Progress on Refining Fremont Weir Operations

Presentation for:

BDCP Conveyance Working Group and HOTT Joint Meeting

May 20, 2009

History of Modeling of Yolo/Fremont Weir for BDCP

- Habitat Restoration Technical Team
- HOTT
- Integration Team
- Tech Study #2 (12/08)
- Overview Document
- DRERIP Evaluation
- Tech Study #2 (revised 3/09)

Operating Criteria from Overview Document[1]

Operational Parameter	Operational Assumptions
Modification and Operation of Fremont Weir	Period of Potential Operation: December 1-May 15 Desired Duration of Inundation: 30-45 days Target Spill Discharge: 2,000-4,000 cfs Spill Frequency: As many times as hydrology allows Stage for Activation: 17.5 ft (NAVD 88) Sacramento River at Fremont

[1] An Overview of the Draft Conservation Strategy for the Bay Delta Conservation Plan, January 12, 2009

DRERIP Evaluation

- Two scenarios evaluated based on Overview Document:

	Scenario 1	Scenario 2
Dates	Dec 1-May 15	Jan 1-Apr 15
Duration	45 days	30 days
Target spill	4000 cfs	2000 cfs

Physical DRERIP Results

	Scenario 1	Scenario 2
Inundation area	22,982 acres	17,421 acres
Mean depth	2.2 feet	2.3 feet
Travel time	6.5 days	9.3 days
Spill frequency	48% of years[1]	54% of years[1]

[1] Compared to 6% of years at existing weir height

Biological DRERIP Results

- Nearly identical biological results between scenarios
- Splittail: High magnitude, high certainty benefits to spawning habitat, rearing habitat, and local food production
- Chinook salmon (all races) and steelhead: High magnitude, high certainty benefits to rearing habitat, local food production, and stranding and poaching reduction
- Sturgeon: High magnitude, high certainty reductions in stranding and poaching

Biological DRERIP Results (cont.)

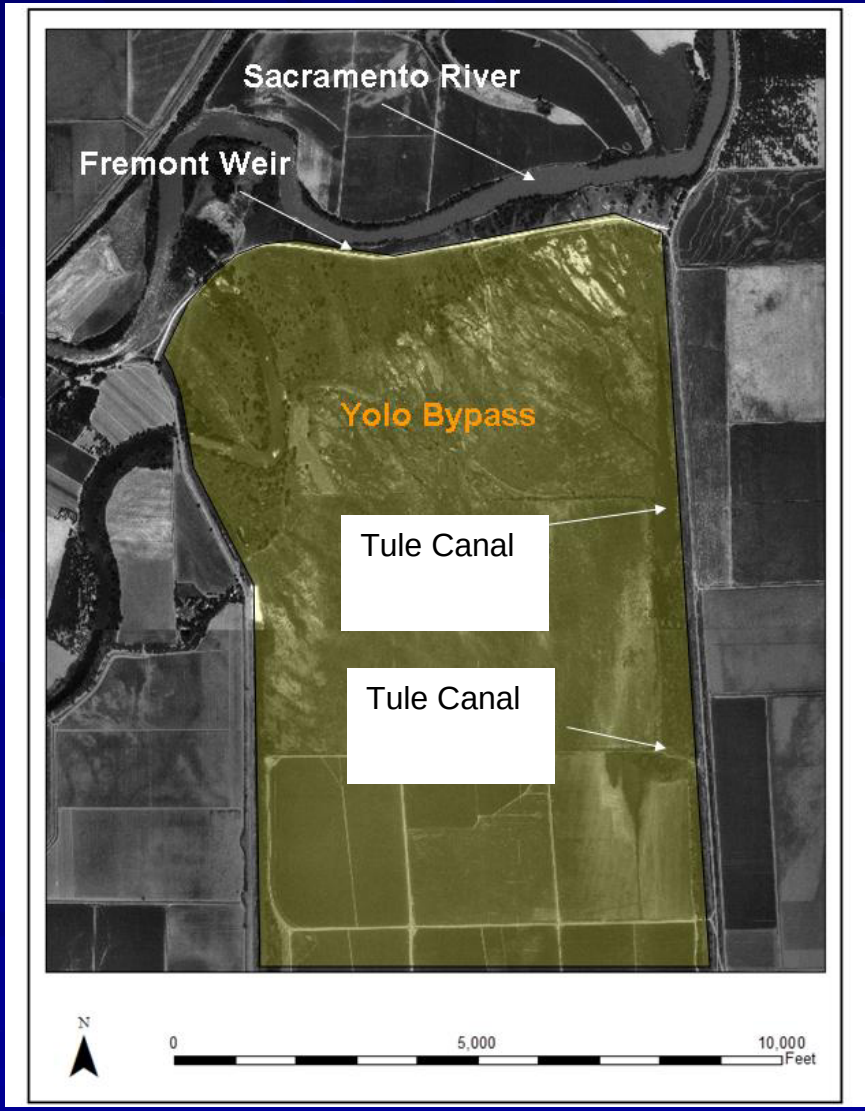
- Delta smelt: high magnitude, high certainty increase in local food production
- Longfin smelt: high magnitude, moderate certainty increase in local food production
- Food export downstream: high magnitude, moderate certainty increase
- Negative outcomes (MeHg, stranding, predator habitat, reduced flows): low magnitude, moderate to high certainty

