

# **Reinitiation of Consultation on the Coordinated Long-Term Operation of the CVP and SWP**

**June 21, 2018**

# Topics

- Approach
- Low Salinity Zone Management
- Old and Middle Rivers
- SJR Inflow: Export



**APPROACH**

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# Goals

- **Near-term Actions: Improve water supply in a way that does not cause additional adverse effects to listed species (is equally or more protective of the species)**
- **Long-term: Improve water supply, power, and re-operate for listed species due to:**
  - Low populations
  - New information as a result of drought
  - New information due to collaborative science

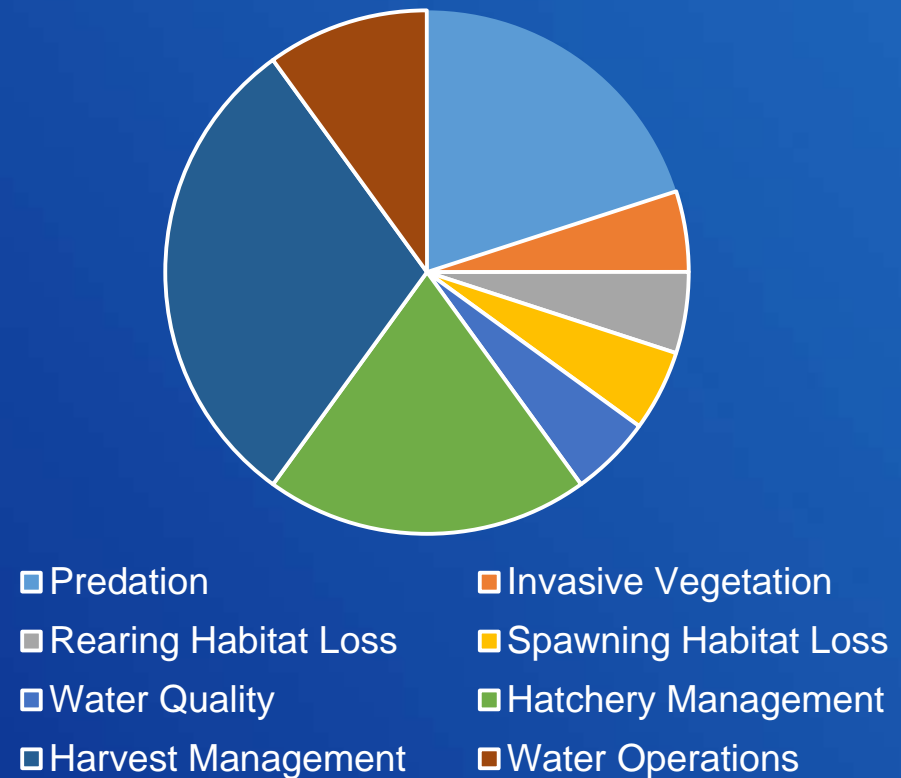
# Long-Term Programmatic Approach

- **Sets the direction for overall system analysis**
  - New storage, conveyance, and power marketability
  - Other stressors
  - Regulatory performance and costs
- **Establishes a framework for water operations in the context of species management**
  - Structured Decision Making
- **Maximizes water supply through improving science around the necessary protections for species**
  - Adaptive management strategy

# Adaptive Management Approach

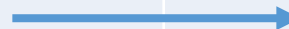
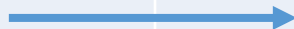
- Sustainable water operations in the context of species management
- Formalized institutional processes for transparency and accountability
- Supports strong voluntary collaborative partnerships

Possible Theoretical Effect of Stressors on Fish??



# Approach

Near-Term	Long-Term	
	<i>Programmatic</i>	<i>Re-Operation</i>
<ul style="list-style-type: none"> <li>• Incorporate updated science for day-to-day decisions on water ops</li> <li>• Incorporate WIIN Act provisions</li> </ul> <p><u>Actions:</u></p> <ul style="list-style-type: none"> <li>➤ San Joaquin I:E</li> <li>➤ OMR Flexibility</li> <li>➤ Salinity Management</li> </ul>	<ul style="list-style-type: none"> <li>• Overall system analysis</li> <li>• Adaptive management</li> </ul> <p><u>Actions:</u></p> <ul style="list-style-type: none"> <li>➤ New Storage, New Conveyance, and Power Marketability</li> <li>➤ Other Stressors</li> <li>➤ Structured Decision Making</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainable water ops in the context of species management</li> </ul> <p><u>Actions:</u></p> <ul style="list-style-type: none"> <li>➤ Sustainable Regulatory Requirements</li> <li>➤ Temperature Management</li> <li>➤ Integrated Operations</li> <li>➤ Implement Non-Flow Actions</li> </ul>



