

## **REACH: YAKIMA RIVER, KEECHELUS DAM TO LAKE EASTON**

### **REACH FLOW PROBLEM:**

Flow is too high in July, August and 1<sup>st</sup> week of September. Winter flow is lower than desired, pulses are absent.

### **REACH FLOW OBJECTIVE:**

The objective is to improve rearing during July-early September by reducing flows down to 450-550 cfs and increasing winter flow to 120 cfs. Periodic pulses are desired to mimic natural flow conditions.

### **SPECIES AND LIFE STAGES BENEFITTED:**

Adult Migration: Steelhead, spring Chinook, Coho and sockeye

Spawning: Steelhead, spring Chinook, Coho

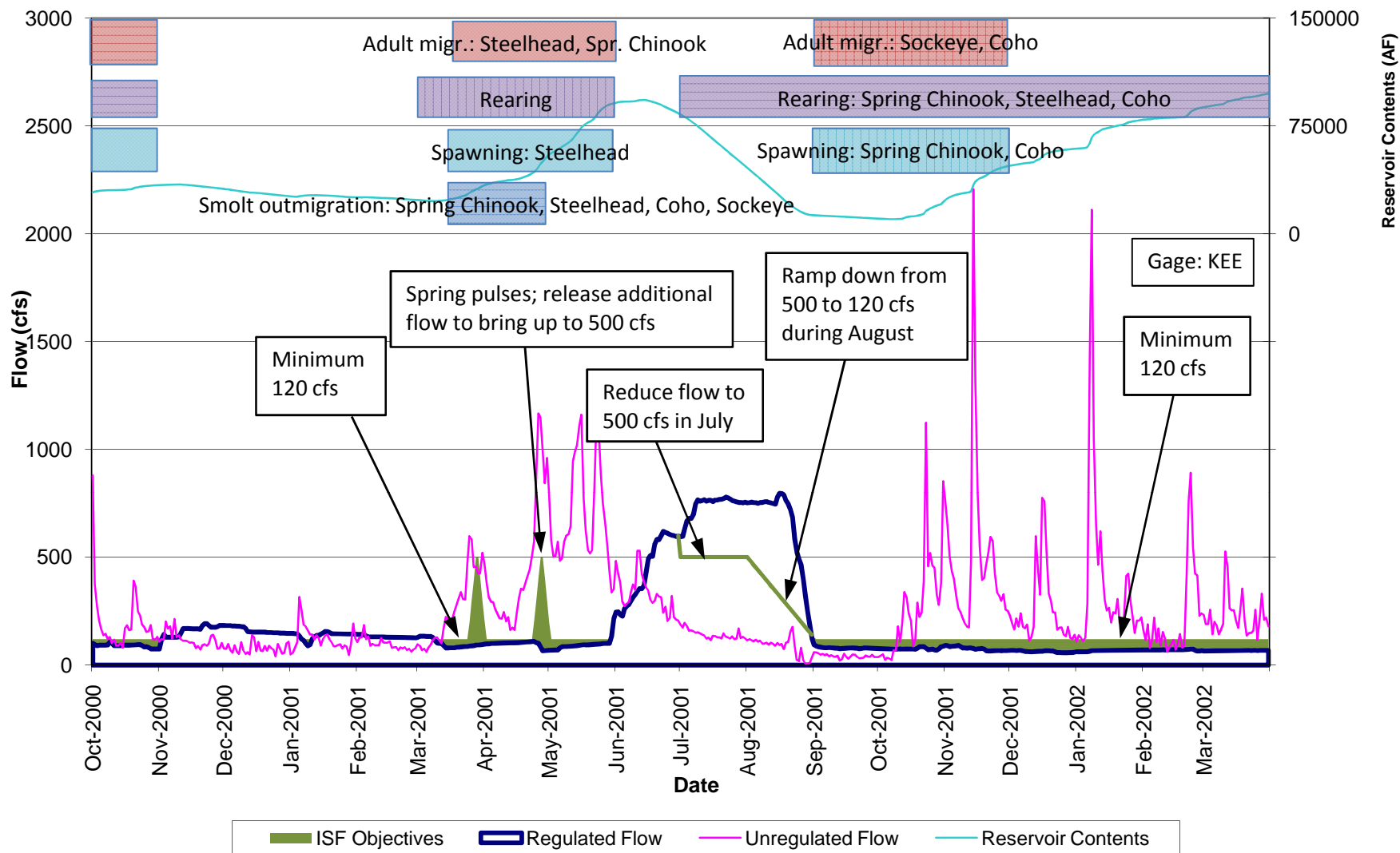
Rearing: Steelhead, spring Chinook, Coho

