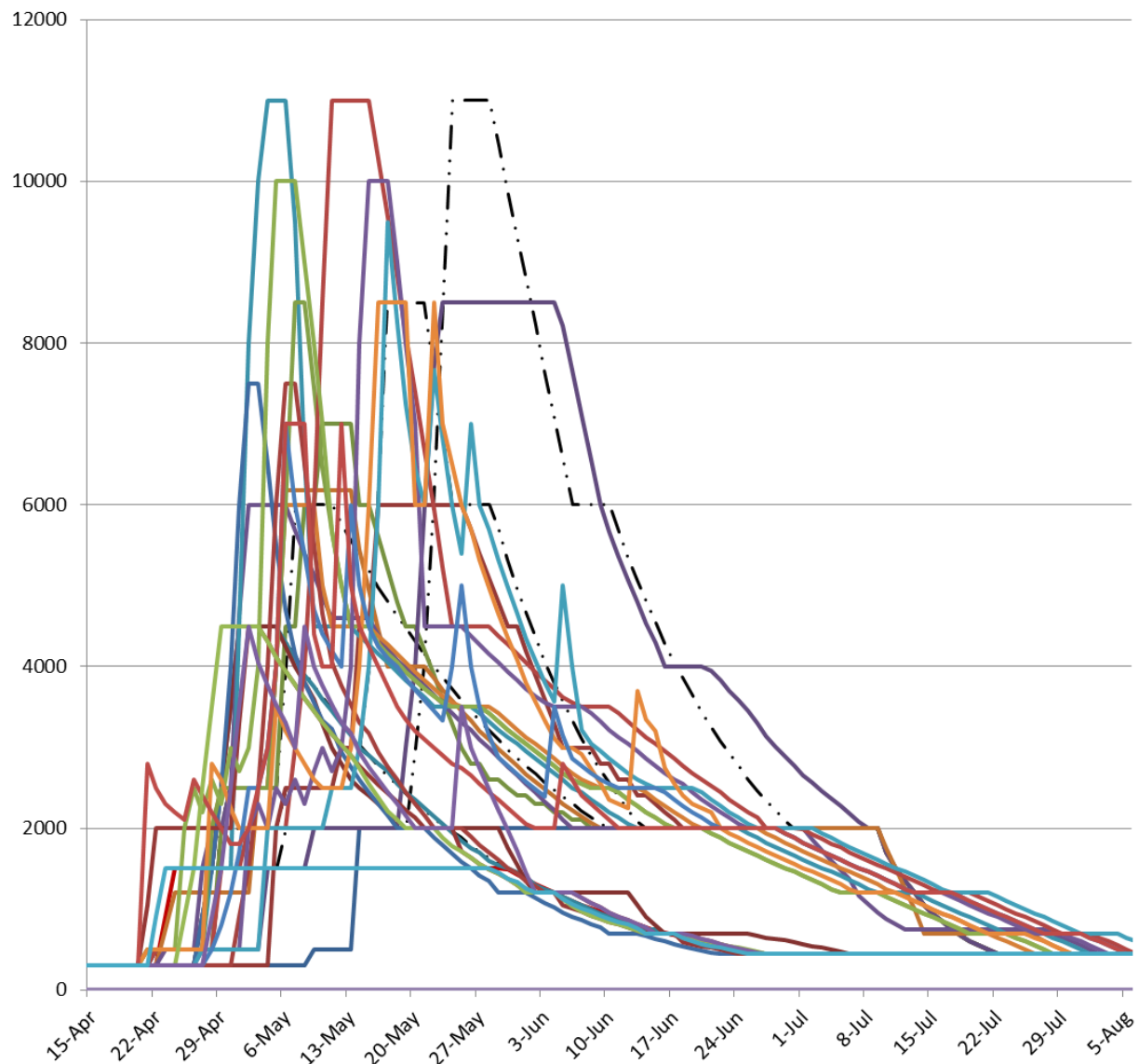


Abbreviated Restoration Flow Release Portfolio

The purpose of this document is to improve TRRP Restoration Flow Hydrograph Recommendations beginning with water year 2014, by providing an abbreviated portfolio of past hydrographs and alternatives with sufficient analyses completed. Only a brief summary of each hydrograph is provided; these may be more broadly documented supplemental documents or in future years.

Compiled by Eric Peterson

Last saved 3/11/2014 3:11 PM by Eric Peterson



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Standard Tables

Table 1: Foundational recommendations.

Water Year Class	Basin Runoff Low (AF; EIS Oct 1999 Public Draft, Table 2-1) ¹	Basin Runoff High (TAF)	Probability of Occurrence	Restoration Volume	ROD Recommended Gravel Augmentation Low (cubic yards/year)	ROD Recommended Gravel Augmentation High (cubic yards/year)
Extremely Wet	>=2,000,000		0.12	815,000	31,000	67,000
Wet	1,350,000	1,999,999	0.28	701,000	10,000	18,000
Normal	1,025,000	1,349,999	0.20	647,000	1,800	2,200
Dry	650,000	1,024,999	0.28	453,000	150	250
Critically Dry		< 650,000	0.12	369,000	0	0

¹ Cutoffs between years are not specified in the ROD document itself. The DEIS (and thus the FEIS by reference, as well as the ROD by reference) specified non-overlapping values. TRFEFR had overlapping values between water year classes.

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Table 2: Hydrograph History.

Water Year	Apr. 1 Forecast Water Year Type	Hydrograph	Scheduled Peak Flow Rate (cfs)
2004	Wet	Volume Constrained, Normal	6,000
2005	Normal	7000 cfs Model Calibration, Normal	7,000
2006	Extremely Wet	Infrastructure Constrained, Extremely Wet	8,500
2007	Dry	ROD Dry	4,500
2008	Normal	Veg Modified, Normal	6,175
2009	Dry	Monitoring Benches Dry	4,500
2010	Normal	Riparian/Wildlife Peak plus Monitoring, Normal	6,000
2011	Wet	11,000 cfs, Wet	11,000
2012	Normal	Riparian Descending Limb, Normal	6,000
2013	Dry	Spring Habitat Bench, Dry	4,500

Table 3: Alternative hydrographs with Analyses Completed as per WY2014 Process

Title	Water Year Type	Year Analyzed
Extremely Wet, Riparian Initiation	Extremely Wet	2014
Wet Year Transport / Riparian Vegetation Alternative 1	Wet	2014
Wet Year Transport / Riparian Vegetation Alternative 2	Wet	2014
Wet Multi-Peak 1	Wet	2014
Wet Multi-Peak 2	Wet	2014
Joint Physical-Riparian, Normal	Normal	2014
Normal Multi-Peak 1	Normal	2014
Normal Multi-Peak 2	Normal	2014
Joint Physical-Riparian Alt 2, Dry	Dry	2014
Dry Multi-Peak	Dry	2014

Extremely Wet Year Hydrographs

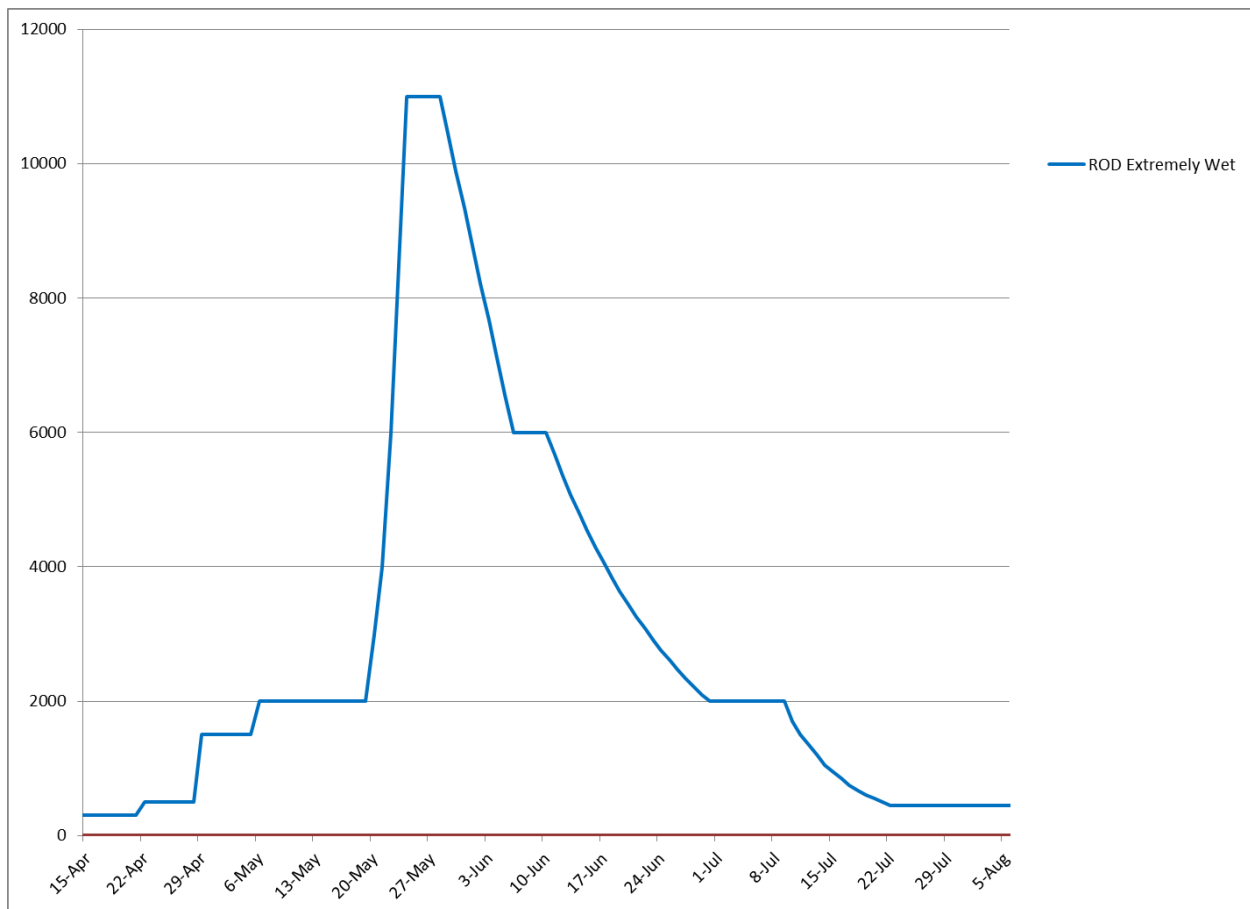
ROD, Extremely Wet

Proposed: TRFEFR 1999

Analyzed: TRFEFR 1999

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Extremely Wet (column C)



Management Objectives (Purpose): From TRFEFR Table 8.5...

- *Peak flow purpose:*
 - reduce fine sediment (<5/16 inch) storage within the surface and subsurface channelbed;
 - increase sinuosity through channel migration;
 - create and maintain alternate bar morphology;
 - create floodplains by bar building and fine sediment deposition;
 - encourage establishment and growth of riparian vegetation on floodplains;
 - sour up to 3 yr old woody riparian vegetation along low flow channel margins and scour younger plants higher on bar flanks.
- *Descending limb 1:*

- reduce fine sediment (<5/16 inch) storage within the surface channelbed.
- *Descending limb bench 1:*
 - reduce fine sediment (<5/16 inch) storage within the surface channelbed while minimizing coarse sediment (>5/16 inch) transport.
- *Descending limb 2:*
 - inundate point bars; minimize river stage change to preserve egg masses of yellow legged frogs;
 - maintain seasonally variable water surface levels in side channels and off-channel wetlands.
- *Descending limb bench 2:*
 - provide optimal temperatures for increased survival of chinook smolts;
 - inundate point bars.

Peak Flow Gravel Augmentation: ROD: 31,000 – 67,000 cubic yards.

Post-Flow Analyses and Key Findings: N/A

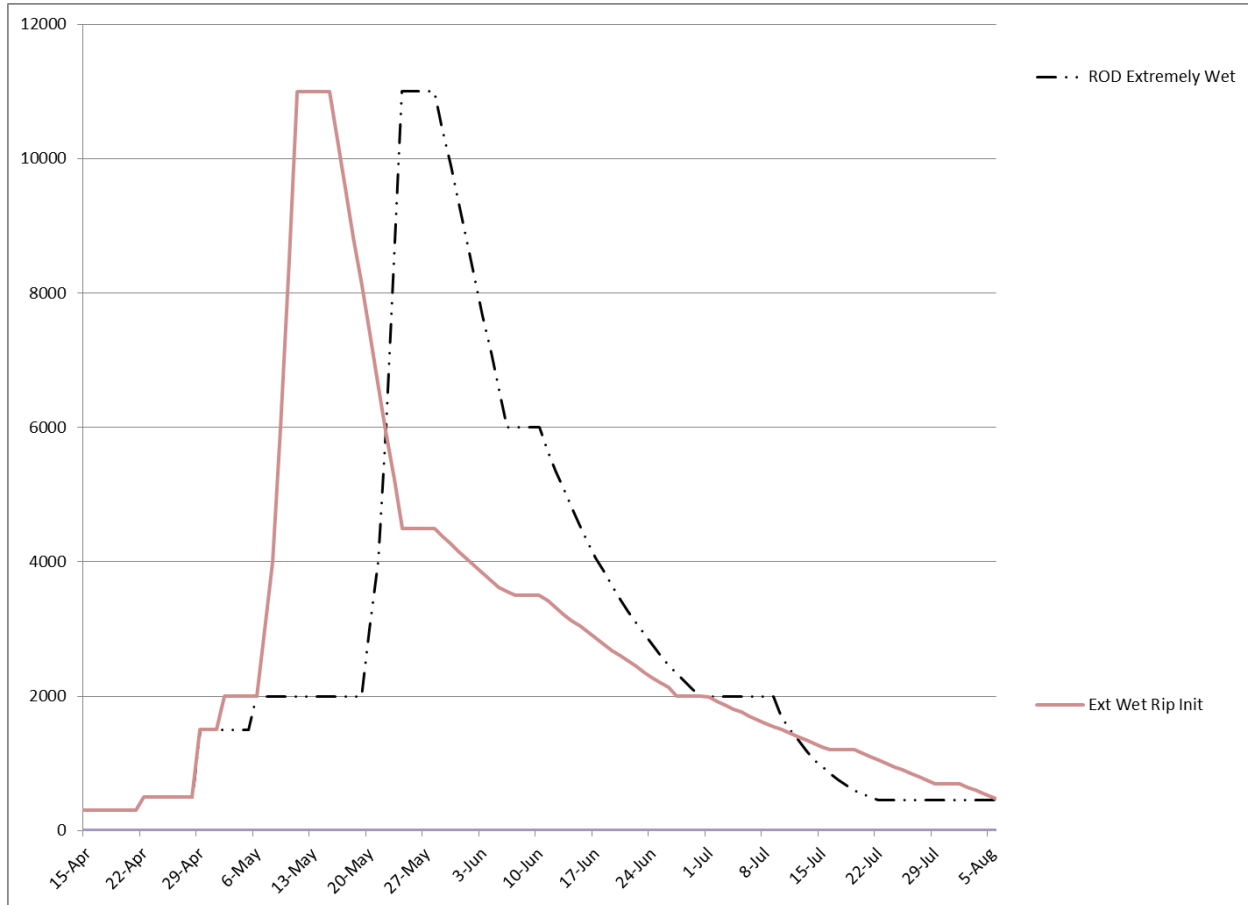
Extremely Wet Riparian Initiation

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Ext Wet Rip Init (column V)



Management Objectives (Purpose): From TRFEFR Table 8.5...

- *Peak flow purpose:*
 - All ROD Hydrograph Objectives
 - Updated objective to improve initiation of riparian vegetation as per current understanding of initiation relative to hydrograph

Peak Flow Gravel Augmentation: ROD: 31,000 – 67,000 cubic yards.

