

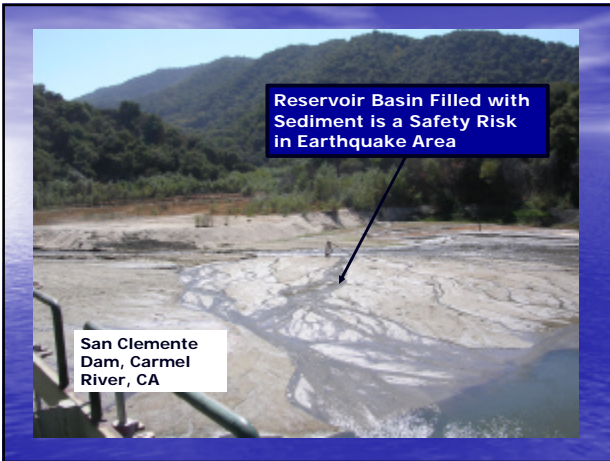
Objective of Discussion:
To identify ongoing efforts for river management and restoration in watersheds.

1. Case studies
2. Dam Modifications
3. Dam Operation Modifications
4. Watershed improvements
5. Site Specific Actions

ISSUES of CONCERN

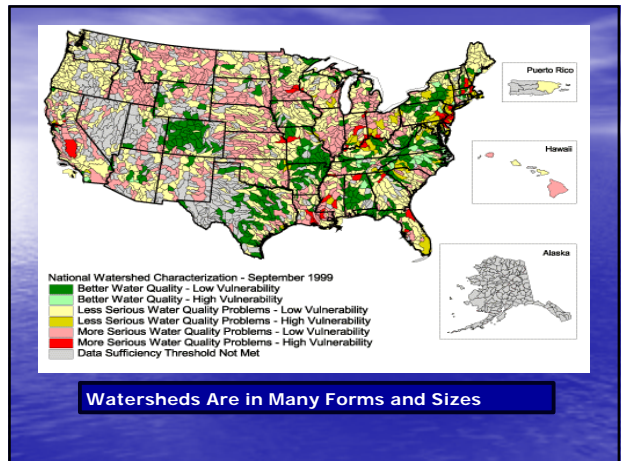
- Infrastructure (dams, levees, diversions) are aging and maintenance costs are rising.
- Changing global conditions (climate, water, circulation patterns) require innovative and systems-based solutions.
- Environmental sustainability for the public and future generations.

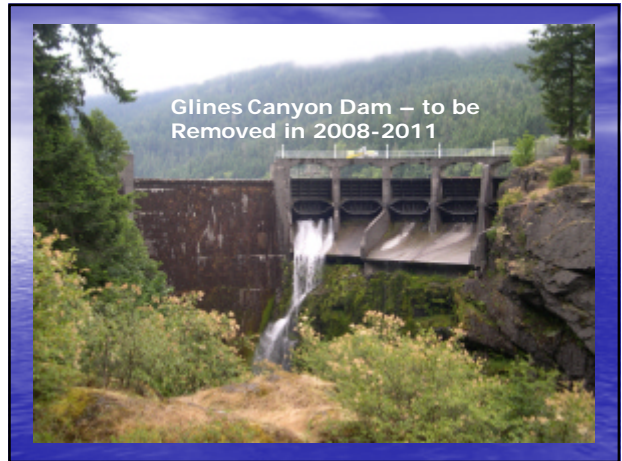




CRISIS FACING WATER MANAGERS AND PUBLIC

- 1. INCREASING RISK TO PEOPLE FROM AGING INFRASTRUCTURE**
Increased Risk of Catastrophic and Combined Failure (Hurricane Katrina)
- 2. COLLAPSE OF FISHERIES AND ENVIRONMENTAL INTEGRITY AND SUSTAINABILITY**
Loss of Species, Genetic Integrity, and Ecological Sustainability and Impact on Economics
- 3. INSTITUTIONAL FRAMEWORK FAILING TO ADDRESS THE LONG-TERM NEEDS OF THE CITIZENS AND THE ENVIRONMENT**
Crisis in Confidence in Leadership and the Process of Governance





IMPACTS FROM LOSS OF WATERSHED DYNAMICS

- Fragmentation of River System
- Loss of Migration Capability for fish and other species
- Modified Water Quality
- Loss of Sediment Dynamics
- Loss of Flow Regime Dynamics
- Increased Risk to Infrastructure
- Loss of Estuary Ecological Dynamics
- Loss of Habitats for Species
 - Aquatic
 - Riparian



Water Quality Concerns


- Turbidity
- Mine drainage
- Temperature
- Nutrients
- Carbon Sources
- Salt Intrusion near coast

Blue River, Colorado



Loss of Sand Supply to Ocean Leads to Increased Erosion Along Beach Front and Loss of Infrastructure and Homes

06.06.2006



Increased Salinity in Estuary and Loss of Habitats for fish and other Species

Carmel River, CA


06.06.2006



Estuary and Wetland Habitats are Important for Migrating Species



WHAT ARE OUR OPTIONS?



Inlet Structures for Powerplant

Retrofit Existing Structures

Hoover Dam, Colorado River

11.29.2006

Proposed Retrofit

Thermal Towers added to Generator Intakes in the 1970's

Glen Canyon Dam, 1987, Dave W. Jones

Michael Collier photo

Mainstem dams on the Green and Colorado Rivers modify the water quality of the river

Figure 3
Flow of Colorado River Below All Major Dams and Diversions 1905-1992

Modified Flow Regimes

Hoover Dam

Glen Canyon Dam

Michael Collier

Maintaining an Environmental Flow Regime is Important in Order to Sustain the Aquatic Ecosystem.

Quantity
Seasonal Timing
Fluctuation

06-14-2008

Rivers Evolve Within the Boundaries of Flow Regimes, Geology, Slope, Topography and Land Dynamics. To Restore Rivers We Must Understand Their Watersheds

10-01-2008

Changing Irrigation Delivery Schedule May Help in Restoring River Dynamics

Irrigation Canal in New Mexico

06-08-2008

Protect Drainages

06-06-2008