Smolt Outmigration: Steelhead, spring Chinook, Coho and sockeye

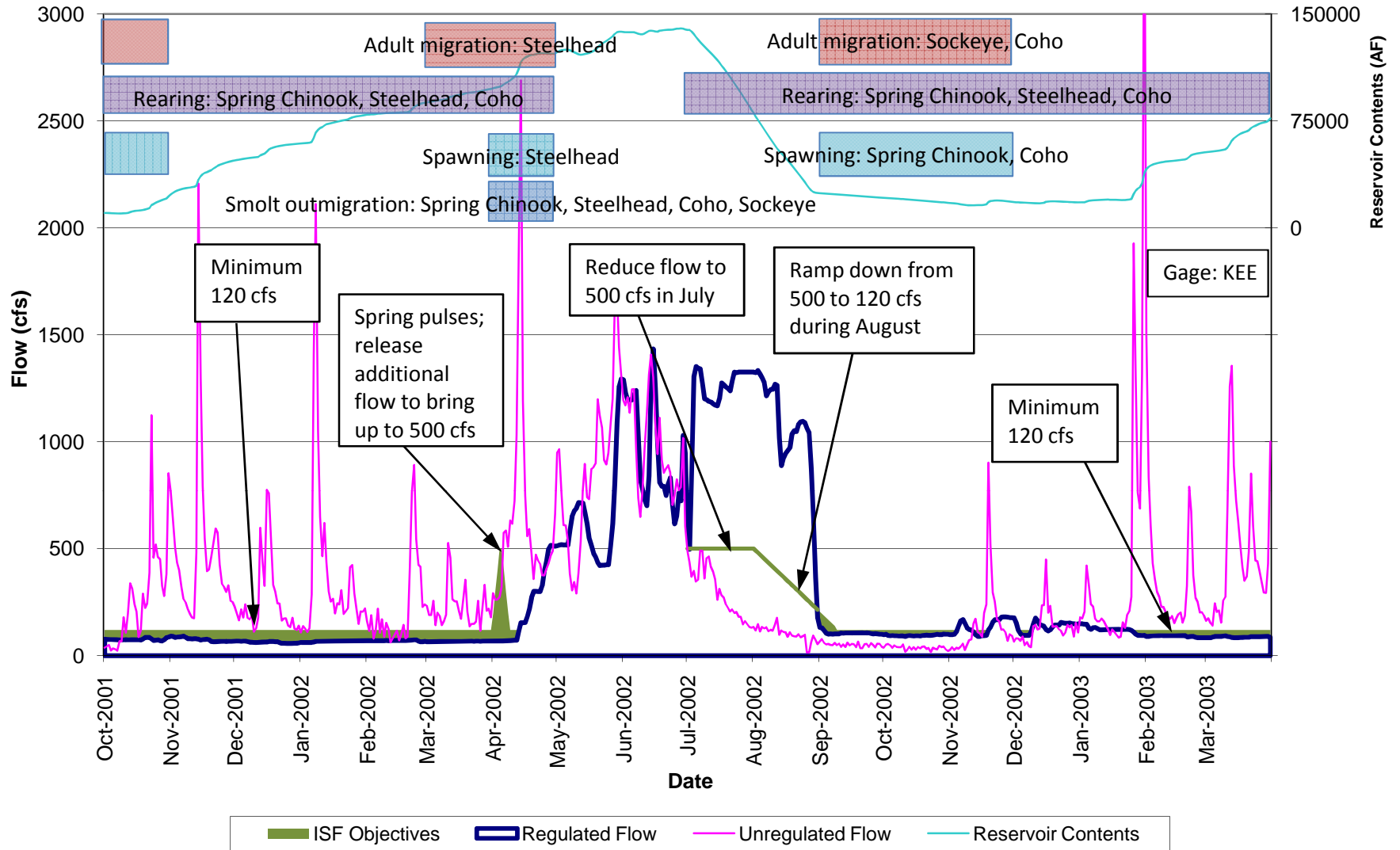
### **HOW WILL YAKIMA PROJECT BE OPERATED TO ACHIEVE FLOW OBJECTIVE?**

With the Integrated Plan, the projects that would help achieve the reach flow objectives are the K-K Pipeline, Wymer Reservoir and other possible storage proposals (Kachess Inactive Storage, Bumping, Cle Elum pool raise, etc). The hydrologic model will test the capability of these elements to meet the reach flow objectives. In general, water will be released from Keechelus Dam during winter to provide an average of 120 cfs flow and flow pulses. The water released during wet years may not need to be stored downstream as there would be sufficient runoff to meet entitlements during the irrigation season. During spring operations, additional water would be released to provide a strong pulse in April (up to channel shaping flows perhaps). In summer water would be released through both the K-K pipeline (up to 400 cfs) and the Yakima River but the flow in the Yakima River would be curtailed as much as possible to meet the 450-550 cfs flow objective in July-early September. To accomplish that, water will be conserved in Keechelus Reservoir during summer and that flow demand met through additional storage in Wymer, Cle Elum or Bumping reservoirs (and possibly Kachess). The water can be released the following winter to refill Wymer or Kachess.

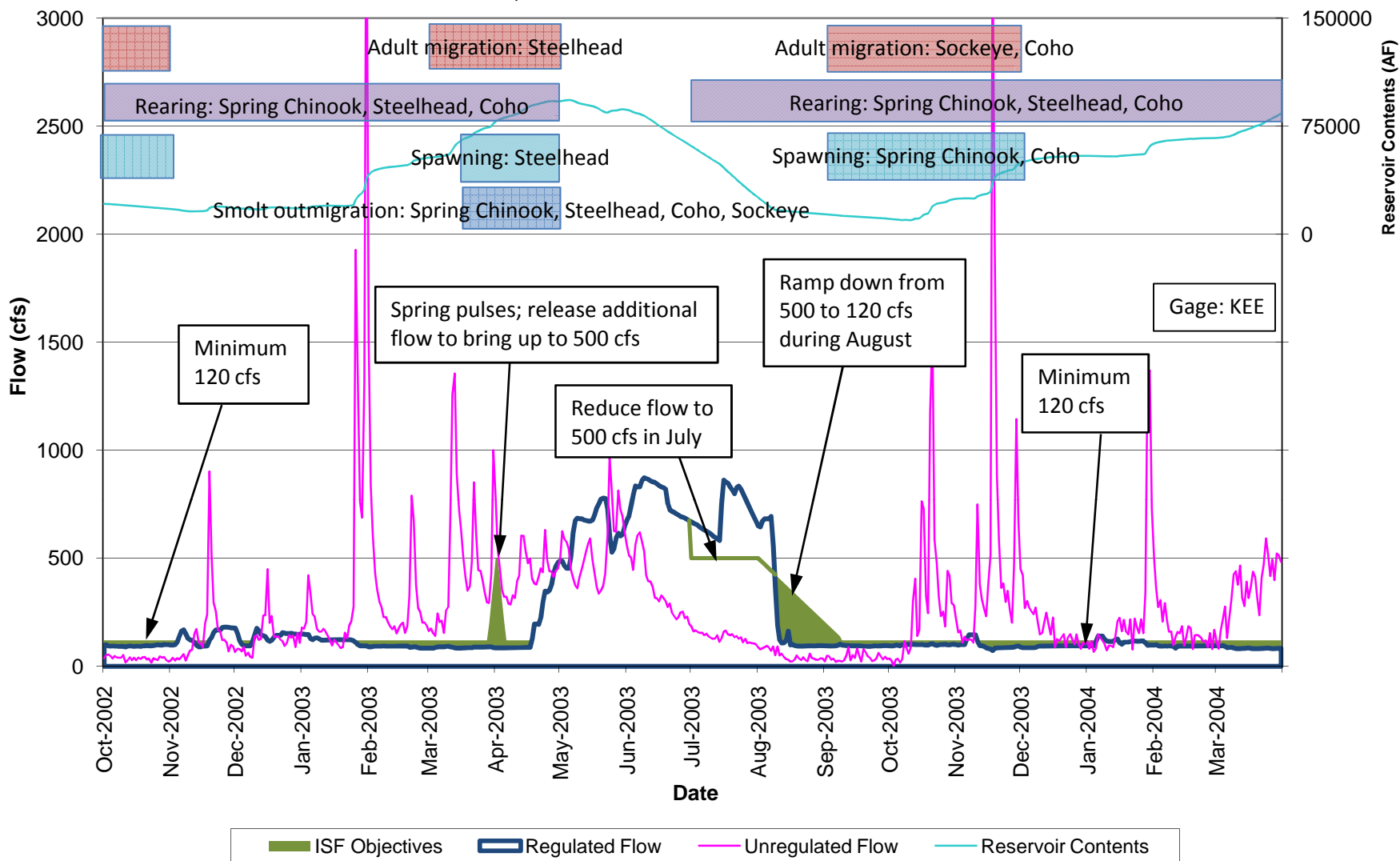
### Comparison of 2001 Flow Data (Drought Year) with Unregulated Flow and Instream Flow Improvement Objectives Yakima River, Keechelus Reservoir to Lake Easton Reach



