

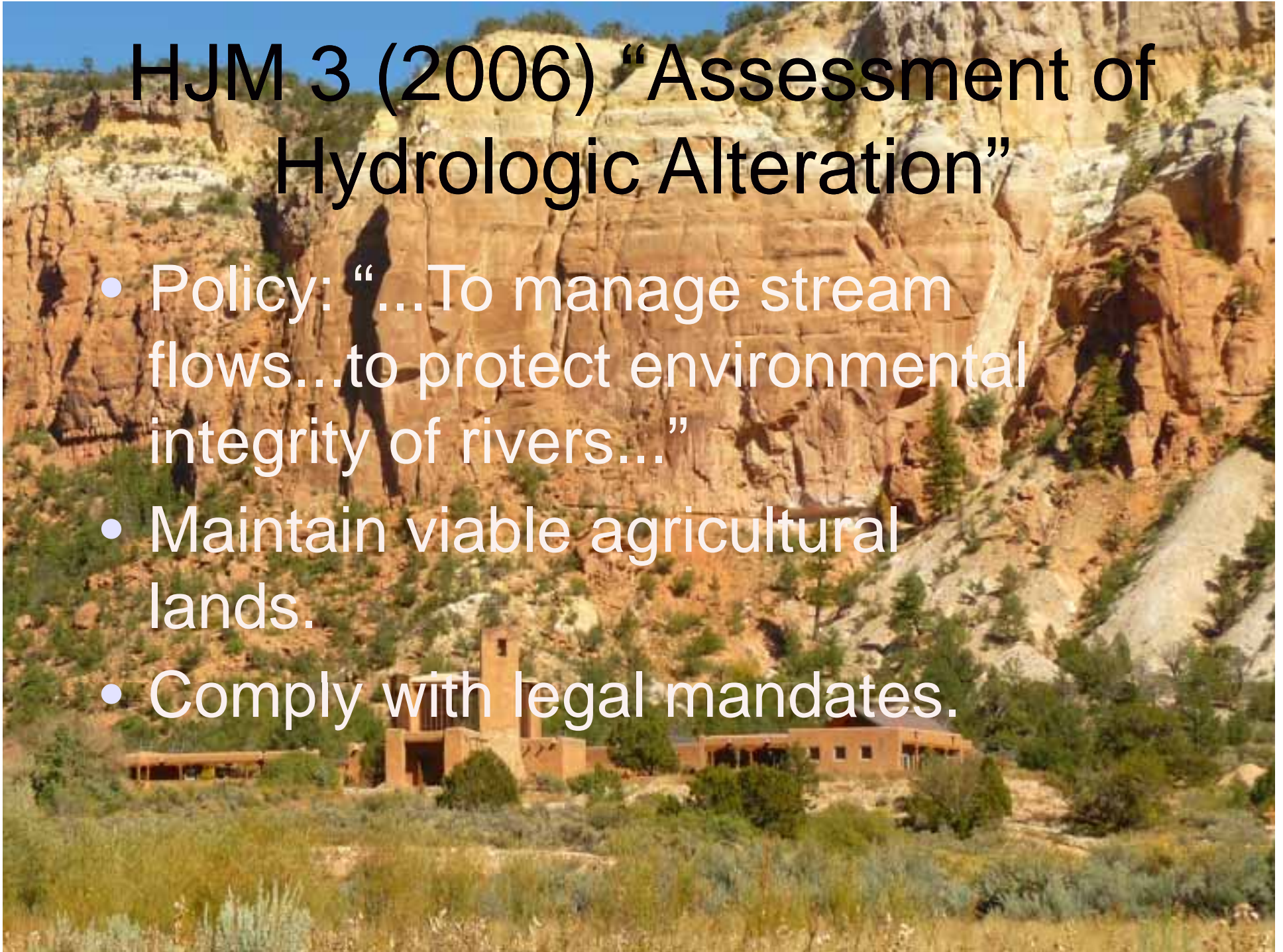
Text

Sustaining New Mexico Rivers: Environmental Flows

Presentation to 55th Annual NM Water Conference
By Steve Harris, Rio Grande Restoration

