



Pacific Ocean

Ecosystems at the  
land-sea interface



Chesapeake Bay  
Neuse Estuary  
Pamlico Sound  
Winyah Bay  
Puget Sound



# The issues

## SOS: California's Native Fish Crisis

*Status of and solutions for restoring our vital  
salmon, steelhead and trout populations*



California Golden Trout  
State Fish of California  
ART BY JONATHAN HILLMAN

Based on a report by Dr. Peter B. Moyle, Dr. Joshua A. Israel,  
and Sabra E. Purdy, commissioned by California Trout

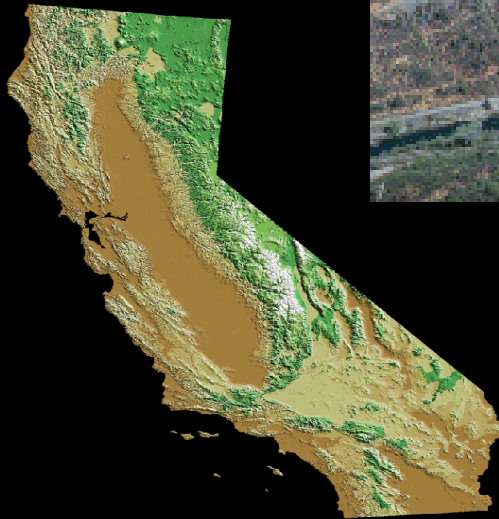