Post-Flow Analyses and Key Findings: See workgroup reports from 2014.

Wet Year Hydrographs

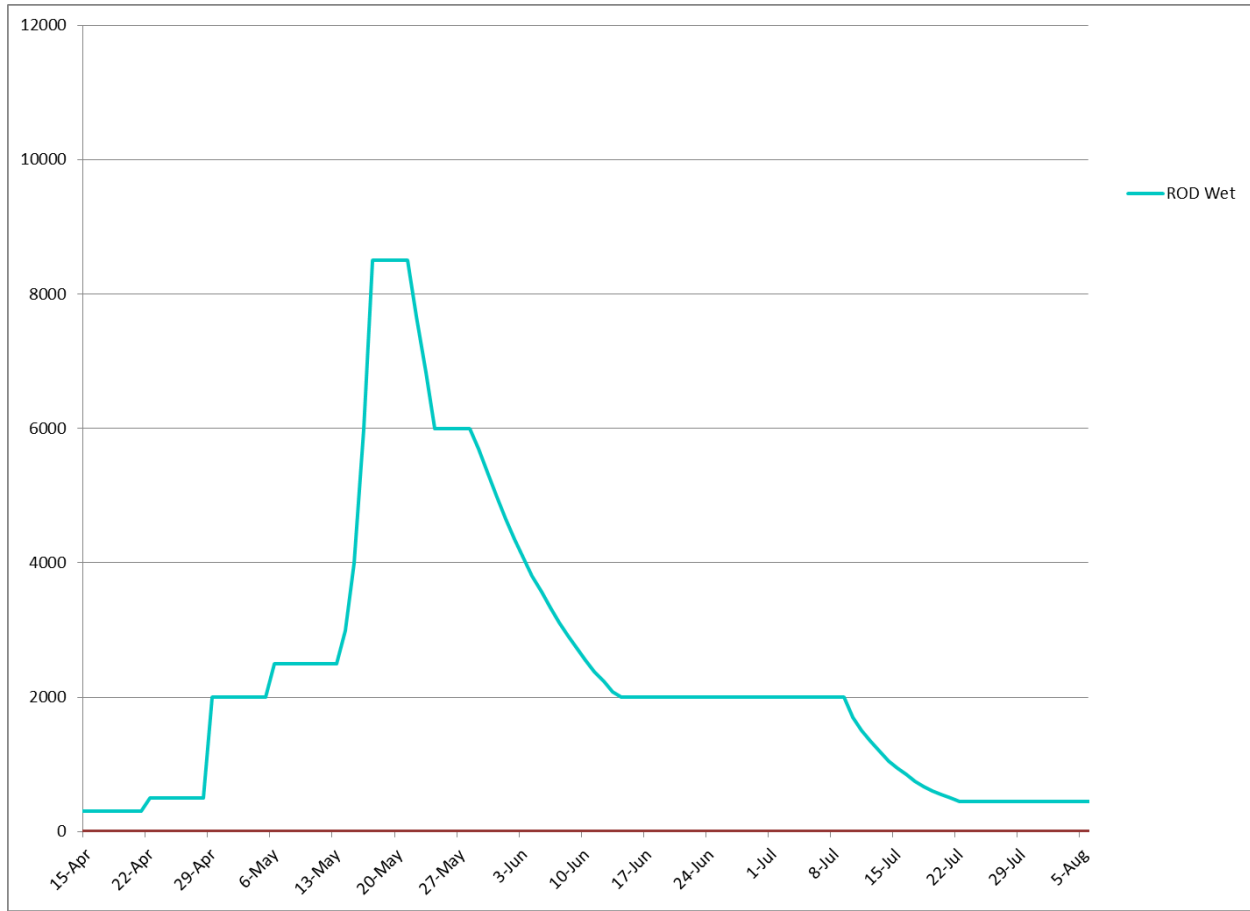
ROD, Wet

Proposed: TRFEFR 1999

Analyzed: TRFEFR 1999

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Wet (column D)



Management Objectives (Purpose): From TRFEFR Table 8.6...

- *Peak flow purpose:*
 - reduce fine sediment (<5/16 inch) storage within the surface and subsurface channelbed;
 - increase sinuosity through channel migration;
 - create and maintain alternate bar morphology;
 - create floodplains by bar building and fine sediment deposition;
 - encourage establishment and growth of riparian vegetation on floodplains;
 - scour up to 2 yr old woody riparian vegetation along low flow channel margins.
- *Descending limb 1:*
 - reduce fine sediment (<5/16 inch) storage within the surface channelbed.
- *Descending limb bench 1:*

- DRAFT
- reduce fine sediment (<5/16 inch) storage within the surface channelbed while minimizing coarse sediment (>5/16 inch) transport.
 - *Descending limb 2:*
 - inundate point bars; minimize river stage change to preserve egg masses of yellow legged frogs;
 - maintain seasonally variable water surface levels in side channels and off-channel wetlands.
 - *Descending limb bench 2:*
 - provide optimal temperatures for increased survival of chinook smolts;
 - inundate point bars.

Peak Flow Gravel Augmentation: ROD: 10,000 – 18,000 cubic yards.

Post-Flow Analyses and Key Findings: N/A

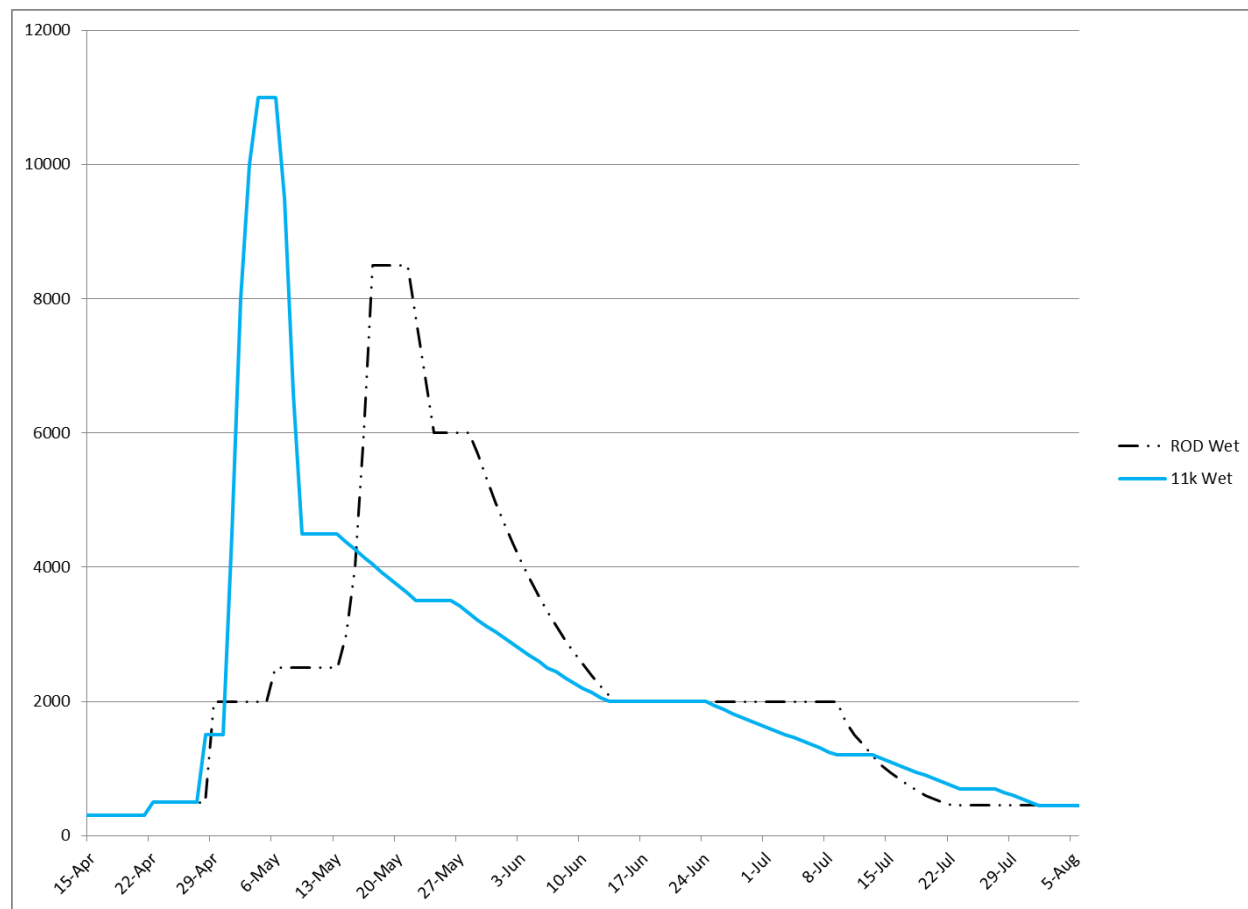
11,000 cfs, Wet (WY2011)

Proposed: WY2011

Analyzed: WY2011

Enacted: WY2011

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} 11k Wet (column P)



Management Objectives (Purpose):

- Expedite geomorphic change and habitat creation at the 23 constructed Phase 1 channel rehabilitation sites and scour pools;
- Assess the geomorphic effect of an 11,000 cfs release at constructed Phase 1 channel rehabilitation sites to improve design of Phase 2 sites;
- Address key uncertainties regarding the peak magnitude and duration of high flow releases needed to meet geomorphic objectives to improve future flow releases to better meet restoration goals;
- Regenerate riparian vegetation on floodplain surfaces; and
- Evaluate the effects of an extended ramp down that better mimics natural recession rates on smolt outmigration.

Peak Flow Gravel Augmentation: 3270cy at Diversion Pool, 2050 cy at Lowden R3, totaling 5,320 cubic yards (4,067 m³)

Post-Flow Analyses and Key Findings:

- **Chinook Outmigrant Timing Date (80%):** July 23
- **Temperature Exceedances:**
 - **Weitchpec:** marginal from July 4 to July 9 (exceeded the targeted optimal temperature regime by a maximum of 4.1°F (2.3°C).
 - **Douglas City:** no exceedances.
 - **North Fork:** no exceedances.
- **Sediment Transport:**
 - **Fines:** Flushed about 14,000 tones fine sediments from upstream of Douglas City;
 - **Bedload:** bed scour monitoring showed variable scour patterns occurred across monitored surfaces, but most sites had scour depths that exceeded 2.0 D84 diameters (TRRP Annual Report)

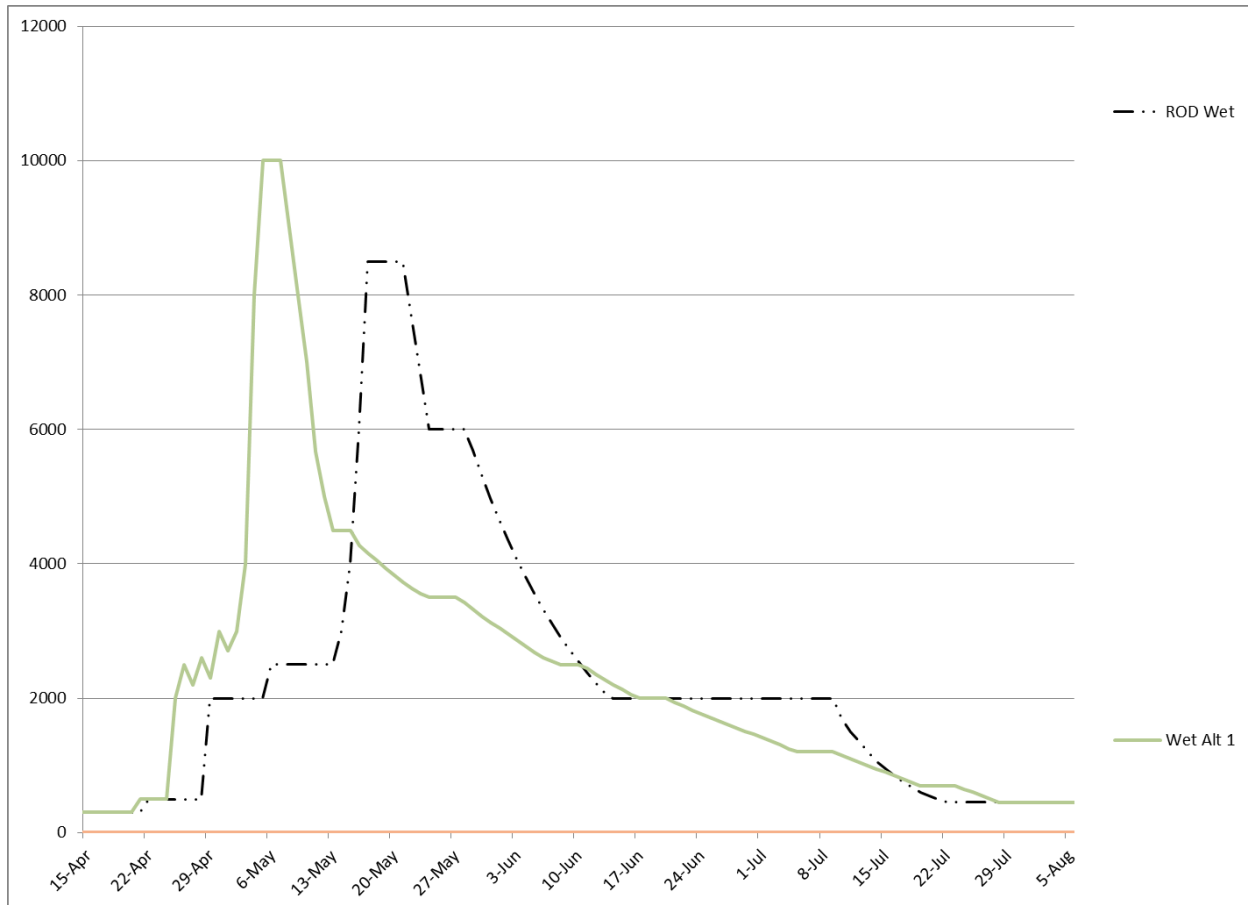
Wet Year Transport / Riparian Vegetation Alternative 1

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Wet Alt 1 (column W)



Management Objectives (Purpose):

- Increase access to fry/juvenile rearing habitat and enhance growth rate prior to peak flow release
- Increase actual sediment transport rates to better achieve transport targets
- Promote smolt outmigration
- Promote natural riparian regeneration on floodplain surfaces
- Meet temperature targets