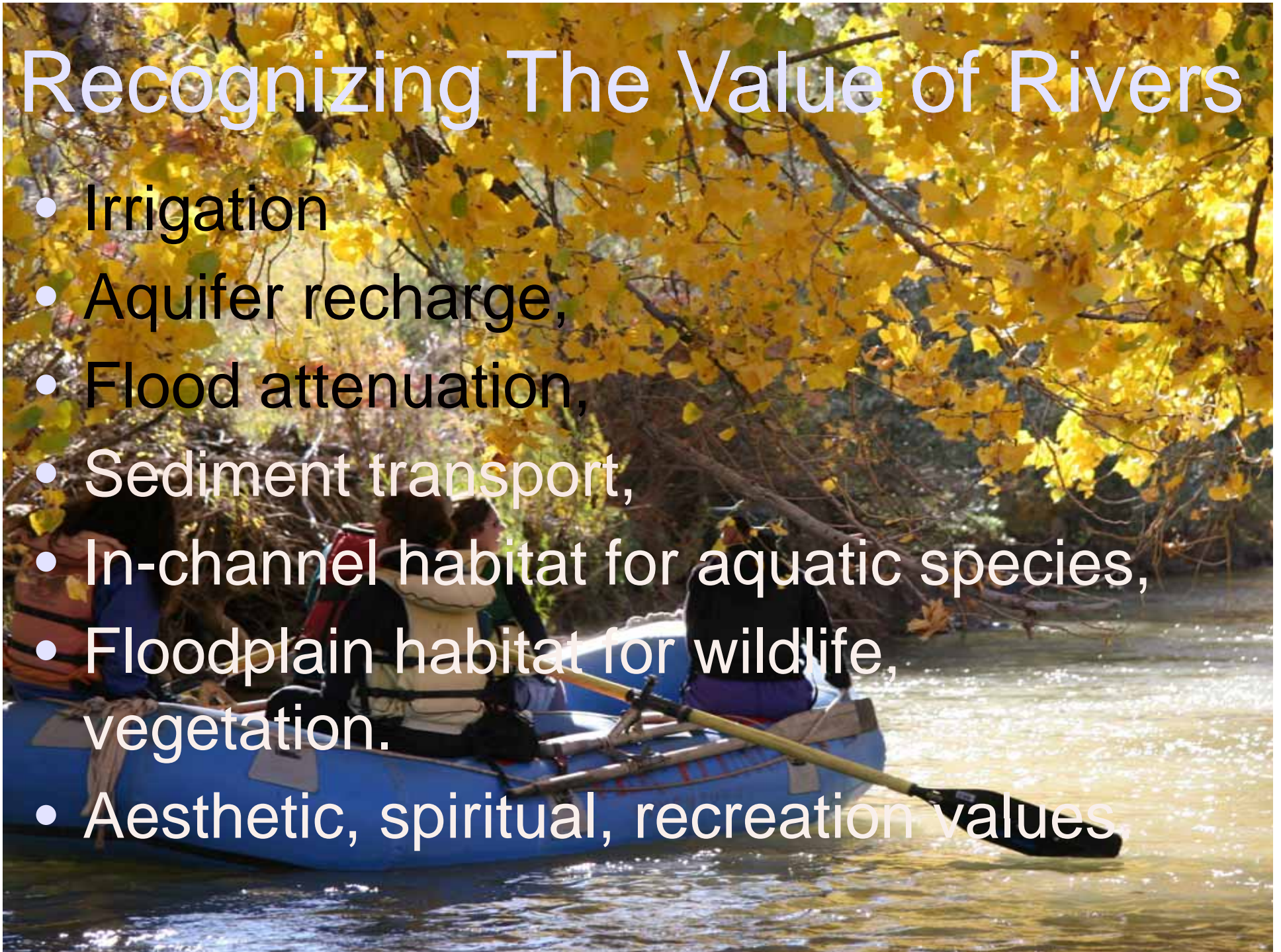
HJM 3 (2006) “Assessment of Hydrologic Alteration”

- Policy: “...To manage stream flows...to protect environmental integrity of rivers...”
- Maintain viable agricultural lands.
- Comply with legal mandates.



Recognizing The Value of Rivers

- Irrigation
- Aquifer recharge,
- Flood attenuation,
- Sediment transport,
- In-channel habitat for aquatic species,
- Floodplain habitat for wildlife, vegetation.
- Aesthetic, spiritual, recreation values,



“Water Cabinet” Agencies: Cooperators

- New Mexico Game & Fish Department,
 - State Engineer/Interstate Stream Comm.,
 - Environment Department,
 - EMNRD (State Forestry),
 - Department of Agriculture; Plus...
-
- Water user and conservation organizations,
 - appropriate scientific specialists.

