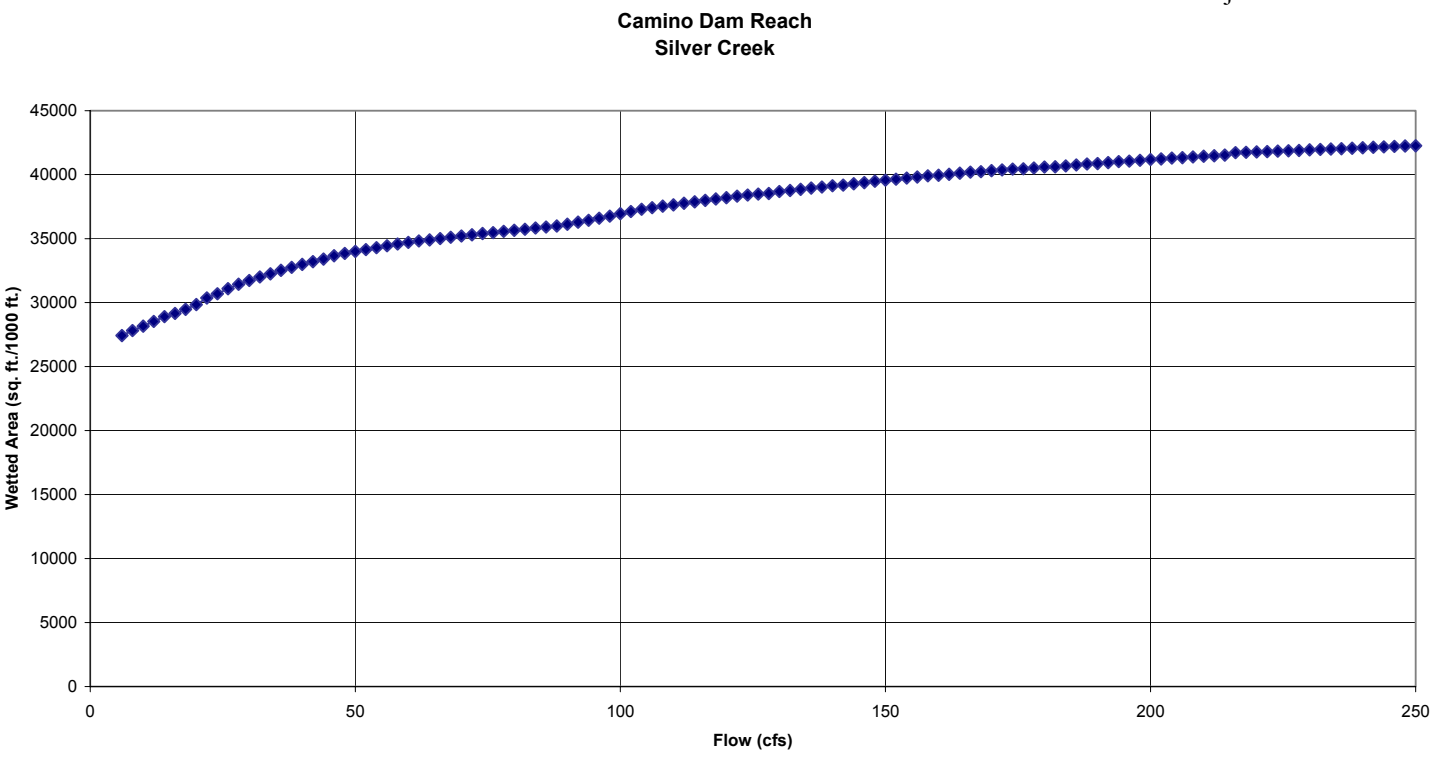

Figure 4.6.1-9. Wetted area versus flow for Camino Dam.

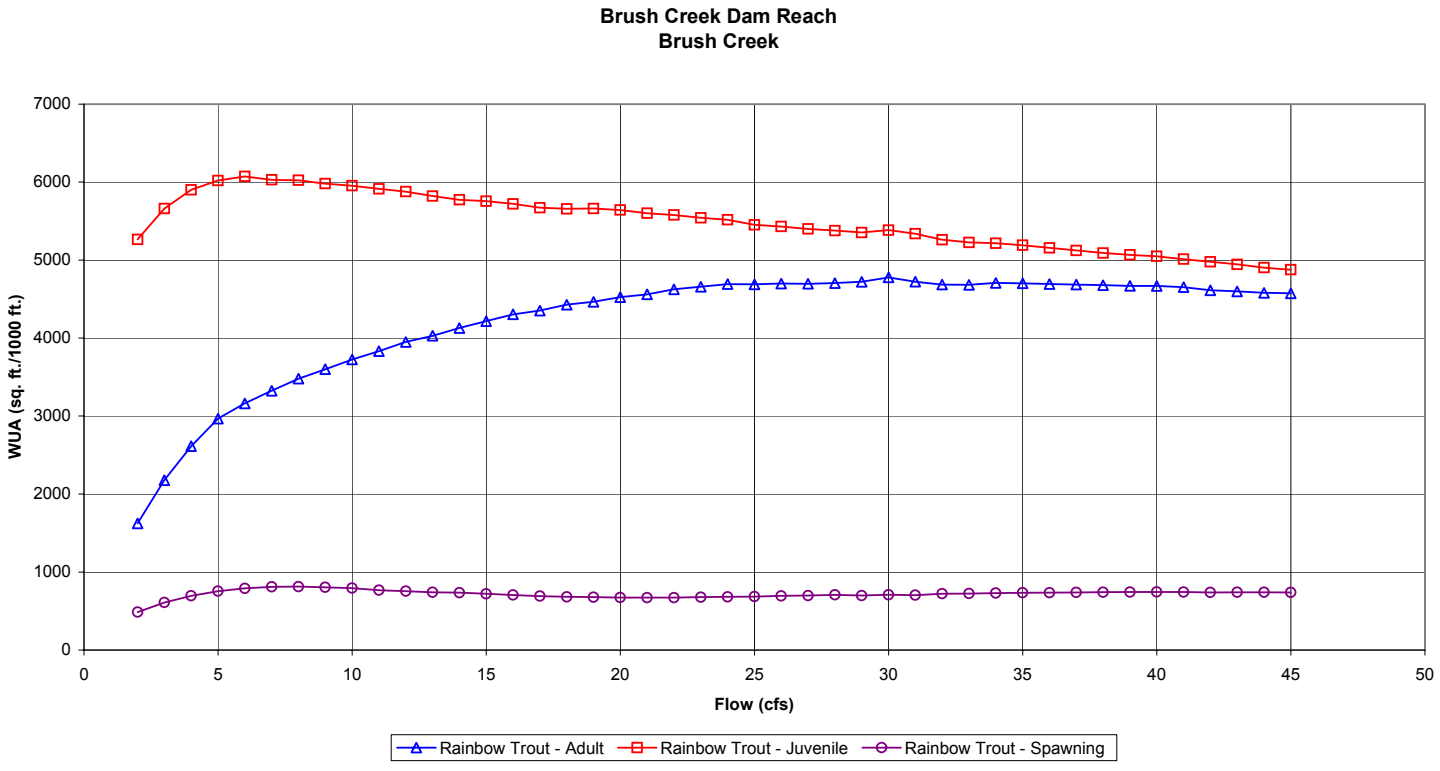

Figure 4.7.1-1. WUA versus flow for Brush Creek Dam Reach: rainbow trout.

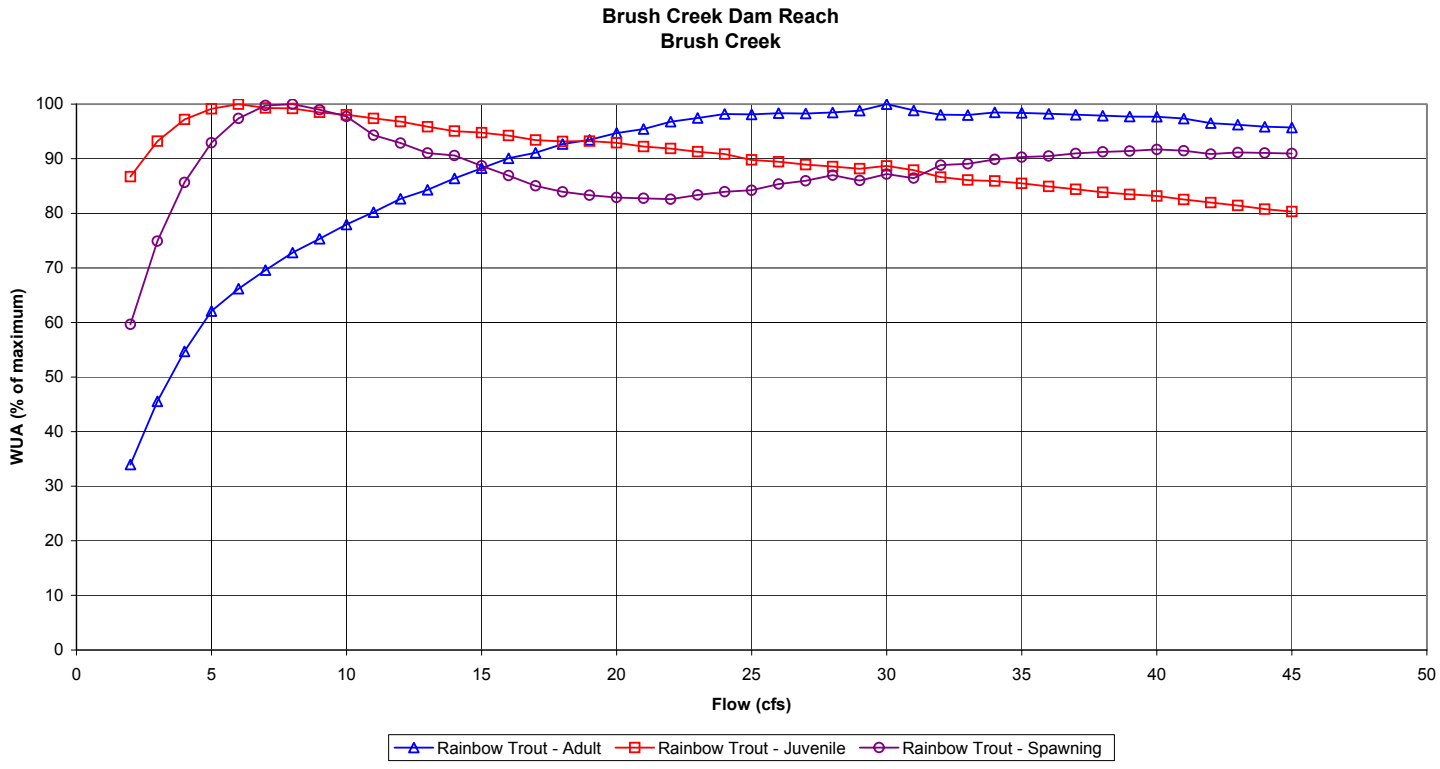

Figure 4.7.1-2. Percent of maximum WUA versus flow for Brush Creek Dam Reach: rainbow trout.

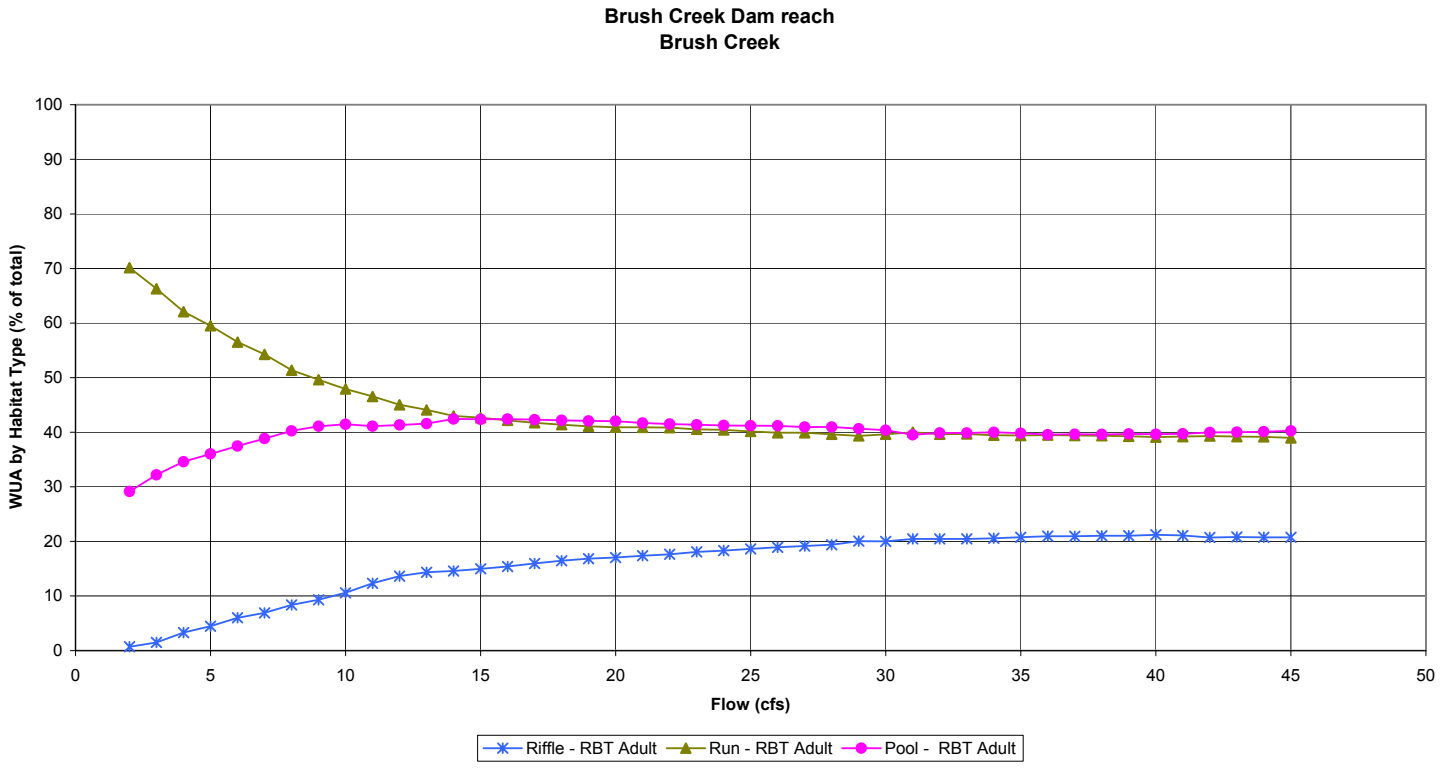

Figure 4.7.1-3. WUA by habitat type for Brush Creek Dam Reach: rainbow trout adult.

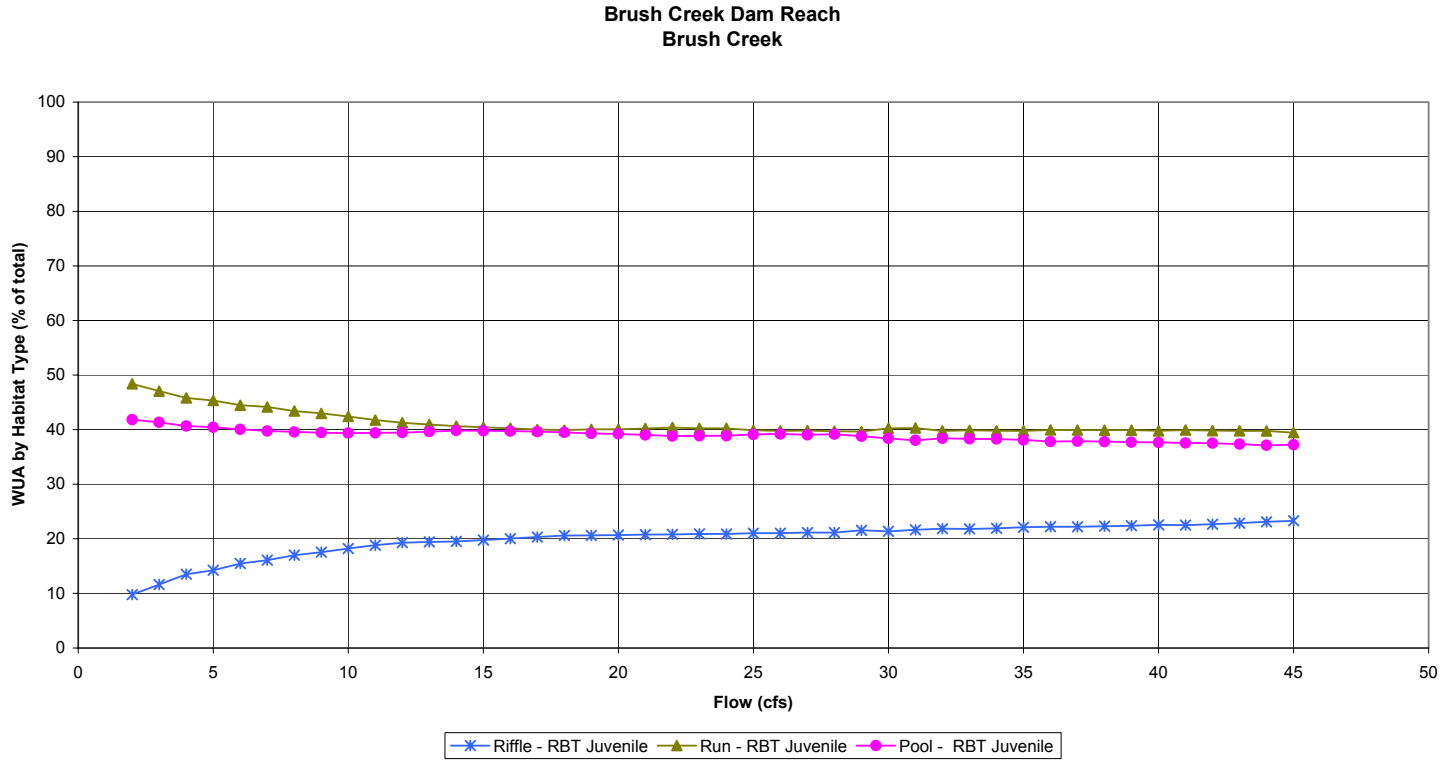

Figure 4.7.1-4. WUA by habitat type for Brush Creek Dam Reach: rainbow trout juvenile.

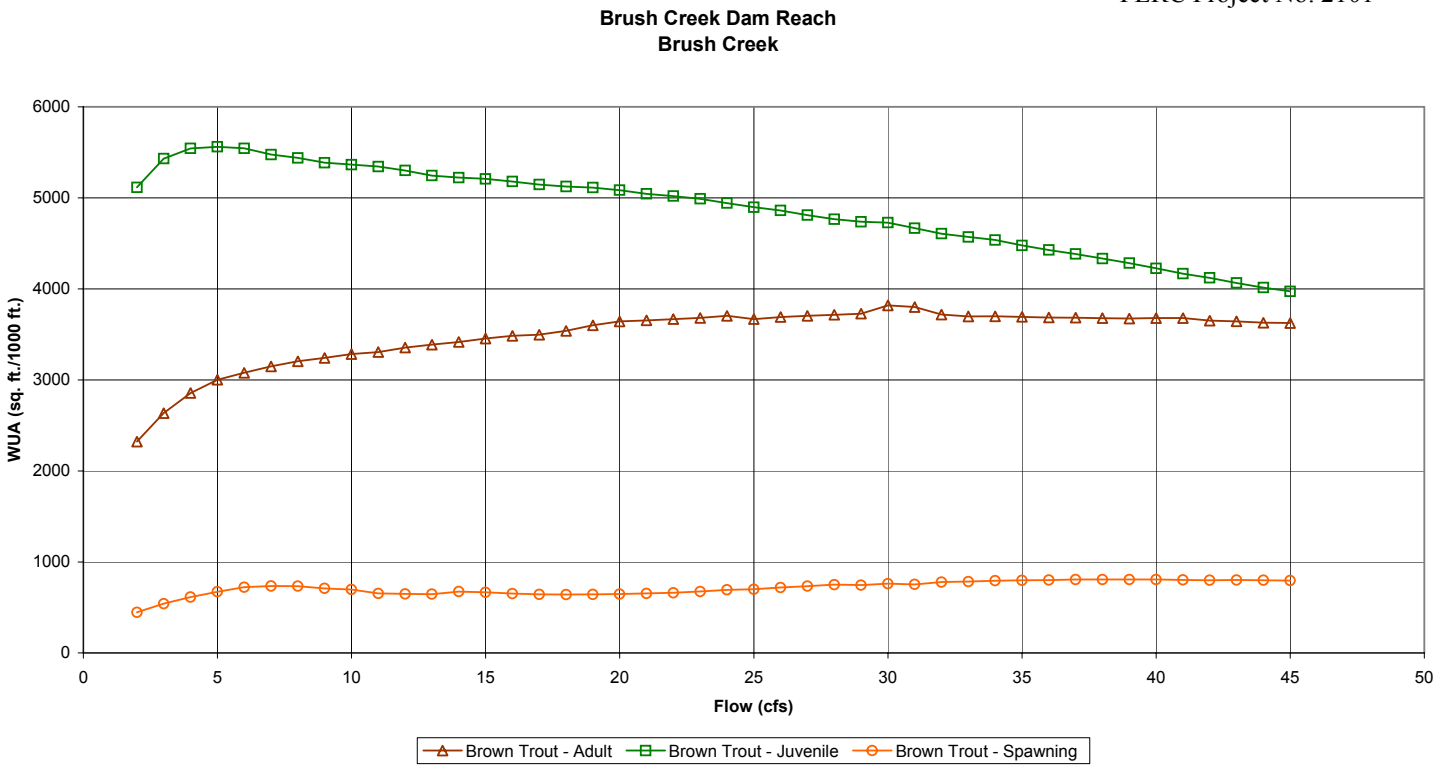

Figure 4.7.1-5. WUA versus flow for Brush Creek Dam Reach: brown trout.

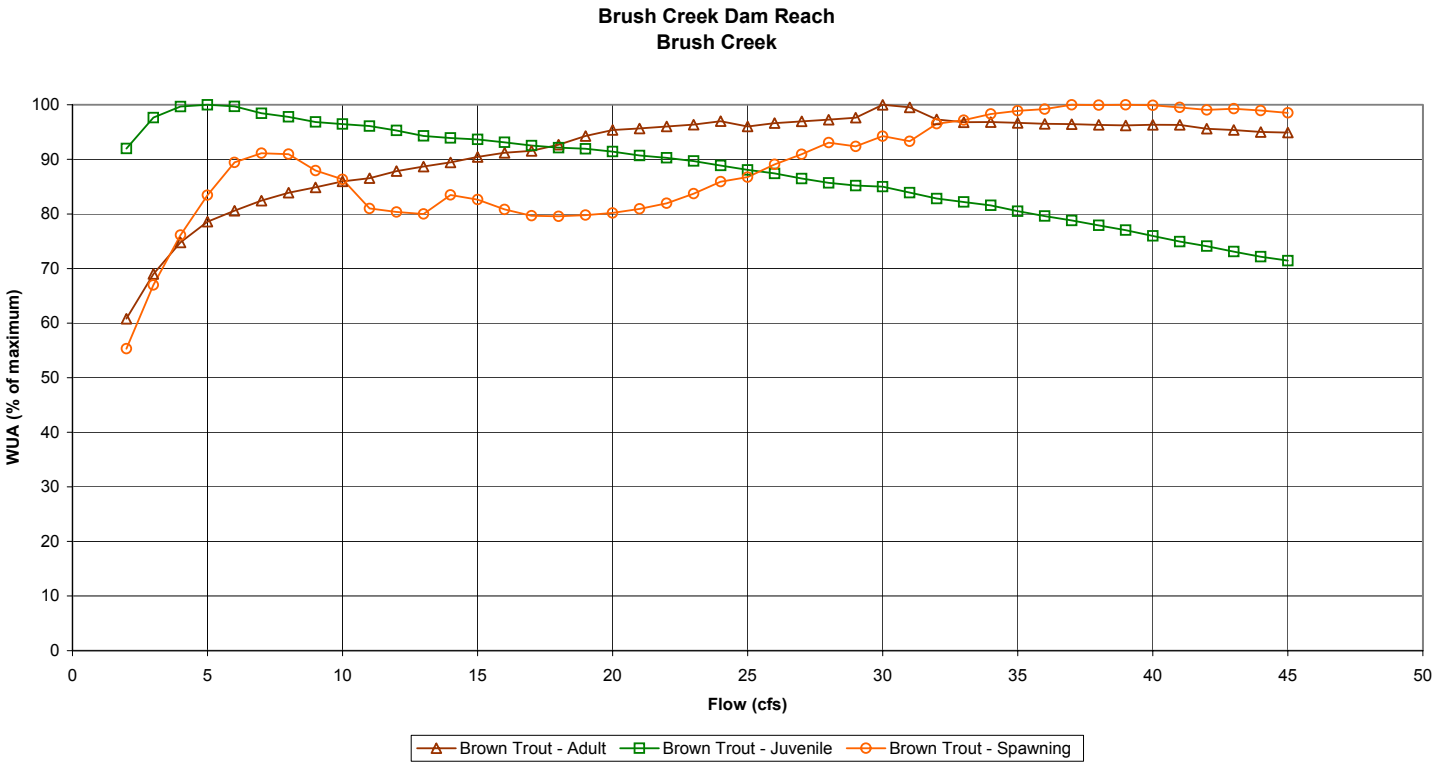

Figure 4.7.1-6. Percent of maximum WUA versus flow for Brush Creek Dam Reach: brown trout.

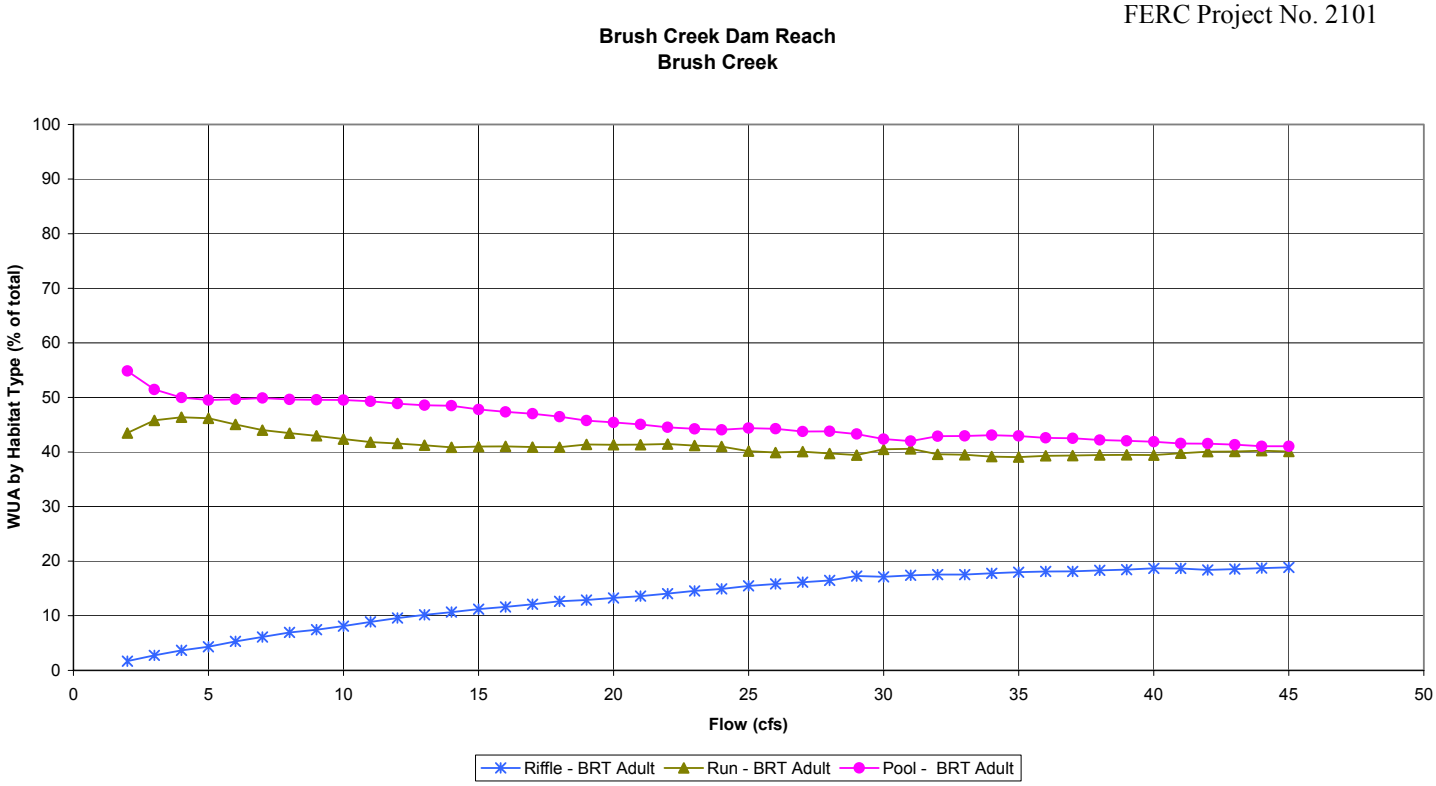

Figure 4.7.1-7. WUA by habitat type for Brush Creek Dam Reach: brown trout adult.

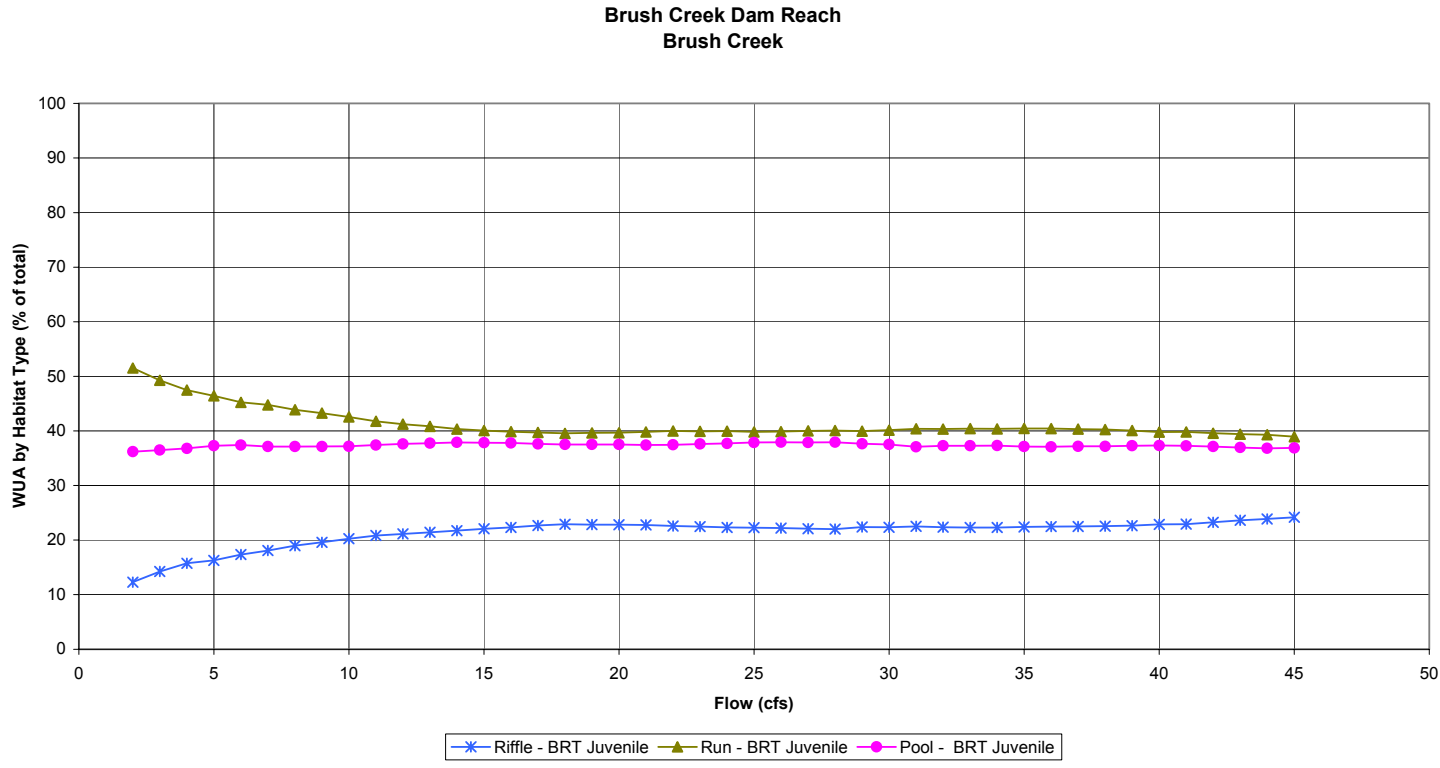

Figure 4.7.1-8. WUA by habitat type for Brush Creek Dam Reach: brown trout juvenile.

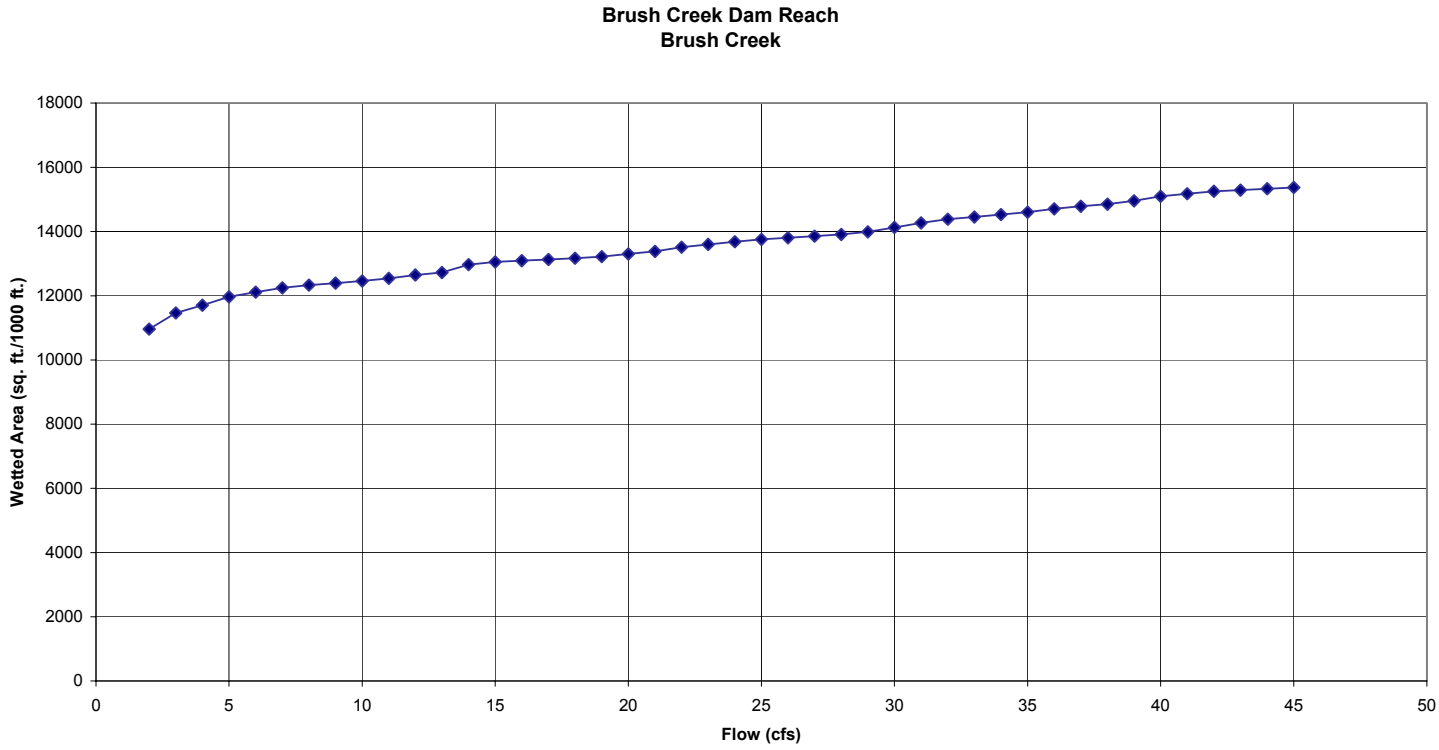

Figure 4.7.1-9. Wetted area versus flow for Brush Creek Dam Reach.

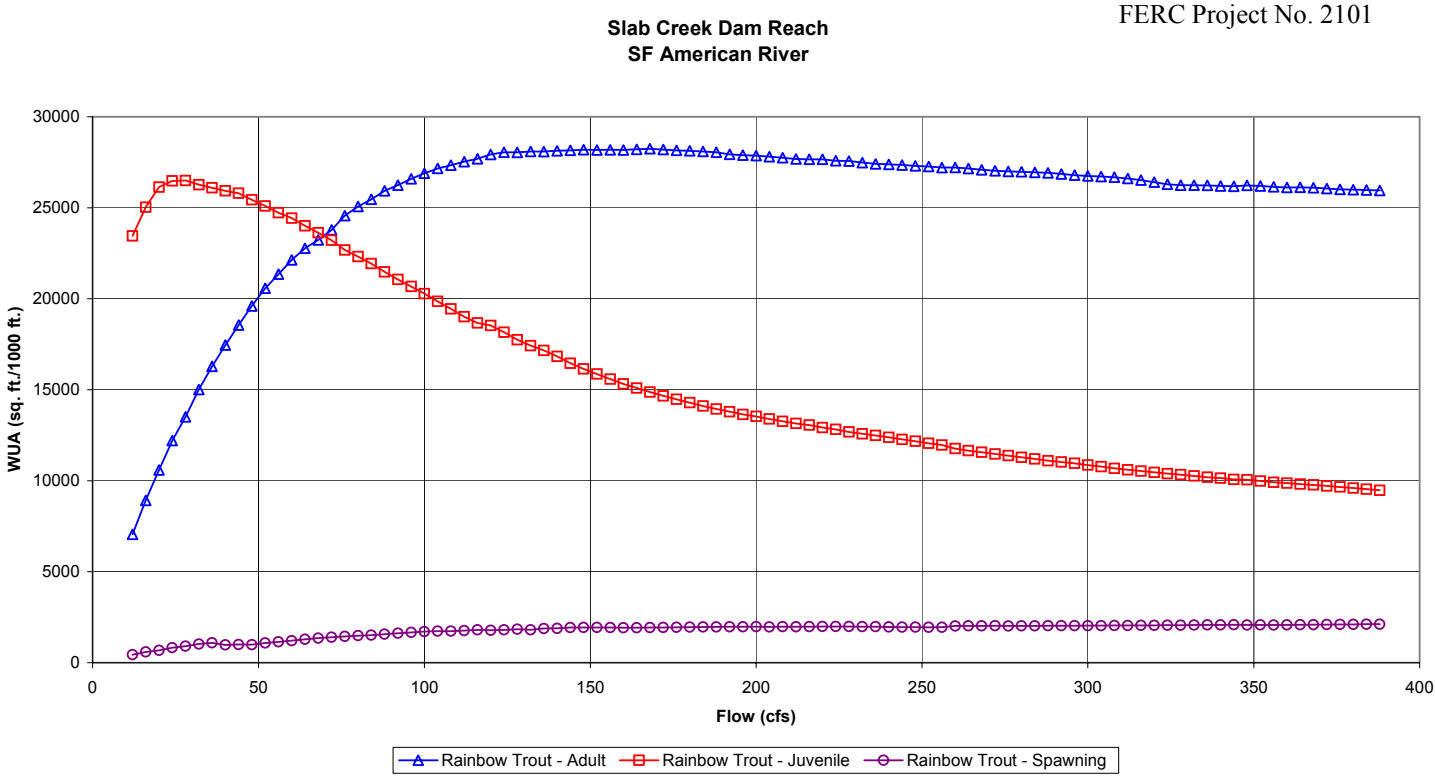

Figure 4.8.1-1. WUA versus flow for Slab Creek Dam Reach: rainbow trout.

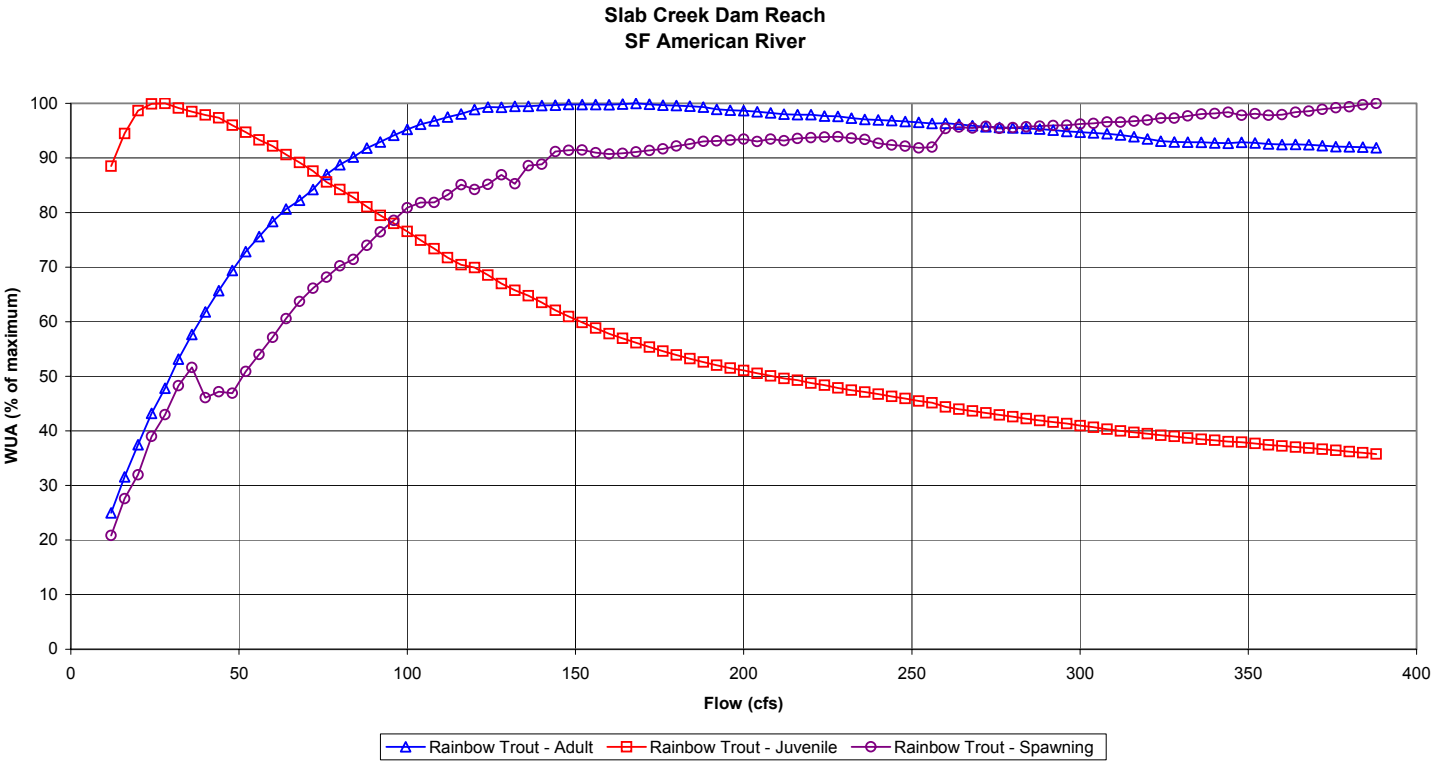

Figure 4.8.1-2. Percent of maximum WUA versus flow for Slab Creek Dam Reach SFAR: rainbow trout.

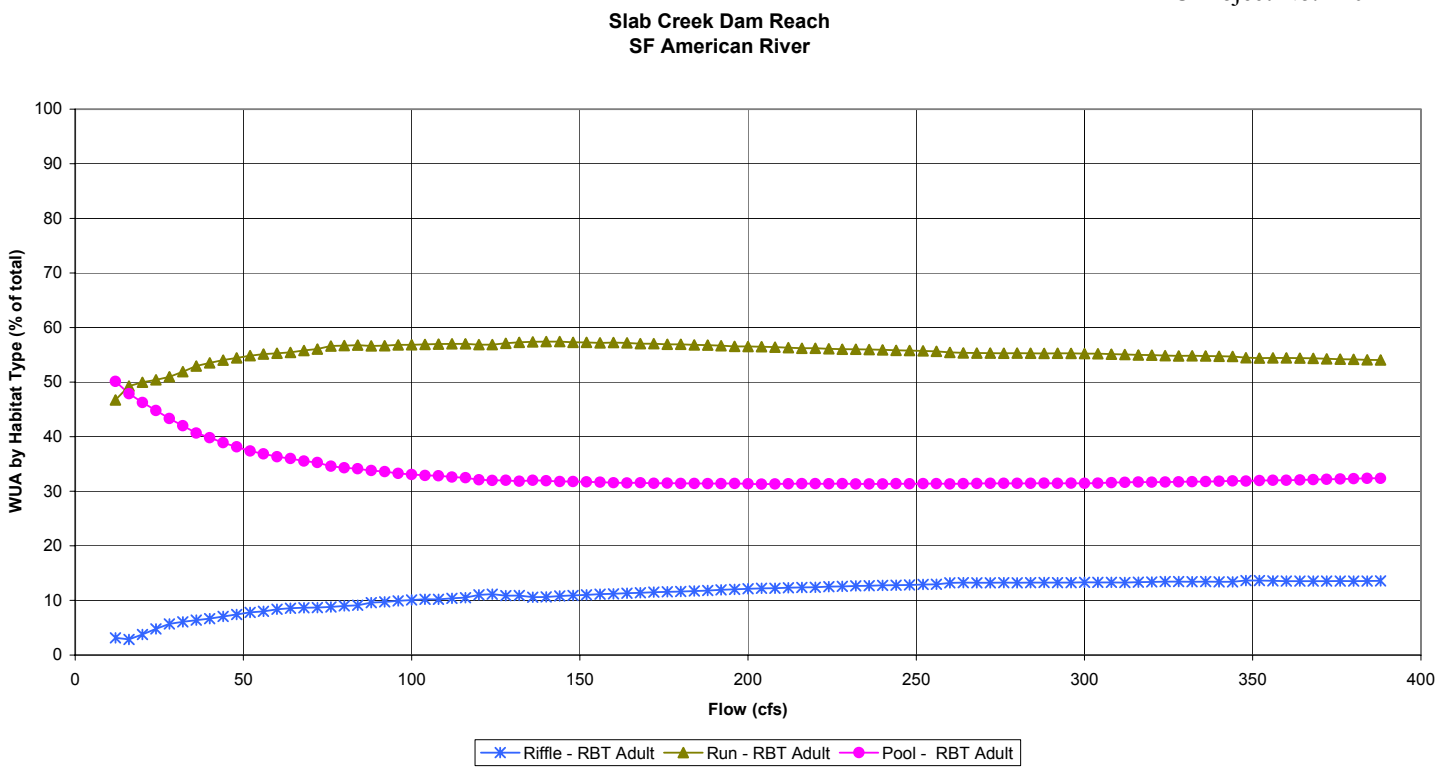

Figure 4.8.1-3. WUA by habitat type for Slab Creek Dam Reach SFAR: rainbow trout adult.

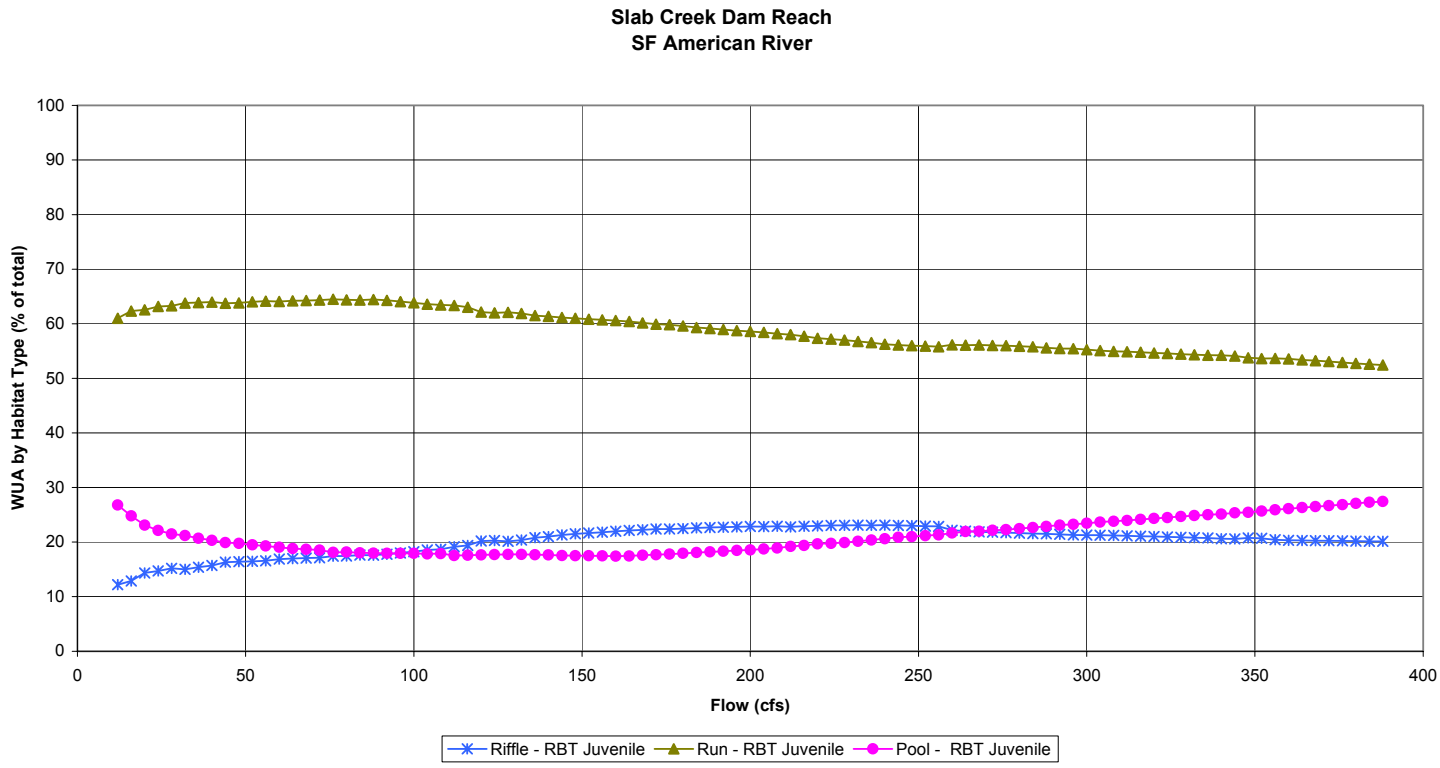

Figure 4.8.1-4. WUA by habitat type for Slab Creek Dam Reach SFAR: rainbow trout juvenile.

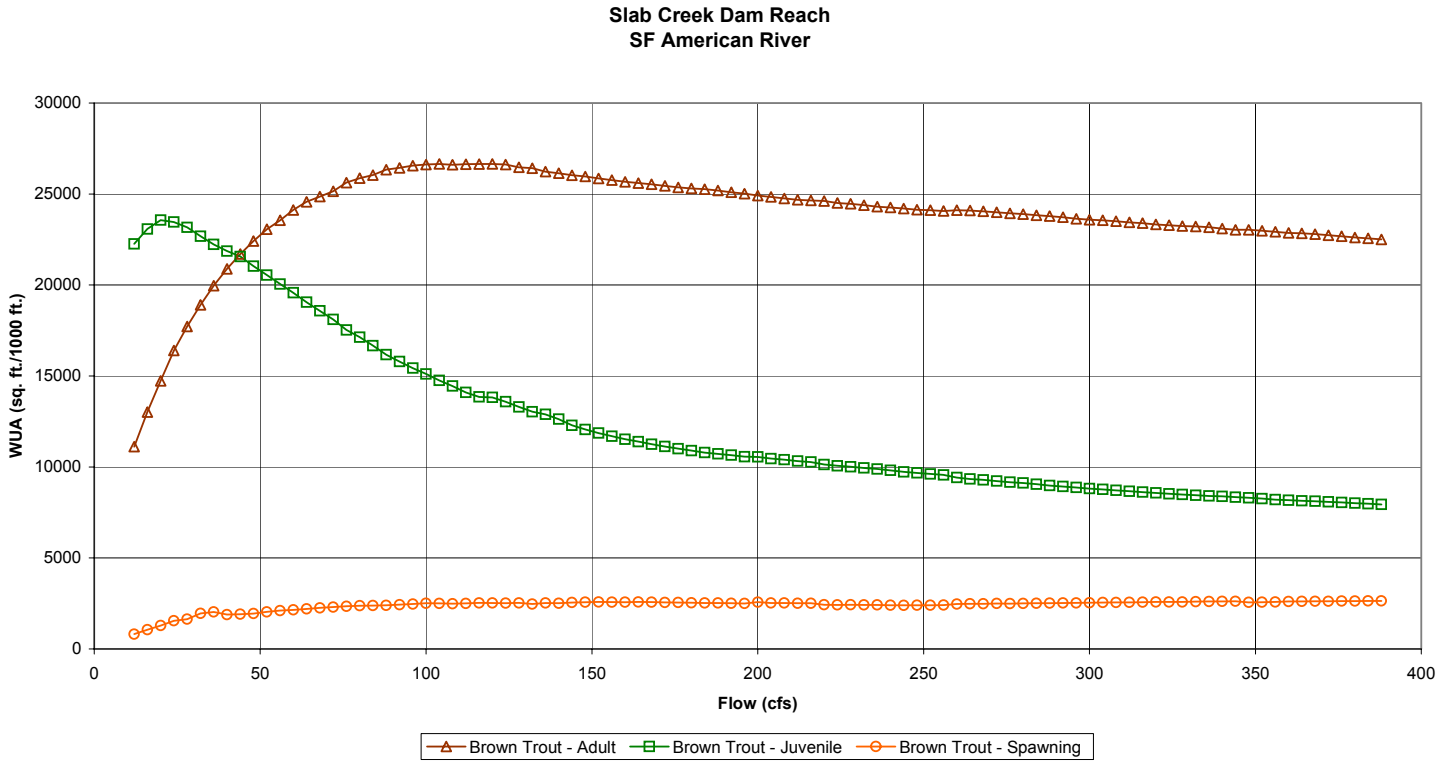

Figure 4.8.1-5. WUA versus flow for Slab Creek Dam Reach SFAR: brown trout.

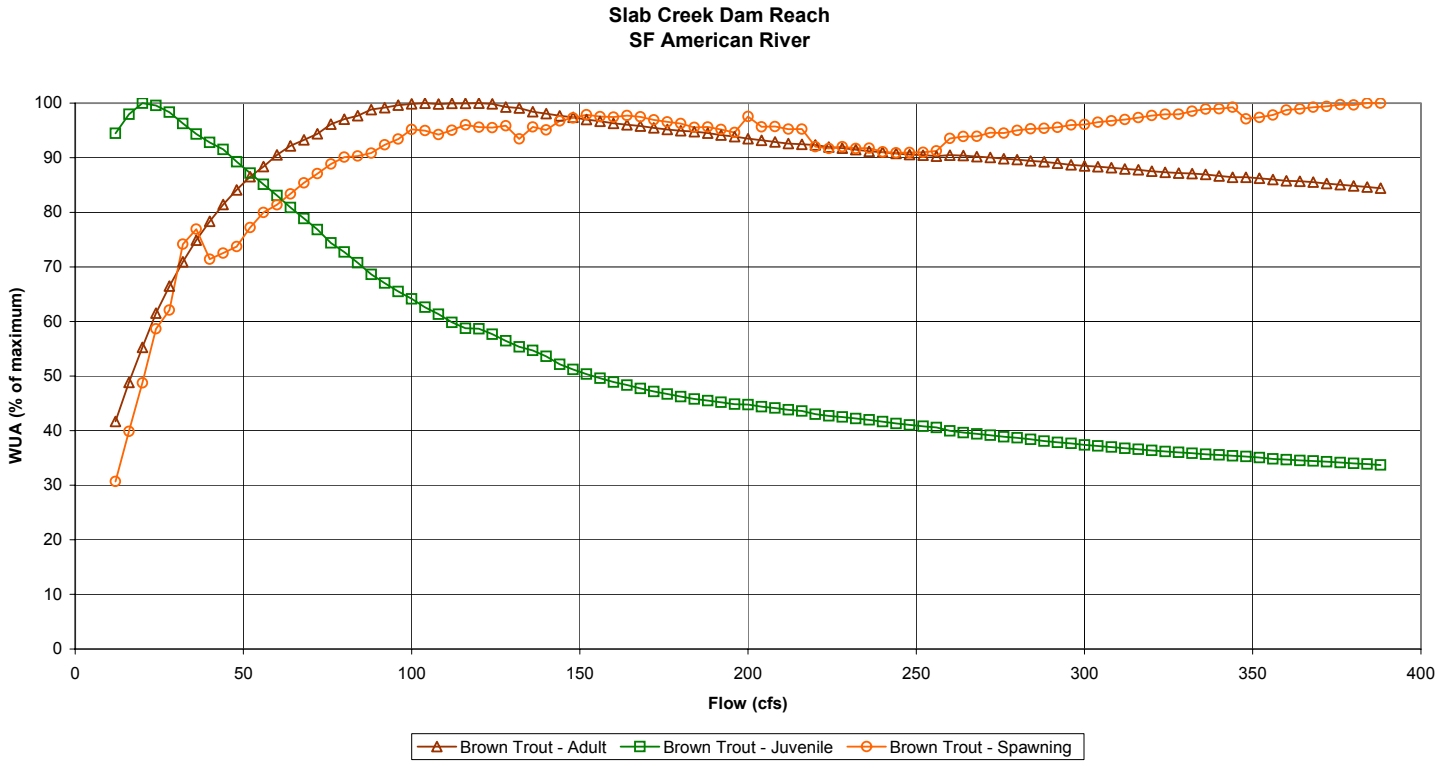

Figure 4.8.1-6. Percent of maximum WUA versus flow for Slab Creek Dam Reach SFAR: brown trout.

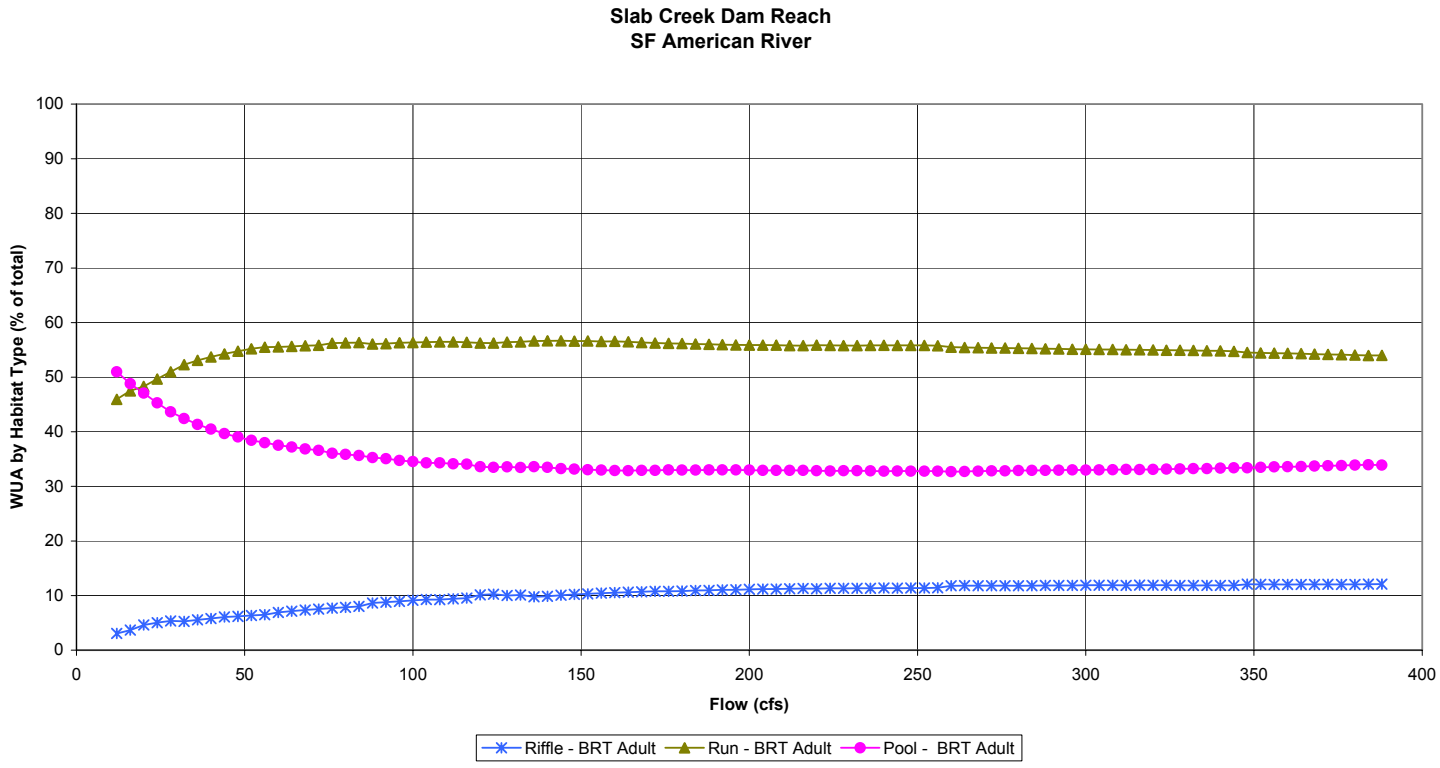

Figure 4.8.1-7. WUA by habitat type for Slab Creek Dam Reach SFAR: brown trout.

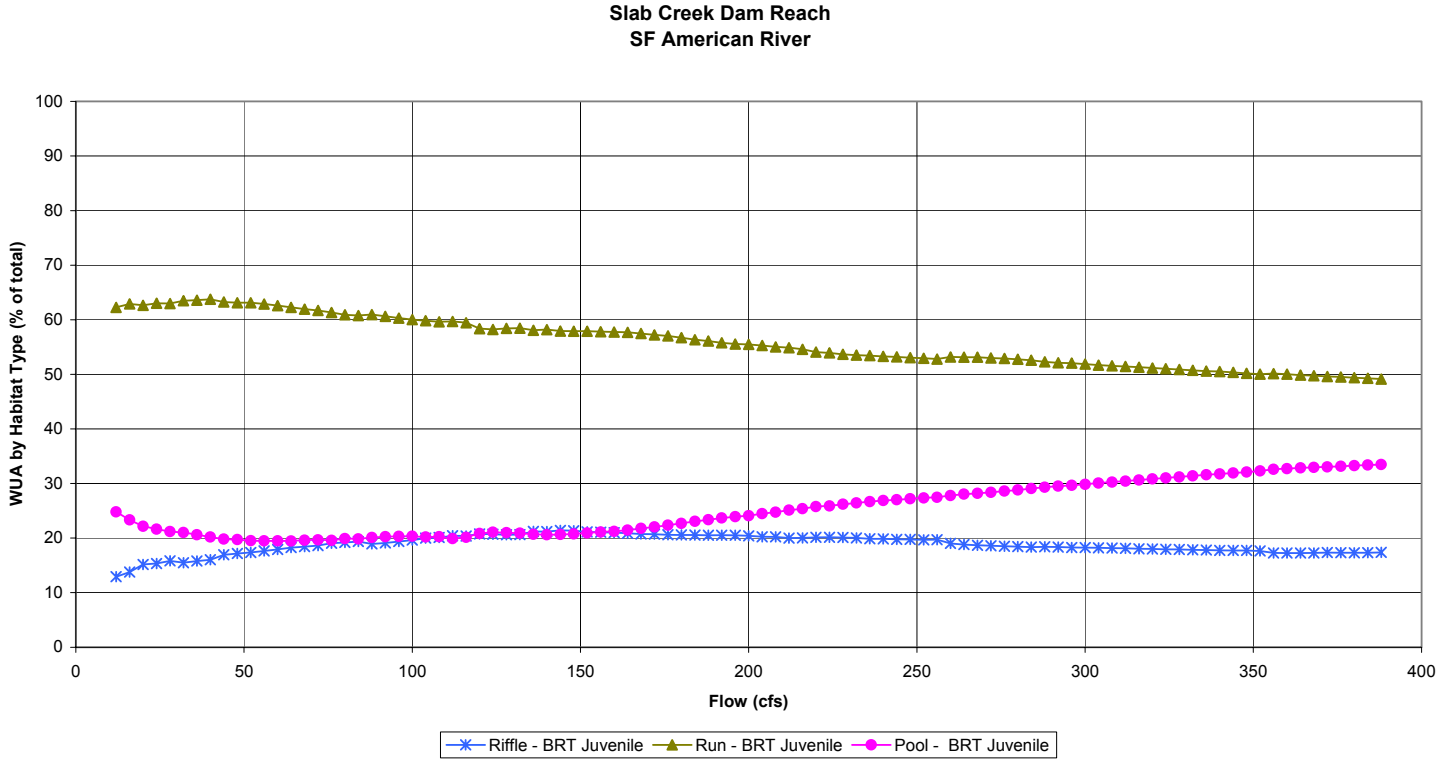

Figure 4.8.1-8. Percent of maximum WUA versus flow for Slab Creek Dam Reach SFAR: brown trout.

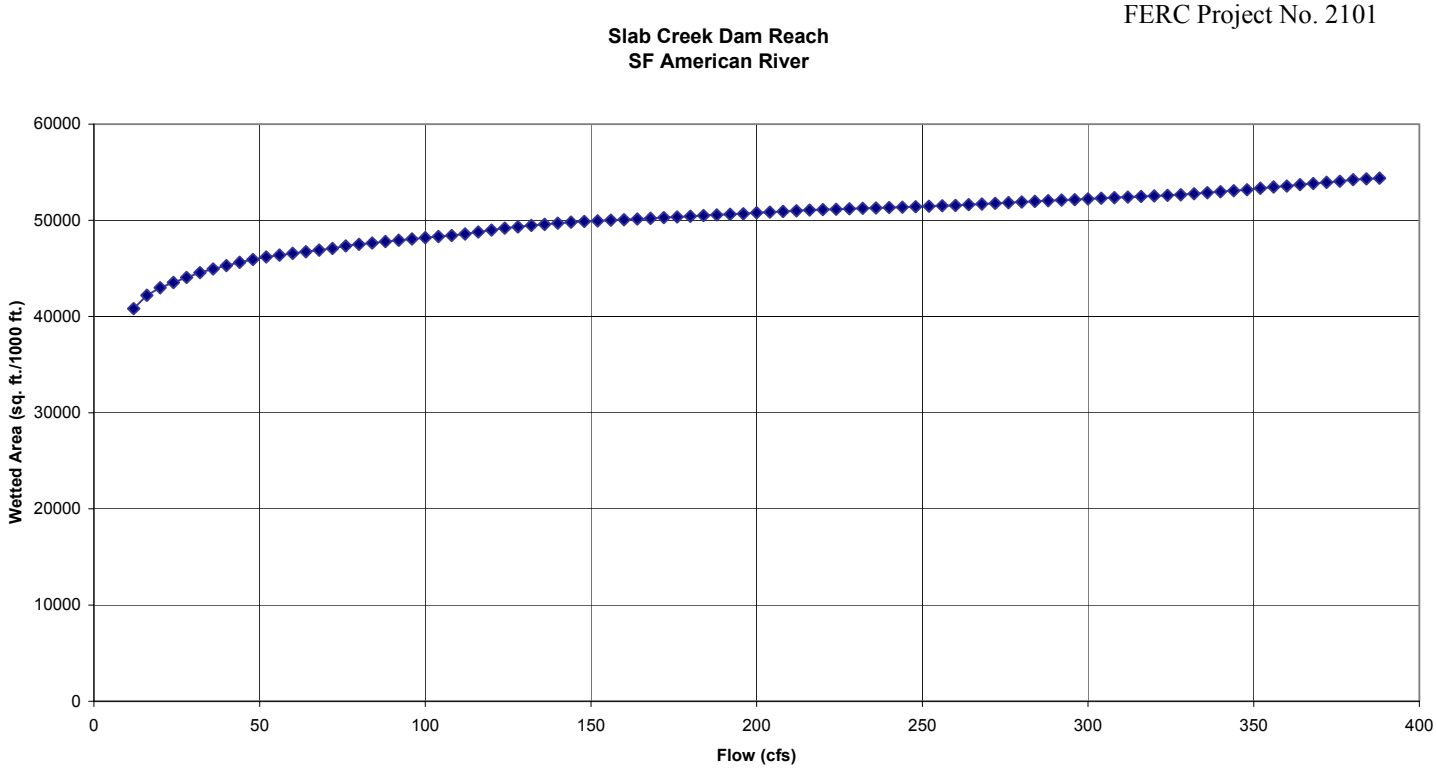

Figure 4.8.1-9. Wetted area versus flow for Slab Creek Dam Reach SFAR.

APPENDIX A

STUDY SITE MAPS AND TRANSECT SELECTION NOTES

STUDY SITE MAPS

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STUDY SITE MAPS AND TRANSECT SELECTION NOTES

APPENDIX B

HABITAT SUITABILITY CRITERIA DEVELOPMENT FIGURES AND CURVES COORDINATES

HABITAT SUITABILITY CRITERIA DEVELOPMENT

Rainbow Trout Adults
Rainbow Trout Juveniles
Rainbow Trout Spawning
Rainbow Trout Fry
Brown Trout Adults
Brown Trout Juveniles
Brown Trout Spawning
Hardhead

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HABITAT SUITABILITY CRITERIA DEVELOPMENT FIGURES AND CURVES COORDINATES

APPENDIX B
Habitat Suitability Criteria Development

Habitat Suitability Criteria (HSC) for the SMUD UARP were developed by the Aquatic TWG from existing data sources through a collaborative and iterative process during a series of meetings, workshops, and conference calls between February and November 2003. Table B-1 presents the dates and subjects of key meetings during the HSC development process. Selected presentation and workshop products were posted to SMUD's relicensing website.

The "starting" HSC data set for the SMUD UARP was "Category III" data (Bovee 1986) collected for El Dorado Irrigation District's (EID) Project 184 by Thomas R. Payne and Associates (TRPA 2000). These data were originally collected as part of a validation study, but were eventually used to develop stand-alone HSC that were accepted by the resource agencies as part of the instream flow analysis for the EID project. The data were collected at a variety of flows and in a variety of channel sizes. For some species and life stages, there were sufficient sample sizes to develop separate HSC curves by channel size. All of the data were from the South Fork American River (SFAR) watershed. Details regarding the development of these HSC for the EID project were presented to the Aquatic TWG on May 5, 2003 and are included in the EID report (TRPA 2000).

The species initially selected for HSC development included rainbow and brown trout, hardhead, Sacramento pikeminnow, and Sacramento sucker. Due to data limitations, similarity of habitat use by the cyprinid species, and species management considerations, the Aquatic TWG decided to focus HSC development on rainbow trout, brown trout, and hardhead.

For the SMUD UARP, the SFAR HSC were supplemented with data from other sources, and comparisons made between data sets. The final UARP HSC curves were developed by combining the various data sets and making other modifications using professional judgment, considering differences in stream size, flow regime, and other factors. The following subsections narratively describe the curve development process for each species and life stage. They identify the "starting" curve (typically from the SFAR), and include a brief description of subsequent adjustments that led to the final, TWG-approved HSC used for SMUD UARP PHABSIM analysis. Figures for each of the HSC are presented in this appendix (Figures B-1 through B-12), and coordinates each curve are included in Tables B-2 and B-3.

Table B-1. Key meetings for the development of habitat suitability Criteria for the SMUD UARP.

Date	Subject
February 21, 2003	Introductory presentation and discussion on Habitat Suitability Criteria
May 5, 2003	Presentation and discussion of TRPA HSC for El Dorado Irrigation District Project 184
July 31, 2003	Habitat Suitability Criteria TWG Workshop #1
August 31, 2003	Habitat Suitability Criteria TWG Workshop #2
September 17, 2003	Habitat Suitability Criteria Conference Call Workshop
October 2, 2003	Habitat Suitability Criteria TWG Workshop #3
November 6, 2003	Habitat Suitability Criteria TWG Workshop #4, Trout HSC finalized

Rainbow Trout Adults

Data sets considered for adult rainbow trout HSC included the following:

- South Fork American River for small, medium, and large channels (EID Project 184)
- Battle Creek
- Bucks and Grizzly creeks
- North Fork Stanislaus River
- Clavey River
- Pit River
- Upper North Fork Feather River (UNFFR) composite curve

Similarities and differences between these curve sets were reviewed and discussed, including differences in the watersheds and streams, and specific differences in the data collection methodologies or curve development techniques. The Aquatic TWG eventually concurred on use of the SFAR curves as the most suitable underlying empirical data set, and modified the SFAR curves to reflect their best professional judgment about HSC for the SMUD UARP.

Modifications to the rainbow trout adult velocity curve included "linearizing" the ascending limb of the curve, flattening the top of the curve to provide maximum suitability over a greater range of velocities, linearizing the descending limb of the curve, and flattening the tail of the curves in a more asymptotic fashion to keep the suitability elevated over a greater range of higher velocities before terminating the curve at a mean column velocity of 3.0 ft/sec. The primary rationale for linearizing the curves and flattening the tops was that relatively small sample sizes may have narrowed the observed field data distribution. The range of maximum suitability values was extended in recognition of the relatively small sample size of the underlying data set, and because of a desire to not restrict maximum suitability to a single velocity value. Similarly, the tails of the velocity curves were flattened to reflect that sample sizes are typically small at the ends of the frequency distribution, and a more conservative approach to possible suitability was considered appropriate.

Similar adjustments were made for each of three channel sizes (small, medium, and large channels, with the medium channel curve placed symmetrically between the small and large channel curves). Curves for all channel sizes display the same ascending limb, but begin descending at different mean column velocities, and the tails flatline at different levels. The rationale for three different curves (by channel size) is based primarily on differing sizes of fish found in different sizes of streams. All of the velocity curves ascend on the small channel curve line because smaller adult fish are present in the larger channels, even though there are larger fish that would utilize faster velocities as well. The final adult rainbow trout velocity curves are presented in Figure B-1.

This general rationale for how to modify the ascending limb, the maximum suitability peak of the curve, the descending limb, and the tail of the curve is generally followed throughout the development of all of the HSC for the SMUD UARP.

The rainbow trout adult depth HSC curves were developed following review of the same data sets as for the velocity criteria. The same conclusion was reached regarding using the SFAR

curves as the underlying empirical data set, and revising those curves using professional judgment. There was extensive discussion as to how to best handle the descending limb of the depth curves, with concerns regarding whether the curves should be depth-limited. Sensitivity tests using PHABSIM data sets from smaller and larger streams were run against various alternative depth curves. Ultimately the Aquatic TWG concurred on three depth curves for three different channel sizes. All of the curves are "linearized" at the upper end of the ascending limb of the curve, and the range of maximum suitability is extended (i.e., the curve was "flattened" on the top). Descending limbs for the small and medium channels generally follow the SFAR data, with tails "flatlined" at varying suitabilities. The large channel depth curve does not have a descending limb, and is flatlined at maximum suitability. The final rainbow trout adult depth curves for the SMUD UARP are presented in Figure B-2.

All substrate and cover types were considered suitable for adult rainbow trout

Rainbow Trout Juveniles

Data sets considered for juvenile rainbow trout HSC included the following:

- South Fork American River curves from EID Project 184
- Battle Creek
- Bucks and Grizzly creeks
- North Fork Stanislaus River
- Clavey River
- Upper North Fork Feather River (UNFFR composite curve)

Ultimately, the data set from the SFAR was used as a basis for the SMUD UARP curve for juvenile rainbow trout. The ascending limb of the curve was linearized, the maximum suitability range was expanded, and the descending limb followed the SFAR data line. The tail of the curve was flattened to reflect limited sample sizes at the end of the curve. The final juvenile rainbow trout juvenile velocity curve for the SMUD UARP is presented in Figure B-3.

The juvenile rainbow trout depth curve was modified in similar fashion to the velocity curve. The upper ascending limb of the curve was linearized, the maximum suitability range was extended, and a portion of the descending limb was linearized. Otherwise the curve followed the line of the SFAR data set. The final rainbow trout juvenile depth curve for the SMUD UARP is presented in Figure B-4.

Juvenile rainbow trout HSC for depth and velocity were applied to all channel sizes. All substrate and cover types were considered suitable for juvenile rainbow trout.

Rainbow Trout Spawning

Data sets considered for rainbow trout spawning HSC included the following:

- Roaring Creek
- Upper North Fork Feather River (UNFFR composite curve)
- Butte Creek
- North Fork Kings River

Following discussion of each of these data sets, the Aquatic TWG concurred that the Roaring Creek data set was most applicable for the SMUD UARP for small and medium channels. The Roaring Creek curve for velocity was linearized on the ascending limb, the maximum suitability range was extended, and the descending limb was partially linearized. The final curve for rainbow trout spawning velocities for small and medium channels is presented in Figure B-5.

The Aquatic TWG determined that the rainbow trout spawning velocity HSC curve for large channels would be better represented by a composite of the North Fork Kings River and the Upper North Fork Feather River curves. Each of these curve sets were overlaid, and the ascending limb of the North Fork Kings River curve was used, along with the descending limb of the Upper North Fork Feather River curve. Maximum suitability ranged from the peak of the North Fork Kings curve to the peak of the UNFFR curve. The final SMUD UARP HSC for rainbow trout spawning velocities in large channels is presented in Figure B-5.

Various sensitivity tests were run on modifications to different rainbow trout spawning depth HSC. Modifications in the descending limb of various curves were evaluated, including curves with no depth limitation. Ultimately the Aquatic TWG concurred on an "envelope" curve over the UNFFR data. The curve included a modification to flatline the suitability midway down the descending limb of the curve. The final rainbow trout spawning depth curve for all channel sizes in the SMUD UARP is presented in Figure B-6.

Rainbow trout spawning substrate HSC were developed based on professional judgment and knowledge of the literature regarding use of various gravel sizes for spawning by rainbow trout. The Aquatic TWG concurred on designating both dominant gravel size codes (small or large gravel) as having maximum suitability. Smaller substrates (sand and smaller) or larger substrates (cobble and larger) were given a suitability index of zero. The final rainbow trout spawning substrate curve (for dominant substrates) for the SMUD UARP is presented in Figure B-7. In many locations ("cells") across a transect, suitable gravel for spawning may be present as the subdominant substrate. In order to recognize that these cells may provide some spawning habitat in smaller pockets of gravel when redds are excavated or cleaned by spawning trout, cells with subdominant gravel codes were assigned a suitability index of 0.5. This index was assigned when the associated dominant substrate was sand or larger based on an assumption that trout would be less likely to clean or excavate gravels in locations dominated by silt, mud, or organic debris.

Rainbow Trout Fry

Suitability criteria were not developed for the fry life stage. Results of instream flow studies on numerous other streams have typically indicated that fry habitat (as measured by WUA) is greatest at low flows, and descends as flows increase. As a result, there is frequently some reticence to consider fry habitat in the development of potential flow regimes, and it is frequently assumed that there will be suitable habitat for the fry regardless of the flow regime. Although some members of the Aquatic TWG had varying opinions about development of WUA versus flow relationships for this life stage, this life stage not was included in the PHABSIM analysis for the SMUD UARP.

Brown Trout Adults

Data sets considered for the adult brown trout HSC included the following:

- South Fork American River for small channels (EID Project 184)
- Middle Fork Stanislaus River
- Tule River

The Aquatic TWG considered the SFAR and Middle Fork Stanislaus curves the most appropriate for use for the SMUD UARP. The SFAR curve was initially selected for small channels, and the Middle Fork Stanislaus curve selected for large channels. Modifications to each of the velocity curves were similar to those implemented for rainbow trout adults: the ascending limb of the curve was linearized, the top of the curve was flattened to provide maximum suitability over a greater range of velocities, and the descending limb of the curve was linearized. A medium channel velocity curve was developed by simply averaging the small and large channel values to provide an intermediate line. The tails of each curve were terminated at the same point as noted in the underlying data sets for the small channel and large channel curves. The curve for medium sized channels was terminated at a point intermediate between the small and large channel curves. The brown trout adult velocity curves for the SMUD UARP are presented in Figure B-8.

The brown trout adult depth HSC curves were developed following review of the same data sets as for the velocity criteria. The same conclusion was reached regarding using the SFAR curves as the underlying empirical data set for the small channel, and revising those curves using professional judgment. The large channel curve utilized the Middle Fork Stanislaus River curve, with a flatline at maximum suitability to indicate no depth limitation.

Due to the flatlining of the large channel brown trout adult depth curve, a mathematical average of the small channel and large channel curves was not appropriate for medium sized channels. Instead, the Aquatic TWG decided to substitute the adult depth curve for rainbow trout for medium channels, and use it as the medium channel brown trout adult depth curve. The ascending limb of the brown trout adult curve for medium channels was modified slightly to overlap with the small channel curve. The final brown trout adult depth curves for the SMUD UARP are presented in Figure B-9.

Brown Trout Juveniles

Data sets considered for the juvenile brown trout HSC included the following:

- South Fork American River small channel curves from EID Project 184
- Middle Fork Stanislaus River
- Tule River

The Aquatic TWG agreed upon a linearized version of the SFAR brown trout velocity curve for small channels and using that curve for all channel sizes. Similar to the modification of the tail of the juvenile rainbow trout velocity curve, this tail was flattened to reflect limited sample sizes at the end of the curve. The final juvenile brown trout velocity curve for the SMUD UARP is presented in Figure B-10.

The juvenile brown trout depth curve was modified in similar fashion to the velocity curve. The upper ascending limb of the curve was linearized, the maximum suitability range was extended, and a portion of the descending limb of the curve was linearized. Otherwise, the curve followed the line of the underlying SFAR data set. The final brown trout juvenile depth curve for the SMUD UARP is presented in Figure B-11.

Brown trout juvenile HSC for depth and velocity were applied to all channel sizes. All substrate and cover types were considered suitable for juvenile brown trout.

Brown Trout Spawning

The Aquatic TWG reviewed brown trout spawning criteria from the North Fork Kings River. The brown trout spawning velocity curve was developed as an "umbrella" curve over the North Fork Kings River data. As such, the curve encompasses the entire North Fork Kings data set, and includes a flat top where the range of maximum suitability is extended. There were no channel size specific curves developed for brown trout spawning velocities, in part because any brown trout management was expected to focus on the upper portions of the watershed that had smaller channels. The final brown trout spawning velocity curve for the SMUD UARP is presented in Figure B-12.

The Aquatic TWG concurred on using the rainbow trout spawning curve to depict spawning depth suitability for brown trout (Figure B-6).

Spawning substrates for brown trout were considered to be identical to rainbow trout, and the same substrate curve was used for both species (Figure B-7).

Hardhead

The Aquatic TWG reviewed hardhead data sets from the following sources:
South Fork American River small channel curves from EID Project 184, Pit River,
Deer Creek, Western Sierra, North Fork Feather River, and Moyle and Baltz (1985).
Following discussion of the merits, similarities, differences, etc. of the various curve sets for application in reaches of the SMUD UARP where hardhead are found, the Aquatic TWG

concluded that additional discussion with species experts was desirable. SMUD staff and consultants met with Dr. Peter Moyle of U.C. Davis on November 17, 2003 to discuss hardhead ecology and the possible use of various hardhead HSC in the South Fork American River. The following points about relevant aspects of hardhead life history were summarized from discussions with Dr. Moyle and review of his recent revision of "Inland Fishes of California."

- Hardhead adults usually use deep, cooler water for holding, but feed in a variety of habitats including swift waters.
- Hardhead probably spawn in flowing water over gravel beds in riffles, runs, or at the heads of pools.
- Flows for successful spawning in rivers are probably more critical than flows for other life stages; there may also be a relationship between minimum flow required for spawning and temperature.
- Spawning occurs with the declining spring hydrograph and associated changes in water temperature.
- During the daytime adults tend to "cruise" in deeper water, as opposed to holding near some feeding lane.
- There may be significant changes in diel behavior and habitat use, but this is not yet understood.
- The juvenile life stage is not well understood. Young hardhead inhabit shallow edges, backwaters, runs, and riffles; they generally are not found in areas that are highly suitable for adult pikeminnow, presumably to avoid depredation.
- Reservoir level management may be an issue, both for excluding predatory centrarchids (through constraints on spawning) and for maintaining margin habitat for juveniles; the former effect, however, is likely more critical.
- Water temperature seems to be a more important factor than flow, yet exact temperature limits are not yet known. Hardhead prefer streams with summer temperatures exceeding 20°C; lab choice studies indicate a preferred range of 24-28°C.
- Habitat preference for adults (over 15 cm) is for clear, deep pools and runs with slow velocities.
- Generally, the upstream, more riverine portions of reservoirs may be more suitable than the slower, lacustrine habitats, especially in the presence of centrarchid populations.
- Although hardhead habitat use appears to have some relationship with depth and water velocity, it appears to be broad and secondarily limiting.

As a result of the information summarized above, the PHABSIM analysis did not include hardhead HSC, since habitat suitability for hardhead was unlikely to be closely related to changes in depths and velocities modeled using PHABSIM.

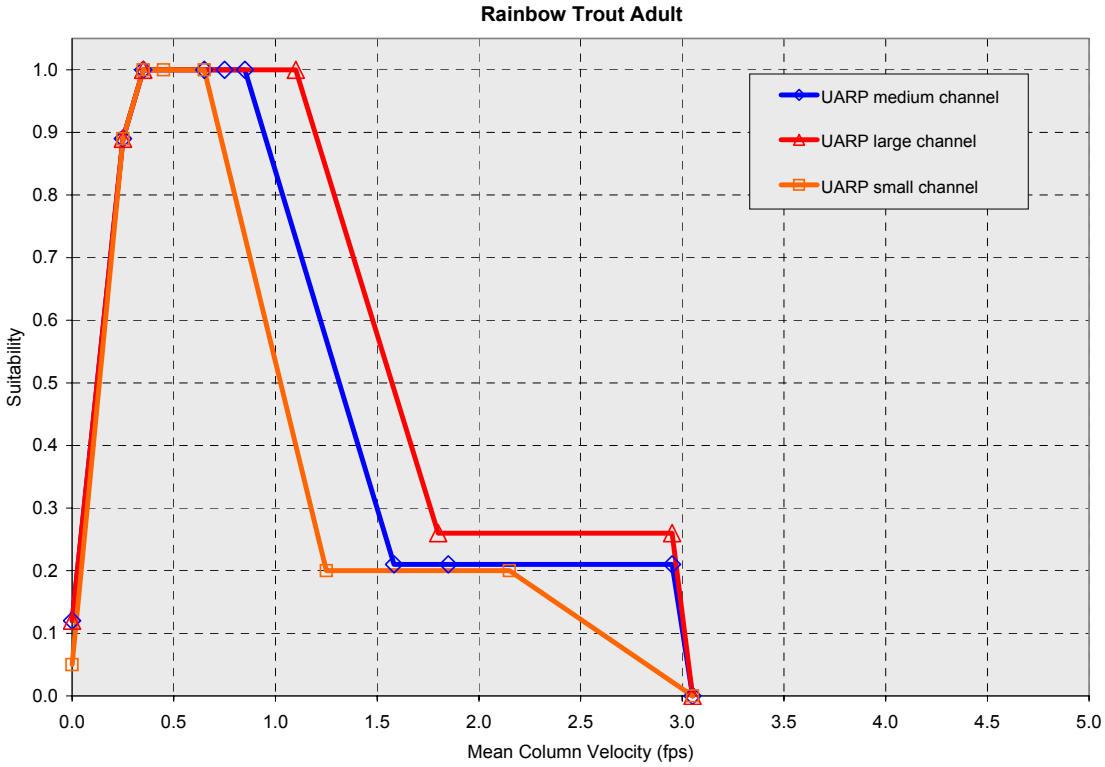

Figure B-1. Habitat suitability criteria for rainbow trout adult velocities.

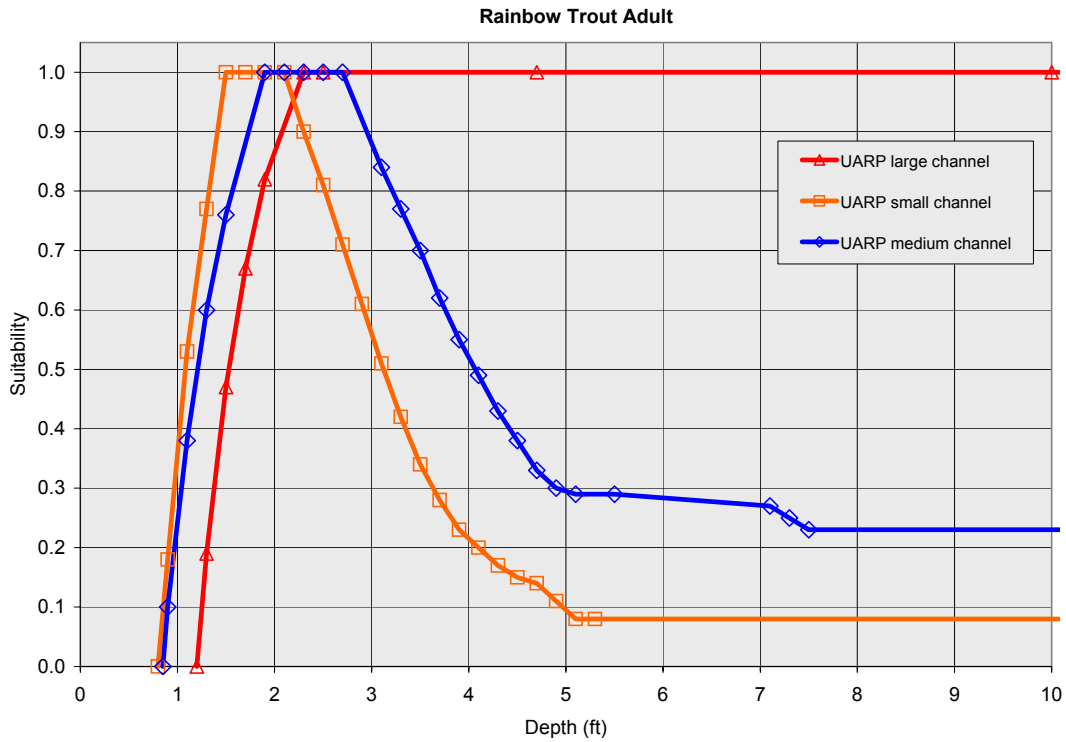

Figure B-2. Habitat suitability criteria for rainbow trout adult depths.

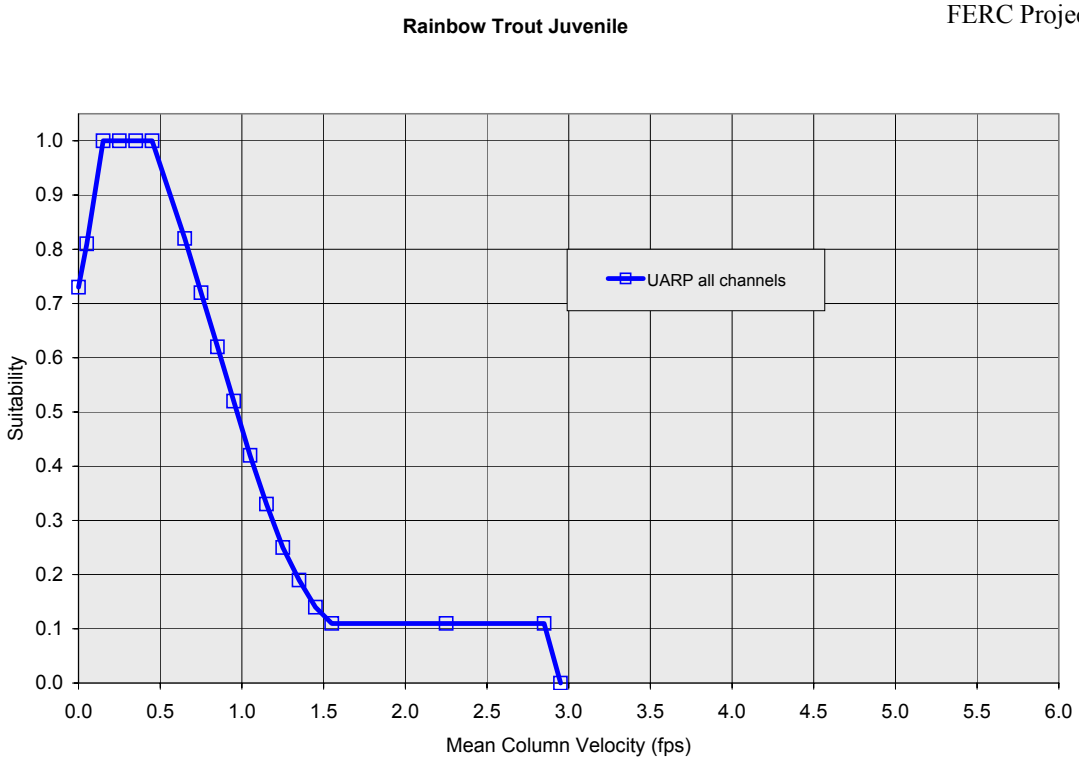

Figure B-3. Habitat suitability criteria for rainbow trout juvenile velocities.

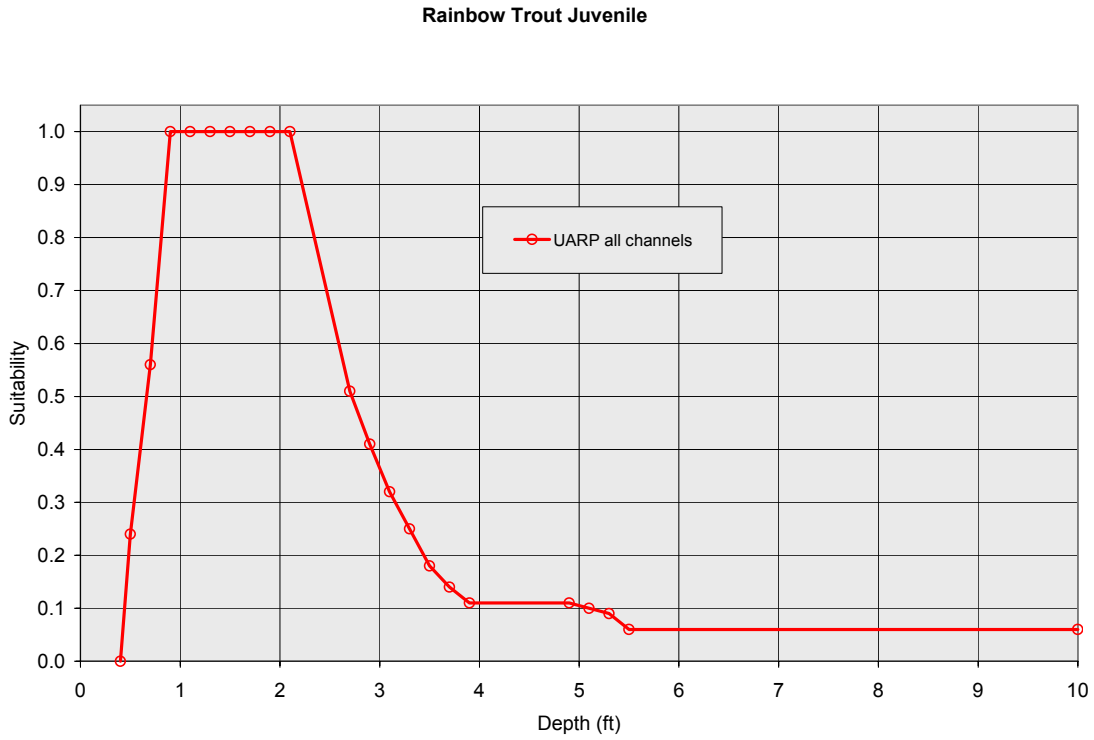

Figure B-4. Habitat suitability criteria for rainbow trout juvenile depths.

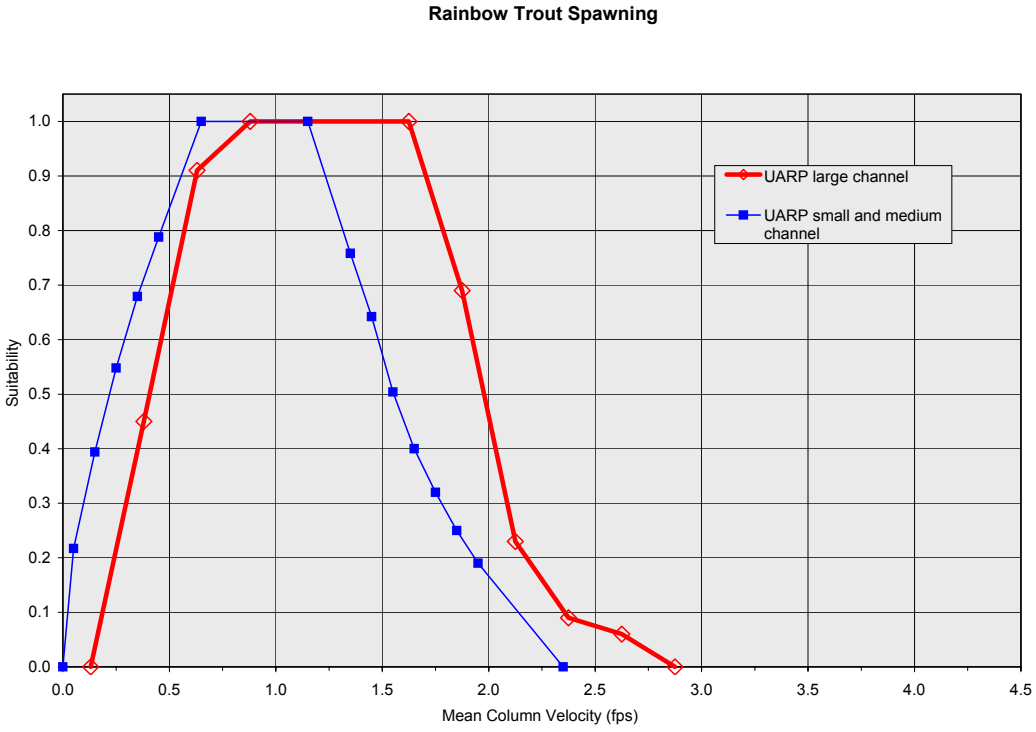

Figure B-5. Habitat suitability criteria for rainbow trout spawning velocities.

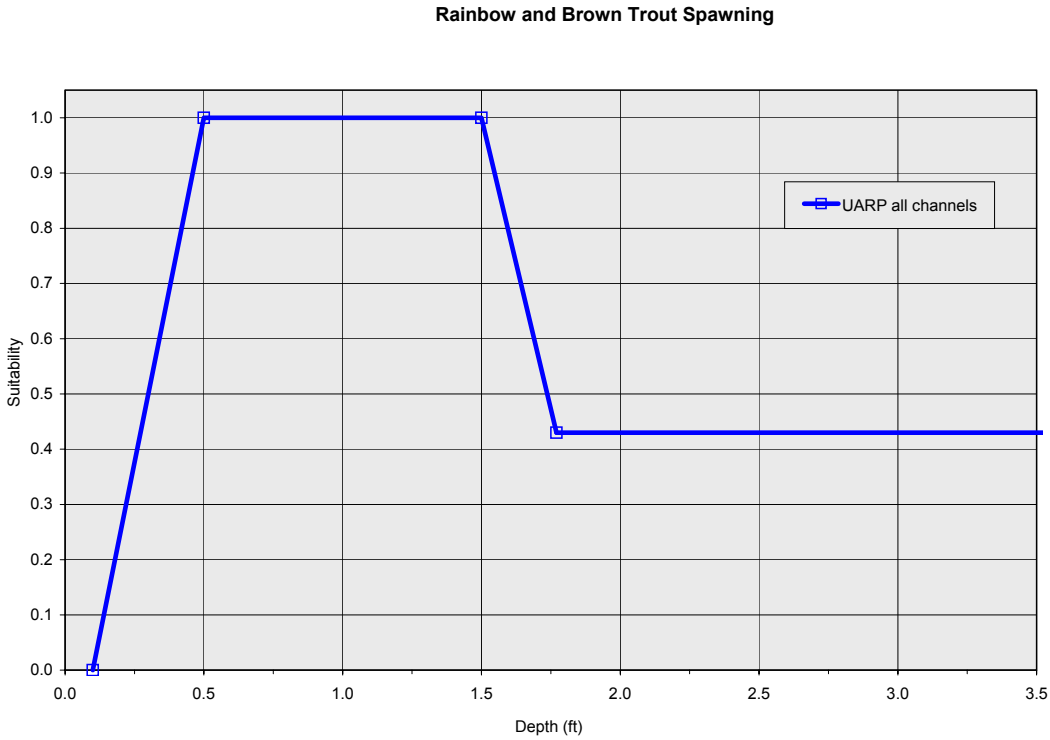

Figure B-6. Habitat suitability criteria for rainbow and brown trout spawning depths.

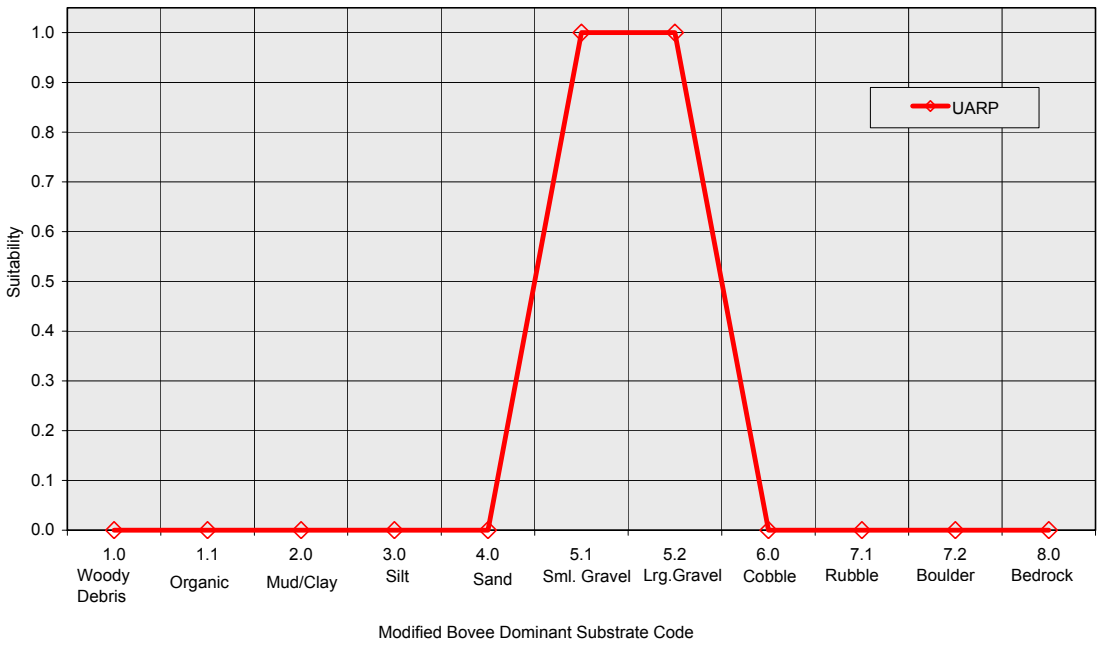

Figure B-7. Habitat suitability criteria for rainbow and brown trout spawning substrate.

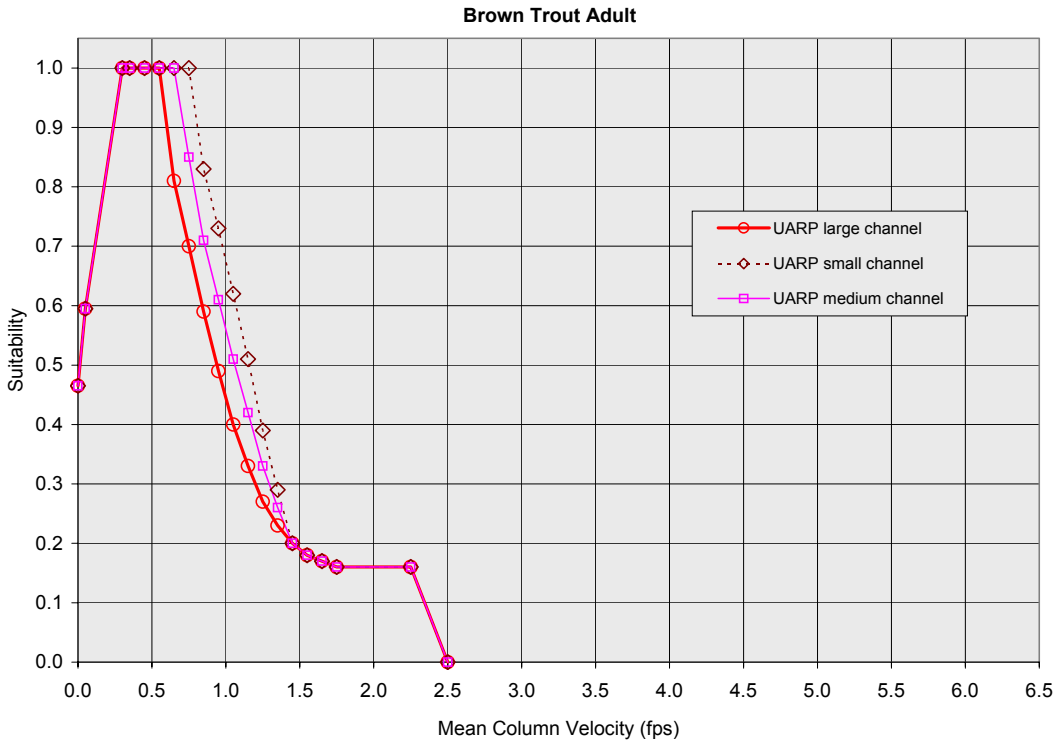

Figure B-8. Habitat suitability criteria for brown trout adult velocities.

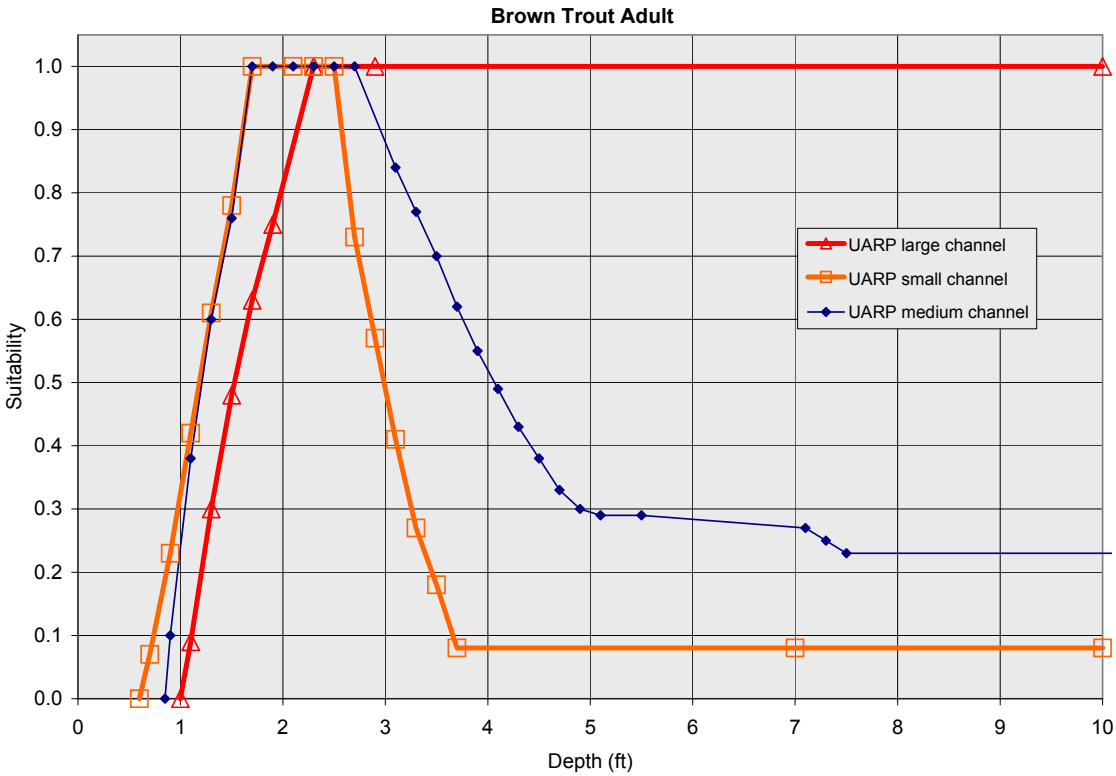

Figure B-9. Habitat suitability criteria for brown trout adult depths.

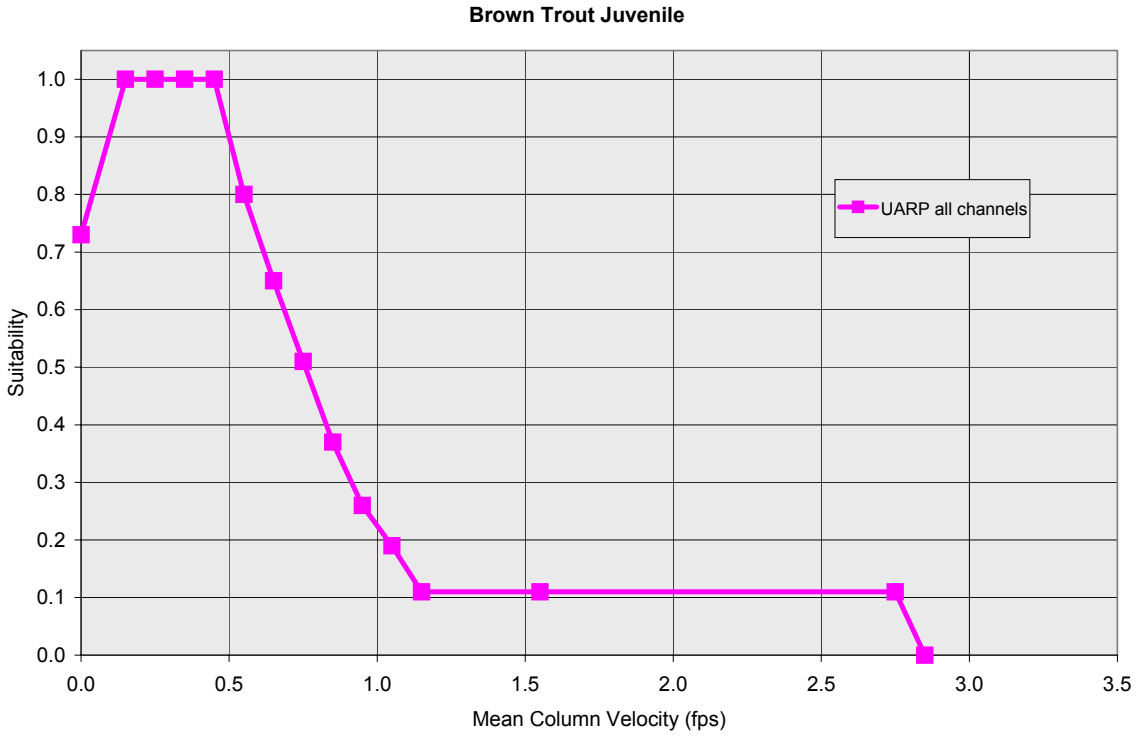

Figure B-10. Habitat suitability criteria for brown trout juvenile velocities.

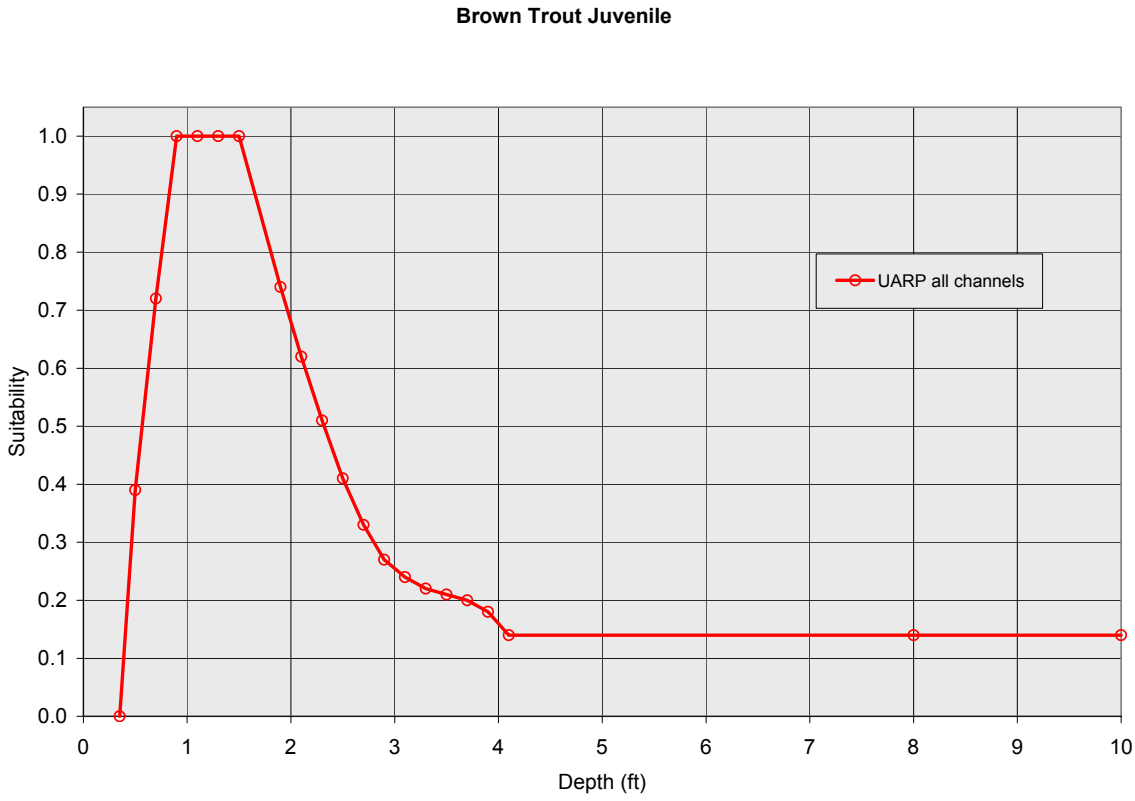

Figure B-11. Habitat suitability criteria for brown trout juvenile depths.

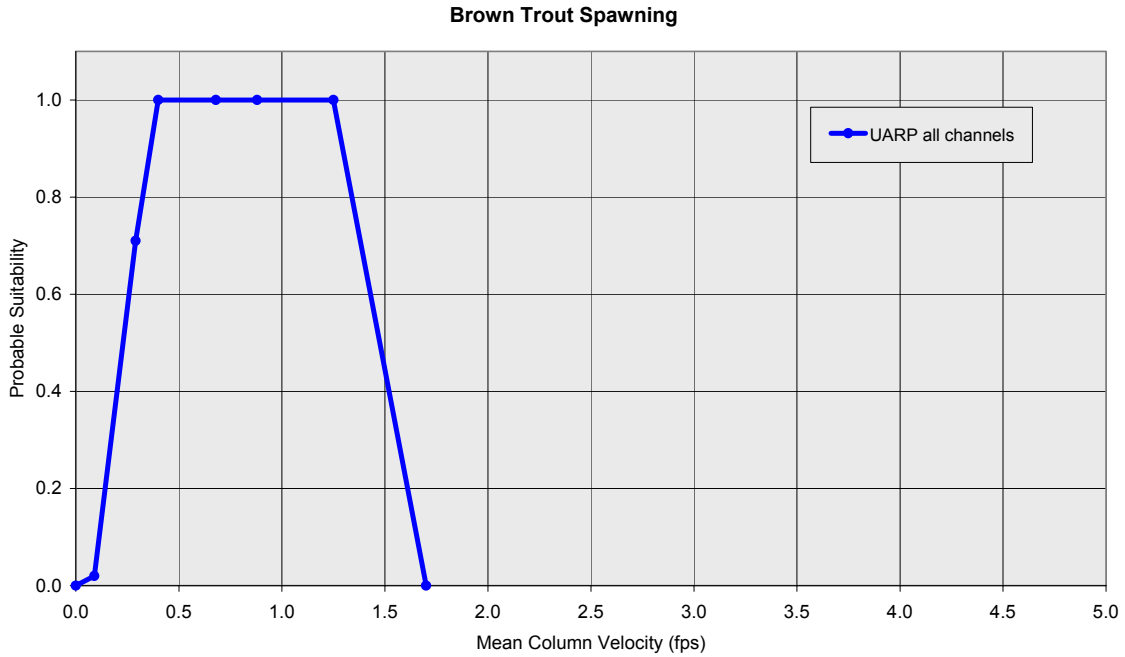

Figure B-12. Habitat suitability criteria for brown trout spawning velocities.

Table B-2. Habitat suitability criteria velocity coordinates for the SMUD UARP

Rainbow Spawning HSC				Rainbow Juvenile HSC		Rainbow Adult HSC				Brown Spawning HSC		Brown Juvenile HSC		Brown Adult HSC			
Velocity	UARP small and medium channel	Velocity	UARP large channel	Velocity	UARP all channels	Velocity	UARP medium channel	UARP large channel	UARP small channel	Velocity	UARP all channels	Velocity	UARP all channels	Velocity	UARP large channel	UARP small channel	UARP medium channel
0.00	0.00	0.13	0.00	0.00	0.73	0.00	0.12	0.12	0.05	0.00	0.00	0.00	0.73	0.00	0.47	0.47	0.47
0.05	0.22	0.38	0.45	0.05	0.81	0.25	0.89	0.89	0.89	0.09	0.02	0.15	1.00	0.05	0.60	0.60	0.60
0.15	0.39	0.63	0.91	0.15	1.00	0.35	1.00	1.00	1.00	0.29	0.71	0.25	1.00	0.30	1.00	1.00	1.00
0.25	0.55	0.88	1.00	0.25	1.00	0.45			1.00	0.40	1.00	0.35	1.00	0.35	1.00	1.00	1.00
0.35	0.68	1.625	1.00	0.35	1.00	0.65	1.00		1.00	0.68	1.00	0.45	1.00	0.45	1.00	1.00	1.00
0.45	0.79	1.875	0.69	0.45	1.00	0.75	1.00			0.88	1.00	0.55	0.80	0.55	1.00	1.00	1.00
0.65	1.00	2.125	0.23	0.65	0.82	0.85	1.00			1.25	1.00	0.65	0.65	0.65	1.00	0.81	1.00
1.15	1.00	2.375	0.09	0.75	0.72	1.10		1.00		1.70	0.00	0.75	0.51	0.75	1.00	0.70	0.85
1.35	0.76	2.625	0.06	0.85	0.62	1.25			0.20			0.85	0.37	0.85	0.83	0.59	0.71
1.45	0.64	2.875	0.00	0.95	0.52	1.58	0.21					0.95	0.26	0.95	0.73	0.49	0.61
1.55	0.50			1.05	0.42	1.80		0.26				1.05	0.19	1.05	0.62	0.40	0.51
1.65	0.40			1.15	0.33	1.85	0.21					1.15	0.11	1.15	0.51	0.33	0.42
1.75	0.32			1.25	0.25	2.15			0.20			1.55	0.11	1.25	0.39	0.27	0.33
1.85	0.25			1.35	0.19	2.95	0.21	0.26				2.75	0.11	1.35	0.29	0.23	0.26
1.95	0.19			1.45	0.14	3.05	0.00	0.00	0.00			2.85	0.00	1.45	0.20	0.20	0.20
2.35	0.00			1.55	0.11									1.55	0.18	0.18	0.18
														1.65	0.17	0.17	0.17
														1.75	0.16	0.16	0.16
														2.25	0.16	0.16	0.16
														2.50	0.00	0.00	0.00

Table B-3. Habitat suitability criteria depth and substrate coordinates for the SMUD UARP.

