

Oroville Facilities (P-2100)
State Water Resources Control Board
December 15, 2010





Oroville Dam

Diversion
Pool & Dam

Supply

Hatchery

Fish Barrier
Dam/Pool

Oroville

Feather River

Thermalito
Complex
(Up to 17,000 cfs)

Low-flow
Channel
(600 cfs)

Thermalito
Afterbay

Robinson
Riffle

Afterbay
Outlet

High-flow
Channel

Oroville Facilities

Project Boundary

Salmon Returns (March through October)

Lake Oroville

Temperature

Flow

Barriers

Sacramento River

Colusa Drainage Canal

Recreation harvest

Bay-Delta Conditions

Ocean Conditions

Union Valley

Harry L. Englebright Lake

Camp Far West Reservoir

Folsom Lake

Sacramento

Sacramento

Freeport

Hood

Delta

Cache Creek

Lake Berryessa

Putah Crk

Shutter Creek
Yuba River

Yuba River
Bear Creek

Yolo

Sacramento River
Sacramento Ship Channel

Cosumnes River

Salmon Holding (May through November)

Habitat Diversity

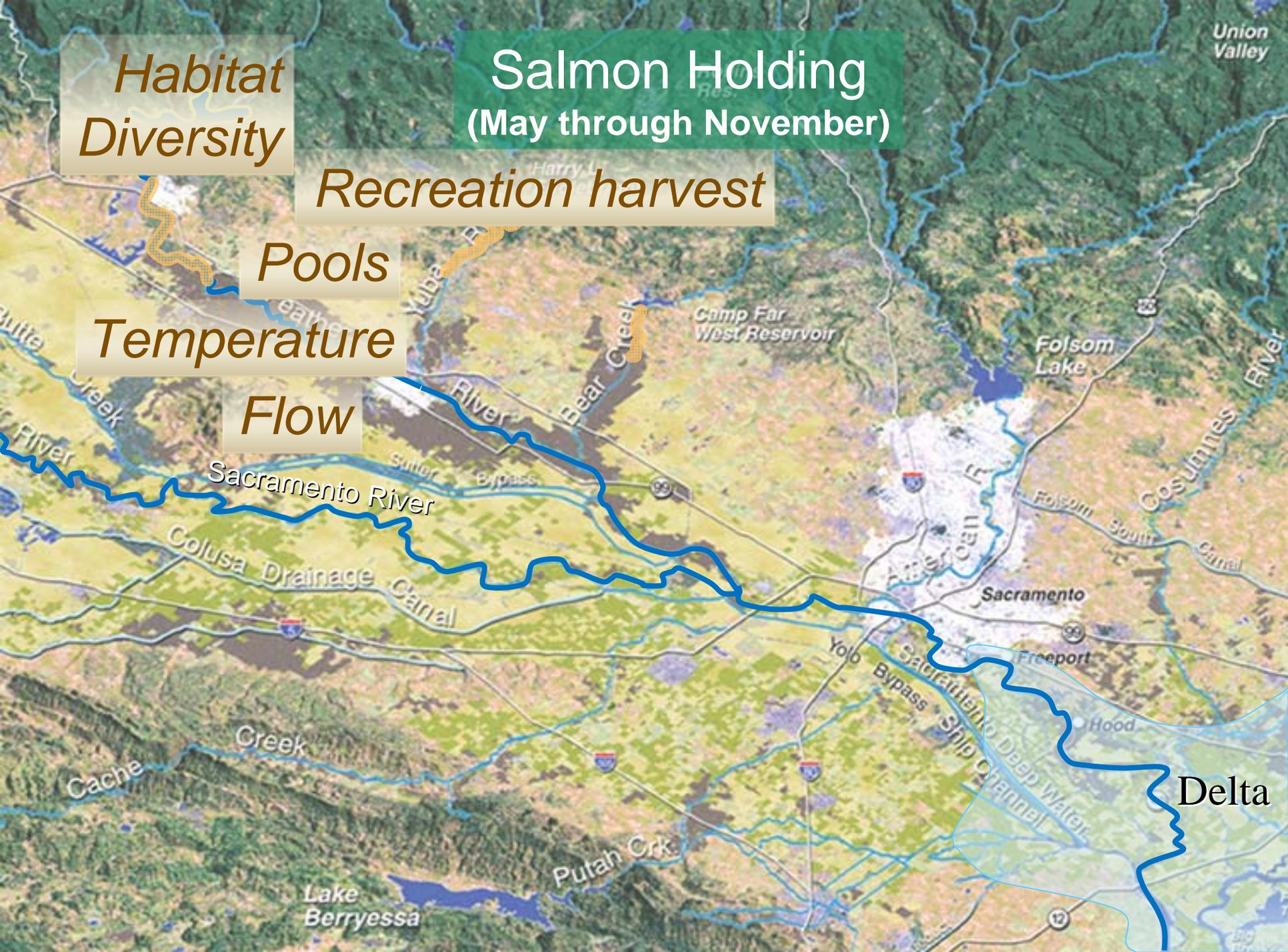
Recreation harvest

Pools

Temperature

Flow

Delta



Camp Far West Reservoir

Folsom Lake

Sacramento River

Colusa Drainage Canal

Sacramento

Freeport

Hood

Lake Berryessa

Putah Crk

Yuba

Sacramento-San Joaquin Deep Water Ship Channel

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Salmon Spawning (September through December)

Flow

Riffles/
Gravel

Habitat diversity

Recreation harvest

Temperature

Delta



Salmon Rearing (November through May)

