Introduction
IEP Physical Modeling and Fish Management Workshop

Lenny Grimaldo (USBR)

Brown Bag Seminar

CALFED Science Review of "2-Gates Proposal" for the Delta

Dr. Cliff Dahm

CALFED Lead Scientist

Physical Modeling and Fish Management In the San Francisco Estuary

Purpose:

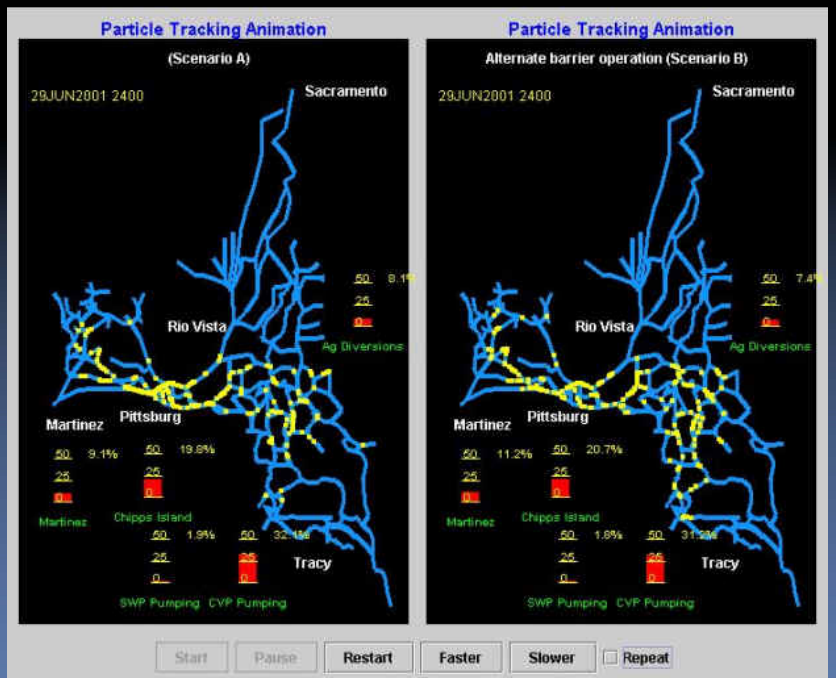
- Modeling overview
- How can the models inform fish biologists and managers ?
- Public discussion: model applications and limitations, role of the IEP
- Initiate a review of IEP hydrodynamic modeling activities by the IEP Science Advisory Group

SAG Charge

1. Independent assessment of IEP and IEP-related hydrodynamic modeling
2. Recommend a scientifically sound, relevant, and appropriate modeling program intended to address the needs of current and potential users
3. Recommend a strategy for better connecting modeling and data collection
4. Give advice regarding the role of IEP in conducting and supporting modeling activities

What is the history/ role of the IEP in supporting fish-hydro models?

IEP



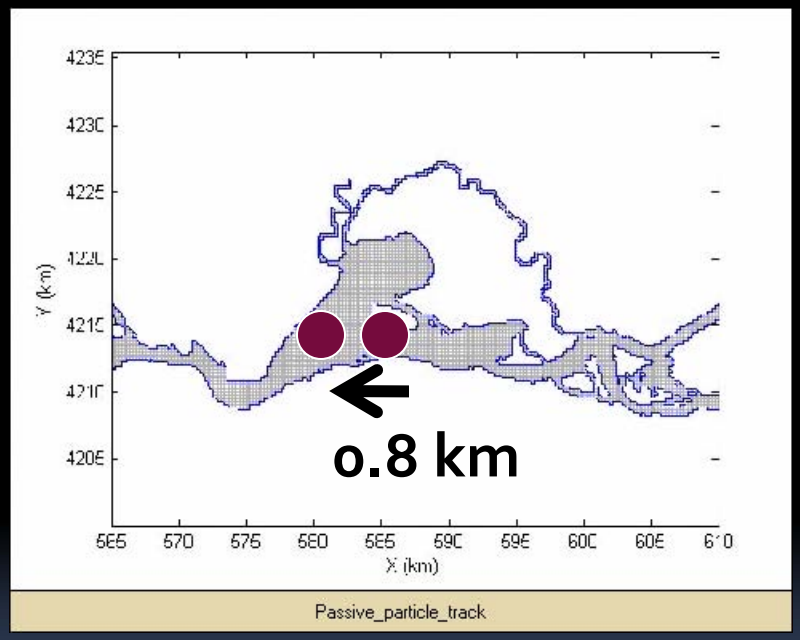
IEP Supported Publications

Kimmerer, Wim J.; Matthew L. Nobriga. 2008. Investigating Particle Transport and Fate in the Sacramento-San Joaquin Delta Using a Particle Tracking Model. San Francisco Estuary and Watershed Science, Vol. 6, Issue 1 (February), Article 4.