Rainbow Spawning HSC		Rainbow Juvenile HSC		Rainbow Adult HSC				Brown Spawning HSC		Brown Juvenile HSC		Brown Adult HSC			
Depth	UARP all channels	Depth	UARP final	Depth	SFAR UARP Large channel	SFAR UARP medium channel	SFAR UARP small channel	Depth	UARP all channels	Depth	UARP all channels	Depth	UARP large channel	UARP small channel	UARP medium channel
0.100	0.00	0.90	1.00	0.10			0.03	0.100	0.00	0.35	0.00	0.60		0.00	
0.500	1.00	1.10	1.00	0.30			0.07	0.500	1.00	0.50	0.39	0.70		0.07	
1.500	1.00	1.30	1.00	0.50			0.12	1.500	1.00	0.70	0.72	0.85			0.00
1.77	0.43	1.50	1.00	0.67	0.07	0.12		1.77	0.43	0.90	1.00	0.90		0.23	0.10
5.000	0.43	1.70	1.00	0.70			0.17	5.000	0.43	1.10	1.00	1.00	0.00		
		1.90	1.00	0.90			0.22			1.30	1.00	1.10	0.09	0.42	0.38
		2.10	1.00	1.10		0.38	0.53			1.50	1.00	1.30	0.30	0.61	0.60
		2.70	0.51	1.20	0.00					1.90	0.74	1.50	0.48	0.78	0.76
		2.90	0.41	1.30	0.19	0.60	0.77			2.10	0.62	1.70	0.63	1.00	1.00
		3.10	0.32	1.50	0.47	0.76	1.00			2.30	0.51	1.90	0.75		1.00
		3.30	0.25	1.70	0.67		1.00			2.50	0.41	2.10		1.00	1.00
		3.50	0.18	1.90	0.82	1.00	1.00			2.70	0.33	2.30	1.00	1.00	1.00
		3.70	0.14	2.10		1.00	1.00			2.90	0.27	2.50		1.00	1.00
		3.90	0.11	2.30	1.00	1.00	0.90			3.10	0.24	2.70		0.73	1.00
		4.90	0.11	2.50	1.00	1.00	0.81			3.30	0.22	2.90	1.00	0.57	
		5.10	0.10	2.70		1.00	0.71			3.50	0.21	3.10		0.41	0.84
		5.30	0.09	2.90			0.61			3.70	0.20	3.30		0.27	0.77
		5.50	0.06	3.10		0.84	0.51			3.90	0.18	3.50		0.18	0.70
		10.00	0.06	3.30		0.77	0.42			4.10	0.14	3.70		0.08	0.62
				3.50		0.70	0.34			8.00	0.14	3.90			0.55
				3.70		0.62	0.28			10.00	0.14	4.10			0.49
				3.90		0.55	0.23					4.30			0.43
				4.10		0.49	0.20					4.50			0.38
				4.30		0.43	0.17					4.70			0.33
				4.50		0.38	0.15					4.90			0.30
				4.70	1.00	0.33	0.14					5.10			0.29
				4.90		0.30	0.11					5.50			0.29
				5.10		0.29	0.08					7.00		0.08	
				5.30			0.08					7.10			0.27
				5.50		0.29						7.30			0.25
				7.10		0.27						7.50			0.23
				7.30		0.25						10.00	1.00	0.08	
				7.50		0.23						11.33			0.23
				10.00	1.00							16.00			0.23
				11.33		0.23	0.08								
				16.00	1.00	0.23									

Dominant Spawning Substrate Field Code	Suitability Index	Description
1	0	Organic
1.1	0	Woody debris
2	0	Mud/Clay
3	0	Silt
4	0	Sand
5.1	1	Small gravel (0.1-0.6 in.)
5.2	1	Large gravel (0.6-2.5 in.)
6	0	Cobble (2.5-10 in.)
7.1	0	Rubble (10-16 in.)
7.2	0	Boulder
8	0	Bedrock

PHABSIM Model Channel Index	Suitability Index
0.00	0.0
40.50	0.0
40.51	0.5
40.52	0.5
40.53	0.0
50.99	0.0
51.00	1.0
52.99	1.0
53.00	0.0
60.50	0.0
60.51	0.5
60.52	0.5
60.53	0.0
71.50	0.0
71.51	0.5
71.52	0.5
71.53	0.0
72.50	0.0
72.51	0.5
72.52	0.5
72.53	0.0
80.50	0.0
80.51	0.5
80.52	0.5
80.53	0.0
90.00	0.0

APPENDIX C

WEIGHTED USABLE AREA TABULAR RESULTS BY SITE

- Loon Lake Dam Reach, Gerle Creek at Wentworth Springs
- Loon Lake Dam Reach, Gerle Creek at Gerle Meadow
- Loon Lake Dam Reach, Gerle Creek below Ice House Bridge
- Gerle Creek Dam Reach, Lower Gerle Creek
- Robbs Peak Dam Reach, Upper SF Rubicon River
- Robbs Peak Dam Reach, Lower SF Rubicon River
- Ice House Dam Reach, Upper SF Silver Creek
- Ice House Dam Reach, Lower SF Silver Creek
- Junction Dam Reach, Silver Creek
- Camino Dam Reach, Silver Creek
- Brush Creek Dam Reach, Brush Creek
- Slab Creek Dam Reach, SF American River

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WEIGHTED USABLE AREA TABULAR RESULTS BY SITE

Loon Lake Dam Reach
Gerle Creek at Wentworth Springs

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	4285.77	7347.41	4218.70	7690.84	3141.37	3269.46
6	4692.49	7359.00	4559.01	7861.64	3387.23	3518.53
7	4961.52	7325.90	4855.19	7984.36	3707.49	3846.05
8	5160.75	7219.66	5001.63	8024.74	3989.24	4114.63
9	5351.44	7158.94	5157.55	8086.94	4241.95	4330.42
10	5431.17	7204.90	5312.91	8239.36	4282.44	4399.25
11	5514.84	7035.48	5403.04	8195.30	4433.45	4561.97
12	5587.72	6993.40	5380.08	8214.96	4537.99	4689.51
13	5637.98	6962.86	5348.55	8244.14	4602.19	4777.97
14	5639.35	6944.70	5351.60	8290.27	4649.48	4863.38
15	5593.08	6887.14	5336.37	8304.63	4630.81	4871.82
16	5540.17	6866.20	5350.39	8354.92	4672.04	4915.46
17	5523.88	6846.74	5292.38	8385.57	4649.53	4899.32
18	5498.06	6812.45	5278.42	8396.40	4648.14	4905.24
19	5464.73	6775.10	5243.34	8399.97	4622.46	4893.27
20	5429.74	6754.48	5261.79	8422.29	4576.19	4863.88
21	5415.95	6753.00	5279.14	8463.55	4524.34	4825.92
22	5383.09	6715.98	5302.23	8462.64	4455.66	4780.21
23	5330.84	6670.43	5254.66	8438.99	4387.84	4725.49
24	5319.81	6632.35	5269.68	8419.12	4346.19	4684.26
25	5318.54	6627.71	5240.99	8430.17	4299.90	4647.77
26	5303.12	6565.91	5248.17	8375.27	4213.45	4587.79
27	5313.35	6514.65	5287.54	8347.27	4152.33	4545.38
28	5328.15	6519.87	5404.18	8371.09	4104.87	4502.54
29	5319.51	6484.88	5469.45	8338.56	4055.36	4465.48
30	5309.95	6449.92	5559.93	8305.09	3992.75	4415.51
31	5305.15	6421.88	5632.06	8288.95	3969.21	4384.57
32	5316.06	6402.00	5716.20	8272.13	3918.86	4339.50
33	5315.66	6379.16	5733.71	8240.29	3890.02	4302.49
34	5300.34	6348.15	5728.79	8188.52	3834.22	4247.65
35	5324.70	6311.05	5731.96	8135.12	3782.90	4201.30
36	5326.68	6289.85	5724.38	8080.75	3707.00	4142.81
37	5327.64	6284.47	5706.27	8048.42	3665.27	4103.95
38	5334.27	6253.71	5700.14	7993.45	3621.86	4057.10
39	5338.97	6247.01	5713.89	7970.29	3567.81	4006.85
40	5340.25	6234.07	5718.53	7944.63	3532.49	3967.44
41	5337.18	6215.13	5723.58	7899.66	3502.76	3940.27
42	5352.23	6189.44	5713.55	7874.37	3456.30	3896.98
43	5347.43	6167.65	5691.06	7834.90	3408.06	3851.25
44	5366.79	6157.02	5717.96	7807.67	3360.13	3805.69

Loon Lake Dam Reach
Gerle Creek at Wentworth Springs

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
45	5370.83	6143.19	5715.20	7771.57	3305.23	3759.54
46	5392.21	6148.13	5756.16	7748.90	3258.58	3716.71
47	5408.04	6149.44	5791.83	7730.68	3233.21	3680.40
48	5390.60	6133.48	5770.05	7691.76	3179.75	3627.64
49	5414.10	6150.31	5816.55	7678.58	3141.56	3579.50
50	5430.77	6168.79	5825.86	7673.67	3100.87	3537.09
51	5417.01	6174.37	5799.73	7634.90	3043.06	3474.89
52	5453.69	6213.88	5836.26	7628.25	3038.45	3436.96
53	5458.73	6283.98	5814.72	7647.59	2956.36	3361.54
54	5463.45	6292.50	5809.97	7636.91	2908.79	3304.94
55	5484.73	6335.22	5815.19	7666.32	2876.71	3256.37
56	5493.59	6368.63	5805.07	7694.21	2834.07	3207.37
57	5486.39	6360.59	5796.07	7668.28	2781.83	3148.14
58	5504.61	6404.62	5825.73	7704.38	2766.87	3116.90
59	5507.36	6421.04	5829.38	7711.24	2739.91	3079.79
60	5532.42	6465.13	5858.91	7747.02	2714.48	3044.47
61	5556.62	6506.18	5889.93	7784.74	2694.17	3013.51
62	5561.02	6511.75	5902.87	7779.36	2672.74	2985.46
63	5582.71	6546.43	5910.95	7808.60	2643.29	2947.57
64	5573.67	6538.45	5894.37	7772.64	2606.36	2905.42
65	5602.52	6573.50	5921.54	7804.11	2580.29	2871.41
66	5609.40	6573.57	5914.81	7795.37	2539.40	2829.61
67	5634.27	6601.04	5919.49	7820.33	2511.92	2789.60
68	5632.98	6600.42	5924.40	7816.66	2483.99	2749.86
69	5634.96	6608.58	5915.51	7798.48	2450.58	2709.27
70	5656.43	6641.78	5904.19	7830.08	2419.78	2662.54
71	5662.51	6667.50	5912.46	7828.48	2387.71	2622.55
72	5698.61	6712.26	5930.76	7877.94	2355.54	2575.97
73	5696.14	6731.78	5923.49	7885.13	2321.50	2533.18
74	5705.23	6761.46	5932.02	7923.28	2286.03	2484.49
75	5715.44	6781.12	5949.63	7944.59	2258.70	2450.10
76	5725.75	6799.69	5965.32	7967.73	2223.36	2413.70
77	5729.89	6833.58	5971.03	8013.01	2184.22	2377.12
78	5735.59	6853.59	5980.41	8036.24	2148.43	2335.84
79	5734.47	6857.52	5990.02	8046.21	2104.57	2292.79
80	5752.04	6882.50	6011.48	8083.31	2061.06	2246.07
81	5734.94	6882.11	6015.05	8078.95	2029.22	2212.22
82	5739.44	6899.79	6036.31	8092.70	1995.62	2178.37
83	5763.31	6924.31	6081.66	8132.74	1960.84	2140.82
84	5757.40	6934.27	6087.32	8125.63	1950.45	2116.17

Loon Lake Dam Reach
Gerle Creek at Wentworth Springs

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	5762.29	6950.28	6101.56	8133.26	1924.15	2087.93
86	5784.42	6967.53	6134.67	8153.48	1893.59	2056.37
87	5780.22	6980.57	6135.24	8150.82	1868.76	2033.18
88	5791.15	7006.65	6149.53	8163.80	1848.24	2008.78
89	5795.04	7013.04	6168.47	8167.59	1830.66	1992.46
90	5814.89	7032.73	6180.64	8170.50	1800.06	1966.78
91	5827.88	7056.48	6197.10	8192.10	1775.94	1946.06
92	5828.95	7063.77	6209.81	8196.95	1757.22	1927.38
93	5830.53	7063.36	6210.96	8199.25	1728.84	1906.36
94	5859.69	7081.05	6228.91	8229.32	1705.29	1886.14
95	5869.47	7079.27	6240.11	8236.88	1684.95	1868.52

Loon Lake Dam Reach
Gerle Creek at Wentworth Springs

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
5	73.02	99.84	67.61	90.87	67.24	66.51
6	79.95	100.00	73.06	92.89	72.50	71.58
7	84.53	99.55	77.81	94.34	79.35	78.24
8	87.93	98.11	80.15	94.82	85.39	83.71
9	91.17	97.28	82.65	95.55	90.79	88.10
10	92.53	97.91	85.14	97.35	91.66	89.50
11	93.96	95.60	86.59	96.83	94.89	92.81
12	95.20	95.03	86.22	97.06	97.13	95.40
13	96.06	94.62	85.71	97.41	98.51	97.20
14	96.08	94.37	85.76	97.95	99.52	98.94
15	95.29	93.59	85.52	98.12	99.12	99.11
16	94.39	93.30	85.74	98.72	100.00	100.00
17	94.11	93.04	84.81	99.08	99.52	99.67
18	93.67	92.57	84.59	99.21	99.49	99.79
19	93.10	92.07	84.03	99.25	98.94	99.55
20	92.51	91.79	84.32	99.51	97.95	98.95
21	92.27	91.77	84.60	100.00	96.84	98.18
22	91.71	91.26	84.97	99.99	95.37	97.25
23	90.82	90.64	84.21	99.71	93.92	96.14
24	90.64	90.13	84.45	99.48	93.03	95.30
25	90.61	90.06	83.99	99.61	92.03	94.55
26	90.35	89.22	84.10	98.96	90.18	93.33
27	90.53	88.53	84.73	98.63	88.88	92.47
28	90.78	88.60	86.60	98.91	87.86	91.60
29	90.63	88.12	87.65	98.52	86.80	90.85
30	90.47	87.65	89.10	98.13	85.46	89.83
31	90.39	87.27	90.26	97.94	84.96	89.20
32	90.57	87.00	91.60	97.74	83.88	88.28
33	90.56	86.69	91.88	97.36	83.26	87.53
34	90.30	86.26	91.81	96.75	82.07	86.41
35	90.72	85.76	91.86	96.12	80.97	85.47
36	90.75	85.47	91.74	95.48	79.34	84.28
37	90.77	85.40	91.44	95.10	78.45	83.49
38	90.88	84.98	91.35	94.45	77.52	82.54
39	90.96	84.89	91.57	94.17	76.37	81.52
40	90.98	84.71	91.64	93.87	75.61	80.71
41	90.93	84.46	91.72	93.34	74.97	80.16
42	91.19	84.11	91.56	93.04	73.98	79.28
43	91.11	83.81	91.20	92.57	72.95	78.35
44	91.44	83.67	91.63	92.25	71.92	77.42

Loon Lake Dam Reach
Gerle Creek at Wentworth Springs

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
45	91.50	83.48	91.59	91.82	70.75	76.48
46	91.87	83.55	92.24	91.56	69.75	75.61
47	92.14	83.56	92.82	91.34	69.20	74.87
48	91.84	83.35	92.47	90.88	68.06	73.80
49	92.24	83.58	93.21	90.73	67.24	72.82
50	92.53	83.83	93.36	90.67	66.37	71.96
51	92.29	83.90	92.94	90.21	65.13	70.69
52	92.92	84.44	93.53	90.13	65.03	69.92
53	93.00	85.39	93.18	90.36	63.28	68.39
54	93.08	85.51	93.11	90.23	62.26	67.24
55	93.44	86.09	93.19	90.58	61.57	66.25
56	93.60	86.54	93.03	90.91	60.66	65.25
57	93.47	86.43	92.88	90.60	59.54	64.05
58	93.78	87.03	93.36	91.03	59.22	63.41
59	93.83	87.25	93.42	91.11	58.64	62.66
60	94.26	87.85	93.89	91.53	58.10	61.94
61	94.67	88.41	94.39	91.98	57.67	61.31
62	94.74	88.49	94.60	91.92	57.21	60.74
63	95.11	88.96	94.73	92.26	56.58	59.97
64	94.96	88.85	94.46	91.84	55.79	59.11
65	95.45	89.33	94.89	92.21	55.23	58.42
66	95.57	89.33	94.79	92.11	54.35	57.57
67	95.99	89.70	94.86	92.40	53.77	56.75
68	95.97	89.69	94.94	92.36	53.17	55.94
69	96.00	89.80	94.80	92.14	52.45	55.12
70	96.37	90.25	94.62	92.52	51.79	54.17
71	96.47	90.60	94.75	92.50	51.11	53.35
72	97.09	91.21	95.04	93.08	50.42	52.41
73	97.05	91.48	94.93	93.17	49.69	51.54
74	97.20	91.88	95.06	93.62	48.93	50.54
75	97.38	92.15	95.34	93.87	48.35	49.84
76	97.55	92.40	95.60	94.14	47.59	49.10
77	97.62	92.86	95.69	94.68	46.75	48.36
78	97.72	93.13	95.84	94.95	45.98	47.52
79	97.70	93.19	95.99	95.07	45.05	46.64
80	98.00	93.52	96.34	95.51	44.11	45.69
81	97.71	93.52	96.39	95.46	43.43	45.01
82	97.78	93.76	96.73	95.62	42.71	44.32
83	98.19	94.09	97.46	96.09	41.97	43.55
84	98.09	94.23	97.55	96.01	41.75	43.05

Loon Lake Dam Reach
Gerle Creek at Wentworth Springs

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
85	98.17	94.45	97.78	96.10	41.18	42.48
86	98.55	94.68	98.31	96.34	40.53	41.83
87	98.48	94.86	98.32	96.30	40.00	41.36
88	98.67	95.21	98.55	96.46	39.56	40.87
89	98.73	95.30	98.85	96.50	39.18	40.53
90	99.07	95.57	99.05	96.54	38.53	40.01
91	99.29	95.89	99.31	96.79	38.01	39.59
92	99.31	95.99	99.51	96.85	37.61	39.21
93	99.34	95.98	99.53	96.88	37.00	38.78
94	99.83	96.22	99.82	97.23	36.50	38.37
95	100.00	96.20	100.00	97.32	36.06	38.01

Loon Lake Dam Reach
Gerle Creek at Gerle Meadow

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	8428.21	11016.56	7023.88	12532.52	3452.31	3919.82
6	8794.78	11080.72	7790.40	12657.75	4095.04	4323.17
7	9024.88	11039.99	8421.79	12693.26	4617.41	4664.08
8	9175.05	10908.07	8798.34	12633.41	5072.44	4947.57
9	9309.65	10763.52	9132.24	12591.76	5395.69	5174.43
10	9361.74	10543.77	9380.83	12460.19	5647.59	5369.38
11	9402.25	10308.02	9554.62	12317.30	5849.56	5504.98
12	9377.10	10072.58	9699.35	12169.68	6006.28	5638.68
13	9293.20	9824.69	9767.22	11987.93	6104.75	5740.95
14	9207.85	9599.43	9818.78	11836.08	6189.86	5850.06
15	9094.41	9333.16	9784.36	11635.02	6236.21	5925.19
16	8979.37	9074.97	9724.05	11433.68	6303.80	6003.24
17	8843.98	8840.07	9649.03	11230.91	6345.86	6091.20
18	8698.11	8620.19	9565.72	11037.75	6370.35	6148.53
19	8530.07	8388.83	9466.03	10824.32	6397.66	6201.80
20	8385.44	8192.57	9384.24	10646.20	6413.33	6241.02
21	8221.39	7979.06	9266.95	10437.23	6407.65	6263.95
22	8098.48	7806.73	9147.81	10256.06	6384.82	6274.64
23	7941.34	7617.66	9010.00	10044.94	6359.04	6282.03
24	7805.83	7470.33	8891.10	9873.16	6351.84	6296.50
25	7651.94	7294.23	8750.38	9677.43	6323.31	6304.83
26	7497.04	7142.41	8598.95	9505.59	6298.51	6317.57
27	7300.17	6978.00	8370.83	9287.61	6066.66	6133.14
28	7167.52	6852.62	8237.31	9131.13	6035.84	6120.94
29	7014.00	6722.30	8108.04	8958.35	5995.54	6113.31
30	6878.81	6597.47	7962.58	8793.40	5947.96	6087.27
31	6743.77	6479.25	7800.34	8633.53	5879.06	6049.13
32	6625.01	6378.61	7681.41	8491.85	5828.50	6030.37
33	6509.39	6284.69	7555.48	8355.71	5788.16	6016.06
34	6417.67	6189.50	7430.65	8217.47	5742.57	6001.49
35	6319.31	6102.39	7290.02	8092.31	5694.77	5985.31
36	6224.42	6013.75	7153.57	7954.53	5654.31	5953.77
37	6124.77	5924.37	6987.39	7821.89	5607.64	5907.16
38	6040.45	5845.67	6859.33	7701.52	5566.06	5859.66
39	5929.35	5707.08	6569.95	7512.69	5476.81	5727.18
40	5864.57	5652.61	6465.88	7423.25	5441.86	5691.49
41	5793.14	5600.44	6354.65	7325.31	5398.29	5644.70
42	5724.06	5544.02	6239.46	7230.80	5337.28	5600.23
43	5686.83	5561.82	6290.76	7213.76	5283.57	5595.87
44	5611.92	5512.53	6185.46	7120.00	5219.07	5537.40

Loon Lake Dam Reach
Gerle Creek at Gerle Meadow

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
45	5549.72	5471.77	6104.17	7042.15	5153.07	5485.16
46	5493.37	5437.16	6040.71	6978.20	5102.89	5434.64
47	5419.24	5350.61	5907.52	6859.82	5045.61	5376.52
48	5358.46	5311.68	5826.49	6785.53	4978.02	5306.75
49	5329.07	5227.85	5818.34	6712.98	4953.44	5277.12
50	5303.60	5237.35	5782.12	6667.33	4945.21	5279.87
51	5250.90	5211.04	5715.19	6613.83	4869.39	5204.28
52	5212.86	5269.48	5657.94	6610.93	4765.26	5109.19
53	5113.70	5230.97	5559.20	6526.10	4651.04	5028.65
54	5048.70	5215.87	5486.38	6495.60	4546.09	4910.19
55	4999.01	5206.09	5447.87	6458.93	4461.32	4852.68
56	4995.45	5199.31	5458.06	6425.98	4388.45	4819.15
57	4897.00	5163.53	5346.38	6367.43	4271.14	4711.78
58	4858.22	5153.31	5314.76	6339.75	4187.98	4650.72
59	4807.03	5120.54	5270.04	6278.91	4106.91	4584.51
60	4774.90	5118.54	5249.22	6250.31	4039.36	4523.45
61	4730.49	5101.29	5207.32	6202.56	3959.06	4458.14
62	4717.22	5084.57	5190.71	6179.35	3864.07	4381.02
63	4688.04	5081.52	5176.41	6161.54	3794.46	4319.57
64	4641.49	5049.26	5134.31	6115.25	3717.63	4264.12
65	4608.23	5044.40	5112.59	6097.03	3639.18	4203.36
66	4578.77	5037.75	5090.77	6072.13	3562.87	4146.92
67	4570.93	5050.68	5125.66	6059.52	3488.29	4097.35
68	4536.80	5025.32	5100.52	6019.51	3420.31	4044.21
69	4510.84	5024.35	5075.50	5994.49	3346.54	3986.90
70	4486.53	5025.27	5042.89	5974.10	3278.21	3931.91
71	4439.60	4952.72	4947.64	5893.33	3212.75	3849.83
72	4416.42	4931.24	4916.37	5858.95	3157.37	3798.90
73	4390.94	4933.54	4875.00	5835.60	3098.18	3751.48
74	4368.33	4951.60	4843.75	5825.62	3043.58	3711.20
75	4351.48	4939.66	4821.71	5800.46	2996.13	3664.77
76	4337.71	4952.69	4794.99	5791.13	2946.92	3619.85
77	4325.11	4975.96	4771.40	5793.23	2904.22	3573.48
78	4298.07	4962.04	4736.14	5760.64	2860.09	3526.76
79	4274.74	4980.75	4698.62	5750.79	2818.48	3485.43
80	4261.16	5007.34	4676.07	5749.87	2707.95	3386.64
81	4240.91	5011.97	4676.00	5730.96	2724.53	3369.62
82	4222.62	5039.90	4649.03	5741.96	2705.21	3334.83
83	4209.20	5074.12	4631.11	5762.74	2689.79	3304.07
84	4185.78	5067.61	4600.83	5753.13	2668.69	3272.73

Loon Lake Dam Reach
Gerle Creek at Gerle Meadow

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	4170.73	5098.45	4577.23	5777.74	2641.78	3237.36
86	4155.30	5125.16	4558.43	5797.68	2615.40	3201.05
87	4134.24	5118.91	4540.86	5786.61	2588.76	3166.60
88	4122.84	5157.60	4530.88	5813.79	2574.71	3138.02
89	4107.12	5187.24	4516.46	5832.08	2555.11	3110.36
90	4089.26	5191.81	4504.85	5825.69	2538.59	3080.63
91	4087.42	5230.30	4499.68	5854.46	2518.17	3048.87
92	4071.37	5221.95	4476.51	5842.09	2496.34	3025.74
93	4068.42	5261.39	4462.80	5870.18	2469.95	2992.06
94	4061.89	5300.06	4444.36	5897.95	2448.68	2961.42
95	4046.05	5298.07	4431.51	5888.74	2430.66	2937.61

Loon Lake Dam Reach
Gerle Creek at Gerle Meadow

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
5	89.64	99.42	71.54	98.73	53.83	62.05
6	93.54	100.00	79.34	99.72	63.85	68.43
7	95.99	99.63	85.77	100.00	72.00	73.83
8	97.58	98.44	89.61	99.53	79.09	78.31
9	99.02	97.14	93.01	99.20	84.13	81.91
10	99.57	95.15	95.54	98.16	88.06	84.99
11	100.00	93.03	97.31	97.04	91.21	87.14
12	99.73	90.90	98.78	95.88	93.65	89.25
13	98.84	88.66	99.47	94.44	95.19	90.87
14	97.93	86.63	100.00	93.25	96.52	92.60
15	96.73	84.23	99.65	91.66	97.24	93.79
16	95.50	81.90	99.04	90.08	98.29	95.02
17	94.06	79.78	98.27	88.48	98.95	96.42
18	92.51	77.79	97.42	86.96	99.33	97.32
19	90.72	75.71	96.41	85.28	99.76	98.17
20	89.19	73.94	95.57	83.87	100.00	98.79
21	87.44	72.01	94.38	82.23	99.91	99.15
22	86.13	70.45	93.17	80.80	99.56	99.32
23	84.46	68.75	91.76	79.14	99.15	99.44
24	83.02	67.42	90.55	77.78	99.04	99.67
25	81.38	65.83	89.12	76.24	98.60	99.80
26	79.74	64.46	87.58	74.89	98.21	100.00
27	77.64	62.97	85.25	73.17	94.59	97.08
28	76.23	61.84	83.89	71.94	94.11	96.89
29	74.60	60.67	82.58	70.58	93.49	96.77
30	73.16	59.54	81.10	69.28	92.74	96.35
31	71.73	58.47	79.44	68.02	91.67	95.75
32	70.46	57.57	78.23	66.90	90.88	95.45
33	69.23	56.72	76.95	65.83	90.25	95.23
34	68.26	55.86	75.68	64.74	89.54	95.00
35	67.21	55.07	74.25	63.75	88.80	94.74
36	66.20	54.27	72.86	62.67	88.16	94.24
37	65.14	53.47	71.16	61.62	87.44	93.50
38	64.24	52.76	69.86	60.67	86.79	92.75
39	63.06	51.50	66.91	59.19	85.40	90.65
40	62.37	51.01	65.85	58.48	84.85	90.09
41	61.61	50.54	64.72	57.71	84.17	89.35
42	60.88	50.03	63.55	56.97	83.22	88.65
43	60.48	50.19	64.07	56.83	82.38	88.58
44	59.69	49.75	63.00	56.09	81.38	87.65

Loon Lake Dam Reach
Gerle Creek at Gerle Meadow

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
45	59.03	49.38	62.17	55.48	80.35	86.82
46	58.43	49.07	61.52	54.98	79.57	86.02
47	57.64	48.29	60.17	54.04	78.67	85.10
48	56.99	47.94	59.34	53.46	77.62	84.00
49	56.68	47.18	59.26	52.89	77.24	83.53
50	56.41	47.27	58.89	52.53	77.11	83.57
51	55.85	47.03	58.21	52.11	75.93	82.38
52	55.44	47.56	57.62	52.08	74.30	80.87
53	54.39	47.21	56.62	51.41	72.52	79.60
54	53.70	47.07	55.88	51.17	70.89	77.72
55	53.17	46.98	55.48	50.88	69.56	76.81
56	53.13	46.92	55.59	50.63	68.43	76.28
57	52.08	46.60	54.45	50.16	66.60	74.58
58	51.67	46.51	54.13	49.95	65.30	73.62
59	51.13	46.21	53.67	49.47	64.04	72.57
60	50.78	46.19	53.46	49.24	62.98	71.60
61	50.31	46.04	53.03	48.87	61.73	70.57
62	50.17	45.89	52.87	48.68	60.25	69.35
63	49.86	45.86	52.72	48.54	59.17	68.37
64	49.37	45.57	52.29	48.18	57.97	67.50
65	49.01	45.52	52.07	48.03	56.74	66.53
66	48.70	45.46	51.85	47.84	55.55	65.64
67	48.62	45.58	52.20	47.74	54.39	64.86
68	48.25	45.35	51.95	47.42	53.33	64.02
69	47.98	45.34	51.69	47.23	52.18	63.11
70	47.72	45.35	51.36	47.07	51.12	62.24
71	47.22	44.70	50.39	46.43	50.09	60.94
72	46.97	44.50	50.07	46.16	49.23	60.13
73	46.70	44.52	49.65	45.97	48.31	59.38
74	46.46	44.69	49.33	45.90	47.46	58.74
75	46.28	44.58	49.11	45.70	46.72	58.01
76	46.13	44.70	48.83	45.62	45.95	57.30
77	46.00	44.91	48.59	45.64	45.28	56.56
78	45.71	44.78	48.24	45.38	44.60	55.82
79	45.47	44.95	47.85	45.31	43.95	55.17
80	45.32	45.19	47.62	45.30	42.22	53.61
81	45.11	45.23	47.62	45.15	42.48	53.34
82	44.91	45.48	47.35	45.24	42.18	52.79
83	44.77	45.79	47.17	45.40	41.94	52.30
84	44.52	45.73	46.86	45.32	41.61	51.80

Loon Lake Dam Reach
Gerle Creek at Gerle Meadow

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
85	44.36	46.01	46.62	45.52	41.19	51.24
86	44.19	46.25	46.43	45.68	40.78	50.67
87	43.97	46.20	46.25	45.59	40.37	50.12
88	43.85	46.55	46.15	45.80	40.15	49.67
89	43.68	46.81	46.00	45.95	39.84	49.23
90	43.49	46.85	45.88	45.90	39.58	48.76
91	43.47	47.20	45.83	46.12	39.26	48.26
92	43.30	47.13	45.59	46.03	38.92	47.89
93	43.27	47.48	45.45	46.25	38.51	47.36
94	43.20	47.83	45.26	46.47	38.18	46.88
95	43.03	47.81	45.13	46.39	37.90	46.50

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	2624.32	5675.59	2145.37	5747.61	543.59	714.51
7	3164.95	6061.50	2846.58	6251.97	696.44	854.61
9	3661.96	6518.90	3494.10	6744.19	1040.20	1130.97
11	4052.71	6801.39	3944.81	7121.66	1250.96	1318.70
13	4396.05	7068.15	4313.11	7451.34	1433.38	1464.69
15	4689.64	7320.80	4744.30	7748.22	1596.74	1599.29
17	4921.39	7548.34	5078.15	8063.98	1740.22	1714.60
19	5141.47	7784.99	5365.39	8378.72	1892.95	1841.73
21	5262.53	7751.97	5498.53	8441.02	1950.60	1898.38
23	5392.26	7801.54	5672.96	8587.91	1995.27	1942.15
25	5521.73	7878.60	5845.19	8770.65	2036.29	1980.77
27	5635.08	7886.67	6009.47	8882.09	2067.10	1996.48
29	5727.34	7917.09	6202.27	8990.36	2090.47	1996.74
31	5784.53	7950.33	6301.76	9057.66	1956.50	1915.01
33	5835.57	7928.22	6432.87	9123.58	1962.72	1931.91
35	5884.41	7903.86	6556.11	9209.60	1975.70	1955.07
37	5908.60	7929.24	6680.90	9313.01	1995.68	1989.80
39	5902.45	7848.31	6768.12	9306.10	1980.83	1975.30
41	5907.26	7810.79	6972.01	9329.41	1987.94	1991.80
43	5897.94	7760.59	7121.72	9328.65	1991.22	2004.68
45	5890.66	7746.71	7231.76	9328.65	2019.34	2039.64
47	5869.21	7690.23	7315.72	9288.36	2031.36	2052.94
49	5889.30	7683.27	7417.59	9315.02	2026.63	2060.85
51	5874.39	7635.34	7438.44	9258.20	2040.78	2076.18
53	5864.81	7590.12	7465.67	9219.83	2063.58	2095.25
55	5846.25	7528.44	7472.47	9164.98	2090.52	2115.79
57	5826.67	7465.03	7497.71	9109.26	2114.31	2128.07
59	5795.25	7386.20	7492.97	9050.49	2131.68	2140.33
61	5759.71	7312.51	7475.97	8966.94	2158.97	2158.52
63	5728.98	7167.08	7504.60	8860.90	2165.29	2176.71
65	5720.93	7125.51	7514.69	8818.98	2174.61	2188.26
67	5698.66	7068.36	7535.66	8760.09	2194.74	2203.64
69	5659.27	6989.91	7524.96	8679.80	2205.54	2216.86
71	5646.80	6950.31	7540.14	8628.53	2221.90	2230.00
73	5639.36	6915.12	7558.45	8578.66	2239.51	2246.01
75	5580.65	6836.10	7502.16	8486.93	2233.88	2231.95
77	5574.58	6842.88	7489.28	8473.66	2126.23	2164.52
79	5536.33	6831.31	7440.51	8430.85	2145.36	2172.34
81	5533.51	6805.00	7434.01	8408.98	2174.42	2192.04
83	5502.29	6747.14	7388.59	8347.54	2184.54	2196.55

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	5499.69	6735.88	7379.27	8312.95	2208.58	2210.75
87	5460.39	6679.23	7327.85	8245.45	2226.97	2217.10
89	5456.22	6612.57	7305.37	8171.49	2225.65	2215.04
91	5432.49	6594.46	7287.24	8129.86	2232.32	2217.19
93	5402.78	6554.19	7264.57	8074.14	2232.85	2216.87
95	5384.07	6505.55	7249.74	8024.85	2232.35	2214.28
97	5365.63	6486.18	7229.97	8001.80	2221.00	2199.57
99	5354.16	6448.53	7203.56	7964.42	2223.62	2201.36
101	5343.71	6400.87	7171.01	7921.49	2187.35	2178.57
103	5334.17	6374.75	7136.63	7895.14	2183.63	2179.23
105	5306.13	6321.79	7085.16	7843.83	2160.99	2164.09
107	5294.01	6279.50	7044.41	7801.24	2146.69	2157.06
109	5303.17	6260.94	7030.64	7782.78	2135.65	2150.50
111	5294.09	6219.30	7003.11	7743.73	2110.43	2134.28
113	5281.14	6171.49	6962.64	7703.47	2107.84	2129.03
115	5272.32	6127.25	6926.85	7666.51	2079.94	2110.12
117	5257.89	6096.74	6895.10	7617.11	2059.21	2097.43
119	5247.07	6061.79	6859.63	7571.33	2053.53	2087.76
121	5265.05	6051.37	6853.13	7560.29	2057.17	2084.81
123	5263.74	6048.13	6823.87	7527.88	2064.20	2080.63
125	5229.17	5992.84	6790.47	7473.29	2045.83	2063.02
127	5217.87	5972.70	6775.37	7452.78	2027.44	2046.57
129	5213.63	5954.13	6775.05	7439.61	2011.10	2035.21
131	5199.53	5935.42	6765.01	7417.23	1999.11	2024.03
133	5187.36	5905.77	6767.77	7389.78	1979.68	2009.80
135	5179.44	5892.58	6777.58	7382.10	1947.65	1990.15
137	5158.00	5853.49	6763.52	7337.70	1916.71	1966.92
139	5147.89	5823.86	6754.77	7317.47	1890.45	1947.91
141	5136.59	5790.39	6750.78	7284.08	1875.36	1933.73
143	5113.21	5740.19	6720.09	7231.46	1848.37	1914.24
145	5098.47	5719.91	6696.81	7194.92	1821.03	1895.45
147	5092.22	5683.28	6681.09	7158.16	1795.05	1877.19
149	5075.14	5659.43	6657.30	7126.44	1770.57	1860.90
151	5065.25	5622.67	6633.63	7085.88	1757.74	1849.25

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
5	44.42	71.39	28.38	61.61	24.27	31.81
7	53.57	76.24	37.66	67.01	31.10	38.05
9	61.98	82.00	46.23	72.29	46.45	50.35
11	68.59	85.55	52.19	76.34	55.86	58.71
13	74.40	88.90	57.06	79.87	64.00	65.21
15	79.37	92.08	62.77	83.05	71.30	71.21
17	83.29	94.94	67.19	86.44	77.71	76.34
19	87.02	97.92	70.99	89.81	84.52	82.00
21	89.07	97.51	72.75	90.48	87.10	84.52
23	91.26	98.13	75.05	92.05	89.09	86.47
25	93.45	99.10	77.33	94.01	90.93	88.19
27	95.37	99.20	79.51	95.21	92.30	88.89
29	96.93	99.58	82.06	96.37	93.34	88.90
31	97.90	100.00	83.37	97.09	87.36	85.26
33	98.76	99.72	85.11	97.79	87.64	86.01
35	99.59	99.42	86.74	98.72	88.22	87.05
37	100.00	99.73	88.39	99.82	89.11	88.59
39	99.90	98.72	89.54	99.75	88.45	87.95
41	99.98	98.24	92.24	100.00	88.77	88.68
43	99.82	97.61	94.22	99.99	88.91	89.26
45	99.70	97.44	95.68	99.99	90.17	90.81
47	99.33	96.73	96.79	99.56	90.71	91.40
49	99.67	96.64	98.14	99.85	90.49	91.76
51	99.42	96.04	98.41	99.24	91.13	92.44
53	99.26	95.47	98.77	98.83	92.14	93.29
55	98.94	94.69	98.86	98.24	93.35	94.20
57	98.61	93.90	99.20	97.64	94.41	94.75
59	98.08	92.90	99.13	97.01	95.18	95.29
61	97.48	91.98	98.91	96.11	96.40	96.10
63	96.96	90.15	99.29	94.98	96.69	96.91
65	96.82	89.63	99.42	94.53	97.10	97.43
67	96.45	88.91	99.70	93.90	98.00	98.11
69	95.78	87.92	99.56	93.04	98.48	98.70
71	95.57	87.42	99.76	92.49	99.21	99.29
73	95.44	86.98	100.00	91.95	100.00	100.00
75	94.45	85.99	99.26	90.97	99.75	99.37
77	94.35	86.07	99.08	90.83	94.94	96.37
79	93.70	85.92	98.44	90.37	95.80	96.72
81	93.65	85.59	98.35	90.13	97.09	97.60
83	93.12	84.87	97.75	89.48	97.55	97.80

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
85	93.08	84.72	97.63	89.10	98.62	98.43
87	92.41	84.01	96.95	88.38	99.44	98.71
89	92.34	83.17	96.65	87.59	99.38	98.62
91	91.94	82.95	96.41	87.14	99.68	98.72
93	91.44	82.44	96.11	86.55	99.70	98.70
95	91.12	81.83	95.92	86.02	99.68	98.59
97	90.81	81.58	95.65	85.77	99.17	97.93
99	90.62	81.11	95.30	85.37	99.29	98.01
101	90.44	80.51	94.87	84.91	97.67	97.00
103	90.28	80.18	94.42	84.63	97.50	97.03
105	89.80	79.52	93.74	84.08	96.49	96.35
107	89.60	78.98	93.20	83.62	95.86	96.04
109	89.75	78.75	93.02	83.42	95.36	95.75
111	89.60	78.23	92.65	83.00	94.24	95.03
113	89.38	77.63	92.12	82.57	94.12	94.79
115	89.23	77.07	91.64	82.18	92.87	93.95
117	88.99	76.69	91.22	81.65	91.95	93.38
119	88.80	76.25	90.75	81.16	91.70	92.95
121	89.11	76.11	90.67	81.04	91.86	92.82
123	89.09	76.07	90.28	80.69	92.17	92.64
125	88.50	75.38	89.84	80.10	91.35	91.85
127	88.31	75.13	89.64	79.88	90.53	91.12
129	88.24	74.89	89.64	79.74	89.80	90.61
131	88.00	74.66	89.50	79.50	89.27	90.12
133	87.79	74.28	89.54	79.21	88.40	89.48
135	87.66	74.12	89.67	79.13	86.97	88.61
137	87.30	73.63	89.48	78.65	85.59	87.57
139	87.13	73.25	89.37	78.43	84.41	86.73
141	86.93	72.83	89.31	78.08	83.74	86.10
143	86.54	72.20	88.91	77.51	82.53	85.23
145	86.29	71.95	88.60	77.12	81.31	84.39
147	86.18	71.48	88.39	76.73	80.15	83.58
149	85.89	71.18	88.08	76.39	79.06	82.85
151	85.73	70.72	87.76	75.95	78.49	82.33

Gerle Creek Dam Reach
Lower Gerle Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
3	3331.34	5728.14	2773.97	6188.76	442.46	593.53
4	3664.85	5899.76	3246.29	6413.37	545.84	689.27
5	3919.68	6219.24	3681.26	6767.44	675.23	762.92
6	4185.51	6602.41	4203.74	7258.30	783.35	816.05
7	4386.29	6756.52	4620.49	7544.03	844.05	858.50
8	4529.65	6832.06	4928.16	7706.06	884.03	874.64
9	4664.82	6843.94	5294.09	7839.69	910.45	890.87
10	4743.20	6851.05	5442.89	7908.81	925.20	901.68
11	4821.47	6923.58	5655.44	8054.25	906.43	886.28
12	4934.93	6905.89	5839.38	8134.48	918.02	887.14
13	4982.16	6872.21	6037.50	8136.00	928.48	883.82
14	5027.29	6741.18	6241.61	8080.05	929.66	870.01
15	5074.13	6612.66	6353.42	8019.08	930.23	860.01
16	5002.41	6377.98	5989.81	7728.63	903.05	833.94
17	5055.98	6289.80	6065.22	7706.38	870.96	810.10
18	5100.87	6142.60	6061.84	7594.97	836.16	778.91
19	5087.03	6250.78	6221.28	7780.14	808.02	754.64
20	5094.01	6145.56	6265.65	7714.14	782.08	729.51
21	5081.42	5987.02	6312.70	7618.12	762.13	708.59
22	5037.98	5863.13	6248.20	7510.64	752.13	697.37
23	5006.60	5676.93	6185.93	7399.01	746.33	698.39
24	4950.99	5530.96	6100.22	7287.67	742.52	697.72
25	4954.12	5450.55	6114.29	7213.40	737.35	695.69
26	4914.72	5364.69	6121.45	7142.32	728.99	693.06
27	4874.16	5268.50	6040.34	7048.40	722.44	691.54
28	4863.60	5198.40	5993.42	6985.48	716.44	695.72
29	4805.66	5101.71	5889.10	6875.46	710.44	694.15
30	4895.50	5177.68	5886.78	6928.30	703.36	688.65
31	4862.04	5109.02	5814.98	6849.07	696.13	689.45
32	4840.20	5052.39	5748.65	6797.71	696.92	695.07
33	4804.06	4973.79	5550.73	6698.64	698.73	704.87
34	4775.63	4928.95	5487.08	6630.24	695.98	707.93
35	4733.54	4778.84	5131.63	6438.77	695.16	710.68
36	4700.42	4762.74	5189.93	6402.61	694.91	713.80
37	4673.00	4726.26	5106.18	6335.87	690.79	718.11
38	4736.40	4749.40	4949.73	6313.42	688.90	718.32
39	4718.00	4744.70	4915.30	6277.80	686.47	727.13
40	4665.92	4713.41	4830.46	6208.14	685.03	732.42
41	4654.22	4722.46	4785.84	6164.86	684.60	736.27
42	4627.32	4711.22	4728.38	6106.84	685.36	744.87

Gerle Creek Dam Reach
Lower Gerle Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
43	4591.87	4676.43	4595.92	6006.17	685.88	750.30
44	4580.36	4702.98	4568.81	5967.12	685.81	756.23
45	4545.49	4696.96	4513.59	5925.38	684.71	759.20

Gerle Creek Dam Reach
Lower Gerle Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
3	65.31	82.73	43.66	76.07	47.57	65.82
4	71.85	85.21	51.10	78.83	58.68	76.44
5	76.84	89.83	57.94	83.18	72.59	84.61
6	82.05	95.36	66.17	89.21	84.21	90.50
7	85.99	97.59	72.72	92.72	90.74	95.21
8	88.80	98.68	77.57	94.72	95.03	97.00
9	91.45	98.85	83.33	96.36	97.87	98.80
10	92.99	98.95	85.67	97.21	99.46	100.00
11	94.52	100.00	89.01	99.00	97.44	98.29
12	96.75	99.74	91.91	99.98	98.69	98.39
13	97.67	99.26	95.03	100.00	99.81	98.02
14	98.56	97.37	98.24	99.31	99.94	96.49
15	99.48	95.51	100.00	98.56	100.00	95.38
16	98.07	92.12	94.28	94.99	97.08	92.49
17	99.12	90.85	95.46	94.72	93.63	89.84
18	100.00	88.72	95.41	93.35	89.89	86.38
19	99.73	90.28	97.92	95.63	86.86	83.69
20	99.87	88.76	98.62	94.81	84.07	80.91
21	99.62	86.47	99.36	93.63	81.93	78.59
22	98.77	84.68	98.34	92.31	80.85	77.34
23	98.15	81.99	97.36	90.94	80.23	77.45
24	97.06	79.89	96.01	89.57	79.82	77.38
25	97.12	78.72	96.24	88.66	79.27	77.15
26	96.35	77.48	96.35	87.79	78.37	76.86
27	95.56	76.09	95.07	86.63	77.66	76.69
28	95.35	75.08	94.33	85.86	77.02	77.16
29	94.21	73.69	92.69	84.51	76.37	76.98
30	95.97	74.78	92.66	85.16	75.61	76.37
31	95.32	73.79	91.53	84.18	74.83	76.46
32	94.89	72.97	90.48	83.55	74.92	77.09
33	94.18	71.84	87.37	82.33	75.11	78.17
34	93.62	71.19	86.36	81.49	74.82	78.51
35	92.80	69.02	80.77	79.14	74.73	78.82
36	92.15	68.79	81.69	78.69	74.70	79.16
37	91.61	68.26	80.37	77.87	74.26	79.64
38	92.85	68.60	77.91	77.60	74.06	79.66
39	92.49	68.53	77.36	77.16	73.80	80.64
40	91.47	68.08	76.03	76.30	73.64	81.23
41	91.24	68.21	75.33	75.77	73.59	81.66
42	90.72	68.05	74.42	75.06	73.68	82.61

Gerle Creek Dam Reach
Lower Gerle Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
43	90.02	67.54	72.34	73.82	73.73	83.21
44	89.80	67.93	71.91	73.34	73.72	83.87
45	89.11	67.84	71.04	72.83	73.61	84.20

Robbs Peak Dam Reach
Upper SF Rubicon River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	517.33	1180.85	593.98	1161.98	950.56	996.38
3	597.25	1151.47	739.41	1190.58	1344.96	1344.49
4	634.33	1141.08	802.11	1201.92	1498.88	1517.47
5	648.58	1075.67	843.09	1189.16	1475.37	1584.96
6	631.76	1019.08	859.24	1166.98	1538.99	1681.74
7	617.01	967.13	840.52	1134.60	1556.32	1718.20
8	600.18	920.05	812.24	1099.69	1585.11	1738.60
9	581.47	890.19	775.52	1080.08	1665.11	1842.57
10	563.80	866.13	731.76	1052.33	1659.57	1849.09
11	544.40	845.01	685.84	1017.72	1670.54	1860.67
12	534.91	848.53	642.05	1003.81	1708.48	1874.80
13	517.02	849.64	593.93	983.74	1719.34	1872.15
14	510.74	846.29	572.82	961.70	1638.43	1794.98
15	498.90	850.79	551.01	961.01	1634.76	1794.34
16	488.81	855.80	544.55	947.14	1594.85	1760.18
17	484.55	854.20	554.06	943.32	1546.56	1728.34
18	481.46	849.31	550.21	936.02	1499.17	1690.30
19	480.11	847.83	548.77	937.56	1475.51	1662.72
20	477.74	858.83	550.69	947.70	1426.36	1621.77
21	475.17	865.56	552.21	946.52	1405.29	1599.06
22	472.17	870.99	558.51	948.47	1387.08	1578.59
23	470.11	886.00	571.55	959.76	1369.95	1561.63
24	469.99	886.03	573.17	961.01	1320.35	1514.35
25	469.36	891.29	576.12	963.14	1307.14	1495.64
26	467.16	899.03	573.67	965.66	1295.29	1477.96
27	464.11	885.88	565.33	951.10	1247.96	1418.52
28	450.30	901.45	553.56	954.31	1283.79	1439.48
29	442.90	908.35	550.13	955.87	1212.16	1377.27
30	430.45	912.66	543.32	963.77	1194.18	1362.96
31	420.79	921.21	535.30	972.72	1181.53	1351.73
32	413.60	923.81	530.16	969.93	1151.80	1320.22
33	411.58	945.71	529.56	983.51	1144.81	1314.25
34	408.95	937.81	526.10	968.69	1109.94	1270.32
35	407.13	958.10	520.57	984.58	1092.75	1250.07
36	410.42	964.49	517.66	991.51	1068.64	1221.94
37	414.84	991.33	516.86	1008.54	1060.87	1217.51
38	413.09	988.63	510.37	990.93	1026.73	1179.04
39	417.13	1009.54	511.30	1003.08	1018.61	1175.71

Robbs Peak Dam Reach
Upper SF Rubicon River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
2	79.76	100.00	69.13	96.68	55.29	53.15
3	92.09	97.51	86.05	99.06	78.23	71.71
4	97.80	96.63	93.35	100.00	87.18	80.94
5	100.00	91.09	98.12	98.94	85.81	84.54
6	97.41	86.30	100.00	97.09	89.51	89.70
7	95.13	81.90	97.82	94.40	90.52	91.65
8	92.54	77.91	94.53	91.49	92.19	92.74
9	89.65	75.39	90.26	89.86	96.85	98.28
10	86.93	73.35	85.16	87.55	96.52	98.63
11	83.94	71.56	79.82	84.67	97.16	99.25
12	82.47	71.86	74.72	83.52	99.37	100.00
13	79.72	71.95	69.12	81.85	100.00	99.86
14	78.75	71.67	66.67	80.01	95.29	95.74
15	76.92	72.05	64.13	79.96	95.08	95.71
16	75.37	72.47	63.38	78.80	92.76	93.89
17	74.71	72.34	64.48	78.48	89.95	92.19
18	74.23	71.92	64.03	77.88	87.19	90.16
19	74.02	71.80	63.87	78.01	85.82	88.69
20	73.66	72.73	64.09	78.85	82.96	86.50
21	73.26	73.30	64.27	78.75	81.73	85.29
22	72.80	73.76	65.00	78.91	80.68	84.20
23	72.48	75.03	66.52	79.85	79.68	83.30
24	72.46	75.03	66.71	79.96	76.79	80.77
25	72.37	75.48	67.05	80.13	76.03	79.78
26	72.03	76.13	66.76	80.34	75.34	78.83
27	71.56	75.02	65.79	79.13	72.58	75.66
28	69.43	76.34	64.42	79.40	74.67	76.78
29	68.29	76.92	64.02	79.53	70.50	73.46
30	66.37	77.29	63.23	80.19	69.46	72.70
31	64.88	78.01	62.30	80.93	68.72	72.10
32	63.77	78.23	61.70	80.70	66.99	70.42
33	63.46	80.09	61.63	81.83	66.58	70.10
34	63.05	79.42	61.23	80.59	64.56	67.76
35	62.77	81.14	60.58	81.92	63.56	66.68
36	63.28	81.68	60.25	82.49	62.15	65.18
37	63.96	83.95	60.15	83.91	61.70	64.94
38	63.69	83.72	59.40	82.45	59.72	62.89
39	64.31	85.49	59.51	83.46	59.24	62.71

Robbs Peak Dam Reach
Lower SF Rubicon River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	5297.99	8643.05	4061.09	9514.99	71.29	192.19
6	5684.96	8596.48	4529.83	9654.41	96.32	229.00
7	6020.01	8526.86	4972.37	9750.45	119.74	256.15
8	6267.11	8418.21	5270.36	9764.41	148.20	283.07
9	6460.97	8320.79	5531.08	9765.45	160.57	299.89
10	6621.56	8206.23	5768.33	9719.25	170.90	310.46
11	6775.71	8099.99	5967.41	9682.18	183.38	319.71
12	6879.44	7970.58	6112.90	9603.54	192.17	325.18
13	6964.98	7845.50	6221.27	9530.96	201.06	336.17
14	7023.76	7714.04	6328.73	9438.78	215.15	346.50
15	7045.21	7546.41	6397.39	9330.04	222.00	348.84
16	7074.87	7487.25	6495.37	9276.17	229.96	351.09
17	7083.48	7365.78	6527.60	9180.63	240.48	352.47
18	7066.61	7249.01	6555.41	9072.84	248.36	355.15
19	7042.59	7145.36	6561.05	8981.32	260.26	360.97
20	7017.26	7041.68	6580.32	8884.54	271.46	367.43
21	6981.84	6945.54	6585.04	8780.03	281.19	369.25
22	6958.00	6893.62	6604.05	8702.67	318.65	381.02
23	6912.27	6810.20	6593.92	8589.72	327.19	385.06
24	6872.64	6728.99	6586.84	8492.94	335.38	391.77
25	6840.42	6668.14	6572.90	8406.76	346.04	399.73
26	6820.63	6622.13	6586.59	8337.54	356.87	407.20
27	6796.77	6561.70	6569.99	8261.68	362.80	412.22
28	6762.03	6503.72	6563.91	8189.34	374.18	416.50
29	6731.78	6440.29	6551.66	8106.75	384.85	426.45
30	6693.46	6386.79	6533.54	8027.30	393.79	430.24
31	6678.36	6339.47	6559.93	7967.87	401.68	433.95
32	6617.77	6264.72	6503.05	7866.68	410.24	437.37
33	6568.30	6203.17	6495.40	7778.43	417.30	442.79
34	6537.16	6171.25	6486.38	7713.53	421.37	445.76
35	6483.98	6130.62	6467.65	7637.88	427.99	449.66
36	6450.99	6084.66	6462.19	7571.34	433.96	453.47
37	6395.18	6045.72	6458.01	7511.77	434.83	455.20
38	6346.34	5982.45	6437.63	7438.10	436.02	455.43
39	6296.74	5942.76	6418.22	7382.13	439.73	465.51
40	6243.80	5894.54	6404.54	7322.35	439.63	466.09
41	6189.86	5855.43	6395.76	7268.68	442.67	470.42
42	6126.91	5815.87	6372.17	7201.86	440.47	469.96
43	6084.48	5778.02	6358.44	7153.82	443.56	472.53
44	6011.53	5710.82	6410.09	7075.89	404.33	448.53
45	5962.49	5676.85	6391.88	7025.04	403.02	448.65

Robbs Peak Dam Reach
Lower SF Rubicon River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
46	5908.15	5645.74	6370.28	6972.32	400.61	448.89
47	5872.13	5594.23	6290.05	6900.02	444.72	479.28
48	5825.66	5570.25	6276.39	6851.97	444.93	481.89
49	5773.30	5546.89	6250.96	6806.40	446.66	484.01
50	5721.21	5519.57	6216.93	6764.54	447.13	487.59
51	5671.54	5481.20	6186.23	6708.07	448.42	488.29
52	5615.05	5453.75	6146.20	6665.47	448.44	487.94
53	5570.91	5423.40	6113.02	6621.81	449.44	488.93
54	5523.96	5395.86	6085.13	6577.60	450.23	488.72
55	5481.84	5373.69	6058.32	6540.74	450.07	493.62
56	5443.79	5351.64	6032.33	6509.19	450.04	495.38
57	5411.59	5329.78	6014.52	6475.53	450.86	496.84
58	5371.98	5311.49	5995.18	6443.55	449.96	496.80
59	5336.94	5295.82	5975.39	6415.07	450.39	498.22
60	5305.79	5268.88	5952.92	6382.61	450.76	501.01
61	5263.80	5249.02	5925.96	6352.77	450.55	502.09
62	5228.07	5221.59	5898.09	6317.75	452.28	503.18
63	5199.53	5201.43	5871.10	6284.81	452.23	503.32
64	5166.82	5195.77	5842.13	6257.73	451.79	505.96
65	5136.98	5195.01	5817.89	6228.09	453.92	507.35
66	5117.71	5178.72	5805.53	6204.30	454.42	508.53
67	5089.43	5181.69	5780.21	6191.66	454.33	509.30
68	5061.09	5166.98	5762.99	6168.24	455.49	511.79
69	5022.38	5162.41	5730.54	6154.01	454.68	511.79
70	5001.72	5144.11	5698.53	6128.31	454.67	512.89
71	4969.97	5136.16	5684.55	6112.28	432.65	492.47
72	4938.46	5127.58	5663.54	6095.49	432.72	493.33
73	4907.29	5121.53	5645.61	6081.09	432.57	494.22
74	4893.08	5117.94	5641.56	6075.19	434.31	499.62
75	4858.31	5107.25	5620.70	6055.01	435.20	502.43
76	4831.12	5093.86	5603.49	6035.32	436.60	503.61
77	4804.71	5089.46	5584.54	6024.18	438.04	508.55
78	4778.43	5077.26	5567.30	6004.86	438.98	509.60
79	4757.48	5075.88	5552.65	6000.32	438.76	509.23
80	4737.31	5074.25	5544.36	5992.69	438.87	510.68
81	4709.99	5064.86	5518.51	5971.72	437.54	510.03
82	4690.76	5065.78	5497.90	5962.45	438.26	510.58
83	4671.20	5057.17	5473.44	5945.66	440.07	512.16
84	4648.59	5050.75	5453.05	5935.38	439.61	512.12

Robbs Peak Dam Reach
Lower SF Rubicon River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	4631.25	5058.63	5436.94	5934.84	439.55	513.09
86	4613.88	5051.16	5418.27	5924.21	440.86	511.88
87	4586.07	5041.38	5395.36	5910.16	442.38	513.46
88	4569.34	5035.51	5376.79	5903.89	441.67	510.68
89	4532.02	4977.47	5319.85	5858.95	441.81	509.77
90	4515.74	4971.08	5299.26	5851.60	441.21	508.42
91	4491.42	4963.93	5272.16	5840.95	441.10	507.79
92	4477.46	4956.77	5255.92	5833.47	440.58	508.16
93	4465.37	4949.05	5241.99	5824.79	440.01	507.48
94	4450.95	4938.07	5230.15	5814.46	439.80	510.76
95	4425.23	4933.77	5211.75	5803.43	439.36	511.80
96	4414.19	4925.18	5203.09	5791.45	437.61	511.38
97	4401.02	4929.06	5191.01	5783.36	436.97	514.27
98	4391.28	4919.62	5181.48	5774.39	436.85	514.67
99	4369.53	4917.72	5172.58	5762.99	450.02	535.76
100	4349.05	4920.99	5155.26	5756.48	449.53	535.33
101	4337.02	4910.04	5135.86	5751.59	447.81	534.63
102	4318.20	4907.57	5113.27	5745.33	445.96	533.55
103	4314.77	4906.23	5109.05	5742.61	445.24	533.31
104	4305.20	4892.72	5098.61	5731.67	443.52	532.32
105	4262.52	4886.41	5026.70	5713.77	442.55	531.70
106	4246.88	4878.69	5006.82	5704.76	441.06	530.89
107	4244.55	4875.68	4992.64	5699.59	439.88	530.44
108	4224.30	4863.87	4969.69	5683.49	436.98	528.15
109	4214.10	4855.70	4948.84	5669.58	435.62	529.48
110	4208.21	4848.48	4931.21	5661.11	435.13	529.30
111	4203.34	4843.30	4930.03	5654.42	433.18	527.72
112	4188.52	4839.49	4918.96	5643.23	433.12	528.00
113	4187.64	4832.85	4925.23	5640.11	433.76	527.97
114	4178.66	4830.06	4913.40	5634.27	430.99	527.29
115	4167.17	4826.90	4908.46	5629.09	432.15	528.37
116	4159.69	4819.38	4893.44	5615.50	430.86	530.60
117	4152.41	4821.18	4887.19	5610.55	427.45	529.31
118	4143.12	4819.26	4872.64	5603.03	426.16	528.84
119	4128.53	4812.58	4861.47	5589.92	424.10	527.74
120	4129.91	4809.85	4865.29	5584.47	420.74	528.50
121	4120.20	4810.35	4855.08	5579.34	418.74	527.63
122	4111.22	4808.77	4840.95	5573.60	418.57	528.24
123	4100.44	4809.14	4828.51	5571.56	417.13	527.47
124	4090.16	4816.47	4815.98	5570.02	416.06	526.59
125	4088.61	4811.96	4809.46	5562.80	416.21	526.97

Robbs Peak Dam Reach
Lower SF Rubicon River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
5	74.79	100.00	61.49	97.44	15.65	35.87
6	80.26	99.46	68.59	98.86	21.15	42.74
7	84.99	98.66	75.29	99.85	26.29	47.81
8	88.48	97.40	79.81	99.99	32.54	52.84
9	91.21	96.27	83.75	100.00	35.25	55.98
10	93.48	94.95	87.35	99.53	37.52	57.95
11	95.66	93.72	90.36	99.15	40.26	59.67
12	97.12	92.22	92.56	98.34	42.19	60.69
13	98.33	90.77	94.20	97.60	44.14	62.75
14	99.16	89.25	95.83	96.65	47.24	64.68
15	99.46	87.31	96.87	95.54	48.74	65.11
16	99.88	86.63	98.35	94.99	50.49	65.53
17	100.00	85.22	98.84	94.01	52.80	65.79
18	99.76	83.87	99.26	92.91	54.53	66.29
19	99.42	82.67	99.35	91.97	57.14	67.38
20	99.07	81.47	99.64	90.98	59.60	68.58
21	98.57	80.36	99.71	89.91	61.73	68.92
22	98.23	79.76	100.00	89.12	69.96	71.12
23	97.58	78.79	99.85	87.96	71.83	71.87
24	97.02	77.85	99.74	86.97	73.63	73.13
25	96.57	77.15	99.53	86.09	75.97	74.61
26	96.29	76.62	99.74	85.38	78.35	76.00
27	95.95	75.92	99.48	84.60	79.65	76.94
28	95.46	75.25	99.39	83.86	82.15	77.74
29	95.03	74.51	99.21	83.01	84.49	79.60
30	94.49	73.90	98.93	82.20	86.46	80.30
31	94.28	73.35	99.33	81.59	88.19	81.00
32	93.43	72.48	98.47	80.56	90.07	81.64
33	92.73	71.77	98.35	79.65	91.62	82.65
34	92.29	71.40	98.22	78.99	92.51	83.20
35	91.54	70.93	97.93	78.21	93.96	83.93
36	91.07	70.40	97.85	77.53	95.27	84.64
37	90.28	69.95	97.79	76.92	95.47	84.96
38	89.59	69.22	97.48	76.17	95.73	85.01
39	88.89	68.76	97.19	75.59	96.54	86.89
40	88.15	68.20	96.98	74.98	96.52	87.00
41	87.38	67.75	96.85	74.43	97.19	87.81
42	86.50	67.29	96.49	73.75	96.70	87.72
43	85.90	66.85	96.28	73.26	97.38	88.20
44	84.87	66.07	97.06	72.46	88.77	83.72
45	84.17	65.68	96.79	71.94	88.48	83.74

Robbs Peak Dam Reach
Lower SF Rubicon River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
46	83.41	65.32	96.46	71.40	87.95	83.79
47	82.90	64.73	95.25	70.66	97.64	89.46
48	82.24	64.45	95.04	70.17	97.68	89.95
49	81.50	64.18	94.65	69.70	98.06	90.34
50	80.77	63.86	94.14	69.27	98.17	91.01
51	80.07	63.42	93.67	68.69	98.45	91.14
52	79.27	63.10	93.07	68.26	98.45	91.07
53	78.65	62.75	92.56	67.81	98.67	91.26
54	77.98	62.43	92.14	67.36	98.85	91.22
55	77.39	62.17	91.74	66.98	98.81	92.14
56	76.85	61.92	91.34	66.66	98.81	92.46
57	76.40	61.67	91.07	66.31	98.98	92.74
58	75.84	61.45	90.78	65.98	98.79	92.73
59	75.34	61.27	90.48	65.69	98.88	92.99
60	74.90	60.96	90.14	65.36	98.96	93.51
61	74.31	60.73	89.73	65.05	98.92	93.72
62	73.81	60.41	89.31	64.69	99.30	93.92
63	73.40	60.18	88.90	64.36	99.29	93.95
64	72.94	60.11	88.46	64.08	99.19	94.44
65	72.52	60.11	88.10	63.78	99.66	94.70
66	72.25	59.92	87.91	63.53	99.77	94.92
67	71.85	59.95	87.53	63.40	99.75	95.06
68	71.45	59.78	87.26	63.16	100.00	95.53
69	70.90	59.73	86.77	63.02	99.82	95.53
70	70.61	59.52	86.29	62.76	99.82	95.73
71	70.16	59.43	86.08	62.59	94.99	91.92
72	69.72	59.33	85.76	62.42	95.00	92.08
73	69.28	59.26	85.49	62.27	94.97	92.25
74	69.08	59.21	85.43	62.21	95.35	93.25
75	68.59	59.09	85.11	62.00	95.55	93.78
76	68.20	58.94	84.85	61.80	95.85	94.00
77	67.83	58.88	84.56	61.69	96.17	94.92
78	67.46	58.74	84.30	61.49	96.38	95.12
79	67.16	58.73	84.08	61.44	96.33	95.05
80	66.88	58.71	83.95	61.37	96.35	95.32
81	66.49	58.60	83.56	61.15	96.06	95.20
82	66.22	58.61	83.25	61.06	96.22	95.30
83	65.94	58.51	82.88	60.88	96.62	95.60
84	65.63	58.44	82.57	60.78	96.51	95.59

Robbs Peak Dam Reach
Lower SF Rubicon River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
85	65.38	58.53	82.33	60.77	96.50	95.77
86	65.14	58.44	82.04	60.67	96.79	95.54
87	64.74	58.33	81.70	60.52	97.12	95.84
88	64.51	58.26	81.42	60.46	96.97	95.32
89	63.98	57.59	80.55	60.00	97.00	95.15
90	63.75	57.52	80.24	59.92	96.87	94.90
91	63.41	57.43	79.83	59.81	96.84	94.78
92	63.21	57.35	79.59	59.74	96.73	94.85
93	63.04	57.26	79.38	59.65	96.60	94.72
94	62.84	57.13	79.20	59.54	96.56	95.33
95	62.47	57.08	78.92	59.43	96.46	95.53
96	62.32	56.98	78.79	59.31	96.08	95.45
97	62.13	57.03	78.60	59.22	95.94	95.99
98	61.99	56.92	78.46	59.13	95.91	96.06
99	61.69	56.90	78.32	59.01	98.80	100.00
100	61.40	56.94	78.06	58.95	98.69	99.92
101	61.23	56.81	77.77	58.90	98.32	99.79
102	60.96	56.78	77.43	58.83	97.91	99.59
103	60.91	56.77	77.36	58.81	97.75	99.54
104	60.78	56.61	77.20	58.69	97.37	99.36
105	60.18	56.54	76.12	58.51	97.16	99.24
106	59.95	56.45	75.81	58.42	96.83	99.09
107	59.92	56.41	75.60	58.36	96.57	99.01
108	59.64	56.27	75.25	58.20	95.94	98.58
109	59.49	56.18	74.94	58.06	95.64	98.83
110	59.41	56.10	74.67	57.97	95.53	98.80
111	59.34	56.04	74.65	57.90	95.10	98.50
112	59.13	55.99	74.48	57.79	95.09	98.55
113	59.12	55.92	74.58	57.76	95.23	98.55
114	58.99	55.88	74.40	57.70	94.62	98.42
115	58.83	55.85	74.32	57.64	94.88	98.62
116	58.72	55.76	74.10	57.50	94.59	99.04
117	58.62	55.78	74.00	57.45	93.84	98.80
118	58.49	55.76	73.78	57.38	93.56	98.71
119	58.28	55.68	73.61	57.24	93.11	98.50
120	58.30	55.65	73.67	57.19	92.37	98.65
121	58.17	55.66	73.52	57.13	91.93	98.48
122	58.04	55.64	73.30	57.07	91.90	98.60
123	57.89	55.64	73.11	57.05	91.58	98.45
124	57.74	55.73	72.92	57.04	91.34	98.29
125	57.72	55.67	72.83	56.96	91.38	98.36

Ice House Dam Reach
Upper SF Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	4269.24	9690.22	3995.62	9637.42	484.24	469.54
8	4952.54	10326.59	5131.52	10527.53	536.79	505.52
10	5562.36	11062.15	5858.40	11575.37	554.10	526.26
12	6173.76	11784.79	6937.77	12628.35	557.94	540.97
14	6621.87	11851.09	7659.05	12940.44	552.23	539.06
16	7042.44	12148.53	8293.32	13403.50	537.80	530.18
18	7431.29	12322.96	8736.63	13728.70	516.06	513.50
20	7745.15	12475.84	9147.24	13996.00	494.81	496.17
22	8024.19	12722.10	9672.19	14376.21	488.86	489.08
24	8278.36	12915.96	9992.95	14716.05	488.75	488.18
26	8317.72	12668.94	9978.73	14587.64	491.27	490.11
28	8552.81	12756.74	10285.46	14753.15	492.92	490.90
30	8706.95	12728.89	10445.55	14786.00	494.69	489.53
32	8933.28	12763.56	10616.86	14922.80	496.71	487.69
34	9115.36	12762.20	10688.35	14971.37	495.53	484.62
36	9232.81	12671.61	10729.35	14969.07	494.63	482.93
38	9395.66	12647.16	10809.72	15058.94	492.67	480.94
40	9533.58	12537.60	11036.09	15053.25	487.31	475.48
42	9616.61	12470.49	11162.86	15040.47	480.82	470.39
44	9717.02	12396.91	11379.85	15062.28	474.31	465.71
46	9803.45	12238.70	11501.95	15009.00	468.05	460.97
48	9854.79	12050.81	11565.12	14935.32	460.29	455.35
50	9935.12	11884.14	11632.04	14837.35	454.20	449.97
52	10029.56	11741.36	11713.20	14738.35	445.07	442.25
54	10100.67	11582.52	11812.17	14629.53	438.00	435.54
56	10119.70	11448.66	11846.42	14507.26	429.83	427.35
58	10179.00	11334.42	11990.75	14436.08	416.30	416.52
60	10208.15	11176.27	12023.61	14325.61	406.11	408.15
62	10238.48	11056.77	12124.68	14245.67	391.98	396.57
64	10287.45	10930.72	12226.70	14149.70	380.91	386.76
66	10297.23	10798.42	12247.21	14030.24	367.21	376.42
68	10354.01	10692.45	12293.20	13929.60	353.59	363.51
70	10350.57	10538.93	12200.30	13761.81	342.45	352.22
72	10382.33	10430.98	12194.45	13634.76	330.13	338.97
74	10360.83	10296.39	12110.09	13484.82	315.64	325.20
76	10377.45	10194.85	12081.43	13371.95	305.63	314.78
78	10328.58	10081.93	12018.22	13234.02	292.67	303.05
80	10351.03	10005.38	12013.06	13149.66	281.69	291.59
82	10312.56	9912.85	11977.37	13029.00	270.65	282.07
84	10273.22	9812.24	11919.99	12921.27	260.65	274.35

Ice House Dam Reach
Upper SF Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	10254.65	9733.93	11889.71	12836.38	249.15	265.79
88	10242.73	9636.21	11876.35	12761.88	237.64	257.47
90	10221.74	9535.89	11830.83	12660.01	228.32	252.23
92	10174.52	9437.32	11764.50	12555.45	220.30	246.55
94	10130.51	9358.97	11705.18	12438.70	212.47	241.08
96	10086.25	9281.78	11634.27	12320.27	207.03	237.78
98	10050.19	9219.47	11572.04	12215.84	200.58	233.92
100	9992.69	9149.15	11495.21	12138.75	195.62	231.10
102	9908.57	8998.29	11403.08	12003.46	187.63	226.18
104	9831.94	8942.95	11310.38	11942.50	183.47	225.91
106	9769.00	8909.64	11260.93	11902.28	179.98	224.12
108	9687.47	8862.23	11185.30	11830.36	176.61	222.37
110	9606.31	8814.17	11095.32	11742.19	173.79	221.45
112	9540.52	8761.24	11026.59	11661.88	170.43	220.17
114	9468.16	8702.53	10934.00	11580.90	167.54	219.57
116	9429.23	8671.27	10884.59	11520.23	166.14	219.60
118	9364.38	8610.37	10810.36	11447.92	161.65	218.12
120	9309.64	8551.86	10757.89	11377.72	156.34	212.88
122	9264.46	8504.02	10689.37	11327.80	153.97	219.32
124	9227.86	8453.95	10618.88	11279.64	150.40	219.47
126	9183.90	8428.21	10529.32	11225.12	148.34	221.01
128	9122.12	8380.56	10445.78	11153.38	145.34	220.17
130	8989.13	8320.24	10342.30	11028.67	143.43	213.82

Ice House Dam Reach
Upper SF Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
6	41.12	75.03	32.50	63.98	86.79	86.80
8	47.70	79.95	41.74	69.89	96.21	93.45
10	53.58	85.65	47.66	76.85	99.31	97.28
12	59.46	91.24	56.44	83.84	100.00	100.00
14	63.78	91.76	62.30	85.91	98.98	99.65
16	67.83	94.06	67.46	88.99	96.39	98.01
18	71.58	95.41	71.07	91.15	92.49	94.92
20	74.60	96.59	74.41	92.92	88.69	91.72
22	77.29	98.50	78.68	95.45	87.62	90.41
24	79.74	100.00	81.29	97.70	87.60	90.24
26	80.11	98.09	81.17	96.85	88.05	90.60
28	82.38	98.77	83.67	97.95	88.35	90.75
30	83.86	98.55	84.97	98.17	88.66	90.49
32	86.04	98.82	86.36	99.07	89.02	90.15
34	87.80	98.81	86.95	99.40	88.81	89.58
36	88.93	98.11	87.28	99.38	88.65	89.27
38	90.50	97.92	87.93	99.98	88.30	88.90
40	91.83	97.07	89.77	99.94	87.34	87.89
42	92.62	96.55	90.81	99.86	86.18	86.95
44	93.59	95.98	92.57	100.00	85.01	86.09
46	94.42	94.76	93.56	99.65	83.89	85.21
48	94.92	93.30	94.08	99.16	82.50	84.17
50	95.69	92.01	94.62	98.51	81.41	83.18
52	96.60	90.91	95.28	97.85	79.77	81.75
54	97.29	89.68	96.09	97.13	78.50	80.51
56	97.47	88.64	96.37	96.32	77.04	79.00
58	98.04	87.76	97.54	95.84	74.61	77.00
60	98.32	86.53	97.81	95.11	72.79	75.45
62	98.61	85.61	98.63	94.58	70.25	73.31
64	99.09	84.63	99.46	93.94	68.27	71.49
66	99.18	83.61	99.63	93.15	65.82	69.58
68	99.73	82.78	100.00	92.48	63.37	67.20
70	99.69	81.60	99.24	91.37	61.38	65.11
72	100.00	80.76	99.20	90.52	59.17	62.66
74	99.79	79.72	98.51	89.53	56.57	60.12
76	99.95	78.93	98.28	88.78	54.78	58.19
78	99.48	78.06	97.76	87.86	52.45	56.02
80	99.70	77.47	97.72	87.30	50.49	53.90
82	99.33	76.75	97.43	86.50	48.51	52.14
84	98.95	75.97	96.96	85.79	46.72	50.72

Ice House Dam Reach
Upper SF Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
86	98.77	75.36	96.72	85.22	44.65	49.13
88	98.66	74.61	96.61	84.73	42.59	47.59
90	98.45	73.83	96.24	84.05	40.92	46.63
92	98.00	73.07	95.70	83.36	39.48	45.58
94	97.57	72.46	95.22	82.58	38.08	44.56
96	97.15	71.86	94.64	81.80	37.11	43.96
98	96.80	71.38	94.13	81.10	35.95	43.24
100	96.25	70.84	93.51	80.59	35.06	42.72
102	95.44	69.67	92.76	79.69	33.63	41.81
104	94.70	69.24	92.01	79.29	32.88	41.76
106	94.09	68.98	91.60	79.02	32.26	41.43
108	93.31	68.61	90.99	78.54	31.65	41.11
110	92.53	68.24	90.26	77.96	31.15	40.94
112	91.89	67.83	89.70	77.42	30.55	40.70
114	91.19	67.38	88.94	76.89	30.03	40.59
116	90.82	67.14	88.54	76.48	29.78	40.59
118	90.20	66.66	87.94	76.00	28.97	40.32
120	89.67	66.21	87.51	75.54	28.02	39.35
122	89.23	65.84	86.95	75.21	27.60	40.54
124	88.88	65.45	86.38	74.89	26.96	40.57
126	88.46	65.25	85.65	74.52	26.59	40.86
128	87.86	64.89	84.97	74.05	26.05	40.70
130	86.58	64.42	84.13	73.22	25.71	39.53

Ice House Dam Reach
Lower SF Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
9	4024.57	12912.88	5294.27	12196.28	6881.79	6270.95
11	4758.21	13962.00	6402.12	13350.40	7718.96	7005.17
13	5434.26	14503.71	7290.10	14209.11	8206.41	7547.18
15	5973.04	14709.46	7909.79	14737.94	8736.15	8042.10
17	6439.26	14949.39	8569.20	15264.06	9084.48	8419.68
19	6919.77	15130.41	9333.82	15818.07	9307.13	8710.80
21	7268.62	15085.41	9847.17	16118.55	9394.19	8899.92
23	7663.95	14873.34	10451.76	16419.17	9414.55	8970.78
25	7982.21	14818.81	10894.59	16652.08	9501.03	9055.86
27	8245.39	14602.42	11285.28	16744.51	9345.00	9017.72
29	8441.06	14333.21	11565.36	16705.75	9092.76	8924.90
31	8688.45	14217.23	12027.72	16842.97	8858.37	8793.27
33	8857.75	13967.31	12217.96	16803.97	8567.27	8623.75
35	9007.15	13746.77	12379.04	16748.06	8332.18	8480.08
37	9039.98	13438.91	12298.21	16529.93	8102.41	8347.62
39	9196.69	13289.59	12387.49	16491.60	7895.83	8171.99
41	9240.72	13059.92	12342.23	16445.31	7926.47	8207.44
43	9273.04	12849.57	12249.90	16323.84	7752.28	8072.05
45	9283.55	12699.02	12127.96	16240.45	7595.78	7957.14
47	9322.77	12527.21	12058.17	16163.14	7448.95	7819.85
49	9351.31	12356.04	11980.06	16139.09	7624.04	7953.19
51	9318.23	12115.43	11864.69	15964.03	7504.87	7841.21
53	9320.18	11957.92	11826.97	15875.81	7426.78	7752.60
55	9327.18	11842.09	11795.98	15798.38	7341.68	7639.73
57	9322.25	11705.25	11784.70	15671.60	7231.34	7491.61
59	9285.11	11551.19	11711.11	15494.38	7118.40	7365.06
61	9223.16	11406.16	11636.59	15325.06	7014.57	7254.23
63	9198.05	11314.81	11542.98	15170.09	6896.57	7179.76
65	9150.77	11197.52	11514.38	14984.29	6703.28	7035.50
67	9165.87	11137.27	11540.96	14916.40	6569.63	6928.00
69	9161.35	11043.72	11495.03	14791.23	6388.48	6784.66
71	9161.40	10962.06	11457.01	14667.35	6221.96	6646.34
73	9110.39	10864.36	11400.28	14526.63	6049.23	6515.84
75	9082.34	10693.44	11329.50	14372.35	5843.69	6361.09
77	9086.09	10597.31	11309.41	14298.44	5494.17	6034.49
79	9039.55	10473.93	11221.37	14121.06	5314.03	5893.92
81	9042.59	10370.36	11172.79	13979.13	5153.49	5755.54
83	9024.99	10222.73	11084.93	13786.38	4943.29	5596.20
85	9015.70	10132.37	11078.61	13682.10	4800.57	5472.13
87	9018.52	10065.69	11043.01	13557.16	4650.15	5317.97

Ice House Dam Reach
Lower SF Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
89	8984.22	10121.88	10963.53	13537.79	4214.78	4952.10
91	9004.97	10027.71	10932.36	13403.37	4063.19	4812.00
93	8963.94	9966.73	10882.34	13280.21	3912.11	4684.67
95	8967.02	9768.05	10917.44	13053.07	3700.54	4513.42
97	8913.28	9684.70	10849.15	12891.59	3566.62	4390.73
99	8914.97	9644.56	10884.54	12818.78	3466.66	4297.36
101	8938.77	9590.18	10918.97	12758.87	3370.26	4202.79
103	8906.82	9501.45	10864.35	12636.49	3269.25	4095.68
105	8885.09	9409.05	10826.84	12545.79	3195.93	4006.50
107	8923.99	9346.29	10852.78	12466.61	3148.29	3919.46
109	8903.37	9261.69	10823.62	12337.22	3084.50	3830.78
111	8905.61	9336.90	10757.23	12364.80	3033.47	3781.39
113	8903.26	9234.07	10680.59	12197.86	2960.40	3696.00
115	8901.98	9164.10	10653.89	12105.13	2907.23	3625.08
117	8867.46	9080.73	10595.38	11973.72	2852.87	3547.15
119	8863.05	8982.63	10560.96	11851.21	2800.98	3483.15
121	8884.23	8945.92	10557.94	11776.72	2771.04	3433.24
123	8844.70	8867.81	10479.03	11646.93	2705.65	3367.61
125	8826.36	8818.31	10434.32	11536.89	2662.79	3321.41
127	8803.37	8777.87	10361.48	11419.48	2610.93	3261.81
129	8801.66	8744.48	10334.55	11364.96	2581.31	3220.79
131	8781.75	8678.03	10254.06	11241.10	2541.49	3178.29
133	8759.29	8660.86	10204.37	11181.79	2512.04	3142.83
135	8711.84	8609.59	10133.73	11082.22	2471.43	3095.10
137	8677.32	8585.49	10101.86	11024.44	2435.86	3041.60
139	8617.12	8541.81	10023.15	10956.71	2398.10	2993.37
141	8569.30	8506.54	9986.34	10908.02	2369.66	2952.07
143	8527.83	8474.62	9940.13	10853.54	2334.14	2911.72
145	8481.78	8453.67	9936.37	10805.71	2316.90	2879.16
147	8410.82	8417.41	9856.91	10722.76	2283.23	2832.49
149	8373.70	8396.79	9827.02	10684.68	2265.69	2803.49
151	8339.77	8357.52	9815.83	10639.81	2250.00	2763.06
153	8297.59	8336.39	9782.92	10584.16	2221.32	2729.34
155	8261.68	8322.66	9751.50	10523.61	2203.25	2697.04
157	8202.67	8291.52	9702.92	10455.95	2177.74	2657.36
159	8163.93	8254.17	9664.44	10403.68	2151.03	2617.36
161	8128.66	8224.41	9627.07	10369.40	2124.78	2581.86
163	8093.99	8198.23	9596.42	10346.01	2100.45	2550.24
165	8020.70	8129.18	9547.51	10279.43	2075.34	2509.58
167	7991.15	8114.55	9529.35	10264.91	2051.90	2479.98

Ice House Dam Reach
Lower SF Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
169	7932.44	8096.02	9482.27	10227.68	2021.99	2435.23
171	7889.36	8069.51	9435.12	10190.45	2004.23	2404.30
173	7834.05	8057.79	9391.36	10138.61	1973.73	2363.41
175	7805.54	8043.39	9353.63	10096.03	1947.08	2328.20
177	7788.02	8034.23	9333.13	10070.99	1921.47	2298.05
179	7735.55	8008.72	9264.72	10008.23	1887.69	2255.87
181	7689.61	7980.75	9208.60	9958.85	1862.69	2228.56
183	7655.36	7950.05	9146.32	9930.44	1833.47	2190.62
185	7616.68	7912.58	9082.20	9892.69	1805.23	2152.19

Ice House Dam Reach
Lower SF Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
9	43.04	85.34	42.74	72.41	72.43	69.25
11	50.88	92.28	51.68	79.26	81.24	77.36
13	58.11	95.86	58.85	84.36	86.37	83.34
15	63.87	97.22	63.85	87.50	91.95	88.81
17	68.86	98.80	69.18	90.63	95.62	92.98
19	74.00	100.00	75.35	93.91	97.96	96.19
21	77.73	99.70	79.49	95.70	98.88	98.28
23	81.96	98.30	84.37	97.48	99.09	99.06
25	85.36	97.94	87.95	98.87	100.00	100.00
27	88.17	96.51	91.10	99.42	98.36	99.58
29	90.27	94.73	93.36	99.19	95.70	98.55
31	92.91	93.96	97.10	100.00	93.24	97.10
33	94.72	92.31	98.63	99.77	90.17	95.23
35	96.32	90.86	99.93	99.44	87.70	93.64
37	96.67	88.82	99.28	98.14	85.28	92.18
39	98.35	87.83	100.00	97.91	83.11	90.24
41	98.82	86.32	99.63	97.64	83.43	90.63
43	99.16	84.93	98.89	96.92	81.59	89.14
45	99.28	83.93	97.90	96.42	79.95	87.87
47	99.69	82.79	97.34	95.96	78.40	86.35
49	100.00	81.66	96.71	95.82	80.24	87.82
51	99.65	80.07	95.78	94.78	78.99	86.59
53	99.67	79.03	95.48	94.26	78.17	85.61
55	99.74	78.27	95.22	93.80	77.27	84.36
57	99.69	77.36	95.13	93.05	76.11	82.73
59	99.29	76.34	94.54	91.99	74.92	81.33
61	98.63	75.39	93.94	90.99	73.83	80.11
63	98.36	74.78	93.18	90.07	72.59	79.28
65	97.86	74.01	92.95	88.96	70.55	77.69
67	98.02	73.61	93.17	88.56	69.15	76.50
69	97.97	72.99	92.80	87.82	67.24	74.92
71	97.97	72.45	92.49	87.08	65.49	73.39
73	97.42	71.80	92.03	86.25	63.67	71.95
75	97.12	70.68	91.46	85.33	61.51	70.24
77	97.16	70.04	91.30	84.89	57.83	66.64
79	96.67	69.22	90.59	83.84	55.93	65.08
81	96.70	68.54	90.19	83.00	54.24	63.56
83	96.51	67.56	89.48	81.85	52.03	61.80
85	96.41	66.97	89.43	81.23	50.53	60.43
87	96.44	66.53	89.15	80.49	48.94	58.72

Ice House Dam Reach
Lower SF Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
89	96.07	66.90	88.50	80.38	44.36	54.68
91	96.30	66.28	88.25	79.58	42.77	53.14
93	95.86	65.87	87.85	78.85	41.18	51.73
95	95.89	64.56	88.13	77.50	38.95	49.84
97	95.32	64.01	87.58	76.54	37.54	48.49
99	95.33	63.74	87.87	76.11	36.49	47.45
101	95.59	63.38	88.15	75.75	35.47	46.41
103	95.25	62.80	87.70	75.03	34.41	45.23
105	95.01	62.19	87.40	74.49	33.64	44.24
107	95.43	61.77	87.61	74.02	33.14	43.28
109	95.21	61.21	87.38	73.25	32.46	42.30
111	95.23	61.71	86.84	73.41	31.93	41.76
113	95.21	61.03	86.22	72.42	31.16	40.81
115	95.19	60.57	86.01	71.87	30.60	40.03
117	94.83	60.02	85.53	71.09	30.03	39.17
119	94.78	59.37	85.26	70.36	29.48	38.46
121	95.01	59.13	85.23	69.92	29.17	37.91
123	94.58	58.61	84.59	69.15	28.48	37.19
125	94.39	58.28	84.23	68.50	28.03	36.68
127	94.14	58.01	83.64	67.80	27.48	36.02
129	94.12	57.79	83.43	67.48	27.17	35.57
131	93.91	57.35	82.78	66.74	26.75	35.10
133	93.67	57.24	82.38	66.39	26.44	34.70
135	93.16	56.90	81.81	65.80	26.01	34.18
137	92.79	56.74	81.55	65.45	25.64	33.59
139	92.15	56.45	80.91	65.05	25.24	33.05
141	91.64	56.22	80.62	64.76	24.94	32.60
143	91.19	56.01	80.24	64.44	24.57	32.15
145	90.70	55.87	80.21	64.16	24.39	31.79
147	89.94	55.63	79.57	63.66	24.03	31.28
149	89.55	55.50	79.33	63.44	23.85	30.96
151	89.18	55.24	79.24	63.17	23.68	30.51
153	88.73	55.10	78.97	62.84	23.38	30.14
155	88.35	55.01	78.72	62.48	23.19	29.78
157	87.72	54.80	78.33	62.08	22.92	29.34
159	87.30	54.55	78.02	61.77	22.64	28.90
161	86.93	54.36	77.72	61.57	22.36	28.51
163	86.55	54.18	77.47	61.43	22.11	28.16
165	85.77	53.73	77.07	61.03	21.84	27.71
167	85.45	53.63	76.93	60.94	21.60	27.39

Ice House Dam Reach
Lower SF Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
169	84.83	53.51	76.55	60.72	21.28	26.89
171	84.37	53.33	76.17	60.50	21.09	26.55
173	83.77	53.26	75.81	60.19	20.77	26.10
175	83.47	53.16	75.51	59.94	20.49	25.71
177	83.28	53.10	75.34	59.79	20.22	25.38
179	82.72	52.93	74.79	59.42	19.87	24.91
181	82.23	52.75	74.34	59.13	19.61	24.61
183	81.86	52.54	73.84	58.96	19.30	24.19
185	81.45	52.30	73.32	58.73	19.00	23.77

Junction Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	4933.10	9784.72	3233.72	9729.99	2376.63	2494.41
8	5626.81	10326.40	4076.72	10576.70	2937.81	2924.74
10	6224.04	10474.80	4781.00	10983.36	3283.00	3262.99
12	6703.94	10367.78	5429.13	11132.72	3560.95	3533.45
14	7123.05	10193.43	6035.59	11188.97	3733.94	3759.09
16	7483.16	9965.06	6580.53	11108.41	3821.76	3903.60
18	7767.22	9754.55	7011.90	10996.34	3922.34	4012.59
20	7998.93	9588.27	7360.79	10893.64	3991.75	4096.71
22	8201.68	9351.01	7659.71	10733.62	4110.58	4201.81
24	8330.92	9170.58	7892.39	10594.47	4143.93	4224.20
26	8417.29	9022.16	8088.94	10467.78	4190.00	4259.99
28	8484.75	8870.55	8255.14	10327.64	4187.28	4248.06
30	8496.50	8743.64	8349.85	10226.81	4170.67	4240.07
32	8519.06	8614.49	8465.31	10139.59	4143.16	4205.06
34	8545.09	8518.54	8576.26	10036.52	4092.76	4139.07
36	8564.40	8437.24	8669.00	9973.31	4012.70	4065.66
38	8554.31	8309.93	8715.51	9836.82	3914.97	3997.03
40	8548.99	8202.83	8755.34	9723.90	3832.04	3933.01
42	8549.65	8127.35	8823.33	9636.15	3721.18	3837.24
44	8524.98	8054.74	8840.27	9530.15	3596.90	3734.87
46	8505.50	7993.37	8858.53	9441.76	3452.08	3617.89
48	8468.04	7941.69	8854.04	9375.35	3303.91	3507.54
50	8432.93	7946.77	8850.52	9343.80	3142.29	3383.05
52	8388.36	7871.43	8840.79	9255.19	2978.04	3251.92
54	8355.27	7837.09	8847.03	9220.94	2862.10	3150.09
56	8299.87	7775.09	8834.05	9171.65	2741.72	3049.25
58	8234.92	7715.45	8814.58	9107.20	2623.57	2936.92
60	8195.66	7708.73	8820.67	9107.89	2540.96	2857.33
62	8127.99	7669.23	8786.56	9086.79	2459.12	2777.57
64	8049.12	7642.72	8727.56	9040.52	2392.58	2706.73
66	8009.42	7632.00	8729.23	9012.81	2320.58	2632.30
68	7966.86	7642.54	8715.16	8999.57	2280.98	2583.71
70	7923.76	7636.40	8686.40	8970.34	2219.13	2517.89
72	7875.03	7646.72	8663.50	8965.54	2189.98	2472.57
74	7844.82	7654.56	8645.95	8964.18	2189.82	2435.86
76	7801.02	7645.99	8614.26	8939.80	2155.38	2391.56
78	7760.77	7661.44	8586.55	8954.72	2145.49	2363.23
80	7712.15	7645.67	8557.88	8935.88	2106.51	2312.45
82	7698.75	7695.21	8566.61	8971.18	2092.95	2304.42
84	7608.43	7637.67	8490.82	8889.00	2061.47	2247.97

Junction Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	7553.34	7636.92	8447.64	8877.20	2065.05	2231.81
88	7471.46	7596.63	8368.75	8811.97	1992.04	2160.13
90	7524.12	7668.89	8438.65	8888.00	1963.26	2128.56
92	7457.15	7653.83	8394.55	8858.16	1951.60	2110.32
94	7421.64	7648.05	8375.96	8841.28	1935.80	2090.83
96	7372.17	7653.15	8346.53	8836.47	1915.42	2061.12
98	7313.52	7510.69	8314.38	8712.57	1898.71	2043.99
100	7274.18	7497.46	8269.21	8702.37	1887.27	2028.31
102	7237.37	7494.68	8257.98	8705.06	1871.41	2013.73
104	7205.23	7475.54	8248.18	8687.84	1850.16	1997.68
106	7085.80	7481.36	8134.50	8635.02	1868.84	2011.26
108	7067.34	7475.23	8140.49	8628.58	1851.05	1996.81
110	7029.00	7466.86	8112.00	8607.61	1843.11	1989.45
112	6999.65	7474.27	8078.44	8588.63	1825.95	1969.19
114	6995.04	7484.55	8065.43	8577.44	1825.61	1958.01
116	6980.68	7483.51	8043.41	8558.52	1823.40	1947.27
118	6962.09	7469.66	7997.30	8530.71	1823.48	1935.92
120	6948.11	7471.86	7957.16	8517.73	1829.30	1932.50
122	6926.03	7468.24	7923.56	8500.15	1825.34	1923.84
124	6989.57	7516.62	7976.22	8564.19	1884.45	1967.63
126	6983.34	7524.99	7968.14	8556.49	1909.25	1982.05
128	6968.21	7506.34	7943.82	8527.75	1911.37	1975.21
130	6930.96	7468.39	7865.94	8472.90	1917.14	1997.05
132	6915.08	7426.24	7845.68	8444.16	1918.87	1992.22
134	6900.26	7418.36	7816.80	8429.35	1925.56	1993.50
136	6896.99	7413.67	7802.64	8415.34	1928.36	1993.19
138	6898.04	7410.49	7798.38	8399.85	1935.72	1993.93
140	6895.24	7414.07	7794.60	8391.16	1940.23	1996.21
142	6875.13	7370.09	7759.90	8358.90	1938.78	1990.90
144	6875.39	7375.70	7748.98	8365.06	1940.87	1994.41
146	6878.29	7376.56	7738.09	8368.50	1950.40	1998.28
148	6880.35	7372.91	7732.64	8365.94	1950.73	2000.39
150	6879.29	7372.19	7726.67	8355.76	1931.30	1987.23
152	6881.27	7356.04	7725.66	8340.61	1933.76	1988.12
154	6892.19	7372.76	7743.15	8353.08	1939.24	1992.35
156	6877.57	7351.76	7714.71	8327.89	1929.95	1987.55
158	6882.83	7353.82	7711.03	8329.82	1939.28	1994.37
160	6884.01	7345.24	7697.03	8316.59	1944.52	1998.08
162	6880.41	7326.10	7686.49	8308.27	1955.60	2005.62
164	6867.19	7326.80	7659.35	8298.49	1887.86	1960.04

Junction Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	6876.35	7331.14	7673.88	8308.65	1899.60	1963.66
168	6853.01	7310.97	7654.72	8295.82	1906.03	1968.33
170	6747.86	7265.86	7565.97	8192.21	1911.82	1968.67
172	6736.65	7259.38	7560.82	8186.11	1922.21	1975.88
174	6739.24	7260.08	7571.41	8188.91	1936.67	1986.20
176	6720.84	7256.75	7551.60	8183.80	1930.10	1978.90
178	6715.29	7248.93	7549.67	8176.64	1944.55	1988.80
180	6717.71	7240.55	7547.50	8170.41	1950.39	1993.61
182	6746.71	7262.53	7583.21	8203.86	1962.53	2000.16
184	6754.96	7260.36	7582.40	8211.74	1969.64	2007.74
186	6743.07	7250.68	7560.75	8191.19	1978.27	2014.14
188	6724.45	7225.48	7542.74	8161.54	1972.98	2030.28
190	6705.79	7195.74	7524.98	8127.71	1985.00	2038.67
192	6684.58	7180.17	7500.29	8104.21	1981.35	2038.55
194	6707.43	7223.87	7520.53	8139.09	1987.29	2039.43
196	6686.13	7154.11	7495.39	8067.12	1986.52	2031.33
198	6678.26	7149.02	7474.55	8064.47	2003.76	2045.05
200	6676.50	7079.34	7476.78	8015.27	2134.70	2159.00
202	6670.23	7066.82	7463.89	8012.89	2138.17	2158.11
204	6674.13	7068.88	7461.88	8020.95	2151.10	2167.61
206	6676.32	7144.18	7458.62	8101.59	2104.71	2122.43
208	6680.12	7160.52	7462.65	8119.66	2123.28	2137.46
210	6682.47	7154.89	7467.10	8119.63	2133.51	2143.71
212	6674.42	7162.14	7467.29	8115.93	2132.49	2144.91
214	6678.44	7161.56	7474.08	8123.84	2147.78	2156.34
216	6674.90	7160.77	7470.31	8120.91	2161.42	2164.64
218	6669.96	7153.72	7462.61	8122.57	2178.83	2193.88
220	6694.36	7173.92	7512.66	8157.79	2233.94	2235.28
222	6694.40	7175.83	7502.51	8166.50	2239.89	2238.87
224	6691.48	7173.03	7494.82	8172.60	2246.55	2240.90
226	6696.62	7174.01	7489.94	8174.45	2267.35	2255.28
228	6673.21	7113.26	7435.38	8112.14	2252.44	2250.60
230	6678.11	7103.60	7433.67	8108.91	2261.86	2258.86
232	6674.24	7096.00	7424.17	8107.88	2260.11	2254.49
234	6670.57	7103.72	7420.90	8118.84	2284.95	2272.65
236	6667.64	7094.57	7404.29	8112.66	2292.71	2275.81
238	6676.58	7092.77	7413.65	8123.85	2289.16	2277.32
240	6666.79	7072.95	7395.56	8105.91	2296.92	2283.73
242	6686.48	7067.29	7400.06	8099.26	2318.53	2307.20
244	6659.18	7052.30	7376.99	8097.74	2303.36	2283.18

Junction Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	6640.63	7081.26	7368.71	8139.41	2263.52	2255.29
248	6642.59	7083.22	7368.62	8143.09	2270.03	2265.17
250	6617.15	7062.65	7334.13	8122.06	2273.86	2266.47

Junction Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
6	57.60	93.41	36.50	86.96	56.72	58.55
8	65.70	98.58	46.02	94.53	70.11	68.66
10	72.67	100.00	53.97	98.16	78.35	76.60
12	78.28	98.98	61.29	99.50	84.99	82.95
14	83.17	97.31	68.13	100.00	89.12	88.24
16	87.38	95.13	74.28	99.28	91.21	91.63
18	90.69	93.12	79.15	98.28	93.61	94.19
20	93.40	91.54	83.09	97.36	95.27	96.17
22	95.76	89.27	86.47	95.93	98.10	98.63
24	97.27	87.55	89.09	94.69	98.90	99.16
26	98.28	86.13	91.31	93.55	100.00	100.00
28	99.07	84.68	93.19	92.30	99.94	99.72
30	99.21	83.47	94.26	91.40	99.54	99.53
32	99.47	82.24	95.56	90.62	98.88	98.71
34	99.77	81.32	96.81	89.70	97.68	97.16
36	100.00	80.55	97.86	89.14	95.77	95.44
38	99.88	79.33	98.39	87.92	93.44	93.83
40	99.82	78.31	98.84	86.91	91.46	92.32
42	99.83	77.59	99.60	86.12	88.81	90.08
44	99.54	76.90	99.79	85.17	85.84	87.67
46	99.31	76.31	100.00	84.38	82.39	84.93
48	98.87	75.82	99.95	83.79	78.85	82.34
50	98.46	75.87	99.91	83.51	75.00	79.41
52	97.94	75.15	99.80	82.72	71.07	76.34
54	97.56	74.82	99.87	82.41	68.31	73.95
56	96.91	74.23	99.72	81.97	65.43	71.58
58	96.15	73.66	99.50	81.39	62.62	68.94
60	95.69	73.59	99.57	81.40	60.64	67.07
62	94.90	73.22	99.19	81.21	58.69	65.20
64	93.98	72.96	98.52	80.80	57.10	63.54
66	93.52	72.86	98.54	80.55	55.38	61.79
68	93.02	72.96	98.38	80.43	54.44	60.65
70	92.52	72.90	98.06	80.17	52.96	59.11
72	91.95	73.00	97.80	80.13	52.27	58.04
74	91.60	73.08	97.60	80.12	52.26	57.18
76	91.09	72.99	97.24	79.90	51.44	56.14
78	90.62	73.14	96.93	80.03	51.20	55.47
80	90.05	72.99	96.61	79.86	50.27	54.28
82	89.89	73.46	96.70	80.18	49.95	54.09
84	88.84	72.91	95.85	79.44	49.20	52.77

Junction Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
86	88.19	72.91	95.36	79.34	49.29	52.39
88	87.24	72.52	94.47	78.76	47.54	50.71
90	87.85	73.21	95.26	79.44	46.86	49.97
92	87.07	73.07	94.76	79.17	46.58	49.54
94	86.66	73.01	94.55	79.02	46.20	49.08
96	86.08	73.06	94.22	78.97	45.71	48.38
98	85.39	71.70	93.86	77.87	45.32	47.98
100	84.93	71.58	93.35	77.78	45.04	47.61
102	84.51	71.55	93.22	77.80	44.66	47.27
104	84.13	71.37	93.11	77.65	44.16	46.89
106	82.74	71.42	91.83	77.17	44.60	47.21
108	82.52	71.36	91.89	77.12	44.18	46.87
110	82.07	71.28	91.57	76.93	43.99	46.70
112	81.73	71.35	91.19	76.76	43.58	46.23
114	81.68	71.45	91.05	76.66	43.57	45.96
116	81.51	71.44	90.80	76.49	43.52	45.71
118	81.29	71.31	90.28	76.24	43.52	45.44
120	81.13	71.33	89.82	76.13	43.66	45.36
122	80.87	71.30	89.45	75.97	43.56	45.16
124	81.61	71.76	90.04	76.54	44.98	46.19
126	81.54	71.84	89.95	76.47	45.57	46.53
128	81.36	71.66	89.67	76.22	45.62	46.37
130	80.93	71.30	88.80	75.73	45.76	46.88
132	80.74	70.90	88.57	75.47	45.80	46.77
134	80.57	70.82	88.24	75.34	45.96	46.80
136	80.53	70.78	88.08	75.21	46.02	46.79
138	80.54	70.75	88.03	75.07	46.20	46.81
140	80.51	70.78	87.99	74.99	46.31	46.86
142	80.28	70.36	87.60	74.71	46.27	46.73
144	80.28	70.41	87.47	74.76	46.32	46.82
146	80.31	70.42	87.35	74.79	46.55	46.91
148	80.34	70.39	87.29	74.77	46.56	46.96
150	80.32	70.38	87.22	74.68	46.09	46.65
152	80.35	70.23	87.21	74.54	46.15	46.67
154	80.47	70.39	87.41	74.65	46.28	46.77
156	80.30	70.19	87.09	74.43	46.06	46.66
158	80.37	70.20	87.05	74.45	46.28	46.82
160	80.38	70.12	86.89	74.33	46.41	46.90
162	80.34	69.94	86.77	74.25	46.67	47.08
164	80.18	69.95	86.46	74.17	45.06	46.01

Junction Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
166	80.29	69.99	86.63	74.26	45.34	46.10
168	80.02	69.80	86.41	74.14	45.49	46.21
170	78.79	69.37	85.41	73.22	45.63	46.21
172	78.66	69.30	85.35	73.16	45.88	46.38
174	78.69	69.31	85.47	73.19	46.22	46.62
176	78.47	69.28	85.25	73.14	46.06	46.45
178	78.41	69.20	85.22	73.08	46.41	46.69
180	78.44	69.12	85.20	73.02	46.55	46.80
182	78.78	69.33	85.60	73.32	46.84	46.95
184	78.87	69.31	85.59	73.39	47.01	47.13
186	78.73	69.22	85.35	73.21	47.21	47.28
188	78.52	68.98	85.15	72.94	47.09	47.66
190	78.30	68.70	84.95	72.64	47.37	47.86
192	78.05	68.55	84.67	72.43	47.29	47.85
194	78.32	68.96	84.90	72.74	47.43	47.87
196	78.07	68.30	84.61	72.10	47.41	47.68
198	77.98	68.25	84.38	72.08	47.82	48.01
200	77.96	67.58	84.40	71.64	50.95	50.68
202	77.88	67.47	84.26	71.61	51.03	50.66
204	77.93	67.48	84.23	71.69	51.34	50.88
206	77.95	68.20	84.20	72.41	50.23	49.82
208	78.00	68.36	84.24	72.57	50.67	50.18
210	78.03	68.31	84.29	72.57	50.92	50.32
212	77.93	68.37	84.29	72.54	50.89	50.35
214	77.98	68.37	84.37	72.61	51.26	50.62
216	77.94	68.36	84.33	72.58	51.59	50.81
218	77.88	68.29	84.24	72.59	52.00	51.50
220	78.16	68.49	84.81	72.91	53.32	52.47
222	78.17	68.51	84.69	72.99	53.46	52.56
224	78.13	68.48	84.61	73.04	53.62	52.60
226	78.19	68.49	84.55	73.06	54.11	52.94
228	77.92	67.91	83.93	72.50	53.76	52.83
230	77.98	67.82	83.92	72.47	53.98	53.03
232	77.93	67.74	83.81	72.46	53.94	52.92
234	77.89	67.82	83.77	72.56	54.53	53.35
236	77.85	67.73	83.58	72.51	54.72	53.42
238	77.96	67.71	83.69	72.61	54.63	53.46
240	77.84	67.52	83.49	72.45	54.82	53.61
242	78.07	67.47	83.54	72.39	55.33	54.16
244	77.75	67.33	83.28	72.37	54.97	53.60

Junction Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
246	77.54	67.60	83.18	72.74	54.02	52.94
248	77.56	67.62	83.18	72.78	54.18	53.17
250	77.26	67.43	82.79	72.59	54.27	53.20

Camino Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	8934.42	11742.89	5152.39	12202.96	1210.01	1697.89
8	9718.37	12306.81	6262.13	13069.16	1549.53	1982.93
10	10400.57	12514.36	7237.31	13431.54	1774.88	2191.88
12	10986.32	12539.53	8092.07	13581.06	2058.21	2407.15
14	11550.96	12472.00	8908.81	13625.51	2251.92	2625.85
16	12035.59	12347.28	9652.59	13584.14	2331.95	2737.22
18	12431.87	12190.41	10203.19	13490.87	2506.69	2856.34
20	12731.76	12030.88	10651.52	13383.50	2498.18	2879.84
22	12935.34	11813.08	10975.91	13210.07	2778.99	3046.79
24	13118.24	11661.70	11316.93	13102.27	2903.74	3110.89
26	13237.37	11504.79	11600.59	12978.16	3021.48	3173.20
28	13312.15	11314.60	11832.90	12820.89	3106.17	3219.27
30	13352.44	11125.43	12006.59	12657.72	3184.25	3288.37
32	13372.20	10953.97	12187.34	12533.43	3251.92	3318.46
34	13454.66	10855.71	12423.47	12430.53	3288.78	3334.32
36	13491.21	10693.31	12564.37	12298.45	3309.19	3342.31
38	13513.69	10515.29	12668.28	12130.76	3335.26	3366.04
40	13524.64	10343.23	12758.37	11995.75	3361.85	3383.48
42	13510.26	10226.82	12863.76	11873.26	3363.57	3386.16
44	13493.47	10112.28	12917.73	11728.65	3344.09	3372.45
46	13445.50	10020.44	12950.48	11632.52	3318.66	3346.29
48	13359.56	9909.50	12954.25	11528.75	3293.47	3323.09
50	13327.89	9844.31	13007.53	11448.34	3195.96	3237.22
52	13233.48	9755.58	12989.69	11361.74	3141.30	3197.75
54	13162.03	9681.17	12996.73	11297.78	3107.96	3169.80
56	13068.19	9579.37	12985.44	11229.10	3074.32	3142.68
58	12954.03	9437.65	12953.56	11132.47	3039.37	3108.92
60	12855.96	9359.69	12950.86	11084.92	3023.36	3088.63
62	12754.33	9287.44	12931.24	11041.61	3003.50	3067.38
64	12622.80	9213.36	12863.25	10963.16	2983.43	3047.31
66	12530.13	9152.59	12851.06	10912.61	2959.79	3024.27
68	12443.55	9145.18	12835.57	10861.12	2962.26	3018.79
70	12349.47	9136.77	12794.63	10796.32	2938.29	2996.41
72	12253.63	9135.31	12759.36	10773.94	2938.97	2988.52
74	12163.66	9127.52	12713.32	10762.83	3031.17	3025.77
76	12066.77	9105.63	12658.98	10726.04	3014.61	3010.93
78	11975.47	9098.74	12604.00	10704.87	3021.72	3006.93
80	11880.09	9070.95	12544.23	10657.13	3010.68	2990.51
82	11791.46	9104.37	12479.14	10648.03	3004.34	2985.40
84	11701.21	9090.37	12403.83	10599.20	2994.82	2970.59

Camino Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	11607.82	9075.74	12327.44	10556.05	3001.17	2967.32
88	11423.04	8957.20	12154.07	10367.11	2832.70	2809.25
90	11609.47	9129.74	12346.48	10541.93	2771.52	2761.84
92	11482.20	9084.71	12229.30	10469.23	2755.20	2751.56
94	11399.94	9073.61	12162.54	10432.04	2735.19	2735.21
96	11312.36	9062.61	12098.81	10390.84	2717.82	2713.94
98	11199.29	8847.85	12000.71	10246.88	2691.18	2691.80
100	11123.96	8838.67	11907.66	10223.08	2672.24	2677.81
102	11051.95	8823.00	11855.00	10199.07	2656.96	2671.28
104	10991.12	8803.72	11809.30	10169.19	2637.43	2659.10
106	10675.06	8839.34	11465.55	10057.01	2704.99	2710.13
108	10626.71	8850.15	11425.03	10046.31	2681.76	2696.97
110	10551.03	8853.38	11346.15	10021.83	2676.38	2690.64
112	10500.46	8877.18	11273.47	10010.38	2662.55	2672.53
114	10479.62	8901.58	11224.77	9995.88	2650.48	2656.32
116	10435.87	8903.93	11162.79	9966.02	2634.62	2640.41
118	10411.24	8910.48	11094.71	9957.90	2622.07	2624.28
120	10385.34	8927.50	11027.11	9949.59	2616.17	2620.10
122	10335.97	8935.95	10964.31	9930.35	2592.70	2605.13
124	10478.29	8966.48	11110.03	10022.86	2715.55	2711.80
126	10453.50	8969.84	11079.83	9999.51	2706.99	2709.73
128	10411.69	8940.07	11027.96	9957.66	2685.51	2692.32
130	10361.68	8912.51	10892.66	9889.16	2575.73	2632.10
132	10346.01	8876.33	10864.95	9856.53	2564.04	2621.27
134	10316.64	8851.26	10814.73	9821.50	2556.28	2616.02
136	10315.18	8839.51	10792.45	9807.40	2546.26	2611.66
138	10314.85	8839.95	10784.71	9782.83	2551.36	2612.44
140	10304.86	8843.31	10758.32	9765.59	2548.89	2610.09
142	10261.74	8805.87	10705.43	9723.06	2537.13	2599.04
144	10255.97	8821.05	10694.03	9732.33	2535.37	2599.67
146	10250.01	8823.88	10681.90	9736.73	2532.79	2597.92
148	10259.86	8824.76	10676.24	9740.02	2528.43	2596.83
150	10244.12	8810.85	10654.17	9723.71	2513.96	2589.46
152	10246.01	8809.70	10646.71	9733.97	2503.48	2582.46
154	10242.46	8816.37	10650.07	9731.60	2500.92	2583.20
156	10212.03	8783.07	10614.54	9699.54	2486.76	2576.36
158	10202.62	8787.01	10611.18	9704.78	2490.20	2581.47
160	10193.49	8776.49	10600.58	9682.94	2479.94	2575.08
162	10167.31	8756.96	10572.44	9664.53	2480.65	2578.89

Camino Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
164	10164.48	8781.53	10564.68	9680.90	2444.04	2558.37
166	10149.49	8772.76	10563.75	9676.07	2449.68	2559.67
168	10122.49	8750.21	10543.18	9668.57	2446.10	2556.48
170	9856.17	8663.85	10329.21	9443.28	2455.74	2560.27
172	9827.81	8652.49	10309.12	9439.31	2464.09	2565.69
174	9809.19	8653.67	10305.17	9443.31	2475.75	2572.22
176	9797.95	8686.06	10292.48	9471.34	2467.27	2561.81
178	9776.77	8692.13	10274.11	9471.01	2483.84	2572.21
180	9763.33	8689.64	10255.14	9463.50	2491.28	2579.44
182	9758.03	8696.16	10253.60	9470.66	2497.98	2578.94
184	9756.50	8714.14	10243.81	9484.90	2509.87	2590.64
186	9738.41	8722.04	10221.33	9486.40	2521.99	2598.88
188	9714.46	8722.01	10200.67	9480.65	2528.77	2615.22
190	9695.39	8712.90	10190.48	9471.13	2536.09	2617.64
192	9665.24	8714.72	10164.06	9465.55	2544.62	2625.63
194	9662.04	8758.73	10164.40	9502.33	2556.74	2633.37
196	9627.78	8731.36	10139.26	9476.31	2559.29	2624.65
198	9613.70	8736.12	10115.63	9482.53	2585.01	2643.81
200	9616.70	8722.69	10160.23	9496.05	2790.49	2816.14
202	9585.29	8712.33	10129.57	9493.58	2794.23	2814.74
204	9578.21	8728.22	10123.91	9517.55	2819.07	2830.29
206	9553.28	8769.91	10100.67	9564.58	2798.85	2805.35
208	9550.71	8800.69	10102.98	9597.86	2831.00	2829.92
210	9536.76	8831.37	10095.49	9628.77	2853.25	2844.16
212	9513.71	8839.88	10083.56	9629.93	2852.64	2843.18
214	9504.06	8855.34	10078.87	9649.87	2878.76	2861.52
216	9495.39	8867.97	10069.24	9667.74	2907.64	2882.70
218	9482.19	8859.26	10047.95	9685.60	2939.60	2944.77
220	9534.85	8943.99	10164.59	9809.10	3075.49	3054.38
222	9521.33	8952.87	10127.62	9833.29	3079.40	3054.46
224	9514.48	8963.50	10117.26	9866.27	3107.63	3073.56
226	9513.63	8966.38	10109.02	9879.88	3139.37	3096.41
228	9501.77	8939.47	10086.86	9866.37	3134.49	3093.18
230	9495.58	8937.04	10071.58	9877.89	3158.18	3112.53
232	9490.12	8931.12	10061.77	9886.39	3155.33	3106.26
234	9490.28	8945.50	10071.88	9913.06	3186.11	3130.78
236	9482.56	8955.25	10055.84	9927.77	3214.33	3149.89
238	9479.44	8944.59	10067.05	9933.31	3206.96	3143.41
240	9470.95	8937.24	10063.38	9931.28	3232.29	3161.95
242	9456.08	8919.55	10049.52	9921.18	3232.26	3160.25

Camino Dam Reach
Silver Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
244	9435.32	8902.45	10034.19	9917.26	3250.58	3173.14
246	9418.49	8901.97	10032.33	9936.95	3226.04	3152.10
248	9419.42	8904.42	10033.00	9947.52	3242.73	3170.54
250	9386.90	8885.73	10005.08	9936.35	3262.85	3187.45

Camino Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
6	66.06	93.65	39.61	89.56	35.97	50.14
8	71.86	98.14	48.14	95.92	46.07	58.56
10	76.90	99.80	55.64	98.58	52.77	64.73
12	81.23	100.00	62.21	99.67	61.19	71.09
14	85.41	99.46	68.49	100.00	66.95	77.55
16	88.99	98.47	74.21	99.70	69.33	80.84
18	91.92	97.22	78.44	99.01	74.52	84.35
20	94.14	95.94	81.89	98.22	74.27	85.05
22	95.64	94.21	84.38	96.95	82.62	89.98
24	97.00	93.00	87.00	96.16	86.33	91.87
26	97.88	91.75	89.18	95.25	89.83	93.71
28	98.43	90.23	90.97	94.09	92.35	95.07
30	98.73	88.72	92.30	92.90	94.67	97.11
32	98.87	87.36	93.69	91.99	96.68	98.00
34	99.48	86.57	95.51	91.23	97.78	98.47
36	99.75	85.28	96.59	90.26	98.38	98.70
38	99.92	83.86	97.39	89.03	99.16	99.41
40	100.00	82.48	98.08	88.04	99.95	99.92
42	99.89	81.56	98.89	87.14	100.00	100.00
44	99.77	80.64	99.31	86.08	99.42	99.59
46	99.41	79.91	99.56	85.37	98.66	98.82
48	98.78	79.03	99.59	84.61	97.92	98.14
50	98.55	78.51	100.00	84.02	95.02	95.60
52	97.85	77.80	99.86	83.39	93.39	94.44
54	97.32	77.21	99.92	82.92	92.40	93.61
56	96.63	76.39	99.83	82.41	91.40	92.81
58	95.78	75.26	99.59	81.70	90.36	91.81
60	95.06	74.64	99.56	81.35	89.89	91.21
62	94.30	74.07	99.41	81.04	89.29	90.59
64	93.33	73.47	98.89	80.46	88.70	89.99
66	92.65	72.99	98.80	80.09	88.00	89.31
68	92.01	72.93	98.68	79.71	88.07	89.15
70	91.31	72.86	98.36	79.24	87.36	88.49
72	90.60	72.85	98.09	79.07	87.38	88.26
74	89.94	72.79	97.74	78.99	90.12	89.36
76	89.22	72.62	97.32	78.72	89.63	88.92
78	88.55	72.56	96.90	78.56	89.84	88.80
80	87.84	72.34	96.44	78.21	89.51	88.32
82	87.19	72.61	95.94	78.15	89.32	88.16
84	86.52	72.49	95.36	77.79	89.04	87.73

Camino Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
86	85.83	72.38	94.77	77.47	89.23	87.63
88	84.46	71.43	93.44	76.09	84.22	82.96
90	85.84	72.81	94.92	77.37	82.40	81.56
92	84.90	72.45	94.02	76.84	81.91	81.26
94	84.29	72.36	93.50	76.56	81.32	80.78
96	83.64	72.27	93.01	76.26	80.80	80.15
98	82.81	70.56	92.26	75.20	80.01	79.49
100	82.25	70.49	91.54	75.03	79.45	79.08
102	81.72	70.36	91.14	74.85	78.99	78.89
104	81.27	70.21	90.79	74.63	78.41	78.53
106	78.93	70.49	88.15	73.81	80.42	80.04
108	78.57	70.58	87.83	73.73	79.73	79.65
110	78.01	70.60	87.23	73.55	79.57	79.46
112	77.64	70.79	86.67	73.47	79.16	78.93
114	77.49	70.99	86.29	73.36	78.80	78.45
116	77.16	71.01	85.82	73.14	78.33	77.98
118	76.98	71.06	85.29	73.08	77.95	77.50
120	76.79	71.19	84.77	73.02	77.78	77.38
122	76.42	71.26	84.29	72.88	77.08	76.93
124	77.48	71.51	85.41	73.56	80.73	80.08
126	77.29	71.53	85.18	73.39	80.48	80.02
128	76.98	71.30	84.78	73.08	79.84	79.51
130	76.61	71.08	83.74	72.58	76.58	77.73
132	76.50	70.79	83.53	72.34	76.23	77.41
134	76.28	70.59	83.14	72.08	76.00	77.26
136	76.27	70.49	82.97	71.98	75.70	77.13
138	76.27	70.50	82.91	71.80	75.85	77.15
140	76.19	70.52	82.71	71.67	75.78	77.08
142	75.87	70.22	82.30	71.36	75.43	76.75
144	75.83	70.35	82.21	71.43	75.38	76.77
146	75.79	70.37	82.12	71.46	75.30	76.72
148	75.86	70.38	82.08	71.48	75.17	76.69
150	75.74	70.26	81.91	71.36	74.74	76.47
152	75.76	70.26	81.85	71.44	74.43	76.27
154	75.73	70.31	81.88	71.42	74.35	76.29
156	75.51	70.04	81.60	71.19	73.93	76.08
158	75.44	70.07	81.58	71.23	74.03	76.24
160	75.37	69.99	81.50	71.06	73.73	76.05
162	75.18	69.83	81.28	70.93	73.75	76.16

Camino Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
164	75.16	70.03	81.22	71.05	72.66	75.55
166	75.04	69.96	81.21	71.01	72.83	75.59
168	74.84	69.78	81.05	70.96	72.72	75.50
170	72.88	69.09	79.41	69.31	73.01	75.61
172	72.67	69.00	79.26	69.28	73.26	75.77
174	72.53	69.01	79.22	69.31	73.60	75.96
176	72.45	69.27	79.13	69.51	73.35	75.66
178	72.29	69.32	78.99	69.51	73.85	75.96
180	72.19	69.30	78.84	69.45	74.07	76.18
182	72.15	69.35	78.83	69.51	74.27	76.16
184	72.14	69.49	78.75	69.61	74.62	76.51
186	72.00	69.56	78.58	69.62	74.98	76.75
188	71.83	69.56	78.42	69.58	75.18	77.23
190	71.69	69.48	78.34	69.51	75.40	77.30
192	71.46	69.50	78.14	69.47	75.65	77.54
194	71.44	69.85	78.14	69.74	76.01	77.77
196	71.19	69.63	77.95	69.55	76.09	77.51
198	71.08	69.67	77.77	69.59	76.85	78.08
200	71.11	69.56	78.11	69.69	82.96	83.17
202	70.87	69.48	77.87	69.68	83.07	83.12
204	70.82	69.61	77.83	69.85	83.81	83.58
206	70.64	69.94	77.65	70.20	83.21	82.85
208	70.62	70.18	77.67	70.44	84.17	83.57
210	70.51	70.43	77.61	70.67	84.83	83.99
212	70.34	70.50	77.52	70.68	84.81	83.96
214	70.27	70.62	77.48	70.82	85.59	84.51
216	70.21	70.72	77.41	70.95	86.44	85.13
218	70.11	70.65	77.25	71.08	87.40	86.96
220	70.50	71.33	78.14	71.99	91.44	90.20
222	70.40	71.40	77.86	72.17	91.55	90.20
224	70.35	71.48	77.78	72.41	92.39	90.77
226	70.34	71.50	77.72	72.51	93.33	91.44
228	70.26	71.29	77.55	72.41	93.19	91.35
230	70.21	71.27	77.43	72.50	93.89	91.92
232	70.17	71.22	77.35	72.56	93.81	91.73
234	70.17	71.34	77.43	72.75	94.72	92.46
236	70.11	71.42	77.31	72.86	95.56	93.02
238	70.09	71.33	77.39	72.90	95.34	92.83
240	70.03	71.27	77.37	72.89	96.10	93.38
242	69.92	71.13	77.26	72.81	96.10	93.33

Camino Dam Reach
Silver Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
244	69.76	71.00	77.14	72.78	96.64	93.71
246	69.64	70.99	77.13	72.93	95.91	93.09
248	69.65	71.01	77.13	73.01	96.41	93.63
250	69.41	70.86	76.92	72.92	97.01	94.13

Brush Creek Dam Reach
Brush Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	2322.12	5116.11	1623.06	5266.49	446.50	484.93
3	2635.21	5432.40	2177.67	5660.50	540.81	608.92
4	2856.67	5544.76	2614.44	5901.99	614.50	696.25
5	3001.71	5562.30	2968.03	6021.44	673.52	755.38
6	3078.56	5545.77	3162.44	6072.80	722.08	791.59
7	3148.85	5476.39	3325.30	6030.40	735.60	810.72
8	3204.35	5439.36	3479.60	6024.56	734.18	812.83
9	3241.66	5386.98	3600.68	5981.28	710.06	804.50
10	3284.24	5365.50	3725.79	5954.59	696.88	794.57
11	3306.13	5345.56	3833.23	5913.65	653.88	766.67
12	3355.14	5301.05	3950.15	5878.32	648.69	754.94
13	3387.57	5245.53	4028.84	5821.67	645.81	740.00
14	3416.81	5223.71	4128.85	5773.61	673.98	736.35
15	3454.78	5209.65	4217.37	5756.34	667.10	720.97
16	3484.28	5179.97	4305.06	5722.13	652.42	706.38
17	3496.76	5146.84	4352.36	5673.02	643.18	691.28
18	3539.80	5125.96	4429.27	5658.38	642.23	682.23
19	3601.20	5113.63	4466.68	5661.71	644.00	677.20
20	3643.24	5085.17	4525.54	5643.03	647.36	673.78
21	3653.84	5045.40	4561.15	5601.53	653.37	672.55
22	3667.82	5020.90	4625.46	5579.22	661.64	671.34
23	3680.68	4989.47	4657.93	5542.40	675.82	677.65
24	3704.75	4942.65	4692.64	5517.52	693.51	682.42
25	3667.98	4897.83	4689.05	5451.84	700.17	684.68
26	3691.55	4862.47	4699.75	5431.49	719.04	693.74
27	3703.73	4811.05	4696.76	5399.67	733.97	698.74
28	3715.84	4766.32	4705.59	5378.55	751.16	706.89
29	3729.06	4738.37	4722.27	5353.74	745.67	698.93
30	3819.68	4728.13	4778.95	5385.15	760.81	708.63
31	3801.71	4667.82	4724.50	5339.21	753.36	702.63
32	3717.64	4607.39	4686.33	5261.76	779.27	721.95
33	3697.39	4571.50	4682.97	5228.00	784.56	723.84
34	3698.48	4537.40	4706.79	5216.73	793.66	730.56
35	3692.68	4478.13	4702.30	5191.15	798.25	733.92
36	3686.24	4428.45	4694.31	5156.84	800.79	735.53
37	3683.71	4382.88	4686.79	5125.04	807.22	739.47
38	3678.68	4333.31	4678.69	5092.36	806.67	741.80
39	3674.77	4284.52	4670.45	5068.48	807.23	743.03
40	3680.20	4226.18	4668.74	5049.93	806.57	745.33
41	3679.37	4168.15	4653.12	5012.41	803.29	743.39

Brush Creek Dam Reach
Brush Creek

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
42	3651.95	4121.56	4612.98	4978.67	799.75	738.52
43	3643.63	4065.80	4599.28	4945.14	801.39	740.81
44	3629.48	4014.25	4581.49	4904.66	798.70	740.24
45	3625.61	3974.11	4574.41	4876.88	795.29	739.36

Brush Creek Dam Reach
Brush Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
2	60.79	91.98	33.96	86.72	55.31	59.66
3	68.99	97.66	45.57	93.21	67.00	74.91
4	74.79	99.68	54.71	97.19	76.12	85.66
5	78.59	100.00	62.11	99.15	83.44	92.93
6	80.60	99.70	66.17	100.00	89.45	97.39
7	82.44	98.46	69.58	99.30	91.13	99.74
8	83.89	97.79	72.81	99.21	90.95	100.00
9	84.87	96.85	75.34	98.49	87.96	98.97
10	85.98	96.46	77.96	98.05	86.33	97.75
11	86.56	96.10	80.21	97.38	81.00	94.32
12	87.84	95.30	82.66	96.80	80.36	92.88
13	88.69	94.31	84.30	95.86	80.00	91.04
14	89.45	93.91	86.40	95.07	83.49	90.59
15	90.45	93.66	88.25	94.79	82.64	88.70
16	91.22	93.13	90.08	94.23	80.82	86.90
17	91.55	92.53	91.07	93.42	79.68	85.05
18	92.67	92.16	92.68	93.18	79.56	83.93
19	94.28	91.93	93.47	93.23	79.78	83.31
20	95.38	91.42	94.70	92.92	80.20	82.89
21	95.66	90.71	95.44	92.24	80.94	82.74
22	96.02	90.27	96.79	91.87	81.96	82.59
23	96.36	89.70	97.47	91.27	83.72	83.37
24	96.99	88.86	98.19	90.86	85.91	83.96
25	96.03	88.05	98.12	89.77	86.74	84.23
26	96.65	87.42	98.34	89.44	89.07	85.35
27	96.96	86.49	98.28	88.92	90.93	85.96
28	97.28	85.69	98.47	88.57	93.05	86.97
29	97.63	85.19	98.81	88.16	92.37	85.99
30	100.00	85.00	100.00	88.68	94.25	87.18
31	99.53	83.92	98.86	87.92	93.33	86.44
32	97.33	82.83	98.06	86.64	96.54	88.82
33	96.80	82.19	97.99	86.09	97.19	89.05
34	96.83	81.57	98.49	85.90	98.32	89.88
35	96.68	80.51	98.40	85.48	98.89	90.29
36	96.51	79.62	98.23	84.92	99.20	90.49
37	96.44	78.80	98.07	84.39	100.00	90.97
38	96.31	77.90	97.90	83.86	99.93	91.26
39	96.21	77.03	97.73	83.46	100.00	91.41
40	96.35	75.98	97.69	83.16	99.92	91.70
41	96.33	74.94	97.37	82.54	99.51	91.46

Brush Creek Dam Reach
Brush Creek

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
42	95.61	74.10	96.53	81.98	99.07	90.86
43	95.39	73.10	96.24	81.43	99.28	91.14
44	95.02	72.17	95.87	80.76	98.94	91.07
45	94.92	71.45	95.72	80.31	98.52	90.96

Slab Creek Dam Reach
SF American River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
12	11114.16	22259.85	7053.94	23452.95	808.93	440.95
16	13020.40	23079.42	8920.66	25036.09	1051.23	584.30
20	14733.36	23561.82	10585.18	26140.56	1285.46	676.30
24	16401.03	23460.26	12205.44	26473.74	1546.45	824.86
28	17723.49	23168.99	13506.43	26498.62	1636.78	909.23
32	18905.79	22682.30	15013.01	26273.02	1955.44	1021.95
36	19966.33	22228.18	16287.46	26098.27	2027.77	1092.66
40	20889.37	21864.50	17455.12	25931.90	1882.88	974.83
44	21703.25	21568.25	18554.72	25801.80	1911.89	998.23
48	22416.96	21033.50	19604.38	25439.27	1943.50	992.47
52	23066.38	20543.55	20573.64	25100.04	2035.29	1076.92
56	23561.28	20054.41	21350.94	24726.74	2108.53	1143.08
60	24124.71	19573.53	22134.60	24430.10	2145.10	1208.99
64	24570.98	19058.44	22772.80	24013.52	2197.92	1281.63
68	24860.93	18580.76	23231.78	23625.90	2251.43	1348.27
72	25155.86	18104.47	23790.11	23212.85	2295.73	1399.75
76	25628.05	17529.01	24566.19	22680.45	2342.22	1442.29
80	25870.25	17132.93	25073.89	22321.00	2375.53	1486.36
84	26041.32	16671.11	25468.26	21930.36	2381.02	1511.29
88	26342.57	16171.31	25931.25	21478.60	2394.99	1565.98
92	26435.46	15794.74	26247.51	21059.91	2434.97	1617.92
96	26559.04	15433.85	26589.92	20672.36	2462.68	1662.90
100	26620.40	15111.55	26897.64	20279.90	2509.61	1711.99
104	26655.73	14753.67	27165.99	19855.79	2504.13	1731.68
108	26612.73	14450.63	27335.55	19445.68	2484.37	1732.12
112	26642.89	14098.56	27536.65	19010.77	2505.31	1761.15
116	26647.09	13845.18	27697.35	18667.81	2531.34	1800.94
120	26655.83	13825.13	27928.96	18533.00	2520.24	1782.64
124	26621.52	13588.53	28053.78	18164.89	2518.16	1801.87
128	26468.51	13301.49	28043.48	17750.62	2527.65	1839.20
132	26415.98	13039.71	28096.83	17423.79	2463.32	1804.57
136	26234.26	12886.81	28093.76	17159.99	2521.23	1874.72
140	26146.92	12629.10	28136.60	16834.49	2506.63	1880.25
144	26036.23	12290.55	28155.83	16456.66	2549.76	1929.09
148	25963.80	12062.31	28191.76	16149.09	2564.98	1934.40
152	25857.27	11864.78	28183.20	15862.33	2580.42	1935.68
156	25768.16	11687.51	28185.87	15585.40	2571.15	1925.19
160	25670.54	11524.90	28177.77	15313.80	2569.06	1919.89
164	25601.43	11390.50	28210.63	15092.48	2576.18	1922.76
168	25535.81	11248.55	28245.75	14873.55	2570.25	1928.01

