

A FRAMEWORK FOR COMPARING ACTIONS AFFECTING FISH

**Integrated fish management as a guiding
concept for prioritizing science and policy
decisions in the Delta.**

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FOCUS

- **Fit**
- **Prioritizing actions**
- **Collaborating**
- **Science**
 - **Factors affecting survival**
 - **Actions to make more fish**
 - **Benefits for fish**
 - **Uncertainties**
- **Policy Decisions**
 - **Cost effectiveness of options; leverage**
 - **Other concerns**
- **What do you think?**

SDFFF FIT

- Screening options
- Salmon and delta smelt

PRIORITIZING

- **Actions benefiting fish**
- **Cost-effectiveness, i.e., leverage**
 - **Present value**
 - **Capital, O&M, and interest costs**
 - **Potential long-term returns**
- **Uncertainties to address**

COLLABORATION: WHO IS CUWA?

- **California Urban Water Agencies**
- **Water for 2/3 of California's population**
- **10 members**
 - **In central and southern California**
 - **Board of Directors**
 - **Executive Director**
 - **Project Advisory Committees**
- **Re-engaging on fish issues**

APPROACH

- **Agencies participate and lead**
 - **CDFG**
 - **NMFS**
 - **USFWS**
 - **CALFED**
- **R2/Cramer provides technical support**
- **CUWA funding**
- **Seek additional support and input**

GUIDELINES FOR THE PILOT

- Collaborate, within a budget
- Seek expert advise and peer review
- Substantiated evidence of relationships
 - Consistent with theory and data
 - Relate to effects of proposed actions
- Factors likely to cause large effects
- Factors we can do something about
- Build on an established analytical basis
- Quantitative life-cycle model

STEPS

GOAL: Develop an Integrated Modeling Framework for Central Valley Winter Run Chinook Salmon

Step 1.0

Develop shared conceptual modeling framework

Step 2.0

Construct a quantitative modeling framework with involvement by key end users

Step 3.0

Run simulations to evaluate the relationship of model outputs to inputs

PILOT SCHEDULE

- June '03 Pilot work plan
- July '03 Conceptual framework
- Jan. '04 Quantitative framework
- April '04 Simulations for evaluation
- May '04 Recommendations

COLLABORATING

- **With scientists with specific expertise**
- **Meetings, telecom's, etc.**
- **June Ops & Science Symposium**
- **July 15-16 EWA salmon workshop**
- **Draft report by July 30**
- **August 18-19 EWA smelt workshop**

MEASURES OF FISH BENEFITS

- Salmon spawner escapement
- Juvenile salmon outflow from the Delta
- Delta smelt juveniles or adults

POTENTIAL FRAMEWORK

- Model part or all of life history
- Quantify factors affecting survival
- Quantify effects on fish abundance
 - Actions
 - Unmanageable factors
- Costs & other policy concerns
- Address uncertainties with best science

POTENTIAL FRAMEWORK

Life stage & location	Factors & effects on survival	Changes in fish abundance due to actions and unmanageable factors	Costs & other policy concerns	Uncertainties to address
	Spawning area eggs, hatching and rearing	Useable habitat Flow patterns Entrainment Contaminants Competition		
	River travel to the Delta	Predation Disease/parasites Food supply		
	Movement thru the Delta	“ Indirects		
	Rearing beyond the Delta	Temperatures Harvest		
	Upstream migration & spawning	Flow patterns Barriers and delays Harvest Etc.		