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

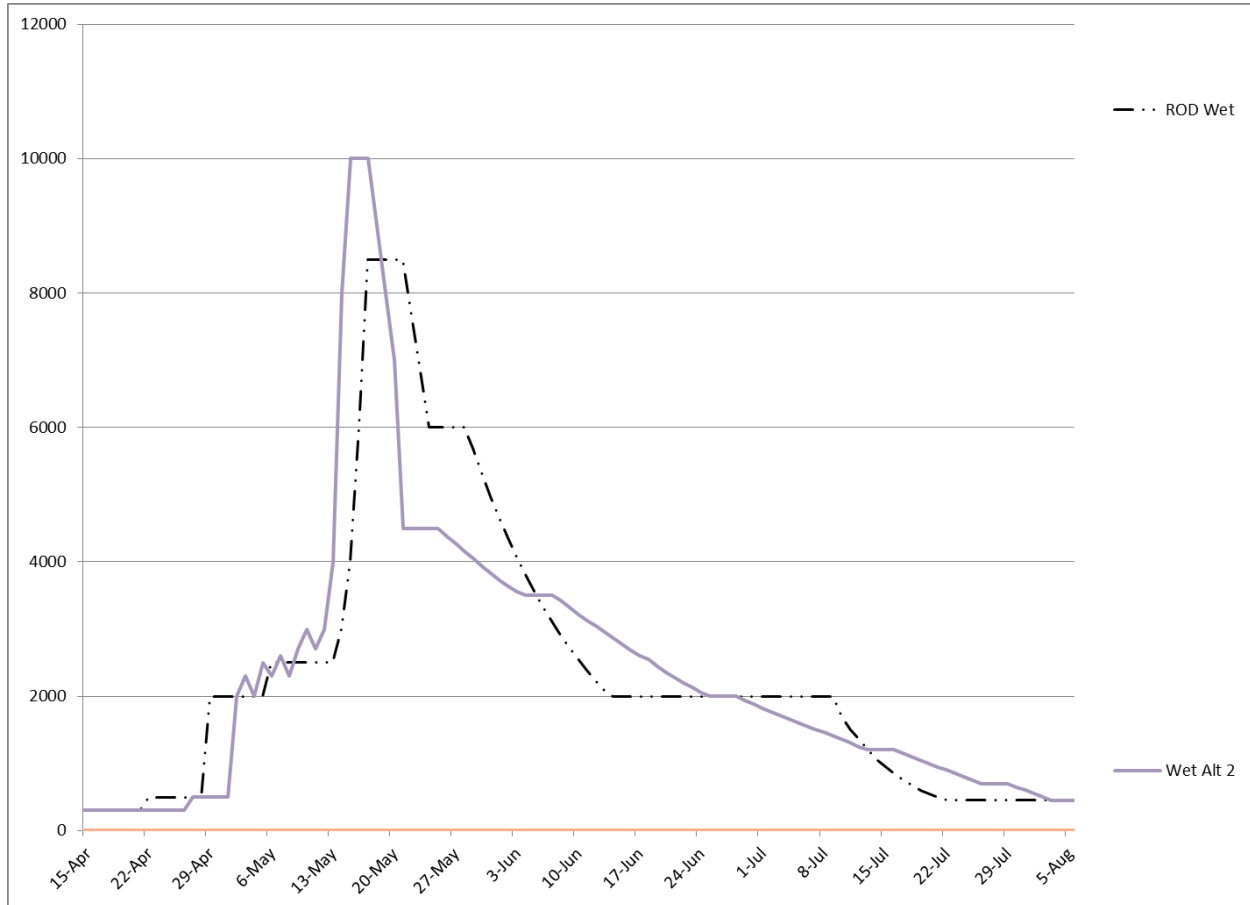
Wet Year Transport / Riparian Vegetation Alternative 2

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Wet Alt 2 (column X)



Management Objectives (Purpose):

- Similar to Wet Year Transport / Riparian Vegetation Alternative 1 except:
 - Later peak release

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

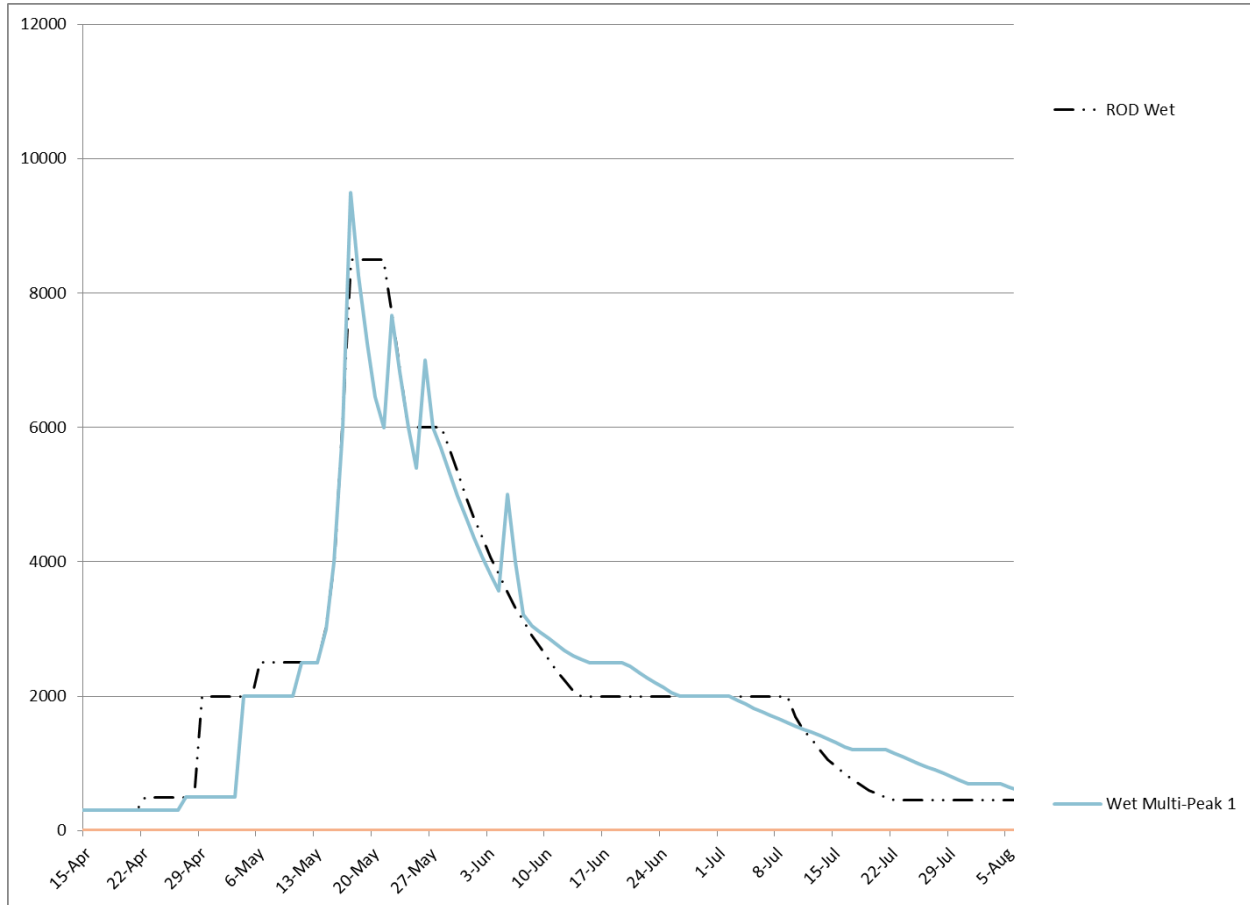
Wet Multi-Peak 1

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Wet Multi-Peak 1 (column Y)



Management Objectives (Purpose):

-

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

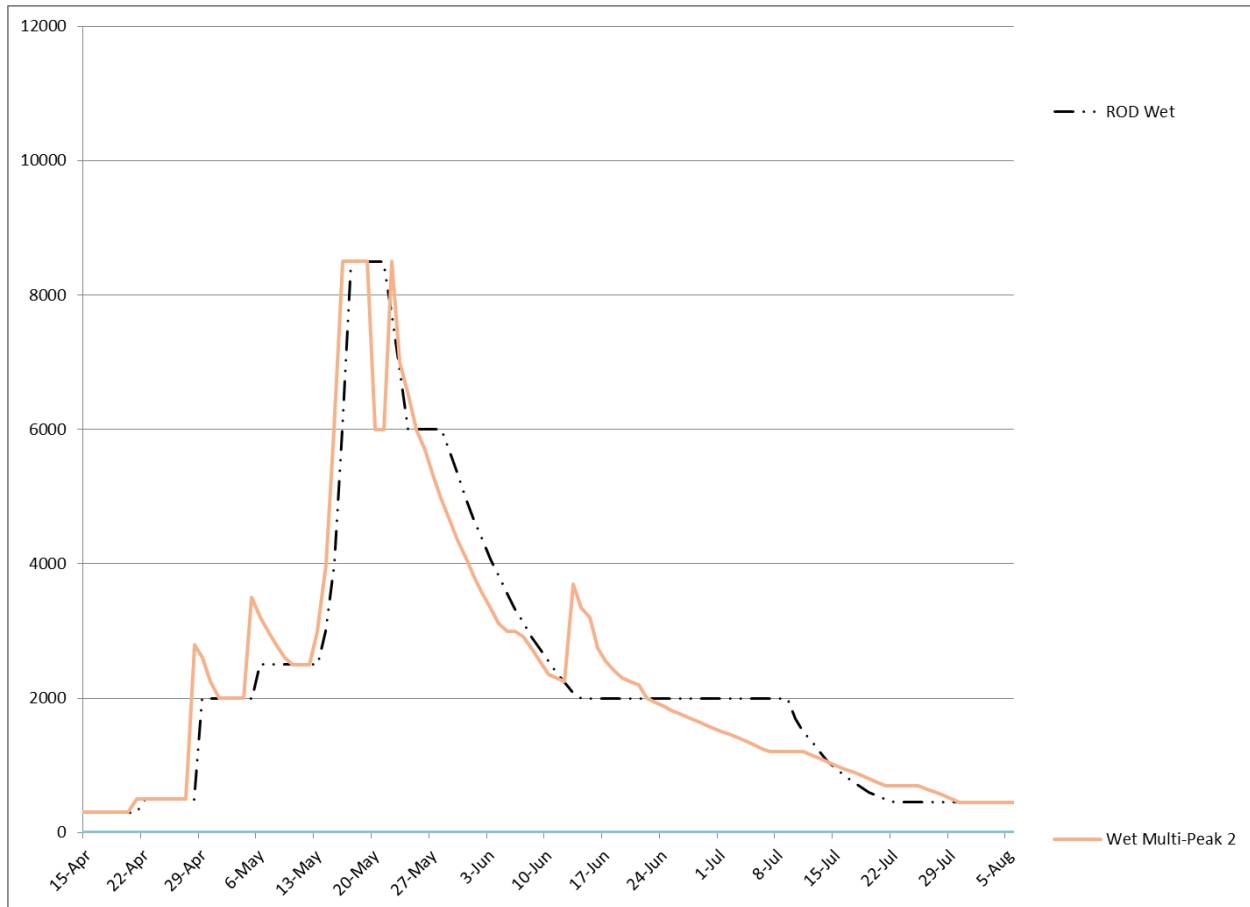
Wet Multi-Peak 2

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Wet Multi-Peak 2 (column Z)



Management Objectives (Purpose):

-

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

Normal Year Hydrographs

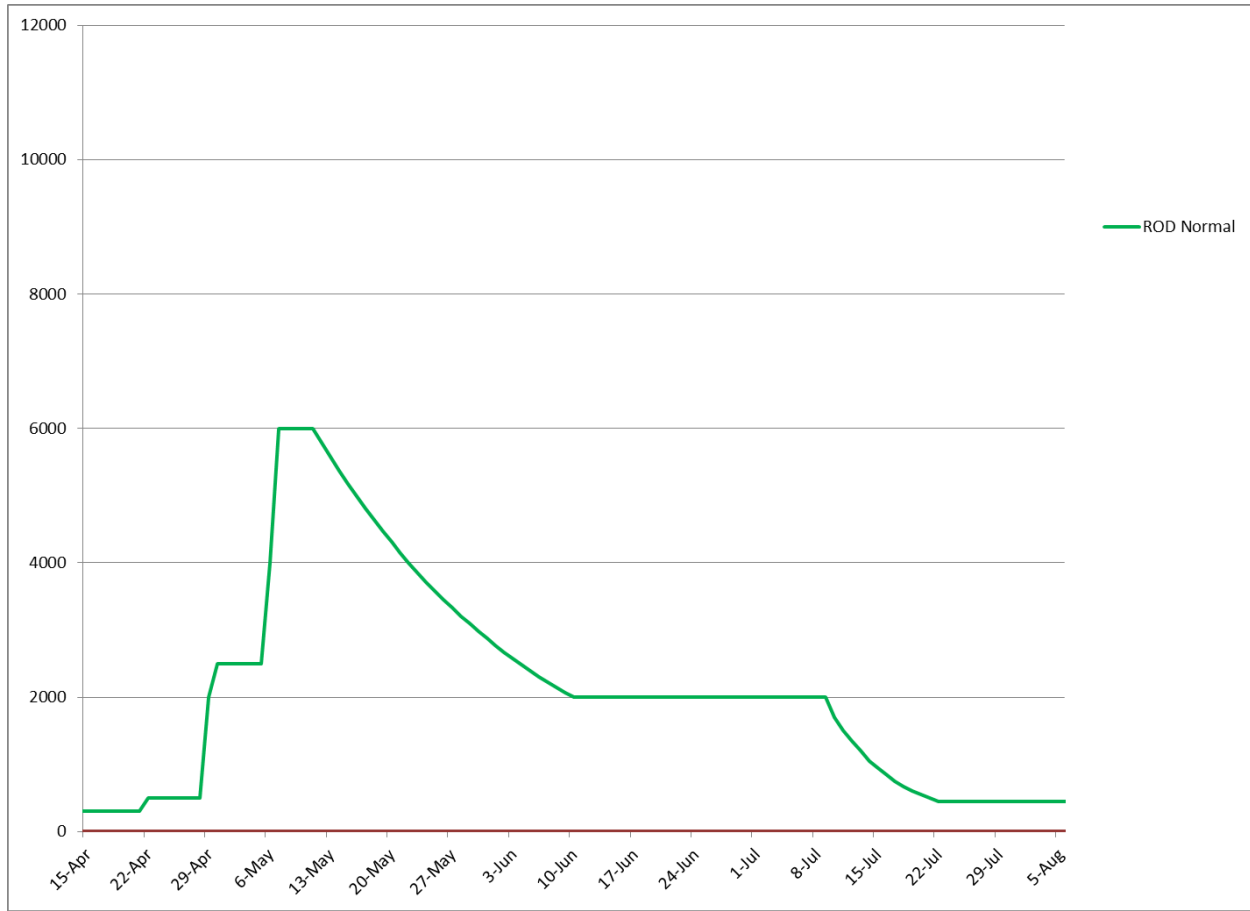
ROD, Normal

Proposed: TRFEFR 1999

Analyzed: TRFEFR 1999

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Normal (column E)



Management Objectives (Purpose): From TRFEFR Table 8.7...

- *Peak flow purpose:*
 - reduce fine sediment (<5/16 inch) storage within the surface channelbed;
 - create and maintain alternate bar morphology;
 - create floodplains by bar building and fine sediment deposition;
 - encourage establishment and growth of riparian vegetation on floodplains;
 - scour up to 1 yr old woody riparian vegetation along channel margins.
- *Descending limb:*
 - Inundate point bars to prevent riparian initiation and encroachment along channel margins;
 - minimize river stage change to preserve egg masses of yellow legged frogs;

- DRAFT
- maintain seasonal variation of water surface levels in side channels and off-channel wetlands.
 - *Descending limb bench:*
 - Provide optimal water temperatures for survival of Chinook salmon smolts;
 - inundate point bars to prevent riparian initiation along channel margins.

Peak Flow Gravel Augmentation: ROD: 1,800 – 2,200 cubic yards.

