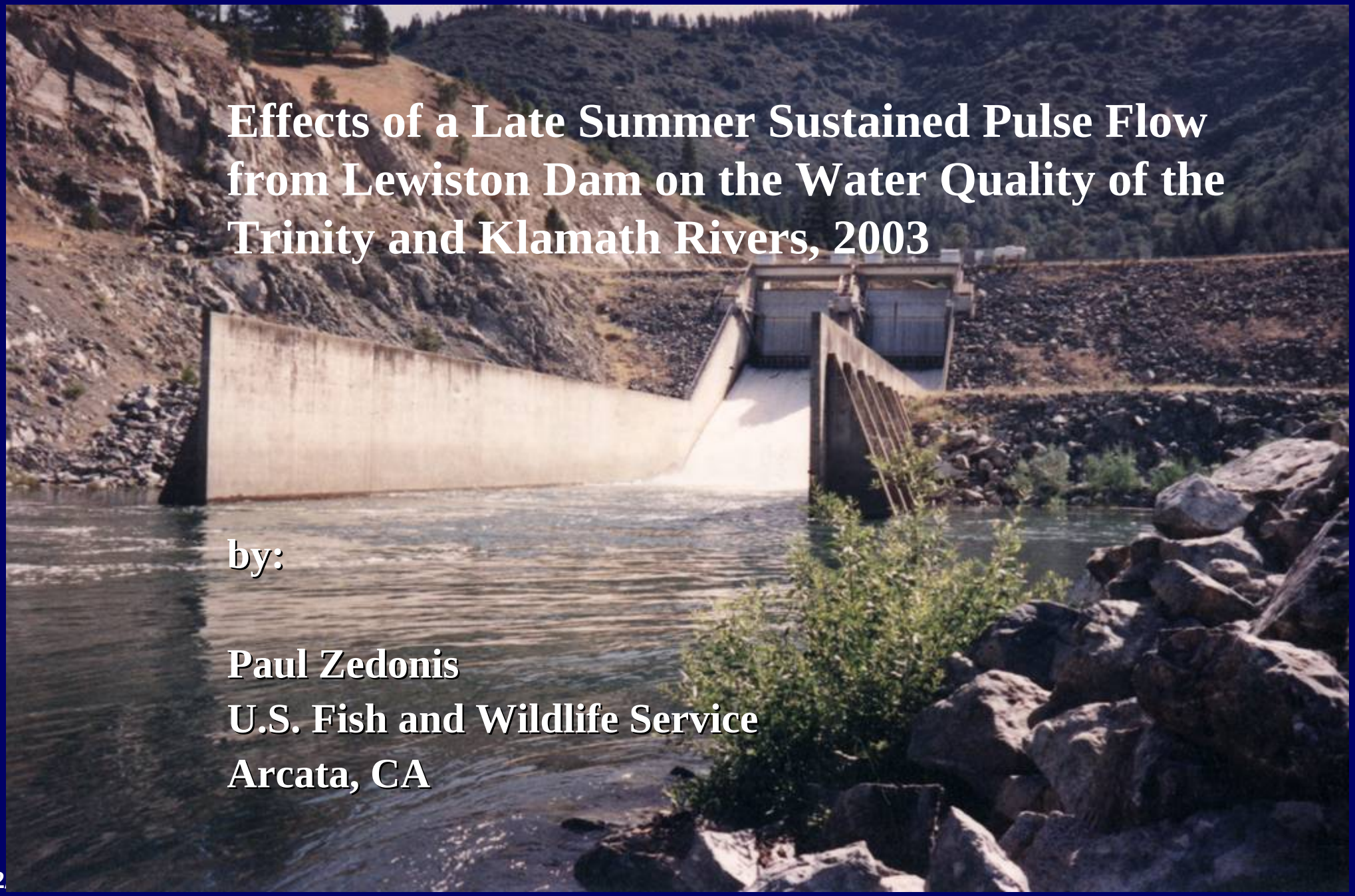

Effects of a Late Summer Sustained Pulse Flow from Lewiston Dam on the Water Quality of the Trinity and Klamath Rivers, 2003

by:

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Arcata, CA

Acknowledgements

- Trinity River Restoration Program
- Yurok Tribe Environmental Program

Presentation Outline

- Purpose
- WQ monitoring locations
- Hydrologic setting
- Pulse flow travel time
- Effects of high sustained flow from Lewiston Dam on downstream water temperatures

