Managed Wetland Water Use
In the California Water Plan Update
Statewide Water Analysis Network Meeting
Todd Hillaire
September 24, 2007
Overview

• Quantifying managed wetland water use
• Water Portfolio Components
• Process map
• Managed Wetlands Spreadsheet Template
• Water Plan activities
• Analytical tool development
• Parking lot issues
• Data needs
• Potential partnerships
Managed Wetlands

- Habitat Type by Field
  - Land Use Surveys
  - Refuge Managers
- Aggregated by DAU-County
- Determine Water Portfolio parameters
Publicly-Owned Fresh Water Wetlands

1. Shasta Valley W.A.
2. Butte Valley W.A.
3. Lower Klamath N.W.R.
4. Tule Lake N.W.R.
5. Clear Lake N.W.R.
6. Modoc N.W.R.
7. Ash Creek W.A.
8. Willow Creek W.A.
9. Honey Lake W.A.
10. Upper Butte Basin W.A.
11. Sacramento River N.W.R.
12. Sacramento N.W.R.
13. Delevan N.W.R.
14. Gray Lodge W.A.
15. Butte Sink N.W.R.
16. Colusa N.W.R.
17. Sutter N.W.R.
18. Yolo Bypass W.A.
19. Stone Lakes N.W.R.
20. Grizzly Island W.A.
21. North Grasslands W.A.
22. San Luis N.W.R.
23. Merced N.W.R.
24. Volta W.A.
25. Los Banos W.A.
26. Mendota W.A.
27. Pixley N.W.R.
28. Kern N.W.R.
29. San Jacinto W.A.
30. Imperial W.A.
31. Salton Sea N.W.R.

N.W.R. = National Wildlife Refuge
W.A. = Wildlife Area
Managed Wetland Habitat Types

- Upland
- Permanent Ponds
- Seasonally Flooded Marsh
- Summer Water
- Watergrass Production
- Rice
Components of Managed Wetland Water Use

- Evapotranspiration (ET)
- Evapotranspiration of Applied Water (ETAW)
- Effective Precipitation (EP)
- Applied Water
  - Total Water Use
  - Use by Water Source type (e.g., surface water, groundwater) if available
Managed Wetlands Spreadsheet Template

• Monthly time-step spreadsheet computes volumes of the following parameters:
  – Effective Precipitation (EP)
  – Evapotranspiration (ET)
    • Habitat Coefficients x Evaporative Demand
  – Evapotranspiration of Applied Water (ETAW)
    • ETAW = ET – EP
  – Flood-up depths (F) and dates
  – Draw-down dates
  – Circulation flows (C) for waterfowl disease management
  – On-field percolation (P) rates
  – Irrigation application (I) for vegetation management

• Applied Water (AW) = ETAW + F + C + P + I
## Managed Wetlands Spreadsheet

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Flood-up/ Drawdown Date</th>
<th>Monthly Calendar of Flood-up, Drawdown, and Irrigation</th>
<th>Average</th>
<th>Habitual Water Depth</th>
<th>Soil Saturation on Depth</th>
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**FOOTNOTES**

- **F** FLOOD-UP
- **D** DRAWDOWN
- **M** MAINTAIN FLOODED FIELD
- **I** IRRIGATION
- **C** CROPPED

**Notes:**
- **Closed System**
- **Habitat Coefficients**
- **Circulation Rate**
- **Soil Percussion Rate**

- Used to account for no cutback and no supply
- Coefficients convert Evaporative Index (Pan Evaporation or CIMIS Eto) to representative crop/habitat ET
- This accounts for habitat flows used to control waterfowl disease. A typical value could be 1cfu/20acres, or .06 cfs/ac.
- This is the average soil percolation rate by habitat in terms of inches per day.

- Irrigation is typically applied in June and July to encourage growth and seed production for waterfowl forage.
# Spreadsheet Input

## INPUT DATA SHEET

All data input data are highlighted in green.

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Flood-up/Drawdown Date</th>
<th>Monthly Calendar of Flood-up, Drawdown, and Irrigation</th>
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## FOOTNOTES

- **F**: FLOOD-UP
- **D**: DRAWDOWN
- **M**: MAINTAIN FLOODED FIELD
- **I**: IRRIGATION
- **C**: CROPPED
### Spreadsheet Output

#### Sacramento National Wildlife Refuge

**Water Year 2000 Summary**

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<th>Habitat Type</th>
<th>Flood-up/Drawdown Date</th>
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Water Plan Activities

- **Deliverables**
  - Managed Wetland Acreage
  - Applied Water
  - ETAW, ET, and EP

- **Update 2005 accomplishments**
  - 1998, 2000, and 2001 water portfolio data

- **Update 2009 planned activities**
Analytical Tool Development

• Incorporate managed wetlands as a module into California Agricultural Water Use Model
  – Utilize rootzone soil moisture accounting
  – Use common Precipitation and Evaporative demand data through database
  – Data easily aggregated via Model’s database
  – Improve habitat vegetation irrigation calculations

• Requires expanded California Agricultural Water Use Model to incorporate smaller units than a DAU/County
  – Managed wetland data are computed by refuge or privately managed wetland grouping
    • Generally smaller than DAUs
    • In some cases, multiple managed wetlands per DAU
Update 2005 Parking Lot Issues

- Comprehensive analytical framework
- Gap analysis
- Additional annual water portfolio data
- QA/QC for Water Plan data
- Improved data transparency
- Climate change impacts
Data needs

- Managed wetland habitat acreage data
  - Refuges
  - Private wetland
- Habitat coefficients
- Flood-up / drawn-down dates
- Habitat management regimes
- Measured applied water by field
Potential Partnerships

- UC Cooperative Extension
- Refuge managers
  - USFWS, CDFG
- Ducks Unlimited
- California Waterfowl Association
- Water Districts/Accencies
- ???
Managed Wetland Water Use
In the California Water Plan Update

Questions?