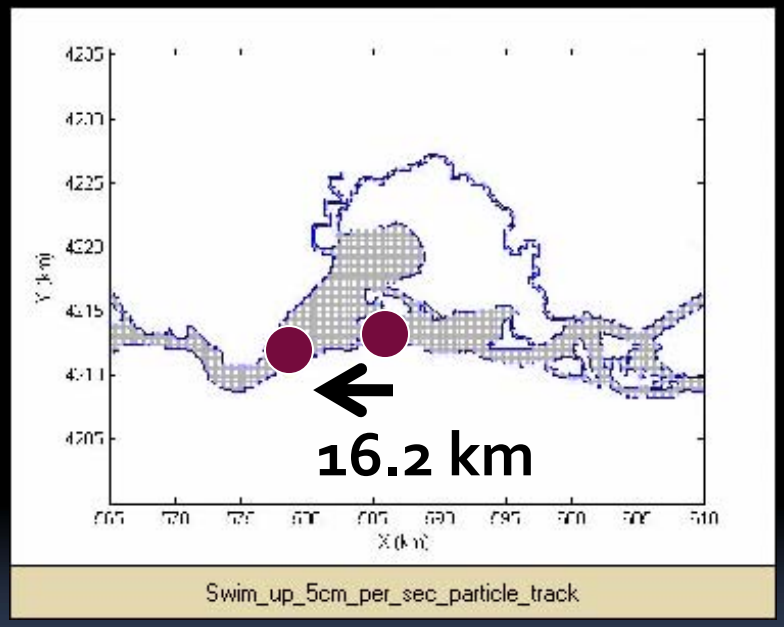
Culberson, S.D., C.B. Harrison. C. Enright and M.L. Nobriga. 2004. Sensitivity of larval fish transport to location, timing, and behavior using a particle tracking model in Suisun Marsh, California. Pages 257-267 *in F. Feyrer, L.R. Brown, R.L. Brown* and J.J. Orsi, eds. Early fife history of fishes in the San Francisco Estuary and watershed. Am. Fish. Soc. Symp. 39, Bethesda, MD, USA

Sommer, T.R., W.C. Harrell, A. Mueller-Solger, B. Tom, and W. Kimmerer. 2004. Effects of flow variation on channel and floodplain biota and habitats of the Sacramento River, California, USA. Aquatic Conservation: Marine and Freshwater Ecosystems 14:247-261.

Pelagic Organism Decline (POD) Research



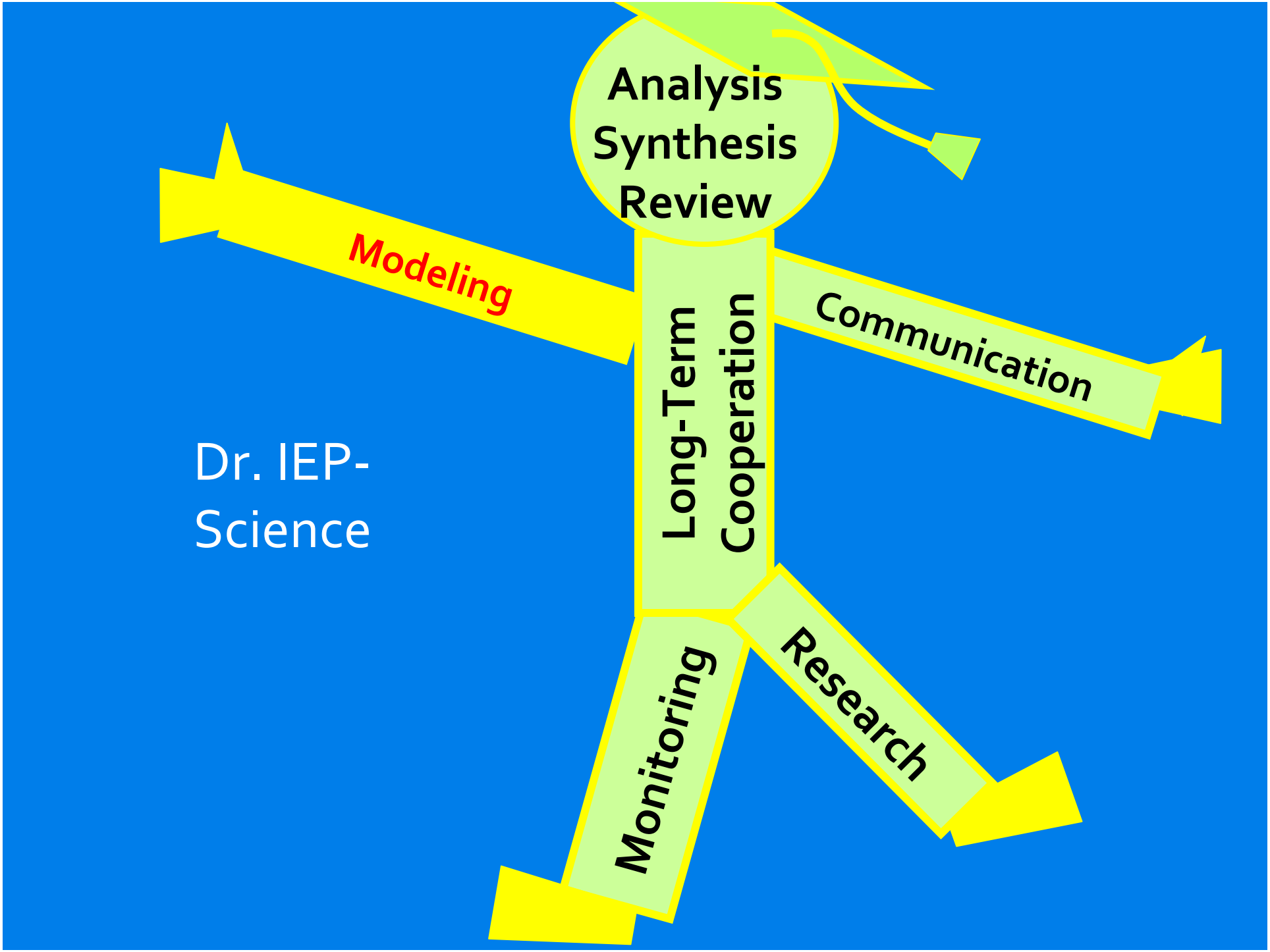
Passive behavior



Swim to surface behavior (5cm/s)