SAMPLE FISH FRAMEWORK – SCIENCE SIDE

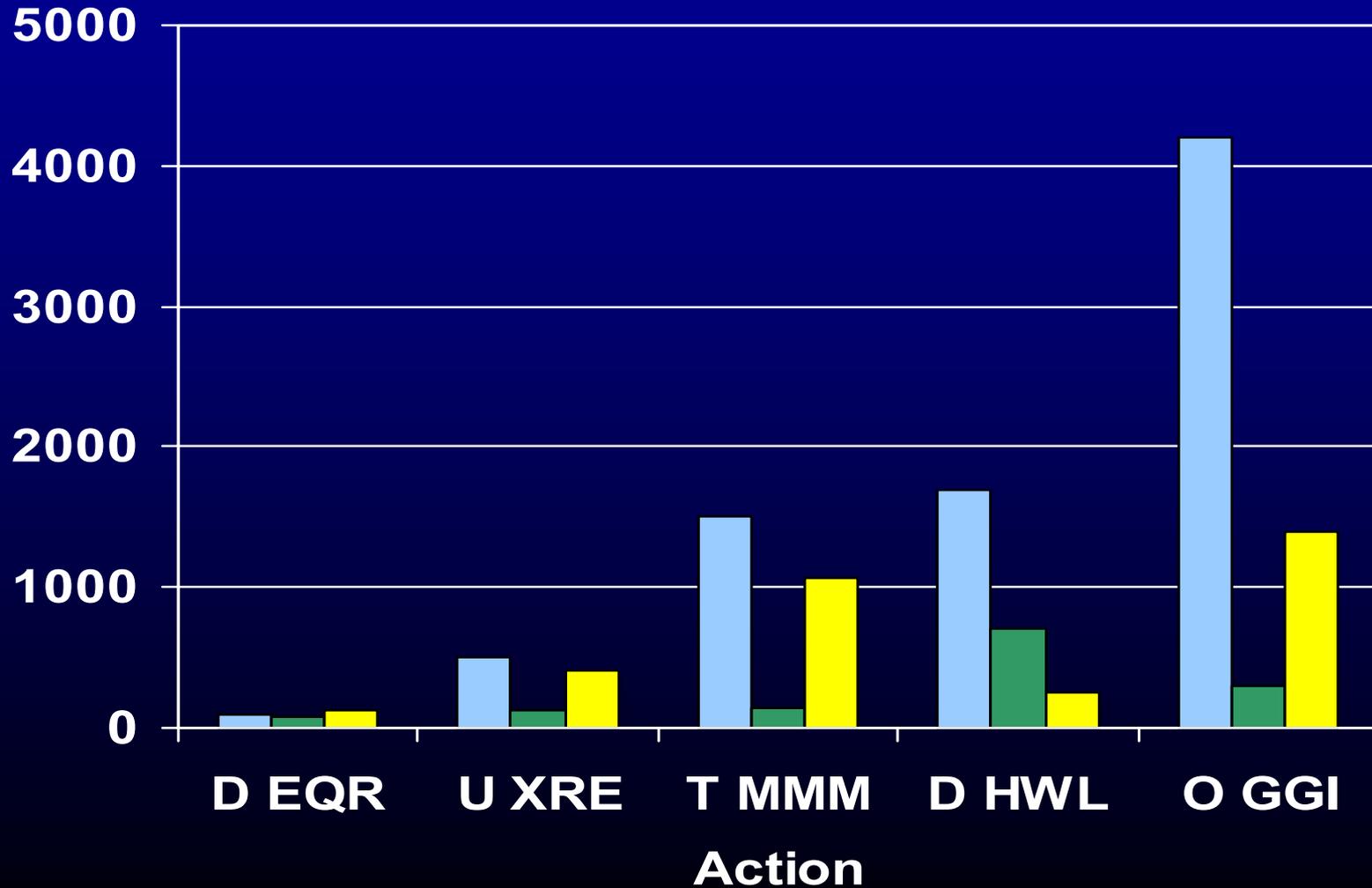
Life Stage	Location	Survival factor	One of many potential actions	Fish benefits	Uncertainties
Spawner	Upstream	Spawning area	Restore Battle Creek	A = ... C = ...	Area
Embryos	Upstream	Flow fluctuations	Non-stranding flow regimes	A = ... C = ...	Minimal flows
Fry	Rivers	Water temperature	Raise Shasta	A = ... C = ...	When needed
Smolt	Delta	Entrainment	Re-plumb Clifton Court	A = ... C = ...	Population effect
Ocean rearing	Ocean	Harvest	Adjust regulations	A = ... C = ...	Sampling
Returning adult	Delta, rivers	Barriers	Modify RBDD or DCC	A = ... C = ...	Baseline passage