Flow

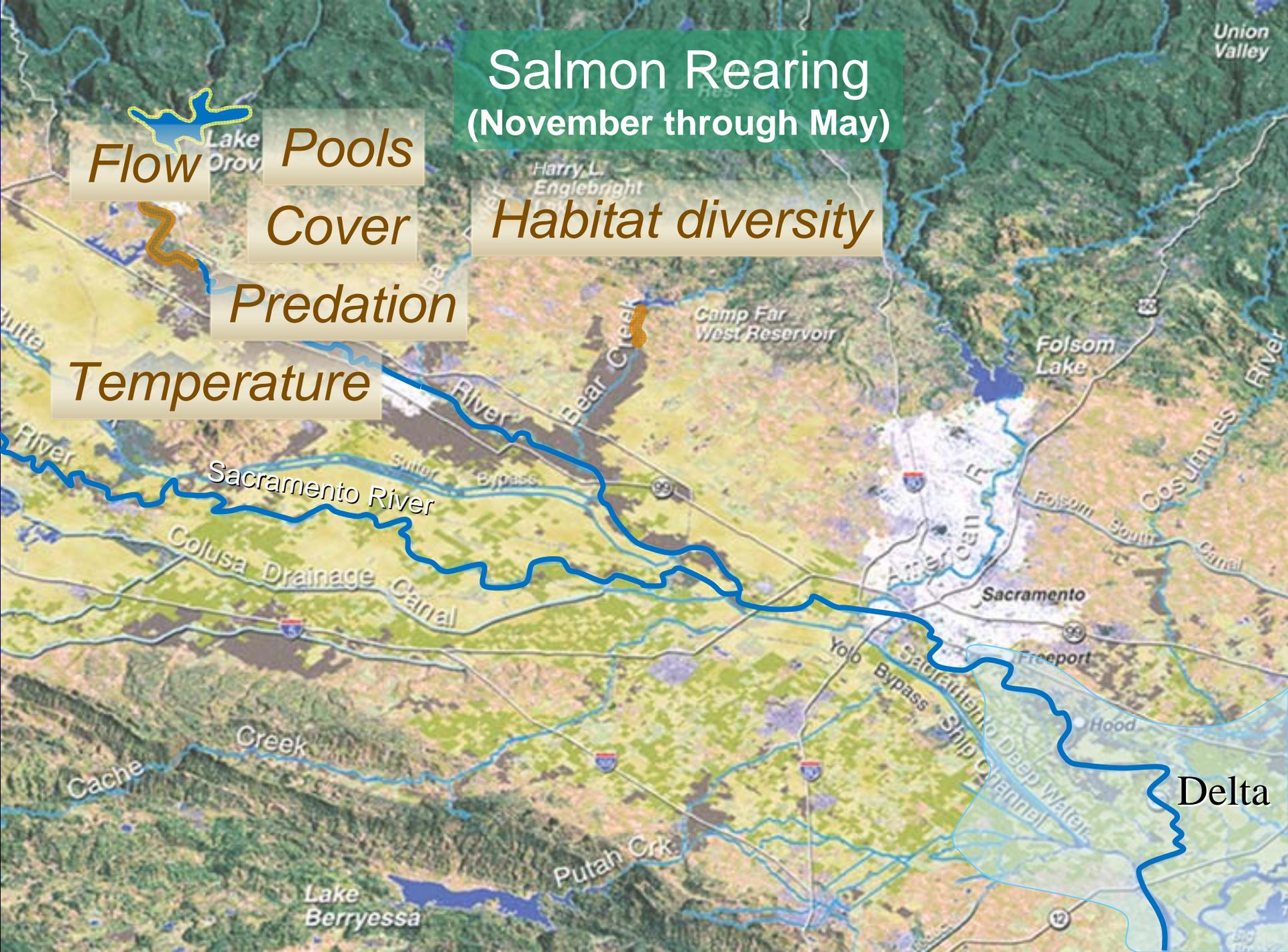
Pools

Cover

Predation

Temperature

Habitat diversity



Union Valley

Lake Oroville

Harry L. Englebright

Camp Far West Reservoir

Folsom Lake

Sacramento River

Colusa Drainage Canal

Sacramento

Freeport

Delta

Cache Creek

Lake Berryessa

Putah Crk

Yolo Bypass

Sacramento Deep Water Ship Channel

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Salmon Juvenile Outmigration (December through July)