### Comparison of 2002 Flow Data (Wet Year) with Unregulated Flow and Instream Flow Improvement Objectives Yakima River, Keechelus Reservoir to Lake Easton Reach

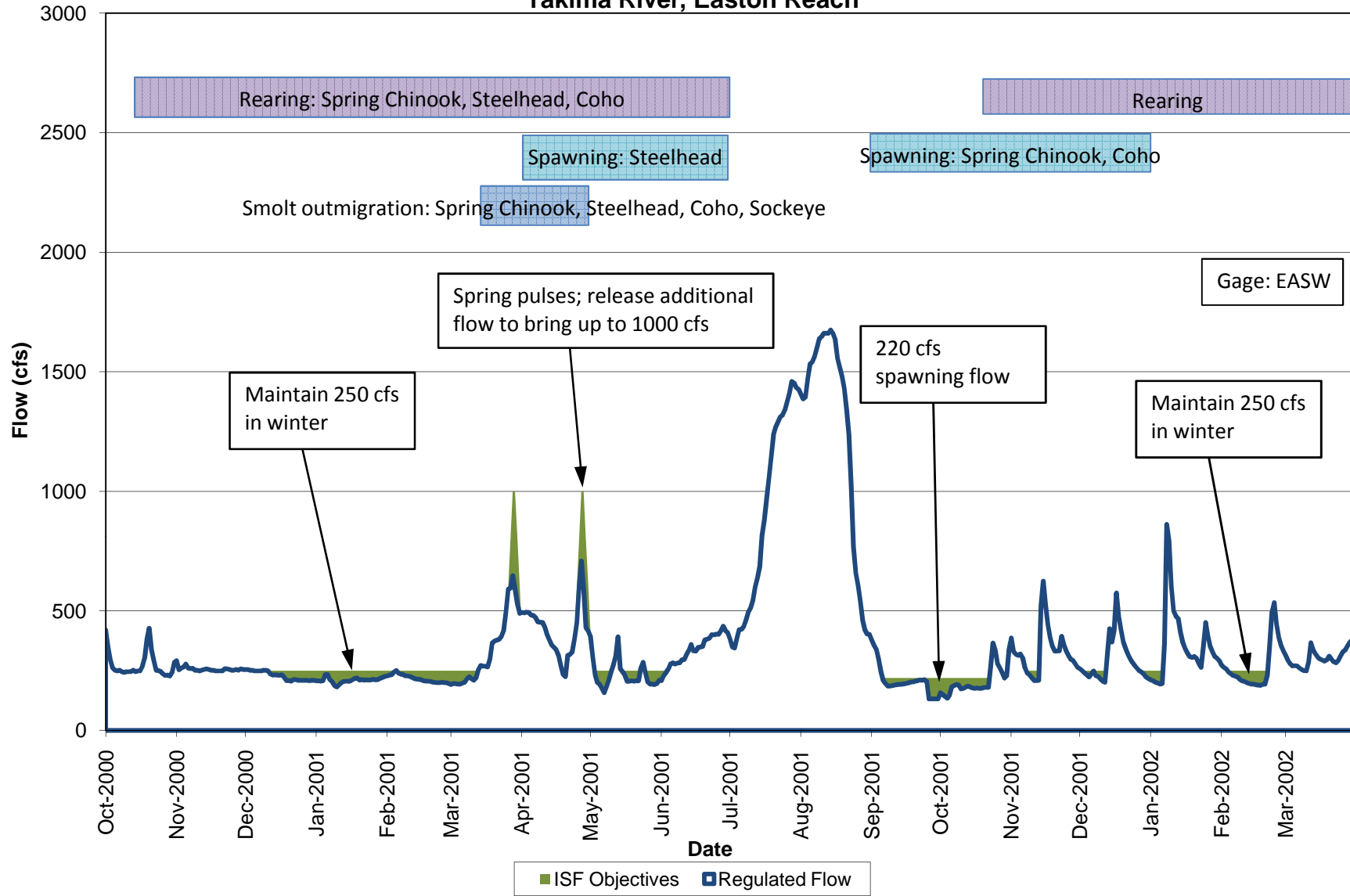


### Comparison of 2003 Flow Data (Average Year) with Unregulated Flow and Instream Flow Improvement Objectives Yakima River, Keechelus Reservoir to Lake Easton Reach

