

Hangman Creek TMDL

- **Fecal coliform results – additional analyses & findings**
- **WARMF phosphorus and sediment model – draft report**
- **Latest schedule**



Hangman Creek TMDL

The two-level fecal coliform bacteria numeric criteria for recreational water contact— same as under the 1997 Washington State standards

- **Extraordinary Contact (formerly Class AA)**
 - 50 cfu/100 mL geometric mean
 - not more than 10% >100 cfu/100 mL
- **Primary Contact (formerly Class A)**
 - 100 cfu/100 mL geometric mean
 - not more than 10% >200 cfu/100 mL
- **Secondary Contact (formerly Class B)**
 - 200 cfu/100 mL geometric mean
 - not more than 10% >400 cfu/100 mL



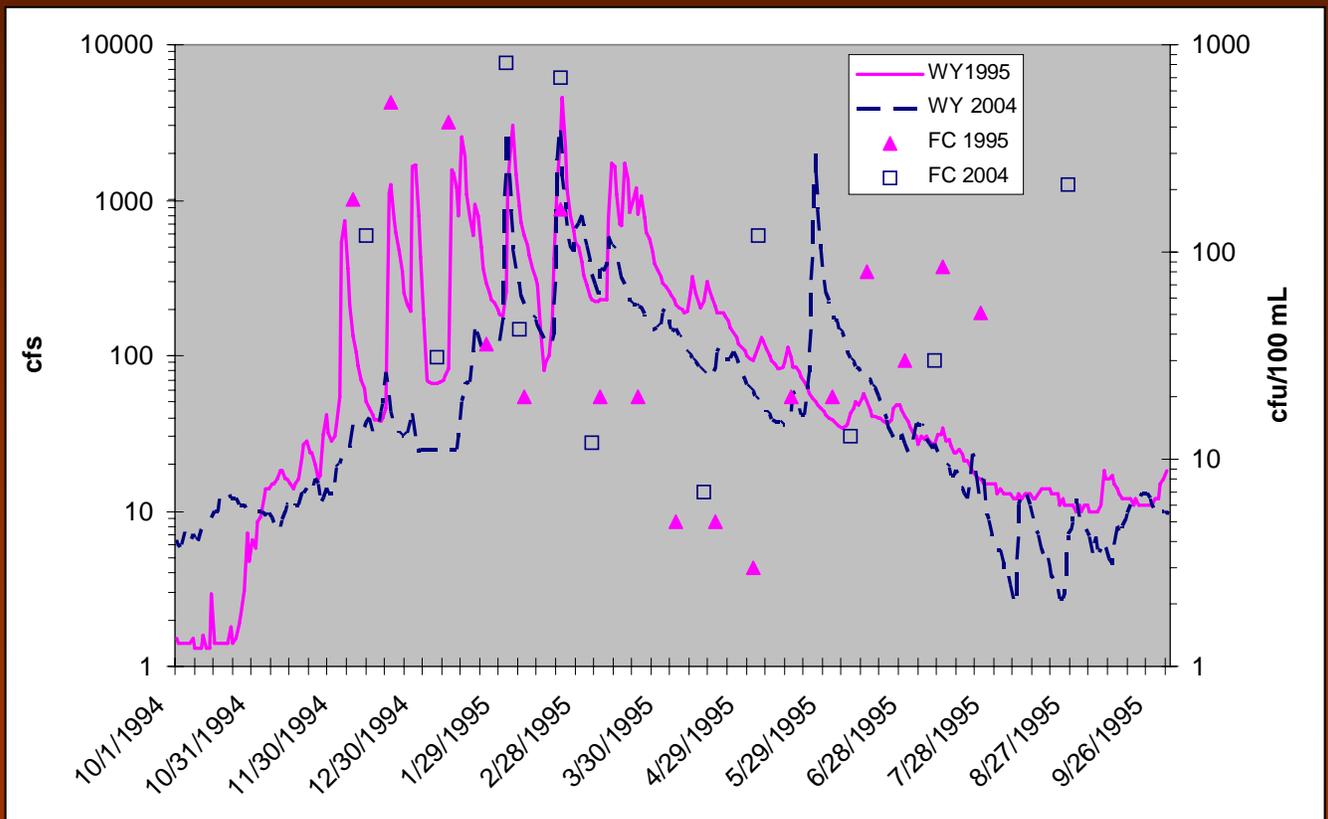
Historical Comparisons

Hangman Creek at State Line near Tekoa 1995 & 2004 (December – August)

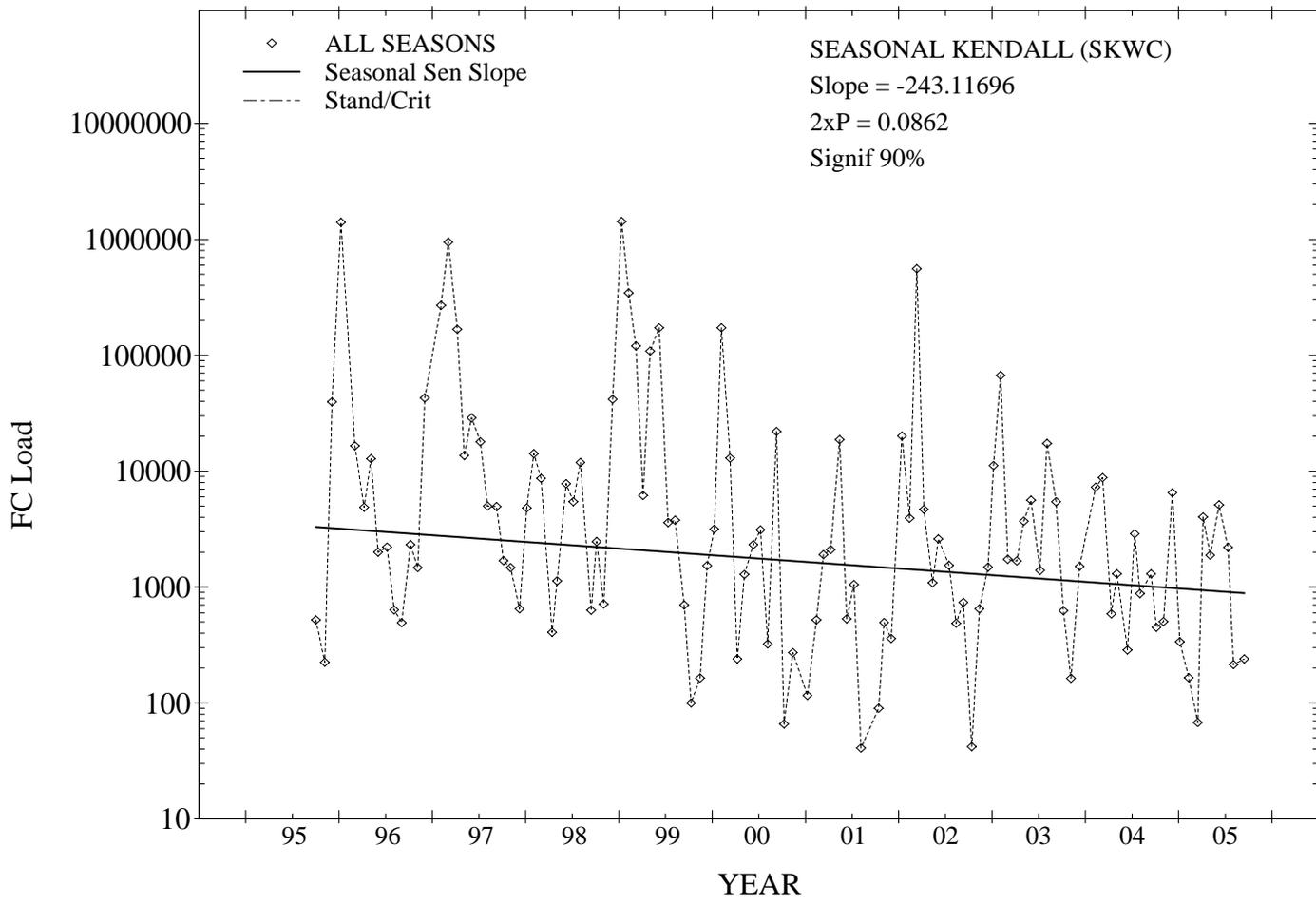
	Water Year 1995	Water Year 2004
Mean seasonal discharge (cfs)	112	52
Geometric mean (cfu/100 mL)	49	64
90 th percentile (cfu/100 mL)	439	505
% samples >200	16%	27%
Number of samples	19	11
Fecal coliform Load (cfu/day)	4.7 x 10¹¹	9.5 x 10¹¹

