

# Trinity River Restoration Program Overview

Briefing for  
TAMWG  
March 19, 2009



# The Compelling Problem:

## Impacts of Trinity Dam on Natural Processes



Confined channel near Douglas City

Decades of low flows from the dam



Encroached riparian vegetation & sediment berms in upper 40 miles

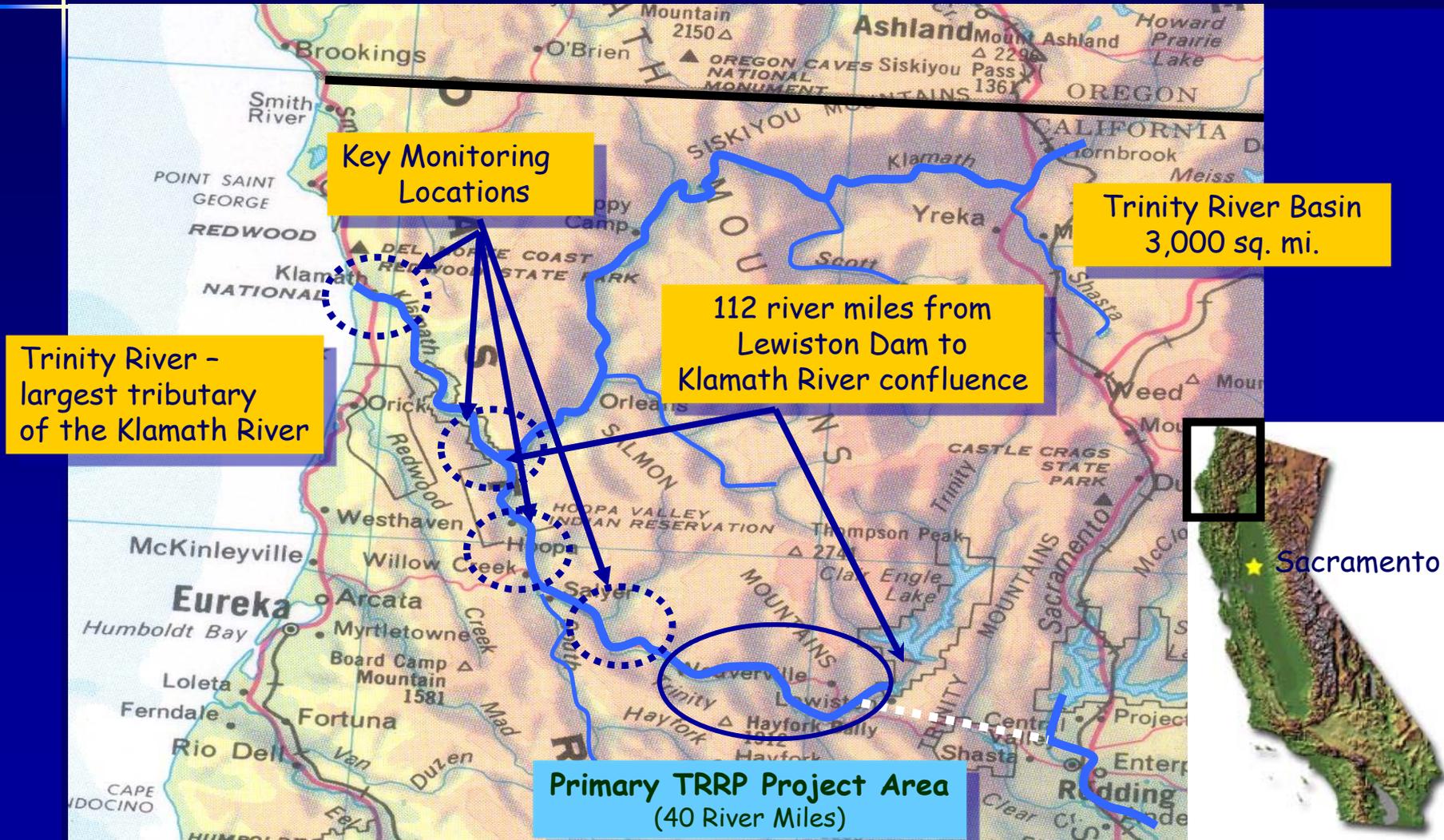


Reduced access to floodplain & loss of critical habitat



Major declines in naturally spawning anadromous fish populations by mid- 1970s

# Project Location:



# Program Goals and Objectives:

## "System-Wide Change" - From Dam to Estuary

### ❖ Restore populations of naturally spawning salmon and steelhead to pre-dam levels.

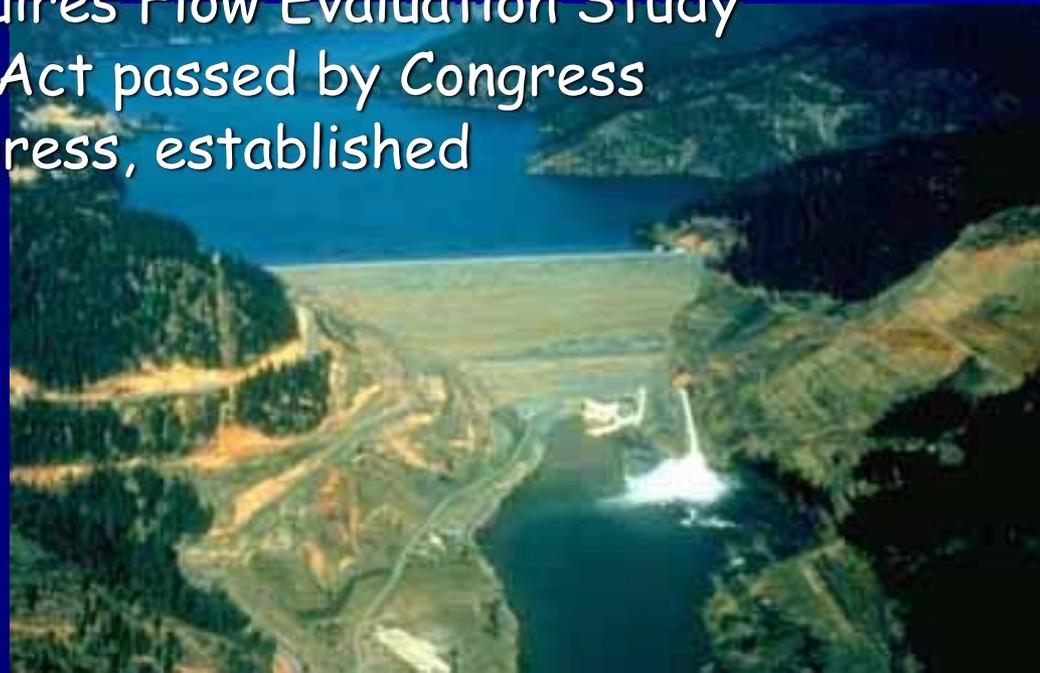
- Complete necessary infrastructure modifications to allow implementation of higher peak releases as soon as possible.
- Create sufficient suitable habitat through achievement of healthy river attributes.
- Predict, measure, and evaluate progress toward long-term program goals; use to influence short-term management actions (AEAM).



# Program Context:

## Statutory, Administrative & Legal Mandates

- 1955 - Trinity Division of Central Valley Project authorized by Congress for water/power purposes
- 1964 - Trinity/Lewiston dams completed and filled
- 1970s - Salmon populations decline significantly
- 1981 - Interior Secretary requires Flow Evaluation Study
- 1984 - TR Fish & Wildlife Mgt Act passed by Congress
- 1992 - CVPIA enacted by Congress, established 340,000 AF min. flows



# Program Context:

## Statutory, Administrative & Legal Mandates

- 1999 - Flow Study completed, basis for Preferred Alternative in EIS/EIR
- 2000 - Record of Decision signed
- 2001 - Lawsuit filed against EIS/EIR in March
- 2002 - Program Office opens in Weaverville
- 2004 - Litigation resolved in favor of Interior in November
- 2005 - First unconstrained ROD flows released, first rehab site completed