Sustainability of native species

Water quality



Water supply



Flooding, levee integrity



**Computational  
Assessments of  
Scenarios of  
Change in the  
a  
Delta  
Ecosystem**

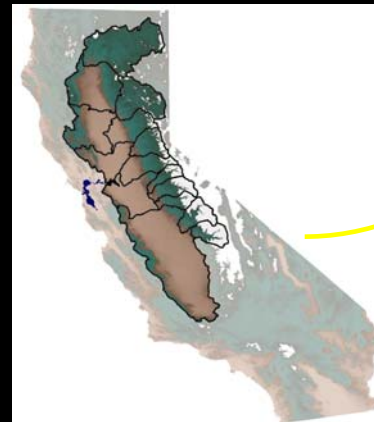
Global  
Climate  
Models



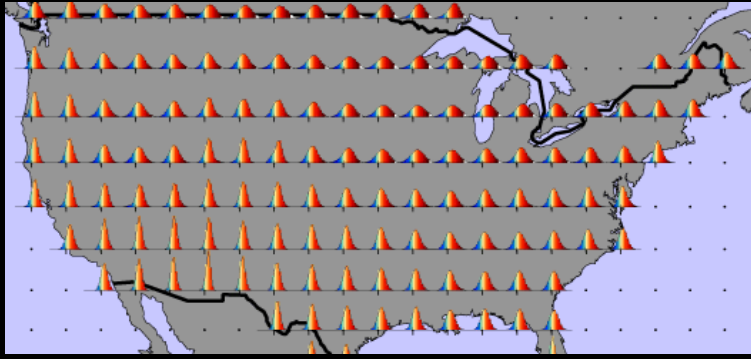
Downscaled  
To Region



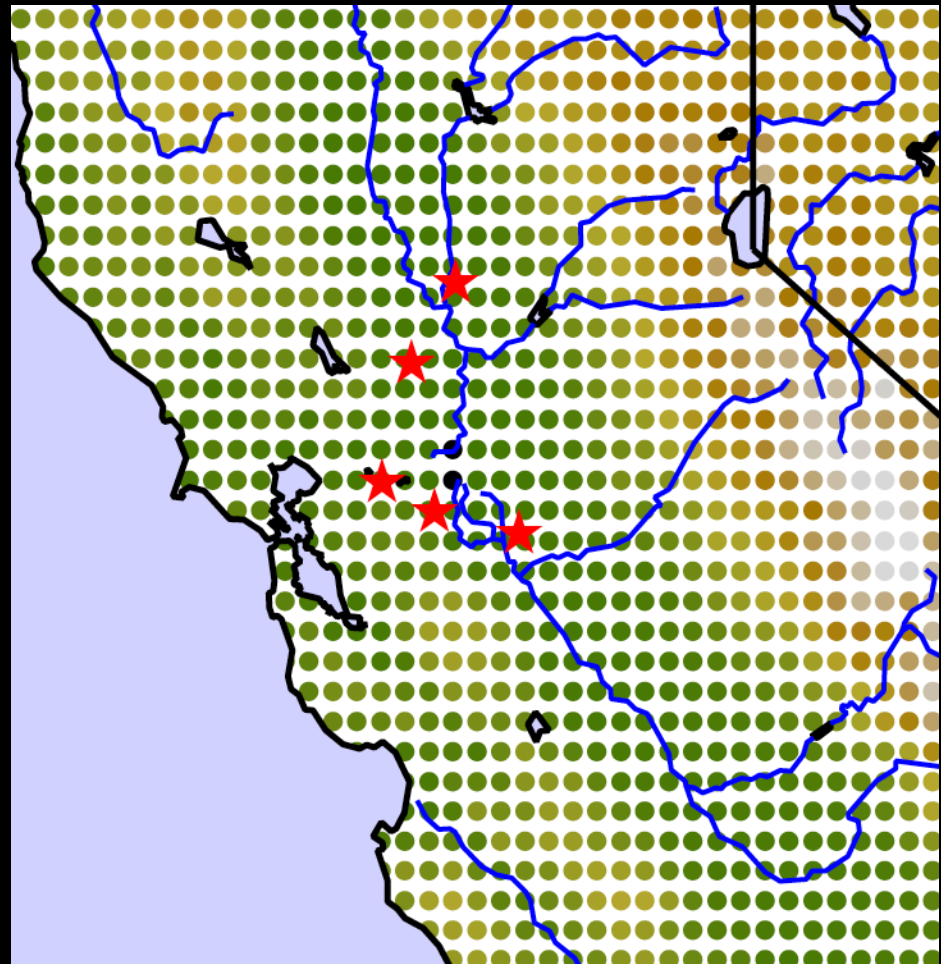
Watershed  
Model



Delta Model

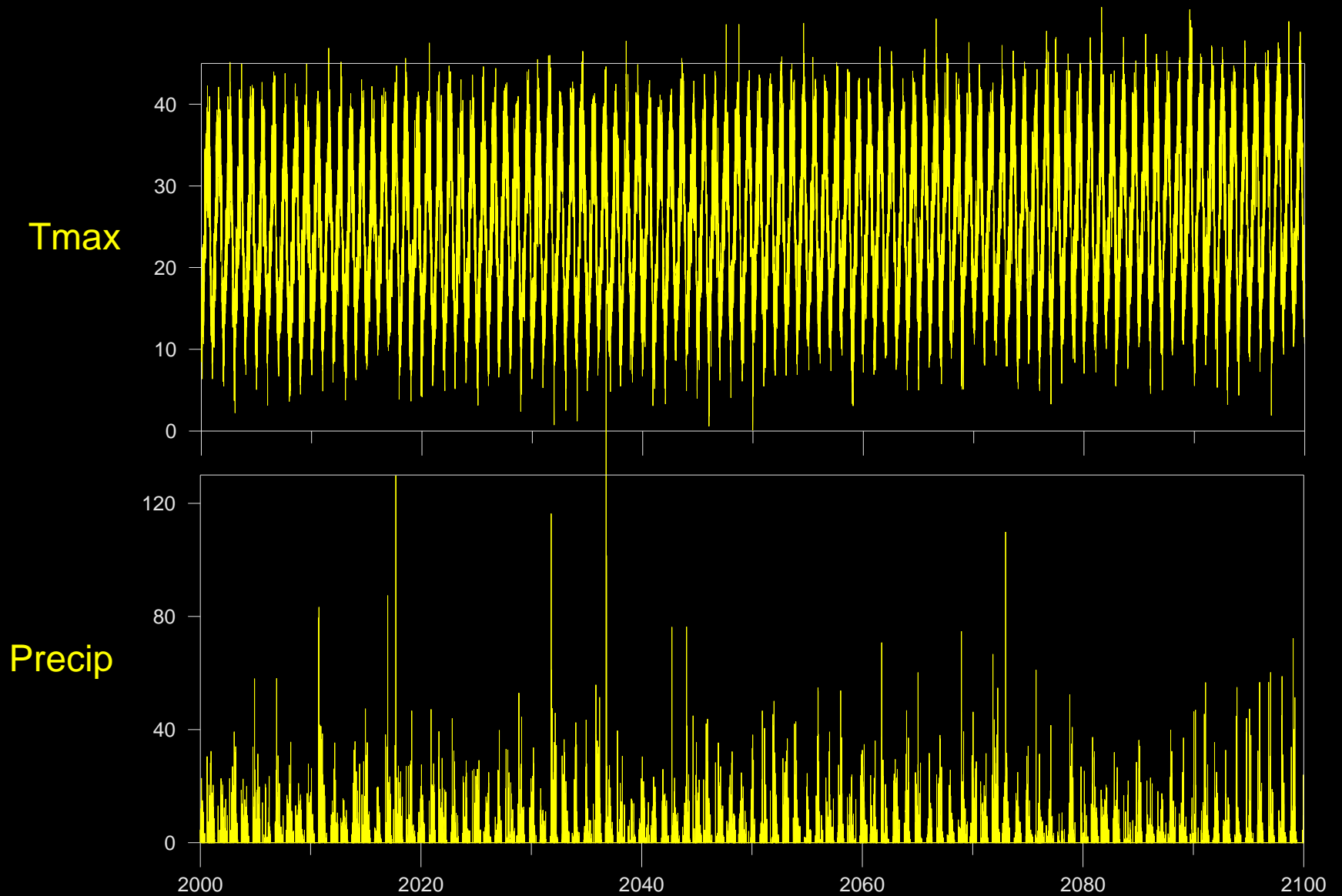


Downscaled daily: air temperatures, precipitation, humidity, winds, solar insolation