Slab Creek Dam Reach
SF American River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
172	25448.35	11118.64	28197.81	14666.68	2555.38	1933.89
176	25368.05	11008.28	28157.81	14471.05	2545.99	1939.69
180	25308.21	10897.96	28129.82	14285.52	2537.44	1950.90
184	25266.08	10792.41	28099.92	14102.69	2518.95	1958.94
188	25193.63	10720.60	28051.97	13942.60	2521.19	1968.90
192	25097.97	10651.35	27939.38	13788.68	2508.93	1970.83
196	25020.31	10564.19	27891.23	13644.64	2494.09	1973.91
200	24918.60	10551.77	27867.72	13535.82	2571.66	1977.50
204	24841.77	10460.72	27810.27	13391.69	2521.55	1968.60
208	24758.47	10398.42	27751.10	13268.26	2523.67	1977.82
212	24682.19	10325.18	27684.89	13143.93	2510.86	1971.84
216	24647.80	10275.44	27662.31	13058.59	2511.19	1980.22
220	24615.74	10134.96	27660.65	12920.99	2425.95	1983.40
224	24512.00	10063.31	27587.78	12816.71	2417.53	1985.65
228	24463.04	10011.56	27572.39	12682.06	2425.79	1986.89
232	24388.36	9949.76	27483.77	12576.56	2417.51	1981.30
236	24303.06	9886.99	27416.86	12487.91	2419.40	1976.42
240	24259.62	9810.40	27387.76	12385.00	2401.33	1961.35
244	24201.95	9731.04	27353.14	12270.38	2396.13	1954.95
248	24141.90	9674.88	27305.91	12169.38	2398.06	1950.70
252	24111.94	9614.76	27267.28	12053.07	2398.98	1943.64
256	24067.49	9563.50	27208.20	11963.65	2405.59	1946.43
260	24116.37	9415.59	27215.36	11763.98	2465.87	2018.68
264	24096.66	9340.23	27161.70	11652.66	2475.27	2023.73
268	24048.83	9287.88	27090.55	11564.91	2475.66	2020.75
272	23999.63	9224.91	27039.33	11470.39	2493.71	2027.04
276	23943.23	9163.09	27002.09	11376.20	2491.29	2018.88
280	23898.89	9114.41	26979.54	11287.38	2505.01	2021.95
284	23834.33	9051.25	26949.47	11195.03	2512.09	2025.47
288	23789.97	8975.62	26919.63	11101.03	2514.47	2027.75
292	23723.22	8922.65	26861.01	11025.62	2519.60	2030.53
296	23642.24	8874.83	26794.65	10955.88	2530.74	2031.75
300	23592.04	8810.38	26752.12	10857.82	2532.96	2036.06
304	23555.40	8765.11	26719.22	10774.11	2544.23	2038.65
308	23504.12	8715.10	26677.45	10681.69	2550.95	2044.21
312	23445.65	8664.55	26612.44	10598.66	2557.43	2043.77
316	23398.03	8618.88	26521.73	10530.27	2566.17	2047.29
320	23329.11	8571.04	26404.97	10459.36	2576.11	2051.55
324	23281.11	8522.74	26291.72	10385.22	2582.30	2059.21
328	23241.06	8487.84	26248.08	10329.96	2582.40	2058.87

Slab Creek Dam Reach
SF American River

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA Rainbow Trout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
332	23220.12	8448.19	26239.01	10258.31	2596.72	2067.68
336	23172.80	8404.99	26232.65	10190.47	2607.69	2074.94
340	23096.61	8380.20	26201.63	10143.37	2608.73	2077.18
344	23037.86	8337.54	26183.84	10075.95	2616.47	2081.79
348	23035.20	8307.03	26234.31	10048.41	2560.64	2069.65
352	22983.89	8263.81	26199.23	9988.25	2567.20	2076.30
356	22928.99	8201.28	26147.78	9917.05	2578.94	2069.63
360	22861.84	8172.06	26120.17	9870.15	2603.12	2072.66
364	22841.94	8137.18	26123.49	9810.12	2608.05	2081.79
368	22801.07	8114.37	26106.11	9766.97	2616.62	2086.18
372	22731.53	8082.78	26059.76	9711.88	2620.56	2093.15
376	22674.31	8050.28	26007.33	9655.53	2629.23	2099.28
380	22615.07	8014.39	25999.06	9594.26	2627.38	2102.75
384	22559.11	7981.67	25976.68	9537.87	2636.26	2111.06
388	22503.16	7944.50	25952.52	9473.21	2635.56	2116.21

Slab Creek Dam Reach
SF American River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
12	41.70	94.47	24.97	88.51	30.68	20.84
16	48.85	97.95	31.58	94.48	39.88	27.61
20	55.27	100.00	37.48	98.65	48.76	31.96
24	61.53	99.57	43.21	99.91	58.66	38.98
28	66.49	98.33	47.82	100.00	62.09	42.97
32	70.93	96.27	53.15	99.15	74.18	48.29
36	74.90	94.34	57.66	98.49	76.92	51.63
40	78.37	92.80	61.80	97.86	71.42	46.06
44	81.42	91.54	65.69	97.37	72.52	47.17
48	84.10	89.27	69.41	96.00	73.72	46.90
52	86.53	87.19	72.84	94.72	77.20	50.89
56	88.39	85.11	75.59	93.31	79.98	54.02
60	90.50	83.07	78.36	92.19	81.37	57.13
64	92.18	80.89	80.62	90.62	83.37	60.56
68	93.27	78.86	82.25	89.16	85.40	63.71
72	94.37	76.84	84.23	87.60	87.08	66.14
76	96.14	74.40	86.97	85.59	88.85	68.15
80	97.05	72.71	88.77	84.23	90.11	70.24
84	97.69	70.75	90.17	82.76	90.32	71.41
88	98.82	68.63	91.81	81.06	90.85	74.00
92	99.17	67.04	92.93	79.48	92.36	76.45
96	99.64	65.50	94.14	78.01	93.42	78.58
100	99.87	64.14	95.23	76.53	95.20	80.90
104	100.00	62.62	96.18	74.93	94.99	81.83
108	99.84	61.33	96.78	73.38	94.24	81.85
112	99.95	59.84	97.49	71.74	95.03	83.22
116	99.97	58.76	98.06	70.45	96.02	85.10
120	100.00	58.68	98.88	69.94	95.60	84.24
124	99.87	57.67	99.32	68.55	95.52	85.15
128	99.30	56.45	99.28	66.99	95.88	86.91
132	99.10	55.34	99.47	65.75	93.44	85.27
136	98.42	54.69	99.46	64.76	95.64	88.59
140	98.09	53.60	99.61	63.53	95.08	88.85
144	97.68	52.16	99.68	62.10	96.72	91.16
148	97.40	51.19	99.81	60.94	97.30	91.41
152	97.00	50.36	99.78	59.86	97.88	91.47
156	96.67	49.60	99.79	58.82	97.53	90.97
160	96.30	48.91	99.76	57.79	97.45	90.72
164	96.04	48.34	99.88	56.96	97.72	90.86
168	95.80	47.74	100.00	56.13	97.50	91.11

Slab Creek Dam Reach
SF American River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
172	95.47	47.19	99.83	55.35	96.93	91.38
176	95.17	46.72	99.69	54.61	96.58	91.66
180	94.94	46.25	99.59	53.91	96.25	92.19
184	94.79	45.80	99.48	53.22	95.55	92.57
188	94.51	45.50	99.31	52.62	95.64	93.04
192	94.16	45.21	98.92	52.04	95.17	93.13
196	93.86	44.84	98.74	51.49	94.61	93.28
200	93.48	44.78	98.66	51.08	97.55	93.45
204	93.19	44.40	98.46	50.54	95.65	93.02
208	92.88	44.13	98.25	50.07	95.73	93.46
212	92.60	43.82	98.01	49.60	95.24	93.18
216	92.47	43.61	97.93	49.28	95.26	93.57
220	92.35	43.01	97.93	48.76	92.02	93.72
224	91.96	42.71	97.67	48.37	91.70	93.83
228	91.77	42.49	97.62	47.86	92.02	93.89
232	91.49	42.23	97.30	47.46	91.70	93.63
236	91.17	41.96	97.07	47.13	91.77	93.39
240	91.01	41.64	96.96	46.74	91.09	92.68
244	90.79	41.30	96.84	46.31	90.89	92.38
248	90.57	41.06	96.67	45.92	90.96	92.18
252	90.46	40.81	96.54	45.49	91.00	91.85
256	90.29	40.59	96.33	45.15	91.25	91.98
260	90.47	39.96	96.35	44.39	93.54	95.39
264	90.40	39.64	96.16	43.97	93.89	95.63
268	90.22	39.42	95.91	43.64	93.91	95.49
272	90.04	39.15	95.73	43.29	94.59	95.79
276	89.82	38.89	95.60	42.93	94.50	95.40
280	89.66	38.68	95.52	42.60	95.02	95.55
284	89.42	38.41	95.41	42.25	95.29	95.71
288	89.25	38.09	95.31	41.89	95.38	95.82
292	89.00	37.87	95.10	41.61	95.57	95.95
296	88.69	37.67	94.86	41.35	96.00	96.01
300	88.51	37.39	94.71	40.98	96.08	96.21
304	88.37	37.20	94.60	40.66	96.51	96.33
308	88.18	36.99	94.45	40.31	96.76	96.60
312	87.96	36.77	94.22	40.00	97.01	96.58
316	87.78	36.58	93.90	39.74	97.34	96.74
320	87.52	36.38	93.48	39.47	97.72	96.94
324	87.34	36.17	93.08	39.19	97.95	97.31
328	87.19	36.02	92.93	38.98	97.96	97.29

Slab Creek Dam Reach
SF American River

Discharge	% MAX Brown Trout - Adult	% MAX Brown Trout - Juvenile	% MAX Rainbow Trout - Adult	% MAX Rainbow Trout - Juvenile	% MAX Brown Trout - Spawning	% MAX Rainbow Trout - Spawning
332	87.11	35.86	92.90	38.71	98.50	97.71
336	86.93	35.67	92.87	38.46	98.92	98.05
340	86.65	35.57	92.76	38.28	98.96	98.16
344	86.43	35.39	92.70	38.02	99.25	98.37
348	86.42	35.26	92.88	37.92	97.13	97.80
352	86.22	35.07	92.75	37.69	97.38	98.11
356	86.02	34.81	92.57	37.42	97.83	97.80
360	85.77	34.68	92.47	37.25	98.74	97.94
364	85.69	34.54	92.49	37.02	98.93	98.37
368	85.54	34.44	92.42	36.86	99.26	98.58
372	85.28	34.30	92.26	36.65	99.40	98.91
376	85.06	34.17	92.08	36.44	99.73	99.20
380	84.84	34.01	92.05	36.21	99.66	99.36
384	84.63	33.88	91.97	35.99	100.00	99.76
388	84.42	33.72	91.88	35.75	99.97	100.00

APPENDIX D

WEIGHTED USABLE AREA
TABULAR RESULTS BY HABITAT TYPE

- Loon Lake Dam Reach, Gerle Creek at Wentworth – Low Gradient Riffle
- Loon Lake Dam Reach, Gerle Creek at Wentworth – Run
- Loon Lake Dam Reach, Gerle Creek at Gerle Meadow – Run
- Gerle Creek at Gerle Meadow – Pool
- Gerle Creek below Ice House Bridge – Low Gradient Riffle
- Gerle Creek below Ice House Bridge – Run
- Gerle Creek Dam Reach, Lower Gerle Creek – Pool
- Gerle Creek Dam Reach, Lower Gerle Creek – Pocket Water
- Robbs Peak Dam Reach, Upper SF Rubicon River – Lower Gradient Riffle
- Robbs Peak Dam Reach, Upper SF Rubicon River – Run
- Robbs Peak Dam Reach, Lower SF Rubicon River – Low Gradient Riffle
- Robbs Peak Dam Reach, Lower SF Rubicon River – Run
- Robbs Peak Dam Reach, Lower SF Rubicon River – Pool
- Ice House Dam Reach, Upper SF Silver Creek – Low Gradient Riffle
- Ice House Dam Reach, Upper SF Silver Creek – Run
- Ice House Dam Reach, Upper SF Silver Creek – Pool
- Ice House Dam Reach, Upper SF Silver Creek – Spawning Riffle
- Ice House Dam Reach, Lower SF Silver Creek – Low Gradient Riffle
- Ice House Dam Reach, Lower SF Silver Creek – Run
- Junction Dam Reach, Silver Creek – Low Gradient Riffle
- Junction Dam Reach, Silver Creek – Run
- Junction Dam Reach, Silver Creek – Pool
- Camino Dam Reach, Silver Creek – Low Gradient Riffle
- Camino Dam Reach, Silver Creek – Run
- Camino Dam Reach, Silver Creek – Pool
- Brush Creek Dam Reach, Brush Creek – Low Gradient Riffle
- Brush Creek Dam Reach, Brush Creek – Run
- Brush Creek Dam Reach, Brush Creek – Pool
- Slab Creek Dam Reach, SF American River – Low Gradient Riffle
- Slab Creek Dam Reach, SF American River – Run
- Slab Creek Dam Reach, SF American River – Pool

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WEIGHTED USABLE AREA TABULAR RESULTS BY HABITAT TYPE

Loon Lake Dam Reach
Gerle Creek at Wentworth - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	68	557	77	566	1598	1583
6	89	609	105	640	1705	1709
7	101	644	116	695	1917	1941
8	114	666	135	740	2110	2149
9	126	706	182	791	2355	2382
10	159	850	257	933	2382	2435
11	164	814	296	891	2587	2636
12	185	924	306	957	2704	2780
13	201	1036	313	1051	2799	2897
14	224	1142	346	1158	2863	2991
15	240	1220	386	1257	2882	3033
16	264	1300	453	1386	2924	3085
17	281	1365	492	1481	2933	3100
18	300	1409	527	1556	2921	3109
19	328	1456	570	1634	2909	3101
20	360	1499	627	1709	2881	3085
21	398	1543	691	1781	2862	3065
22	421	1538	732	1805	2811	3025
23	456	1559	776	1858	2777	2988
24	483	1571	804	1870	2758	2961
25	529	1631	848	1943	2753	2949
26	547	1629	869	1953	2694	2904
27	576	1631	927	1977	2656	2879
28	619	1664	1046	2040	2626	2854
29	647	1692	1142	2073	2596	2829
30	668	1693	1229	2082	2558	2788
31	696	1712	1321	2111	2534	2766
32	737	1737	1428	2146	2503	2743
33	766	1763	1479	2162	2481	2720
34	785	1766	1509	2160	2427	2683
35	812	1773	1537	2163	2395	2661
36	835	1778	1555	2157	2330	2623
37	865	1794	1583	2171	2299	2608
38	887	1803	1602	2172	2259	2582
39	912	1816	1622	2189	2218	2556
40	932	1818	1635	2195	2184	2528
41	953	1824	1647	2196	2166	2510
42	976	1821	1658	2201	2139	2486
43	983	1814	1648	2190	2099	2455
44	1003	1820	1653	2193	2070	2429

Loon Lake Dam Reach
Gerle Creek at Wentworth - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
45	1023	1828	1675	2191	2031	2399
46	1045	1848	1697	2192	1999	2371
47	1070	1870	1729	2204	1983	2347
48	1069	1875	1726	2191	1954	2312
49	1092	1917	1751	2208	1926	2276
50	1116	1953	1768	2223	1897	2245
51	1119	1973	1753	2217	1856	2201
52	1151	2021	1765	2250	1848	2174
53	1179	2102	1766	2305	1777	2106
54	1185	2121	1761	2316	1737	2064
55	1212	2170	1764	2365	1710	2029
56	1234	2218	1765	2413	1676	1990
57	1226	2228	1744	2407	1636	1941
58	1249	2280	1757	2456	1617	1914
59	1258	2303	1754	2478	1593	1884
60	1280	2351	1771	2533	1571	1855
61	1305	2395	1791	2591	1554	1830
62	1306	2408	1790	2608	1528	1805
63	1332	2451	1808	2665	1501	1772
64	1328	2451	1803	2655	1474	1738
65	1355	2491	1806	2702	1441	1703
66	1364	2504	1807	2718	1407	1668
67	1393	2547	1816	2762	1378	1632
68	1398	2561	1816	2778	1347	1595
69	1399	2574	1809	2779	1325	1563
70	1429	2617	1816	2832	1297	1525
71	1436	2645	1814	2855	1267	1489
72	1469	2685	1833	2915	1245	1455
73	1474	2700	1834	2932	1216	1417
74	1500	2734	1858	2982	1184	1379
75	1511	2749	1866	3007	1161	1348
76	1527	2767	1887	3034	1138	1322
77	1545	2798	1901	3082	1108	1288
78	1558	2814	1917	3111	1076	1254
79	1567	2824	1933	3132	1045	1221
80	1597	2849	1973	3178	1013	1184
81	1595	2852	1983	3185	982	1152
82	1610	2868	2015	3206	962	1129
83	1641	2898	2066	3252	933	1100
84	1645	2903	2077	3250	918	1080

Loon Lake Dam Reach
Gerle Creek at Wentworth - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	1657	2915	2095	3261	897	1058
86	1687	2934	2127	3285	873	1037
87	1690	2940	2132	3281	852	1018
88	1703	2959	2147	3295	829	998
89	1716	2968	2160	3301	815	982
90	1741	2978	2179	3303	793	964
91	1755	2995	2196	3319	772	947
92	1770	3006	2211	3331	758	934
93	1777	3007	2221	3329	738	919
94	1808	3022	2248	3354	723	906
95	1818	3028	2253	3362	702	890

Loon Lake Dam Reach
Gerle Creek at Wentworth - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	4217	6791	4142	7125	1543	1687
6	4603	6750	4454	7222	1682	1809
7	4860	6682	4740	7289	1791	1905
8	5047	6554	4866	7284	1879	1965
9	5225	6453	4975	7296	1887	1948
10	5272	6355	5056	7306	1901	1965
11	5351	6222	5107	7305	1847	1926
12	5402	6070	5074	7258	1834	1909
13	5437	5927	5036	7193	1803	1881
14	5415	5802	5006	7132	1786	1873
15	5353	5667	4951	7048	1749	1838
16	5276	5567	4897	6969	1748	1831
17	5243	5482	4800	6905	1716	1800
18	5198	5403	4752	6841	1727	1796
19	5137	5319	4674	6766	1713	1792
20	5070	5256	4635	6713	1695	1779
21	5018	5210	4588	6682	1663	1761
22	4962	5178	4570	6658	1645	1755
23	4875	5111	4479	6581	1611	1737
24	4837	5061	4465	6549	1588	1723
25	4790	4996	4393	6487	1546	1699
26	4757	4937	4379	6422	1519	1684
27	4737	4884	4360	6370	1497	1666
28	4709	4855	4358	6331	1479	1648
29	4673	4793	4328	6265	1459	1636
30	4642	4757	4331	6223	1435	1627
31	4609	4710	4311	6178	1435	1618
32	4579	4665	4288	6126	1415	1597
33	4550	4616	4255	6079	1409	1582
34	4515	4582	4220	6029	1407	1565
35	4512	4539	4195	5973	1388	1540
36	4492	4511	4170	5924	1377	1520
37	4463	4491	4124	5877	1367	1496
38	4447	4451	4098	5821	1363	1475
39	4427	4431	4091	5781	1350	1451
40	4408	4416	4084	5750	1349	1439
41	4384	4391	4076	5703	1337	1431
42	4377	4368	4055	5674	1318	1411
43	4364	4353	4043	5645	1309	1396
44	4364	4337	4065	5614	1291	1377

45	4348	4315	4040	5581	1275	1360
46	4347	4300	4059	5557	1260	1346
47	4338	4279	4063	5527	1250	1334
48	4322	4258	4044	5501	1226	1316
49	4322	4234	4066	5470	1216	1304
50	4314	4215	4058	5451	1204	1292
51	4298	4201	4047	5418	1187	1274
52	4303	4193	4072	5378	1191	1263
53	4280	4182	4049	5342	1180	1255
54	4278	4172	4049	5321	1171	1241
55	4272	4165	4051	5301	1166	1227
56	4259	4150	4041	5281	1158	1217
57	4260	4133	4052	5261	1146	1207
58	4256	4125	4069	5248	1150	1203
59	4250	4118	4075	5233	1147	1196
60	4253	4114	4088	5214	1144	1189
61	4252	4111	4099	5194	1140	1183
62	4255	4104	4113	5172	1145	1180
63	4251	4096	4103	5144	1142	1176
64	4246	4088	4091	5117	1132	1167
65	4248	4082	4115	5102	1139	1168
66	4246	4069	4107	5077	1133	1161
67	4242	4054	4103	5058	1134	1158
68	4235	4040	4109	5039	1137	1155
69	4236	4035	4106	5020	1125	1147
70	4227	4025	4088	4999	1123	1138
71	4227	4023	4099	4974	1121	1133
72	4229	4027	4098	4963	1110	1121
73	4222	4032	4089	4953	1106	1116
74	4206	4028	4074	4941	1102	1106
75	4204	4032	4084	4937	1097	1102
76	4199	4033	4079	4933	1085	1092
77	4185	4035	4070	4931	1076	1089
78	4177	4040	4064	4925	1073	1082
79	4168	4034	4057	4915	1060	1072
80	4155	4033	4039	4905	1048	1062
81	4140	4030	4032	4894	1047	1060
82	4130	4032	4022	4887	1034	1049
83	4123	4027	4016	4881	1028	1041
84	4112	4032	4010	4876	1033	1036
85	4106	4035	4006	4873	1028	1030
86	4097	4033	4008	4868	1020	1019

87	4090	4041	4003	4869	1017	1015
88	4088	4048	4002	4869	1019	1011
89	4079	4045	4009	4867	1016	1011
90	4074	4055	4002	4867	1007	1003
91	4073	4061	4001	4873	1004	1000
92	4059	4058	3999	4866	1000	993
93	4053	4056	3990	4870	991	987
94	4052	4059	3981	4876	982	980
95	4052	4052	3987	4874	983	978

Loon Lake Dam Reach
Gerle Meadow - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	1294	3407	1739	3202	1879	1739
6	1437	3485	1946	3328	2111	1916
7	1557	3494	2115	3402	2273	2061
8	1653	3456	2202	3442	2403	2188
9	1711	3407	2279	3476	2477	2276
10	1768	3307	2339	3466	2502	2319
11	1821	3196	2391	3449	2526	2357
12	1867	3078	2454	3421	2528	2380
13	1897	2951	2490	3373	2508	2388
14	1901	2843	2519	3333	2492	2399
15	1899	2723	2514	3272	2461	2395
16	1889	2618	2482	3209	2457	2405
17	1881	2528	2445	3147	2448	2416
18	1870	2434	2404	3080	2429	2409
19	1851	2359	2362	3018	2417	2401
20	1831	2292	2320	2963	2398	2387
21	1817	2228	2290	2908	2366	2354
22	1806	2177	2268	2853	2331	2333
23	1786	2123	2242	2796	2282	2296
24	1783	2088	2235	2759	2240	2271
25	1757	2036	2212	2699	2180	2240
26	1738	1997	2181	2654	2128	2210
27	1711	1953	2151	2600	2068	2179
28	1698	1918	2127	2564	2013	2138
29	1662	1887	2104	2519	1964	2109
30	1645	1855	2074	2480	1912	2076
31	1626	1822	2035	2443	1864	2042
32	1612	1795	2009	2410	1819	2014
33	1596	1770	1972	2381	1781	1988
34	1592	1748	1948	2355	1745	1960
35	1579	1723	1912	2322	1709	1934
36	1573	1704	1884	2292	1679	1905
37	1554	1676	1833	2253	1658	1881
38	1543	1653	1796	2221	1634	1853
39	1541	1637	1767	2194	1612	1823
40	1532	1617	1731	2165	1591	1796
41	1518	1598	1691	2133	1571	1768
42	1522	1585	1666	2116	1547	1739
43	1516	1575	1640	2095	1523	1710
44	1499	1559	1605	2068	1502	1684

Loon Lake Dam Reach
Gerle Meadow - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
45	1489	1548	1580	2049	1477	1657
46	1487	1542	1564	2036	1456	1627
47	1470	1530	1538	2013	1434	1599
48	1460	1522	1516	1996	1409	1568
49	1463	1452	1530	1951	1426	1570
50	1429	1441	1487	1925	1391	1542
51	1420	1434	1473	1910	1367	1516
52	1417	1501	1450	1938	1320	1469
53	1367	1493	1402	1909	1276	1440
54	1381	1495	1423	1915	1267	1423
55	1363	1495	1418	1908	1237	1397
56	1346	1491	1410	1898	1208	1370
57	1327	1482	1393	1885	1176	1343
58	1318	1476	1386	1882	1147	1318
59	1311	1475	1383	1874	1119	1293
60	1298	1473	1372	1858	1092	1270
61	1288	1471	1367	1845	1063	1246
62	1300	1456	1364	1838	1019	1212
63	1286	1448	1345	1826	992	1189
64	1279	1445	1342	1822	965	1166
65	1273	1439	1337	1818	938	1145
66	1268	1433	1330	1812	913	1125
67	1262	1425	1323	1803	884	1104
68	1258	1415	1322	1794	860	1086
69	1251	1408	1316	1783	834	1066
70	1249	1402	1314	1777	813	1048
71	1249	1399	1317	1772	795	1030
72	1245	1390	1306	1760	776	1009
73	1243	1383	1299	1751	755	989
74	1238	1379	1290	1739	737	974
75	1238	1373	1284	1731	723	961
76	1233	1365	1271	1721	703	943
77	1233	1363	1266	1716	688	926
78	1232	1364	1265	1712	676	911
79	1228	1362	1258	1701	663	898
80	1228	1359	1254	1693	652	882
81	1234	1363	1270	1693	681	888
82	1237	1361	1271	1691	675	875
83	1236	1356	1263	1688	663	861
84	1240	1357	1258	1691	651	850

Loon Lake Dam Reach
Gerle Meadow - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	1242	1357	1254	1691	642	837
86	1237	1352	1244	1685	629	822
87	1242	1352	1245	1686	618	810
88	1245	1357	1246	1688	611	800
89	1244	1352	1242	1683	604	791
90	1245	1352	1239	1682	593	779
91	1246	1355	1239	1682	584	768
92	1246	1349	1234	1679	573	756
93	1246	1348	1230	1678	563	745
94	1247	1347	1227	1678	553	733
95	1241	1342	1219	1672	546	725

Loon Lake Dam Reach
Gerle Meadow - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	7134	7610	5285	9331	1574	2180
6	7358	7595	5845	9329	1984	2407
7	7468	7546	6306	9291	2345	2603
8	7522	7452	6596	9191	2669	2759
9	7599	7356	6853	9116	2919	2899
10	7593	7237	7042	8994	3146	3051
11	7581	7112	7164	8868	3324	3148
12	7510	6995	7245	8749	3478	3259
13	7396	6873	7277	8615	3597	3353
14	7307	6757	7299	8503	3698	3451
15	7196	6610	7270	8363	3776	3530
16	7091	6457	7242	8225	3847	3598
17	6963	6312	7204	8084	3898	3675
18	6828	6186	7162	7958	3941	3739
19	6679	6029	7104	7806	3980	3801
20	6554	5900	7065	7683	4015	3854
21	6404	5751	6977	7529	4042	3910
22	6293	5630	6880	7403	4054	3941
23	6156	5495	6768	7249	4077	3986
24	6023	5383	6656	7114	4112	4025
25	5895	5258	6539	6979	4144	4065
26	5759	5146	6418	6852	4170	4108
27	5589	5025	6220	6687	3999	3954
28	5469	4934	6110	6567	4023	3983
29	5352	4836	6004	6439	4032	4004
30	5234	4743	5888	6313	4036	4011
31	5118	4658	5765	6191	4015	4007
32	5013	4584	5672	6082	4010	4016
33	4914	4515	5583	5975	4007	4028
34	4825	4442	5483	5863	3998	4041
35	4740	4380	5379	5770	3985	4052
36	4652	4310	5270	5663	3976	4049
37	4571	4248	5155	5568	3949	4026
38	4498	4192	5063	5480	3933	4007
39	4388	4070	4803	5319	3865	3904
40	4333	4036	4735	5258	3851	3895
41	4275	4002	4664	5192	3827	3877
42	4202	3959	4573	5115	3790	3861
43	4171	3987	4651	5118	3760	3886
44	4113	3954	4581	5052	3717	3853

Loon Lake Dam Reach
Gerle Meadow - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
45	4060	3923	4524	4993	3676	3829
46	4007	3895	4476	4942	3647	3808
47	3949	3821	4369	4847	3612	3777
48	3899	3790	4311	4789	3569	3739
49	3866	3776	4288	4762	3528	3707
50	3874	3796	4295	4743	3554	3738
51	3831	3777	4242	4704	3502	3689
52	3796	3769	4208	4673	3446	3640
53	3747	3737	4158	4617	3375	3589
54	3668	3721	4063	4581	3279	3488
55	3636	3711	4030	4551	3224	3456
56	3649	3708	4048	4528	3181	3449
57	3570	3682	3953	4482	3095	3369
58	3540	3677	3929	4457	3041	3333
59	3496	3646	3887	4405	2988	3291
60	3477	3645	3877	4392	2948	3254
61	3443	3630	3840	4357	2896	3212
62	3417	3628	3826	4342	2845	3169
63	3402	3633	3831	4335	2802	3131
64	3363	3605	3792	4293	2753	3098
65	3335	3605	3776	4279	2701	3058
66	3311	3605	3761	4260	2650	3022
67	3309	3626	3803	4256	2604	2993
68	3279	3610	3779	4225	2560	2959
69	3259	3616	3759	4211	2512	2921
70	3238	3624	3729	4197	2466	2884
71	3190	3554	3631	4121	2418	2820
72	3172	3541	3610	4099	2382	2789
73	3148	3550	3576	4085	2343	2762
74	3130	3573	3554	4087	2307	2737
75	3114	3567	3537	4069	2273	2704
76	3105	3588	3524	4070	2244	2677
77	3092	3613	3505	4077	2216	2647
78	3066	3598	3471	4049	2184	2616
79	3047	3619	3441	4049	2155	2587
80	3034	3648	3422	4057	2056	2504
81	3007	3649	3406	4038	2044	2481
82	2986	3679	3378	4051	2030	2460
83	2973	3718	3368	4075	2027	2443
84	2946	3711	3342	4062	2018	2423

Loon Lake Dam Reach
Gerle Meadow - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	2929	3741	3324	4086	2000	2401
86	2918	3773	3314	4113	1986	2379
87	2893	3766	3296	4101	1970	2356
88	2878	3800	3285	4126	1964	2338
89	2863	3836	3274	4149	1952	2319
90	2844	3840	3266	4144	1946	2302
91	2841	3876	3260	4172	1934	2281
92	2826	3873	3243	4163	1924	2270
93	2823	3914	3233	4192	1907	2247
94	2815	3953	3217	4220	1895	2228
95	2805	3956	3212	4217	1885	2213

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	216	1256	228	1014	352	351
7	279	1469	289	1226	396	421
9	355	1846	360	1530	646	640
11	411	2085	379	1800	772	775
13	478	2323	451	2050	883	877
15	552	2567	645	2274	980	969
17	616	2819	796	2549	1072	1048
19	706	3094	906	2831	1182	1145
21	748	3125	907	2895	1206	1180
23	814	3255	983	3055	1217	1201
25	903	3414	1094	3270	1239	1225
27	985	3515	1207	3421	1260	1236
29	1055	3645	1354	3572	1271	1229
31	1118	3779	1413	3694	1126	1140
33	1198	3871	1515	3834	1126	1154
35	1285	3949	1620	3992	1138	1171
37	1366	4076	1746	4175	1156	1201
39	1430	4101	1862	4258	1138	1180
41	1506	4155	2081	4364	1139	1188
43	1570	4197	2264	4452	1134	1191
45	1628	4270	2411	4534	1155	1217
47	1682	4304	2545	4586	1157	1219
49	1766	4385	2708	4698	1148	1220
51	1823	4427	2800	4737	1157	1229
53	1887	4462	2912	4795	1176	1243
55	1950	4489	3026	4849	1206	1263
57	2000	4501	3133	4886	1224	1273
59	2038	4491	3199	4912	1236	1284
61	2071	4483	3255	4910	1261	1301
63	2114	4406	3342	4886	1266	1317
65	2175	4424	3422	4919	1278	1331
67	2222	4425	3510	4935	1297	1348
69	2248	4403	3565	4930	1308	1362
71	2298	4418	3649	4950	1326	1377
73	2352	4431	3731	4967	1349	1399
75	2360	4400	3747	4944	1346	1387
77	2412	4449	3798	4991	1243	1324
79	2430	4480	3814	5007	1263	1334
81	2481	4491	3869	5044	1296	1357
83	2508	4470	3885	5040	1310	1365

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	2559	4495	3930	5062	1339	1383
87	2572	4473	3935	5050	1362	1393
89	2602	4453	3959	5032	1376	1398
91	2630	4464	3993	5040	1389	1405
93	2651	4454	4019	5035	1396	1412
95	2680	4433	4049	5031	1405	1417
97	2708	4442	4081	5056	1406	1413
99	2741	4432	4106	5064	1418	1423
101	2769	4410	4119	5061	1394	1410
103	2802	4410	4136	5079	1403	1422
105	2813	4381	4130	5066	1394	1417
107	2835	4362	4126	5061	1392	1420
109	2877	4369	4152	5081	1394	1423
111	2903	4349	4157	5078	1384	1419
113	2921	4323	4153	5073	1393	1424
115	2943	4298	4146	5068	1379	1415
117	2958	4288	4145	5053	1372	1412
119	2978	4269	4140	5038	1380	1414
121	3021	4275	4165	5057	1395	1421
123	3048	4290	4167	5056	1415	1426
125	3040	4254	4164	5033	1411	1418
127	3053	4249	4178	5039	1405	1411
129	3076	4246	4207	5054	1402	1408
131	3088	4239	4222	5057	1403	1406
133	3103	4226	4254	5058	1394	1400
135	3121	4227	4290	5075	1372	1388
137	3124	4201	4299	5053	1352	1374
139	3139	4186	4317	5056	1333	1363
141	3153	4163	4333	5042	1325	1354
143	3155	4127	4325	5011	1304	1340
145	3165	4117	4325	4995	1284	1328
147	3182	4091	4331	4978	1264	1314
149	3187	4075	4327	4964	1247	1303
151	3197	4047	4324	4942	1239	1295

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	2408	4420	1918	4733	192	363
7	2886	4592	2558	5026	301	434
9	3307	4673	3134	5214	395	491
11	3642	4716	3566	5321	479	544
13	3918	4745	3862	5402	550	587
15	4138	4753	4100	5474	617	631
17	4305	4730	4282	5515	668	666
19	4435	4691	4459	5548	711	697
21	4514	4627	4591	5546	744	719
23	4578	4546	4690	5532	778	741
25	4618	4464	4751	5500	798	755
27	4650	4371	4803	5461	807	760
29	4672	4272	4848	5419	820	767
31	4666	4171	4889	5363	830	775
33	4637	4057	4918	5290	837	778
35	4600	3955	4936	5218	838	784
37	4542	3853	4935	5138	840	789
39	4473	3748	4906	5048	843	795
41	4401	3656	4891	4966	849	803
43	4328	3564	4858	4877	857	814
45	4263	3476	4821	4795	864	823
47	4188	3386	4771	4702	874	834
49	4123	3299	4710	4617	879	841
51	4052	3208	4638	4522	884	847
53	3978	3128	4554	4425	887	852
55	3896	3039	4447	4316	884	853
57	3827	2964	4365	4223	891	855
59	3758	2895	4294	4138	896	857
61	3689	2829	4221	4057	898	858
63	3615	2761	4163	3975	899	860
65	3546	2701	4093	3900	896	857
67	3477	2643	4025	3825	898	856
69	3411	2587	3960	3750	897	855
71	3349	2533	3891	3678	896	853
73	3287	2485	3828	3612	890	847
75	3221	2436	3755	3543	888	845
77	3162	2394	3692	3483	883	841
79	3107	2351	3626	3423	882	839
81	3053	2314	3565	3365	879	835
83	2995	2277	3503	3308	875	832

Loon Lake Dam Reach
Gerle Creek below Ice House Bridge - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
85	2940	2241	3449	3251	870	827
87	2888	2206	3393	3196	865	824
89	2854	2160	3346	3140	850	817
91	2802	2131	3294	3090	844	812
93	2752	2101	3246	3039	837	805
95	2704	2073	3200	2994	827	797
97	2658	2044	3149	2945	815	787
99	2613	2017	3098	2901	806	778
101	2574	1991	3052	2860	793	768
103	2532	1964	3000	2816	780	757
105	2493	1941	2955	2778	767	747
107	2460	1917	2918	2740	754	737
109	2426	1892	2878	2702	741	727
111	2391	1870	2846	2666	727	715
113	2360	1848	2810	2630	714	706
115	2330	1829	2781	2599	701	695
117	2300	1808	2750	2564	688	685
119	2269	1793	2719	2533	673	673
121	2244	1776	2688	2503	662	664
123	2216	1758	2657	2472	649	655
125	2189	1739	2626	2440	635	645
127	2165	1724	2597	2413	622	636
129	2137	1708	2568	2386	609	627
131	2112	1697	2543	2360	596	618
133	2085	1680	2513	2332	586	610
135	2059	1666	2488	2307	576	602
137	2034	1652	2464	2284	565	593
139	2008	1638	2437	2262	557	585
141	1983	1627	2418	2242	550	580
143	1958	1614	2395	2220	544	574
145	1934	1603	2372	2200	537	568
147	1910	1593	2350	2180	531	563
149	1888	1584	2330	2163	524	557
151	1868	1576	2309	2144	519	554

Gerle Creek Dam Reach
Lower Gerle Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
3	2273	2513	1413	3028	332	440
4	2317	2537	1541	3062	411	522
5	2346	2593	1636	3119	487	567
6	2365	2677	1762	3247	551	599
7	2357	2707	1920	3317	601	639
8	2336	2768	2054	3371	637	659
9	2321	2812	2143	3400	663	678
10	2292	2822	2201	3401	685	695
11	2283	2823	2263	3387	706	707
12	2285	2812	2299	3362	732	723
13	2263	2775	2325	3282	750	728
14	2245	2749	2372	3231	770	731
15	2232	2707	2365	3169	777	729
16	2228	2659	2384	3107	769	722
17	2245	2630	2429	3086	744	701
18	2229	2569	2413	3018	710	670
19	2208	2521	2414	2972	682	643
20	2193	2476	2429	2932	654	615
21	2156	2417	2399	2871	631	591
22	2132	2375	2368	2821	620	577
23	2098	2264	2314	2750	612	572
24	2063	2215	2270	2709	607	569
25	2036	2163	2230	2663	601	564
26	2011	2115	2175	2624	594	558
27	1979	2076	2129	2582	588	554
28	1958	2054	2097	2555	582	551
29	1930	2025	2053	2522	576	548
30	1911	2001	2009	2500	571	544
31	1886	1974	1966	2472	564	542
32	1872	1952	1937	2456	566	544
33	1857	1928	1907	2437	567	546
34	1829	1898	1855	2399	564	546
35	1806	1869	1812	2363	563	547
36	1789	1843	1769	2332	562	549
37	1779	1818	1736	2303	559	550
38	1757	1797	1696	2269	558	550
39	1740	1784	1672	2244	555	551
40	1718	1774	1639	2216	555	554
41	1703	1763	1615	2191	554	555
42	1687	1740	1587	2157	554	556

Gerle Creek Dam Reach
Lower Gerle Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
43	1673	1721	1564	2128	555	560
44	1660	1701	1544	2097	554	560
45	1643	1680	1513	2069	553	561

Gerle Creek Dam Reach
Lower Gerle Creek - Pocket Water

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
3	1058	3215	1361	3161	111	154
4	1348	3362	1705	3352	135	167
5	1573	3626	2045	3649	188	196
6	1820	3925	2441	4011	233	217
7	2029	4049	2700	4227	244	219
8	2194	4064	2874	4335	247	216
9	2343	4031	3152	4440	247	213
10	2451	4029	3242	4508	240	207
11	2539	4100	3392	4668	201	179
12	2650	4094	3540	4772	186	165
13	2719	4097	3713	4854	178	156
14	2782	3992	3870	4849	159	139
15	2842	3906	3988	4850	153	131
16	2775	3719	3606	4622	134	112
17	2811	3659	3636	4620	127	110
18	2872	3574	3649	4577	126	109
19	2879	3730	3807	4808	126	112
20	2901	3670	3837	4782	128	114
21	2925	3570	3914	4747	131	118
22	2906	3488	3880	4689	132	120
23	2908	3413	3872	4649	134	126
24	2888	3316	3830	4579	135	129
25	2918	3288	3884	4550	136	132
26	2904	3249	3946	4518	135	135
27	2896	3193	3912	4466	135	138
28	2905	3145	3896	4431	135	144
29	2875	3076	3836	4354	134	147
30	2985	3176	3878	4428	132	145
31	2976	3135	3849	4377	132	147
32	2968	3100	3812	4342	131	151
33	2947	3046	3643	4262	132	159
34	2946	3031	3632	4231	132	162
35	2928	2910	3319	4076	132	163
36	2911	2920	3420	4070	133	165
37	2894	2908	3370	4033	131	168
38	2980	2952	3254	4044	131	168
39	2978	2961	3243	4034	131	176
40	2948	2939	3192	3992	130	179
41	2951	2960	3171	3974	131	182
42	2941	2971	3142	3950	131	189

Gerle Creek Dam Reach
Lower Gerle Creek - Pocket Water

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
43	2919	2955	3032	3878	131	191
44	2921	3002	3025	3870	132	196
45	2903	3017	3001	3857	132	198

Robbs Peak Dam Reach
Upper S.F. Rubicon River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	0	73	0	45	443	455
3	0	35	0	32	631	646
4	0	35	0	31	692	722
5	1	40	0	35	635	725
6	1	45	0	34	666	769
7	1	49	0	38	664	786
8	2	56	0	43	697	809
9	4	74	0	63	793	926
10	4	81	0	64	805	938
11	3	96	0	67	830	957
12	4	111	0	75	878	984
13	4	126	0	86	916	1003
14	4	131	0	86	862	946
15	5	144	0	104	884	969
16	5	147	0	110	878	957
17	5	143	0	115	868	949
18	5	146	1	115	848	932
19	5	149	3	121	845	927
20	3	160	2	129	815	907
21	3	165	4	135	808	901
22	4	169	5	141	804	896
23	4	179	6	146	794	890
24	3	180	5	146	751	857
25	4	187	6	152	747	854
26	4	193	7	159	743	849
27	4	175	7	146	698	803
28	4	183	7	151	725	823
29	4	182	7	149	659	770
30	5	186	8	157	651	767
31	7	189	8	167	644	765
32	8	185	8	163	619	742
33	10	194	8	170	615	742
34	10	181	8	153	587	705
35	12	191	8	163	578	690
36	13	192	8	164	558	668
37	15	202	9	174	554	669
38	15	196	8	162	527	637
39	16	205	8	172	522	637

Robbs Peak Dam Reach
Upper S.F. Rubicon River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	517	1107	594	1117	508	541
3	597	1116	739	1159	714	699
4	634	1106	802	1171	807	796
5	648	1036	843	1155	840	860
6	631	974	859	1133	873	912
7	616	918	841	1096	892	932
8	598	864	812	1056	888	930
9	578	816	776	1017	872	916
10	560	785	732	988	854	911
11	541	749	686	951	840	903
12	531	737	642	928	830	891
13	513	723	594	898	803	869
14	506	715	573	875	776	849
15	494	707	551	857	750	826
16	484	709	545	837	717	803
17	479	711	554	828	679	780
18	476	703	549	821	651	759
19	475	699	546	817	631	736
20	474	699	548	819	611	715
21	472	700	549	812	597	698
22	469	701	554	808	583	683
23	466	707	566	814	576	672
24	467	706	568	815	569	657
25	466	704	570	811	560	642
26	463	706	566	807	553	629
27	460	711	559	805	550	615
28	446	718	546	803	559	617
29	439	726	543	807	553	608
30	425	727	536	807	544	596
31	414	732	527	806	537	587
32	406	739	522	807	533	578
33	402	752	521	813	530	572
34	399	756	518	816	523	565
35	396	767	512	821	515	560
36	397	773	509	827	511	554
37	400	790	508	835	507	548
38	398	793	502	829	500	542
39	401	805	503	831	496	539

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	317	1019	499	1081	0	0
6	340	987	571	1089	0	0
7	367	979	616	1100	0	0
8	391	952	620	1075	0	0
9	413	942	612	1059	0	0
10	425	939	609	1034	0	0
11	442	955	625	1041	0	0
12	459	963	633	1046	0	0
13	478	970	634	1051	0	0
14	487	967	641	1046	0	0
15	494	972	645	1051	0	0
16	513	995	664	1069	0	0
17	521	1002	657	1070	0	0
18	523	1006	658	1066	0	0
19	529	1007	655	1070	0	0
20	539	1009	653	1072	0	0
21	545	1016	647	1071	0	0
22	559	1035	648	1082	0	0
23	560	1043	633	1086	0	0
24	569	1046	637	1096	0	0
25	580	1061	639	1113	0	0
26	593	1076	656	1131	0	0
27	598	1081	662	1146	0	0
28	608	1080	675	1159	0	0
29	617	1081	686	1169	0	0
30	623	1085	694	1174	0	0
31	634	1090	709	1185	0	0
32	639	1081	711	1185	0	0
33	643	1080	726	1185	0	0
34	651	1086	737	1192	0	0
35	660	1091	753	1203	0	0
36	673	1093	775	1216	0	0
37	677	1090	784	1221	0	0
38	683	1070	789	1212	0	0
39	690	1069	797	1215	0	0
40	692	1062	804	1217	0	0
41	702	1057	815	1225	0	0
42	705	1050	820	1220	0	0
43	711	1044	818	1216	0	0
44	716	985	841	1169	0	0
45	724	985	854	1169	0	0

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
46	722	982	855	1163	0	0
47	726	980	869	1162	0	0
48	732	982	882	1163	0	0
49	732	979	884	1159	0	0
50	734	976	894	1159	0	0
51	743	978	912	1162	0	0
52	741	975	910	1157	0	0
53	743	973	912	1153	0	0
54	745	967	916	1149	0	0
55	754	965	920	1150	0	0
56	757	963	923	1150	0	0
57	759	964	921	1150	0	0
58	764	964	927	1149	0	0
59	772	958	929	1146	0	0
60	775	957	929	1147	0	0
61	776	953	926	1144	0	0
62	782	951	934	1142	0	0
63	785	949	931	1137	0	0
64	789	947	932	1132	0	0
65	791	949	929	1128	0	0
66	798	949	935	1127	0	0
67	799	949	933	1126	0	0
68	802	950	934	1127	0	0
69	804	953	934	1128	0	0
70	811	962	945	1135	0	0
71	813	961	950	1132	0	0
72	817	967	957	1136	0	0
73	817	970	959	1135	0	0
74	821	974	963	1137	0	0
75	823	974	965	1135	0	0
76	821	968	965	1132	0	0
77	822	970	965	1133	0	0
78	825	972	968	1135	0	0
79	827	975	969	1137	0	0
80	830	978	971	1139	0	0
81	830	980	969	1139	0	0
82	830	982	967	1139	0	0
83	834	984	969	1140	0	0
84	833	985	968	1141	0	0
85	835	992	970	1145	0	0
86	836	993	971	1147	0	0

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
87	837	995	974	1149	0	0
88	836	994	972	1147	0	0
89	836	994	972	1147	0	0
90	839	1000	975	1152	0	0
91	842	1003	979	1154	0	0
92	842	1003	978	1156	0	0
93	845	1006	981	1159	0	0
94	845	1003	983	1160	0	0
95	842	1000	984	1158	0	0
96	843	1000	985	1157	0	0
97	844	1000	983	1155	0	0
98	846	1000	983	1154	0	0
99	849	1000	985	1154	0	0
100	845	997	980	1149	0	0
101	843	995	973	1152	0	0
102	845	995	972	1154	0	0
103	848	996	976	1155	0	0
104	845	991	974	1151	0	0
105	847	993	972	1153	0	0
106	849	993	972	1155	0	0
107	850	993	973	1155	0	0
108	847	988	970	1151	0	0
109	850	990	973	1153	0	0
110	851	991	971	1155	0	0
111	852	992	975	1156	0	0
112	851	989	975	1151	0	0
113	852	987	980	1152	0	0
114	852	987	983	1153	0	0
115	854	988	989	1155	0	0
116	852	982	986	1151	0	0
117	852	984	990	1153	0	0
118	853	985	997	1154	0	0
119	847	977	994	1149	0	0
120	848	976	1000	1150	0	0
121	849	974	1004	1150	0	0
122	846	972	1003	1148	0	0
123	844	973	1008	1151	0	0
124	842	973	1011	1152	0	0
125	843	970	1012	1149	0	0

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	1322	2474	1334	2610	58	123
6	1486	2487	1485	2661	79	148
7	1636	2497	1647	2707	99	169
8	1752	2509	1763	2750	119	188
9	1858	2507	1900	2800	124	198
10	1942	2478	1982	2814	129	204
11	2034	2441	2043	2825	135	209
12	2090	2392	2066	2818	137	211
13	2135	2338	2088	2814	143	213
14	2168	2291	2129	2815	153	218
15	2194	2238	2152	2814	156	218
16	2220	2186	2187	2808	161	217
17	2231	2136	2200	2795	166	217
18	2243	2088	2209	2776	172	218
19	2253	2042	2210	2755	177	218
20	2259	2000	2215	2738	183	219
21	2267	1959	2225	2719	187	219
22	2268	1917	2216	2688	192	220
23	2270	1877	2213	2649	198	223
24	2274	1836	2206	2610	203	226
25	2273	1799	2197	2567	211	230
26	2274	1767	2187	2525	216	231
27	2282	1734	2174	2485	218	230
28	2283	1706	2164	2448	223	232
29	2280	1677	2151	2408	229	233
30	2278	1648	2137	2369	234	234
31	2273	1623	2123	2332	236	234
32	2265	1595	2109	2290	241	236
33	2250	1573	2102	2254	242	235
34	2240	1549	2090	2214	241	233
35	2227	1526	2074	2175	243	233
36	2209	1500	2058	2132	246	232
37	2191	1481	2050	2101	244	230
38	2171	1457	2036	2067	242	226
39	2148	1437	2022	2035	241	224
40	2129	1413	2010	2003	237	219
41	2100	1394	2005	1974	237	217
42	2075	1373	1996	1946	231	211
43	2048	1354	1988	1920	230	210
44	2021	1335	1983	1892	228	207
45	1991	1317	1972	1864	227	206

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
46	1960	1298	1959	1837	225	204
47	1932	1281	1949	1813	225	203
48	1894	1260	1934	1782	225	202
49	1866	1246	1926	1759	227	202
50	1838	1231	1910	1736	228	202
51	1803	1199	1879	1692	228	202
52	1775	1185	1862	1670	229	202
53	1749	1172	1849	1649	230	202
54	1719	1156	1832	1623	230	202
55	1694	1143	1820	1602	231	202
56	1671	1129	1801	1581	231	201
57	1650	1116	1790	1561	231	202
58	1627	1101	1775	1540	231	201
59	1602	1089	1756	1518	231	200
60	1582	1075	1740	1496	231	201
61	1560	1063	1727	1477	231	200
62	1540	1049	1711	1458	233	201
63	1519	1038	1694	1438	233	202
64	1495	1026	1680	1418	233	202
65	1474	1014	1664	1398	235	202
66	1456	1004	1648	1383	236	203
67	1436	994	1634	1364	236	203
68	1416	983	1620	1345	237	204
69	1389	973	1600	1324	237	203
70	1376	966	1590	1312	237	204
71	1355	957	1573	1293	239	204
72	1331	948	1556	1275	239	205
73	1308	940	1538	1258	239	205
74	1295	933	1527	1246	239	205
75	1273	926	1512	1230	240	206
76	1255	919	1496	1214	240	205
77	1242	913	1484	1203	240	206
78	1222	904	1464	1186	241	207
79	1208	897	1451	1173	241	207
80	1194	894	1437	1161	241	207
81	1176	889	1420	1146	240	207
82	1165	887	1410	1137	241	208
83	1145	882	1391	1123	241	208
84	1135	880	1380	1116	241	208
85	1119	876	1365	1106	241	209
86	1107	872	1352	1098	241	209

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
87	1089	868	1335	1088	241	210
88	1077	865	1324	1080	241	210
89	1058	861	1311	1071	241	211
90	1046	857	1300	1064	241	211
91	1027	853	1284	1054	241	211
92	1013	848	1274	1046	241	212
93	996	843	1263	1037	242	212
94	983	840	1253	1030	242	213
95	966	838	1240	1020	242	213
96	955	835	1234	1013	243	214
97	941	834	1222	1006	243	214
98	929	832	1212	1000	244	214
99	918	830	1203	994	244	215
100	904	830	1192	988	244	215
101	893	828	1184	983	244	215
102	881	827	1172	978	244	216
103	874	825	1163	974	244	216
104	866	825	1157	971	244	216
105	855	822	1144	966	244	216
106	847	819	1135	962	244	217
107	840	816	1127	959	244	217
108	828	815	1117	955	244	218
109	820	811	1106	950	244	218
110	812	809	1097	946	244	218
111	807	806	1090	943	244	218
112	797	804	1085	939	245	219
113	791	802	1078	934	245	219
114	785	800	1072	931	245	220
115	778	798	1067	928	245	220
116	774	796	1064	924	245	220
117	769	796	1059	921	245	221
118	763	794	1052	918	245	221
119	757	792	1047	914	245	222
120	754	791	1042	909	245	222
121	749	788	1034	906	245	222
122	747	785	1030	902	245	223
123	742	786	1021	899	245	223
124	738	790	1013	896	245	223
125	736	791	1010	894	245	223

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
5	3659	5150	2228	5824	13	69
6	3859	5122	2474	5904	17	81
7	4017	5051	2709	5944	21	87
8	4125	4957	2887	5939	30	95
9	4190	4872	3019	5906	37	102
10	4255	4790	3177	5871	42	106
11	4300	4704	3300	5816	48	111
12	4330	4615	3415	5739	55	115
13	4352	4537	3499	5667	58	123
14	4368	4457	3559	5577	63	129
15	4357	4336	3600	5465	66	130
16	4342	4306	3644	5399	69	134
17	4331	4228	3670	5316	74	136
18	4301	4156	3688	5231	77	137
19	4260	4096	3697	5156	83	143
20	4218	4033	3712	5074	89	148
21	4170	3970	3713	4990	94	150
22	4131	3942	3740	4932	127	161
23	4082	3891	3748	4854	129	162
24	4030	3847	3743	4787	132	166
25	3987	3808	3737	4727	135	170
26	3953	3779	3743	4682	140	176
27	3916	3747	3734	4631	145	182
28	3871	3718	3725	4582	151	185
29	3835	3682	3715	4530	156	193
30	3793	3654	3703	4484	160	196
31	3772	3627	3728	4451	166	200
32	3714	3589	3683	4392	170	202
33	3675	3551	3668	4339	175	208
34	3646	3536	3659	4307	180	213
35	3597	3513	3640	4259	185	217
36	3570	3491	3630	4224	188	221
37	3526	3475	3623	4189	190	225
38	3492	3456	3613	4159	194	229
39	3458	3438	3599	4132	199	242
40	3423	3419	3590	4102	203	247
41	3388	3405	3576	4070	206	253
42	3347	3392	3556	4036	209	259
43	3326	3380	3552	4018	213	263
44	3274	3391	3586	4015	176	242
45	3248	3375	3566	3992	176	243

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
46	3226	3365	3555	3972	175	245
47	3215	3334	3472	3925	219	276
48	3199	3328	3461	3907	220	280
49	3175	3322	3441	3889	220	282
50	3149	3312	3414	3870	220	285
51	3126	3304	3395	3853	220	286
52	3099	3294	3374	3839	220	286
53	3078	3279	3352	3820	219	287
54	3059	3273	3337	3805	220	287
55	3034	3266	3318	3789	220	292
56	3016	3260	3308	3779	219	294
57	3002	3250	3304	3764	220	295
58	2981	3247	3293	3754	219	296
59	2964	3248	3290	3751	220	298
60	2949	3236	3284	3739	220	300
61	2928	3233	3273	3732	219	302
62	2906	3221	3253	3718	219	302
63	2896	3214	3246	3710	219	302
64	2883	3223	3231	3708	219	304
65	2872	3233	3225	3702	219	305
66	2865	3227	3222	3694	219	306
67	2854	3239	3213	3701	219	307
68	2843	3234	3209	3696	218	308
69	2830	3237	3196	3702	218	308
70	2814	3216	3164	3682	217	309
71	2802	3219	3161	3687	194	288
72	2790	3213	3150	3685	194	289
73	2782	3212	3148	3688	194	290
74	2777	3211	3151	3693	195	294
75	2762	3207	3144	3689	195	297
76	2755	3207	3143	3689	197	298
77	2740	3206	3135	3688	198	302
78	2732	3201	3135	3684	198	303
79	2723	3204	3133	3690	198	302
80	2714	3202	3137	3693	198	304
81	2704	3195	3129	3687	197	303
82	2696	3197	3121	3687	197	303
83	2692	3191	3113	3683	199	304
84	2681	3186	3105	3678	199	304
85	2678	3191	3101	3684	199	304
86	2671	3186	3094	3679	200	303

Robbs Peak Dam Reach
Lower S.F. Rubicon River - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
87	2660	3178	3087	3673	201	304
88	2657	3176	3081	3677	201	300
89	2638	3123	3037	3641	201	299
90	2631	3114	3024	3636	201	298
91	2622	3108	3009	3633	200	297
92	2623	3106	3005	3631	200	296
93	2624	3100	2998	3629	198	296
94	2623	3095	2994	3625	197	298
95	2617	3096	2987	3625	197	299
96	2616	3091	2984	3621	195	298
97	2616	3095	2986	3622	194	301
98	2616	3088	2987	3620	193	301
99	2603	3088	2985	3615	206	321
100	2600	3094	2983	3619	206	320
101	2600	3087	2979	3616	204	320
102	2592	3085	2969	3614	202	318
103	2593	3085	2970	3613	201	317
104	2593	3077	2968	3610	199	316
105	2561	3071	2911	3595	198	315
106	2552	3066	2900	3588	197	314
107	2554	3066	2892	3585	195	313
108	2549	3060	2882	3577	193	311
109	2544	3055	2870	3567	191	312
110	2545	3049	2863	3560	191	311
111	2545	3045	2865	3555	189	309
112	2540	3046	2858	3554	188	309
113	2544	3043	2867	3553	189	309
114	2542	3044	2859	3551	186	307
115	2536	3041	2852	3547	187	308
116	2534	3041	2843	3540	186	310
117	2532	3042	2838	3537	183	309
118	2527	3040	2823	3531	181	308
119	2524	3043	2820	3527	179	306
120	2528	3043	2824	3525	176	307
121	2522	3048	2816	3524	174	306
122	2519	3052	2808	3524	174	305
123	2514	3050	2799	3521	172	305
124	2510	3054	2792	3522	171	304
125	2510	3051	2787	3519	171	304

Ice House Dam Reach
Upper S.F. Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	152	1001	0	905	0	0
8	200	1000	250	861	0	0
10	311	1540	339	1418	0	0
12	502	2051	874	1990	0	0
14	548	2094	1013	2048	0	0
16	690	2355	1233	2336	0	0
18	820	2492	1338	2538	0	0
20	935	2614	1508	2704	0	0
22	1086	2838	1879	2995	0	0
24	1203	2963	2063	3194	0	0
26	1160	2719	1925	3010	0	0
28	1270	2779	2089	3095	0	0
30	1353	2824	2216	3155	0	0
32	1491	2893	2330	3254	0	0
34	1589	2937	2360	3294	0	0
36	1632	2919	2343	3301	0	0
38	1719	2951	2381	3375	0	0
40	1794	3001	2473	3435	0	0
42	1828	3010	2567	3443	0	0
44	1905	3063	2776	3535	0	0
46	1931	3037	2830	3546	0	0
48	1967	2978	2882	3547	0	0
50	2007	2916	2892	3521	0	0
52	2092	2895	2970	3545	0	0
54	2143	2839	3031	3519	0	0
56	2148	2786	3025	3460	0	0
58	2203	2747	3062	3459	0	0
60	2246	2696	3070	3445	0	0
62	2287	2656	3121	3443	0	0
64	2341	2611	3181	3439	0	0
66	2362	2574	3197	3416	0	0
68	2411	2540	3221	3386	0	0
70	2433	2497	3192	3337	0	0
72	2472	2470	3201	3306	0	0
74	2471	2428	3166	3265	0	0
76	2513	2415	3172	3255	0	0
78	2499	2387	3141	3215	0	0
80	2535	2388	3139	3221	0	1
82	2524	2368	3119	3195	0	1
84	2511	2344	3101	3179	0	2

Ice House Dam Reach
Upper S.F. Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	2504	2323	3076	3166	0	2
88	2514	2305	3070	3171	0	3
90	2503	2266	3033	3148	0	5
92	2487	2230	2997	3121	0	6
94	2465	2200	2957	3084	0	7
96	2445	2176	2921	3042	0	8
98	2419	2151	2877	3003	0	9
100	2392	2127	2838	2984	0	10
102	2350	2037	2794	2921	0	11
104	2314	2042	2747	2925	1	15
106	2285	2053	2720	2940	1	17
108	2255	2061	2687	2945	1	18
110	2222	2053	2639	2932	1	20
112	2198	2043	2599	2919	1	22
114	2179	2028	2551	2899	1	24
116	2171	2024	2518	2887	1	26
118	2155	2007	2475	2874	1	28
120	2130	1996	2430	2858	1	29
122	2134	1987	2404	2861	2	37
124	2139	1979	2372	2861	2	40
126	2135	1986	2329	2853	2	43
128	2120	1978	2280	2837	2	44
130	2115	1985	2291	2827	2	47

Ice House Dam Reach
Upper S.F. Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	2126	4257	2015	4349	115	124
8	2418	4630	2345	4841	122	128
10	2685	4739	2653	5096	127	130
12	2891	4941	2852	5410	133	133
14	3112	5009	3217	5587	133	129
16	3290	5134	3452	5728	119	114
18	3435	5242	3618	5830	107	101
20	3544	5387	3745	5964	90	85
22	3626	5538	3832	6112	84	79
24	3714	5714	3904	6319	83	78
26	3775	5821	3984	6456	83	78
28	3867	5947	4086	6595	82	77
30	3942	5990	4143	6661	79	74
32	4014	6061	4196	6773	77	72
34	4086	6095	4259	6841	76	70
36	4163	6117	4315	6902	75	69
38	4248	6151	4372	6991	74	67
40	4330	6074	4535	7004	71	65
42	4386	6069	4603	7045	69	64
44	4444	6020	4661	7057	66	62
46	4516	5961	4718	7058	63	61
48	4550	5894	4751	7047	62	60
50	4605	5849	4833	7038	61	60
52	4627	5781	4865	6981	59	59
54	4668	5741	4951	6969	58	59
56	4693	5705	5024	6956	57	58
58	4724	5680	5166	6950	56	58
60	4729	5612	5213	6905	55	57
62	4748	5576	5293	6884	54	56
64	4772	5536	5364	6851	53	55
66	4791	5482	5404	6809	52	54
68	4821	5443	5450	6783	51	54
70	4826	5377	5436	6720	50	53
72	4843	5337	5460	6680	48	52
74	4844	5285	5450	6630	46	50
76	4849	5236	5460	6589	44	49
78	4834	5186	5460	6546	42	48
80	4842	5139	5484	6504	41	47
82	4830	5091	5487	6451	40	46
84	4835	5041	5496	6409	39	45

Ice House Dam Reach
Upper S.F. Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	4834	4990	5510	6373	38	44
88	4833	4919	5520	6327	36	43
90	4848	4873	5535	6282	35	42
92	4843	4824	5526	6238	34	41
94	4846	4777	5515	6180	33	40
96	4850	4732	5501	6131	32	39
98	4865	4701	5502	6088	30	38
100	4865	4665	5483	6053	29	37
102	4855	4623	5460	6009	28	36
104	4841	4582	5441	5969	26	35
106	4839	4558	5445	5941	25	34
108	4824	4520	5431	5894	24	33
110	4798	4485	5403	5845	22	32
112	4785	4449	5393	5803	22	31
114	4758	4415	5367	5763	20	30
116	4747	4395	5364	5733	19	30
118	4728	4361	5352	5694	18	29
120	4703	4335	5330	5657	17	28
122	4677	4302	5307	5618	16	28
124	4656	4277	5289	5589	14	27
126	4636	4252	5265	5554	13	26
128	4615	4229	5252	5519	12	26
130	4499	4169	5154	5413	12	17

Ice House Dam Reach
Upper S.F. Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	1991	4432	1981	4383	369	345
8	2334	4697	2537	4825	415	378
10	2567	4784	2866	5061	427	396
12	2782	4793	3211	5229	425	408
14	2962	4749	3429	5306	420	410
16	3063	4660	3609	5339	418	416
18	3177	4589	3780	5360	410	413
20	3266	4475	3894	5328	405	411
22	3313	4346	3961	5270	405	410
24	3361	4238	4026	5203	405	410
26	3383	4129	4070	5121	409	413
28	3416	4031	4110	5064	411	414
30	3412	3915	4087	4970	416	415
32	3428	3810	4091	4895	419	416
34	3441	3730	4069	4837	420	415
36	3438	3636	4071	4766	419	414
38	3429	3546	4057	4693	419	414
40	3410	3462	4027	4615	416	410
42	3402	3392	3994	4552	412	406
44	3368	3313	3943	4471	409	404
46	3356	3241	3953	4405	405	400
48	3338	3179	3932	4341	398	395
50	3323	3119	3908	4278	393	390
52	3310	3064	3878	4212	386	383
54	3290	3003	3830	4142	380	377
56	3279	2958	3798	4091	372	369
58	3252	2908	3763	4027	360	359
60	3233	2869	3741	3975	351	351
62	3203	2825	3711	3918	338	340
64	3174	2784	3681	3860	328	331
66	3144	2743	3646	3805	315	322
68	3122	2710	3622	3761	303	310
70	3091	2666	3572	3705	293	299
72	3067	2623	3533	3648	282	287
74	3046	2584	3494	3590	270	275
76	3016	2544	3449	3528	261	265
78	2995	2509	3418	3473	250	254
80	2973	2478	3390	3425	240	244
82	2959	2454	3371	3383	230	235
84	2927	2428	3323	3333	221	228

Ice House Dam Reach
Upper S.F. Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	2916	2421	3304	3297	211	220
88	2896	2412	3286	3263	201	212
90	2871	2397	3263	3230	193	205
92	2844	2383	3241	3197	186	200
94	2820	2382	3234	3174	180	195
96	2792	2374	3212	3147	175	191
98	2766	2367	3193	3124	170	187
100	2736	2357	3174	3102	167	185
102	2703	2338	3149	3074	160	179
104	2677	2319	3123	3048	156	176
106	2645	2299	3095	3022	154	174
108	2609	2282	3067	2991	152	171
110	2586	2276	3054	2966	150	169
112	2558	2269	3034	2940	148	167
114	2532	2259	3016	2919	146	165
116	2511	2253	3003	2900	146	164
118	2482	2242	2983	2880	142	161
120	2476	2221	2997	2863	138	156
122	2453	2215	2979	2850	136	154
124	2433	2198	2957	2830	134	152
126	2413	2190	2936	2818	133	152
128	2387	2173	2913	2797	131	150
130	2375	2166	2898	2789	129	149

Ice House Dam Reach
Upper S.F. Silver Creek - Spawning Riffle

Discharge	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	6954	6863
8	8694	8882
10	10210	10640
12	11569	12061
14	12528	13050
16	13134	13655
18	13399	14168
20	13091	14125
22	12856	14172
24	12196	13874
26	11876	13726
28	11311	13396
30	10830	12922
32	10581	12729
34	10398	12532
36	9988	12162
38	9523	11792
40	8970	11345
42	8721	11212
44	8280	10840
46	7924	10555
48	7588	10228
50	7291	9937
52	6832	9530
54	6627	9369
56	6361	9129
58	6158	8916
60	5881	8607
62	5708	8378
64	5561	8238
66	5318	7967
68	5186	7870
70	4972	7690
72	4860	7561
74	4665	7291
76	4576	7154
78	4426	6956
80	4289	6751
82	4254.6	6662.2
84	4152.7	6523.7

Ice House Dam Reach
Upper S.F. Silver Creek - Spawning Riffle

Discharge	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	4003.8	6381.4
88	3937.9	6271.8
90	3805.9	6206.1
92	3651.5	6236.4
94	3546.5	6083.7
96	3478.5	5992.8
98	3367.7	5858.2
100	3258.2	5729.2
102	3173.7	5602.8
104	3099.9	5492.6
106	3040.4	5379.7
108	2970.9	5289.5
110	2903.6	5187.4
112	2828.6	5090.2
114	2768.1	4997.6
116	2694	4892.1
118	2628.4	4913.9
120	2586	4939.6
122	2522.3	4837.2
124	2459	4756
126	2420.3	4672.3
128	2346.6	4578.4
130	2292.8	4491.3

Ice House Dam Reach
Lower S.F. Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
9	289	2183	343	2049	2098	2021
11	364	2440	380	2331	2401	2336
13	435	2552	528	2575	2588	2566
15	486	2706	658	2745	2805	2713
17	552	2923	819	2933	2992	2859
19	631	3177	1037	3209	3139	2979
21	697	3313	1159	3368	3177	3051
23	780	3294	1298	3541	3208	3071
25	850	3454	1383	3729	3291	3126
27	906	3548	1487	3862	3249	3150
29	932	3551	1531	3887	3159	3141
31	1000	3664	1650	4041	3107	3130
33	1040	3712	1703	4106	2976	3060
35	1102	3781	1840	4184	2897	3037
37	1124	3789	1896	4188	2790	2984
39	1195	3872	2009	4280	2729	2920
41	1237	3909	2065	4409	2894	3049
43	1268	3927	2085	4441	2825	2996
45	1327	4013	2154	4557	2758	2966
47	1367	4033	2194	4625	2693	2924
49	1411	4045	2263	4741	2944	3146
51	1423	4006	2333	4755	2890	3109
53	1469	4007	2443	4833	2880	3101
55	1509	4015	2559	4883	2862	3080
57	1523	4002	2649	4874	2845	3042
59	1532	3974	2707	4838	2810	3012
61	1547	3951	2762	4836	2775	2974
63	1568	3956	2760	4808	2772	3000
65	1565	3929	2766	4740	2706	2944
67	1615	3960	2837	4784	2695	2926
69	1641	3965	2859	4776	2649	2881
71	1665	3968	2870	4770	2602	2842
73	1696	3966	2915	4776	2563	2806
75	1675	3860	2865	4705	2479	2742
77	1722	3853	2928	4757	2246	2506
79	1722	3808	2901	4690	2188	2457
81	1752	3783	2920	4672	2141	2419
83	1739	3717	2872	4594	2060	2361
85	1764	3706	2885	4600	2020	2328
87	1792	3704	2904	4585	1975	2282

Ice House Dam Reach
Lower S.F. Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
89	1824	3829	2881	4695	1657	2012
91	1839	3789	2878	4643	1593	1960
93	1855	3778	2885	4619	1541	1916
95	1873	3631	2941	4475	1397	1815
97	1862	3593	2920	4403	1345	1768
99	1893	3598	2989	4411	1328	1743
101	1928	3583	3043	4419	1309	1722
103	1931	3535	3031	4380	1265	1678
105	1944	3488	3039	4362	1244	1649
107	1981	3475	3081	4362	1235	1624
109	1989	3430	3089	4306	1209	1583
111	2018	3554	3073	4406	1192	1580
113	2018	3505	3047	4323	1151	1540
115	2030	3483	3054	4299	1129	1513
117	2027	3455	3046	4245	1110	1478
119	2032	3404	3037	4189	1073	1444
121	2063	3402	3064	4177	1063	1425
123	2066	3370	3046	4124	1028	1393
125	2076	3369	3055	4088	1012	1374
127	2076	3354	3025	4020	988	1345
129	2090	3358	3035	4014	982	1329
131	2094	3347	3013	3962	959	1306
133	2108	3362	3011	3956	951	1292
135	2111	3353	2999	3925	931	1268
137	2112	3362	2977	3911	919	1243
139	2110	3354	2948	3901	900	1223
141	2122	3367	2954	3916	886	1205
143	2124	3363	2943	3904	866	1187
145	2135	3380	2958	3913	858	1175
147	2120	3368	2928	3883	838	1149
149	2130	3373	2933	3893	833	1138
151	2141	3363	2940	3888	833	1117
153	2150	3371	2943	3878	824	1106
155	2161	3385	2944	3863	819	1086
157	2153	3389	2928	3839	808	1067
159	2156	3385	2909	3828	797	1045
161	2164	3386	2897	3828	788	1023
163	2178	3403	2904	3847	779	1009
165	2155	3366	2878	3816	767	985
167	2173	3385	2882	3839	759	974

Ice House Dam Reach
Lower S.F. Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
169	2179	3395	2874	3838	748	953
171	2195	3411	2874	3853	736	939
173	2189	3439	2863	3849	714	912
175	2200	3452	2860	3850	700	891
177	2222	3478	2876	3872	689	877
179	2216	3487	2851	3856	665	850
181	2216	3494	2840	3854	654	838
183	2221	3504	2826	3866	637	816
185	2213	3506	2799	3858	616	791

Ice House Dam Reach
Lower S.F. Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
9	3736	10730	4951	10148	4783	4250
11	4394	11522	6023	11019	5318	4669
13	4999	11951	6763	11634	5619	4981
15	5487	12003	7252	11992	5931	5329
17	5887	12026	7750	12331	6093	5561
19	6289	11953	8297	12609	6168	5732
21	6571	11773	8688	12751	6217	5849
23	6884	11579	9154	12878	6206	5899
25	7132	11364	9511	12923	6210	5930
27	7340	11054	9799	12883	6096	5867
29	7509	10783	10034	12818	5934	5784
31	7688	10553	10378	12802	5751	5664
33	7818	10255	10515	12698	5591	5563
35	7905	9966	10539	12564	5435	5443
37	7916	9650	10402	12342	5312	5364
39	8001	9418	10378	12212	5167	5252
41	8003	9151	10277	12036	5033	5159
43	8005	8923	10165	11883	4927	5076
45	7956	8686	9974	11684	4837	4991
47	7956	8494	9864	11539	4756	4896
49	7940	8311	9717	11399	4680	4807
51	7895	8110	9532	11209	4615	4733
53	7851	7951	9384	11043	4547	4651
55	7818	7828	9237	10915	4479	4559
57	7799	7704	9136	10798	4387	4450
59	7753	7578	9004	10656	4308	4353
61	7676	7455	8875	10489	4240	4280
63	7630	7358	8783	10362	4124	4180
65	7586	7269	8749	10244	3997	4092
67	7551	7178	8704	10132	3874	4002
69	7521	7079	8636	10016	3740	3903
71	7497	6994	8587	9897	3620	3805
73	7414	6899	8486	9750	3486	3710
75	7407	6834	8465	9668	3364	3619
77	7364	6745	8382	9541	3249	3529
79	7318	6666	8321	9431	3126	3437
81	7290	6587	8253	9307	3012	3337
83	7286	6506	8213	9192	2884	3235
85	7251	6426	8193	9082	2781	3144
87	7226	6361	8139	8972	2676	3036

Ice House Dam Reach
Lower S.F. Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
89	7160	6293	8082	8843	2558	2940
91	7166	6239	8054	8760	2471	2852
93	7109	6188	7998	8661	2371	2769
95	7094	6137	7977	8579	2303	2698
97	7052	6092	7929	8488	2222	2623
99	7022	6047	7896	8408	2139	2554
101	7011	6007	7876	8340	2061	2481
103	6976	5966	7834	8257	2004	2418
105	6941	5921	7788	8184	1952	2358
107	6943	5871	7772	8105	1913	2295
109	6914	5831	7735	8031	1876	2248
111	6887	5783	7684	7959	1841	2202
113	6886	5729	7634	7875	1810	2156
115	6872	5681	7600	7807	1779	2112
117	6841	5625	7550	7729	1743	2069
119	6831	5578	7524	7663	1728	2039
121	6821	5544	7494	7600	1708	2008
123	6779	5498	7433	7522	1677	1975
125	6751	5450	7380	7449	1651	1948
127	6727	5424	7336	7400	1623	1916
129	6711	5386	7300	7351	1600	1892
131	6688	5331	7241	7279	1583	1873
133	6652	5299	7194	7226	1561	1851
135	6601	5256	7135	7157	1540	1827
137	6566	5224	7124	7113	1517	1799
139	6507	5188	7075	7056	1498	1771
141	6447	5139	7032	6992	1484	1747
143	6404	5112	6997	6949	1468	1724
145	6347	5074	6978	6893	1459	1704
147	6291	5050	6929	6840	1445	1684
149	6244	5024	6894	6792	1433	1666
151	6199	4995	6876	6751	1417	1646
153	6148	4966	6840	6706	1397	1623
155	6101	4938	6807	6660	1384	1611
157	6050	4902	6775	6617	1369	1590
159	6008	4870	6755	6576	1354	1572
161	5965	4838	6730	6541	1337	1559
163	5916	4795	6692	6499	1321	1542
165	5866	4763	6669	6464	1308	1525
167	5818	4729	6647	6426	1293	1506

Ice House Dam Reach
Lower S.F. Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
169	5754	4701	6608	6389	1274	1482
171	5694	4659	6561	6338	1268	1465
173	5645	4618	6528	6290	1259	1451
175	5605	4591	6493	6246	1247	1437
177	5566	4557	6457	6199	1233	1421
179	5520	4522	6413	6153	1223	1406
181	5474	4486	6368	6105	1209	1390
183	5434	4446	6320	6065	1196	1375
185	5403	4407	6283	6035	1189	1361

Junction Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	60	703	70	686	376	343
8	113	772	138	814	501	468
10	156	823	173	895	578	557
12	170	776	216	892	628	606
14	197	774	256	927	647	637
16	209	802	279	940	663	667
18	226	846	302	960	655	681
20	241	920	319	1002	712	725
22	265	970	354	1045	722	761
24	270	1012	358	1080	716	773
26	283	1065	376	1126	726	795
28	290	1105	386	1154	710	789
30	315	1179	406	1243	698	788
32	327	1211	421	1292	680	779
34	336	1241	433	1330	666	754
36	357	1288	456	1400	628	721
38	369	1308	473	1421	571	675
40	381	1322	486	1430	521	635
42	397	1345	505	1450	467	586
44	410	1366	523	1469	416	541
46	415	1367	533	1471	351	495
48	431	1389	553	1492	296	460
50	447	1454	578	1545	256	430
52	452	1431	590	1518	204	381
54	463	1443	604	1535	181	353
56	469	1446	616	1544	160	325
58	475	1453	630	1536	115	273
60	493	1481	653	1570	101	255
62	500	1477	661	1576	88	238
64	503	1476	666	1579	84	222
66	511	1482	677	1574	80	207
68	524	1494	690	1584	76	196
70	534	1496	694	1590	75	184
72	538	1504	702	1600	76	172
74	550	1514	716	1603	77	162
76	561	1520	728	1608	79	152
78	561	1523	734	1615	80	143
80	569	1524	750	1623	81	136
82	603	1560	791	1657	85	147
84	574	1514	770	1605	71	113

Junction Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	571	1519	771	1607	85	116
88	580	1528	780	1617	88	119
90	579	1528	786	1621	88	121
92	580	1534	797	1628	90	120
94	588	1538	813	1629	93	121
96	590	1544	826	1632	94	120
98	589	1491	840	1565	96	121
100	596	1487	847	1569	97	119
102	599	1491	853	1578	96	115
104	605	1489	866	1585	87	110
106	609	1479	878	1578	82	107
108	623	1478	897	1583	73	101
110	625	1472	902	1572	64	96
112	628	1471	901	1563	55	92
114	639	1471	908	1561	55	88
116	655	1476	918	1565	56	87
118	660	1473	912	1561	56	85
120	668	1473	909	1559	57	83
122	673	1468	913	1555	57	81
124	684	1502	909	1575	58	81
126	697	1510	922	1580	79	96
128	699	1505	914	1570	77	94
130	686	1467	890	1538	74	105
132	691	1461	889	1536	75	105
134	696	1466	881	1537	77	106
136	700	1470	876	1537	77	105
138	707	1469	871	1541	76	104
140	717	1473	877	1547	75	104
142	723	1475	872	1554	78	102
144	727	1479	871	1557	77	102
146	731	1487	871	1564	78	102
148	728	1482	870	1562	79	102
150	738	1489	881	1570	79	102
152	737	1479	877	1558	80	101
154	745	1486	885	1569	80	100
156	751	1489	887	1571	80	101
158	758	1492	888	1576	79	101
160	765	1496	889	1577	81	102
162	773	1486	888	1581	83	103
164	775	1487	885	1581	82	102

Junction Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	786	1496	893	1592	82	103
168	787	1496	890	1590	82	103
170	795	1497	896	1594	83	103
172	794	1500	897	1594	83	103
174	799	1501	903	1599	84	104
176	806	1503	911	1604	85	106
178	805	1495	912	1600	85	105
180	817	1497	927	1609	86	107
182	845	1520	957	1642	88	109
184	853	1517	968	1646	89	110
186	857	1517	973	1647	89	111
188	863	1521	981	1651	89	112
190	843	1497	959	1623	90	113
192	843	1490	957	1618	89	113
194	854	1494	969	1627	91	115
196	853	1493	969	1624	90	116
198	861	1488	979	1626	91	116
200	864	1486	978	1630	91	117
202	869	1484	981	1636	93	119
204	874	1480	985	1635	92	119
206	879	1477	984	1636	96	121
208	885	1481	987	1642	96	122
210	891	1470	992	1638	96	122
212	891	1470	992	1637	96	123
214	899	1462	996	1638	96	123
216	900	1461	996	1638	97	124
218	908	1463	999	1643	100	126
220	911	1453	1000	1638	99	126
222	917	1456	1004	1642	100	127
224	924	1459	1012	1647	102	129
226	927	1455	1009	1641	101	129
228	927	1455	1006	1641	101	129
230	937	1454	1017	1639	104	131
232	939	1456	1016	1642	103	132
234	941	1460	1014	1645	105	133
236	947	1454	1016	1643	107	134
238	954	1458	1018	1651	105	135
240	953	1453	1011	1646	106	135
242	985	1455	1030	1645	127	158
244	968	1451	1020	1653	105	128

Junction Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	975	1456	1026	1661	106	132
248	981	1459	1031	1666	107	134
250	982	1454	1033	1662	108	135

Junction Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	1581	5494	1360	5210	1928	1867
8	1992	5806	1775	5682	2313	2115
10	2345	5826	2122	5913	2541	2328
12	2634	5735	2451	6028	2687	2500
14	2841	5553	2750	6035	2784	2637
16	3033	5294	3030	5938	2834	2726
18	3169	5057	3264	5821	2881	2785
20	3290	4840	3454	5697	2905	2827
22	3413	4592	3625	5532	2900	2831
24	3476	4392	3738	5370	2885	2812
26	3509	4222	3820	5219	2871	2799
28	3546	4080	3899	5089	2843	2767
30	3511	3928	3905	4939	2797	2723
32	3515	3815	3941	4834	2748	2675
34	3495	3709	3945	4711	2684	2613
36	3476	3633	3963	4615	2617	2556
38	3437	3540	3949	4503	2549	2513
40	3410	3475	3936	4420	2491	2471
42	3399	3413	3946	4348	2415	2407
44	3361	3354	3918	4266	2329	2339
46	3356	3323	3913	4201	2236	2259
48	3333	3288	3881	4145	2129	2175
50	3286	3250	3820	4083	2023	2097
52	3272	3228	3802	4047	1905	2010
54	3254	3209	3789	4018	1804	1930
56	3225	3179	3764	3980	1694	1850
58	3194	3168	3740	3956	1617	1787
60	3173	3166	3721	3942	1538	1719
62	3131	3158	3679	3930	1460	1650
64	3095	3163	3633	3908	1391	1590
66	3083	3173	3628	3905	1318	1525
68	3058	3176	3602	3903	1271	1481
70	3041	3170	3583	3891	1206	1423
72	3022	3175	3562	3886	1168	1384
74	3016	3177	3547	3886	1119	1331
76	2998	3170	3520	3868	1082	1294
78	2994	3190	3506	3889	1065	1271
80	2972	3182	3481	3880	1020	1225
82	2959	3184	3477	3888	1001	1203
84	2926	3174	3445	3872	984	1181

Junction Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	2908	3175	3428	3877	968	1158
88	2889	3174	3407	3879	959	1145
90	2860	3177	3390	3880	954	1128
92	2841	3174	3381	3872	945	1111
94	2827	3167	3373	3868	931	1093
96	2807	3172	3352	3880	914	1068
98	2793	3165	3345	3877	904	1057
100	2774	3158	3328	3871	897	1046
102	2760	3158	3333	3877	887	1037
104	2743	3146	3329	3862	880	1028
106	2749	3147	3346	3861	875	1023
108	2735	3136	3352	3853	876	1019
110	2722	3130	3351	3852	880	1018
112	2708	3129	3347	3844	876	1007
114	2700	3129	3346	3840	882	1005
116	2684	3120	3339	3827	886	1002
118	2668	3103	3323	3801	892	998
120	2654	3098	3309	3790	902	998
122	2645	3094	3295	3783	909	997
124	2640	3099	3291	3793	919	998
126	2629	3099	3282	3789	929	999
128	2628	3097	3286	3786	945	1002
130	2623	3108	3287	3790	1013	1047
132	2605	3080	3277	3773	1019	1047
134	2595	3077	3275	3771	1029	1050
136	2587	3073	3274	3761	1038	1052
138	2580	3070	3279	3749	1045	1054
140	2569	3067	3281	3740	1053	1059
142	2560	3029	3269	3712	1055	1060
144	2558	3023	3263	3712	1059	1064
146	2560	3014	3255	3705	1071	1070
148	2561	3014	3253	3703	1073	1073
150	2555	3012	3243	3689	1056	1061
152	2559	3005	3250	3678	1062	1066
154	2564	3014	3262	3682	1071	1072
156	2554	3000	3241	3665	1067	1068
158	2558	2997	3237	3659	1077	1075
160	2555	2988	3224	3652	1087	1081
162	2554	2985	3227	3647	1099	1088
164	2537	2972	3200	3625	1033	1041

Junction Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	2543	2972	3208	3627	1045	1045
168	2526	2957	3198	3617	1055	1052
170	2520	2944	3189	3598	1056	1050
172	2521	2938	3191	3592	1065	1057
174	2528	2937	3199	3587	1076	1065
176	2502	2914	3172	3560	1071	1059
178	2507	2911	3177	3556	1081	1067
180	2503	2899	3167	3541	1083	1067
182	2509	2895	3176	3541	1092	1073
184	2510	2887	3167	3538	1094	1076
186	2500	2872	3146	3511	1098	1078
188	2481	2834	3124	3472	1088	1089
190	2492	2831	3133	3467	1099	1097
192	2480	2819	3117	3446	1091	1094
194	2498	2846	3128	3461	1091	1088
196	2490	2773	3109	3387	1089	1081
198	2477	2770	3084	3378	1097	1088
200	2470	2692	3065	3304	1156	1142
202	2472	2683	3060	3296	1157	1140
204	2475	2683	3056	3295	1161	1144
206	2485	2760	3065	3371	1109	1097
208	2483	2760	3066	3370	1116	1103
210	2486	2750	3069	3358	1117	1103
212	2487	2755	3075	3354	1115	1104
214	2488	2756	3081	3353	1122	1109
216	2487	2750	3082	3340	1123	1107
218	2478	2744	3080	3327	1126	1110
220	2478	2737	3081	3314	1126	1106
222	2478	2731	3083	3308	1130	1110
224	2469	2720	3070	3293	1122	1100
226	2473	2724	3071	3295	1133	1107
228	2450	2661	3017	3225	1117	1102
230	2447	2651	3009	3217	1114	1101
232	2443	2642	3004	3208	1114	1097
234	2435	2640	2997	3203	1127	1106
236	2428	2630	2981	3191	1120	1099
238	2433	2629	2985	3193	1121	1103
240	2425	2613	2973	3177	1118	1101
242	2420	2613	2962	3175	1119	1105
244	2417	2607	2953	3166	1117	1103

Junction Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	2393	2639	2937	3199	1078	1074
248	2389	2637	2931	3192	1076	1075
250	2372	2625	2899	3176	1070	1067

Junction Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	3292	3588	1804	3834	72	284
8	3522	3748	2164	4080	124	342
10	3723	3825	2486	4175	164	378
12	3900	3857	2762	4212	246	427
14	4085	3867	3029	4227	303	486
16	4241	3869	3272	4230	325	511
18	4373	3852	3445	4215	386	546
20	4468	3828	3587	4195	375	545
22	4524	3788	3681	4156	489	610
24	4585	3766	3796	4145	543	639
26	4626	3735	3893	4123	593	666
28	4648	3685	3970	4085	634	692
30	4670	3636	4039	4045	676	729
32	4677	3588	4104	4014	714	751
34	4714	3569	4198	3995	743	772
36	4732	3516	4250	3958	768	789
38	4748	3462	4294	3912	795	810
40	4758	3405	4333	3874	821	827
42	4753	3370	4372	3838	840	844
44	4754	3334	4399	3796	852	855
46	4735	3303	4413	3770	865	864
48	4704	3265	4420	3738	879	873
50	4700	3243	4453	3716	864	856
52	4664	3212	4449	3689	869	861
54	4639	3186	4454	3669	877	867
56	4606	3150	4453	3648	888	874
58	4566	3095	4445	3614	892	876
60	4530	3062	4446	3596	902	883
62	4497	3035	4447	3581	911	890
64	4451	3004	4428	3554	917	895
66	4415	2977	4424	3534	923	900
68	4385	2972	4422	3513	934	907
70	4350	2970	4410	3489	938	911
72	4314	2968	4399	3480	946	916
74	4278	2964	4383	3476	993	943
76	4242	2956	4366	3464	994	945
78	4206	2949	4346	3451	1001	949
80	4172	2939	4326	3433	1005	952
82	4137	2951	4298	3426	1006	954
84	4108	2950	4276	3412	1007	954

Junction Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	4074	2943	4248	3394	1012	957
88	4003	2895	4182	3316	945	896
90	4085	2964	4263	3386	922	880
92	4037	2946	4217	3358	917	879
94	4006	2943	4191	3344	911	876
96	3974	2937	4168	3325	908	873
98	3932	2854	4129	3270	899	866
100	3905	2852	4095	3262	893	863
102	3878	2846	4072	3250	889	863
104	3857	2840	4054	3241	883	860
106	3727	2855	3910	3196	911	881
108	3710	2862	3891	3193	902	877
110	3682	2865	3859	3184	900	875
112	3664	2875	3831	3181	895	870
114	3657	2885	3811	3176	889	864
116	3641	2887	3787	3167	882	859
118	3634	2893	3763	3169	876	853
120	3626	2901	3738	3168	871	851
122	3608	2906	3716	3162	860	846
124	3666	2915	3776	3196	908	889
126	3658	2916	3765	3187	901	887
128	3641	2905	3743	3172	889	879
130	3622	2894	3690	3145	831	845
132	3619	2885	3680	3135	825	841
134	3609	2875	3661	3121	819	838
136	3610	2871	3652	3118	814	836
138	3611	2872	3648	3110	814	836
140	3609	2874	3637	3104	812	834
142	3593	2866	3618	3093	806	829
144	3591	2873	3615	3096	805	829
146	3588	2876	3612	3099	801	827
148	3592	2877	3610	3101	799	826
150	3586	2871	3602	3097	797	825
152	3586	2873	3598	3104	791	821
154	3583	2873	3597	3101	788	820
156	3572	2862	3586	3092	783	818
158	3567	2864	3586	3095	783	819
160	3564	2862	3584	3088	776	815
162	3553	2855	3572	3081	774	815
164	3555	2867	3575	3092	773	816

Junction Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	3548	2863	3572	3089	773	816
168	3540	2857	3566	3088	769	813
170	3433	2825	3481	3001	773	815
172	3421	2822	3472	3000	774	816
174	3412	2822	3469	3003	777	817
176	3412	2840	3469	3019	774	814
178	3403	2844	3460	3020	779	817
180	3398	2845	3454	3020	782	819
182	3393	2847	3450	3021	782	818
184	3391	2856	3447	3027	787	822
186	3386	2863	3442	3033	791	825
188	3380	2870	3438	3039	795	829
190	3371	2868	3433	3038	796	828
192	3361	2872	3426	3040	801	832
194	3356	2884	3423	3051	806	836
196	3343	2888	3417	3056	808	834
198	3340	2891	3412	3060	816	841
200	3342	2902	3434	3081	887	899
202	3329	2899	3422	3081	889	899
204	3325	2906	3421	3091	898	905
206	3313	2907	3409	3095	900	904
208	3312	2919	3410	3108	912	913
210	3305	2934	3406	3123	921	919
212	3296	2937	3400	3125	921	918
214	3291	2943	3396	3133	930	924
216	3288	2950	3392	3143	941	933
218	3284	2947	3384	3152	954	958
220	3305	2984	3431	3205	1009	1003
222	3299	2988	3415	3216	1009	1002
224	3298	2995	3414	3232	1022	1012
226	3297	2995	3410	3238	1033	1020
228	3297	2998	3413	3247	1034	1019
230	3294	2999	3407	3253	1045	1027
232	3293	2998	3405	3259	1043	1025
234	3294	3004	3410	3270	1053	1034
236	3292	3010	3407	3279	1066	1043
238	3290	3006	3410	3280	1063	1039
240	3288	3007	3412	3283	1074	1047
242	3281	2999	3407	3279	1072	1044
244	3275	2994	3404	3279	1081	1052

Junction Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	3272	2987	3406	3280	1079	1049
248	3273	2988	3407	3285	1086	1056
250	3263	2983	3402	3284	1096	1064

Camino Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	8	91	9	89	49	44
8	15	100	18	105	65	60
10	20	106	22	116	75	72
12	22	100	28	115	81	78
14	25	100	33	120	84	82
16	27	104	36	121	86	86
18	29	109	39	124	85	88
20	31	119	41	129	92	94
22	34	125	46	135	93	98
24	35	131	46	140	93	100
26	37	138	49	146	94	103
28	38	143	50	149	92	102
30	41	152	52	161	90	102
32	42	156	54	167	88	101
34	43	160	56	172	86	97
36	46	166	59	181	81	93
38	48	169	61	184	74	87
40	49	171	63	185	67	82
42	51	174	65	187	60	76
44	53	177	68	190	54	70
46	54	177	69	190	45	64
48	56	180	71	193	38	59
50	58	188	75	200	33	56
52	58	185	76	196	26	49
54	60	186	78	198	23	46
56	61	187	80	199	21	42
58	61	188	81	199	15	35
60	64	191	84	203	13	33
62	65	191	85	204	11	31
64	65	191	86	204	11	29
66	66	192	87	203	10	27
68	68	193	89	205	10	25
70	69	193	90	205	10	24
72	70	194	91	207	10	22
74	71	196	93	207	10	21
76	72	196	94	208	10	20
78	72	197	95	209	10	19
80	74	197	97	210	10	18
82	78	202	102	214	11	19
84	74	196	100	207	9	15

Camino Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	74	196	100	208	11	15
88	75	197	101	209	11	15
90	75	197	102	209	11	16
92	75	198	103	210	12	15
94	76	199	105	211	12	16
96	76	200	107	211	12	16
98	76	193	109	202	12	16
100	77	192	109	203	13	15
102	77	193	110	204	12	15
104	78	192	112	205	11	14
106	79	191	113	204	11	14
108	80	191	116	205	9	13
110	81	190	117	203	8	12
112	81	190	116	202	7	12
114	83	190	117	202	7	11
116	85	191	119	202	7	11
118	85	190	118	202	7	11
120	86	190	118	201	7	11
122	87	190	118	201	7	10
124	88	194	117	203	7	10
126	90	195	119	204	10	12
128	90	194	118	203	10	12
130	89	190	115	199	10	14
132	89	189	115	198	10	14
134	90	189	114	199	10	14
136	90	190	113	199	10	14
138	91	190	113	199	10	13
140	93	190	113	200	10	13
142	93	191	113	201	10	13
144	94	191	113	201	10	13
146	94	192	113	202	10	13
148	94	191	112	202	10	13
150	95	192	114	203	10	13
152	95	191	113	201	10	13
154	96	192	114	203	10	13
156	97	192	115	203	10	13
158	98	193	115	204	10	13
160	99	193	115	204	10	13
162	100	192	115	204	11	13
164	100	192	114	204	11	13

Camino Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	102	193	115	206	11	13
168	102	193	115	205	11	13
170	103	193	116	206	11	13
172	103	194	116	206	11	13
174	103	194	117	207	11	13
176	104	194	118	207	11	14
178	104	193	118	207	11	14
180	106	193	120	208	11	14
182	109	196	124	212	11	14
184	110	196	125	213	11	14
186	111	196	126	213	12	14
188	112	197	127	213	12	14
190	109	193	124	210	12	15
192	109	192	124	209	11	15
194	110	193	125	210	12	15
196	110	193	125	210	12	15
198	111	192	127	210	12	15
200	112	192	126	211	12	15
202	112	192	127	211	12	15
204	113	191	127	211	12	15
206	114	191	127	211	12	16
208	114	191	128	212	12	16
210	115	190	128	212	12	16
212	115	190	128	212	12	16
214	116	189	129	212	12	16
216	116	189	129	212	13	16
218	117	189	129	212	13	16
220	118	188	129	212	13	16
222	118	188	130	212	13	16
224	119	188	131	213	13	17
226	120	188	130	212	13	17
228	120	188	130	212	13	17
230	121	188	131	212	13	17
232	121	188	131	212	13	17
234	122	189	131	213	14	17
236	122	188	131	212	14	17
238	123	188	132	213	14	17
240	123	188	131	213	14	17
242	127	188	133	213	16	20
244	125	188	132	214	14	17

Camino Dam Reach
Silver Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	126	188	133	215	14	17
248	127	188	133	215	14	17
250	127	188	133	215	14	17

Camino Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	806	2802	694	2658	983	952
8	1016	2961	905	2898	1180	1079
10	1196	2972	1082	3016	1296	1187
12	1343	2925	1250	3075	1370	1275
14	1449	2832	1403	3078	1420	1345
16	1547	2700	1545	3029	1445	1390
18	1616	2579	1665	2969	1469	1420
20	1678	2469	1762	2906	1482	1442
22	1741	2342	1849	2822	1479	1444
24	1773	2240	1907	2739	1471	1434
26	1790	2154	1949	2662	1465	1427
28	1809	2081	1989	2596	1450	1411
30	1791	2004	1992	2519	1427	1389
32	1793	1946	2010	2466	1402	1364
34	1783	1892	2012	2403	1369	1333
36	1773	1853	2021	2354	1335	1304
38	1753	1805	2014	2297	1300	1282
40	1739	1773	2008	2254	1270	1260
42	1734	1741	2013	2218	1232	1227
44	1714	1711	1998	2176	1188	1193
46	1712	1695	1996	2143	1141	1152
48	1700	1677	1979	2114	1086	1109
50	1676	1658	1948	2082	1032	1070
52	1669	1647	1939	2064	972	1025
54	1660	1637	1933	2049	920	984
56	1645	1621	1920	2030	864	944
58	1629	1616	1908	2018	825	912
60	1618	1615	1898	2011	784	877
62	1597	1611	1877	2005	745	841
64	1579	1613	1853	1993	710	811
66	1572	1618	1851	1992	672	778
68	1560	1620	1837	1991	648	755
70	1551	1617	1827	1985	615	726
72	1542	1619	1817	1982	596	706
74	1538	1620	1809	1982	571	679
76	1529	1617	1795	1973	552	660
78	1527	1627	1788	1984	543	649
80	1516	1623	1776	1979	520	625
82	1509	1624	1773	1983	511	614
84	1492	1619	1757	1975	502	602

Camino Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	1483	1619	1749	1977	494	591
88	1473	1619	1738	1978	489	584
90	1459	1621	1729	1979	486	575
92	1449	1619	1724	1975	482	567
94	1442	1616	1720	1973	475	558
96	1432	1618	1710	1979	466	545
98	1424	1614	1706	1978	461	539
100	1415	1611	1697	1975	458	534
102	1408	1611	1700	1977	452	529
104	1399	1605	1698	1970	449	524
106	1402	1605	1707	1969	446	522
108	1395	1599	1710	1965	447	520
110	1388	1596	1709	1965	449	519
112	1381	1596	1707	1961	447	514
114	1377	1596	1707	1959	450	513
116	1369	1592	1703	1952	452	511
118	1361	1583	1695	1939	455	509
120	1354	1580	1688	1933	460	509
122	1349	1578	1681	1930	463	509
124	1346	1581	1679	1935	469	509
126	1341	1580	1674	1933	474	509
128	1341	1580	1676	1931	482	511
130	1338	1585	1676	1933	516	534
132	1329	1571	1671	1924	520	534
134	1324	1569	1671	1923	525	535
136	1319	1567	1670	1918	529	537
138	1316	1566	1673	1912	533	538
140	1311	1564	1673	1908	537	540
142	1306	1545	1668	1893	538	540
144	1305	1542	1664	1893	540	543
146	1306	1537	1660	1890	546	546
148	1306	1538	1659	1889	547	547
150	1303	1536	1654	1882	538	541
152	1305	1533	1658	1876	542	544
154	1308	1537	1664	1878	546	547
156	1303	1530	1653	1869	544	545
158	1305	1529	1651	1866	549	548
160	1303	1524	1644	1863	554	552
162	1303	1522	1646	1860	560	555
164	1294	1516	1632	1849	527	531

Camino Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	1297	1516	1636	1850	533	533
168	1288	1508	1631	1845	538	536
170	1285	1502	1627	1835	538	536
172	1286	1498	1628	1832	543	539
174	1289	1498	1632	1830	549	543
176	1276	1486	1618	1816	546	540
178	1279	1485	1620	1814	551	544
180	1276	1478	1615	1806	552	544
182	1280	1477	1620	1806	557	547
184	1280	1473	1615	1805	558	549
186	1275	1465	1605	1791	560	550
188	1266	1446	1593	1771	555	556
190	1271	1444	1598	1768	560	560
192	1265	1438	1590	1758	557	558
194	1274	1452	1596	1765	556	555
196	1270	1414	1586	1728	556	552
198	1263	1413	1573	1723	559	555
200	1260	1373	1563	1685	590	583
202	1261	1369	1561	1681	590	581
204	1262	1369	1559	1681	592	584
206	1267	1408	1563	1720	566	560
208	1267	1408	1564	1719	569	562
210	1268	1403	1566	1713	570	563
212	1269	1405	1568	1711	569	563
214	1269	1406	1572	1710	572	566
216	1268	1403	1572	1704	573	565
218	1264	1399	1571	1697	574	566
220	1264	1396	1572	1690	574	564
222	1264	1393	1573	1688	577	566
224	1260	1387	1566	1679	572	561
226	1261	1389	1566	1681	578	565
228	1249	1357	1539	1645	570	562
230	1248	1352	1535	1641	568	561
232	1246	1348	1532	1636	568	560
234	1242	1347	1529	1634	575	564
236	1238	1341	1521	1627	571	560
238	1241	1341	1523	1628	572	563
240	1237	1333	1516	1620	570	562
242	1234	1333	1511	1620	571	563
244	1233	1330	1506	1615	570	563

Camino Dam Reach
Silver Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	1221	1346	1498	1632	550	548
248	1218	1345	1495	1628	549	548
250	1210	1339	1478	1620	546	544

Camino Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
6	8120	8850	4450	9457	178	701
8	8688	9246	5339	10066	305	844
10	9184	9436	6133	10300	404	933
12	9621	9514	6814	10391	607	1054
14	10076	9540	7473	10428	748	1199
16	10462	9543	8071	10434	801	1261
18	10787	9502	8499	10398	953	1348
20	11023	9443	8848	10348	925	1344
22	11161	9345	9081	10253	1207	1505
24	11311	9291	9364	10224	1340	1577
26	11411	9214	9604	10171	1463	1643
28	11466	9091	9794	10076	1564	1706
30	11521	8969	9962	9978	1667	1798
32	11537	8852	10123	9901	1762	1853
34	11629	8804	10355	9856	1834	1904
36	11672	8674	10484	9764	1893	1945
38	11713	8541	10593	9650	1961	1997
40	11736	8400	10688	9557	2024	2041
42	11725	8312	10786	9468	2072	2083
44	11726	8225	10852	9363	2102	2109
46	11680	8149	10886	9300	2133	2130
48	11604	8053	10903	9222	2170	2155
50	11594	7999	10985	9166	2131	2112
52	11506	7924	10974	9101	2143	2123
54	11443	7858	10986	9050	2164	2140
56	11363	7771	10986	9000	2190	2157
58	11264	7634	10965	8916	2200	2162
60	11174	7554	10968	8872	2226	2179
62	11093	7486	10969	8833	2247	2195
64	10979	7410	10924	8766	2263	2208
66	10892	7343	10913	8717	2277	2219
68	10816	7332	10909	8666	2304	2238
70	10730	7326	10878	8606	2313	2247
72	10642	7322	10852	8585	2333	2260
74	10554	7312	10812	8574	2450	2326
76	10465	7292	10769	8546	2453	2331
78	10376	7275	10721	8513	2468	2340
80	10291	7251	10672	8468	2480	2348
82	10204	7279	10604	8451	2483	2353
84	10135	7276	10547	8417	2484	2354

Camino Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
86	10051	7260	10479	8371	2497	2361
88	9875	7141	10315	8180	2332	2210
90	10076	7312	10516	8353	2274	2171
92	9958	7268	10402	8284	2262	2169
94	9882	7259	10337	8249	2248	2162
96	9804	7245	10282	8201	2240	2154
98	9699	7041	10186	8067	2218	2137
100	9632	7036	10101	8046	2202	2129
102	9567	7020	10045	8018	2192	2128
104	9514	7007	10000	7994	2177	2121
106	9194	7043	9645	7884	2248	2174
108	9151	7060	9600	7877	2225	2164
110	9082	7067	9520	7854	2220	2159
112	9038	7091	9450	7848	2209	2147
114	9020	7116	9401	7836	2194	2132
116	8982	7122	9341	7812	2176	2118
118	8965	7137	9282	7817	2160	2104
120	8945	7157	9222	7815	2149	2100
122	8900	7168	9166	7800	2122	2086
124	9044	7192	9314	7885	2239	2192
126	9023	7194	9287	7863	2223	2188
128	8981	7166	9234	7824	2194	2169
130	8935	7138	9101	7757	2050	2084
132	8928	7116	9079	7734	2035	2074
134	8903	7092	9030	7699	2021	2067
136	8905	7082	9009	7691	2007	2061
138	8907	7084	9000	7672	2008	2061
140	8902	7089	8972	7658	2002	2057
142	8863	7070	8925	7629	1989	2045
144	8857	7088	8917	7638	1985	2044
146	8850	7095	8909	7645	1976	2039
148	8860	7096	8905	7649	1971	2036
150	8845	7082	8886	7639	1965	2035
152	8846	7086	8876	7656	1951	2026
154	8838	7087	8872	7651	1944	2024
156	8812	7060	8847	7627	1932	2018
158	8800	7065	8845	7635	1930	2020
160	8792	7059	8841	7617	1915	2010
162	8765	7042	8812	7600	1910	2011
164	8770	7073	8818	7627	1906	2014

Camino Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
166	8751	7064	8812	7620	1906	2013
168	8732	7049	8797	7618	1897	2007
170	8468	6969	8587	7402	1907	2011
172	8439	6960	8566	7401	1910	2013
174	8417	6962	8557	7407	1916	2016
176	8418	7006	8557	7448	1910	2008
178	8394	7014	8536	7450	1922	2015
180	8381	7018	8520	7449	1928	2021
182	8369	7023	8510	7453	1929	2017
184	8366	7045	8503	7467	1940	2028
186	8352	7061	8491	7483	1950	2035
188	8337	7080	8481	7497	1962	2045
190	8316	7076	8468	7493	1964	2043
192	8291	7085	8450	7499	1976	2053
194	8278	7114	8443	7527	1989	2063
196	8248	7124	8428	7539	1992	2058
198	8239	7131	8416	7550	2014	2074
200	8245	7158	8470	7600	2189	2218
202	8212	7152	8442	7601	2192	2218
204	8203	7168	8438	7626	2215	2231
206	8172	7171	8410	7634	2221	2230
208	8170	7201	8412	7667	2250	2252
210	8153	7239	8402	7704	2271	2266
212	8130	7245	8387	7708	2271	2264
214	8119	7261	8378	7728	2294	2280
216	8111	7277	8368	7753	2322	2302
218	8101	7271	8348	7776	2353	2362
220	8153	7360	8464	7907	2488	2474
222	8139	7372	8425	7934	2490	2472
224	8136	7388	8421	7974	2522	2496
226	8133	7389	8412	7987	2548	2515
228	8133	7394	8418	8010	2552	2514
230	8126	7397	8405	8025	2577	2534
232	8123	7395	8398	8038	2574	2530
234	8127	7410	8412	8067	2598	2549
236	8122	7426	8404	8088	2629	2572
238	8115	7415	8413	8092	2621	2563
240	8111	7417	8417	8098	2649	2583
242	8094	7399	8405	8089	2645	2576
244	8078	7385	8396	8089	2667	2594

Camino Dam Reach
Silver Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
246	8072	7368	8402	8091	2662	2587
248	8074	7371	8405	8104	2680	2605
250	8050	7359	8393	8102	2703	2626

Brush Creek Dam Reach
Brush Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	39	629	12	514	256	223
3	72	774	33	658	306	282
4	105	873	86	798	339	326
5	130	905	133	857	361	353
6	163	962	190	939	372	367
7	192	990	229	971	370	372
8	222	1033	291	1024	371	375
9	242	1055	335	1050	359	366
10	266	1087	395	1085	344	356
11	294	1113	472	1114	321	344
12	322	1120	538	1134	300	332
13	345	1124	578	1131	280	316
14	365	1136	602	1127	263	291
15	387	1150	632	1138	242	270
16	405	1157	663	1146	210	248
17	423	1167	695	1153	182	227
18	447	1174	728	1165	162	210
19	463	1167	752	1168	140	192
20	483	1160	771	1167	123	176
21	497	1149	793	1163	108	161
22	515	1133	816	1161	96	150
23	536	1122	842	1158	87	142
24	553	1104	860	1152	83	132
25	568	1091	874	1146	81	124
26	585	1079	889	1142	79	117
27	598	1063	900	1142	79	111
28	612	1049	912	1137	77	105
29	644	1060	946	1154	60	88
30	654	1057	956	1151	59	83
31	662	1051	966	1156	58	79
32	652	1030	959	1150	74	89
33	649	1019	958	1140	73	86
34	657	1012	968	1143	72	83
35	664	1004	977	1147	71	81
36	667	995	984	1146	70	79
37	668	986	982	1137	70	77
38	674	978	984	1135	69	75
39	678	970	983	1135	69	75
40	687	967	991	1139	69	74
41	686	955	981	1129	69	74

Brush Creek Dam Reach
Brush Creek - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
42	671	959	956	1128	65	67
43	676	961	957	1131	65	67
44	680	958	951	1134	64	66
45	684	961	949	1136	63	65

Brush Creek Dam Reach
Brush Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	1010	2635	1139	2549	175	181
3	1207	2676	1444	2663	196	228
4	1324	2632	1623	2704	210	250
5	1386	2583	1766	2730	219	264
6	1387	2509	1787	2701	226	268
7	1386	2453	1805	2663	213	261
8	1392	2386	1788	2615	188	244
9	1393	2330	1787	2571	162	232
10	1391	2283	1786	2526	151	222
11	1383	2233	1785	2469	142	215
12	1394	2186	1779	2426	153	211
13	1397	2142	1776	2384	166	208
14	1396	2108	1775	2347	175	204
15	1416	2088	1799	2328	185	205
16	1429	2065	1815	2303	190	204
17	1430	2044	1817	2270	196	204
18	1447	2028	1833	2258	203	206
19	1490	2027	1835	2268	211	209
20	1506	2017	1852	2262	216	212
21	1511	2009	1866	2253	224	216
22	1520	2008	1889	2253	233	219
23	1516	1991	1888	2231	242	222
24	1519	1976	1897	2220	252	226
25	1473	1951	1883	2174	258	229
26	1473	1939	1876	2160	265	233
27	1484	1925	1874	2150	272	237
28	1476	1910	1865	2135	280	241
29	1471	1894	1857	2123	283	243
30	1547	1897	1894	2167	292	247
31	1543	1885	1891	2152	296	250
32	1471	1859	1858	2092	299	253
33	1461	1847	1858	2085	304	256
34	1448	1832	1857	2076	308	259
35	1443	1811	1853	2065	312	261
36	1449	1791	1853	2060	313	262
37	1450	1767	1847	2046	317	264
38	1452	1745	1842	2032	316	265
39	1451	1717	1834	2022	313	265
40	1452	1682	1827	2010	312	265
41	1464	1659	1825	2001	309	264

Brush Creek Dam Reach
Brush Creek - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
42	1464	1632	1813	1982	307	264
43	1461	1602	1803	1967	306	265
44	1460	1578	1794	1950	305	264
45	1453	1548	1783	1924	304	265

Brush Creek Dam Reach
Brush Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
2	1273	1852	473	2203	15	81
3	1356	1983	701	2339	39	99
4	1428	2040	905	2400	66	120
5	1486	2074	1070	2434	94	139
6	1528	2074	1185	2432	124	157
7	1571	2033	1291	2397	153	178
8	1590	2020	1401	2385	175	194
9	1607	2002	1479	2360	189	206
10	1627	1995	1545	2344	202	217
11	1630	1999	1576	2331	191	208
12	1639	1995	1633	2319	196	212
13	1645	1980	1675	2307	200	215
14	1656	1980	1752	2300	235	241
15	1651	1972	1787	2290	240	246
16	1650	1958	1826	2273	252	254
17	1644	1936	1841	2249	265	260
18	1645	1924	1868	2235	278	266
19	1647	1919	1879	2226	293	276
20	1655	1907	1902	2214	308	286
21	1646	1887	1902	2186	321	295
22	1633	1880	1920	2165	332	302
23	1629	1876	1927	2154	347	314
24	1633	1863	1936	2145	358	324
25	1627	1856	1932	2132	362	332
26	1634	1845	1935	2130	375	344
27	1621	1823	1923	2108	383	350
28	1628	1807	1928	2106	394	361
29	1614	1784	1919	2077	402	369
30	1619	1774	1929	2068	410	378
31	1597	1732	1867	2032	399	374
32	1595	1718	1869	2021	406	380
33	1588	1705	1867	2003	408	382
34	1594	1693	1882	1997	413	389
35	1586	1663	1872	1979	415	392
36	1570	1642	1858	1951	417	394
37	1566	1629	1858	1942	421	399
38	1553	1611	1853	1925	422	401
39	1546	1597	1853	1911	425	404
40	1541	1577	1851	1901	426	406
41	1529	1554	1847	1882	426	406

Brush Creek Dam Reach
Brush Creek - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
42	1517	1531	1843	1868	427	407
43	1507	1503	1840	1846	430	410
44	1490	1478	1837	1821	430	410
45	1488	1466	1842	1816	428	410

Slab Creek Dam Reach
S.F. American River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
12	341	2877	222	2858	137	177
16	480	3178	254	3226	144	180
20	680	3574	398	3749	94	88
24	827	3599	584	3892	174	128
28	949	3668	770	4028	179	133
32	997	3515	914	3942	349	168
36	1110	3509	1041	4020	348	163
40	1214	3505	1163	4073	347	158
44	1319	3653	1310	4213	301	109
48	1387	3612	1454	4174	295	114
52	1467	3567	1606	4135	292	118
56	1531	3538	1709	4098	288	113
60	1668	3506	1856	4123	258	113
64	1757	3479	1952	4079	264	120
68	1831	3424	2012	4033	264	126
72	1896	3373	2065	3979	268	132
76	1974	3342	2164	3952	269	134
80	2032	3287	2258	3897	266	139
84	2088	3230	2321	3864	271	146
88	2277	3062	2487	3779	230	162
92	2324	3019	2555	3743	238	168
96	2376	2988	2638	3721	244	172
100	2429	2967	2715	3697	252	177
104	2474	2949	2773	3686	259	183
108	2462	2907	2785	3632	233	158
112	2508	2880	2859	3636	234	164
116	2543	2823	2910	3620	237	170
120	2698	2872	3081	3745	222	129
124	2730	2814	3130	3685	227	133
128	2645	2740	3049	3575	241	152
132	2668	2693	3060	3547	242	154
136	2562	2735	2979	3571	251	167
140	2583	2677	2995	3535	252	166
144	2621	2631	3041	3507	256	168
148	2652	2575	3077	3474	260	169
152	2670	2508	3107	3437	265	168
156	2695	2461	3141	3400	267	168
160	2703	2421	3158	3367	272	168
164	2721	2378	3194	3339	277	170
168	2733	2334	3222	3308	282	169

Slab Creek Dam Reach
S.F. American River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
172	2744	2305	3249	3283	286	171
176	2740	2267	3258	3239	292	174
180	2744	2243	3275	3212	296	175
184	2762	2219	3298	3187	302	178
188	2763	2200	3311	3160	307	178
192	2771	2187	3335	3134	314	180
196	2770	2167	3353	3109	319	181
200	2777	2153	3378	3093	323	183
204	2782	2117	3395	3058	300	173
208	2773	2103	3396	3038	303	174
212	2778	2065	3412	2997	310	177
216	2785	2058	3426	2991	315	178
220	2774	2041	3431	2968	319	179
224	2781	2029	3456	2955	323	181
228	2772	2014	3468	2925	328	181
232	2769	1993	3478	2904	330	182
236	2755	1965	3478	2882	336	183
240	2760	1947	3496	2863	312	169
244	2748	1923	3498	2827	316	171
248	2748	1911	3507	2799	321	171
252	2745	1893	3520	2762	328	172
256	2752	1885	3525	2737	335	176
260	2845	1791	3598	2610	385	250
264	2851	1758	3599	2564	389	250
268	2841	1735	3586	2531	394	254
272	2834	1716	3579	2503	399	256
276	2829	1696	3578	2472	399	257
280	2820	1679	3569	2443	404	260
284	2816	1661	3570	2413	407	261
288	2820	1652	3575	2389	412	264
292	2813	1639	3561	2362	415	266
296	2804	1622	3551	2335	420	268
300	2808	1609	3563	2310	423	272
304	2804	1597	3555	2290	425	273
308	2796	1585	3547	2267	429	275
312	2785	1571	3535	2242	433	279
316	2789	1556	3540	2220	436	283
320	2773	1543	3534	2198	439	284
324	2768	1529	3536	2174	440	289
328	2760	1521	3532	2156	443	292

Slab Creek Dam Reach
S.F. American River - Low Gradient Riffle

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
332	2754	1508	3522	2134	445	295
336	2752	1496	3528	2114	447	298
340	2741	1487	3515	2092	450	302
344	2732	1478	3509	2073	452	305
348	2784	1473	3578	2087	388	294
352	2773	1458	3572	2066	389	295
356	2763	1417	3549	2026	395	284
360	2748	1410	3533	2007	399	283
364	2752	1405	3538	1992	400	286
368	2748	1403	3531	1979	401	287
372	2742	1401	3528	1967	402	290
376	2733	1395	3525	1953	403	294
380	2724	1387	3520	1935	401	295
384	2725	1383	3522	1920	402	297
388	2723	1381	3523	1908	403	300

Slab Creek Dam Reach
S.F. American River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
12	5107	13860	3297	14310	553	235
16	6186	14517	4394	15603	723	344
20	7117	14763	5289	16351	953	501
24	8145	14783	6154	16722	1078	583
28	9038	14588	6884	16772	1152	653
32	9884	14399	7791	16761	1283	717
36	10598	14134	8623	16675	1341	779
40	11219	13941	9341	16589	1151	637
44	11776	13640	10027	16448	1191	684
48	12275	13274	10672	16234	1189	646
52	12733	12966	11281	16070	1256	706
56	13075	12609	11773	15860	1305	760
60	13401	12250	12238	15656	1349	809
64	13669	11868	12627	15418	1373	856
68	13864	11509	12962	15178	1389	887
72	14049	11168	13334	14933	1401	914
76	14412	10753	13906	14623	1426	940
80	14560	10434	14214	14369	1428	959
84	14667	10131	14459	14108	1438	977
88	14770	9856	14682	13839	1450	994
92	14840	9576	14873	13541	1453	1010
96	14954	9309	15108	13243	1455	1023
100	14999	9071	15287	12947	1470	1044
104	15036	8826	15456	12628	1457	1051
108	15023	8617	15573	12334	1462	1065
112	15043	8415	15702	12043	1474	1078
116	15026	8233	15791	11766	1481	1091
120	15000	8070	15881	11515	1490	1106
124	14973	7912	15952	11262	1494	1114
128	14933	7770	16016	11024	1497	1122
132	14913	7622	16094	10784	1500	1125
136	14855	7485	16117	10555	1508	1126
140	14812	7350	16157	10330	1510	1133
144	14758	7121	16163	10063	1552	1200
148	14697	6986	16148	9849	1555	1204
152	14643	6872	16140	9651	1561	1212
156	14571	6758	16120	9463	1547	1211
160	14522	6656	16128	9277	1543	1214
164	14460	6570	16129	9120	1540	1215
168	14389	6466	16112	8947	1532	1223

Slab Creek Dam Reach
S.F. American River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
172	14321	6363	16080	8791	1510	1228
176	14254	6278	16032	8657	1497	1230
180	14214	6180	16011	8512	1485	1235
184	14170	6083	15967	8365	1464	1236
188	14118	6015	15930	8247	1465	1241
192	14044	5941	15831	8129	1447	1238
196	13990	5870	15769	8015	1434	1238
200	13923	5854	15749	7930	1506	1235
204	13881	5783	15708	7823	1487	1231
208	13831	5722	15658	7719	1488	1231
212	13775	5667	15587	7625	1473	1219
216	13748	5608	15549	7537	1470	1218
220	13752	5482	15544	7410	1377	1212
224	13684	5427	15478	7329	1368	1207
228	13652	5374	15447	7230	1365	1202
232	13606	5326	15394	7139	1357	1191
236	13567	5284	15345	7060	1348	1177
240	13547	5227	15311	6967	1355	1174
244	13512	5178	15267	6882	1340	1159
248	13476	5133	15232	6813	1336	1152
252	13460	5091	15191	6738	1332	1139
256	13421	5050	15138	6675	1328	1136
260	13386	5006	15086	6605	1333	1129
264	13357	4963	15037	6535	1331	1125
268	13322	4935	14990	6490	1328	1119
272	13285	4889	14953	6427	1330	1115
276	13250	4848	14931	6370	1327	1106
280	13215	4808	14922	6308	1328	1103
284	13171	4760	14901	6243	1329	1103
288	13131	4692	14874	6171	1323	1097
292	13088	4651	14852	6115	1319	1095
296	13032	4620	14807	6073	1320	1092
300	13000	4571	14776	6001	1315	1091
304	12973	4532	14747	5934	1316	1089
308	12943	4493	14704	5870	1315	1089
312	12902	4456	14654	5816	1309	1082
316	12871	4421	14577	5768	1312	1083
320	12829	4385	14510	5716	1310	1082
324	12794	4350	14425	5666	1310	1083
328	12764	4318	14386	5624	1304	1080

Slab Creek Dam Reach
S.F. American River - Run

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
332	12747	4286	14384	5574	1308	1081
336	12710	4252	14368	5528	1311	1084
340	12660	4233	14343	5501	1306	1082
344	12612	4198	14321	5450	1309	1084
348	12557	4169	14291	5404	1310	1084
352	12514	4135	14253	5357	1311	1085
356	12471	4111	14231	5320	1313	1088
360	12430	4088	14220	5286	1329	1091
364	12407	4058	14208	5236	1328	1095
368	12364	4037	14188	5200	1332	1096
372	12310	4010	14143	5155	1333	1099
376	12273	3986	14097	5109	1338	1100
380	12226	3959	14079	5060	1335	1102
384	12177	3933	14047	5016	1340	1106
388	12151	3905	14031	4967	1340	1110

Slab Creek Dam Reach
S.F. American River - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
12	5666	5523	3536	6284	119	28
16	6354	5384	4272	6207	185	61
20	6936	5226	4898	6041	239	87
24	7429	5078	5468	5859	295	113
28	7736	4913	5852	5698	306	123
32	8024	4768	6308	5570	324	137
36	8258	4585	6624	5404	339	151
40	8457	4418	6951	5271	384	180
44	8609	4275	7217	5140	420	205
48	8755	4148	7478	5032	459	233
52	8866	4010	7686	4895	487	253
56	8956	3907	7869	4769	516	270
60	9056	3817	8040	4651	538	287
64	9146	3711	8194	4516	561	306
68	9166	3647	8257	4415	598	335
72	9211	3564	8391	4302	627	354
76	9243	3435	8496	4105	647	368
80	9278	3411	8602	4055	681	388
84	9286	3310	8688	3958	673	387
88	9296	3253	8762	3860	715	410
92	9271	3200	8819	3776	744	440
96	9229	3136	8845	3708	763	468
100	9193	3074	8895	3636	787	491
104	9146	2979	8936	3542	788	498
108	9128	2926	8977	3479	789	509
112	9092	2804	8976	3332	797	520
116	9079	2790	8997	3282	814	539
120	8958	2882	8967	3273	808	548
124	8919	2862	8971	3218	796	555
128	8890	2791	8978	3151	790	565
132	8835	2725	8943	3092	721	526
136	8817	2668	8998	3034	762	582
140	8752	2602	8985	2970	744	580
144	8658	2539	8951	2887	741	561
148	8615	2502	8966	2827	751	562
152	8544	2485	8935	2774	754	556
156	8502	2468	8925	2723	756	547
160	8446	2448	8891	2670	753	538
164	8420	2442	8889	2634	758	538
168	8414	2448	8912	2619	757	537

Slab Creek Dam Reach
S.F. American River - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
172	8383	2450	8869	2593	760	534
176	8374	2463	8868	2575	757	537
180	8350	2475	8844	2562	757	540
184	8335	2490	8835	2551	752	545
188	8313	2506	8811	2536	749	550
192	8283	2523	8773	2526	748	553
196	8261	2527	8769	2521	742	555
200	8219	2545	8740	2512	742	559
204	8178	2561	8707	2511	734	564
208	8154	2573	8698	2511	733	573
212	8129	2593	8685	2522	728	576
216	8114	2609	8687	2531	726	584
220	8090	2613	8685	2544	730	592
224	8046	2607	8655	2533	726	598
228	8039	2624	8658	2527	732	604
232	8014	2631	8611	2533	731	609
236	7981	2638	8594	2546	735	617
240	7952	2636	8580	2554	734	618
244	7942	2630	8588	2561	741	625
248	7917	2631	8567	2557	741	628
252	7907	2631	8556	2553	739	632
256	7894	2628	8545	2552	742	635
260	7885	2618	8532	2549	748	640
264	7888	2620	8526	2554	755	648
268	7886	2618	8515	2543	754	648
272	7881	2620	8507	2541	764	655
276	7864	2620	8493	2534	766	656
280	7864	2627	8488	2536	773	660
284	7848	2631	8478	2538	776	662
288	7839	2631	8471	2540	780	666
292	7822	2633	8447	2549	786	669
296	7807	2633	8436	2548	792	671
300	7785	2630	8413	2547	795	673
304	7778	2637	8417	2549	803	676
308	7766	2637	8427	2545	807	680
312	7759	2637	8423	2540	816	683
316	7737	2641	8404	2543	819	682
320	7727	2643	8361	2545	826	685
324	7720	2644	8330	2545	831	688
328	7717	2649	8330	2550	835	687

Slab Creek Dam Reach
S.F. American River - Pool

Discharge	WUA Brown Trout - Adult	WUA Brown Trout - Juvenile	WUA RainbowTrout - Adult	WUA Rainbow Trout - Juvenile	WUA Brown Trout - Spawning	WUA Rainbow Trout - Spawning
332	7719	2654	8333	2550	844	691
336	7710	2657	8337	2549	850	693
340	7695	2660	8344	2550	852	693
344	7694	2662	8354	2553	856	693
348	7694	2666	8366	2558	862	692
352	7696	2670	8374	2565	868	696
356	7695	2673	8367	2571	871	698
360	7684	2674	8367	2577	875	699
364	7682	2674	8377	2583	879	702
368	7689	2675	8387	2588	883	703
372	7679	2672	8388	2590	886	703
376	7668	2669	8385	2594	888	705
380	7665	2668	8400	2599	891	706
384	7657	2666	8407	2601	895	709
388	7630	2659	8399	2599	892	706

APPENDIX E

PHABSIM MODEL CALIBRATION INPUT AND OUTPUT FILES

- PHABSIM Model Calibration Input And Output Files (Provided on CD by Request)

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PHABSIM MODEL CALIBRATION INPUT AND OUTPUT FILES

APPENDIX E
PHABSIM Model Calibration, Input, and Output Files (CD By Request)

The electronic files supplied on the CD-ROM by request labeled PHABSIM Model Calibration and Input Files contain calibration detail files, input files, model database files, and Excel spreadsheet files used for the SMUD PHABSIM analysis.

