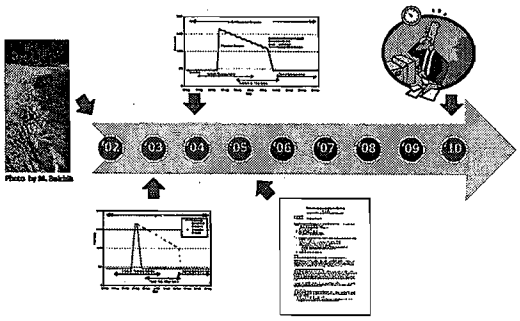
Klamath Flow Evaluation

TRINITY ADAPTIVE MANAGEMENT WORKING GROUP
September 13, 2010
Ernie Clarke
Trinity River Restoration Program

Presentation Outline

- Background.
- Recommendation.
- Work group products.
- Next steps.

Background (1/3)



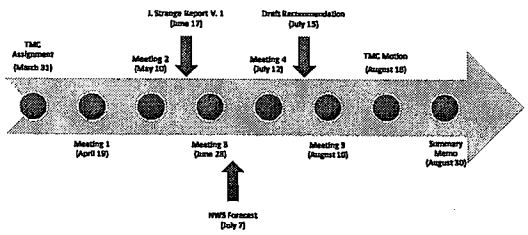
Background (2/3)

TMC 2010 Assignment

- Compile available information.
- Review triggers established previously and determine if they were beneficial.
- Develop forecast for the lower Klamath and determine if triggers are likely to be met.
- If so, what would alleviate the problem?
- If so, would it be helpful to release additional Trinity water?
- If so, how?

Background (3/3)

2010 Activities



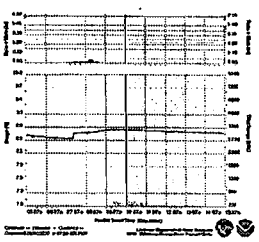
Recommendations (1/3)

General

- Proactive and emergency releases suggested.
- Discharge triggers associated with USGS Site #11530500.
- Period of concern coincides with the migration season for fall Chinook salmon.
- Water source is considered unimportant for successfully preventing an Ich outbreak.

Recommendations (2/3)
Proactive Release

- GOAL: Reduce the likelihood of a large scale fish die-off by impeding the infectivity and spread of Ich.
- IF flows are below 2,500 cfs in the lower Klamath during the migration season THEN release water to increase base flows to at least 2,500 cfs.



Recommendations (3/3)
Emergency release

- GOAL: Decrease the severity of a fish die-off if real-time monitoring indicates a rapid spread of the incidence of Ich.
- IF there are multiple severe confirmed Ich infections THEN immediately release water to double pre-existing base flows in the lower Klamath. Double flows will be maintained for seven days.

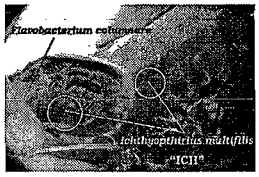
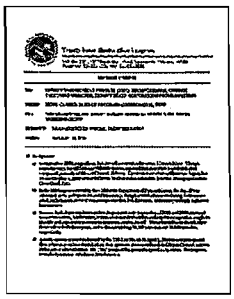


Photo by M. Belchik

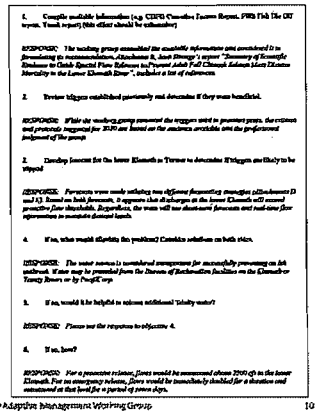
Work Group Products (1/6)



- Summary memo
- Att. A Response to TMC objectives
- Att. B 2010 participants
- Att. C Josh Strange's report "Summary of Scientific Evidence to Guide Special Flow Releases to Reduce the Risk of Adult Fall Chinook Salmon Mass Disease Mortality in the Lower Klamath River".
- Att. D Joe Polos' memorandum "Summary of Klamath Fall Chinook salmon runs and fall flows in the lower Klamath River, 1978-2009".
- Att. E – Eric Peterson's report "Forecasting flows on the lower Klamath River in late summer with empirical models".
- Att. F - Instructions for the National Weather Service discharge forecast tool.
- Att. G - Meeting summaries

