

Overview of Predictive Hydrology

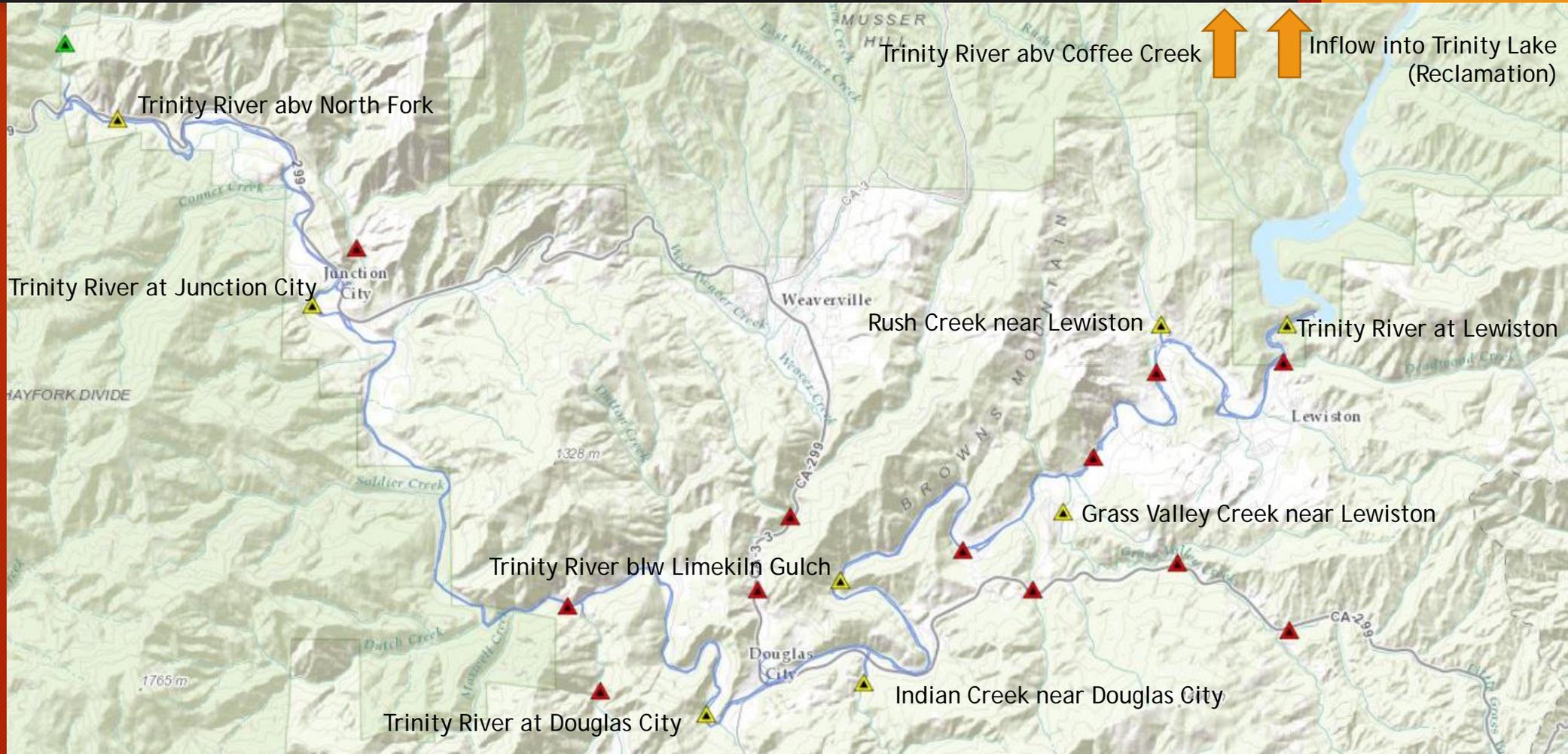
Hydrology Model used to Predict Flows Downstream in Conjunction with Reservoir Releases