Historical Comparisons

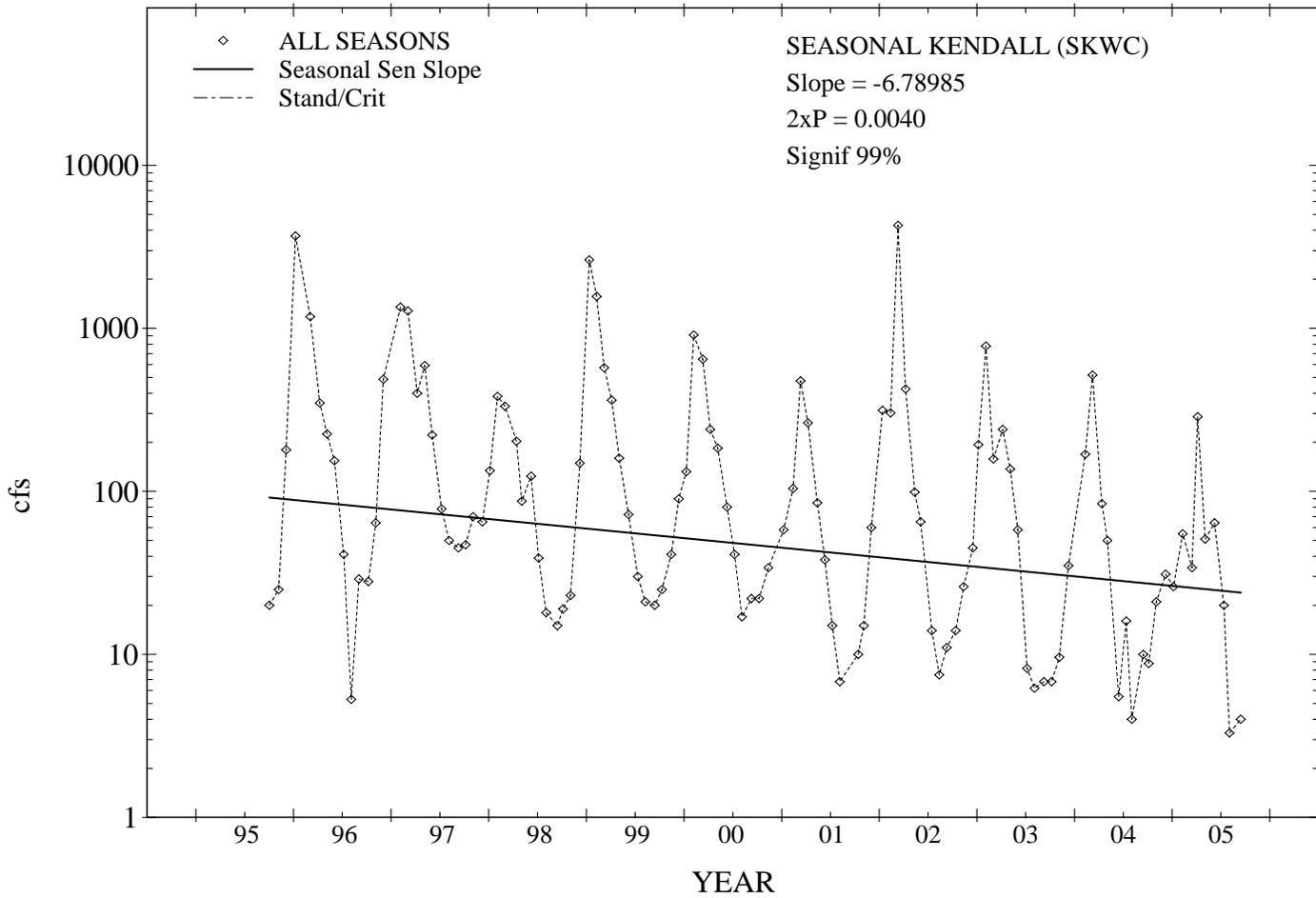
1995 & 2004
Hangman Creek at State Line near Tekoa



