



# Upper Colorado River Endangered Fish Recovery Program

## Green River Spring Flow Request: 2014

Presentation to Flaming Gorge Work Group

Vernal, Utah

Aug 21, 2014

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# Outline

- Recovery Program Background / Basics
- Program Elements
  - Flow Management – Green River
    - Spring Flows 2014 – preliminary results
    - Baseflows – current conditions; expectations

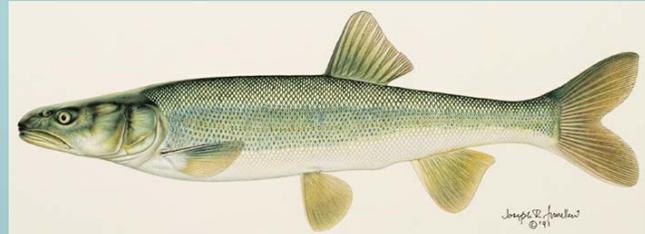




# Upper Colorado River Endangered Fish Recovery Program

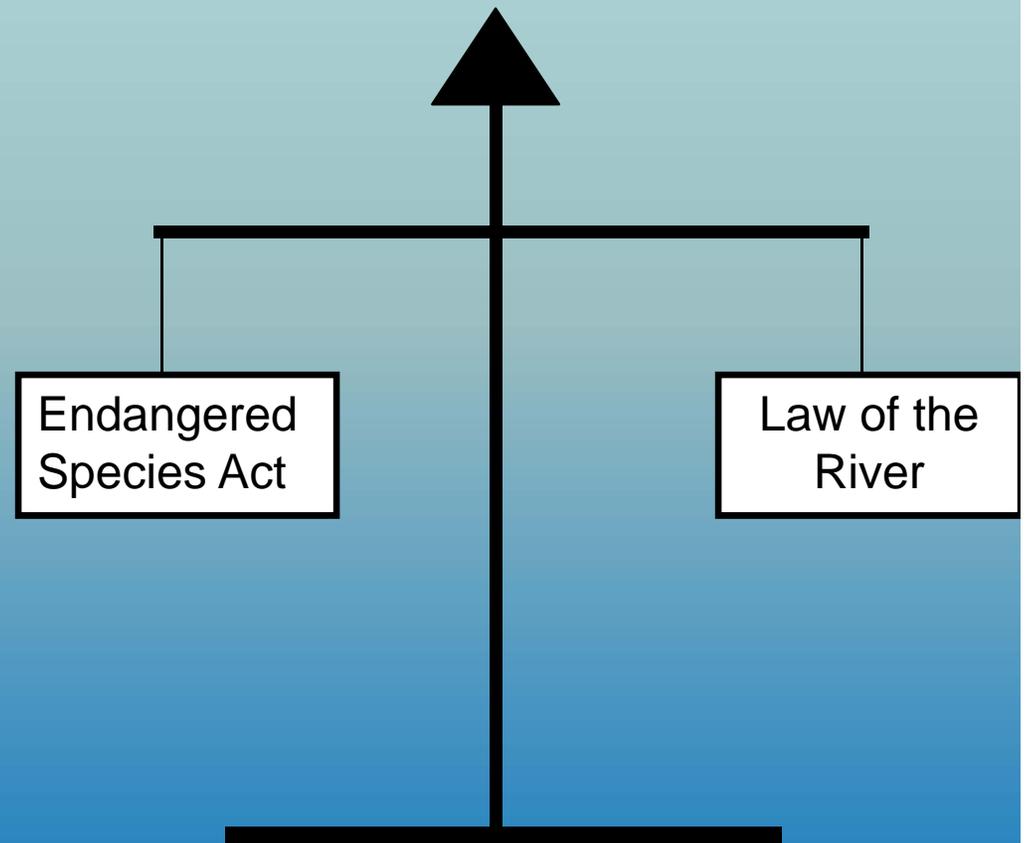
- Partners

- 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.



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

## Summary of Endangered Species Act Section 7 Consultations

(1/1988 through 12/2013)

State	Number of Projects	Historic Depletions	New Depletions (Acre-Feet/Yr)	Total Depletions (Acre-Feet/Yr)
Colorado	1,190	1,915,681	206,616	2,122,297
Utah	233	517,670	97,049	614,719
Wyoming	388	83,498	35,644	119,142
Regional*	238			
<b>Total</b>	<b>2,049</b>	<b>2,516,849</b>	<b>339,309</b>	<b>2,856,158</b>

