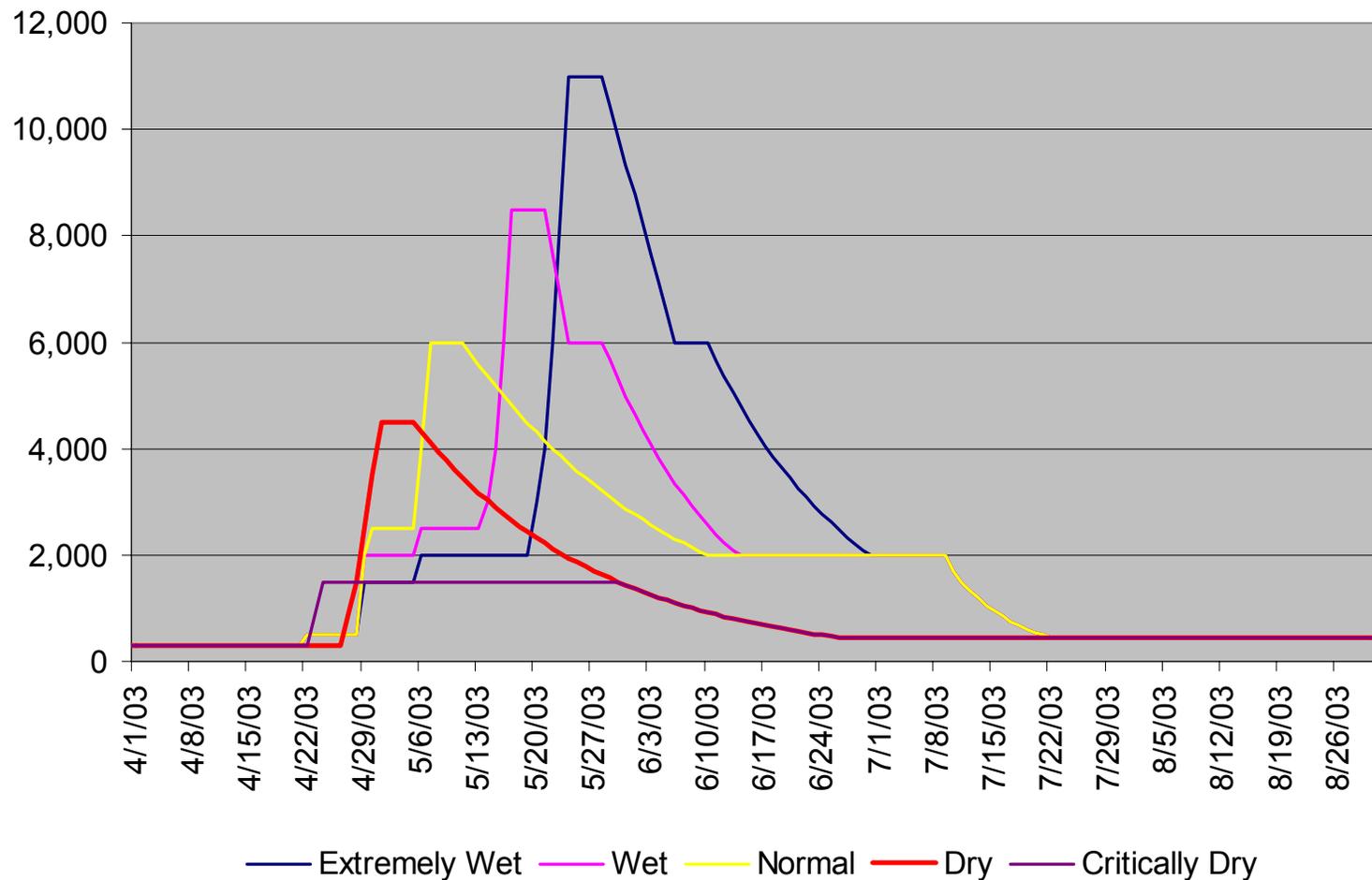


Dry Year Flow Schedule
and
Potential fall pulse flows

Water Year Type Hydrographs at Lewiston



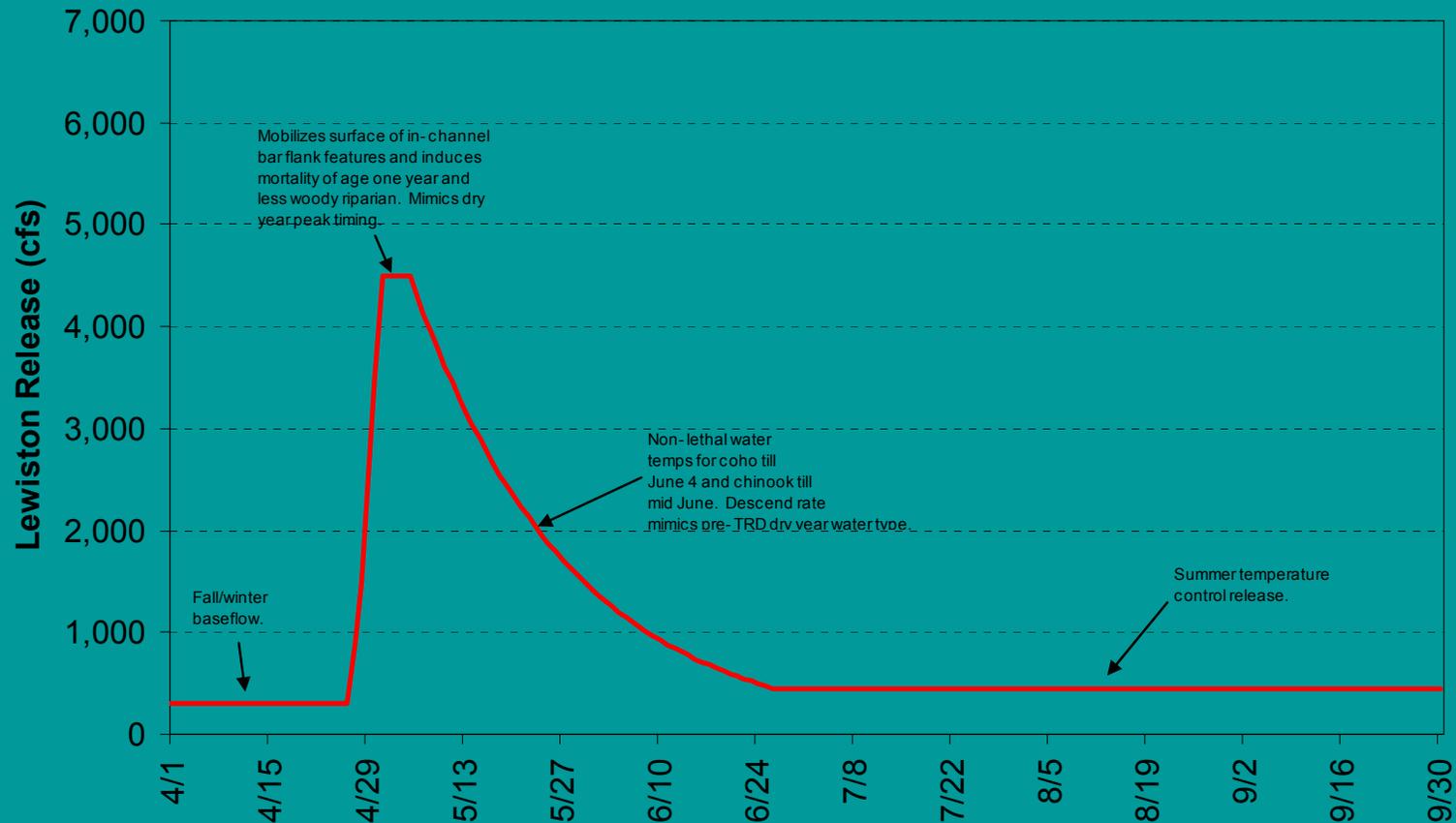
Water Year Type Probabilities

| Water Year Type | Probability of occurrence |
|------------------|---------------------------|
| • Extremely Wet | 0.12 |
| • Wet | 0.28 |
| • Normal | 0.20 |
| • Dry | 0.28 |
| • Critically Dry | 0.12 |