Temperature

Flow

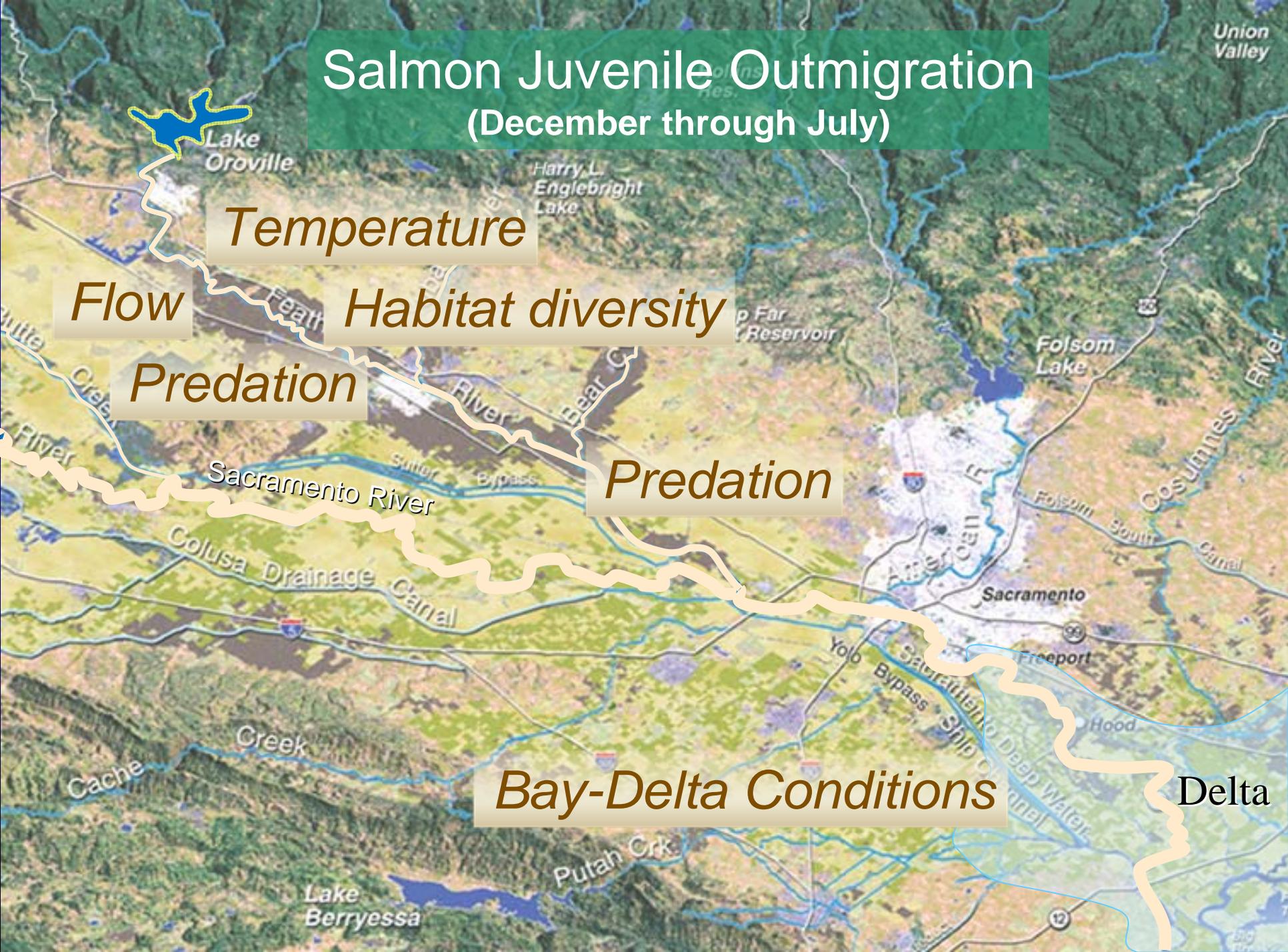
Habitat diversity

Predation

Predation

Bay-Delta Conditions

Delta





Settlement Solution

- Initial replenishment
- Monitor
- 5-year O&M review

Current Condition

Dam blocks gravel movement

Scouring flows every 5-10 years



Gravel Replenishment
(spawning, rearing: habitat diversity)



Dam alters natural hydrology, flows

Settlement Solution

- Improve 2 existing and 4 new channels
- 5-year O&M review

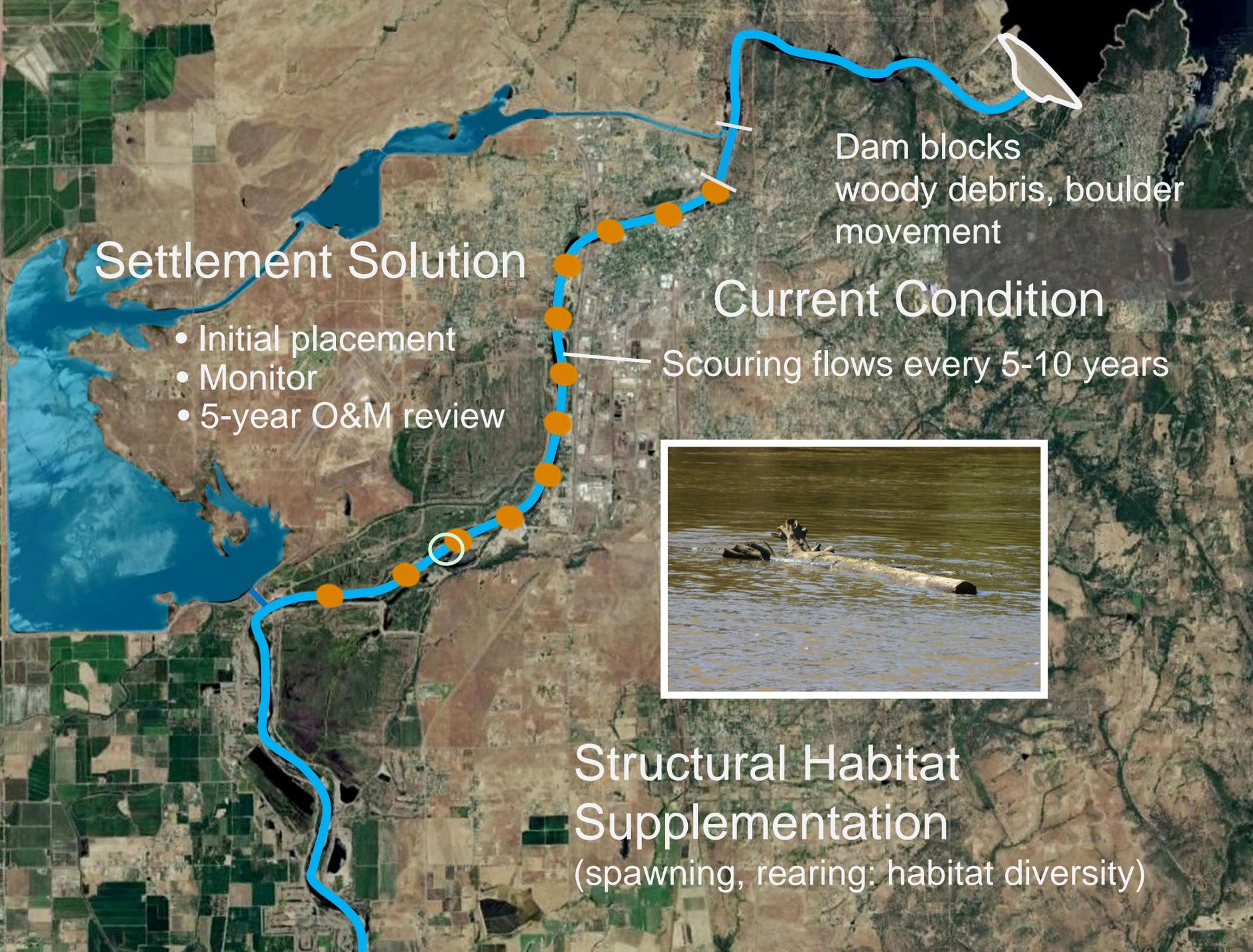
Current Condition

Flow condition not conducive to side-channel development



Side-Channel Development for Steelhead Trout

(holding, spawning, rearing: habitat diversity, predation)