\* Amount included in individual state's new depletions

# Recovery Elements

Habitat Development



Habitat / Flow Management



Research and Monitoring



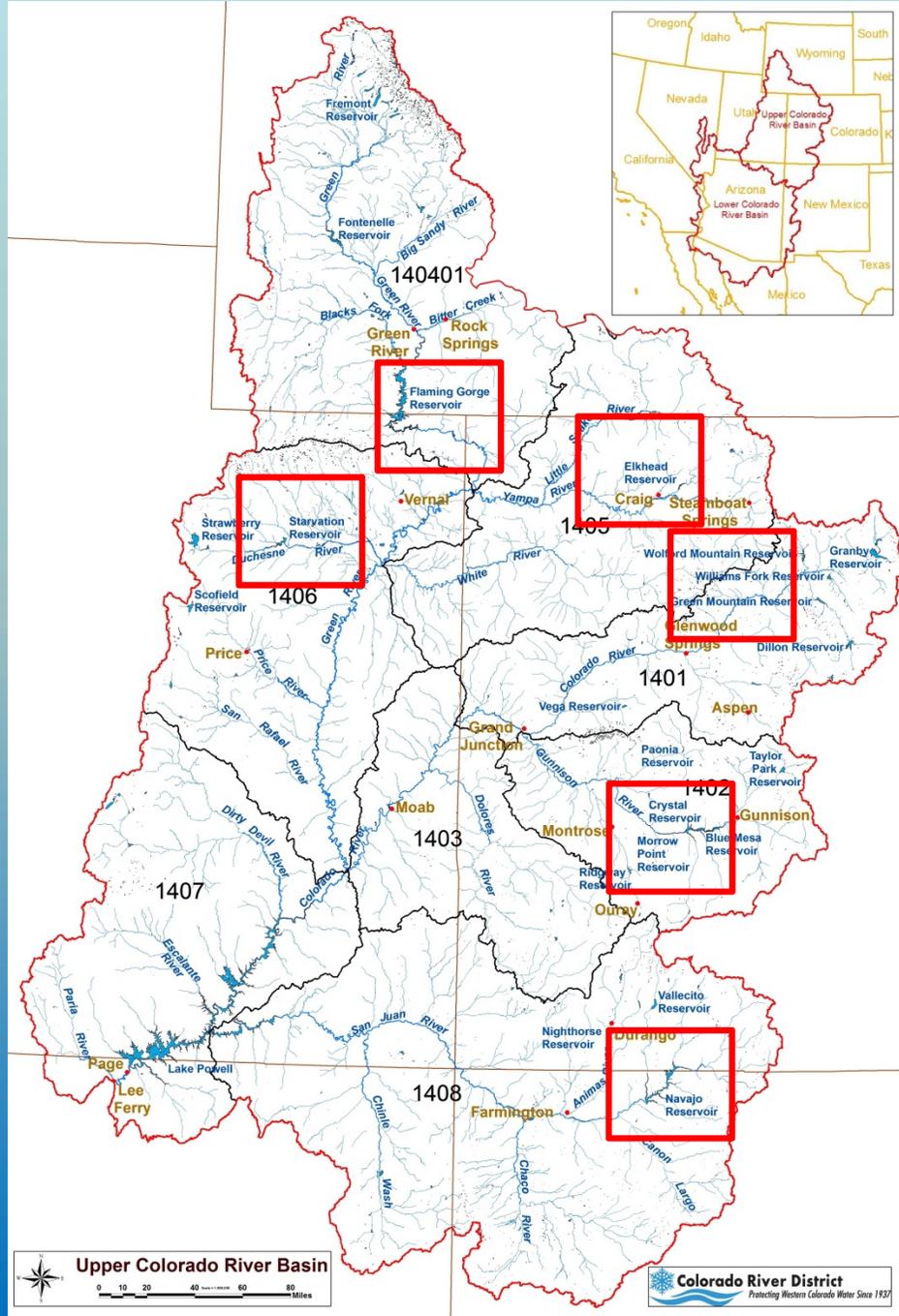
Managing Nonnative fish



Stocking Endangered Fish



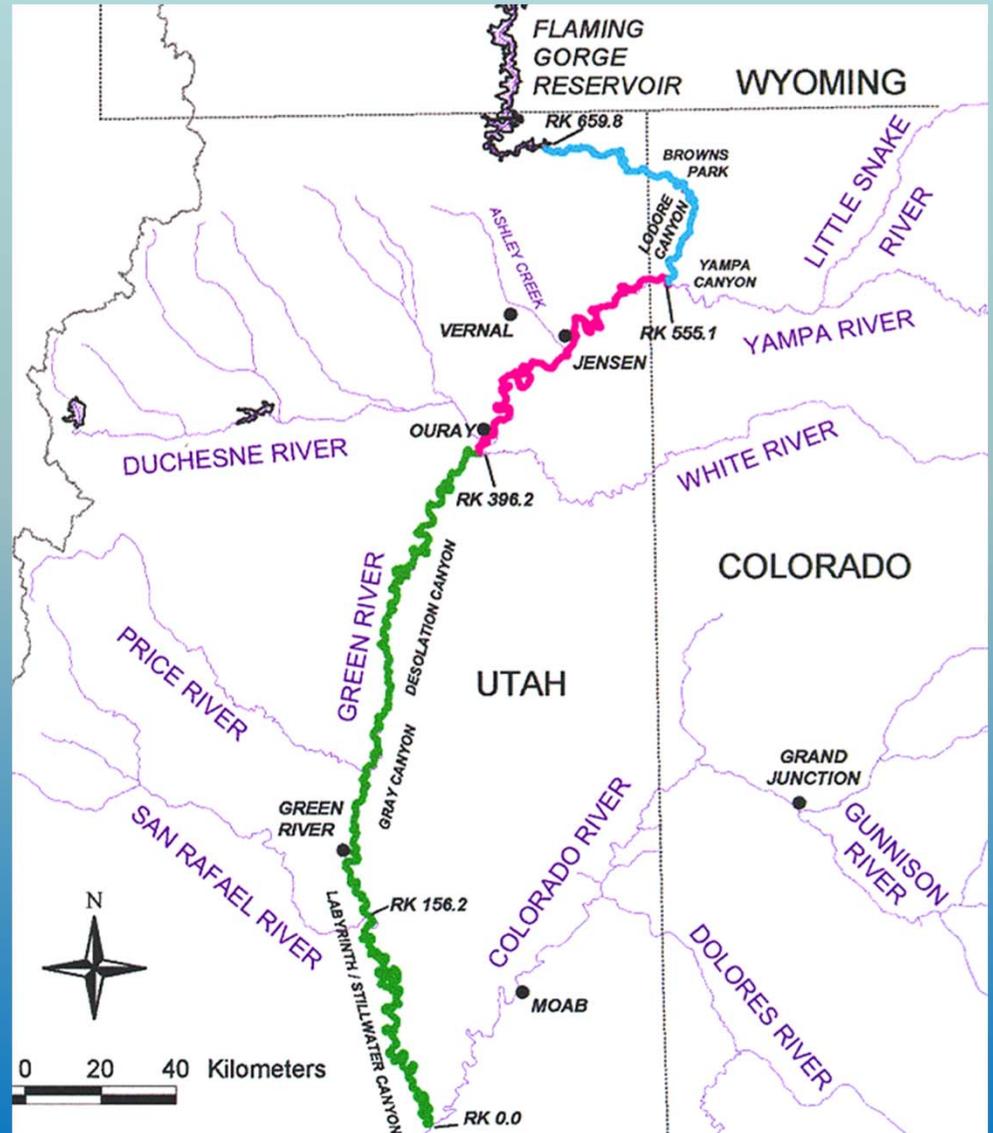
# Instream Flow Management Occurs Throughout the Upper Basin



*Points of flow control*

# Green River Reaches

- **Reach 1:** Flaming Gorge Dam to Yampa River
  - adult CPM in Lodore
- **Reach 2:** Yampa to White River
  - RBS spawning
  - RBS and CPM nursery habitat
  - adult HBC in upper portion
- **Reach 3:** White to Colorado River
  - HBC in Desolation and Gray canyons