Hangman Creek TMDL

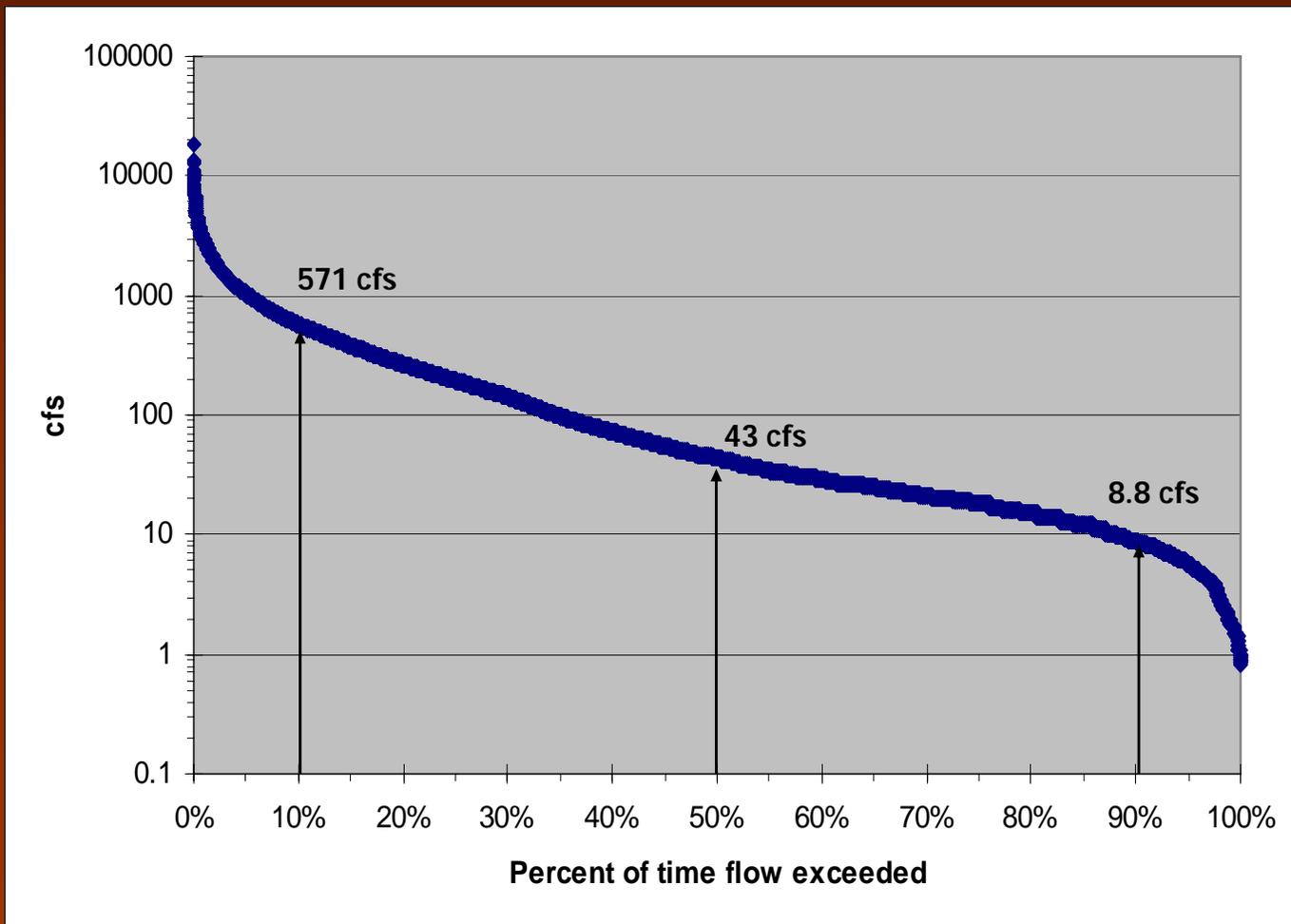


Hangman Creek TMDL



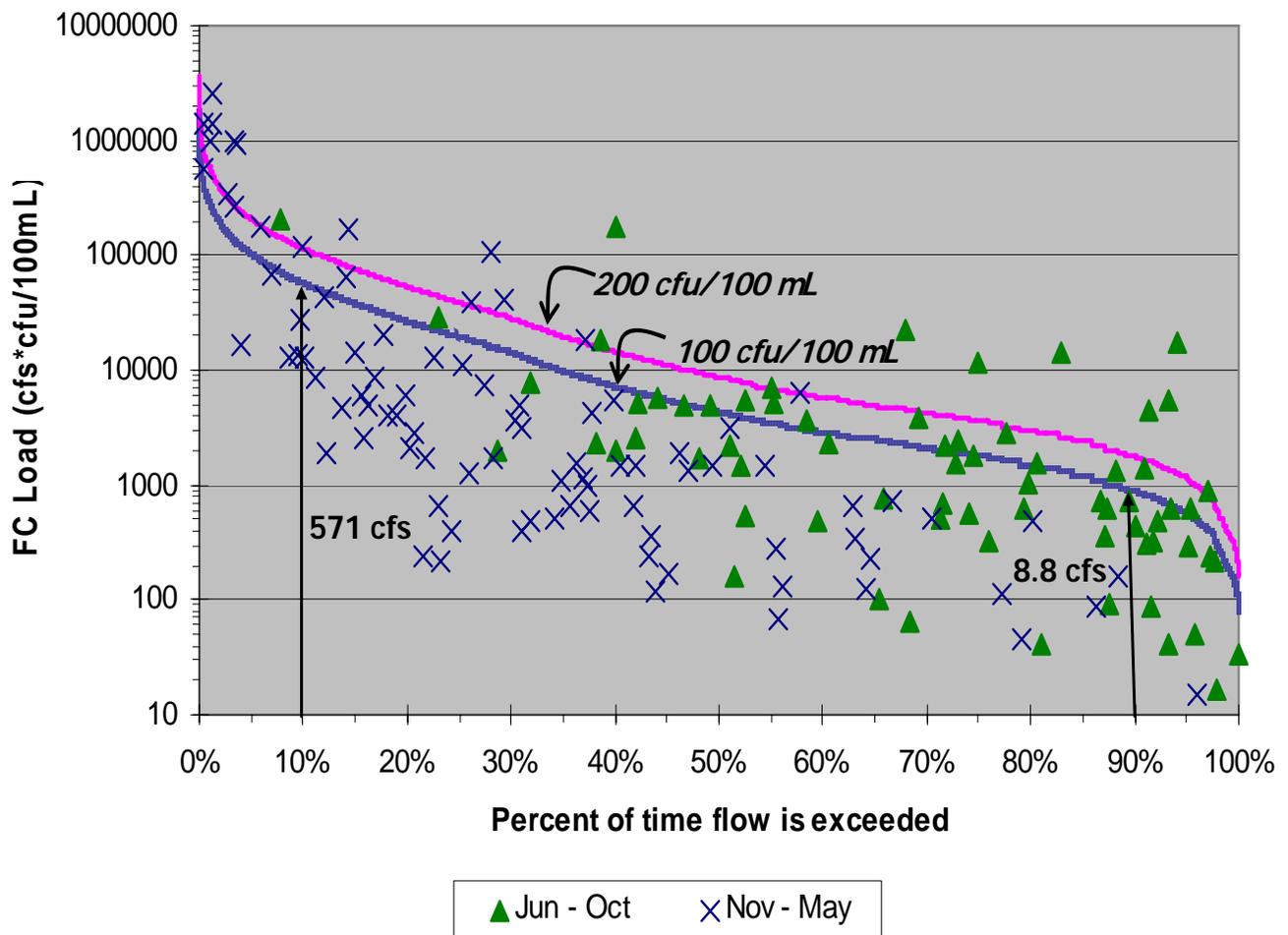
Hangman Creek TMDL

Fecal coliform Load Duration Curve



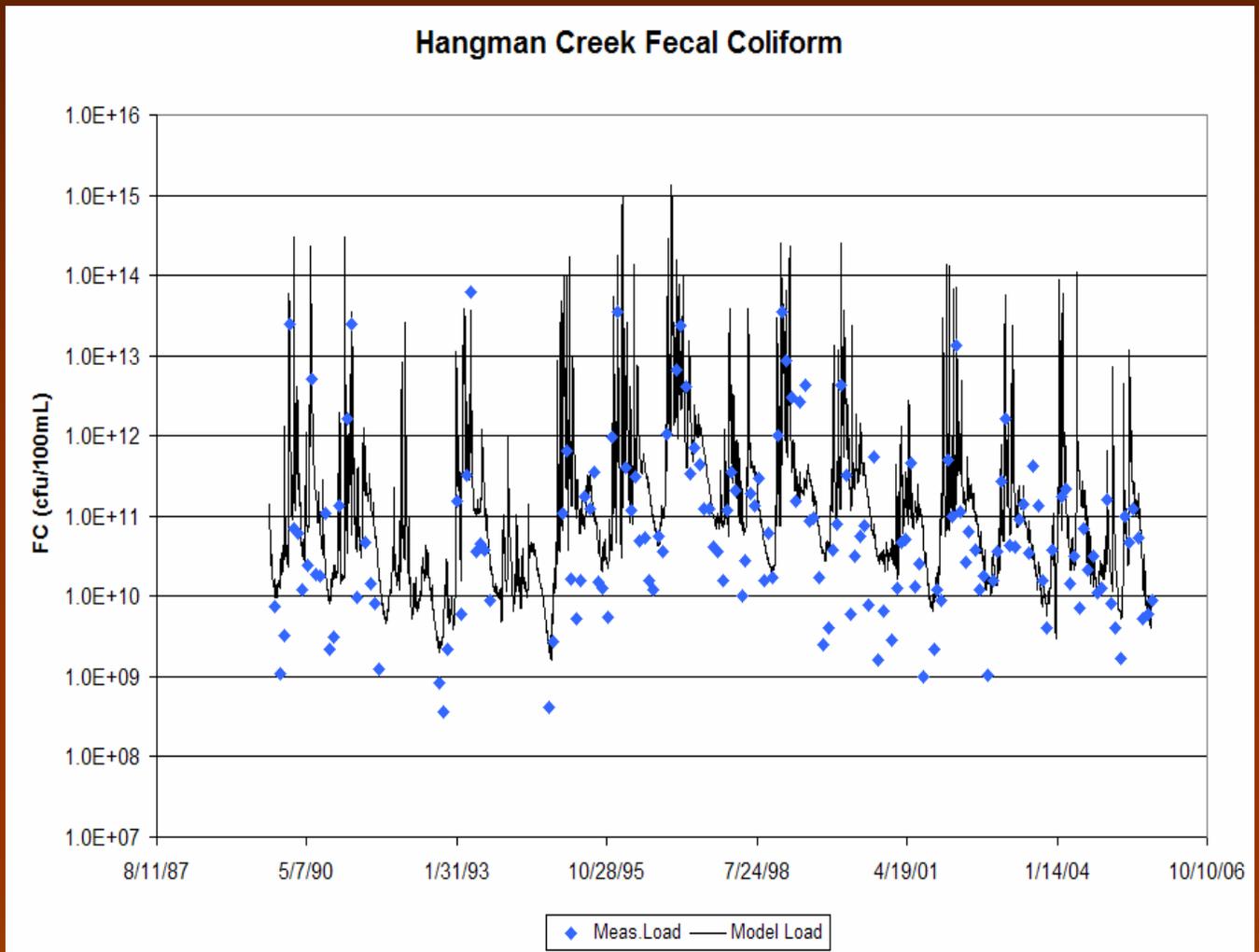