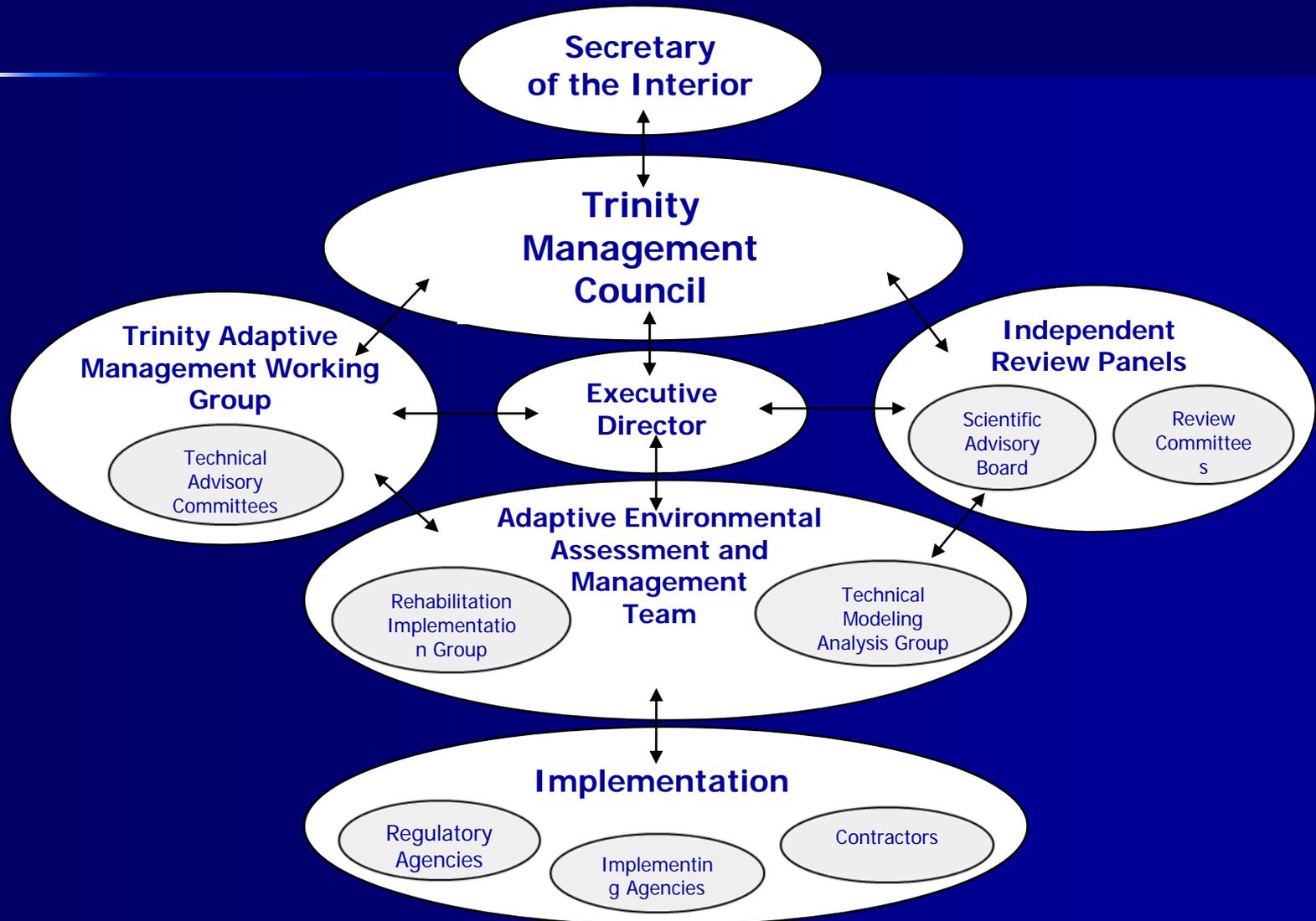


# Important Milestones:

An Ambitious Schedule & Steady Progress



# Organizational Structure: As Envisioned in the ROD



# Program Partners:

## Key Players - Numerous & Diverse

### TMC

("Board of Directors")

- ❖ Bureau of Reclamation
- ❖ California Resources Agency (DWR, DFG)
- ❖ Fish & Wildlife Service
- ❖ Forest Service
- ❖ Hoopa Valley Tribe
- NOAA Fisheries
- ❖ Trinity County
- ❖ Yurok Tribe

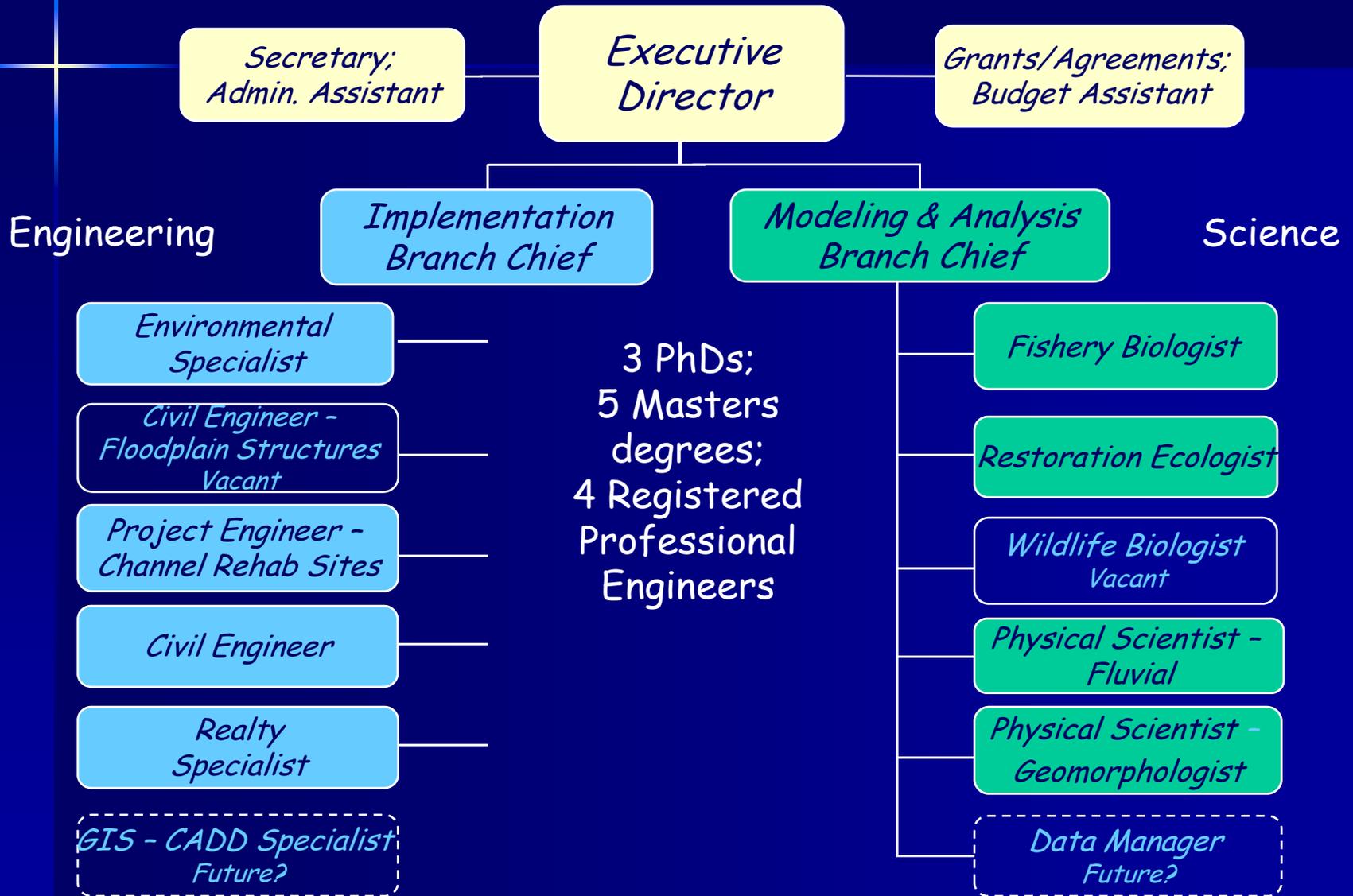
### TAMWG

(Federal Advisory Committee)

- Big Bar Community Development Group
- Redwood Regional Audobon Society
- California Trout, Inc.
- Northcoast Environmental Center
- Environmental Defense
- Friends of the Trinity
- Glen Colusa Irrigation District
- Tehama-Colusa Canal Authority
- Natural Resource Conservation Service
- City of Redding Electric Utility
- Safe Alternatives for Forest Environment
- 6 Rivers Outfitters & Guides Association
- County Residents & Landowners
- ❖ Trinity County Resource Conservation District
- Willow Cr. Community Services District

❖ Funding Recipients

# Weaverville Program Office: Scientific and Engineering Expertise (AEAM)



# Key Concepts of the ROD:

A Combination of Actions are Needed

Managed high-flow releases (up to 11,000 cfs)

+ Removal of berms & vegetation (47 sites)

+ Gravel introductions (ave. 15,000 tons/yr)

+ Fine sediment control (tributaries)