The model used to generate results for this study was the PHABWin-2002 developed by Dr. Thomas Hardy of Utah State University. The PHABWin-2002 software utilizes a MicroSoft Access database as its data management tool. One of the features of the model is a set of electronic output files that describe model calibration details and summary data. Included in this set of files are standard report output files (ZOUT) in a format that has been used since the earliest versions of the model.

A standard set of output files are provided on the CD-ROM by subreach for each habitat type modeled. Output for each habitat type and subreach have to be appropriately extrapolated and summed, as described in Section 3.4.7 of the *Physical Habitat Simulation Technical Report* to generate the final WUA results presented in Section 4 of the technical report. These results are also included as spreadsheet files on the enclosed CD-ROM.

The model database and the set of electronic output files have been compressed using WinZIP software to allow for inclusion on the CD-ROM. The WinZIP format allow these files to be viewed or copied from the CD-ROM from any computer using the MS Windows operating system.

Table E-1 describes the files included to address the specific requests from Section 2.3 of the *Technical Report on Physical Habitat Simulation*.

Table E-1. Description of requested model calibration, input, and output files.

Request	File	Description
Stage-discharge relationship	stgsq.zout	Calibration of stage-discharge relationship
Velocity determination	velsim.zout	Calibration details by cross section
Velocity determination	velsim.zvaff	Velocity Adjustment Factors
Input data decks	*.ifg	IFG4 data deck file by subreach and habitat type
Input data decks	*.pnt	Input point file for PHABWin-2002 by subreach and habitat type
Input data decks	*.xsec	Input cross-section file for PHABWin-2002 by subreach habitat type
WUA results	*.xls	WUA versus flow results

Table E-2 lists additional output calibration files produced by the model and contained on the CD-ROM. These files are provided by subreach for each habitat type modeled.

Table E-2. Additional model calibration files provided.		
Stage-discharge files	**Velocity file**	**Habitat files**
stgsq.ioc	velsim.ioc	habtae.crv
stgsq.qlst	velsim.pnt	habtae.ioc
stgsq.wsl	velsim.qlst	habtae.out
stgsq.xsec	velsim.wsl	habtae.pnt
prod.wsl	velsim.vel	habtae.qlst
	velsim.xsec	habtae.vel
	velsim.zvceff	habtae.wsl
		habtae.xsec
		habtae.zhaqf

APPENDIX F

UARP HABITAT TIME SERIES ANALYSIS HISTORIC VS. UNIMPAIRED FLOW REGIME TABULAR AND GRAPHICAL RESULTS

- Loon Lake Dam Reach, Gerle Creek
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

- Ice House Dam Reach, South Fork Silver Creek
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

- Junction Dam Reach, Silver Creek
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

- Camino Dam Reach, Silver Creek
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

- Brush Creek Dam Reach, Brush Creek
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

- Slab Creek Dam Reach, South Fork American River
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

- Robbs Peak Dam Reach
    - Full-Year Summary Table
    - Partial-Year Summary Table
    - Historic vs. Unimpaired Flow Regimes Time Series Graphs, Hydrology and Fish Habitat

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APPENDIX F
UARP Habitat Time Series Analysis
Historic vs. Unimpaired Flow Regime
Tabular and Graphical Results

This appendix contains the graphical results of the historic vs. unimpaired flow regime habitat time series analysis for all reaches of the *Physical Habitat Simulation Technical Report.* These results are also available by request in electronic format on a CD-ROM. The CD-ROM contains copies of all the graphics and the underlying data files used to perform the time series analysis. The information is organized by project reach. For each reach, a separate Excel spreadsheet is provided on the CD-ROM that contains the graphical output of the time series analysis, as well as all the underlying hydrologic (historic flows, unimpaired flows, accretion) and habitat (WUA curves) that served as the foundation of the analyses.

Table F-1 lists the names of the Excel files that contain the results of the habitat time series analyses. These files are stored on the CD-ROM within a folder name "Historic vs. Unimpaired."

Table F-1. Excel files with graphical results of historic vs. unimpaired habitat time series analysis, stored in the Historic vs. Unimpaired folder.

Project Reach	Excel File
Loon Lake Dam Reach (Gerle Creek)	GCbLL Hist vs Unimp 4 WY.XLS
Robbs Peak Dam Reach (SF Rubicon River)	SFRbGCConfl Hist vs Unimp 4 WY.XLS
Ice House Dam Reach (SF Silver Creek)	SFSCbIH Hist vs Unimp 4 WY.XLS
Junction Dam Reach (Silver Creek)	SCbJN Hist vs Unimp 4 WY.XLS
Camino Dam Reach (Silver Creek)	SCbCM Hist vs Unimp 4 WY.XLS
Brush Creek Dam Reach (Brush Creek)	BCbBC Hist vs Unimp 4 WY.XLS
Slab Creek Dam Reach (SF American River)	SFARbSCk Hist vs Unimp 4 WY.XLS

A separate folder is contained on the CD-ROM that contains the Excel spreadsheet files that allow the user to perform habitat time series analyses that evaluate the relationship between a new release schedule at the project dams vs. the unimpaired flow regime. Table F-2 lists the names of the Excel files that contain the spreadsheets. These files are stored on the CD-ROM within a folder name "New vs. Unimpaired."

Table F-2. Excel files with graphical results of New PM&E measure vs. unimpaired habitat time series analysis, stored in the New vs. Unimpaired folder.

Project Reach	Excel File
Loon Lake Dam Reach (Gerle Creek)	GCbLL New vs Unimp 5 WY.XLS
Robbs Peak Dam Reach (SF Rubicon River)	SFRbGCConfl New vs Unimp 5 WY.XLS
Ice House Dam Reach (SF Silver Creek)	SFSCbIH New vs Unimp 5 WY.XLS
Junction Dam Reach (Silver Creek)	SCbJN New vs Unimp 5 WY.XLS
Camino Dam Reach (Silver Creek)	SCbCM New vs Unimp 5 WY.XLS
Brush Creek Dam Reach (Brush Creek)	BCbBC New vs Unimp 5 WY.XLS
Slab Creek Dam Reach (SF American River)	SFARbSCk New vs Unimp 5 WY.XLS

New PM&E Measures vs. Unimpaired Flow Regime
Habitat Time Series Analysis

Instructions for Running Excel Spreadsheet

1. Unzip then Open Folder on CD-ROM named “New vs. Unimpaired”
2. Click on Excel File of choice (see Table F-2, above)
3. Click on “Enable Macros” button
4. Click on “No” to question about linked information (may not come up)
5. Excel spreadsheet will open to “New Flows” tab
6. Modify table of minimum releases to create new PM&E flows. Flows can be modified at first-of-month or half-month. If no half-month value is given first-of-month value will apply to entire month.
7. After flows are changed, click on “Reset Summary and Plots” button
8. Once program has run (may be up to 5 minutes) and results have been reviewed, print results by clicking on “Print All Summary Tables and Charts” button

Loon Lake Dam Reach
Gerle Creek

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Loon Lake Reach
Full Year Summary

Gerle Creek below Loon Lake

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,091,932	1,870,459	71.30	1,103,135	1,909,989	73.14	1,210,686	1,777,504	46.82	1,320,942	1,852,844	40.27
Brown Trout - Juvenile	1,439,790	2,603,973	80.86	1,465,021	2,626,795	79.30	1,559,320	2,466,198	58.16	1,758,690	2,538,992	44.37
Brown Trout - Spawning	816,600	1,449,941	77.56	800,519	1,490,946	86.25	766,049	1,380,026	80.15	905,138	1,449,090	60.10
Rainbow Trout - Adult	1,085,549	1,811,677	66.89	1,110,694	1,847,111	66.30	1,236,464	1,721,897	39.26	1,328,307	1,791,454	34.87
Rainbow Trout - Juvenile	1,701,570	2,899,379	70.39	1,719,071	2,937,613	70.88	1,833,111	2,750,223	50.03	2,043,868	2,843,509	39.12
Rainbow Trout - Spawning	868,674	1,493,744	71.96	855,898	1,531,619	78.95	825,152	1,420,880	72.20	963,245	1,487,551	54.43

Gerle Creek below Jerrett Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,103,013	1,883,367	70.75	1,179,855	1,962,656	66.35	1,075,444	1,610,819	49.78	1,264,320	1,742,889	37.85
Brown Trout - Juvenile	1,432,879	2,475,875	72.79	1,549,699	2,551,293	64.63	1,396,439	2,104,148	50.68	1,678,416	2,233,446	33.07
Brown Trout - Spawning	803,092	1,499,999	86.78	807,859	1,570,675	94.42	685,043	1,268,358	85.15	896,089	1,401,243	56.37
Rainbow Trout - Adult	1,110,746	1,825,516	64.35	1,192,306	1,905,087	59.78	1,094,015	1,581,767	44.58	1,268,757	1,694,507	33.56
Rainbow Trout - Juvenile	1,709,007	2,867,158	67.77	1,819,137	2,984,381	64.05	1,632,389	2,471,268	51.39	1,953,428	2,632,546	34.77
Rainbow Trout - Spawning	860,828	1,558,668	81.07	865,901	1,634,736	88.79	733,823	1,329,696	81.20	953,137	1,458,309	53.00

Gerle Creek below Barts & Dellar Creeks

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,549,417	2,898,983	87.10	1,607,618	2,897,743	80.25	1,285,947	2,169,463	68.71	1,809,220	2,549,031	40.89
Brown Trout - Juvenile	1,686,970	3,138,238	86.03	1,808,502	3,120,972	72.57	1,444,638	2,364,115	63.65	2,018,547	2,690,892	33.31
Brown Trout - Spawning	1,078,685	1,941,214	79.96	1,045,302	1,958,229	87.34	827,461	1,440,951	74.14	1,170,273	1,765,603	50.87
Rainbow Trout - Adult	1,605,038	3,010,935	87.59	1,625,982	3,016,187	85.50	1,300,480	2,238,605	72.14	1,833,862	2,692,382	46.81
Rainbow Trout - Juvenile	2,066,053	3,823,696	85.07	2,183,061	3,805,266	74.31	1,737,958	2,865,581	64.88	2,435,251	3,314,685	36.11
Rainbow Trout - Spawning	1,117,235	1,899,726	70.04	1,097,922	1,911,468	74.10	859,760	1,411,612	64.19	1,203,195	1,719,042	42.87

Gerle Creek below Rocky Basin Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,130,517	1,623,115	43.57	1,194,630	1,711,016	43.23	1,015,680	1,361,608	34.06	1,229,220	1,554,960	26.50
Brown Trout - Juvenile	1,634,021	2,483,796	52.01	1,741,251	2,585,832	48.50	1,463,576	2,039,202	39.33	1,815,175	2,311,672	27.35
Brown Trout - Spawning	384,064	531,148	38.30	405,100	571,550	41.09	350,437	461,684	31.75	419,959	535,234	27.45
Rainbow Trout - Adult	1,290,480	1,726,217	33.77	1,357,350	1,851,788	36.43	1,164,653	1,501,994	28.96	1,375,550	1,691,586	22.98
Rainbow Trout - Juvenile	1,860,745	2,724,595	46.42	1,976,404	2,851,933	44.30	1,662,192	2,262,233	36.10	2,036,826	2,556,552	25.52
Rainbow Trout - Spawning	393,237	542,850	38.05	417,356	582,750	39.63	360,379	471,031	30.70	430,598	539,467	25.28

Gerle Creek Inflow above Gerle Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,123,841	1,616,881	43.87	1,208,960	1,718,711	42.16	999,347	1,340,279	34.12	1,238,938	1,559,899	25.91
Brown Trout - Juvenile	1,621,676	2,465,186	52.01	1,762,613	2,582,944	46.54	1,443,991	2,004,385	38.81	1,823,129	2,305,909	26.48
Brown Trout - Spawning	382,954	529,344	38.23	407,923	576,505	41.33	343,955	455,318	32.38	423,735	539,541	27.33
Rainbow Trout - Adult	1,288,227	1,727,806	34.12	1,375,478	1,871,086	36.03	1,142,541	1,480,062	29.54	1,387,561	1,704,880	22.87
Rainbow Trout - Juvenile	1,848,222	2,710,312	46.64	2,002,066	2,855,958	42.65	1,638,035	2,223,799	35.76	2,048,034	2,556,576	24.83
Rainbow Trout - Spawning	391,994	541,330	38.10	421,537	587,614	39.40	353,841	464,292	31.21	434,240	543,167	25.08

Loon Lake Reach
Partial Year Summary

Gerle Creek below Loon Lake

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	478,197	1,260,939	163.69	492,693	1,277,338	159.26	658,218	1,244,893	89.13	688,478	1,218,859	77.04
Brown Trout - Juvenile	647,897	1,761,049	171.81	662,519	1,755,828	165.02	878,807	1,731,520	97.03	925,333	1,668,450	80.31
Brown Trout - Spawning	36,953	243,343	558.53	35,183	244,354	594.52	105,058	243,849	132.11	71,854	245,112	241.12
Rainbow Trout - Adult	472,333	1,221,800	158.67	501,584	1,235,209	146.26	669,395	1,206,241	80.20	700,500	1,178,461	68.23
Rainbow Trout - Juvenile	761,348	1,958,596	157.25	770,716	1,963,945	154.82	1,013,316	1,928,977	90.36	1,061,252	1,869,406	76.15
Rainbow Trout - Spawning	352,178	376,373	6.87	305,504	388,458	27.15	299,912	366,317	22.14	260,703	341,800	31.11

Gerle Creek below Jerrett Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	527,116	1,294,377	145.56	550,432	1,296,882	135.61	599,958	1,143,839	90.65	610,615	1,075,743	76.17
Brown Trout - Juvenile	711,862	1,737,590	144.09	750,304	1,714,966	128.57	823,822	1,525,963	85.23	861,511	1,400,822	62.60
Brown Trout - Spawning	53,789	248,903	362.74	52,147	253,199	385.55	134,899	257,707	91.04	102,749	261,141	154.15
Rainbow Trout - Adult	529,985	1,251,727	136.18	560,106	1,261,771	125.27	604,449	1,119,480	85.21	611,919	1,047,542	71.19
Rainbow Trout - Juvenile	837,713	1,982,249	136.63	860,098	1,979,233	130.12	940,306	1,756,828	86.84	971,321	1,628,323	67.64
Rainbow Trout - Spawning	356,180	426,136	19.64	291,695	413,048	41.60	225,540	286,151	26.87	162,593	214,336	31.82

Gerle Creek below Barts & Dellar Creeks

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	873,117	2,141,227	145.24	773,725	1,971,732	154.84	890,394	1,723,351	93.55	974,946	1,642,977	68.52
Brown Trout - Juvenile	988,944	2,384,540	141.12	924,024	2,197,233	137.79	1,035,239	1,923,648	85.82	1,157,316	1,790,491	54.71
Brown Trout - Spawning	91,136	332,654	265.01	89,712	333,324	271.55	206,209	351,225	70.32	157,293	351,089	123.21
Rainbow Trout - Adult	867,942	2,173,799	150.45	731,233	1,996,593	173.04	864,302	1,743,397	101.71	929,635	1,690,322	81.83
Rainbow Trout - Juvenile	1,191,872	2,857,693	139.77	1,086,713	2,623,227	141.39	1,226,909	2,297,812	87.28	1,359,676	2,160,072	58.87
Rainbow Trout - Spawning	465,458	541,166	16.27	322,070	395,885	22.92	219,958	240,515	9.35	154,971	190,332	22.82

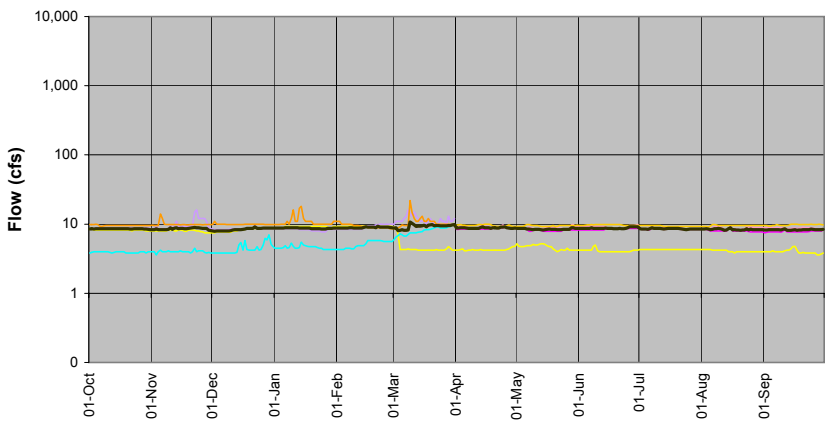
Gerle Creek below Rocky Basin Creek

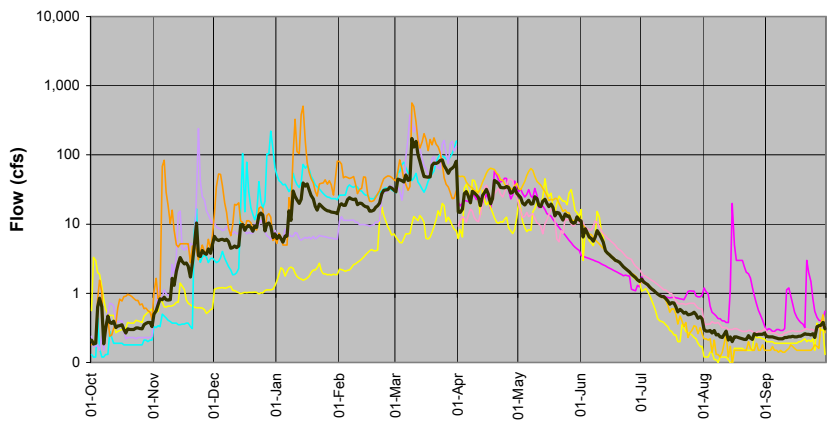
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	564,962	1,047,883	85.48	562,071	1,052,263	87.21	586,270	919,507	56.84	583,325	893,052	53.10
Brown Trout - Juvenile	869,359	1,687,763	94.14	865,476	1,666,783	92.59	911,901	1,452,302	59.26	928,664	1,387,137	49.37
Brown Trout - Spawning	19,018	68,354	259.41	17,374	69,259	298.62	54,492	86,167	58.13	32,856	79,819	142.93
Rainbow Trout - Adult	622,032	1,071,652	72.28	622,608	1,107,269	77.84	634,155	964,941	52.16	623,813	942,959	51.16
Rainbow Trout - Juvenile	971,241	1,814,487	86.82	966,589	1,803,142	86.55	1,005,875	1,570,182	56.10	1,017,354	1,504,444	47.88
Rainbow Trout - Spawning	159,385	166,719	4.60	157,838	171,545	8.68	112,610	116,071	3.07	94,065	94,803	0.78

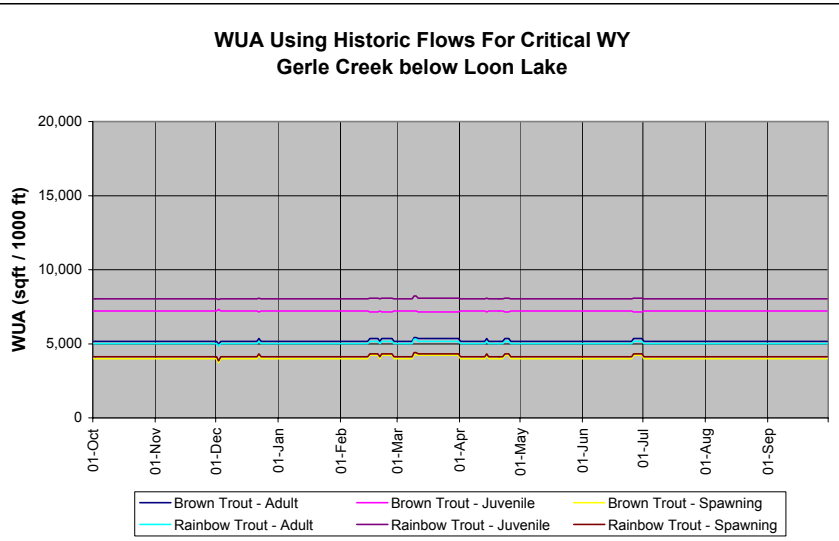
Gerle Creek Inflow above Gerle Reservoir

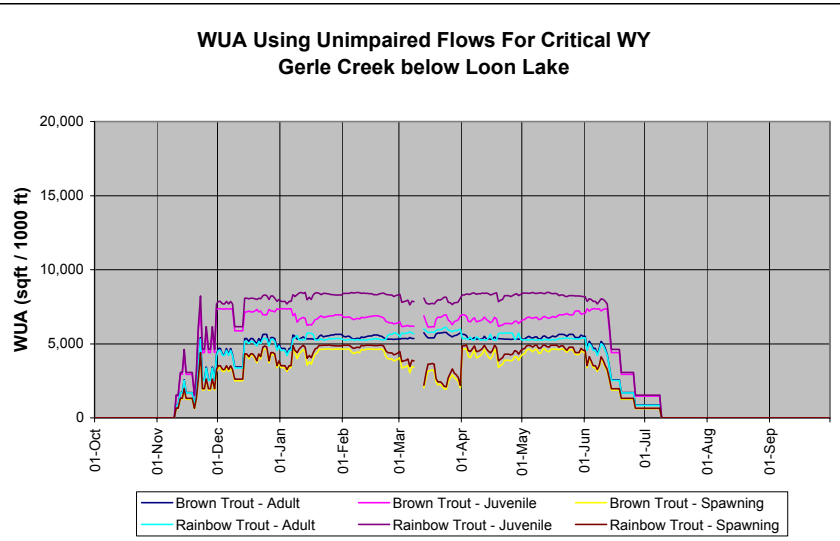
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	571,925	1,054,661	84.41	575,247	1,055,953	83.56	575,103	904,324	57.25	589,366	894,097	51.70
Brown Trout - Juvenile	876,638	1,690,273	92.81	889,877	1,665,939	87.21	901,471	1,429,318	58.55	938,137	1,382,850	47.40
Brown Trout - Spawning	20,420	69,140	238.60	18,353	70,140	282.17	56,120	86,997	55.02	34,531	80,969	134.48
Rainbow Trout - Adult	633,205	1,085,705	71.46	635,283	1,114,943	75.50	618,183	947,028	53.20	628,332	946,135	50.58
Rainbow Trout - Juvenile	980,638	1,821,553	85.75	992,427	1,804,243	81.80	991,479	1,543,780	55.70	1,027,128	1,501,429	46.18
Rainbow Trout - Spawning	161,085	168,224	4.43	157,842	172,915	9.55	105,084	107,979	2.76	91,695	92,757	1.16

Loon Lake Reach
Critical WY Plots

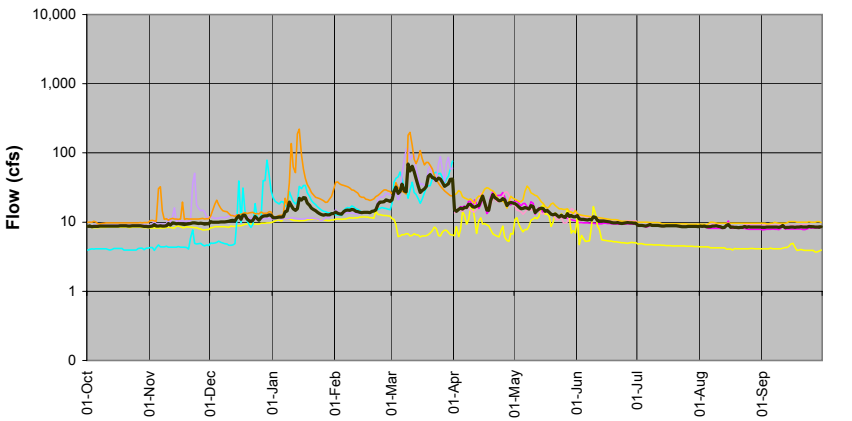


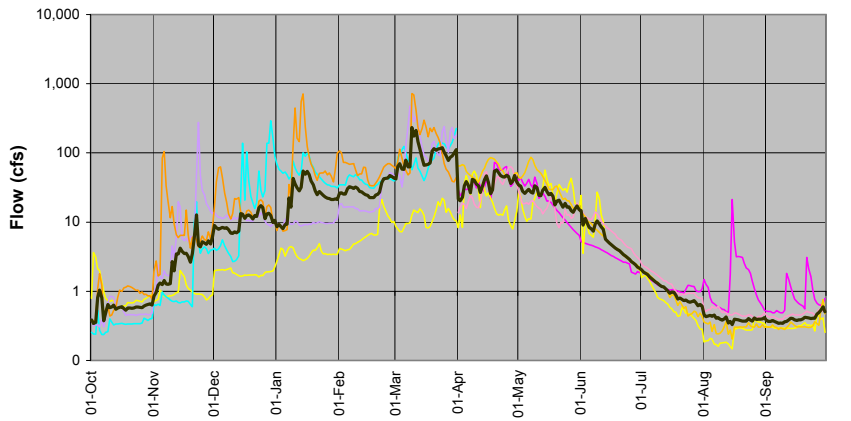


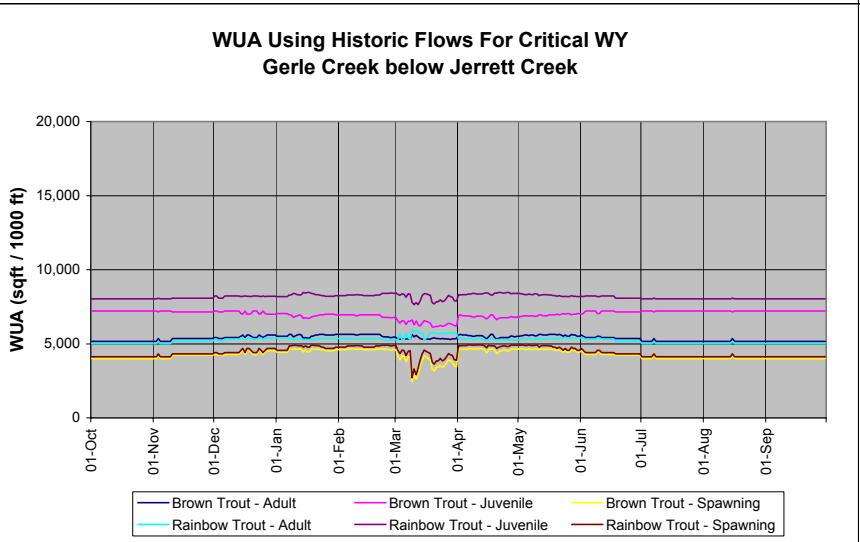


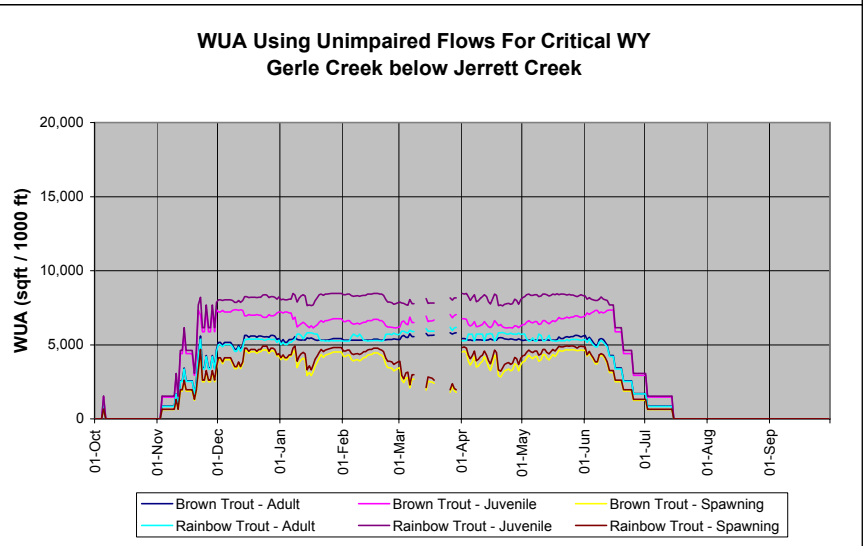


Loon Lake Reach
Critical WY Plots

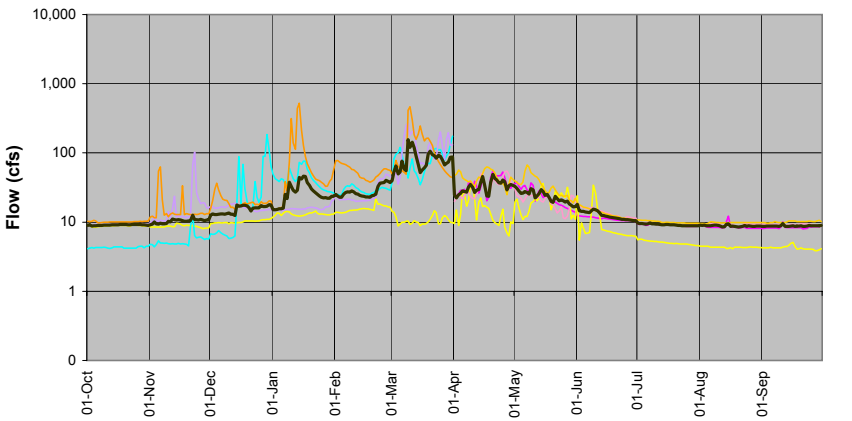


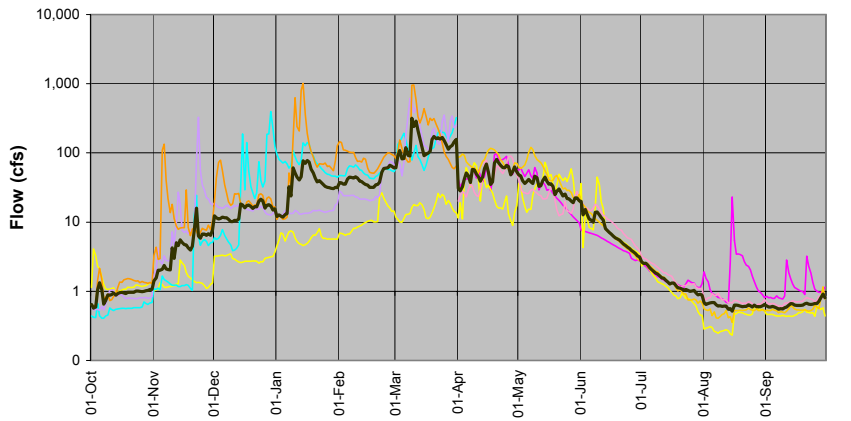


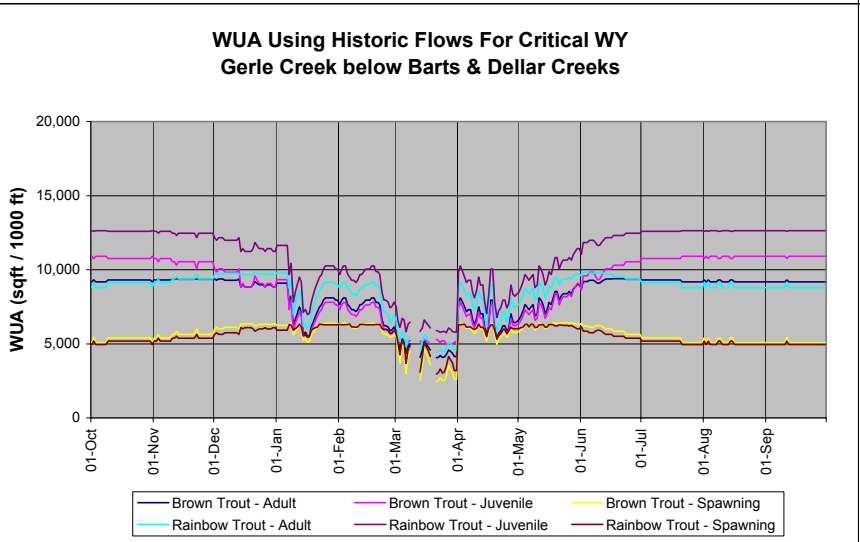


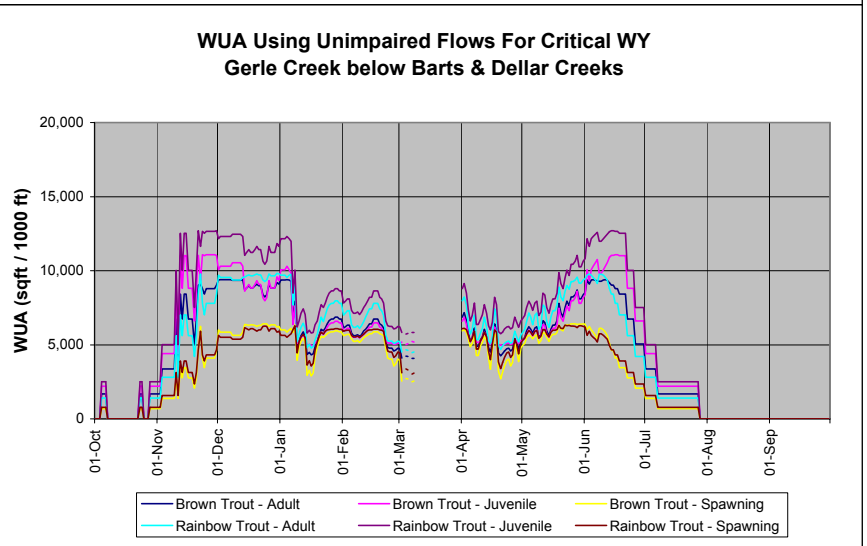


Loon Lake Reach
Critical WY Plots

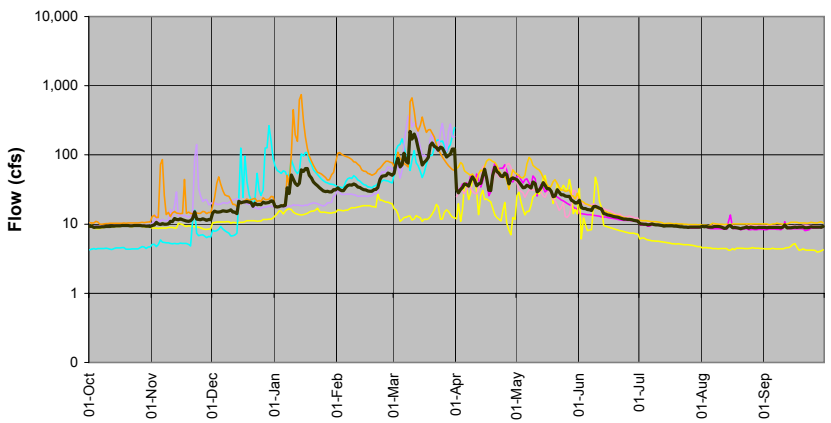


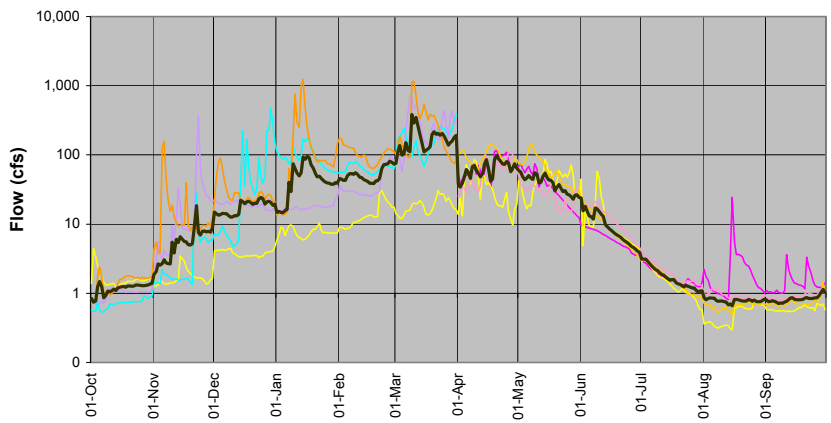


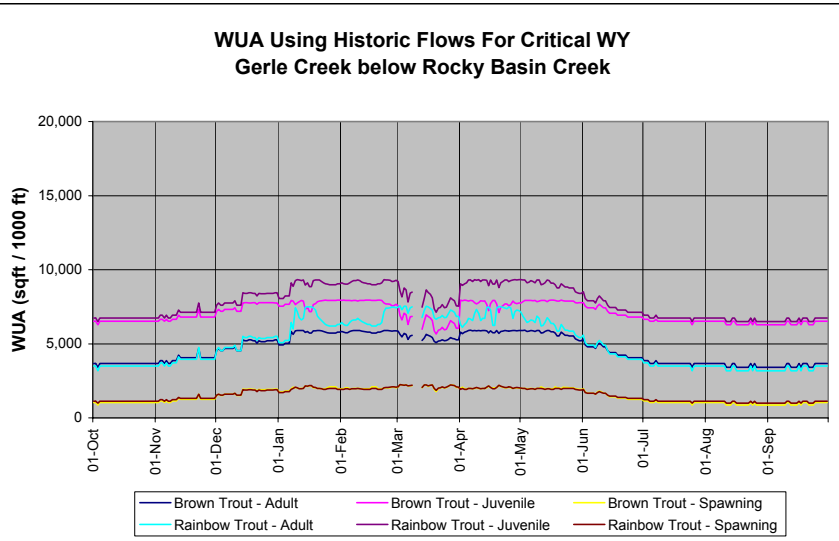


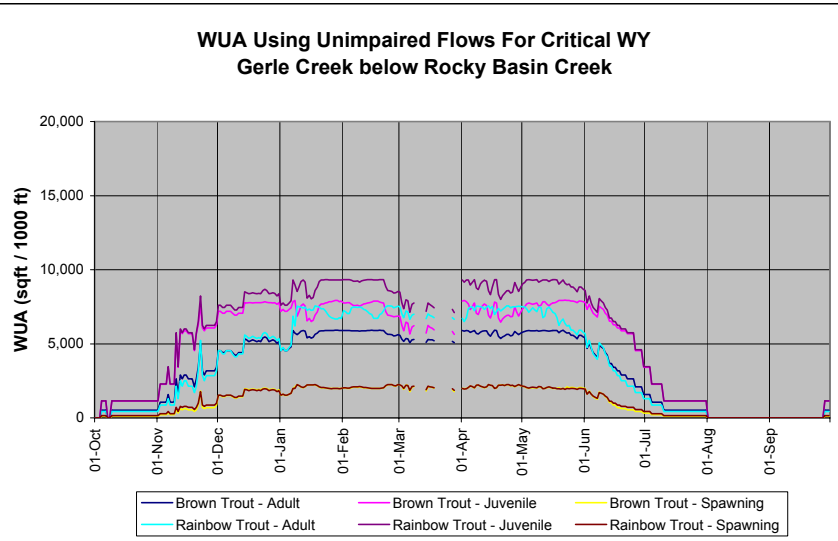


Loon Lake Reach
Critical WY Plots



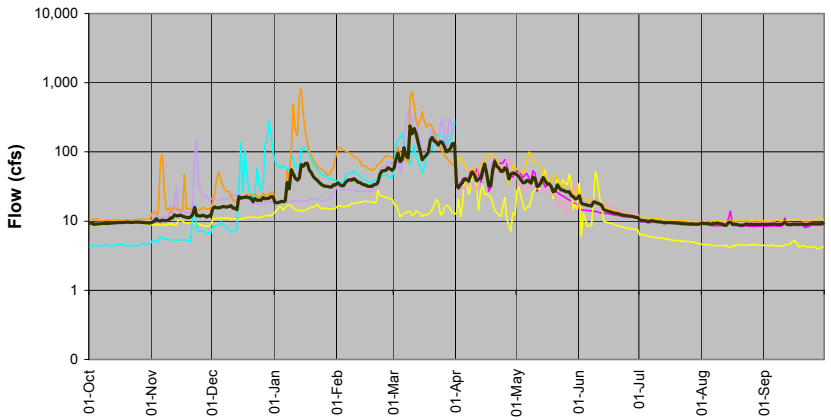




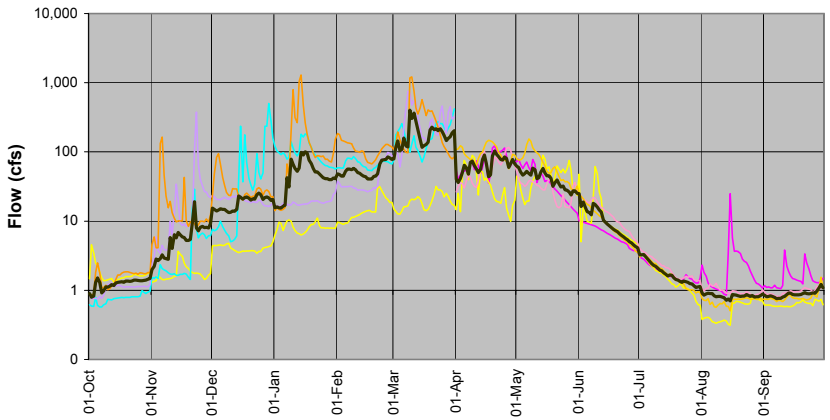


Loon Lake Reach
Critical WY Plots

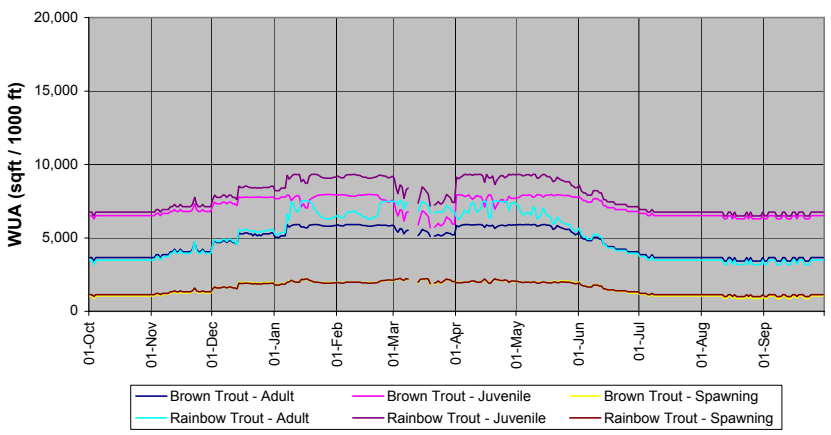
Historic Flows For Critical WY
Gerle Creek Inflow above Gerle Reservoir



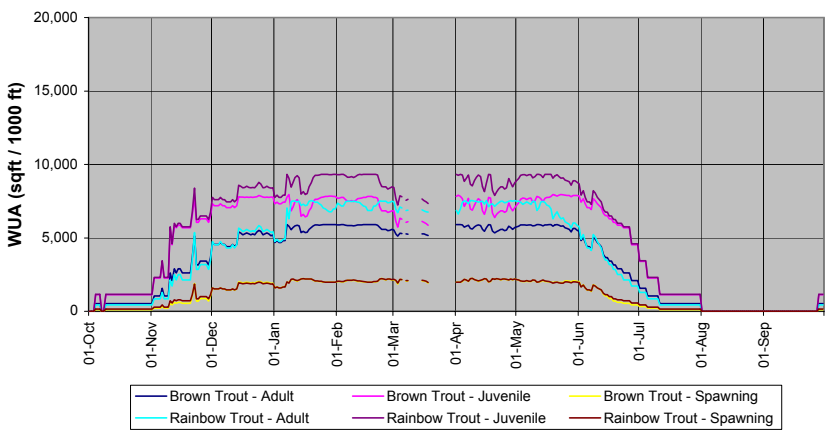
Unimpaired Flows For Critical WY
Gerle Creek Inflow above Gerle Reservoir



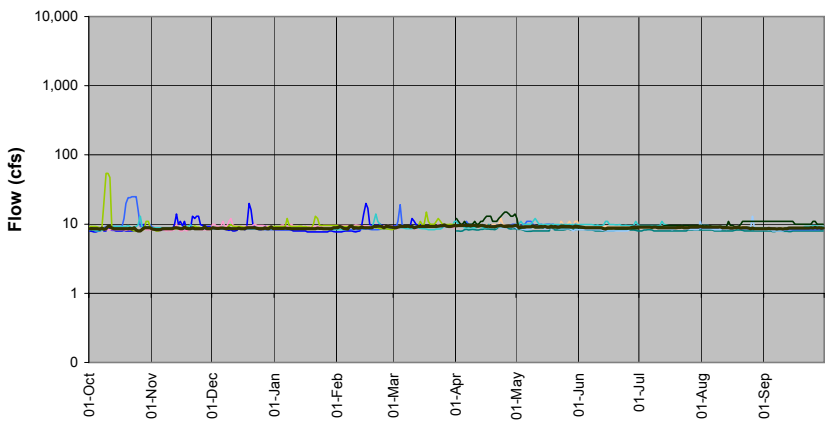
WUA Using Historic Flows For Critical WY
Gerle Creek Inflow above Gerle Reservoir

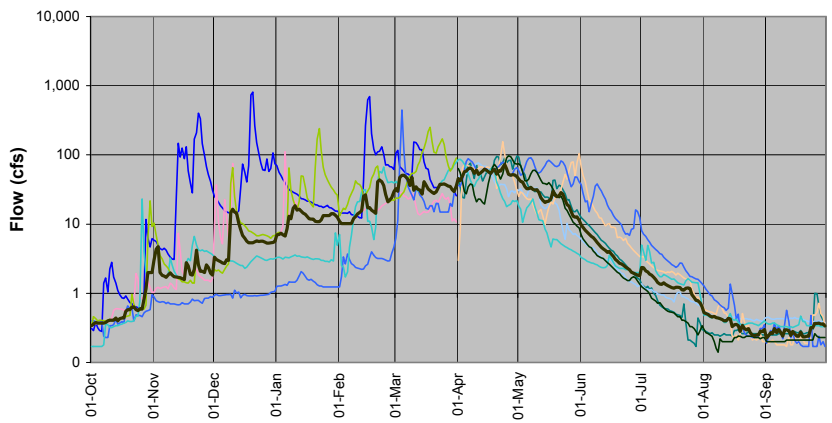


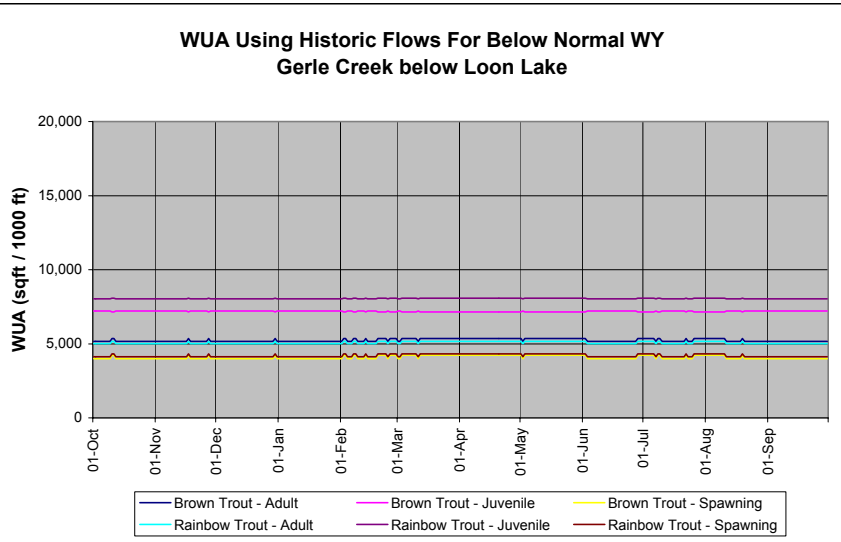
WUA Using Unimpaired Flows For Critical WY
Gerle Creek Inflow above Gerle Reservoir

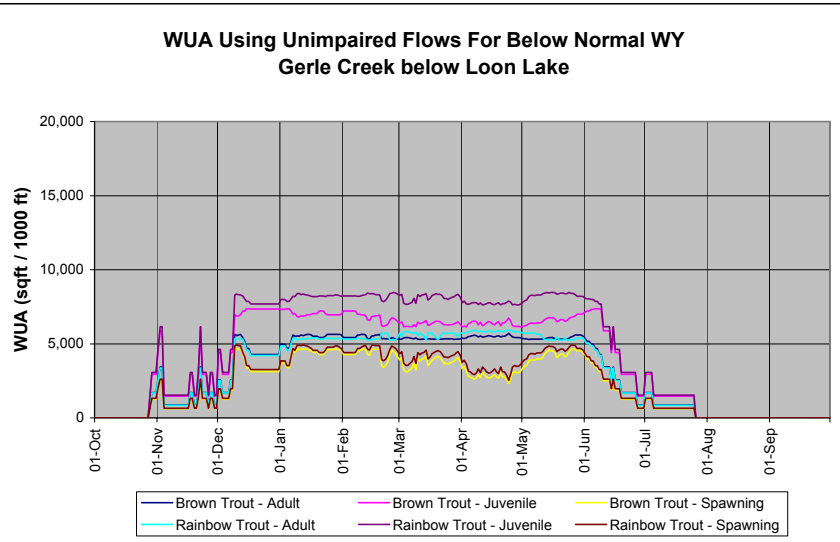


Loon Lake Reach
Below Normal WY Plots

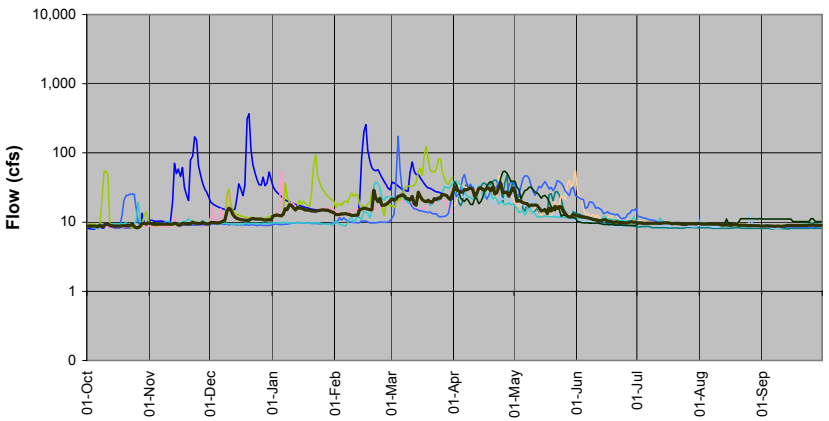


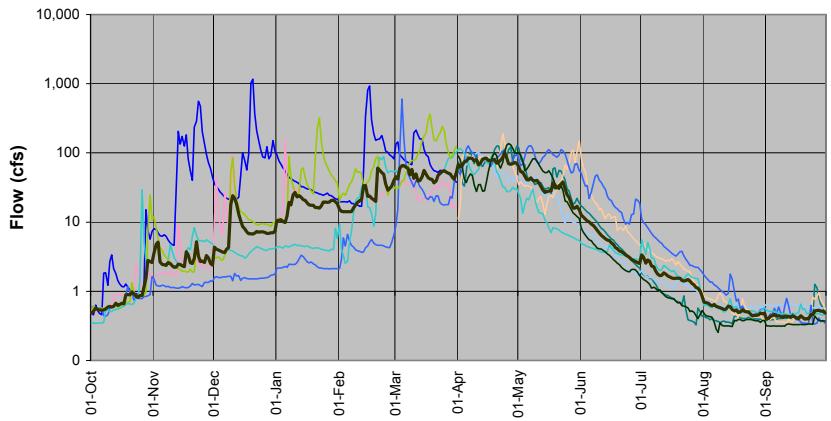


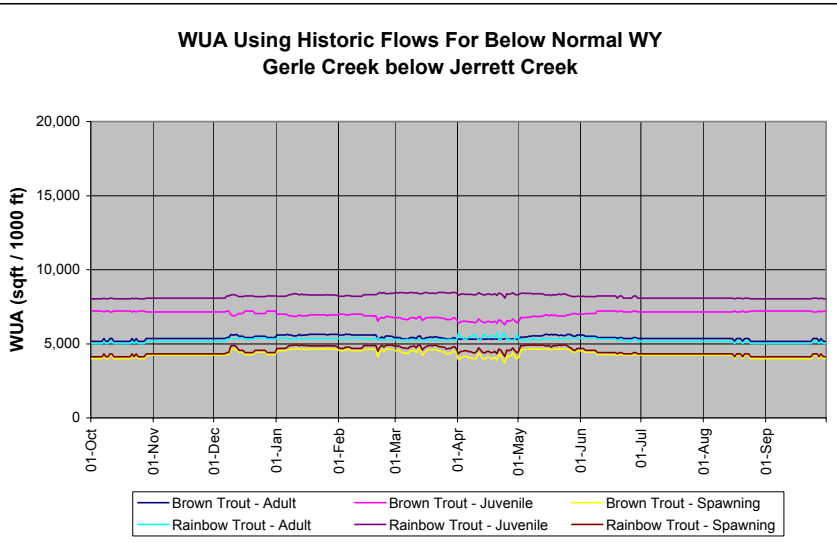


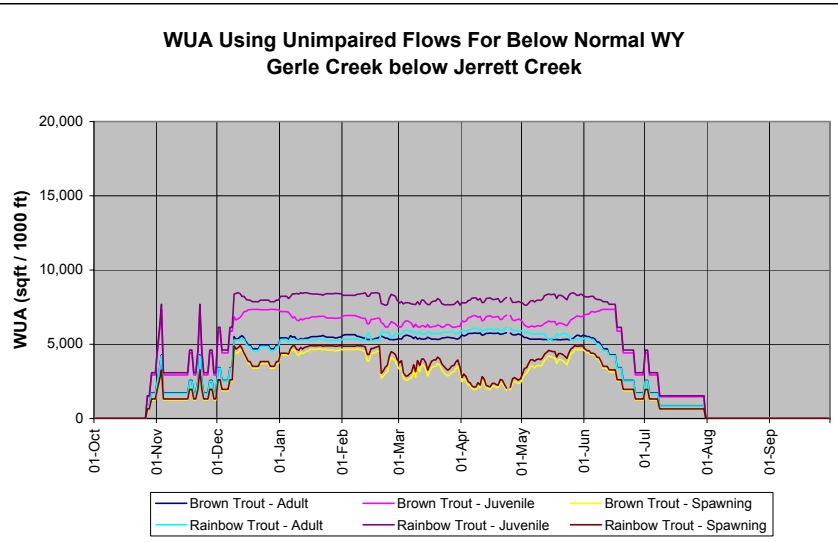


Loon Lake Reach
Below Normal WY Plots

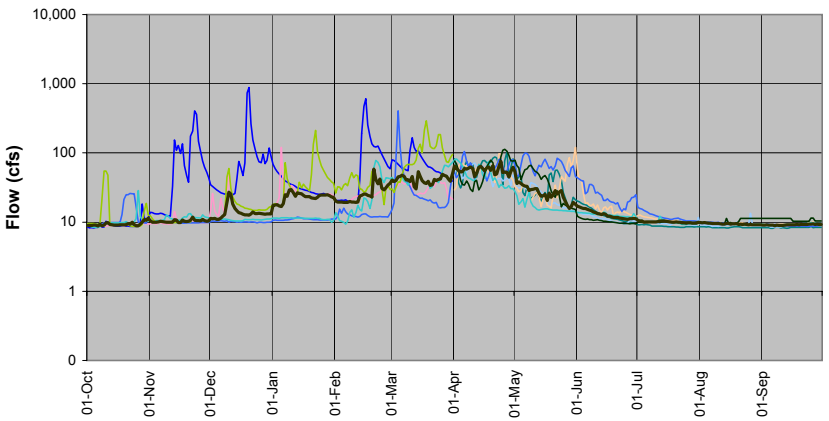


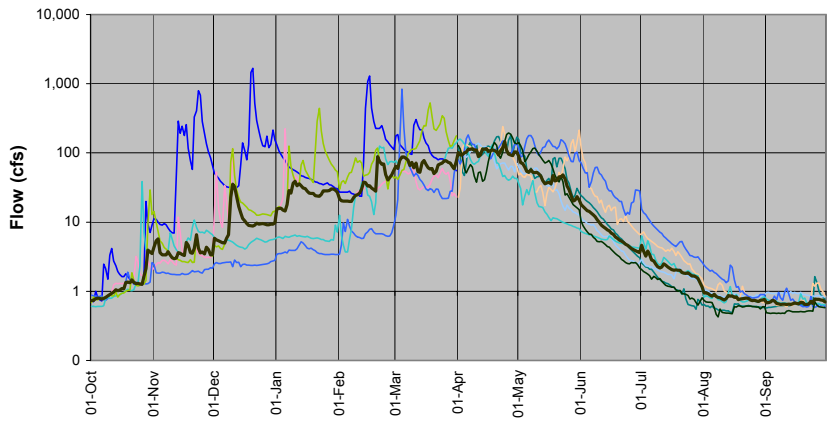


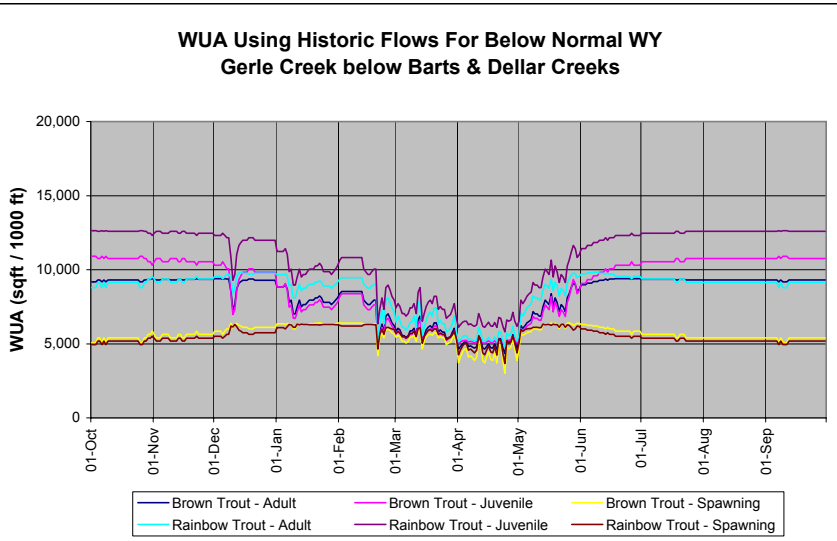


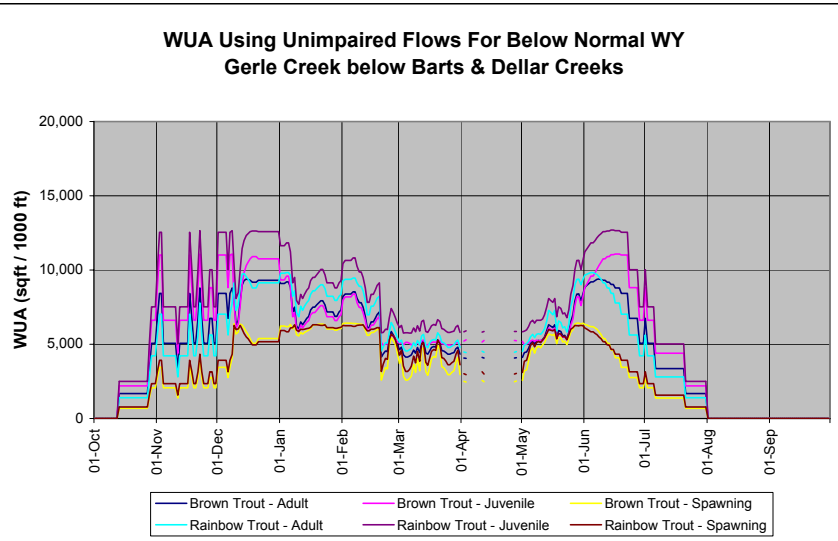


Loon Lake Reach
Below Normal WY Plots



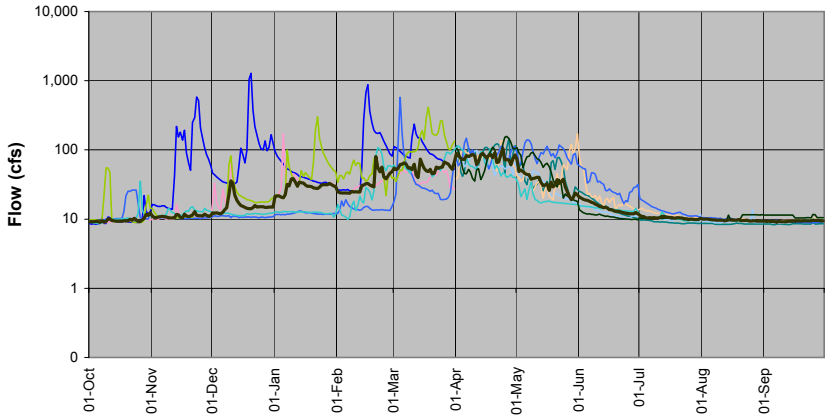




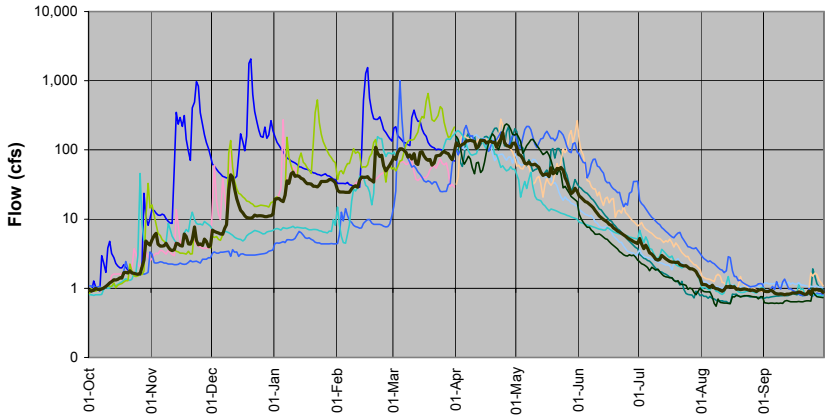


Loon Lake Reach
Below Normal WY Plots

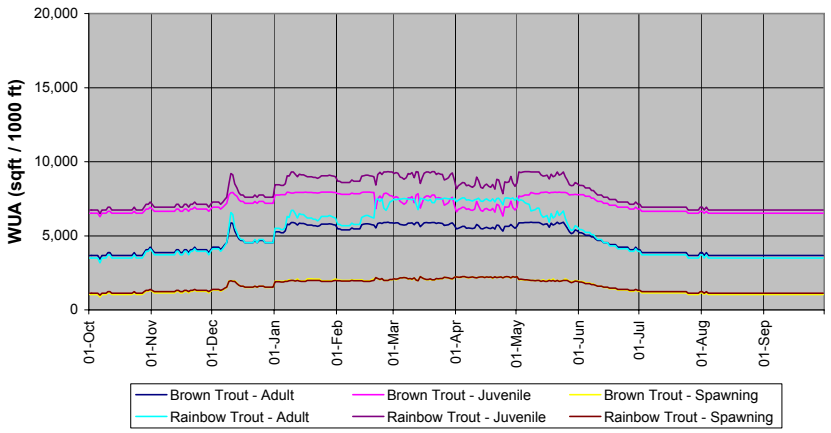
Historic Flows For Below Normal WY
Gerle Creek below Rocky Basin Creek



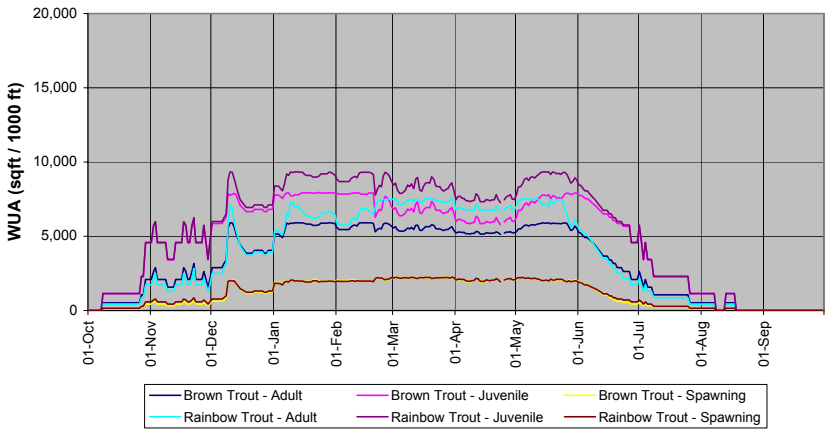
Unimpaired Flows For Below Normal WY
Gerle Creek below Rocky Basin Creek



WUA Using Historic Flows For Below Normal WY
Gerle Creek below Rocky Basin Creek

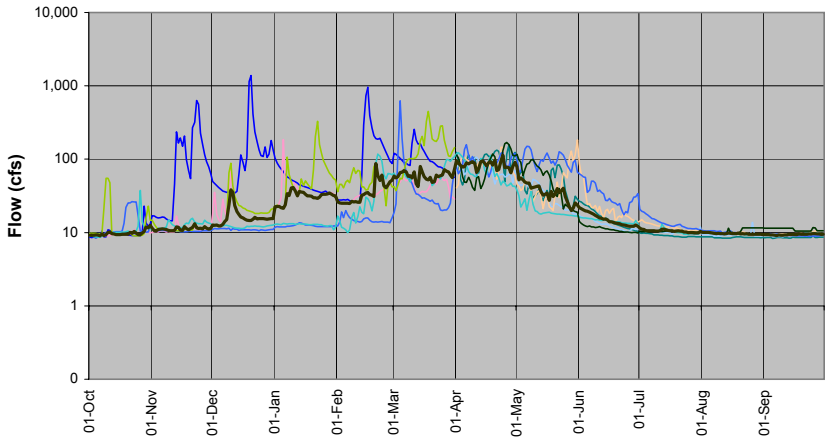


WUA Using Unimpaired Flows For Below Normal WY
Gerle Creek below Rocky Basin Creek

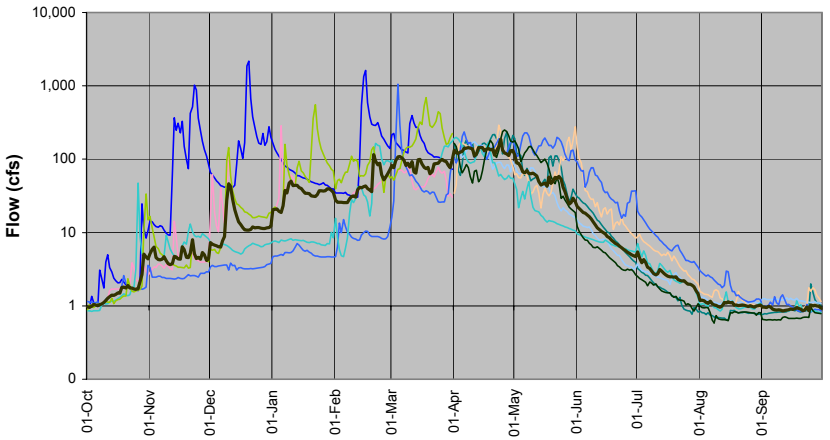


Loon Lake Reach
Below Normal WY Plots

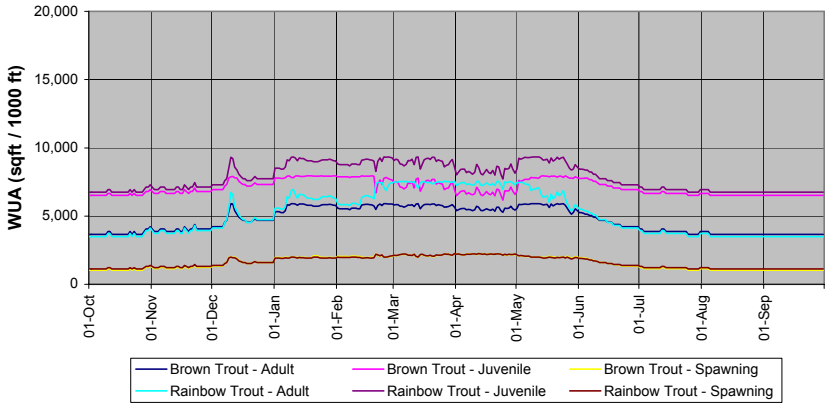
Historic Flows For Below Normal WY
Gerle Creek Inflow above Gerle Reservoir



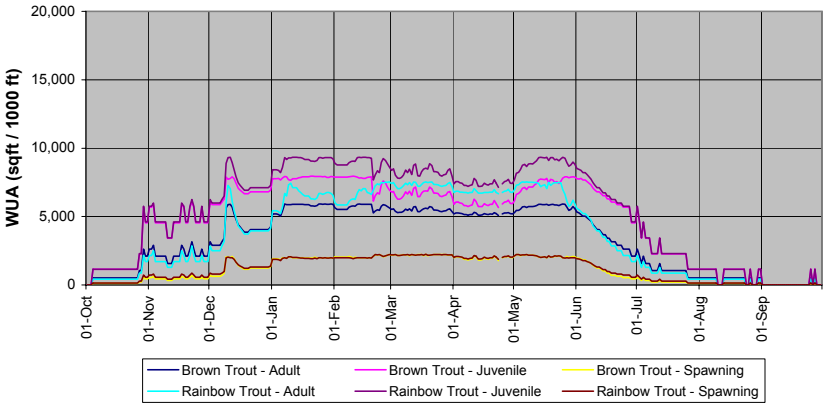
Unimpaired Flows For Below Normal WY
Gerle Creek Inflow above Gerle Reservoir



WUA Using Historic Flows For Below Normal WY
Gerle Creek Inflow above Gerle Reservoir

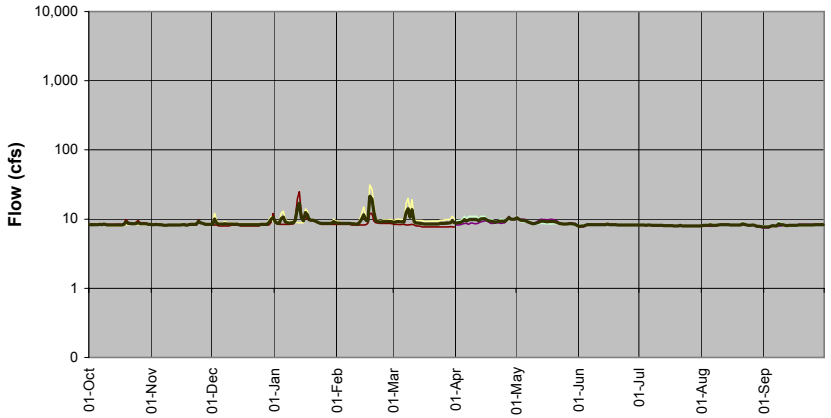


WUA Using Unimpaired Flows For Below Normal WY
Gerle Creek Inflow above Gerle Reservoir

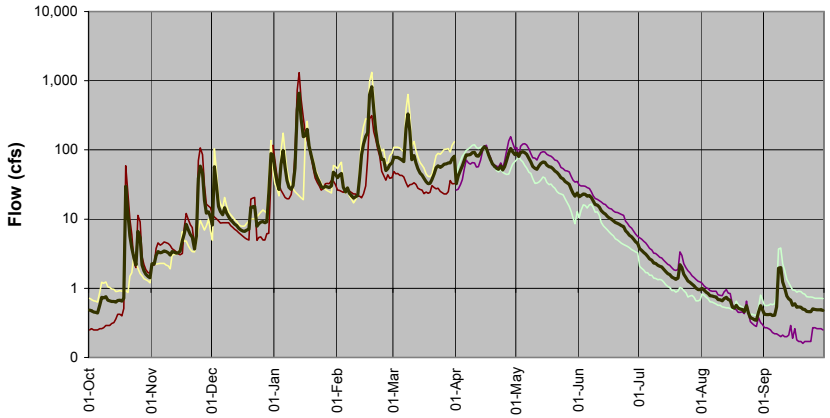


Loon Lake Reach
Above Normal WY Plots

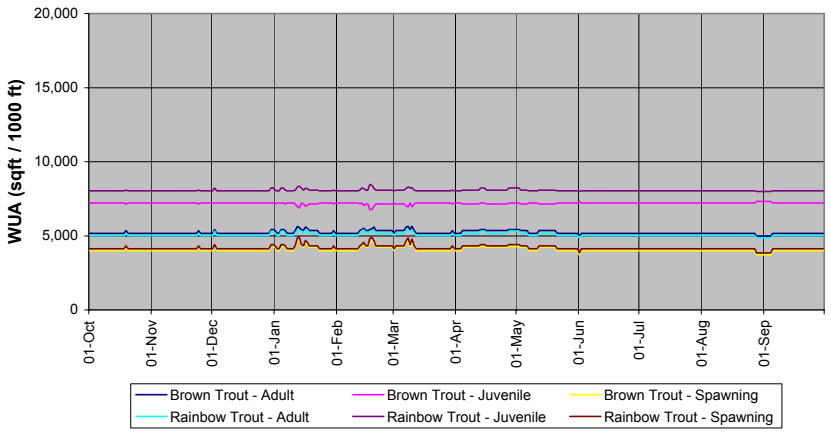
Historic Flows For Above Normal WY
Gerle Creek below Loon Lake



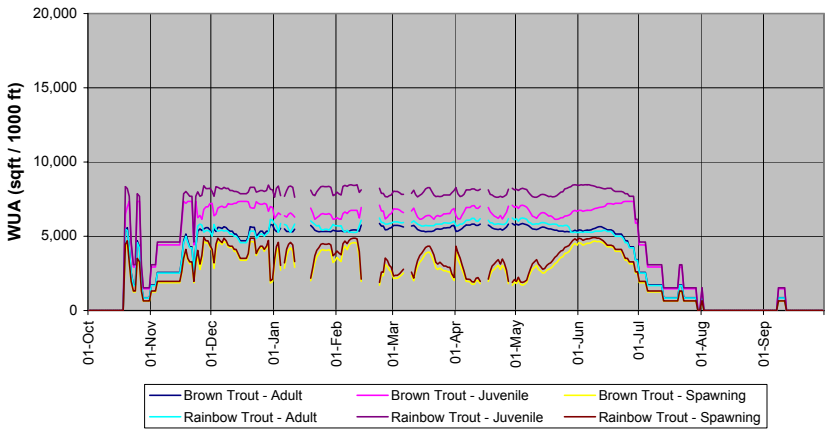
Unimpaired Flows For Above Normal WY
Gerle Creek below Loon Lake



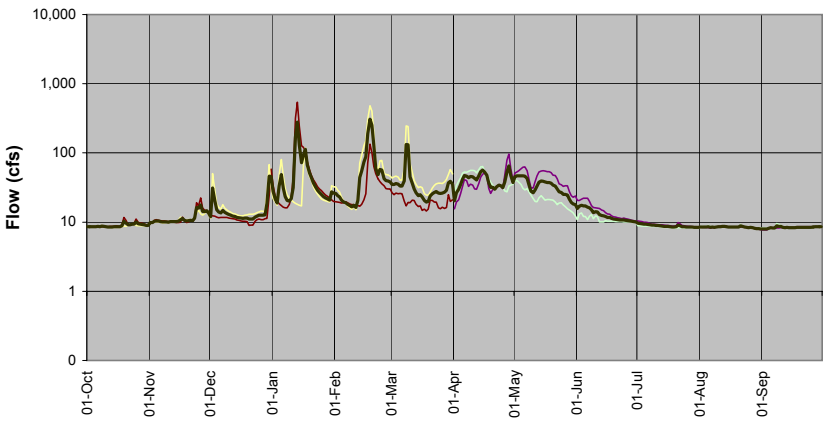
WUA Using Historic Flows For Above Normal WY
Gerle Creek below Loon Lake

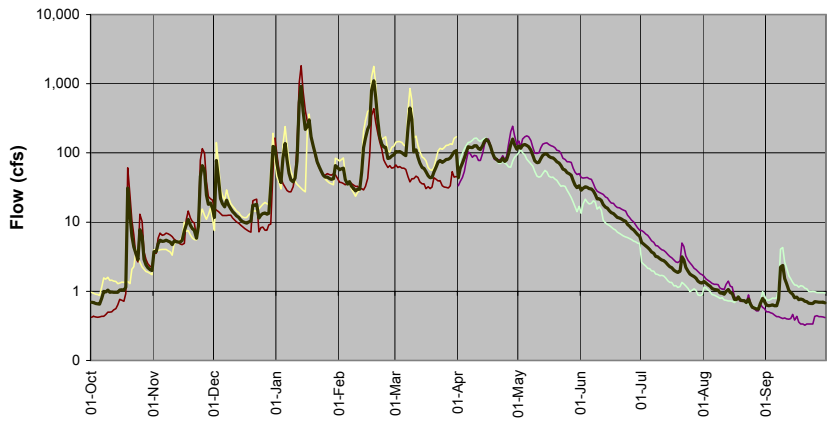


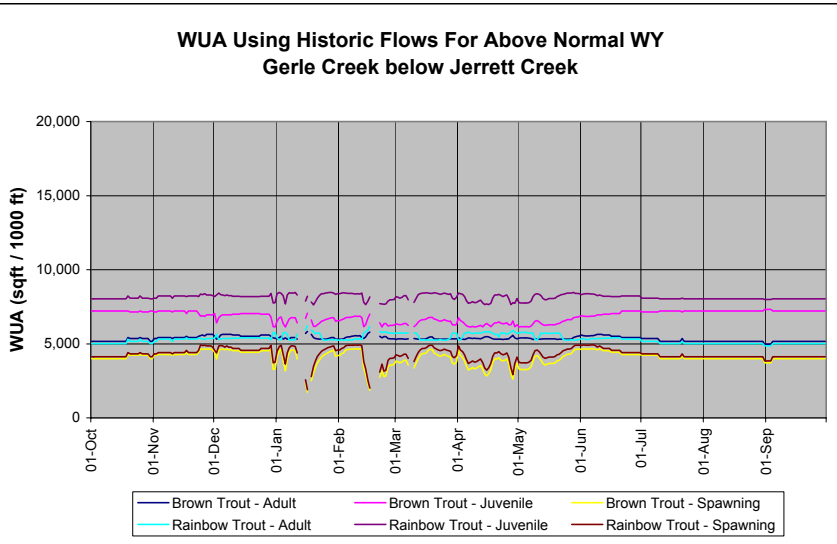
WUA Using Unimpaired Flows For Above Normal WY
Gerle Creek below Loon Lake

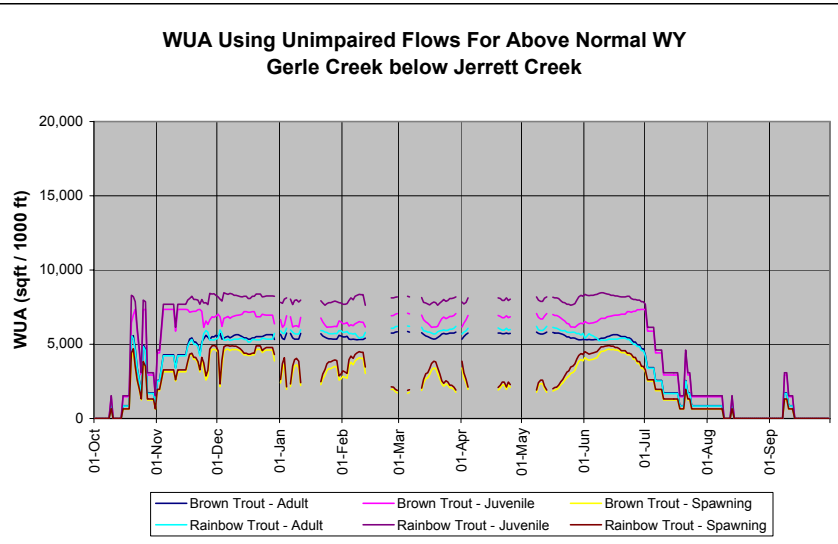


Loon Lake Reach
Above Normal WY Plots

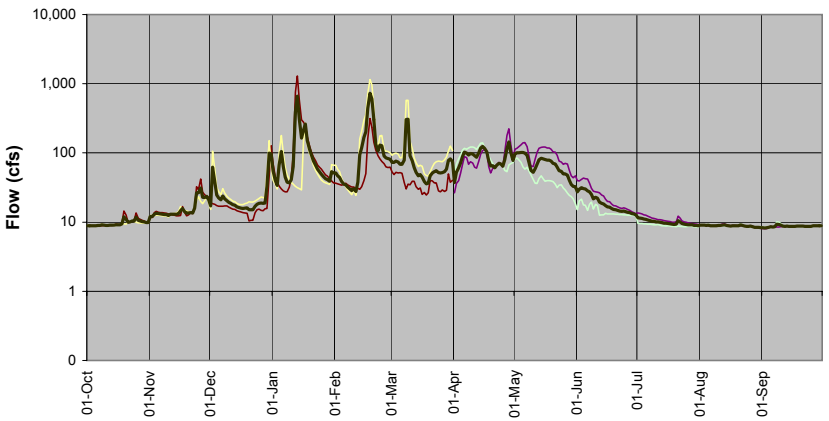


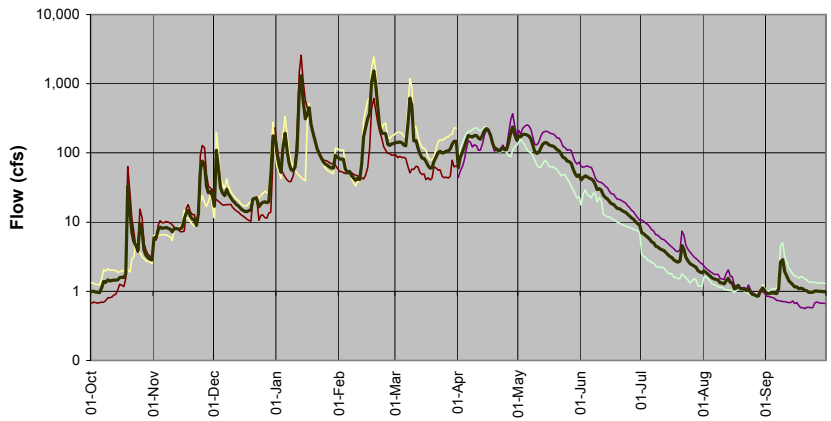


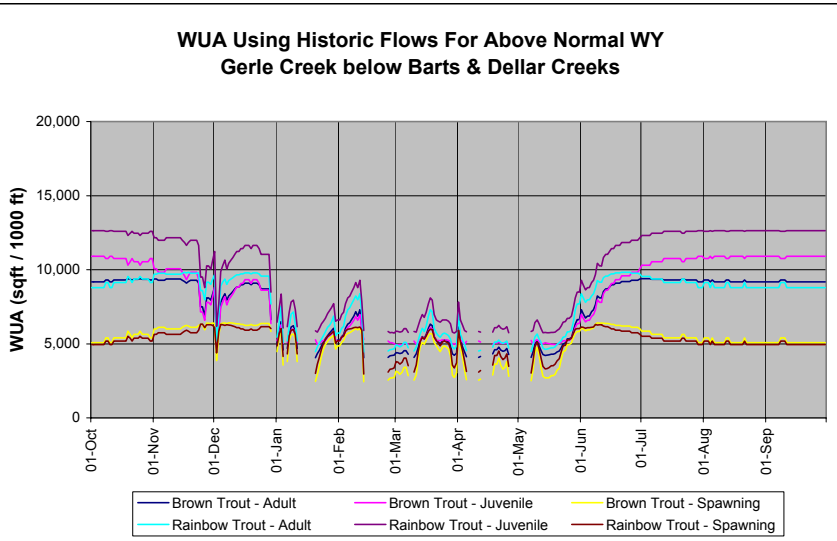


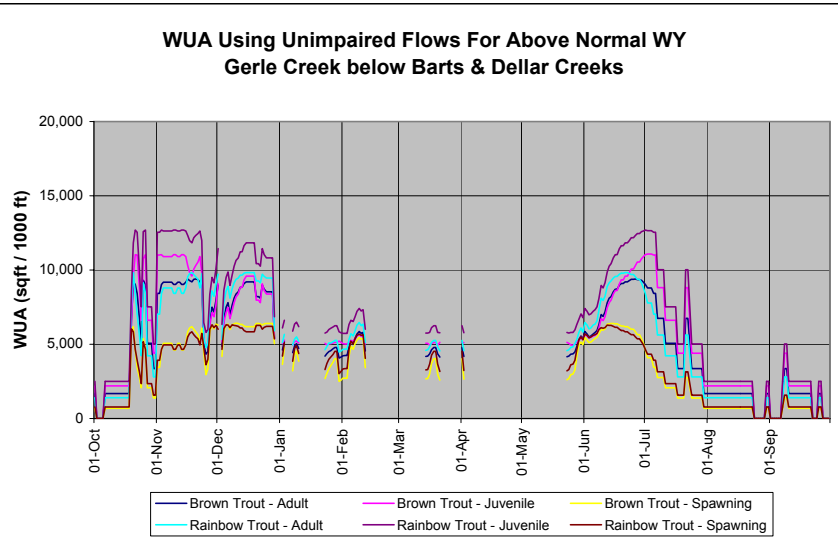


Loon Lake Reach
Above Normal WY Plots

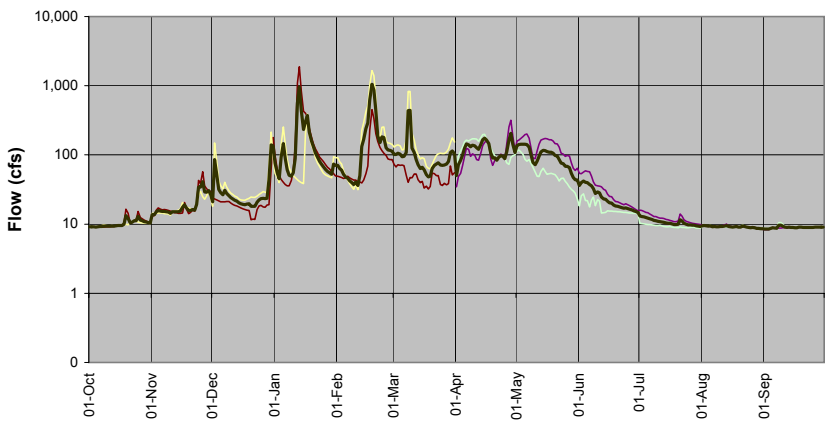


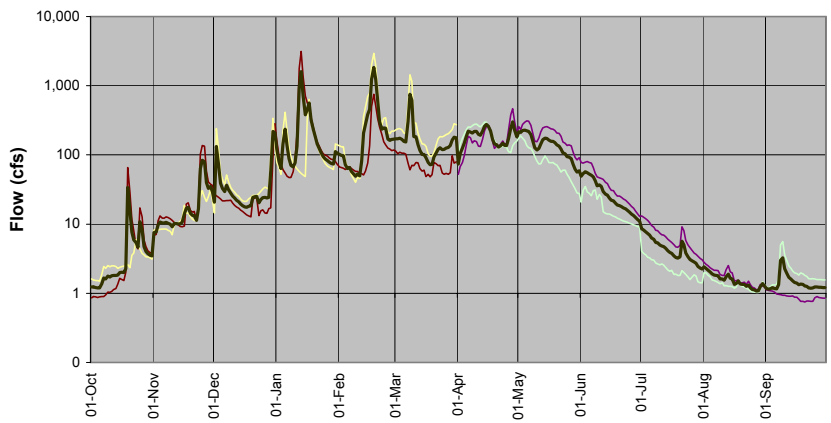


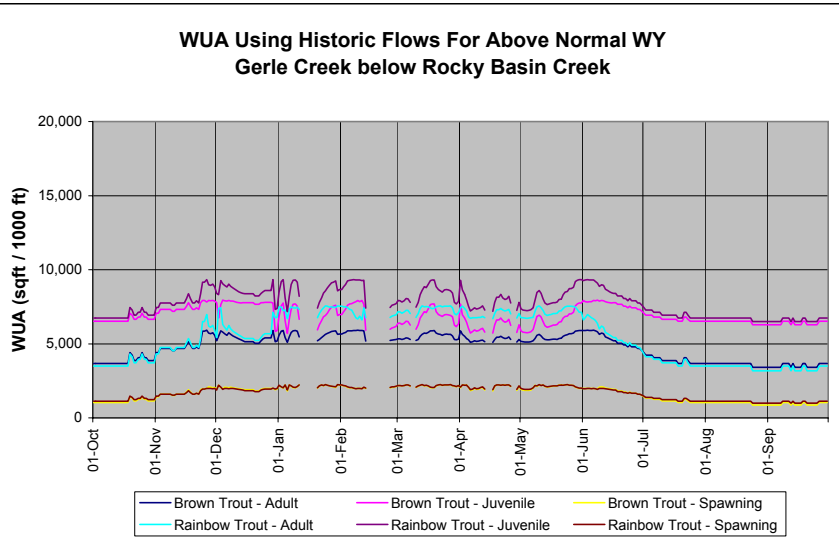


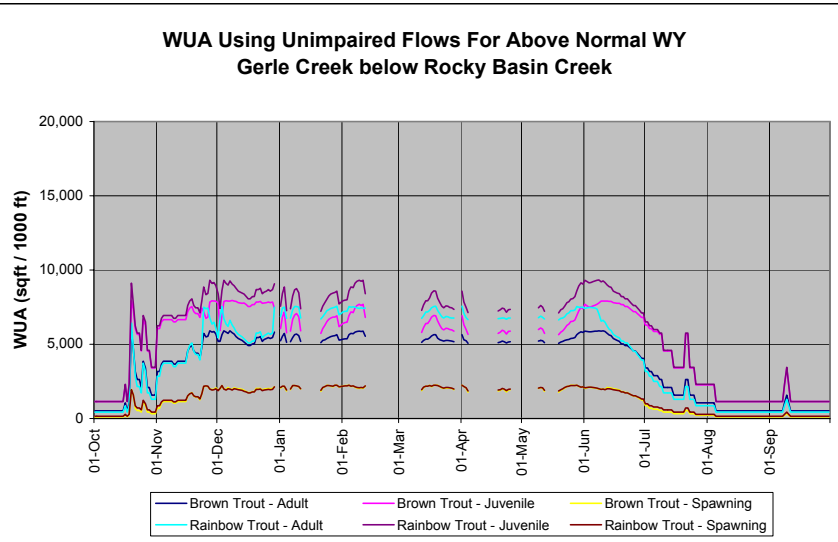


Loon Lake Reach
Above Normal WY Plots



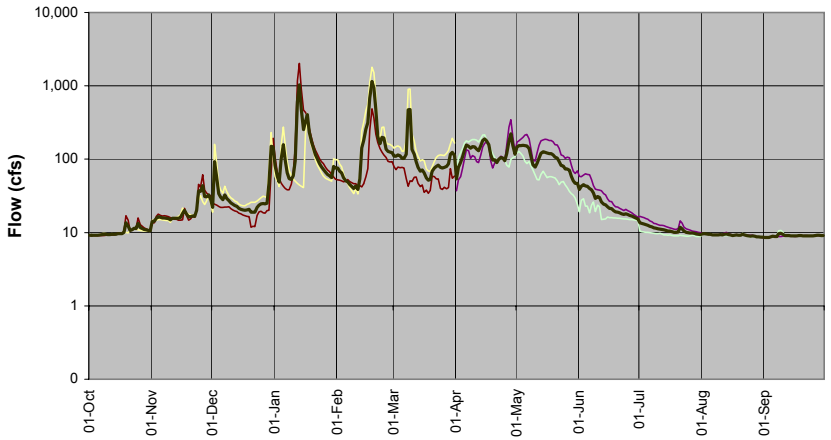




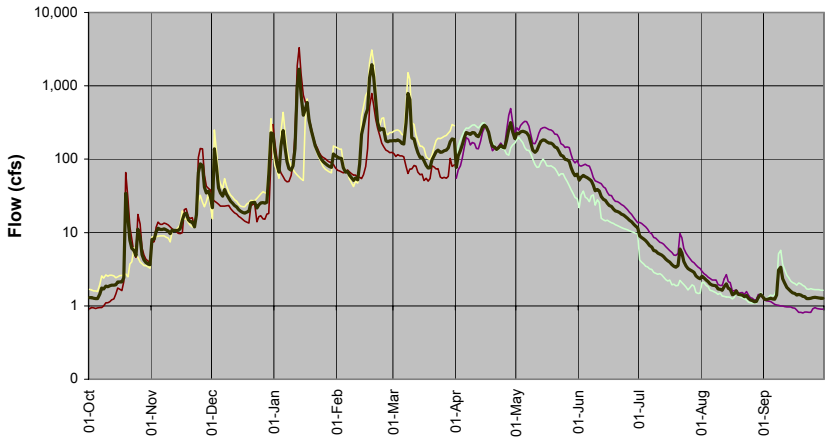


Loon Lake Reach
Above Normal WY Plots

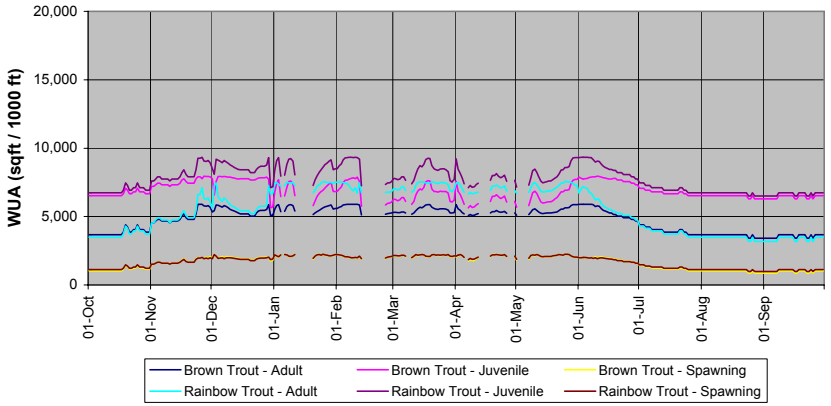
Historic Flows For Above Normal WY
Gerle Creek Inflow above Gerle Reservoir



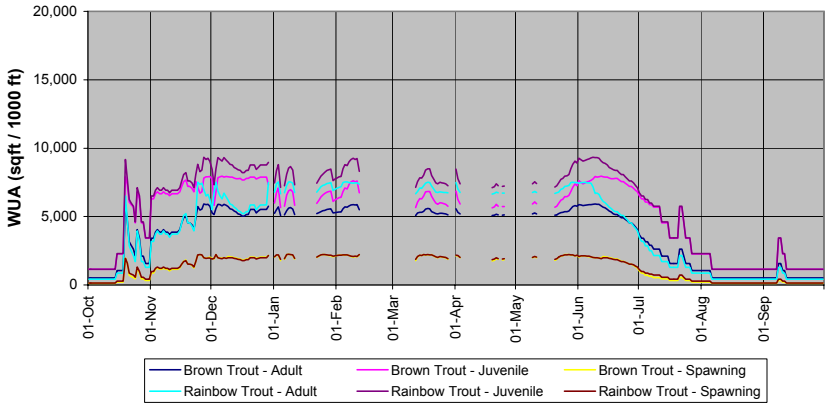
Unimpaired Flows For Above Normal WY
Gerle Creek Inflow above Gerle Reservoir



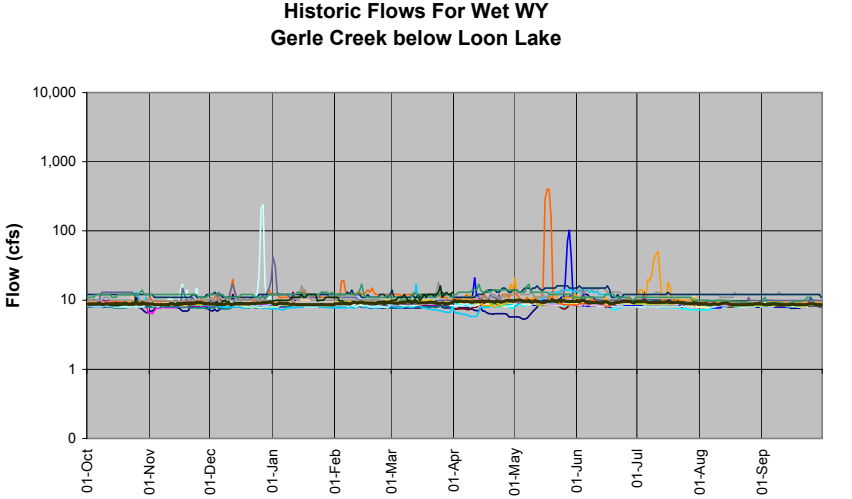
WUA Using Historic Flows For Above Normal WY
Gerle Creek Inflow above Gerle Reservoir

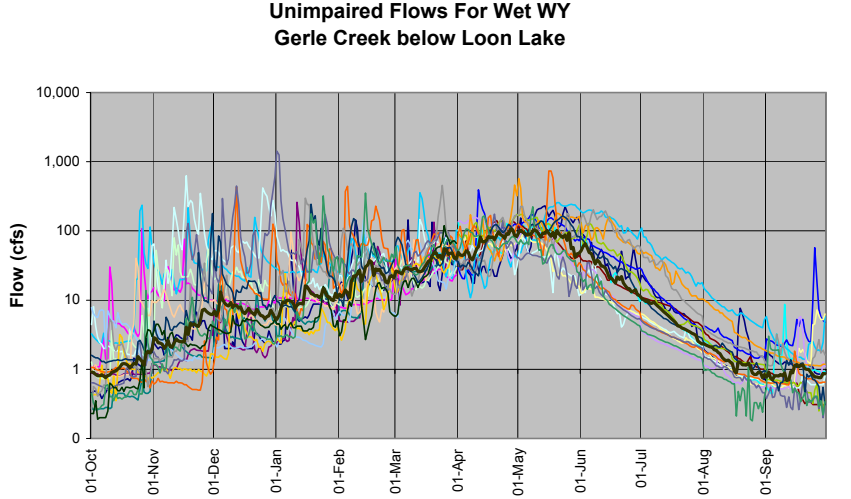


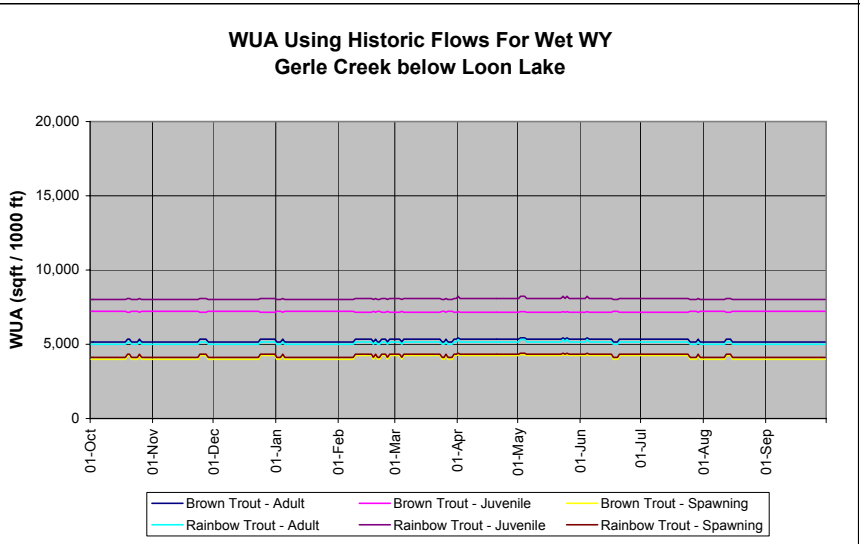
WUA Using Unimpaired Flows For Above Normal WY
Gerle Creek Inflow above Gerle Reservoir

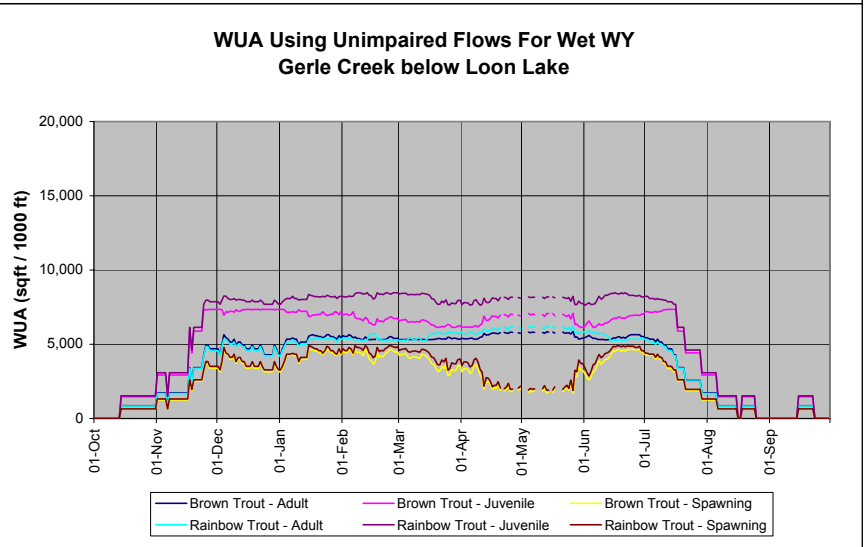


Loon Lake Reach
Wet WY Plots

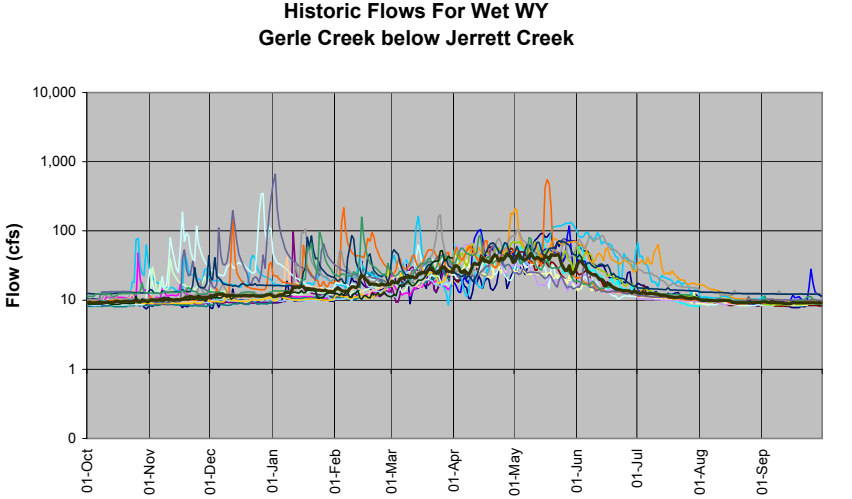


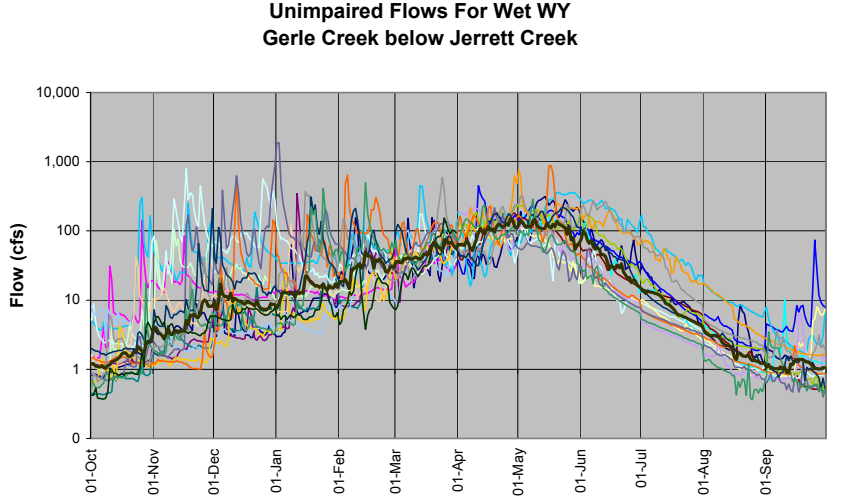


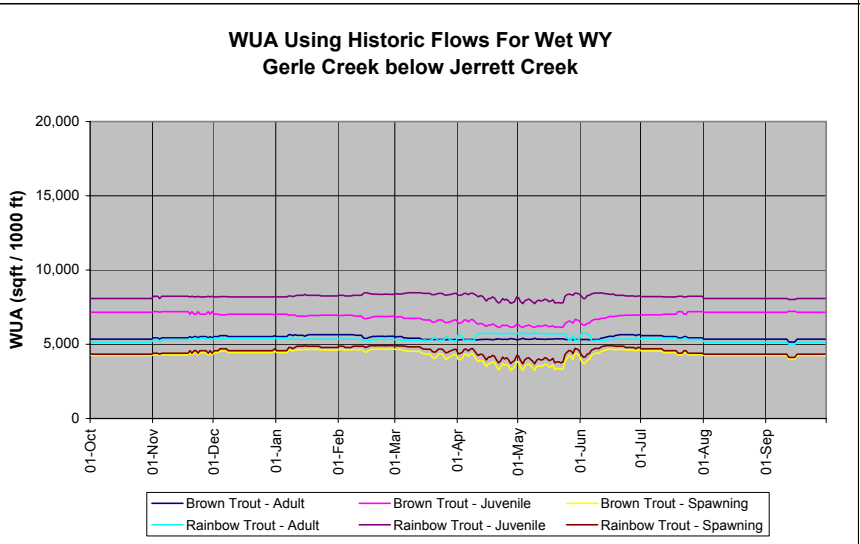


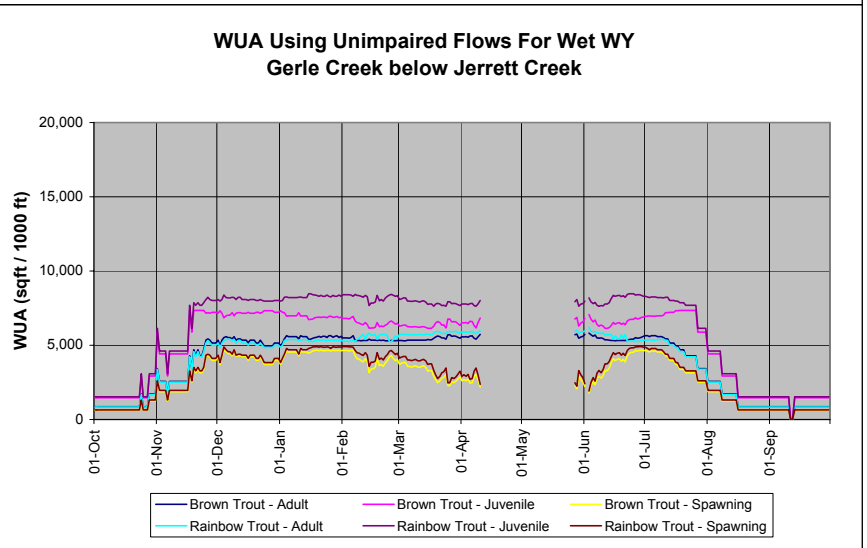


Loon Lake Reach
Wet WY Plots



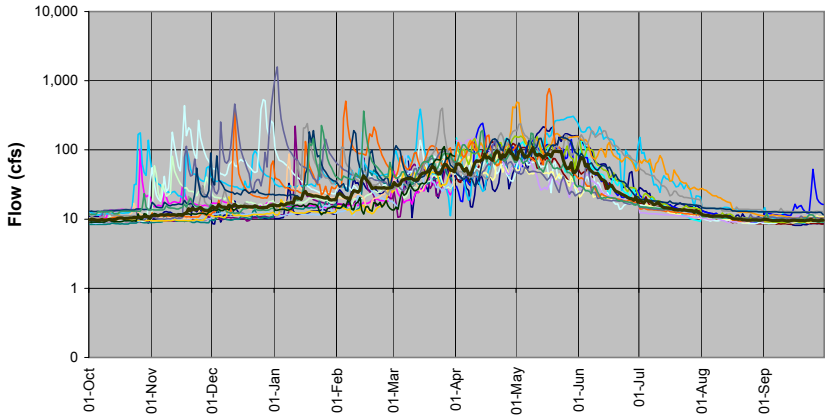




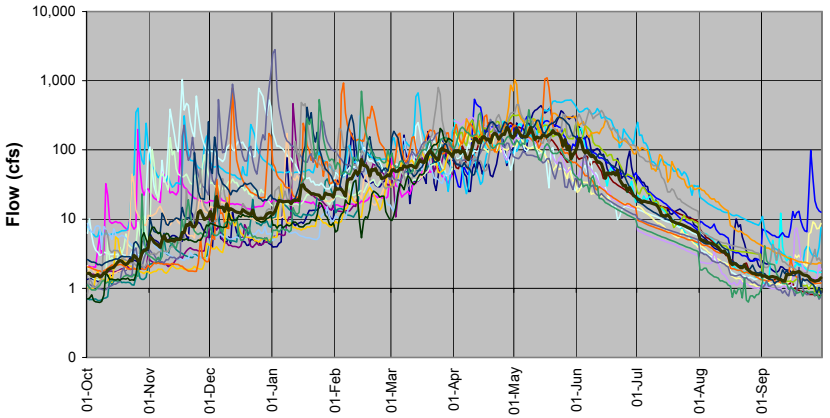


Loon Lake Reach
Wet WY Plots

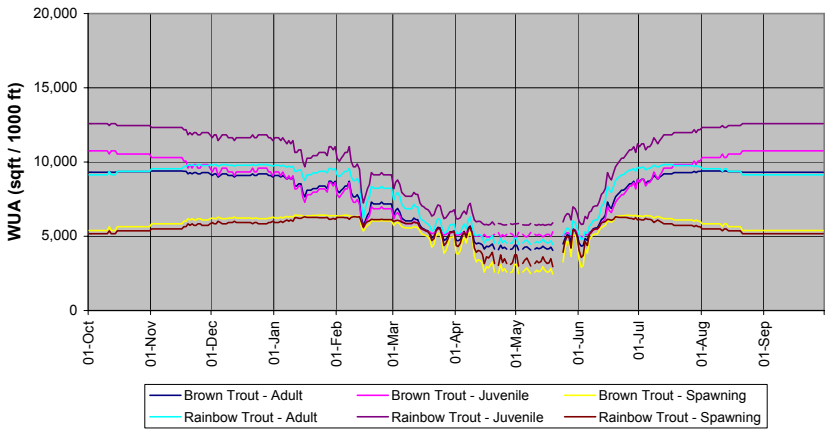
Historic Flows For Wet WY
Gerle Creek below Barts & Dellar Creeks



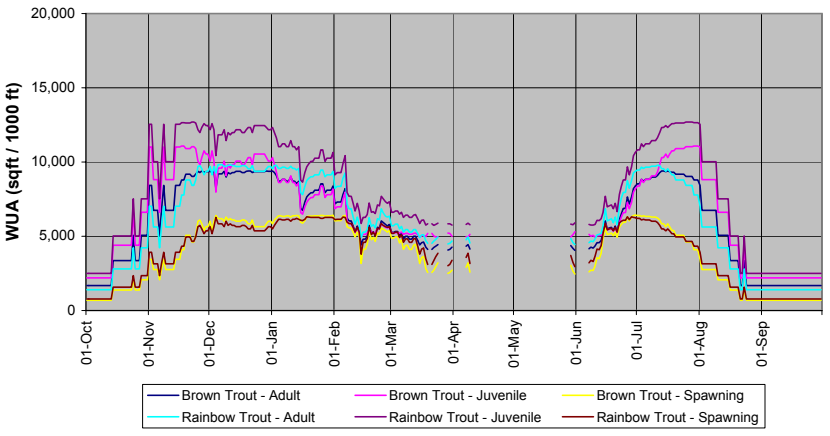
Unimpaired Flows For Wet WY
Gerle Creek below Barts & Dellar Creeks



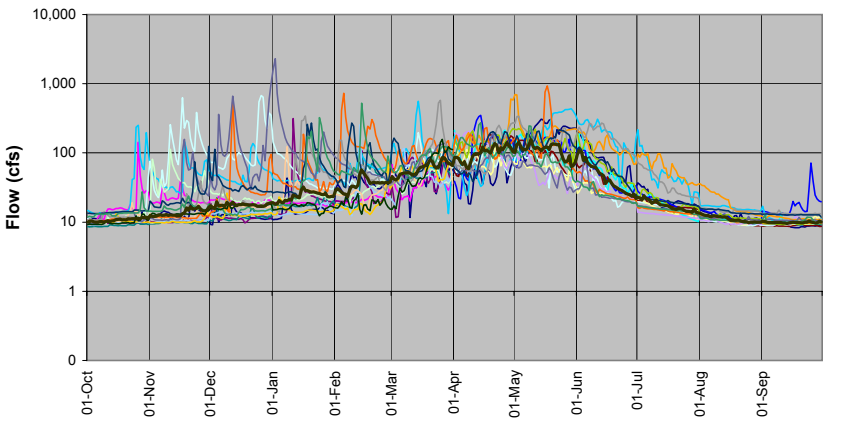
WUA Using Historic Flows For Wet WY
Gerle Creek below Barts & Dellar Creeks

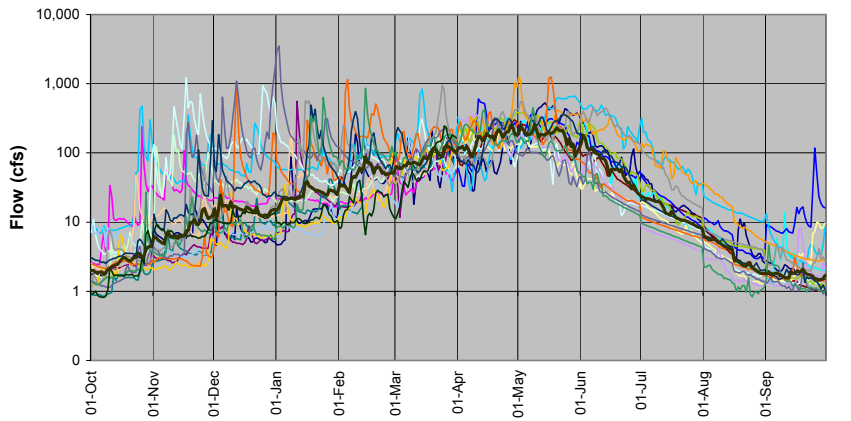


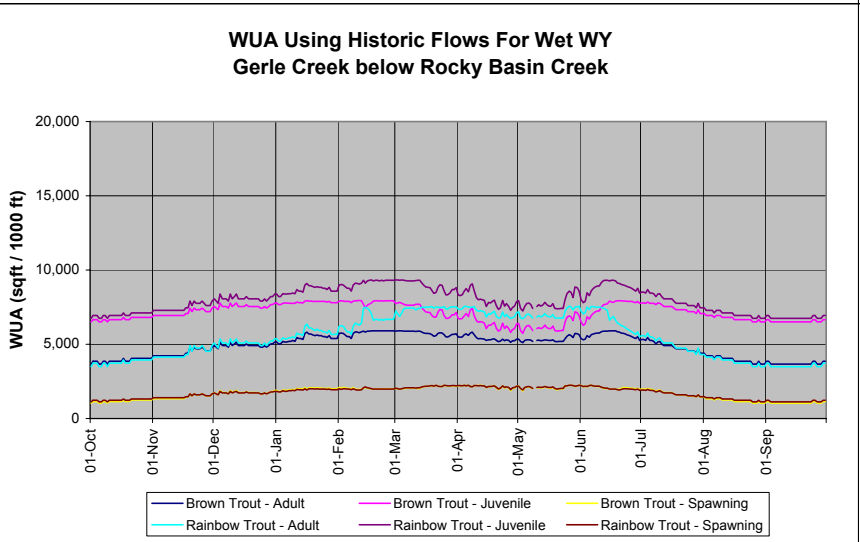
WUA Using Unimpaired Flows For Wet WY
Gerle Creek below Barts & Dellar Creeks

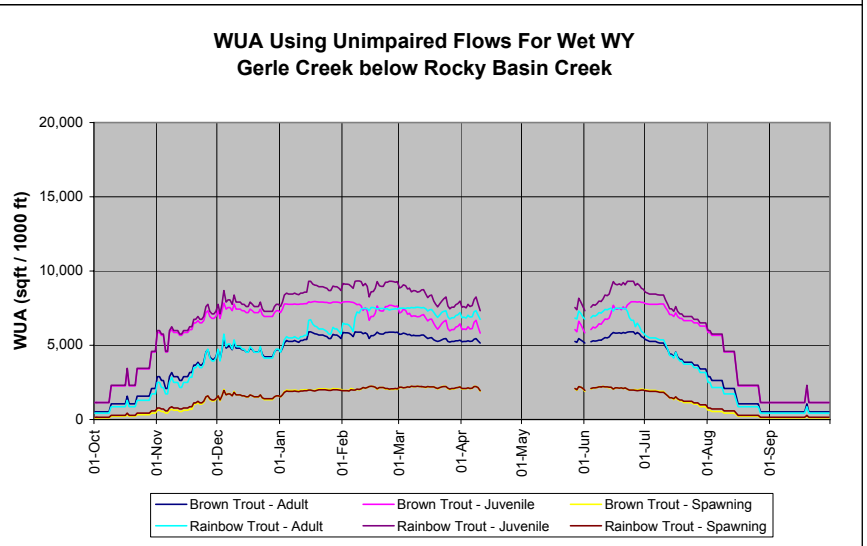


Loon Lake Reach
Wet WY Plots

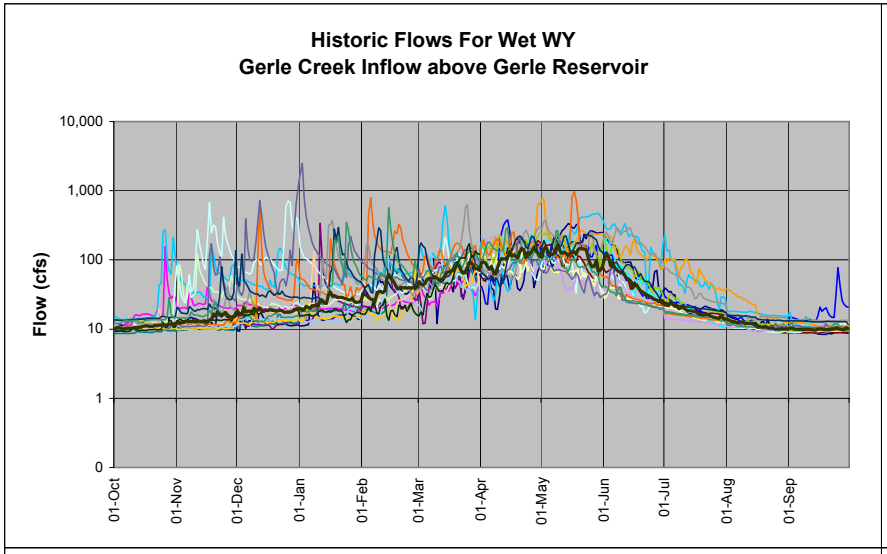


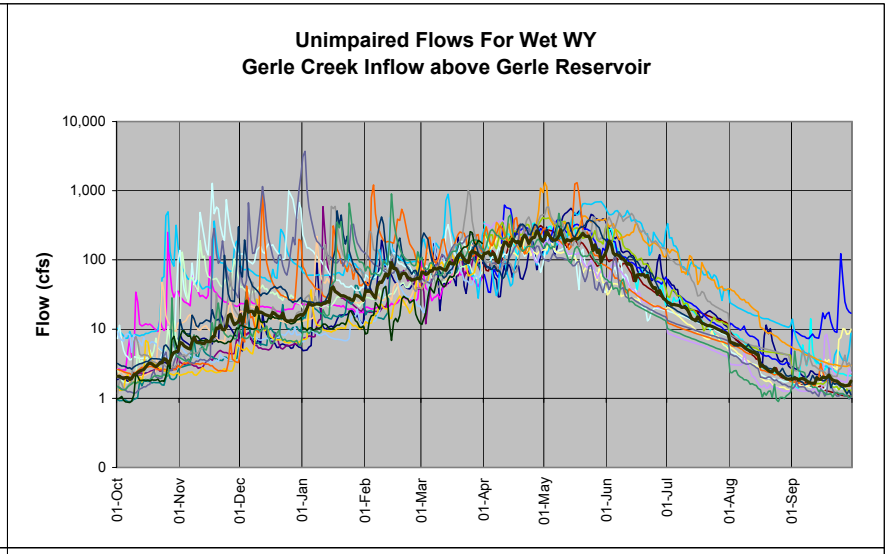


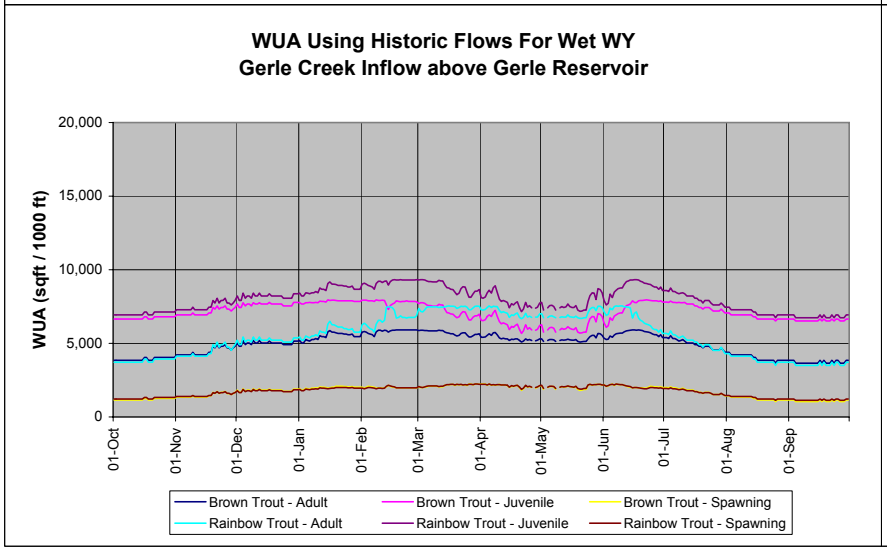


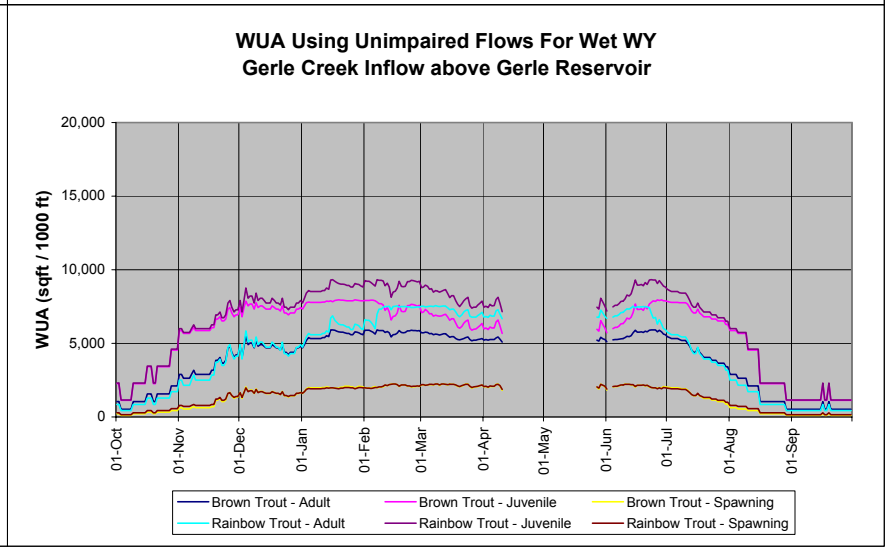


Loon Lake Reach
Wet WY Plots









Ice House Dam Reach
South Fork Silver Creek

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Ice House Reach

Full Year Summary

SF Silver Creek Below Ice House Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,094,521	1,325,922	-36.70	1,933,705	1,278,636	-33.88	1,661,319	1,901,325	14.45	1,964,204	1,475,592	-24.88
Brown Trout - Juvenile	2,939,334	2,968,724	1.00	2,921,798	2,902,221	-0.67	2,487,255	2,707,410	8.85	3,009,583	2,846,065	-5.43
Brown Trout - Spawning	2,110,587	2,135,006	1.16	2,248,966	2,082,753	-7.39	1,841,109	2,091,983	13.63	2,384,688	2,628,731	10.23
Rainbow Trout - Adult	2,377,681	1,251,497	-47.36	2,179,794	1,196,688	-45.10	1,855,512	2,177,687	17.36	2,223,754	1,604,457	-27.85
Rainbow Trout - Juvenile	3,403,482	2,963,257	-12.93	3,308,844	2,886,408	-12.77	2,816,196	3,135,997	11.36	3,401,006	3,006,411	-11.60
Rainbow Trout - Spawning	2,495,779	2,117,185	-15.17	2,565,210	2,055,409	-19.87	2,104,919	2,438,001	15.82	2,706,026	2,696,204	-0.36

SF Silver Creek below Peavine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,145,447	1,778,608	-17.10	2,083,605	1,710,544	-17.90	1,662,191	1,868,096	12.39	2,047,597	1,910,500	-6.70
Brown Trout - Juvenile	3,045,567	3,603,662	18.32	3,139,095	3,497,926	11.43	2,546,991	2,638,056	3.58	3,091,075	3,297,200	6.67
Brown Trout - Spawning	2,181,512	2,961,587	35.76	2,394,292	3,005,379	25.52	1,943,983	2,149,634	10.58	2,481,513	3,368,489	35.74
Rainbow Trout - Adult	2,417,320	1,841,664	-23.81	2,350,719	1,783,257	-24.14	1,856,030	2,164,887	16.64	2,332,000	2,207,688	-5.33
Rainbow Trout - Juvenile	3,508,545	3,722,093	6.09	3,557,275	3,608,487	1.44	2,865,677	3,073,025	7.24	3,509,565	3,618,740	3.11
Rainbow Trout - Spawning	2,558,149	3,043,921	18.99	2,740,008	3,075,783	12.25	2,196,614	2,485,012	13.13	2,828,591	3,567,897	26.14