Hangman Creek TMDL

Fecal coliform Load Duration Curve



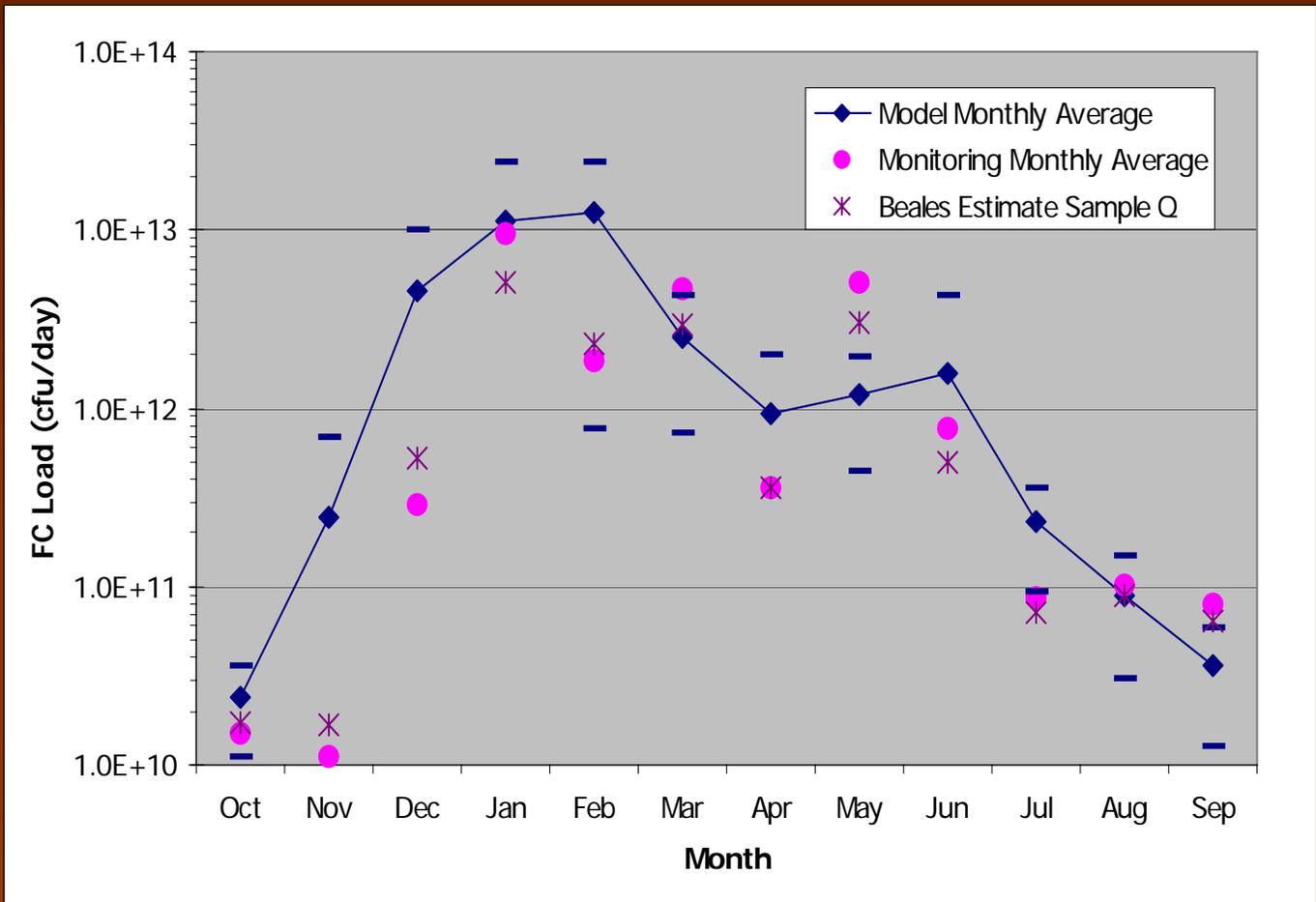
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Fecal Coliform Multiple Regression Model Load Estimates