Dry Year Flow Geomorphic and Hydrologic Objectives

- Mobilize spawning gravels
- Transport sand
- Prevent riparian germination low on bar features
- Emulate the timing and duration of a spring snowmelt hydrograph of a dry year

2000 Record of Decision Dry Year Flow Schedule



Dry Year Flow Water Temperature Characteristics

- Suitable temperatures for holding adult spring chinook and spawning spring and fall chinook of $<60^{\circ}$ F from July 1 to September 14 at Douglas City and $<56^{\circ}$ F from October 1 to December 31 at the North Fork Trinity River Confluence
- Provides marginal water temperatures for anadromous salmonids throughout most of their outmigration by meeting temperature targets of $<62.6^{\circ}$ F prior to June 4 for coho salmon smolts, and $<68.0^{\circ}$ F to mid-June for chinook salmon smolts
- Facilitate early outmigration of smolts by allowing water temperatures to rise roughly in “synchrony” with dry-year lower tributary and Klamath River temperatures at Weitchpec

Averting another salmon die-off

- Judge Oliver Wanger requested of Interior potential solutions to reduce the risk of another adult fish die-off in the lower Klamath River
- The Judge was ruling on allocation of Trinity River water for 2003. Our solutions forwarded to him to prevent a die off had to be Trinity based

Assumptions

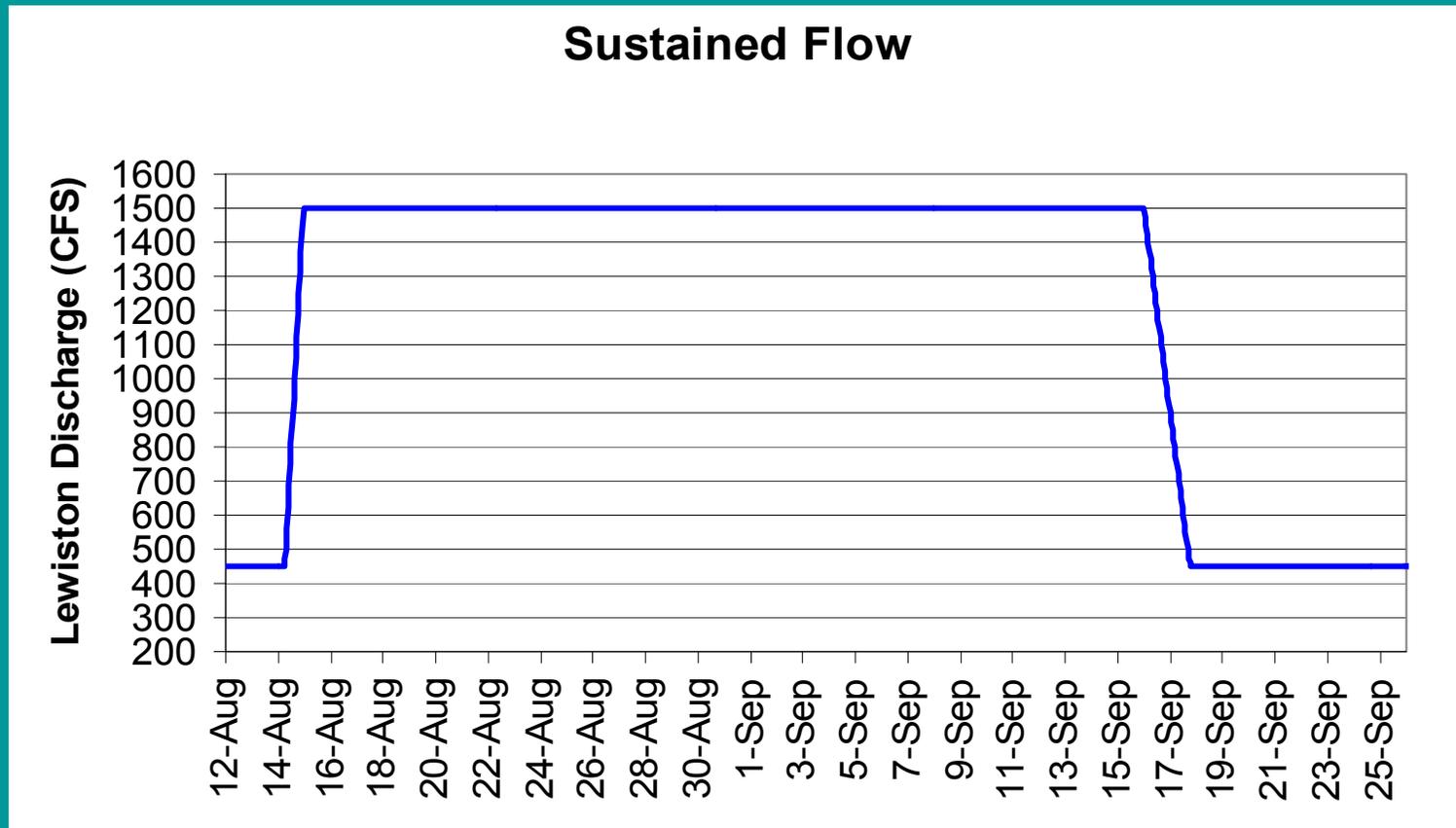
- The primary causes of death observed in the 2002 die off were epizootics of *Ichthyophthiris multifilis* (ICH) and *Flavobacter columnare* (columnaris)
- Late summer water temperatures near 20 to 21° C are experienced nearly every year in the lower Klamath River and are well within temperatures conducive to ICH and columnaris
- The spread of these pathogens can be exponentially accelerated under conditions of high fish densities
- Very high densities of adult salmon were observed last year in the period leading into the onset of the die off. In addition to a relatively large return of adults, there may have been some physical or behavioral migration barrier
- Fall chinook run size and Klamath hydrologic conditions are both preliminarily expected to be similar to last year

