

Title: Trinity River Integrated Predictive Modeling Placeholder for 2012

Objective: Initiate integrated use of individual predictive models such as 2-d hydraulic modeling and SALMOD to: 1. evaluate rehabilitation site designs beforehand, as-built implementation, and follow-up ecological succession at sites as flows work the surfaces and revegetation occurs; 2. provide comparable quantitative predictions of fish production and growth response to flow (and concomitant water temperature) schedule alternatives; and 3. compare response to temperature predictions based on water year type and climate possibilities (see Section 3.3.2 of the IAP version 1.0). These predictions should be tested on an annual basis and against historical long-term data to improve our understanding of how fish respond to flows, temperatures and rehabilitation actions. These models can help understand and communicate links between physical habitat and biological responses and which management actions would have the strongest benefits and best improve Program outcomes.

The goal of this project is to demonstrate the uses of a combination of 2-dimensional hydraulic models, reservoir and river water temperature models, {PHABSIM} species-specific habitat models, and {SALMOD} young-of-year outmigrant production models integrated into a {SmartRiver GIS} decision support system to predict effects of flows, river water temperature and habitat availability on growth and survival of juvenile salmonids.

Specific objectives are to:

1. Implement the 2011 Workshop methodologies and goals.
2. Use ongoing collected fish and habitat data to improve predictions from a fry/pre-smolt production model and then explore the consequences of different escapement levels and flow and habitat scenarios on survival and growth. Examine the linkages among habitat-flow relationships, temperature, fish growth, fish movement and fish production.
3. Demonstrate how models can be used to quantify interim habitat targets identified in the TRFE.
4. Suggest specific changes to flow regime, temperature regime or habitat availability that could (as short-term adaptive management experiments) get us closer to our production objectives.

Project Scope: Final scope to be developed at Workshop

Technical Approach: A combination of methodologies (perhaps based on the IAP version 1.0) will be used. Finalization of the technical approach will be made during the 2011 Workshop.

Schedule: 2012

Organization / Responsibilities: To be determined after Workshop planned for June 2011.

Deliverables / Tasks: We envision that the Trinity River integrated predictive models developed will demonstrate the usefulness of this approach to: 1. evaluate rehabilitation designs at the stages of pre-implementation, post-implementation and post-implementation with revegetation and channel changes; 2. quantify predictions of fish production and growth response to flow schedule alternatives; and 3. drive future data collection, analysis and assessments of the interactive effect of habitat, flow and temperature on salmonid growth and production.

Budget for placeholder: \$100,000

Title. Trinity River Integrated Predictive Modeling Capability Development

Scope.

- Clearly define methods by which Trinity River Integrated Predictive Modeling will be developed.
 - The product will be detailed methodologies required for developing a combination of 2-dimensional hydraulic models, reservoir and river water temperature models, {PHABSIM} species-specific habitat models, and {SALMOD} young-of-year outmigrant production models and integrating into a {SmartRiver GIS} decision support system to predict effects of flows, river water temperature and habitat availability on growth and survival of juvenile salmonids.
- Clearly define expectations from and uses of Trinity River Integrated Predictive Modeling tools
 - The product will detail the applications of Trinity River Integrated Predictive and its uses for flow scheduling, designs and any other potential uses

Need.

- Trinity River Integrated Predictive Modeling will assist the Program in making decisions.
 - The predictive modeling will generate predictions about the effects of temperature modulation, flow modifications, and proposed designs on salmonid growth, survival, and habitat use. These predictions can be tested against field observations. Through an iterative process we can evaluate our understanding of principle drivers in the ecosystem for juvenile salmonids.¹ Results of these tests of predictive models will then be used to guide restoration and management strategies to improve the productivity of naturally spawning coho salmon.

Participants.

- Who are the collaborators? Provide a bulleted list of individuals and their organizations.
 - Tom Shaw (USFWS)
 - Nina Hemphill (TRRP)
 - Sam Williamson (USGS)
 - Thom Hardy (Texas State University)

Deliverables.

- What product(s) will be provided when?
 - Straw proposal and revisions presented at Technical meetings
 - Final Proposal including methodologies and expected uses delivered by October 1, 2011 to the individuals below.
- To whom?
 - Ernest Clarke, Science Coordinator

Time and Cost Estimate.

- How much staff time is estimated to complete the task? Include an estimate for each participant.
 - Nina Hemphill (TRRP) (40) hours
 - Tom Shaw (USFS) (40 hours)
 - Sam Williamson (USGS) (60 hours)
 - Thom Hardy (Texas)(60 hours)
 - Others? (40) hours

Is additional funding required?

- Not at this time

