Waterfowl Impacts of the Proposed Conservation Measure 2 for the Yolo Bypass

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Western Regional Office
Rancho Cordova, CA

Study Update:
June 8, 2012
Objectives

• Design a tool to measure the effects on waterfowl of the increases in frequency, duration and magnitude of the proposed “Notch” flooding of the Yolo Bypass
• Provide example runs and examine output data
• Provide updated grazing, rice and wetland geodatasets for the bypass
Main Drivers

1. Wildlife Area and Lease Area Closures - recreational opportunities lost
2. Farm & Hunting Income Loss - Wildlife Area, Grower & Duck Clubs
3. Flooding Winter Season Deep – foraging loss
4. Flooding Spring Season – seed production
   - Direct flooding
   - Indirect, Unable to drain fields
D1: Hunter Use Impact

- Review YBWA closed days during duck season
- Determine the difference in closed days for large versus small magnitude floods
- YBWA closed on average 14 days/year during the hunt season
Baseline Recreational Loss
SACTO R AT FREMONT WEIR (CREST 33.5') (FRE)
Date from 12/5/1998 14:42 through 12/15/1998 14:42 Duration: 10 days
Max of period: (12/08/1998 08:00, 1641.15) Min of period: (12/06/1998 04:00, 0.01)

1,641 cfs
Baseline Recreational Loss

The chart illustrates the trend of recreational loss from 1997 to 2010. The x-axis represents the years, while the y-axis represents the months. The chart shows a marked increase in recreational loss during certain periods, with specific events such as the Fremont Weir Overlap and Wildlife Area Closed highlighted. The data suggests a notable peak in recreational loss during the 2003-2004 period.
SACTOR AT FREMONT WEIR (Crest 33.5") (FRE)

Date from 12/09/2003 12:50 through 02/07/2004 12:50 Duration: 60 days

Max of period: (01/03/2004 08:00, 3042.1), Min of period: (01/04/2004 23:00, 0.23)

3,042 cfs
Baseline Recreational Loss

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- **Fremont Weir Overtop**
- **Wildlife Area Closed**
SACTO R AT FREMONT WEIR (CREST 33.5") (FRE)

Date from 01/01/2002 14:42 through 01/12/2002 14:42 Duration: 11 days

Max of period: (01/05/2002 20:00, 35743.891) Min of period: (01/10/2002 18:00, 0.01)

FLOW, RIVER DISCHARGE - CFS (20)

35,743 cfs
Baseline Recreational Loss

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Compare a 3 week closure with a 2 week closure (50-100K event vs. 5-10K cfs event)
Baseline Recreational Loss

West side tributaries
BERRYESSA (BER)
Date from 12/16/2004 07:43 through 01/15/2005 07:43 Duration: 30 days
Max of period: (12/28/2004 00:00, 2.17) Min of period: (12/7/2004 00:00, 0.0)

INCHES

Date / Time

PRECIPITATION, INCREMENTAL - INCHES (7823)
Hunter Opportunities

• Future Scenarios: Compare baseline lost hunt days to any potential scenario
• Express result in hunt days lost and the fraction of the hunt season lost
• What is the tipping point (in the amount of the season lost) where hunt club members lose interest in maintaining habitat?
• Currently WA is either all open or closed. Potential for partial closure due to notch flooding
D2: Income Loss

• Types
  – Grazing
  – Rice
  – DFG Hunter Fees
  – Hunt Club Memberships

Figure 6, Fremont Weir (Sutter Bypass on left, and Yolo Bypass on right)
Source: DWR Fact Sheet – Sac River Flood Control Project Weirs and Flood Relief Structures, pg 4
Grazing
Yolo Co Ag Effects

- Flood Date and Flow Volume Agricultural Impact Analysis, monetize farm losses
  - Field dry time 2 weeks west bypass, 4 weeks east
  - Field prep time needed: 4 weeks
- Analyzed Dates: Feb 15, March 24, April 10 and April 30, May 15; CM2 (30 day extension)
- Flood April 24 last date for WEST side planting (June 10 plant date)
- Flood April 10 last date for EAST side planting (June 10 plant date)
D3: Flooding Winter Season Deep

- Create baseline landcover dataset
- Bypass Depth: Programmed GIS model to interpret flood model by DWR for waterfowl
- Input new data into the TRUEMET basin model
Operation of Notch: Questions

• Opening and closing rules or passive management
• Size of notch ~ 6,000 cfs capacity
• Timing of notch opening in relation to the west side tributaries
Examples of Proposed Changes to Bypass Flooding