Settlement Solution

- Initial placement
- Monitor
- 5-year O&M review

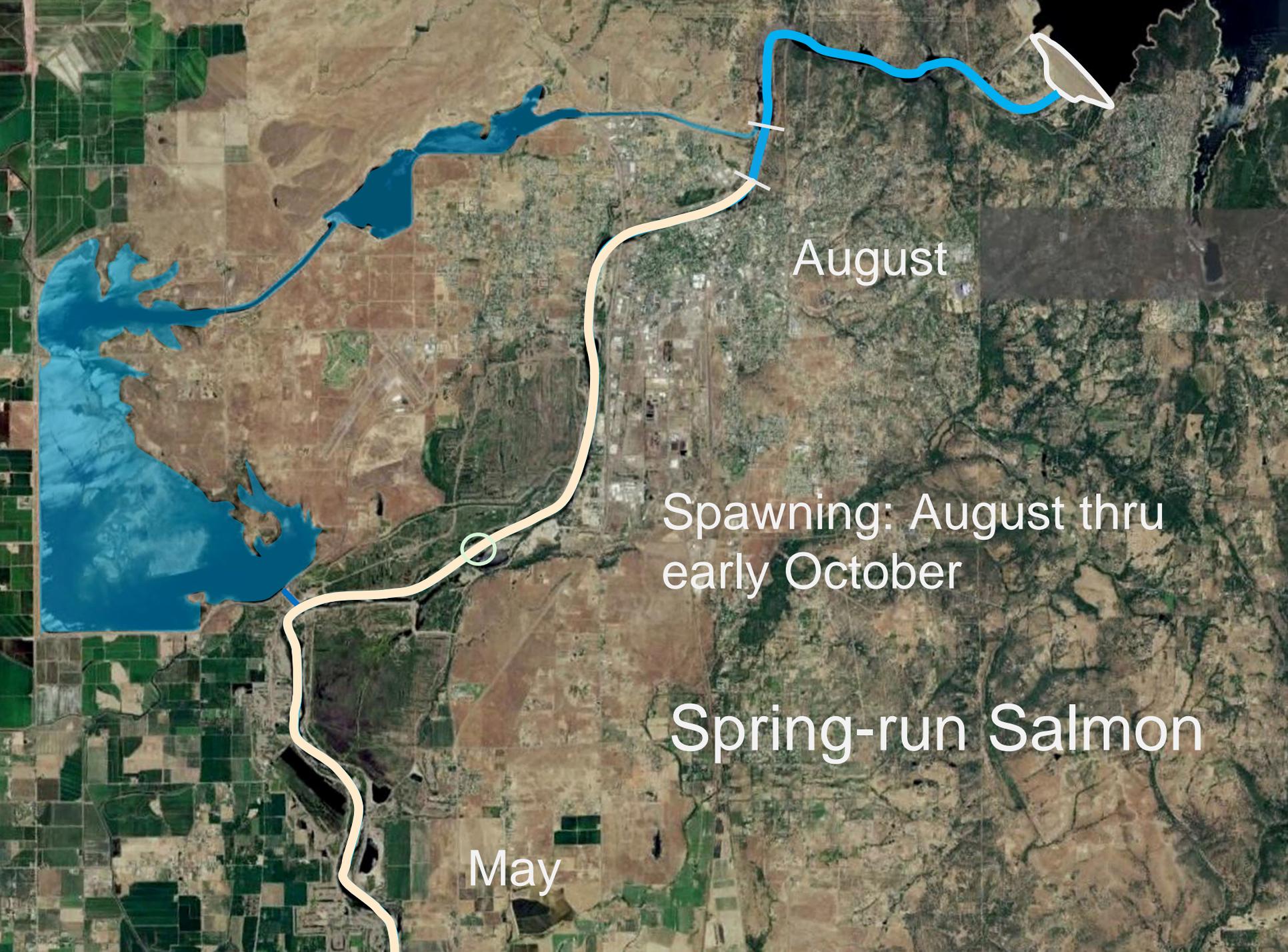
Dam blocks woody debris, boulder movement

Current Condition

Scouring flows every 5-10 years

Structural Habitat Supplementation
(spawning, rearing: habitat diversity)





August

Spawning: August thru
early October

Spring-run Salmon

May



Egg super-imposition

Spring-run holding
September

Past Solutions

- Hatch/rear spring-run in hatchery
- Truck to Bay area
- Genetic integrity concerns

Spawning: mid September thru December

Fall- & Spring-run Salmon
(in-river spring-run spawning, genetic integrity)

August



Settlement Solution

In-River:

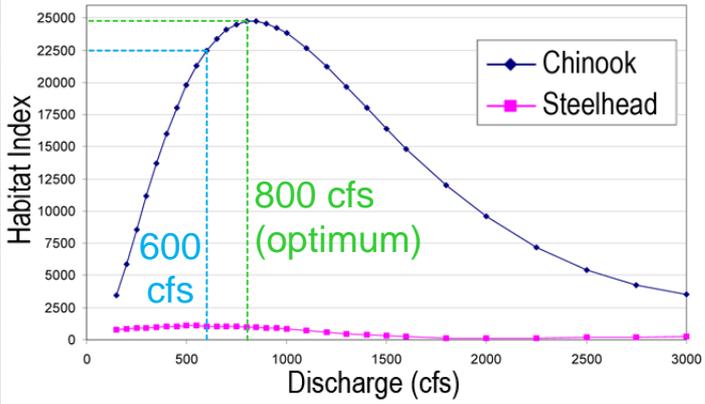
- Counting weir
- Monitor spring-run
- Permanent separation weir

Hatchery:

- Limited spring-run
- Disease control (temperature)
- Genetics management plan/tagging
- Increase in-river release
- Data collection, reporting

Fall- & Spring-run Salmon
(in-river spring-run spawning, genetic integrity)