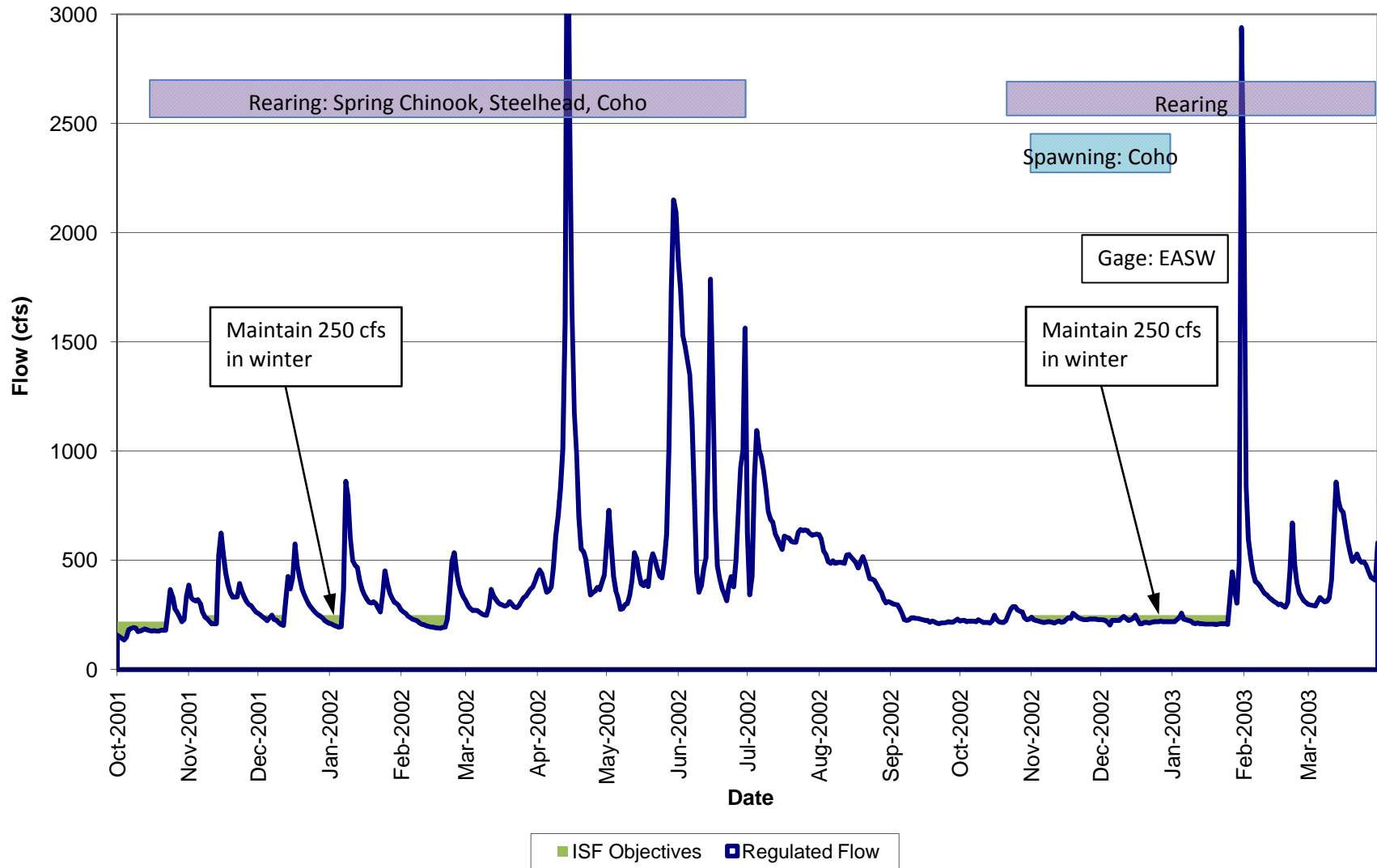




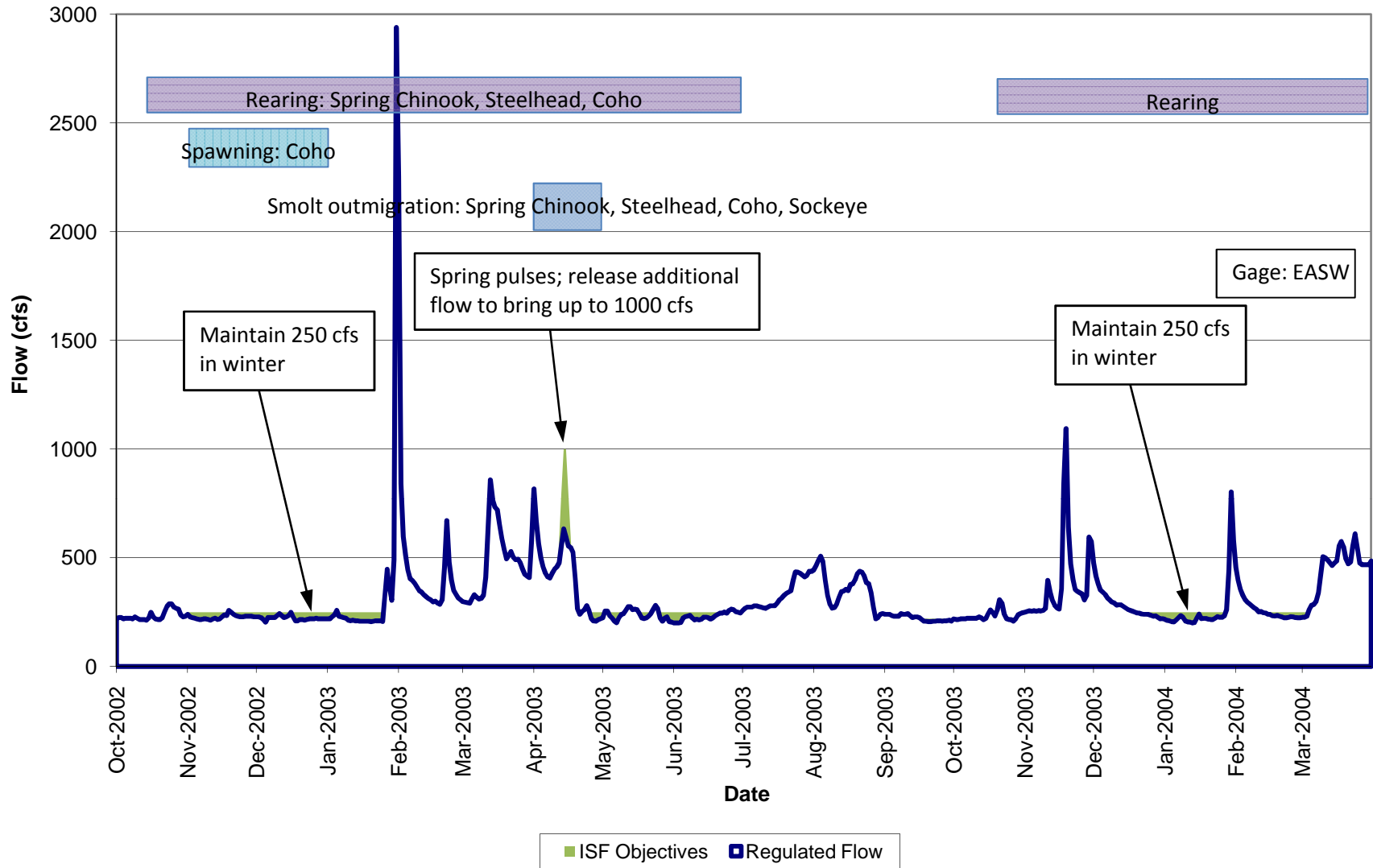
## 2001 Flow Data (Drought Year) with Instream Flow Improvement Objectives Yakima River, Easton Reach