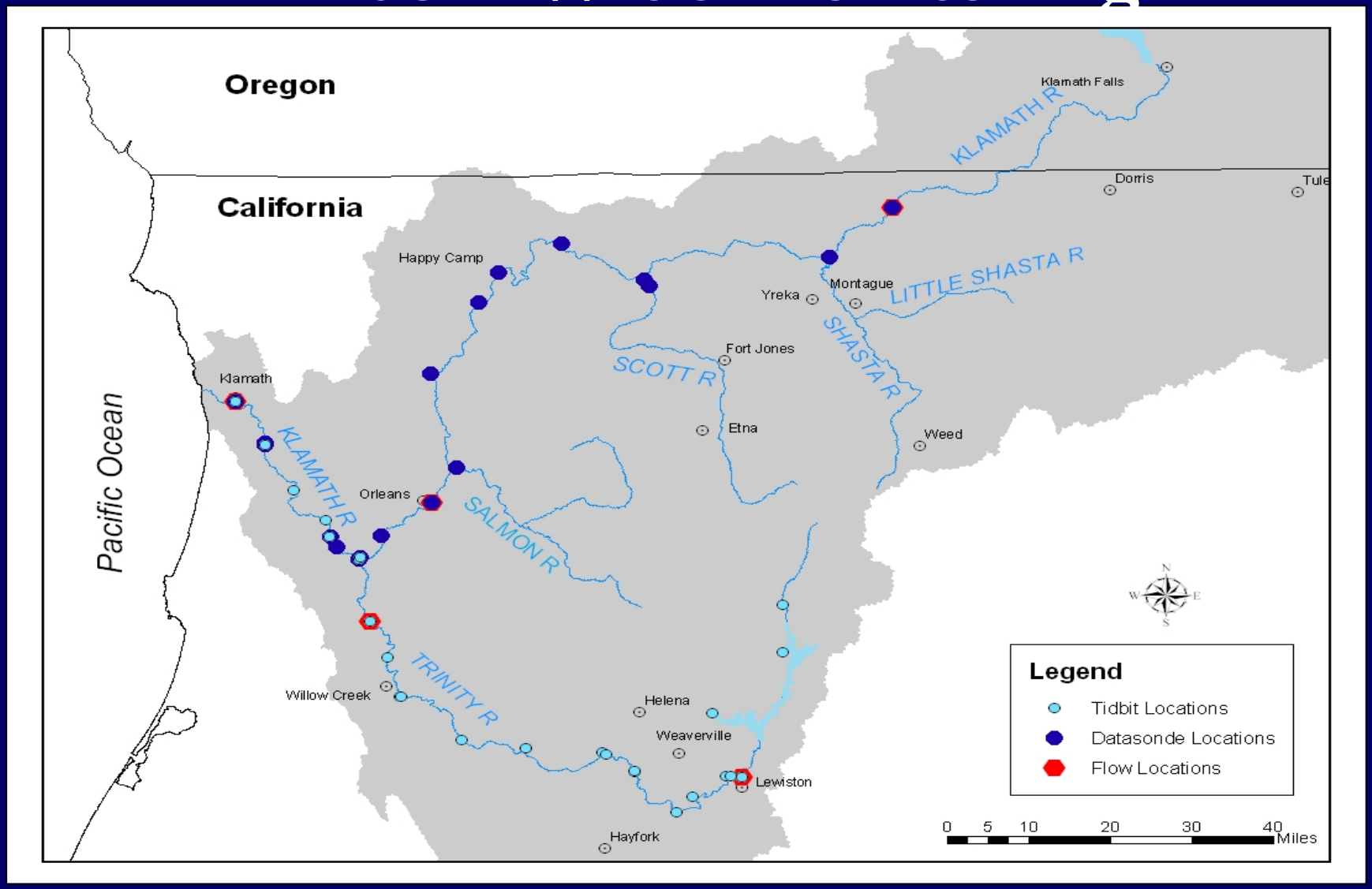
Pulse Flow Purpose:

- **Flow Purpose: Avert adult salmon die-off in the Lower Klamath River in 2003**