E-FLOWS WORKSHOP

UNM Utton Center- March 15, 2010

**125 Participants:
Texas, Colorado Programs,
Tribes, Irrigators, Agencies,
Nature Conservancy, Tetra Tech,
Conservation Voters, Trout Unlimited, Rio
Grande Restoration.**



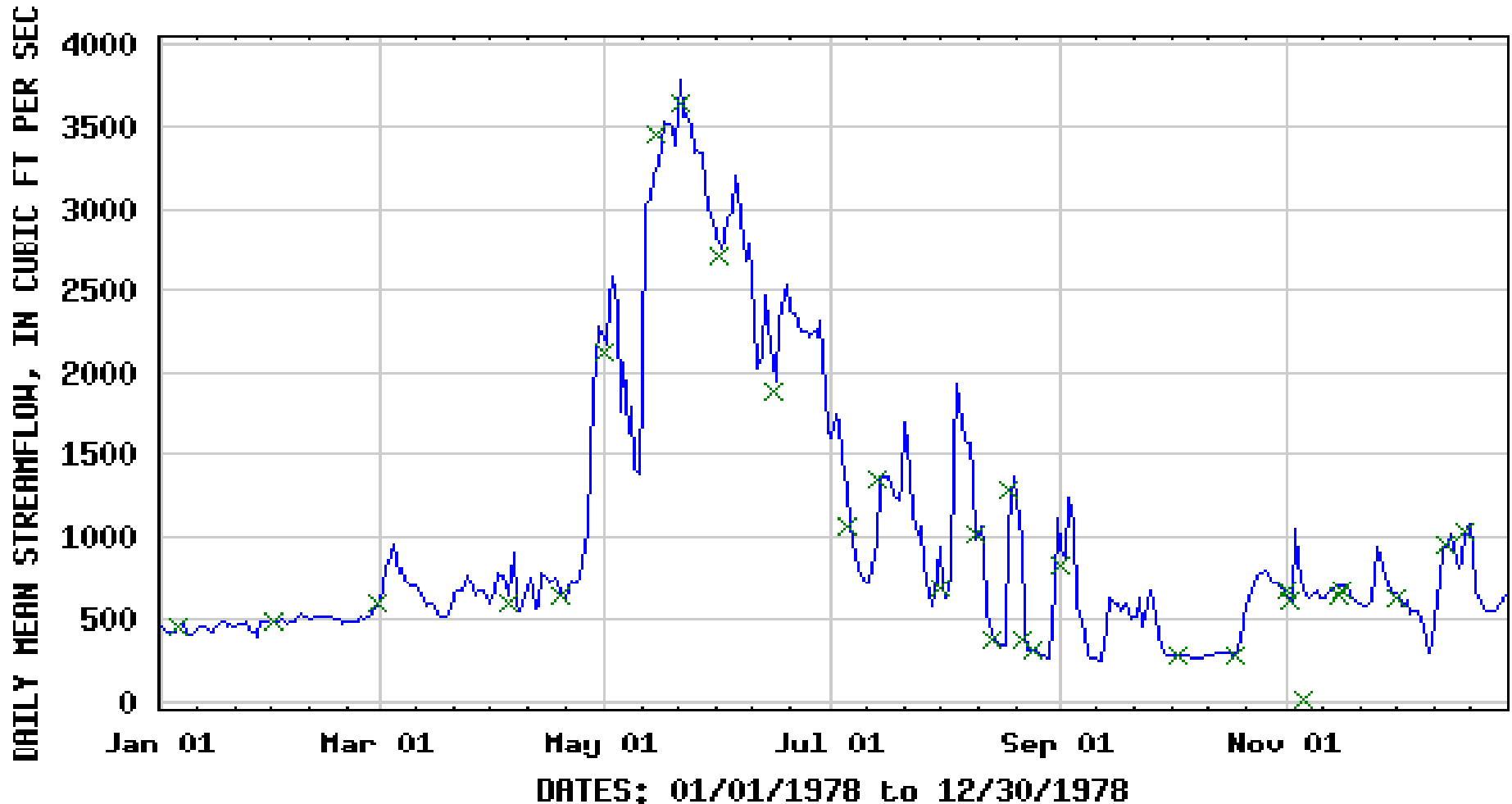
Index of Hydrologic Alteration:

Comparing Pre-, Post-Development Conditions

- Magnitude
- Magnitude and duration of annual extreme conditions;
- Timing of annual extreme conditions;
- Frequency and duration of high and low pulses;

