Technical Setup in Progress

Training starts at 9:05 am

Please put your name/affiliation in:
- Chat box (Teams Participants)
- Nametags & Chat Box (On-site Participants)

CALIFORNIA DEPARTMENT OF
WATER RESOURCES

DSM2 Learning Series

Agenda

Welcome/Introduction
Xiaochun Wang (DWR)

Session 1: ECO-PTM Overview
Doug Jackson (QEDA), Adam Pope (USGS)

Session 2: Input/Output and Hands-On
Brad Tom (DWR), Xiaochun Wang (DWR)

Hands-on Exercise Helpers
Brad Tom (DWR), Xiaochun Wang (DWR), Gourab Saha (DWR), Hans Kim (DWR)

Training Coordinators
Jamie Anderson (DWR)
Kevin He (DWR)

Housekeeping Items

- Training will be recorded in Teams

  - Keep muted / camera off
  - Questions: Teams chat box
  - Hands-on task done: Teams "Raise Your Hand"

- On-site participants:

  - Wi-Fi: CNRAGuest
  - Restroom needs CNRA Badge to return

- Training Follow-Up Survey

  - QR Code & Link in slides and Teams Chat; also to be sent out in email

- All QR codes will be displayed during the break

Teams Facilitator

Hans Kim will monitor the chat for

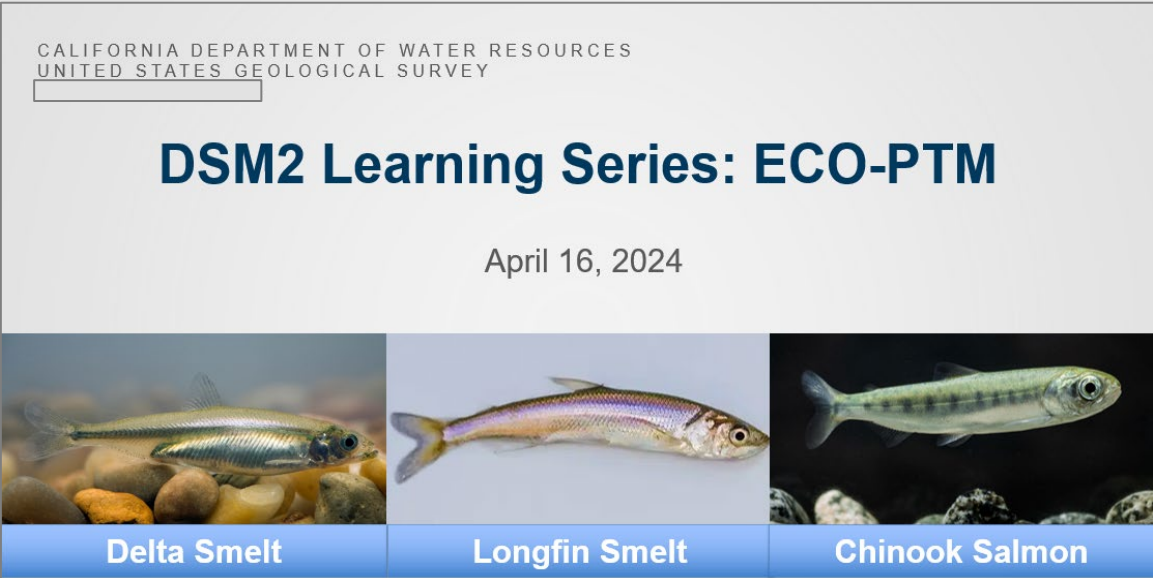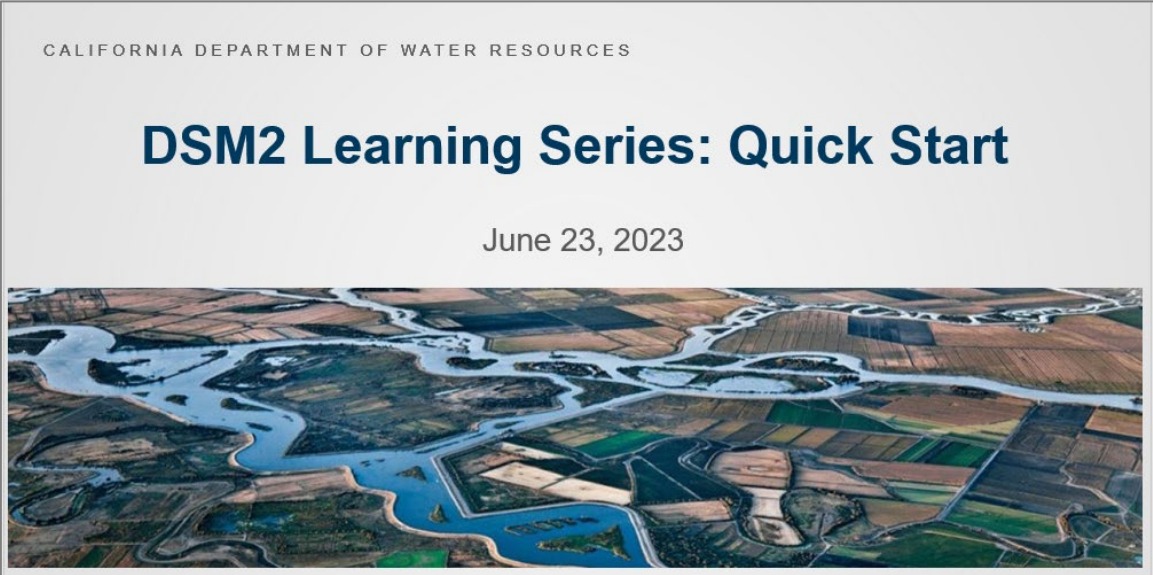- Teams issues (seeing slides, hearing speakers, etc)