- What are we modeling?
 - Flows at downstream locations during key periods
- Why is it important?
 - Several models depend on this as input
- What objectives does the model help to inform?
 - Both River Health and Fish Recovery Fundamental Objectives
 - And a host of “means objectives”

Hydrology Information used to Predict Flows from Lewiston to North Fork

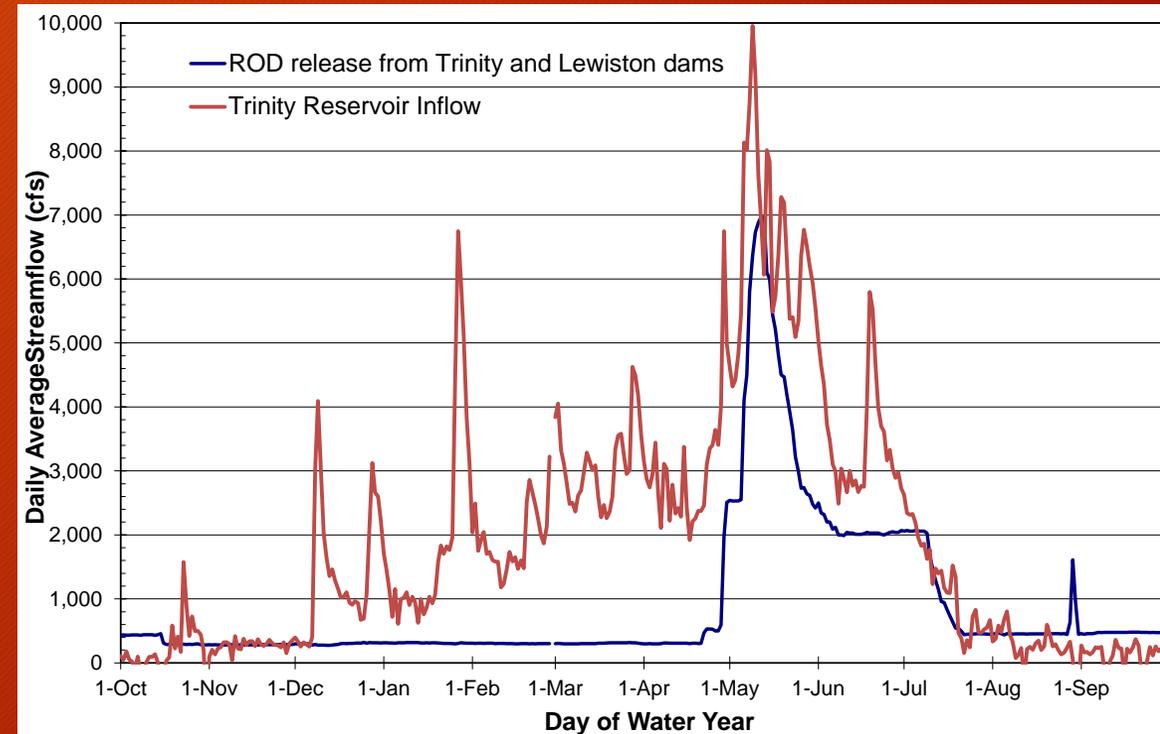
- ▲ Seasonal gage
- ▲ Historical gage
- ▲ Active gage

