

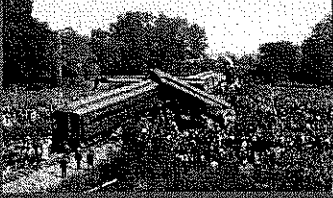
## History

1983 - Service proposed:

- Minimum stream flows (at pre-1980 levels) for all occupied habitat
- Any water project causing depletions below minimum stream flows would have to replace depletions on a one-for-one basis.

This requirement could have:

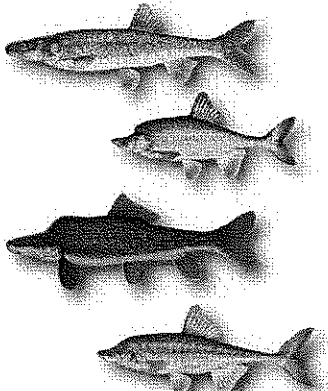
- Stopped water development
- Limited use of existing water supplies
- Conflicted with existing federal and state water law



Head-on collision would have occurred among water users, federal agencies, power users, and environmentalists.

## Upper Colorado River Endangered Fish Recovery Program

- Established in 1988
- Partners
  - State of Colorado
  - State of Utah
  - State of Wyoming
  - Bureau of Reclamation
  - Colorado River Energy Distributors Association
  - Colorado Water Congress
  - National Park Service
  - The Nature Conservancy
  - U.S. Fish and Wildlife Service
  - Utah Water Users Association
  - Western Area Power Administration
  - Western Resource Advocates
  - Wyoming Water Association

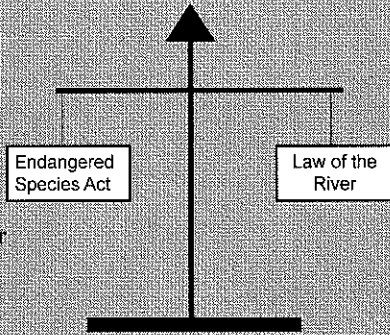


Fish illustrations by Joe Tomelleri

## The Goal of the Recovery Program

- The purpose of this Recovery Program is to recover the endangered fishes while water development proceeds in compliance with all applicable Federal and State laws.

- Providing Endangered Species Act compliance for federal, tribal, state and private existing and new water projects throughout the Colorado River Basin above Lake Powell.

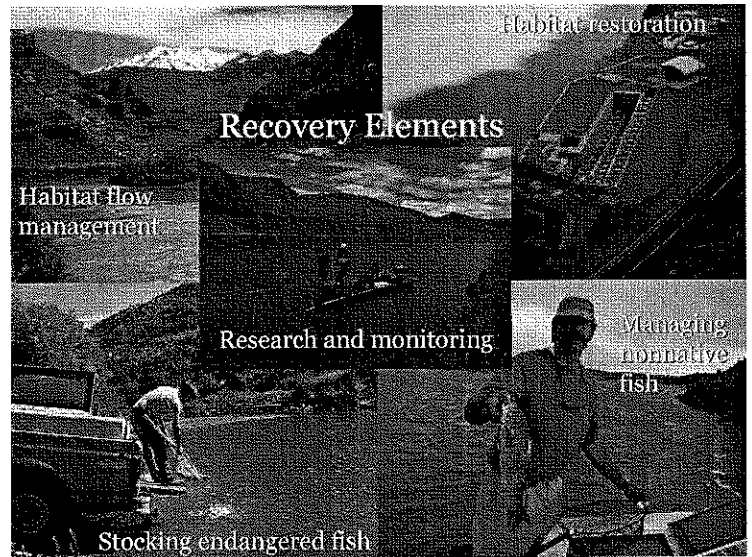
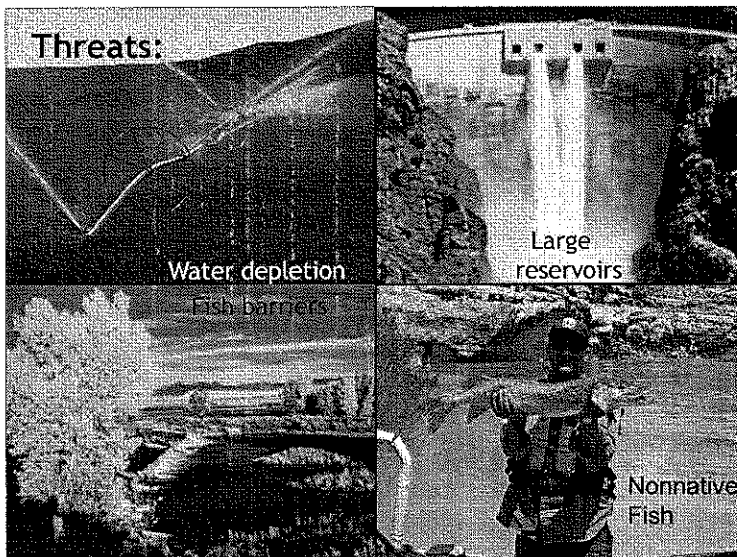