  - CPM (RBS) spawning
  - RBS and CPM nursery habitat

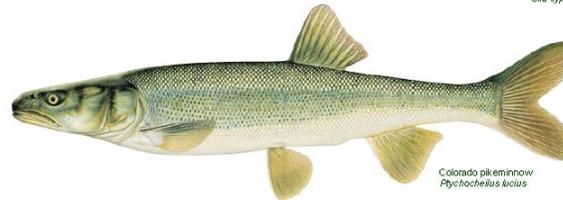


# Flow Management Green River :

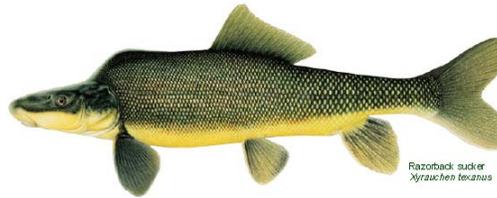
## **Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam**



Humpback chub  
*Gila cypha*



Colorado pike minnow  
*Ptychocheilus lucius*



Razorback sucker  
*Xyrauchen texanus*

**Upper Colorado River  
Endangered Fish Recovery Program  
Project F0-63**

**Final Report  
September 2000**

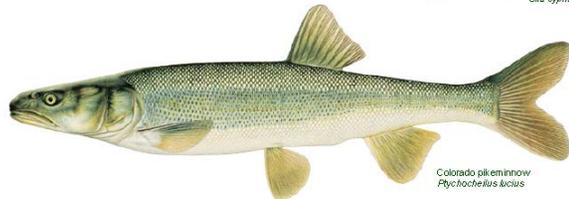
*Muth et al. 2000*

# Flow Recommendations: Spring Peaks should focus on:

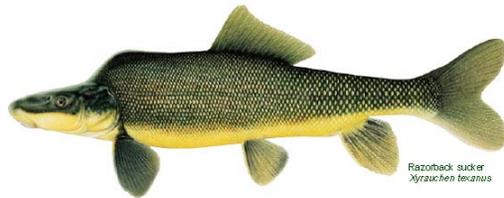
## Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam



Humpback chub  
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Colorado pikeminnow  
*Ptychocheilus bicus*



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Upper Colorado River  
Endangered Fish Recovery Program  
Project F0-63

Final Report  
September 2000

- Importance of 18,600 cfs in Reach 2 in avg or wetter years = significant floodplain connection in the ONWR
- FGD releases should be timed to match peak, or immediate post-peak of the Yampa River
- FGD releases should be timed to coincide with presence of sucker larvae (many other timing factors)

# Bestgen et al. 2012 - a “Floodplain Synthesis”

## Provides New Information:

- *Report reviews various aspects of razorback sucker life history*
- *Reviews FGD operations and Yampa River flows in relation to presence of larval razorback sucker (1992 – 2009) in the Uintah Basin*
- *Determines that to provide critical nursery habitat for larval razorback sucker (flooded wetlands), FGD releases will need to occur after the Yampa River peak in most years.*

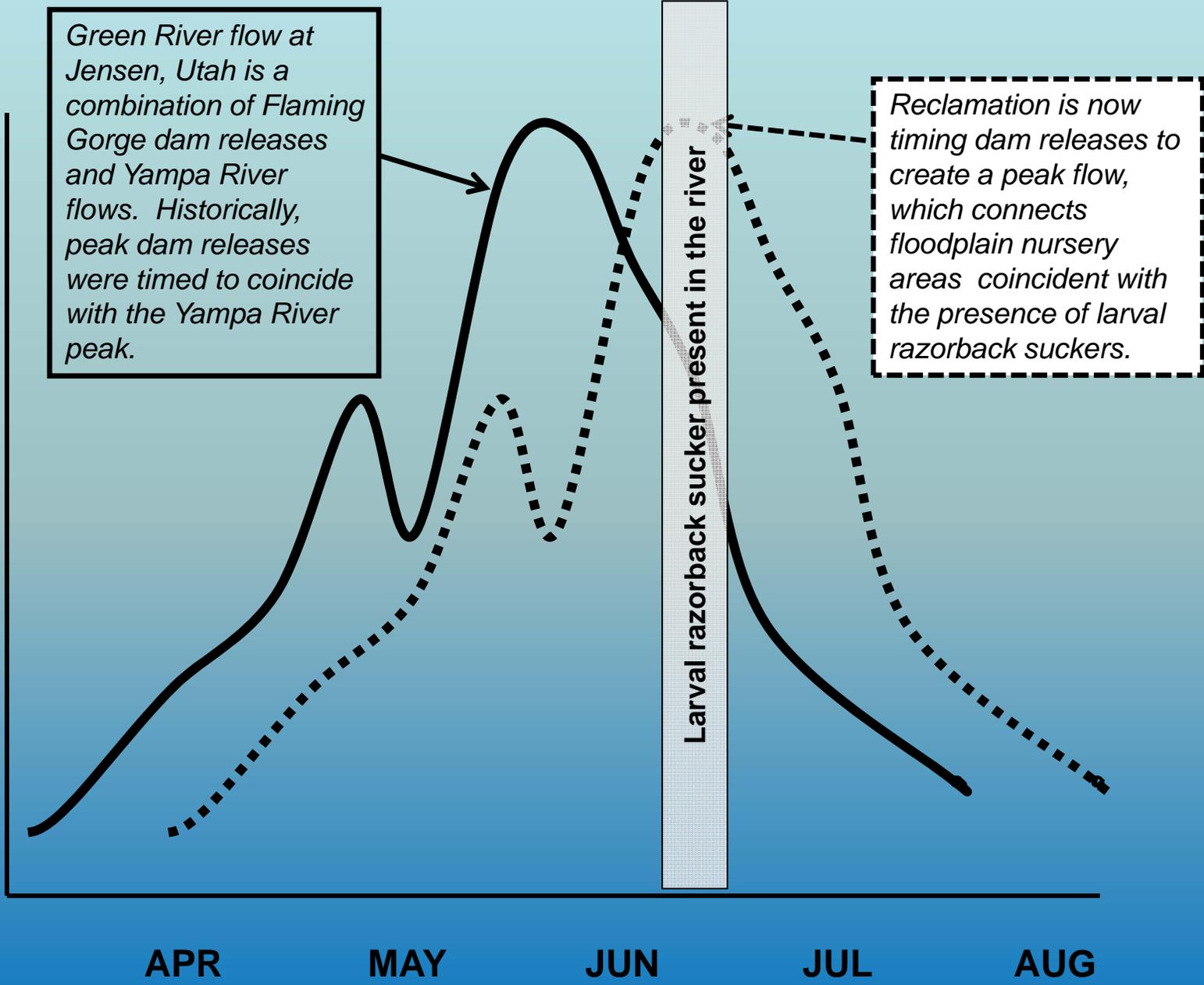


# Reproduction of razorback sucker, Green River

- Coincident with increasing water temperature (8-18 C), increasing or peak flows, earlier when warm, later if cool
- Once started, mean spawning date is 3 weeks after first spawning, mean hatching is 2 weeks after mean spawn, and mean capture time 2 weeks after that.
- Long and later reproductive period in cold water!