Post-Flow Analyses and Key Findings: N/A

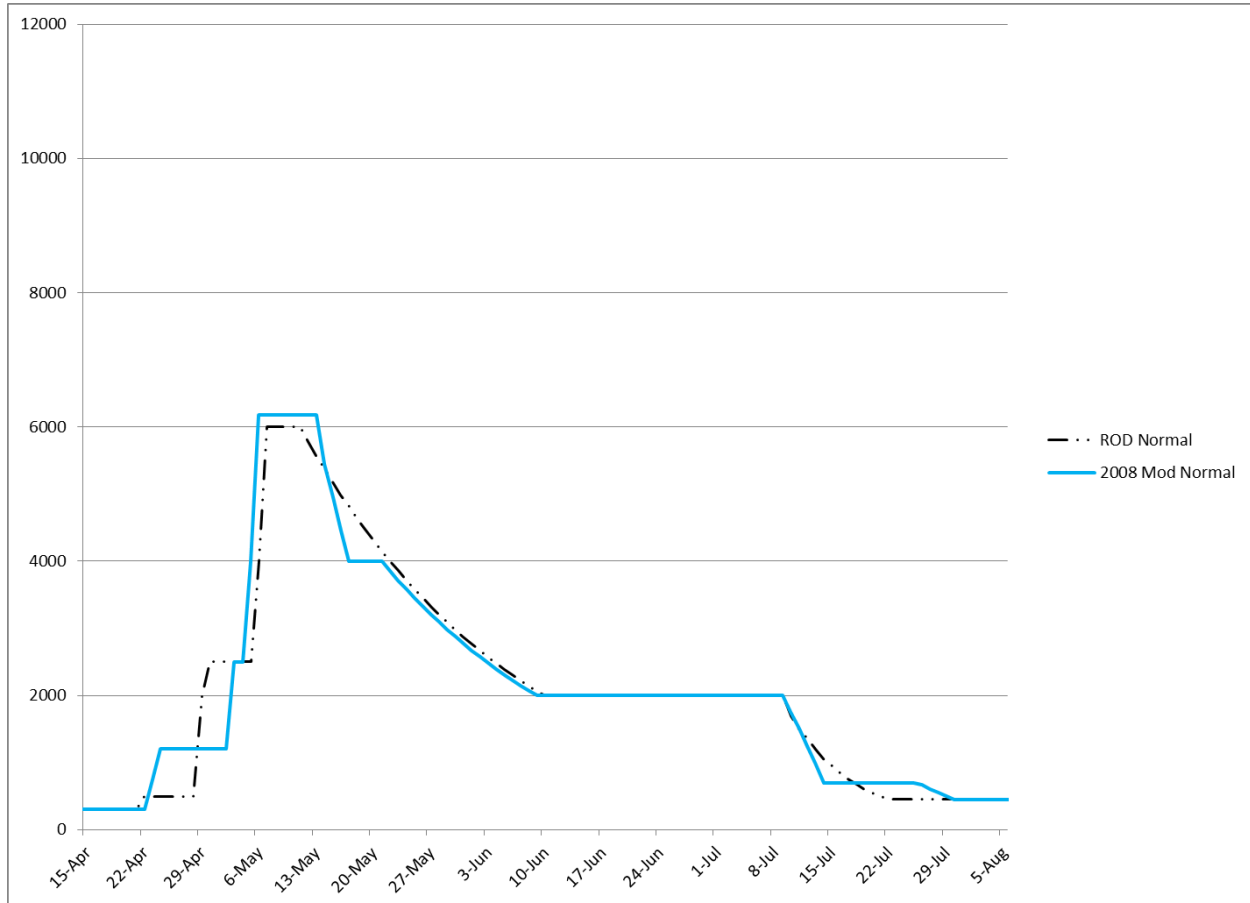
Veg Modified, Normal (WY2008)

Proposed: WY2008

Analyzed: WY2008

Enacted: WY2008

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} 2008 Mod Normal (column M)



Management Objectives (Purpose):

- Peak:
 - Create disturbance
 - Scour seedlings
 - Deposit sediment and seeds on floodplains and
 - Prepare seedbeds
- Incorporate benches for habitat monitoring, rotary screw trap calibration.

Peak Flow Gravel Augmentation: In WY2008, 1667cy at Diversion Pool, 667cy at Sawmill Point, for total of 2334cy.

Post-Flow Analyses and Key Findings:

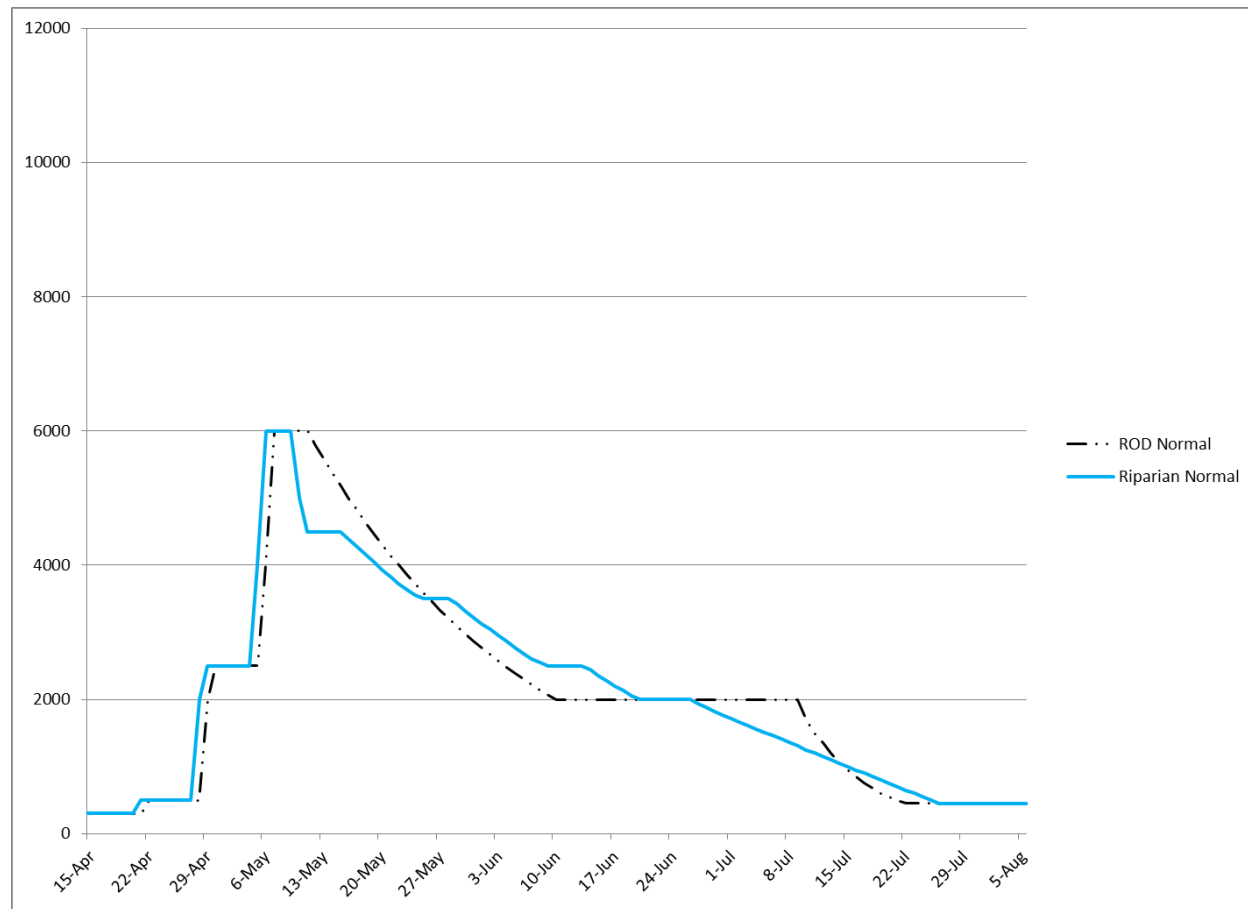
Riparian Descending Limb, Normal (WY2012)

Proposed: WY2012

Analyzed: WY2012

Enacted: WY2012

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Riparian Normal (column Q)



Management Objectives (Purpose): Encourage establishment and growth of riparian vegetation on floodplains; scour up to 3 yr old woody riparian vegetation along low flow channel margins and scour younger plants higher on bar flank; increase species and age diversity of riparian vegetation; create moist ground surfaces on constructed and natural floodplains between 2,500 and 6,000 cfs to provide sufficient time for a riparian hardwood seed to germinate and begin to grow; descend at a rate equal to or less than 0.10 ft a day at the Trinity River above the North Fork.

Peak Flow Gravel Augmentation: no peak flow augmentation in WY2012.

Post-Flow Analyses and Key Findings:

- **Chinook Outmigrant Timing Date (80%):** July 8
- **Temperature Exceedances:**
 - **Weitchpec:** no exceedances.
 - **Douglas City:** no exceedances.

- DRAFT
- **North Fork:** no exceedances.
 - **Sediment Transport:** From TRRP 2012 Annual Report: “coarse sediment storage volumes remained nearly constant in the upper river, even though no coarse sediment augmentations were performed in 2012. Sediment fluxes calculated from the 2012 sediment transport measurements also indicate that the volume of the finer sandy sediments that can compromise spawning success continued to decrease in the upper river.” On bed mobilization, “With exception of one site (Reading Creek XS 1903+50, discussed below), bed mobility monitoring showed the water year (WY) 2012 ROD release achieved partial ($\geq 20\%$) to full ($\geq 80\%$) D84 mobilization (D84 = particle diameter which exceeds the diameter of 84 percent of the sampled particles) at the monitoring sites, meeting the TRFES “normal” water year objective of mobilizing the D84 on channel-bed surfaces and along bar flanks.” And “both scour and deposition patterns along the cross section were variable [...] the spring release did not fully meet the TRFES “normal” water year bed scour objective.” Finally, “based on preliminary results, the WY2012 spring ROD flow release appears to have been large enough to mobilize the bed surface, but not large enough to scour or redeposit material in sufficient quantity to create large geomorphic changes.”

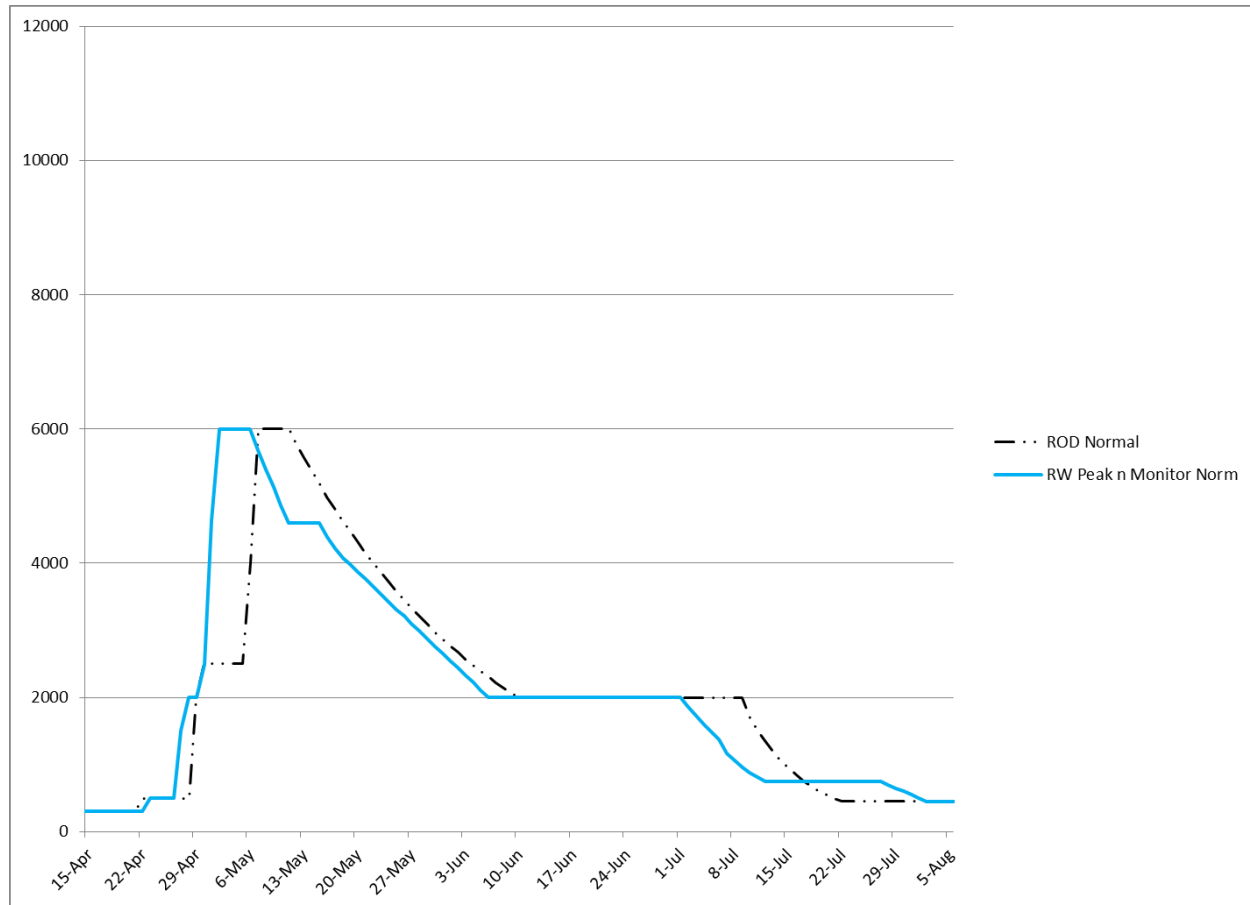
Riparian/Wildlife Peak plus Monitoring, Normal (WY2010)

Proposed: WY2010

Analyzed: WY2010

Enacted: WY2010

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} RW Peak n Monitor Norm (column O)



Management Objectives (Purpose):

- The adjustment in peak timing coincides better with the seed dispersal of black cottonwood, shiny willow, and red willow (all large trees)
- The adjustment in peak timing means subsequent recession timing will coincide better with the onset of YLF egg laying
- Reach 2,000 cfs a week earlier may allow oviposition by foothill yellow-legged frogs, although this shift may still have temperature regimes that are too cool to initiate oviposition. The goal is to achieve metamorphosis early enough in the summer to have time to feed as a terrestrial metamorphic frog and sequester enough resources before entering hibernation in the fall
- Addition of benches for IHAP monitoring.

Peak Flow Gravel Augmentation: 1580cy at Diversion Pool, 1530 at Lowden IC7, totaling 3110cy.

Post-Flow Analyses and Key Findings:

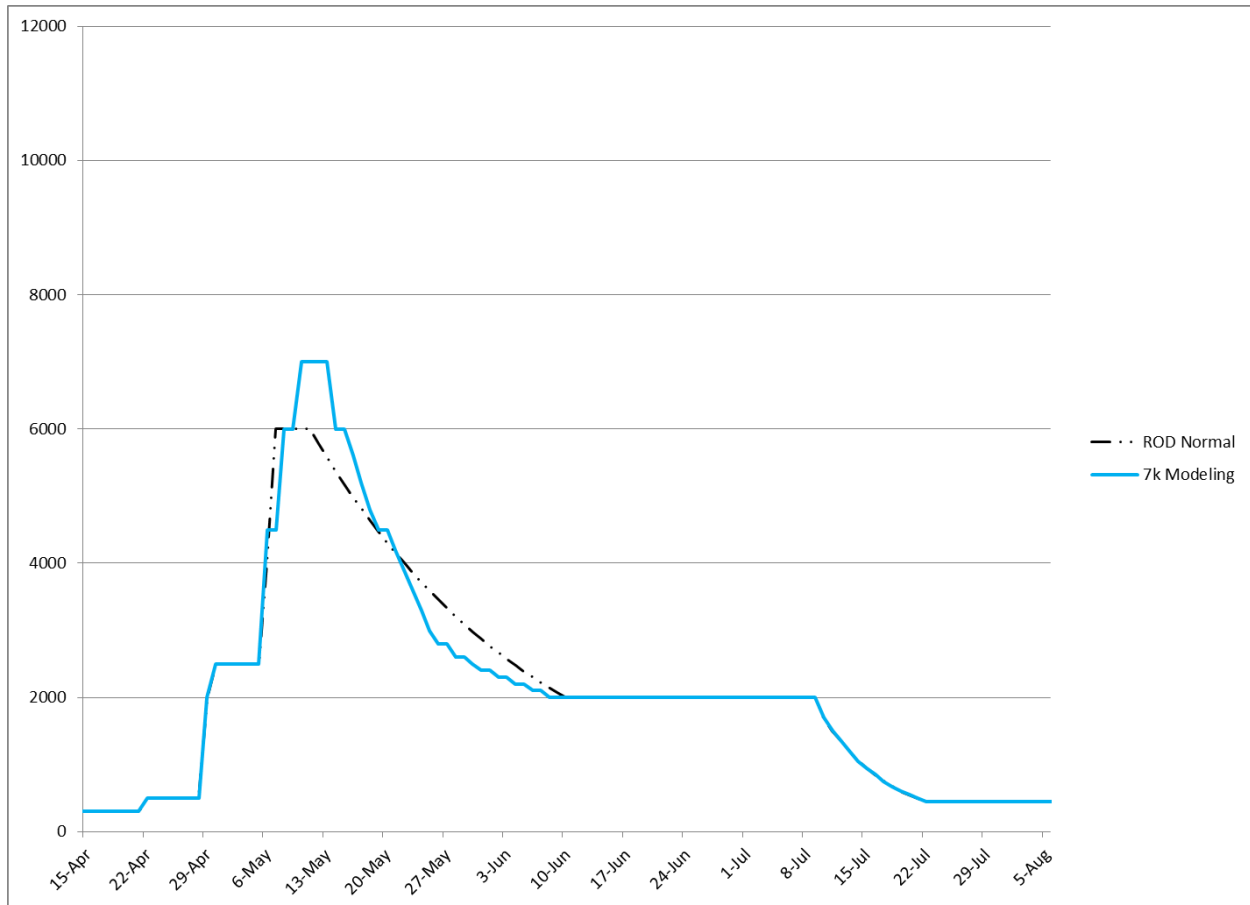
7000 cfs Model Calibration, Normal (WY2005)

Proposed: WY2005

Analyzed: WY2005

Enacted: WY2005

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} 7k Modeling (column J)



Management Objectives (Purpose):

- Model calibration at 7000 cfs.