Upper Reach Chinook and Steelhead Spawning WUA/RSI



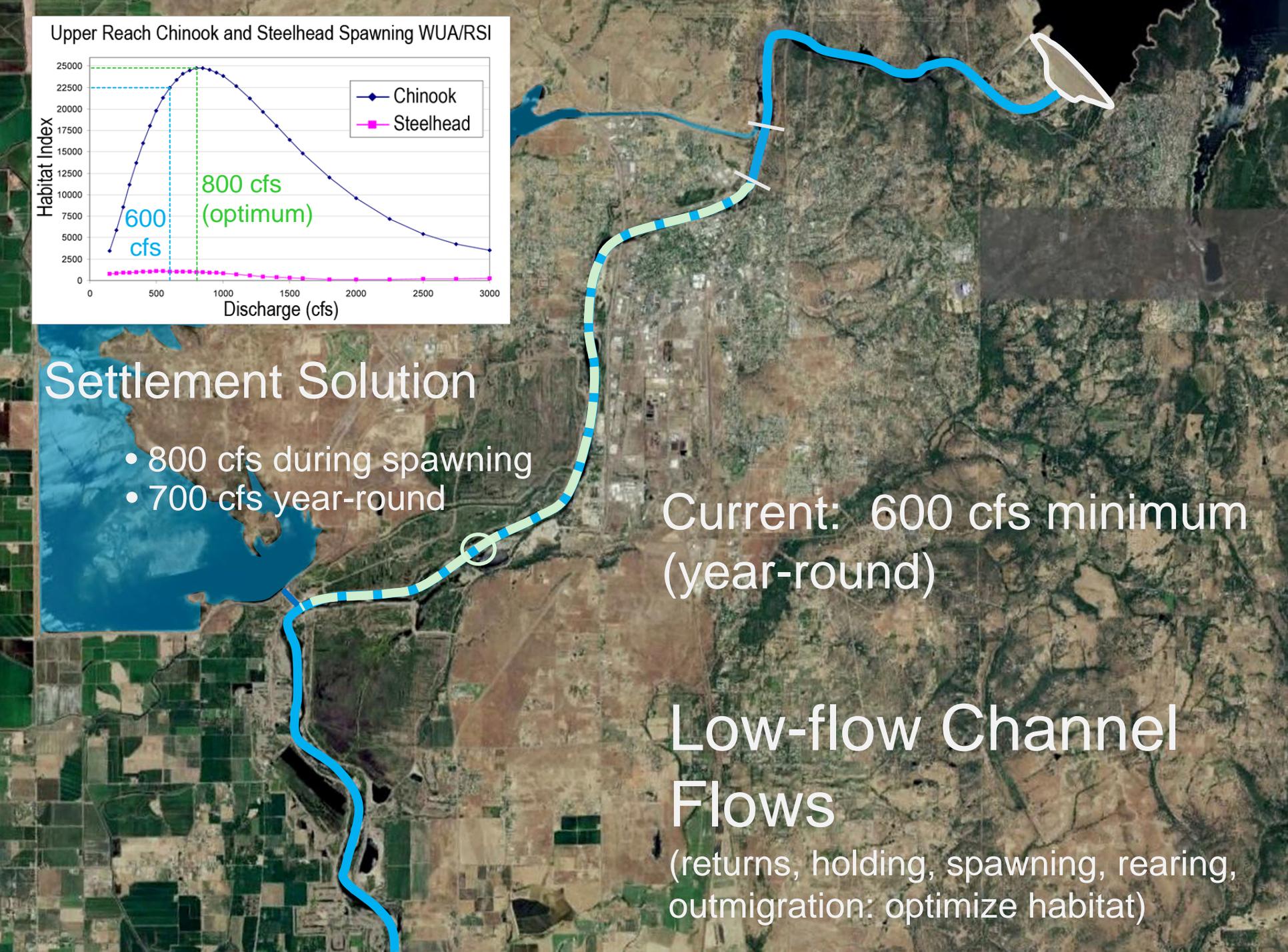
Settlement Solution

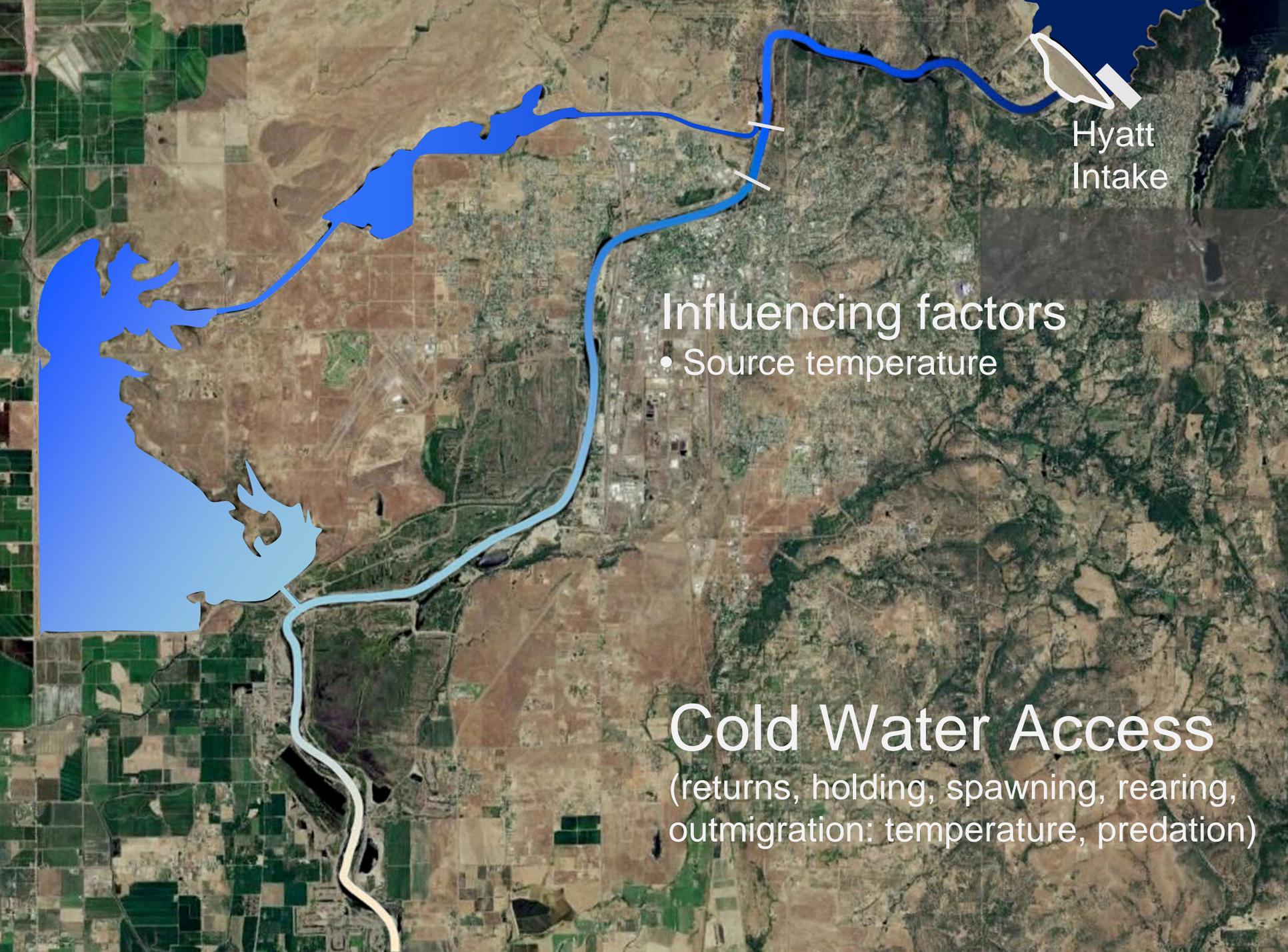
- 800 cfs during spawning
- 700 cfs year-round

