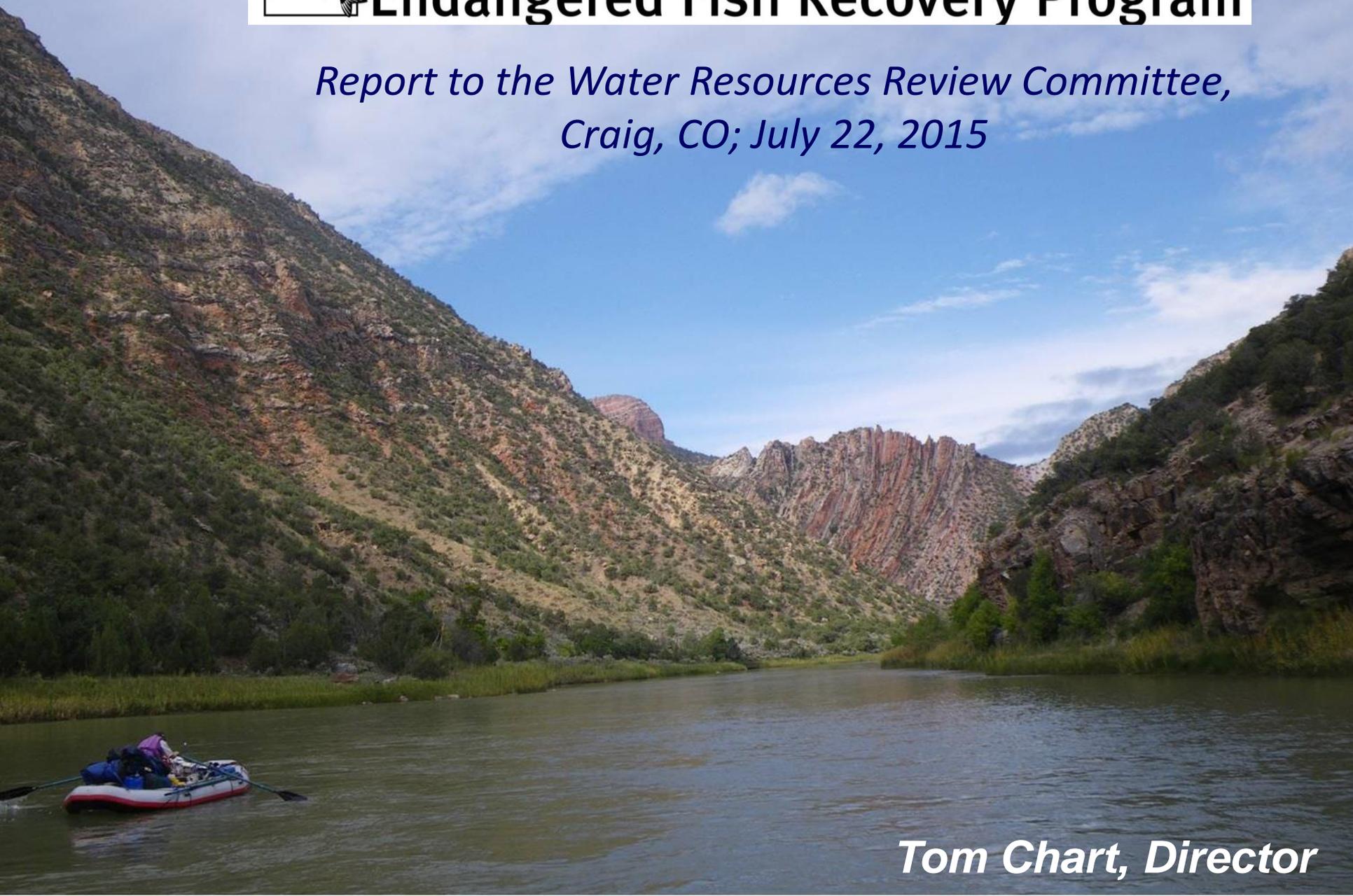




Upper Colorado River Endangered Fish Recovery Program

*Report to the Water Resources Review Committee,
Craig, CO; July 22, 2015*



Tom Chart, Director

Outline:

1. Recovery Program Basics
2. Recovery Actions
3. Status of the Endangered Fish
4. Yampa River specifics



History

1983 - Service proposed:

- Minimum stream flows (at pre-1960 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.