Purpose of Tech Study #2

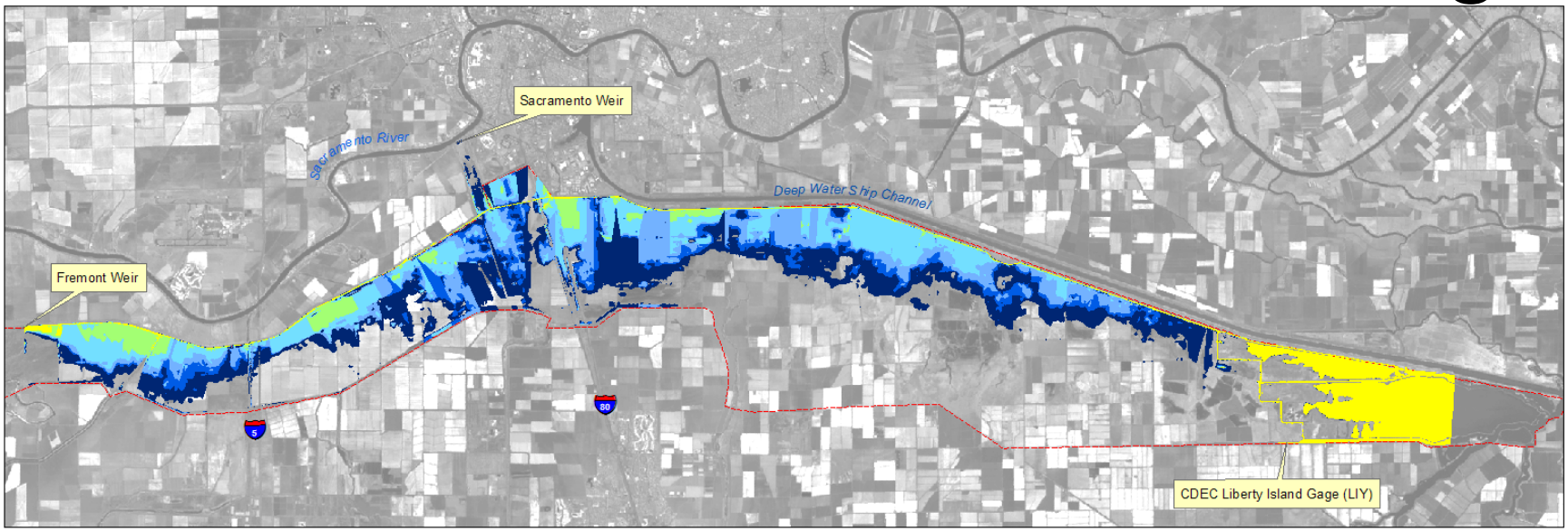
- Evaluate the range of increased frequency and duration of Yolo Bypass inundation
- Summarize existing knowledge about anticipated effects on fish
- Make recommendations to facilitate discussion about further refinements to operational parameters

Primary Modeling Changes in Tech Study #2

- New bathymetry data for Liberty Island to Sacramento Weir
- Modifications to bathymetry from Sacramento Weir to Fremont Weir
- Modified roughness coefficients
- Calibrated hydrology with Lisbon Weir data