Current: 600 cfs minimum (year-round)

Low-flow Channel Flows

(returns, holding, spawning, rearing, outmigration: optimize habitat)





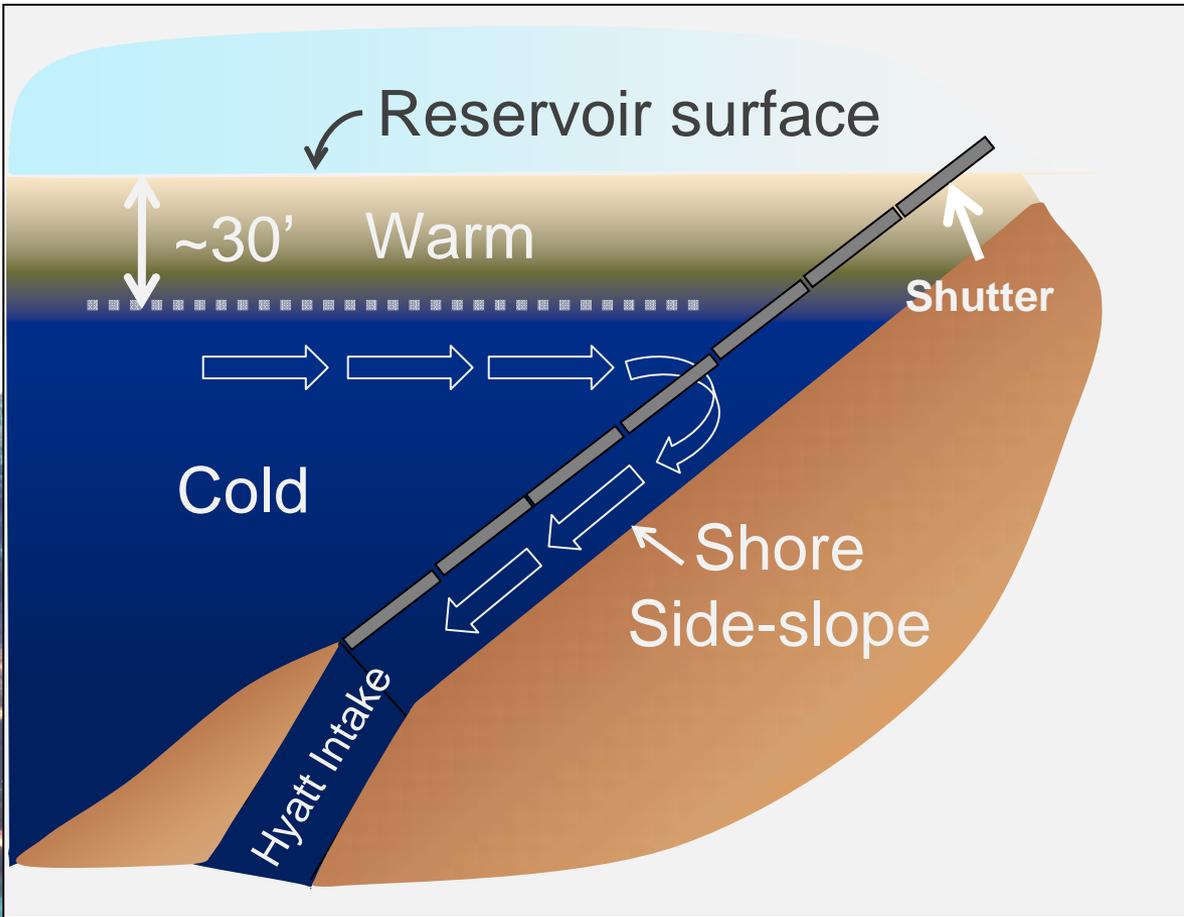
Hyatt
Intake

Influencing factors

- Source temperature

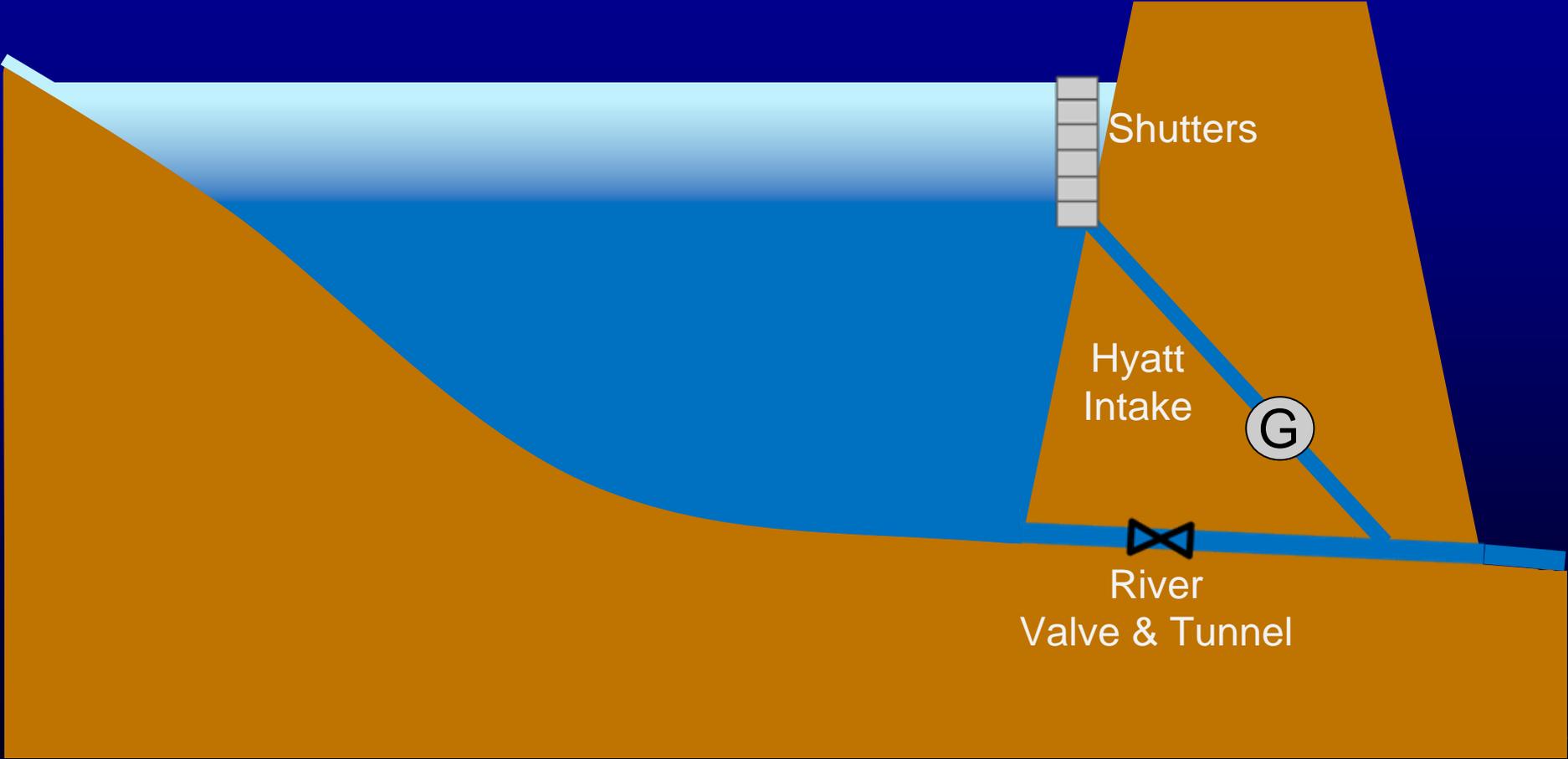
Cold Water Access