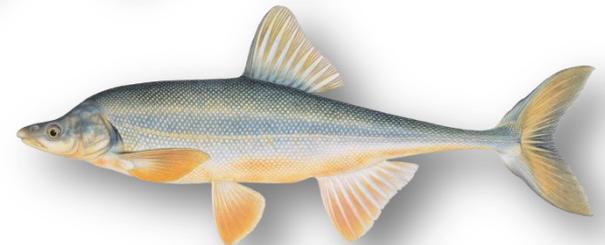
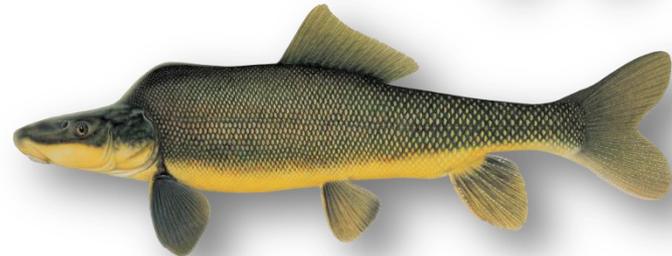
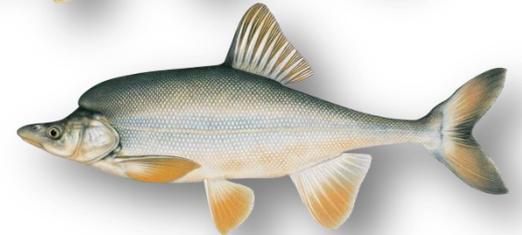
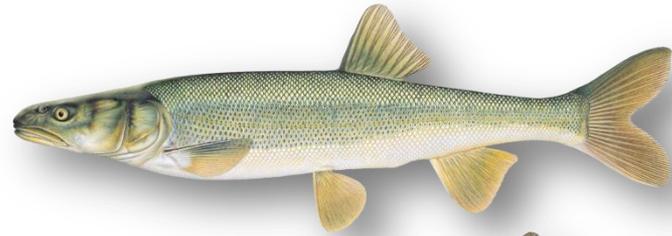
Head-on collision would have occurred among states, water users, federal agencies, power users, and environmentalists.



Upper Colorado River Endangered Fish Recovery Program

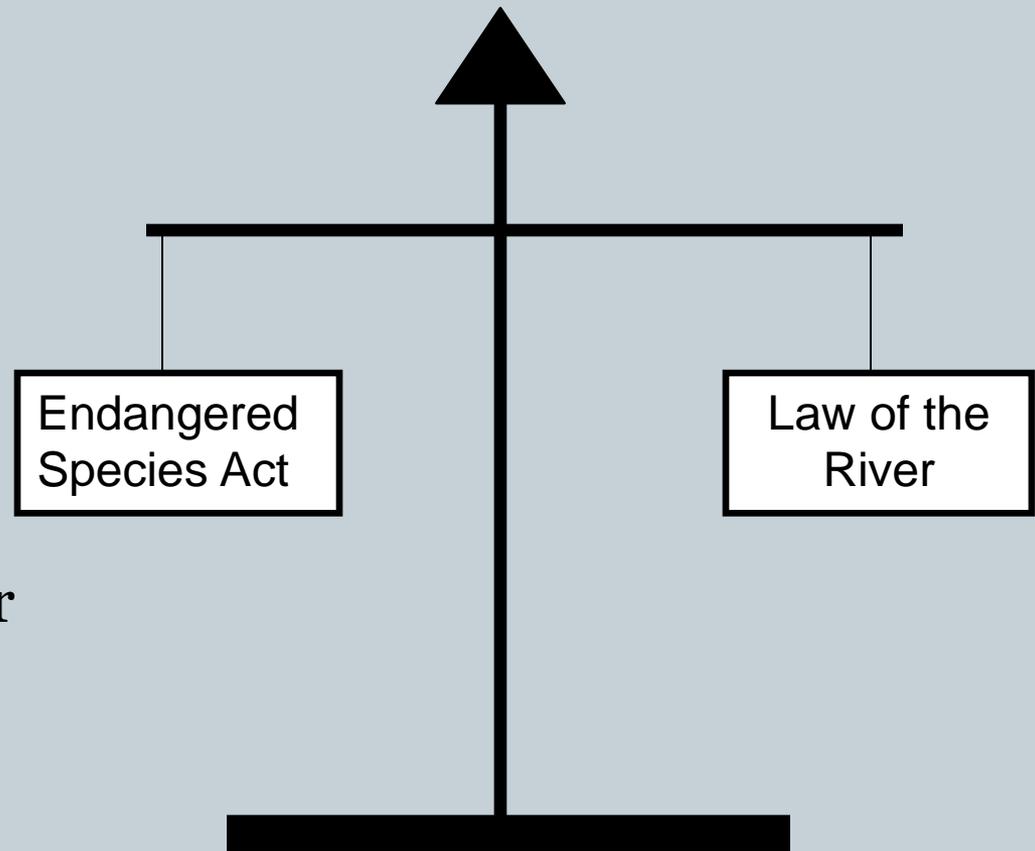


- Established in 1988
- Partners
 - State of Colorado
 - State of Utah
 - State of Wyoming
 - Bureau of Reclamation
 - Colorado River Energy Distributors Association
 - Colorado Water Congress
 - National Park Service
 - The Nature Conservancy
 - U.S. Fish and Wildlife Service
 - Utah Water Users Association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