- Questions
  All participants on-site & Teams **put questions in the chat**
  please include **slide numbers**
  - Hans will read some of the questions to the speaker
  - Some of the questions may be answered in the chat
  - All questions will be addressed in writing in a Q&A after the class

- Indication you are finished with an exercise step
  (use raise hand function✋ in Teams)

DSM2 Learning Series

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Follow-Up Survey

CALIFORNIA DEPARTMENT OF WATER RESOURCES

DSM2 Learning Series: Quick Start

June 23, 2023

CALIFORNIA DEPARTMENT OF WATER RESOURCES

DSM2 Learning Series: Planning Studies

October 27, 2023

CALIFORNIA DEPARTMENT OF WATER RESOURCES
UNITED STATES GEOLOGICAL SURVEY

DSM2 Learning Series: ECO-PTM

April 16, 2024

Delta Smelt   Longfin Smelt   Chinook Salmon

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DSM2 Learning Series: Future Topics

Please suggest topics for future learning sessions on the Follow-Up Survey **5**

DSM2 Learning Series: ECO-PTM

April 16, 2024

Modeling Support Office, Delta Modeling Section

DSM2 Learning Series: ECO-PTM
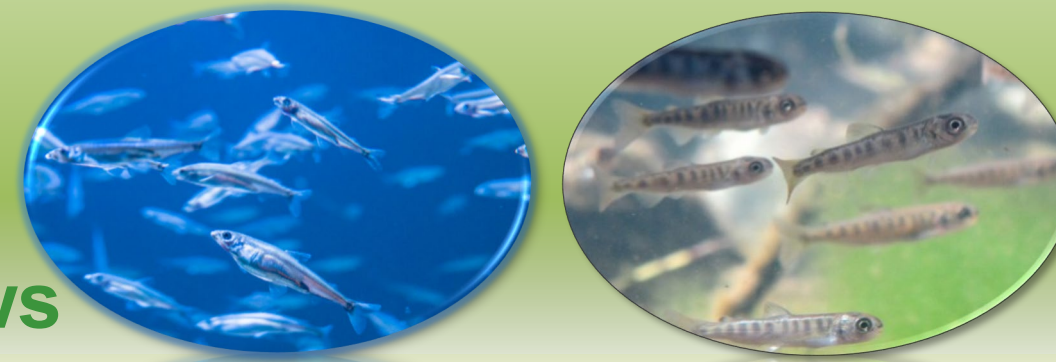
April 16, 2024