Peak Flow Gravel Augmentation: no peak flow augmentation in WY2005

Post-Flow Analyses and Key Findings:

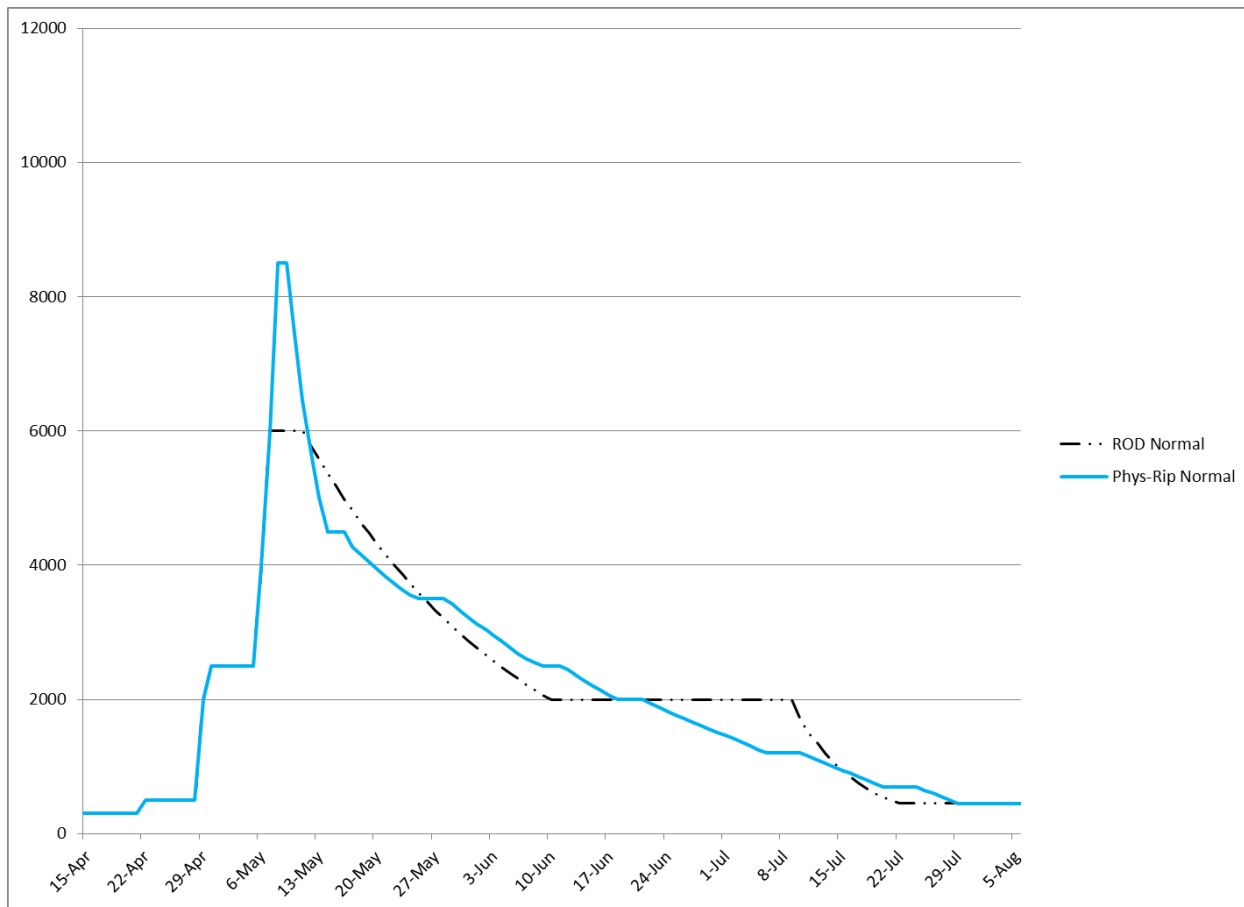
Joint Physical-Riparian, Normal

Proposed: WY2013

Analyzed: WY2013

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Phys-Rip Normal (column T)



Management Objectives (Purpose):

- Increase the total sediment transport given available release water volume to closer meet sediment transport objectives defined in the Trinity River Flow Evaluation Final Report (TRFEFR, prepared by USFWS & HVT, 1999);
- Increase the mobilization of sediments from the Rush Creek Delta;
- Induce fine sediment flushing and gravel sorting at the Upper Junction City rehabilitation site that was constructed in 2012; and
- Improve post construction evaluation of the Dark Gulch rehabilitation site.

Peak Flow Gravel Augmentation: not specified.

Post-Flow Analyses and Key Findings: N/A

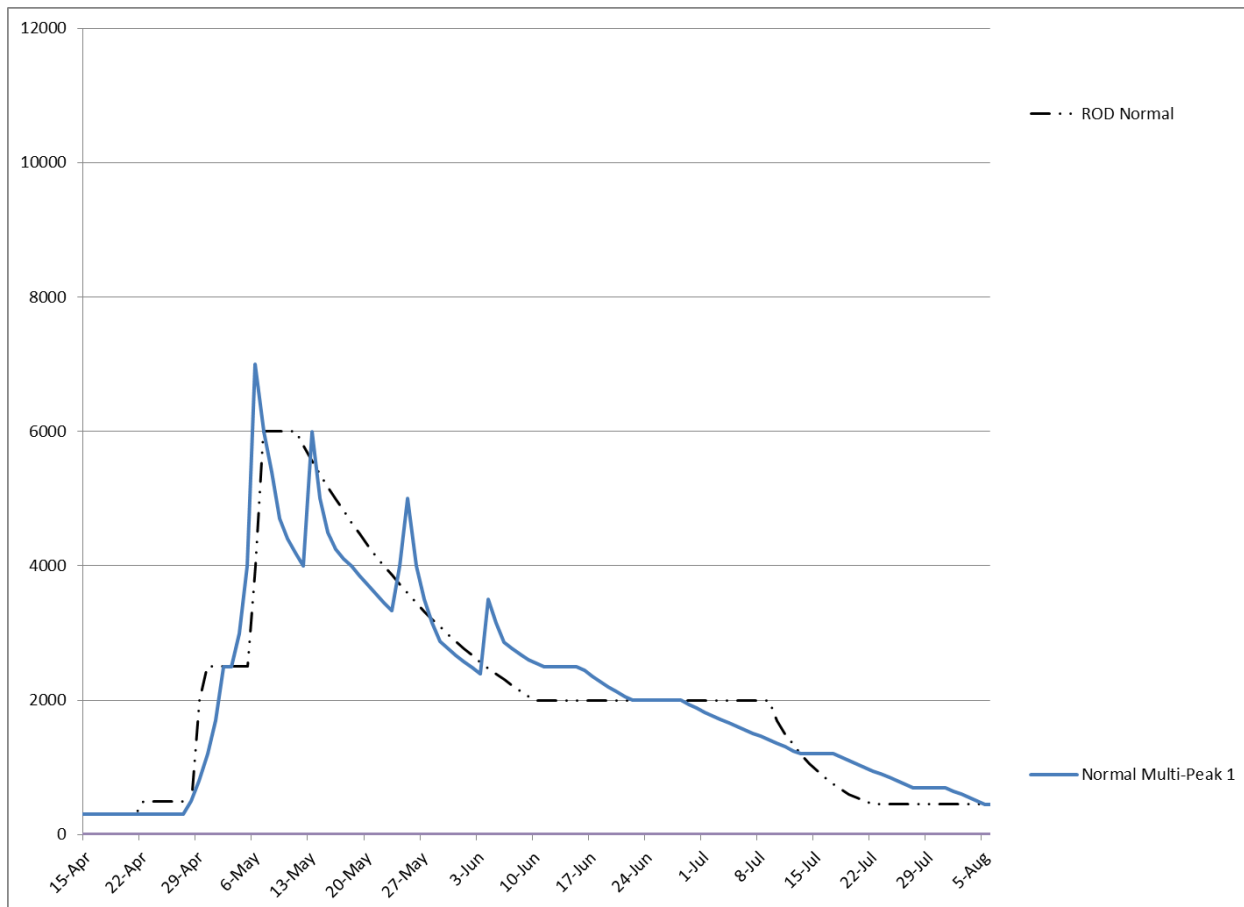
Normal Multi-Peak 1

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Normal Multi-Peak 1 (column AA)



Management Objectives (Purpose):

- Test the effect of multiple flow peaks on sediment transport
- Achieve temperature and smolt migration objectives for a normal water year
- Provide a flow schedule that more closely mimics a natural flow regime of multiple snowmelt peaks
- Provide diverse rearing and feeding conditions for salmonid juveniles and smolts 5) provide a recession limb sufficient for riparian root development.
- The flow schedule alternative could be formulated to provide benches for habitat monitoring personnel to perform fish habitat data collection.

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

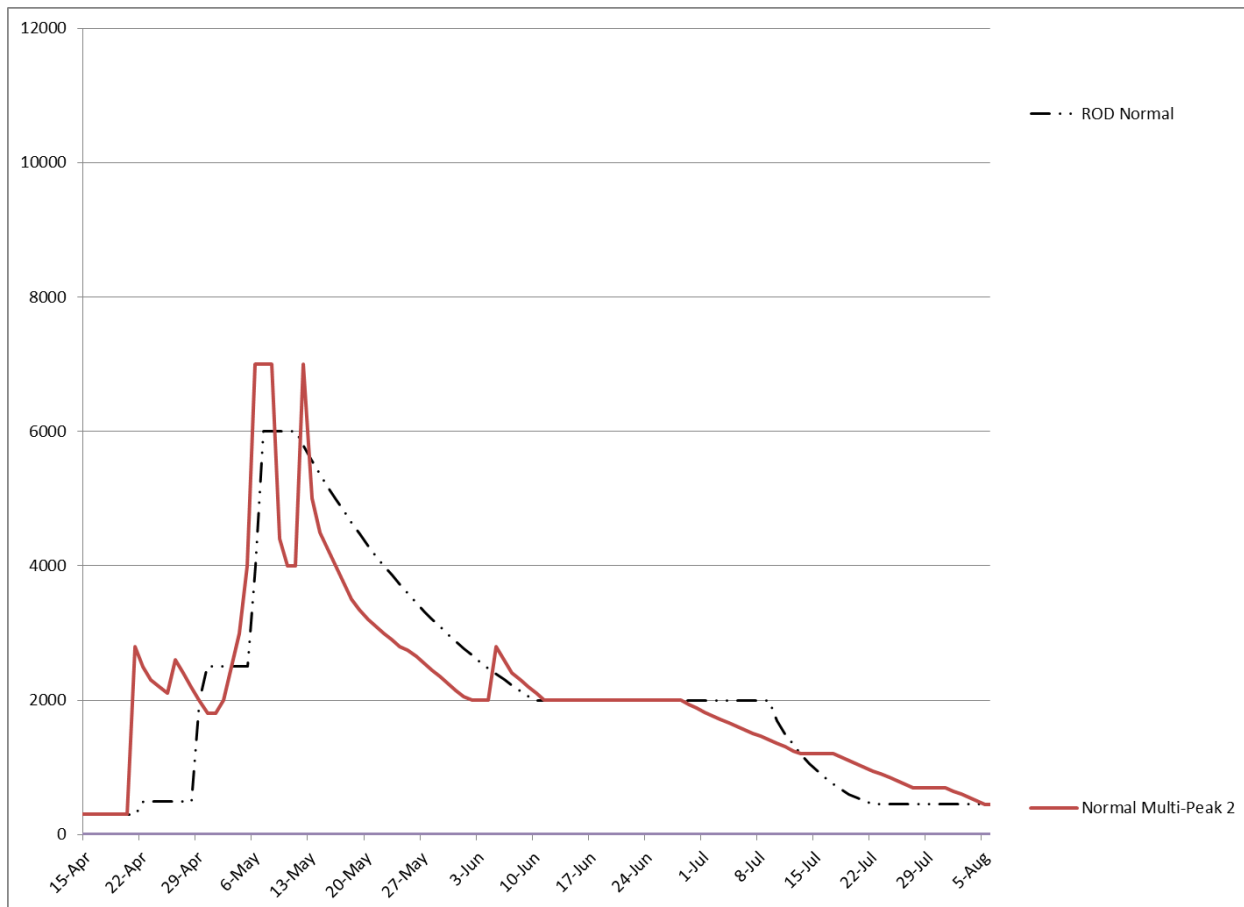
Normal Multi-Peak 2

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Normal Multi-Peak 2 (column AB)



Management Objectives (Purpose):

- Test the effect of multiple flow peaks on sediment transport
- Achieve temperature and smolt migration objectives for a normal water year
- Provide a flow schedule that more closely mimics a natural flow regime of multiple snowmelt peaks
- Provide diverse rearing and feeding conditions for salmonid juveniles and smolts 5) provide a recession limb sufficient for riparian root development.
- The flow schedule alternative could be formulated to provide benches for habitat monitoring personnel to perform fish habitat data collection.