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 (Acre-Feet/Yr)	New Depletions (Acre-Feet/Yr)	Total Depletions (Acre-Feet/Yr)
Colorado	1207	1,915,681	206,620	2,122,301
Utah	240	517,670	97,279	614,949
Wyoming	398	83,498	35,694	119,192
Regional*	238	(regional)	(regional)	0
Total	2,083	2,516,849	339,593	2,856,442

* Amount included in individual state's new depletions

Threats:



Water depletion



Large reservoirs



Fish barriers



Nonnative Fish

Habitat restoration

Recovery Elements

Habitat flow management



Research and monitoring



Managing nonnative fish



Stocking endangered fish



Recovery Elements



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

Instream Flow Management Occurs Throughout the Upper Basin

Flaming Gorge Reservoir (Green River):
Cooperators: BOR

Elkhead Reservoir (Yampa River):
Cooperators: CRWCD, City of Craig, TriState Power

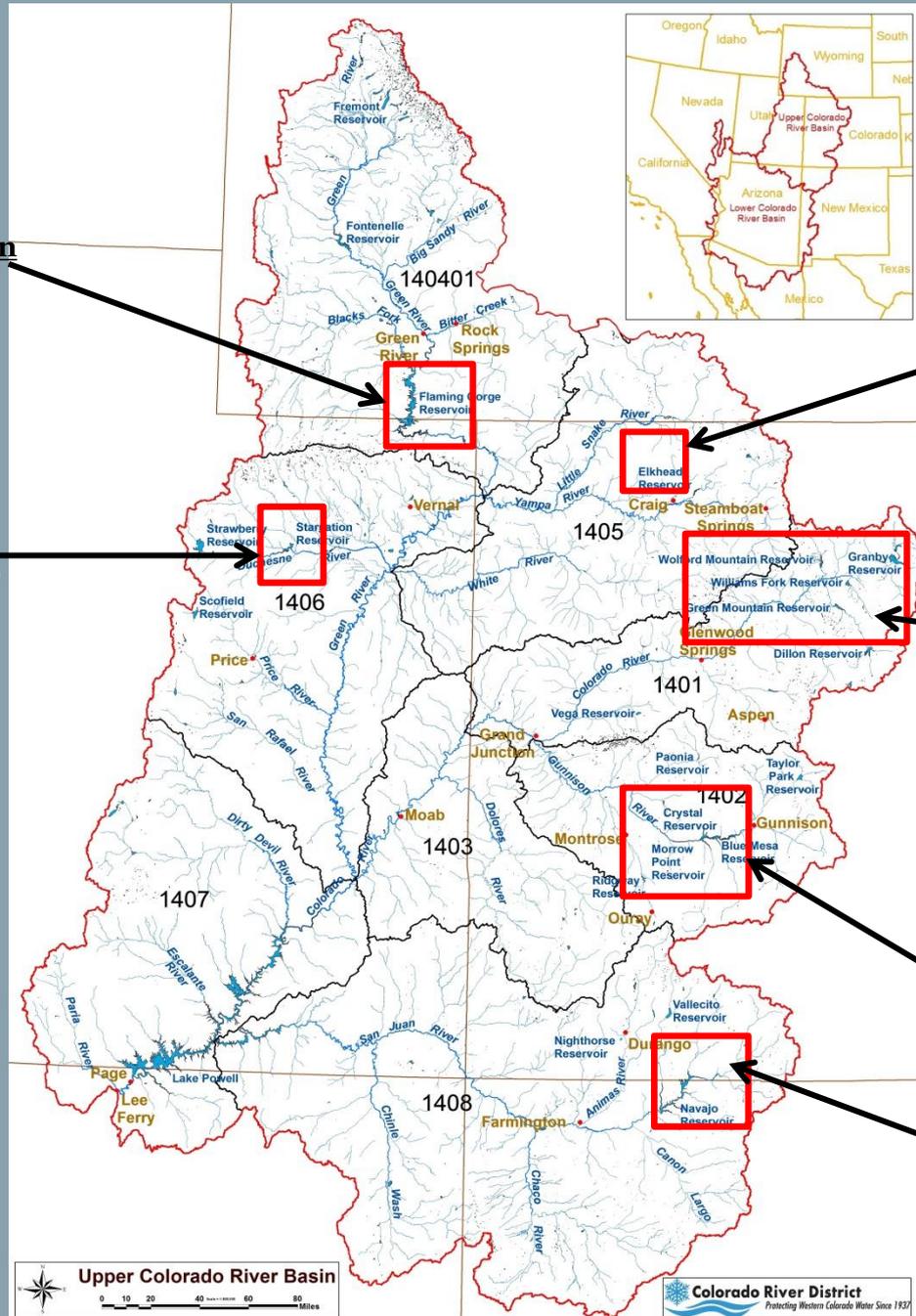
Duchesne River Reservoirs:
Cooperators: CUWCD, BOR