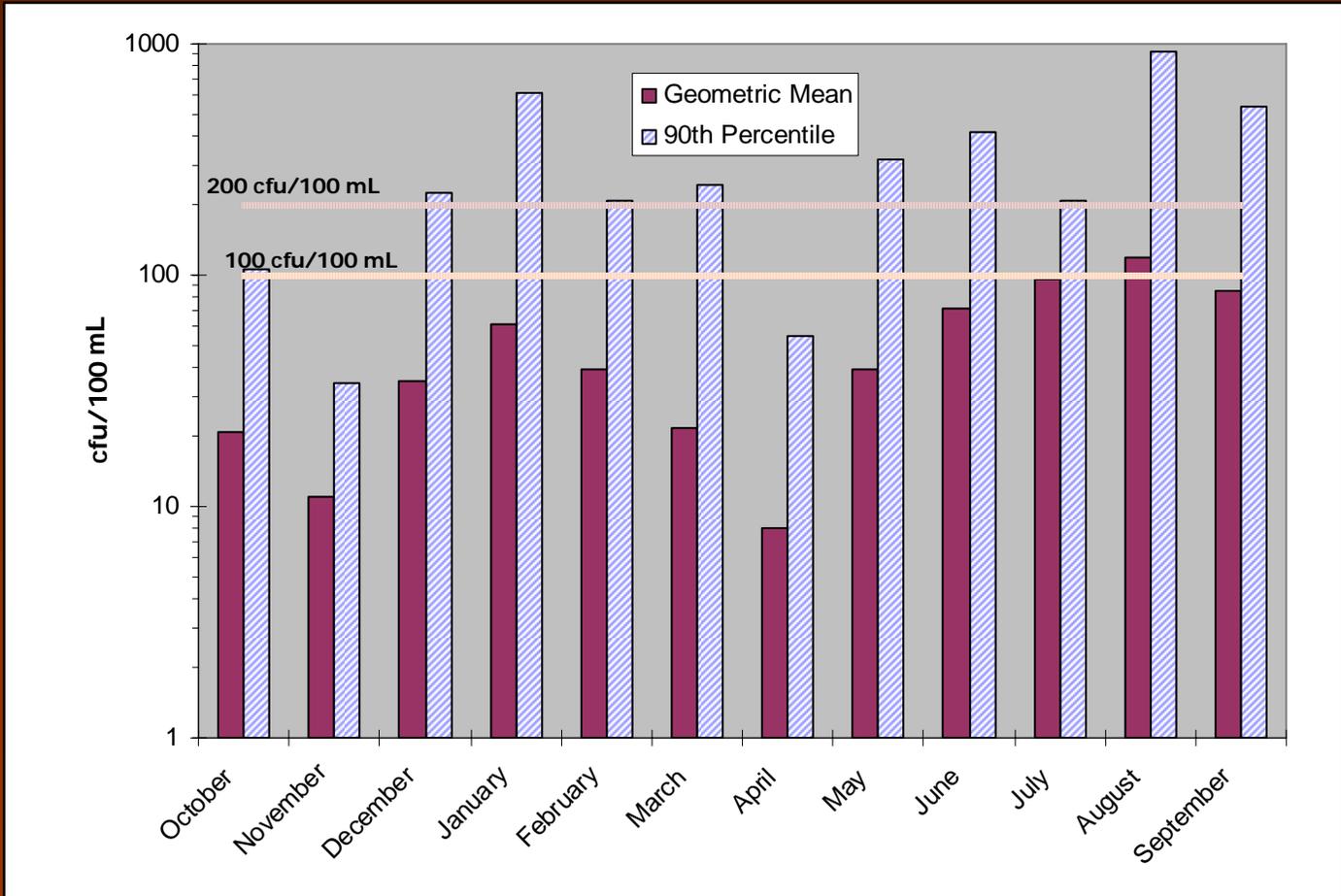
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Fecal Coliform Long-term Monthly Load Estimates



Hangman Creek TMDL

Fecal Coliform Long-term Monthly Statistics



Hangman Creek TMDL

Fecal Coliform

More Preliminary Results

- Hangman Creek at Stateline requires a 72% FC reduction based on August – February critical conditions
- Little Hangman and Cove Creek require 69% and 79% FC reductions, respectively. Little Hangman based on 1994 -95, May through February. Cove Creek is all data collected in 2003 – 04.
- Rattler Run, and Rock Creek require FC reductions – storm & low-flow conditions
- Tekoa & Fairfield WWTP effluent require more reliable disinfection
- No FC concentration downward trends since 1995 – downward trend in discharge => lower loads
- Surface runoff controls may be most important measures



Next Steps for Fecal Coliform TMDL

- Finish historical data comparisons and decide critical season & period of record
- Examine loading between mainstem sites and estimate non-tributary contributions
- Calculate statistical rollback terms and reductions
- Ensure that cumulative reductions are adequate for downstream protection
- Assign load allocations to nonpoint sources and wasteload allocations to MS4 stormwater sources
- Identify primary areas for implementation



WARMF Modeling of Hangman Creek

- WARMF = Watershed Analysis and Risk Management Framework
- Multiple sub-watershed loads individually run and linked by a stream course network.
- Stream channel erosion and other water quality features simulated in the stream course network.
- Daily time-step loads calculated