(returns, holding, spawning, rearing, outmigration: temperature, predation)



Hyatt Intake &
Temperature
Control Device

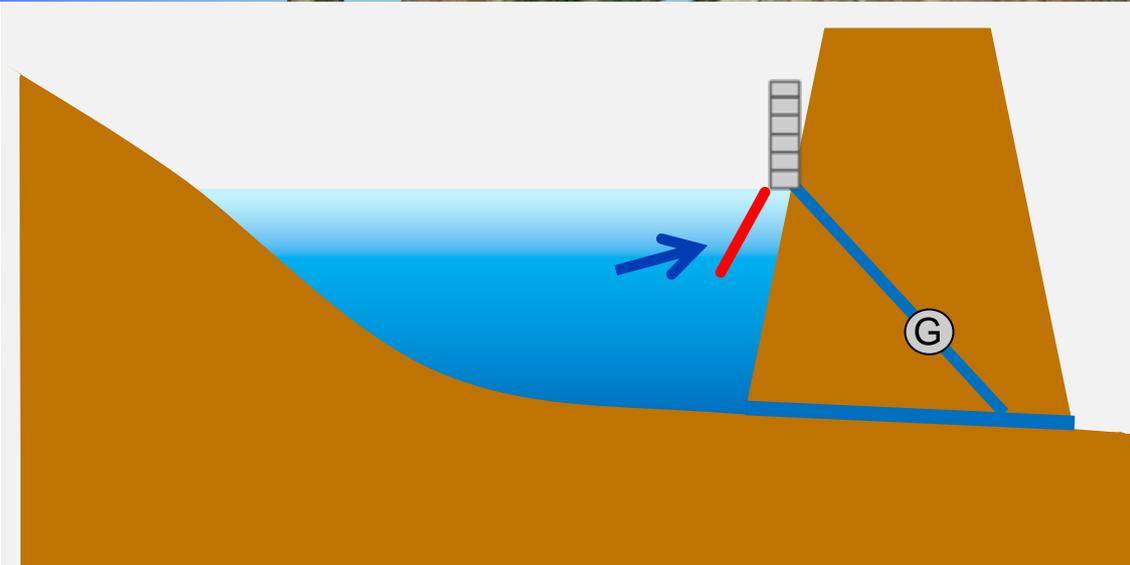
Oroville Dam Water Access



Water Temperature Management

Settlement: Recon Study

- “Elephant trunk”
 - 8-15 Month River Release Curtailment
- River valve re-design
 - Deep Water Construction Environment