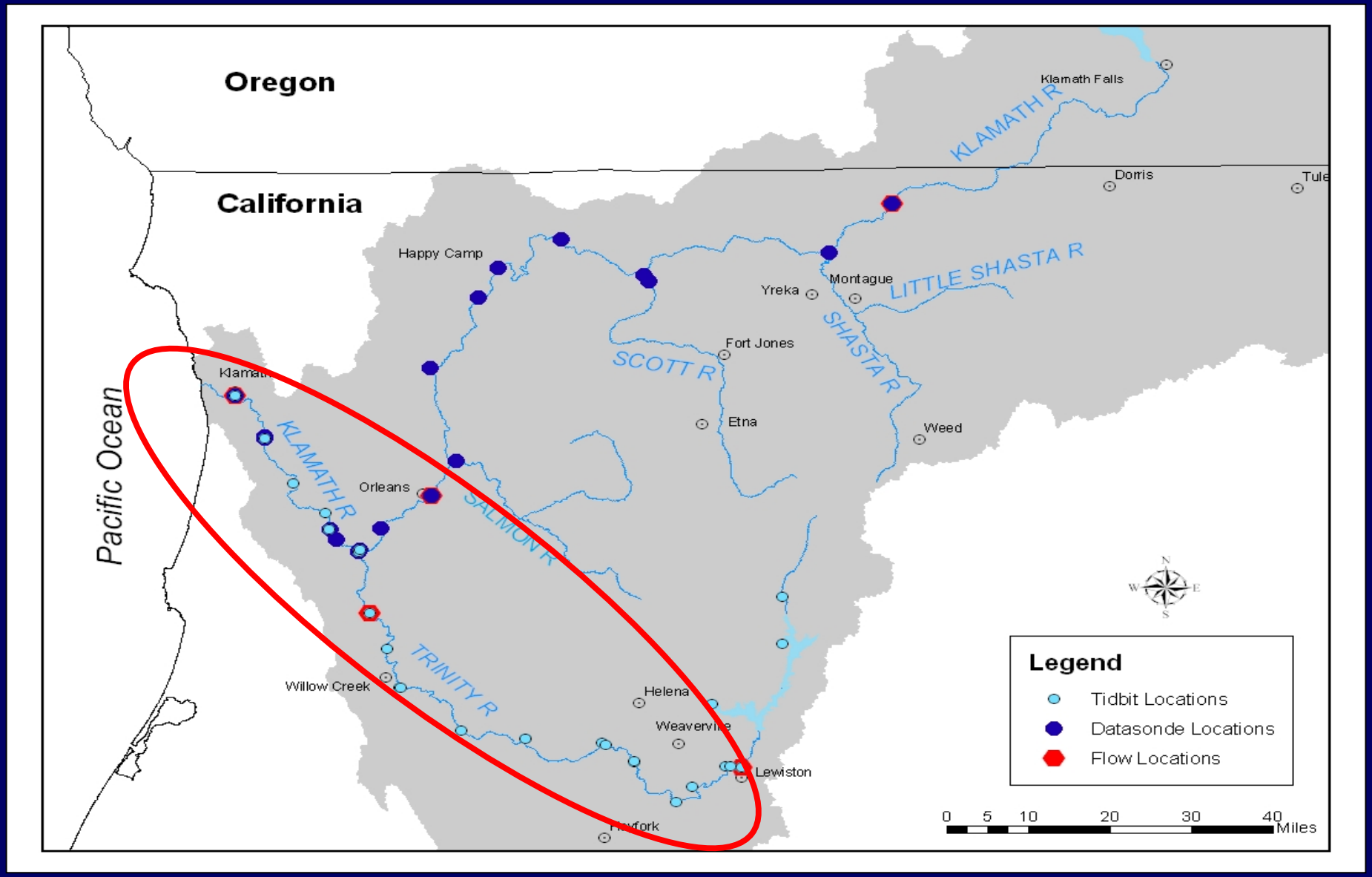
- **Hoopa Valley Tribe Ceremony (White Deerskin Dance)**

Study Purpose: Evaluate the effects of the pulse flow on water temperatures of the Trinity and Klamath Rivers