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

Dry Year Hydrographs

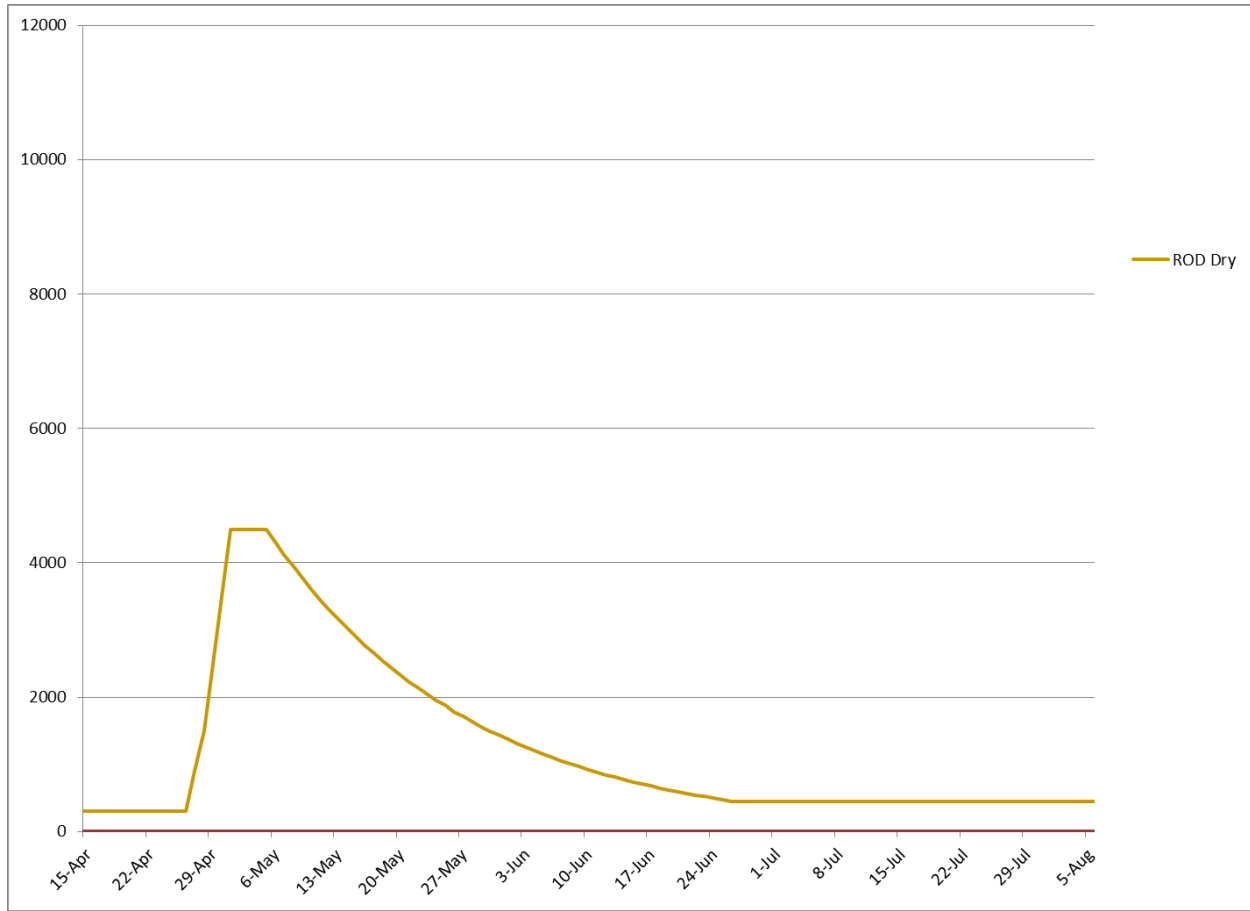
ROD Dry (WY2007)

Proposed: TRFEFR 1999

Analyzed: TRFEFR 1999

Enacted: WY2007

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Dry (column F)



Management Objectives (Purpose): From TRFEFR Table 8.8:

- *Peak flow purpose:*
 - Reduce fine sediment (<5/16 inch) storage within surface channelbed.
- *Descending limb purposes:*
 - Inundate point bars; minimize river stage change to preserve egg masses of yellow legged frogs;
 - maintain seasonal variation of water surface levels in side channels and off-channel wetlands;
 - Improve salmonids smolt production by providing temperatures necessary for survival of steelhead, coho, chinook smolts.

Peak Flow Gravel Augmentation: ROD: 150-250 cubic yards; no peak flow augmentation in WY2007.

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Post-Flow Analyses and Key Findings:

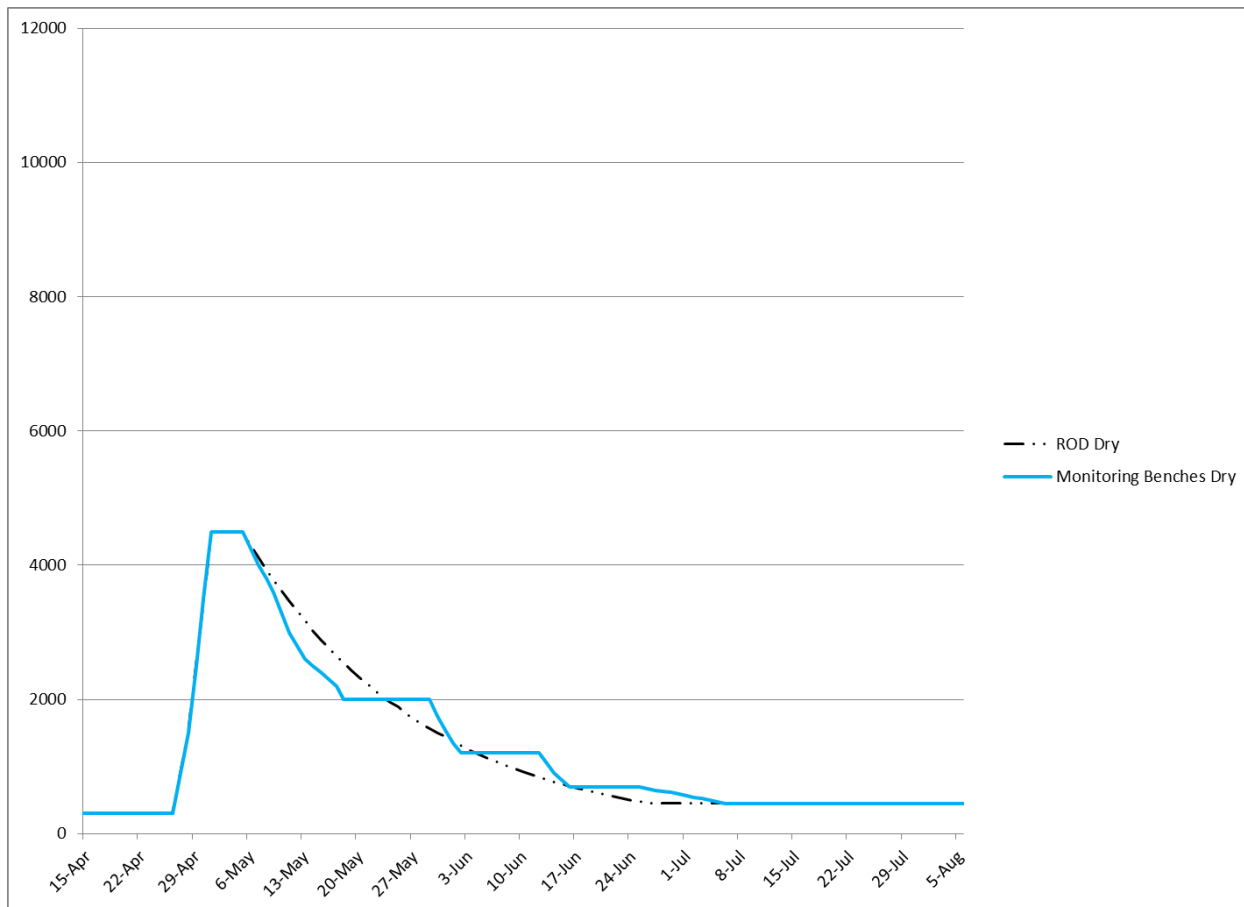
Monitoring Benches Dry (WY2009)

Proposed: WY2009

Analyzed: WY2009

Enacted: WY2009

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Monitoring Benches Dry (column N)



Management Objectives (Purpose): Identical to the ROD Dry Year objectives with the addition of benches for habitat monitoring purposes.

Peak Flow Gravel Augmentation: In WY2009, 667cy at Diversion Pool, 1667cy at Sawmill Point, totaling 2334cy.

Post-Flow Analyses and Key Findings:

- **Chinook Outmigrant Timing Date (80%):**
 - Willow Creek Trap: Week 26 (June 25-July 1)
- **Temperature Exceedances:**
 - Weitchpec:
 - Douglas City:
 - North Fork:
- **Sediment Transport:**

ROD Dry with Benches 2

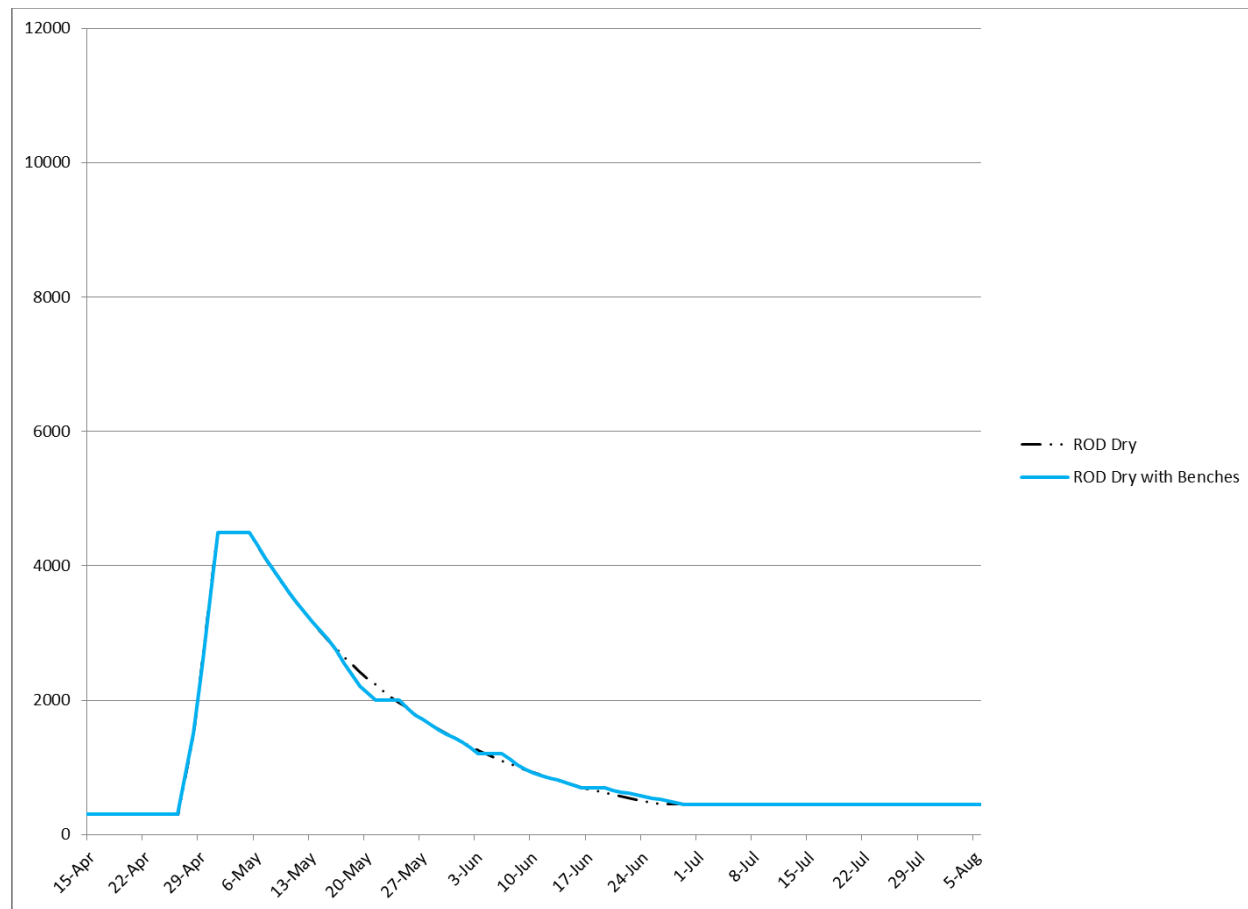
Proposed: WY2014

Analyzed: N/A*

Enacted: N/A

* monitoring benches were considered by the Flow Workgroup to be a negligible deviation from the strict ROD Dry hydrograph, not requiring analysis; the hydrograph is included here simply to track that a Critically Dry hydrograph is available with monitoring benches scheduled; this version to is included as the benches are much shorter in duration than those used in the 2009 hydrograph.

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Dry with Benches (column AC)



Management Objectives (Purpose):

- Identical to the ROD Dry.
- The flow schedule alternative was also formulated to provide benches for habitat monitoring personnel to perform fish habitat data collection.

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

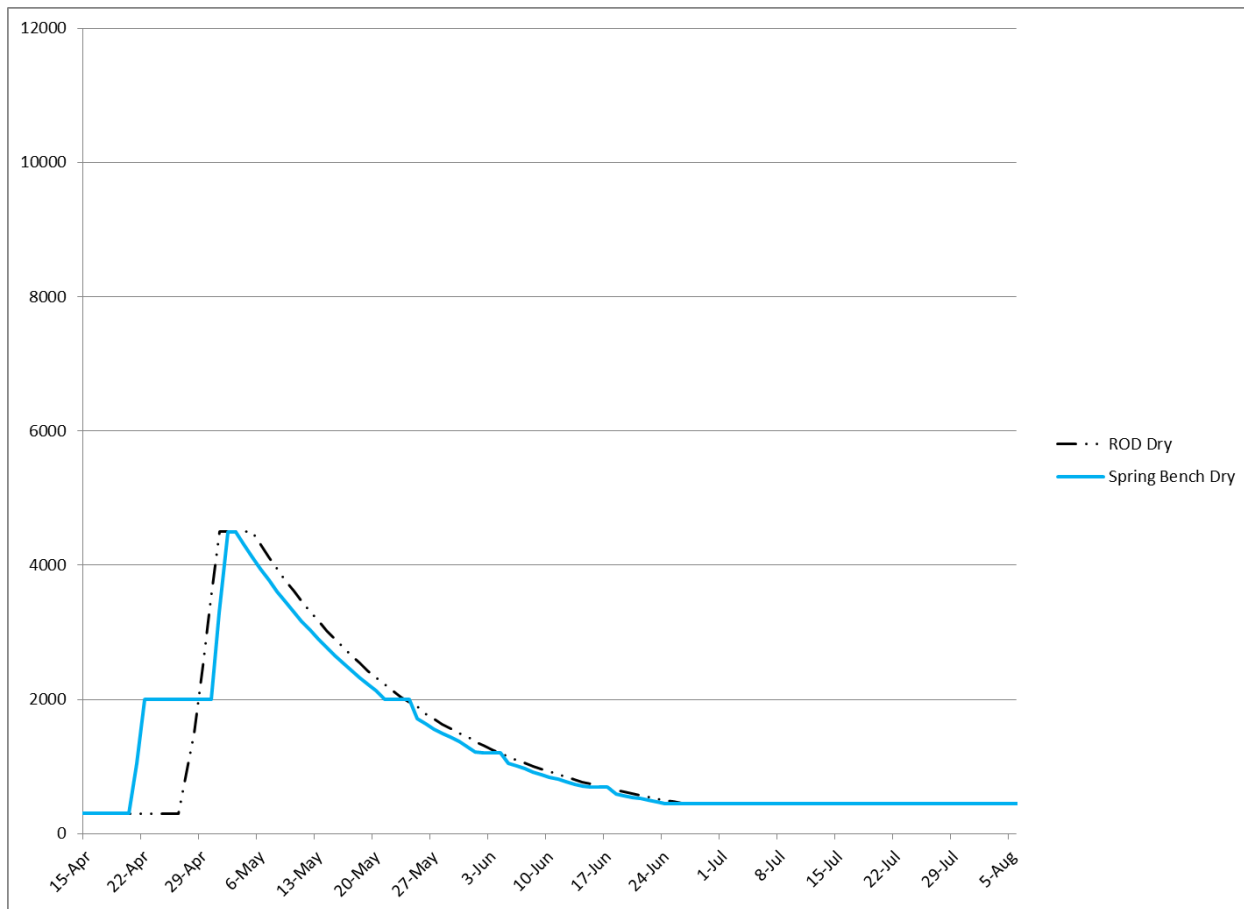
Spring Habitat Bench, Dry (WY2013)

Proposed: WY2013

Analyzed: WY2013

Enacted: WY2013

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Spring Bench Dry (column U)



Management Objectives (Purpose): The Flow Workgroup developed the Dry Alt 3 instream flow release recommendation as a proactive management approach to provide improved rearing conditions for fry and juvenile Chinook salmon during a water-year preceded by exceptionally high natural Chinook salmon escapement and subsequent high emergence success and fry abundance.