Shape of “Natural” Hydrograph

USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NH



EXPLANATION

— DAILY MEAN STREAMFLOW

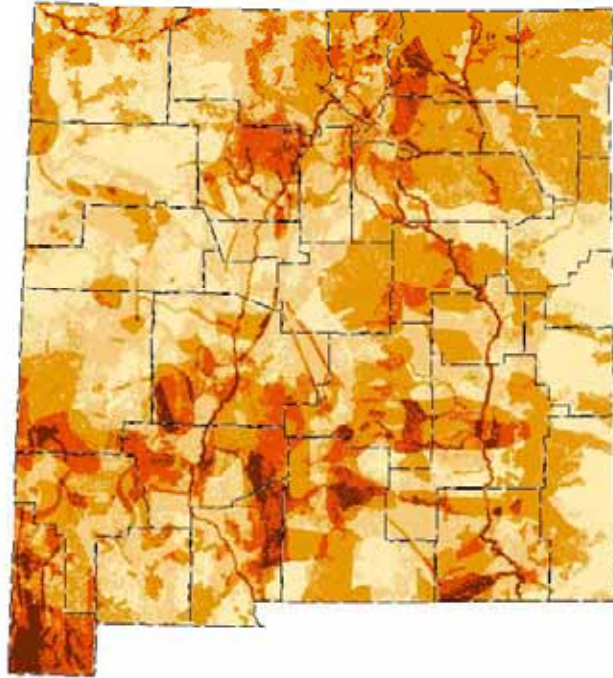
× MEASURED STREAMFLOW

Relevant Environmental Measures

(Compared with Hydrologic Alteration Data)

- **Aquatic Species of Concern** (NMGF Comp. Wildlife Management Strategy);
- **CWA Impaired Waters** (NMED 303 (d) list, G. 4 streams);
- **Riparian Condition** (UNM Wetland Inventory surveys);
- **Watershed Condition** (NM Forestry Forest Resource Assessment);
- **Geomorphic Alteration** (NMED Relative Bed Stability Index);
- **Groundwater to Surface Water Connection** (NMOSE Critical Basins data);
- **Agro-Ecosystem Health** (measure to be determined);
- **Drought & Climate Vulnerability** (to be determined)

Fish & Wildlife Habitat (Biodiversity)

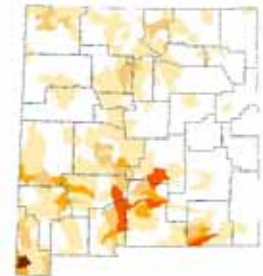


- Fish & Wildlife Priority
- Low - Least important habitat
 - Low/Medium
 - Medium
 - Medium/High
 - High - Most important habitat