## Recovery Program Provides ESA compliance for Historic and New Water Depletion Projects

Summary of Endangered Species Act Section 7 Consultations  
(1/1988 through 12/31/2014)

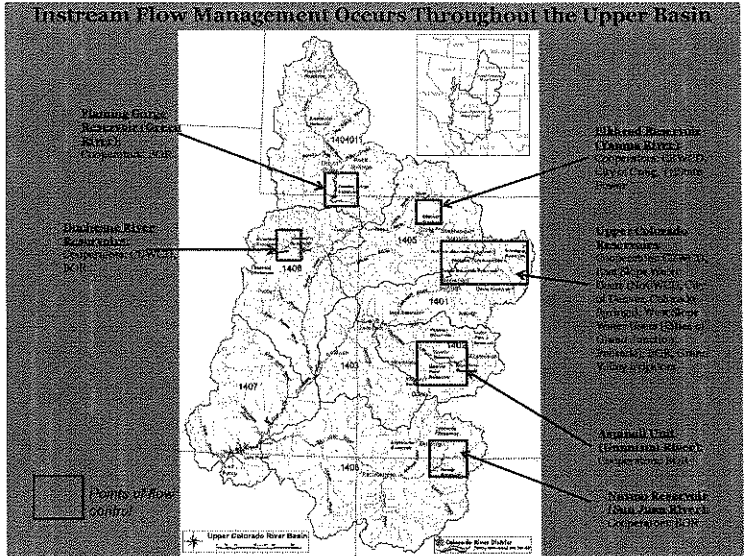
State	Number of Projects	Historic Depletions (Acro-feet/Yr)	New Depletions (Acro-feet/Yr)	Total Depletions (Acro-feet/Yr)
Colorado	1207	1,915,681	206,620	2,122,301
Utah	240	517,670	97,279	614,949
Wyoming	398	82,498	35,694	118,192
Regional*	238	(regional)	(regional)	0
<b>Total</b>	<b>2,083</b>	<b>2,516,849</b>	<b>339,593</b>	<b>2,856,442</b>

\* Amount included in individual state's new depletions



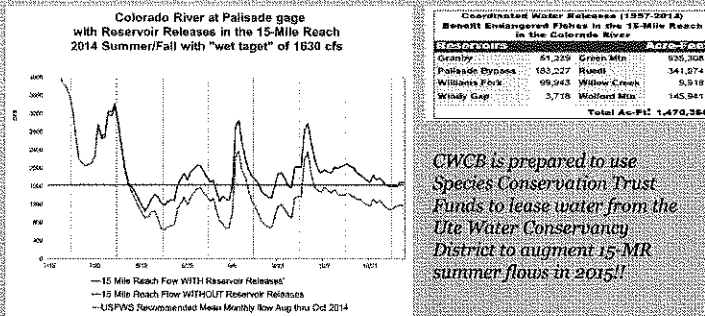
## Recovery Elements

- Flow Management
- Habitat Restoration
- Nonnative Fish Management
- Stocking Endangered Fish
- Research and Monitoring
- Information and Education