WARMF Model Structure

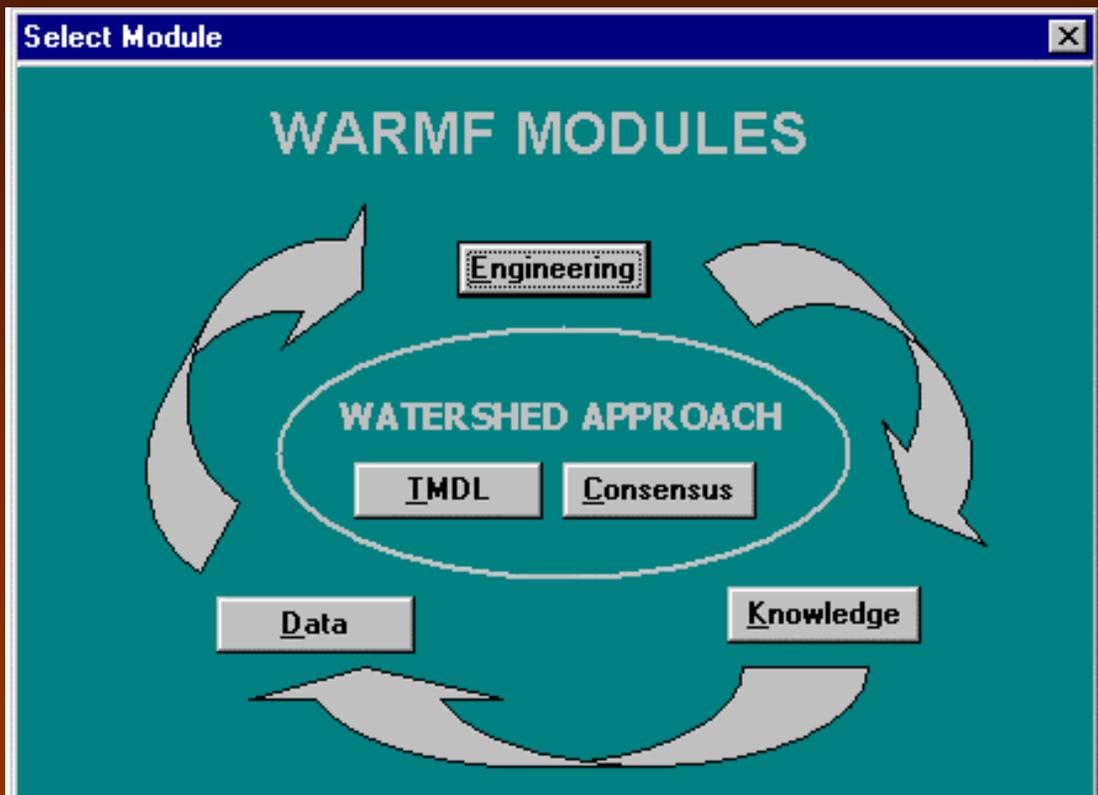
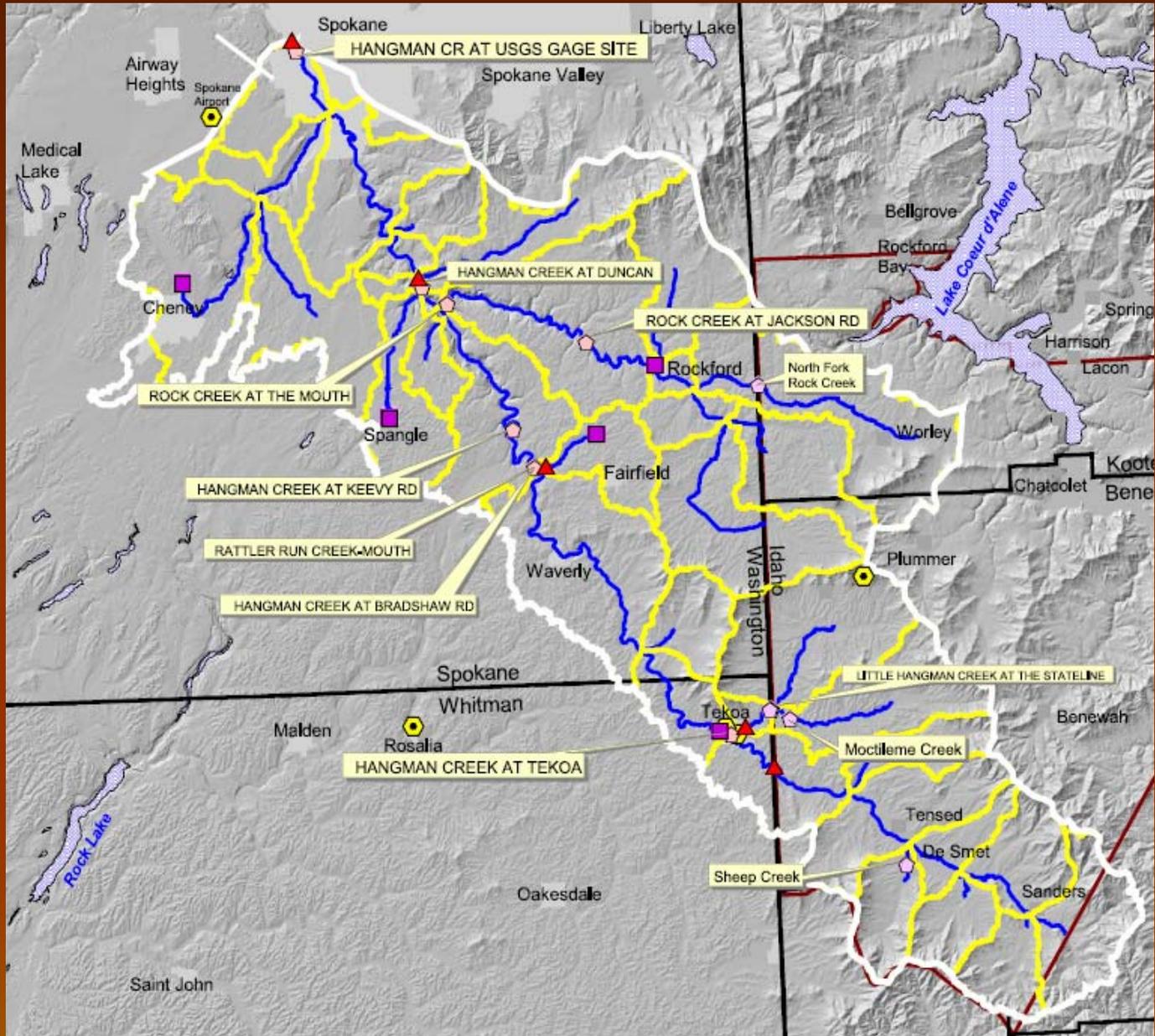


Figure 2.1
The Five Modules of WARMF.