Response to TMC objectives

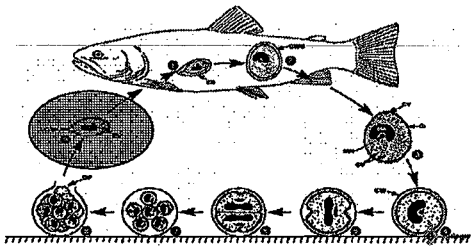
Product 2/6



Attachment A

Summary of Scientific Evidence to Guide Special Flow Releases to Reduce the Risk of Adult Fall Chinook Salmon Mass Disease Mortality in the Lower Klamath River

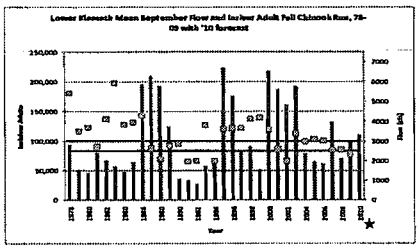
Product 3/6



Attachment C

Summary of Klamath Fall Chinook salmon runs and fall flows in the lower Klamath River, 1978-2009

Product 4/6



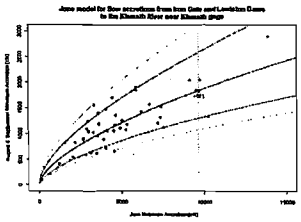
Attachment D

Regression-based Forecast

Products 5/6

- Forecast of late-summer minimum flow
- Based upon minimum flow in prior months at same gage
- Models available utilizing any of months April – August
  - Use of later months increases accuracy
- Model build with data from 47 years (1961-1995, 1998-2009)
- Use of other gages and snow data tested, but found less effective

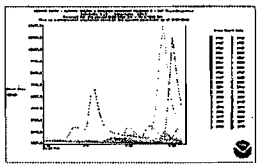
Attachment E

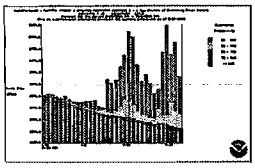


Model	Forecast	Prediction Interval (0.8)	
		Lower	Upper
April	1399 (2849)	985 (2418)	1989 (3439)
May	1407 (2857)	948 (2208)	2094 (3544)
June	1843 (3293)	1309 (2759)	2596 (4046)
July	NA	NA	NA
August	NA	NA	NA

National Weather Service Forecast

Products 6/6

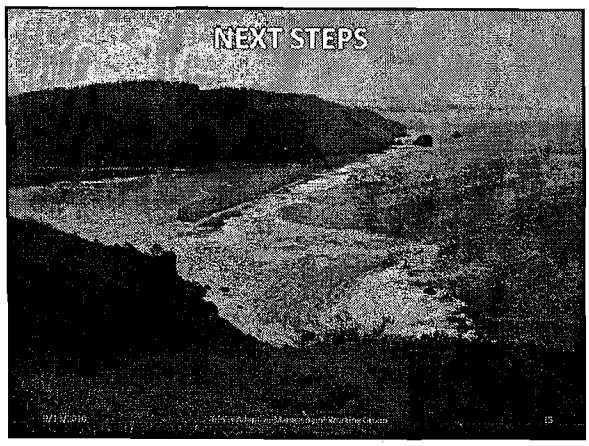




- Ensemble System utilizes today's conditions along with historical data to generate possible future discharges.
- Example run on 8-30-10. Starting with the model states (soil moisture, snowpack, etc.), the trace for year 1961 represents the model simulation using the precipitation and temperature that occurred during 1961.
- Repeated for every year of historical calibration (61–98).

- Traces can be used to develop a probability distribution.
- Using this distribution you can answer risk-based questions.
- For example, what discharge has 90% chance of being exceeded throughout this period?

Attachment F


NEXT STEPS

Contributors

Buford Holt, Don Reck, Eric Wiseman, Ernie Clarke, George Kautsky, Joe Polos, Josh Strange, Keith Schultz, Larry Hanson, Mike Belchik, Mike Berry, Mike Orcutt, Nina Hemphill, Robert Franklin, Scott Foott, Seth Naman, Thomas Weseloh, Tim Hayden

Questions?

Point of Contact

Ernie Clarke

Trinity River Restoration Program

Phone: 530-623-1815

Email: ernest_clarke@fws.gov