SF Silver Creek below Windmiller Ravine

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,110,143	1,886,548	-10.60	2,181,686	1,927,303	-11.66	1,731,076	1,990,028	14.96	2,108,321	2,223,308	5.45
Brown Trout - Juvenile	3,600,650	4,593,166	27.56	3,889,186	4,844,167	24.55	3,170,240	3,233,215	1.99	3,714,506	4,115,953	10.81
Brown Trout - Spawning	1,902,303	2,580,964	35.68	2,090,653	2,771,538	32.57	1,674,393	1,812,804	8.27	2,065,089	2,526,595	22.35
Rainbow Trout - Adult	2,692,373	2,497,180	-7.25	2,818,383	2,578,846	-8.50	2,218,946	2,562,968	15.50	2,749,858	2,985,370	8.56
Rainbow Trout - Juvenile	4,070,825	4,671,612	14.76	4,334,195	4,876,660	12.52	3,472,421	3,728,387	7.37	4,167,784	4,606,202	10.52
Rainbow Trout - Spawning	1,891,350	2,414,594	27.67	2,058,370	2,574,498	25.07	1,634,400	1,802,250	10.27	2,026,276	2,440,617	20.45

SF Silver Creek below Big Hill Canyon

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,155,345	2,082,215	-3.39	2,327,575	2,258,500	-2.97	1,751,242	1,929,606	10.19	2,171,919	2,316,259	6.65
Brown Trout - Juvenile	3,782,705	4,707,329	24.44	4,121,575	4,935,641	19.75	3,215,151	3,031,468	-5.71	3,602,440	3,809,432	5.75
Brown Trout - Spawning	2,000,913	2,689,598	34.42	2,198,524	2,888,030	31.36	1,731,158	1,731,695	0.03	2,029,545	2,350,746	15.83
Rainbow Trout - Adult	2,751,131	2,758,247	0.26	3,005,286	3,025,179	0.66	2,261,493	2,491,287	10.16	2,832,245	3,088,547	9.05
Rainbow Trout - Juvenile	4,235,940	4,878,500	15.17	4,595,795	5,188,344	12.89	3,524,825	3,555,832	0.88	4,131,626	4,476,475	8.35
Rainbow Trout - Spawning	1,979,064	2,533,189	28.00	2,167,368	2,730,706	25.99	1,685,169	1,727,566	2.52	2,012,543	2,318,066	15.18

SF Silver Creek at Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,198,708	2,159,131	-1.80	2,358,826	2,324,335	-1.46	1,761,231	1,870,357	6.20	2,190,032	2,337,605	6.74
Brown Trout - Juvenile	3,873,628	4,724,401	21.96	4,164,975	4,896,996	17.58	3,198,255	2,922,128	-8.63	3,557,850	3,709,866	4.27
Brown Trout - Spawning	2,038,124	2,716,361	33.28	2,225,595	2,885,009	29.63	1,736,529	1,691,327	-2.60	2,012,712	2,264,477	12.51
Rainbow Trout - Adult	2,807,086	2,860,982	1.92	3,044,399	3,103,709	1.95	2,279,787	2,421,820	6.23	2,853,692	3,117,641	9.25
Rainbow Trout - Juvenile	4,326,500	4,943,464	14.26	4,646,829	5,212,023	12.16	3,520,364	3,447,986	-2.06	4,114,222	4,418,422	7.39
Rainbow Trout - Spawning	2,015,009	2,566,028	27.35	2,194,109	2,740,054	24.88	1,690,557	1,688,142	-0.14	2,003,201	2,253,756	12.51

Ice House Reach
Partial Year Summary

SF Silver Creek Below Ice House Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,132,683	843,013	-25.57	918,452	807,597	-12.07	917,413	1,349,500	47.10	921,364	1,049,380	13.89
Brown Trout - Juvenile	1,596,037	1,879,943	17.79	1,481,982	1,833,067	23.69	1,582,756	2,042,028	29.02	1,546,079	1,878,658	21.51
Brown Trout - Spawning	253,480	359,382	41.78	321,874	366,249	13.79	468,014	594,510	27.03	445,814	650,870	46.00
Rainbow Trout - Adult	1,255,920	795,567	-36.65	991,040	755,838	-23.73	990,443	1,560,471	57.55	993,592	1,205,561	21.33
Rainbow Trout - Juvenile	1,831,264	1,878,351	2.57	1,628,620	1,823,079	11.94	1,712,891	2,336,039	36.38	1,683,320	2,044,275	21.44
Rainbow Trout - Spawning	745,494	443,794	-40.47	540,237	394,611	-26.96	244,401	261,698	7.08	48,553	70,963	46.16

SF Silver Creek below Peavine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,238,670	1,101,972	-11.04	1,028,638	1,016,845	-1.15	1,008,524	1,382,906	37.12	974,025	1,120,716	15.06
Brown Trout - Juvenile	1,821,737	2,390,614	31.23	1,704,609	2,158,997	26.66	1,761,183	2,044,282	16.07	1,666,772	1,892,132	13.52
Brown Trout - Spawning	319,870	460,677	44.02	408,220	474,657	16.27	547,141	642,015	17.34	562,705	728,936	29.54
Rainbow Trout - Adult	1,359,395	1,077,654	-20.73	1,107,138	1,026,293	-7.30	1,090,855	1,612,109	47.78	1,065,639	1,308,762	22.81
Rainbow Trout - Juvenile	2,059,769	2,408,844	16.95	1,858,404	2,195,632	18.15	1,902,539	2,359,672	24.03	1,810,290	2,093,286	15.63
Rainbow Trout - Spawning	732,901	692,059	-5.57	525,470	599,962	14.18	217,643	247,205	13.58	14,317	38,668	170.09

SF Silver Creek below Windmiller Ravine

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,174,556	1,036,974	-11.71	1,164,260	1,128,906	-3.04	1,087,416	1,477,241	35.85	1,056,512	1,260,327	19.29
Brown Trout - Juvenile	2,236,826	3,056,141	36.63	2,329,283	3,122,397	34.05	2,313,850	2,524,310	9.10	2,203,493	2,454,460	11.39
Brown Trout - Spawning	294,113	402,696	36.92	374,450	424,479	13.36	469,948	500,383	6.48	492,126	551,807	12.13
Rainbow Trout - Adult	1,496,022	1,371,585	-8.32	1,485,341	1,503,311	1.21	1,410,797	1,929,887	36.79	1,376,913	1,703,279	23.70
Rainbow Trout - Juvenile	2,431,726	2,936,307	20.75	2,464,878	3,055,811	23.97	2,421,678	2,892,718	19.45	2,315,273	2,694,024	16.36
Rainbow Trout - Spawning	529,710	625,636	18.11	416,205	664,701	59.71	190,189	258,017	35.66	38,551	111,785	189.97

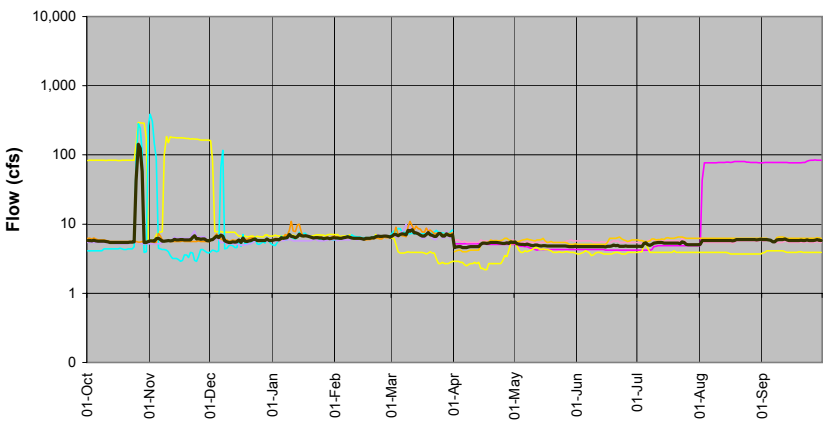
SF Silver Creek below Big Hill Canyon

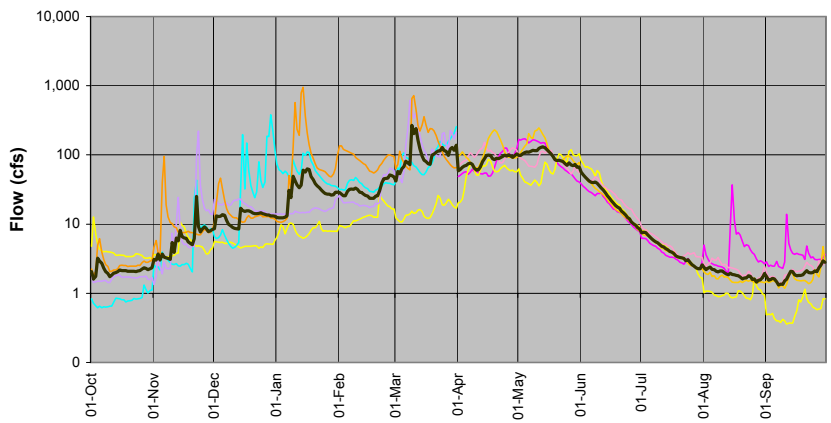
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,314,129	1,279,679	-2.62	1,277,181	1,328,890	4.05	1,153,245	1,458,339	26.46	1,115,044	1,297,602	16.37
Brown Trout - Juvenile	2,594,643	3,399,952	31.04	2,621,566	3,252,059	24.05	2,451,454	2,400,529	-2.08	2,189,319	2,299,519	5.03
Brown Trout - Spawning	365,684	457,100	25.00	449,174	485,563	8.10	507,907	505,978	-0.38	538,001	572,862	6.48
Rainbow Trout - Adult	1,675,414	1,704,138	1.71	1,640,730	1,788,253	8.99	1,508,202	1,906,826	26.43	1,465,979	1,770,670	20.78
Rainbow Trout - Juvenile	2,780,948	3,347,367	20.37	2,754,484	3,290,876	19.47	2,574,684	2,803,507	8.89	2,358,984	2,629,447	11.47
Rainbow Trout - Spawning	512,375	727,308	41.95	389,866	661,209	69.60	156,556	200,573	28.12	15,214	48,703	220.12

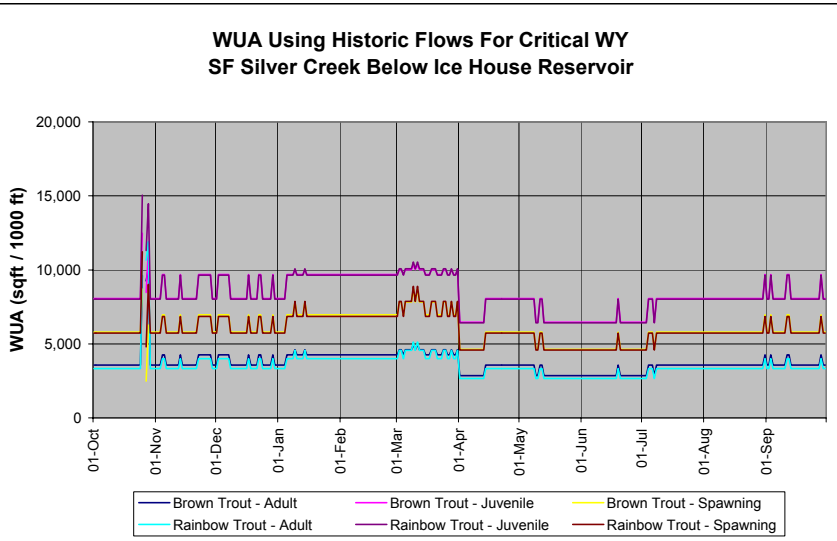
SF Silver Creek at Junction Reservoir

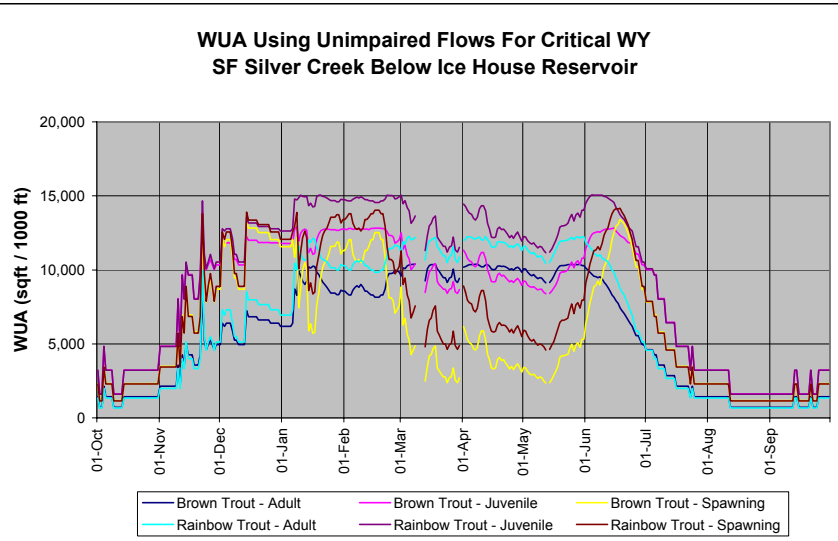
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,362,773	1,348,522	-1.05	1,300,176	1,364,871	4.98	1,178,839	1,458,728	23.74	1,144,953	1,322,878	15.54
Brown Trout - Juvenile	2,713,364	3,452,510	27.24	2,687,284	3,235,307	20.39	2,463,868	2,361,956	-4.14	2,187,197	2,260,218	3.34
Brown Trout - Spawning	390,159	465,534	19.32	467,276	498,820	6.75	516,146	505,459	-2.07	548,573	575,239	4.86
Rainbow Trout - Adult	1,738,097	1,802,237	3.69	1,674,677	1,834,492	9.54	1,547,340	1,907,918	23.30	1,507,932	1,806,109	19.77
Rainbow Trout - Juvenile	2,897,879	3,434,143	18.51	2,819,866	3,304,817	17.20	2,603,205	2,779,185	6.76	2,382,374	2,624,876	10.18
Rainbow Trout - Spawning	506,768	749,742	47.95	377,085	638,533	69.33	147,928	181,101	22.42	12,754	39,351	208.53

Ice House Reach
Critical WY Plots

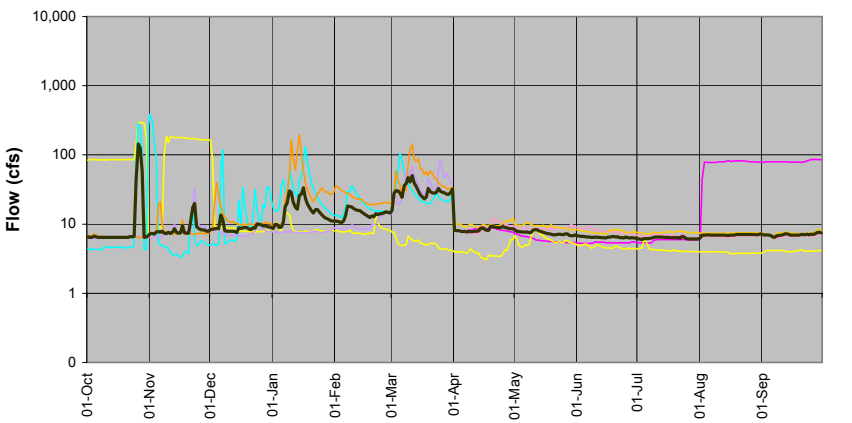


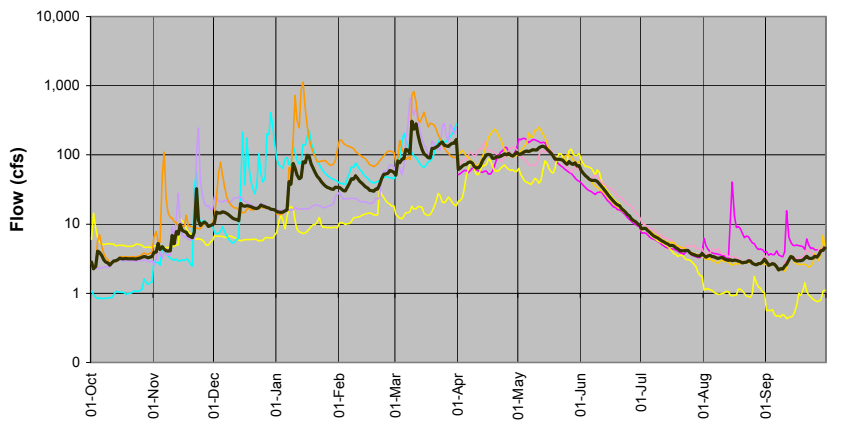


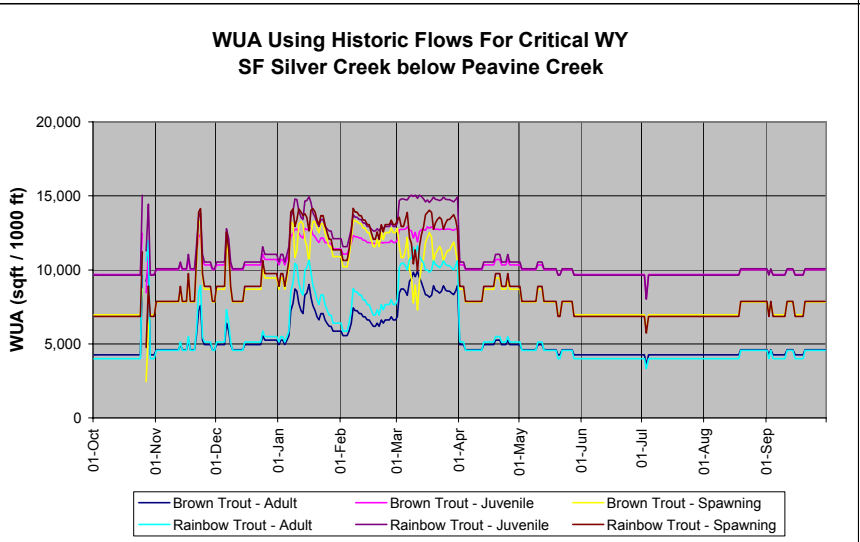


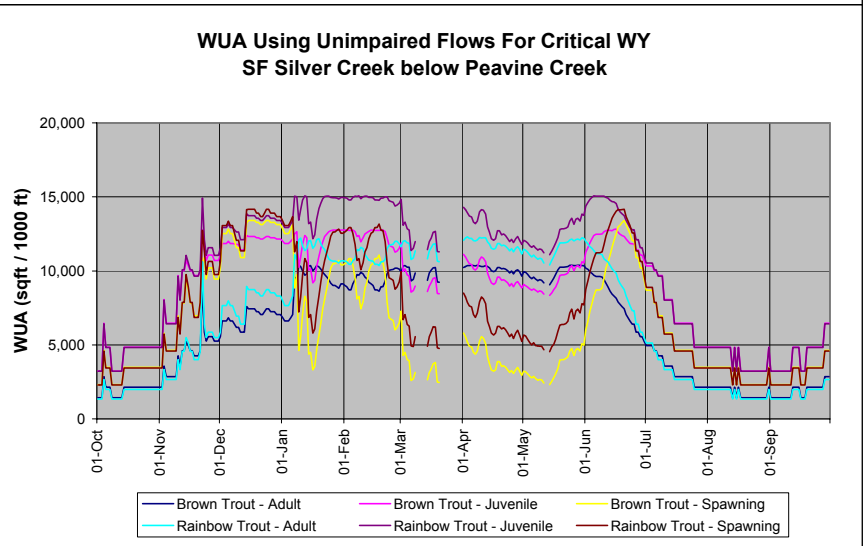


Ice House Reach
Critical WY Plots

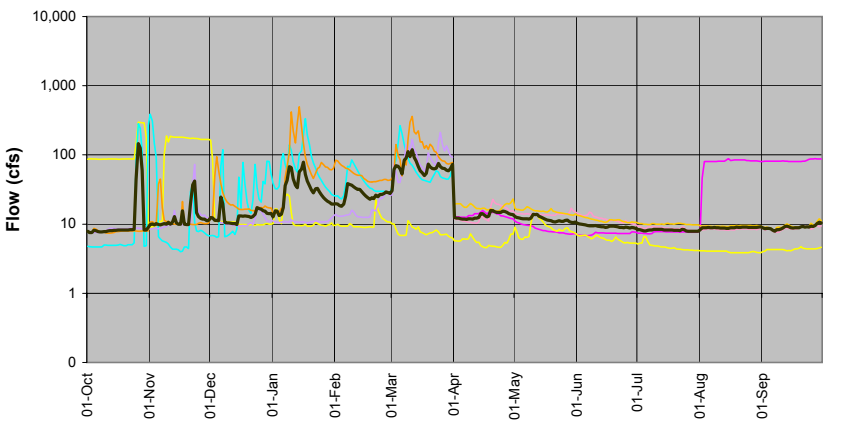


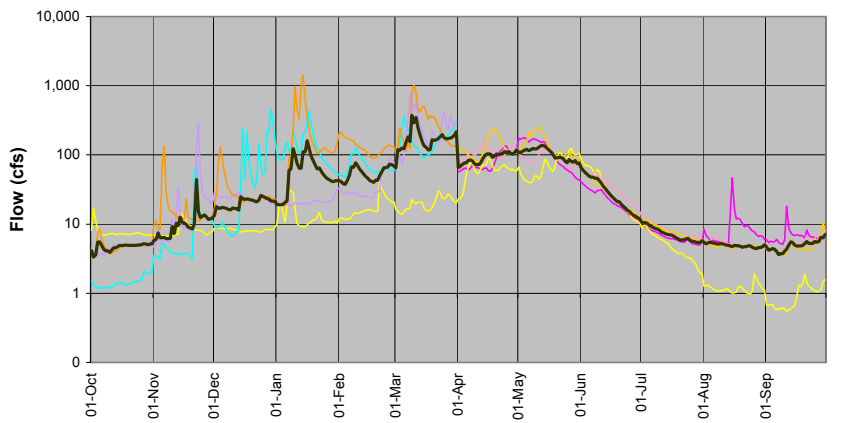


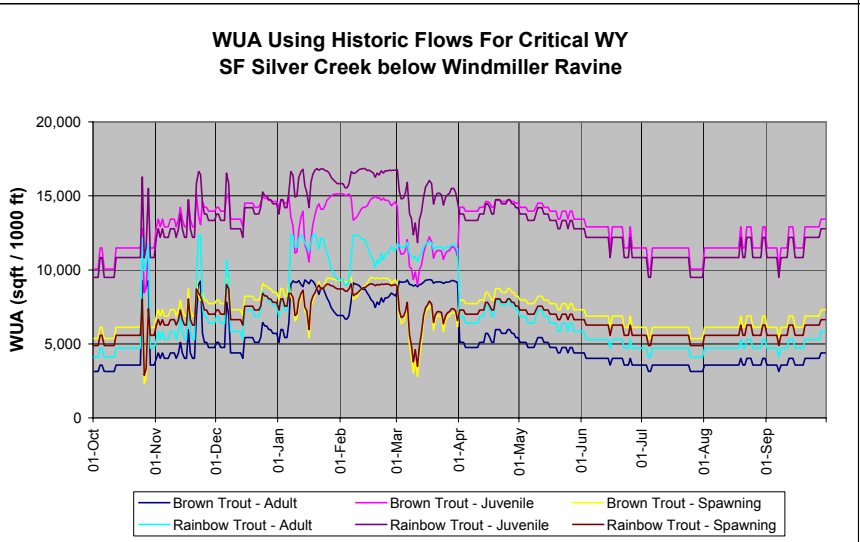


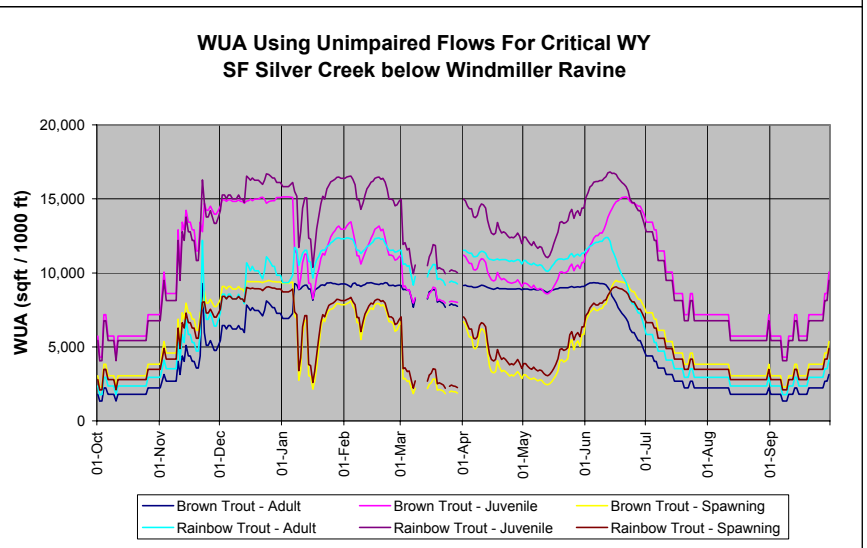


Ice House Reach
Critical WY Plots



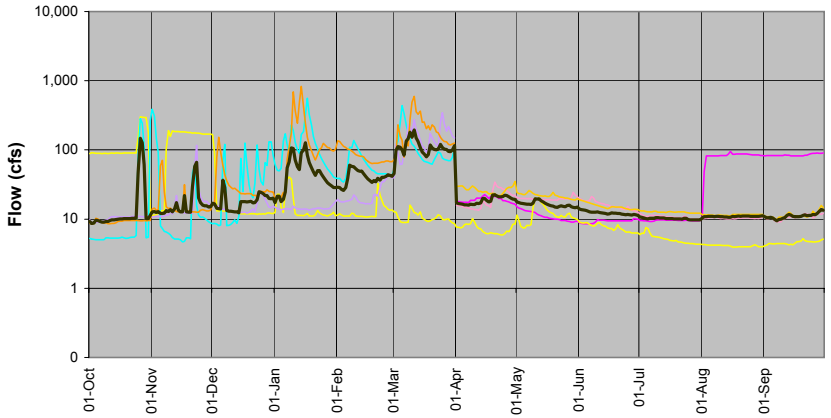




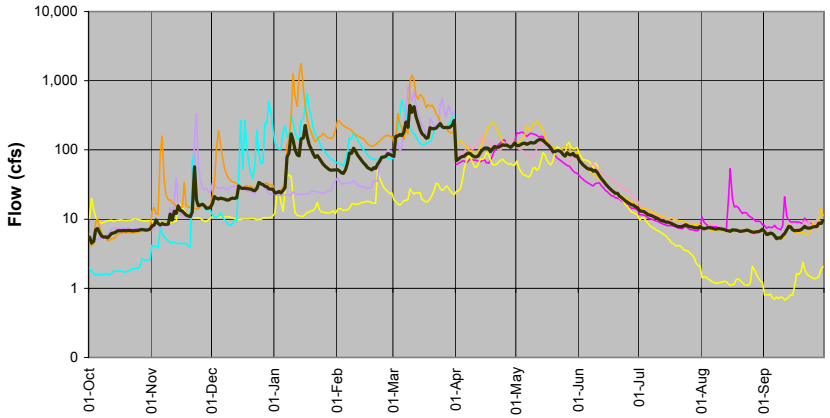


Ice House Reach
Critical WY Plots

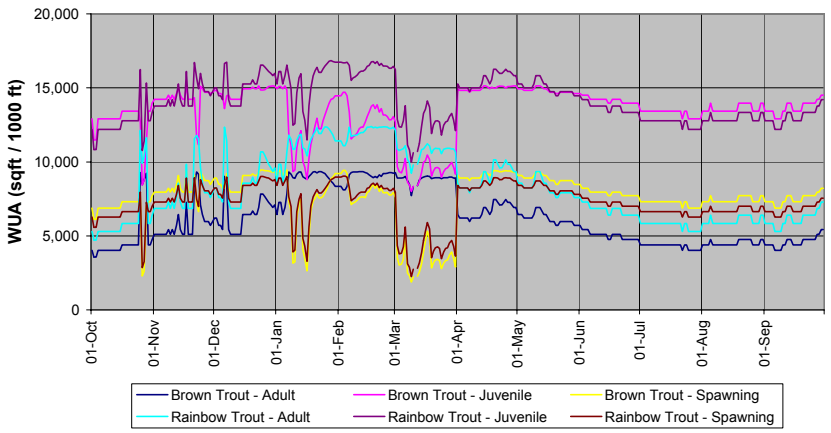
Historic Flows For Critical WY
SF Silver Creek below Big Hill Canyon



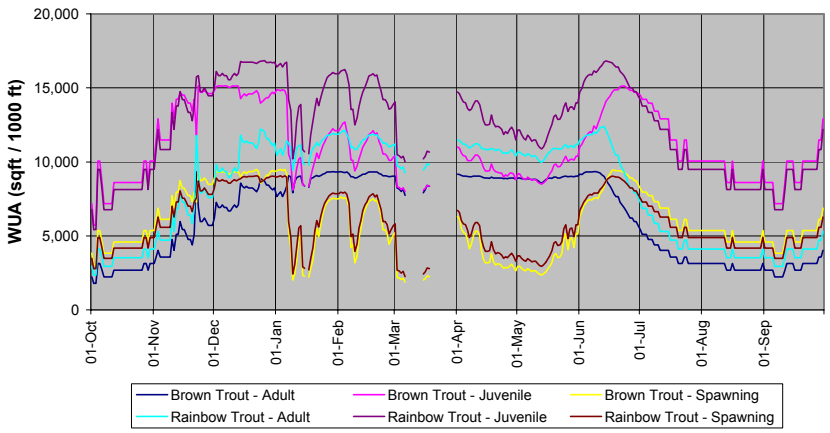
Unimpaired Flows For Critical WY
SF Silver Creek below Big Hill Canyon



WUA Using Historic Flows For Critical WY
SF Silver Creek below Big Hill Canyon

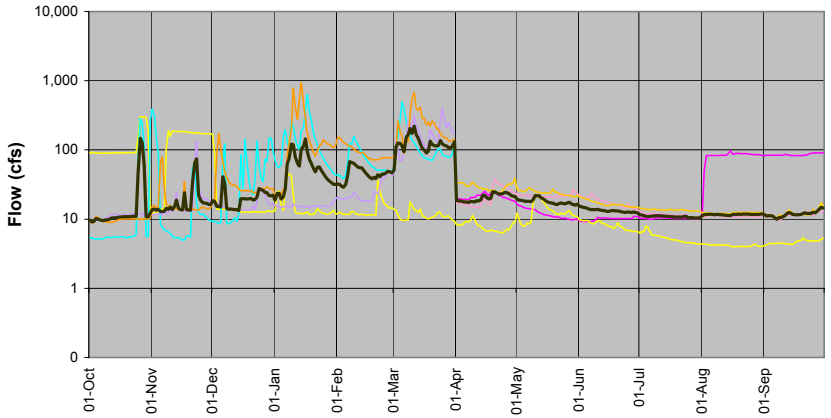


WUA Using Unimpaired Flows For Critical WY
SF Silver Creek below Big Hill Canyon

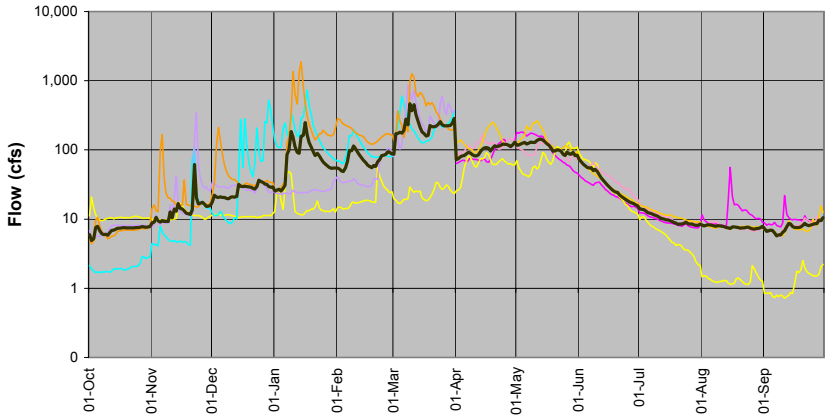


Ice House Reach
Critical WY Plots

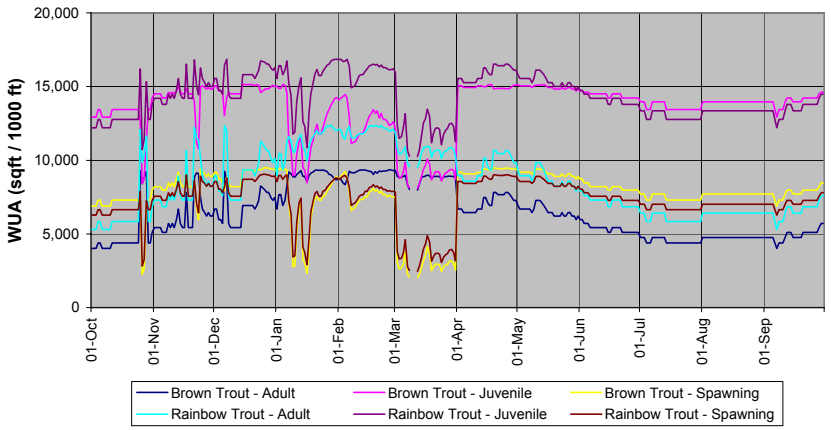
Historic Flows For Critical WY
SF Silver Creek at Junction Reservoir



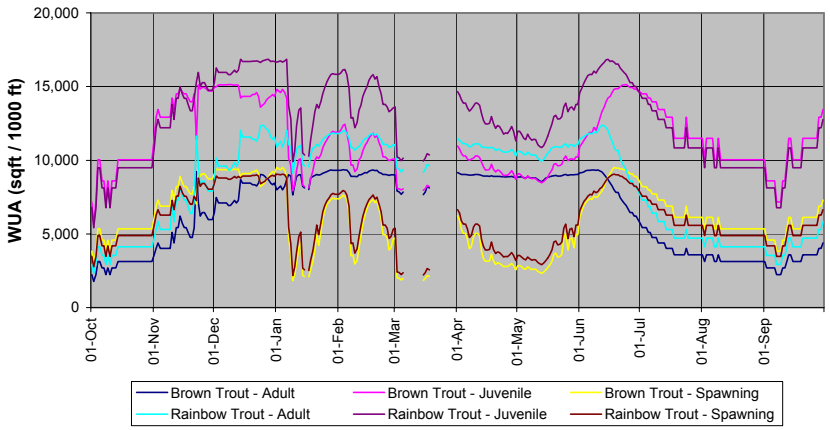
Unimpaired Flows For Critical WY
SF Silver Creek at Junction Reservoir



WUA Using Historic Flows For Critical WY
SF Silver Creek at Junction Reservoir

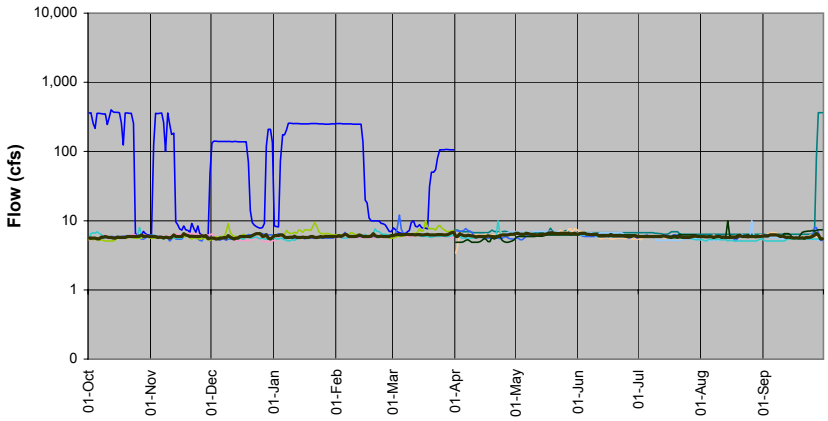


WUA Using Unimpaired Flows For Critical WY
SF Silver Creek at Junction Reservoir

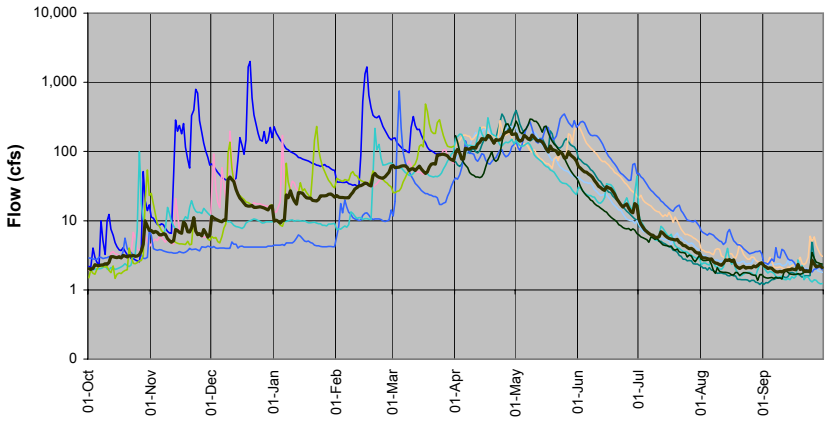


Ice House Reach
Below Normal WY Plots

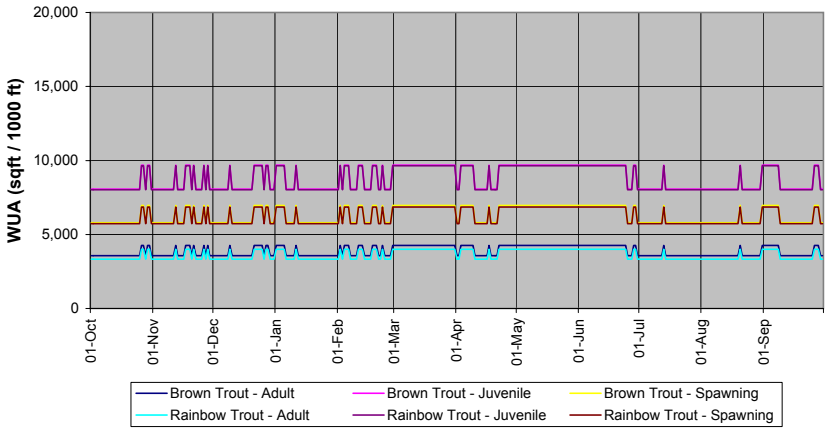
Historic Flows For Below Normal WY
SF Silver Creek Below Ice House Reservoir



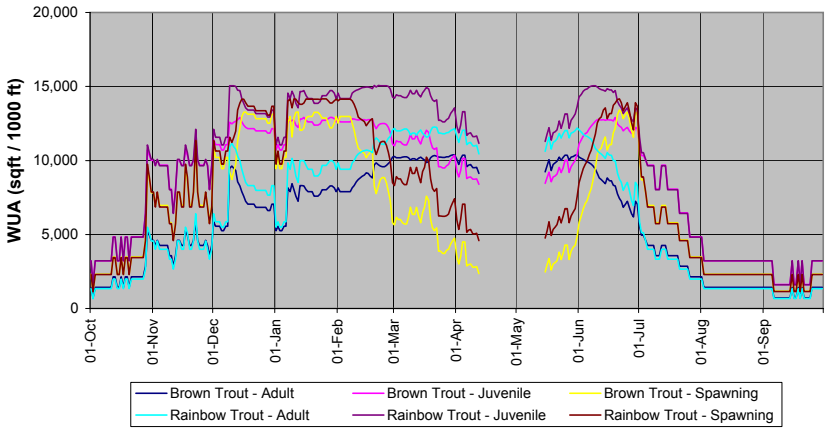
Unimpaired Flows For Below Normal WY
SF Silver Creek Below Ice House Reservoir



WUA Using Historic Flows For Below Normal WY
SF Silver Creek Below Ice House Reservoir

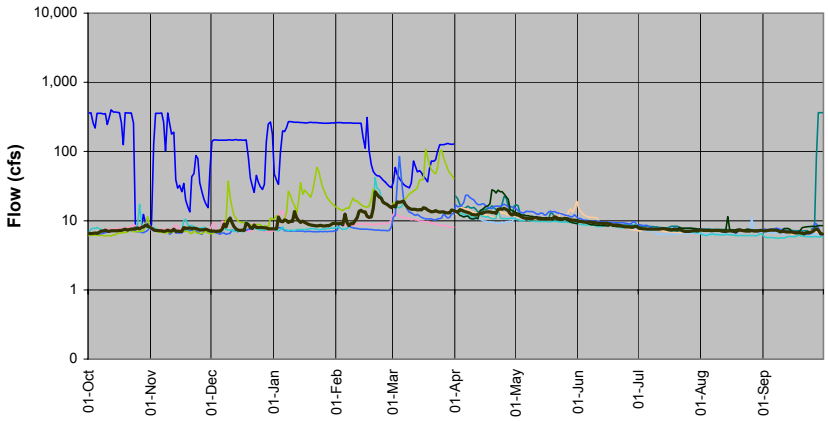


WUA Using Unimpaired Flows For Below Normal WY
SF Silver Creek Below Ice House Reservoir

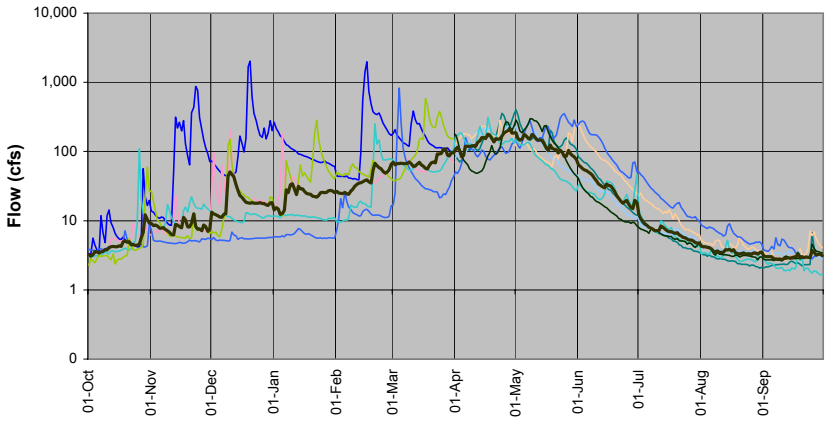


Ice House Reach
Below Normal WY Plots

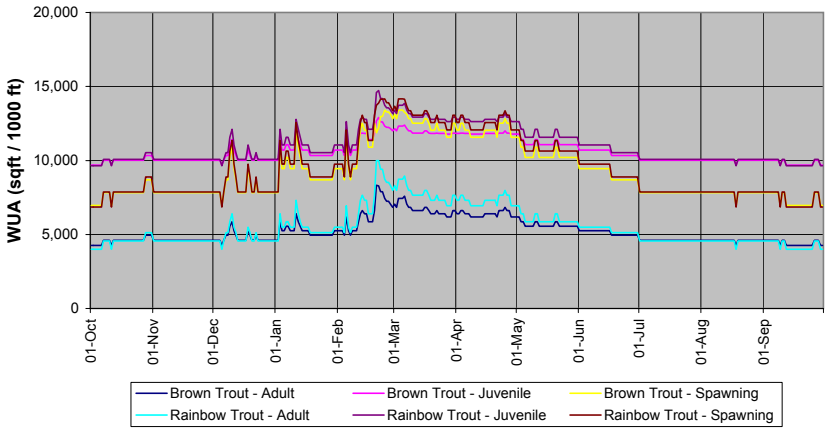
Historic Flows For Below Normal WY
SF Silver Creek below Peavine Creek



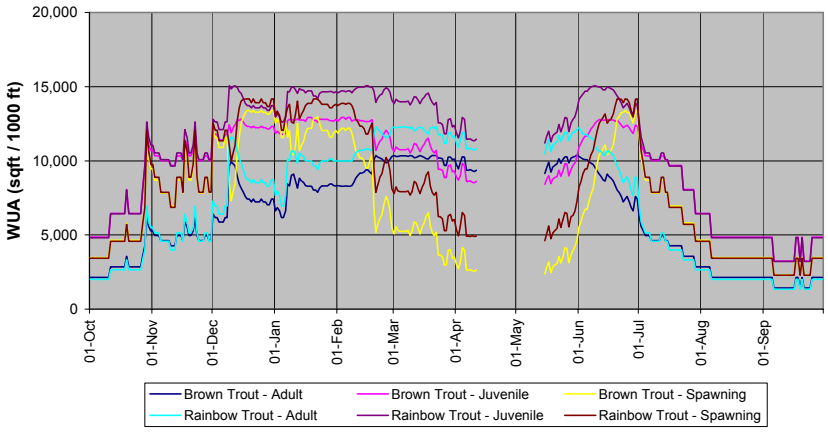
Unimpaired Flows For Below Normal WY
SF Silver Creek below Peavine Creek



WUA Using Historic Flows For Below Normal WY
SF Silver Creek below Peavine Creek

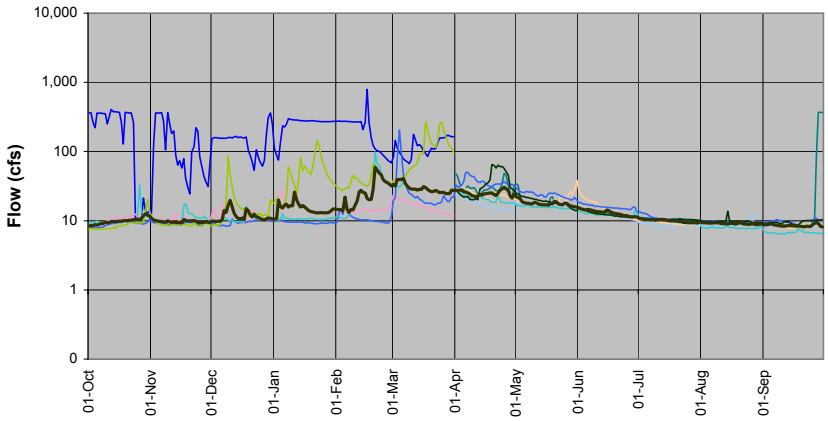


WUA Using Unimpaired Flows For Below Normal WY
SF Silver Creek below Peavine Creek

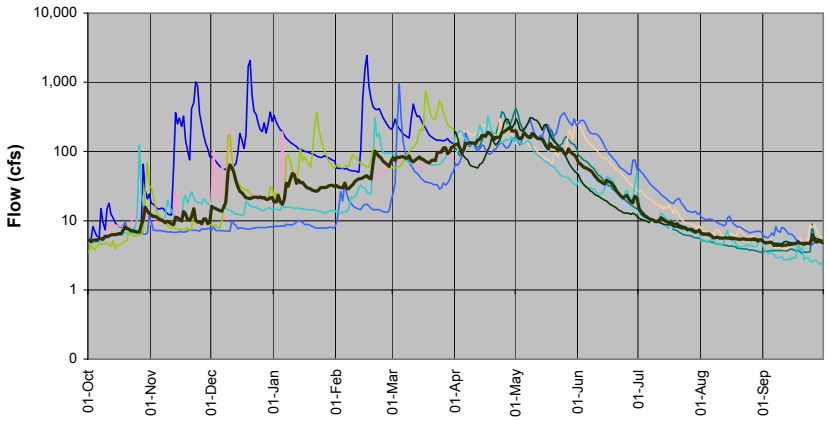


Ice House Reach
Below Normal WY Plots

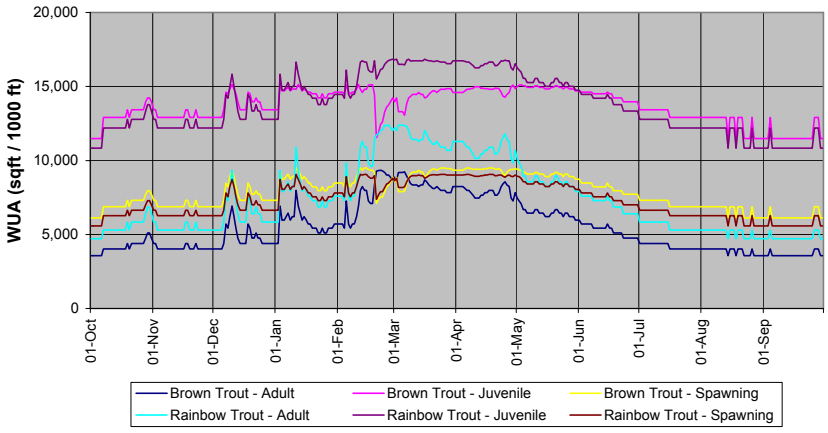
Historic Flows For Below Normal WY
SF Silver Creek below Windmiller Ravine



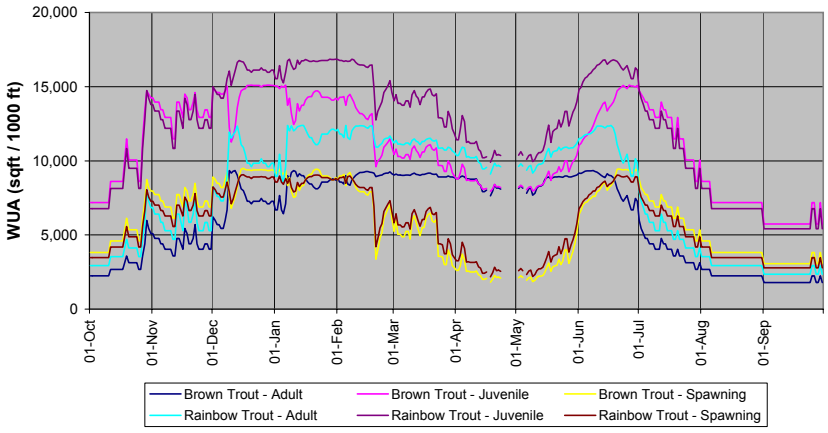
Unimpaired Flows For Below Normal WY
SF Silver Creek below Windmiller Ravine



WUA Using Historic Flows For Below Normal WY
SF Silver Creek below Windmiller Ravine

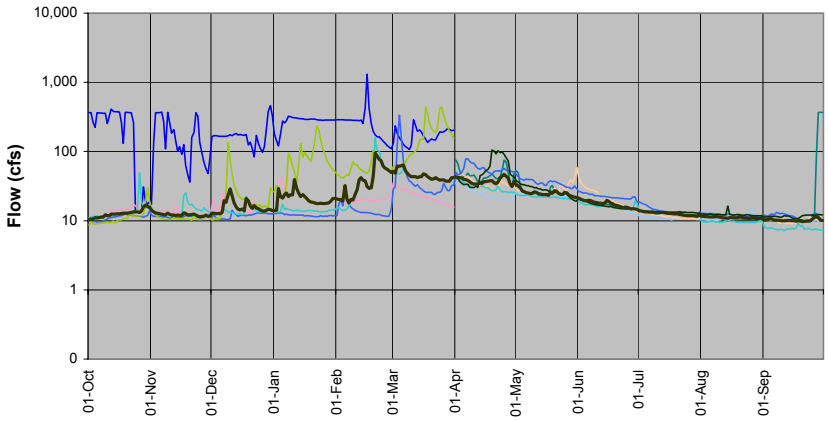


WUA Using Unimpaired Flows For Below Normal WY
SF Silver Creek below Windmiller Ravine

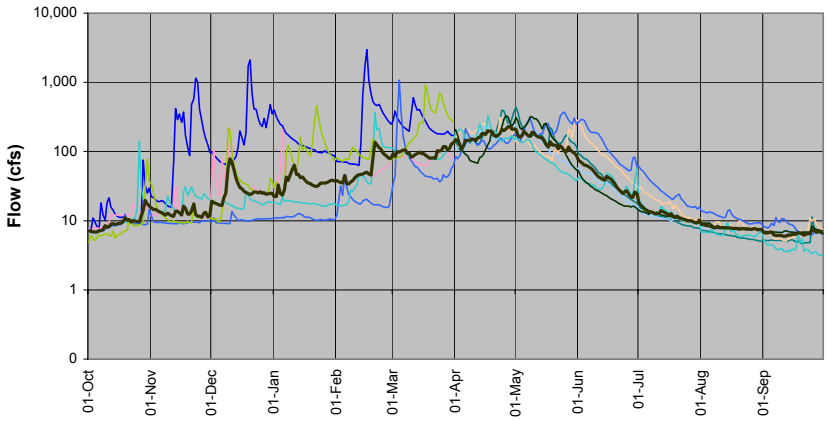


Ice House Reach
Below Normal WY Plots

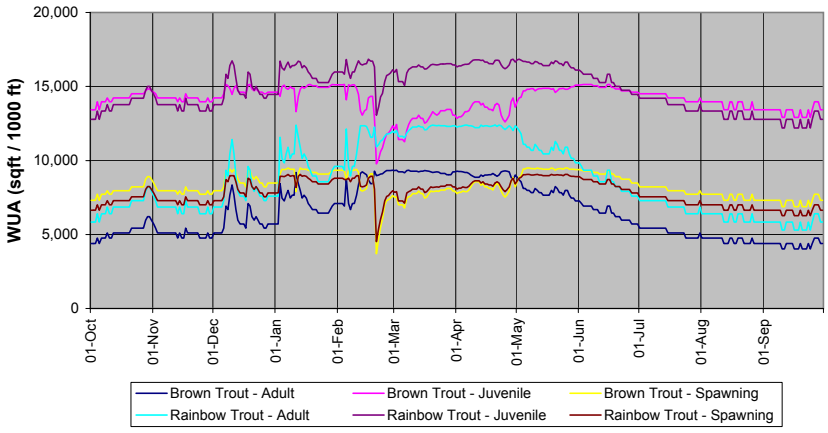
Historic Flows For Below Normal WY
SF Silver Creek below Big Hill Canyon



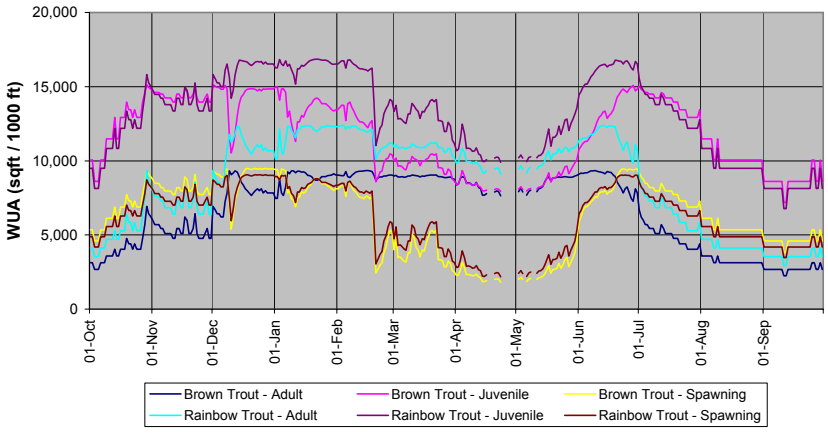
Unimpaired Flows For Below Normal WY
SF Silver Creek below Big Hill Canyon



WUA Using Historic Flows For Below Normal WY
SF Silver Creek below Big Hill Canyon

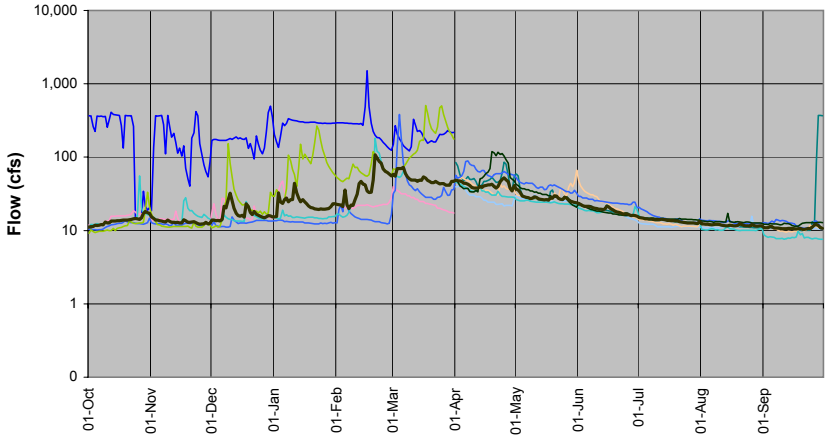


WUA Using Unimpaired Flows For Below Normal WY
SF Silver Creek below Big Hill Canyon

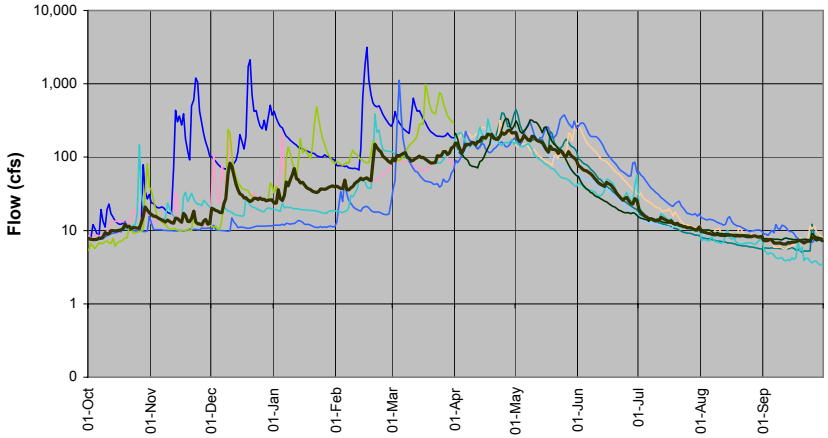


Ice House Reach
Below Normal WY Plots

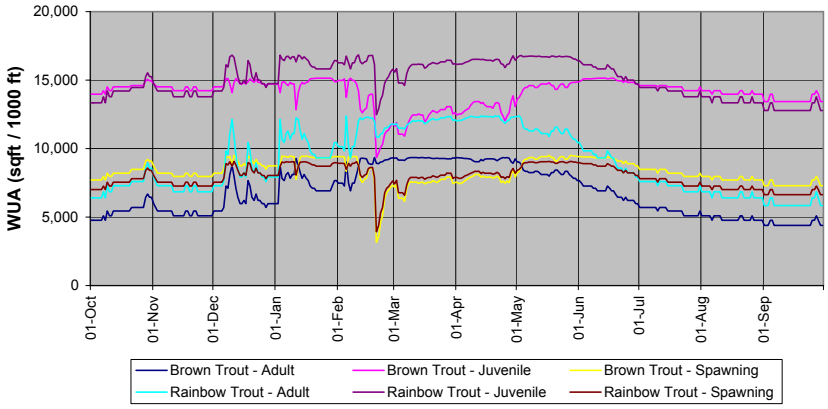
Historic Flows For Below Normal WY
SF Silver Creek at Junction Reservoir



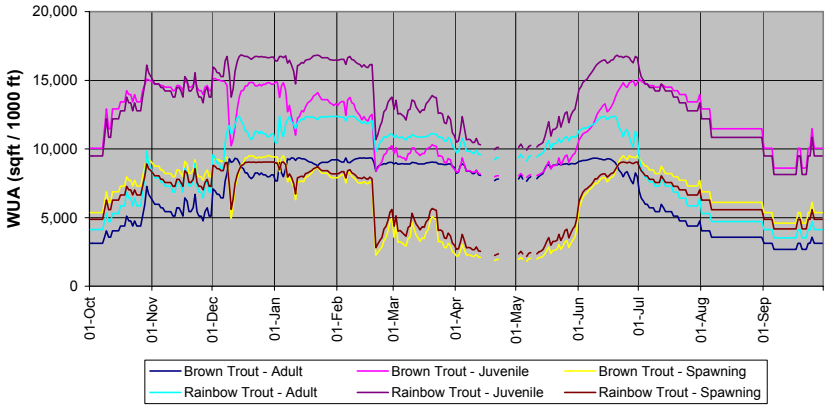
Unimpaired Flows For Below Normal WY
SF Silver Creek at Junction Reservoir



WUA Using Historic Flows For Below Normal WY
SF Silver Creek at Junction Reservoir

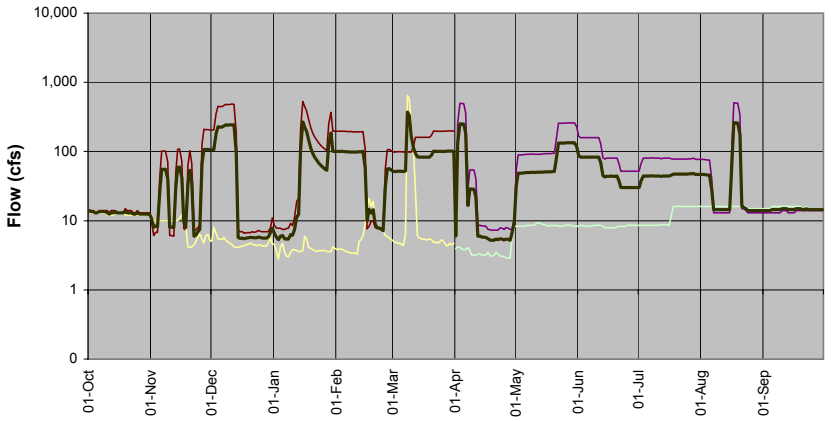


WUA Using Unimpaired Flows For Below Normal WY
SF Silver Creek at Junction Reservoir

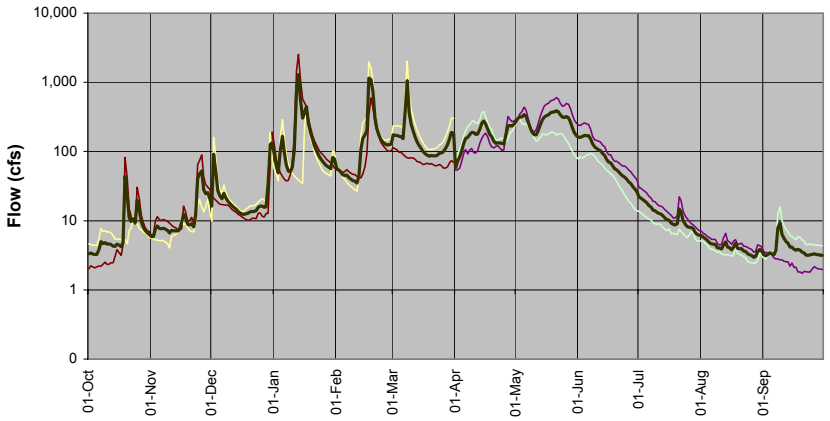


Ice House Reach
Above Normal WY Plots

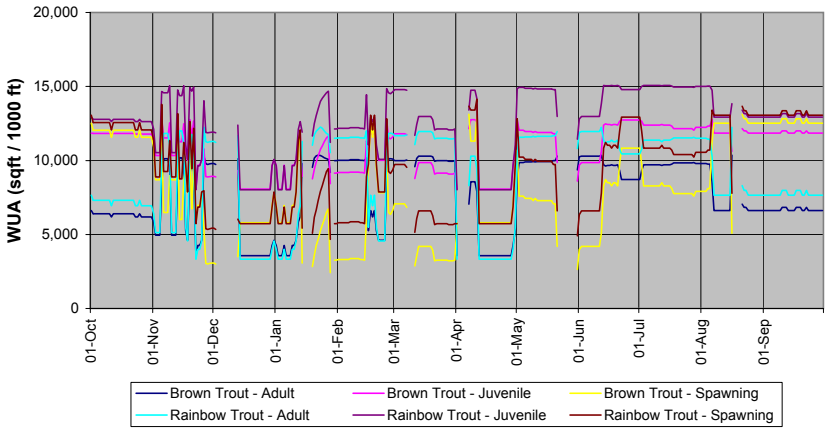
Historic Flows For Above Normal WY
SF Silver Creek Below Ice House Reservoir



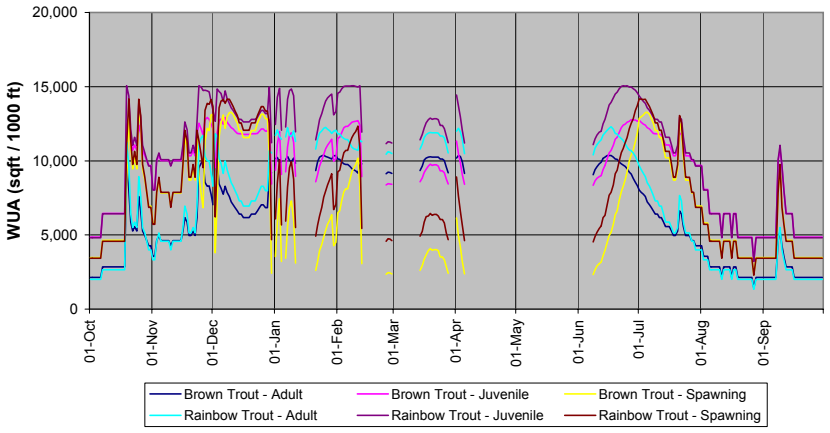
Unimpaired Flows For Above Normal WY
SF Silver Creek Below Ice House Reservoir



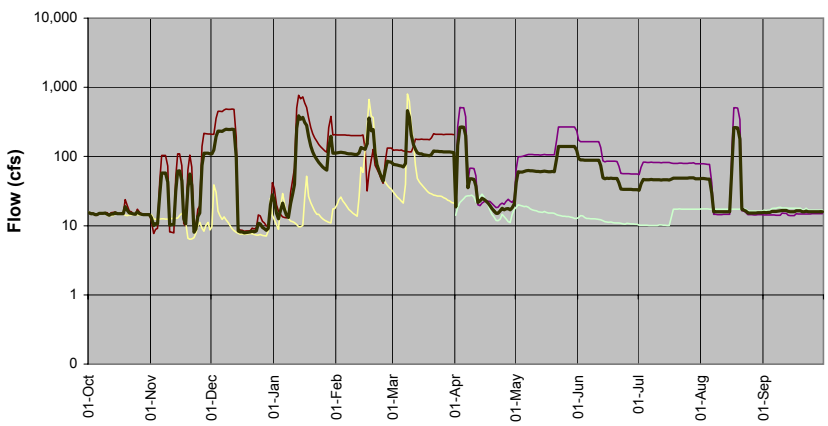
WUA Using Historic Flows For Above Normal WY
SF Silver Creek Below Ice House Reservoir

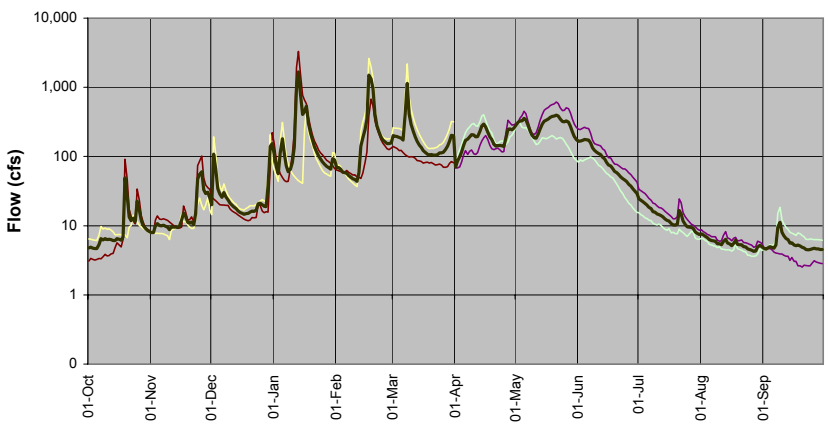


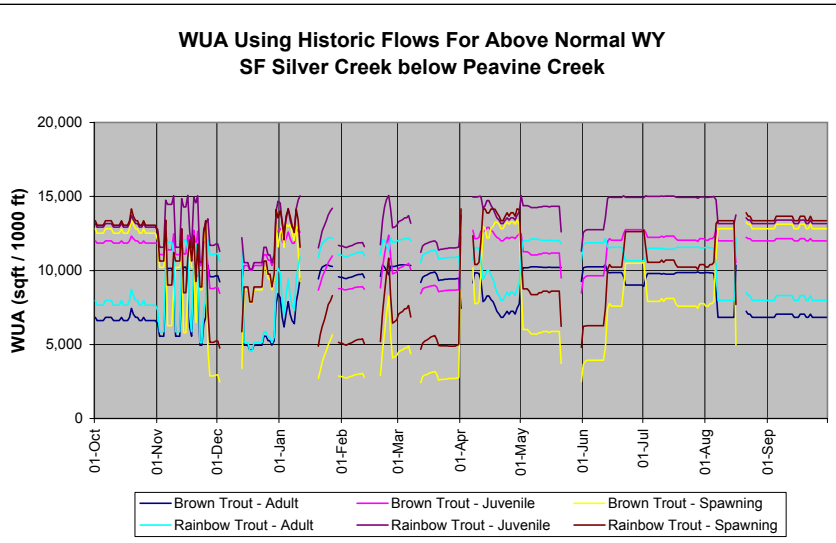
WUA Using Unimpaired Flows For Above Normal WY
SF Silver Creek Below Ice House Reservoir

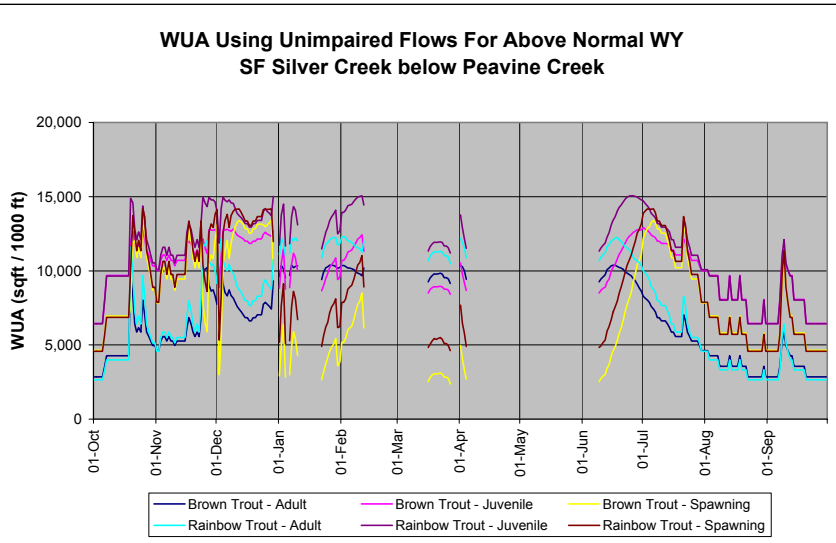


Ice House Reach
Above Normal WY Plots



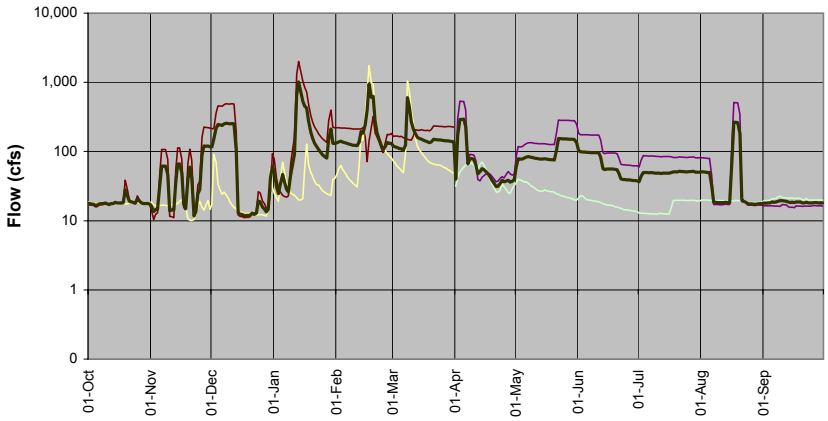




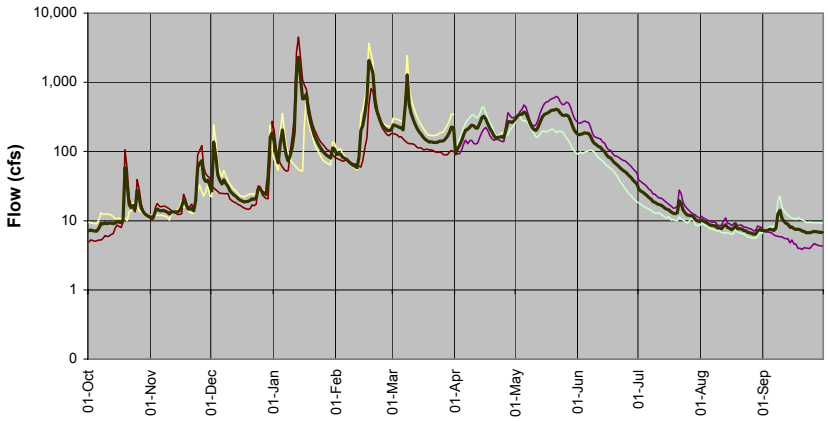


Ice House Reach
Above Normal WY Plots

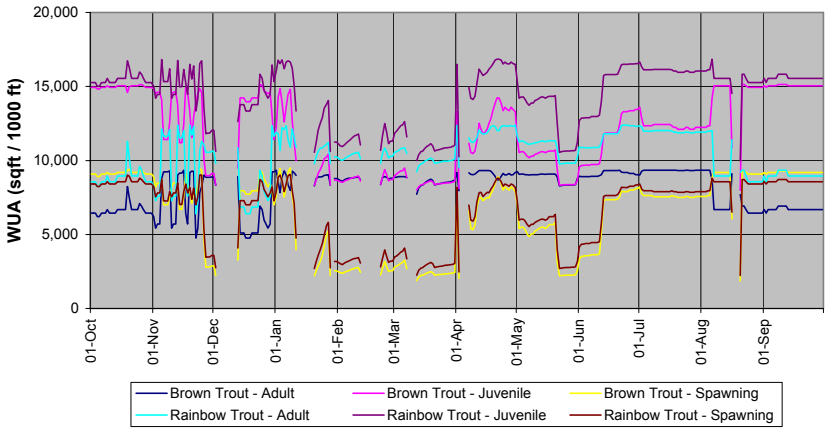
Historic Flows For Above Normal WY
SF Silver Creek below Windmiller Ravine



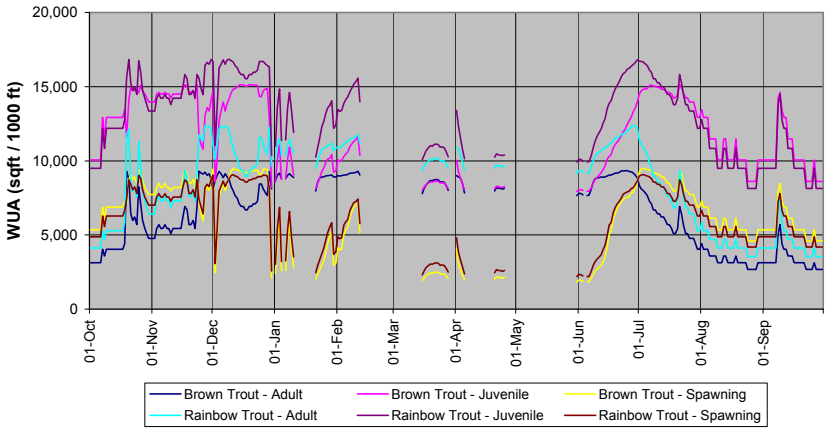
Unimpaired Flows For Above Normal WY
SF Silver Creek below Windmiller Ravine



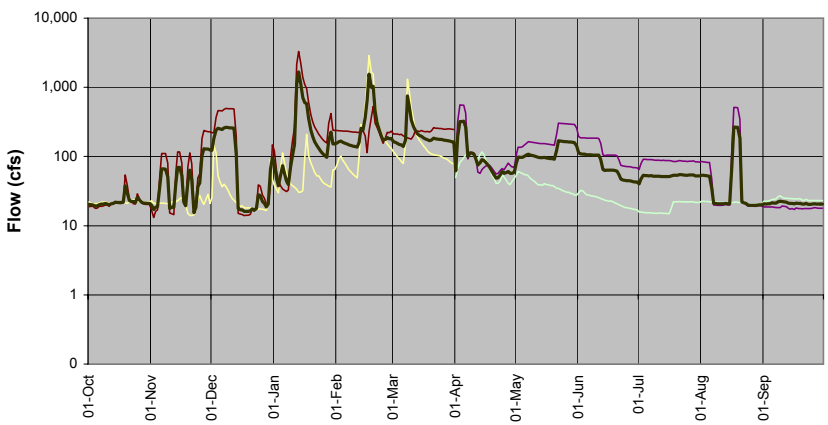
WUA Using Historic Flows For Above Normal WY
SF Silver Creek below Windmiller Ravine

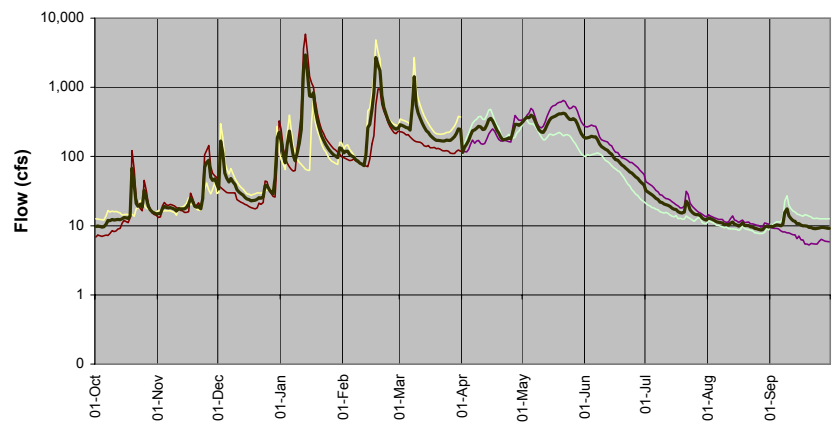


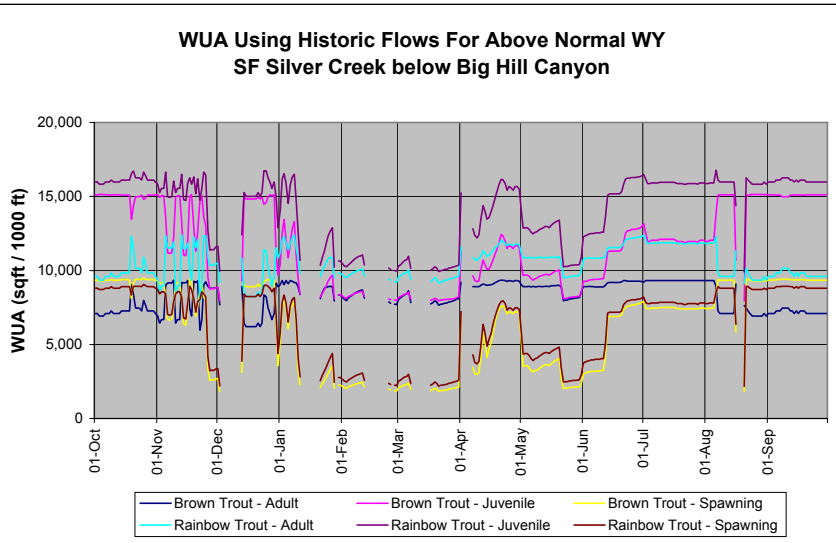
WUA Using Unimpaired Flows For Above Normal WY
SF Silver Creek below Windmiller Ravine

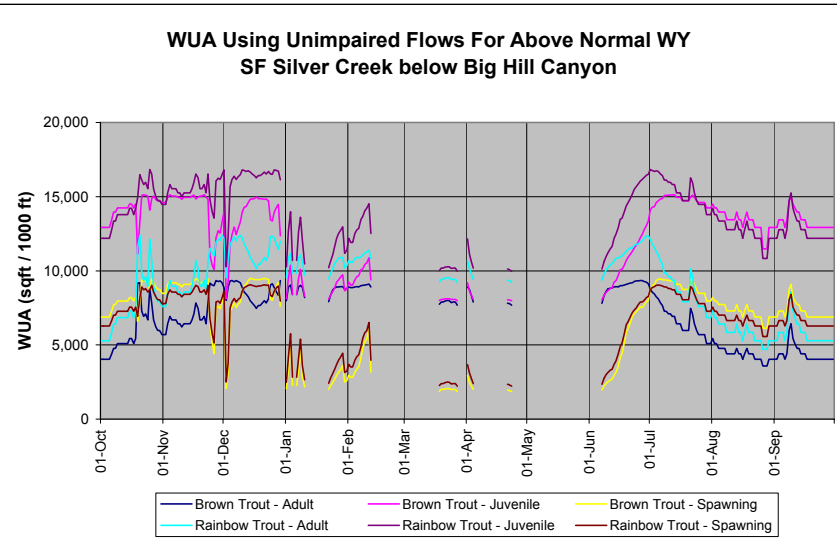


Ice House Reach
Above Normal WY Plots



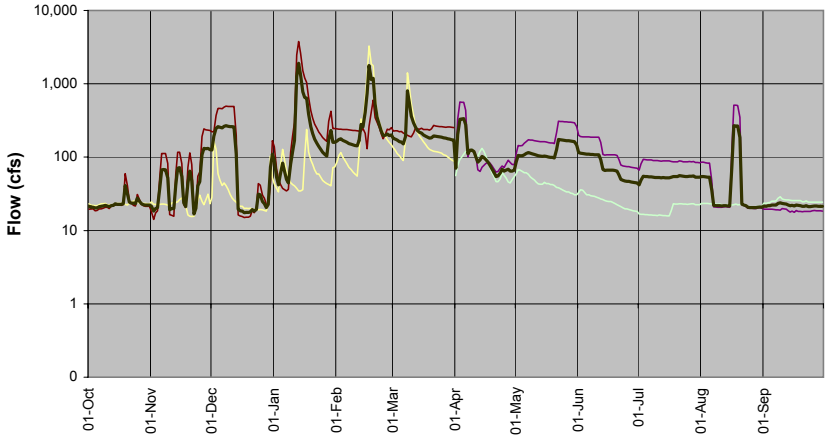




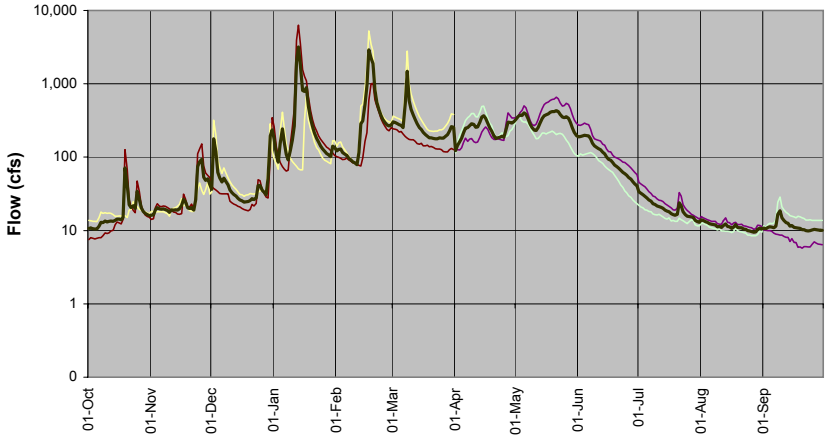


Ice House Reach
Above Normal WY Plots

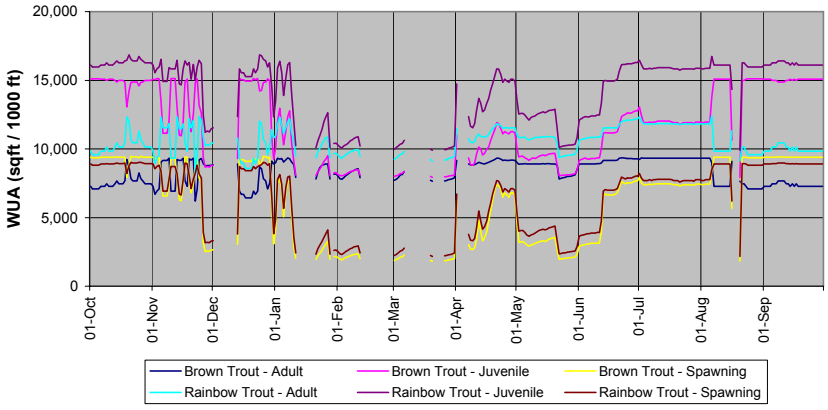
Historic Flows For Above Normal WY
SF Silver Creek at Junction Reservoir



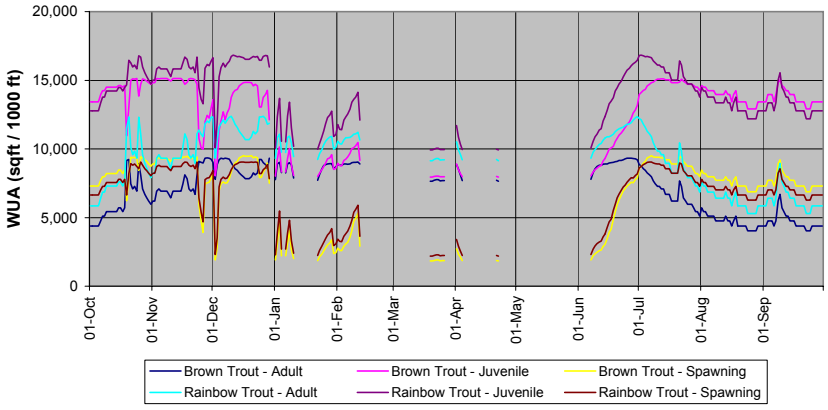
Unimpaired Flows For Above Normal WY
SF Silver Creek at Junction Reservoir



WUA Using Historic Flows For Above Normal WY
SF Silver Creek at Junction Reservoir

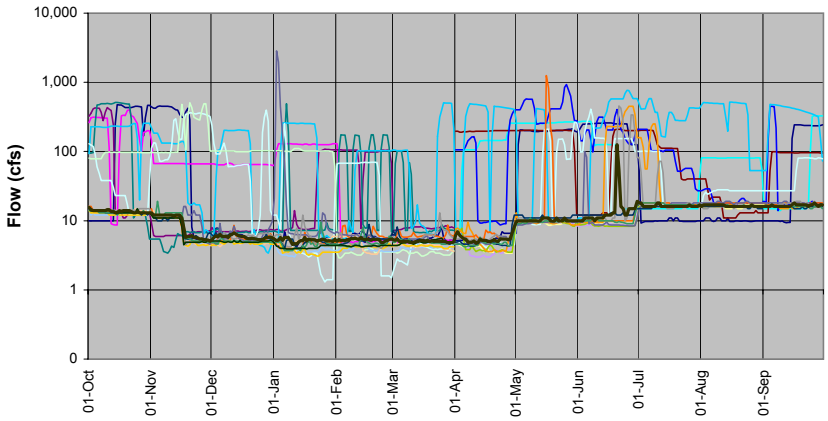


WUA Using Unimpaired Flows For Above Normal WY
SF Silver Creek at Junction Reservoir

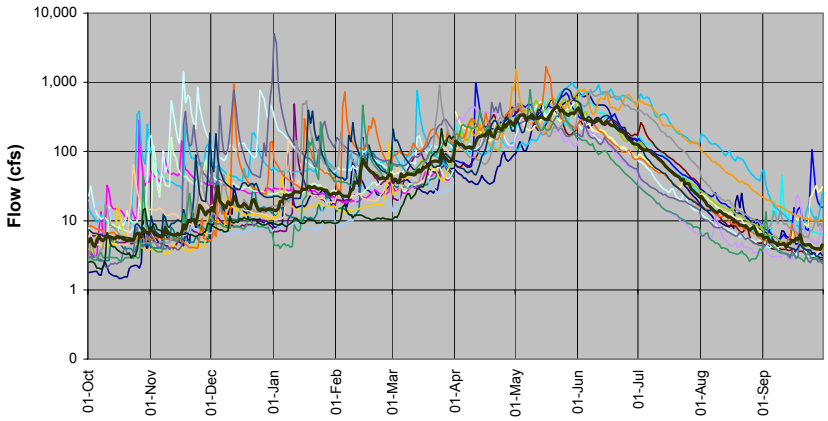


Ice House Reach
Wet WY Plots

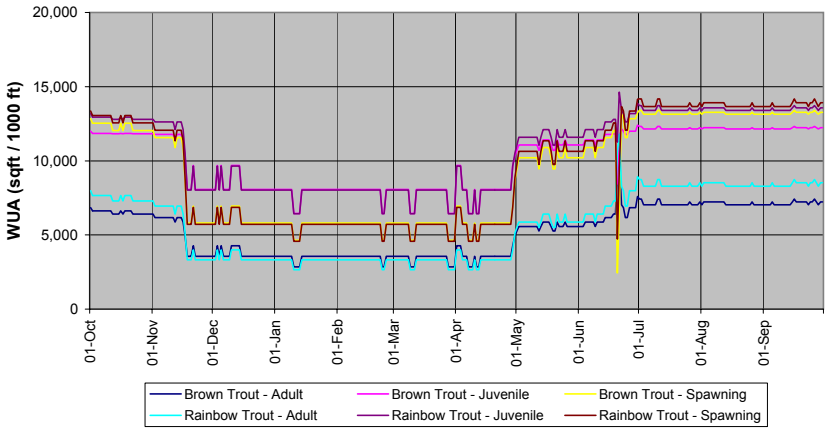
Historic Flows For Wet WY
SF Silver Creek Below Ice House Reservoir



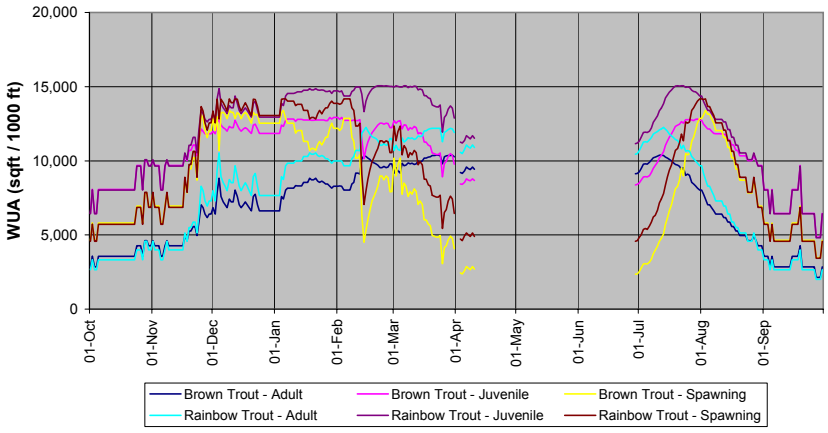
Unimpaired Flows For Wet WY
SF Silver Creek Below Ice House Reservoir



WUA Using Historic Flows For Wet WY
SF Silver Creek Below Ice House Reservoir

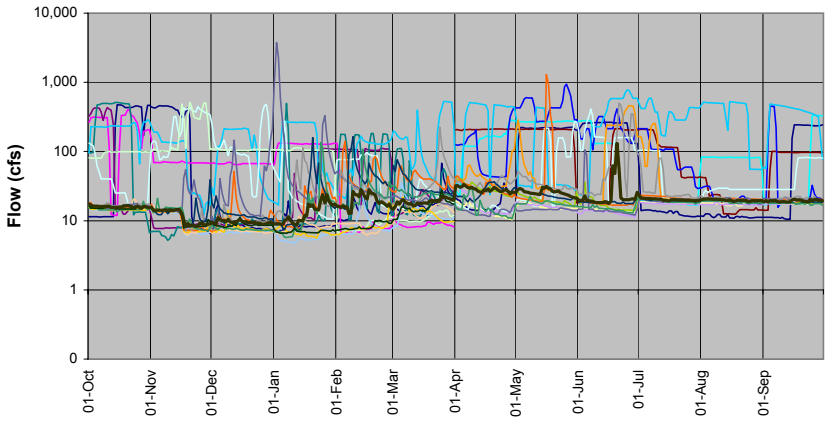


WUA Using Unimpaired Flows For Wet WY
SF Silver Creek Below Ice House Reservoir

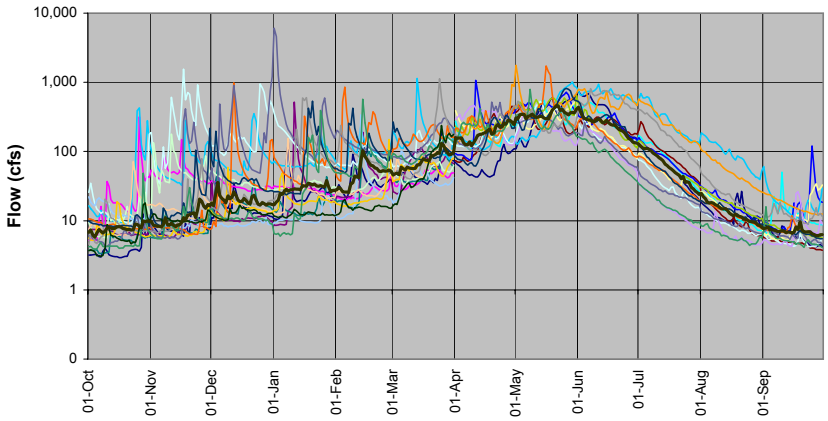


Ice House Reach
Wet WY Plots

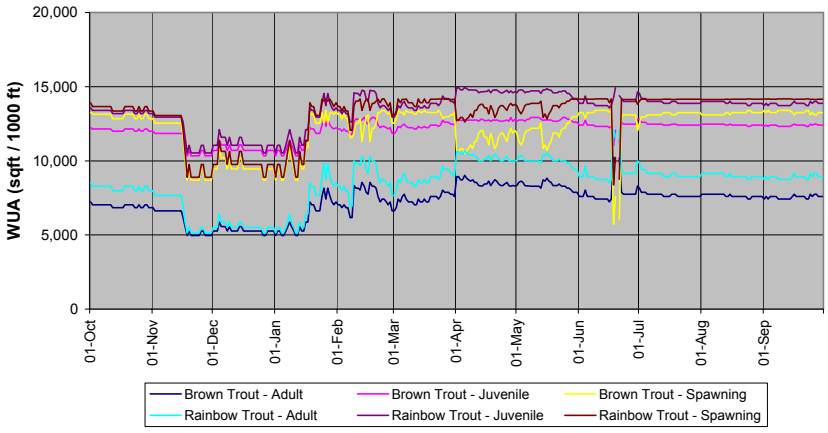
Historic Flows For Wet WY
SF Silver Creek below Peavine Creek



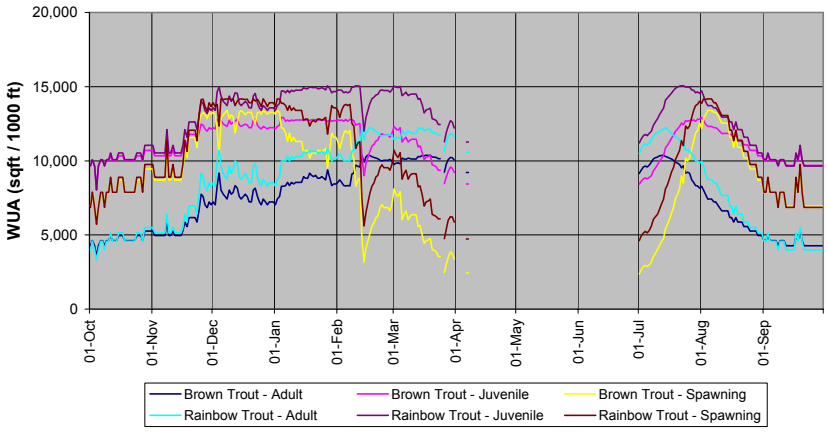
Unimpaired Flows For Wet WY
SF Silver Creek below Peavine Creek



WUA Using Historic Flows For Wet WY
SF Silver Creek below Peavine Creek

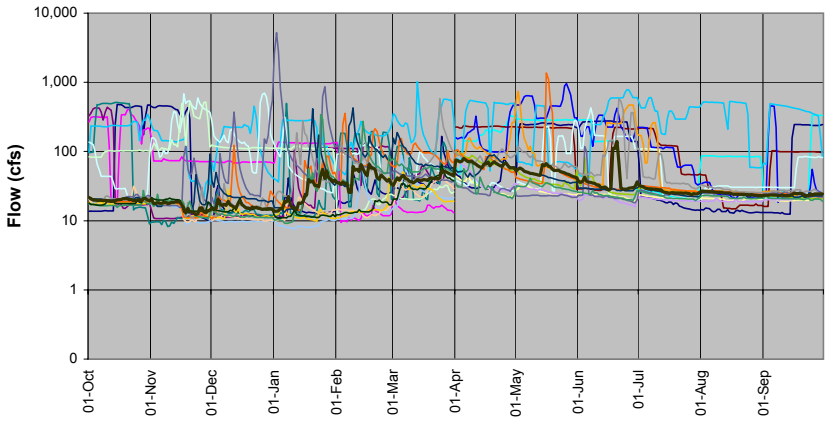


WUA Using Unimpaired Flows For Wet WY
SF Silver Creek below Peavine Creek

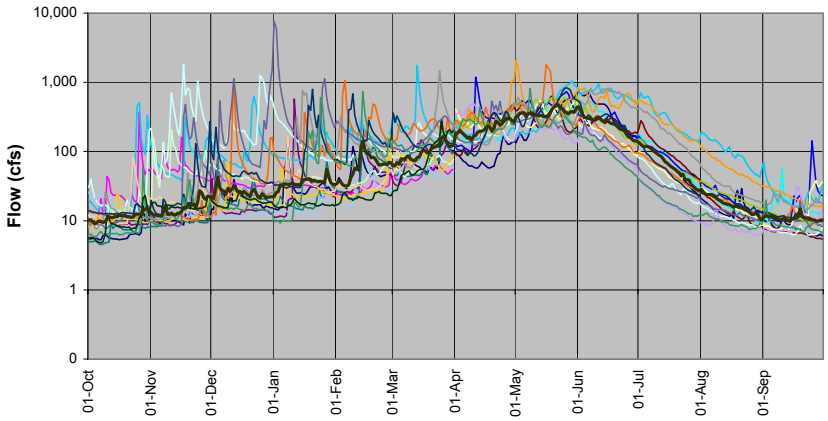


Ice House Reach
Wet WY Plots

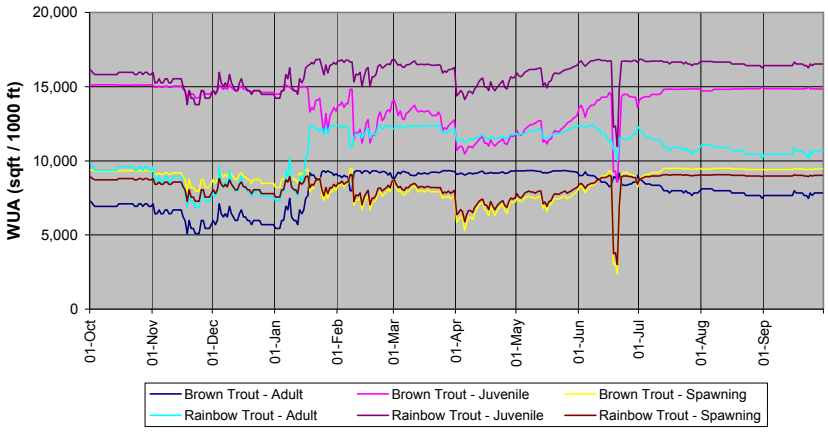
Historic Flows For Wet WY
SF Silver Creek below Windmiller Ravine



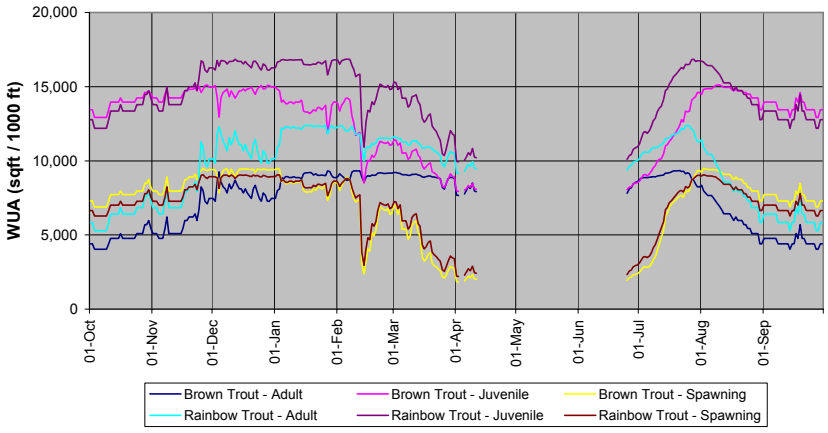
Unimpaired Flows For Wet WY
SF Silver Creek below Windmiller Ravine



WUA Using Historic Flows For Wet WY
SF Silver Creek below Windmiller Ravine

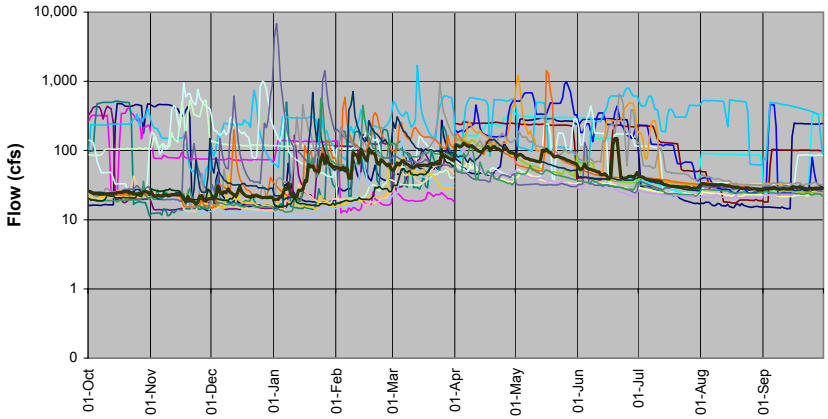


WUA Using Unimpaired Flows For Wet WY
SF Silver Creek below Windmiller Ravine

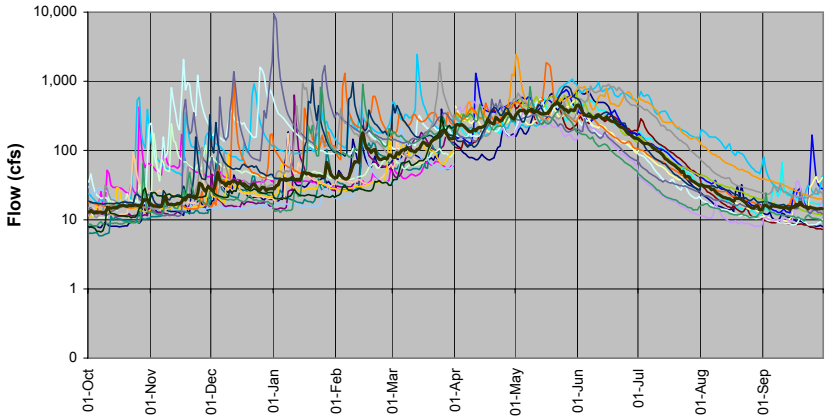


Ice House Reach
Wet WY Plots

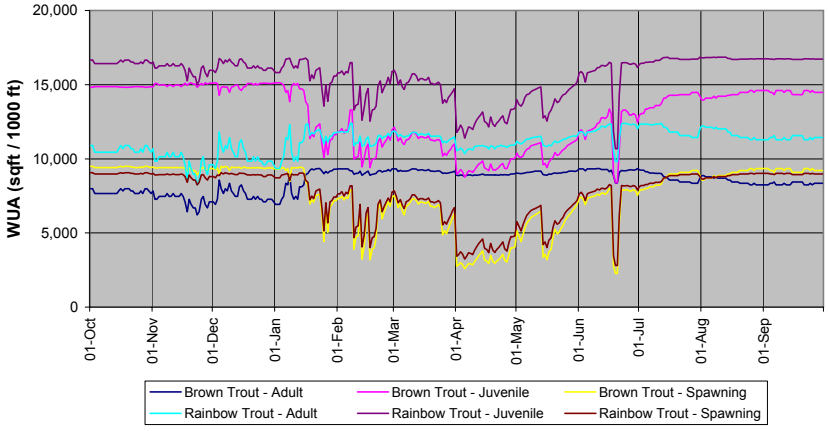
Historic Flows For Wet WY
SF Silver Creek below Big Hill Canyon



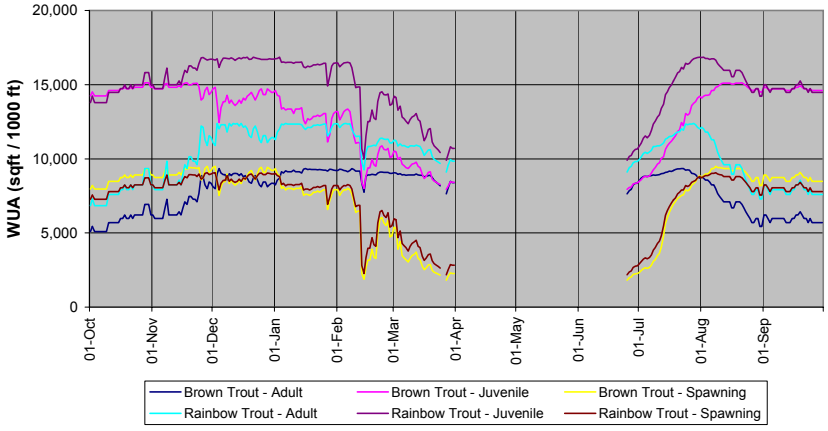
Unimpaired Flows For Wet WY
SF Silver Creek below Big Hill Canyon



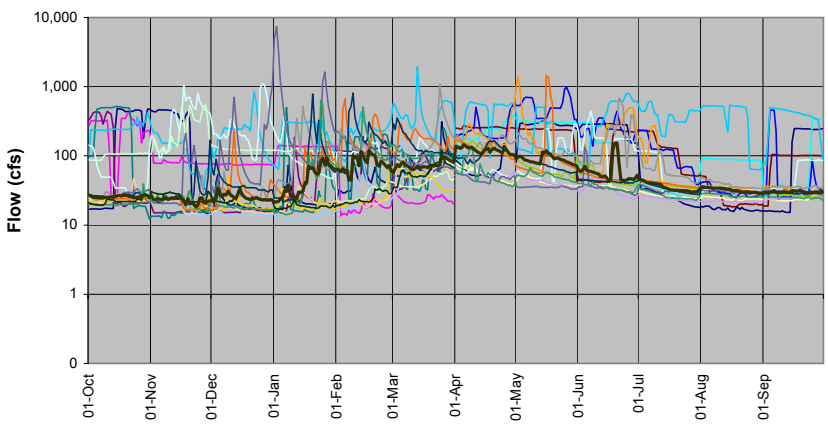
WUA Using Historic Flows For Wet WY
SF Silver Creek below Big Hill Canyon

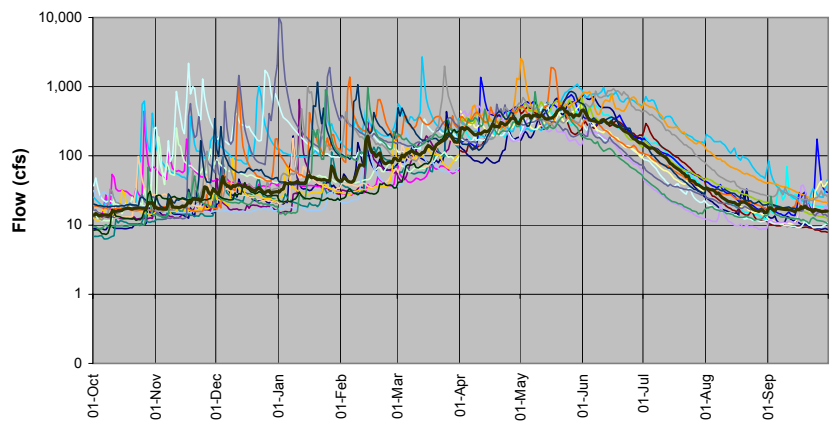


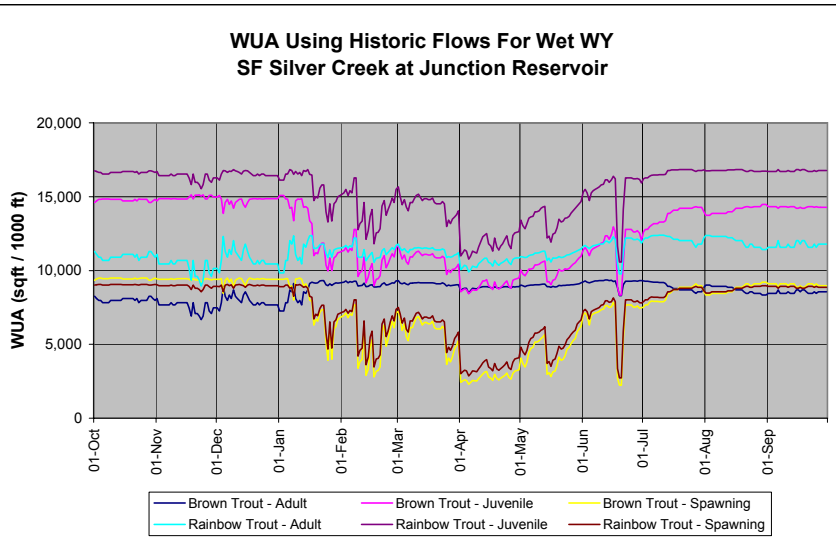
WUA Using Unimpaired Flows For Wet WY
SF Silver Creek below Big Hill Canyon

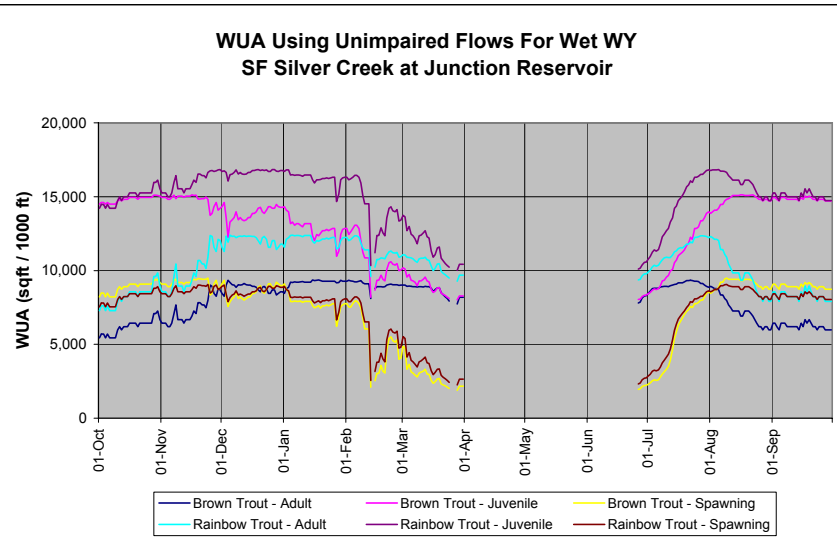


Ice House Reach
Wet WY Plots









Junction Dam Reach
Silver Creek

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Junction Reach
Full Year Summary

Silver Creek below Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,676,094	912,019	-45.59	2,042,483	1,530,827	-25.05	1,508,713	1,306,050	-13.43	1,542,990	1,464,822	-5.07
Brown Trout - Juvenile	1,909,221	1,807,724	-5.32	2,187,124	2,643,120	20.85	1,566,919	1,938,235	23.70	1,539,680	1,927,689	25.20
Brown Trout - Spawning	702,190	439,726	-37.38	823,800	793,307	-3.70	594,648	677,047	13.86	549,026	746,963	36.05
Rainbow Trout - Adult	1,669,511	598,426	-64.16	2,073,214	1,149,546	-44.55	1,565,231	1,086,578	-30.58	1,655,771	1,291,365	-22.01
Rainbow Trout - Juvenile	2,177,711	1,798,076	-17.43	2,525,217	2,745,194	8.71	1,817,988	2,099,084	15.46	1,797,774	2,138,127	18.93
Rainbow Trout - Spawning	725,350	461,279	-36.41	860,933	796,855	-7.44	617,288	683,737	10.76	576,686	756,985	31.26

Silver Creek below Grey Horse Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,679,408	1,161,182	-30.86	2,053,434	1,654,906	-19.41	1,503,627	1,377,666	-8.38	1,528,113	1,533,881	0.38
Brown Trout - Juvenile	1,875,740	2,187,845	16.64	2,168,224	2,665,075	22.92	1,545,362	1,906,416	23.36	1,520,275	1,860,773	22.40
Brown Trout - Spawning	701,204	586,804	-16.31	822,022	871,411	6.01	588,107	706,884	20.20	529,396	777,536	46.87
Rainbow Trout - Adult	1,683,165	812,202	-51.75	2,097,233	1,308,669	-37.60	1,568,721	1,188,352	-24.25	1,648,918	1,402,631	-14.94
Rainbow Trout - Juvenile	2,147,663	2,215,985	3.18	2,510,047	2,827,033	12.63	1,796,384	2,099,063	16.85	1,774,435	2,105,167	18.64
Rainbow Trout - Spawning	724,891	596,966	-17.65	859,096	868,605	1.11	610,352	717,532	17.56	558,407	788,469	41.20

Silver Creek below Onion Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,689,304	1,523,938	-9.79	2,061,735	1,977,896	-4.07	1,469,299	1,540,222	4.83	1,482,438	1,644,774	10.95
Brown Trout - Juvenile	1,781,785	2,148,240	20.57	2,099,363	2,498,425	19.01	1,472,928	1,702,845	15.61	1,479,281	1,662,039	12.35
Brown Trout - Spawning	696,485	790,039	13.43	802,667	1,000,459	24.64	549,035	763,797	39.12	457,135	768,741	68.17
Rainbow Trout - Adult	1,728,380	1,301,047	-24.72	2,146,183	1,781,672	-16.98	1,562,055	1,464,249	-6.26	1,627,151	1,640,973	0.85
Rainbow Trout - Juvenile	2,061,099	2,354,728	14.25	2,446,041	2,805,720	14.70	1,719,021	1,964,741	14.29	1,719,188	1,949,402	13.39
Rainbow Trout - Spawning	718,353	796,010	10.81	837,840	1,018,857	21.61	571,900	778,415	36.11	492,731	785,743	59.47

Silver Creek below Sugar Pine Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,692,601	1,580,793	-6.61	2,054,495	2,016,252	-1.86	1,460,453	1,549,052	6.07	1,466,184	1,639,604	11.83
Brown Trout - Juvenile	1,769,538	2,113,885	19.46	2,080,616	2,447,845	17.65	1,458,340	1,665,396	14.20	1,466,138	1,624,996	10.84
Brown Trout - Spawning	694,841	811,522	16.79	794,235	1,011,334	27.33	537,975	762,662	41.77	442,156	742,481	67.92
Rainbow Trout - Adult	1,739,102	1,385,857	-20.31	2,146,419	1,847,825	-13.91	1,558,168	1,492,537	-4.21	1,614,589	1,654,973	2.50
Rainbow Trout - Juvenile	2,050,001	2,345,568	14.42	2,426,735	2,771,601	14.21	1,702,481	1,930,909	13.42	1,702,986	1,910,596	12.19
Rainbow Trout - Spawning	716,400	821,749	14.71	829,179	1,031,564	24.41	561,272	776,583	38.36	478,133	763,064	59.59

Silver Creek above Camino Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,693,157	1,589,562	-6.12	2,054,508	2,021,403	-1.61	1,460,013	1,551,360	6.26	1,465,130	1,639,641	11.91
Brown Trout - Juvenile	1,767,562	2,107,630	19.24	2,079,092	2,443,244	17.51	1,457,470	1,661,228	13.98	1,465,645	1,620,789	10.59
Brown Trout - Spawning	694,392	814,355	17.28	793,495	1,012,907	27.65	536,821	762,864	42.11	440,643	738,510	67.60
Rainbow Trout - Adult	1,740,959	1,399,309	-19.62	2,147,582	1,856,032	-13.58	1,558,375	1,497,480	-3.91	1,614,057	1,657,834	2.71
Rainbow Trout - Juvenile	2,048,270	2,342,934	14.39	2,425,286	2,768,823	14.16	1,701,366	1,927,454	13.29	1,702,230	1,906,222	11.98
Rainbow Trout - Spawning	715,942	825,458	15.30	828,388	1,033,350	24.74	560,216	776,692	38.64	476,627	759,763	59.40

Junction Reach
Partial Year Summary

Silver Creek below Junction Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,408,314	753,467	-46.50	1,415,595	1,110,511	-21.55	1,326,800	1,159,753	-12.59	1,214,787	1,167,478	-3.89
Brown Trout - Juvenile	1,625,874	1,494,072	-8.11	1,572,242	1,840,300	17.05	1,373,860	1,669,749	21.54	1,195,228	1,448,309	21.17
Brown Trout - Spawning	195,672	117,528	-39.94	236,635	182,042	-23.07	166,586	196,434	17.92	196,539	228,879	16.45
Rainbow Trout - Adult	1,365,236	494,103	-63.81	1,387,047	859,657	-38.02	1,358,739	980,584	-27.83	1,282,793	1,056,532	-17.64
Rainbow Trout - Juvenile	1,852,964	1,485,869	-19.81	1,805,232	1,935,466	7.21	1,597,257	1,824,090	14.20	1,401,551	1,629,457	16.26
Rainbow Trout - Spawning	74,006	66,517	-10.12	51,651	84,956	64.48	30,857	57,470	86.24	0	0	0.00

Silver Creek below Grey Horse Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,425,732	950,970	-33.30	1,429,974	1,171,260	-18.09	1,322,461	1,210,173	-8.49	1,202,472	1,204,299	0.15
Brown Trout - Juvenile	1,606,849	1,815,749	13.00	1,554,280	1,834,200	18.01	1,353,033	1,635,456	20.87	1,176,715	1,393,186	18.40
Brown Trout - Spawning	196,046	144,231	-26.43	235,372	195,092	-17.11	164,146	208,941	27.29	189,888	238,661	25.69
Rainbow Trout - Adult	1,394,980	655,839	-52.99	1,413,177	941,680	-33.36	1,363,091	1,056,331	-22.50	1,278,354	1,122,058	-12.23
Rainbow Trout - Juvenile	1,839,961	1,831,372	-0.47	1,792,084	1,960,966	9.42	1,576,453	1,811,844	14.93	1,379,937	1,591,055	15.30
Rainbow Trout - Spawning	72,979	90,918	24.58	51,560	92,953	80.28	28,608	56,513	97.54	0	0	0.00

Silver Creek below Onion Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,451,348	1,253,013	-13.67	1,449,405	1,369,857	-5.49	1,296,950	1,335,841	3.00	1,162,757	1,255,594	7.98
Brown Trout - Juvenile	1,528,214	1,823,935	19.35	1,487,650	1,717,474	15.45	1,288,509	1,471,091	14.17	1,137,534	1,253,505	10.19
Brown Trout - Spawning	194,497	200,079	2.87	227,071	227,776	0.31	148,903	226,848	52.35	163,812	250,456	52.89
Rainbow Trout - Adult	1,458,882	1,051,499	-27.92	1,469,637	1,236,610	-15.86	1,366,509	1,271,486	-6.95	1,263,573	1,262,623	-0.08
Rainbow Trout - Juvenile	1,772,091	1,986,069	12.07	1,733,959	1,930,961	11.36	1,508,988	1,698,616	12.57	1,329,622	1,473,532	10.82
Rainbow Trout - Spawning	65,847	119,891	82.08	49,066	101,578	107.02	26,716	53,686	100.95	0	0	0.00

Silver Creek below Sugar Pine Creek

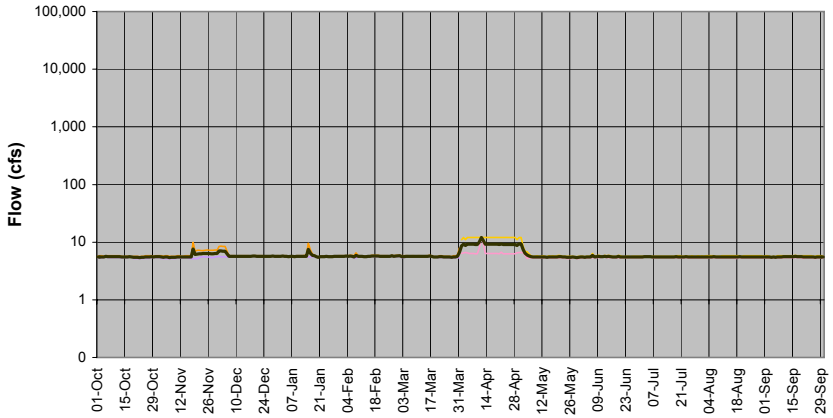
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,455,136	1,302,463	-10.49	1,444,596	1,391,782	-3.66	1,288,394	1,340,957	4.08	1,147,438	1,248,233	8.78
Brown Trout - Juvenile	1,516,389	1,797,758	18.56	1,469,542	1,681,268	14.41	1,274,131	1,439,214	12.96	1,125,004	1,225,553	8.94
Brown Trout - Spawning	194,040	207,109	6.74	224,505	233,097	3.83	146,334	228,193	55.94	158,304	248,900	57.23
Rainbow Trout - Adult	1,470,436	1,124,059	-23.56	1,471,440	1,276,071	-13.28	1,363,088	1,292,601	-5.17	1,252,723	1,268,125	1.23
Rainbow Trout - Juvenile	1,761,545	1,982,765	12.56	1,715,970	1,905,305	11.03	1,492,793	1,669,054	11.81	1,314,521	1,442,344	9.72
Rainbow Trout - Spawning	65,361	122,802	87.88	46,846	97,251	107.60	24,536	48,216	96.51	0	0	0.00

Silver Creek above Camino Reservoir

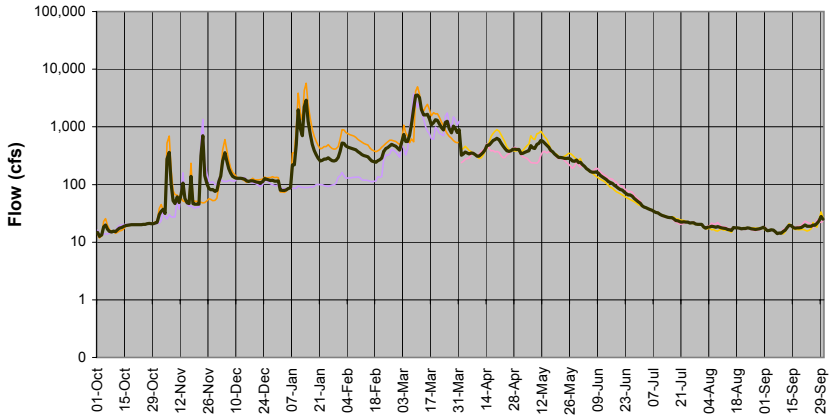
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,455,755	1,309,996	-10.01	1,444,750	1,394,804	-3.46	1,288,043	1,342,492	4.23	1,146,457	1,247,960	8.85
Brown Trout - Juvenile	1,514,429	1,793,028	18.40	1,467,916	1,678,528	14.35	1,273,280	1,436,305	12.80	1,124,545	1,222,996	8.75
Brown Trout - Spawning	193,895	207,780	7.16	224,164	233,459	4.15	145,893	228,372	56.53	157,766	248,477	57.50
Rainbow Trout - Adult	1,472,372	1,135,425	-22.88	1,472,669	1,280,854	-13.03	1,363,396	1,296,098	-4.94	1,252,322	1,269,519	1.37
Rainbow Trout - Juvenile	1,759,867	1,981,256	12.58	1,714,468	1,903,685	11.04	1,491,751	1,666,562	11.72	1,313,850	1,439,340	9.55
Rainbow Trout - Spawning	65,354	123,136	88.41	46,863	97,263	107.55	24,542	48,024	95.68	0	0	0.00

Junction Reach
Critical WY Plots

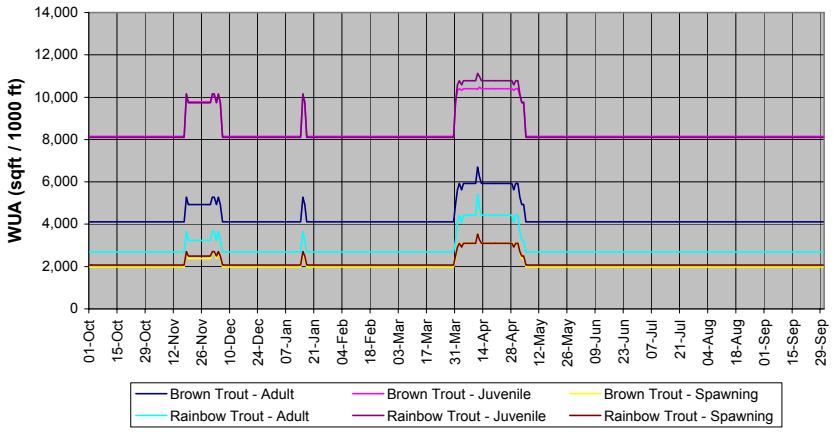
Historic Flows For Critical WY
Silver Creek below Junction Reservoir



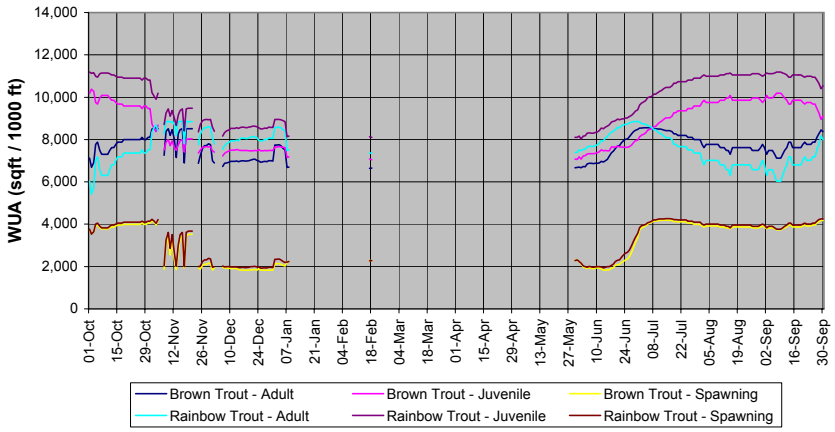
Unimpaired Flows For Critical WY
Silver Creek below Junction Reservoir



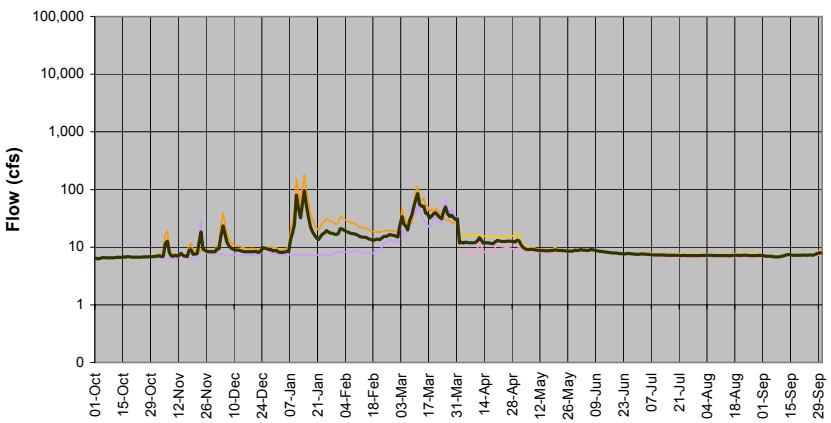
WUA Using Historic Flows For Critical WY
Silver Creek below Junction Reservoir