**low-flow conditions, idealized conditions, 2 day release, 49,000 particles,*

PTM's courtesy Ed Gross (3-D TRIM)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Long-Term
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Science
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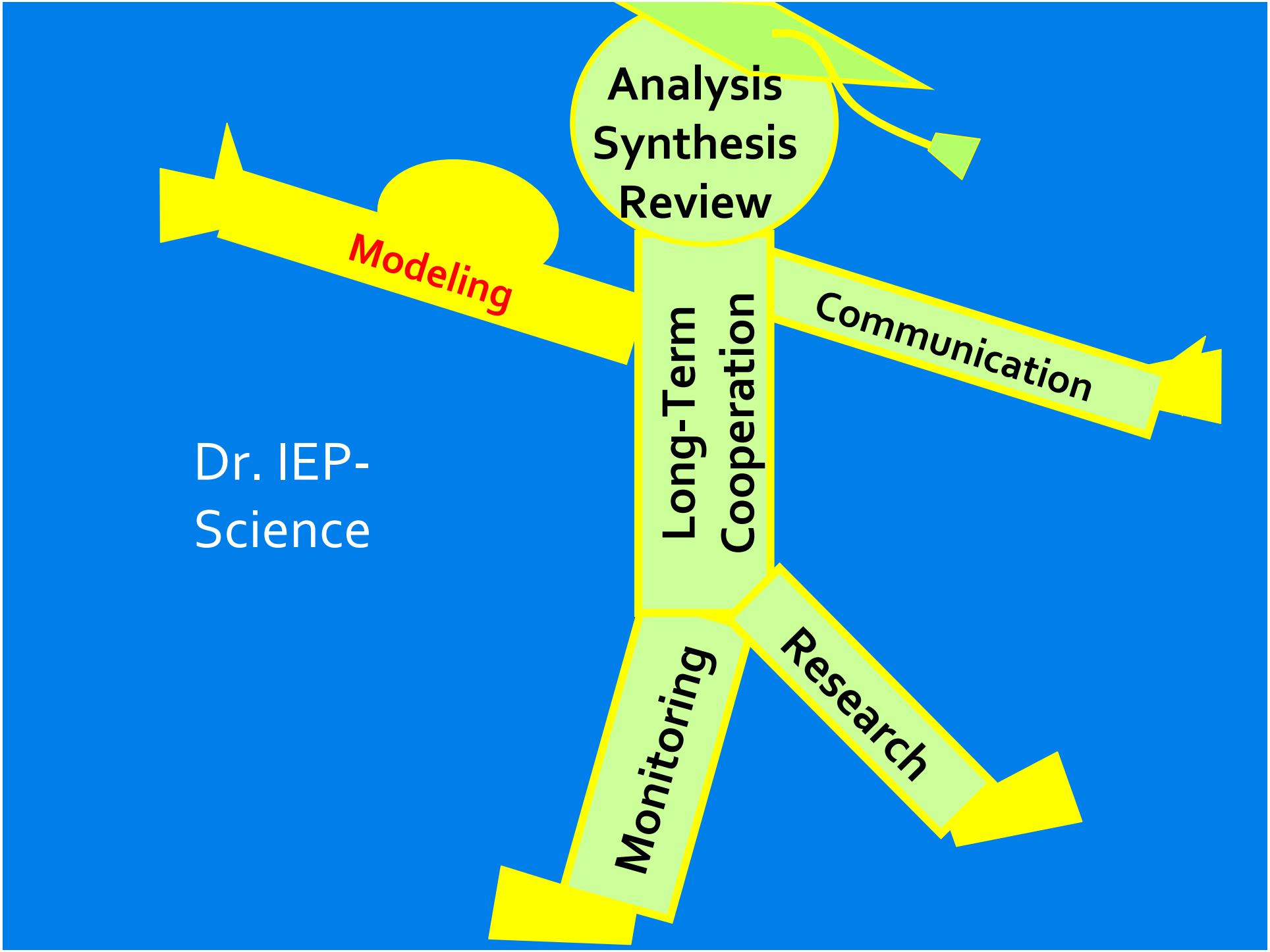