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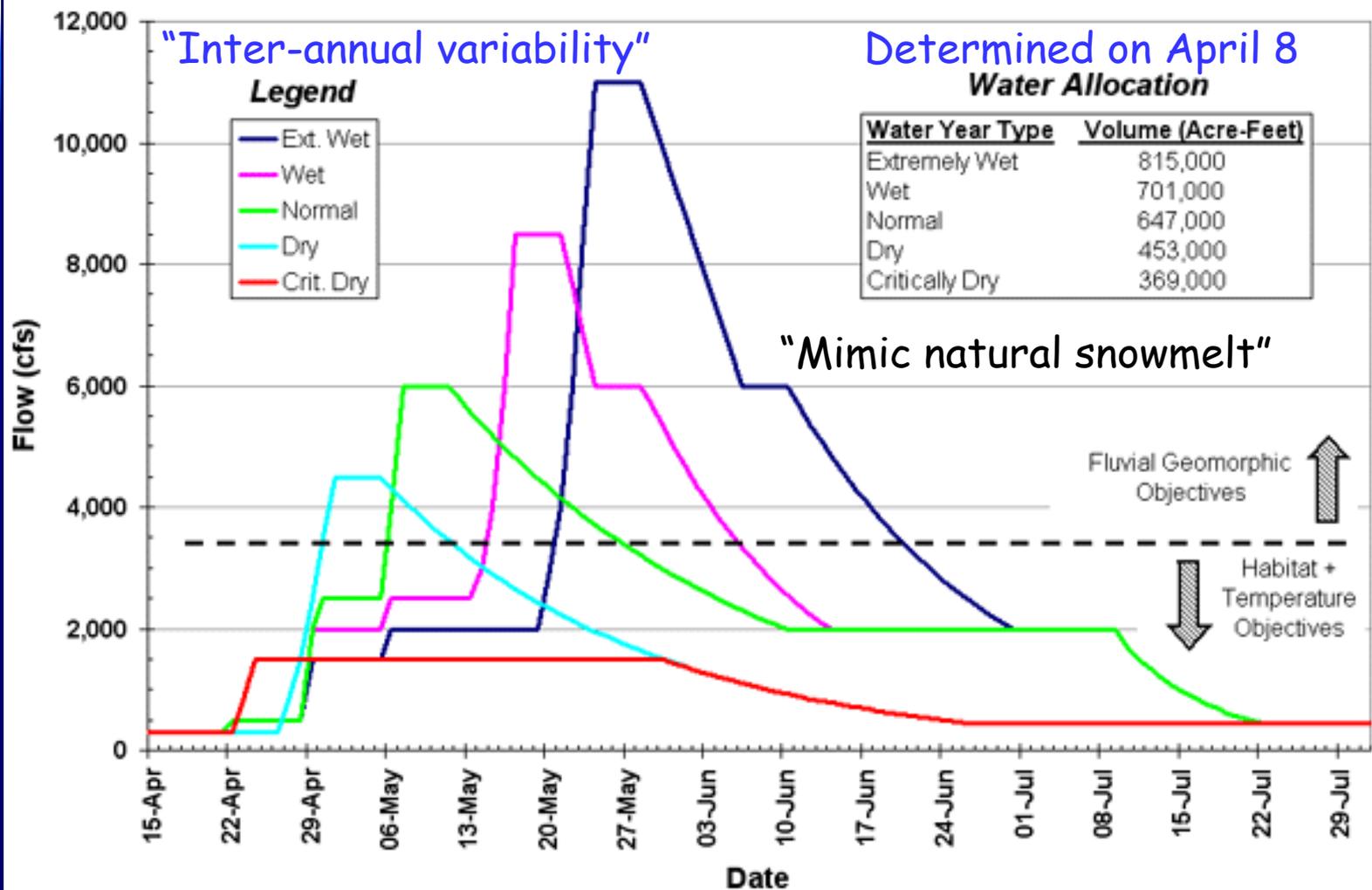
➤ Restored fluvial processes (rescale)

➤ New channel form (40 river miles)

➤ More rearing habitat (3-4x)

= Increased salmonid production (at least 2x)

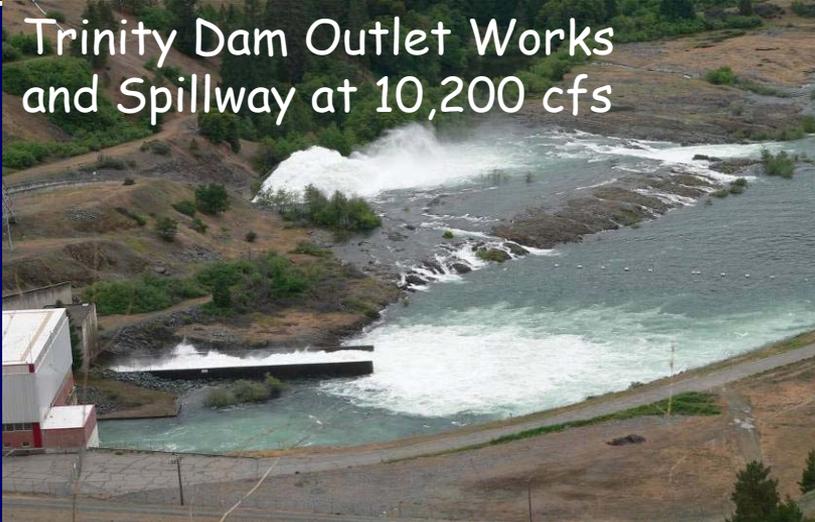
# Higher Flows: Five Water Year Types



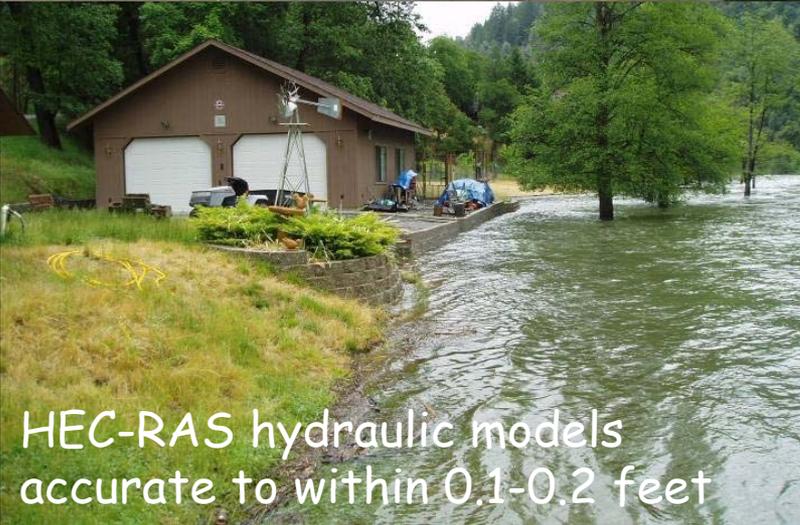
# Higher Flows:

## Only Possible with Infrastructure Modifications

Trinity Dam Outlet Works  
and Spillway at 10,200 cfs

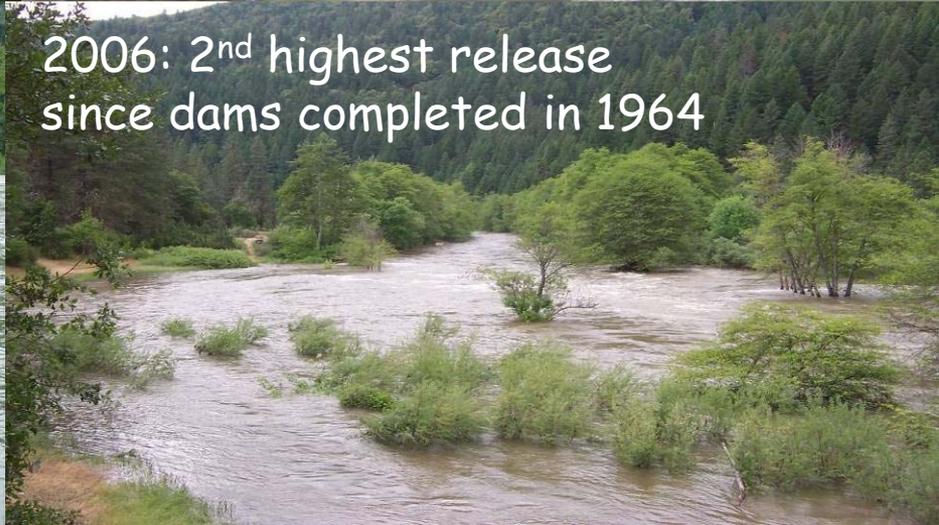


Deck & gazebo relocated since  
this photo



HEC-RAS hydraulic models  
accurate to within 0.1-0.2 feet

2006: 2<sup>nd</sup> highest release  
since dams completed in 1964



# Floodplain Preparation:

## Step 1: Replace Three Bridges



Biggers Road Bridge, 2001

Railroad flatcar bridges  
limited dam releases to  
6,000 cfs

Fully engineered bridges  
now able to withstand  
ROD flows >11,000 cfs



Biggers Road Bridge, 2005

# Floodplain Preparation:

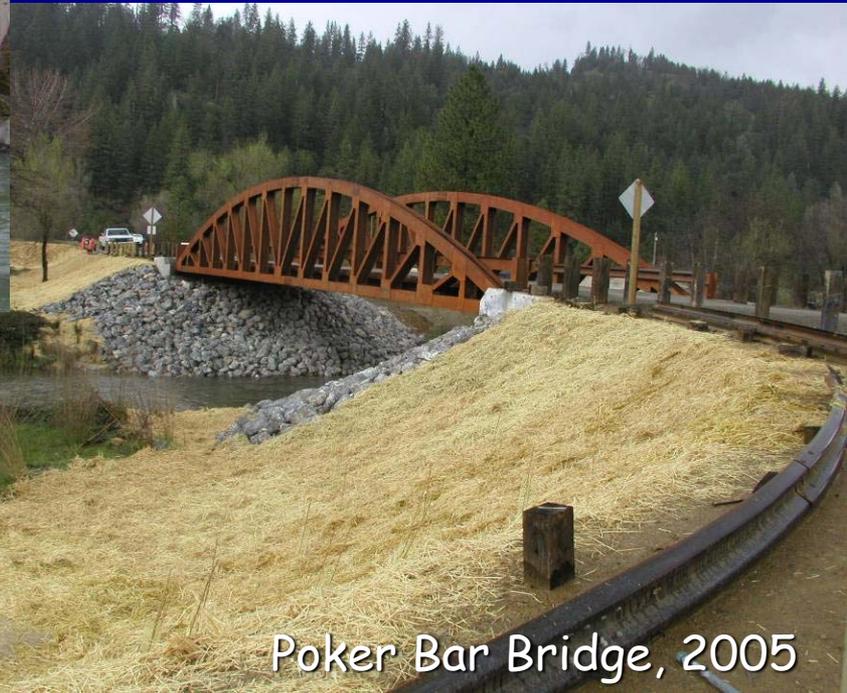
## Step 1: Bridges No Longer a Constraint



Poker Bar Bridge, 2001

Two contracts; \$10 million for planning, design, and construction; completed in three years

11,000 cfs



Poker Bar Bridge, 2005

Four new river crossings provide safe access to over 120 homes during maximum fishery flows

# Floodplain Preparation: Step 2: One House Removal



The "Little Yellow House": a limiting factor for high flows; purchased March 2005



May 2005  
7,000 cfs



March 2006  
Removal



May 2006  
10,000 cfs

11,000 cfs →  
8,500 cfs →

# Floodplain Preparation:

## Step 3: Over 500 Private Parcels

Maximum ROD Flows  
11,000 cfs  
Inundation Level



Trinity River



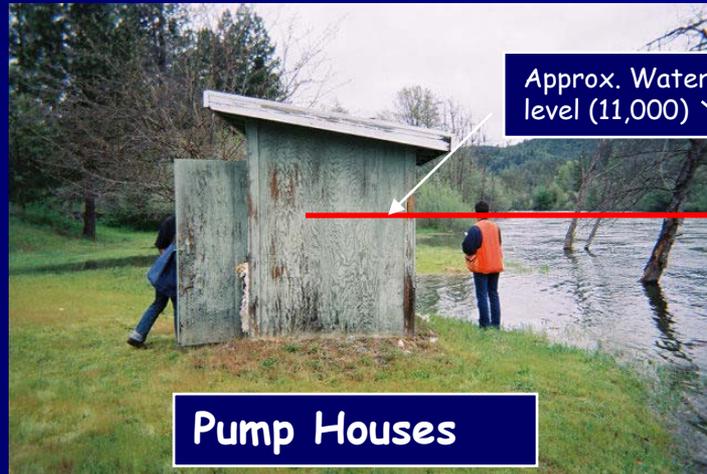
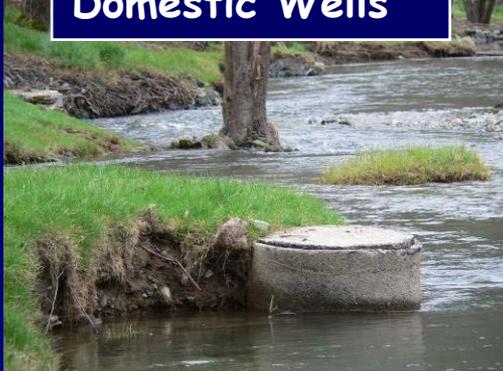
Tullis Property  
("Little Yellow House")

HWY 299

Case-by-case negotiations  
with individual landowners

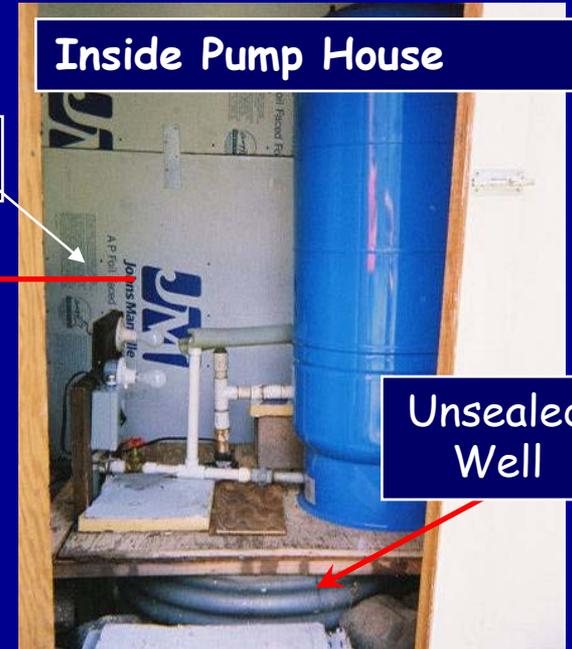
# Floodplain Preparation: Step 3: Many Small Structures

Domestic Wells



Pump Houses

Inside Pump House



Unsealed Well



Electrical Connections



Decks

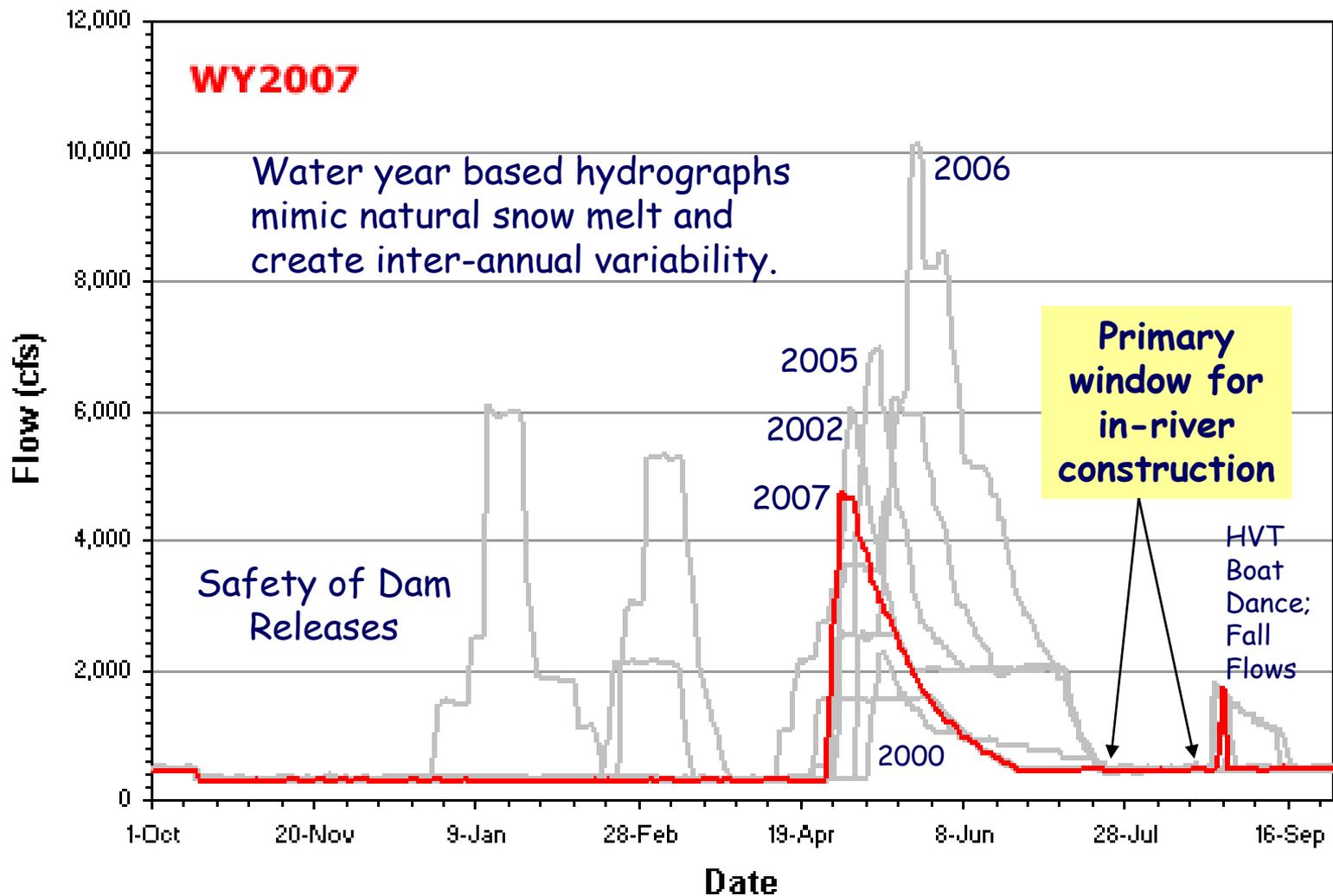
Waiver of liability secured & recorded from over 70 landowners for floodplain structure modifications, including domestic water and sewage disposal systems, at a cost of \$500,000.