• Updated model to current conditions
• Example 1: Run model for a January event, month long full notch event*
• Example 2: Run model for the duration of notch operating season: Nov 15 – April 15*

* Note: flooding shown is a prior run of the Mike21 output; this output was updated by DWR in May, 2012 and needs to be incorporated in this process. Mike21 model currently being reviewed by Yolo County.
Land Use Baseline 2011
Land Use
With Example Flood

Land Use, 2011
- OTHER AG
- RICE ROTATION
- TIDAL WETLAND
- UPLAND
- WETLAND

Flood Water
- Shallow
- Deep
Initial Comparisons of Flood Depths

Existing Conditions (acres)

Example Proposed Flooding
Habitat Base
Rice Base
Boundaries

- Compare County & Basin Boundaries

Yolo Basin with the other Central Valley Planning Basins
Rice Acreage for Yolo County 1996-2010

- Yolo Basin Rice 45%-60% of the county rice
• Yolo Basin Corn 45%-70% of the sum of 2 counties
Central Valley Winter Duck Population

**Dabblers Vs Divers**
- Total Divers: 461,000
- Total Dabblers: 5,472,000

**Dabblers**
- Pintail: largest segment
- Mallard: second largest segment
- Wood Duck
- Shoveler: smallest segment
- Cinnamon Teal, Green-Winged Teal, Wigeon, Gadwall: smaller segments
Yolo Basin Duck Population Objectives

Figure 4-80. Population objectives by 15-day intervals for ducks in Yolo Basin.
Implementation Plan

[Graph showing supply and demand over time periods A-23 to M-21]
Current Conditions

![Graph showing Supply and Demand over time](image)
January Flow Event

![Graph showing supply and demand over time]

- Supply
- Demand

Time Period

Energy (GJ/day)
Winter Long Flow Event

Graph showing the relationship between supply and demand over a time period from A-23 to N-21.
D4: Flooding Spring Season – seed production

Figure 6, Fremont Weir (Sutter Bypass on left, and Yolo Bypass on right)

Source: DWR Fact Sheet – Sac River Flood Control Project Weirs and Flood Relief Structures, pg 4
Current Practices at the WA

• Wildlife Area – Swamp Timothy
  – Last top off water in managed wetlands in middle of February
  – Slow evaporation of water in March
  – Managers note when the Swamp Timothy is germinating at the edges of field, April 1-15
  – Drain fields to promote seed production
Current Practices at Private Clubs

• Promote Watergrass and Smart Weed
  – Some clubs may drop water level down part way to concentrate invertebrates in mid-February
  – Start full draw down in early to mid-March (draw down takes 2-3 weeks)
  – Late spring irrigation in May, water held 2-4 weeks to control weeds
Wetland Management

• Late season drawdown may promote annual weed dominance and increased maintenance (Meeks, 1969)

• Central Valley study (Rahilly and Quinn, 2010; Naylor, 1999)
  – Swamp Timothy Studies
  – First year of delayed draw down by 4-6 weeks caused small effect
  – Second year of delayed draw down caused large effect on seed production & biomass
  – No known rate of recovery of a field due to change in flooding
## Fremont Weir Flow Events

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**Note:** Data compiled from records of DWR stream gaging station: Sacramento River at Fremont Weir (FRE), West End. Datum: 0'-0' U.S.E.D. Period of Record 1955 to 2008. Crest Elevation: 3.35 feet. 

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**Designates period of flow over weir.**
Land Use

Example

Flood: Direct & Indirect Effects
Potential Loss to Seed Production

• Current Conditions Curve

+2 years with delayed draw down
Yolo Basin Duck Population Objectives

Figure 4-80. Population objectives by 15-day intervals for ducks in Yolo Basin.
Waterfowl Breeding

- Initial nesting in late March
- Peak of nesting late April
- Last nest initiation early June
- 50+ days for incubation, hatch and fledge
Review: Main Drivers

• Wildlife Area and Lease Area Closures - recreational opportunities lost
  – days, define thresholds?
• Farm & Hunting Income Loss - Wildlife Area, Grower & Duck Clubs:
  – Yolo Co. Study, need breakouts for WA or clubs?
• Flooding Winter Season Deep – foraging loss
  – Next step is to define scenarios
• Flooding Spring Season – seed production
  – Direct flooding
  – Indirect, Unable to drain fields
Steps Needed

• Review & calibrate MIKE-21
• Select west side tributary input channels need bathymetry
• Study needed to measure seed production effect and multi-year rebound time needed for seed production after late season flooding
• Chose model scenarios to analyze