Approach

- Prevent high densities of adult salmon in the lower Klamath River by attempting to disperse and/or draw Trinity River fish out of the lower Klamath
- Critical period begins mid-August based on historical run timing of fall chinook salmon and the observation of high densities that preceded last year's die off
- Target period for flow related actions to end mid-September to avoid adverse impacts to early- spawning Trinity River spring chinook salmon
- We forwarded three scenarios, each attempting to cue migration of Trinity River fall chinook out of the lower Klamath River

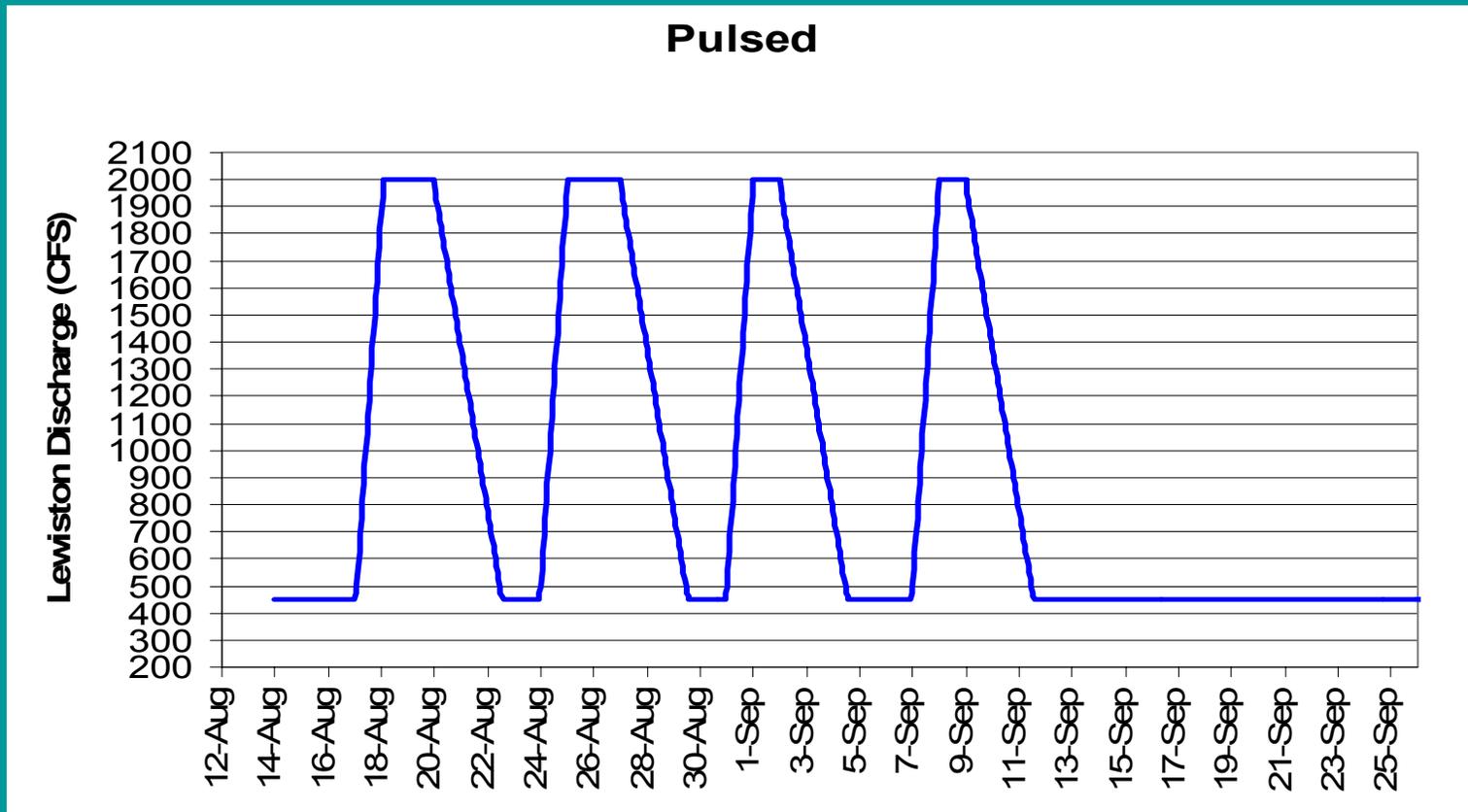
Scenario 1

Ramp Lewiston flows up to 1,500 cfs and sustain for one prolonged pulse over the entire target period of August 15 to September 15. Scenario forwarded would use 69,206 acre-feet