SAMPLE FISH FRAMEWORK – POLICY SIDE

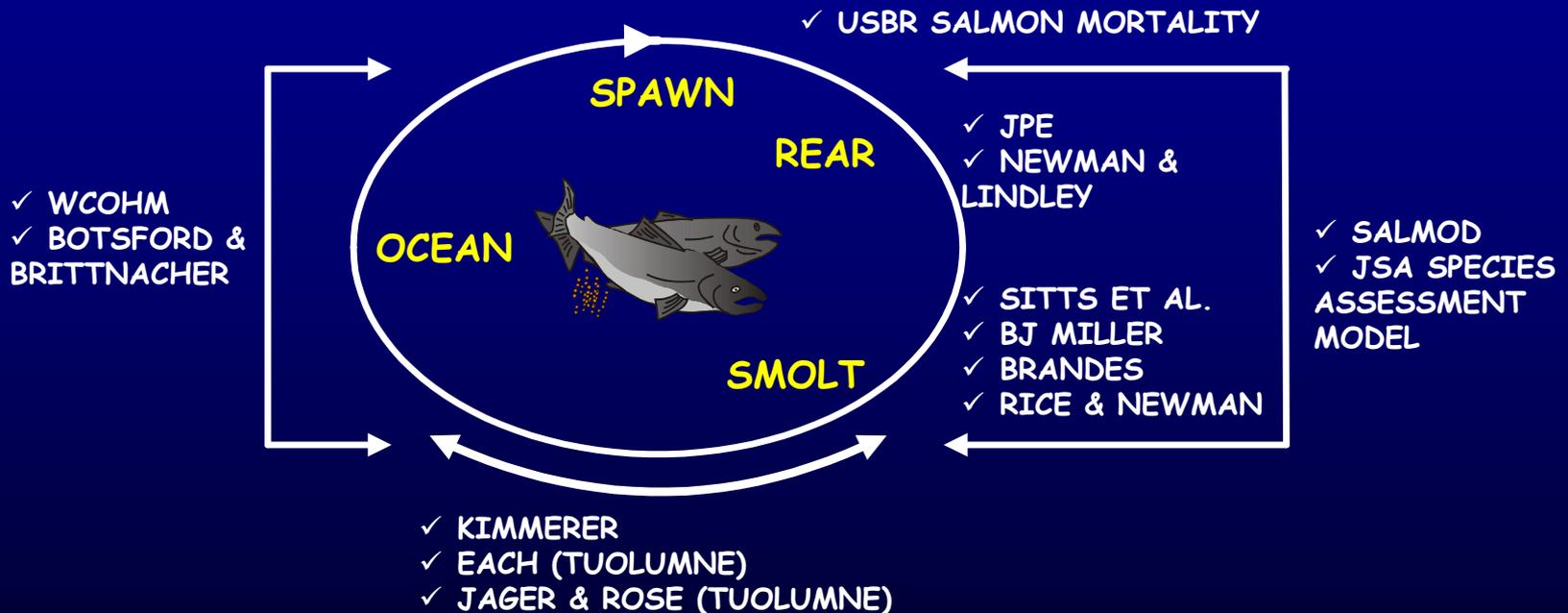
One of many potential actions	Fish benefit	Cost (NPV)	Cost effectiveness	Feasibility	Other concerns
Restore Battle Creek	A = ... C = ...	\$	F/\$	tbd	?
Non-stranding flow regimes	A = ... C = ...	\$	F/\$	tbd	?
Raise Shasta	A = ... C = ...	\$	F/\$	tbd	?
Re-plumb Clifton Court	A = ... C = ...	\$	F/\$	tbd	?
Adjust regulations	A = ... C = ...	\$	F/\$	tbd	?
Modify RBDD or DCC	A = ... C = ...	\$	F/\$	tbd	?

HYPOTHETICAL COMPARISON

■ Fish gain ■ Cost ■ 100 Fish/Cost



CV CHINOOK MODELING



WINTER-RUN REMEDIES

- **Control Water Temperature**
- **Optimize Sacramento River Flow**
- **Improve Juvenile & Adult Passage at RBDD**
- **Screen Diversions**
- **Supplement with Hatchery Rearing**
- **Limit Export Pumping**
- **Schedule Delta Cross Channel Use**
- **Restrict Harvest in Ocean & River**
- **Reduce Contamination from Iron Mt Mine**
- **Re-establish Run in Battle Creek**

THE ROAD TO RECOVERY

1. **START:** How is population functioning now?
2. **MAP:** How do we improve on what we have?
3. **PILOTED VEHICLE:** Mechanism to accomplish fix, but capable of adjusting course.



COMMENTS FROM THE CALFED SCIENCE EVENTS

- Move on from conceptual models
- Model life cycles in steps
- Don't impinge on science debate
- More concerned with fish than costs

WHAT DO YOU THINK?

- Collaborating?
- Bridging actions and benefits quantitatively?
- Improving the framework?
- Pertinent admonitions for the optimistic?

CUWA MISSION

Mission:

Provide a forum for combining the expertise and resources of its member agencies to study and promote the need for a reliable, high-quality water supply for the state's current and future urban water users.