**Flows measured @ Jensen, UT**



*Green River flow at Jensen, Utah is a combination of Flaming Gorge dam releases and Yampa River flows. Historically, peak dam releases were timed to coincide with the Yampa River peak.*

*Reclamation is now timing dam releases to create a peak flow, which connects floodplain nursery areas coincident with the presence of larval razorback suckers.*

**Larval razorback sucker present in the river**

# Larval Trigger Study Plan (LTSP): Study Matrix and Timeline

	Peak Flow (x) as Measured at Jensen, Utah	Proposed Study Wetlands (a, b)	Number of Days (x) Flow to Be Exceeded and Corresponding Hydrologic Conditions (c)		
			$1 < x < 7$	$7 < x < 14$	$x \geq 14$
3 years	$8,300 \leq x < 14,000$ cfs	Stewart Lake (f), Above Brennan (f), Old Charley Wash (s)	Dry	Moderately dry	Moderately dry and average (below median)
	$14,000 \leq x < 18,600$ cfs	Same as previous plus Thunder Ranch (f), Bonanza Bridge (f), Johnson Bottom (s), Stirrup (s), Leota 7 (s)	Average (below median)	Average (below median)	Average (below median)
3 years	$18,600 \leq x < 20,300$ cfs	Same as previous	Average (above median)	Average (above median)	Average (above median)
	$20,300 \leq x < 26,400$ cfs	Same as previous plus Baeser Bend (s), Wyasket (s), additional Leota units (7a and 4), Sheppard Bottom (s)	Moderately wet	Moderately wet	Moderately wet
	$x \geq 26,400$ cfs	Same as previous	Wet	Wet	Wet

(a) f = flow-through wetland, s = single-breach wetland

(b) Up to eight wetlands would be sampled in a given year with the three in the lowest flow category being sampled in all years.

(c) Refer to Table 1 for exceedance percentages and peak flow recommendations for each hydrologic condition. Note that the hydrologic conditions presented are the driest that could support a particular combination of peak flow magnitude and duration. For any combination, wetter hydrology could also support an experiment.

# Larval Razorback Sucker Sampling w/ Light Traps

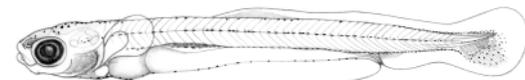


## Developmental Phases

Protolarva



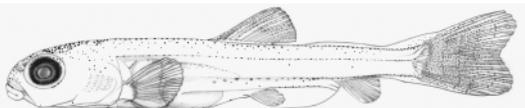
Flexion mesolarva



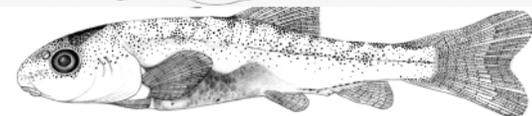
Postflexion mesolarva



Metalarva



Early juvenile (YOY)