# The Result: 1.780 Million Acre Feet more water than if ROD had not been signed!

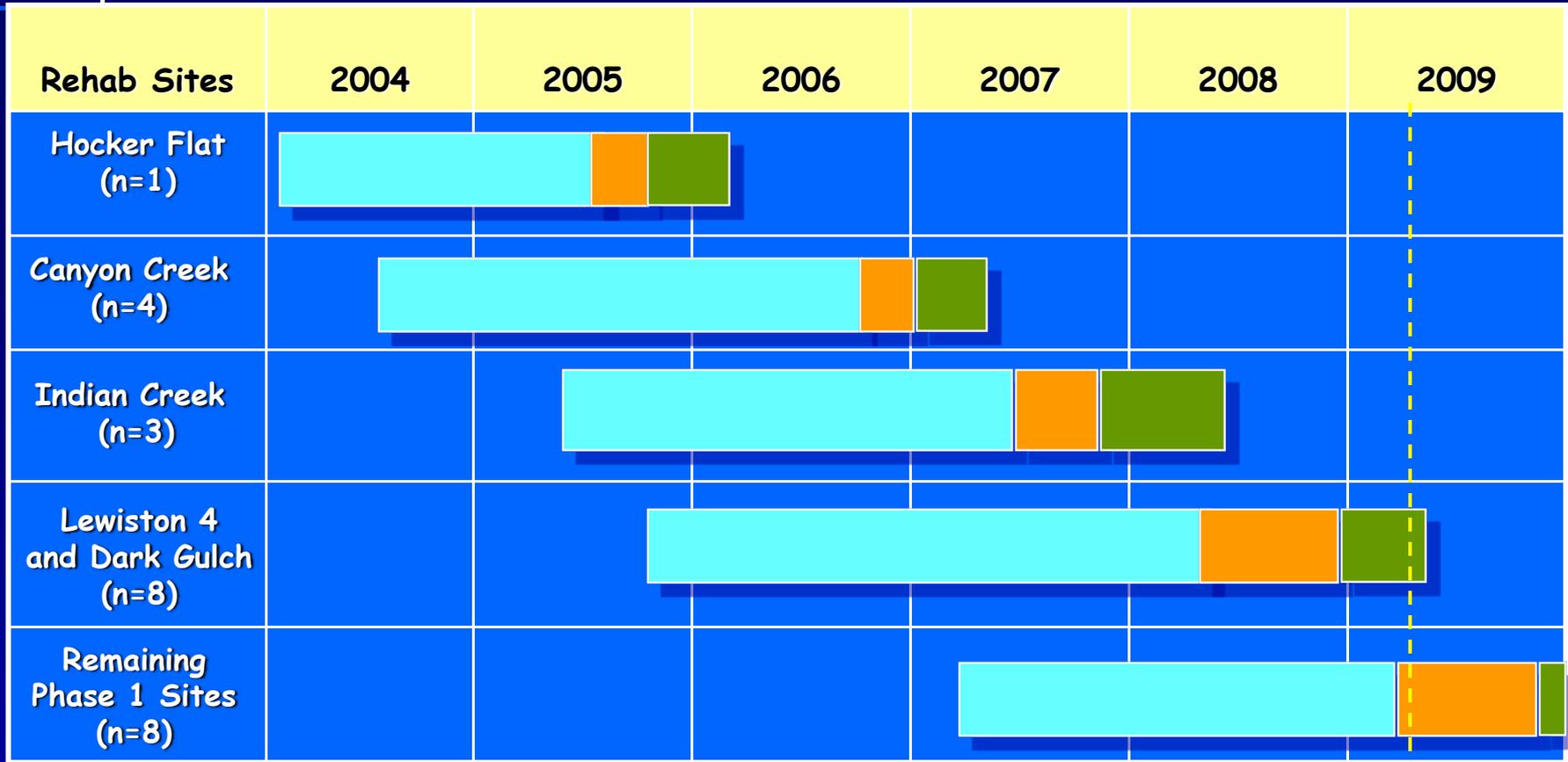
<u>Water Year</u>		<u>Volume (AF)</u>	<u>Class</u>
2008		647,000	Normal
2007	(unconstrained flows)	453,000	Dry
2006		815,000	Ext. Wet
2005		647,000	Normal
2004	(litigation resolved)	647,000	Wet
2003		453,000	Wet
2002	(limited by Court order)	469,000	Normal
2001		369,000	Dry
2000	(pre-ROD)	340,000	Wet