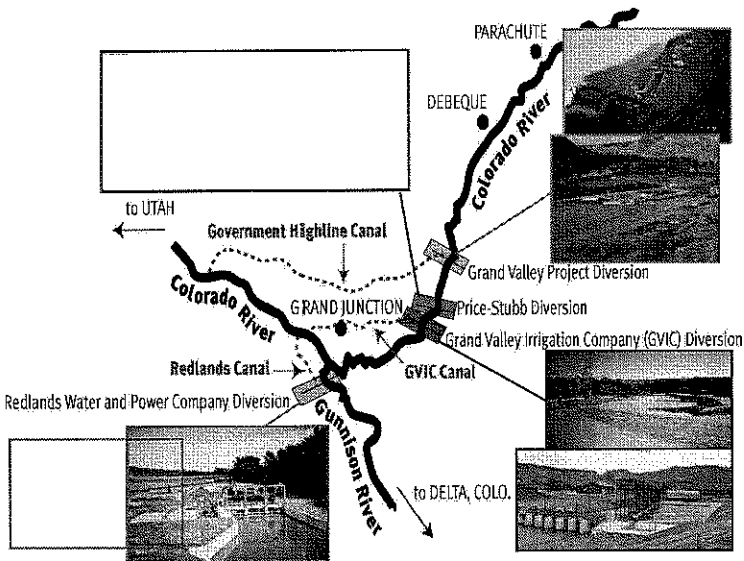
## Colorado River 15-mile reach

### Mainstem Base Flow Augmentation



## Recovery Elements

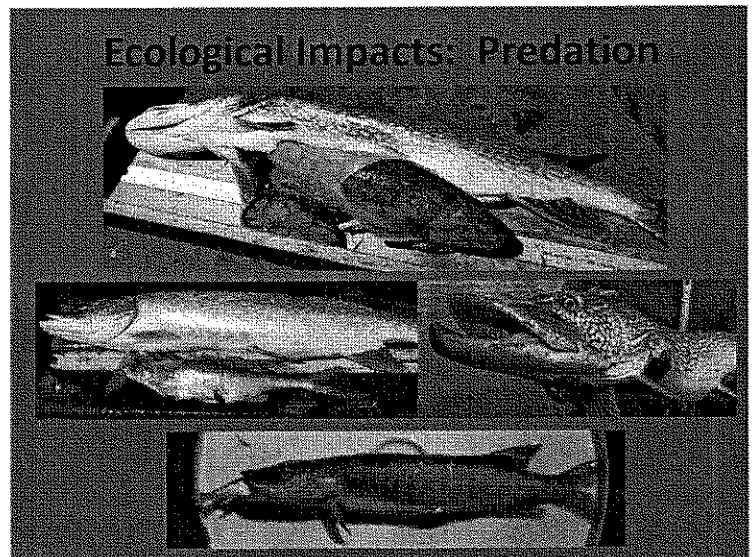
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## Recovery Elements

- Flow Management
- Habitat Restoration
- Nonnative Fish Management
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River Reach	Presence of invasive aquatic species by decade			
	1980	1990	2000	2010
Colorado (Rifle to Fish Ladder)			🐟🐟🐟	🐟🐟🐟
Colorado (Fish Ladder to Westwater)			🐟🐟	🐟🐟
Colorado (Westwater to Green River)			🐟	🐟
Dolores (McPhee to San Miguel River)			🐟	🐟
Dolores (San Miguel to Colorado River)			🐟	🐟
Gunison (Colorado to Uncompahgre River)			🐟	🐟
Green (Flaming Gorge to Yampa River)			🐟🐟	🐟🐟
Green (Yampa to White River)			🐟🐟	🐟🐟
Green (White to Colorado River)			🐟	🐟
White (Kenney to Green River)			🐟	🐟
Little Snake (Baggs to Yampa River)				🐟
Yampa (Stagecoach to Craig)			🐟🐟	🐟🐟
Yampa (Craig to Green River)			🐟	🐟
San Juan (Navajo Dam to Lake Powell)				



## Ecological Impacts: High Reproduction leading to competition



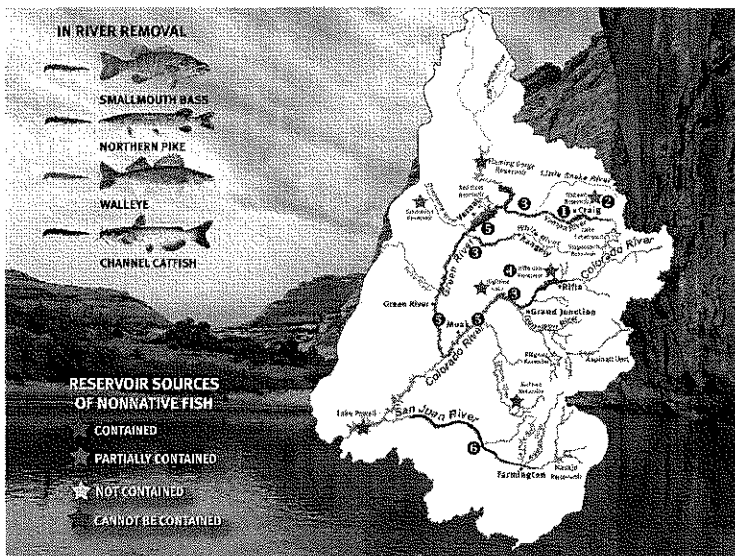
## Two Tiered Strategy

### In-River

- Reduce in-river reproduction
- Coordinate effort
- Respond to environmental conditions