Results of HEC-RAS Modeling



Legend
Estimated flood area for different model flows at Fremont weir

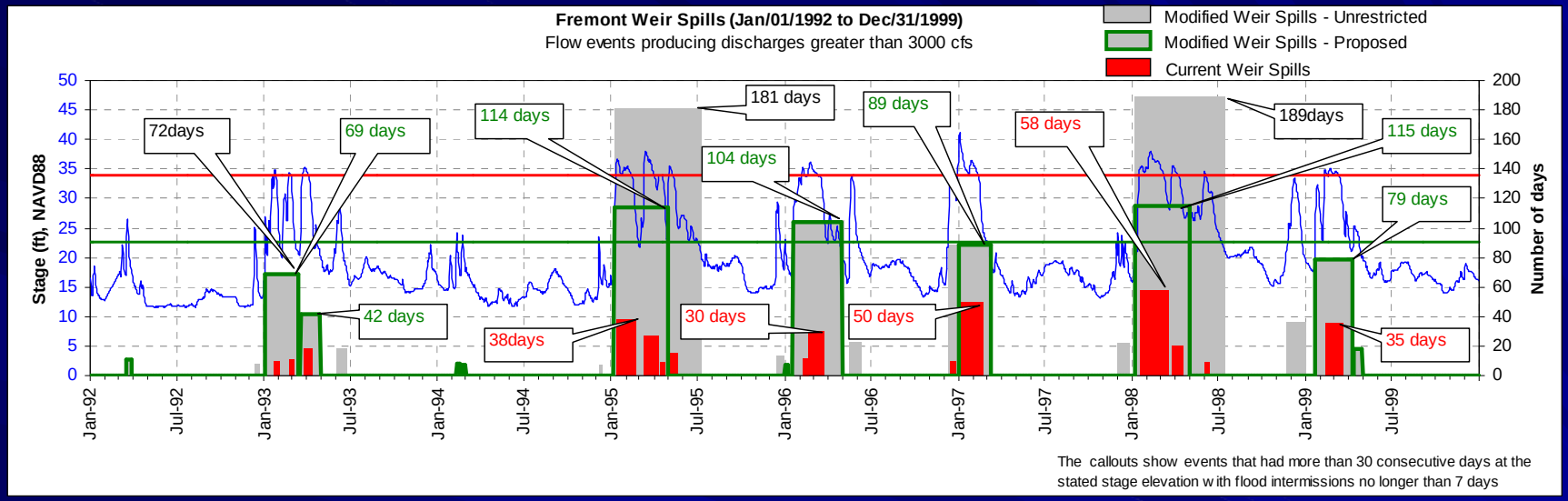
- Yolo Bypass Boundary
- b 1000 cfs
- b 2000 cfs
- b 3000 cfs
- b 4000 cfs
- b 5000 cfs
- b 10000 cfs

Flow	Mean Depth for the Entire Yolo Bypass	Surface Area (from GIS mapping)	Mean Velocity	Travel Time
(Q) cfs	(D) ft	(A) Acres	(V) ft/s	(t) day
1,000	5.9	4,100	1.66	8.8
2,000	5.3	5,700	1.94	4.9
3,000	3.9	11,000	1.77	4.2
4,000	2.8	15,900	1.49	4.2
5,000	2.6	18,600	1.32	4.0
6,000	2.6	21,500	1.26	3.9
7,000	2.6	23,100	1.19	3.7
8,000	2.6	24,600	1.20	3.6
9,000	2.7	25,900	1.20	3.5
10,000	2.8	27,100	1.20	3.4

Modeling Inputs

- Flows – 3,000-6,000 cfs
- Dates – Jan 1-Apr 15

Results: Example of Hydrology



Results: Summary of Modeling

Number of events with consecutive days of spills (max 7 day gap to count as new event) that produced more than 3,000 cfs	Count of events between 1984-2007 (24 years)		Count of events between 1929-2007 (79 years)	
	Current Weir	With Gates	Current Weir	With Gates
Less than 30 days	17	41	27	137
Greater than 30 days	9	19	9	70
Greater than 45 days	3	11	3	46

Limitations and Considerations

- Coarse modeling – results will be different with advanced modeling
- Bathymetry improvements
- Continuing to work with Yolo County and Yolo Basin interests to address potential impacts

May 8 Steering Committee Meeting

- Floodplain Enhancement Targets:
  - Plan Commitment of 3,000-6,000 cfs
  - Acreage of enhanced floodplain habitat based on actual bathymetry

Other Concepts Being Discussed for Yolo Bypass

- Optimizing height of Fremont Weir notch
- Summer flows from Yolo Bypass for additional input of production to Cache Creek
- Putah Creek modifications
- Incorporation of westside tributary flooding
- Other fish passage improvements
- Modifications to Tule Canal
- Sacramento Weir operations

Next Steps

- Continue to refine text of the conservation measure
- Recommendations for operational criteria to Steering Committee
- Further modeling and engineering work