### 2002 Flow Data (Wet Year) with Instream Flow Improvement Objectives Yakima River, Easton Reach



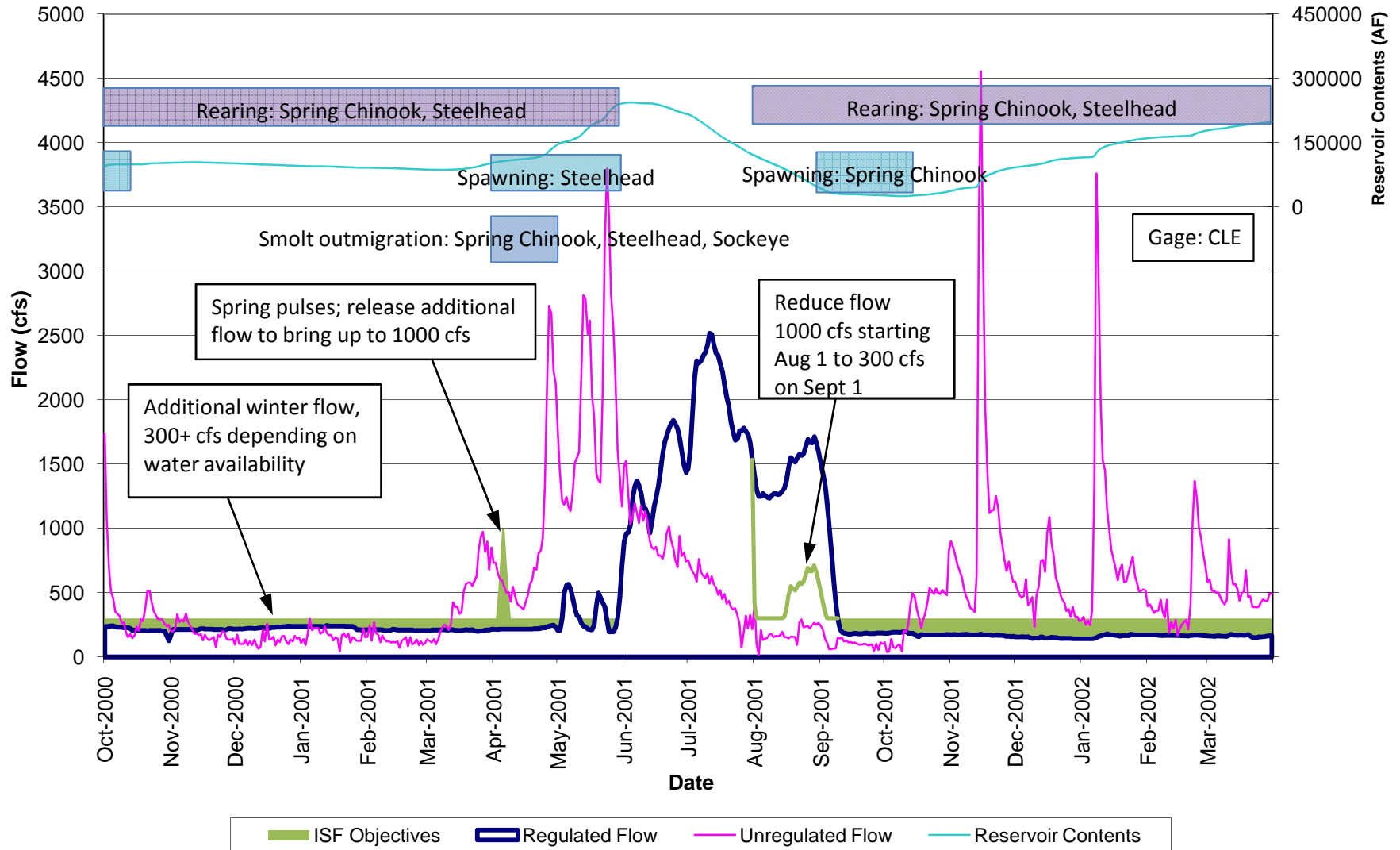
### 2003 Flow Data (Average Year) with Instream Flow Improvement Objectives Yakima River, Easton Reach