# Juvenile Razorback Sucker Sampling w/ Seines





# Upper Colorado River Endangered Fish Recovery Program

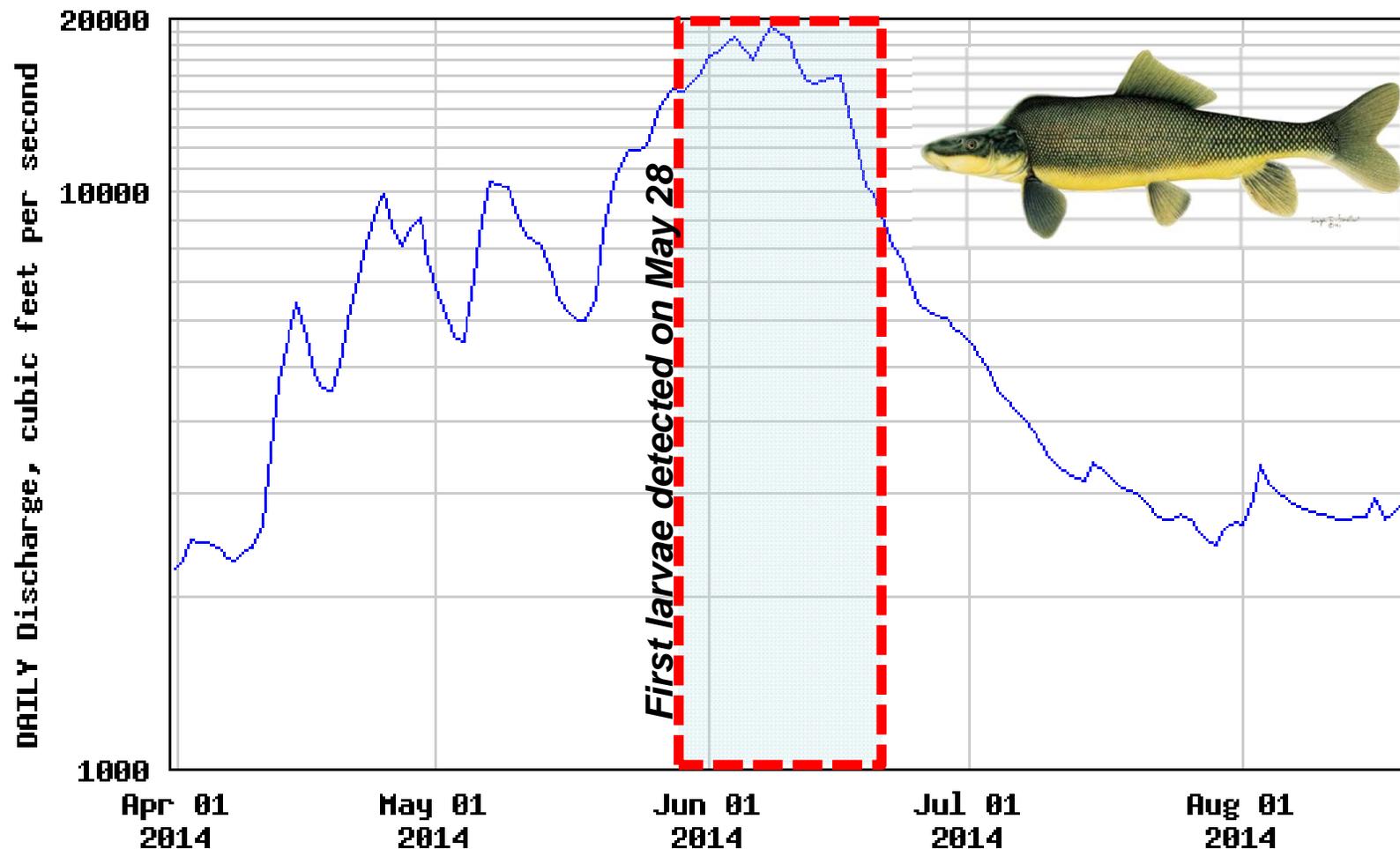
## Recovery Program's LTSP Related Actions: 2014

- Feb – Mar: Develop Spring Flow Request Letter (seeking approval of Biology, Water Acquisition, and Management Committees)
- March 21: Request finalized; transmitted to Reclamation
  - Supports FG ops consistent with ROD and BiOp
  - Implement the LTSP
- May 12: Service biologists begin larval monitoring w/ light traps.
- May 28: USFWS biologists report first capture of larval razorback sucker; Stewart Lk outlet gate opened. BOR has ramp up already scheduled.
  - USFWS and UDWR expand larval sampling to include floodplains sites
- June 10 – UDWR opens Stewart Lake inlet to create flow through that floodplain
- ~June 15 – BOR ramps releases down; UDWR closes gates at Stewart Lk to retain water and entrained larvae.
- July 21-24 – UDWR captures 13 RBS (TL = 28-44mm) in Stewart Lk
- Aug 4-7 – UDWR captures 29 RBS (TL = 27-69mm) in Stewart Lk
- Fall 2014 – UDWR plans to drain Stewart Lk in Sept. UDWR and USFWS will sample for juvenile RBS at all LTSP sites.