Upper Colorado Reservoirs:
Cooperators: CRWCD, East Slope Water Users (NoCWCD, City of Denver, Colorado Springs), West Slope Water Users (Cities of Grand Junction, Palisade), BOR, Grand Valley irrigators

Aspinall Unit (Gunnison River):
Cooperators: BOR

Navajo Reservoir (San Juan River):
Cooperators: BOR

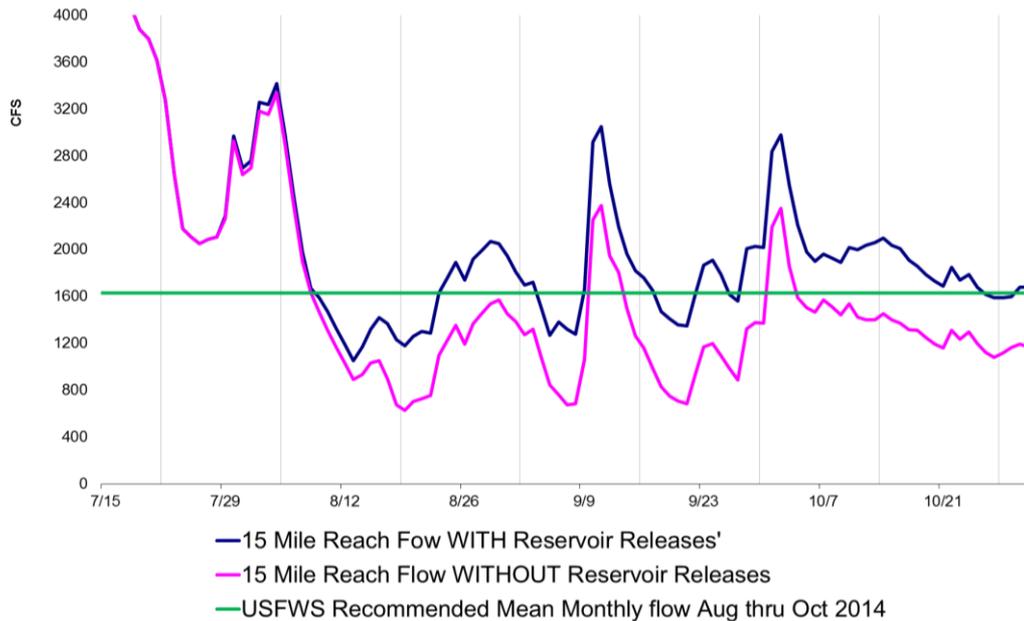
 Points of flow control



Colorado River 15-mile reach

Mainstem Base Flow Augmentation

Colorado River at Palisade gage
with Reservoir Releases in the 15-Mile Reach
2014 Summer/Fall with "wet target" of 1630 cfs