Delta Smelt | **Longfin Smelt** | **Chinook Salmon**

Xiaochun Wang (DWR), Doug Johnson (QEDA),
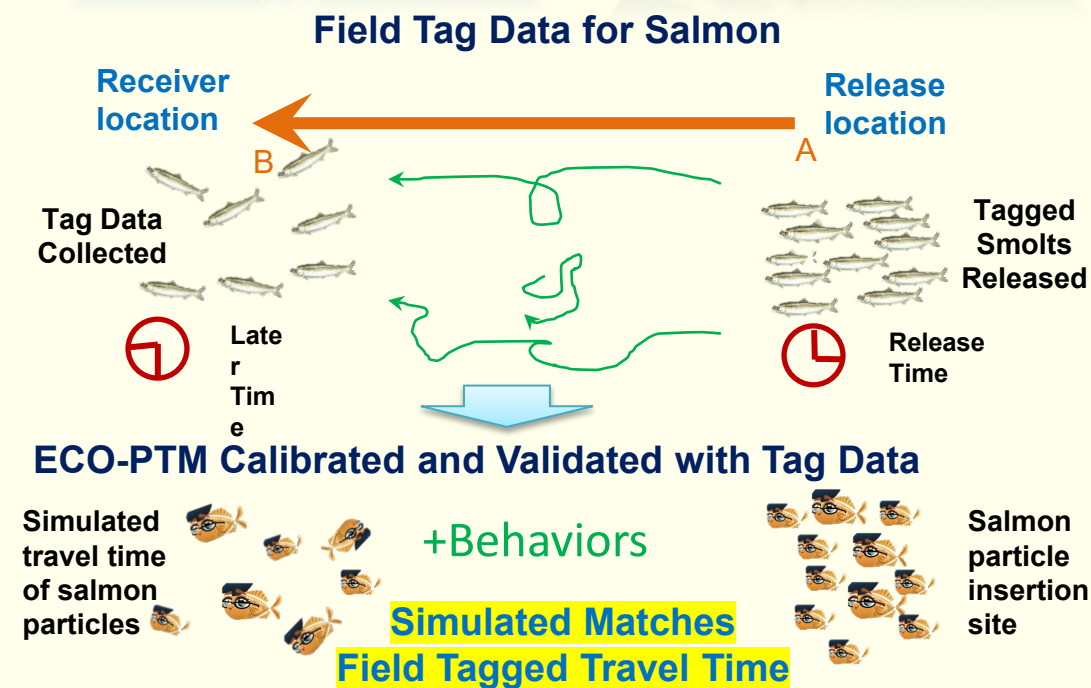Adam Pope (USGS), Brad Tom (DWR)

ECO-PTM -- An Individual Based Ecological Particle Tracking Model That Considers Tidal Flows

ECO-PTM FACTS

ECO-PTM is an individual-based ecological particle tracking model that tracks three types of particles, neutrally buoyant (Delta smelt larvae), position oriented (longfin smelt larvae), and salmon (Chinook salmon):

➤ Based on a random-walk particle-tracking method

➤ Utilizes flow information from a 15-minute-time-step hydrodynamic simulation of the Delta that captures the estuary's temporal and spatial tidal variations

➤ Used commonly for impact analyses of larvae entrainment of Delta smelt and longfin smelt into water project facilities

➤ Applied for analyses of juvenile salmon migration and survival through the Delta

➤ Attached fish-like behaviors to the salmon particles

➤ Calibrated and validated behavior parameters with field tag data: simulated outputs match observations

Field Tag Data for Salmon

Receiver location ← Release location

B   A

Tag Data Collected   Tagged Smolts Released

Later Time   Release Time

ECO-PTM Calibrated and Validated with Tag Data

Simulated travel time of salmon particles

+Behaviors

Simulated Matches Field Tagged Travel Time

Salmon particle insertion site

Model Applications

ECO-PTM can be an effective tool for quantitatively assessing water resources management actions, such as impacts on entrainment or fish survival from:

➤ Fish Barriers

➤ Project operation changes

➤ Restoration actions

For more information contact
Xiaochun.Wang@water.ca.gov

ECO-PTM Team

- U.S. Geological Survey, Western Fisheries Research Center:
  - Russ Perry, Adam Pope, Dalton Hance, Michael Dodrill

- QEDA Consulting:
  - Doug Jackson

- California Department of Water Resources:
  - Xiaochun Wang, Bradley Tom, Gourab Saha

Why ECO-PTM ?

Quantitative assessment tool to explore and evaluate **management actions** that **benefit both** species recovery efforts and California's water demands

Delta Smelt

Longfin Smelt

Chinook Salmon

Delta Simulation Model II (DSM2)

