Riparian habitat & flood management: innovative approaches during rapid climate change

RHVJ Conference: Integrating Riparian Conservation & Flood Mgmt
December 4, 2007
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Key Points:

• Human-caused climate change is happening now and accelerating

• More frequent and catastrophic flooding projected

• Solution: Widen and restore floodplains, re-vegetate levees

• Many benefits for people and wildlife

• No time to lose- collaborate now!
Global warming is 'unequivocal'... [and] human activity is largely responsible.
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Extreme, deadly weather will be more common

Hurricane Katrina over Florida, August 26, 2006, Photo: NOAA
~20–30% species face extinction with 2.7 F
~40–70% with 6.3 F increase
Hundreds of millions of people face flooding, water shortages by 2020
Record Breaking Loss of Sea Ice, September 16, 2007

Total extent = 4.1 million sq km
Arctic melting—3x faster, 30 years earlier
Greenland melting—3x faster
Sea level rise—2x faster as
CO2 into atmosphere—3x faster

Ecosystems already disrupted
Alpine Species -- Nowhere to Go

Pika or rock rabbit

Elevation at Yosemite
Up ~ 2000 ft over past 100 years

• 2004- 9,500 ft
• 1900- 7,800 ft
• Functionally extinct

UC Berkeley, Grinnell Project
Drought = No Breeding

Chrissal Thrasher

–Sonoran Desert

Phainopepla
Annual Variation in Nest Survival and SOI

Song Sparrows - Cosumnes River

Estimated Daily Nest Survival

Nest survival predicted by SOI

Model-adjusted estimates by year

El Nino = Breeding Success
Seabird Breeding Failure

Cassin’s Auklet
Sierra Spring Snow Pack - 70% - 90%
More Frequent & Severe Flooding
Upper Jones Tract Levee Break in the Sacramento-San Joaquin Delta
DWR Website  June 2004  12, 153 acres, 6 months cleanup, $90m
Water Shortages

CA Climate Change Center  www.climatechange.ca.gov
~20–30% species face extinction with 2.7 degree F increase

IPCC 4th Assessment Report 2007

Edith’s Bay Checkerspot - local populations extinct
We All Rely on Ecosystem “Services”

- Food
- Freshwater
- Wood and Fiber
- Fuel

- Climate
- Flood
- Disease
- Water quality

- Recreational
- Educational
- Spiritual
OUR 21\textsuperscript{st} CENTURY CHALLENGE:

We must manage for flood control \textit{and} ecosystem function
SOLUTION: Widen, Replant Floodplains

• slow, divert floodwaters
• improve water quality
• replenish groundwater
• sequester carbon
• reverse decline of birds, fisheries, plants
• provide recreation
#1: Restoration can restore biodiversity

Sacramento River Restoration Project

Partners:

- CA Dept of Fish & Game
- CA Parks & Recreation
- PRBO Conservation Science
- River Partners
- The Nature Conservancy
- U.S. Fish & Wildlife Service
Birds as Indicators: *Multi-species Approach*

- Species at risk
- Umbrella species
- Easily monitored species

*represent range of ecosystem elements*

*Chase and Geupel 2005*
Adaptive Conservation Planning - process

ID threats/changes

Baseline Data

Recommendations

Guide

Implement

Monitor

Feedback loop

Analysis
Employ recommendations:

• Enhance understory
• Increase shrub density
• Increase shrub & tree diversity
• Plant in patches
• Create soft edges
• Leave old trees
• Encourage natural processes
IT WORKS: restoring birds, ecosystems

Gardali, et al, 2006
O’Connor Lakes Project

- 400 acre property owned by CDFG
- Bottleneck between levees
- Flood conveyance channel—filled with invasives- star thistle and pepperweed
- Bulldozed each year by DWR
O’Connor Lakes Project Area

Star Bend

228 acres

roadblock: ESA- Elderberry

different agreements needed

Funded by Wildlife Conservation Board
River Partners and MBK Engineers
Planting Associations Map-
“Flood Neutral” Design

- Woodland (31 acres)
- Native Grass (64 acres)
- Low Shrub (35 acres)
- Woodland (31 acres)
- Enhancement (67 acres)

River Partners
IT WORKS: Re-vegetation and flood water conveyance

O’Conner Lakes Project
Flow: about 65,000 cfs
4 January 2006

River Partners
1. Birds are good indicators of riparian ecosystem function
2. “Flood neutral” restoration design works
3. Riparian revegetation can provide wildlife habitat AND facilitate flow conveyance, sediment transport (*away from flood-control structures*)
4. Restoration can result in lower floodway maintenance costs & reduced flood damage costs
5. Monitoring is critical to assess and improve efforts
6. Partnerships work- flood management and conservation interests can have win-win outcomes
KEY: changing adversarial relationships into collaborative relationships!
Is this our future?

Costly, deadly flooding
Integrating
--levee management
--flood protection
--riparian conservation
--wildlife protection

With economic and ecological benefits
Huge potential in CV alone

Current: ~110,000 acres
Next 5 Years Goal: 10,000 more
Potential: +800,000 more acres

(CVJV 2006 Implementation Plan)

BUT: don’t have statewide riparian map or common definition of floodplain!
OH, OKAY, I SEE YOUR POINT. BUT YOU HAVE TO BALANCE THAT AGAINST THE CONVENIENCES OF MY LIFESTYLE.

GLOBAL WARMING

ONE OF WHICH IS NOT THINKING ABOUT THIS.
“The longer action is delayed, the more it will cost.”

IPCC 4th Assessment Final report, November, 2007

How do we go beyond “business as usual” to achieve best economic and ecological outcomes?
Partner agencies and organizations of the RHJV include:
• National Audubon Society
• PRBO Conservation Science
• National Fish and Wildlife Foundation
• The Nature Conservancy
• River Partners
• Trust for Public Land
• The Resources Agency
• California Department of Fish and Game
• Wildlife Conservation Board
• California State Lands Commission
• California Department of Water Resources
• Natural Resource Conservation Service
• U.S.D.A. Forest Service
• Bureau of Land Management
• U.S. Fish and Wildlife Service
• Bureau of Reclamation
• National Park Service
• U.S. Geological Service

**One Next Step:**
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