Lower Cosumnes River:
Oneto-Denier floodplain restoration
Objectives:

• Enhance floodplain connectivity (1.5-year return interval)

• Restore riparian habitat (~500 acres)
Project phases

1. Planning
2. Permitting
3. Earthwork
4. Establishment
1. Planning site selection
1. Planning
hydraulic analysis
1. Planning
final design
11/5/14 after earthwork

2/10/15 flood event

levee removal

flow
1. Planning restoration treatments

- **High**
  - plant trees, shrubs, grasses
  - irrigation
  - weed control
- **Medium**
  - plant trees only
- **Low**
  - process-based
2. Permitting
### Environmental Documentation

<table>
<thead>
<tr>
<th>Agency/Board</th>
<th>Act/Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacramento County</td>
<td>California Environmental Quality Act (CEQA), IS/MND</td>
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<td>US Army Corps of Engineers</td>
<td>National Environmental Policy Act (NEPA)</td>
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### Permits

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<tr>
<td>Central Valley Flood Protection Board</td>
<td>Encroachment Permit</td>
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<tr>
<td>CA Department of Fish and Wildlife</td>
<td>Streambed Alteration Agreement (1602)</td>
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<tr>
<td>CA Department of Fish and Wildlife</td>
<td>California Endangered Species Act correspondence</td>
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<tr>
<td>Sacramento County</td>
<td>Grading Permit</td>
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<tr>
<td>US Army Corps of Engineers</td>
<td>Clean Water Act, Section 404 Permit</td>
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<tr>
<td>US Fish and Wildlife Service</td>
<td>Endangered Species Act Biological Opinion</td>
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<tr>
<td>National Marine Fisheries Service</td>
<td>Endangered Species Act Biological Assessment</td>
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<td>State Historic Preservation Officer</td>
<td>National Historic Preservation Act, Section 106 consult</td>
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<tr>
<td>Regional Water Quality Control Board</td>
<td>Clean Water Act, Section 401 Water Quality Certification</td>
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<td>Clean Water Act, Section 402 NPDES Permit</td>
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### Other Agreements

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<tr>
<td>CA Department of Fish and Wildlife</td>
<td>Right of Entry Agreement</td>
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<tr>
<td>Natural Resources Conservation Service</td>
<td>Compatible Use Authorization (CUA)</td>
</tr>
</tbody>
</table>
3. Earthwork

- Aug-Oct, 2014
- 80,000 cubic yards removed
- 2,000 feet of levee removed
- Main levee removal 750 feet
4. Habitat Establishment

- Three-year establishment
- Restoration treatments
- Year two survivorship
  High: 47%
  Medium: 36%
Fisheries response

C.A. Jeffres, J.J. Opperman, & P.B. Moyle
(Environmental Biology of Fishes, 2008)
Fisheries response

[Graph showing percent native fish leaving the floodplain over a series of dates, with specific percentages indicated at various points.]
Groundwater and avian response
Geomorphic response

Floodplain inundation

2017
Project partners

- Natural Resources Conservation Service
- CA Department of Fish and Wildlife
- Wildlife Conservation Board
- CALFED
- Elk Hills Power, LLC
- US Fish and Wildlife Service
- University of California, Davis
- Point Blue Conservation Science
- Galt Joint Unified School District

- AECOM
- West Yost
- Western Engineering
- RiverSmith
- Dittes and Guardino
- KLM Farms
- University of Idaho
Hamilton City