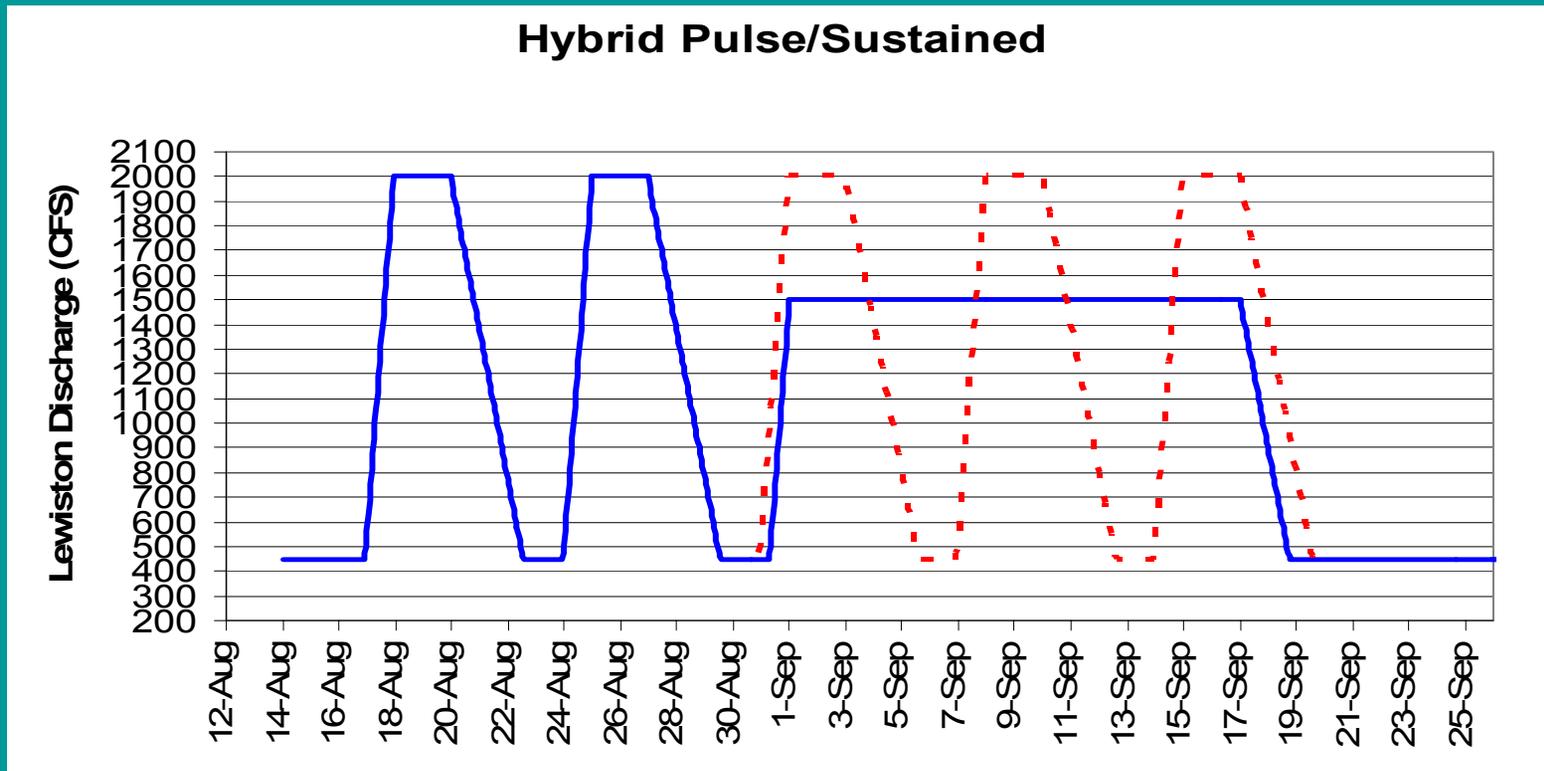
Scenario 2

Periodically pulse flows to 2,000 cfs to cue migration of immigrating fall chinook over the critical period. Scenario forwarded would use 39,857 acre-feet



Scenario 3

Adaptable combination of the first two scenarios. Start with short-term duration 2,000 cfs pulses and determine if effective at dispersing fish. If effective, continue to pulse through critical period. If not effective, change to prolonged 1,500 cfs. Scenario forwarded would use from 34,805 to 57,976 acre feet, depending on effectiveness of the initial pulses



Implementation

We envisioned formation of a technical group to assess the situation in late July.

- Base response on triggering criteria
 - Run size greater or equal to long term average triggers implementation
 - Evaluate river discharge – Projected discharge at Turwar Gage less than 3,000 cfs triggers implementation
 - Water temperatures in Late July/Early Aug greater than 19 ° C triggers implementation
 - If implementation triggered, the technical group would provide final review of relief strategies and coordinate to monitor the response of fish and environmental conditions

Order

- Judge Wanger ordered 50,000 acre-feet made available to the Trinity River during the mid-August to mid-September period contingent upon need for the water
- The Judge recognized that management in the Klamath basin might also address potential conditions conducive to risk of another die off and the 50,000 acre feet will only be made available from the Trinity if conditions warrant and are not addressed by management in the Klamath Basin
- Process for implementation of a relief action was not spelled out by the Judge