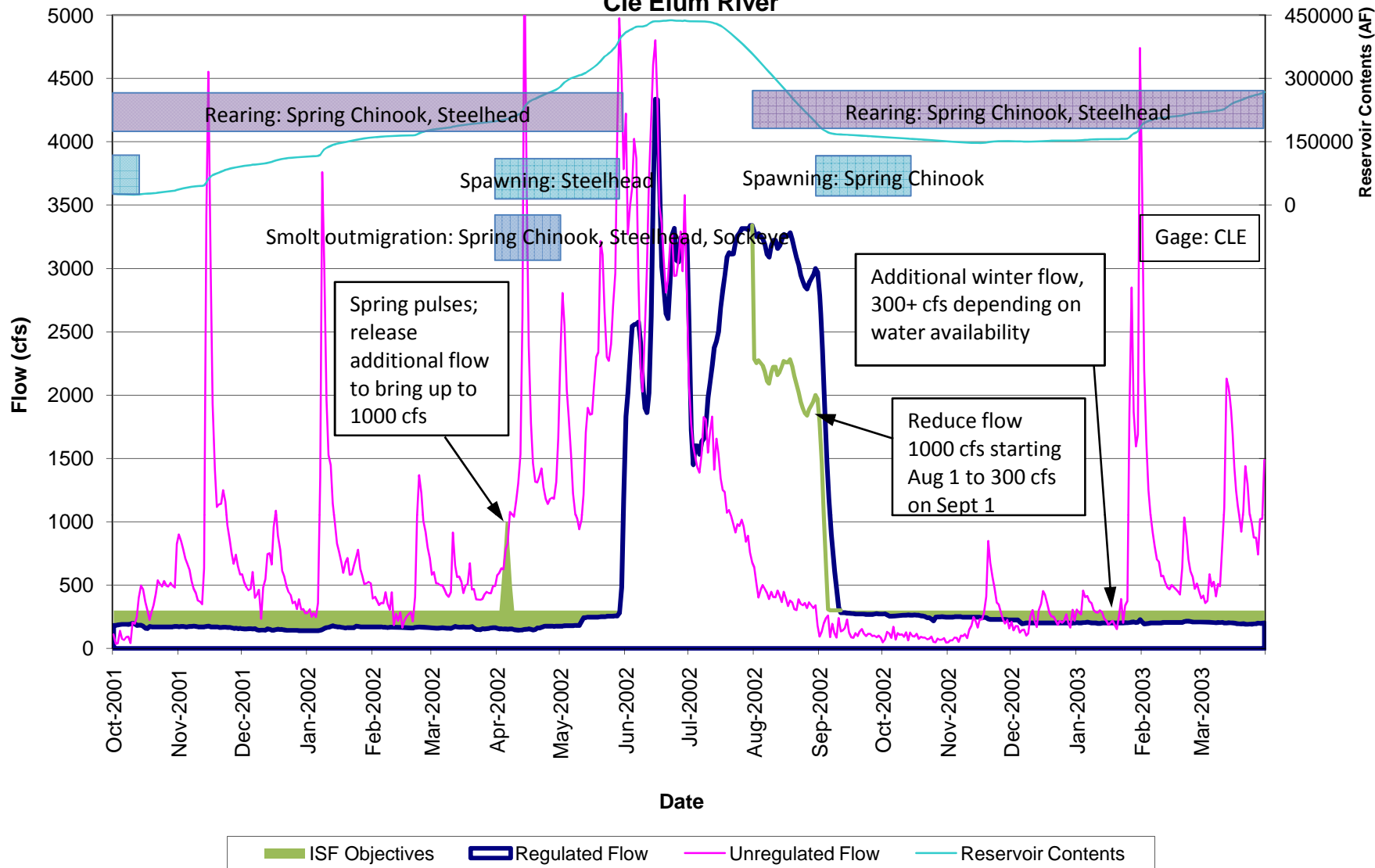




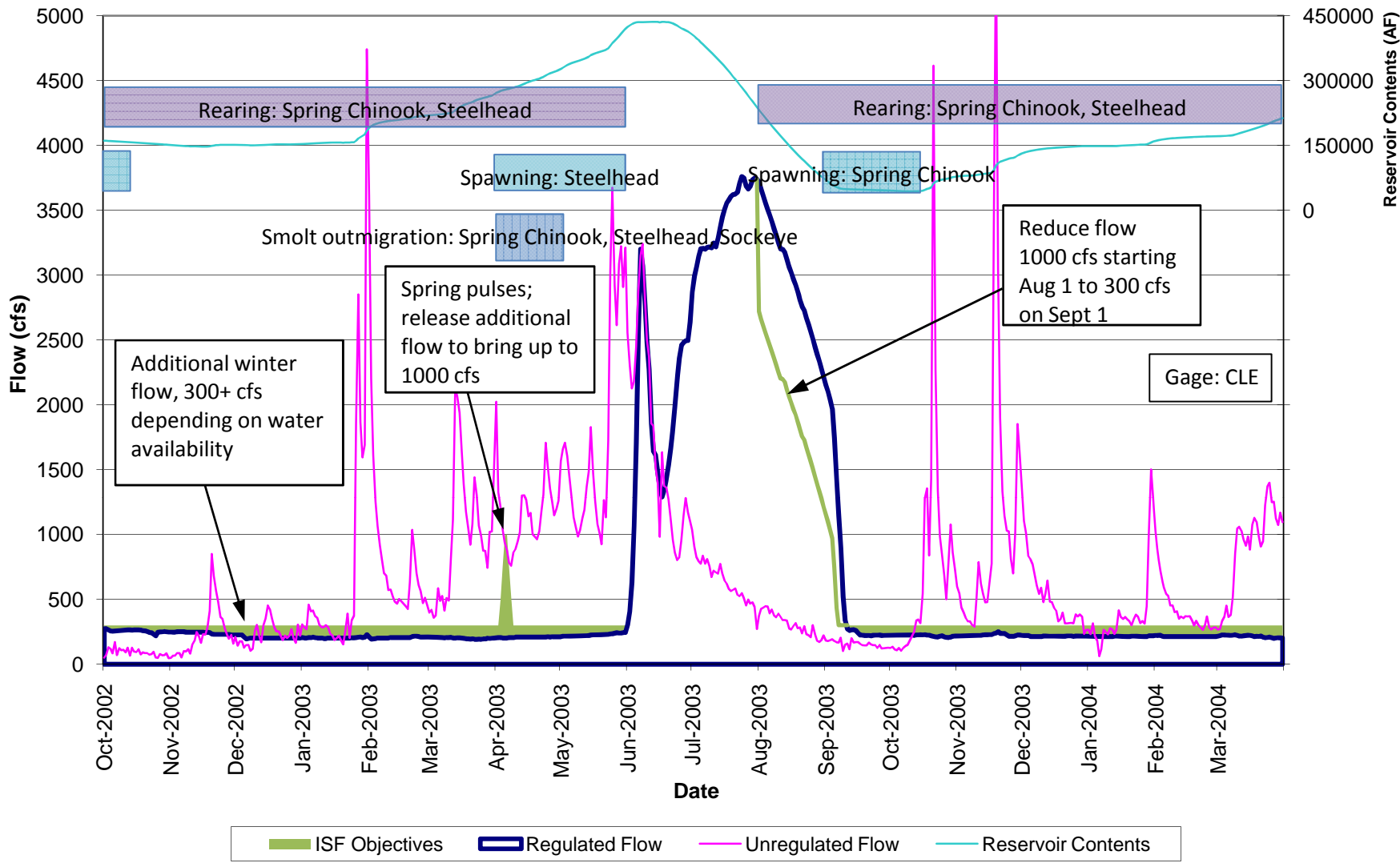
### Comparison of 2001 Flow Data (Drought Year) with Unregulated Flow and Instream Flow Improvement Objectives Cle Elum River



### Comparison of 2002 Flow Data (Wet Year) with Unregulated Flow and Instream Flow Improvement Objectives Cle Elum River



### Comparison of 2003 Flow Data (Average Year) with Unregulated Flow and Instream Flow Improvement Objectives Cle Elum River



## **REACH: YAKIMA RIVER, TEANAWAY RIVER TO ROZA DAM**

### **REACH FLOW PROBLEM:**

Summer flows are too high in July and August. Tributary inflows help with flow variation and channel shaping flows but additional improvement is desired.

### **REACH FLOW OBJECTIVE:**

The summer objective and highest priority is to reduce flows to more closely mimic the unregulated hydrograph. Periodic pulses in winter are desired to mimic natural flow conditions, along with channel shaping flows.