- 15-minute data
- Daily average data
- Instantaneous peak data



Hydrology Uses

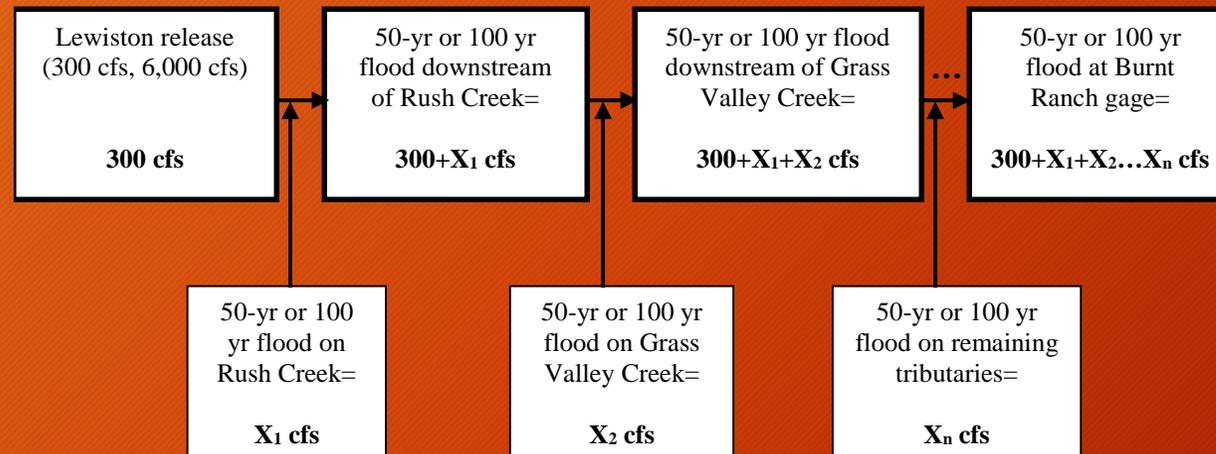
- Channel Design
 - Bridge and infrastructure (flood hydrology)
 - Geomorphic and riparian (flood peaks, daily benches and recession rates)
 - Habitat surfaces (daily flows, frequency-duration)
- Ecological evaluations
 - Fish (daily flows)
 - Riparian regeneration (flood peaks, daily benches and recession rates)
 - Amphibians (daily flows and recession rates)
- Flow Management
 - Downstream peak and daily flow estimates



Hydrology model

- Simple empirical model (daily flows or peak flows)