Wildlife Occurrence



Rare Plant Occurrence



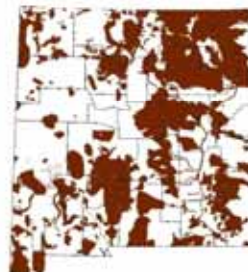
T&E Potential Habitat



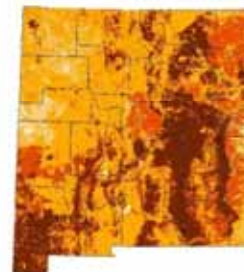
TNC Fish Atlas



TNC Cons Areas



CWCS Key Areas



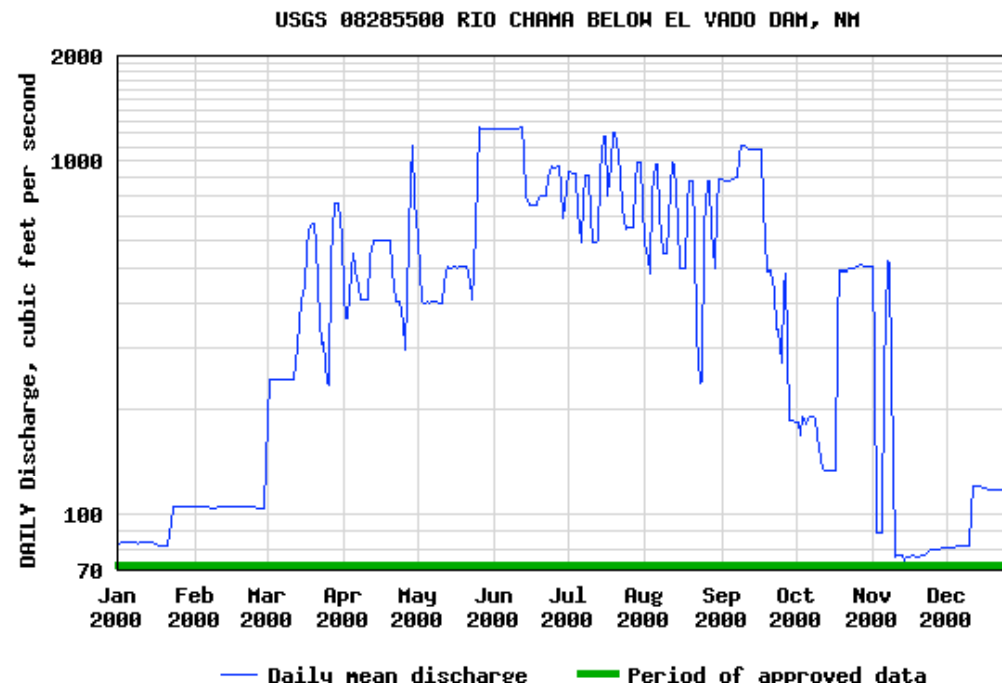
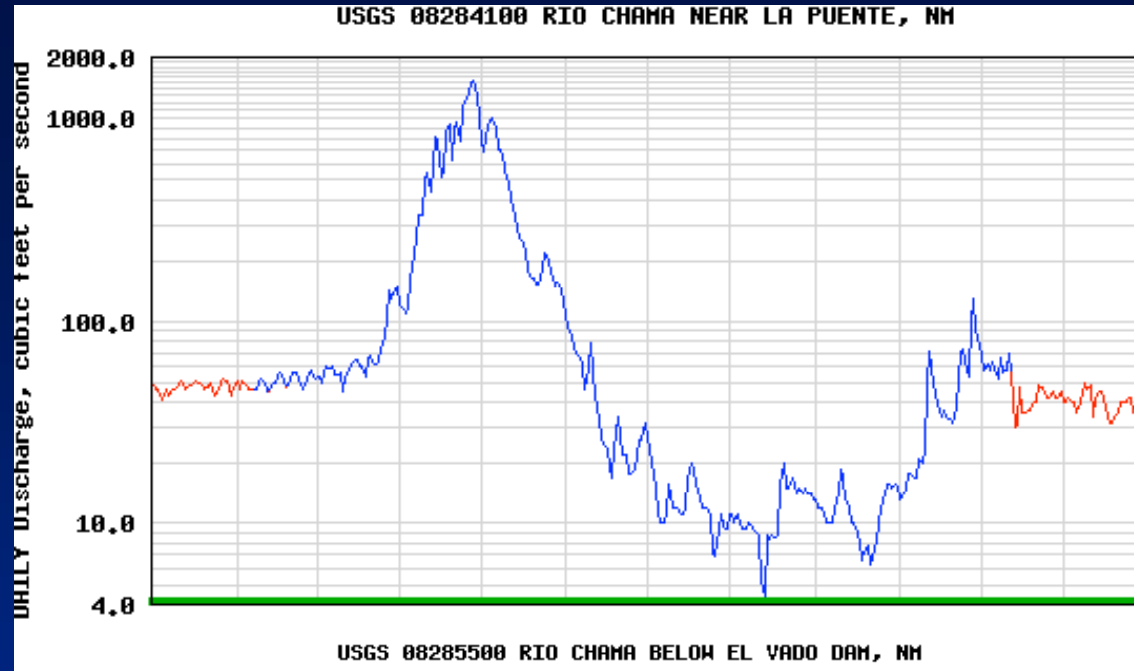
WGA Corridors



Rio Chama Flow Optimization Project



LA PUENTE vs. EL VADO Hydrographs



Rio Chama Stakeholders

- Bureau of Reclamation
- Corps of Engineers
- State: NMISC/OSE, State Parks, etc.
- Middle Rio Grande Conservancy District
- Albuquerque Water Utility Authority
- BLM-Forest Service
- Pueblos
- Fishermen
- Whitewater recreationists
- Land owners, Acequias, Hydro-power

Chama Optimization Plan

- Model Ecosystem, Management;
 - **Baseline Data Acquisition;**
 - Model E-Flow Criteria;
 - Determine Desired Outcomes;
 - Rule-setting Workshop;
 - Optimization Modelling;
 - Integrate with Operations Planning.
- 

Collaborative, Adaptive, Ecosystem Management

- **Adaptive Management**-An iterative process in which the manager identifies uncertainties, and then establishes management methods to test hypotheses concerning those uncertainties. It uses management as a tool not only to change the system, but as a tool to learn about the system.
- **Ecosystem Management**-integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward a goal of protecting native ecosystem integrity, alongside human economies, over the long term.
- **Collaborative Management**-cooperative work among all parties affected by management decisions communicate, cooperate, negotiate among alternative actions, seeking out opportunities to sustain a full range of stakeholder values.

Evolving Water Management Institutions



- Integrated Reservoir Management
- “Soft” Flood Control
- Local Water Governance
- Adaptive Management