*Mike Dettinger*

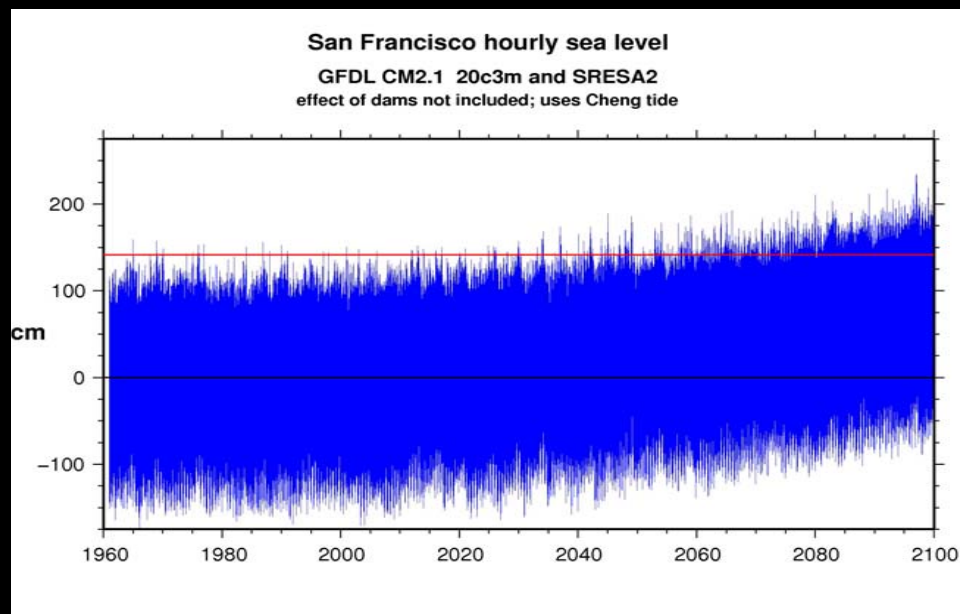
# Daily weather at Sacramento: GFDL Model, A2 emissions (1 of 4 scenarios)



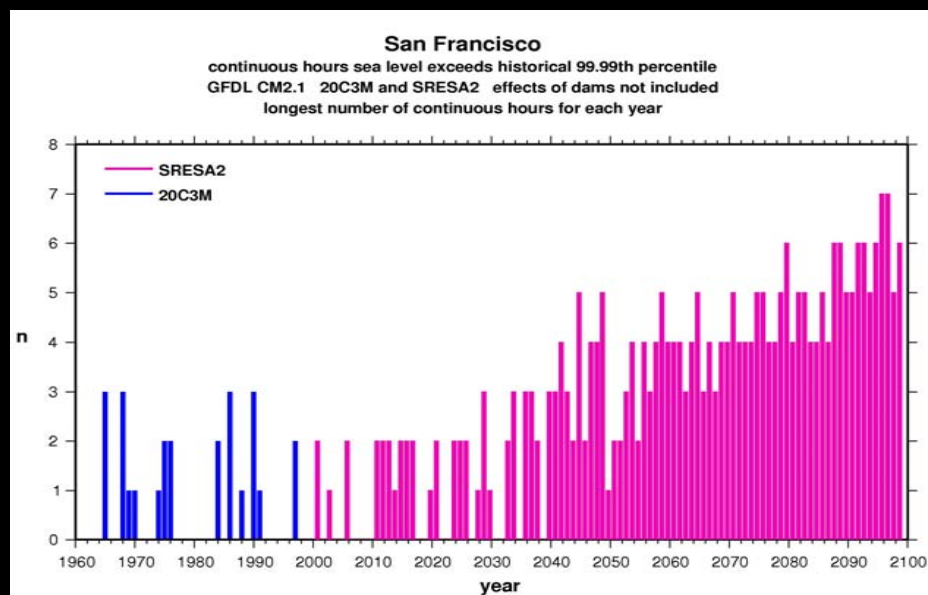


# Sea Level & Storm Surges

GFDL A2  
+ 0.9 m

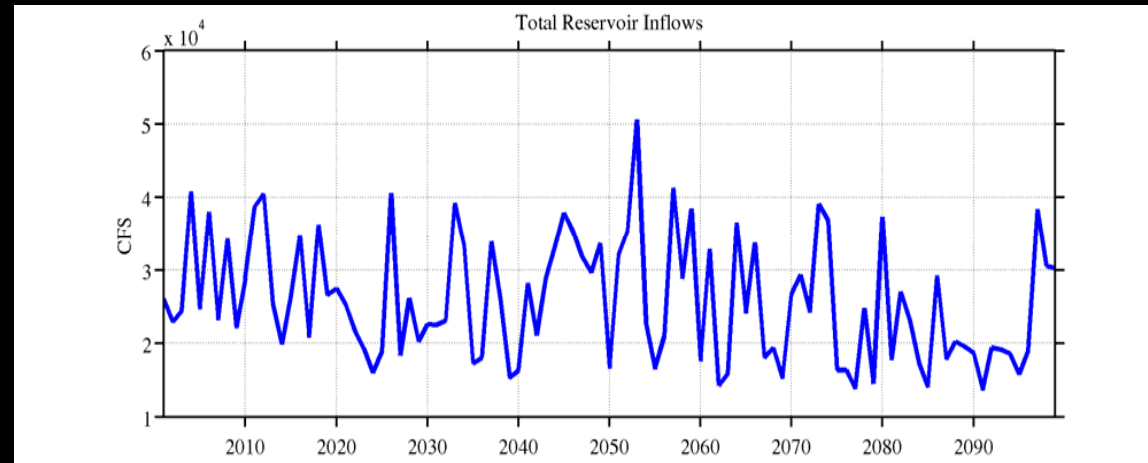
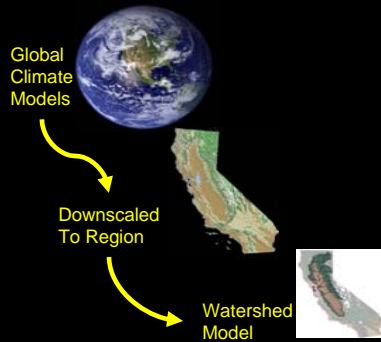