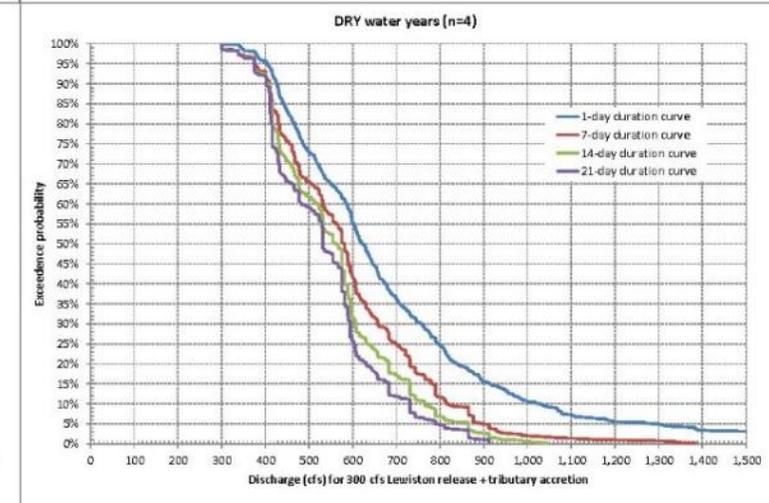
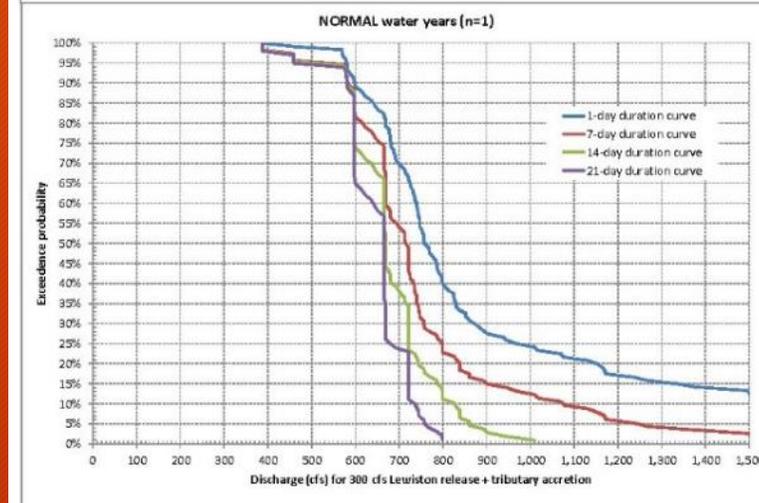
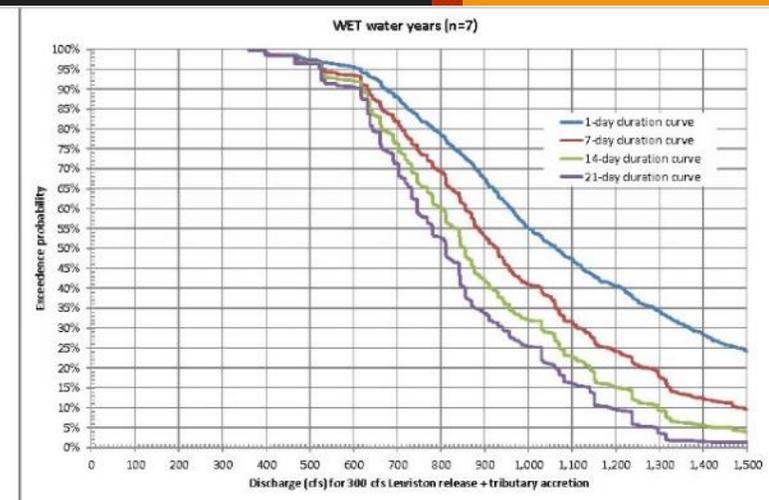
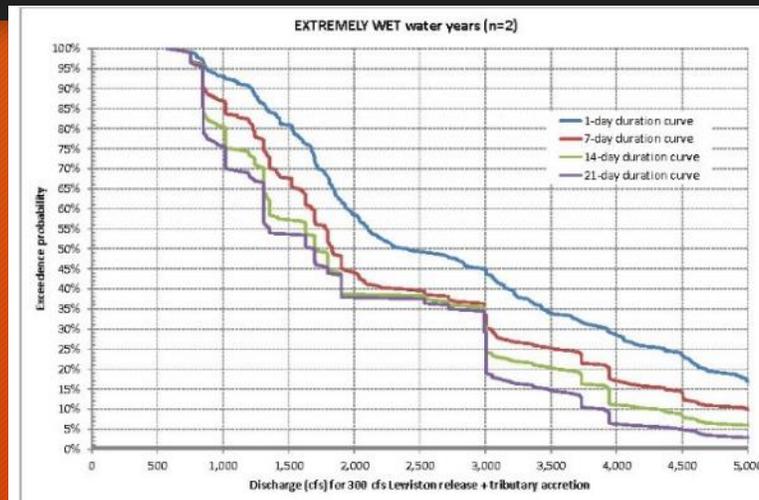
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- Hydrodynamic model within sub-daily water temperature model

Fish use example at Junction City from 2011 Channel Design Guide

- Uses USGS gaging data
- Flow analysis for fry rearing periodicity
- 1, 7, 14 and 21-day duration analysis allows assessment of nutrient exchange, primary productivity, secondary productivity, and other biological processes
- Assess by water year classes
- Informs design of habitat features (high flow channels, benches, floodplains)



Correlative Hydrology Model used to Predict Flows Downstream in Conjunction with Reservoir Releases

- How outputs fit in DSS
 - Description of output metrics and where they fit in DSS **Provide FLOW values for "everything"**
 - Who runs the model? **-individual users**
 - How long is required to analyze alternatives? **Depends on alternatives being compared**
- Model development and application
 - Is the model complete? If not, when? **Additive model is simple enough that it is done by user as needed.**
 - Are there any roadblocks that keep it from being done? **None apparent**

Correlative Hydrology Model used to Predict Flows Downstream in Conjunction with Reservoir Releases

- Outputs (predictions)
 - Computations are quick
 - Resolution = Reaches between major tributaries
 - Time Step = Daily and Peak values
 - Output = cubic feet per sec or metric
 - Accuracy assured by empirical nature (actual observation)