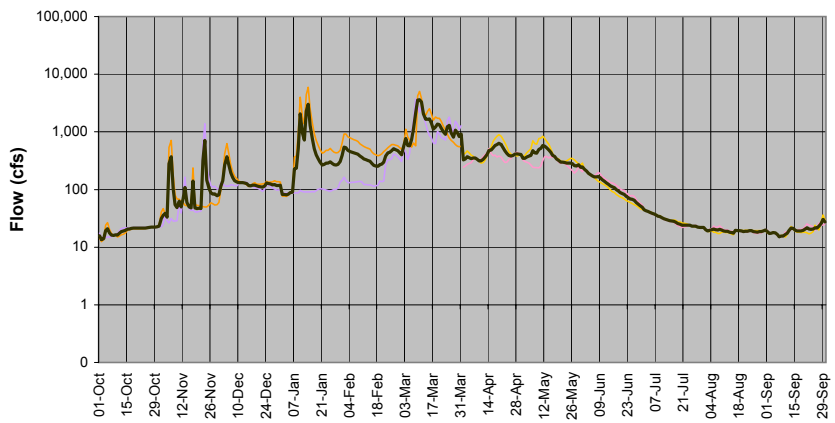


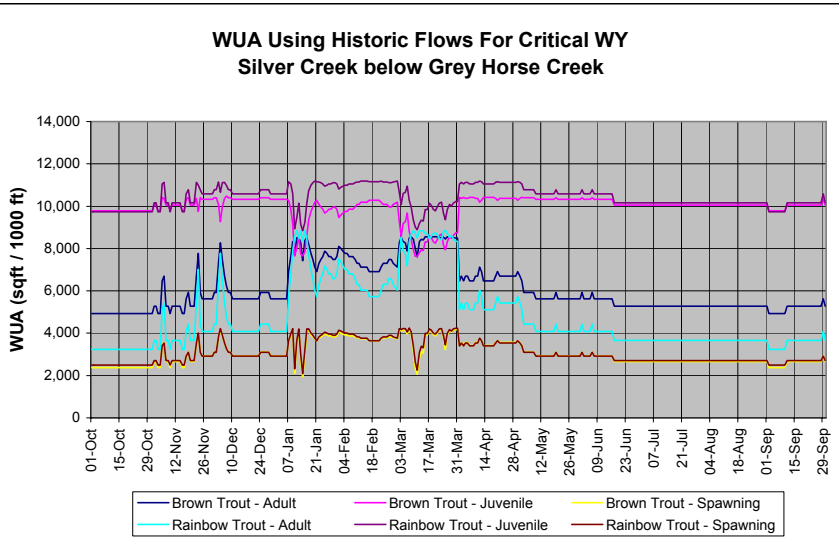
WUA Using Unimpaired Flows For Critical WY
Silver Creek below Junction Reservoir

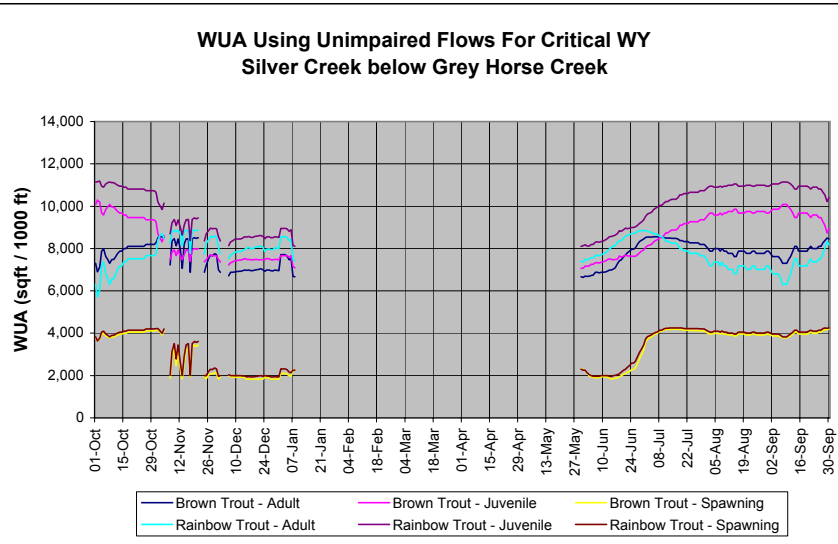


Junction Reach
Critical WY Plots

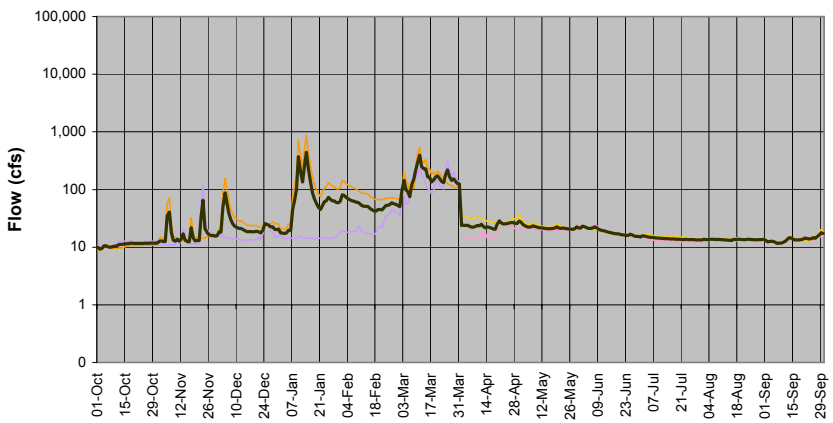


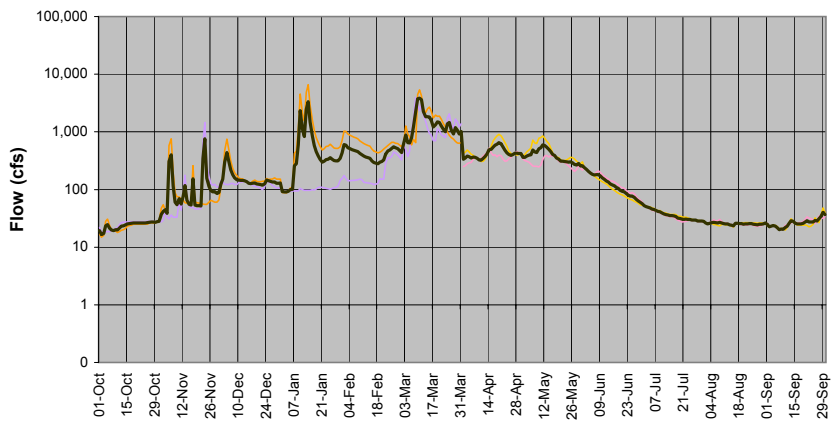


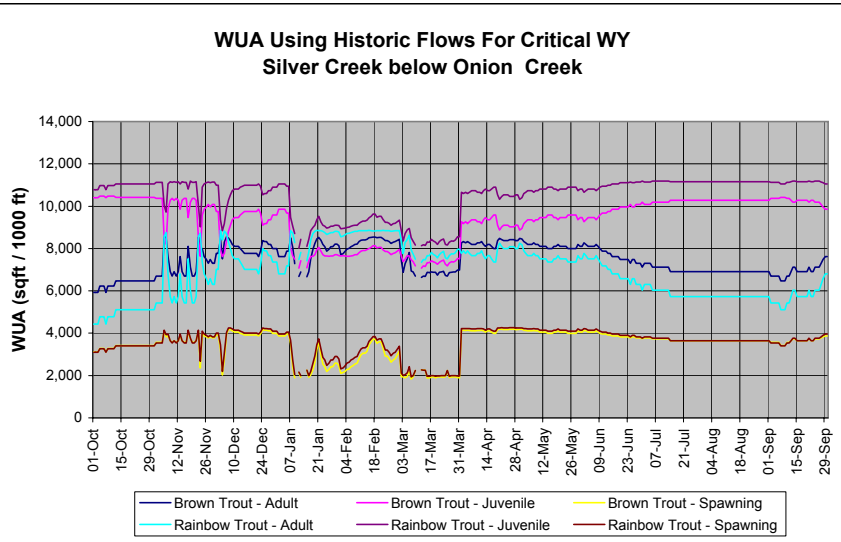


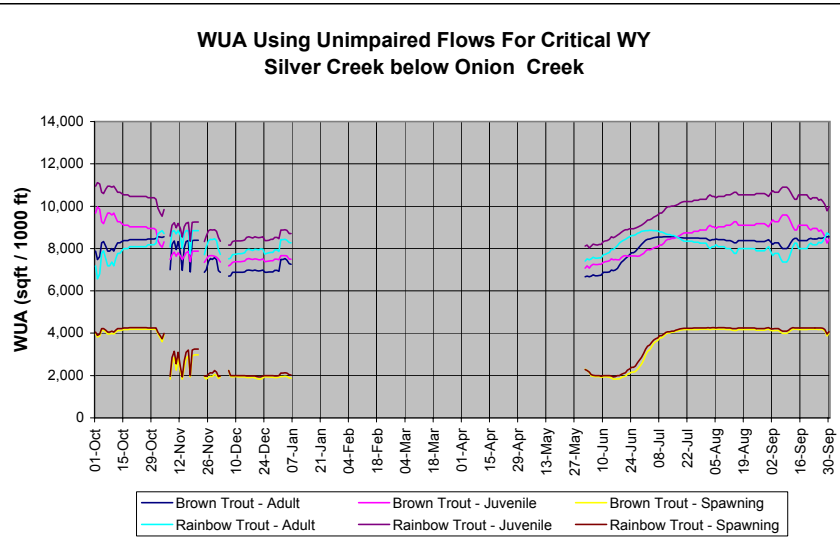


Junction Reach
Critical WY Plots



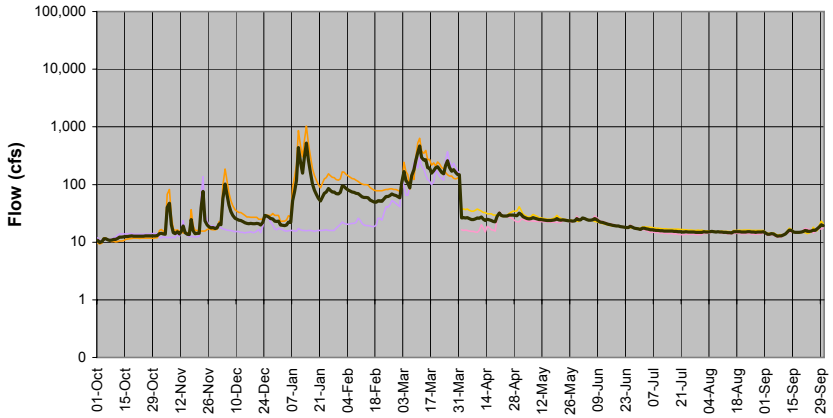




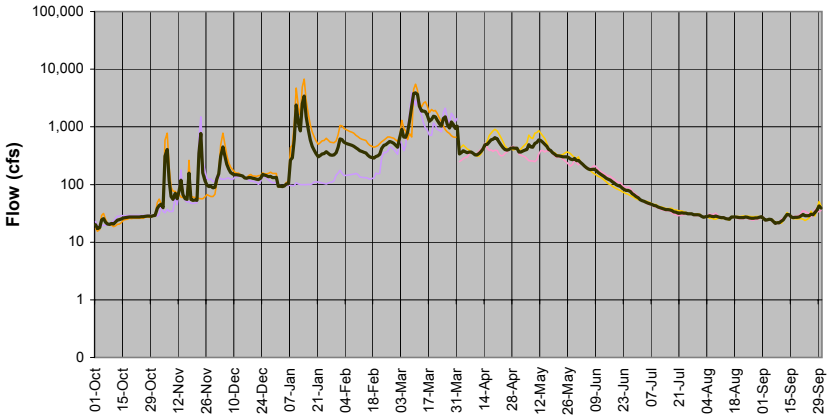


Junction Reach
Critical WY Plots

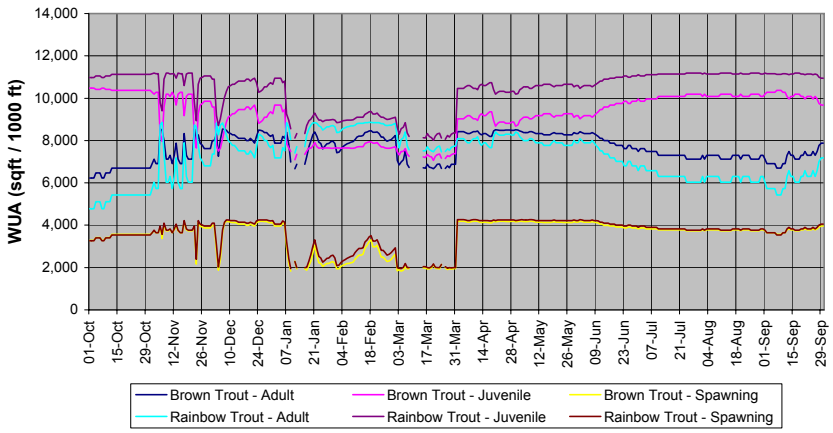
Historic Flows For Critical WY
Silver Creek below Sugar Pine Creek



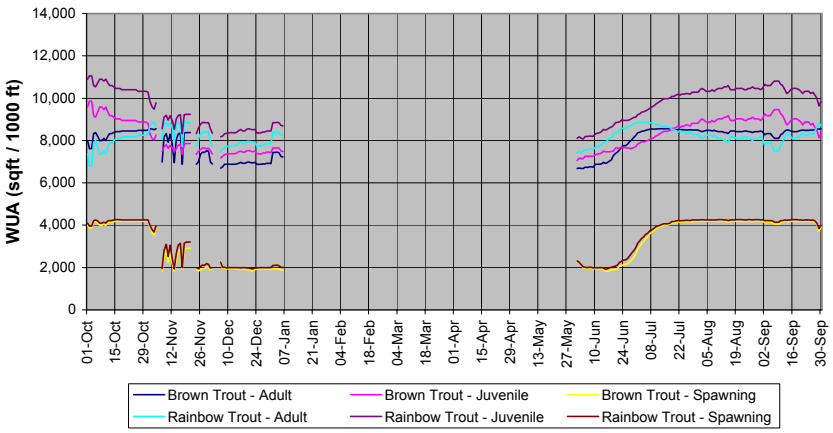
Unimpaired Flows For Critical WY
Silver Creek below Sugar Pine Creek



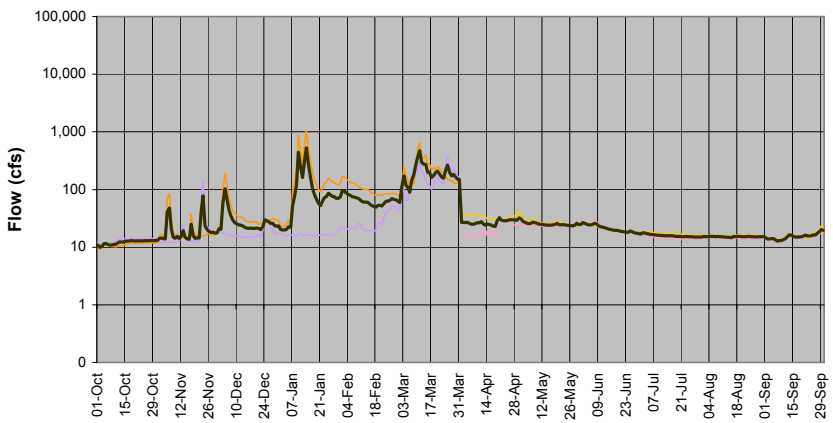
WUA Using Historic Flows For Critical WY
Silver Creek below Sugar Pine Creek

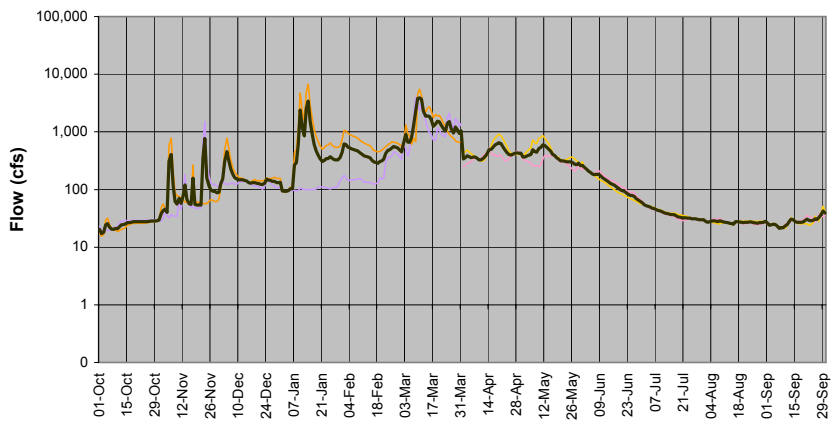


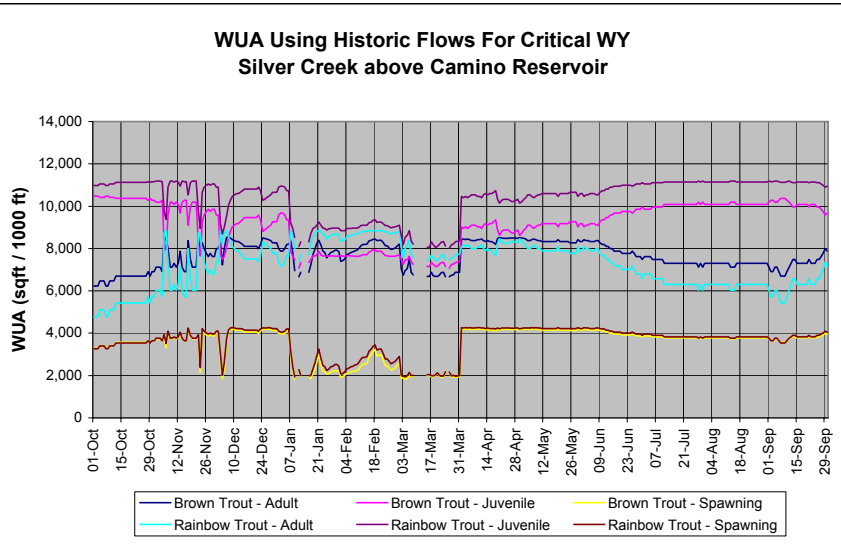
WUA Using Unimpaired Flows For Critical WY
Silver Creek below Sugar Pine Creek

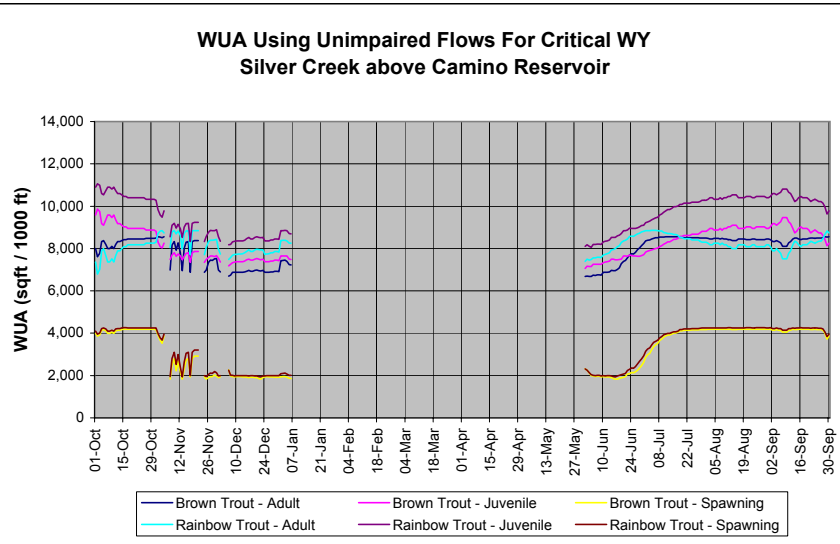


Junction Reach
Critical WY Plots



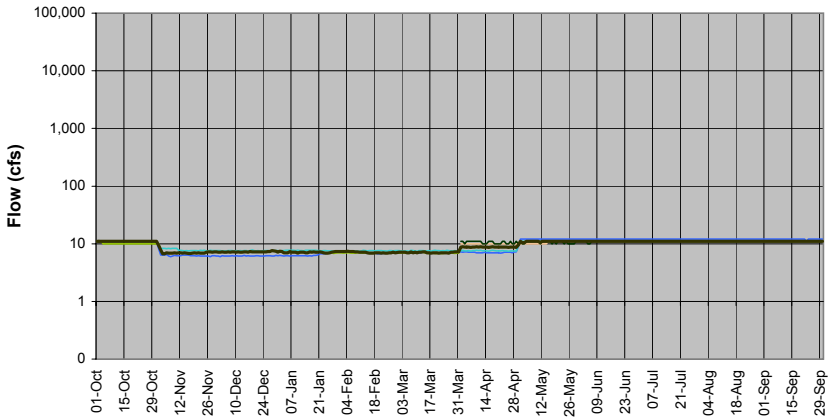




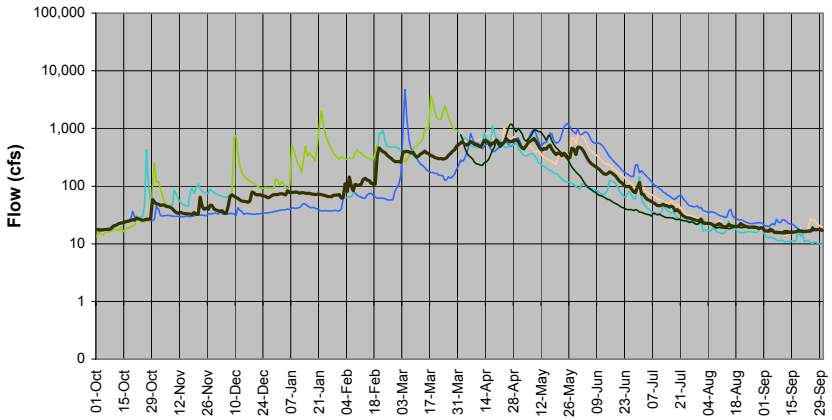


Juntion Reach
Below Normal WY Plots

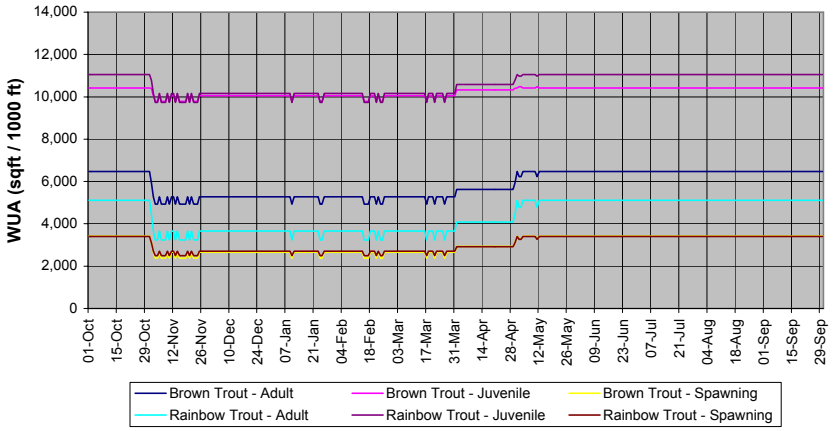
Historic Flows For Below Normal WY
Silver Creek below Junction Reservoir



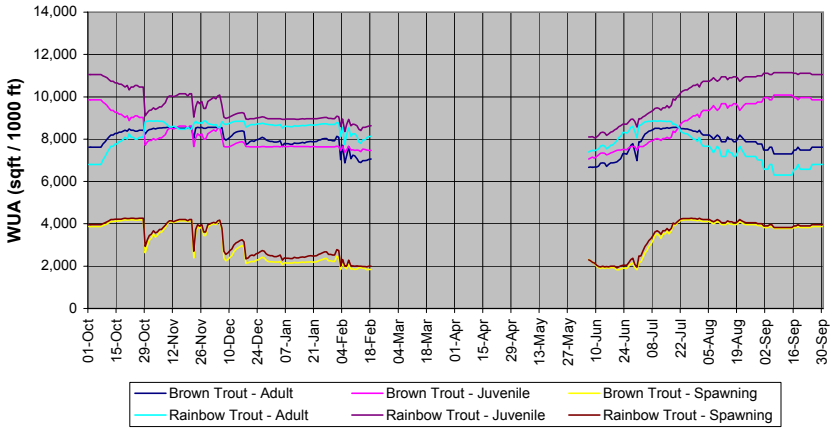
Unimpaired Flows For Below Normal WY
Silver Creek below Junction Reservoir



WUA Using Historic Flows For Below Normal WY
Silver Creek below Junction Reservoir

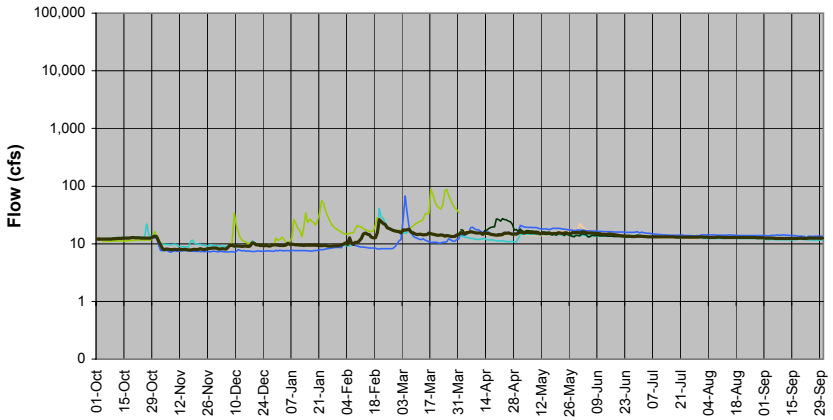


WUA Using Unimpaired Flows For Below Normal WY
Silver Creek below Junction Reservoir

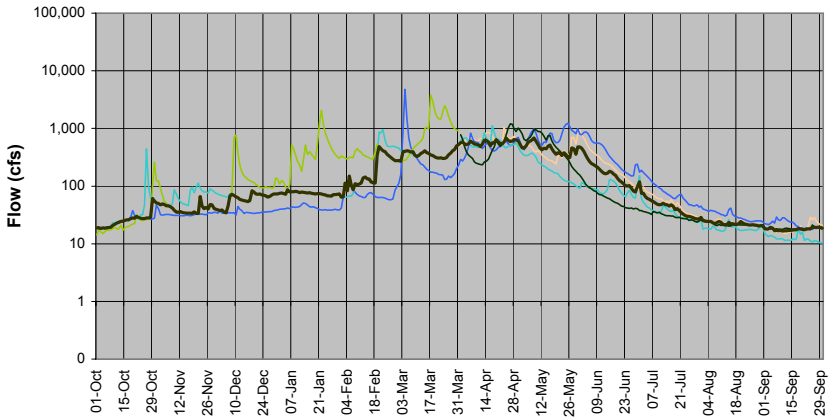


Juntion Reach
Below Normal WY Plots

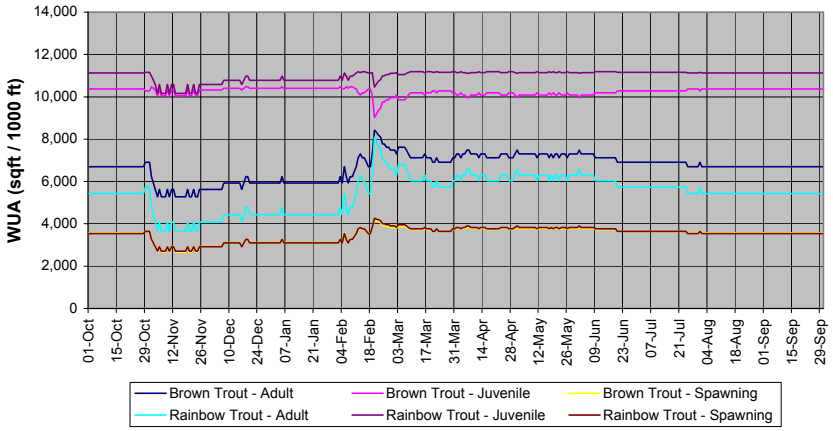
Historic Flows For Below Normal WY
Silver Creek below Grey Horse Creek



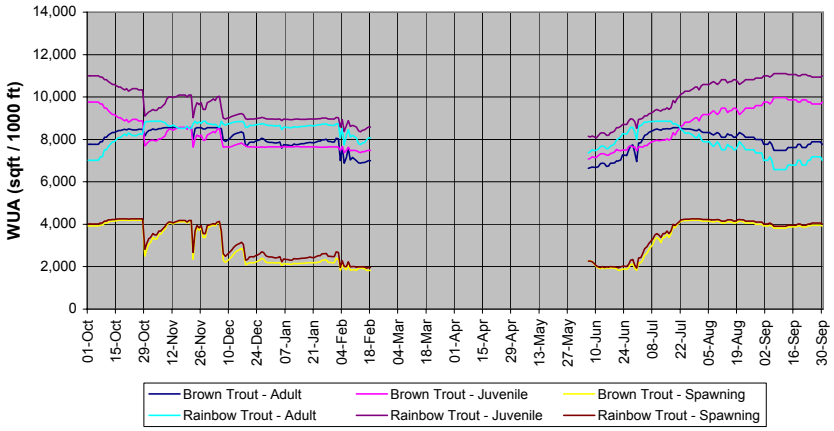
Unimpaired Flows For Below Normal WY
Silver Creek below Grey Horse Creek



WUA Using Historic Flows For Below Normal WY
Silver Creek below Grey Horse Creek

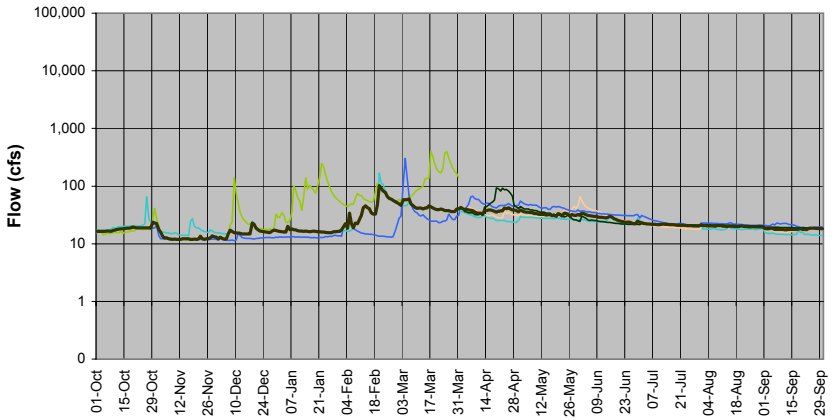


WUA Using Unimpaired Flows For Below Normal WY
Silver Creek below Grey Horse Creek

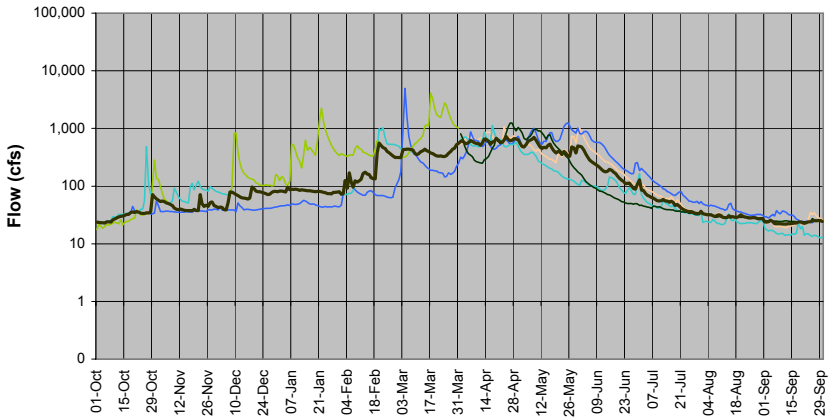


Juntion Reach
Below Normal WY Plots

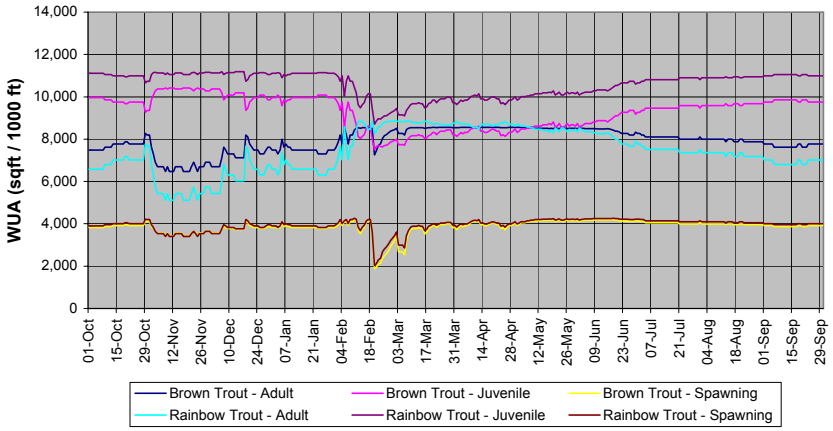
Historic Flows For Below Normal WY
Silver Creek below Onion Creek



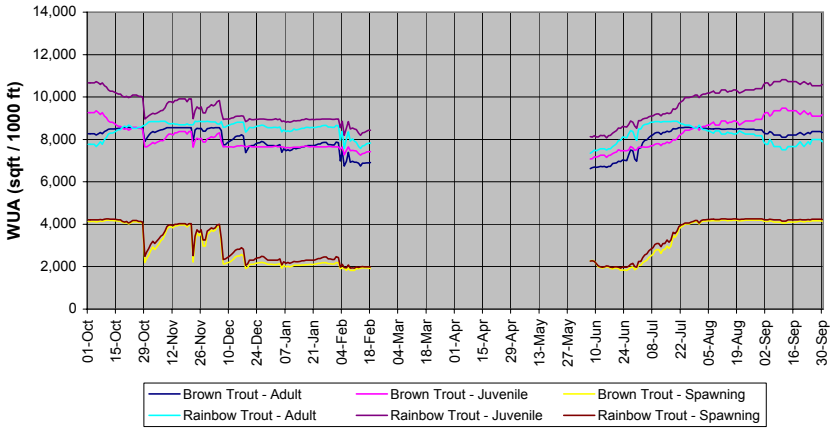
Unimpaired Flows For Below Normal WY
Silver Creek below Onion Creek



WUA Using Historic Flows For Below Normal WY
Silver Creek below Onion Creek

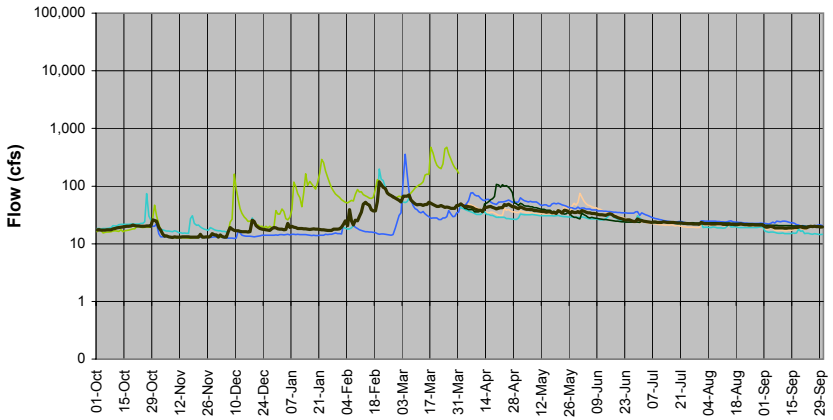


WUA Using Unimpaired Flows For Below Normal WY
Silver Creek below Onion Creek

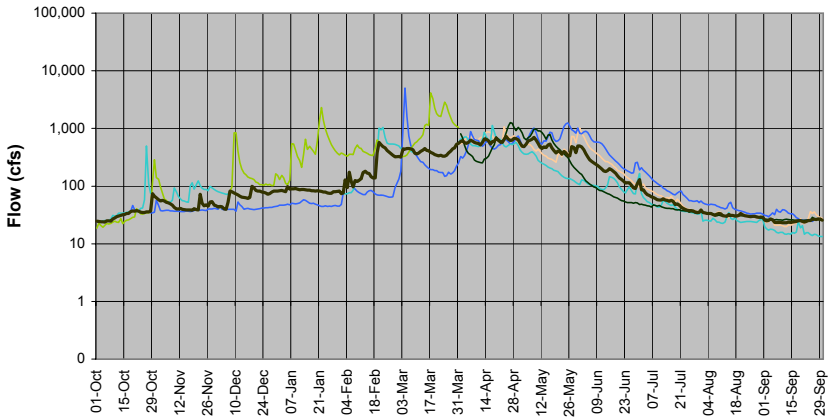


Juntion Reach
Below Normal WY Plots

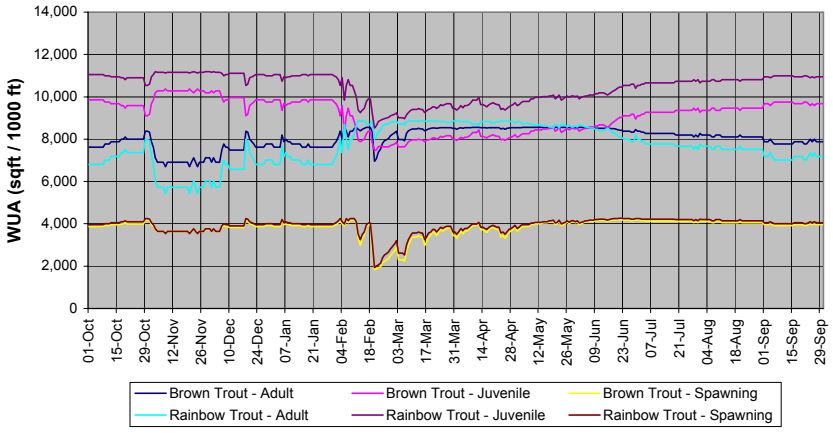
Historic Flows For Below Normal WY
Silver Creek below Sugar Pine Creek



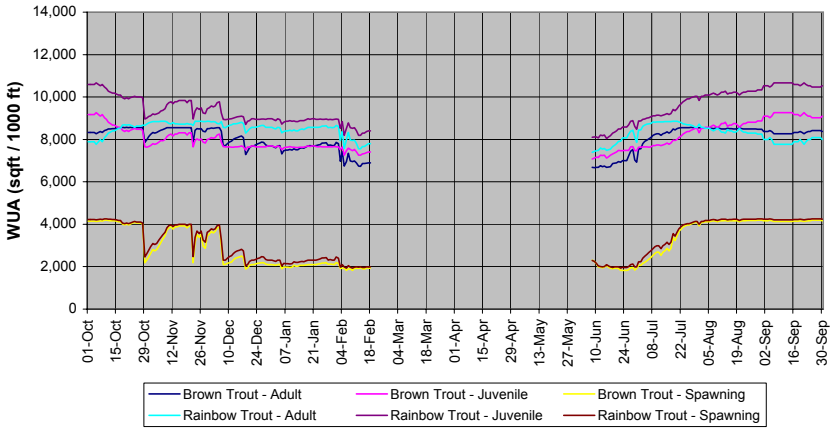
Unimpaired Flows For Below Normal WY
SF Silver Creek below Big Hill Canyon



WUA Using Historic Flows For Below Normal WY
Silver Creek below Sugar Pine Creek

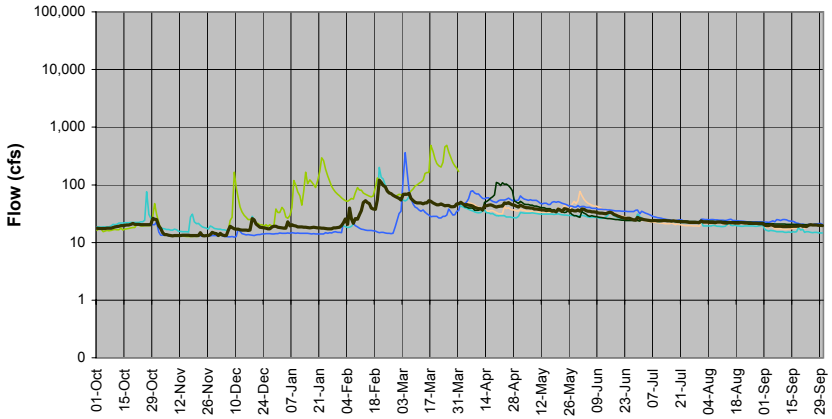


WUA Using Unimpaired Flows For Below Normal WY
Silver Creek below Sugar Pine Creek

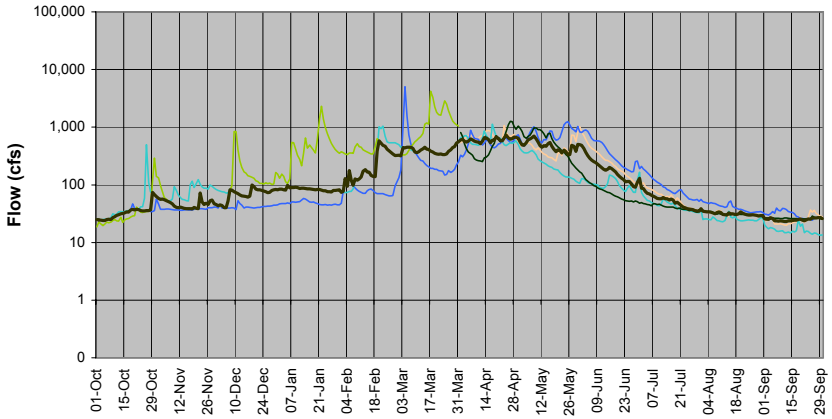


Juntion Reach
Below Normal WY Plots

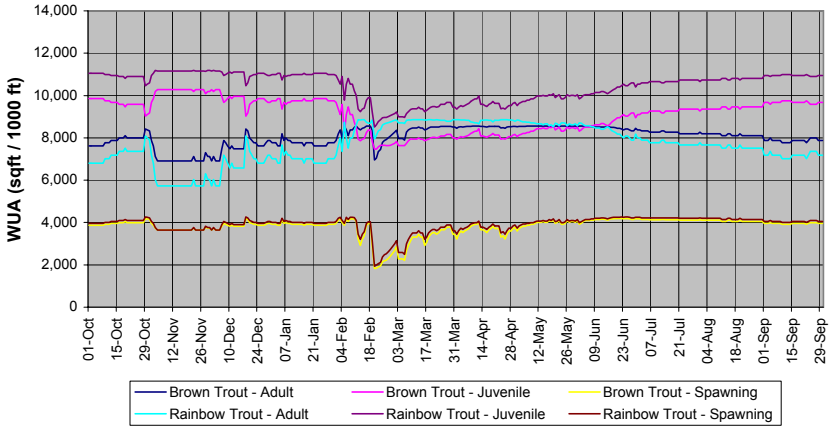
Historic Flows For Below Normal WY
Silver Creek above Camino Reservoir



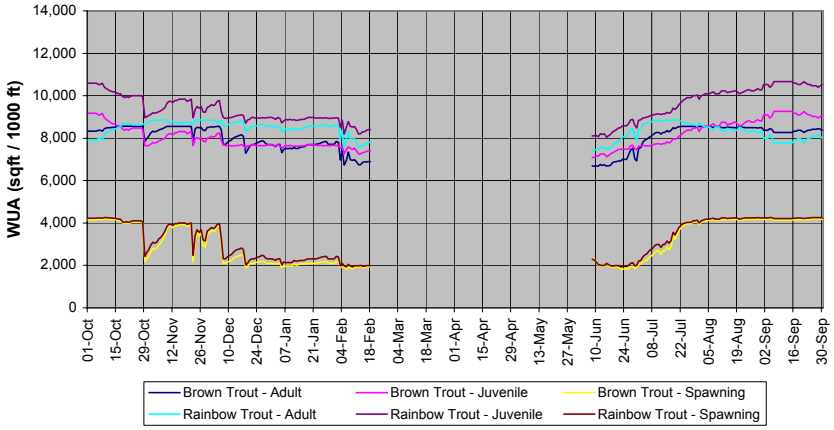
Unimpaired Flows For Below Normal WY
Silver Creek above Camino Reservoir



WUA Using Historic Flows For Below Normal WY
Silver Creek above Camino Reservoir

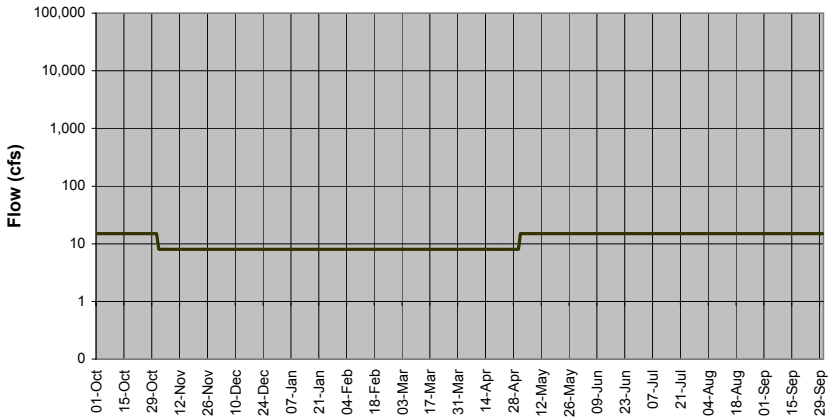


WUA Using Unimpaired Flows For Below Normal WY
Silver Creek above Camino Reservoir

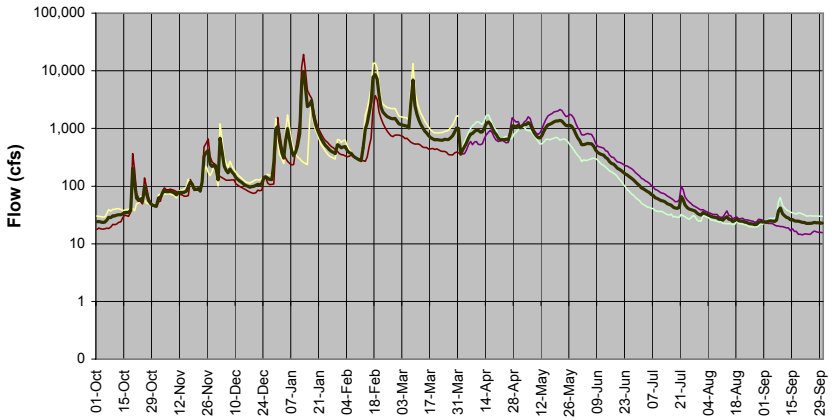


Juntion Reach
Above Normal WY Plots

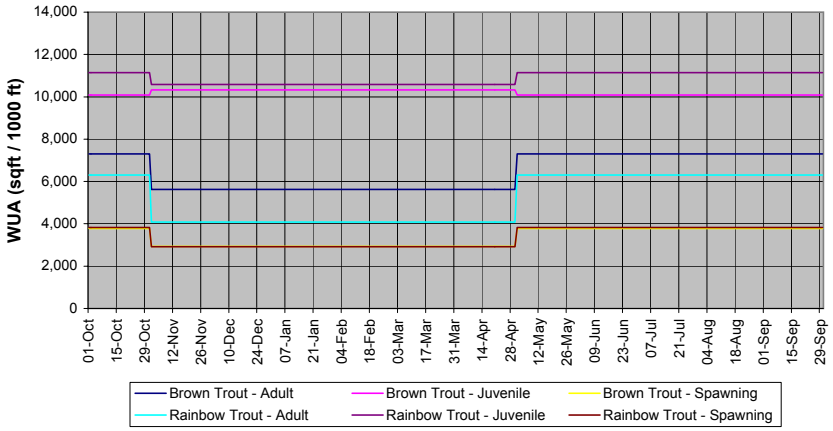
Historic Flows For Above Normal WY
Silver Creek below Junction Reservoir



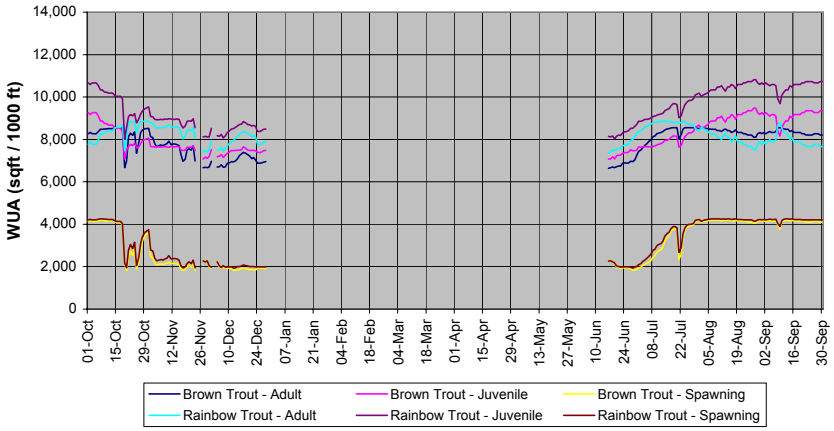
Unimpaired Flows For Above Normal WY
Silver Creek below Junction Reservoir



WUA Using Historic Flows For Above Normal WY
Silver Creek below Junction Reservoir

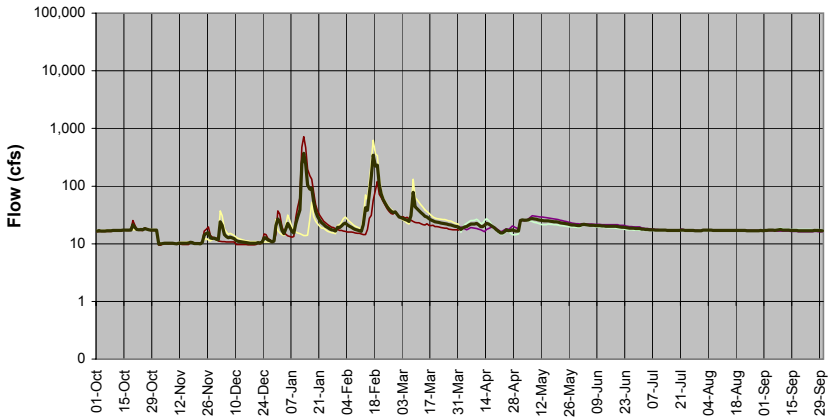


WUA Using Unimpaired Flows For Above Normal WY
Silver Creek below Junction Reservoir

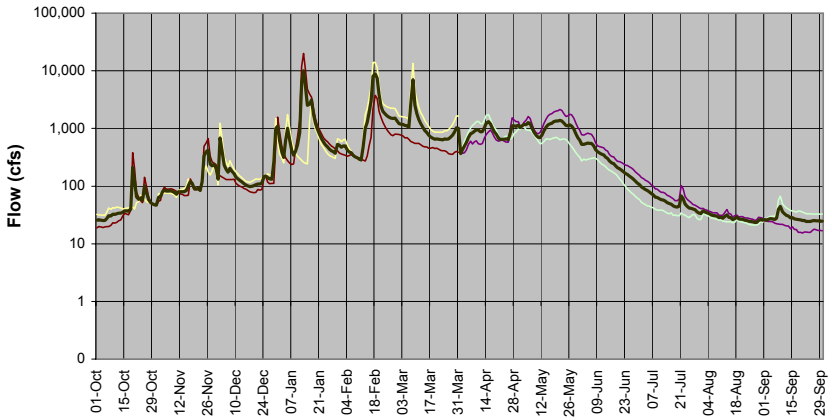


Juntion Reach
Above Normal WY Plots

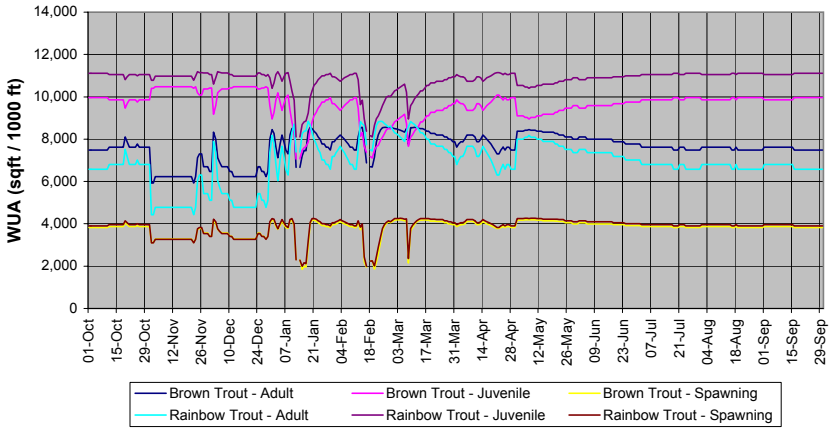
Historic Flows For Above Normal WY
Silver Creek below Grey Horse Creek



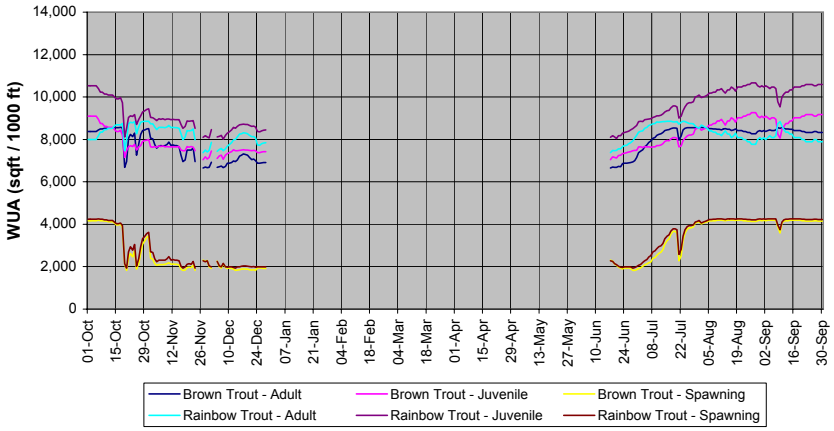
Unimpaired Flows For Above Normal WY
Silver Creek below Grey Horse Creek



WUA Using Historic Flows For Above Normal WY
Silver Creek below Grey Horse Creek

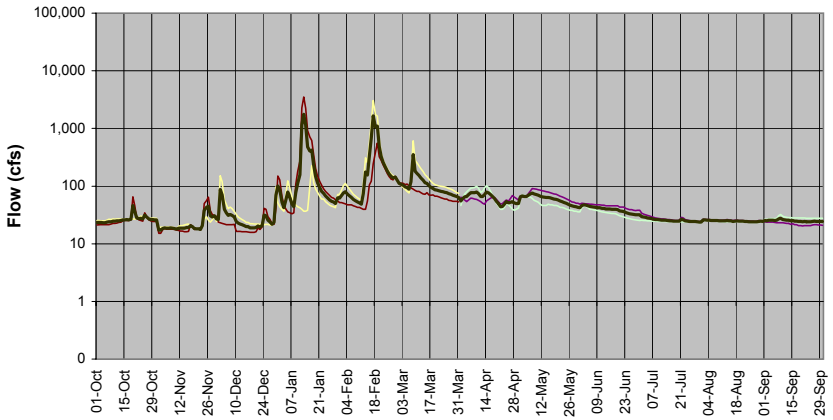


WUA Using Unimpaired Flows For Above Normal WY
Silver Creek below Grey Horse Creek

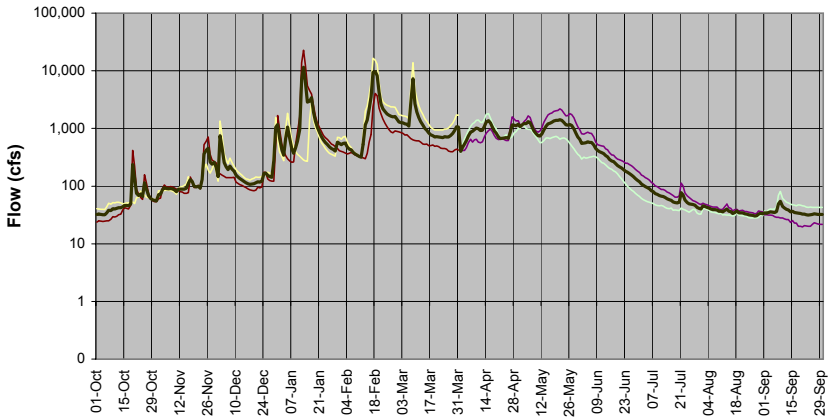


Juntion Reach
Above Normal WY Plots

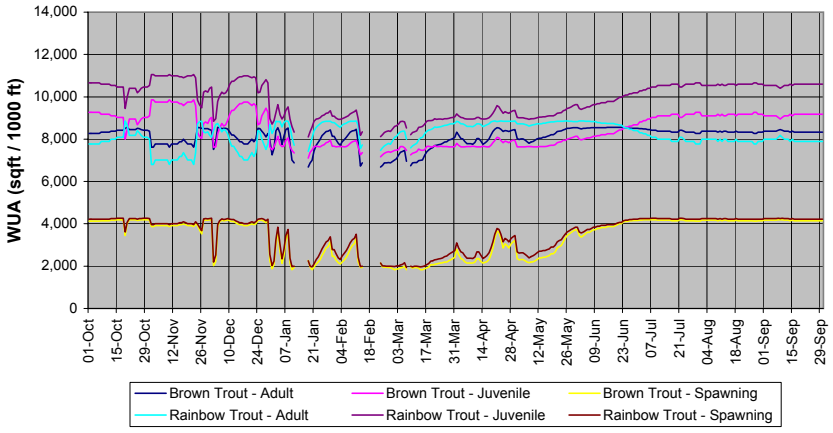
Historic Flows For Above Normal WY
Silver Creek below Onion Creek



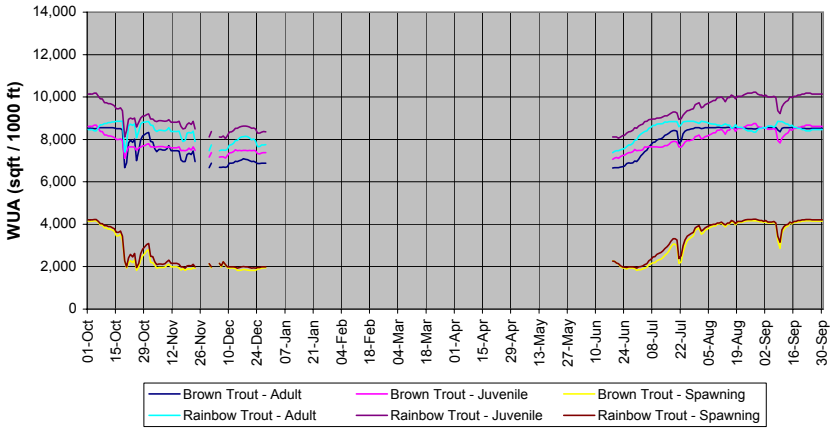
Unimpaired Flows For Above Normal WY
Silver Creek below Onion Creek



WUA Using Historic Flows For Above Normal WY
Silver Creek below Onion Creek

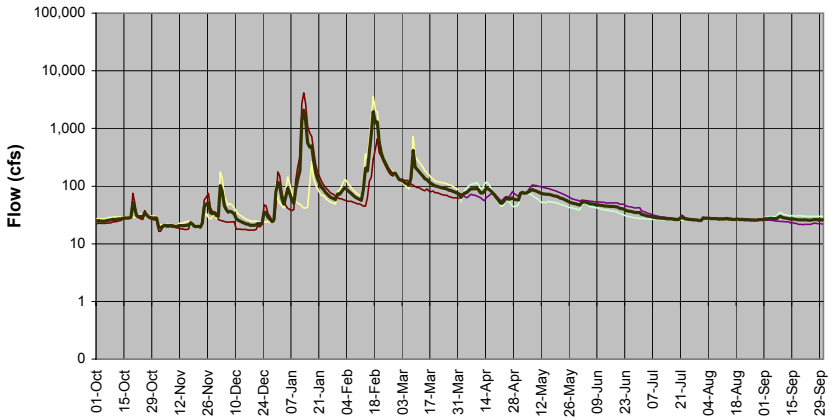


WUA Using Unimpaired Flows For Above Normal WY
Silver Creek below Onion Creek

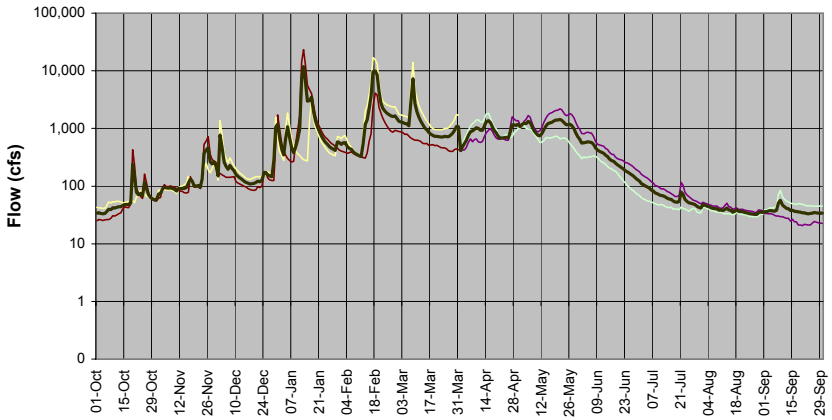


Juntion Reach
Above Normal WY Plots

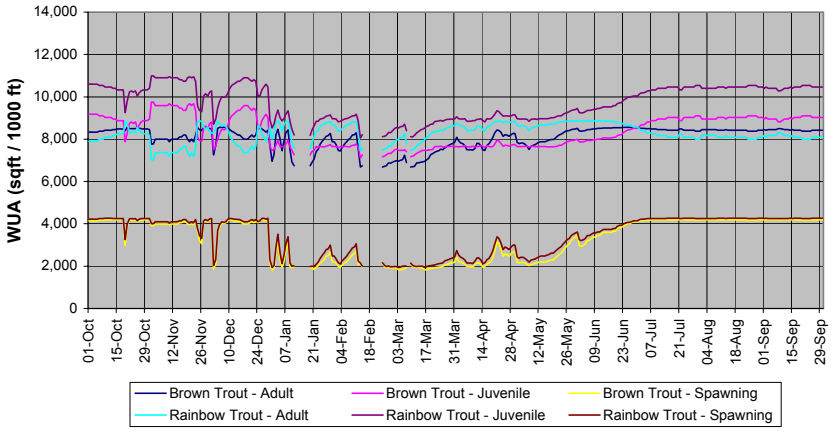
Historic Flows For Above Normal WY
Silver Creek below Sugar Pine Creek



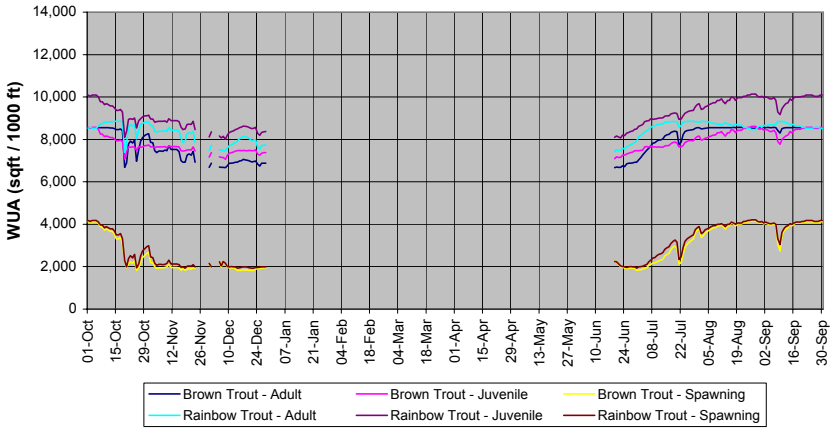
Unimpaired Flows For Above Normal WY
Silver Creek below Sugar Pine Creek



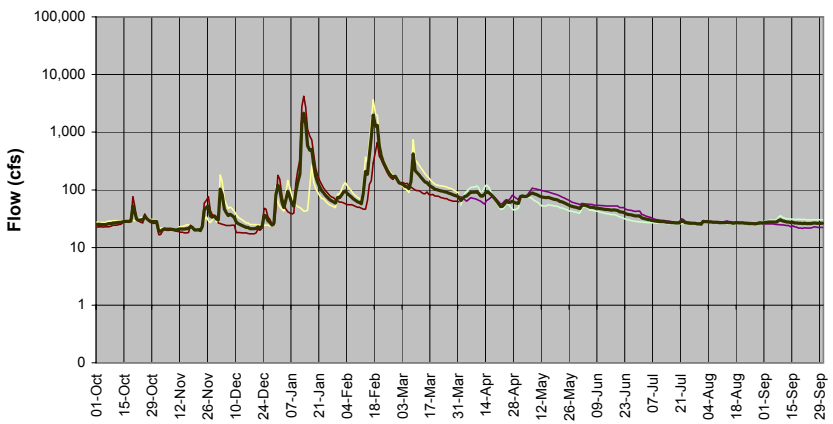
WUA Using Historic Flows For Above Normal WY
Silver Creek below Sugar Pine Creek

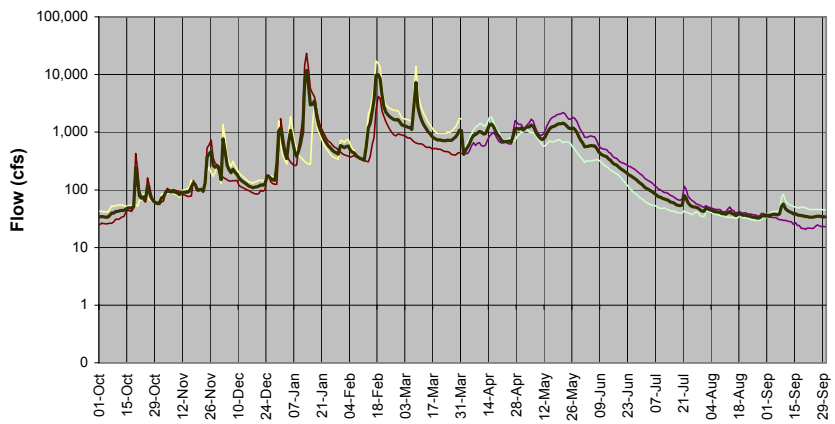


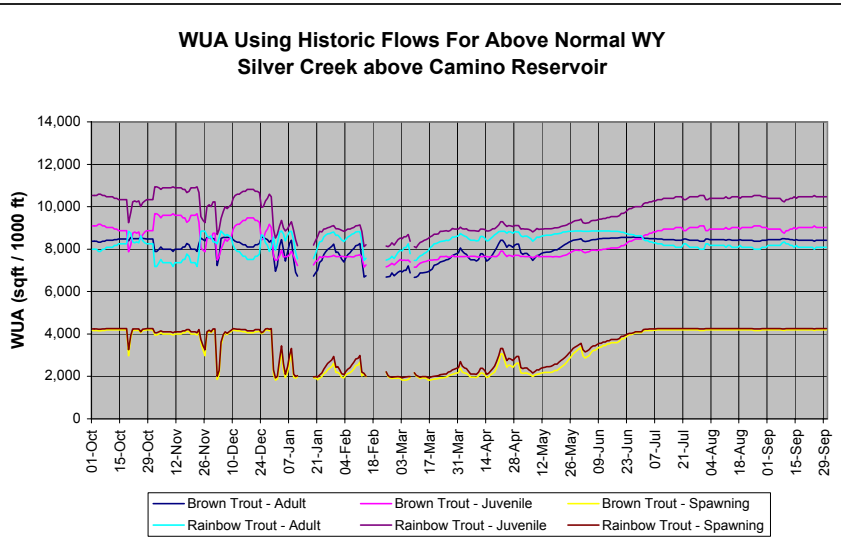
WUA Using Unimpaired Flows For Above Normal WY
Silver Creek below Sugar Pine Creek

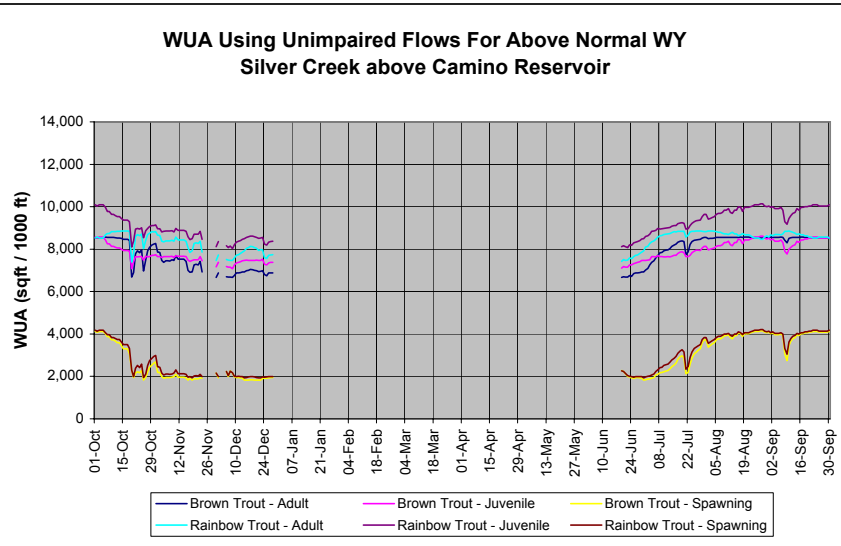


Juntion Reach
Above Normal WY Plots



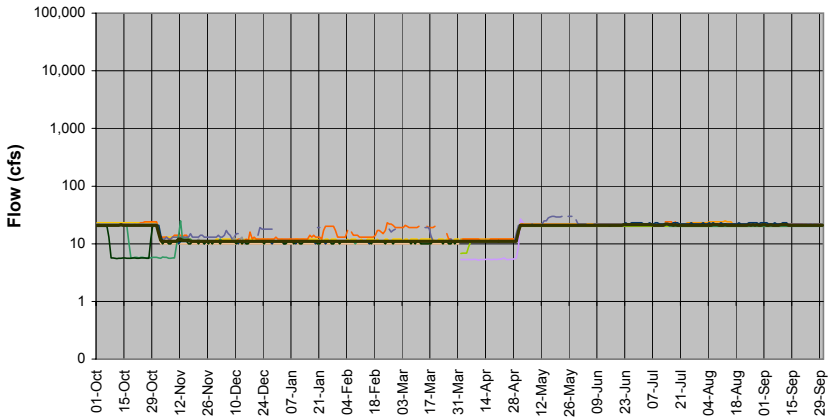




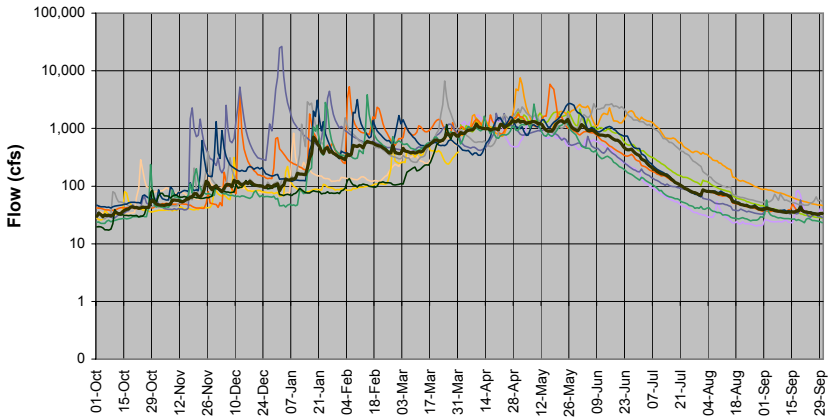


Juntion Reach
Wet WY Plots

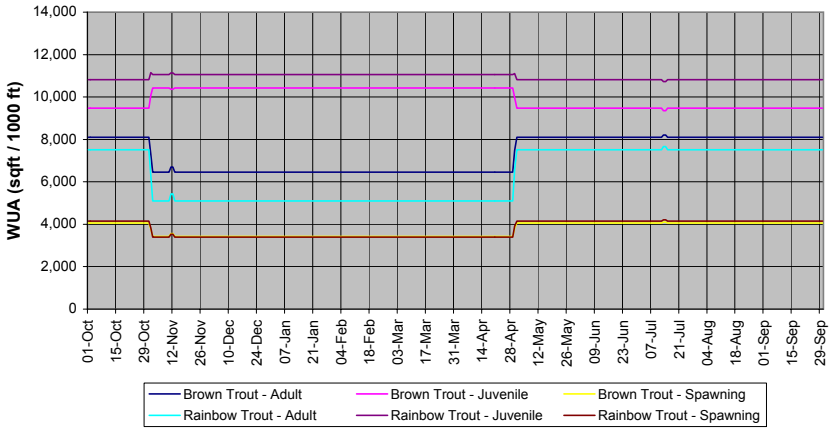
Historic Flows For Wet WY
Silver Creek below Junction Reservoir



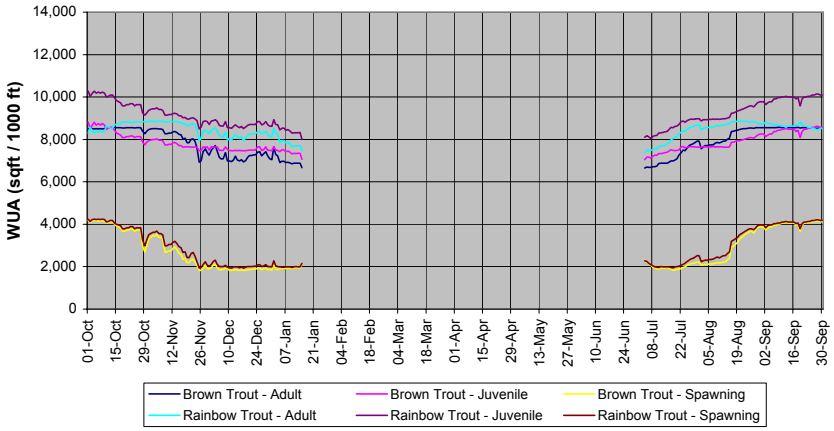
Unimpaired Flows For Wet WY
Silver Creek below Junction Reservoir



WUA Using Historic Flows For Wet WY
Silver Creek below Junction Reservoir

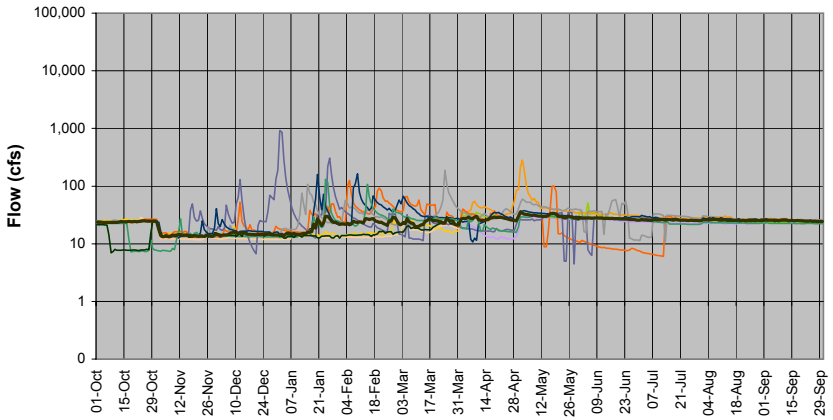


WUA Using Unimpaired Flows For Wet WY
Silver Creek below Junction Reservoir

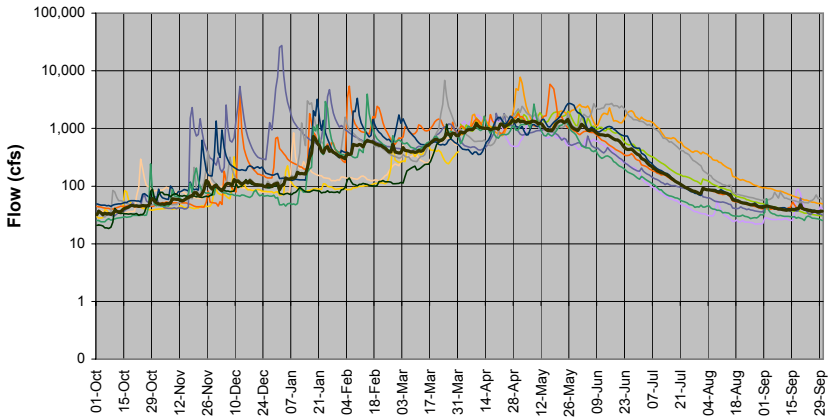


Juntion Reach
Wet WY Plots

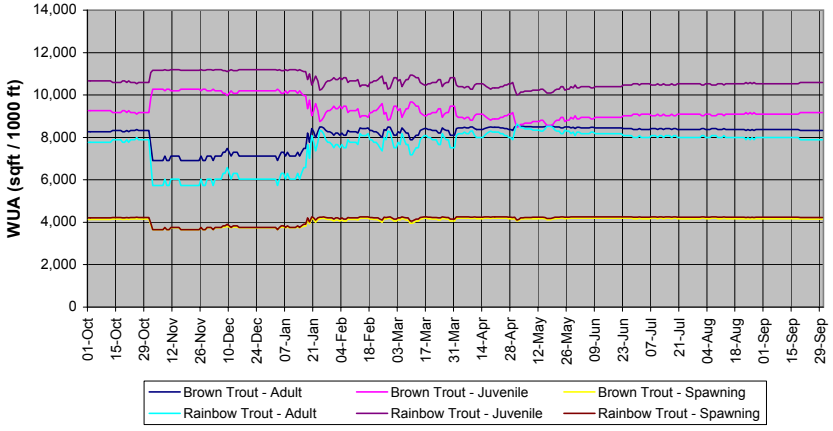
Historic Flows For Wet WY
Silver Creek below Grey Horse Creek



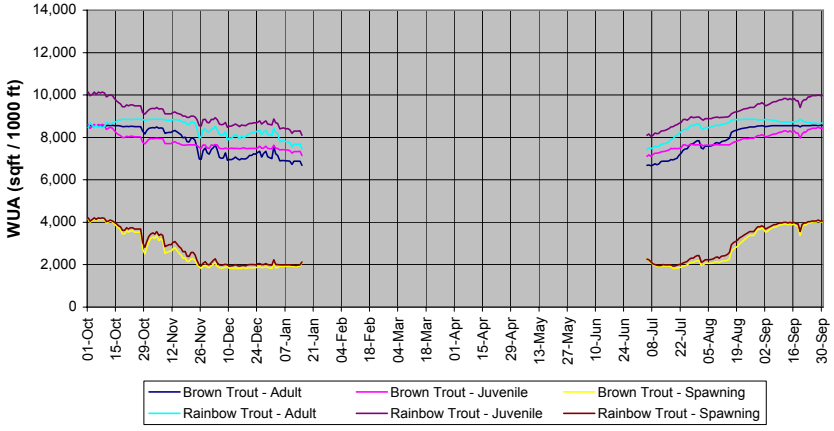
Unimpaired Flows For Wet WY
Silver Creek below Grey Horse Creek



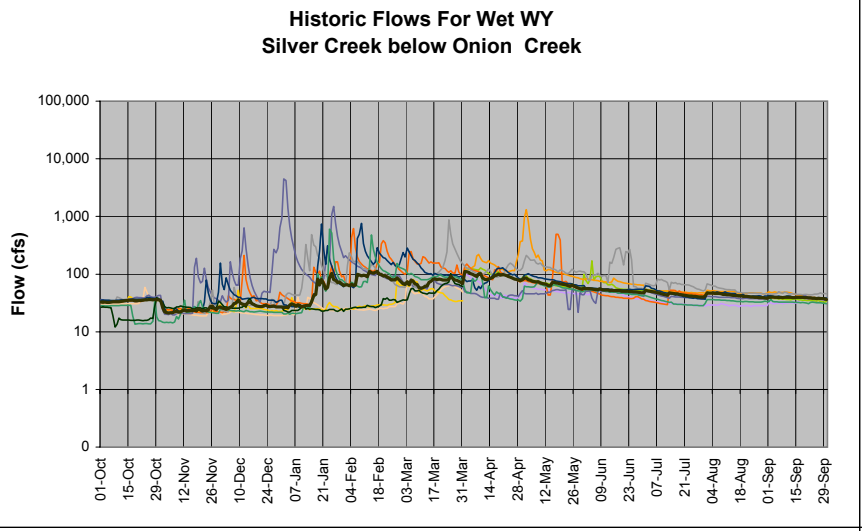
WUA Using Historic Flows For Wet WY
Silver Creek below Grey Horse Creek

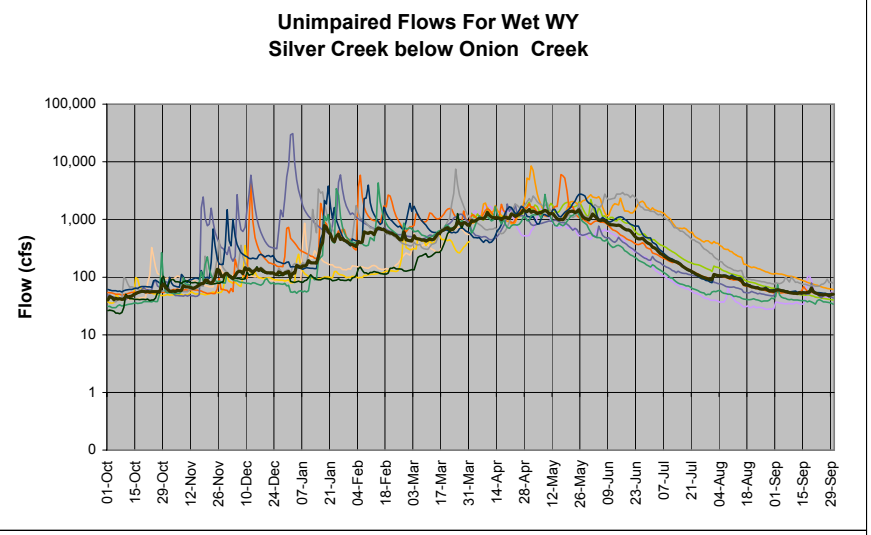


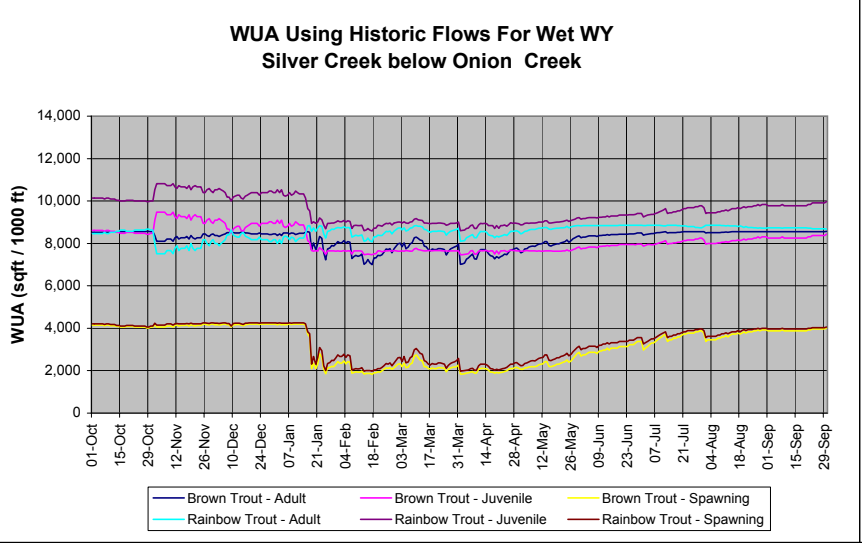
WUA Using Unimpaired Flows For Wet WY
Silver Creek below Grey Horse Creek

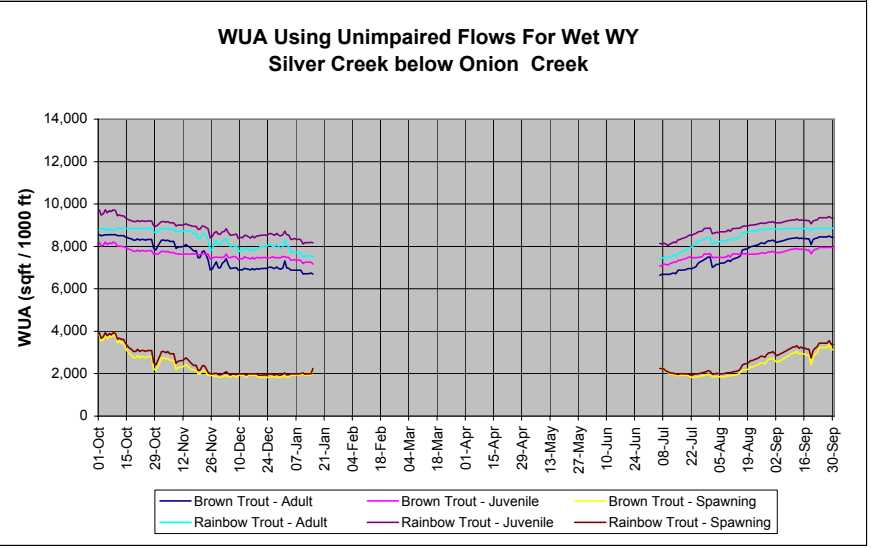


Juntion Reach
Wet WY Plots



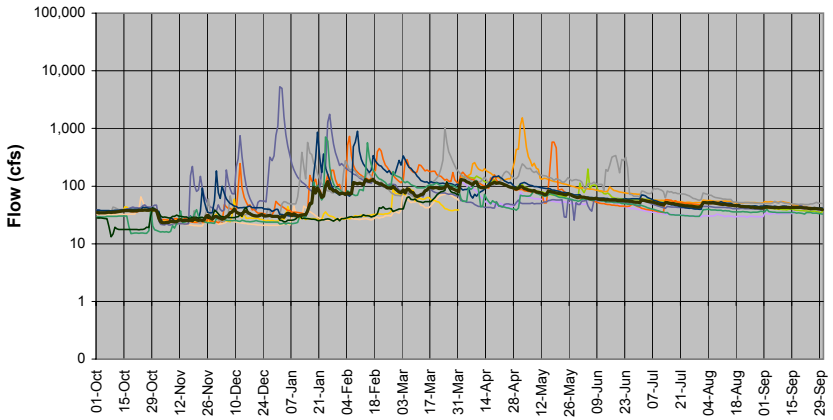




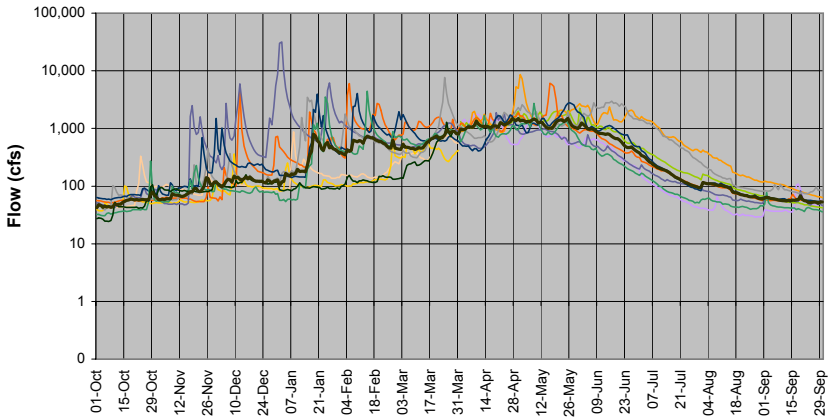


Juntion Reach
Wet WY Plots

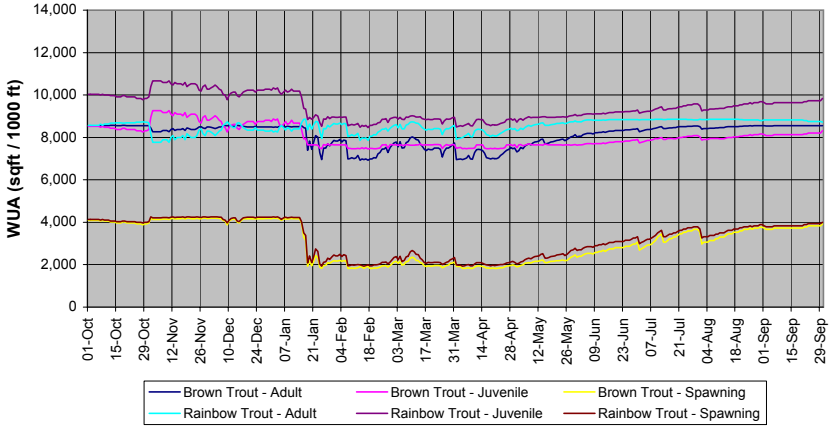
Historic Flows For Wet WY
Silver Creek below Sugar Pine Creek



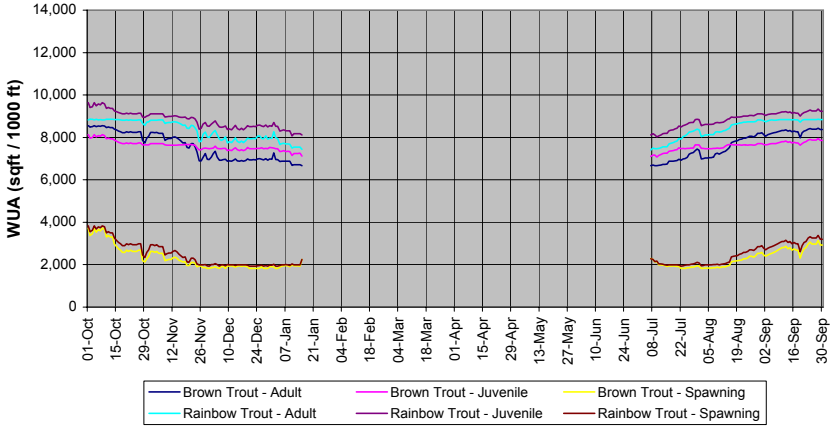
Unimpaired Flows For Wet WY
Silver Creek below Sugar Pine Creek



WUA Using Historic Flows For Wet WY
Silver Creek below Sugar Pine Creek

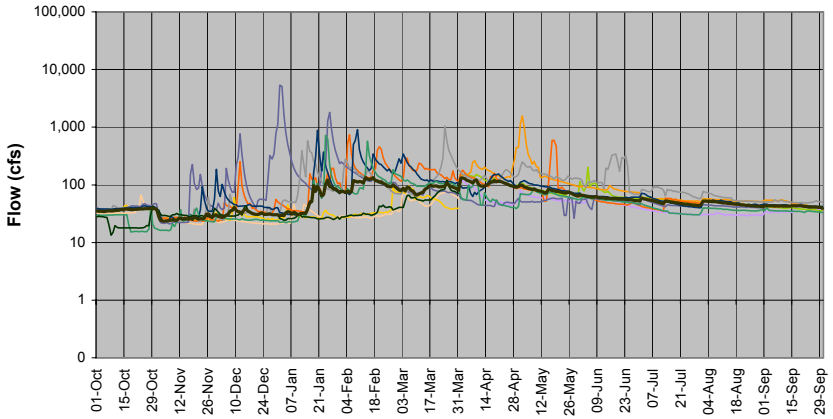


WUA Using Unimpaired Flows For Wet WY
Silver Creek below Sugar Pine Creek

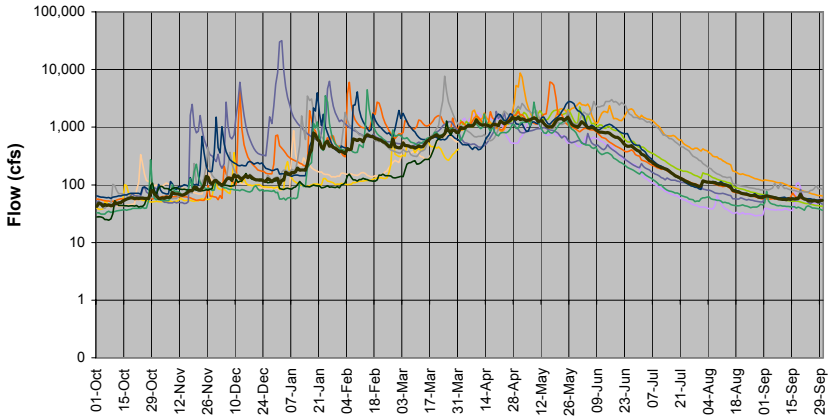


Juntion Reach
Wet WY Plots

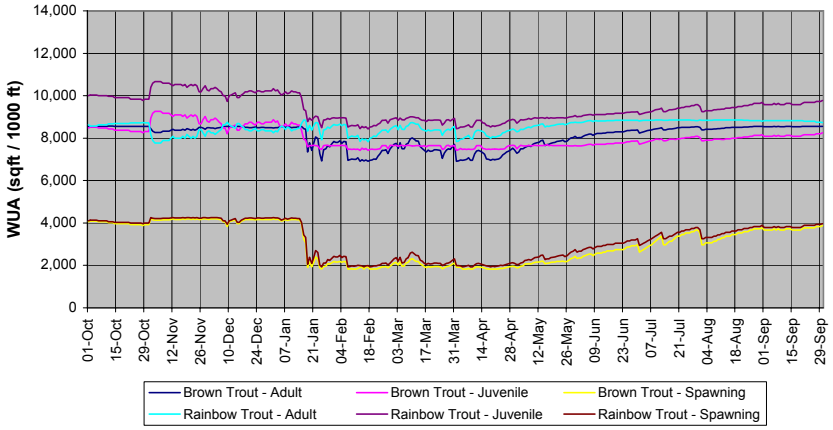
Historic Flows For Wet WY
Silver Creek above Camino Reservoir



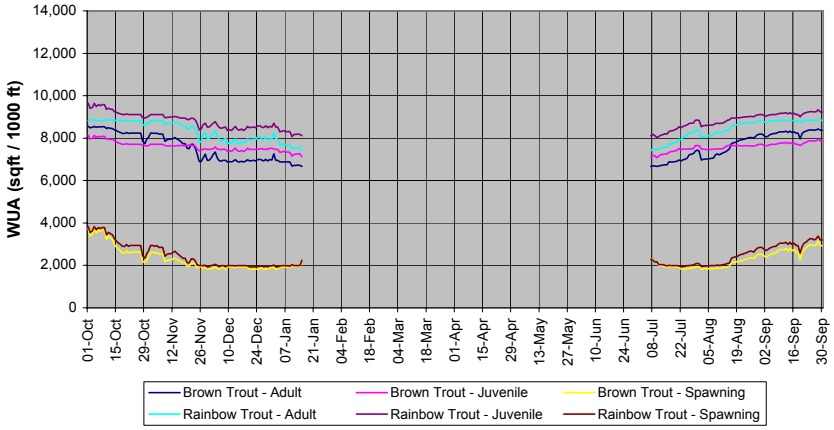
Unimpaired Flows For Wet WY
Silver Creek above Camino Reservoir



WUA Using Historic Flows For Wet WY
Silver Creek above Camino Reservoir



WUA Using Unimpaired Flows For Wet WY
Silver Creek above Camino Reservoir



Camino Dam Reach
Silver Creek

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Camino Reach
Full Year Summary

Silver Creek Below Camino Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,905,752	1,829,572	-37.04	3,153,048	2,633,158	-16.49	2,253,217	2,140,745	-4.99	2,401,715	2,514,116	4.68
Brown Trout - Juvenile	2,416,703	2,390,613	-1.08	2,563,212	3,187,788	24.37	1,782,283	2,286,522	28.29	1,904,668	2,534,768	33.08
Brown Trout - Spawning	709,762	253,580	-64.27	770,259	442,104	-42.60	560,436	405,256	-27.69	591,904	509,390	-13.94
Rainbow Trout - Adult	2,764,507	1,072,256	-61.21	3,075,119	1,790,078	-41.79	2,244,786	1,658,433	-26.12	2,480,445	2,015,448	-18.75
Rainbow Trout - Juvenile	2,747,522	2,490,985	-9.34	2,920,460	3,402,717	16.51	2,045,363	2,498,080	22.13	2,183,184	2,792,198	27.90
Rainbow Trout - Spawning	727,253	351,077	-51.73	786,138	549,427	-30.11	565,776	478,912	-15.35	600,587	574,621	-4.32

Silver Creek below Round Tent

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,884,296	1,961,131	-32.01	3,147,721	2,727,166	-13.36	2,238,593	2,189,661	-2.19	2,389,981	2,597,391	8.68
Brown Trout - Juvenile	2,392,420	2,519,391	5.31	2,556,416	3,213,642	25.71	1,766,349	2,266,143	28.30	1,900,079	2,514,140	32.32
Brown Trout - Spawning	704,233	283,088	-59.80	770,681	479,877	-37.73	556,910	424,837	-23.72	590,971	541,761	-8.33
Rainbow Trout - Adult	2,746,024	1,185,977	-56.81	3,074,818	1,926,255	-37.35	2,234,458	1,736,482	-22.29	2,472,882	2,140,928	-13.42
Rainbow Trout - Juvenile	2,721,461	2,636,276	-3.13	2,913,700	3,454,611	18.56	2,027,966	2,487,945	22.68	2,177,304	2,787,832	28.04
Rainbow Trout - Spawning	721,393	382,759	-46.94	786,021	581,790	-25.98	562,120	494,704	-11.99	599,375	602,626	0.54

Silver Creek Half Way below No Name Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,852,896	2,128,531	-25.39	3,141,307	2,826,429	-10.02	2,222,641	2,244,026	0.96	2,367,698	2,666,118	12.60
Brown Trout - Juvenile	2,359,923	2,680,963	13.60	2,549,758	3,213,565	26.03	1,747,945	2,233,768	27.79	1,886,475	2,458,950	30.35
Brown Trout - Spawning	695,272	318,655	-54.17	771,439	520,441	-32.54	552,813	445,454	-19.42	587,049	575,174	-2.02
Rainbow Trout - Adult	2,716,615	1,328,811	-51.09	3,074,582	2,074,296	-32.53	2,223,691	1,822,922	-18.02	2,454,367	2,264,690	-7.73
Rainbow Trout - Juvenile	2,685,705	2,817,677	4.91	2,906,487	3,477,796	19.66	2,008,108	2,466,321	22.82	2,160,985	2,747,510	27.14
Rainbow Trout - Spawning	712,176	422,377	-40.69	786,204	616,266	-21.61	558,071	511,177	-8.40	595,271	627,030	5.34

Silver Creek at SFAR

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,832,538	2,161,927	-23.68	3,137,598	2,879,638	-8.22	2,217,990	2,278,415	2.72	2,359,975	2,699,073	14.37
Brown Trout - Juvenile	2,338,127	2,698,422	15.41	2,546,192	3,206,311	25.93	1,742,179	2,218,736	27.35	1,883,977	2,430,215	28.99
Brown Trout - Spawning	689,636	328,926	-52.30	772,176	543,970	-29.55	551,971	453,943	-17.76	586,126	594,805	1.48
Rainbow Trout - Adult	2,698,255	1,369,421	-49.25	3,074,068	2,155,986	-29.87	2,222,552	1,874,670	-15.65	2,448,990	2,325,346	-5.05
Rainbow Trout - Juvenile	2,661,914	2,842,350	6.78	2,902,545	3,482,162	19.97	2,002,133	2,457,611	22.75	2,157,271	2,726,158	26.37
Rainbow Trout - Spawning	706,274	432,037	-38.83	786,536	635,449	-19.21	557,283	519,350	-6.81	594,294	639,402	7.59

Camino Reach
Partial Year Summary

Silver Creek Below Camino Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,378,863	1,393,456	-41.42	2,356,618	1,907,164	-19.07	1,999,311	1,876,813	-6.13	1,698,876	1,751,609	3.10
Brown Trout - Juvenile	1,969,513	1,830,780	-7.04	1,889,458	2,270,809	20.18	1,561,155	1,974,480	26.48	1,295,100	1,671,644	29.07
Brown Trout - Spawning	186,906	63,494	-66.03	193,501	96,957	-49.89	166,651	116,058	-30.36	182,048	144,500	-20.63
Rainbow Trout - Adult	2,206,873	804,579	-63.54	2,234,671	1,331,574	-40.41	1,976,834	1,471,708	-25.55	1,739,397	1,450,780	-16.59
Rainbow Trout - Juvenile	2,243,315	1,902,927	-15.17	2,165,827	2,435,514	12.45	1,800,432	2,162,338	20.10	1,508,320	1,856,461	23.08
Rainbow Trout - Spawning	92,295	46,128	-50.02	83,037	68,985	-16.92	32,750	32,401	-1.07	0	0	0.00

Silver Creek below Round Tent

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,378,350	1,474,494	-38.00	2,355,264	1,924,239	-18.30	1,985,118	1,907,236	-3.92	1,690,012	1,778,507	5.24
Brown Trout - Juvenile	1,963,870	1,934,260	-1.51	1,883,954	2,278,790	20.96	1,545,107	1,954,638	26.51	1,290,823	1,662,375	28.78
Brown Trout - Spawning	187,682	69,596	-62.92	193,184	101,795	-47.31	163,109	120,644	-26.03	181,589	154,272	-15.04
Rainbow Trout - Adult	2,211,179	855,588	-61.31	2,238,050	1,356,018	-39.41	1,967,213	1,522,776	-22.59	1,735,486	1,493,707	-13.93
Rainbow Trout - Juvenile	2,238,375	2,012,283	-10.10	2,160,816	2,448,959	13.33	1,783,101	2,149,009	20.52	1,503,804	1,852,980	23.22
Rainbow Trout - Spawning	92,252	52,356	-43.25	83,016	71,138	-14.31	32,774	33,502	2.22	0	0	0.00

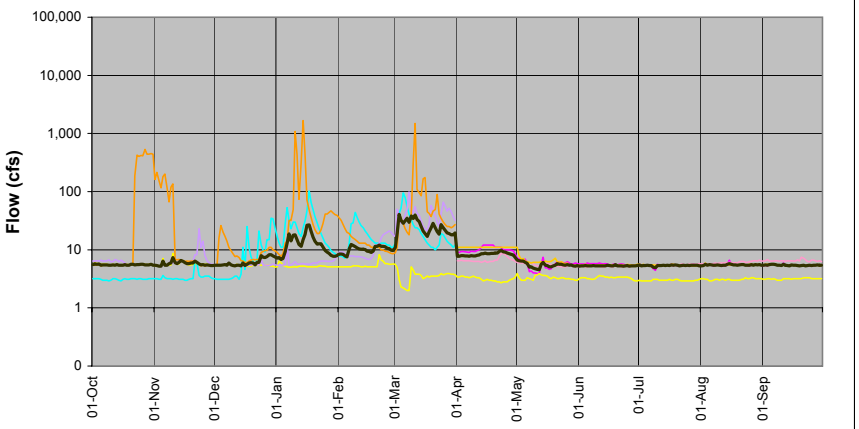
Silver Creek Half Way below No Name Creek

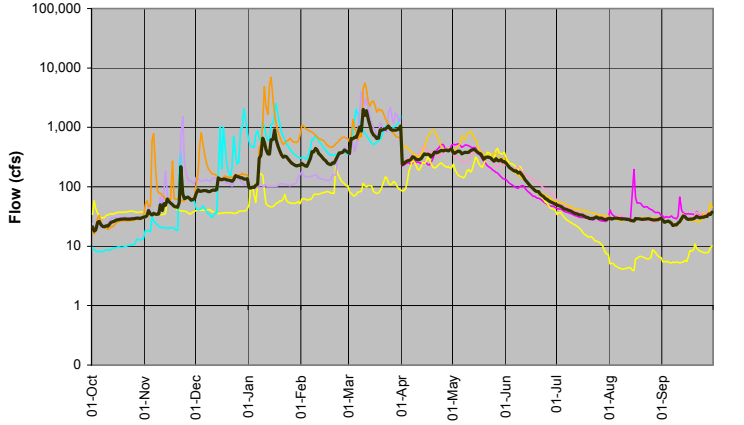
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,377,369	1,636,184	-31.18	2,353,388	1,961,070	-16.67	1,969,793	1,942,748	-1.37	1,680,123	1,811,489	7.82
Brown Trout - Juvenile	1,958,986	2,133,389	8.90	1,877,590	2,286,996	21.80	1,526,664	1,927,095	26.23	1,286,395	1,641,676	27.62
Brown Trout - Spawning	188,433	80,880	-57.08	192,658	109,459	-43.18	159,378	125,764	-21.09	180,937	162,677	-10.09
Rainbow Trout - Adult	2,214,495	964,640	-56.44	2,242,017	1,409,072	-37.15	1,957,413	1,581,394	-19.21	1,730,804	1,552,872	-10.28
Rainbow Trout - Juvenile	2,233,972	2,225,193	-0.39	2,154,882	2,466,743	14.47	1,763,415	2,128,678	20.71	1,498,585	1,839,409	22.74
Rainbow Trout - Spawning	92,227	56,890	-38.31	82,924	75,823	-8.56	32,862	34,405	4.70	0	0	0.00

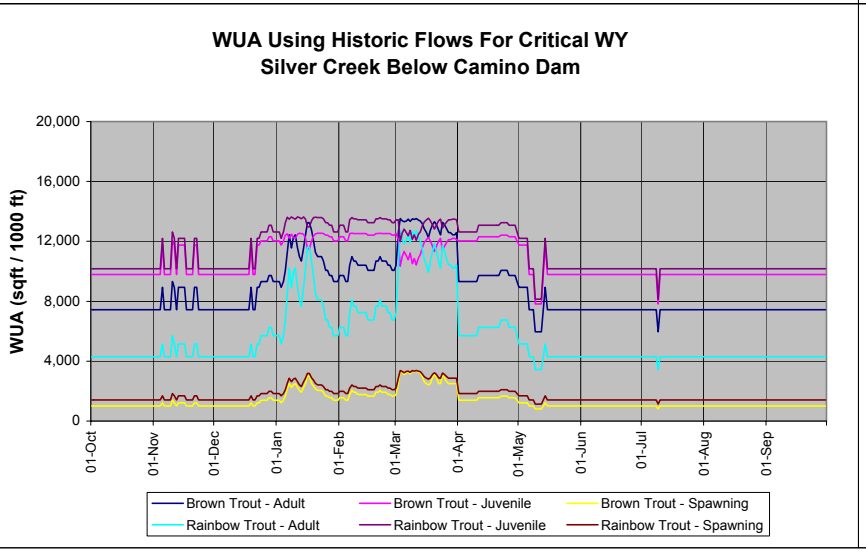
Silver Creek at SFAR

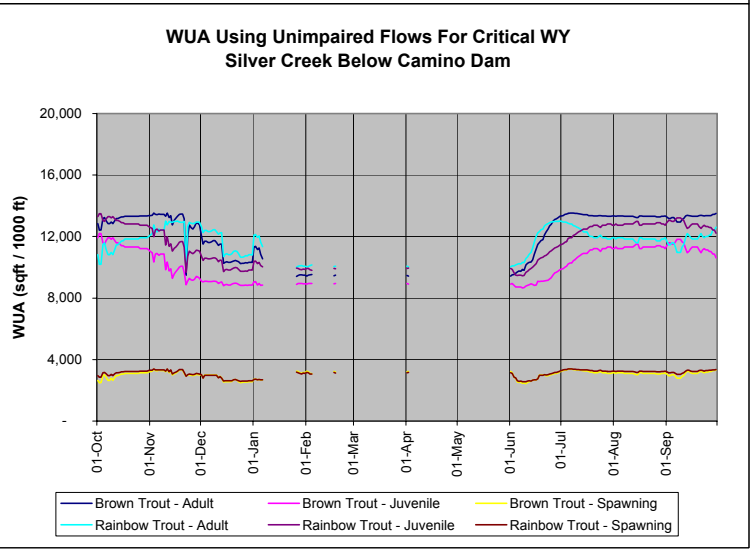
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	2,367,599	1,669,669	-29.48	2,352,437	1,990,075	-15.40	1,965,688	1,968,698	0.15	1,673,629	1,826,442	9.13
Brown Trout - Juvenile	1,946,350	2,167,303	11.35	1,873,954	2,288,983	22.15	1,521,006	1,915,792	25.96	1,284,021	1,626,693	26.69
Brown Trout - Spawning	189,070	83,562	-55.80	192,404	113,926	-40.79	158,820	129,808	-18.27	180,535	167,469	-7.24
Rainbow Trout - Adult	2,207,507	995,884	-54.89	2,244,075	1,451,201	-35.33	1,956,948	1,620,091	-17.21	1,727,244	1,582,728	-8.37
Rainbow Trout - Juvenile	2,220,791	2,265,080	1.99	2,151,574	2,474,890	15.03	1,757,715	2,122,131	20.73	1,495,413	1,828,067	22.24
Rainbow Trout - Spawning	89,018	58,117	-34.71	82,794	76,974	-7.03	32,865	34,880	6.13	0	0	#DIV/0!