Extreme  
events

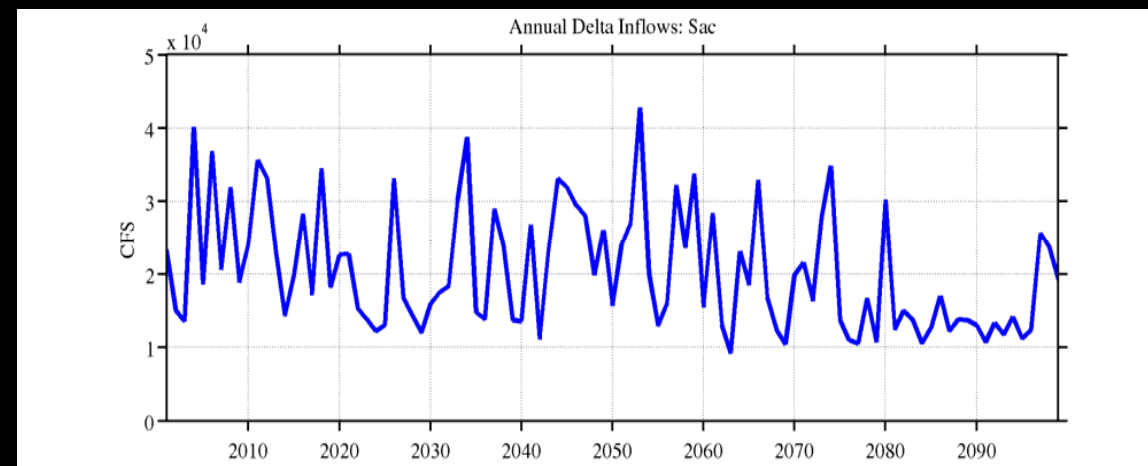


*Dan Cayan*

# Runoff, River Flow, Reservoir Storage, Delta Inflow

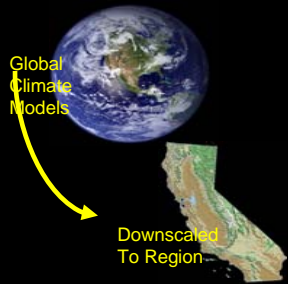