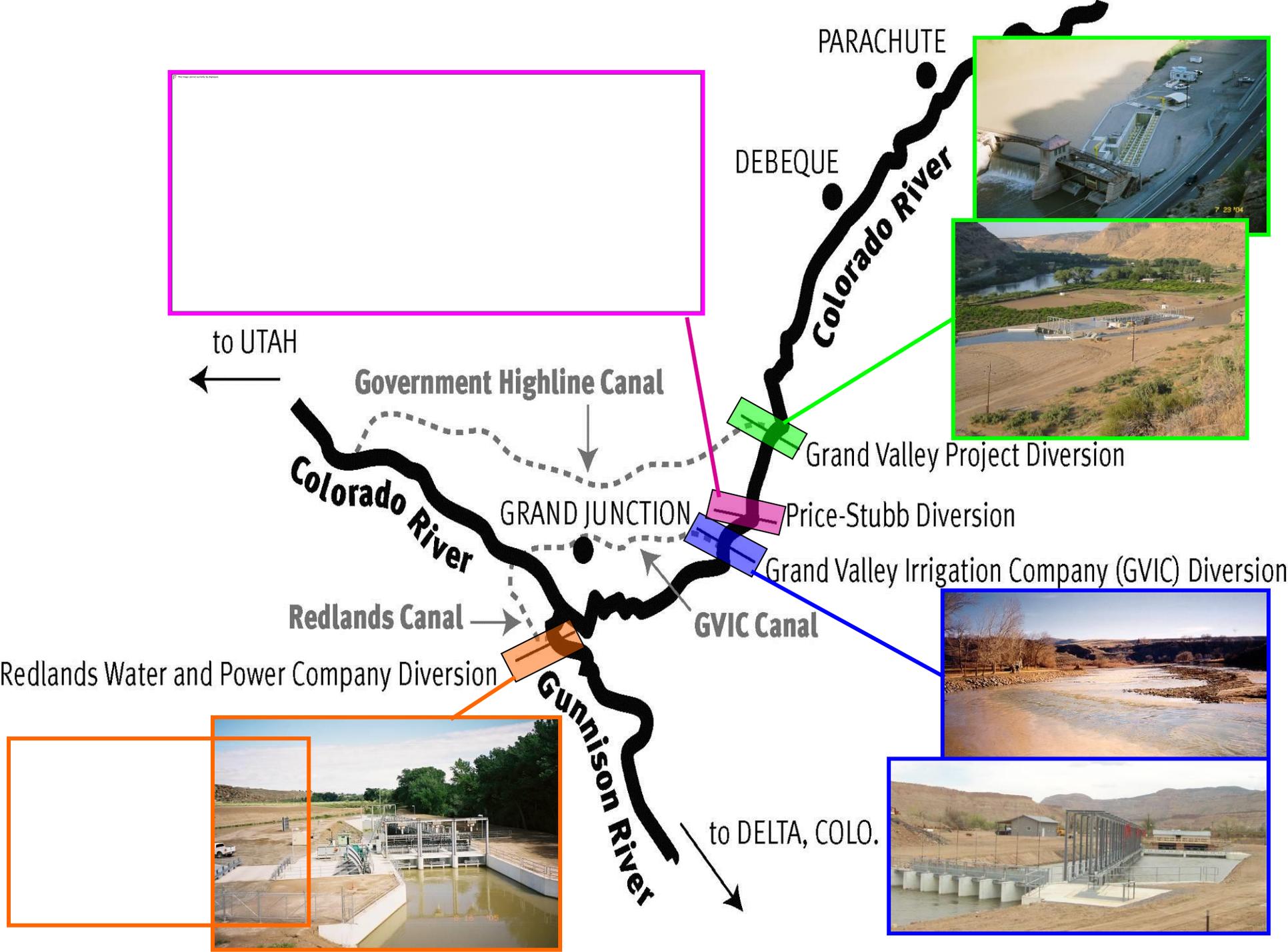
Coordinated Water Releases (1997-2014) Benefit Endangered Fishes in the 15-Mile Reach in the Colorado River			
Reservoirs		Acre-Feet	
Granby	51,239	Green Mtn	635,308
Palisade Bypass	183,227	Ruedi	341,074
Williams Fork	99,943	Willow Creek	9,918
Windy Gap	3,718	Wolford Mtn	145,941
Total Ac-Ft: 1,470,368			

CWCB is prepared to use Species Conservation Trust Funds to lease water from the Ute Water Conservancy District to augment 15-MR summer flows in 2015!!

Recovery Elements



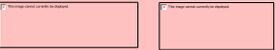
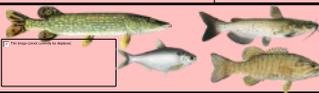
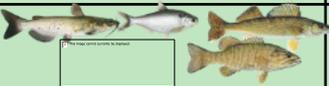
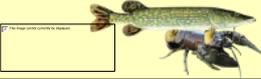
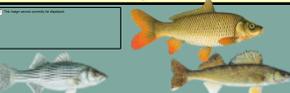
- Flow Management
- **Habitat Restoration**
- Nonnative Fish Management
- Stocking Endangered Fish
- Research and Monitoring
- Information and Education



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)				
Gunnison (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: Predation