Hydro

Flow, velocity, water levels

Qual
Water Quality Model

- Salinity including chloride, bromide, …
- Water Temperature
- Dissolved oxygen

GTM
General Transport Model

- Salinity
- Suspended sediment
- Sediment bed
- Mercury
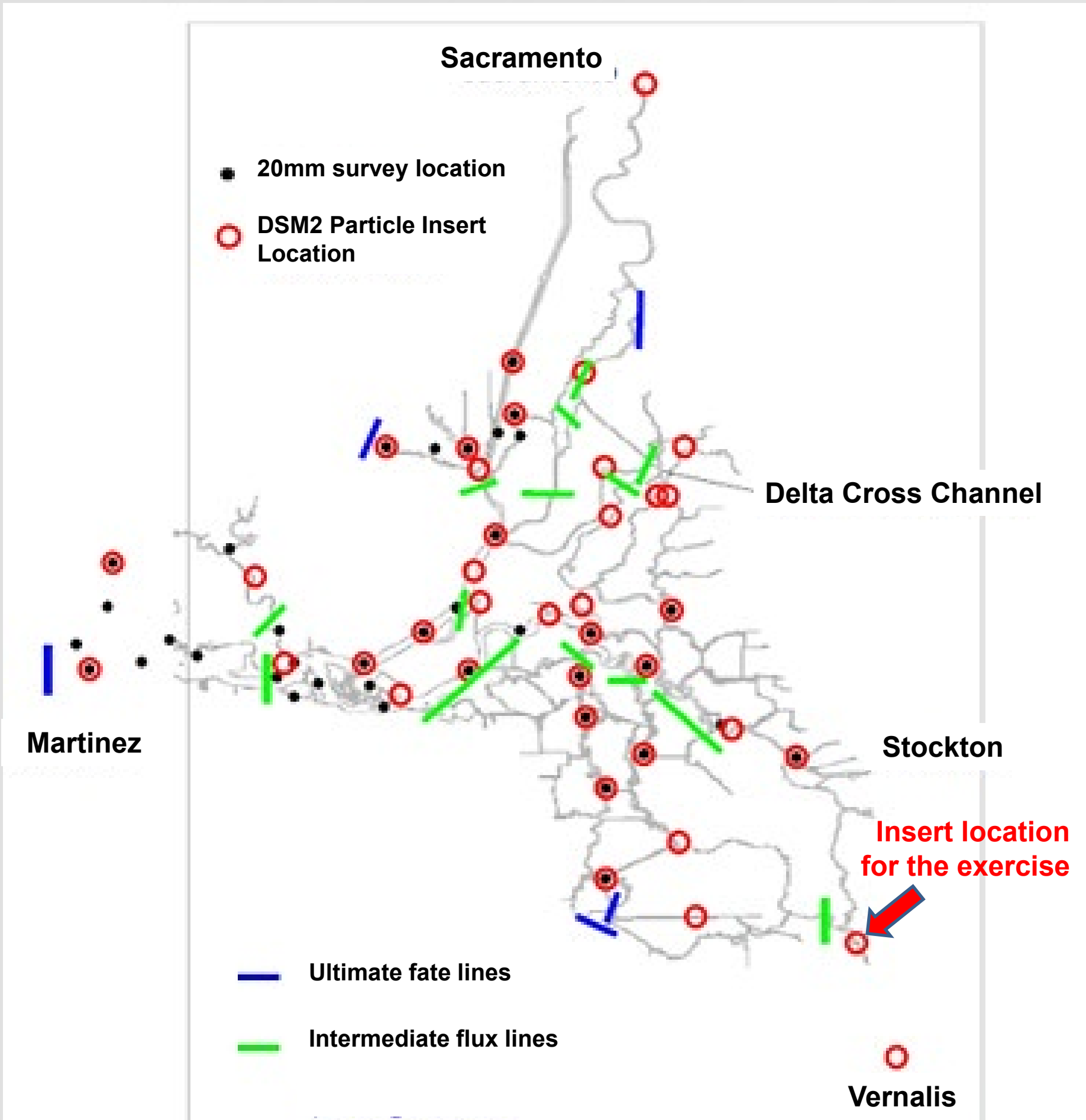- Modular for easy expansion