Reservoir Inflow

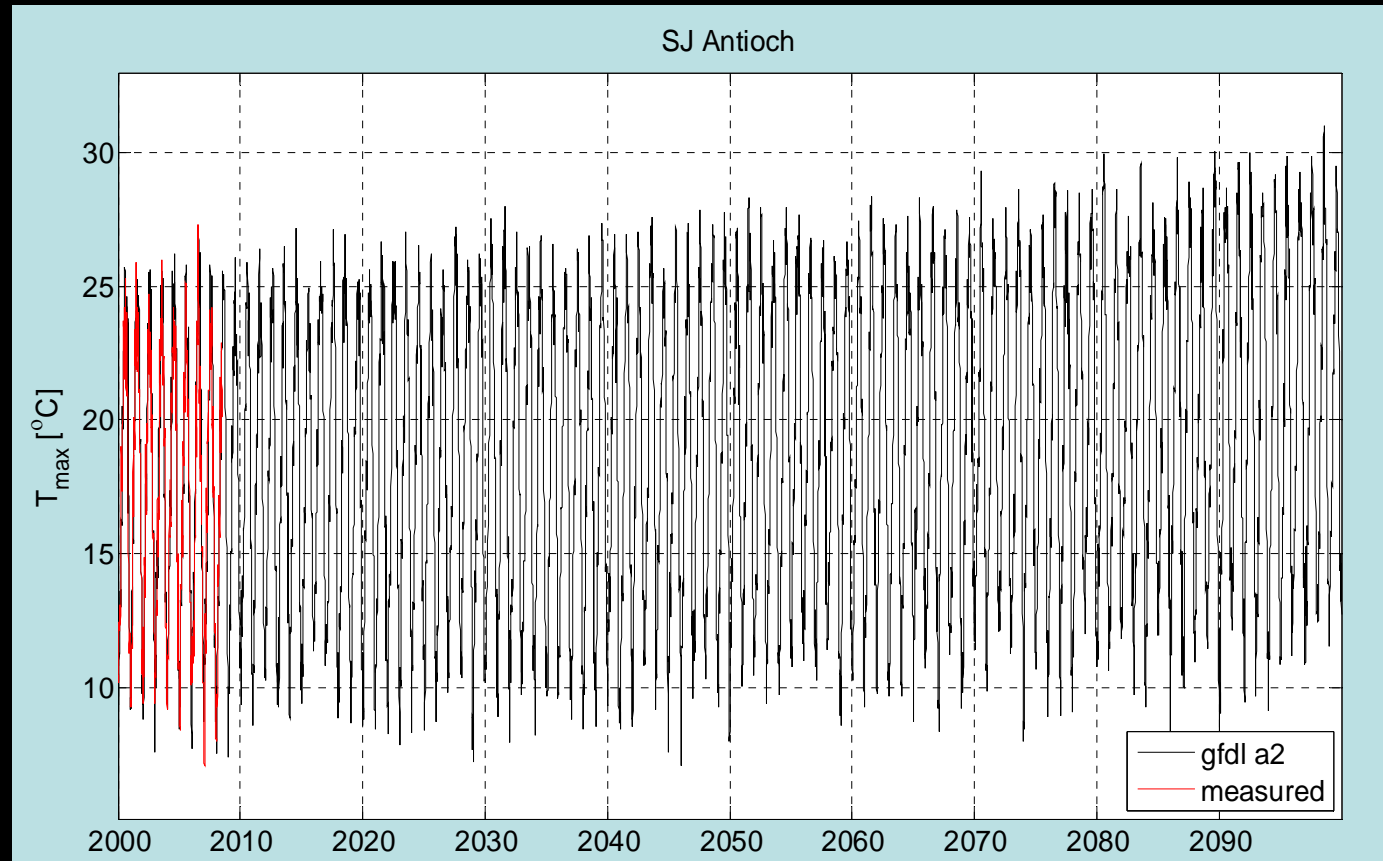


Delta Inflow

Noah Knowles

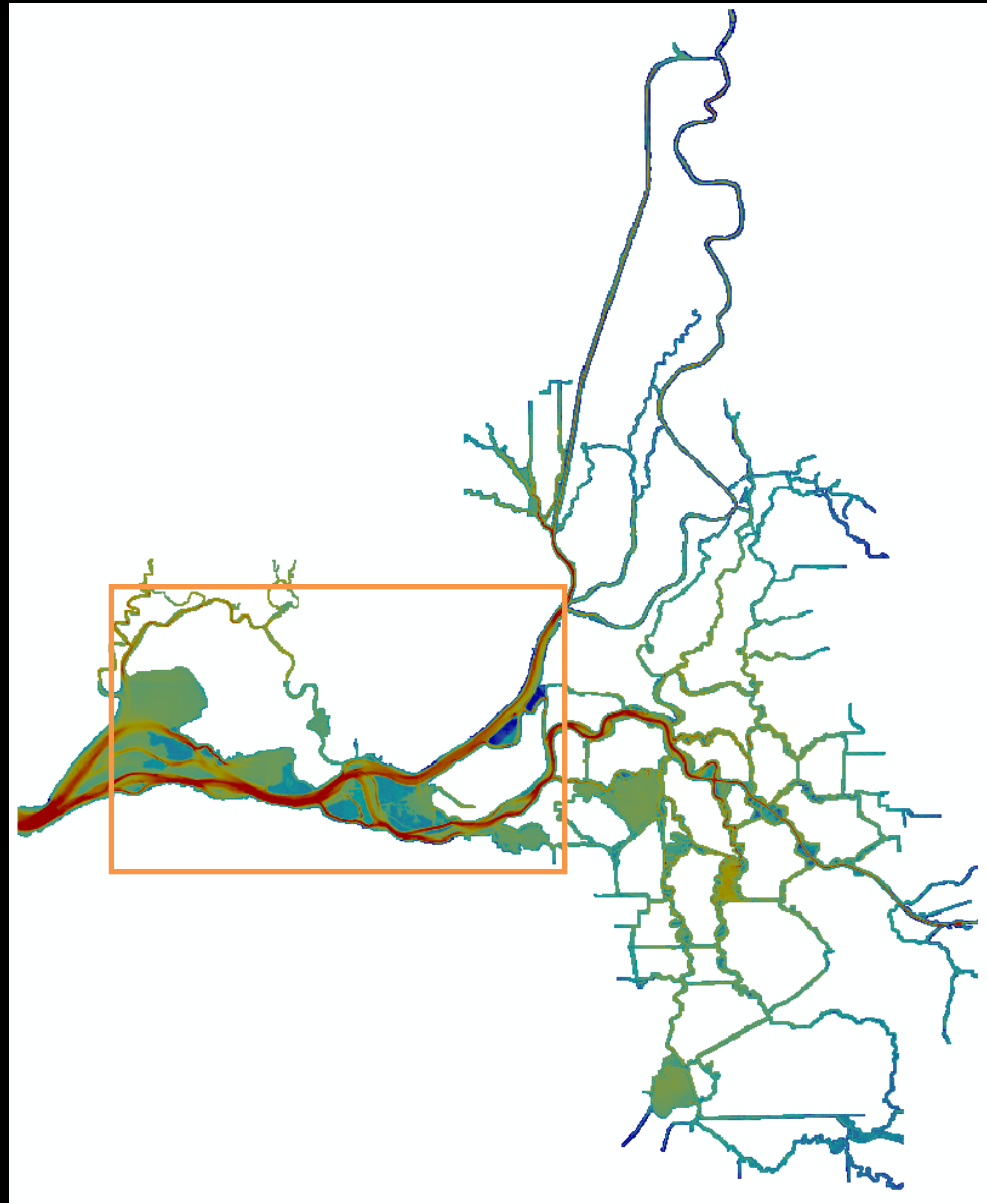
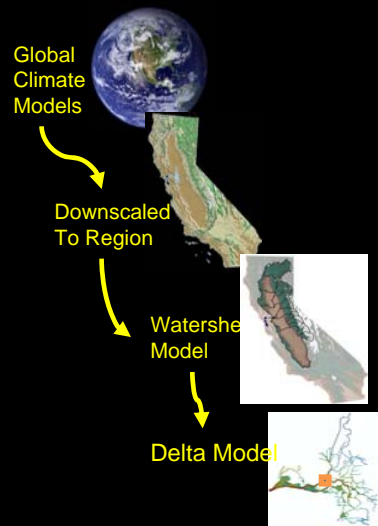