Ecological Impacts: High Reproduction leading to competition



Predators in shared habitats



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

IN RIVER REMOVAL

-   **SMALLMOUTH BASS**
-   **NORTHERN PIKE**
-   **WALLEYE**
-   **CHANNEL CATFISH**

RESERVOIR SOURCES OF NONNATIVE FISH

-  **CONTAINED**
-  **PARTIALLY CONTAINED**
-  **NOT CONTAINED**
-  **CANNOT BE CONTAINED**



Recovery Elements

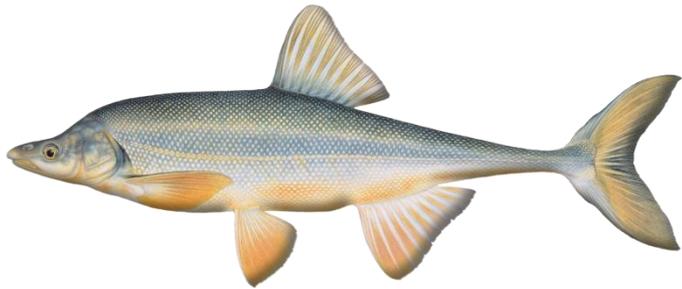


- Flow Management
- Habitat Restoration
- Nonnative Fish Management
- **Stocking Endangered Fish**
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Propagation, Genetics, and Stocking



Hatchery Production Necessary?