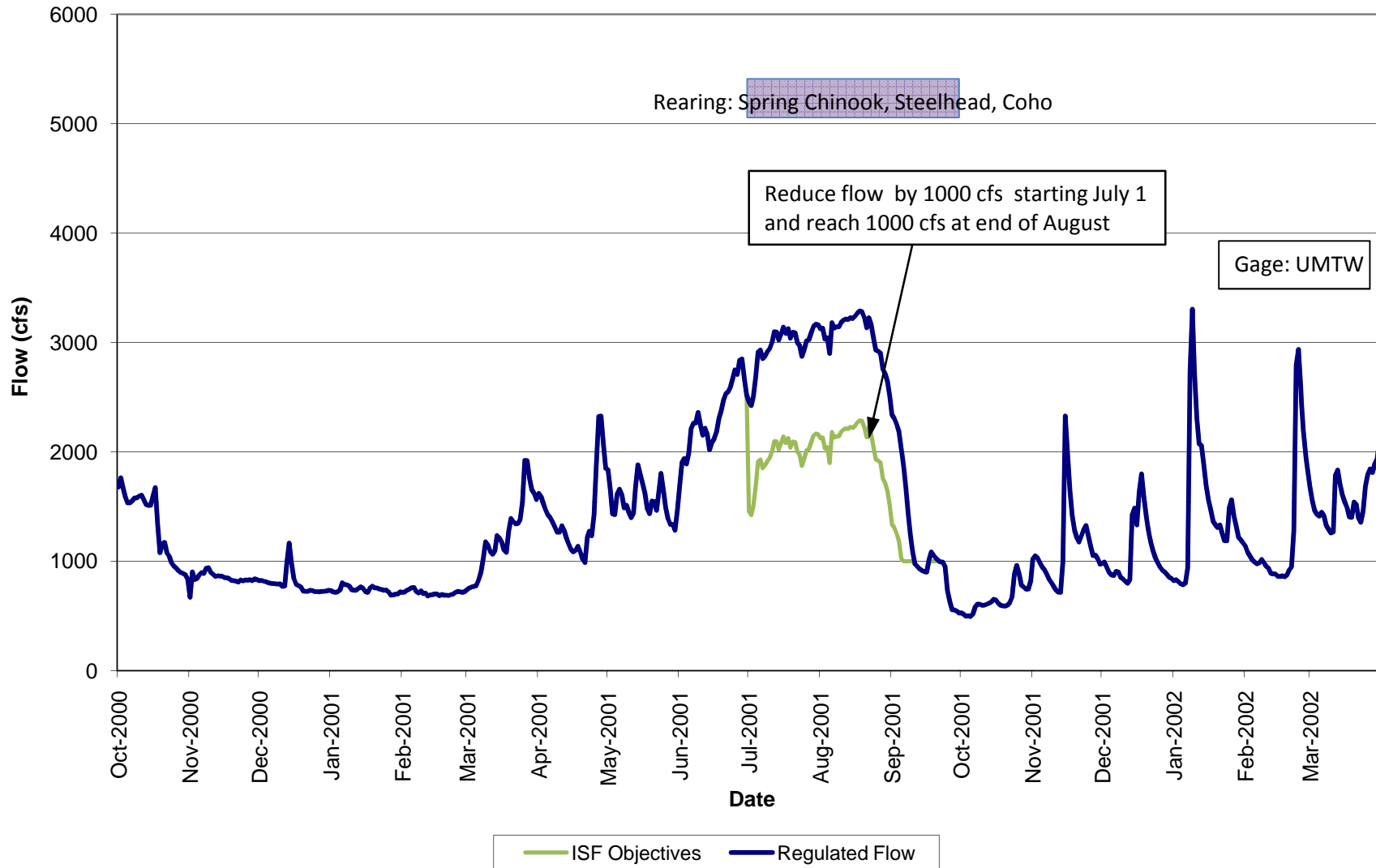
### **SPECIES AND LIFE STAGES BENEFITTED:**