# Larval Trigger Operations: 2014



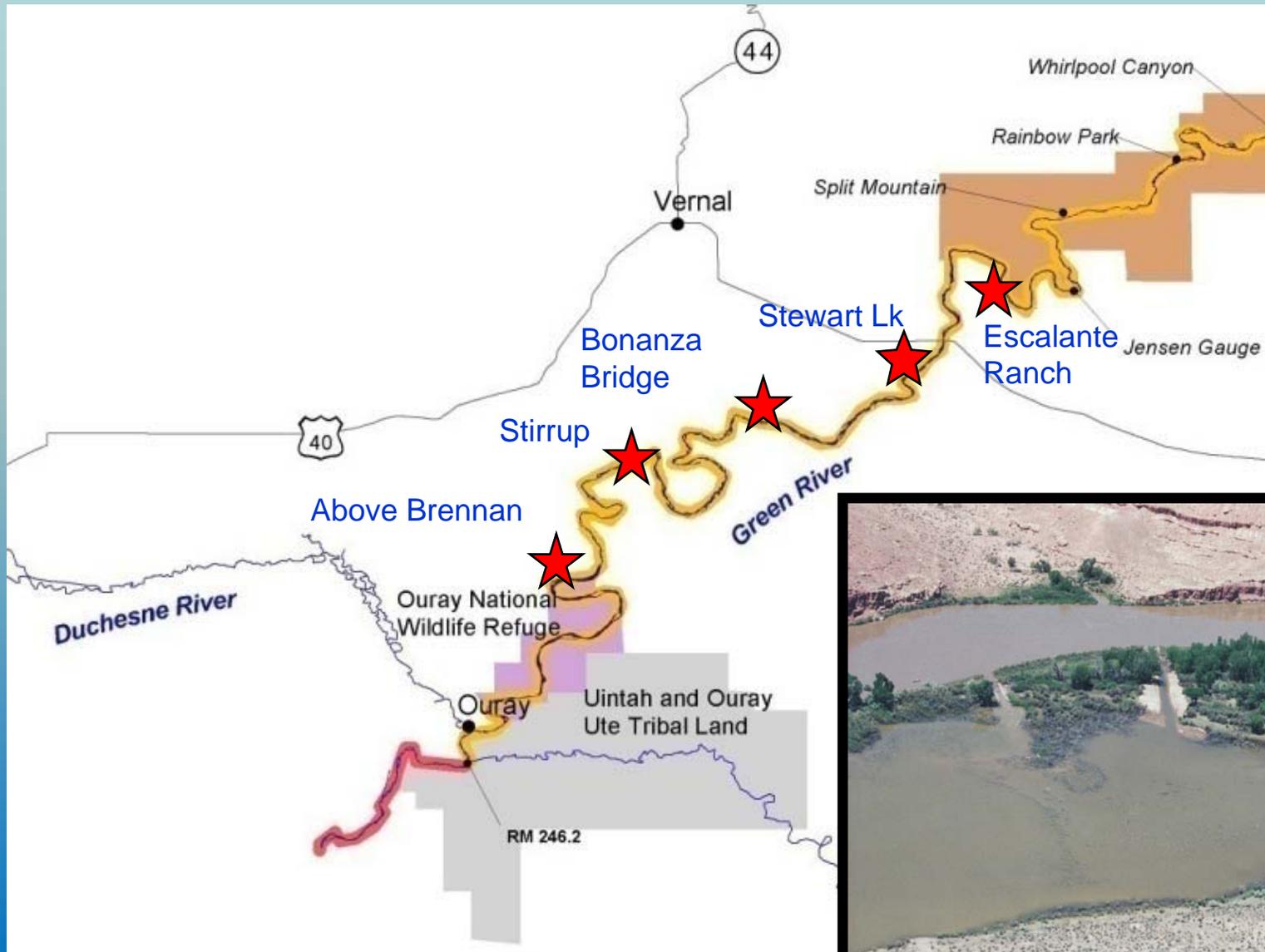
USGS 09261000 GREEN RIVER NEAR JENSEN, UT



---- Provisional Data Subject to Revision ----

# Targetted Floodplains: 2014

Average (Above Median) Hydrology



# LTSP: Summary

Year / date larv. Detec- ted	Year type GR/ YR	Flow (CFS) Days @ Jensen After RBS Larvae Detected			Floodplains – RBS Larvae Detected					Floodplains – RBS Juveniles Detected				
		>8,300	>18,600	>20,300	ER	SL	BB	St	AB	ER	SL	BB	St	AB
2011 Jun24	ModWet/ Wet	33	19	13	<i>Prior to start of LTSP study – larvae presumably entrained in all wetlands.</i>					<i>Juvenile RBS detected in Wyasket Lk – only connects at very high flows.</i>				
2012 May16	Dry / Dry	5	-	-	-	+	-	-	-	-	-	-	-	-
2013 May26	Mod Dry / Mod Dry	18	-	-	-	+	-	-	-	-	+	-	-	-
2014 May28	Avg (Above Med) / Mod Wet	25	4		+	+	+	+	+	?	+	?	?	?

ER = Escalante Ranch; SL = Stewart Lk; BB = Bonanza Bridge; St = Stirrup; AB = Above Brennan.

# Base Flows

Colorado pikeminnow



# YOY Colorado pikeminnow



## Age-0 / Juvenile Colorado Pikeminnow Habitat, Jensen/Ouray



# **Base Flows 2014:**

- 1. Typically, USFWS Utah Field Office, in cooperation with Recovery Program Reclamation selects reach 2 within the appropriate ROD base flow range. Not the case in 2014, because,,,**
- 2. Reclamation selects a Reach 2 target of 2,400cfs through Sept 30, 2014, which corresponds to the wet side of the 'average' base flow range. Past research indicates this should be beneficial to Age-0 Colorado pikeminnow.**

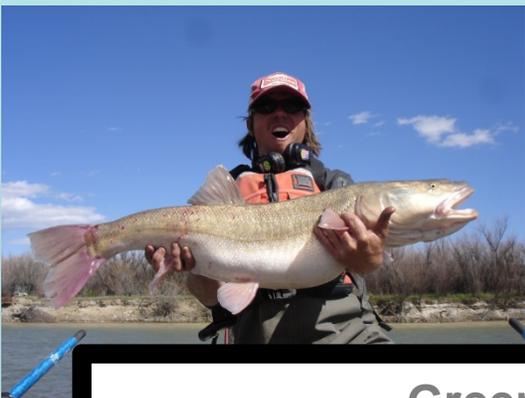
# Young-of-year pikeminnow collections : 2000 - 2013