Camino Reach
Critical WY Plots

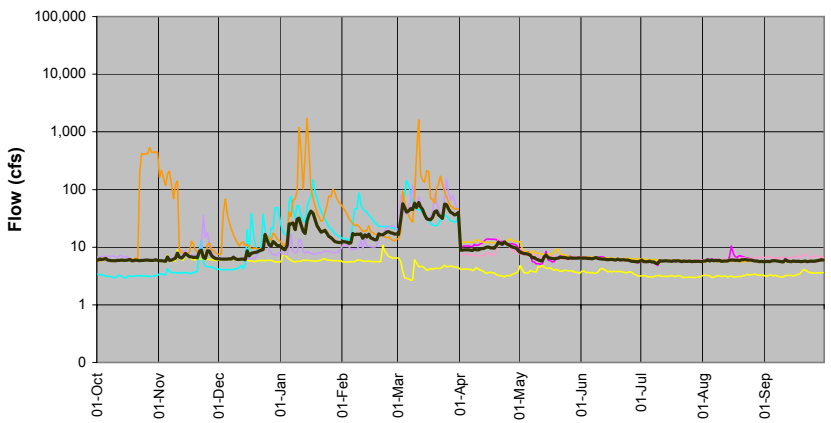


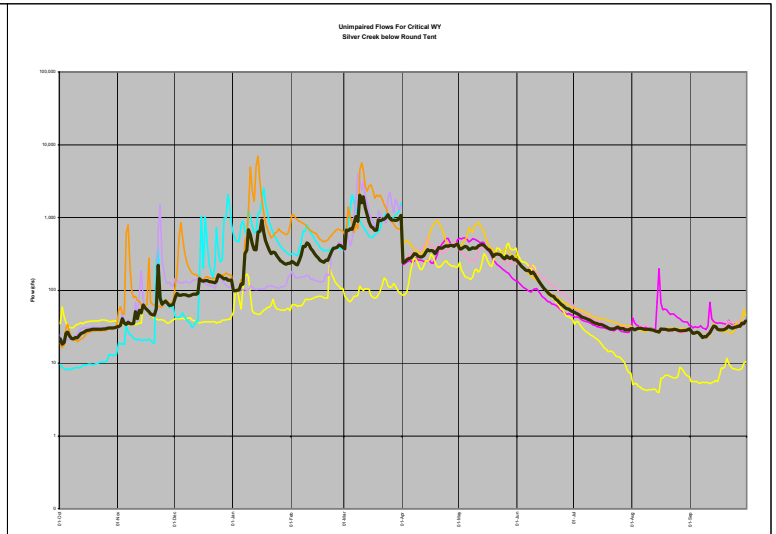


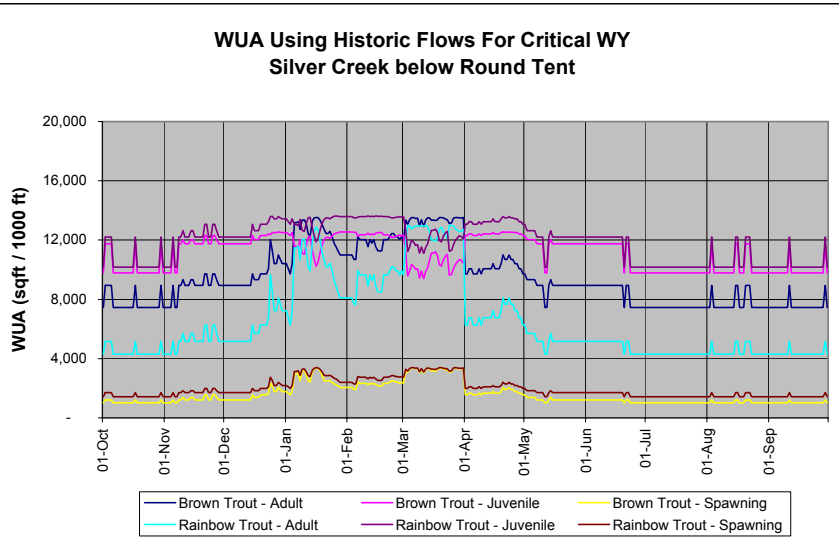


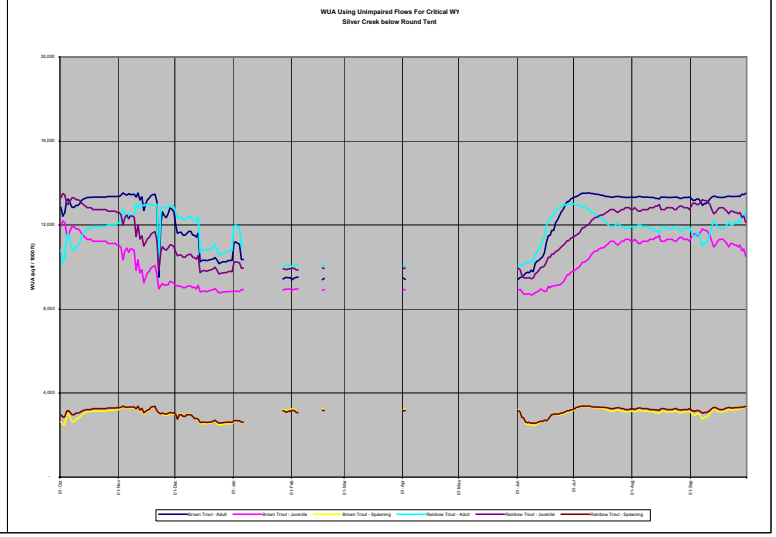


Camino Reach
Critical WY Plots

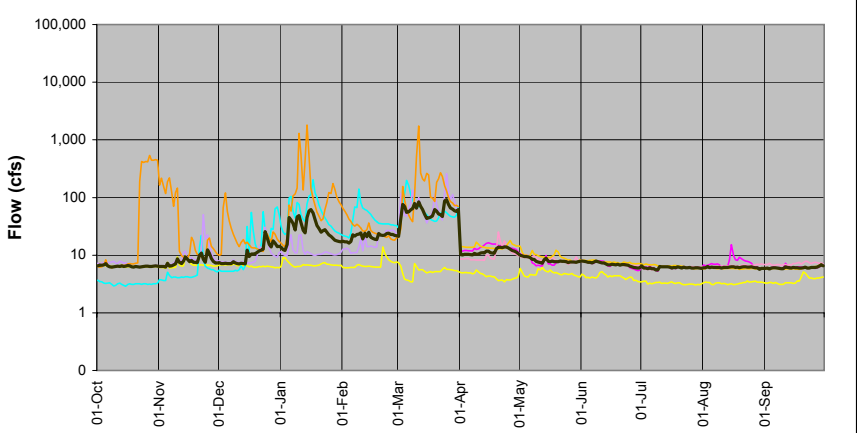


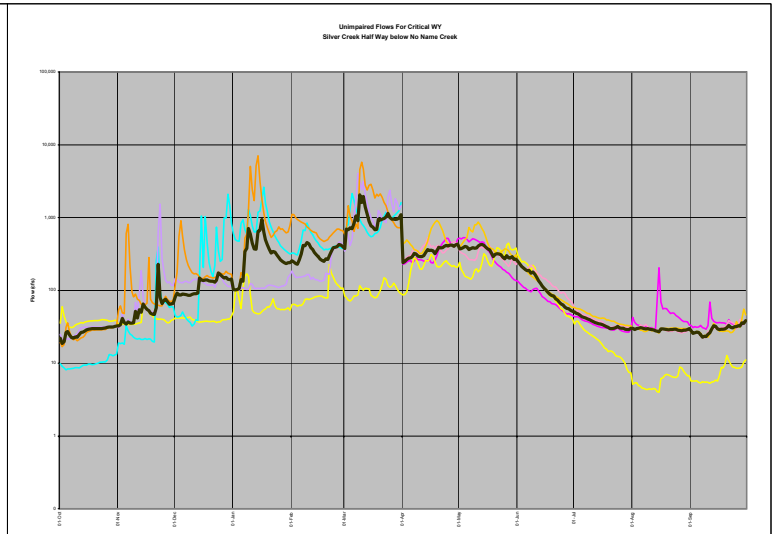


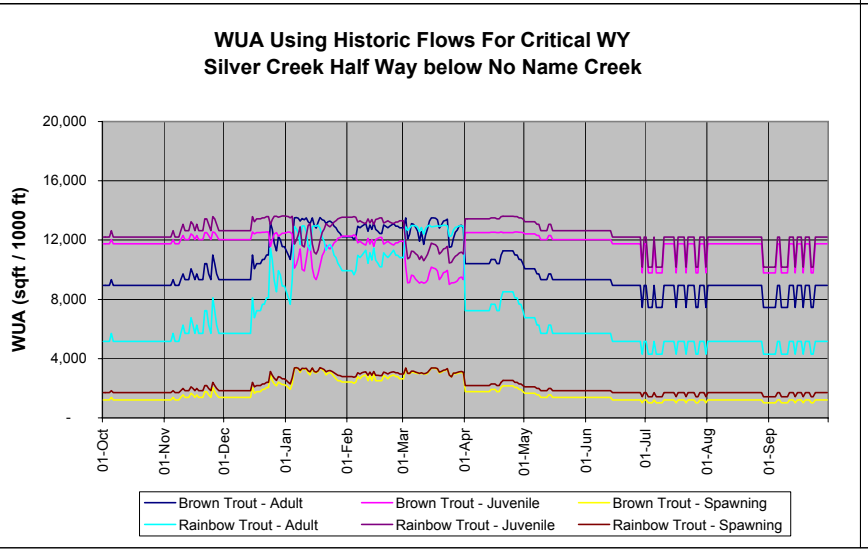


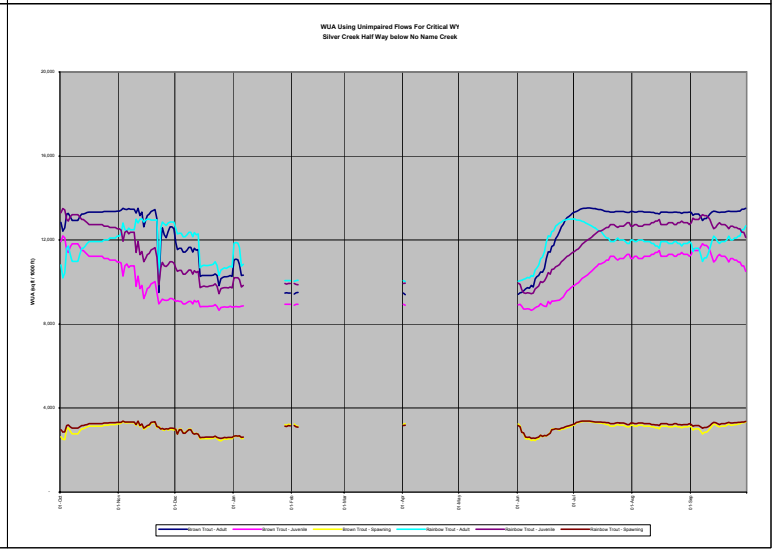


Camino Reach
Critical WY Plots

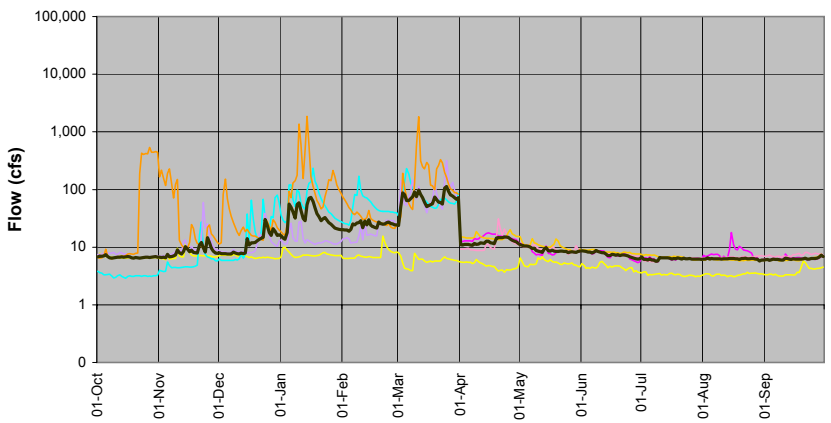


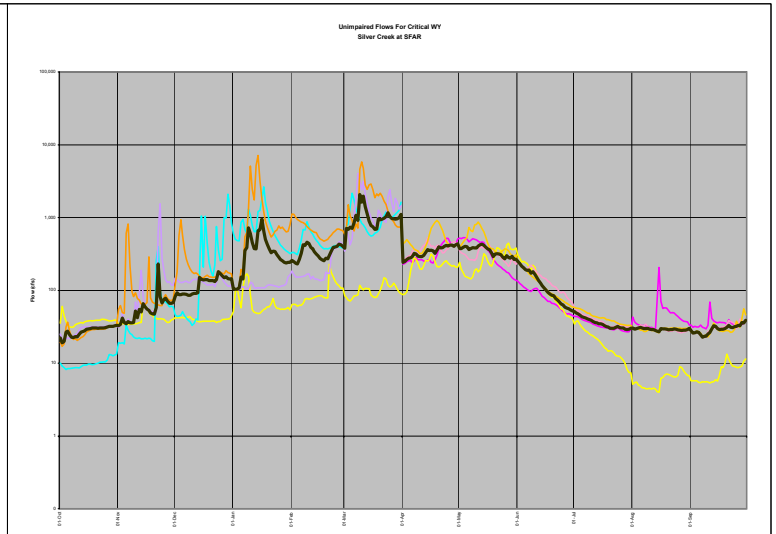


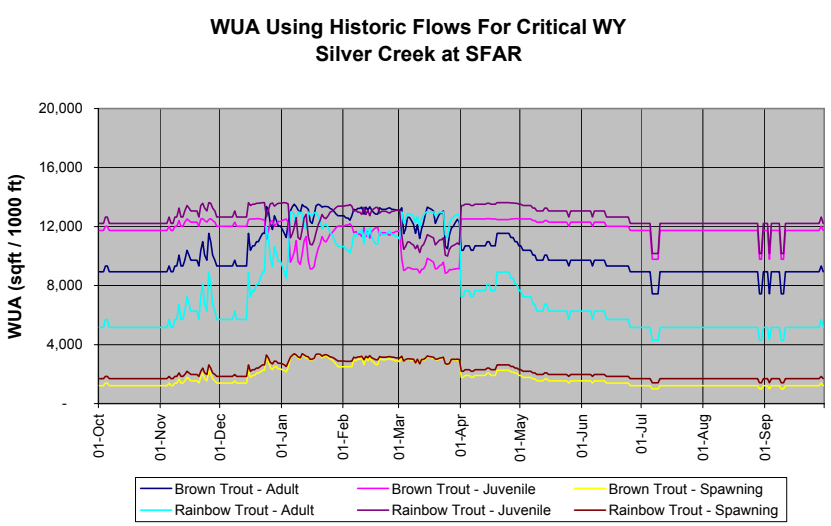


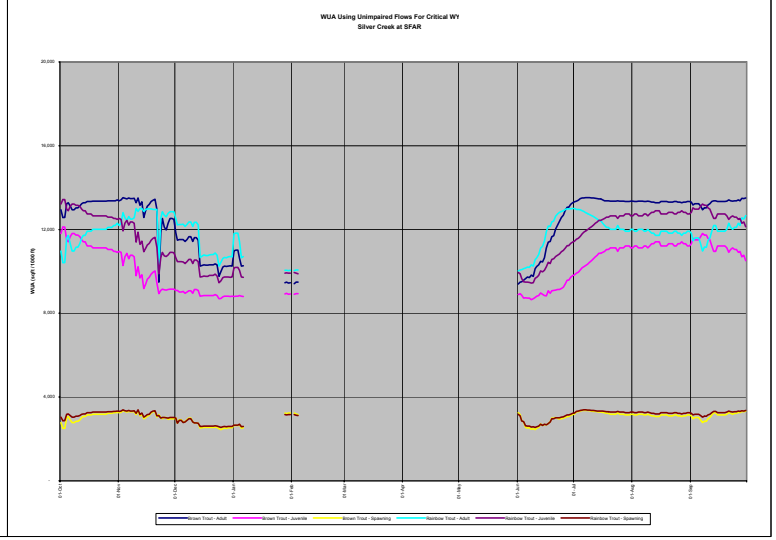


Camino Reach
Critical WY Plots



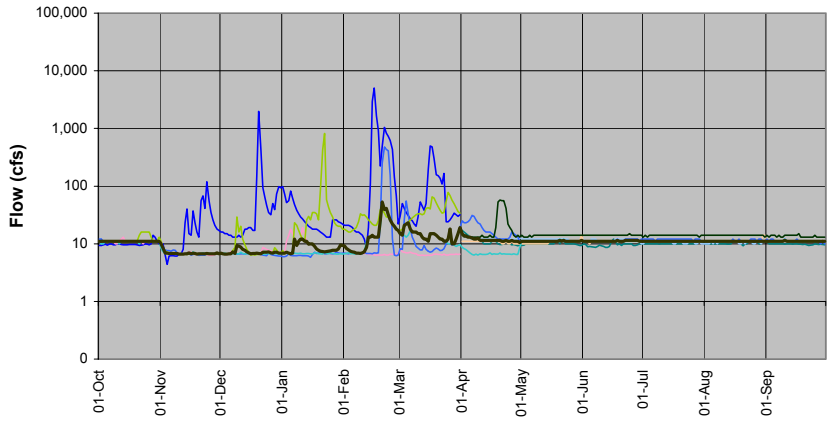




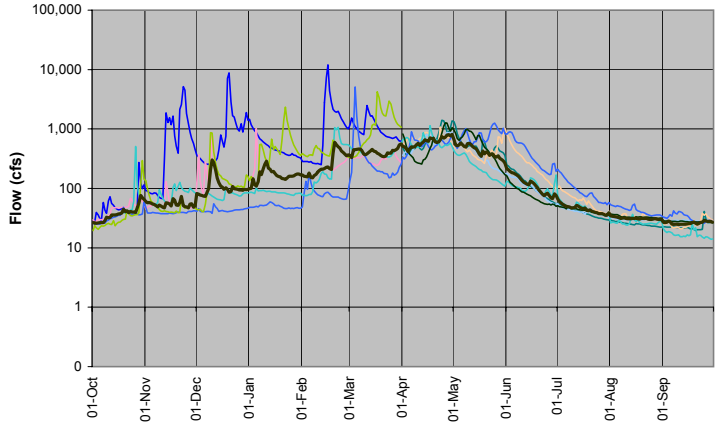


Camino Reach
Below Normal WY Plots

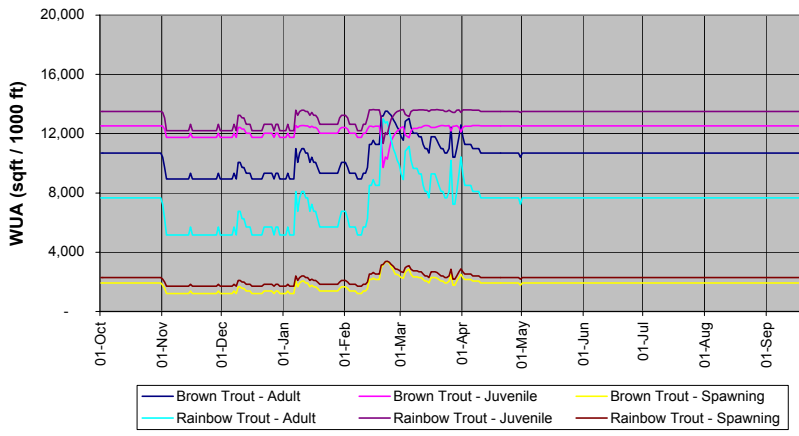
Historic Flows For Below Normal WY
Silver Creek Below Camino Dam



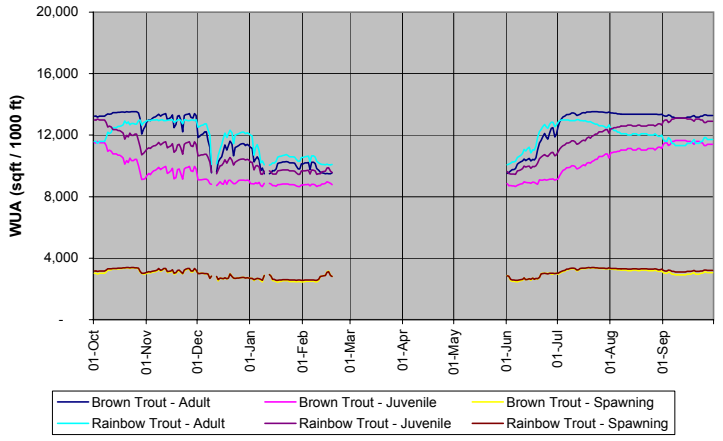
Unimpaired Flows For Below Normal WY
Silver Creek Below Camino Dam



WUA Using Historic Flows For Below Normal WY
Silver Creek Below Camino Dam

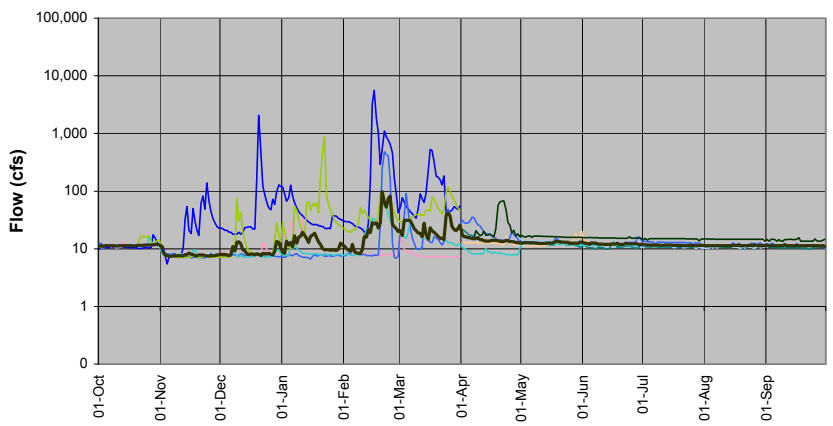


WUA Using Unimpaired Flows For Below Normal WY
Silver Creek Below Camino Dam

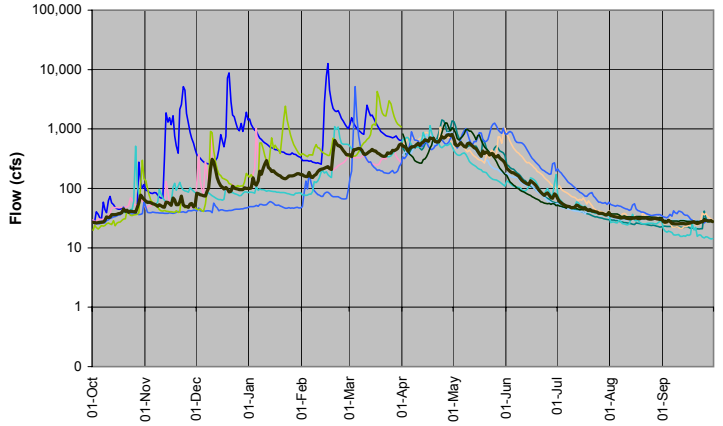


Camino Reach
Below Normal WY Plots

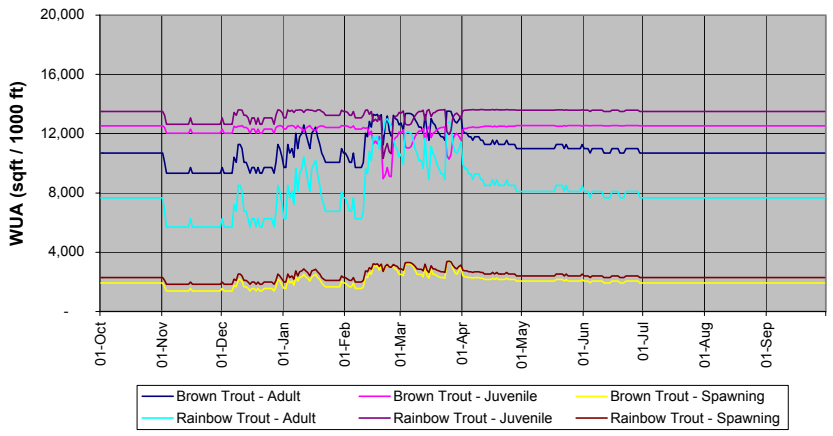
Historic Flows For Below Normal WY
Silver Creek below Round Tent



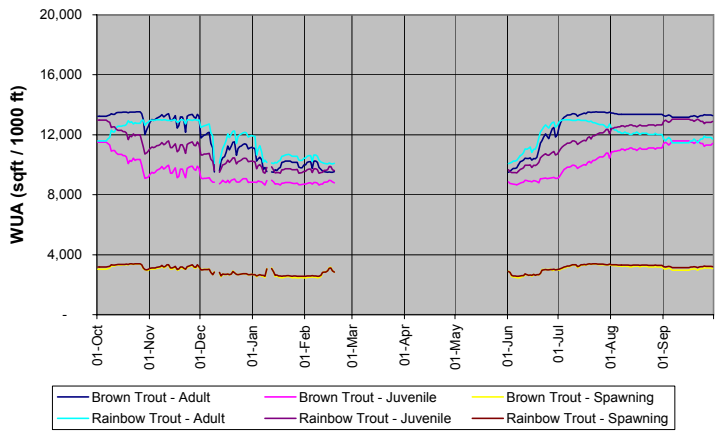
Unimpaired Flows For Below Normal WY
Silver Creek below Round Tent



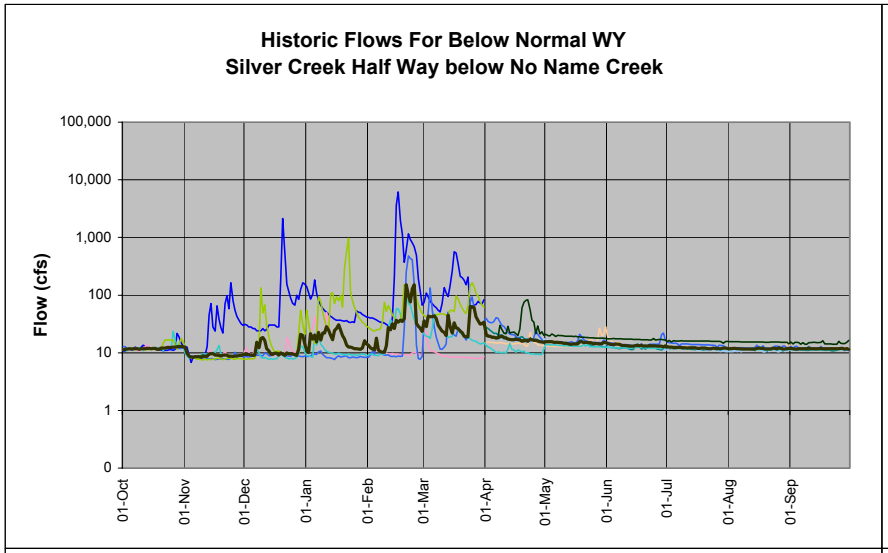
WUA Using Historic Flows For Below Normal WY
Silver Creek below Round Tent

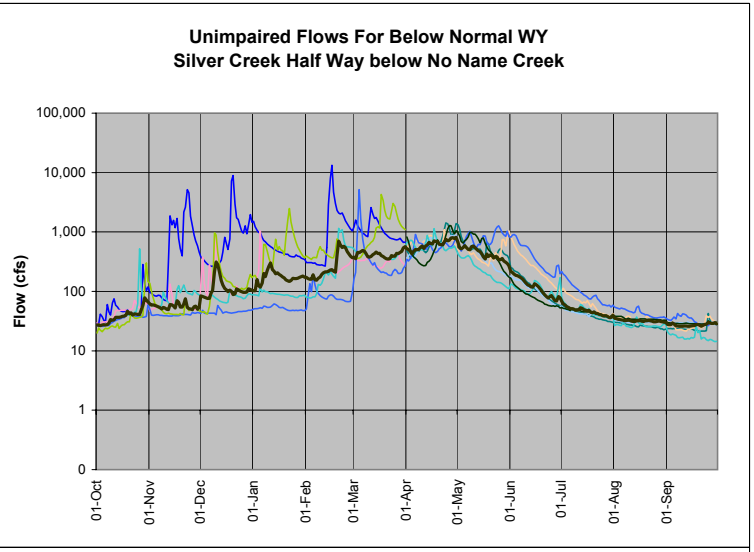


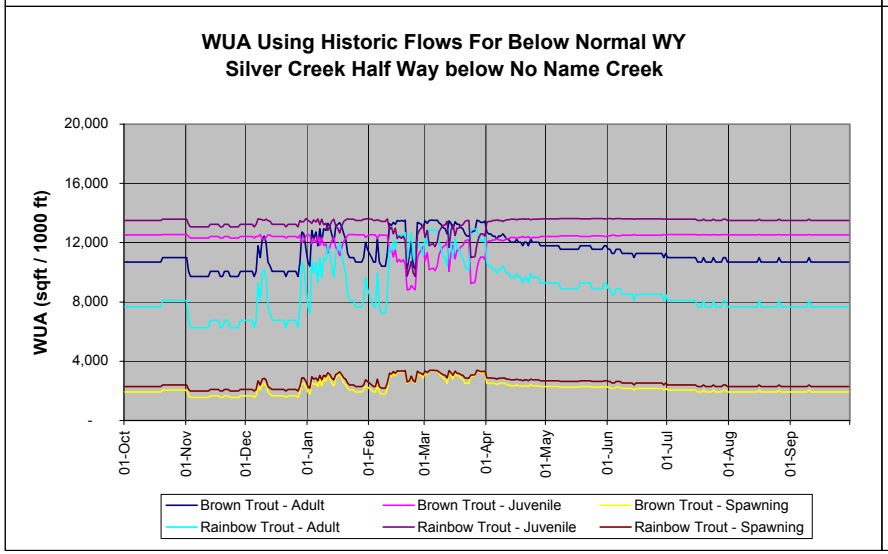
WUA Using Unimpaired Flows For Below Normal WY
Silver Creek below Round Tent

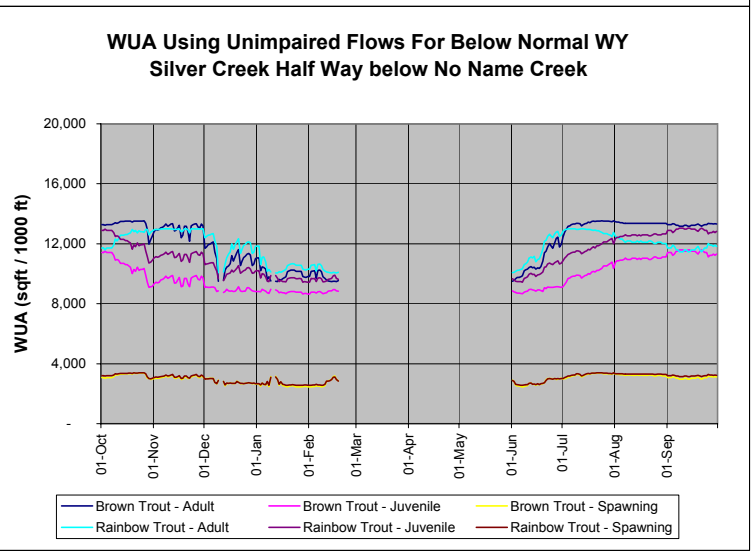


Camino Reach
Below Normal WY Plots

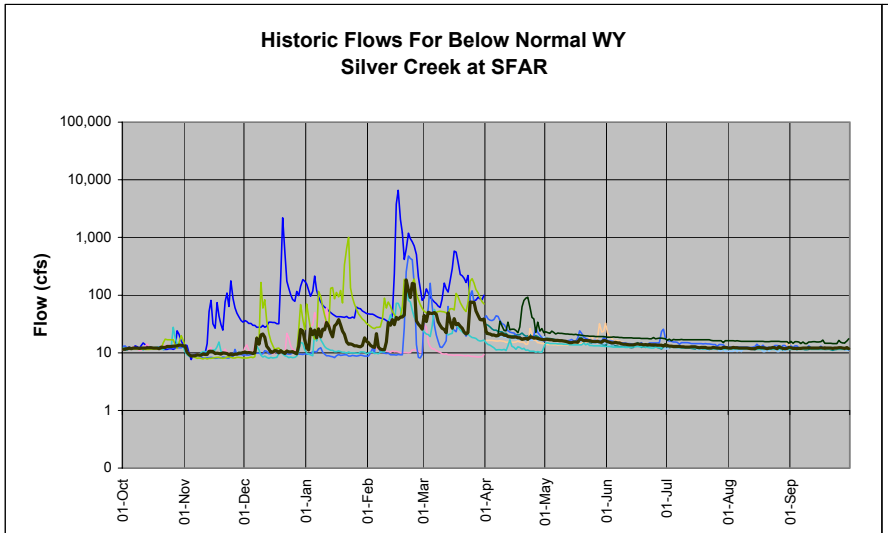


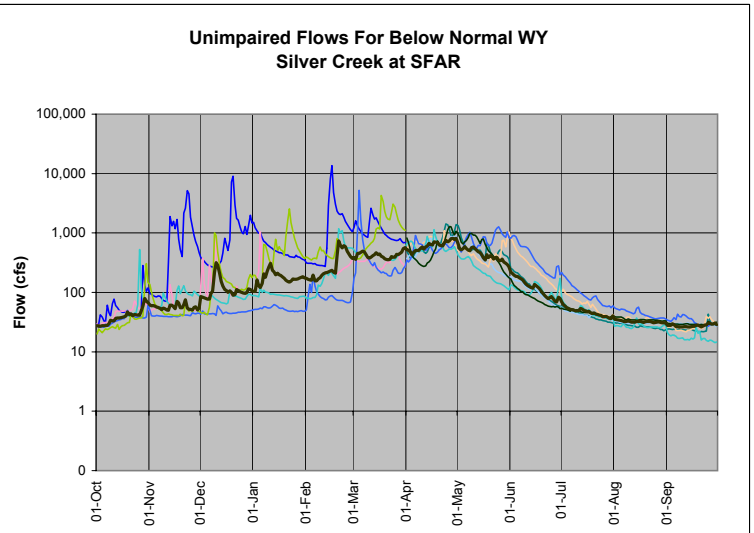


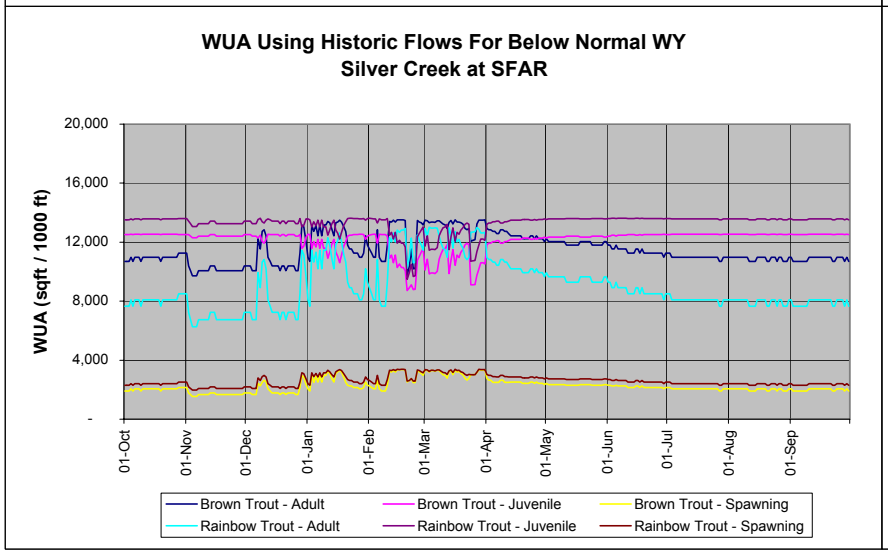


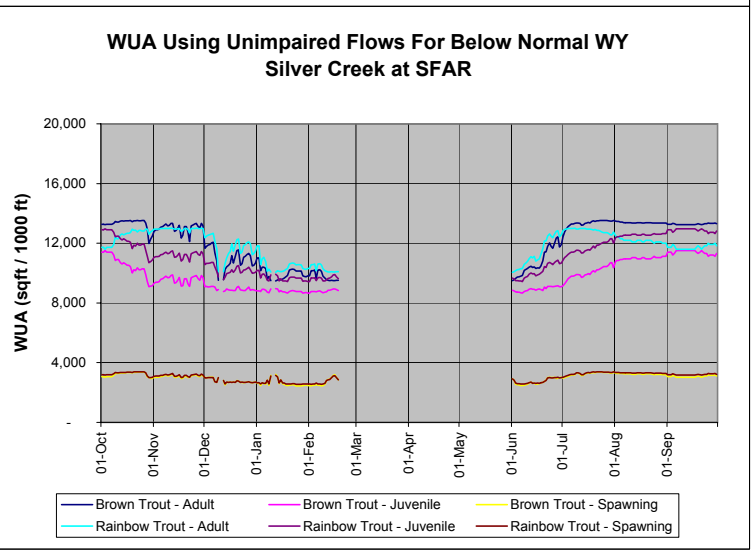


Camino Reach
Below Normal WY Plots

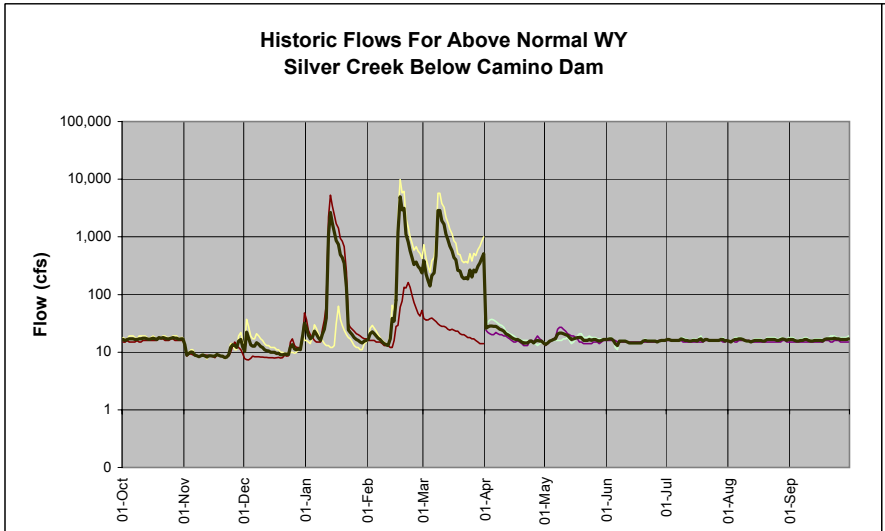


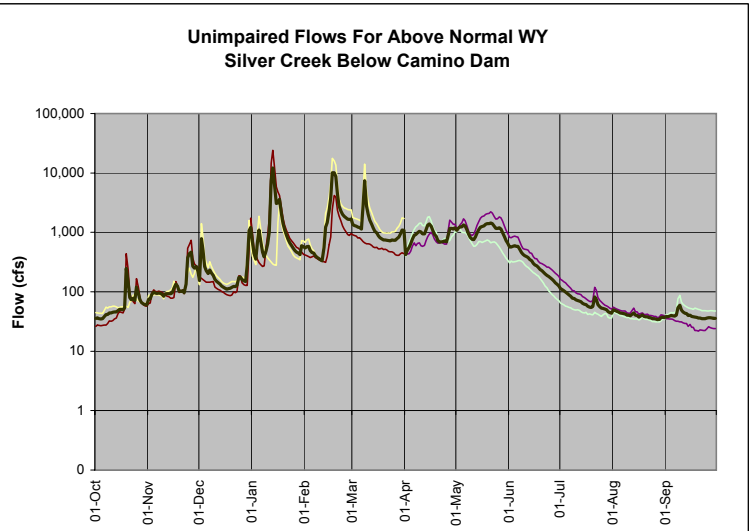


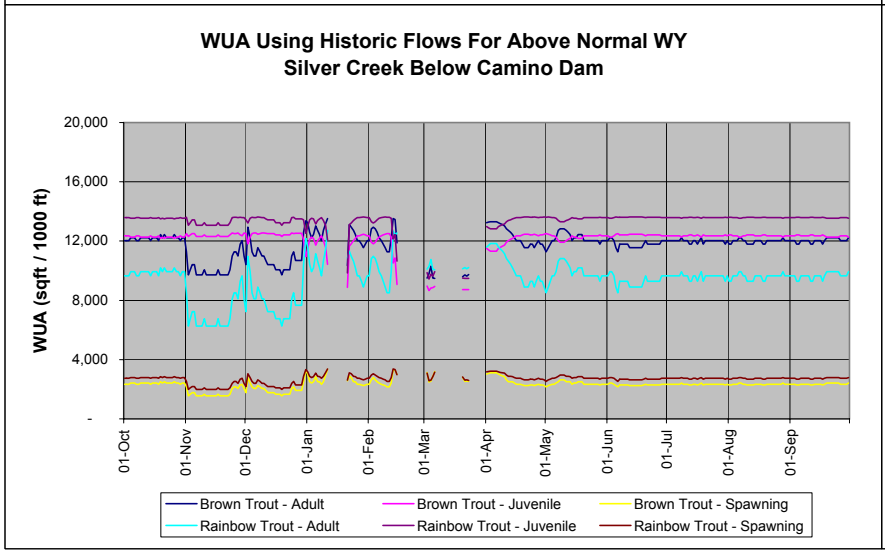


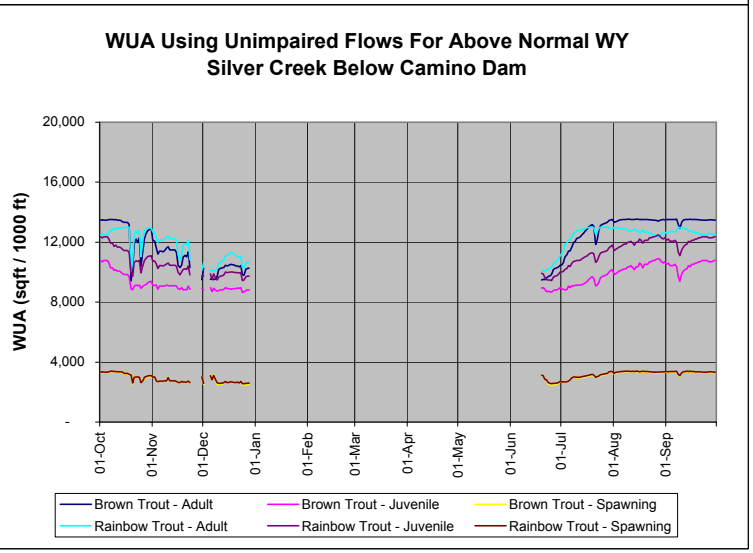


Camino Reach
Above Normal WY Plots

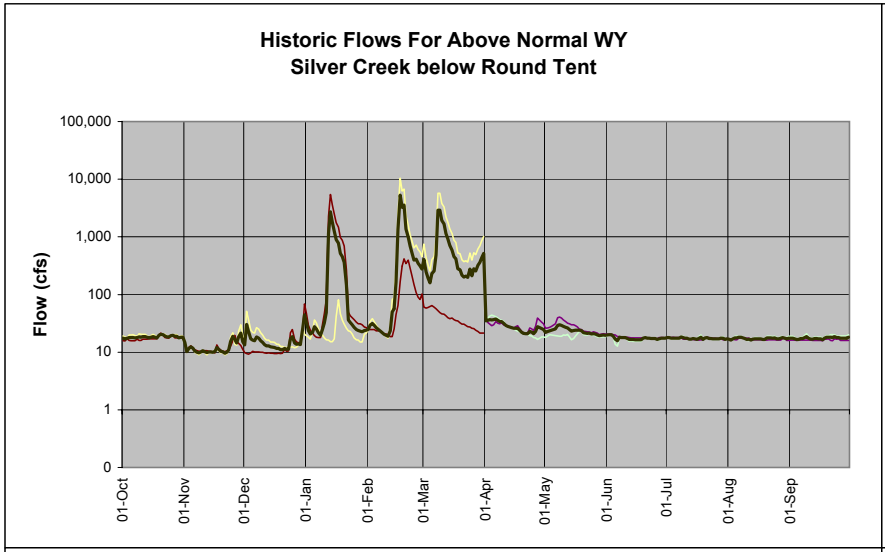


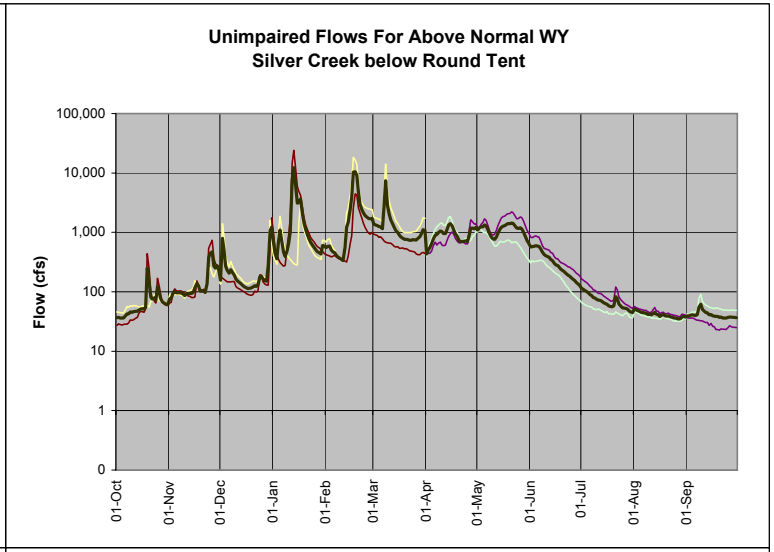


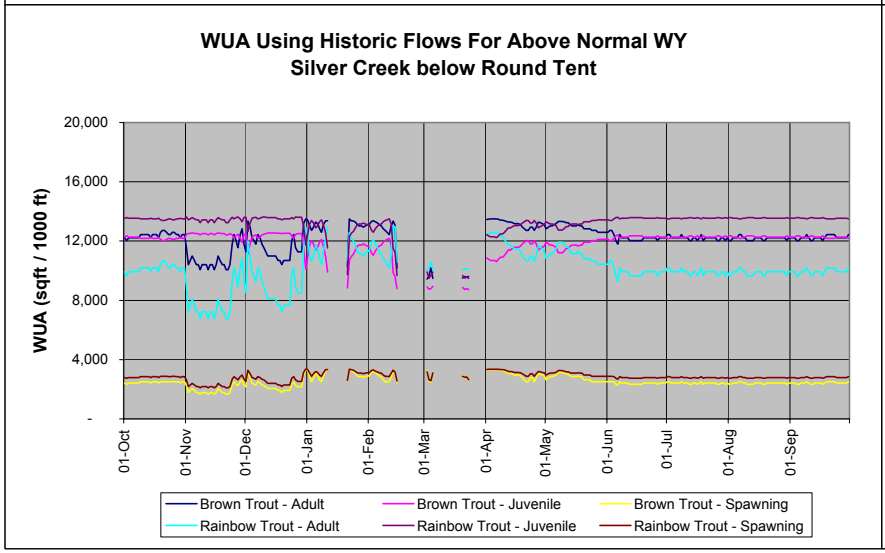


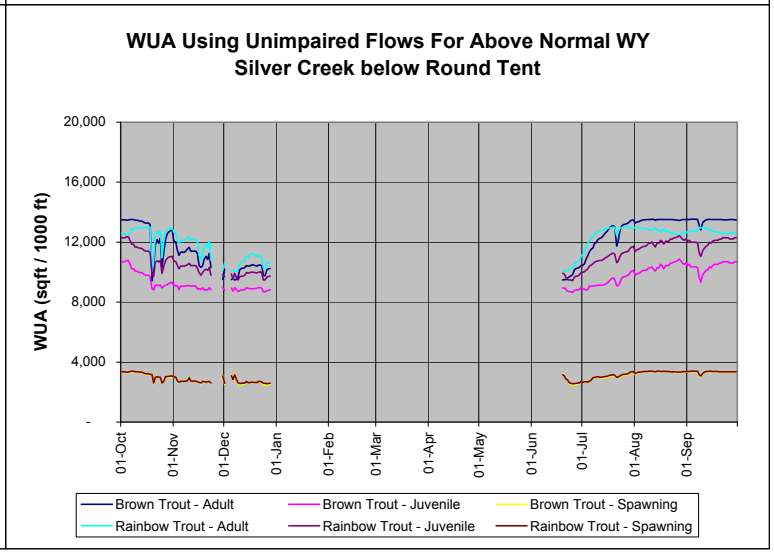


Camino Reach
Above Normal WY Plots

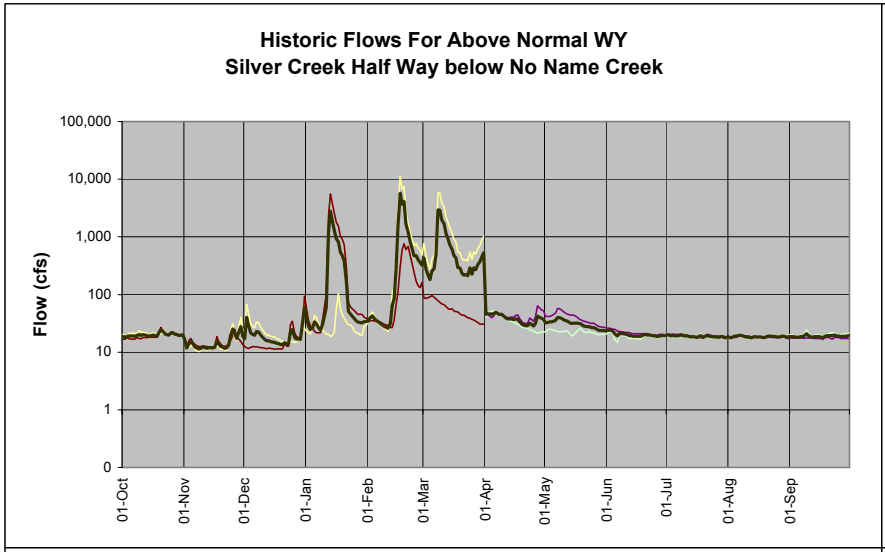


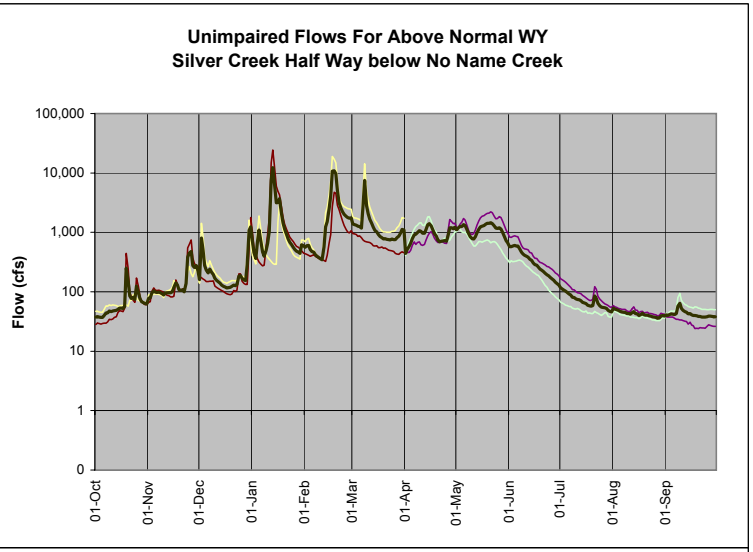


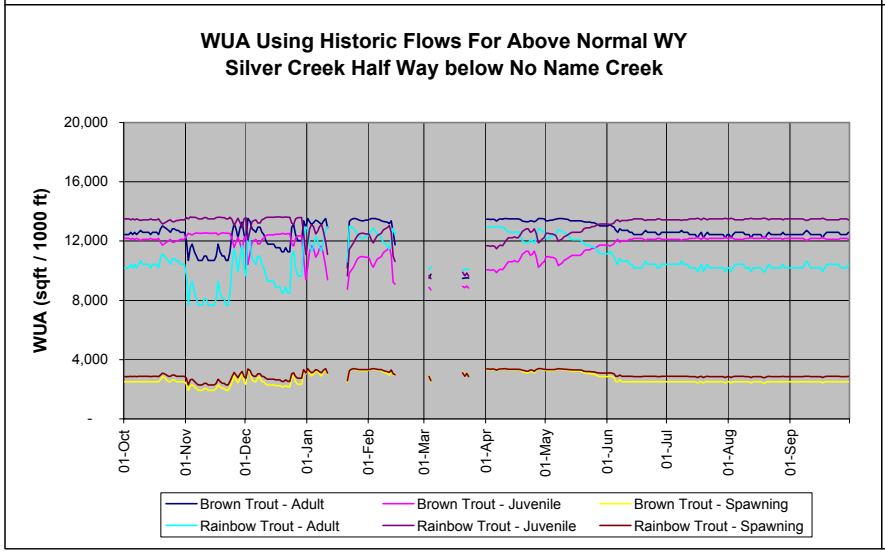


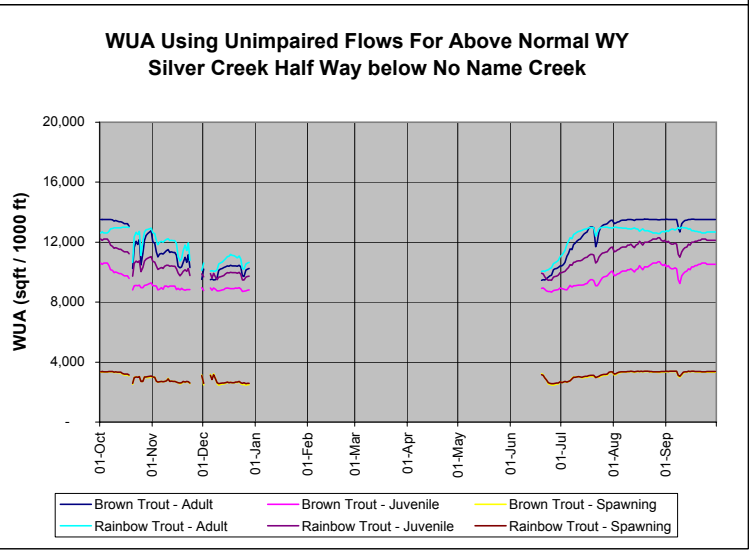


Camino Reach
Above Normal WY Plots

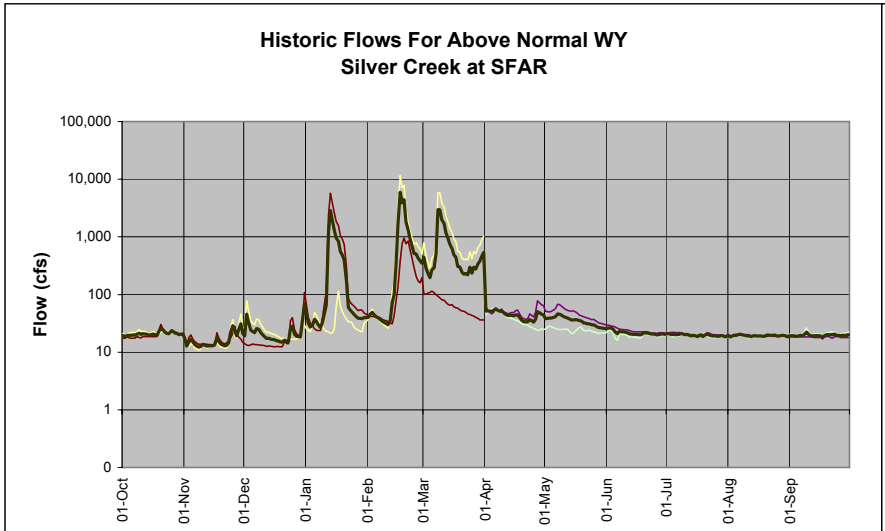


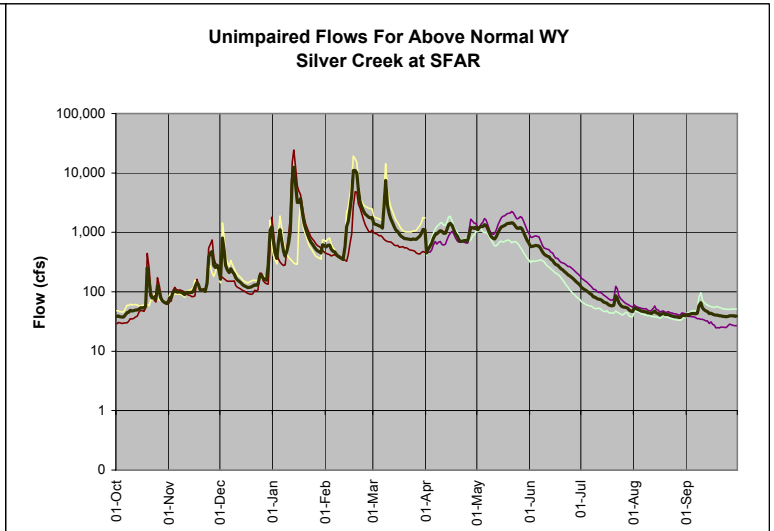


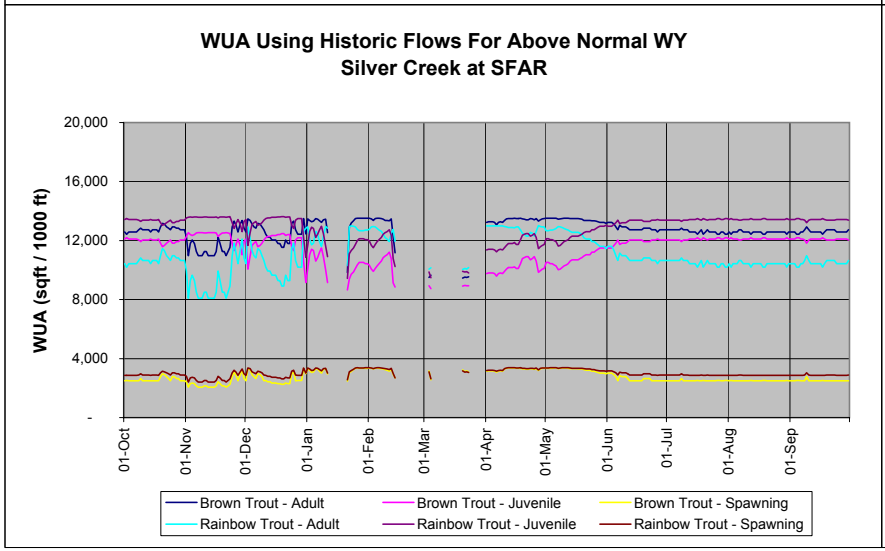


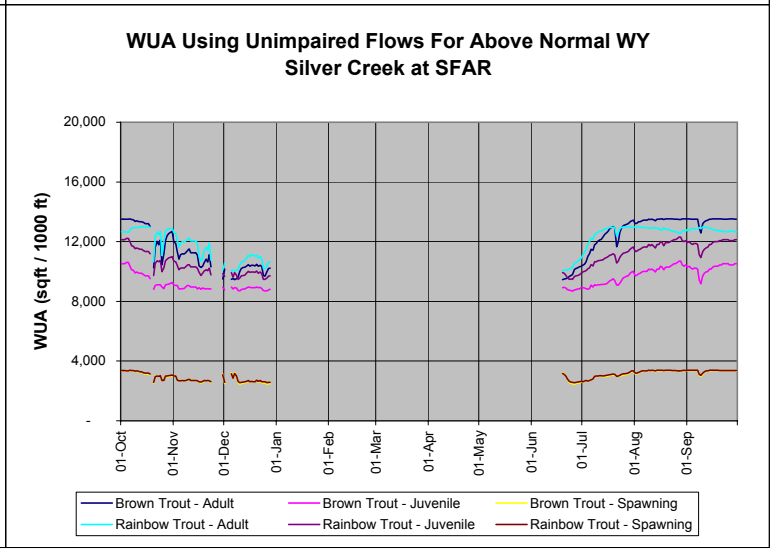


Camino Reach
Above Normal WY Plots

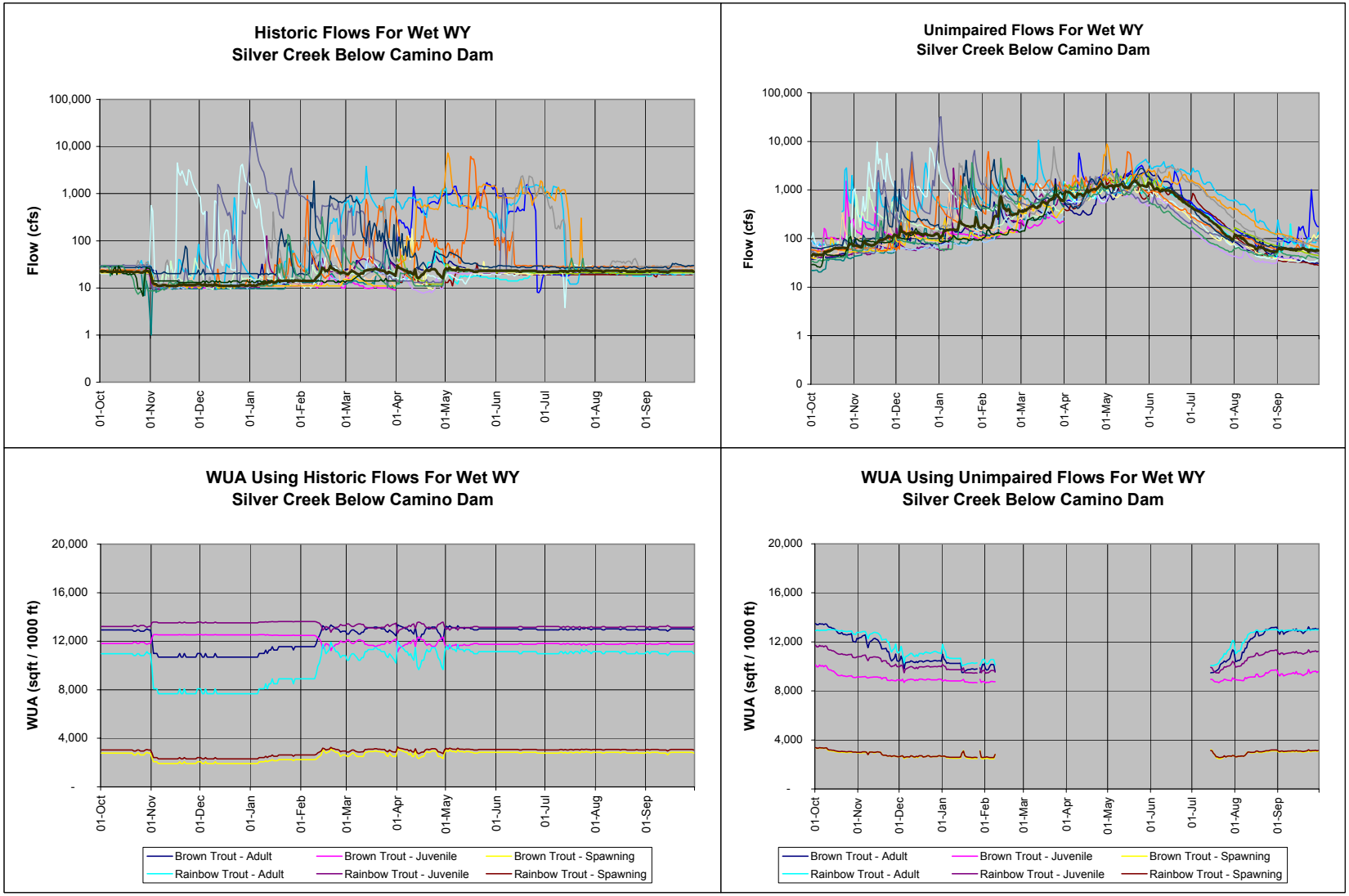






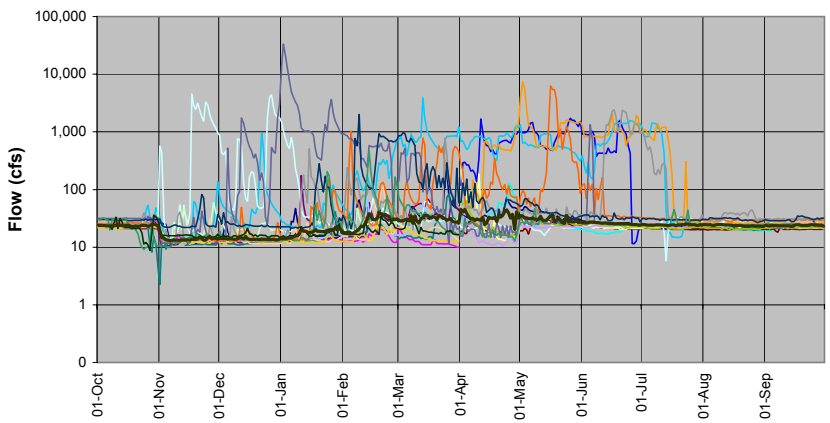


Camino Reach
Wet WY Plots

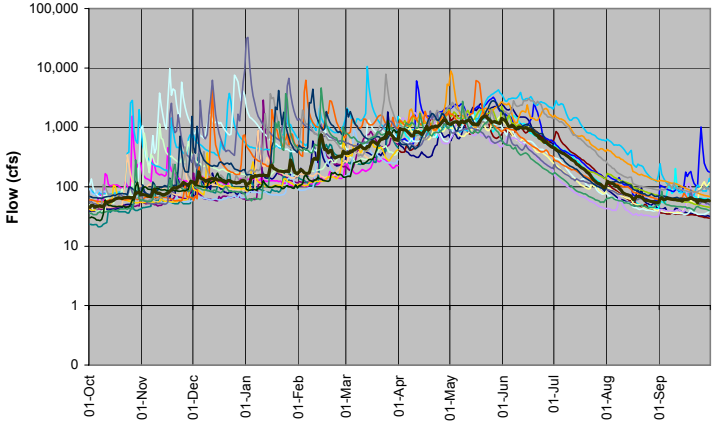


Camino Reach
Wet WY Plots

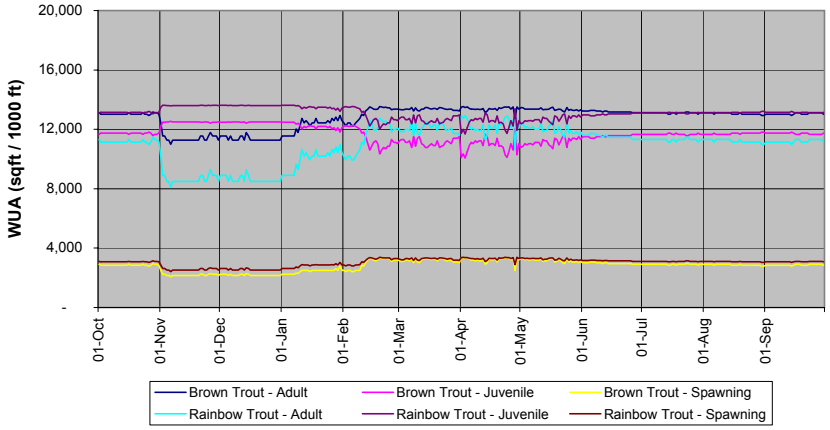
Historic Flows For Wet WY
Silver Creek below Round Tent



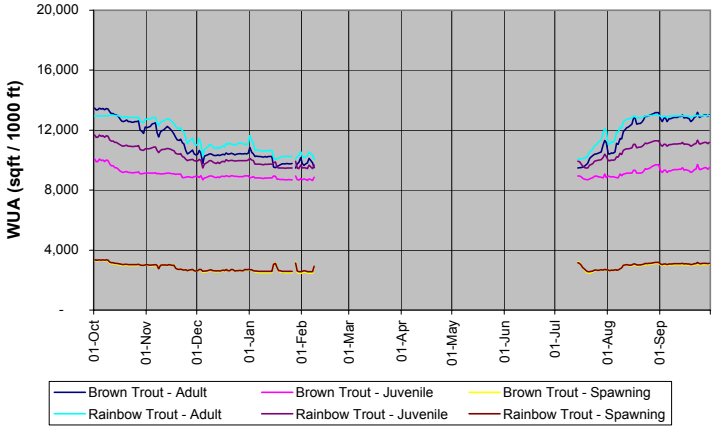
Unimpaired Flows For Wet WY
Silver Creek below Round Tent



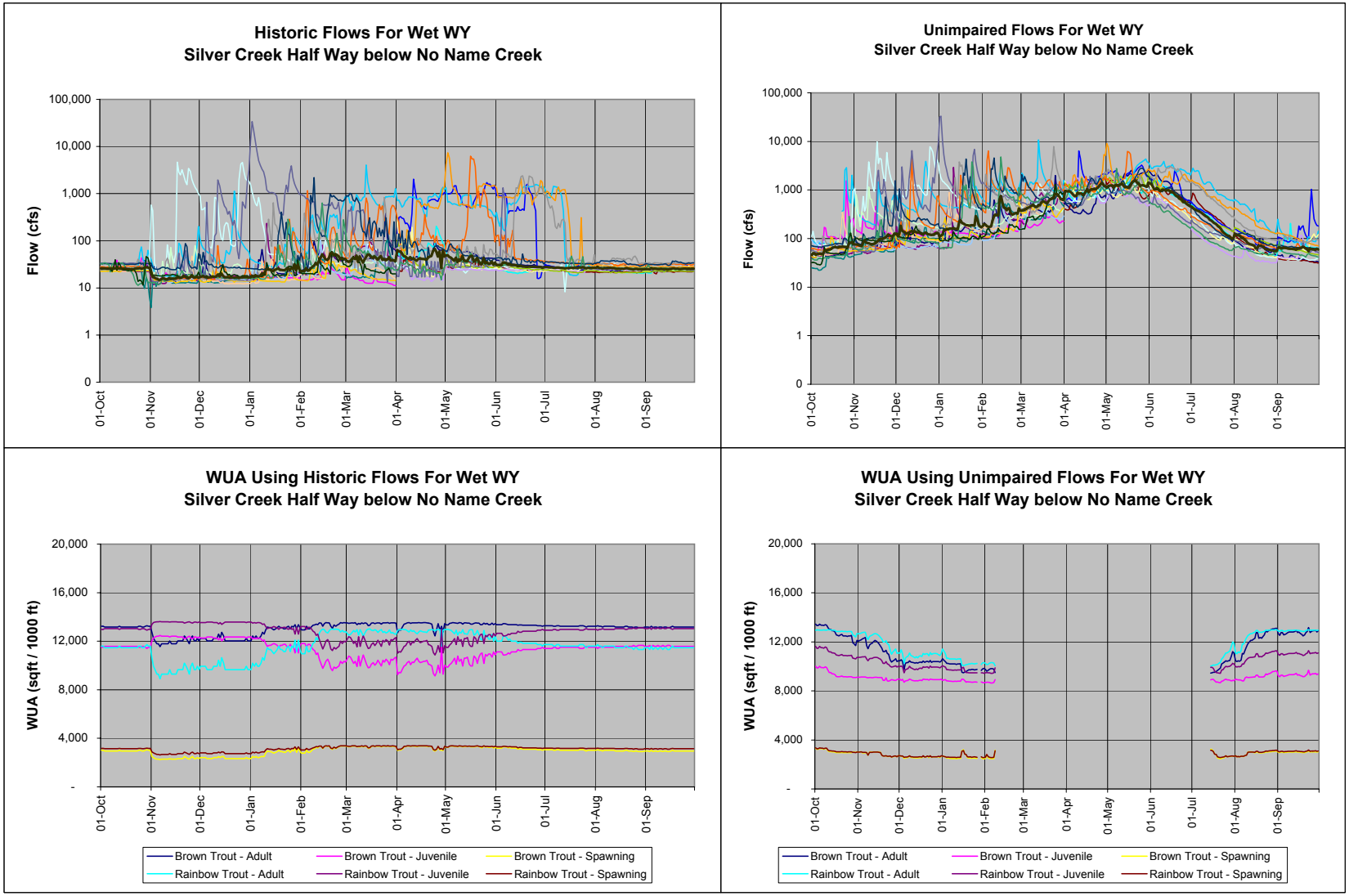
WUA Using Historic Flows For Wet WY
Silver Creek below Round Tent



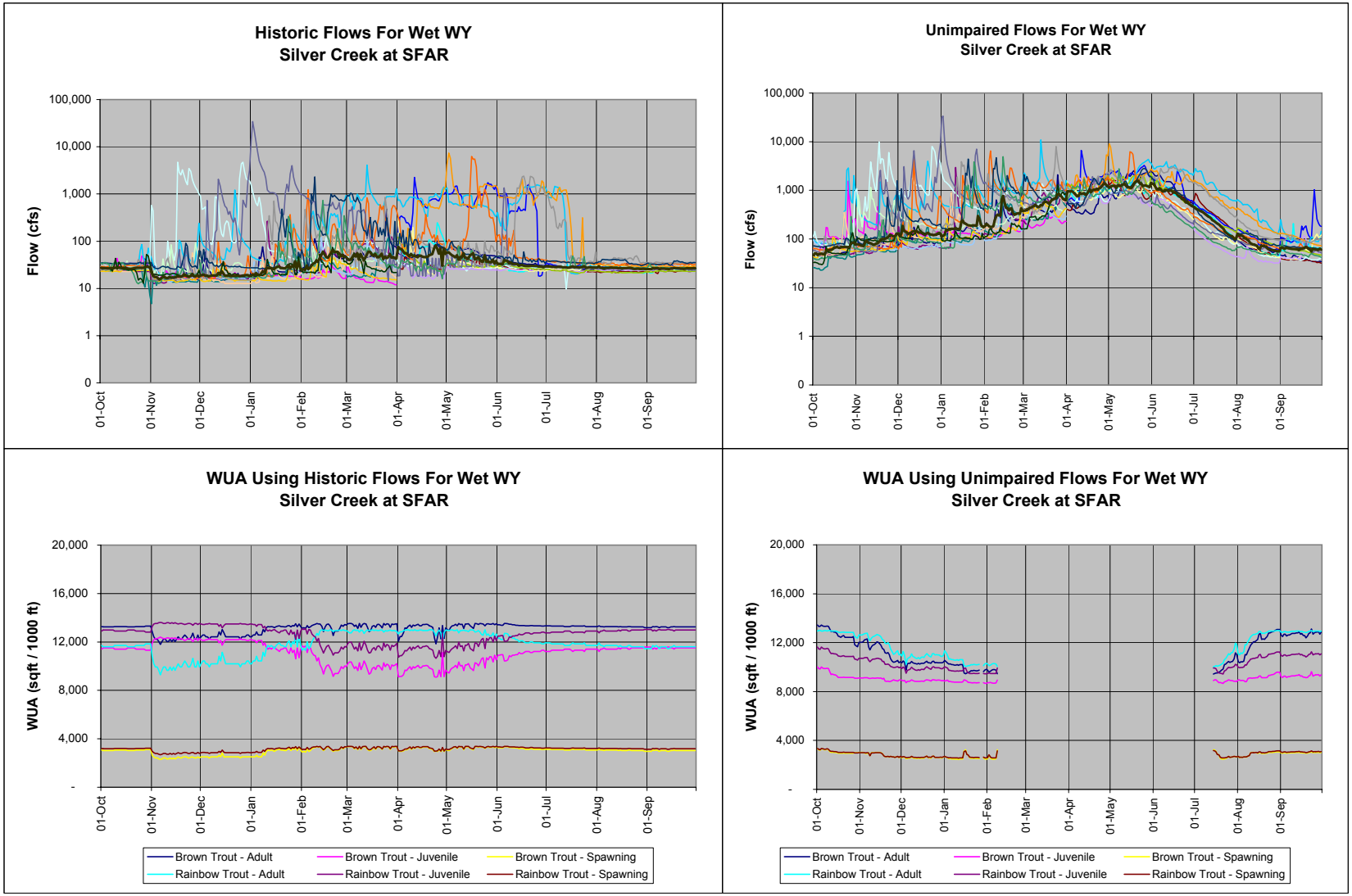
WUA Using Unimpaired Flows For Wet WY
Silver Creek below Round Tent



Camino Reach
Wet WY Plots



Camino Reach
Wet WY Plots



Brush Creek Dam Reach
Brush Creek

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Brush Creek Reach
Full Year Summary

Brush Creek below Brush Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	684,973	843,140	23.09	853,117	953,390	11.75	978,730	914,228	-6.59	1,174,265	1,039,239	-11.50
Brown Trout - Juvenile	1,238,483	1,727,121	39.45	1,608,660	1,942,306	20.74	1,679,067	1,751,756	4.33	1,890,568	1,973,057	4.36
Brown Trout - Spawning	140,942	173,502	23.10	175,966	197,110	12.02	200,444	202,609	1.08	247,911	232,007	-6.42
Rainbow Trout - Adult	676,237	697,054	3.08	804,887	796,917	-0.99	1,023,014	858,148	-16.12	1,310,566	988,780	-24.55
Rainbow Trout - Juvenile	1,328,829	1,811,681	36.34	1,714,626	2,040,435	19.00	1,814,542	1,874,141	3.28	2,081,265	2,117,465	1.74
Rainbow Trout - Spawning	154,166	193,441	25.48	194,603	220,135	13.12	216,195	224,569	3.87	265,435	256,862	-3.23

Brush Creek above Slab Creek Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	738,803	881,314	19.29	939,842	1,038,663	10.51	977,044	944,571	-3.32	1,102,981	1,057,650	-4.11
Brown Trout - Juvenile	1,299,610	1,669,474	28.46	1,692,784	1,952,866	15.36	1,588,508	1,643,605	3.47	1,690,983	1,761,831	4.19
Brown Trout - Spawning	152,296	186,933	22.74	195,262	224,300	14.87	207,293	198,543	-4.22	234,467	223,426	-4.71
Rainbow Trout - Adult	755,299	831,476	10.09	938,142	996,168	6.19	1,072,413	999,702	-6.78	1,278,406	1,173,920	-8.17
Rainbow Trout - Juvenile	1,402,936	1,785,456	27.27	1,820,721	2,095,109	15.07	1,743,849	1,786,545	2.45	1,885,316	1,935,970	2.69
Rainbow Trout - Spawning	166,249	207,503	24.81	213,993	250,098	16.87	221,315	222,224	0.41	249,109	248,108	-0.40

Brush Creek Reach
Partial Year Summary

Brush Creek below Brush Creek Dam

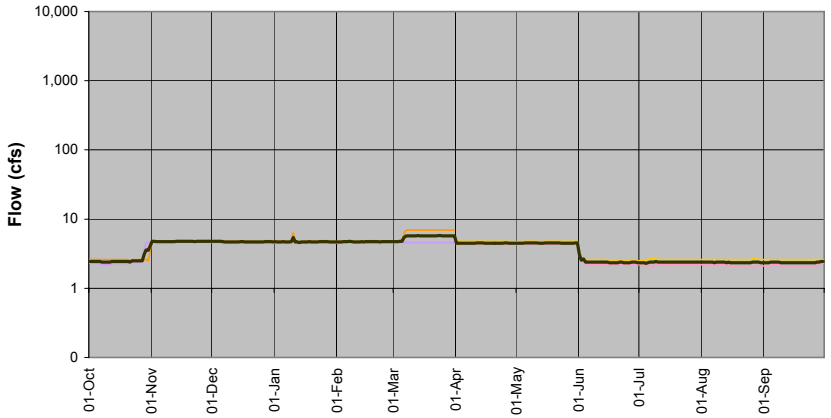
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	415,538	617,028	48.49	479,568	615,868	28.42	719,756	683,336	-5.06	776,138	685,204	-11.72
Brown Trout - Juvenile	832,529	1,289,032	54.83	978,094	1,287,971	31.68	1,299,815	1,335,823	2.77	1,312,157	1,335,293	1.76
Brown Trout - Spawning	27,525	32,727	18.90	19,130	32,371	69.21	36,482	38,427	5.33	41,388	38,655	-6.60
Rainbow Trout - Adult	357,747	489,453	36.82	399,288	487,352	22.06	714,661	620,965	-13.11	838,111	625,100	-25.42
Rainbow Trout - Juvenile	876,475	1,345,065	53.46	1,027,897	1,343,642	30.72	1,390,467	1,418,681	2.03	1,432,778	1,419,093	-0.96
Rainbow Trout - Spawning	57,121	57,143	0.04	63,928	57,143	-10.61	65,462	66,555	1.67	65,447	66,903	2.23

Brush Creek above Slab Creek Reservoir

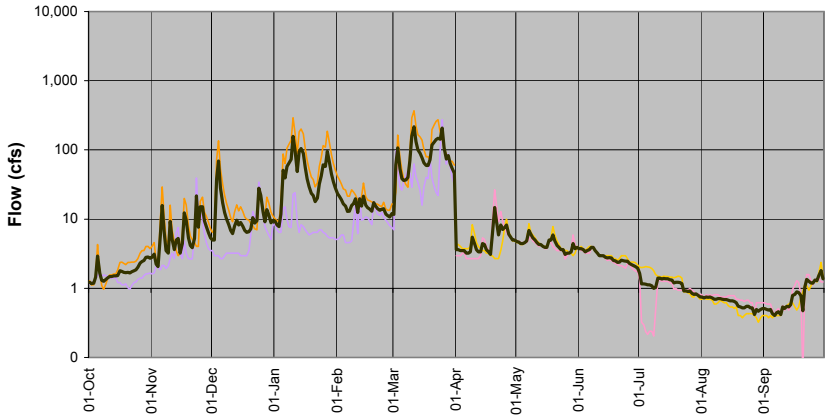
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	499,589	658,550	31.82	552,851	669,554	21.11	762,884	740,386	-2.95	792,660	756,144	-4.61
Brown Trout - Juvenile	954,954	1,304,595	36.61	1,083,390	1,321,681	21.99	1,285,663	1,320,251	2.69	1,250,601	1,293,093	3.40
Brown Trout - Spawning	33,466	37,933	13.35	26,036	35,326	35.68	40,586	41,118	1.31	44,094	42,336	-3.99
Rainbow Trout - Adult	463,569	579,483	25.00	493,949	595,828	20.63	812,544	761,317	-6.30	904,589	818,275	-9.54
Rainbow Trout - Juvenile	1,018,438	1,381,516	35.65	1,149,446	1,400,765	21.86	1,402,938	1,428,615	1.83	1,387,756	1,416,608	2.08
Rainbow Trout - Spawning	66,211	66,740	0.80	69,872	67,800	-2.97	65,861	65,719	-0.22	60,082	63,282	5.33

Brush Creek Reach
Critical WY Plots

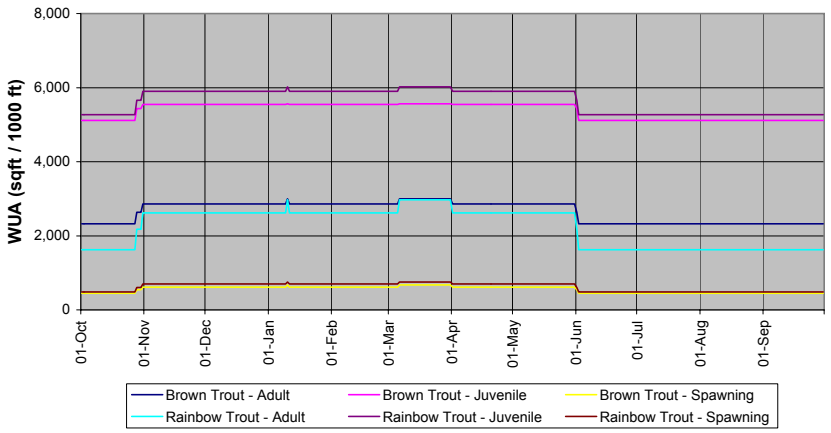
Historic Flows For Critical WY
Brush Creek Below Brush Creek Dam



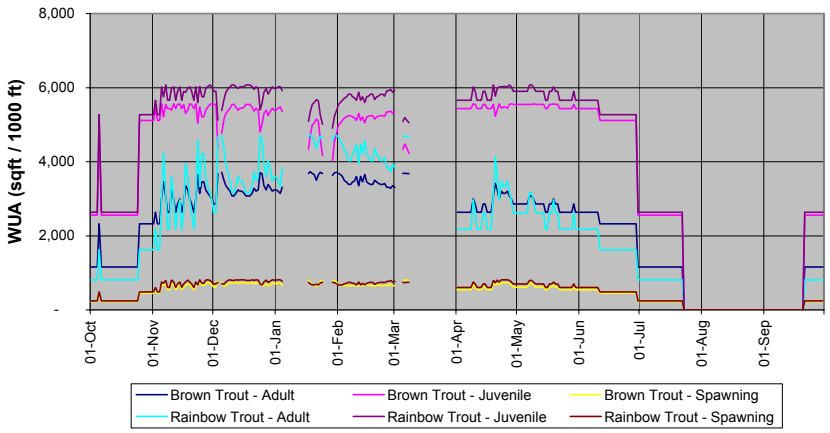
Unimpaired Flows For Critical WY
Brush Creek Below Brush Creek Dam



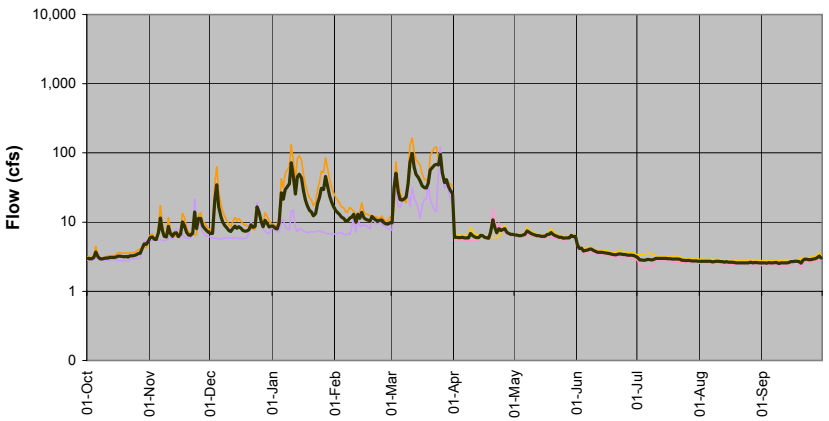
WUA Using Historic Flows For Critical WY
Brush Creek Below Brush Creek Dam

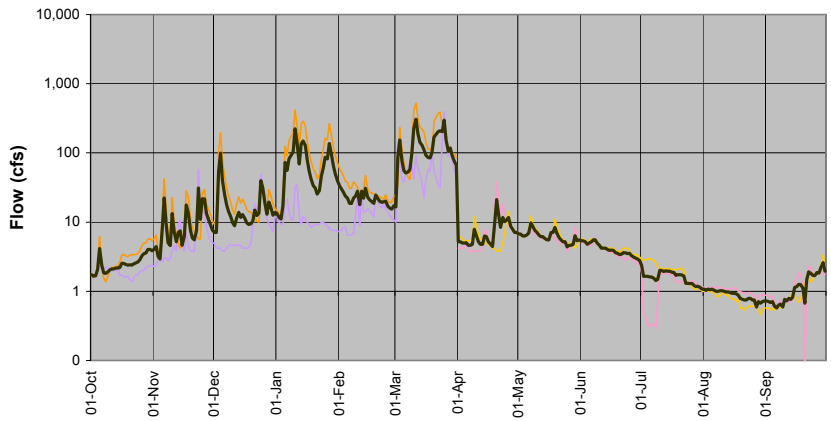


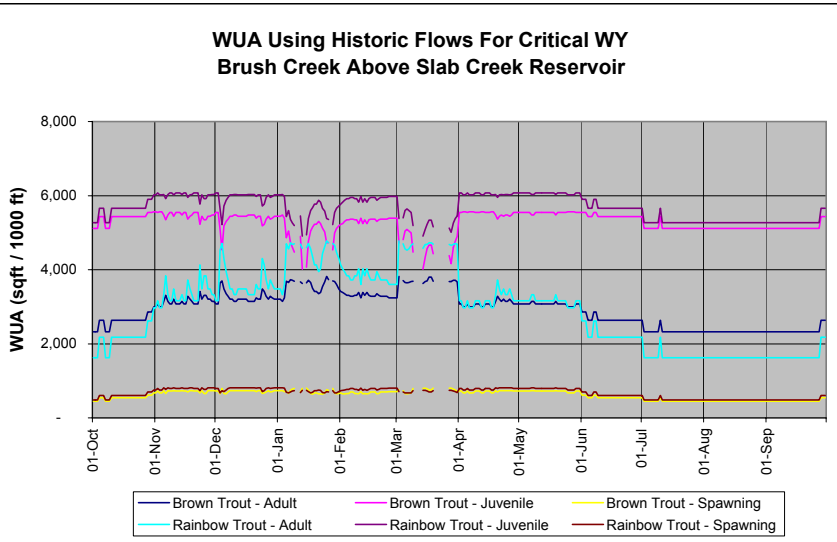
WUA Using Unimpaired Flows For Critical WY
Brush Creek Below Brush Creek Dam

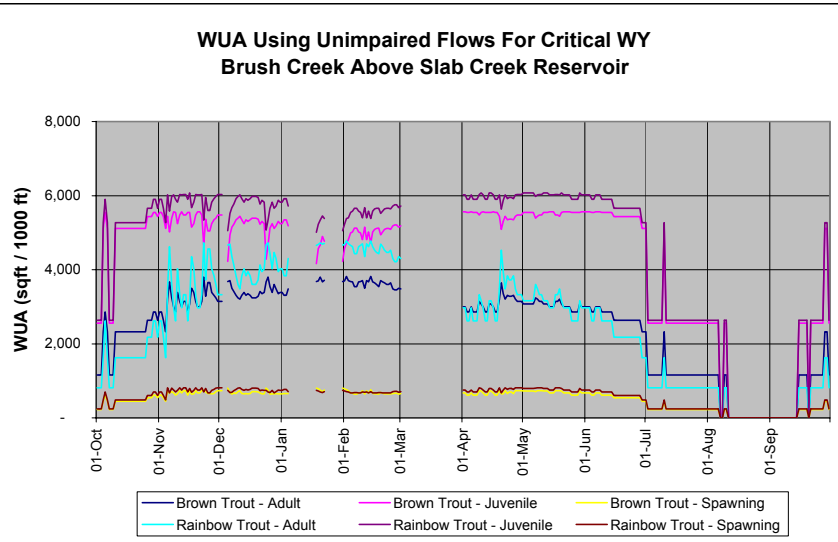


Brush Creek Reach
Critical WY Plots



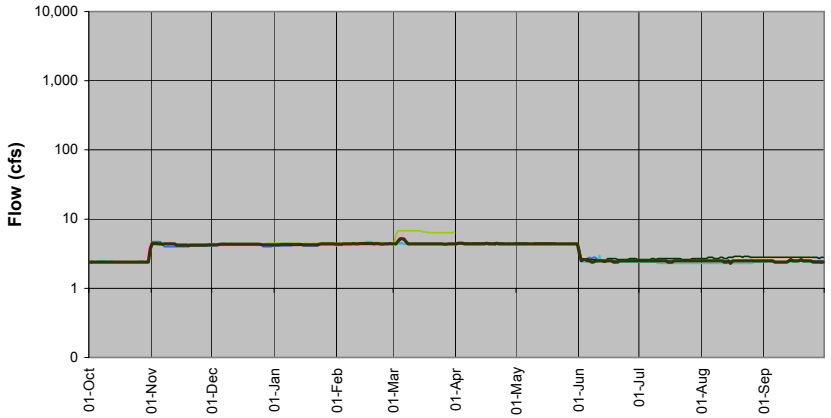




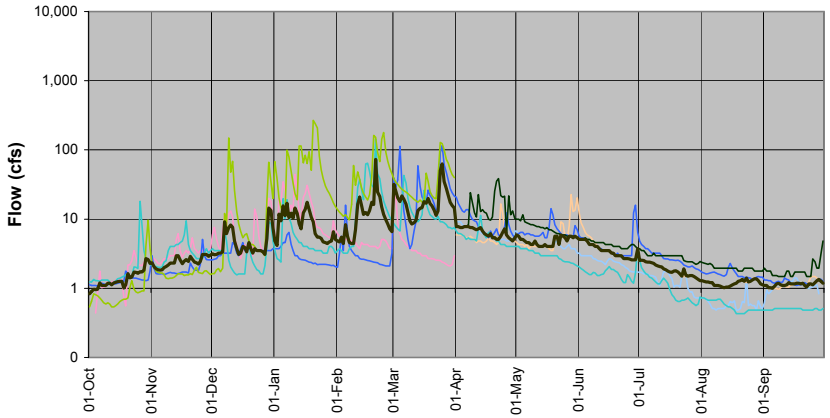


Brush Creek Reach
Below Normal WY Plots

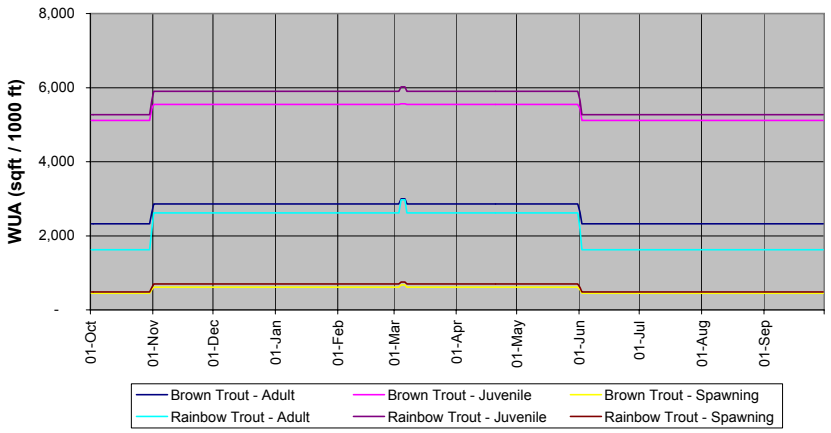
Historic Flows For Below Normal WY
Brush Creek Below Brush Creek Dam



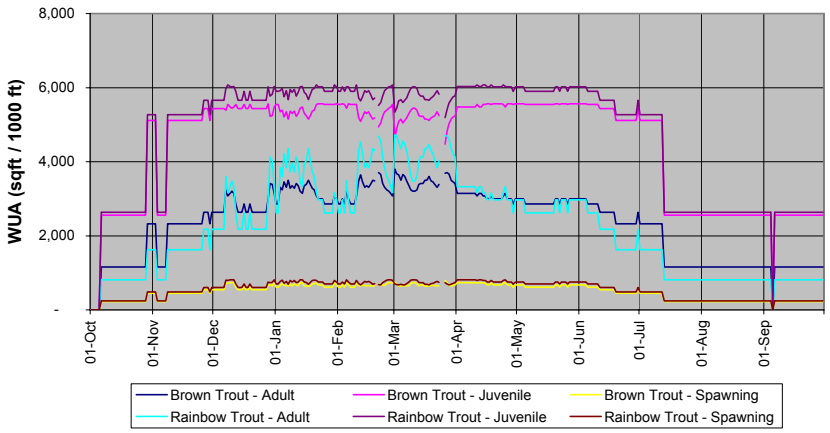
Unimpaired Flows For Below Normal WY
Brush Creek Below Brush Creek Dam



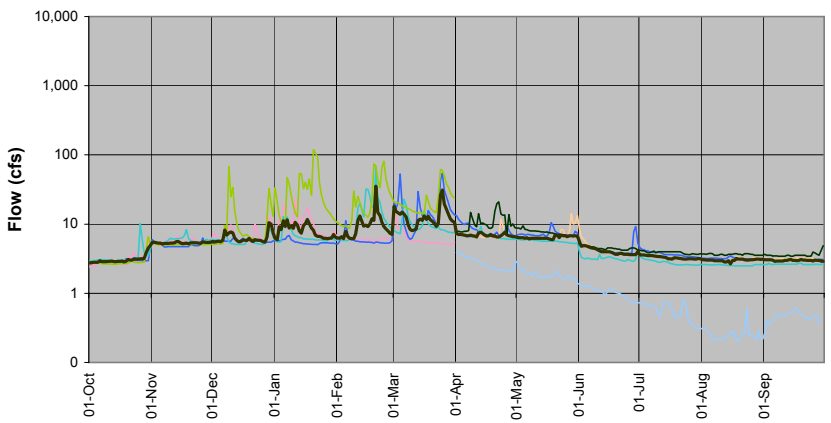
WUA Using Historic Flows For Below Normal WY
Brush Creek Below Brush Creek Dam

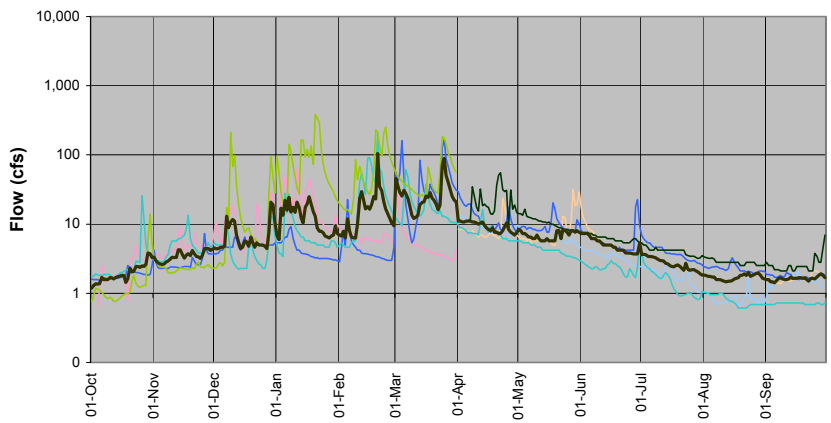


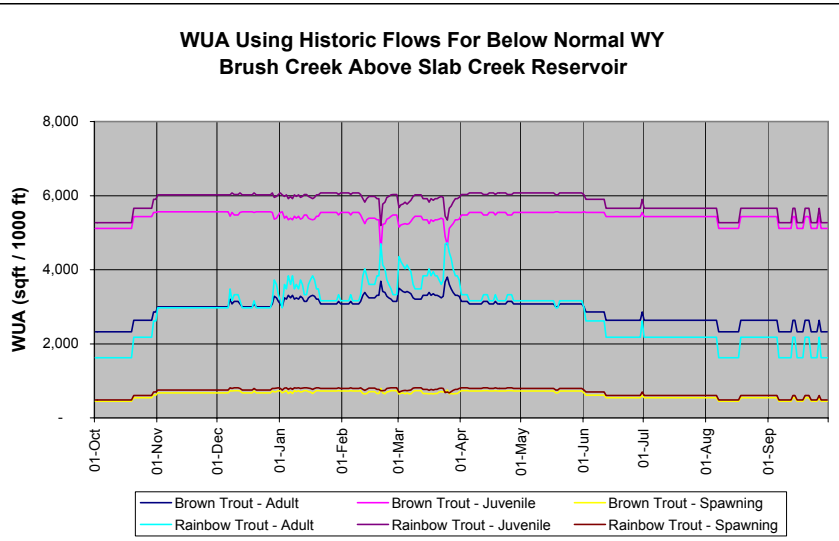
WUA Using Unimpaired Flows For Below Normal WY
Brush Creek Below Brush Creek Dam

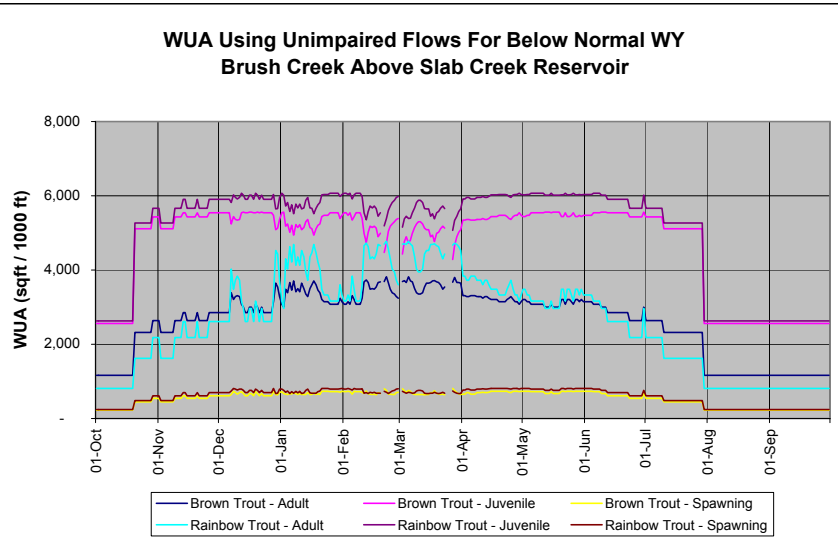


Brush Creek Reach
Below Normal WY Plots



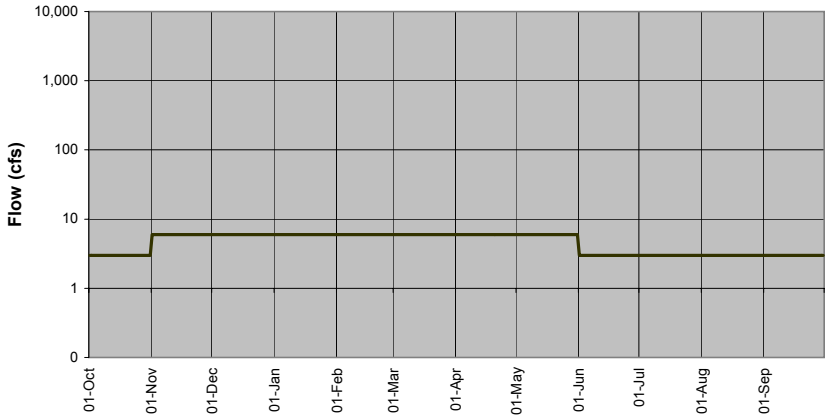




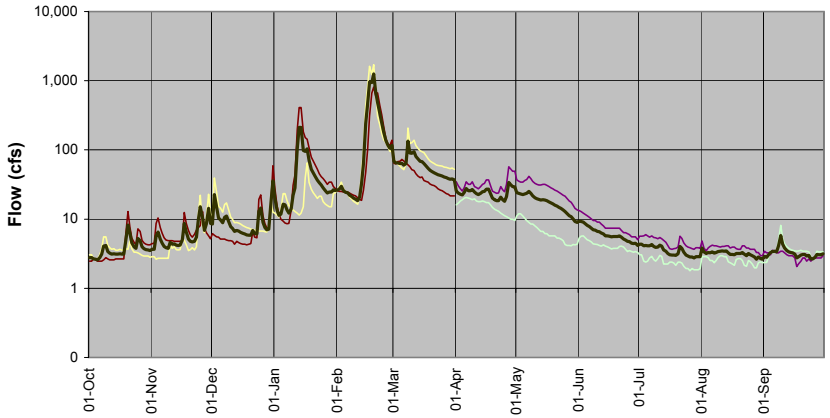


Brush Creek Reach
Above Normal WY Plots

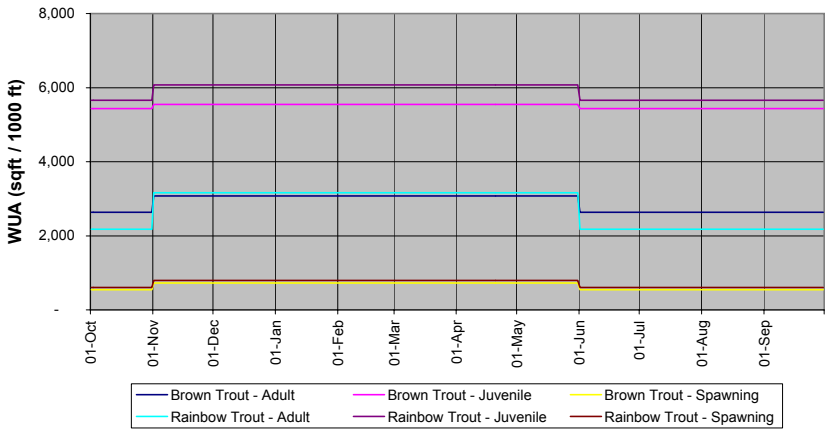
Historic Flows For Above Normal WY
Brush Creek Below Brush Creek Dam



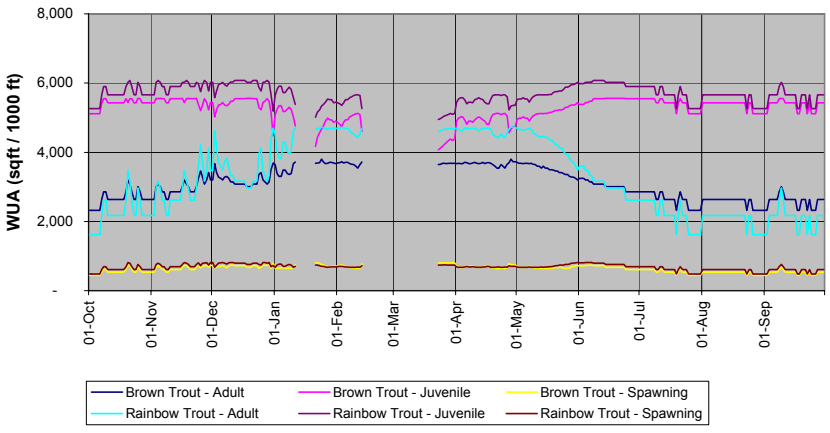
Unimpaired Flows For Above Normal WY
Brush Creek Below Brush Creek Dam



WUA Using Historic Flows For Above Normal WY
Brush Creek Below Brush Creek Dam

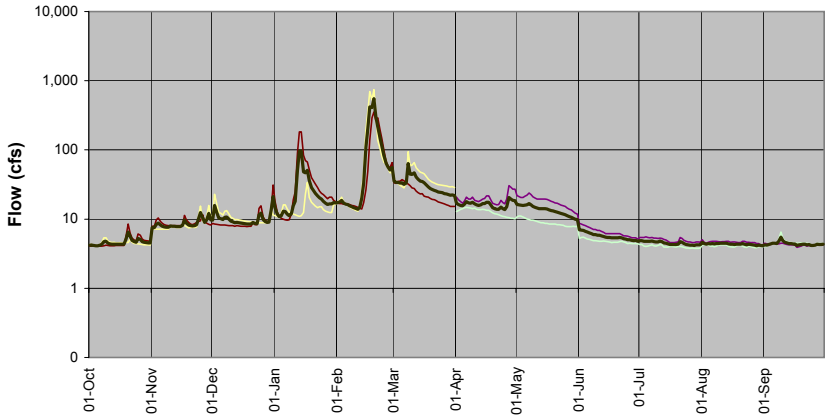


WUA Using Unimpaired Flows For Above Normal WY
Brush Creek Below Brush Creek Dam

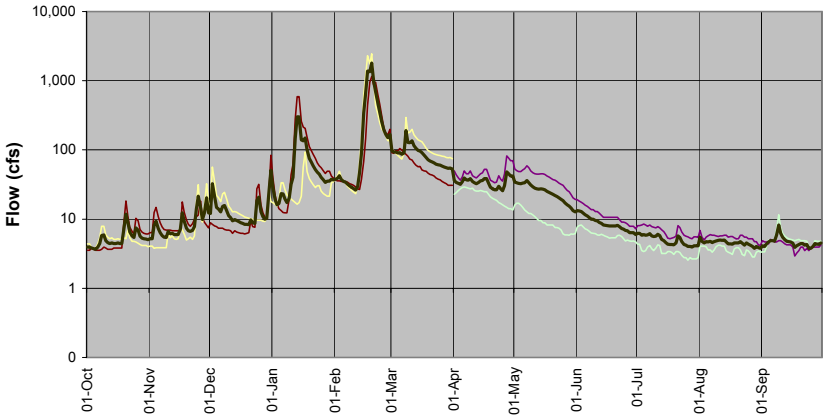


Brush Creek Reach
Above Normal WY Plots

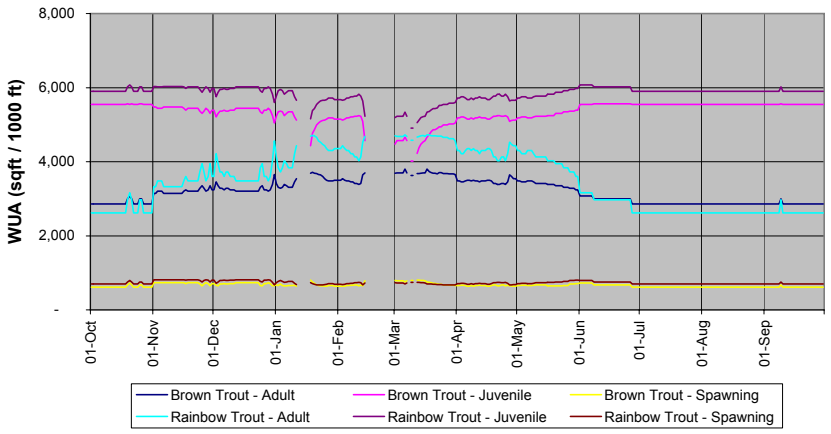
Historic Flows For Above Normal WY
Brush Creek Above Slab Creek Reservoir



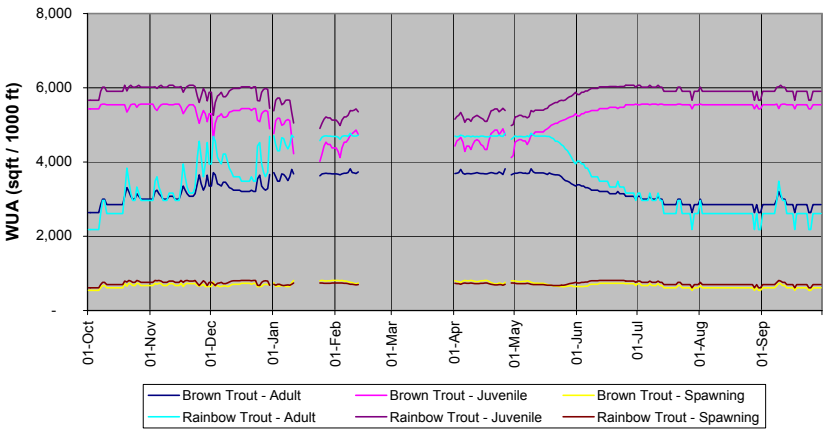
Unimpaired Flows For Above Normal WY
Brush Creek Above Slab Creek Reservoir



WUA Using Historic Flows For Above Normal WY
Brush Creek Above Slab Creek Reservoir

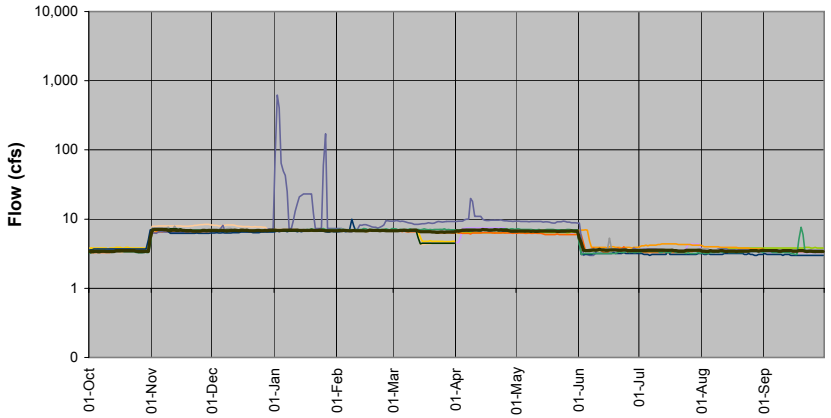


WUA Using Unimpaired Flows For Above Normal WY
Brush Creek Above Slab Creek Reservoir

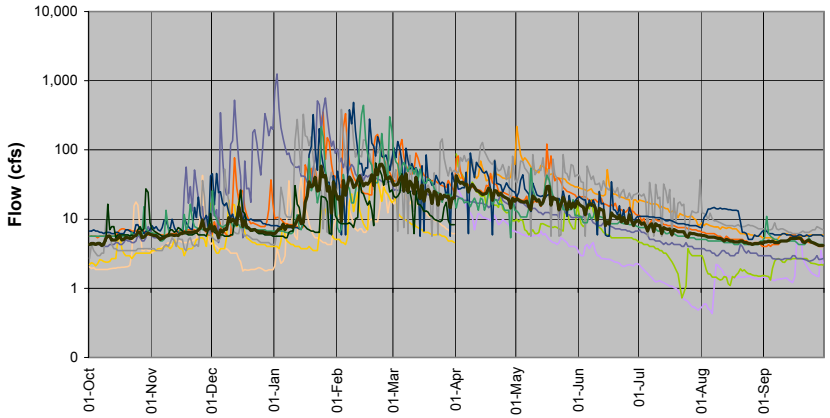


Brush Creek Reach
Wet WY Plots

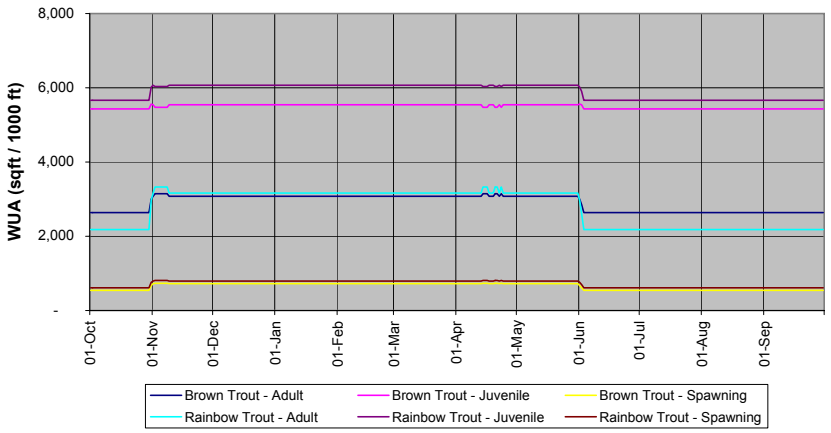
Historic Flows For Wet WY
Brush Creek Below Brush Creek Dam



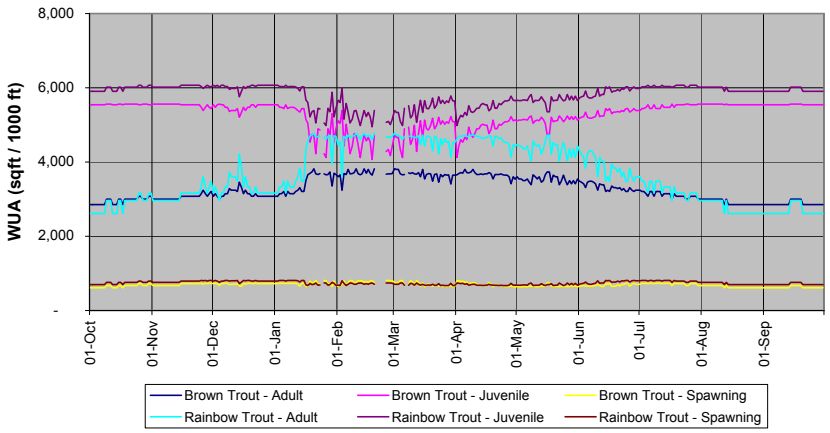
Unimpaired Flows For Wet WY
Brush Creek Below Brush Creek Dam



WUA Using Historic Flows For Wet WY
Brush Creek Below Brush Creek Dam

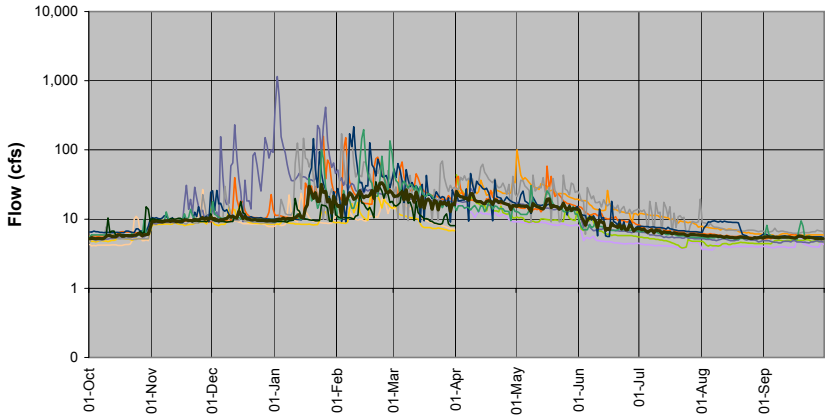


WUA Using Unimpaired Flows For Wet WY
Brush Creek Below Brush Creek Dam

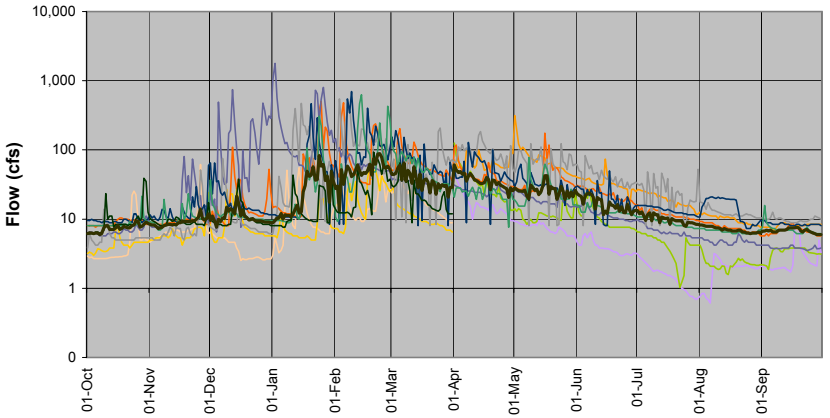


Brush Creek Reach
Wet WY Plots

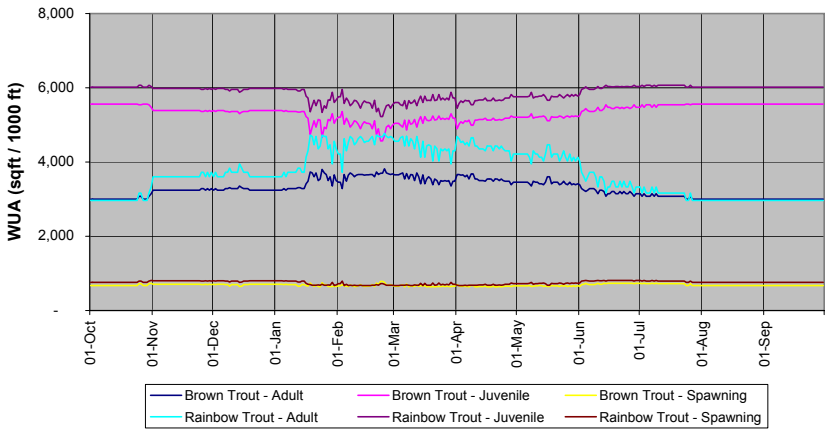
Historic Flows For Wet WY
Brush Creek Above Slab Creek Reservoir



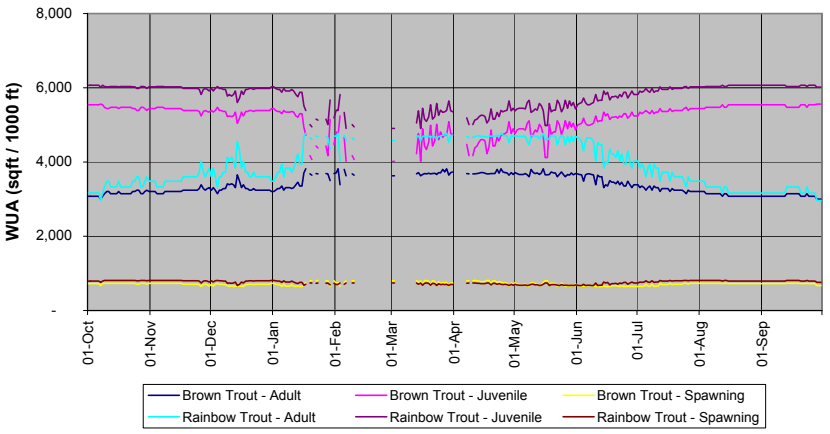
Unimpaired Flows For Wet WY
Brush Creek Above Slab Creek Reservoir



WUA Using Historic Flows For Wet WY
Brush Creek Above Slab Creek Reservoir



WUA Using Unimpaired Flows For Wet WY
Brush Creek Above Slab Creek Reservoir



Slab Creek Dam Reach
South Fork American River

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Slab Creek Reach
Full Year Summary

SFAR Below Slab Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,863,836	3,338,662	-31.36	5,347,007	3,766,291	-29.56	4,097,808	3,119,729	-23.87	4,702,892	3,839,063	-18.37
Brown Trout - Juvenile	3,476,002	4,533,757	30.43	3,649,601	4,730,201	29.61	2,250,184	3,737,195	66.08	1,987,951	4,205,443	111.55
Brown Trout - Spawning	461,364	315,769	-31.56	506,953	365,151	-27.97	396,331	311,376	-21.44	477,517	378,140	-20.81
Rainbow Trout - Adult	4,721,431	2,531,547	-46.38	5,266,161	2,962,970	-43.74	4,277,871	2,480,348	-42.02	5,229,793	3,152,124	-39.73
Rainbow Trout - Juvenile	4,309,997	5,128,309	18.99	4,563,989	5,408,393	18.50	2,881,011	4,331,426	50.34	2,556,431	4,950,478	93.65
Rainbow Trout - Spawning	296,777	169,962	-42.73	331,994	197,018	-40.66	283,257	165,605	-41.54	373,577	201,802	-45.98

SFAR below Iowa Canyon Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,829,173	3,488,411	-27.76	5,316,408	3,940,661	-25.88	4,104,599	3,232,882	-21.24	4,690,688	4,006,219	-14.59
Brown Trout - Juvenile	3,442,808	4,668,596	35.60	3,609,344	4,916,105	36.20	2,227,240	3,692,269	65.78	1,971,192	4,139,090	109.98
Brown Trout - Spawning	457,113	334,615	-26.80	502,882	375,844	-25.26	397,803	323,902	-18.58	477,467	360,630	-24.47
Rainbow Trout - Adult	4,689,421	2,664,648	-43.18	5,242,184	3,110,342	-40.67	4,296,145	2,615,541	-39.12	5,224,034	3,368,020	-35.53
Rainbow Trout - Juvenile	4,273,742	5,300,848	24.03	4,520,743	5,631,216	24.56	2,855,918	4,314,352	51.07	2,530,486	4,919,597	94.41
Rainbow Trout - Spawning	293,851	179,381	-38.96	329,700	201,782	-38.80	285,279	173,078	-39.33	374,096	187,371	-49.91

SFAR below Mosquito Rd Bridge

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,839,127	3,613,975	-25.32	5,332,008	4,111,990	-22.88	4,088,830	3,339,625	-18.32	4,609,868	4,115,299	-10.73
Brown Trout - Juvenile	3,422,974	4,668,177	36.38	3,581,452	4,926,590	37.56	2,193,199	3,617,169	64.93	1,929,622	3,987,978	106.67
Brown Trout - Spawning	458,068	354,693	-22.57	504,390	385,184	-23.63	396,664	322,673	-18.65	469,752	361,461	-23.05
Rainbow Trout - Adult	4,709,314	2,798,969	-40.57	5,273,522	3,295,379	-37.51	4,289,283	2,757,100	-35.72	5,139,756	3,554,177	-30.85
Rainbow Trout - Juvenile	4,253,768	5,338,643	25.50	4,492,674	5,693,727	26.73	2,817,598	4,265,194	51.38	2,473,853	4,793,523	93.77
Rainbow Trout - Spawning	295,268	188,776	-36.07	331,899	205,143	-38.19	285,526	170,895	-40.15	368,574	188,148	-48.95

SFAR below Rock Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,828,963	4,028,806	-16.57	5,272,011	4,577,785	-13.17	4,043,081	3,763,010	-6.93	4,139,199	4,217,696	1.90
Brown Trout - Juvenile	3,293,820	4,450,519	35.12	3,383,967	4,619,301	36.51	2,037,429	3,249,372	59.48	1,695,297	3,113,756	83.67
Brown Trout - Spawning	456,947	393,231	-13.94	497,001	413,162	-16.87	396,795	333,220	-16.02	423,646	381,263	-10.00
Rainbow Trout - Adult	4,743,975	3,306,818	-30.29	5,271,141	3,899,605	-26.02	4,296,177	3,387,566	-21.15	4,635,563	3,965,337	-14.46
Rainbow Trout - Juvenile	4,120,355	5,229,249	26.91	4,281,424	5,509,481	28.68	2,636,441	3,996,256	51.58	2,159,265	3,965,079	83.63
Rainbow Trout - Spawning	296,942	209,938	-29.30	330,926	219,176	-33.77	291,395	180,519	-38.05	335,269	228,384	-31.88

SFAR above Chili Bar Reservoir

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,790,757	4,023,711	-16.01	5,257,501	4,601,974	-12.47	4,021,394	3,780,877	-5.98	4,087,153	4,205,981	2.91
Brown Trout - Juvenile	3,265,694	4,389,890	34.42	3,358,595	4,575,802	36.24	2,014,416	3,189,959	58.36	1,669,632	3,018,831	80.81
Brown Trout - Spawning	452,442	390,789	-13.63	495,505	416,031	-16.04	394,962	336,442	-14.82	418,560	381,815	-8.78
Rainbow Trout - Adult	4,705,674	3,318,068	-29.49	5,262,032	3,942,255	-25.08	4,278,499	3,429,320	-19.85	4,579,068	3,983,596	-13.00
Rainbow Trout - Juvenile	4,089,217	5,169,175	26.41	4,253,783	5,472,204	28.64	2,608,605	3,942,380	51.13	2,125,171	3,867,998	82.01
Rainbow Trout - Spawning	293,773	208,491	-29.03	330,482	220,233	-33.36	290,591	184,956	-36.35	331,499	232,141	-29.97

Slab Creek Reach
Partial Year Summary

SFAR Below Slab Creek Dam

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,092,750	3,038,580	-25.76	4,105,079	3,299,496	-19.62	3,597,490	2,762,083	-23.22	3,347,416	2,689,675	-19.65
Brown Trout - Juvenile	3,172,089	3,932,741	23.98	3,121,513	3,795,287	21.58	2,057,091	3,247,442	57.87	1,465,932	2,942,892	100.75
Brown Trout - Spawning	142,600	90,329	-36.66	136,550	104,066	-23.79	125,082	91,910	-26.52	152,356	121,738	-20.10
Rainbow Trout - Adult	3,852,557	2,341,090	-39.23	3,886,596	2,666,704	-31.39	3,711,641	2,211,024	-40.43	3,696,062	2,209,435	-40.22
Rainbow Trout - Juvenile	3,928,675	4,495,079	14.42	3,882,266	4,423,369	13.94	2,640,993	3,775,228	42.95	1,908,250	3,464,914	81.58
Rainbow Trout - Spawning	40,994	20,869	-49.09	39,532	21,853	-44.72	4,182	2,048	-51.02	0	0	0.00

SFAR below Iowa Canyon Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,105,119	3,107,005	-24.31	4,122,935	3,346,832	-18.82	3,605,581	2,844,028	-21.12	3,339,879	2,780,845	-16.74
Brown Trout - Juvenile	3,156,779	3,980,997	26.11	3,101,804	3,830,053	23.48	2,035,627	3,212,664	57.82	1,453,654	2,907,276	100.00
Brown Trout - Spawning	143,306	95,646	-33.26	137,216	104,662	-23.72	124,973	96,345	-22.91	151,918	115,225	-24.15
Rainbow Trout - Adult	3,873,815	2,406,085	-37.89	3,916,243	2,712,452	-30.74	3,731,121	2,310,676	-38.07	3,693,663	2,325,643	-37.04
Rainbow Trout - Juvenile	3,914,607	4,558,445	16.45	3,865,160	4,465,907	15.54	2,618,181	3,761,095	43.65	1,889,438	3,448,689	82.52
Rainbow Trout - Spawning	40,987	21,532	-47.47	39,558	21,058	-46.77	4,184	2,154	-48.52	0	0	0.00

SFAR below Mosquito Rd Bridge

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,117,383	3,175,647	-22.87	4,142,737	3,407,909	-17.74	3,591,356	2,918,228	-18.74	3,331,441	2,896,808	-13.05
Brown Trout - Juvenile	3,139,222	3,968,413	26.41	3,079,043	3,826,975	24.29	2,003,233	3,151,055	57.30	1,441,423	2,859,073	98.35
Brown Trout - Spawning	143,851	101,441	-29.48	137,757	104,641	-24.04	124,769	98,526	-21.03	151,668	116,975	-22.87
Rainbow Trout - Adult	3,895,501	2,484,871	-36.21	3,949,620	2,783,191	-29.53	3,725,687	2,411,924	-35.26	3,690,886	2,483,457	-32.71
Rainbow Trout - Juvenile	3,898,151	4,564,591	17.10	3,845,386	4,478,185	16.46	2,582,500	3,717,617	43.95	1,869,554	3,424,786	83.19
Rainbow Trout - Spawning	41,014	22,080	-46.17	39,644	19,832	-49.97	2,073	1,127	-45.65	0	0	0.00

SFAR below Rock Creek

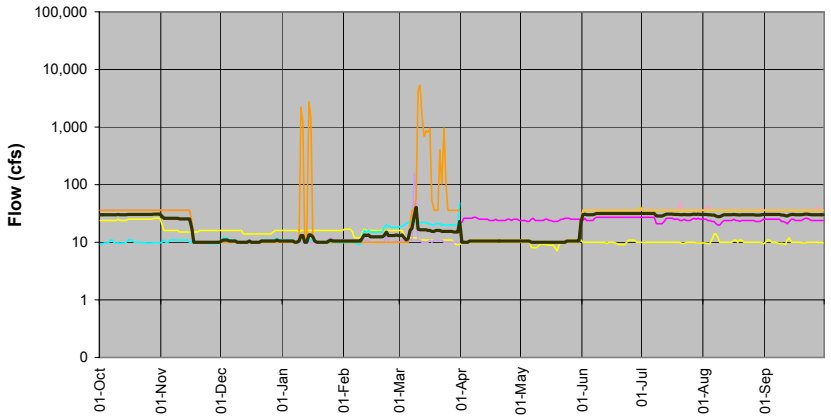
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,162,447	3,449,035	-17.14	4,214,439	3,676,435	-12.77	3,619,224	3,320,144	-8.26	3,195,977	3,189,287	-0.21
Brown Trout - Juvenile	3,035,574	3,847,479	26.75	2,946,891	3,712,823	25.99	1,879,044	2,908,616	54.79	1,341,509	2,423,330	80.64
Brown Trout - Spawning	146,600	119,194	-18.69	139,912	114,409	-18.23	124,707	103,486	-17.02	150,083	137,499	-8.38
Rainbow Trout - Adult	3,990,736	2,816,655	-29.42	4,088,569	3,126,708	-23.53	3,816,219	2,975,814	-22.02	3,567,026	2,973,082	-16.65
Rainbow Trout - Juvenile	3,799,274	4,513,567	18.80	3,722,203	4,429,828	19.01	2,441,769	3,566,197	46.05	1,723,942	3,067,872	77.96
Rainbow Trout - Spawning	39,273	20,076	-48.88	37,808	20,010	-47.07	2,101	1,410	-32.87	0	0	0.00

SFAR above Chili Bar Reservoir

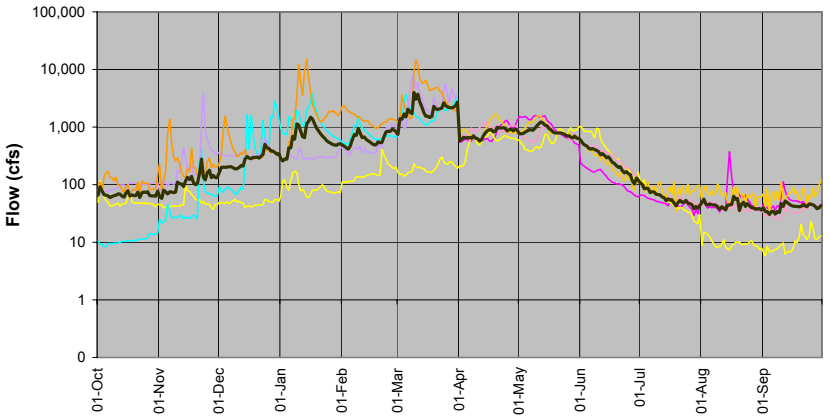
	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	4,170,283	3,480,898	-16.53	4,224,394	3,705,585	-12.28	3,598,327	3,332,354	-7.39	3,190,967	3,220,685	0.93
Brown Trout - Juvenile	3,024,339	3,833,741	26.76	2,932,324	3,697,158	26.08	1,856,835	2,857,001	53.86	1,333,973	2,377,814	78.25
Brown Trout - Spawning	146,866	119,136	-18.88	140,259	116,512	-16.93	122,198	102,801	-15.87	150,069	139,569	-7.00
Rainbow Trout - Adult	4,004,951	2,856,677	-28.67	4,106,694	3,166,592	-22.89	3,799,146	3,008,413	-20.81	3,564,149	3,024,706	-15.14
Rainbow Trout - Juvenile	3,788,584	4,507,329	18.97	3,708,519	4,420,687	19.20	2,415,204	3,518,794	45.69	1,712,229	3,029,316	76.92
Rainbow Trout - Spawning	39,305	20,081	-48.91	37,830	20,487	-45.84	2,103	1,432	-31.92	0	0	0.00

Slab Creek Reach
Critical WY Plots

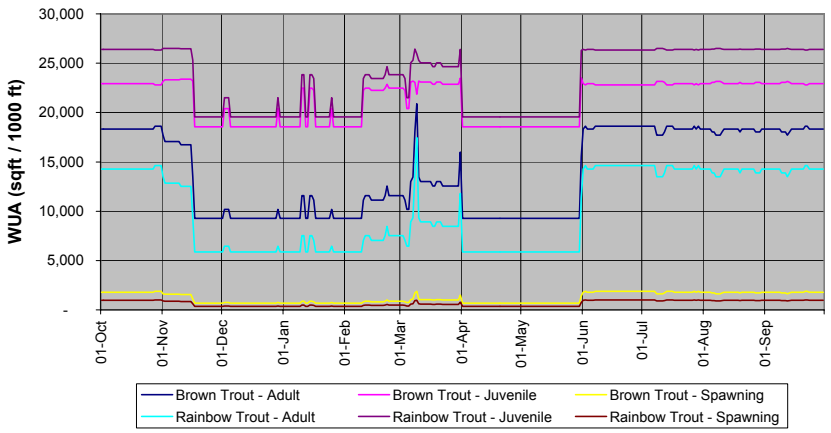
Historic Flows For Critical WY
SFAR Below Slab Creek Dam



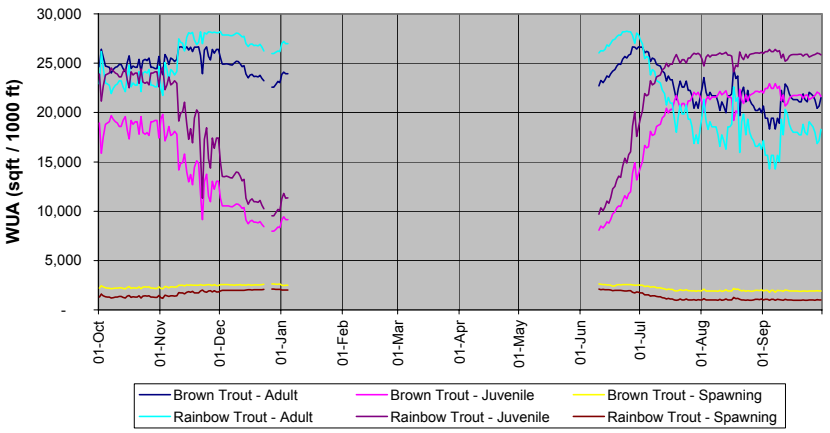
Unimpaired Flows For Critical WY
SFAR Below Slab Creek Dam



WUA Using Historic Flows For Critical WY
SFAR Below Slab Creek Dam

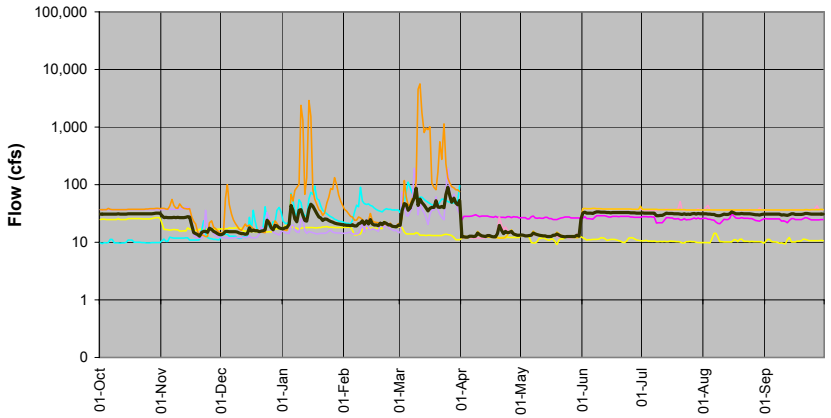


WUA Using Unimpaired Flows For Critical WY
SFAR Below Slab Creek Dam

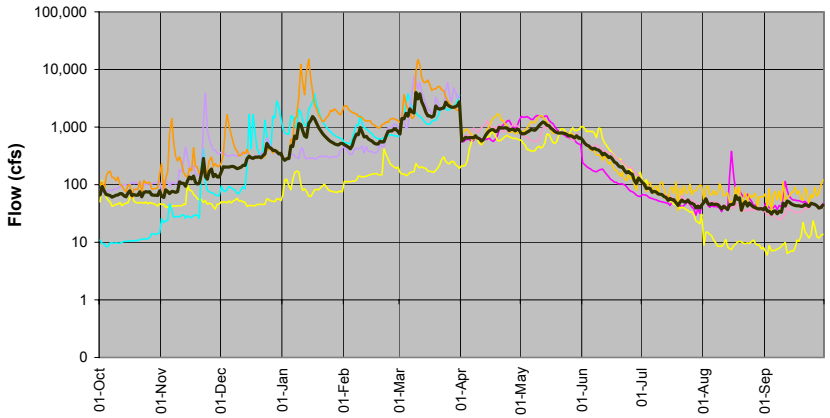


Slab Creek Reach
Critical WY Plots

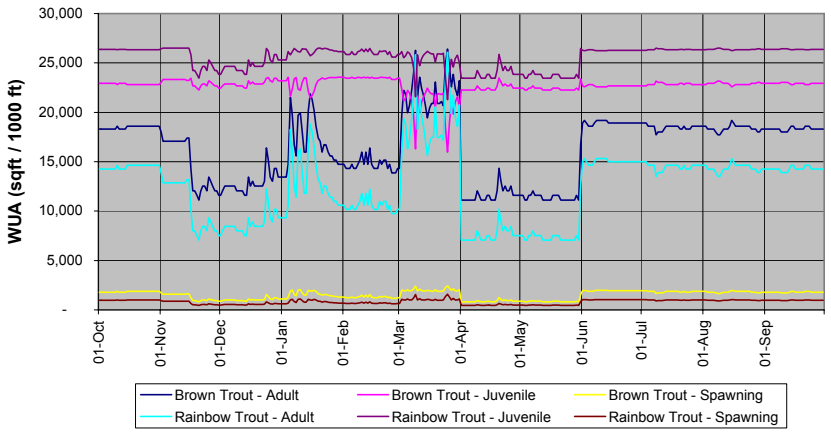
Historic Flows For Critical WY
SFAR below Iowa Canyon Creek



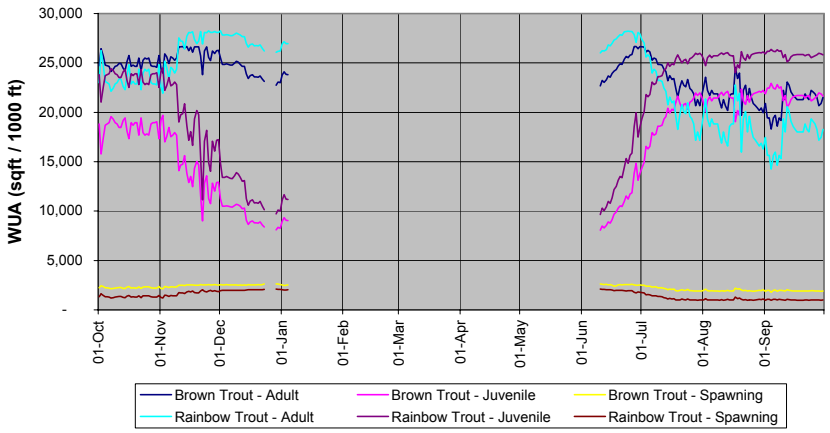
Unimpaired Flows For Critical WY
SFAR below Iowa Canyon Creek



WUA Using Historic Flows For Critical WY
SFAR below Iowa Canyon Creek

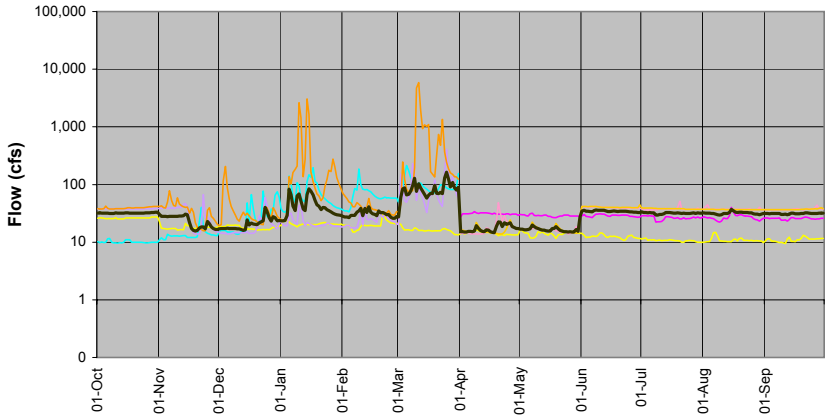


WUA Using Unimpaired Flows For Critical WY
SFAR below Iowa Canyon Creek

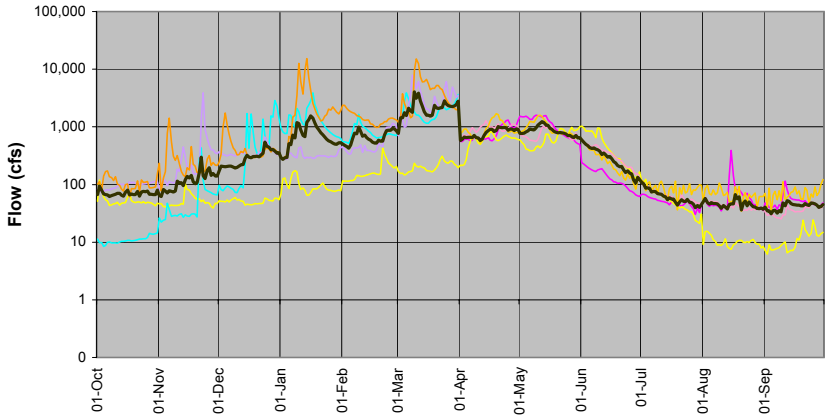


Slab Creek Reach
Critical WY Plots

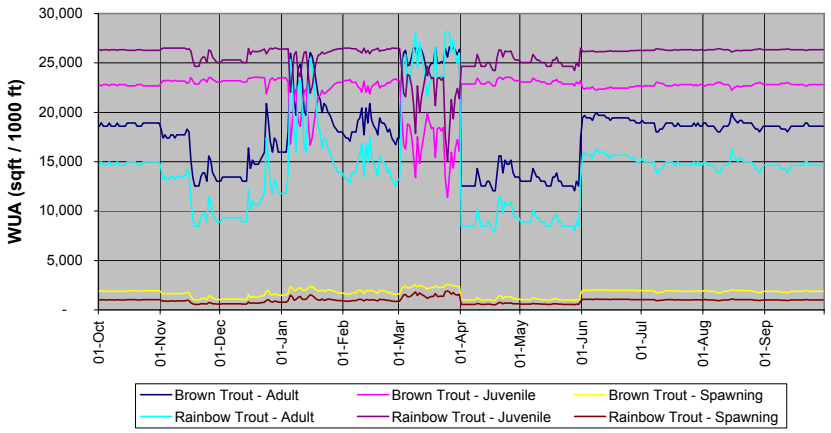
Historic Flows For Critical WY
SFAR below Mosquito Rd Bridge



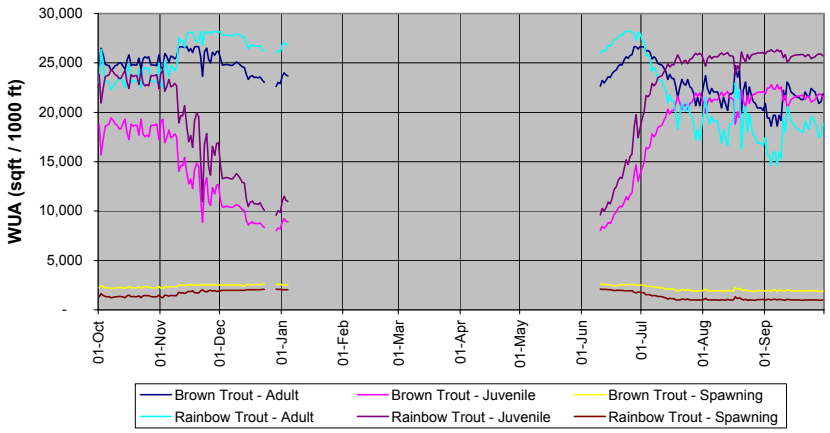
Unimpaired Flows For Critical WY
SFAR below Mosquito Rd Bridge