### In-Reservoir

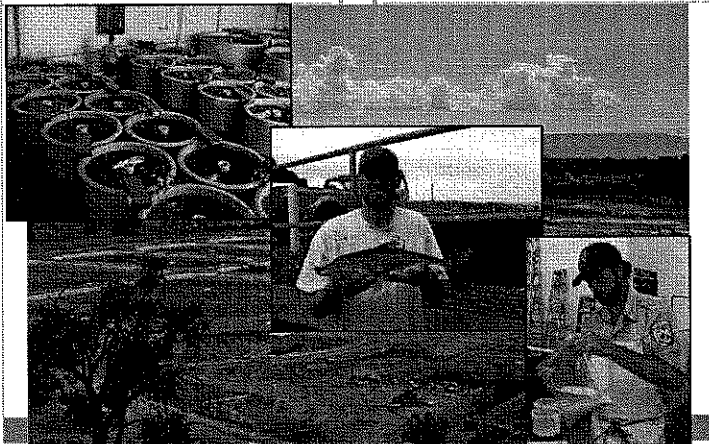
- Containment & eradication
- Lake Mgmt. Plans that include replacement fisheries
  - Sterile predators
- Appropriate harvest regulations



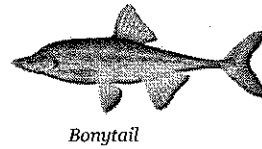
## Recovery Elements

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## Propagation, Genetics, and Stocking



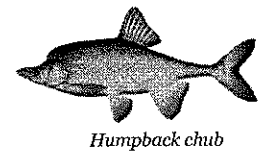
## Hatchery Production Necessary?



YES



NO



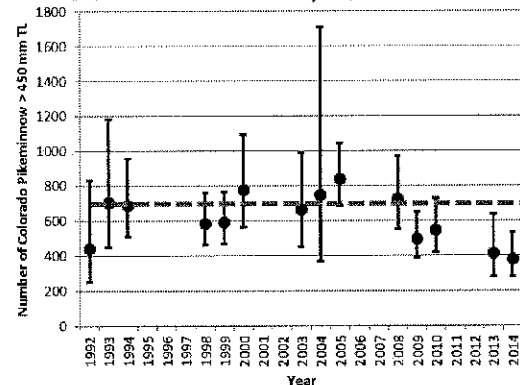
Fish Illustrations by Joe Tomella

## Recovery Elements

- Flow Management
- Habitat Restoration
- Nonnative Fish Management
- Stocking Endangered Fish
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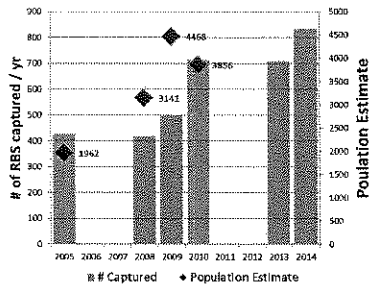
## Species Status: Colorado Pikeminnow

Colorado Pikeminnow, Colorado River

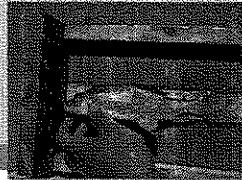


## Species Status: Razorback Sucker

Razorback Sucker in the Colorado River

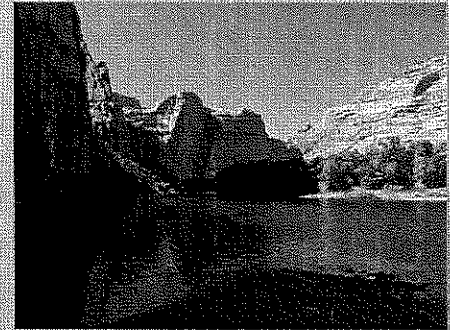


- Trending positively in upper and lower basins
- Research shows razorback are spawning in Lake Powell inflow areas
- Wild-produced larvae increasing in upper basin rivers.
- Wild-produced juveniles beginning to appear in upper basin rivers.