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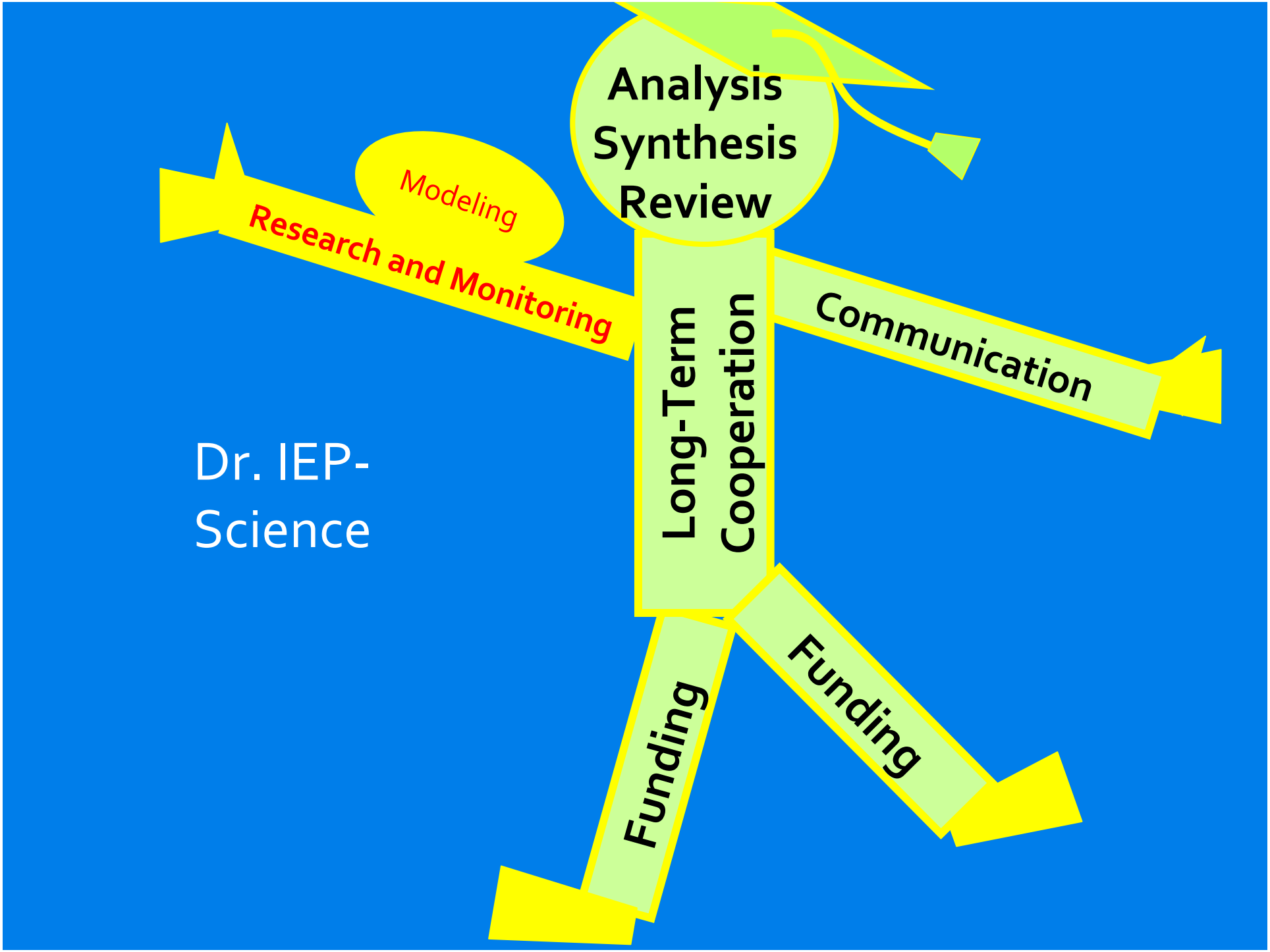
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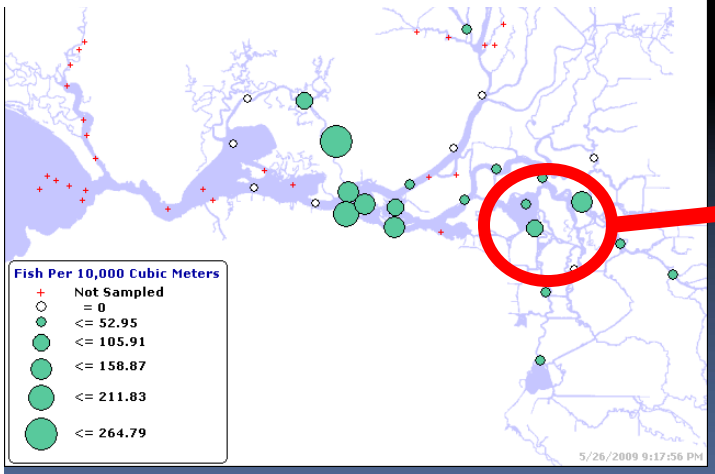
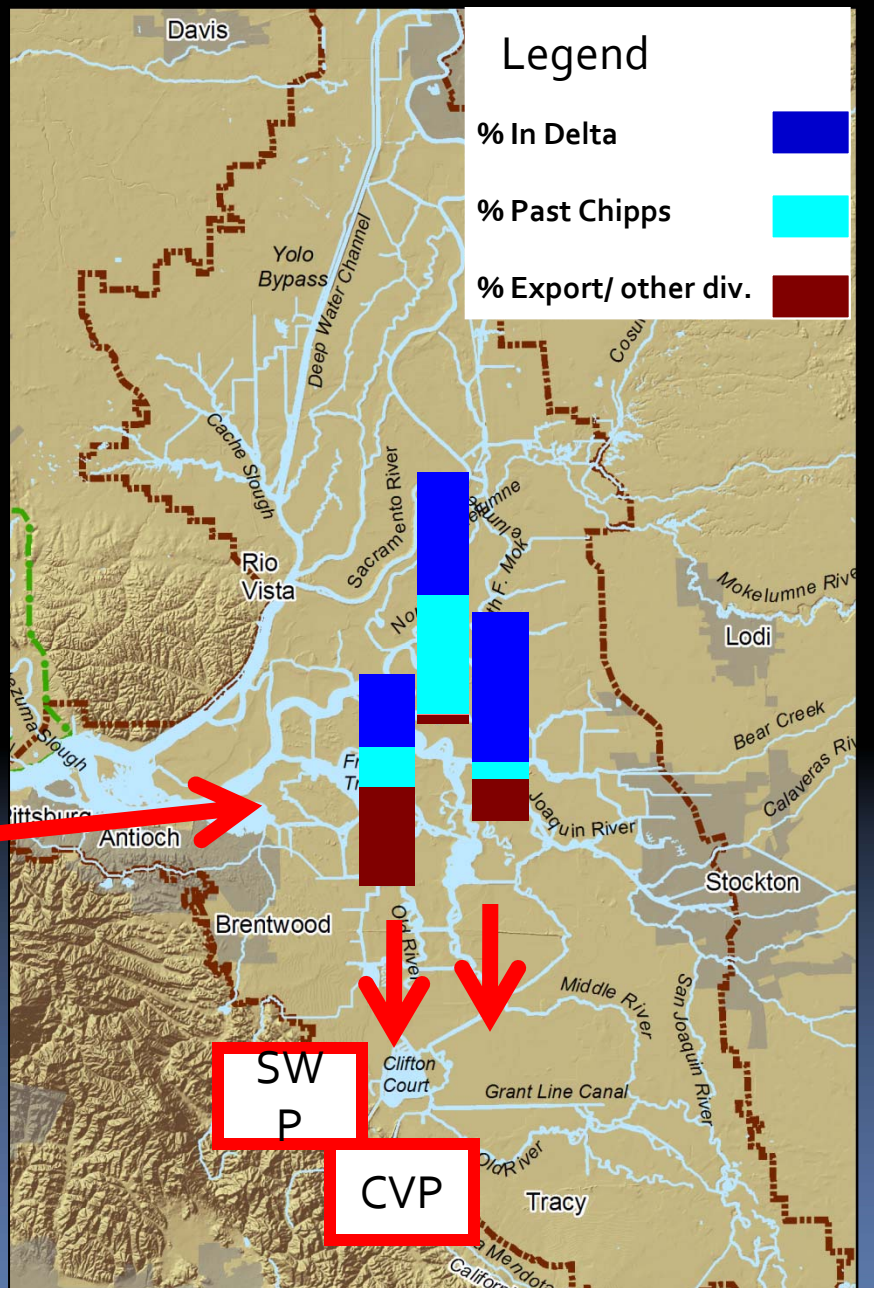
Fish-hydro model emphasis has centered on water project operations