# Actual Releases:

Inter-annual variability = healthy river attributes



# Channel Rehabilitation Sites: 24 Sites by 2010 - All 47 Sites by 2014



Phase 1 Total: 24 Rehab Sites

3/15/09

Design, NEPA/CEQA,  
Permits, Contracting

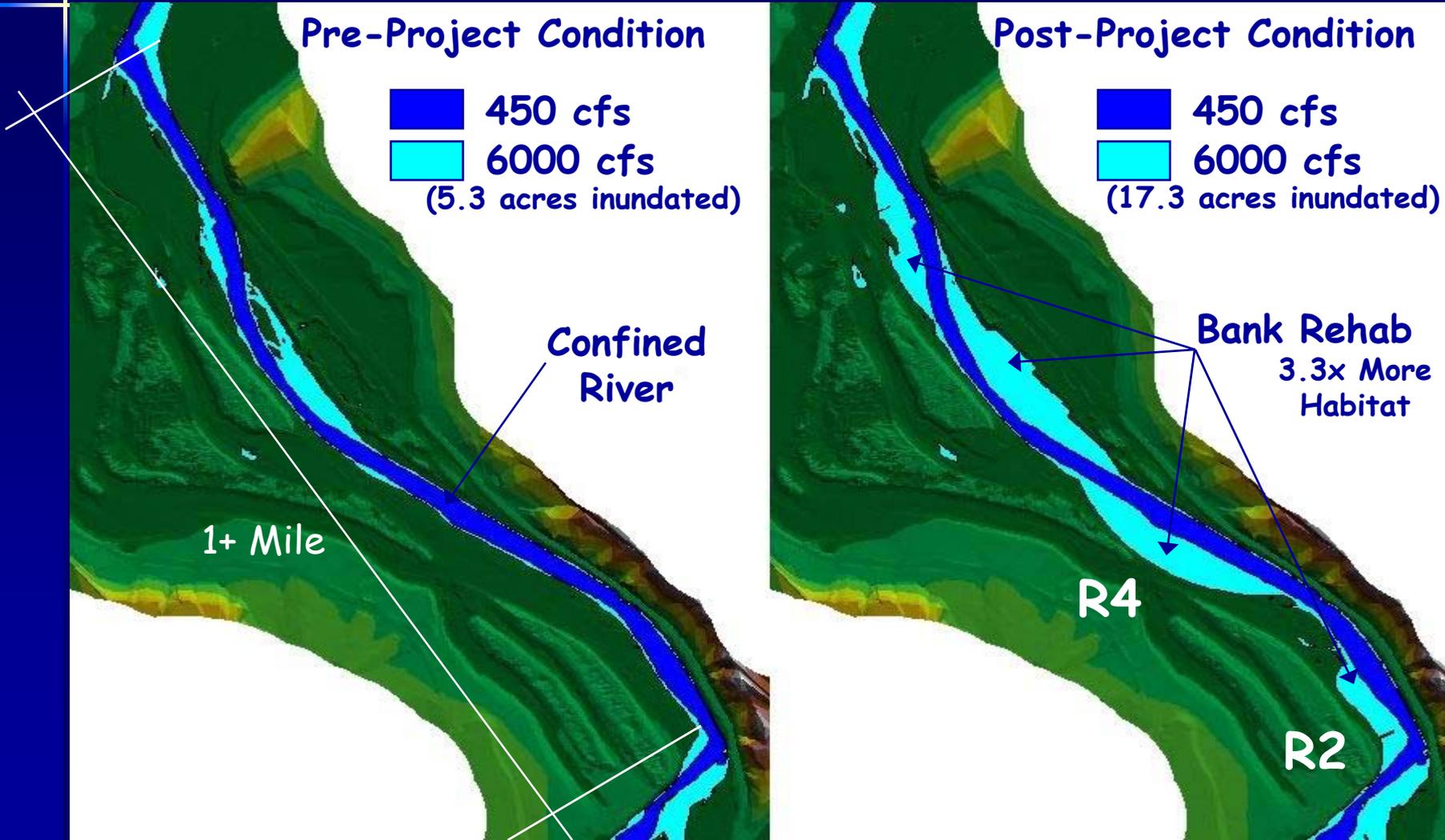
Construction

Revegetation

Phase 2 Total: 23 Rehab Sites  
Scheduled for 2009 - 2012

# Channel Rehab Sites:

## Large Projects Needed to Initiate Change



# Channel Rehab Sites: Site Characteristics & Objectives Vary



At Hocker Flat, elevated floodplain terraces were lowered by 6-8 ft. (90,000 cu. yds.)



Removing root systems of encroached riparian vegetation

# Hocker Flat - 2005: Mechanical Restoration & Flows Working Together



February 2005  
Pre-Construction: 300 cfs



September 2005  
Post-Construction: 450 cfs



December 2005  
Winter Storms: 20,000+ cfs



October 2006  
Winter Base Flows: 300 cfs

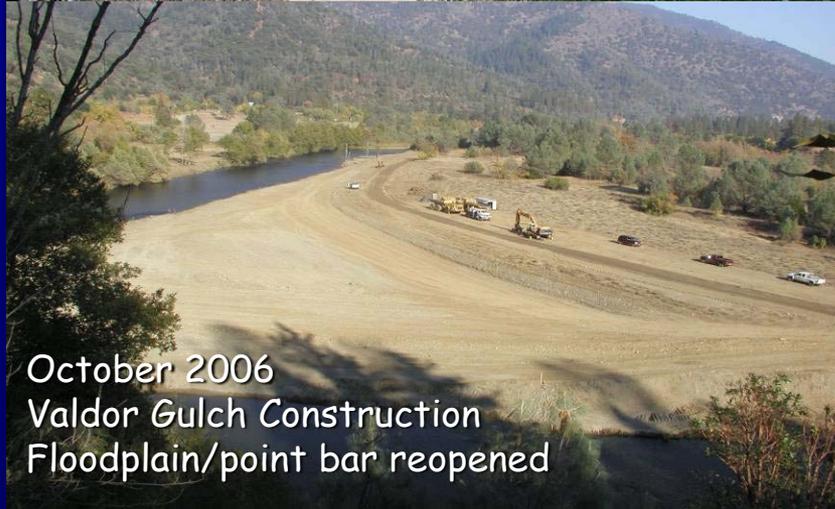
# Canyon Creek - 2006: NCRWQCB Partnered as Lead CEQA Agency



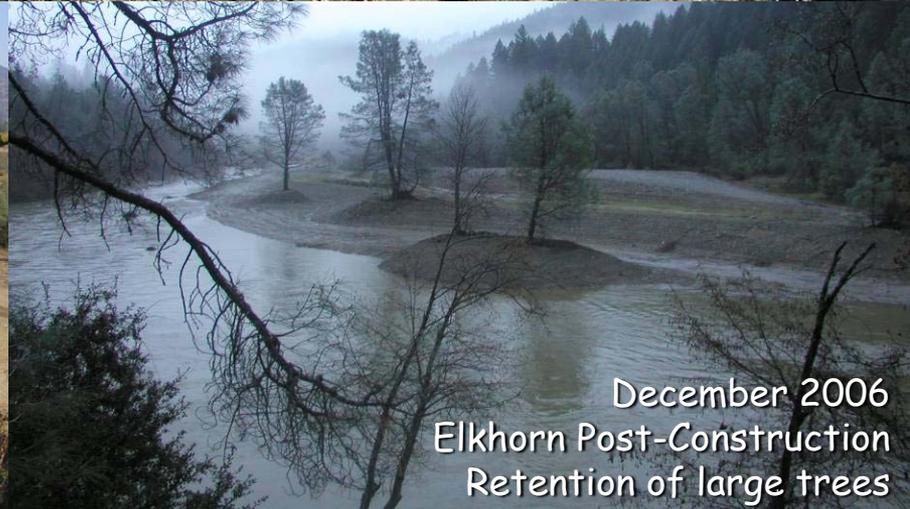
December 2005  
Pre-Construction: 14,000 cfs



October 2006  
Elkhorn Post-Construction  
Removal of fine sediment berm

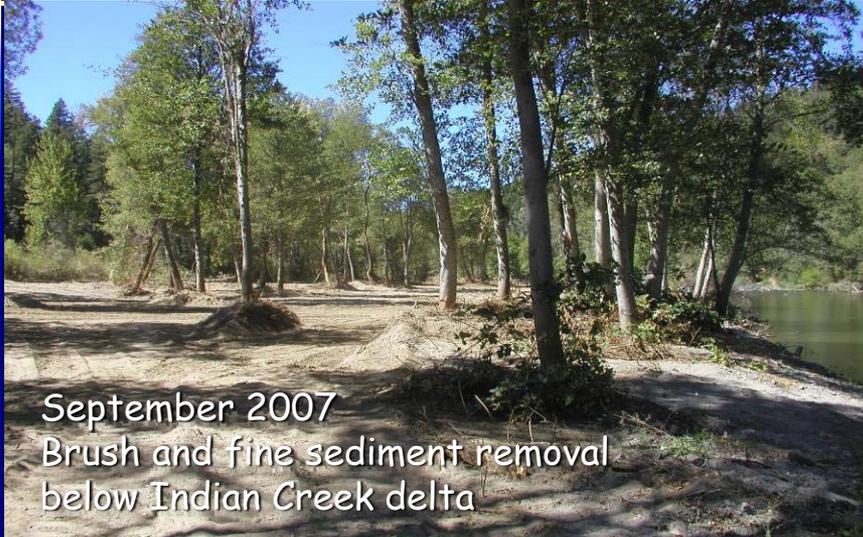


October 2006  
Valdor Gulch Construction  
Floodplain/point bar reopened



December 2006  
Elkhorn Post-Construction  
Retention of large trees

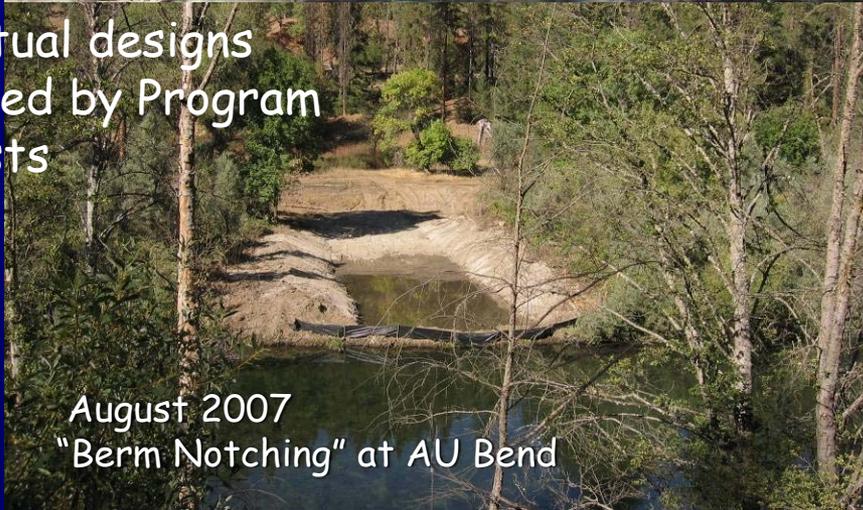
# Indian Creek - 2007: New Design Features & Construction Methods



