

# THE MANAGEMENT TARGETS AND ASSOCIATED PURPOSES OF THE NORMAL YEAR ROD HYDROGRAPH AND PROPOSED 2010 REVISIONS

March 19<sup>th</sup>, 2010

The proposed WY2010 Hydrograph fulfills the purpose of the ROD hydrographs and meets recession targets identified in the TRFES, while also accommodating an ambitious fish habitat sampling field schedule and bank rehabilitation site construction.

## Flow Evaluation Study Objectives For ROD Normal Year Hydrograph

### 6,000 cfs Snowmelt Peak Management Targets

- Achieve mobility on alluvial features (i.e., induce scour mortality on 1-yr old riparian seedlings)
- Induce fine sediment deposition on floodplains
- Transport coarse sediment at a rate equal to or greater than input from tributaries

### 6,000 cfs Snowmelt Peak Purpose

- Reduce fine sediment storage within the surface channelbed for improved egg to emergence success
- Create and maintain alternate bar morphology
- Build bars and deposit fine sediment on floodplains to initiate riparian vegetation on natural and constructed floodplains
- Increase year round rearing habitat quality and quantity and reduce outmigration transport time
- Discourage riparian vegetation initiation along the low water margin

### 6,000 to 2,000 cfs Descending Limb Management Targets

- Descend at a rate mimicking pre-TRD descent
- Descend at a rate less than 0.1ft a day

### 6,000 to 2,000 cfs Descending Limb Purpose

- Inundate bars to reduce riparian initiation along the low water edge
- Minimize river stage change to preserve YLF egg masses
- Maintain seasonal variation of water surface levels in side channels and off-channel wetlands
- Reduce fine sediment storage within the surface channelbed for improved egg to emergence success
- Improve juvenile Chinook growth
- Increase riparian vegetation higher on the channel bank and future LWD recruitment

### 2,000 cfs Bench Management Targets

- Provide optimal temperatures to Weitchpec for Chinook

### 2,000 cfs Bench Limb Purpose

- Inundate bars to reduce riparian initiation along the low water edge
- Provide optimal temperatures for survival of Spring Chinook salmon

2,000 cfs to 450 cfs Descending Limb Management Targets

- Decline to summer baseflows

2,000 cfs to 450 cfs Descending Limb Purpose

- Minimize salmonid fry stranding
- Increase survival of steelhead fry
- Provide outmigration cues for Chinook salmon smolts

450 cfs Baseflow Management Targets

- Provide water temperatures  $\leq 60^{\circ}\text{F}$  to Douglas City through September 14
- Provide water temperatures  $\leq 56^{\circ}\text{F}$  to Douglas City September 15 to Sept 30

450 cfs Baseflow Purpose

- Increase survival of holding adults spring run Chinook by providing optimal thermal refugia
- Increase production of coho salmon and steelhead by providing water temperatures conducive for growth

**Additional Objectives for Proposed 2010 IHAP Hydrograph:**

Adjust the Hydrograph to Begin Earlier Management Targets

- Move the ascending limb, peak and subsequent benches forward one week

Adjust the Hydrograph to Begin Earlier 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

6,000 cfs Snowmelt Peak Management Targets

- 5 day duration

6,000 cfs Snowmelt Peak Purpose (IHAP)

- As well as meeting TRFES objectives for a normal ROD hydrograph, the 6000 cfs bench allows the habitat crew to measure water surface elevations (WSEL), velocity measurements and discharges at six of the twelve 2D GRTS sites necessary for 2D model calibration/verification

6,000 to 4,600 cfs Descending Limb Management Targets

- Descend at a rate less than 0.1ft a day

6,000 to 4,600 cfs Descending Limb Purpose

- Minimize river stage change to preserve YLF egg masses
- Streamflow recession rates do not exceed the seedling root growth rates (benefit of proposed 2010 IHAP hydrograph)

4,600 cfs Bench Management Targets

- 5 day duration

4,600 cfs Bench Peak Purpose

- The 4600 cfs bench allows the habitat crew to measure WSEL's, velocity measurements and discharges at six of the twelve 2D GRTS sites necessary for 2D model calibration/verification

4,600 to 2,000 cfs Descending Limb Management Targets

- Descend at a rate less than 0.1ft a day
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4,600 to 2,000 cfs Descending Limb Purpose

- Minimize river stage change to preserve YLF egg masses
- Streamflow recession rates do not exceed the seedling root growth rates (benefit of proposed 2010 IHAP hydrograph)
- 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

2,000 cfs Bench Management Targets

- 26 day duration (four days less than the ROD hydrograph)

2,000 cfs Bench Purpose

- As well as meeting TRFES objectives, the 2000 cfs bench will allow the habitat crew to measure WSEL's, velocity measurements and discharges at all of the 2D GRTS sites necessary for 2D model calibration/verification. Also the 2000 cfs bench will allow the habitat crew to collect bathymetric data sufficient to build a 2D model suitable for micro-habitat modeling.
- The 2000 cfs bench for the ~27 days may assist with the time of hatchling and dispersion away from an egg mass and before a descending limb of the hydrograph from 2000 to 700 cfs for the earliest cohort of breeders.
- Frogs that breed later on the 2000 cfs bench flows will likely have their reproductive effort (egg masses) desiccate before the embryos complete development to both hatching and progress to a mobile tadpole stage.

2,000 cfs to 450 cfs Descending Limb Management Targets

- Descend at a rate less than 0.1ft a day

2,000 to 450 cfs Descending Limb Purpose

- Minimize river stage change to preserve YLF egg masses
- Streamflow recession rates do not exceed the seedling root growth rates (benefit of proposed 2010 IHAP hydrograph)
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750 cfs Bench Management Targets

- 16 day duration

750 cfs Bench purpose

- The 750 cfs bench will allow the habitat crew to measure WSEL's, velocity measurements and discharges at all of the 2D GRTS sites necessary for 2D model calibration/verification.

**Immediate Considerations for WY2011 Fall Baseflow Recession**

450 cfs to 300 cfs Descending Limb Management Targets

- Descend at a rate less than 0.1ft a day

450 cfs to 300 cfs Descending Limb Purpose

- Streamflow recession rates do not exceed the seedling root growth rates (benefit of proposed 2010 IHAP hydrograph)