Peak Flow Gravel Augmentation: 200cy at Diversion Pool.

Post-Flow Analyses and Key Findings:

- **Chinook Outmigrant Timing Date (80%):** TBD
- **Temperature Exceedances:** TBD
- **Sediment Transport:** TBD
- **Other:** TBD

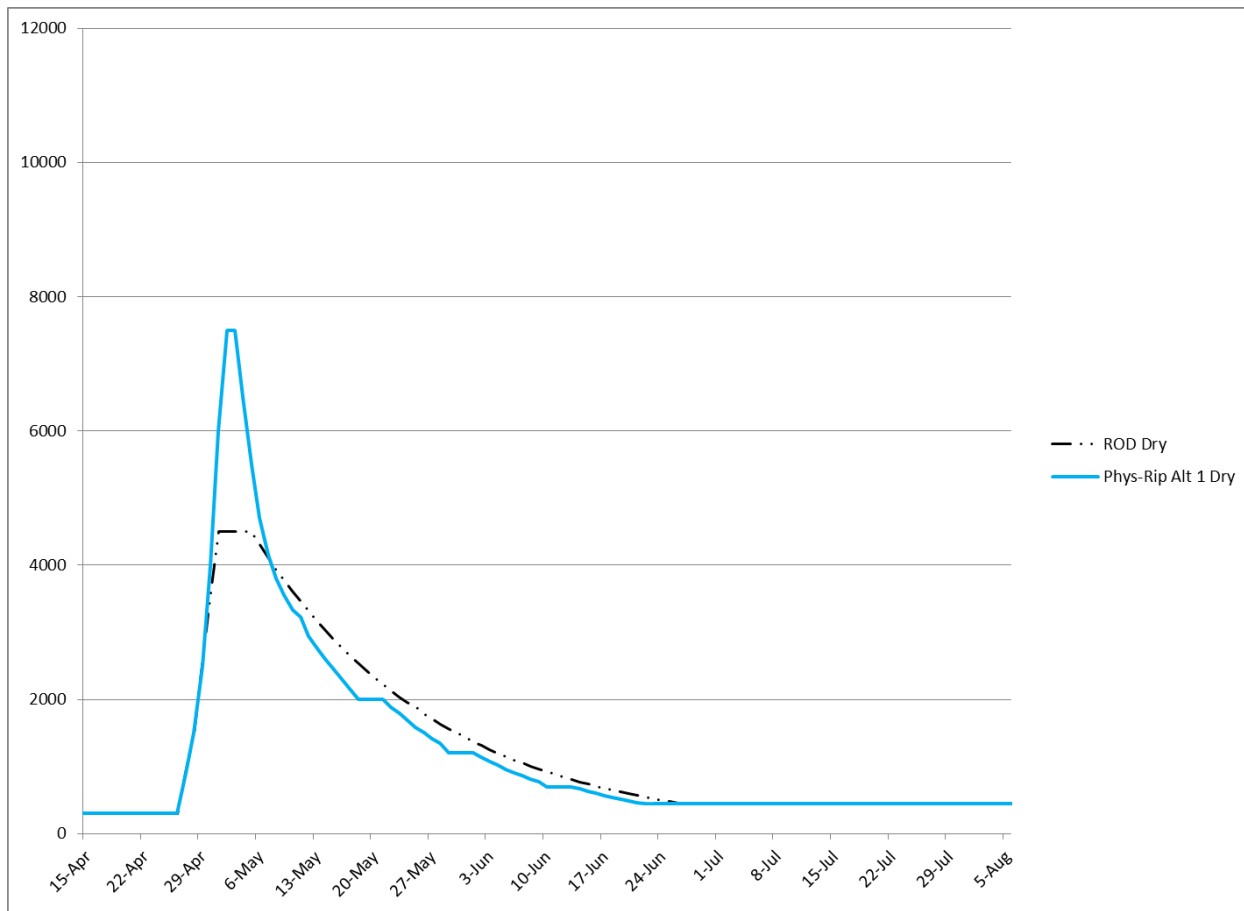
Joint Physical-Riparian Alt 1, Dry

Proposed: WY2013

Analyzed: WY2013/WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Phys-Rip Alt 1 Dry (column R)



Management Objectives (Purpose):

- Increase the total sediment transport given available release water volume to closer meet sediment transport objectives defined in the Trinity River Flow Evaluation Final Report (TRFEFR, prepared by USFWS & HVT, 1999);
- Increase the mobilization of sediments from the Rush Creek Delta;
- Induce fine sediment flushing and gravel sorting at the Upper Junction City rehabilitation site that was constructed in 2012; and
- Improve post construction evaluation of the Dark Gulch rehabilitation site.

Peak Flow Gravel Augmentation: not specified

Post-Flow Analyses and Key Findings: N/A

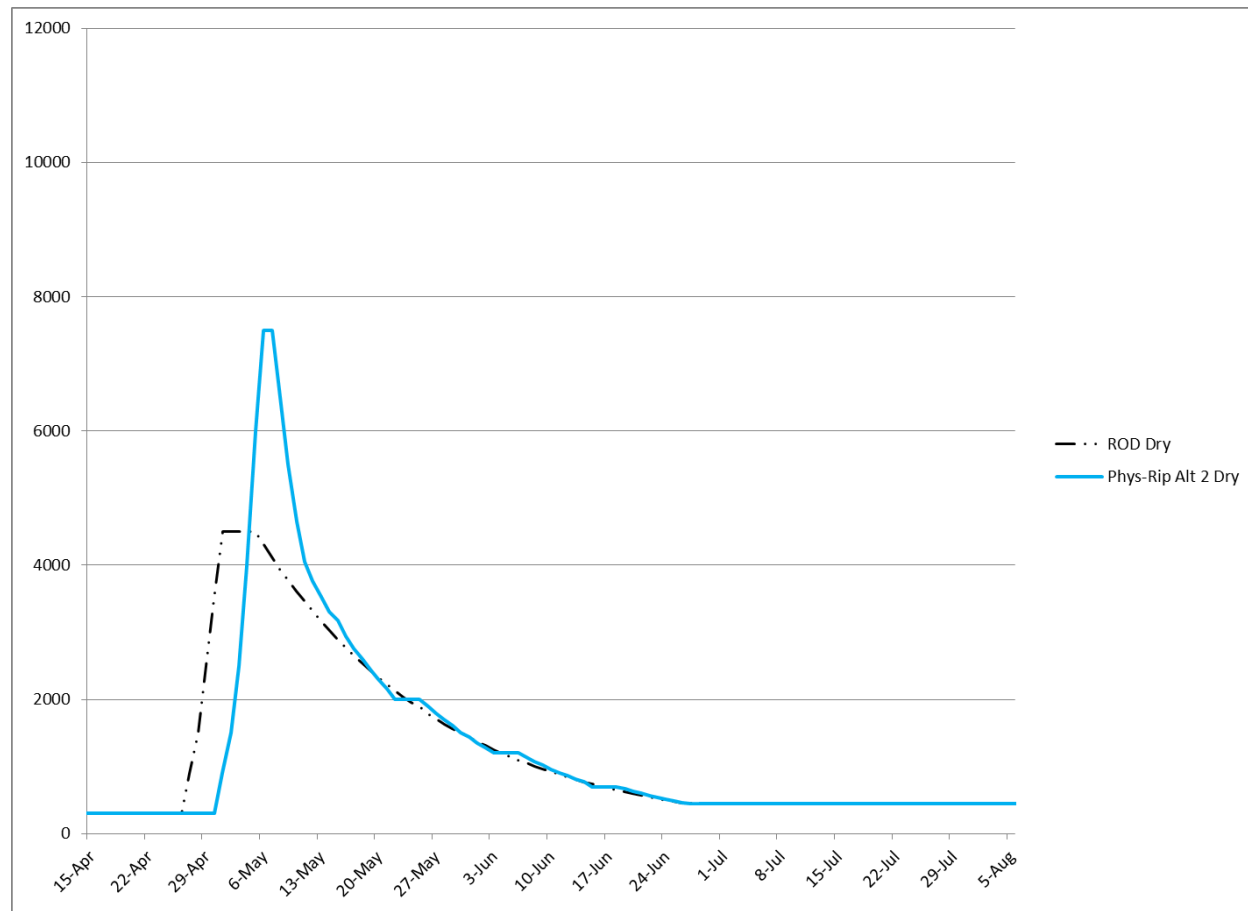
Joint Physical-Riparian Alt 2, Dry

Proposed: WY2013

Analyzed: WY2013/WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Phys-Rip Alt 2 Dry (column S)



Management Objectives (Purpose):

- Increase the total sediment transport given available release water volume to closer meet sediment transport objectives defined in the Trinity River Flow Evaluation Final Report (TRFEFR, prepared by USFWS & HVT, 1999);
- Increase the mobilization of sediments from the Rush Creek Delta;
- Induce fine sediment flushing and gravel sorting at the Upper Junction City rehabilitation site that was constructed in 2012; and
- Improve post construction evaluation of the Dark Gulch rehabilitation site.

Peak Flow Gravel Augmentation: not specified

Post-Flow Analyses and Key Findings: N/A

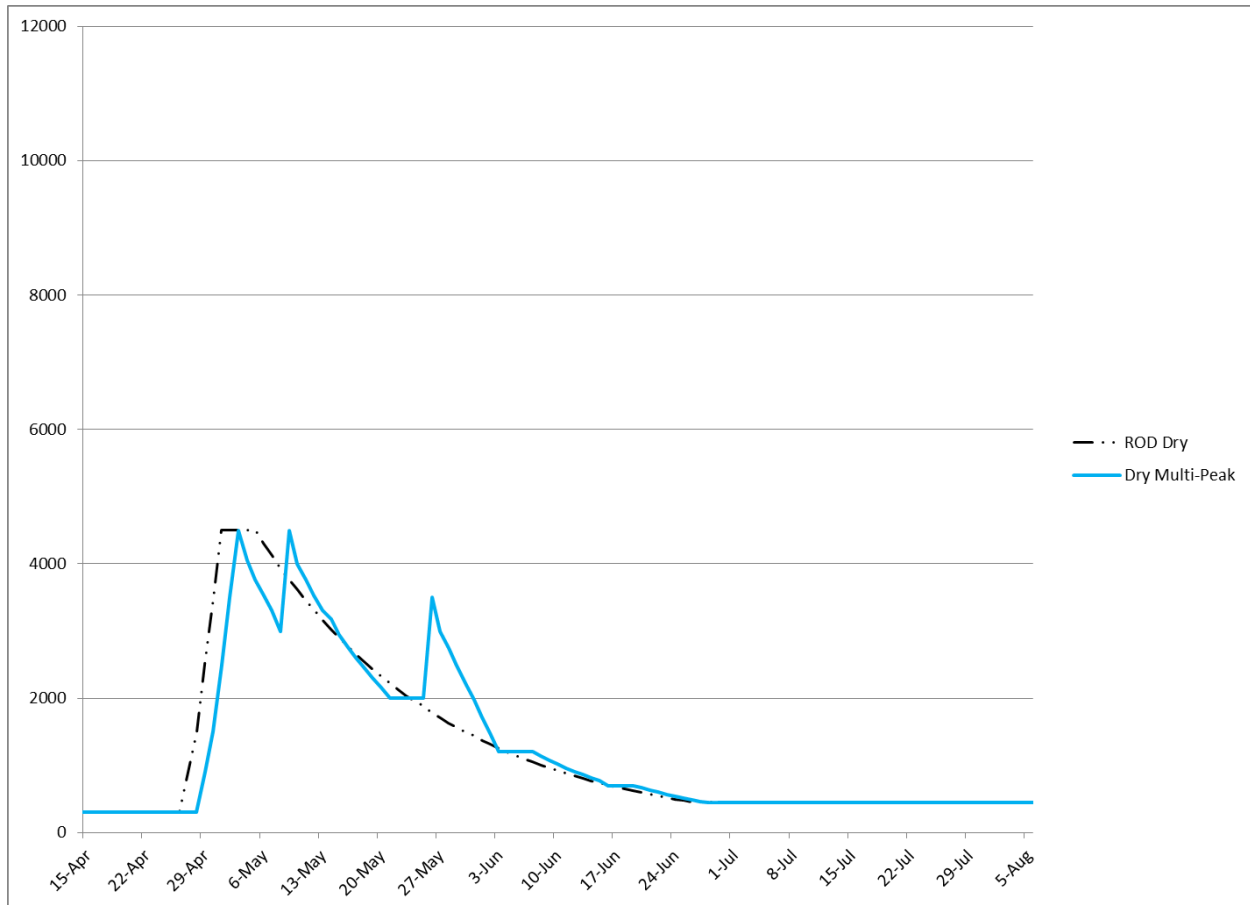
Dry Multi-Peak

Proposed: WY2014

Analyzed: WY2014

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} Dry Multi-Peak (column AD)



Management Objectives (Purpose):

- Test the effect of multiple flow peaks on sediment transport
- Achieve temperature and smolt migration objectives for a dry water year
- Provide a flow schedule that more closely mimics a natural flow regime of multiple snowmelt peaks
- Provide diverse rearing and feeding conditions for salmonid juveniles and smolts.
- The flow schedule alternative was also formulated to provide benches for habitat monitoring personnel to perform fish habitat data collection.