Smelt Workgroup Example::

CDFG 20 mm Survey

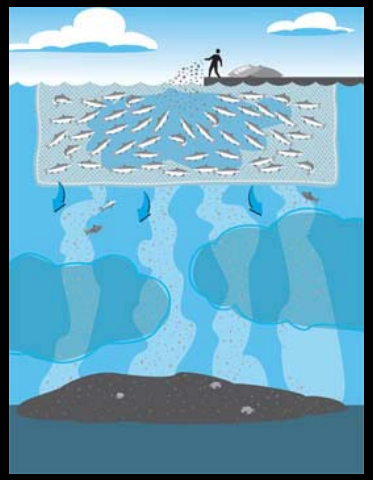
Delta smelt and longfin smelt abundance





Rich History of Fish-Hydro models in the literature

Egg and larvae dispersion



Fish farm waste

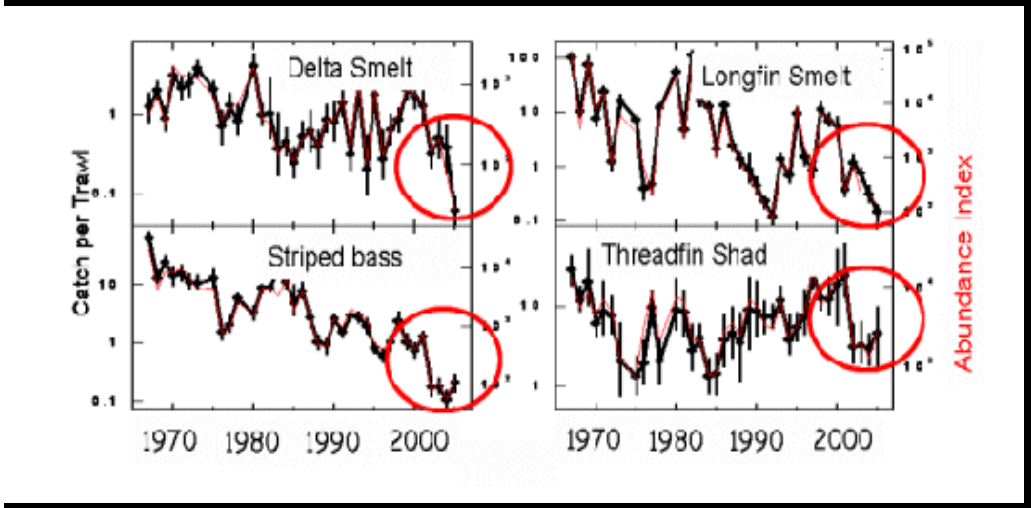
Marine Protected Area connectivity

http://northweb.hpl.umces.edu/index.html

http://houdelab.cbl.umces.edu/index.html

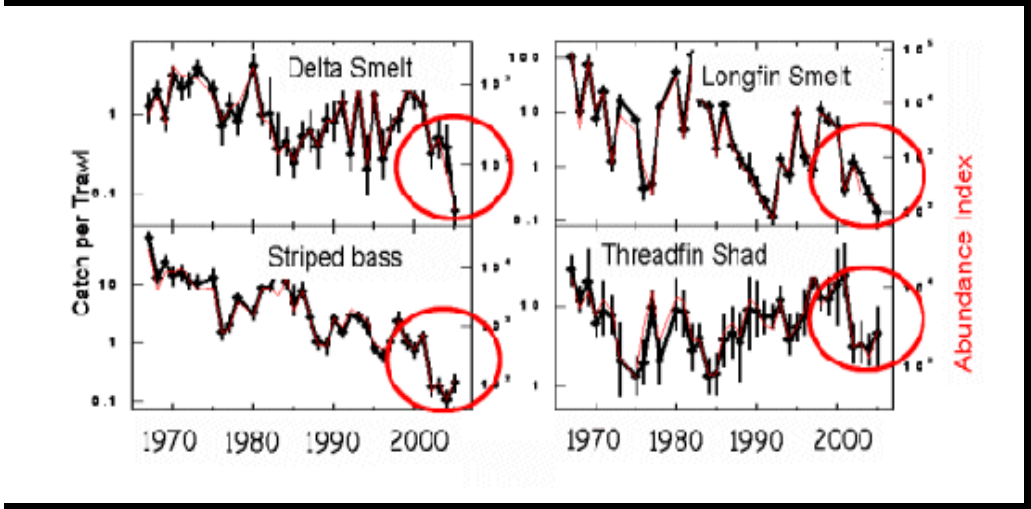
Power plant entrainment

Challenges to developing fish-hydro models



Getting harder to find fish and ESA take issues

Challenges to developing fish-hydro models