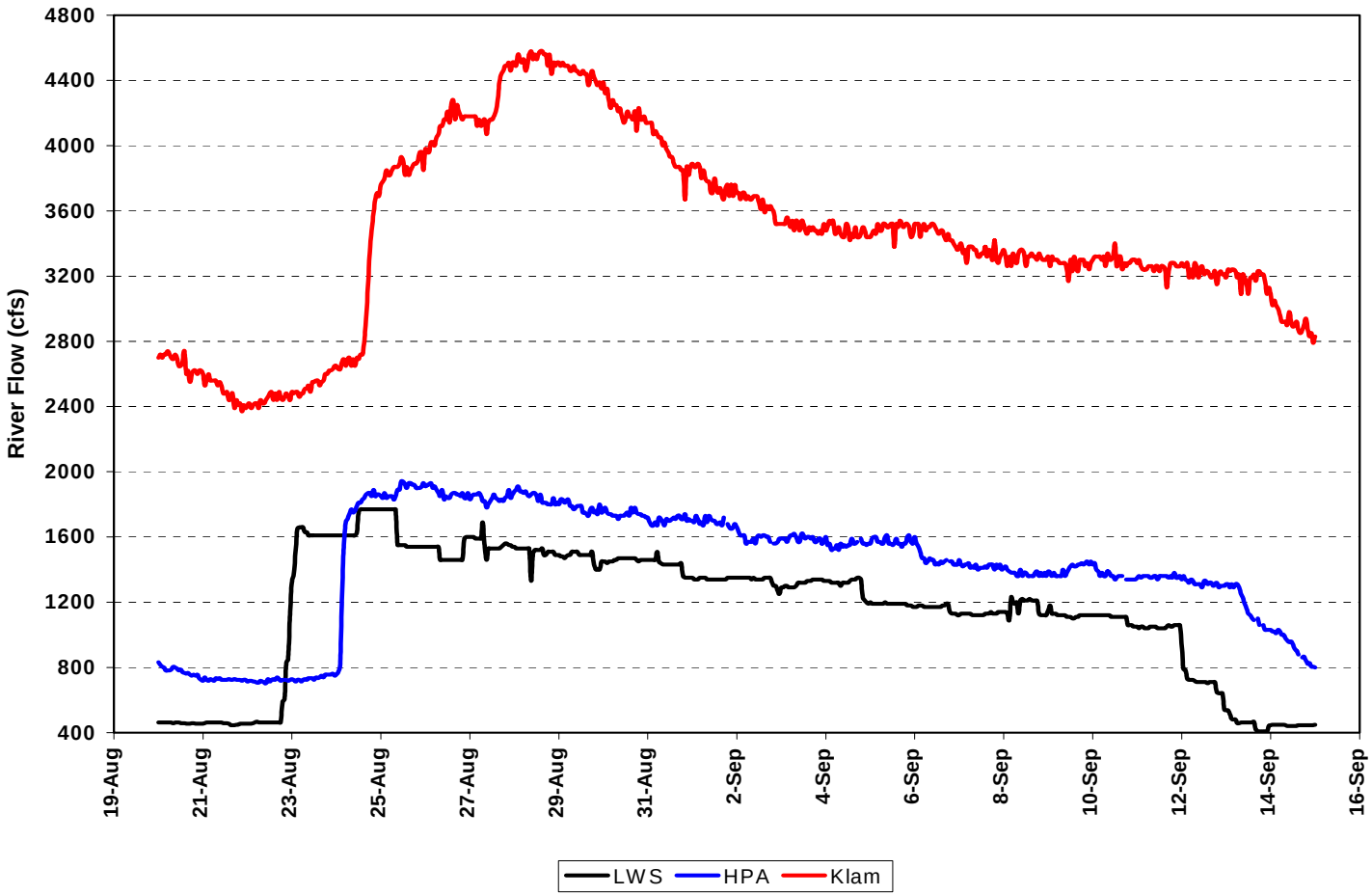
Basin Wide Monitoring



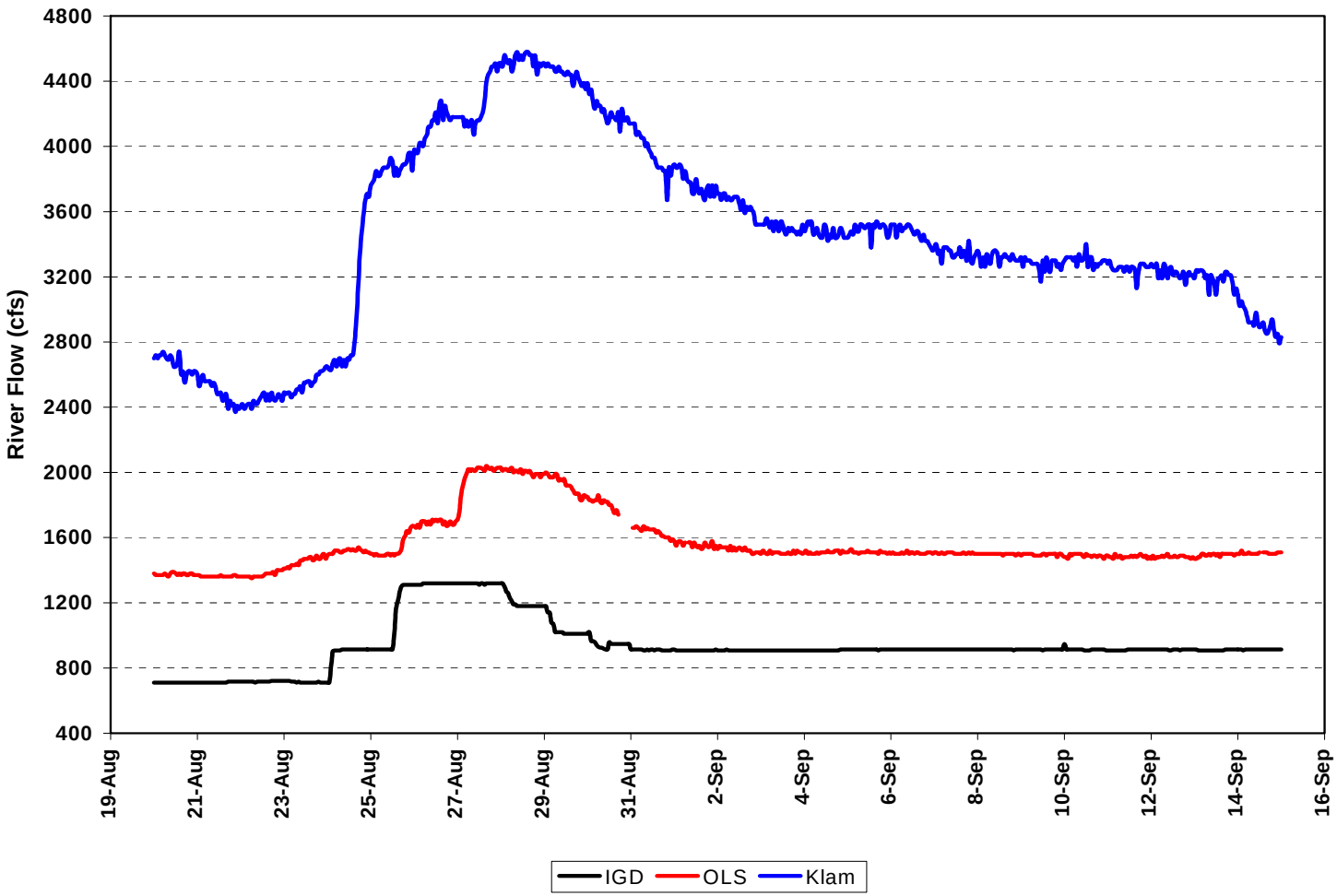
Focus Area


Oregon
California
Pacific Ocean
Klamath Falls
KLAMATH R
Dorris
Tule
Happy Camp
Montague
Yreka
LITTLE SHASTA R
SHASTA R
Fort Jones
SCOTT R
Etna
Weed
Klamath
KLAMATH R
Orleans
SALMON R
TRINITY R
Willow Creek
Helena
Weaverville
Lewiston
Legend
Tidbit Locations
Datasonde Locations
Flow Locations
0 5 10 20 30 40
Miles