# Near-term Actions

- **Completion within a year**
  - **Final Environmental Assessment and Endangered Species Act Consultation by the end of December 2018**
- **Update RPA actions to current science**
- **Objective: Improve water supply in a way that does not create additional adverse effects to listed species**



# Near-term Actions to Improve Water Supply

The need for the proposal is to:

- maximize water deliveries to Central Valley Project and State Water Project water users,
- consistent with applicable laws, contractual obligations, agreements, and to
- improve Reclamation's ability to implement the Water Infrastructure Improvements for the Nation (WIIN) Act, in coordination with the SWP,
- without additional adverse effects to listed species beyond those analyzed in the 2008 & 2009 BOs

# Near-term Action Engagement

- **January 19: Brainstorming Workshop**
- **February – March: Meetings with water users, power customers, NGOs, agencies**
- **April 26: Alternatives Workshop**
- **June: Input solicited on science**
- **June 21: Initial Analysis Workshop**

# **LOW SALINITY ZONE MANAGEMENT**

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# Existing Requirement

- **2008 USFWS BO RPA Action 4**
  - September to October, outflow = no greater than 74km in the fall (following wet years) and 81km in the fall (following above normal years)
  - November: Inflow must equal outflow in upstream reservoirs
- The 2008 Service BO uses X2 as a surrogate indicator of fall habitat for Delta Smelt based on analyses described by Feyrer et al. (2010).

# Delta Smelt Habitat Science

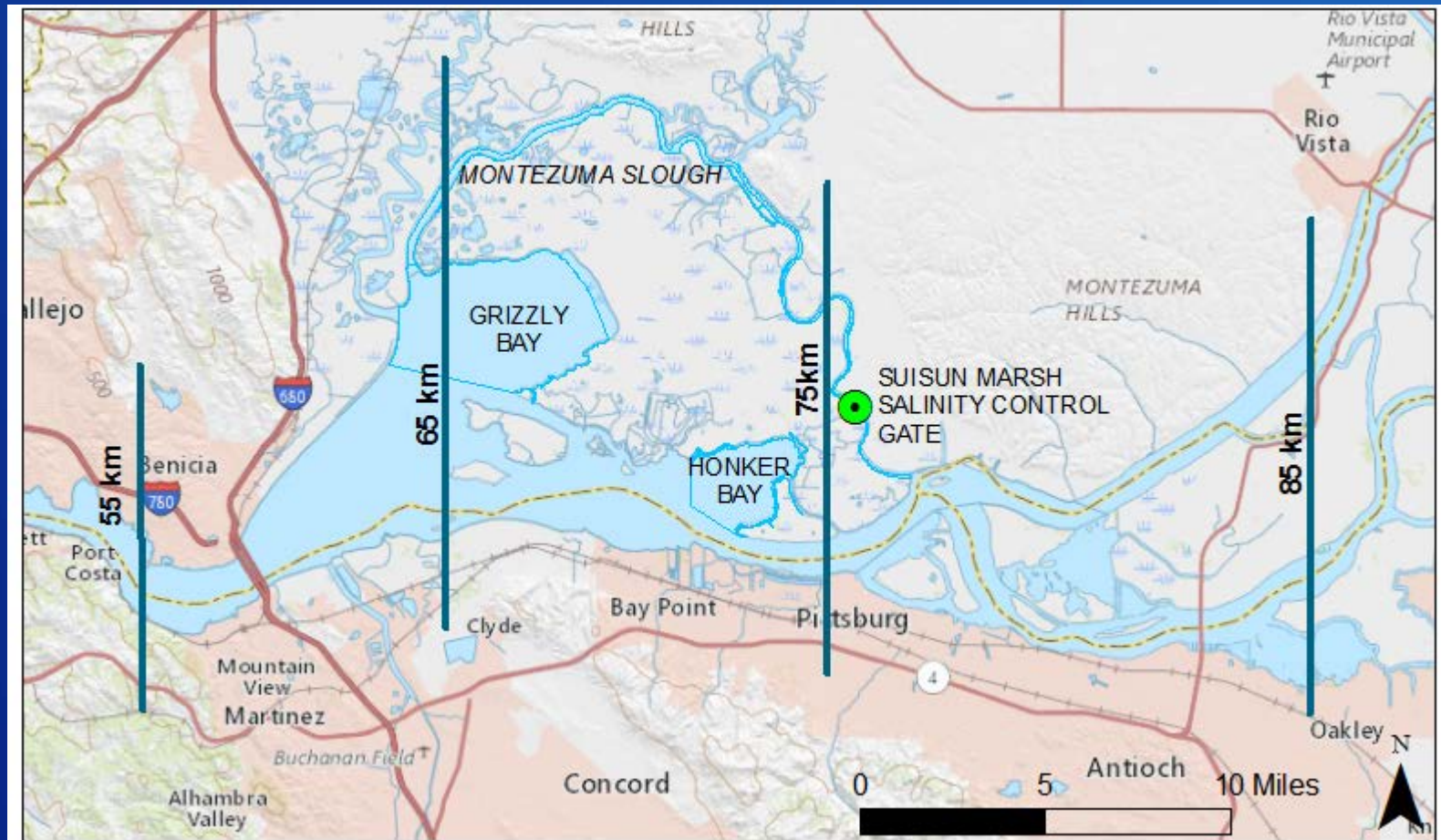
2008 / 2009 Biological Opinion Science	Current Science
<p>Smelt populations were larger in the late 1990's, when there was higher fall outflow</p> <p>Bennett 2005</p> <p>Feyrer et al 2007, 2008</p> <p>Lehman et al 2008</p> <p>Nobriga et al 2008</p>	<p>Grizzly and Honker Bay are key regions for smelt habitat</p> <p>Smelt found outside of LSZ</p> <p>Food, temperature, turbidity, other factors important for smelt</p> <p>Feyrer et al 2011; Sommer et al 2011; Sommer and Mejia 2013; Brown et al 2014; Kimmerer and Thompson 2014 IEP MAST 2015; Bever et al 2016</p>