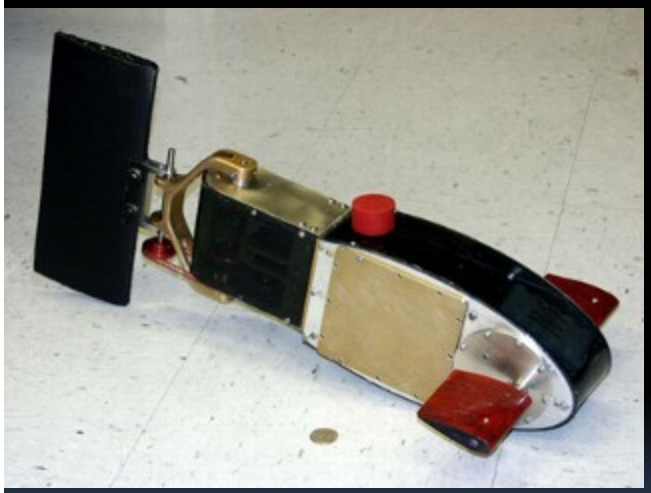
Getting harder to find fish and ESA take issues

Data from monitoring programs may not be appropriate for scale model questions

Some focused behavior studies (Entrapment zone, South Delta, Delta Cross channel)

Output only as good as the input

Fish behaviors for model input may not be perfect:



Simple

Output only as good as the input

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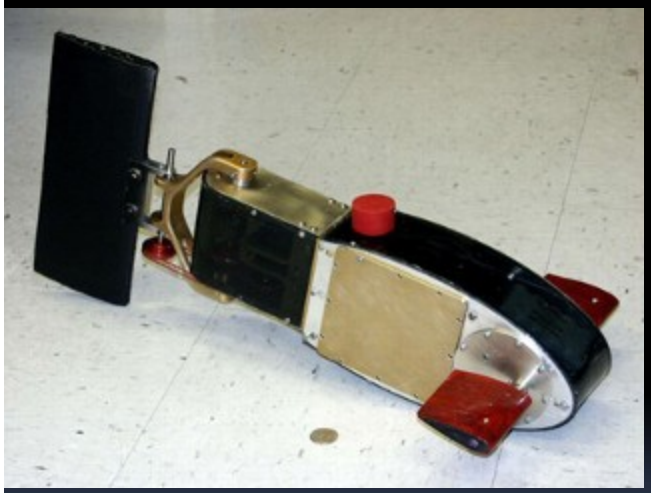

Simple

Idealized

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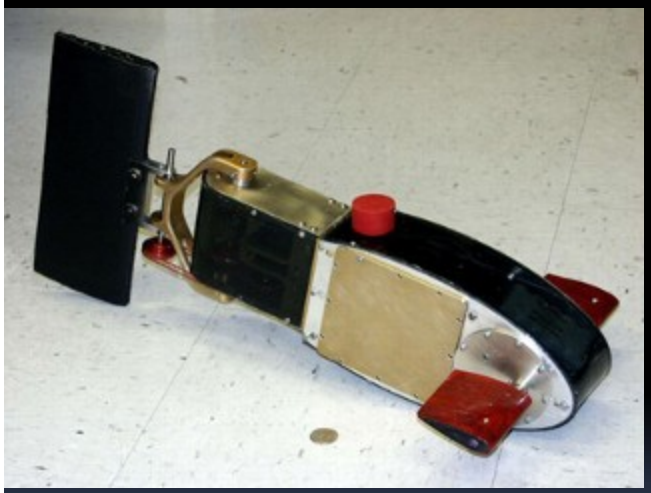
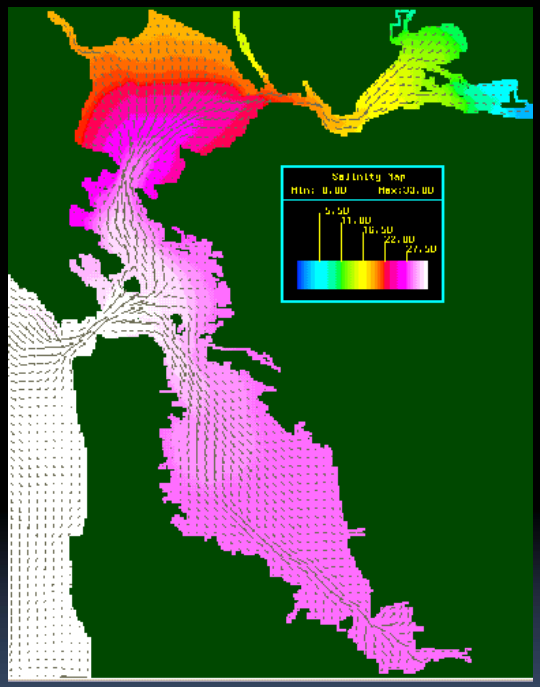