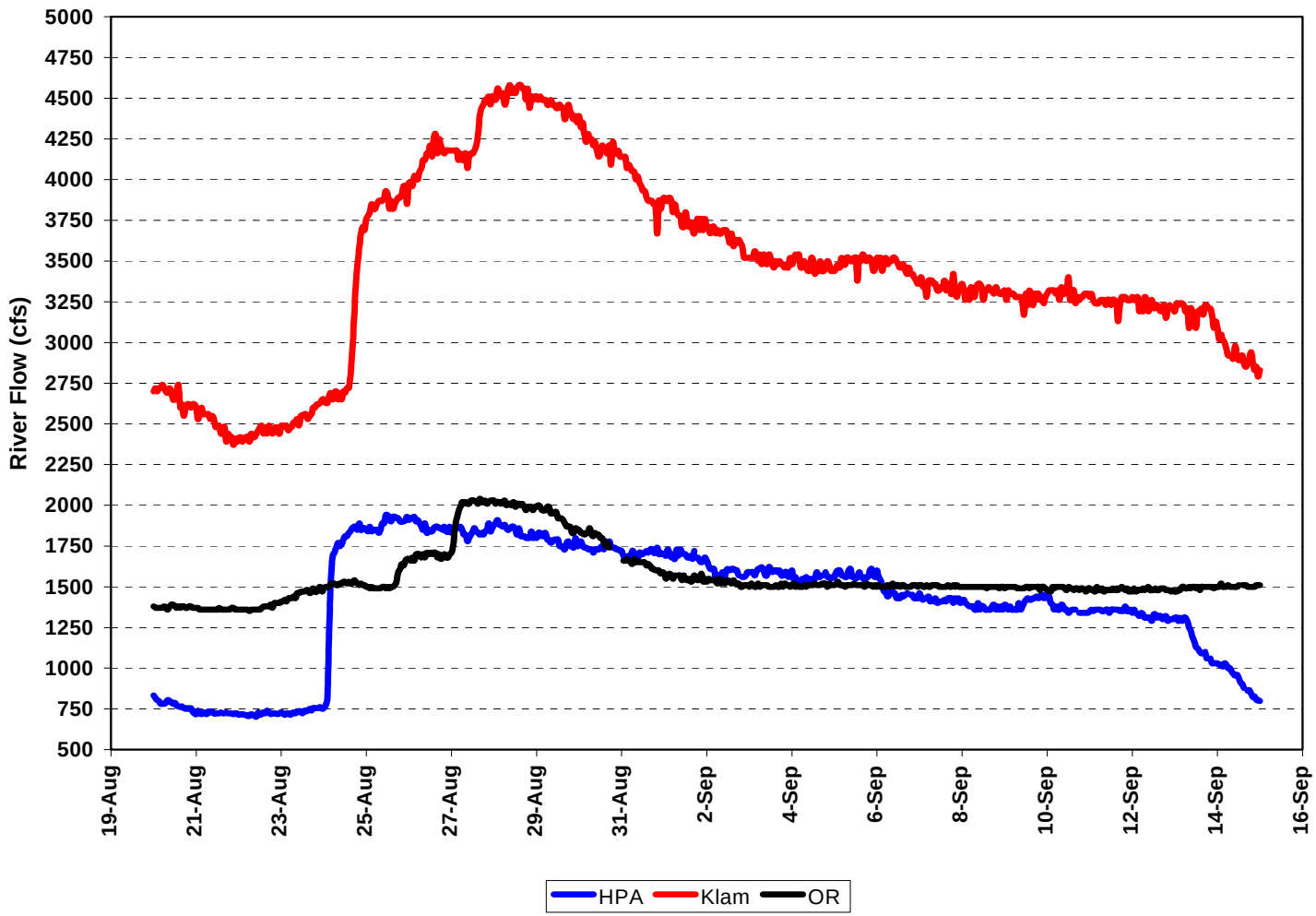
Hydrologic Setting Trinity River



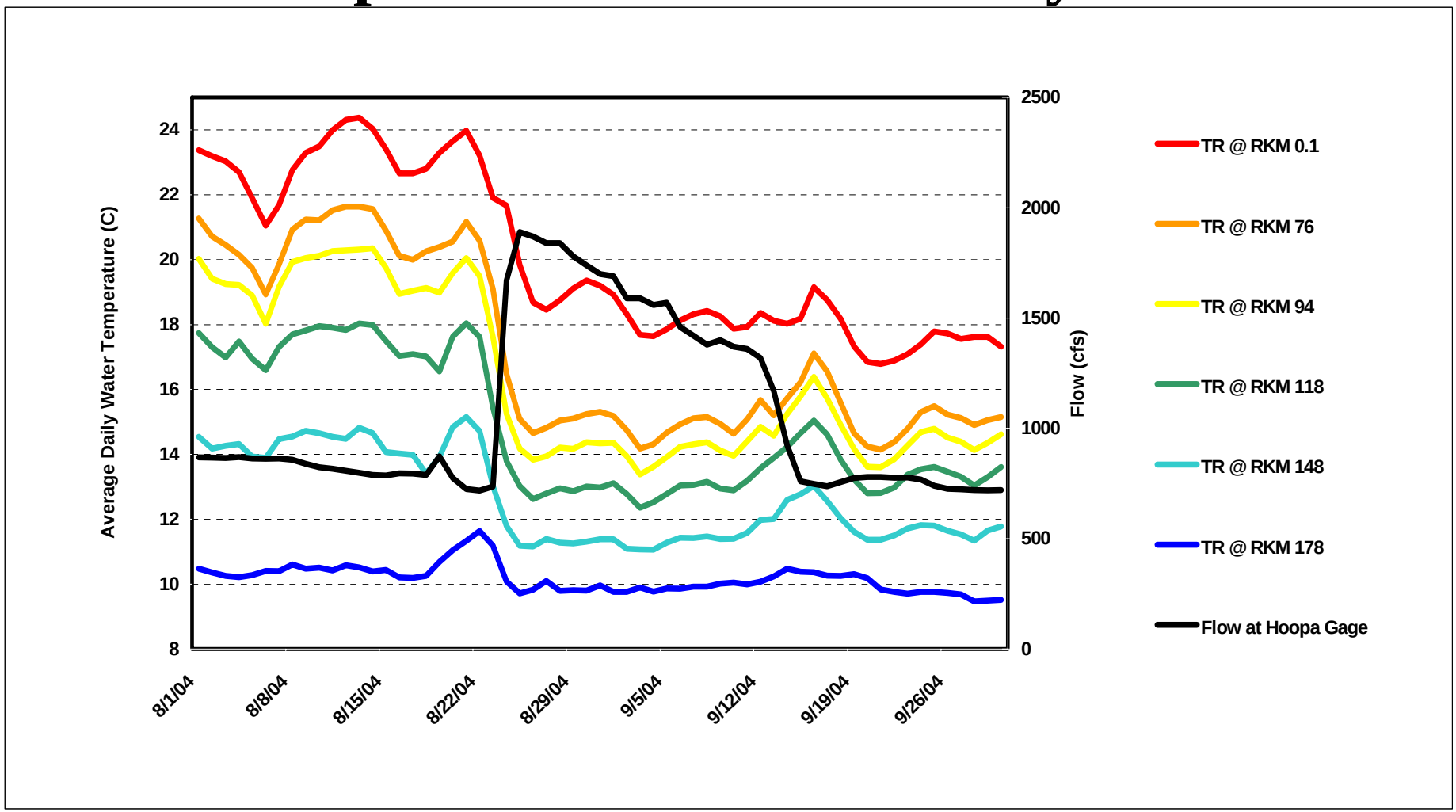
Hydrologic Setting Klamath River



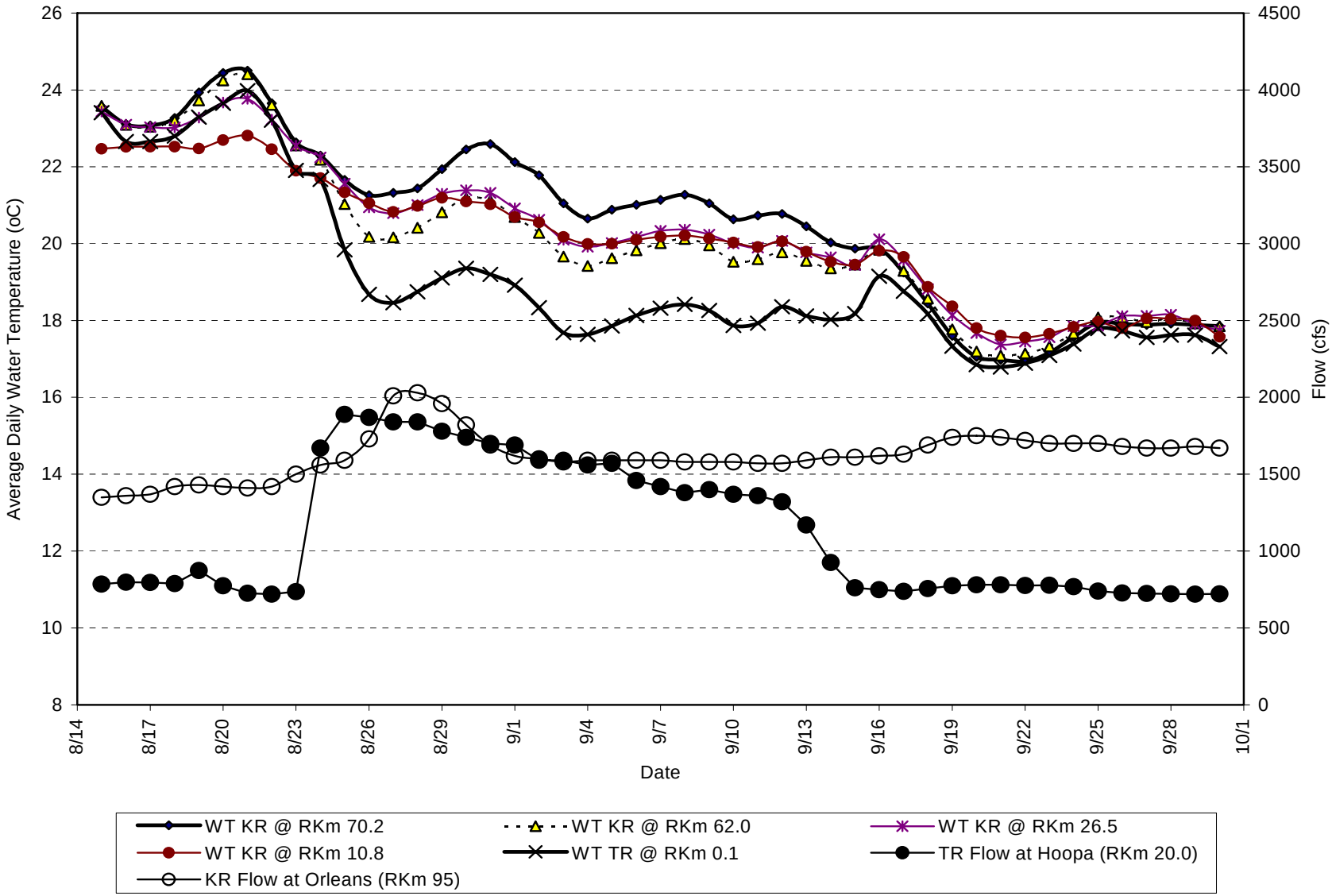
Hydrologic Setting TR-KR Confluence



Temperature Effects – Trinity River



Temperature Effects Below the Confluence



Summary

- The sustained pulse flow reduced water temperatures of the Trinity River and lower Klamath River.
  - TR Greatest temperature reduction ~ 3.5 °C, relative to the Klamath River
  - Average daily water temperatures of the Klamath River decreased by up to 1.5 °C and reduced to near 21.0 °C.
- 42 to 44 hours for the kinematic wave (of the peak release) to reach the Klamath gage
- ~ 48 hrs to significantly effect temperature of the Klamath River @ Weitchpec
- Short travel time, reduced flow contributions of warm water from tributaries, and coldwater releases (~10°C) from Lewiston Dam are primary factors responsible for the observed temperature effect