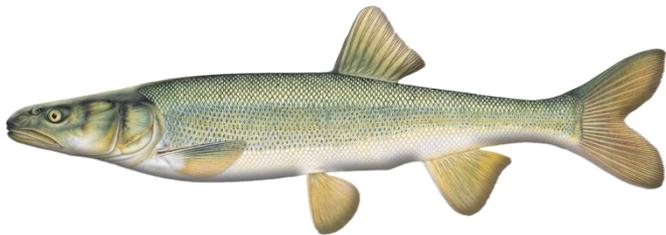


Bonytail

YES

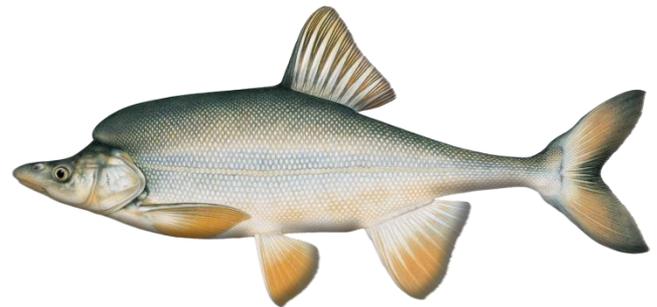


Razorback sucker



Colorado pikeminnow

NO



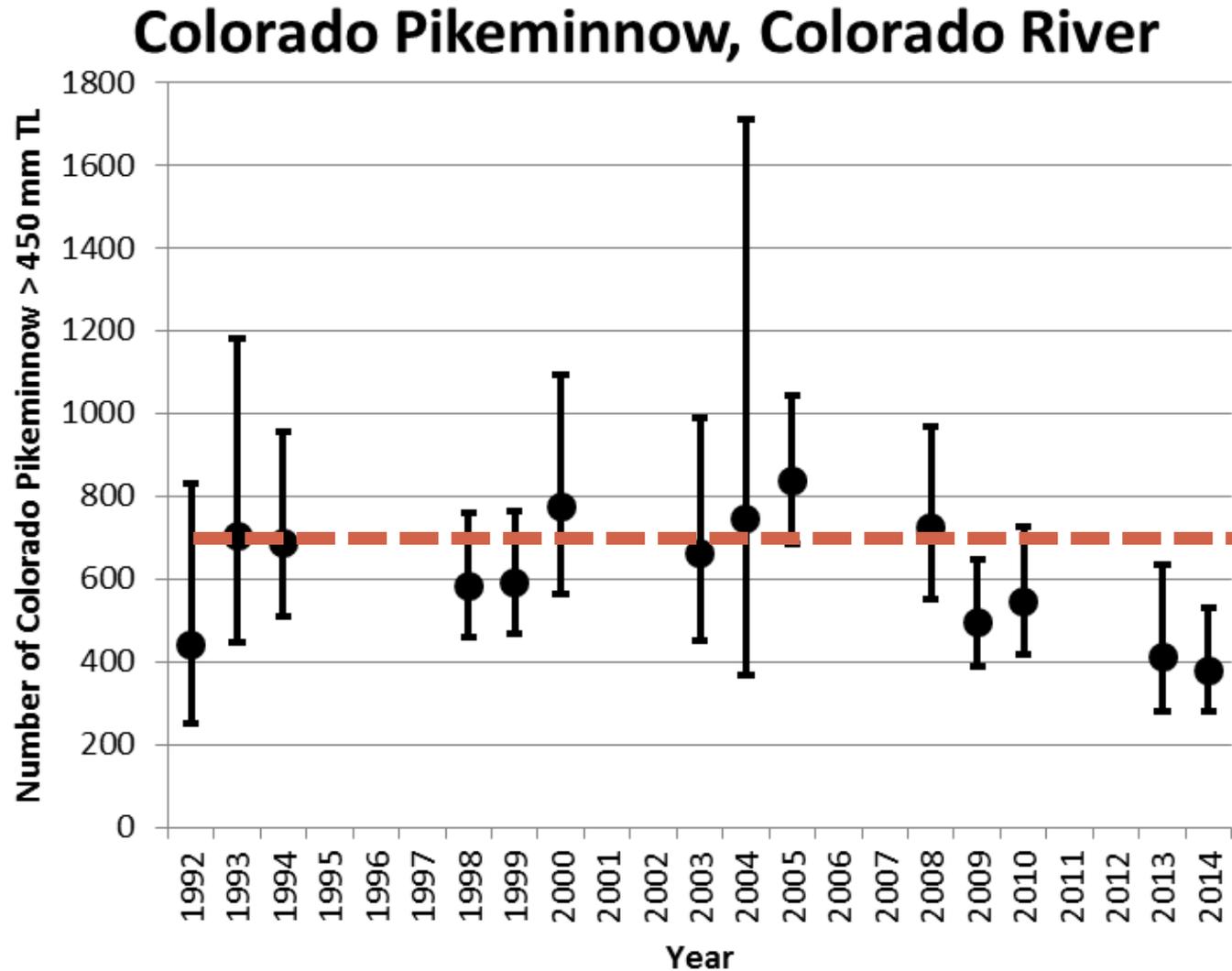
Humpback chub

Recovery Elements



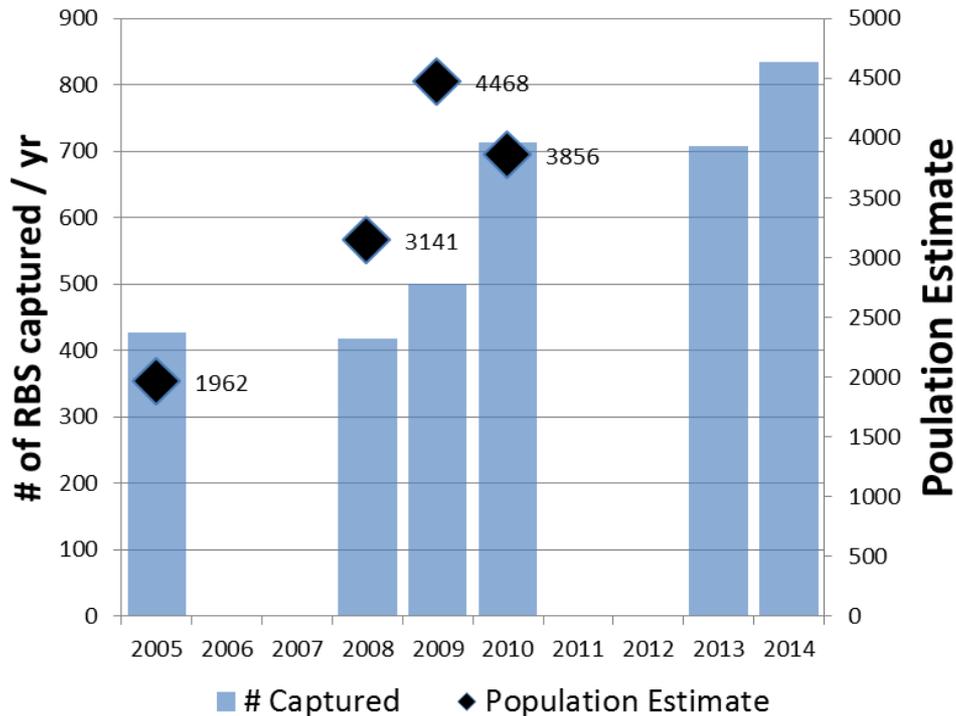
- Flow Management
- Habitat Restoration
- Nonnative Fish Management
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- **Research and Monitoring**
- Information and Education

Species Status: Colorado Pikeminnow



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 ^a	5,201	15,307	10,106	76	88	12	5,277	15,395	10,118
Industrial ^b	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
TOTALS	125,271	155,375	30,104	42,583	66,011	23,428	167,854	221,386	53,532

^a Including domestic, commercial and light industrial consumption

^b 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.