Influencing factors

- Source temperature
- Weather
- Water velocity/flow



Water Temperature Management

Settlement: Recon Study

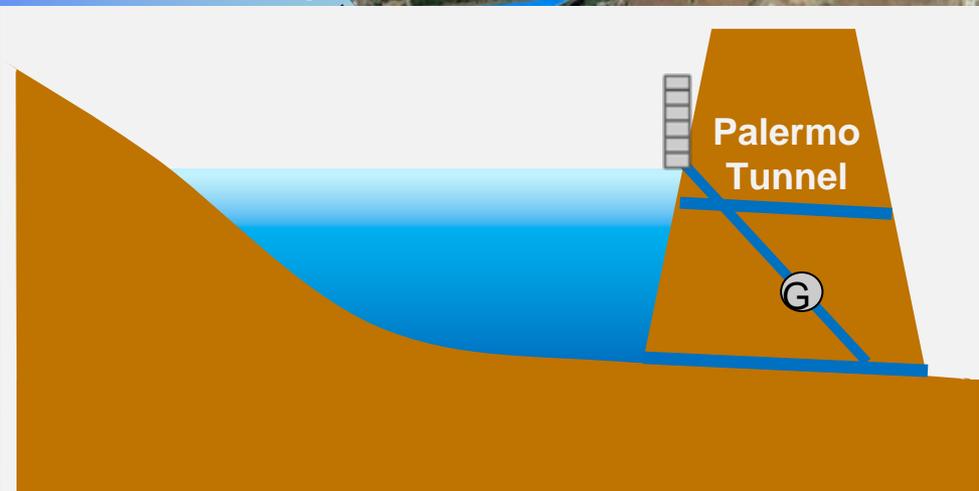
- “Elephant trunk”
 - 8-15 Month River Release Curtailment
- River valve re-design
 - Deep Water Construction Environment
- Palermo tunnel
 - Conduit Alignment

New Conduit

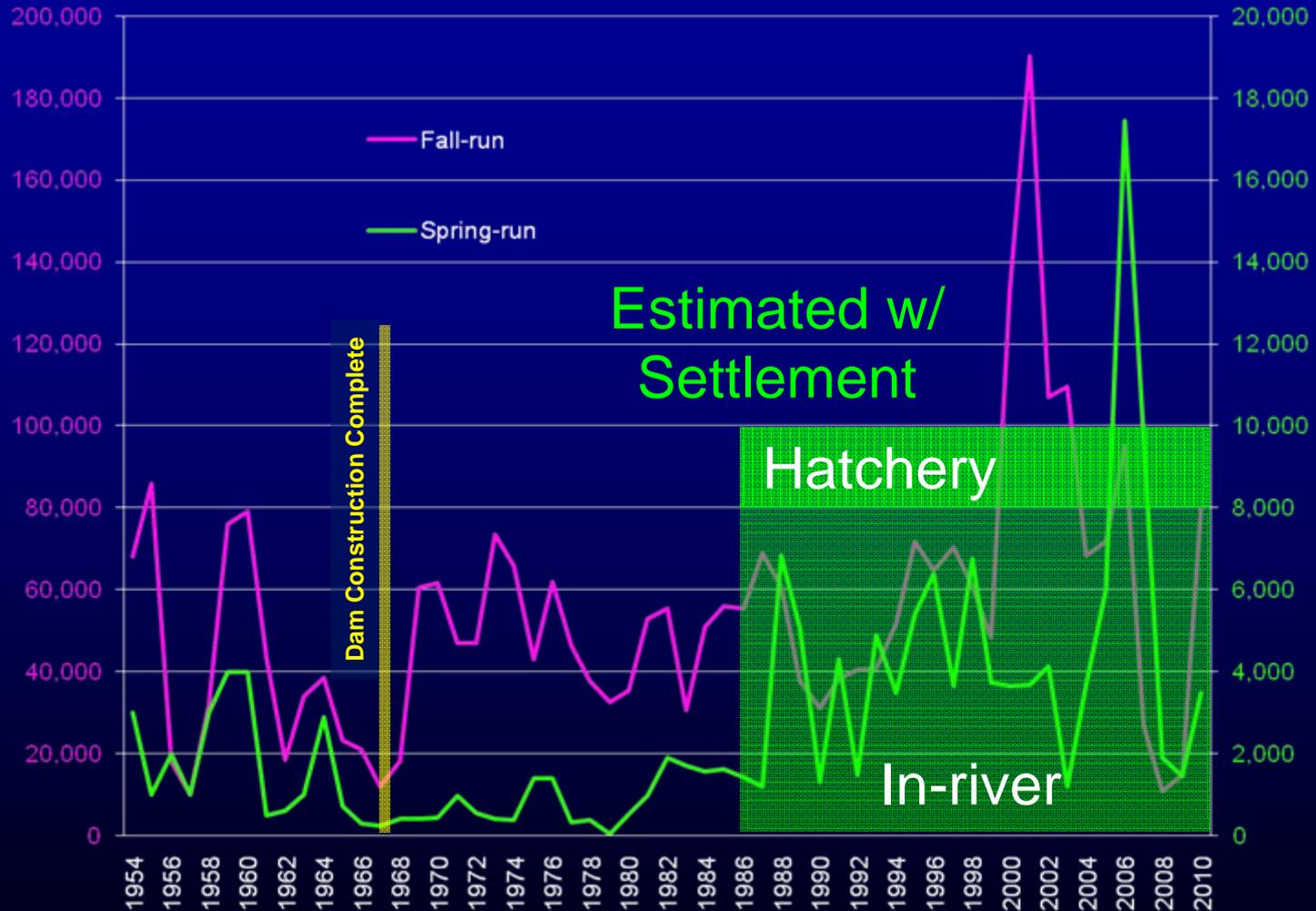
Ex. 25 cfs (irrigation)

Influencing factors

- Source temperature
- Weather
- Water velocity/flow



Salmon Returns



Questions?