# Delta Water Temperature

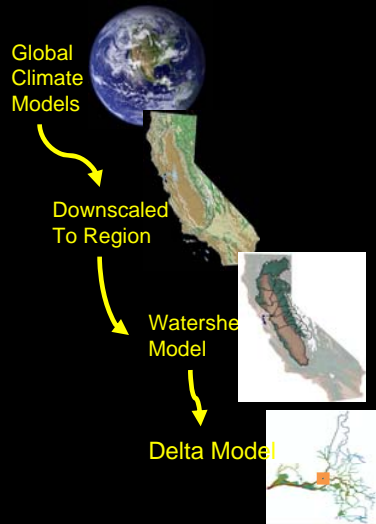


*Wayne Wagner, Mark Stacey*

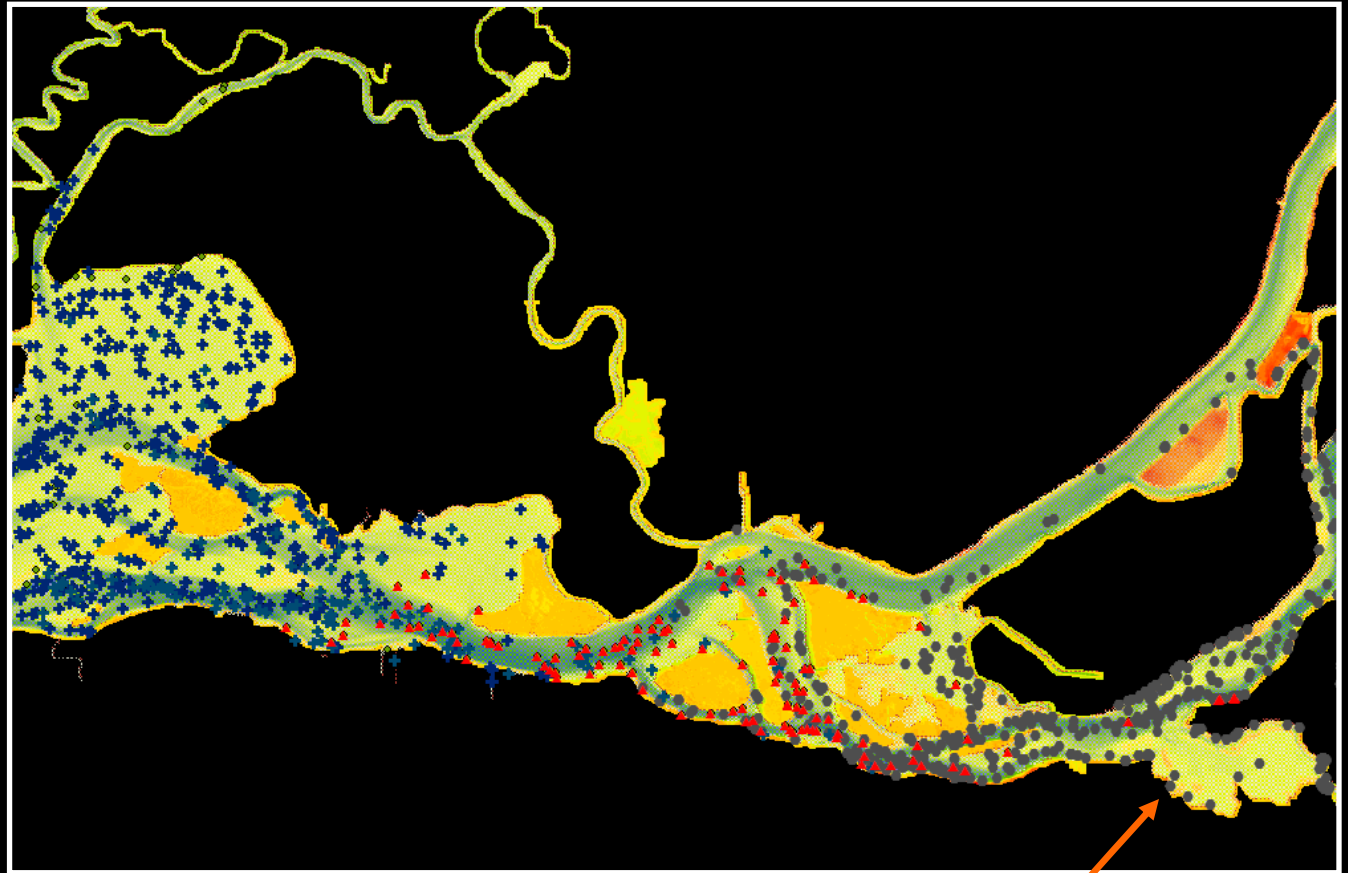
## Delta TRIM – tidal model



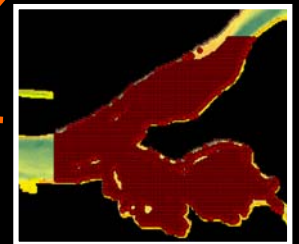
*Nancy Monsen*

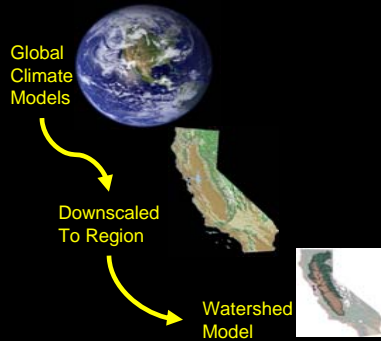


# Particle Trajectories & Residence Time

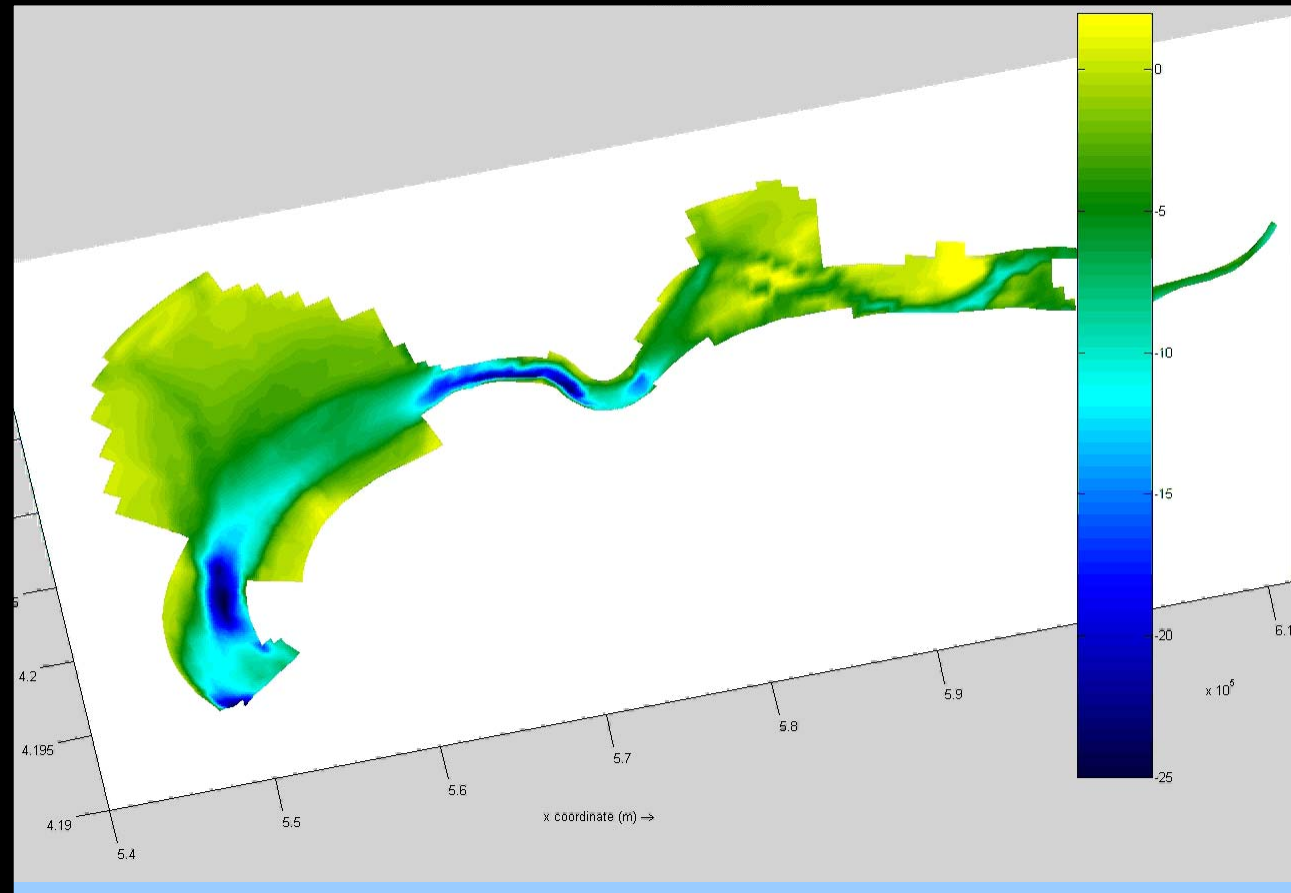


*Nancy Monsen*



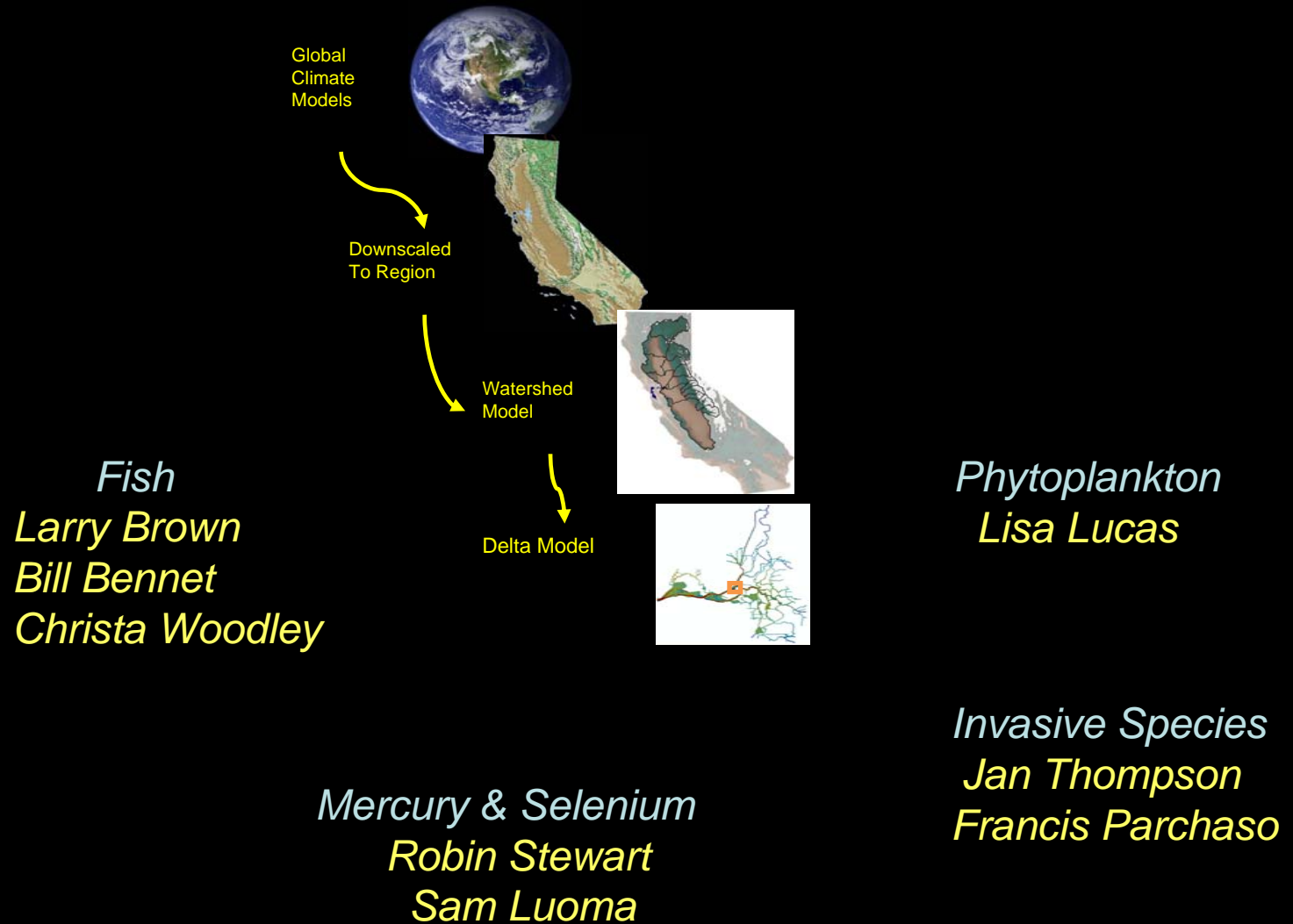


# Sediment Inputs & Transport, Turbidity, Bathymetry



*Mick van der Wegen, Dave Schoellhamer,  
Neil Ganju, Bruce Jaffe, Dano Roelvink*

# Ecological Changes in the 21st century



# To Learn More ....



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## Access - San Francisco Bay and Delta

Access Home