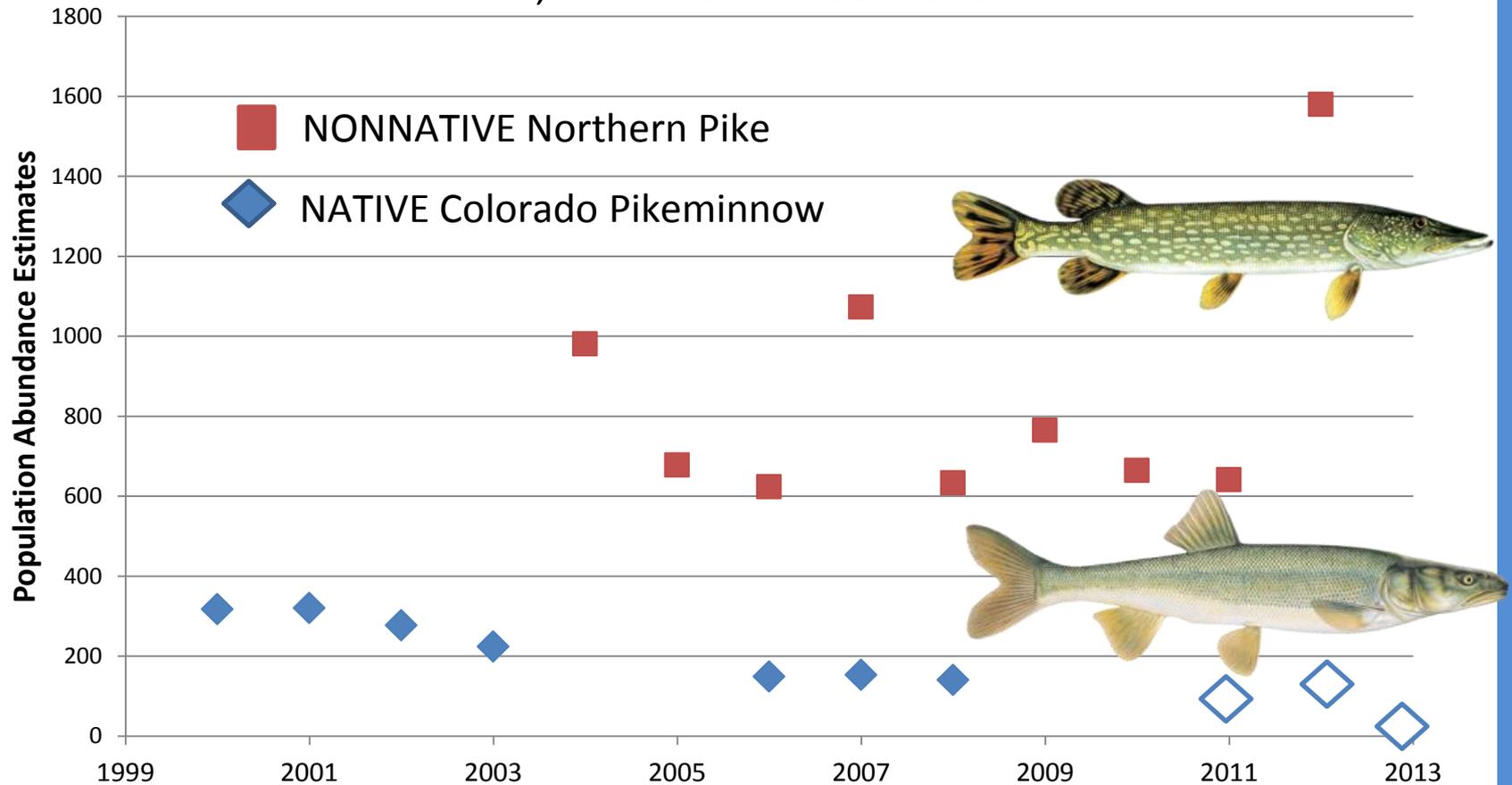
Yampa River Base Flow Management

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

Comparison of Large Bodied Predator Densities in the Yampa River, Northwestern Colorado



Elkhead Reservoir Spillway – Proposed Placement of Fish Containment Net

Purpose: Contain Nonnative NP and SMB

Estimated Cost: \$780K

Contributors: State of Colorado (\$500K); Recovery Program (\$280K) (and Others?)

Timeline: Installation prior to Spring Runoff 2016



Questions??