# **DRAFT LSZ Proposed Action**

- **Operate to the greatest degree practicable in November and not augment outflow in December**
- **Allow operation of the Suisun Marsh Salinity Control Gates year-round**
- **Add a Western Drain to the Roaring River Distribution System, providing food-rich water to Grizzly Bay**
- **Operate the Suisun Marsh Salinity Control Gate in September and October following Above-Normal and Wet water years to achieve low salinity zone area in Grizzly & Honker Bays per the objective of Action 4**



# Suisun Marsh Salinity Control Gate



# Addressing Uncertainty

- Reclamation will conduct a collaborative fall outflow and habitat monitoring, analysis and synthesis report each year for five years. Another review of the Fall X2 action will be conducted to incorporate the syntheses from the five-year period.
- Directed Outflow Project - study outflow actions and their benefit to Delta Smelt through paired data collections (same location and time) of abiotic and biotic habitat constituents. Sampling will occur during the Delta Smelt juvenile rearing-stage, a period known to be associated with the location of the LSZ.



# CALSIM RESULTS

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**Questions**

RECLAMATION

# **OLD AND MIDDLE RIVER REVERSE FLOWS**

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# Existing Requirement

- **2008 Service BO (Actions 1-3):**
  - December to June
  - Action 1, Action 2, Action 3
- **2009 NMFS BO (Action IV.2.3):**
  - January 1 to June 15
  - First and Second Stages based on Density-Dependent
- **WIIN Act:**
  - Requires the Secretary of Interior and Secretary of Commerce to manage reverse flow in Old and Middle Rivers to maximize water supplies, subject to no additional adverse effects on listed species

# Old and Middle Reverse Flow Science

2008 / 2009 Biological Opinion Science	Current Science
Migrating fish are vulnerable to diversion into the San Joaquin River channels towards the export facilities, and respond to flow within the channels, including the net migration speed downstream	OMR may not correlate to salmonid survival
Vogel 2004	Continued development of Particle Tracking Models
SJRGA 2006	2014 DWR Stipulation Study
SJRGA 2007	Guerin 2014; Perry 2017
SJRGA 2008	Salmonid Rapid Genetics Protocol
	Grimaldo 2017