### CASCaDE Main Page

#### **CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem**

This is the CASCaDE Project web site. Here you will find the original proposal and supplemental material which was submitted in response to the [California Bay-Delta Authority Science Program 2004 Proposal Solicitation](#).

The project was funded and officially began March 1, 2006.

<http://sfbay.wr.usgs.gov/cascade/>

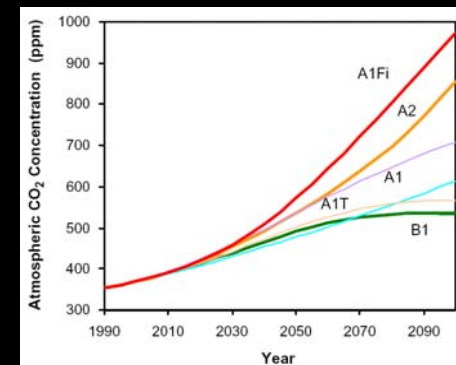
## Climate Scenarios

Climatic Change (2008) 87 (Suppl 1):S21–S42  
DOI 10.1007/s10584-007-9377-6

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### Climate change scenarios for the California region

Daniel R. Cayan • Edwin P. Maurer •  
Michael D. Dettinger • Mary Tyree • Katharine Hayhoe




## GCM Downscaling

**DOWNSCALING WITH CONSTRUCTED  
ANALOGUES: DAILY PRECIPITATION  
AND TEMPERATURE FIELDS OVER THE  
UNITED STATES**

*Prepared For:*  
**California Energy Commission**  
Public Interest Energy Research Program

*Prepared By:*  
Hugo G. Hidalgo, Michael D. Dettinger,  
and Daniel R. Cayan



Arnold Schwarzenegger  
Governor

**PIER FINAL PROJECT REPORT**

January 2008  
CEC-500-2007-123

## Sea Level Rise

### A Semi-Empirical Approach to Projecting Future Sea-Level Rise

Stefan Rahmstorf

19 JANUARY 2007 VOL 315 SCIENCE

Climatic Change (2008) 87 (Suppl 1):S57–S73  
DOI 10.1007/s10584-007-9376-7

### Climate change projections of sea level extremes along the California coast

Daniel R. Cayan • Peter D. Bromirski •  
Katharine Hayhoe • Mary Tyree •  
Michael D. Dettinger • Reinhard E. Flick

<http://www.energy.ca.gov/2007publications/CEC-500-2007-123/CEC-500-2007-123.PDF>