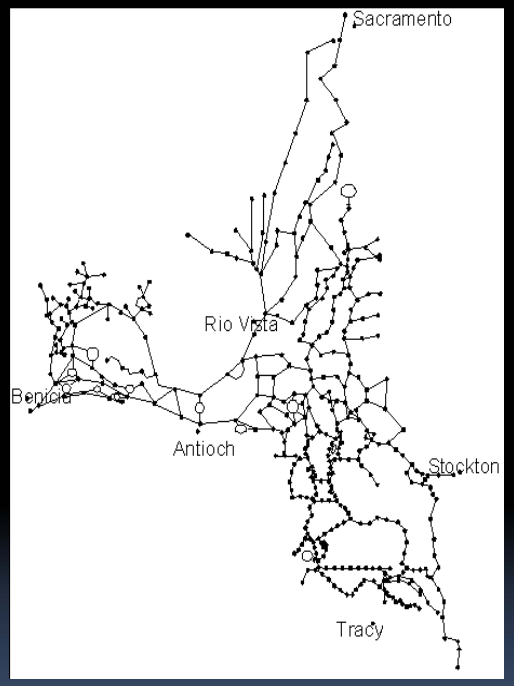
Simple

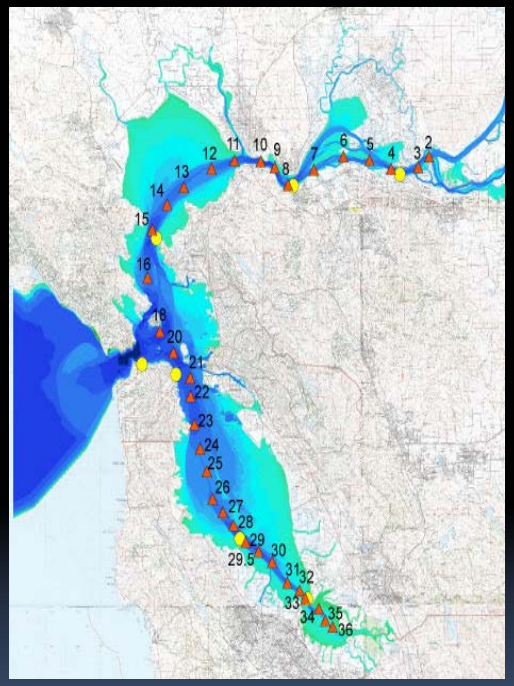
Idealized

Optimized

Recap from yesterday:







1d, 2d, and 3d models (9 total)

Today: Application of physical models to research and management and fishes in the estuary

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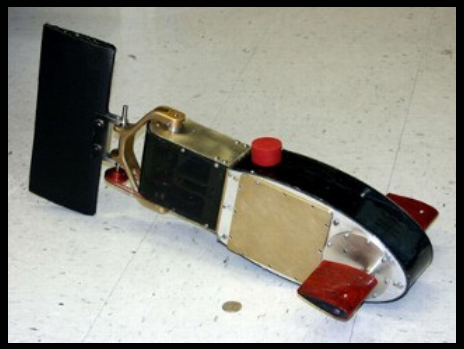

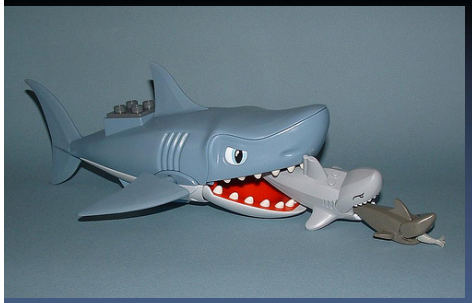

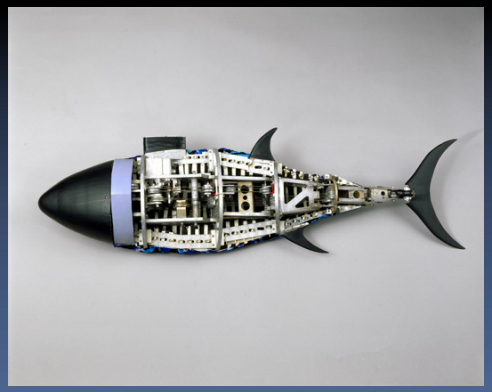

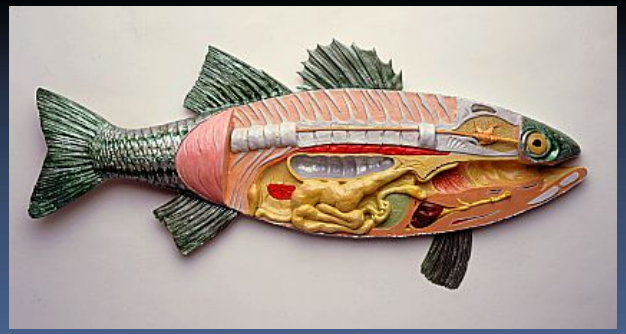

Overview of presentations

Particle Tracking Model (PTM) Simulations

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Coupled fish-hydro field studies