ECO-PTM
Ecological Particle Tracking Model

- Neutrally buoyant particles **Delta smelt larvae**
- Position oriented particles **Longfin smelt larvae**
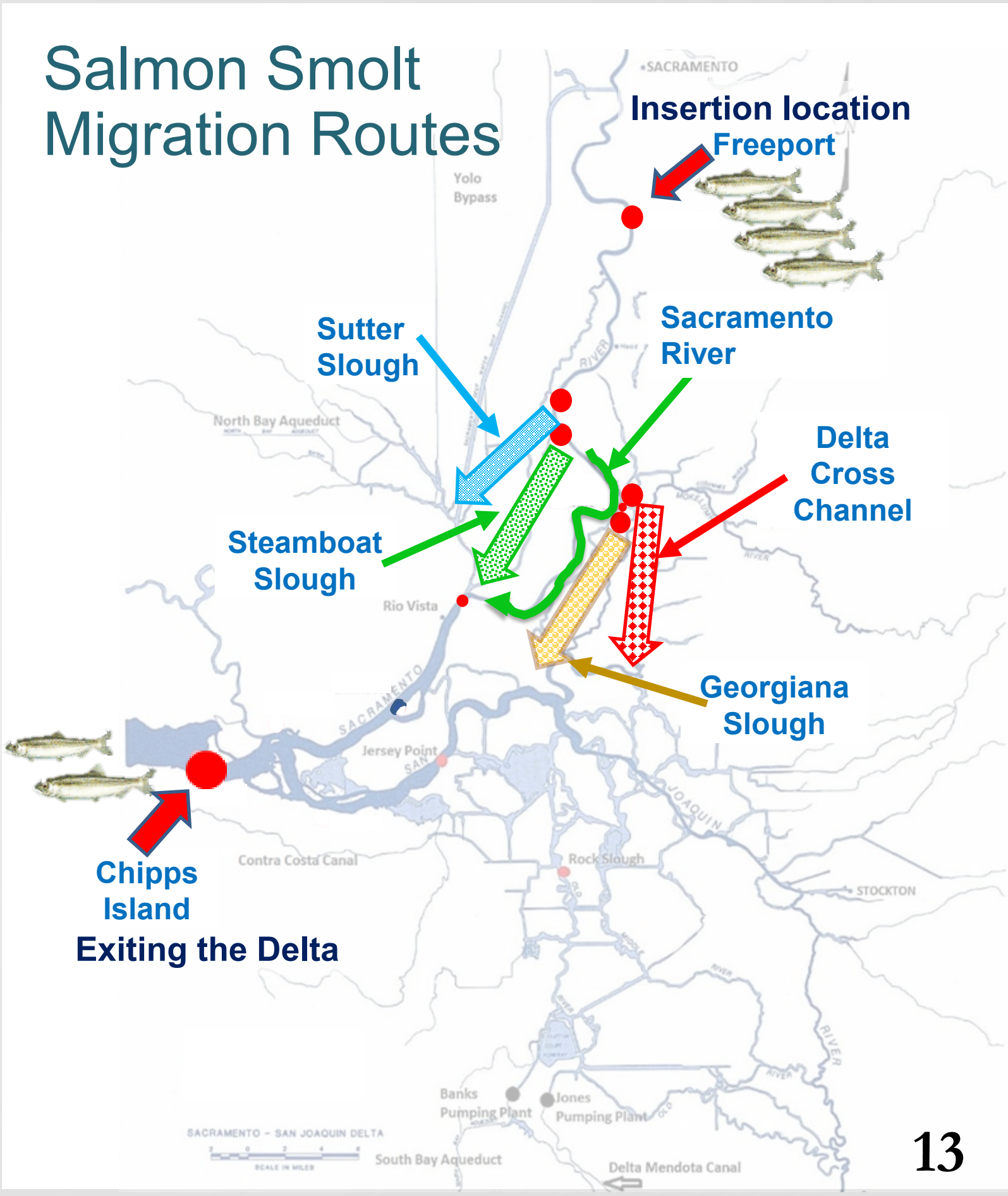- Salmon particles **Chinook salmon smolts**

11

ECO-PTM Output

- Entrainment into facilities (smelt larvae)