- Flow from Iron Gate probably lessened the influenced of the coldwater pulse of the Trinity River on the lower Klamath River (good or bad??)
- Purpose of the pulse appears to have been met (i.e. no adult mortalities observed in 2004).

Reports on 2002, 2003, 2004

Temperature Monitoring of the Trinity River are available at:

http://arcata.fws.gov/fisheries

Contact Information:

Trinity River Restoration Program

or

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707-822-7201

The End

HE FAR SIDE
By GARY LARSON
NORM'S SPAWNING SERVICE
"When you gotta get upstream in a hurry!"

Pulse Flow Travel Times

Gage Location	Gage Basin	Distance to the Pacific Ocean (River Kilometer)	Date and Time of Initial Flow Increase	Flow Estimate (cfs)	Cumulative Travel Time (hr) [a]	Date and Time of Peak Release	Flow Estimate (cfs)	Cumulative Travel Time (hr) [a]	Note
Trinity River Pulse Flow									
Lewiston	Trinity R.	248.7	8/22 @20:00	503	0	8/23 @6:00	1660	0	
Burnt Ranch	Trinity R.	148.7	8/23 @15:00	647	19	8/24 @0:00	1610	18	
Hoopa	Trinity R.	95.2	8/24 @2:00	821	30	8/24 @9:00	1850	27	
Klamath	Klamath R.	10.8	8/24 @14:00	2720	42	8/25 @2:00	3800	44	
Klamath River Pulse Flow									
Iron Gate Dam	Klamath R.	305.4	8/24 @1:00	710	0	8/24 @6:00	908	0	1st Step Increase
Orleans	Klamath R.	95.1	8/25 @16:00	1510	39	8/26 @1:00	1660	42	
Klamath	Klamath R.	10.8	8/26 @7:00	4070	54	8/26 @12:00	4210	53	
Iron Gate Dam	Klamath R.	305.4	8/25 @13:00	1010	0	8/25 @21:00	1310	0	2nd Step Increase
Orleans	Klamath R.	95.1	8/27 @0:00	1710	35	8/27 @8:00	2020	35	
Klamath	Klamath R.	10.8	8/27 @14:00	4210	49	8/27 @20:00	4490	47	

a- Travel time estimates are based on graphical interpretation of preliminary flow estimates at gages and do not represent times of temperature change