WUA Using Historic Flows For Critical WY
SFAR below Mosquito Rd Bridge

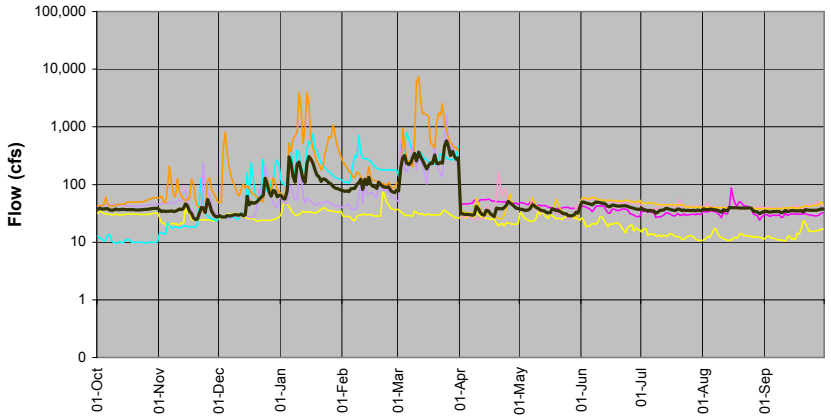


WUA Using Unimpaired Flows For Critical WY
SFAR below Mosquito Rd Bridge

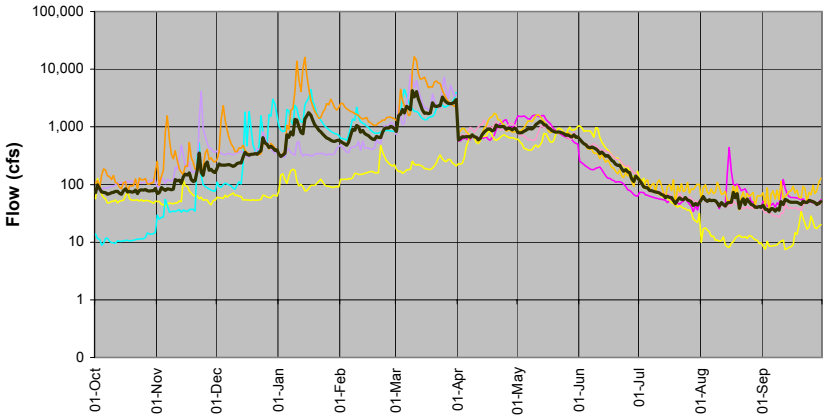


Slab Creek Reach
Critical WY Plots

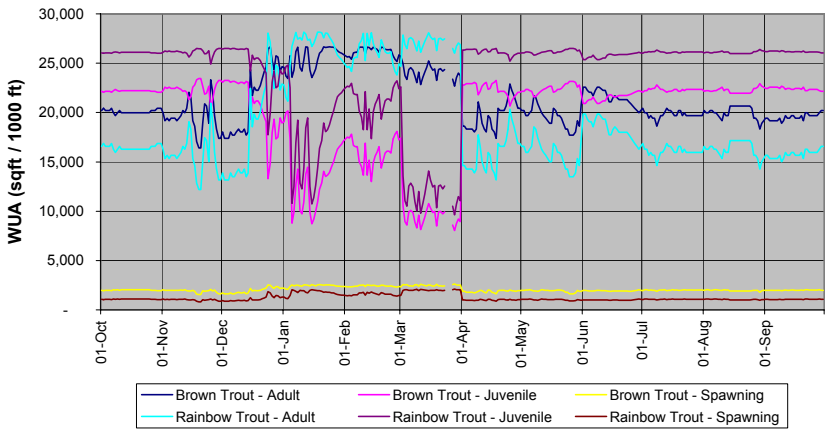
Historic Flows For Critical WY
SFAR below Rock Creek



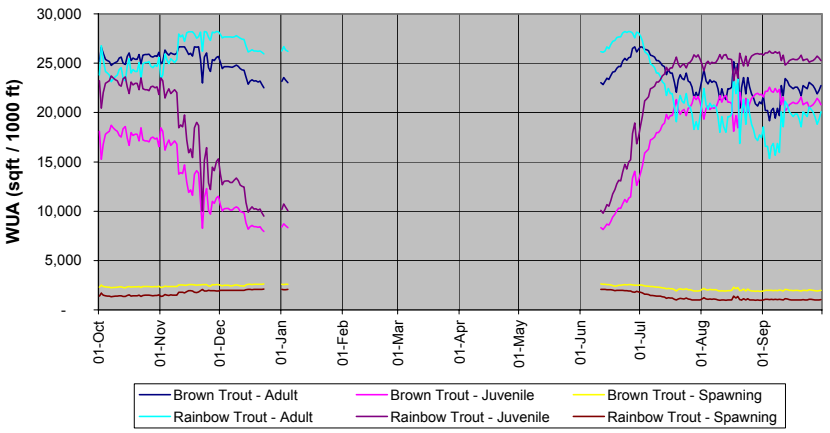
Unimpaired Flows For Critical WY
SFAR below Rock Creek



WUA Using Historic Flows For Critical WY
SFAR below Rock Creek

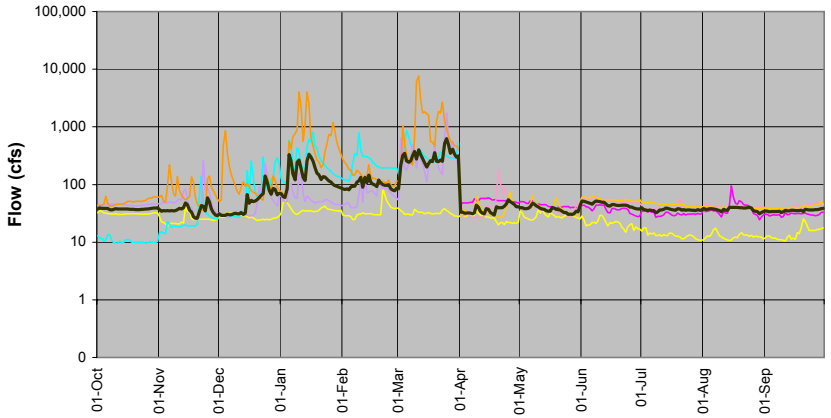


WUA Using Unimpaired Flows For Critical WY
SFAR below Rock Creek

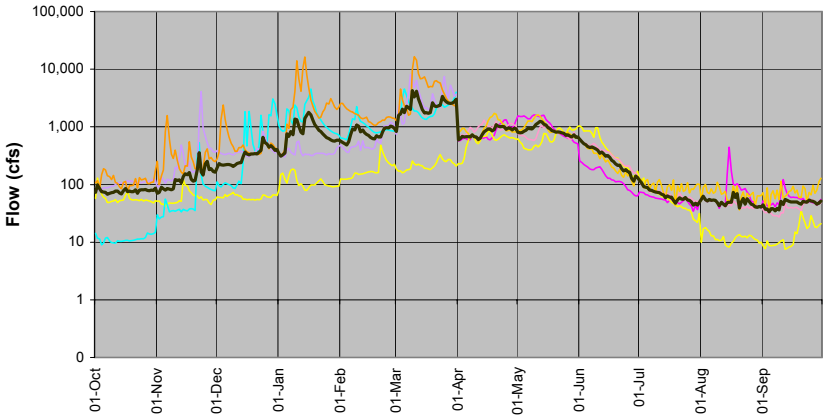


Slab Creek Reach
Critical WY Plots

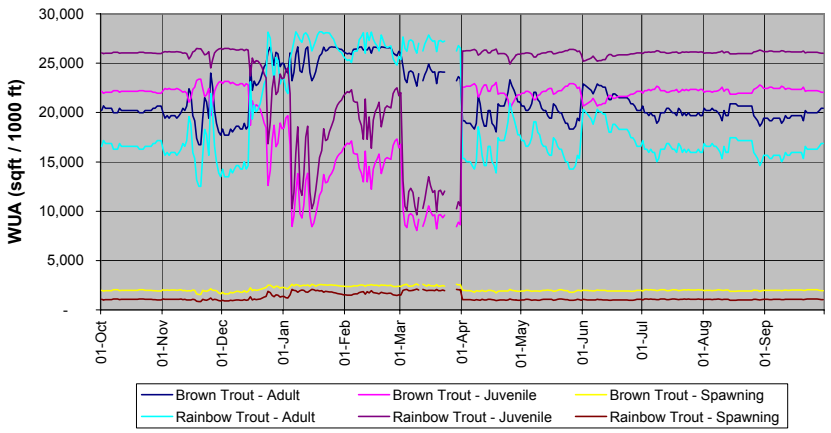
Historic Flows For Critical WY
SFAR above Chili Bar Reservoir



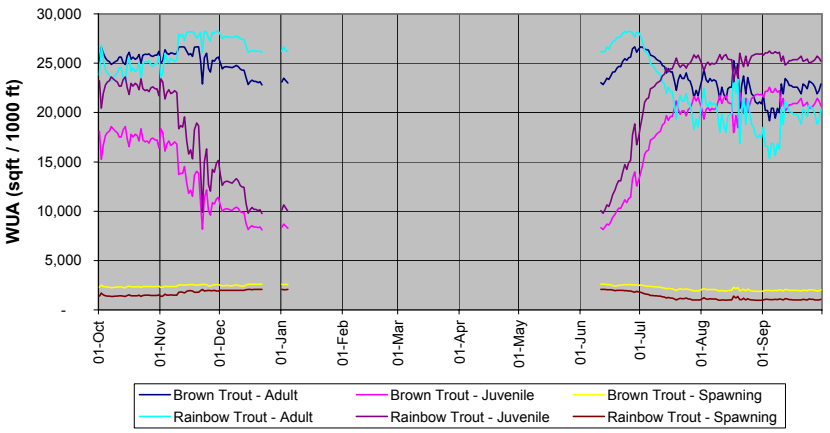
Unimpaired Flows For Critical WY
SFAR above Chili Bar Reservoir



WUA Using Historic Flows For Critical WY
SFAR above Chili Bar Reservoir

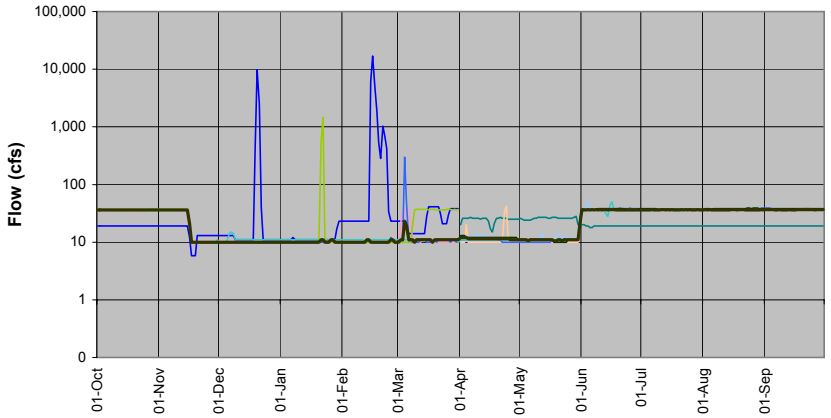


WUA Using Unimpaired Flows For Critical WY
SFAR above Chili Bar Reservoir

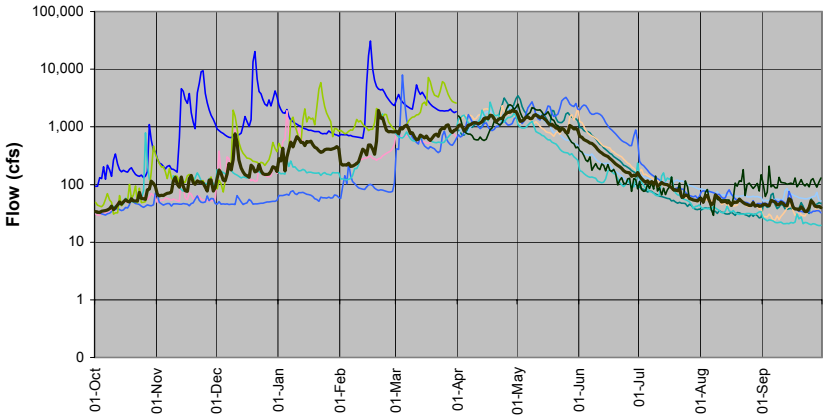


Slab Creek Reach
Below Normal WY Plots

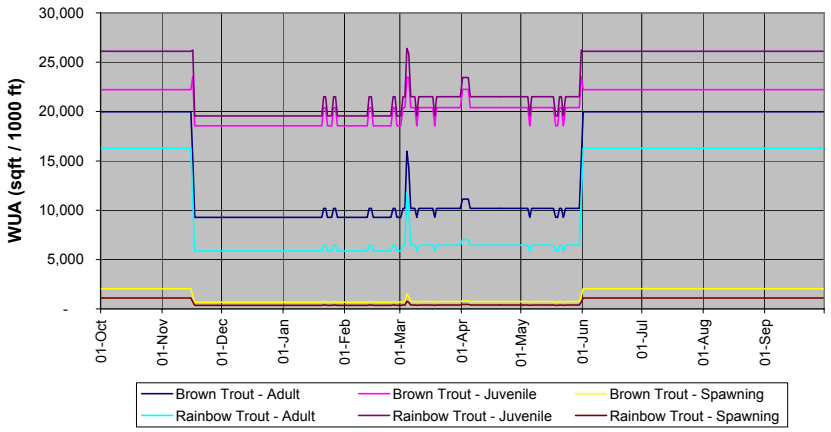
Historic Flows For Below Normal WY
SFAR Below Slab Creek Dam



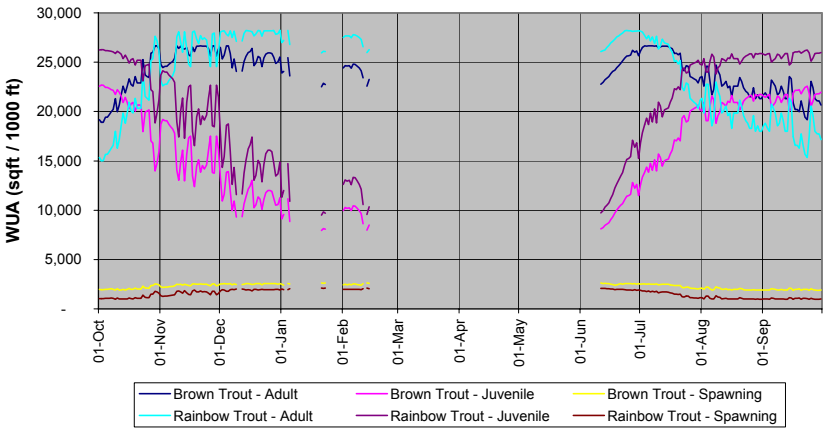
Unimpaired Flows For Below Normal WY
SFAR Below Slab Creek Dam



WUA Using Historic Flows For Below Normal WY
SFAR Below Slab Creek Dam

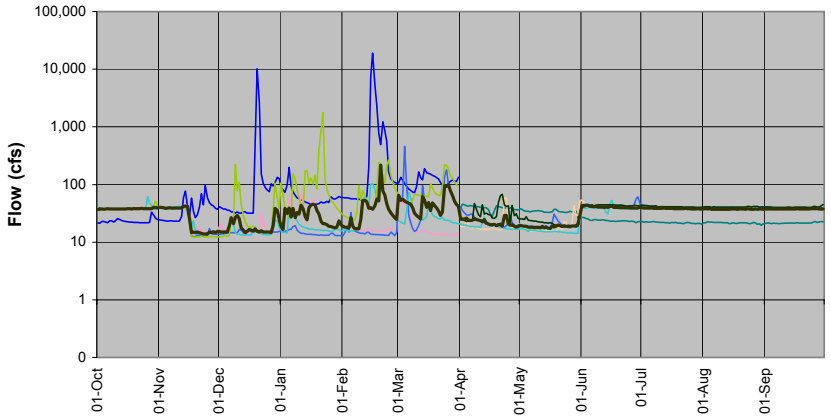


WUA Using Unimpaired Flows For Below Normal WY
SFAR Below Slab Creek Dam

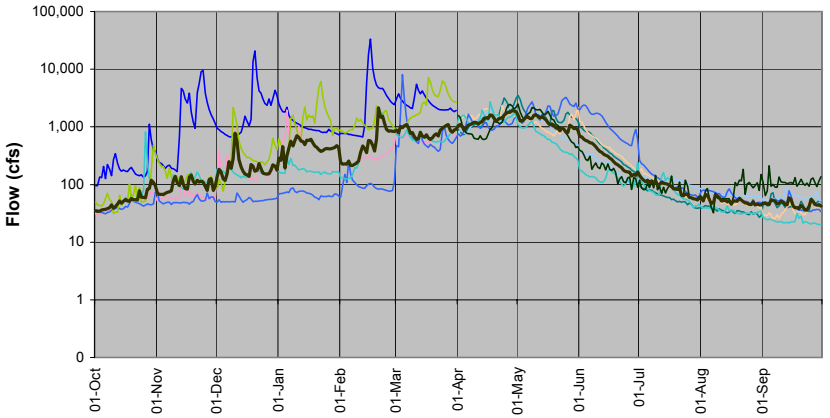


Slab Creek Reach
Below Normal WY Plots

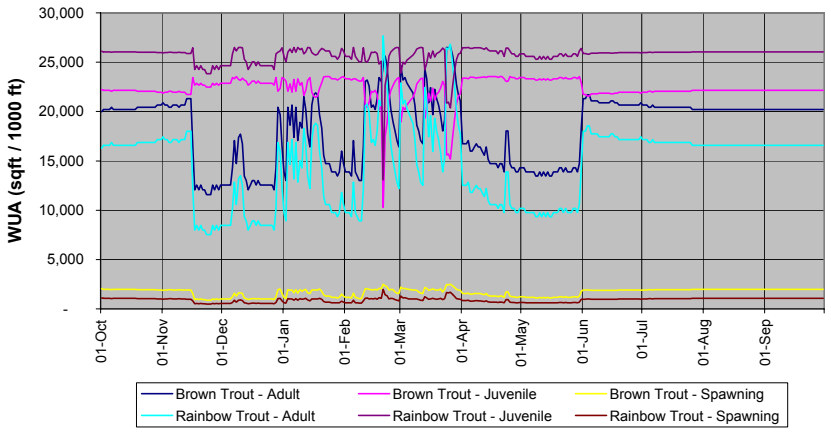
Historic Flows For Below Normal WY
SFAR below Mosquito Rd Bridge



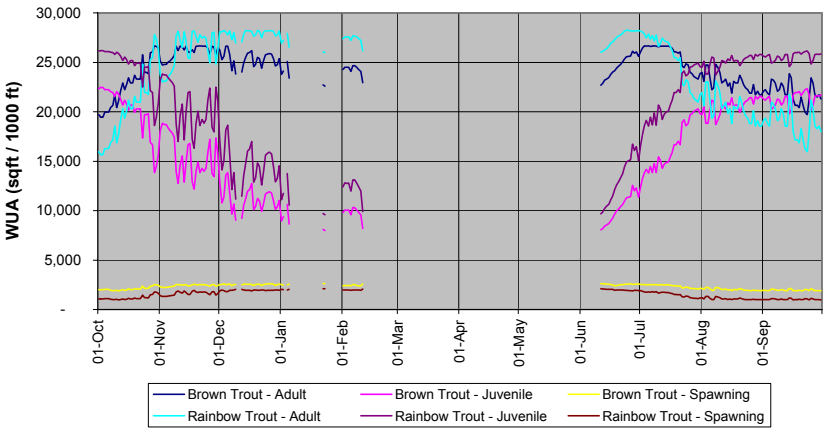
Unimpaired Flows For Below Normal WY
SFAR below Mosquito Rd Bridge



WUA Using Historic Flows For Below Normal WY
SFAR below Mosquito Rd Bridge

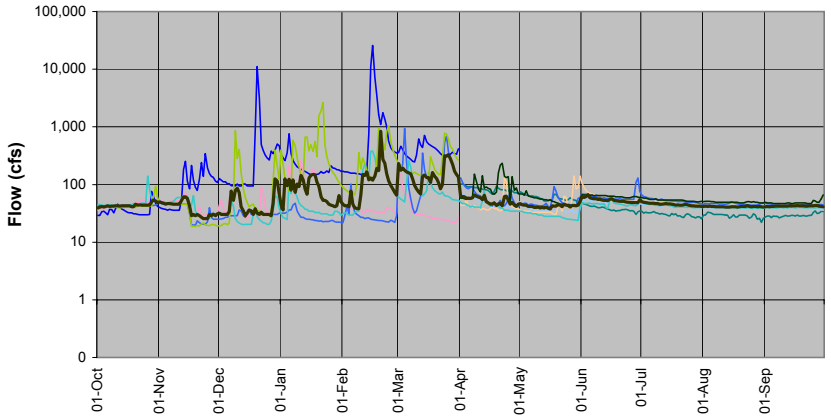


WUA Using Unimpaired Flows For Below Normal WY
SFAR below Mosquito Rd Bridge

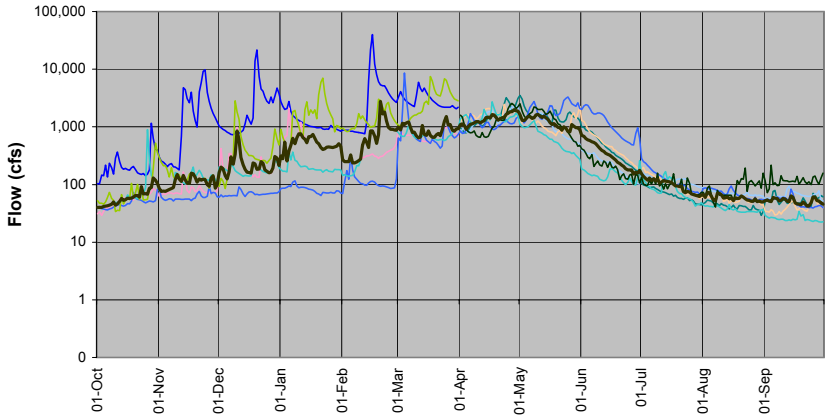


Slab Creek Reach
Below Normal WY Plots

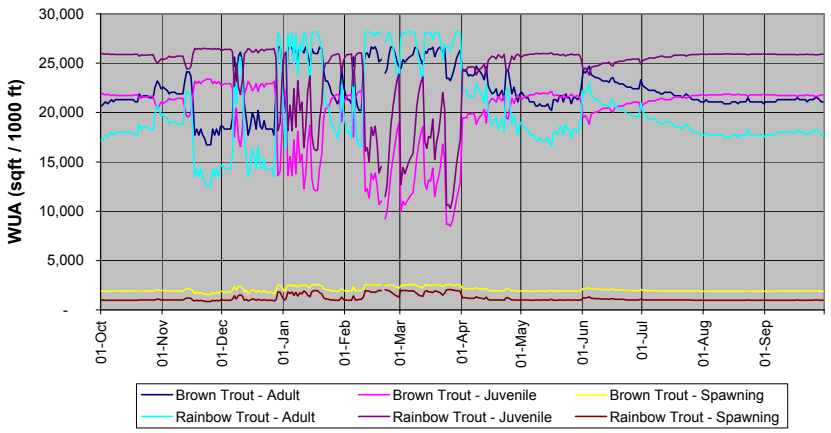
Historic Flows For Below Normal WY
SFAR below Rock Creek



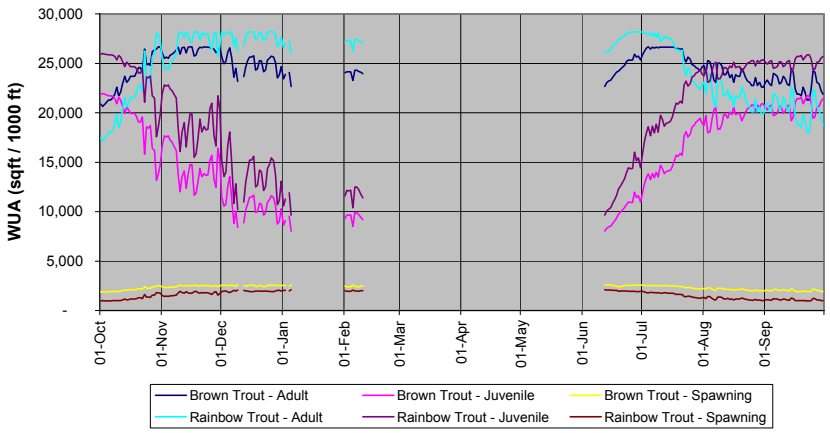
Unimpaired Flows For Below Normal WY
SFAR below Rock Creek



WUA Using Historic Flows For Below Normal WY
SFAR below Rock Creek

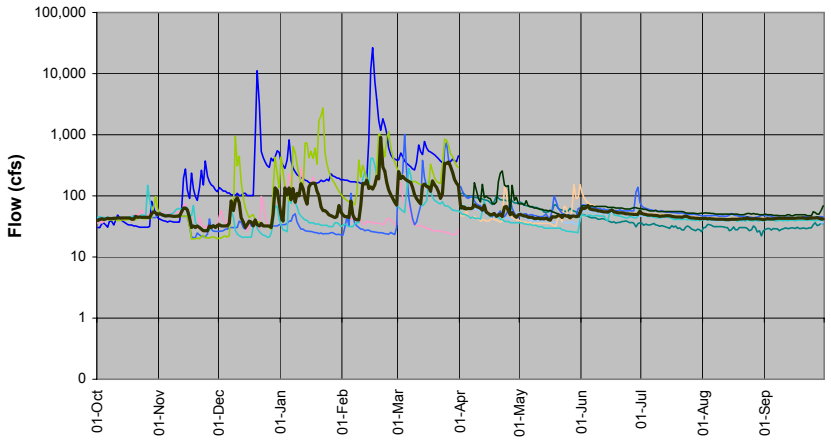


WUA Using Unimpaired Flows For Below Normal WY
SFAR below Rock Creek

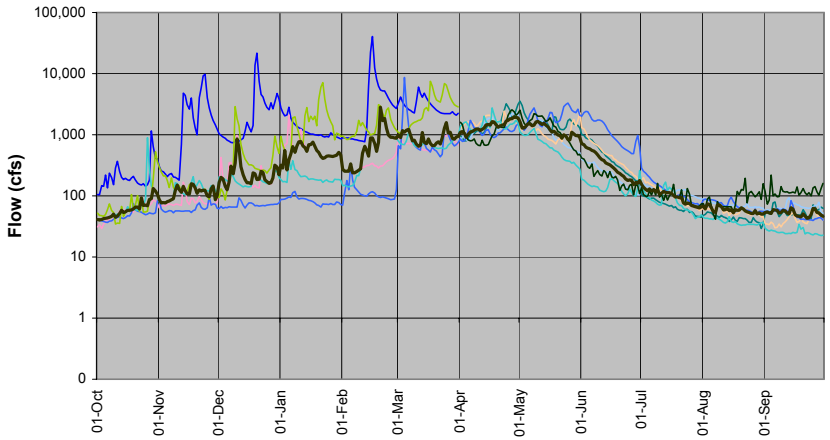


Slab Creek Reach
Below Normal WY Plots

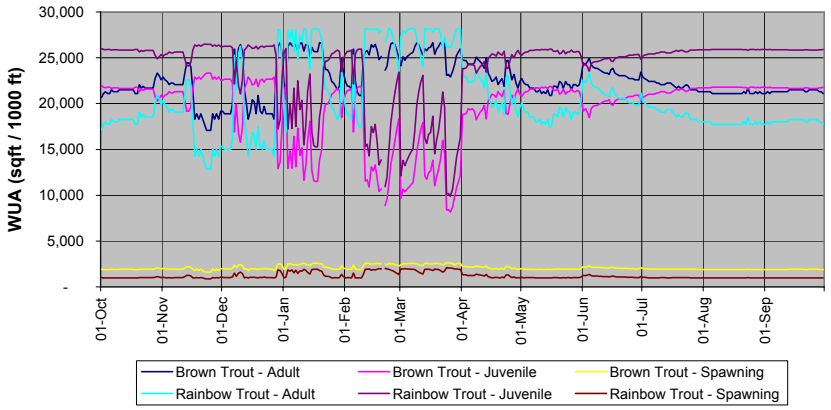
Historic Flows For Below Normal WY
SFAR above Chili Bar Reservoir



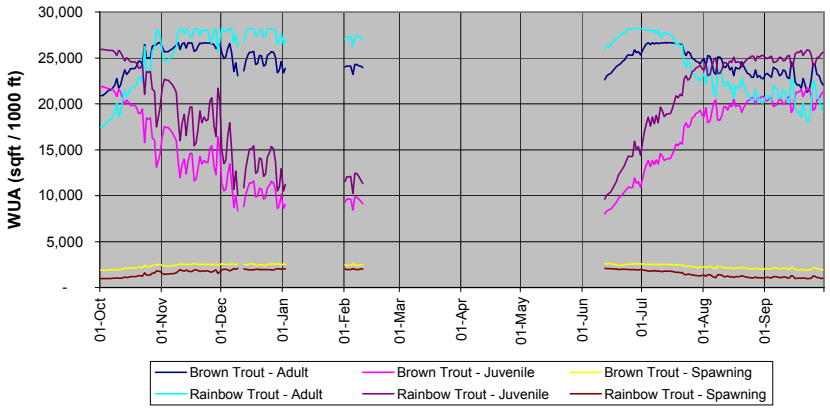
Unimpaired Flows For Below Normal WY
SFAR above Chili Bar Reservoir



WUA Using Historic Flows For Below Normal WY
SFAR above Chili Bar Reservoir

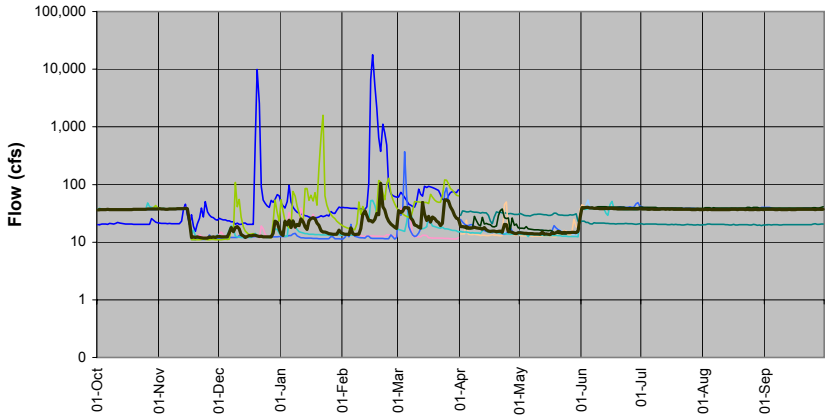


WUA Using Unimpaired Flows For Below Normal WY
SFAR above Chili Bar Reservoir

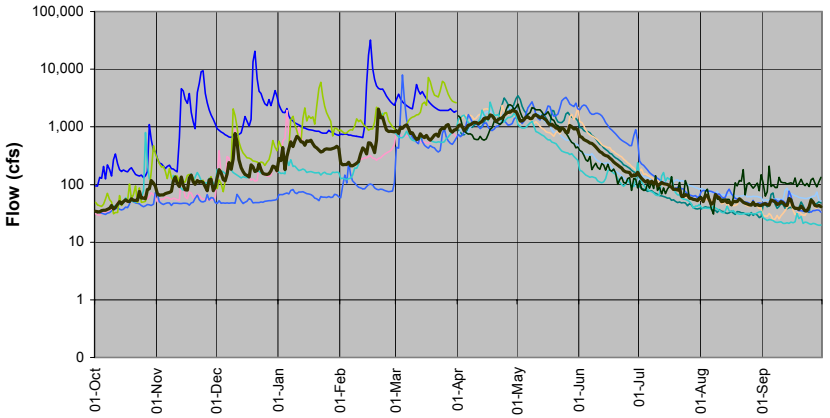


Slab Creek Reach
Below Normal WY Plots

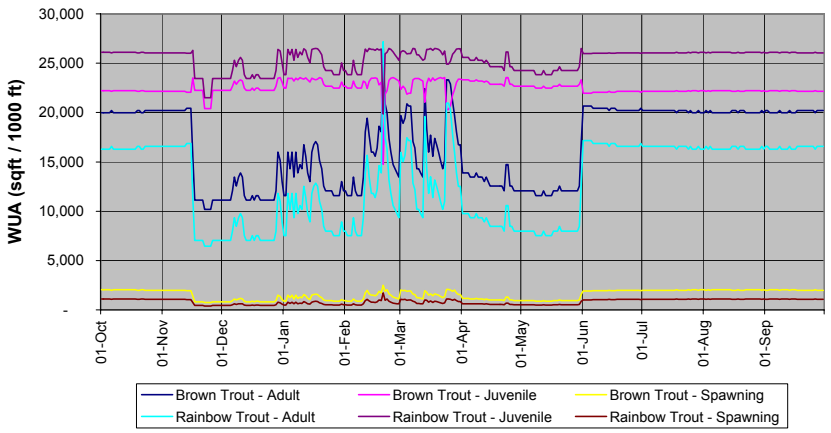
Historic Flows For Below Normal WY
SFAR below Iowa Canyon Creek



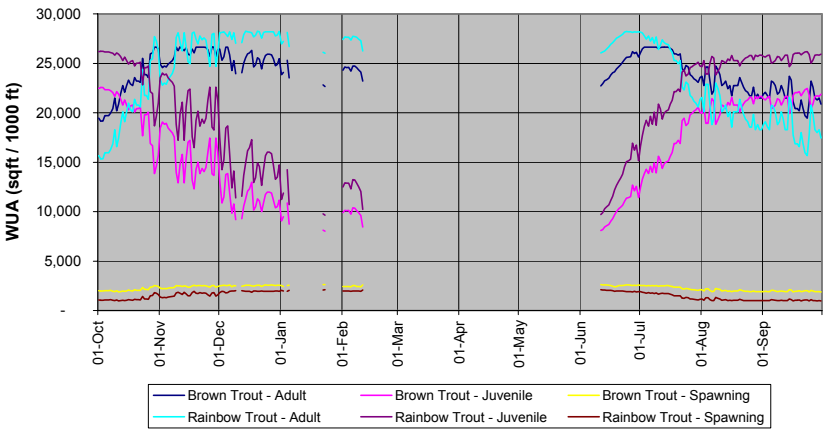
Unimpaired Flows For Below Normal WY
SFAR below Iowa Canyon Creek



WUA Using Historic Flows For Below Normal WY
SFAR below Iowa Canyon Creek

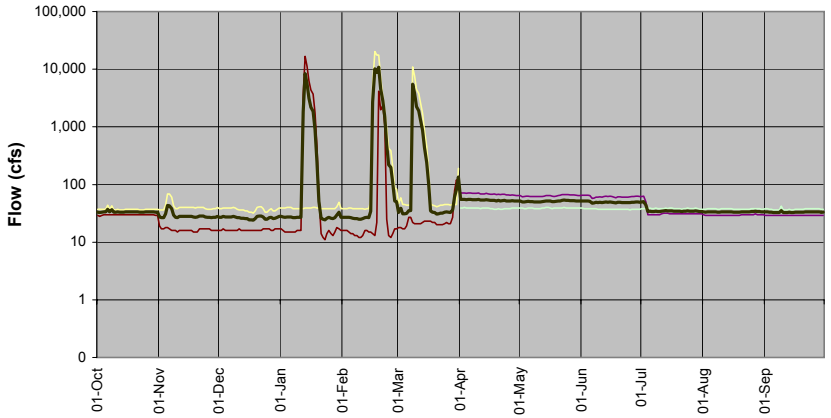


WUA Using Unimpaired Flows For Below Normal WY
SFAR below Iowa Canyon Creek

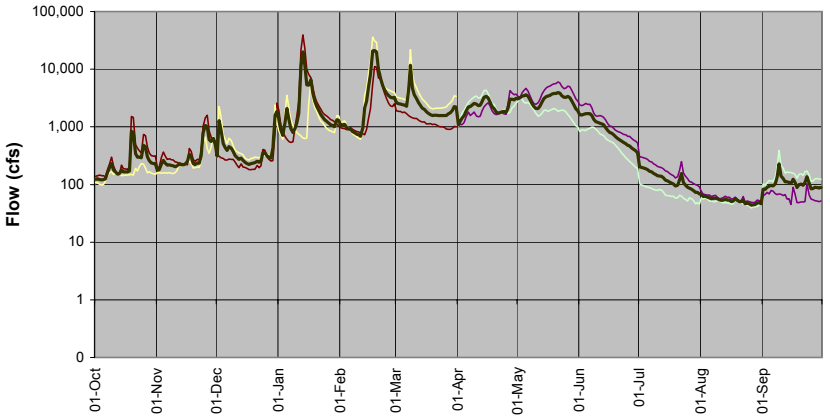


Slab Creek Reach
Above Normal WY Plots

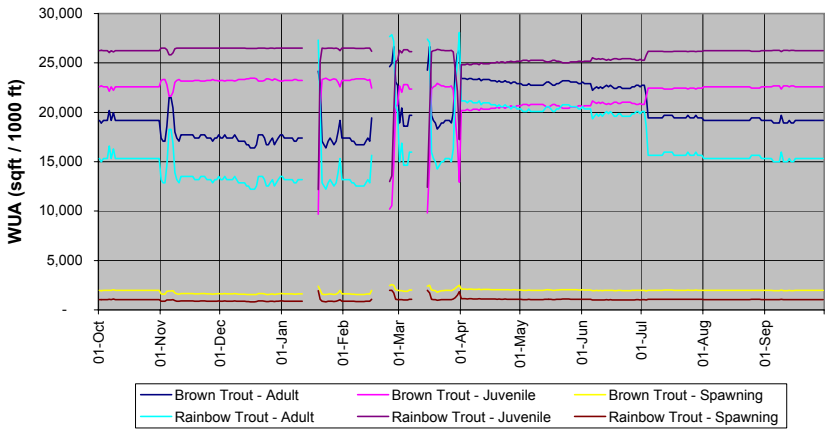
Historic Flows For Above Normal WY
SFAR Below Slab Creek Dam



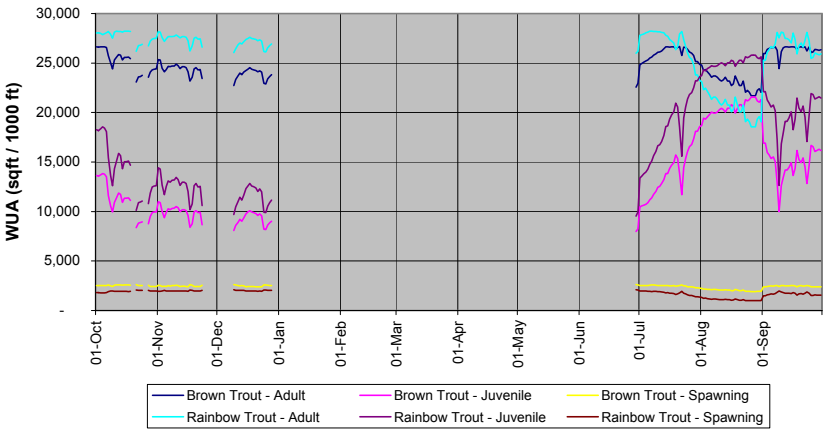
Unimpaired Flows For Above Normal WY
SFAR Below Slab Creek Dam



WUA Using Historic Flows For Above Normal WY
SFAR Below Slab Creek Dam

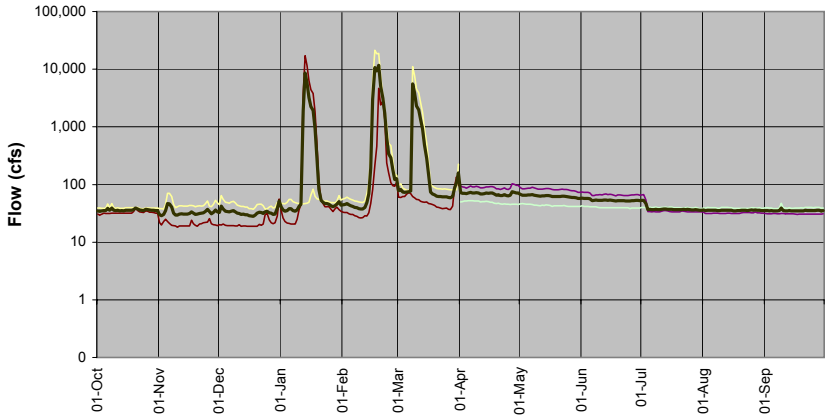


WUA Using Unimpaired Flows For Above Normal WY
SFAR Below Slab Creek Dam

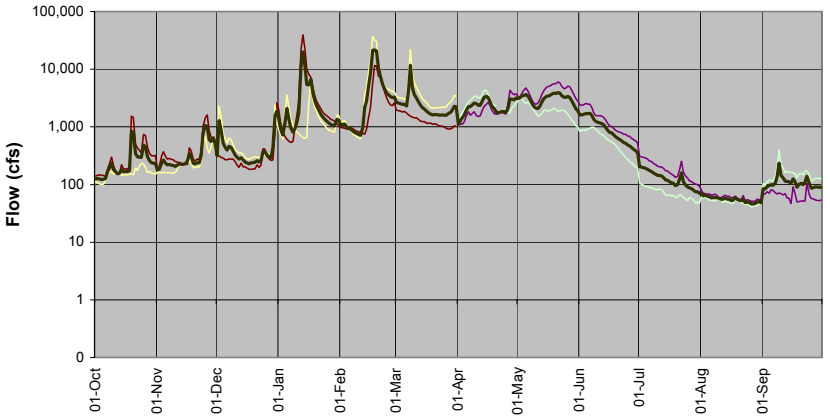


Slab Creek Reach
Above Normal WY Plots

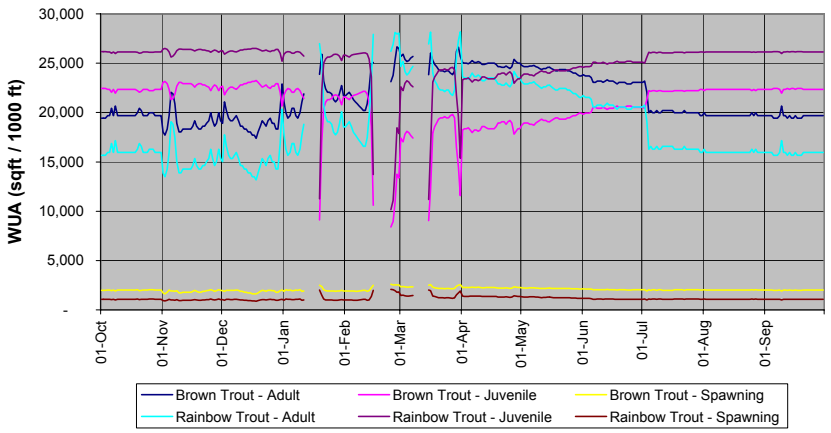
Historic Flows For Above Normal WY
SFAR below Iowa Canyon Creek



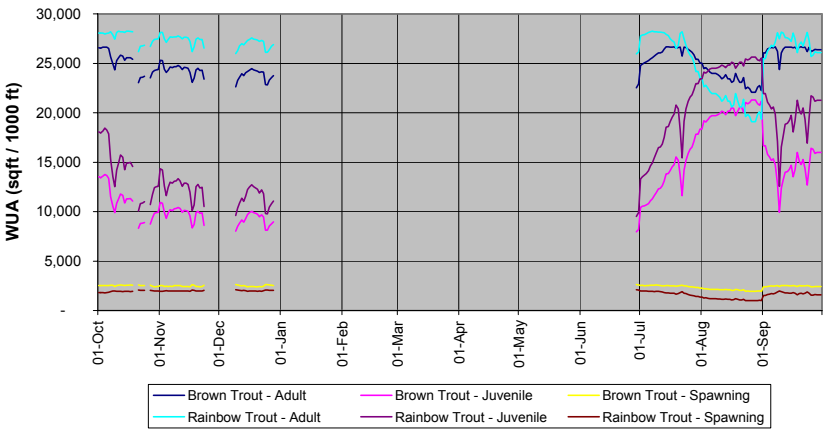
Unimpaired Flows For Above Normal WY
SFAR below Iowa Canyon Creek



WUA Using Historic Flows For Above Normal WY
SFAR below Iowa Canyon Creek

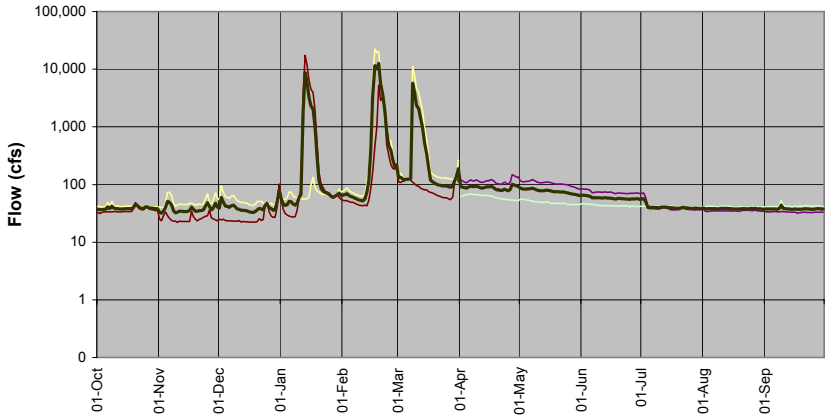


WUA Using Unimpaired Flows For Above Normal WY
SFAR below Iowa Canyon Creek

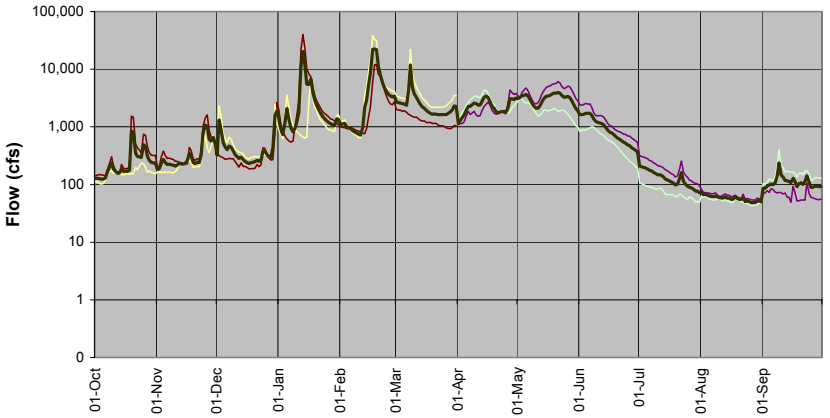


Slab Creek Reach
Above Normal WY Plots

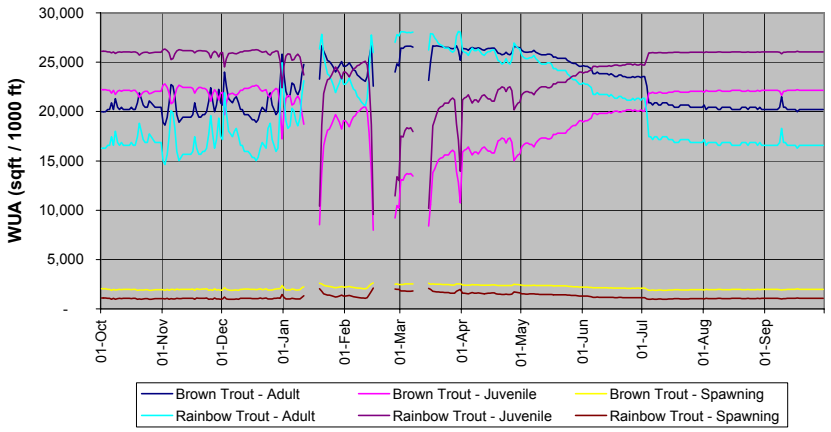
Historic Flows For Above Normal WY
SFAR below Mosquito Rd Bridge



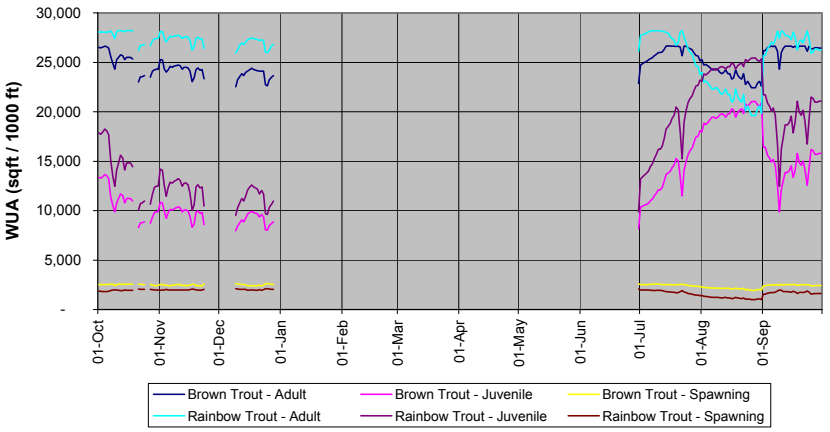
Unimpaired Flows For Above Normal WY
SFAR below Mosquito Rd Bridge



WUA Using Historic Flows For Above Normal WY
SFAR below Mosquito Rd Bridge

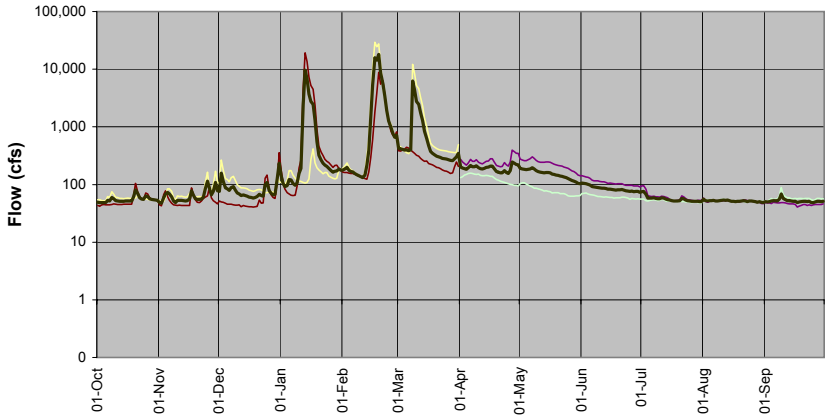


WUA Using Unimpaired Flows For Above Normal WY
SFAR below Mosquito Rd Bridge

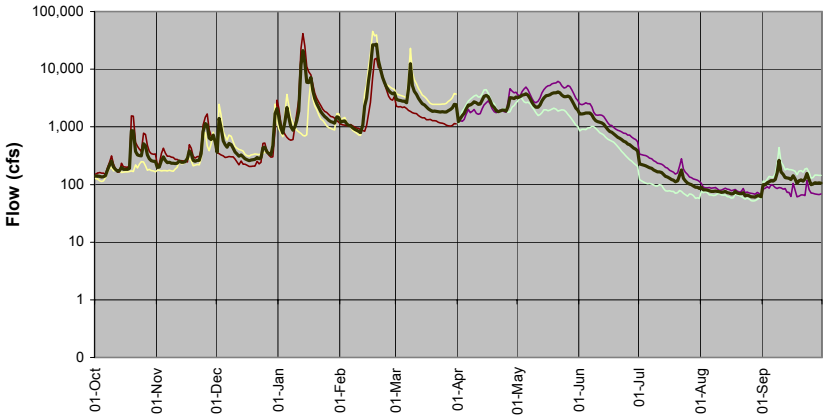


Slab Creek Reach
Above Normal WY Plots

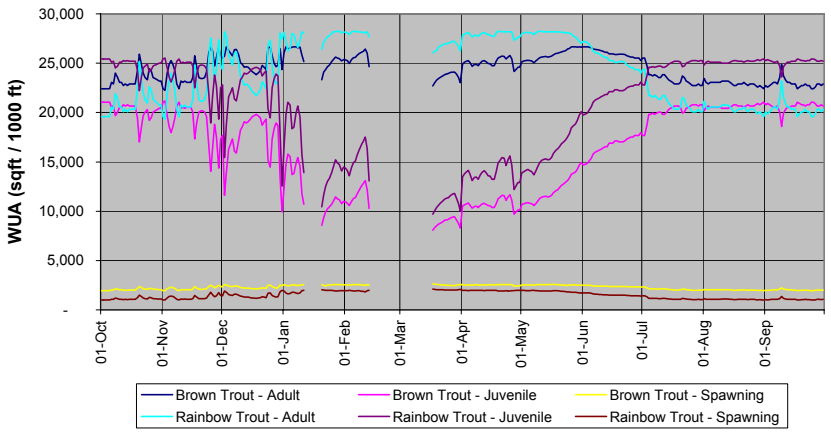
Historic Flows For Above Normal WY
SFAR below Rock Creek



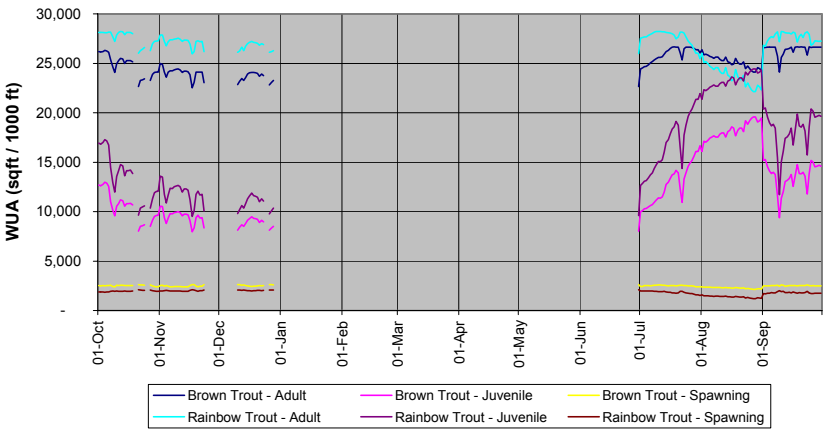
Unimpaired Flows For Above Normal WY
SFAR below Rock Creek



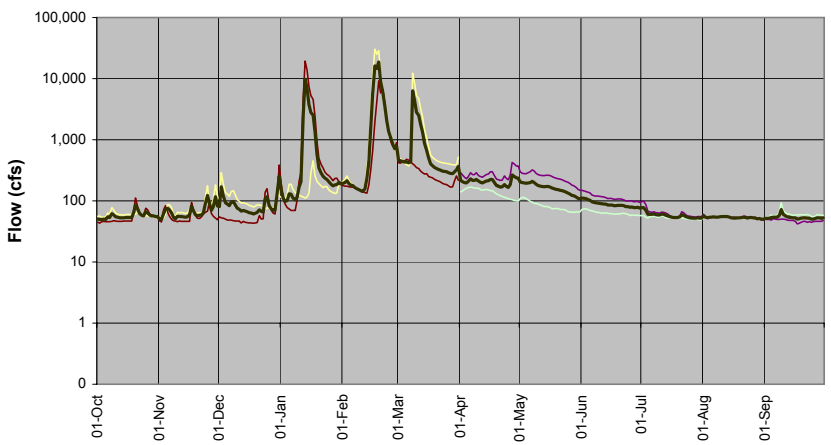
WUA Using Historic Flows For Above Normal WY
SFAR below Rock Creek

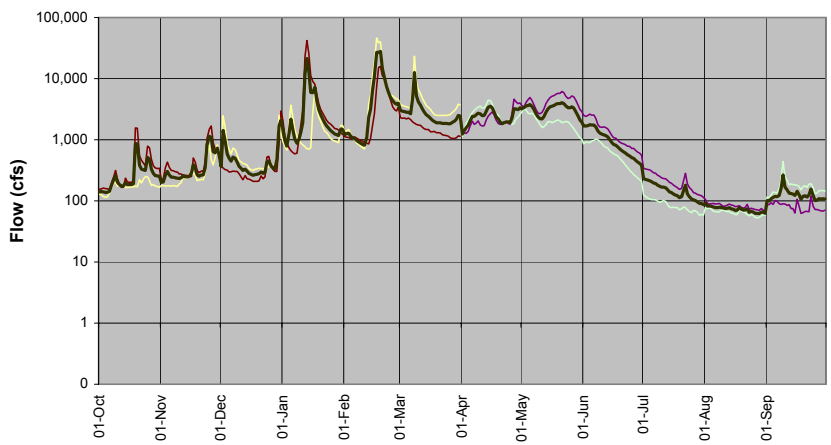


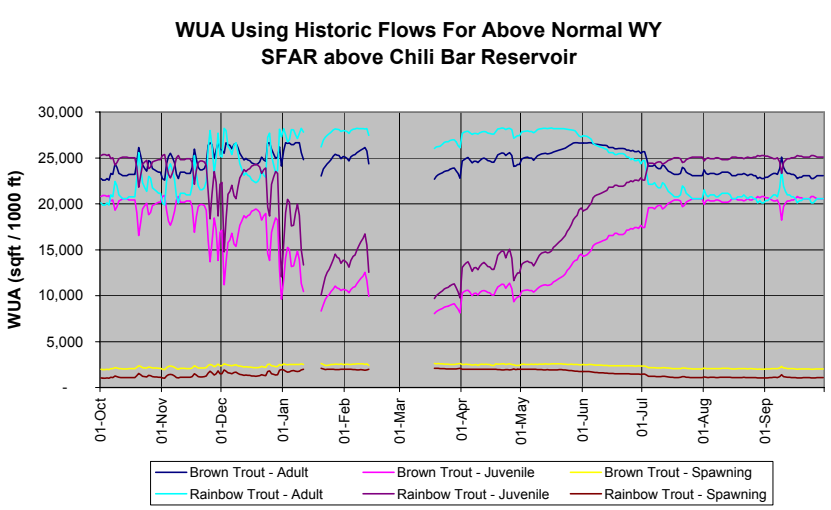
WUA Using Unimpaired Flows For Above Normal WY
SFAR below Rock Creek

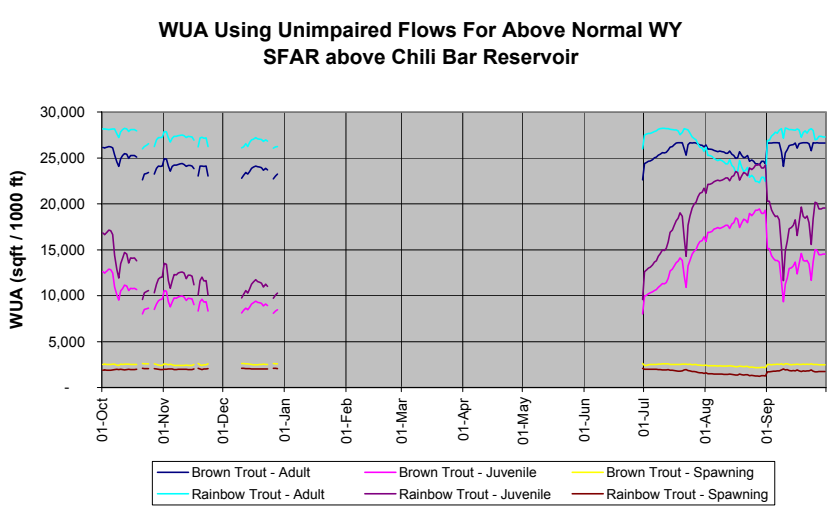


Slab Creek Reach
Above Normal WY Plots



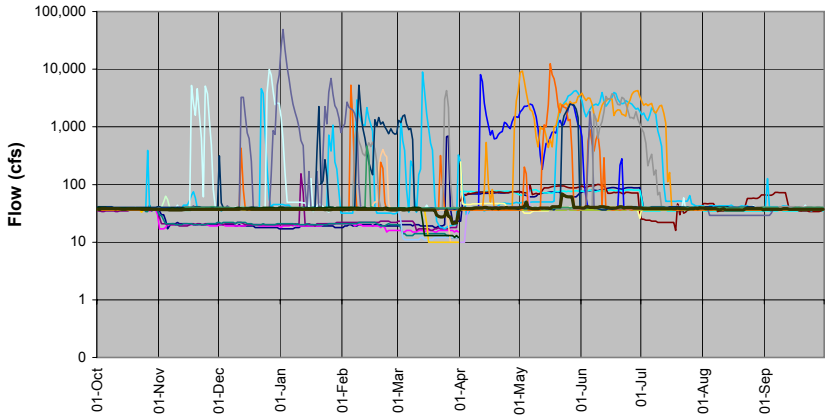




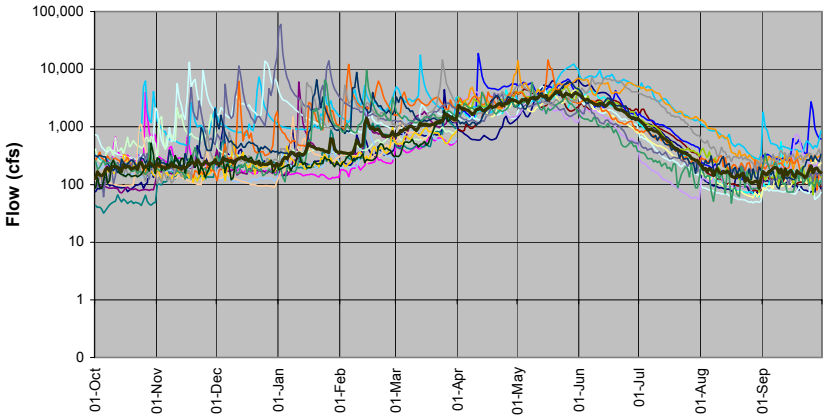


Slab Creek Reach
Wet WY Plots

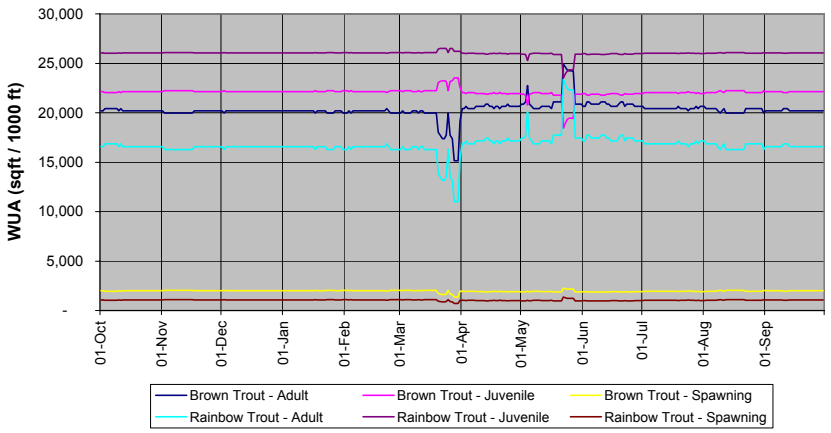
Historic Flows For Wet WY
SFAR Below Slab Creek Dam



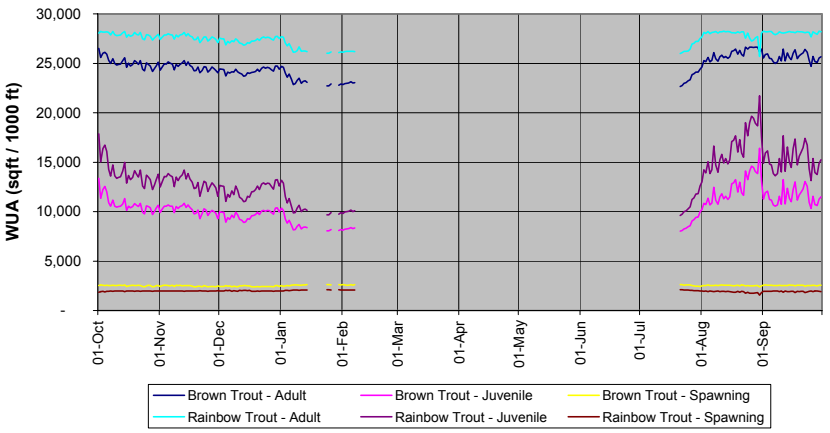
Unimpaired Flows For Wet WY
SFAR Below Slab Creek Dam



WUA Using Historic Flows For Wet WY
SFAR Below Slab Creek Dam

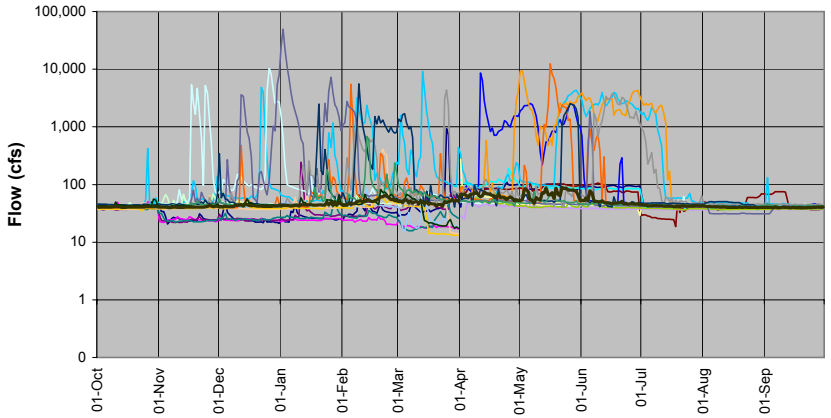


WUA Using Unimpaired Flows For Wet WY
SFAR Below Slab Creek Dam

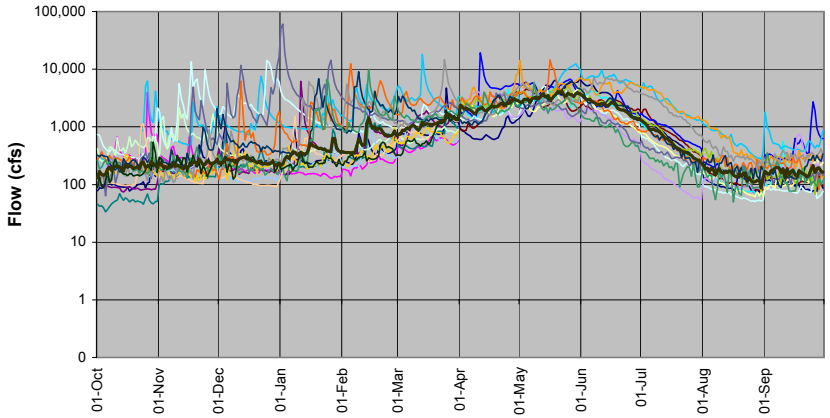


Slab Creek Reach
Wet WY Plots

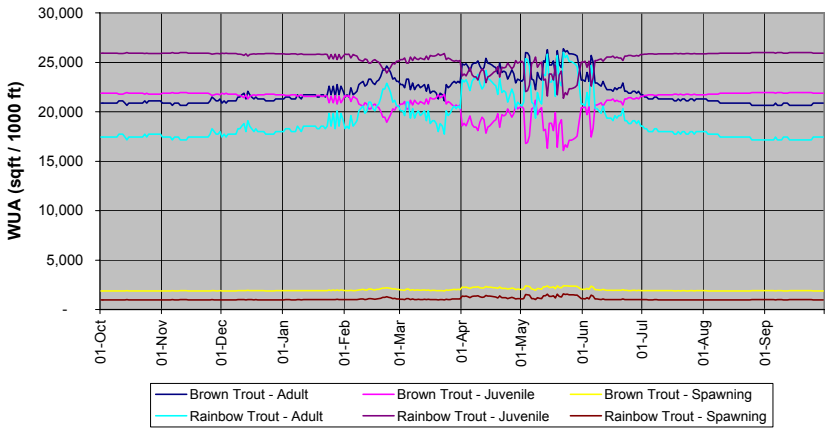
Historic Flows For Wet WY
SFAR below Iowa Canyon Creek



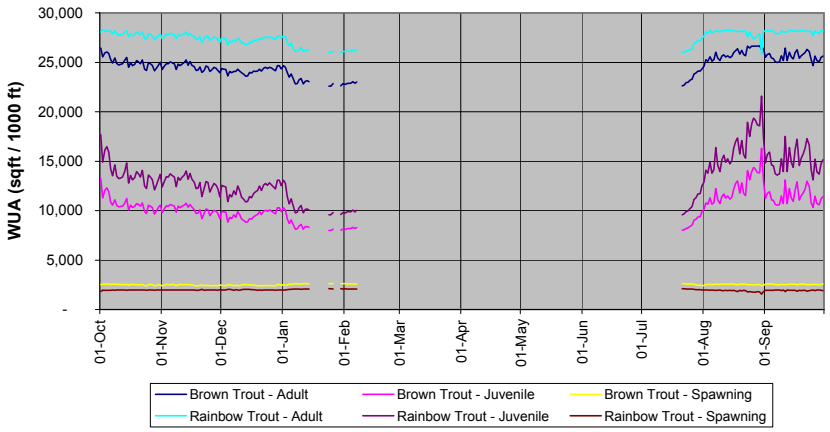
Unimpaired Flows For Wet WY
SFAR below Iowa Canyon Creek



WUA Using Historic Flows For Wet WY
SFAR below Iowa Canyon Creek

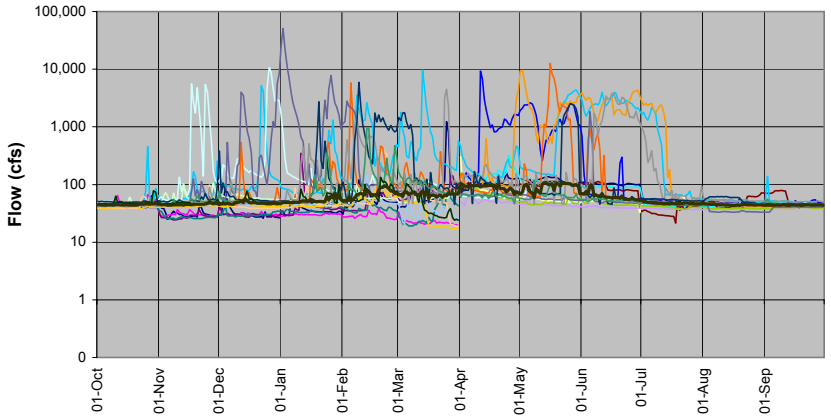


WUA Using Unimpaired Flows For Wet WY
SFAR below Iowa Canyon Creek

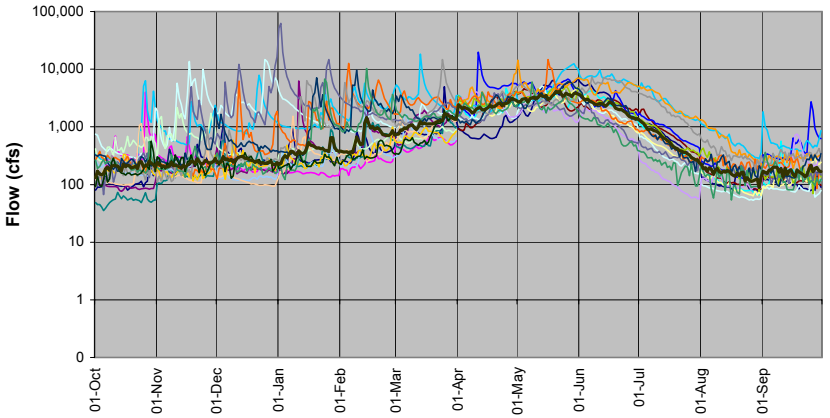


Slab Creek Reach
Wet WY Plots

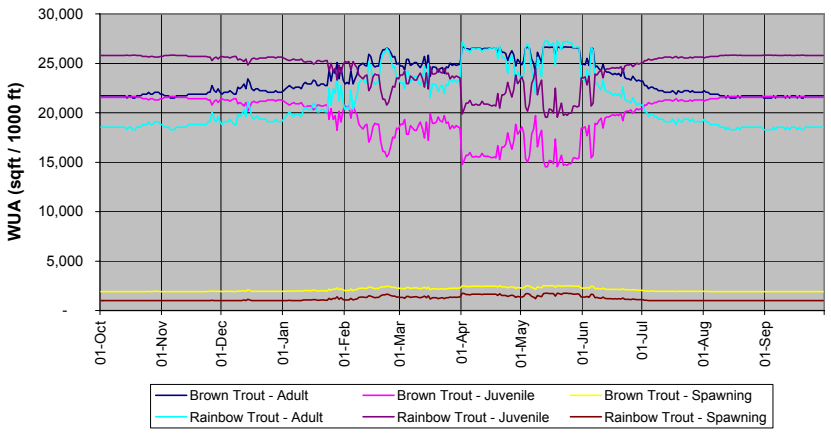
Historic Flows For Wet WY
SFAR below Mosquito Rd Bridge



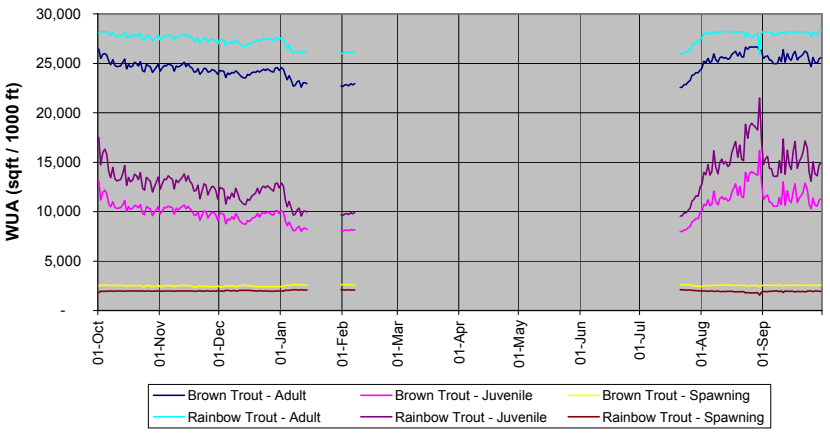
Unimpaired Flows For Wet WY
SFAR below Mosquito Rd Bridge



WUA Using Historic Flows For Wet WY
SFAR below Mosquito Rd Bridge

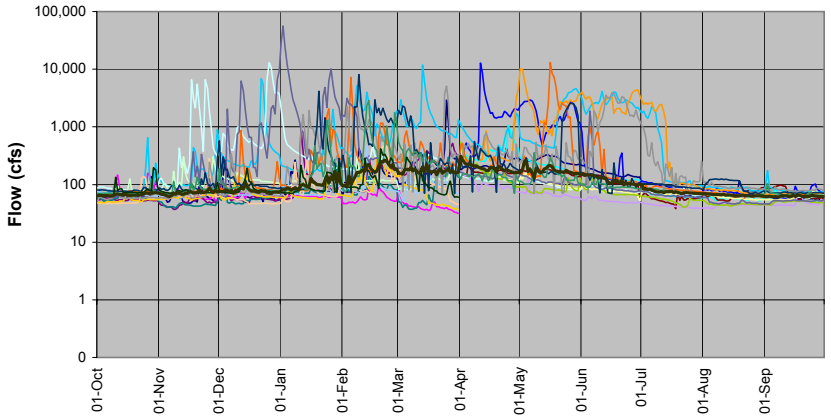


WUA Using Unimpaired Flows For Wet WY
SFAR below Mosquito Rd Bridge

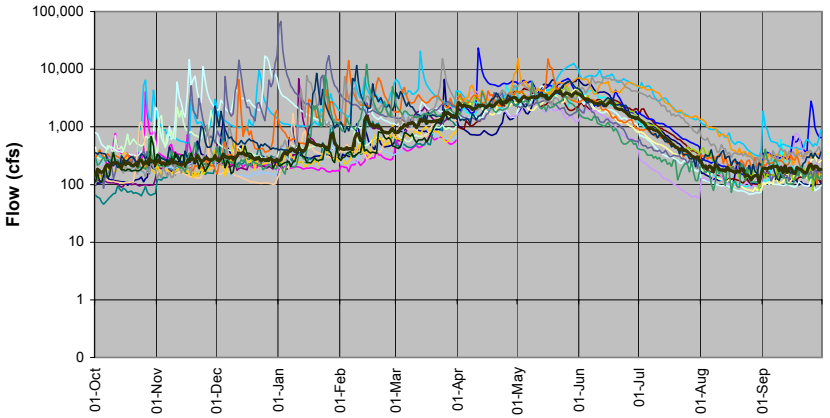


Slab Creek Reach
Wet WY Plots

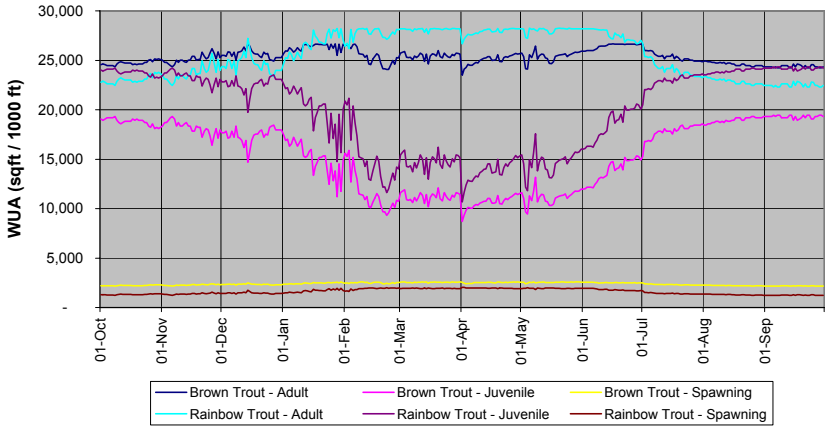
Historic Flows For Wet WY
SFAR below Rock Creek



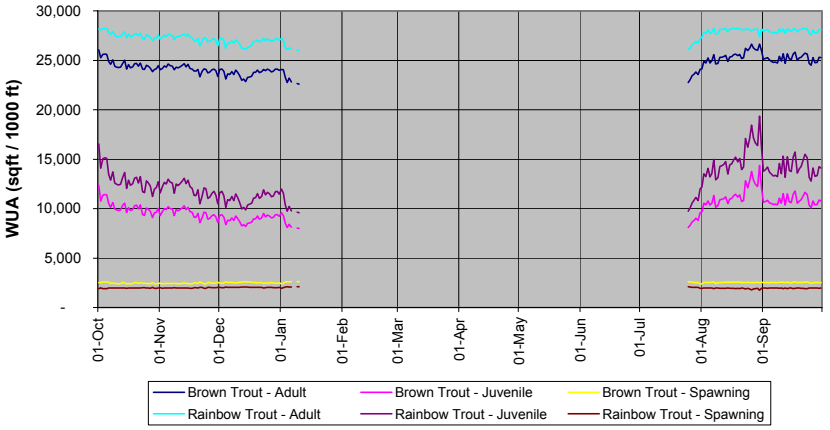
Unimpaired Flows For Wet WY
SFAR below Rock Creek



WUA Using Historic Flows For Wet WY
SFAR below Rock Creek

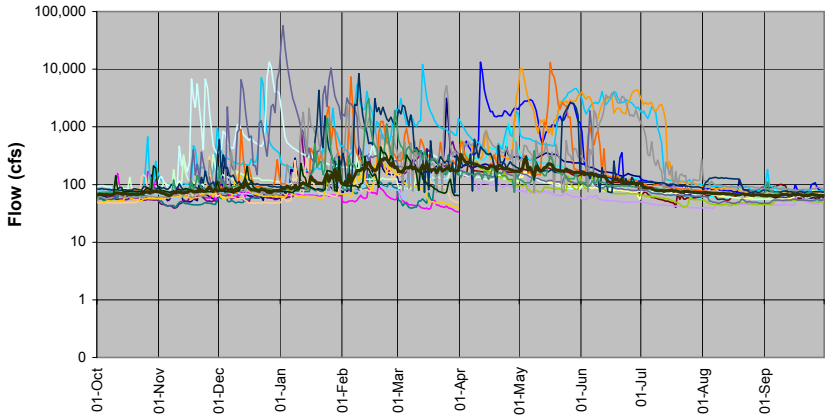


WUA Using Unimpaired Flows For Wet WY
SFAR below Rock Creek

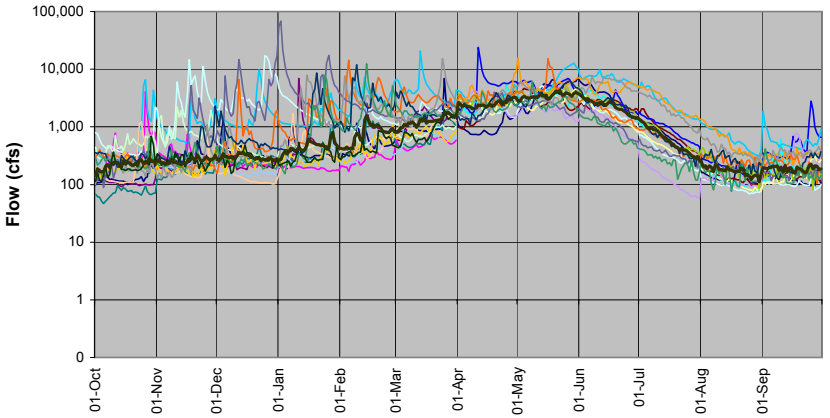


Slab Creek Reach
Wet WY Plots

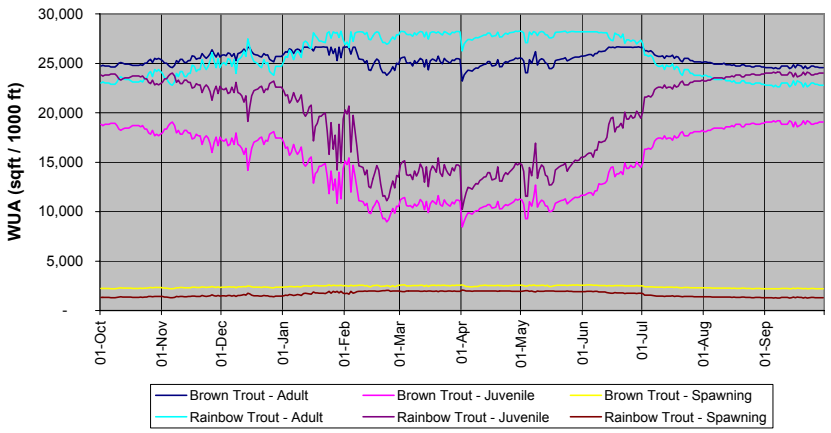
Historic Flows For Wet WY
SFAR above Chili Bar Reservoir



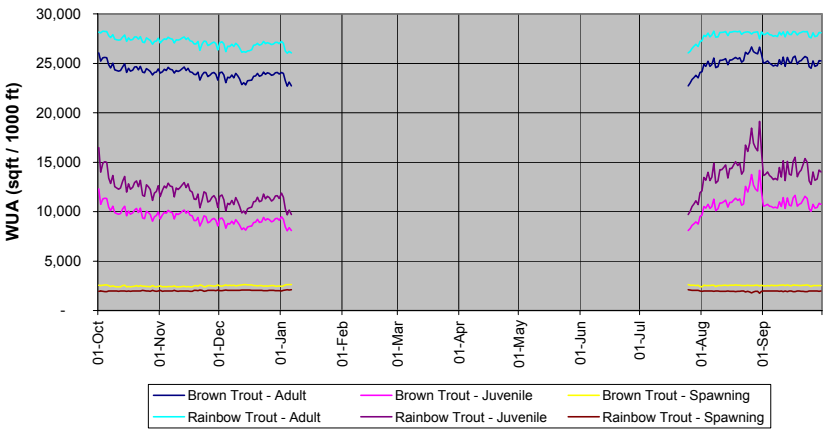
Unimpaired Flows For Wet WY
SFAR above Chili Bar Reservoir



WUA Using Historic Flows For Wet WY
SFAR above Chili Bar Reservoir



WUA Using Unimpaired Flows For Wet WY
SFAR above Chili Bar Reservoir



Robbs Peak Dam Reach
South Fork Rubicon River

Full-Year Summary Table

Partial-Year Summary Table

Historic vs. Unimpaired Flow Regimes Time Series Graphs
Hydrology and Fish Habitat

Lower SF Rubicon Reach
Full Year Summary

SF Rubicon At Confluence with Gerle Creek

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,263,561	1,568,889	24.16	1,329,574	1,564,870	17.70	1,026,883	1,309,740	27.55	1,397,013	1,586,194	13.54
Brown Trout - Juvenile	1,527,833	2,517,210	64.76	1,640,757	2,445,847	49.07	1,257,372	1,703,791	35.50	1,615,333	2,085,854	29.13
Brown Trout - Spawning	65,576	22,368	-65.89	60,606	24,271	-59.95	45,697	31,267	-31.58	70,448	36,885	-47.64
Rainbow Trout - Adult	1,216,490	1,213,351	-0.26	1,247,887	1,227,502	-1.63	953,839	1,118,061	17.22	1,336,685	1,346,982	0.77
Rainbow Trout - Juvenile	1,791,427	2,783,017	55.35	1,919,471	2,722,608	41.84	1,473,289	1,989,729	35.05	1,919,007	2,428,109	26.53
Rainbow Trout - Spawning	86,020	58,322	-32.20	83,011	60,183	-27.50	61,511	59,055	-3.99	90,249	70,693	-21.67

SF Rubicon Above Rubicon River

	Critical : 0 <= Flow < 1.00 MAF			Below Normal : 1.00 <= Flow < 1.50 MAF			Above Normal : 1.50 <= Flow < 2.00 MAF			Wet : Flow >= 2.00		
	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change	Unimpaired	Historic	% Change
Brown Trout - Adult	1,527,441	1,805,825	18.23	1,597,650	1,848,285	15.69	1,212,539	1,393,543	14.93	1,450,310	1,651,486	13.87
Brown Trout - Juvenile	1,937,341	2,213,046	14.23	1,957,893	2,195,749	12.15	1,418,723	1,493,328	5.26	1,544,285	1,718,012	11.25
Brown Trout - Spawning	67,318	50,252	-25.35	69,281	53,504	-22.77	54,044	46,608	-13.76	77,503	59,046	-23.81
Rainbow Trout - Adult	1,413,770	1,578,801	11.67	1,484,926	1,633,040	9.97	1,138,693	1,272,570	11.76	1,428,894	1,526,784	6.85
Rainbow Trout - Juvenile	2,250,167	2,628,333	16.81	2,298,996	2,630,399	14.42	1,687,287	1,842,080	9.17	1,879,117	2,138,097	13.78
Rainbow Trout - Spawning	94,038	86,069	-8.47	96,658	88,942	-7.98	73,266	69,936	-4.55	96,986	84,254	-13.13

Lower SF Rubicon Reach
Partial Year Summary

SF Rubicon At Confluence with Gerle Creek

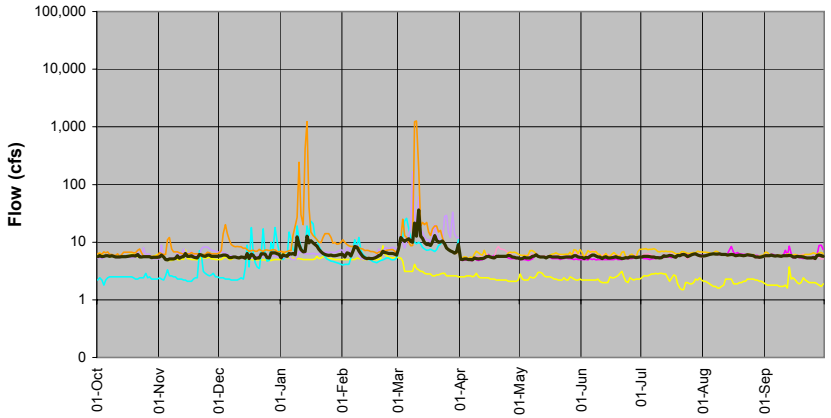
	Critical : 0 <= Flow < 0.9 MAF			Dry : 0.90 <= Flow < 1.70 MAF			Below Normal : 1.70 <= Flow < 2.60 MAF			Above Normal : 2.60 <= Flow < 3.50 MAF			Wet : Flow >= 3.50		
	Unimpaired	New	% Change	Unimpaired	New	% Change	Unimpaired	New	% Change	Unimpaired	New	% Change	Unimpaired	New	% Change
Brown Trout - Adult	901,728	1,160,259	28.67	815,181	1,006,617	23.48	882,007	1,107,147	25.53	883,458	1,026,364	16.18	965,696	1,059,472	9.71
Brown Trout - Juvenile	1,174,792	1,892,829	61.12	1,057,402	1,642,180	55.30	1,077,635	1,432,346	32.92	1,115,096	1,334,308	19.66	1,206,831	1,375,339	13.96
Brown Trout - Spawning	6,336	4,348	-31.37	8,662	4,348	-49.80	14,271	7,365	-48.39	8,652	7,437	-14.05	12,742	7,437	-41.64
Rainbow Trout - Adult	810,374	889,379	9.75	715,661	771,607	7.82	800,440	948,411	18.49	778,747	877,483	12.68	877,729	906,325	3.26
Rainbow Trout - Juvenile	1,359,216	2,083,783	53.31	1,228,346	1,807,849	47.18	1,270,023	1,675,507	31.93	1,305,400	1,558,672	19.40	1,410,803	1,607,268	13.93
Rainbow Trout - Spawning	29,195	12,684	-56.55	16,162	7,111	-56.00	10,338	6,520	-36.94	4,106	2,484	-39.51	6,687	4,036	-39.65

SF Rubicon Above Rubicon River

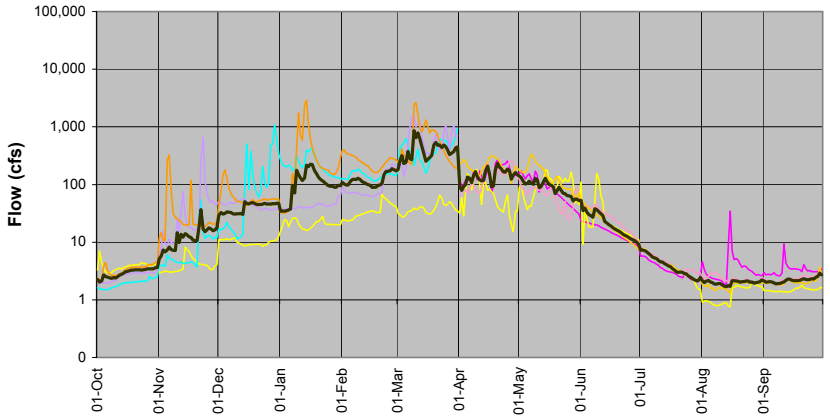
	Critical : 0 <= Flow < 0.9 MAF			Dry : 0.90 <= Flow < 1.70 MAF			Below Normal : 1.70 <= Flow < 2.60 MAF			Above Normal : 2.60 <= Flow < 3.50 MAF			Wet : Flow >= 3.50		
	Unimpaired	New	% Change	Unimpaired	New	% Change	Unimpaired	New	% Change	Unimpaired	New	% Change	Unimpaired	New	% Change
Brown Trout - Adult	1,247,271	1,390,617	11.49	1,127,050	1,229,710	9.11	1,058,837	1,185,939	12.00	1,042,627	1,112,999	6.75	1,045,953	1,143,679	9.34
Brown Trout - Juvenile	1,642,602	1,788,780	8.90	1,443,355	1,554,825	7.72	1,246,365	1,293,722	3.80	1,154,697	1,180,395	2.23	1,124,986	1,206,453	7.24
Brown Trout - Spawning	9,557	8,995	-5.88	13,012	10,124	-22.19	17,977	12,754	-29.06	14,322	12,654	-11.65	16,912	13,334	-21.16
Rainbow Trout - Adult	1,101,421	1,190,092	8.05	992,828	1,060,047	6.77	974,063	1,075,808	10.45	968,887	1,021,670	5.45	1,001,844	1,052,455	5.05
Rainbow Trout - Juvenile	1,898,137	2,097,629	10.51	1,683,001	1,832,124	8.86	1,484,780	1,586,749	6.87	1,401,977	1,460,857	4.20	1,372,771	1,495,187	8.92
Rainbow Trout - Spawning	28,885	20,687	-28.38	16,568	12,184	-26.46	9,586	7,298	-23.86	3,071	2,468	-19.62	5,235	4,025	-23.12

Lower SF Rubicon Reach
Critical WY Plots

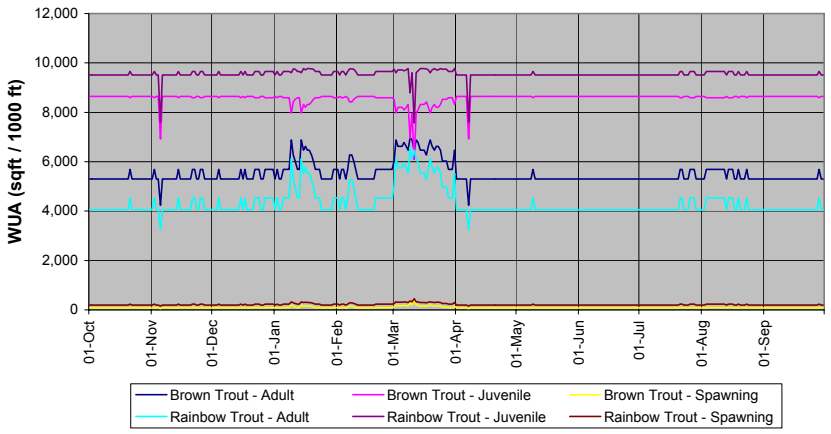
Historic Flows For Critical WY
SF Rubicon At Confluence with Gerle Creek



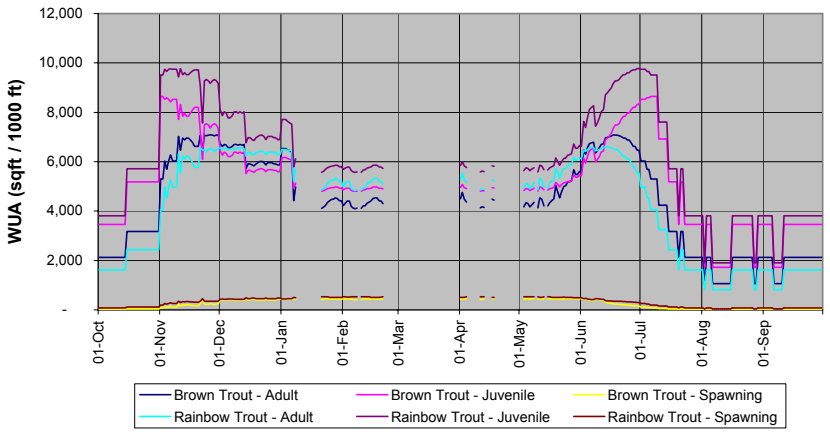
Unimpaired Flows For Critical WY
SF Rubicon At Confluence with Gerle Creek



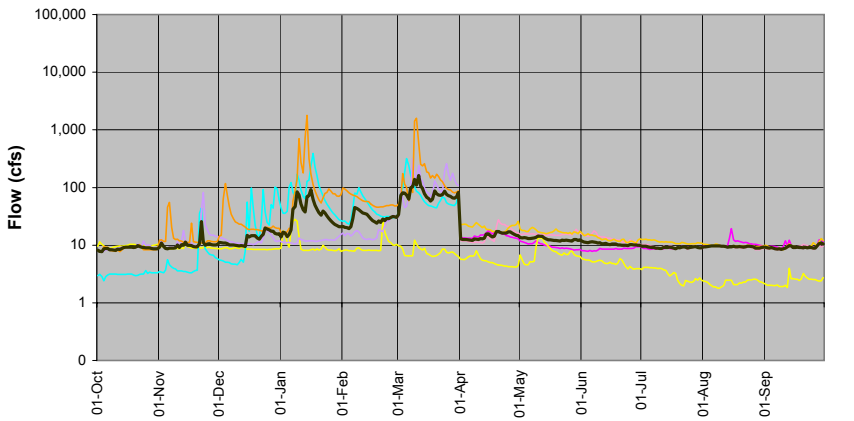
WUA Using Historic Flows For Critical WY
SF Rubicon At Confluence with Gerle Creek

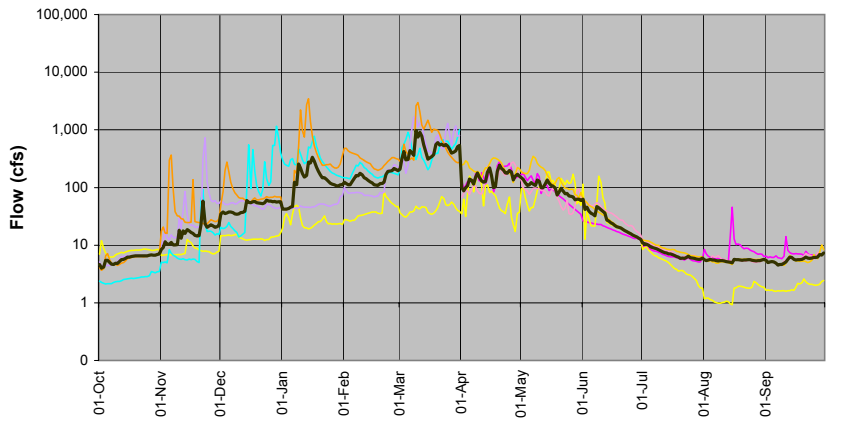


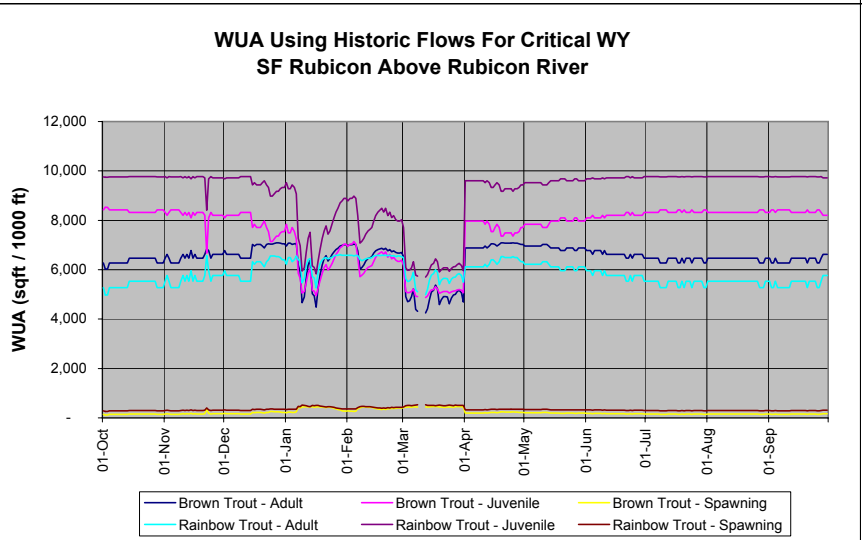
WUA Using Unimpaired Flows For Critical WY
SF Rubicon At Confluence with Gerle Creek

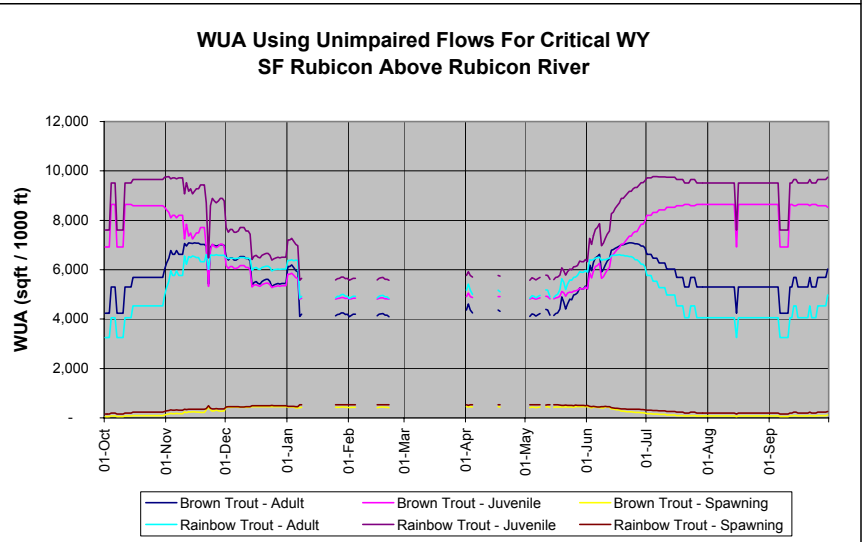


Lower SF Rubicon Reach
Critical WY Plots



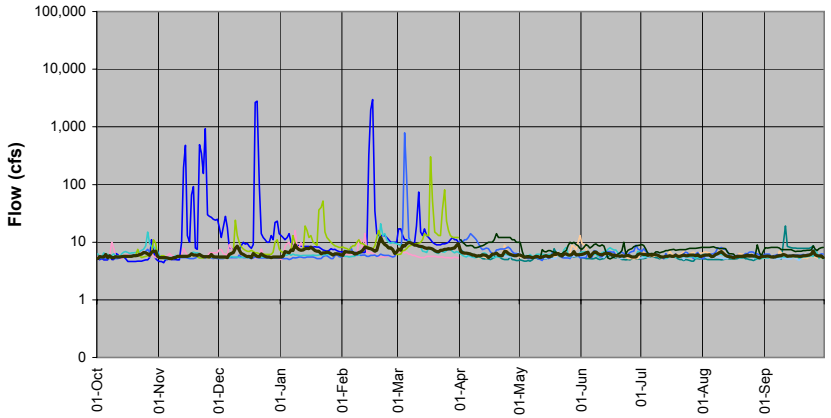




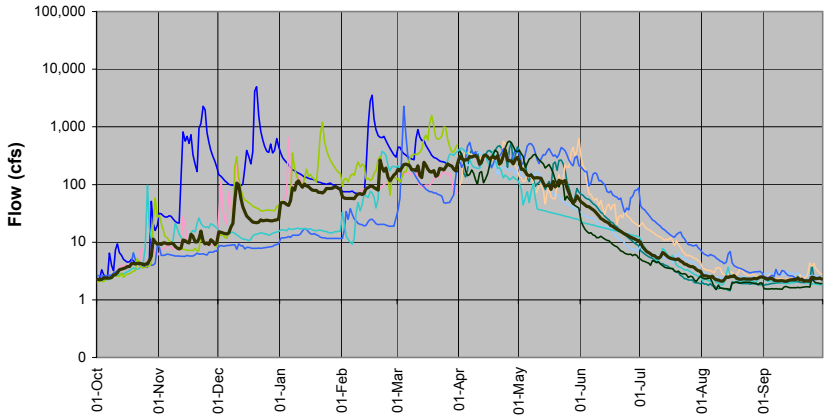


Lower SF Rubicon Reach
Below Normal WY Plots

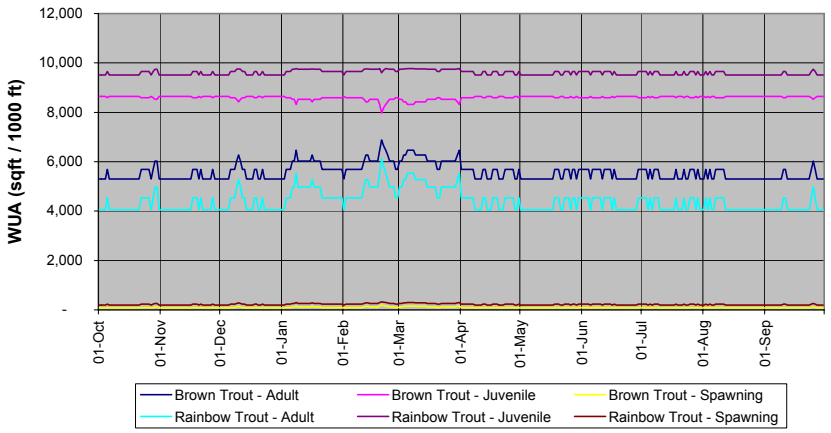
Historic Flows For Below Normal WY
SF Rubicon At Confluence with Gerle Creek



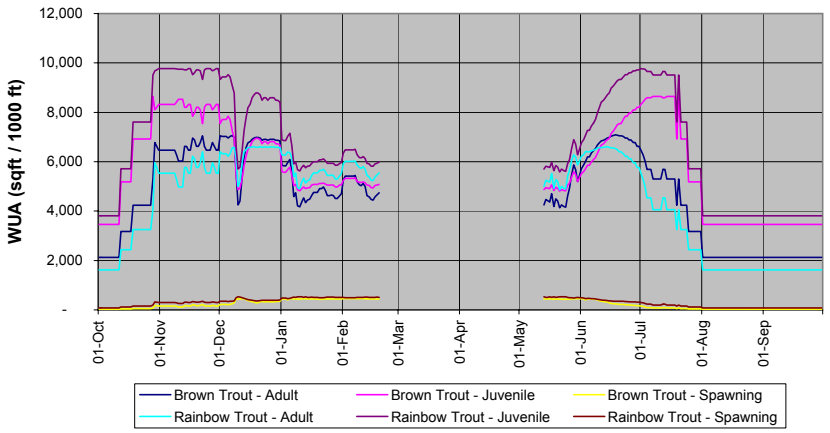
Unimpaired Flows For Below Normal WY
SF Rubicon At Confluence with Gerle Creek



WUA Using Historic Flows For Below Normal WY
SF Rubicon At Confluence with Gerle Creek

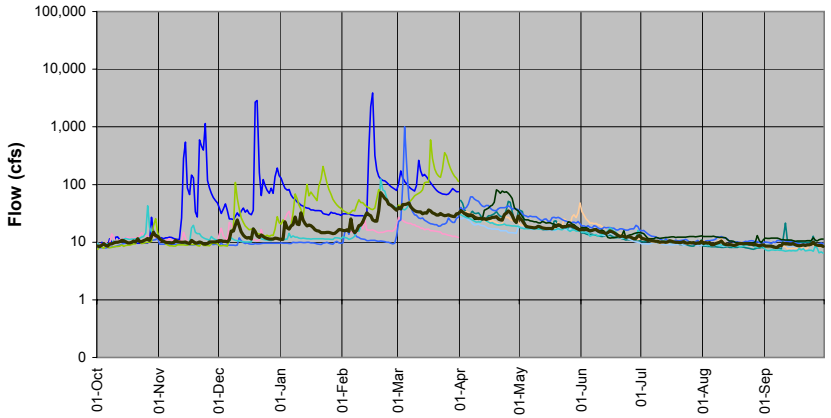


WUA Using Unimpaired Flows For Below Normal WY
SF Rubicon At Confluence with Gerle Creek

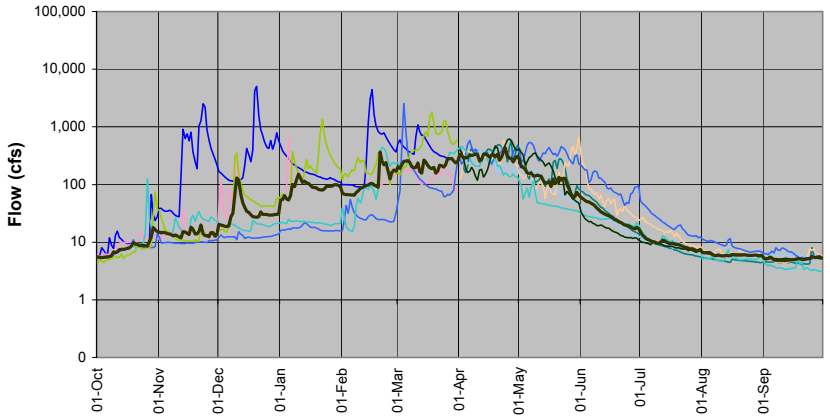


Lower SF Rubicon Reach
Below Normal WY Plots

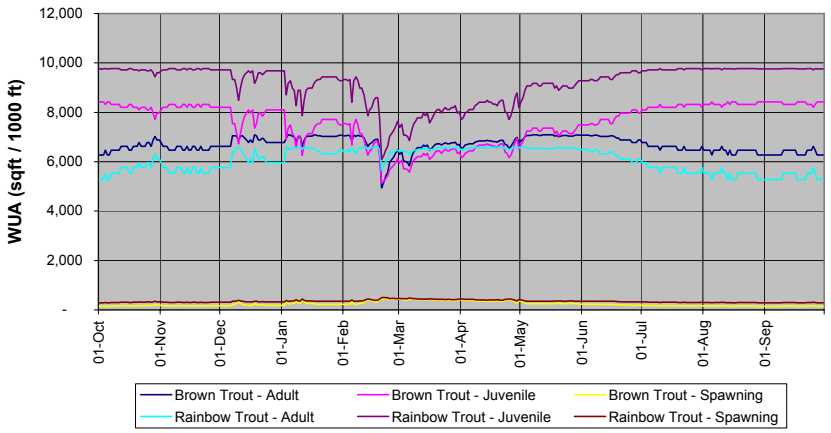
Historic Flows For Below Normal WY
SF Rubicon Above Rubicon River



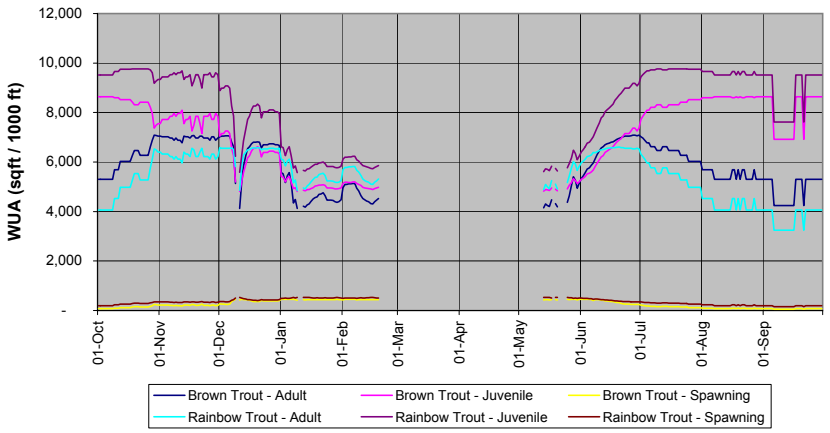
Unimpaired Flows For Below Normal WY
SF Rubicon Above Rubicon River



WUA Using Historic Flows For Below Normal WY
SF Rubicon Above Rubicon River

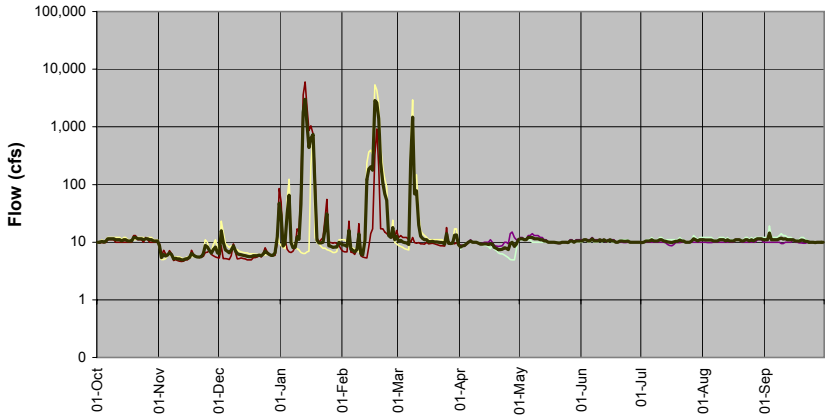


WUA Using Unimpaired Flows For Below Normal WY
SF Rubicon Above Rubicon River

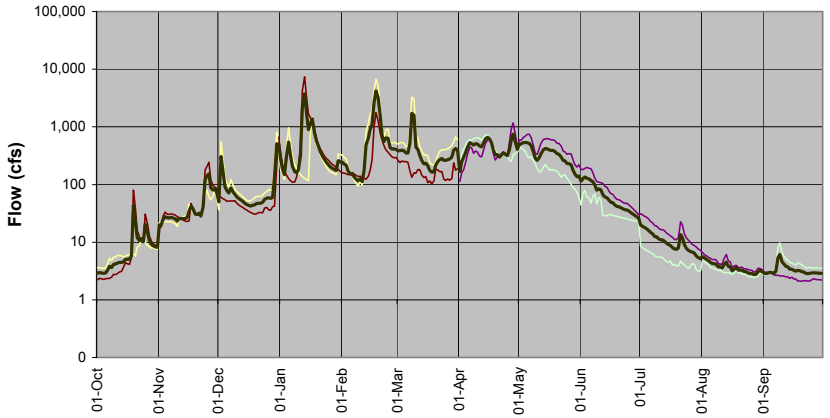


Lower SF Rubicon Reach
Above Normal WY Plots

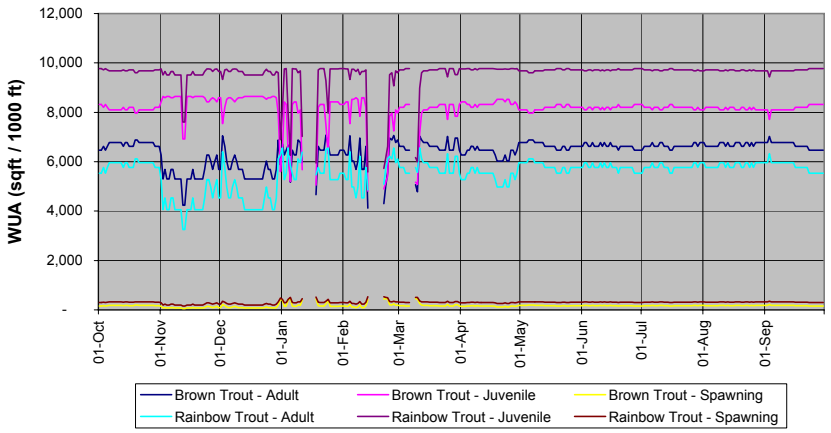
Historic Flows For Above Normal WY
SF Rubicon At Confluence with Gerle Creek



Unimpaired Flows For Above Normal WY
SF Rubicon At Confluence with Gerle Creek



WUA Using Historic Flows For Above Normal WY
SF Rubicon At Confluence with Gerle Creek



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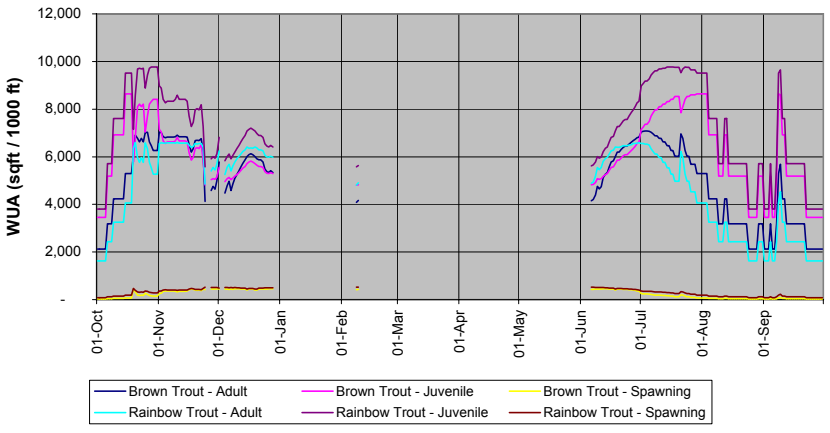
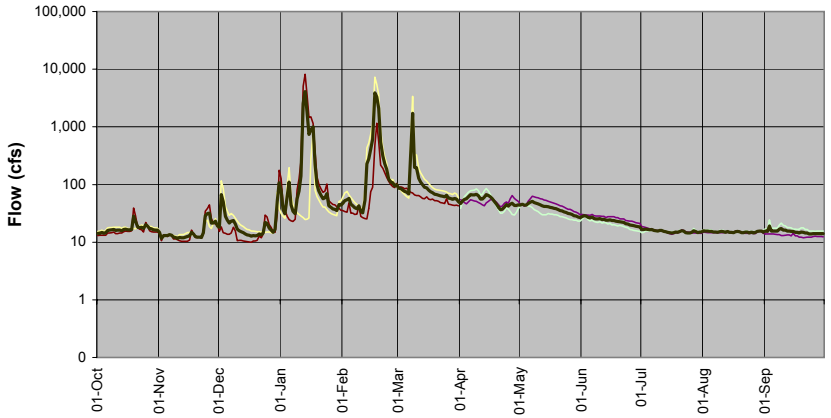
SF Rubicon At Confluence with Gerle Creek

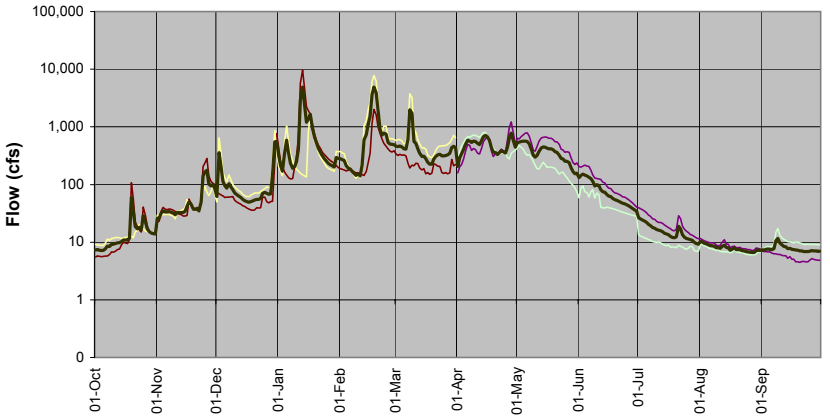


Lower SF Rubicon Reach
Above Normal WY Plots

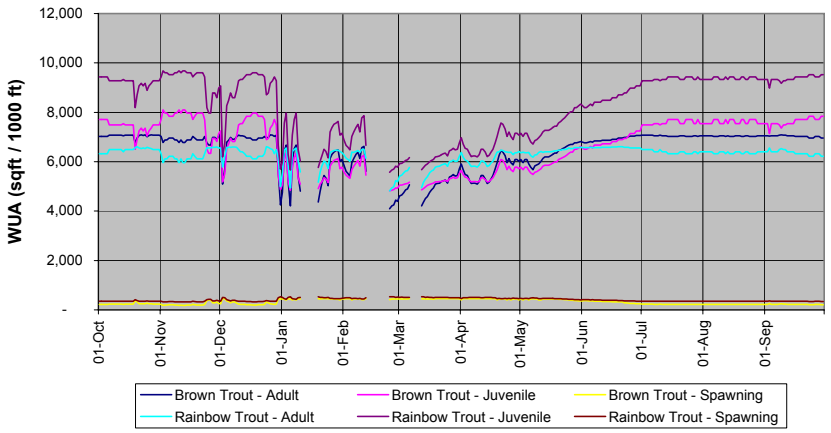
Historic Flows For Above Normal WY
SF Rubicon Above Rubicon River



Unimpaired Flows For Above Normal WY
SF Rubicon Above Rubicon River



WUA Using Historic Flows For Above Normal WY
SF Rubicon Above Rubicon River



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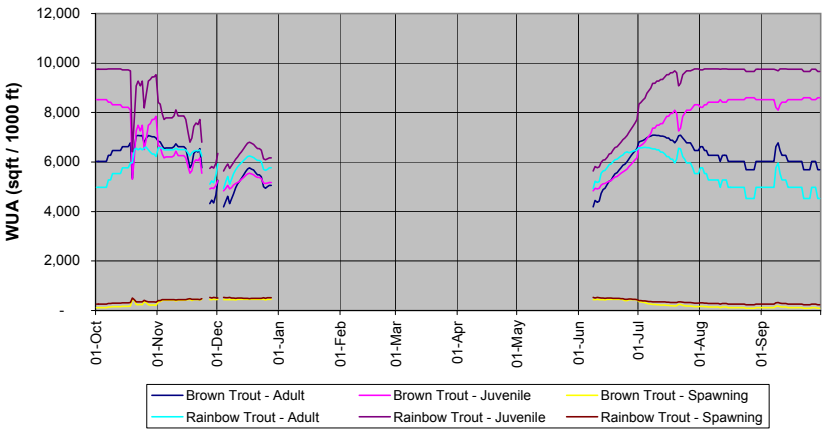
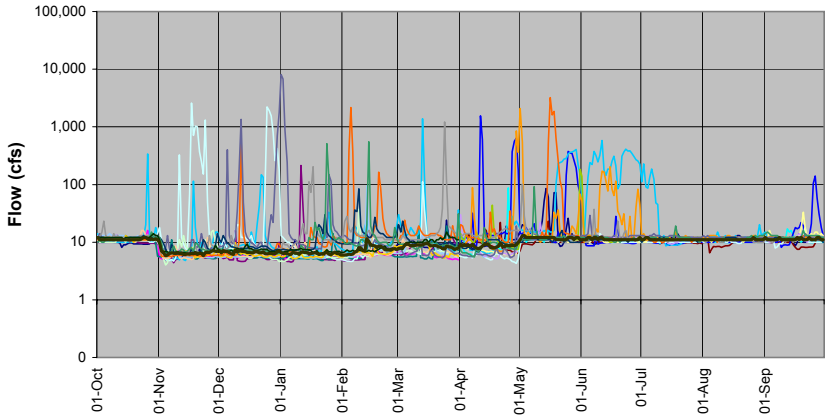
SF Rubicon Above Rubicon River

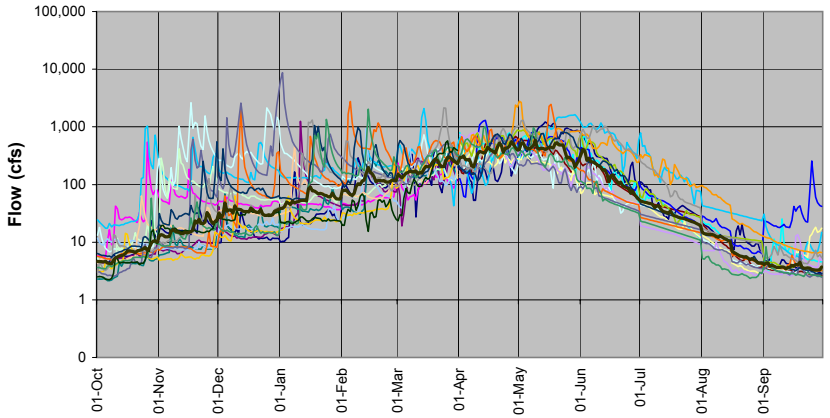


Lower SF Rubicon Reach
Wet WY Plots

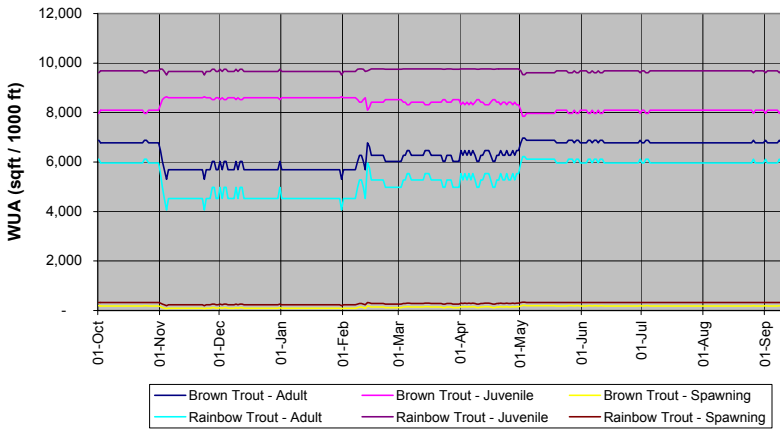
Historic Flows For Wet WY
SF Rubicon At Confluence with Gerle Creek



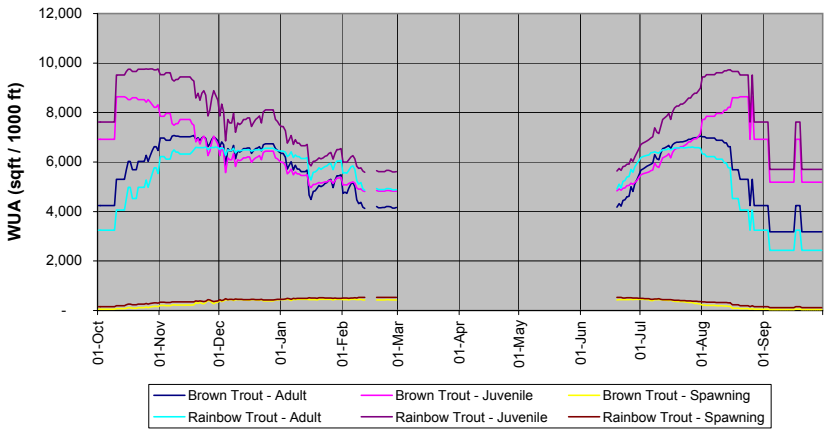
Unimpaired Flows For Wet WY
SF Rubicon At Confluence with Gerle Creek



WUA Using Historic Flows For Wet WY
SF Rubicon At Confluence with Gerle Creek

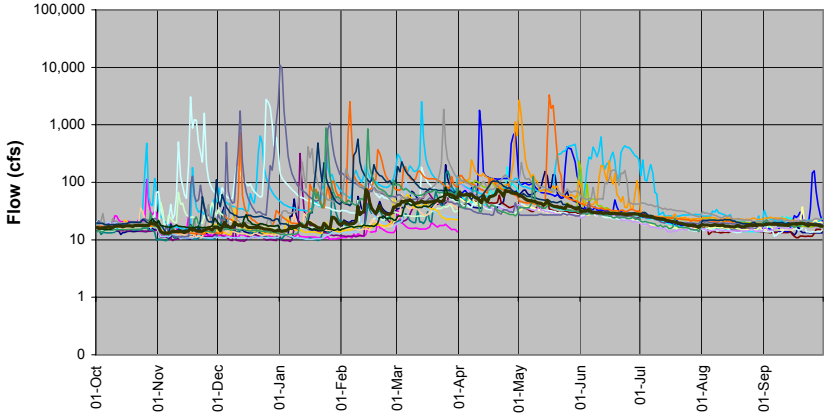


WUA Using Unimpaired Flows For Wet WY
SF Rubicon At Confluence with Gerle Creek

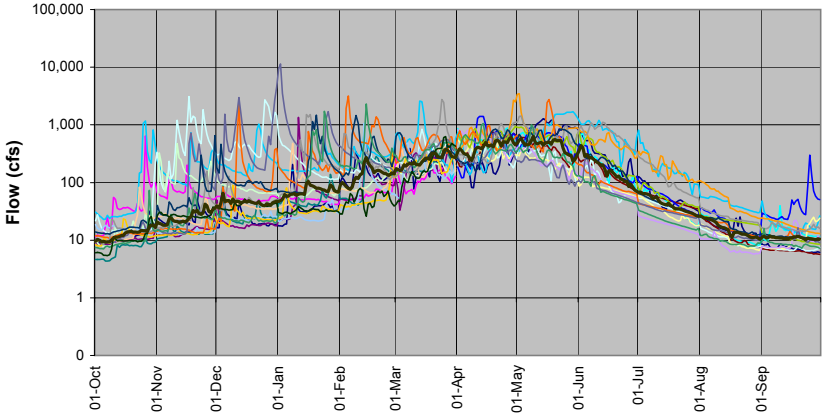


Lower SF Rubicon Reach
Wet WY Plots

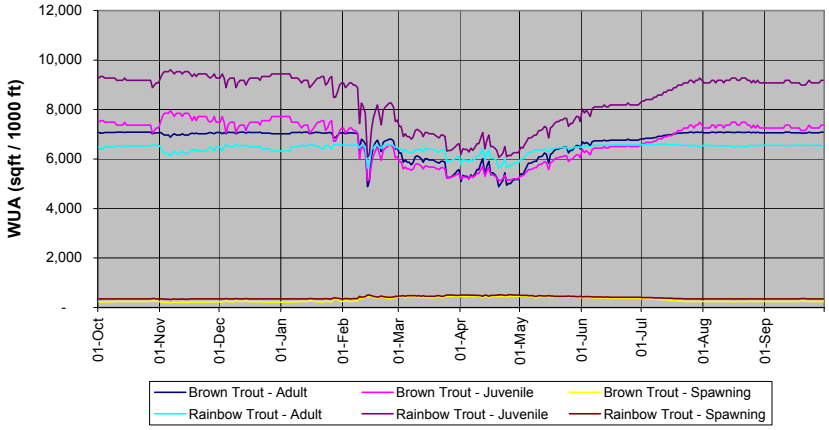
Historic Flows For Wet WY
Brush Creek Above Slab Creek Dam



Unimpaired Flows For Wet WY
SF Rubicon Above Rubicon River



WUA Using Historic Flows For Wet WY
SF Rubicon Above Rubicon River



WUA Using Unimpaired Flows For Wet WY
SF Rubicon Above Rubicon River