- Open code and EPA-Supported (Ecosystem Research Division) – contractor has experience
- Performs well compared to other medium-complex landscape models
- User-friendly interface that allows stakeholders to examine implementation alternatives

Hangman Creek

- WARMF model developed for 36 Hangman Creek sub-watersheds



Information Sources for the WARMF Model

Data Coverage

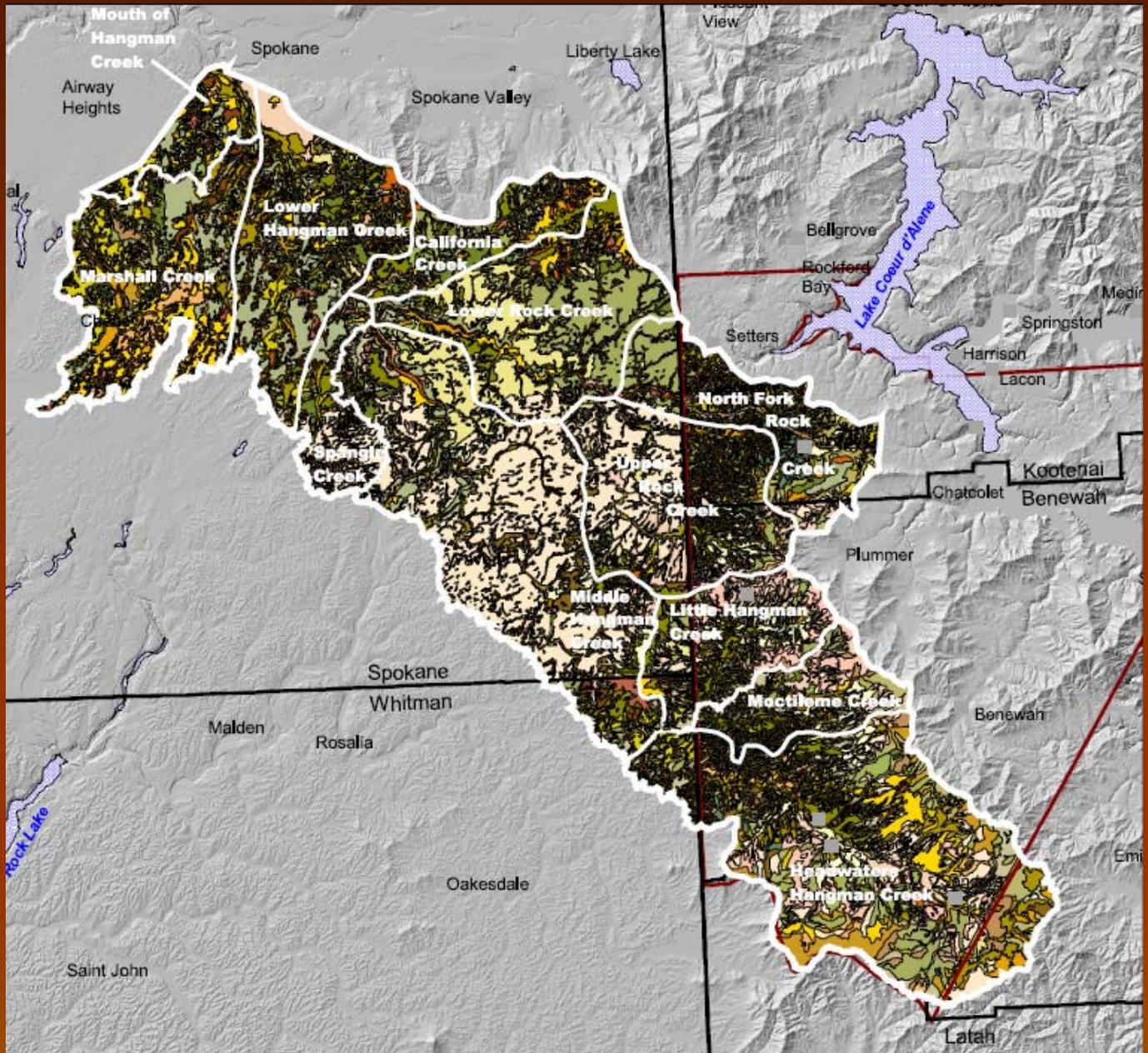
Source Agencies

- **Roads** ➤ WDOT & IDOT
- **Elevation** ➤ WDNR & U of I Library
- **Political Boundaries** ➤ WDOE, USGS, IDWR, WDOT, U of I Library
- **Hydrography** ➤ WDOE, USGS
- **Land Use / Land Cover** ➤ USGS
- **Soils** ➤ USDA – NRCS
- **Meteorology** ➤ NCDC, USGS, NRCS
- **Stream Flow** ➤ SCCD, CdA Tribe, USGS
- **Water Quality** ➤ SCCD, WDOE, CdA Tribe, Multi-party
- **Point Sources** ➤ SCCD, WDOE, CdA Tribe, City of Spokane, WDOT
- **Stream Hydraulics** ➤ SCCD, USGS, WDOE, CdA
- **Biological Surveys** ➤ WDOE, SCCD, CdA Tribe