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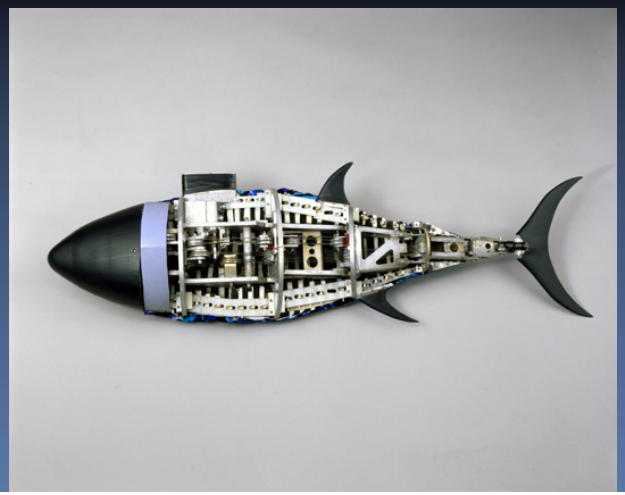
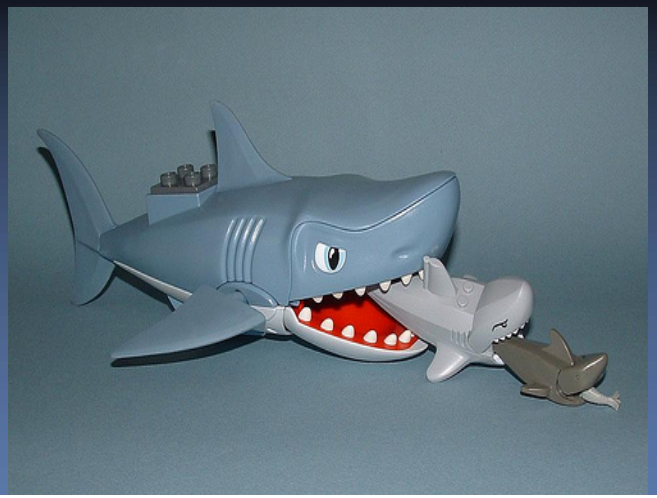
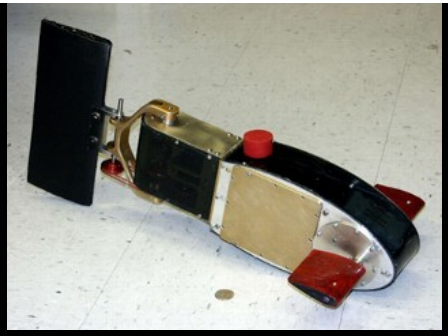
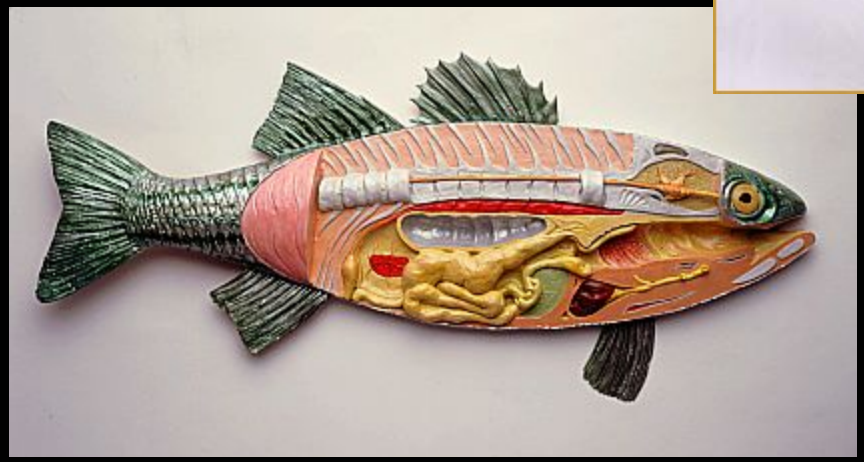
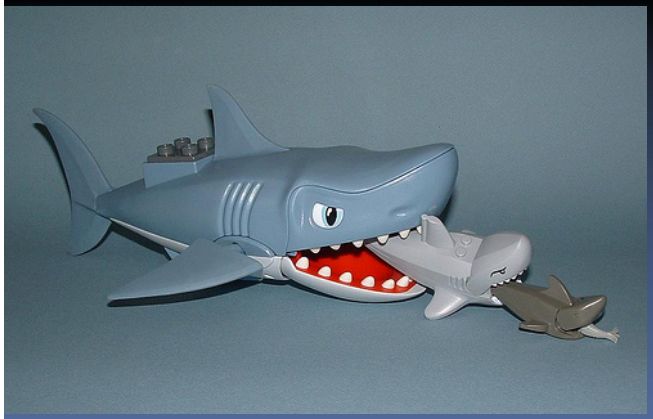
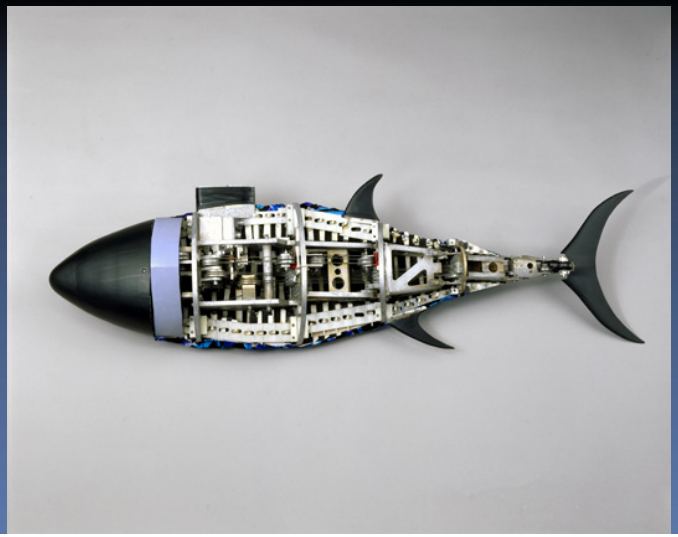
Particle Tracking Model (PTM) Simulations

Coupled fish-hydro field studies

Individual Based Models





Questions to presenters

1. What are the basic fundamentals of your model? Underlying numerical scheme? Limitations of this approach
2. What are the management-related questions you are using the model to answer? Who funds your research?
3. What is your quality control process?
4. What would you suggest as a bibliography?
5. What applications are you comfortable using your model to explore? What applications give you pause?