- Survival through the Delta (salmon smolt)
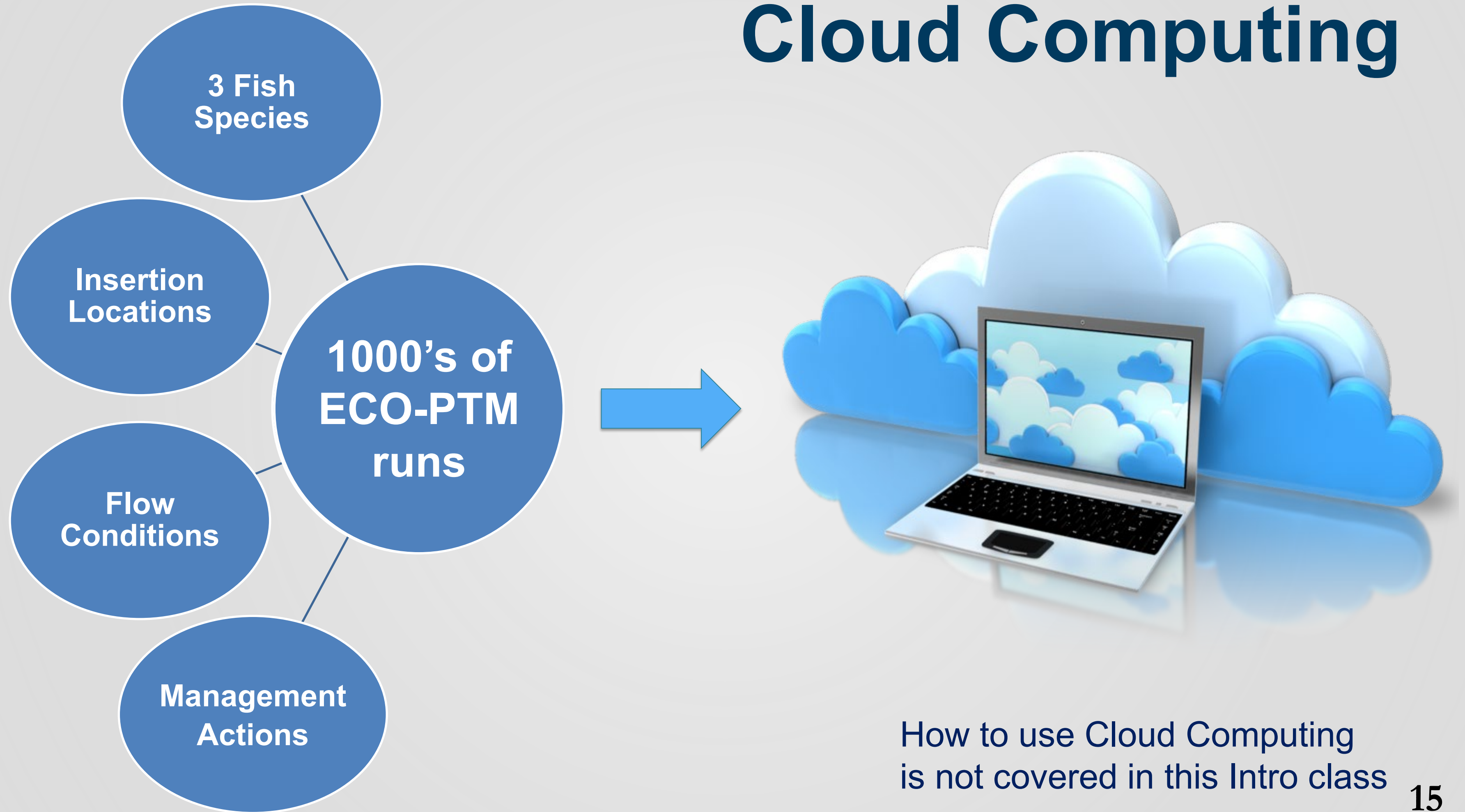
Entrainment (smelt larvae)

- **20mm survey location**
- **DSM2 Particle Insert Location**

Sacramento

Delta Cross Channel

Martinez

Stockton

Insert location for the exercise

- **Ultimate fate lines**
- **Intermediate flux lines**

Vernalis

Survival (salmon smolt)

Salmon Smolt Migration Routes

Insertion location Freeport

Sutter Slough

Sacramento River

Delta Cross Channel

Steamboat Slough

Georgiana Slough

Chipps Island
Exiting the Delta

13

ECO-PTM output depends on:

- species
- insert locations
- flow conditions
- management scenarios
- ……

Cloud Computing

3 Fish Species

Insertion Locations

Flow Conditions

Management Actions

1000's of ECO-PTM runs

How to use Cloud Computing is not covered in this Intro class

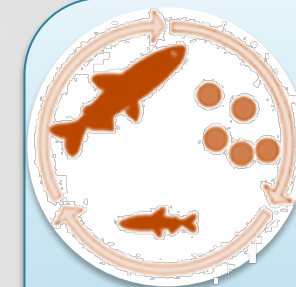15

ECO-PTM: Take Home Points

Collaborative Development

3 Fish Species
Delta Smelt Larvae
Longfin Smelt Larvae
Chinook Salmon Smolts

DATA **Calibrated & Validated to Fish tag data**

Entrainment & Survival
Routing
Movement
Survival

Today's Training

- **What is ECO-PTM**

- **Why it can be used for evaluations**

- **How we use it**

Delta Smelt

Longfin Smelt

Chinook Salmon

Questions? Please type them into Teams chat
Include slide # if possible

Xiaochun Wang (Xiaochun.Wang@water.ca.gov)