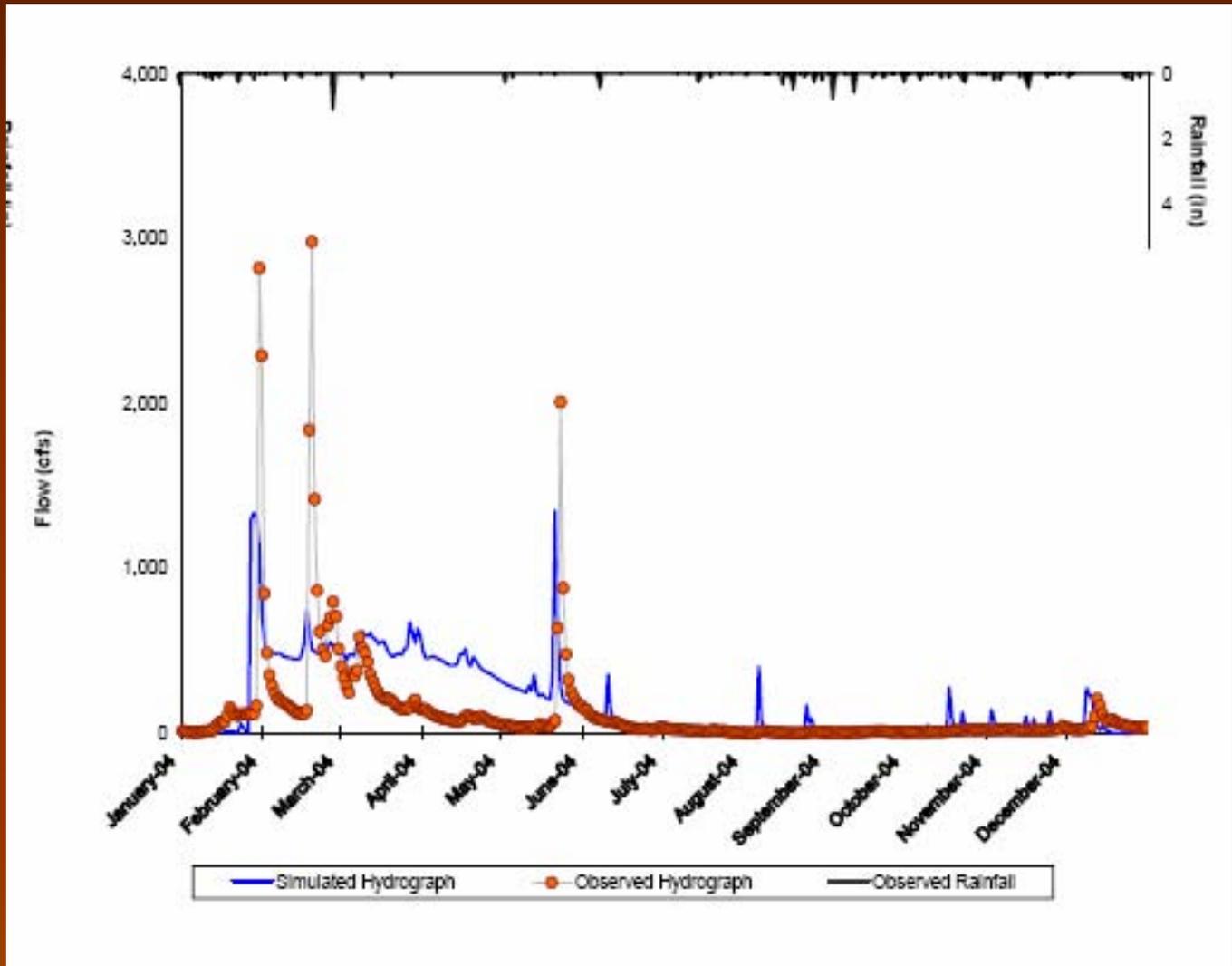
Hangman Creek WARMF Model

Land Use / Land Cover



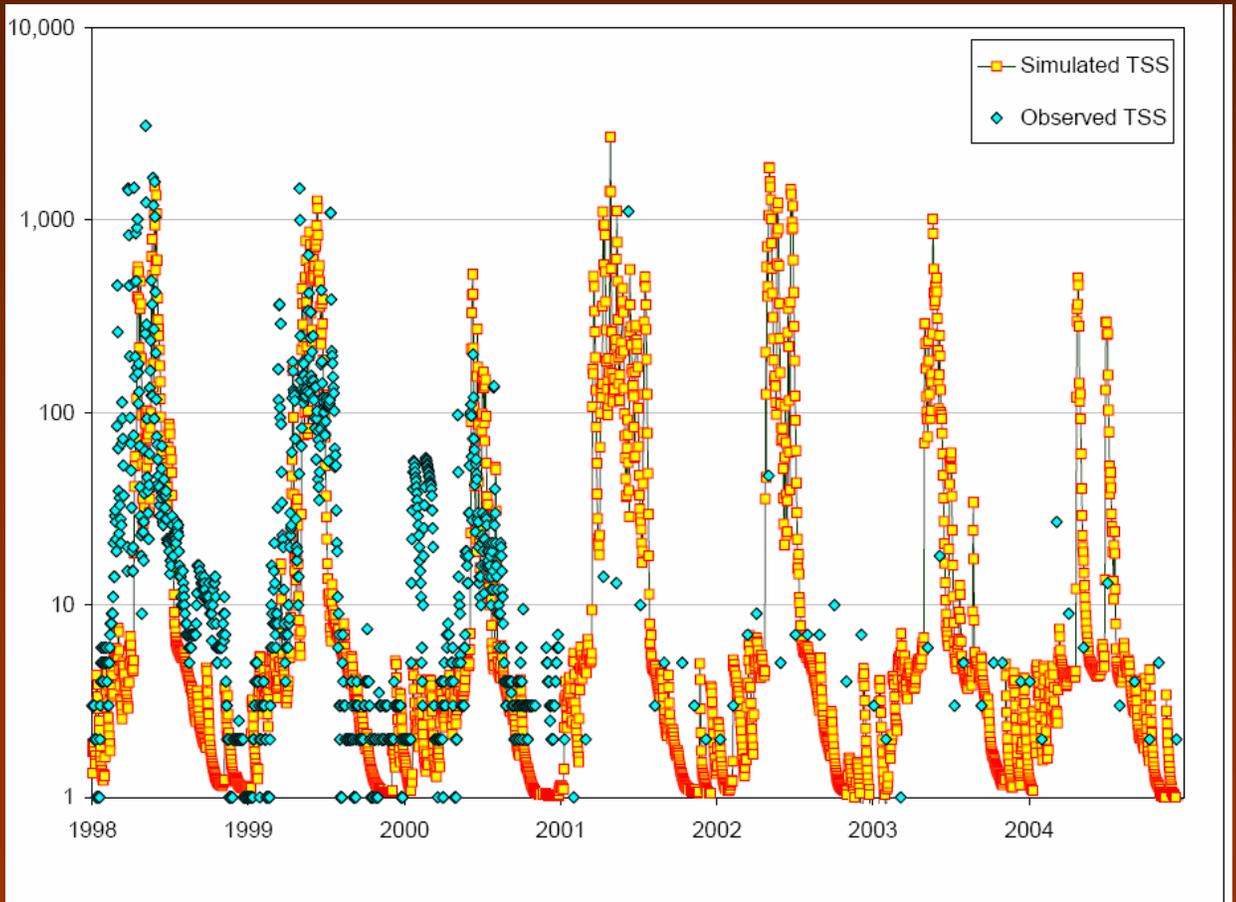
Hangman Creek WARMF

Hydrologic simulation of Hangman Creek
at the mouth



Hangman Creek Example

Water Quality Calibration



Hangman (Latah) Creek TMDL Modeling
Draft Model Report

Figure 5
TSS - Hangman Creek Mouth
Simulate vs. Observed

Next Steps/Tentative Schedule

- **October:** Obtain WARMF model from contractor.
 - Finalize model functions
 - Conduct scenario simulations
 - Analyze results for TMDL targets
- **November:** Complete fecal coliform, turbidity, and total phosphorus targets
 - Send technical portion of report to advisory committee for review
- **December:** Put all technical assessments into the report for final draft review