September 2007  
Brush and fine sediment removal  
below Indian Creek delta



August 2007  
Gravel Processing



August 2007  
"Berm Notching" at AU Bend



August 2007  
Large Wood Placement

Conceptual designs  
developed by Program  
scientists

# Program of Work & Budget: Balance Between Implementation & Science

<b>RIG</b> 50%	Gravel Augmentation; Watersheds	Gravel Augmentation; Watersheds	Gravel Augmentation; Watersheds	Gravel Augmentation; Watersheds	<b>RIG</b> 20%
	Phase 1 Rehab Sites; Floodplain Structure Mods	Phase 2 Rehab Sites	Follow-up	Update Baseline;	
<b>TMAG</b> 30%	Compliance; Baseline Assessments; Prerequisites	Measure Progress; Evaluate Mgt Actions; Compliance; Prerequisites	Update Baseline; Measure Progress; Evaluate Mgt Actions (flows); Prerequisites	Measure Progress; Evaluate Mgt Actions (flows); Prerequisites	<b>TMAG</b> 60%
	<b>Program Administration (20%)</b>				
	2006-2010	2011-2014	2014-2016	2017-2020	

# Program of Work & Budget:

## ROD Cost Estimates (1999)

	Year 1	Year 2	Year 3
Bridge Construction	350	5,700	0
Houses/Outbuildings	125	225	0
Channel Rehab Projects	2,150	2,400	2,400
Watershed Restoration	2,000	2,000	2,000
Coarse & Fine Sediments	50	50	355
Objective Specific Monitoring	5,640	5,176	5,176
AEAM Team (Staffing)	2,025	2,025	2,025
Totals	12,340	17,576	11,956

All dollars in thousands; taken from December 2000  
ROD/Implementation Plan; not adjusted for inflation

# Program of Work & Budget:

## Recent TRRP Budgets

	Actuals FY2006	Final FY2007	Tentatively Approved FY2008	Estimated Full ROD FY2009
Program Administration	1,830	1,729	1,930	2,161
Rehabilitation Implementation	4,415	3,799	5,277	7,200
Modeling and Analysis	4,732	3,768	4,107	6,250
Totals	10,977	9,296	11,314	15,611

All dollars in thousands; FY2009 figures are best available estimates of a fully-implemented program of work; subject to on-going verification and improvement; funding sources not specified. Out year Full Program estimates do not include additional \$1.5 million for watershed restoration.

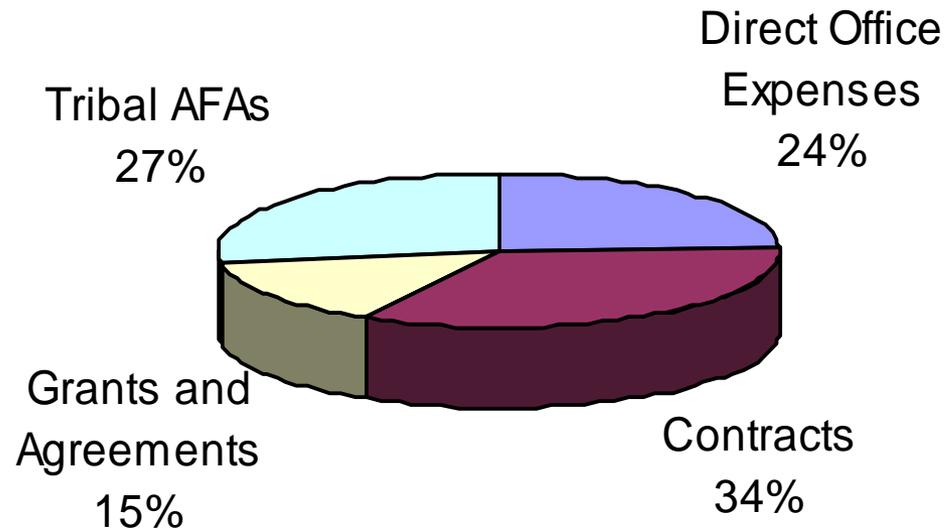
# Program of Work & Budget:

## TRRP Funding Levels Since ROD was Signed

	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Reclamation (W&RR)	7.0	7.0	6.3	6.0	8.1	7.0	7.0	7.1
CVPIA Restoration Fund	1.1	0	2.0	1.0	2.0	1.0	4.0	1.0
USFWS	0.9	1.4	1.3	1.5	1.5	1.5	1.5	1.5
DFG Salmon Recovery Program	0	0.2	1.9	0	0	0	0.7	0.5
<b>Totals</b>	<b>9.0</b>	<b>8.6</b>	<b>11.5</b>	<b>8.5</b>	<b>11.6</b>	<b>9.5</b>	<b>13.2</b>	<b>10.1</b>