# DRAFT OMR Proposed Action

- **Scientifically Supported Implementation of OMR Flow Requirements**
- **Temporary Operational Flexibility for Storm Events**
- **OMR Index**
- **Rapid Genetic Protocols**

# DRAFT OMR Proposed Action

**DOSS and the Smelt Working Group would meet weekly during OMR management season and provide Reclamation and DWR a report on:**

- **Species distribution**
- **Abiotic factors that would affect future distribution based on MAST / SAIL conceptual models**
- **Assist Reclamation and DWR in developing and updating conceptual models when new info is out**
- **Assist Reclamation and DWR in developing and updating entrainment models**
- **Assist Reclamation and DWR in the development of alternative measures that would have lesser water supply impact**

# DRAFT Implementation of OMR

## Salmonids

- DOSS predicts 5% entering the Delta would trigger OMR restrictions (-5000 cfs)
- 95% exited the Delta would stop OMR restrictions
- When 5% have exited the Delta, Reclamation would consider managing OMR at rates less negative
  - Vulnerable migration life-stage
- Reclamation would conduct risk assessments to determine when there may be additional adverse effects and operate to rates less negative
  - At 5% exiting, & at 50%, 75% and 90% of take at a minimum

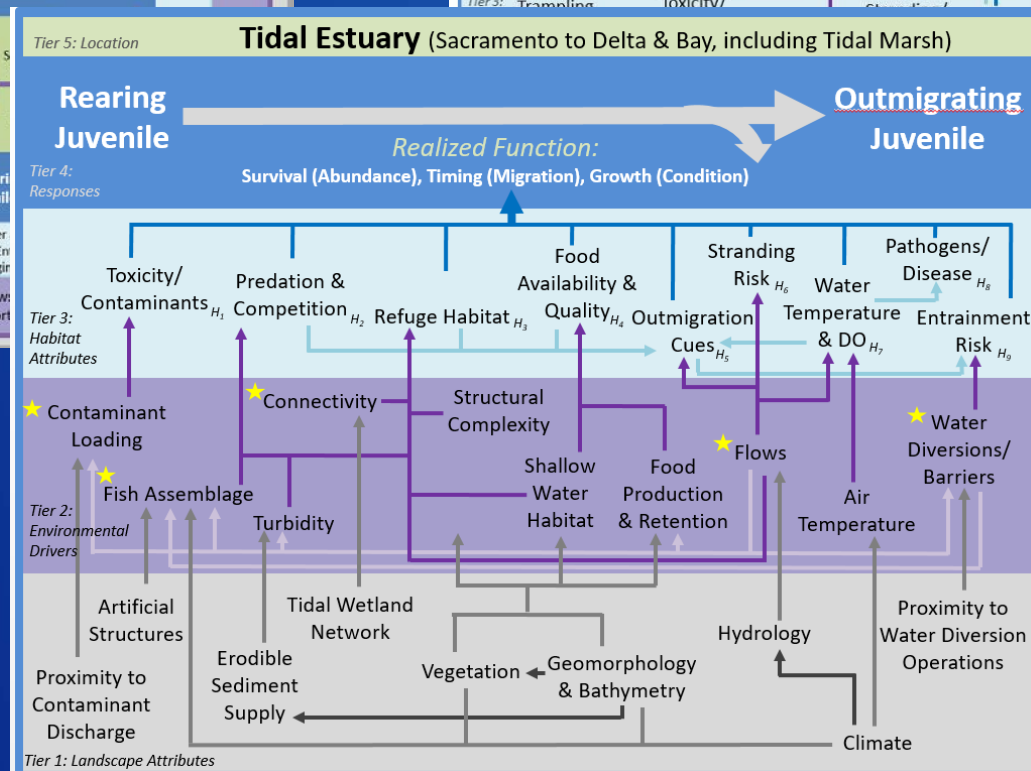
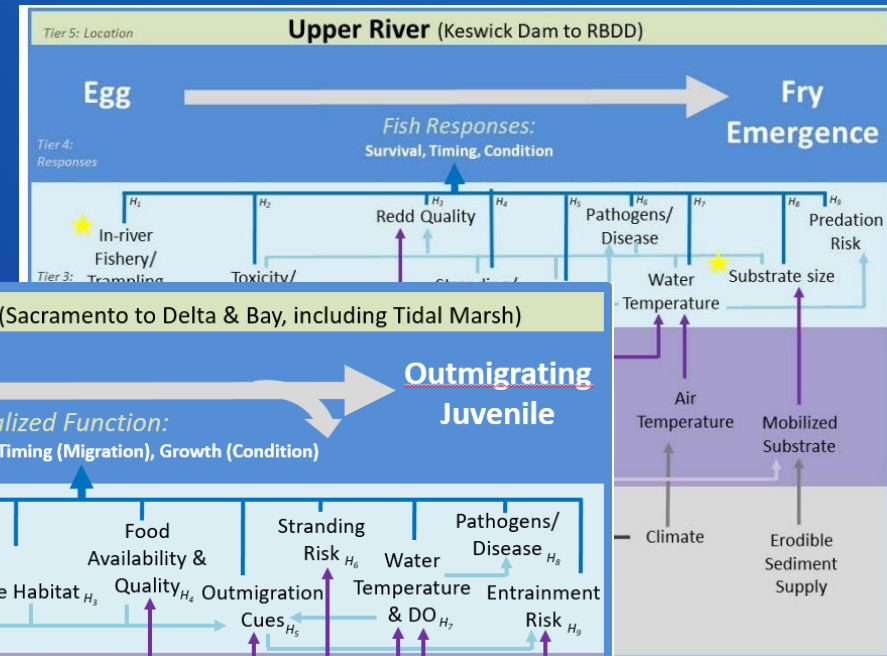
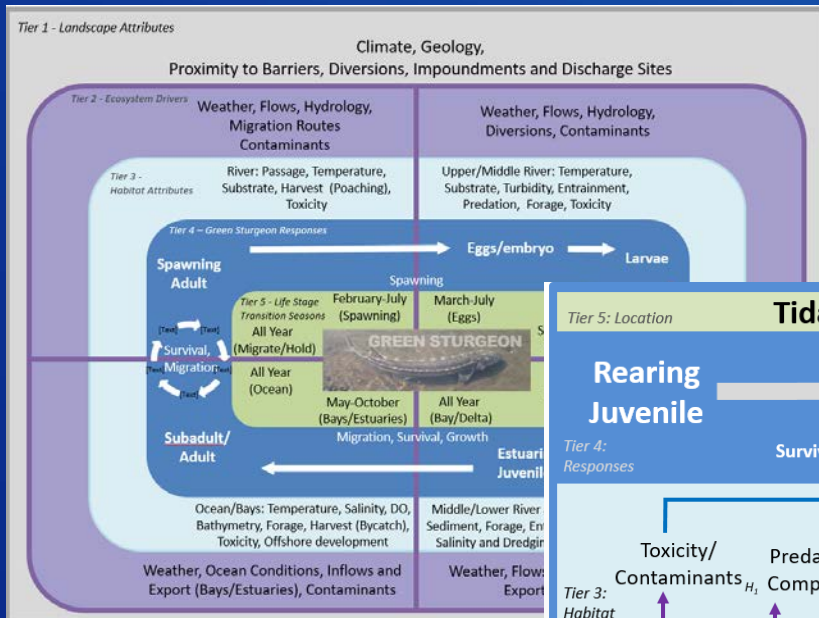


# DRAFT Implementation of OMR

**Salmonid Risk Assessment factors include:**

- **Near-term forecasts with available salvage models**
- **Requirements under applicable State law**
- **Distribution of listed species**
- **Potential effects of high entrainment risk on subsequent species abundance**
- **Water temperature**
- **Turbidity**
- **Other significant factors relevant to the determination as required by applicable federal or state laws**
- **Whether any alternative measures could have a substantially lesser water supply impact**