Year	# of age-0 pikeminnow collected	Average flow between July 15 and September 30	Years base flows dropped below 1000 cfs
2000	31	1423	
2001	8	1073	X
2002	0	876	X
2003	2	1101	X
2004	60	1367	
2005	8	1958	
2006	5	1213	X
2007	3	1122	X
2008	18	2376	
2009	325	2610	
2010	454	2292	
2011	0	8660	
2012	2	1443	
2013	97	1505	

# Stirrup Wetland



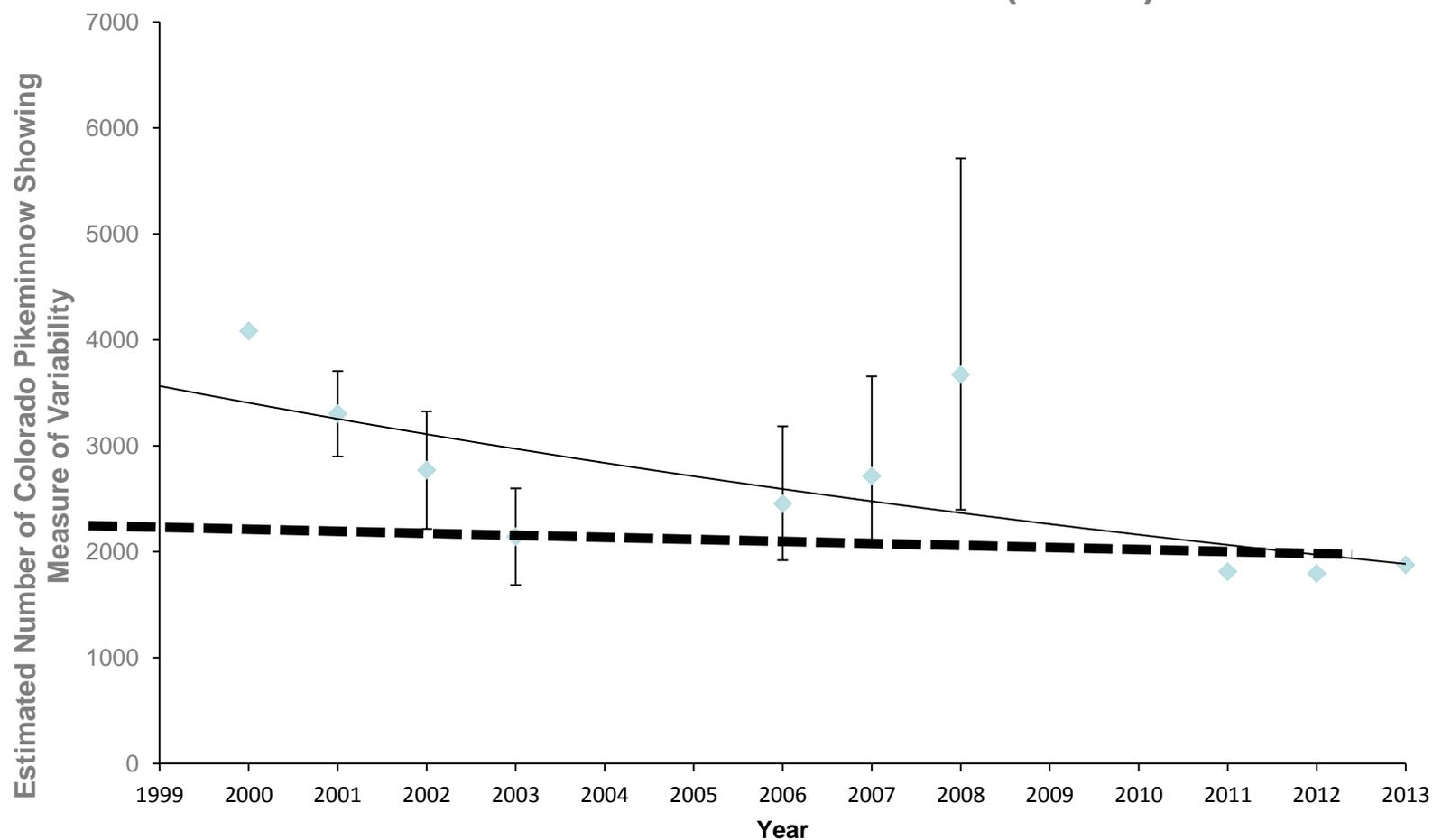




## Upper Colorado Program:

- Wild populations
- Nonnative predators depressing numbers of adults through competition or predation.
- Survival of young is better when Green River summer baseflows  $>2,000$  cfs

Green River Colorado Pikeminnow (adults)



# Colorado pikeminnow: Upper Colorado River Subbasin