# Program of Work & Budget: Distribution of Annual Budget

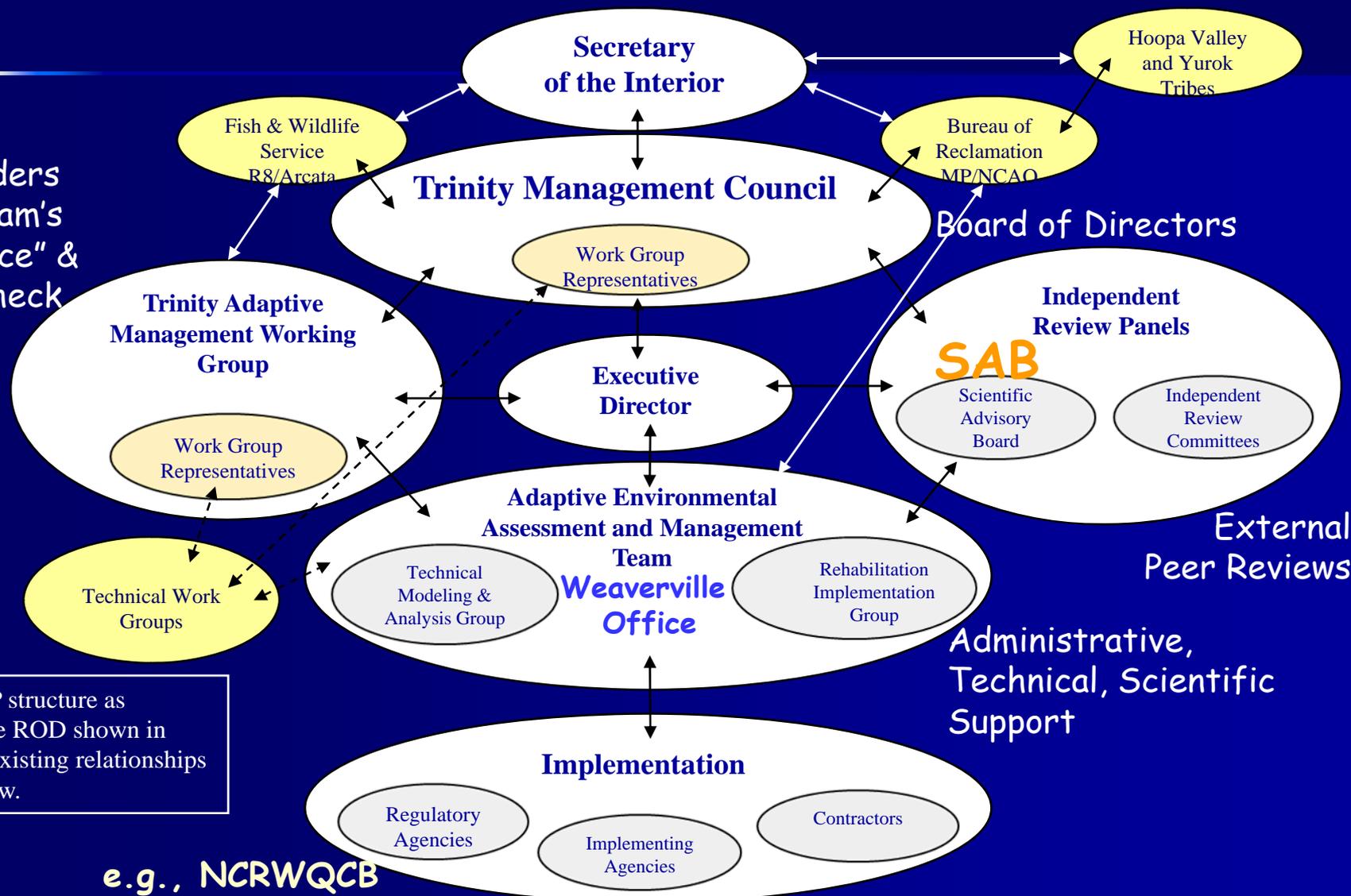
## Major Categories of TRRP Activities



Based on average annual budget of \$10 million

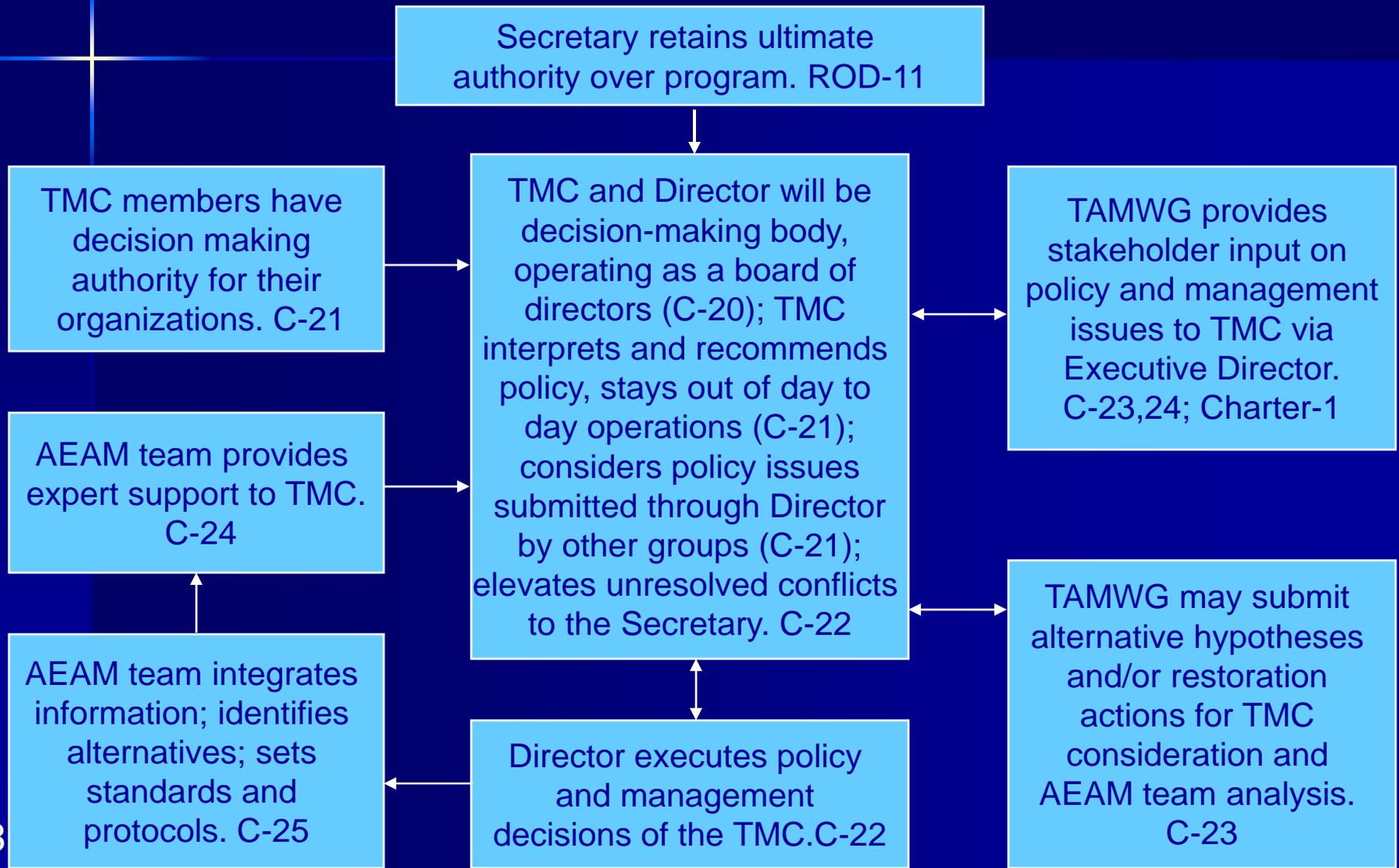
# Organizational Structure: More Complex than Anticipated by ROD

Stakeholders are Program's "Conscience" & Reality Check

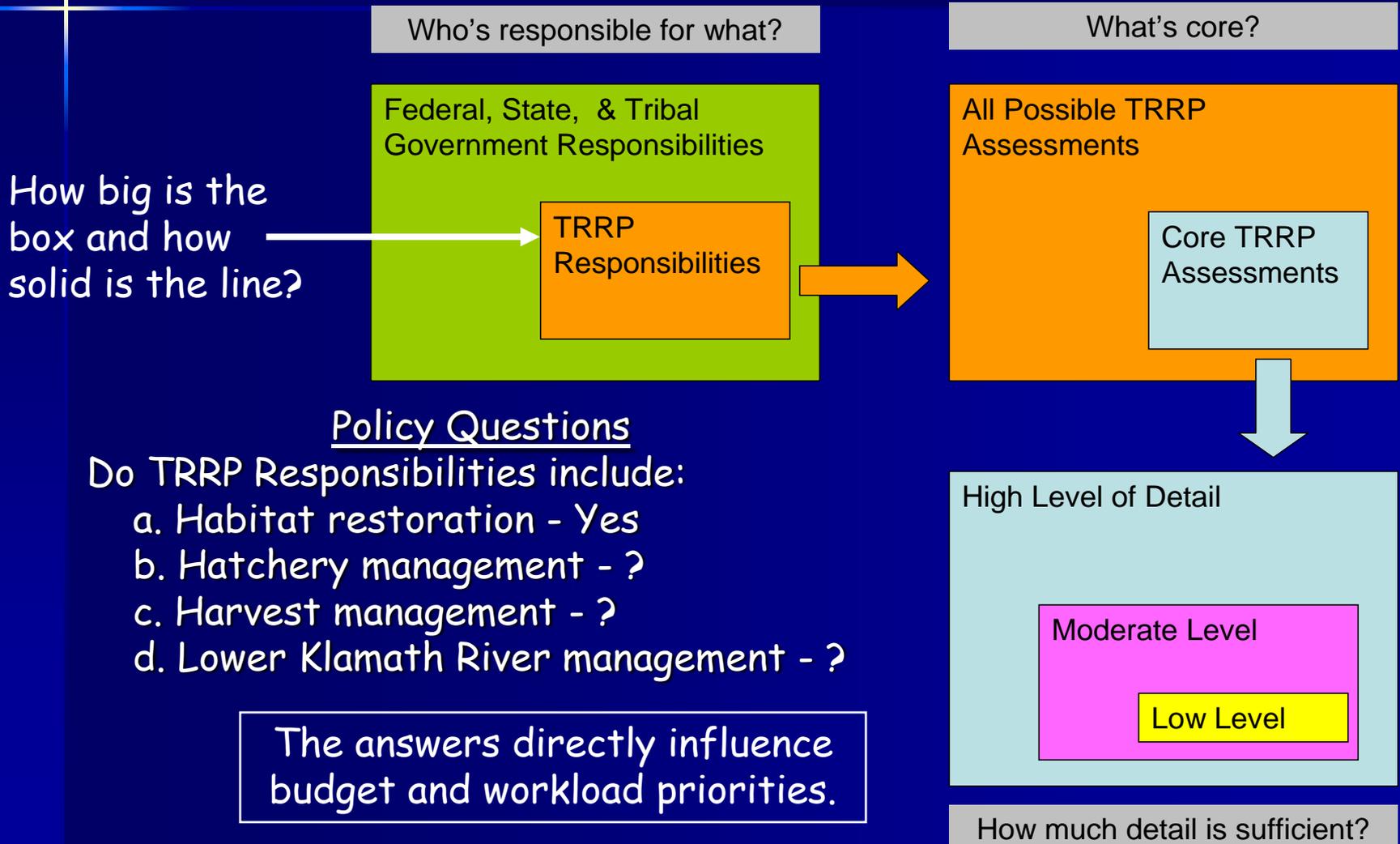


Existing TRRP structure as approved in the ROD shown in white. Other existing relationships shown in yellow.

# Organizational Structure: ROD/IP Direction Covers Many Situations



# Organizational Structure: View of Responsibilities Influences Roles





Low flow side channel  
doubles amount of rearing  
habitat for 0.5 miles

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