# Salmonid Conceptual Models



# DRAFT Implementation of OMR

## Delta Smelt

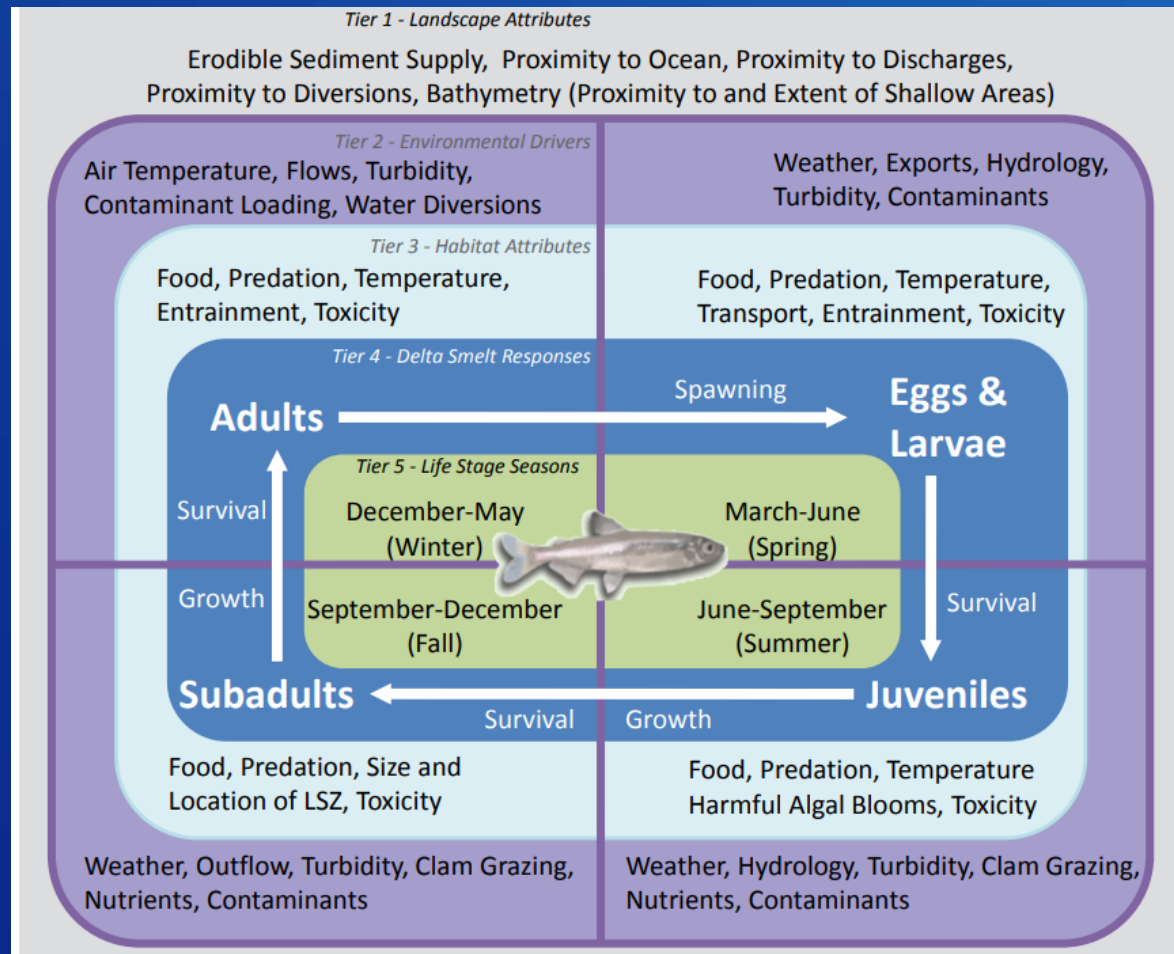
- After first flush, manage OMR to no more negative than -5,000
- Reclamation would conduct risk assessments to determine when there may be additional adverse effects and operate to rates less negative
  - At 50%, 75% and 90% of take at a minimum

# DRAFT Implementation of OMR

**Delta Smelt Risk assessment factors include:**

- **Targeted real-time fish monitoring in the Old River including at Station 902**
- **Near-term forecasts with available salvage models**
- **Requirements under applicable State law**
- **Distribution of listed species**
- **Potential effects of high entrainment risk on subsequent species abundance**
- **Water temperature**
- **Turbidity**
- **Other significant factors relevant to the determination as required by applicable federal or state laws**
- **Whether any alternative measures could have a substantially lesser water supply impact**

# Delta Smelt Conceptual Model



# DRAFT Temporary Operational Flexibility for Storm Events

- Reclamation would identify a storm event based upon forecasted precipitation within the Central Valley where the predicted Delta Outflow Index indicates a higher level of flow available for diversion

Reclamation and/or DWR will evaluate the risk of additional adverse effects based on:

- The degree to which the Delta outflow index indicates a higher level of flow available for diversion;
- Relevant physical parameters including projected inflows, turbidity, salinities, and tidal cycles;
- The real-time distribution of listed species and including existing/current and anticipated/projected distribution.