## Yampa River: Specifically

- Yampa River Programmatic Biological Opinion (2005) Identifies:
  - ID's Historic and Future Water Development
  - Necessary Recovery Actions to Offset Depletion Effects



## Recovery Program Provides ESA compliance for Water Depletion Projects in the Yampa Basin

All Yampa river depletions are provided ESA coverage by the Yampa Programmatic Biological Opinion

Table 2. Current and projected future depletions from the Yampa Basin by sector

Sector	Colorado			Wyoming			Basin Total		
	Current	Future	Diff.	Current	Future	Diff.	Current	Future	Diff.
Agriculture	87,765	92,258	4,493	26,905	37,451	10,546	114,670	129,709	15,039
Municipal <sup>a</sup>	5,201	15,307	10,106	76	88	12	5,277	15,395	10,118
Industrial <sup>b</sup>	16,947	32,350	15,403	0	3,000	3,000	16,947	35,350	18,403
Export	2,815	2,917	102	14,400	22,656	8,256	17,215	25,573	8,358
Evaporation	12,543	12,543	0	1,202	2,816	1,614	13,745	15,359	1,614
<b>TOTALS</b>	<b>125,271</b>	<b>155,375</b>	<b>30,104</b>	<b>42,583</b>	<b>66,011</b>	<b>23,428</b>	<b>167,854</b>	<b>221,386</b>	<b>53,532</b>

<sup>a</sup>Including domestic, commercial, and light industrial consumption

<sup>b</sup>Principally evaporation of cooling water for thermo-electric power generation

## Recovery Program Provides ESA compliance for Water Depletion Projects in the Yampa Basin (cont.)

YPBO - USFWS directs the Recovery Program to mitigate water development as follows:

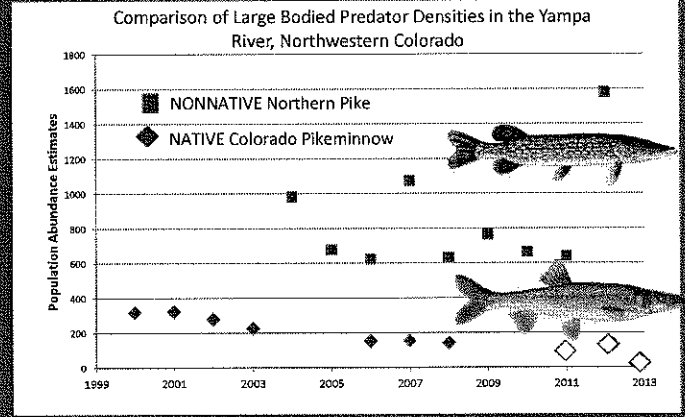
1. Augment Base flows / Enlarge Elkhead – 5,000 AF permanent pool; 2,000 AF short term pool; *Program contributes ~\$11M to total project costs.*
  - a) Screen reservoir outlets; *completed during construction*
2. Investigate endangered fish entrainment at Maybell Ditch – fix if necessary; *(2) studies determine entrainment is low – offset with continued intensive nonnative predator removal / control / prevention*
3. Control nonnative species – *Program spending ~\$900K/ yr to remove NP and SMB from 171 miles of Yampa River.*
4. Monitor Colorado pikeminnow population – *Program conducts mark / recap pop estimates on Yampa, White, and Green rivers 3yrs on/ 2yrs off.*
5. Manage floodplain habitats on the Green River, i.e. **protect YR spring peaks.**

## Yampa River Base Flow Management

Year	Average Flow July-Oct (cfs)	Target (cfs)	Elkhead Release (af)		Days Below Target in July-Oct (cfs)		
			Start Date	Total Release	Below 93	Below 134	Below 200
2014	663	200	Jul 20	1579	0	0	0
2013	321	93	Aug 7	5246	4	21	48
2012	113	93	Jul 2	6583	64	85	111
2011	2037	200	Aug 18	1822	0	0	0
2010	418	134	Sep 1	5000	0	8	42
2009	530	134	Aug 10	5000	0	8	23
2008	702	134	Aug 24	5005	0	0	6
2007	299	93	Aug 2	5000	0	7	40

*As the fish community shifts to one dominated by nonnative predators, particularly smallmouth bass, researchers caution that 93 cfs (Modde et al. 1999) may not be adequate to assist in the recovery of the endangered species.*

## Nonnative Predators Delay Downlisting



### Elkhead Reservoir Spillway – Proposed Placement of Fish Containment Net