NEAR-TERM DECISIONS AFFECTING FISH

- **Biological Opinions, incl. OCAP**
- **South Delta Improvements**
- **Expanded Banks Pumping**
- **CVP Intertie**
- **EWA long-term**
- **Red Bluff Diversion Dam**

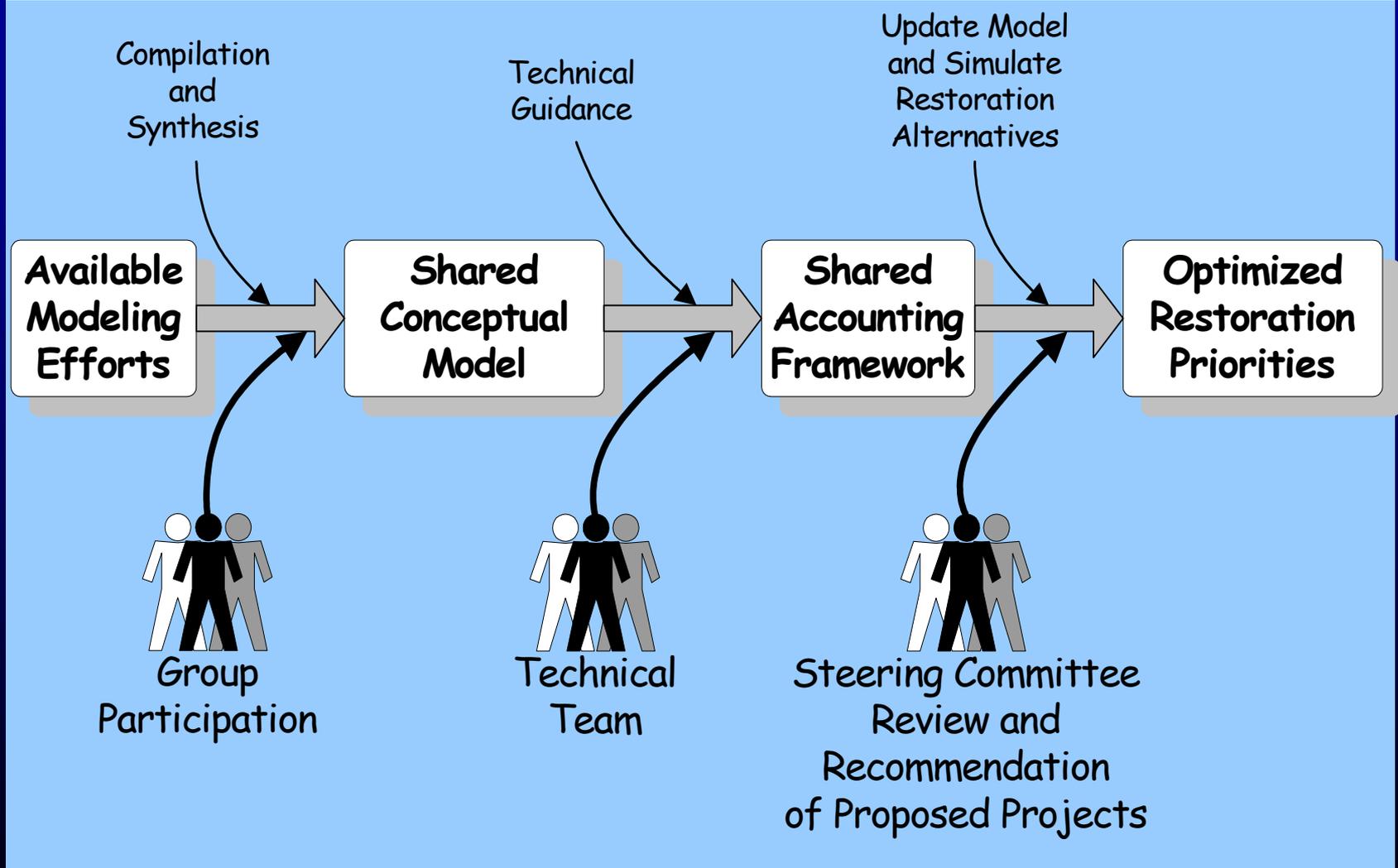
OTHER ACTIONS AFFECTING FISH

- Increase upstream storage
- Upstream of DCC channel modifications
- Change DCC ops
- Re-plumb Clifton Court Forebay
- Ecosystem restoration
 - Battle Creek
 - Dutch Slough
 - Suisun Marsh
 - Others
- Modify the harvest

CUWA GOALS

- 1) Water Management – Advance the state of knowledge of progressive water management and promote application of strategies which will meet urban water needs in an efficient and environmentally responsible manner.
- 3) Bay-Delta Ecosystem Integrity – Pursue and promote technical investigations and solutions which comprehensively address all factors affecting Bay-Delta ecosystem health.
- 4) Participation and Collaboration – Advance the satisfaction of urban water needs through application of technical knowledge and collaborative participation in non-legislative forums where urban water interests are affected.

DERIVING COLLABORATIVE PILOT FRAMEWORKS



OTHER POLICY CONCERNS

- **Feasibility**

 - **Technical**

 - **Political**

- **Improving cost evaluations**

- **Many others**