# DRAFT Temporary Operational Flexibility for Storm Events

## Delta Smelt Factors

- Turbidity at Bacon Island
- Turbidity Relationship
- EDSM
- Spring Kodiak Trawl
- 20 mm Larval Survey
- eDNA

## Salmonid Factors

- Survey Data
- Cumulative Routing Risk
- Acoustic Tagging
- Hydrology alteration model
- Entrainment Risk
- Entrainment Model



# DRAFT OMR Index

$$OMR_i = A \cdot Q_{SJR} + B \cdot Q_{SDD\&E} + C$$

Where,

- **A, B, and C are calibrated coefficients;**
- **$Q_{SJR}$  = prior day flows on the San Joaquin River at Vernalis (cfs);**
- **$Q_{SDD\&E}$  = South Delta Diversions and Exports (cfs), and;**
- **$Q_{SDD\&E} = Q_{CCF} + Q_{JPP} + Q_{CCWD, Total} - Q_{CCWD, Canal} + \frac{1}{4} Q_{Delta \text{ Depletions}}$**
- **Where,**
- **$Q_{CCF}$  = Clifton Court Forebay Intake (cfs);**
- **$Q_{JPP}$  = Jones Pumping Plant Exports (cfs);**
- **$Q_{CCWD, Total}$  = Total CCWD diversions (cfs);**
- **$Q_{CCWD, Canal}$  = Contra Costa Canal Diversions (cfs); and**
- **$Q_{Delta \text{ Depletions}}$  = Delta Net Channel Depletions (cfs).**



# Rapid Genetics Protocol

- **CVP and SWP may, at our discretion, use existing rapid genetics protocols in lieu of length-at-date criteria for identification of winter-run.**
- **CVP and SWP would have up to 2 days to complete the identification prior to scheduling reductions to pumping under 2009 NMFS BO Action IV.2.3 as modified by this Proposed Action**

# Addressing Uncertainty

- Reclamation would make permanent implementation the pilot Enhanced Delta Smelt Monitoring Program (EDSM) and Salmon and Sturgeon Assessment of Indicators by Life-stage (SAIL) programs through the Interagency Ecological Program (IEP) while these modifications to OMR management are in place
- Reclamation would assist NMFS in the performance of studies to more accurately refine the Juvenile Production Estimate

**Questions**

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# **SAN JOAQUIN RIVER I:E RATIO**

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# Existing Requirement

- 2009 NMFS BO (Action IV.2.1)
  - April 1 to May 31
  - Based on 14-day running average and water year type
    - 1:1 during critical years
    - 2:1 during dry years
    - 3:1 during normal years
    - 4:1 during above normal and wet years
- WIIN Act
  - 1:1 I:E as a 3-day running average at Vernalis for transfers

# SJR I:E Science

2008 / 2009 Biological Opinion Science	Current Science
Correlation between SJR Flow at Vernalis and SJR steelhead survival	New science continues to confirm no apparent relationship between exports and SJR steelhead survival
2007 VAMP studies of Coded Wire Tag Chinook salmon	2017 Multivariate Acoustic Tag Analysis
Kjelson et al 1981; Kjelson and Brandes 1989	2017 Salmonid Scoping Team Report
Mesick 2007	2014 South Delta Chinook Salmon Survival Study
CDFG 2005	
Newman 2008	

# DRAFT SJR I:E Proposed Action

- **Operate to a 1:1 Inflow to export ratio for all Water Year Hydrologic Classifications in the San Joaquin Valley including transfers, as measured as a 3-day running average at Vernalis on the San Joaquin River**

# Addressing Uncertainty

- **Second phase of the 6-year steelhead telemetry study and coordinate with the SJRRP on the monitoring array and tagging of fish through the IEP**
- **Action III.1.3 – Stanislaus flow rates – would remain**



# **SJR I:E CALSIM RESULTS**

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**Questions**

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