Rearing: Steelhead, spring Chinook, Coho

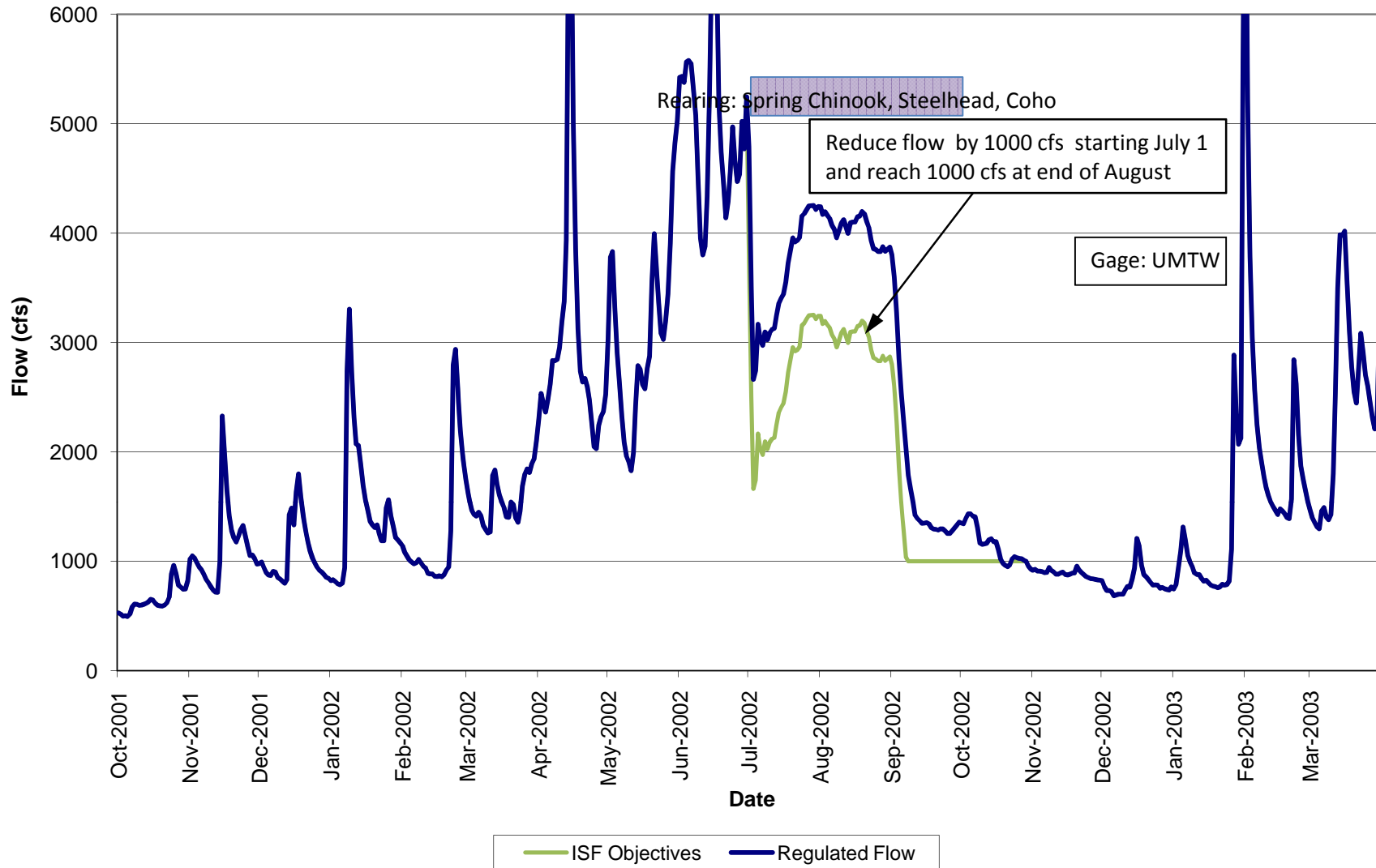
### **HOW WILL YAKIMA PROJECT BE OPERATED TO ACHIEVE FLOW OBJECTIVE?**

With the Integrated Plan, the projects that would help achieve the reach flow objectives are the Thorp Pump Station and feed to Wymer Reservoir, and other possible storage proposals downstream of this reach (Bumping, etc). Downstream reservoirs can release water to make up for desired flow reductions in August. New upstream reservoir projects such as Kachess Inactive Storage are important to allow earlier release of water and balance releases from the reservoir system. The hydrologic model will test the capability of these elements meeting the reach flow objectives. In summer water releases would be reduced as much as possible during August to meet lower flow objectives. A flow reduction will be obtained by other August flow reduction efforts performed for upstream reaches combined with pumping 1000 cfs at Thorp into the KRD North Branch Canal and Wymer Reservoir. The August flow in this reach will be decreased as much as possible (given the limits of storage and releases and the capacity of the Thorp Pump Station). To accomplish that, water will be conserved in Keechelus, Kachess and Cle Elum reservoirs during summer and that flow demand met through additional storage in Wymer or Bumping reservoirs. The water can be released the following winter to refill Wymer or Kachess.

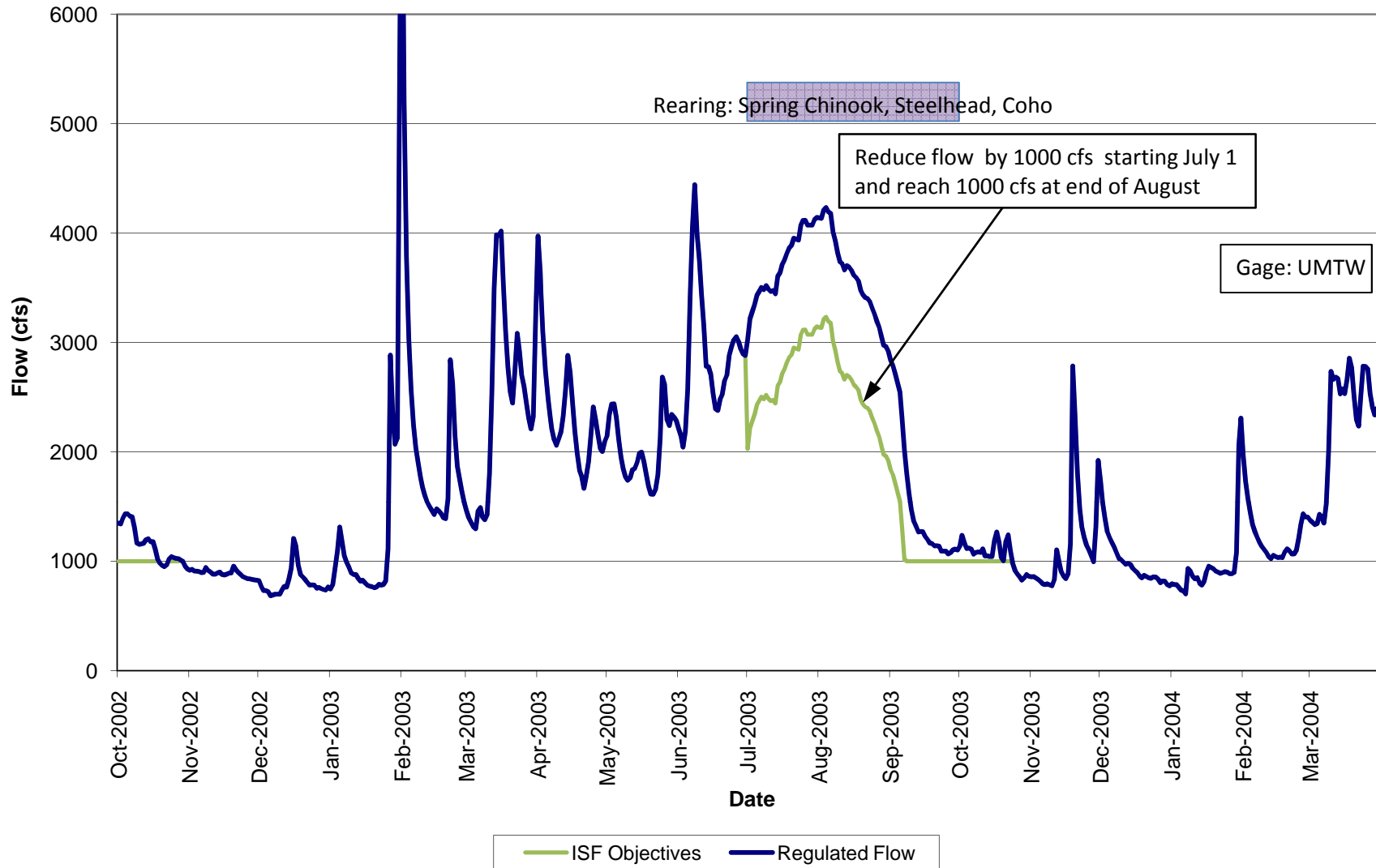
### 2001 Flow Data (Drought Year) with Instream Flow Improvement Objectives Yakima River, Teanaway to Roza (Ellensburg) Reach



### 2002 Flow Data (Wet Year) with Instream Flow Improvement Objectives Yakima River, Teanaway to Roza (Ellensburg) Reach



### 2003 Flow Data (Average Year) with Instream Flow Improvement Objectives Yakima River, Teanaway to Roza (Ellensburg) Reach





## **REACH: TIETON RIVER**

### **REACH FLOW PROBLEM:**

Low winter flows (75 – 120 cfs) and limited variation November to March. Also have high flows in September due to flip-flop operations

### **REACH FLOW OBJECTIVE:**

The winter objective, and high priority, is to increase flows to approximately 125 cfs. In September at the beginning and end of flip-flop operations, reduce flows as much as possible.

### **SPECIES AND LIFE STAGES BENEFITTED:**

Adult Migration: Steelhead, Coho

Spawning: Coho

Rearing: Steelhead, spring Chinook, Coho

### **HOW WILL YAKIMA PROJECT BE OPERATED TO ACHIEVE FLOW OBJECTIVE?**

With the Integrated Plan, the projects that would help achieve the reach flow objectives are additional storage at Bumping Dam to allow additional flow to be released from Rimrock Reservoir in winter and operational improvements to adjust the rate of flow change. The South Fork fish passage project is also needed to allow flexibility in Rimrock reservoir operations.

### Comparison of 2001 Flow Data (Drought Year) with Unregulated Flow and Instream Flow Improvement Objectives Tieton River Reach