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

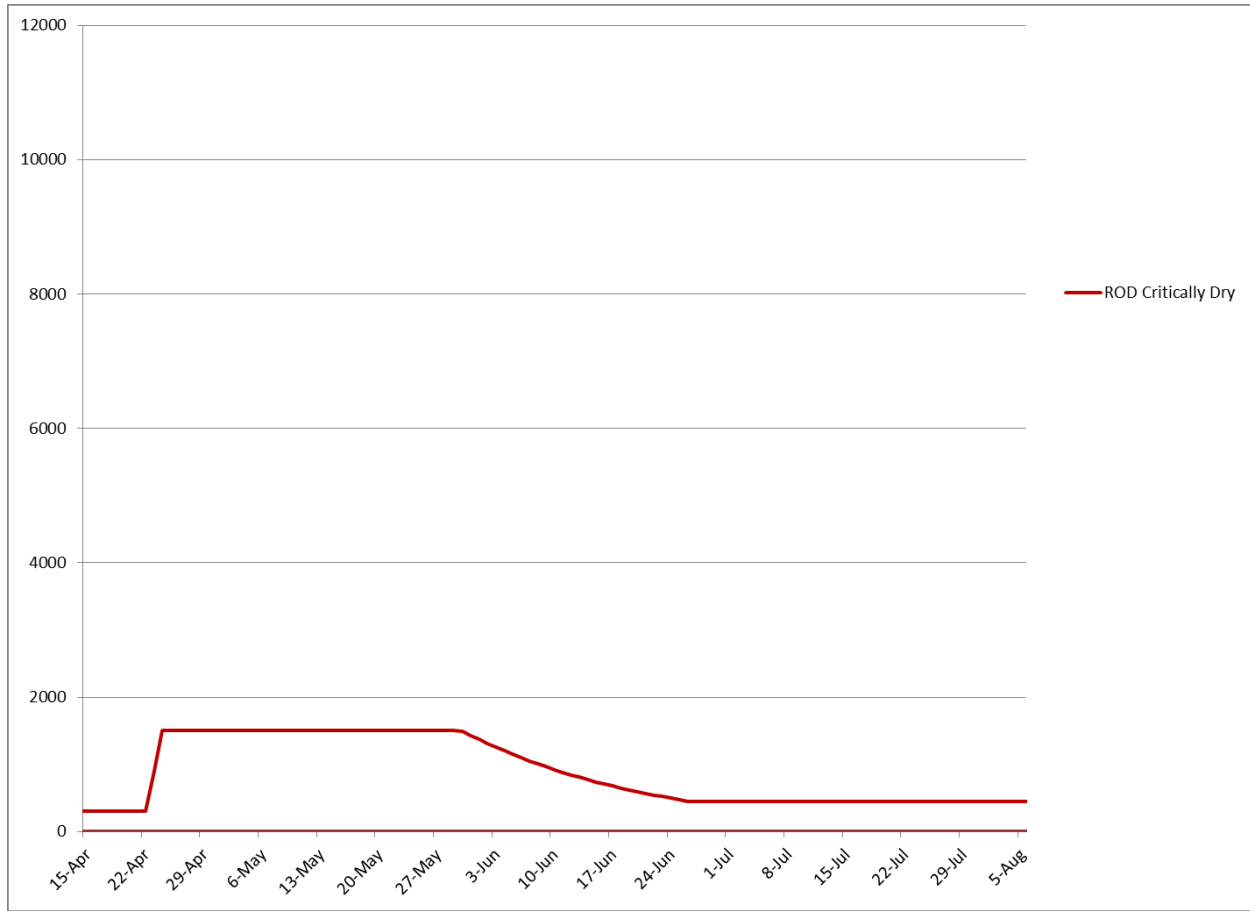
Critically Dry Hydrographs ROD, Critically Dry

Proposed: TRFEFR 1999

Analyzed: TRFEFR 1999

Enacted: N/A

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Critically Dry (column G)



Management Objectives (Purpose): From TRFEFR Table 8.9:

- *Peak flow purpose:*
 - Sustain steelhead and coho salmon smolt production by providing non-lethal temperatures for survival.
 - Discourage riparian vegetation establishment along channel margins.
- *Descending limb purpose:*
 - Minimize river stage change to preserve egg masses of yellow legged frogs;
 - inundate point bars;
 - improve salmonids smolt production by providing temperatures necessary for survival of steelhead, coho, chinook smolts.

Peak Flow Gravel Augmentation: ROD: none.

ROD Critically Dry with Monitoring Benches

Post-Flow Analyses and Key Findings: N/A

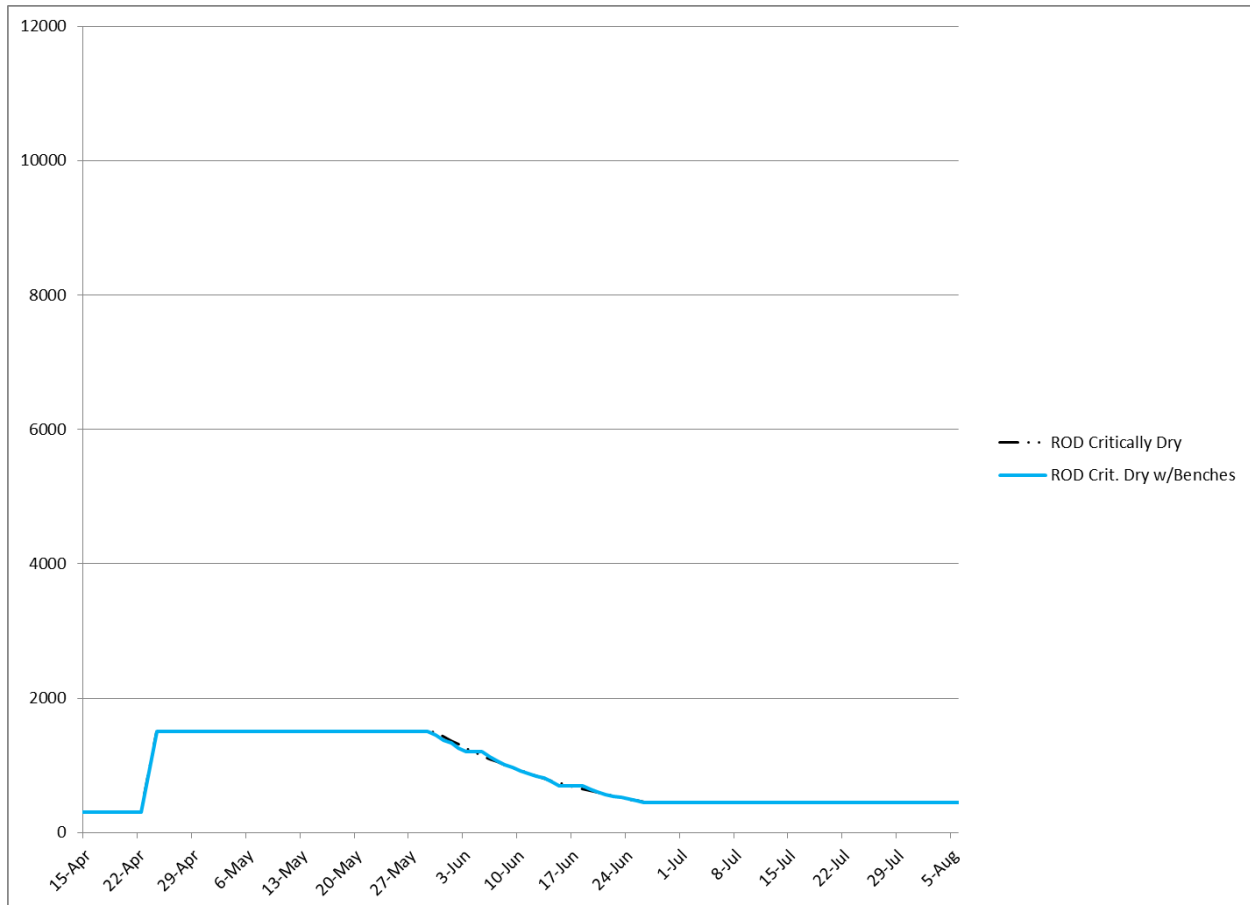
Proposed: WY2014

Analyzed: N/A*

Enacted: N/A

* monitoring benches were considered by the Flow Workgroup to be a negligible deviation from the strict ROD Critically Dry hydrograph, not requiring analysis; the hydrograph is included here simply to track that a Critically Dry hydrograph is available with monitoring benches scheduled.

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} ROD Crit. Dry w/Benches (column AE)



Management Objectives (Purpose):

- Identical to ROD Critically Dry.
- The flow schedule alternative was also formulated to provide benches for habitat monitoring personnel to perform fish habitat data collection.

Peak Flow Gravel Augmentation:

Post-Flow Analyses and Key Findings: N/A

Constrained Hydrographs

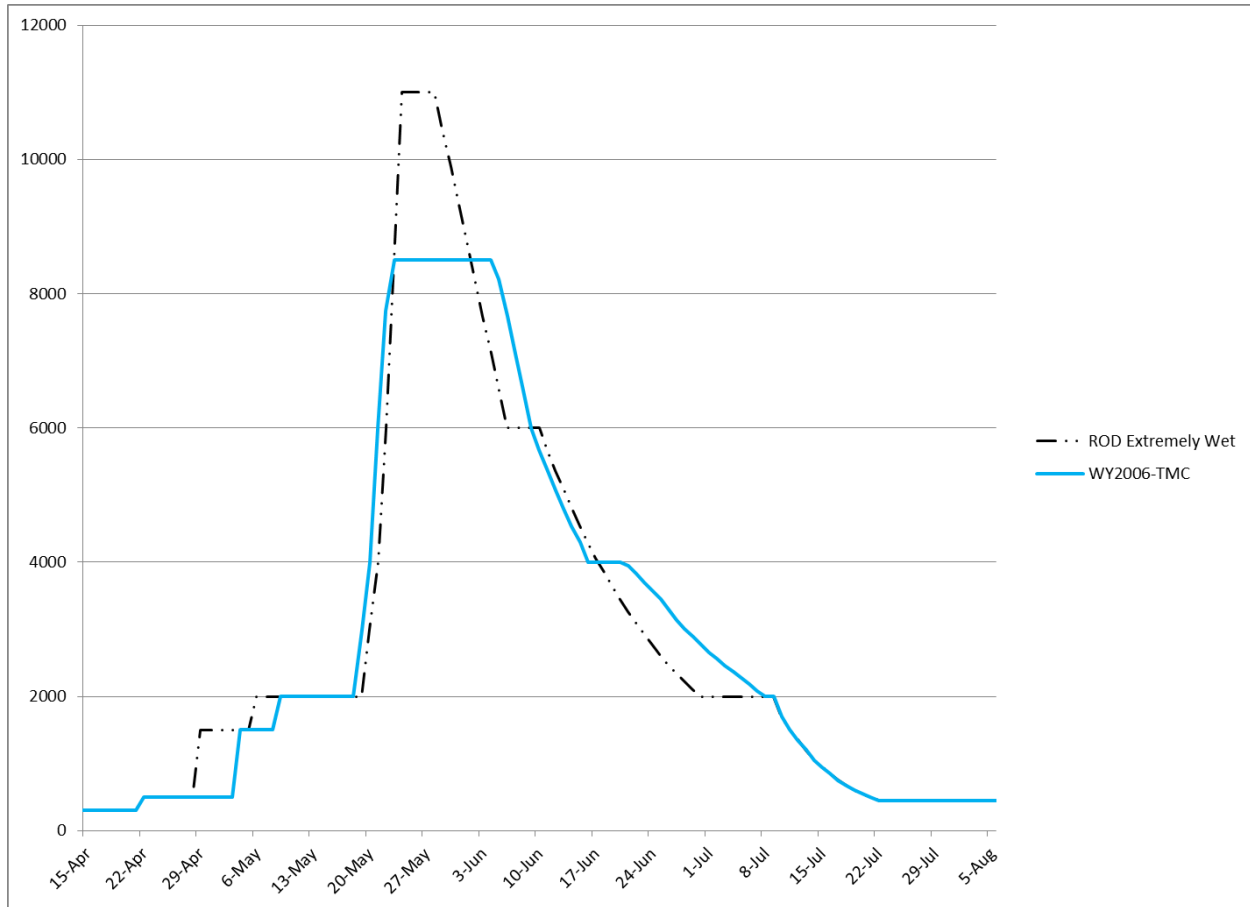
Infrastructure Constrained, Extremely Wet (WY2006)

Proposed: WY2006

Analyzed: WY2006

Enacted: WY2006

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} WY2006-TMC (column K)



Constraint: Scheduled peak flows were limited to 8,500 cfs for floodplain structures; a 6,000 cfs limit was also imposed through May 16th for pump house upgrades, and scheduling was constrained so as to return to 450 cfs by July 22nd for the hatchery gravel augmentation project.

Management Objectives (Purpose): Given significant constraints on the scheduling of an extremely wet year volume, the allowable peak was extended to provide geomorphic processes more appropriate for an extremely wet year.

Peak Flow Gravel Augmentation: no peak flow augmentation in WY 2006

Post-Flow Analyses and Key Findings:

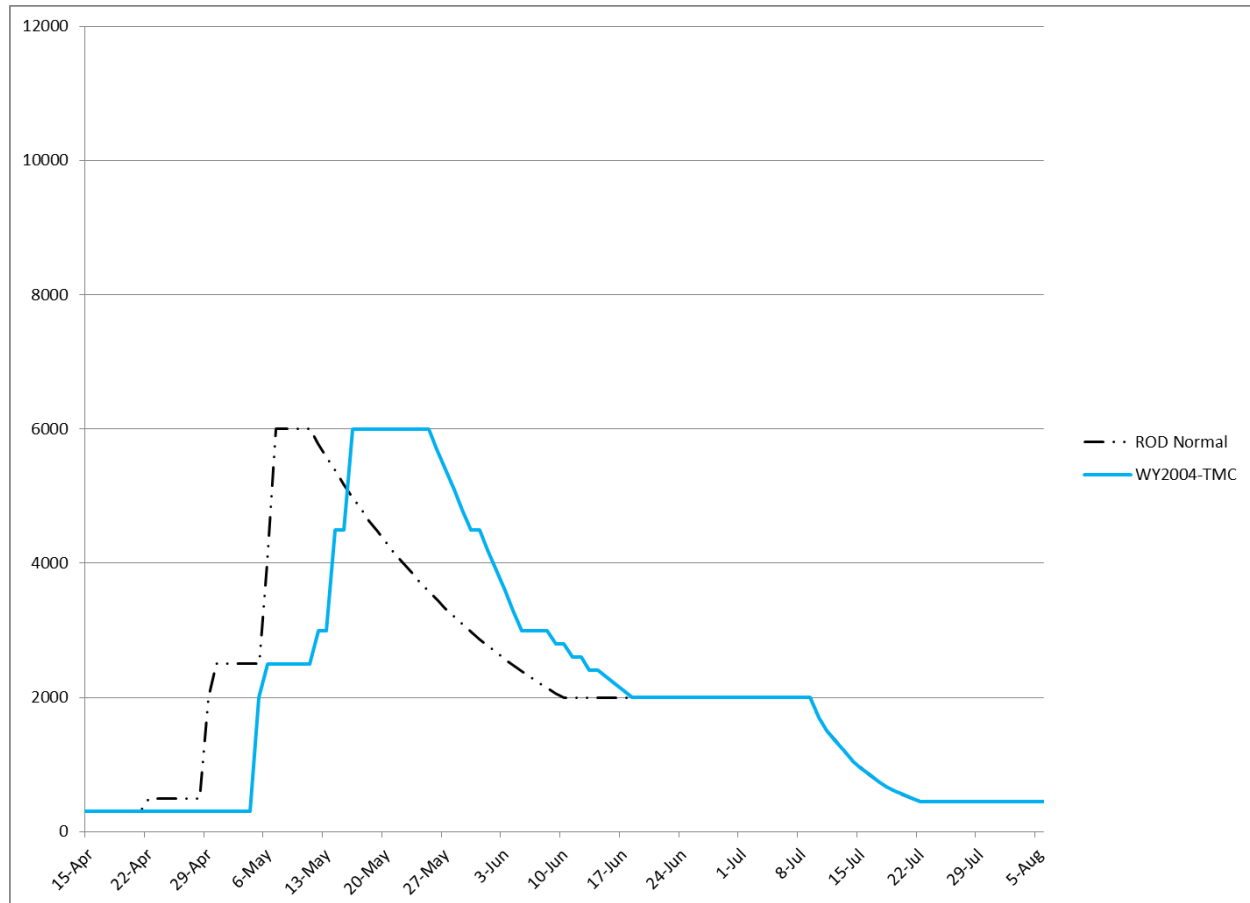
Volume Constrained, Normal (WY2004)

Proposed: WY2004

Analyzed: WY2004

Enacted: WY2004

XLS Sheet & Column and Graph: {Data, Hydrograph Designs} WY2004-TMC (column I)



Management Objectives (Purpose): The release includes benches to update sediment sampling curves for a sediment model. It also includes a peak release of 6,000 cfs for 10 days to scour seedlings and transport coarse and fine sediment. Note: this Normal volume hydrograph was enacted during a Wet year with water volume constrained by litigation.

Peak Flow Gravel Augmentation: no peak flow augmentation in WY2004.

Post-Flow Analyses and Key Findings:

- **Chinook Outmigrant Timing Date (80%):**
- **Temperature Exceedances:**
 - **Weitchpec:**
 - **Douglas City:**
 - **North Fork:**
- **Sediment Transport:**