



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

### Mountain-Prairie Region

IN REPLY REFER TO:  
FWS/R6  
ES/CRRP

MAILING ADDRESS:  
P.O. BOX 25486, DFC  
Denver, Colorado 80225-0486

STREET LOCATION:  
134 Union Boulevard  
Lakewood, Colorado 80228-1807

SEP 20 2013

## Memorandum

To: Implementation/Management Committee, Consultants, and Interested Parties

From: Regional Director, Region 6

Subject: Final 2012—2013 Assessment of Sufficient Progress Under the Upper Colorado River Endangered Fish Recovery Program in the Upper Colorado River Basin, and of Implementation of Action Items in the December 20, 1999, 15-Mile Reach Programmatic Biological Opinion and December 4, 2009, Gunnison River Basin Programmatic Biological Opinion

### I. “SUFFICIENT PROGRESS”

In accordance with the Section 7, Sufficient Progress, and Historic Projects Agreement, the U.S. Fish and Wildlife Service (Service) is reviewing 2011—2012 and cumulative accomplishments and shortcomings of the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) in the Upper Colorado River Basin. Per that Agreement, the Service uses the following criteria to evaluate whether the Recovery Program is making “sufficient progress” toward recovery of the four listed fish species:

- actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction;
- status of the fish populations;
- adequacy of flows; and
- magnitude of the impact of projects.

The final April 2, 2013, assessment of accomplishments and shortcomings of the Recovery Program under the Recovery Implementation Program Recovery Action Plan (RIPRAP) from March 1, 2012, through February 1, 2013, is incorporated in the tables to the RIPRAP found at on the Recovery Program’s website (<http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/foundational-documents.html>). Previous years’ accomplishments and shortcomings are described in [previous “sufficient progress” memoranda](#) and outlined in the RIPRAP itself.

The Service issued its [most recent sufficient progress memorandum](#) on July 18, 2012.

## A. Status of the Species in the Upper Basin

In 2002, the Service developed Recovery Goals (USFWS 2002 a-d) to supplement the individual endangered species recovery plans. The Recovery Goals contain specific demographic criteria to maintain self-sustaining populations and recovery factor criteria to minimize/remove threats to the species. A minimum viable population is identified for each species as a gauge for recovery. In addition, key requirements of the population criteria are no net loss of fish over established monitoring periods, and recruitment of young fish into the adult population must occur at a rate to maintain the population. Significant changes in the status of the four species generally are not detected on a year-to-year basis due to species life history (i.e., recapture rates over long lifespan) as well as variable confidence intervals around population estimates and potential influence of sampling on capture probability

Hatchery-produced, stocked fish form the foundation for the reestablishment of naturally self-sustaining populations<sup>1</sup> of razorback sucker and bonytail in the upper Colorado and Green river systems. The Recovery Program implemented a revised, integrated stocking plan ([Nesler et al. 2003](#)) with the goal of establishing self-sustaining populations of razorback sucker and bonytail in the Upper Colorado River Basin by 2015. The Program has been largely successful in meeting the plan's stocking targets. Stocked razorback sucker are reproducing and wild juvenile razorbacks are starting to be captured. Recaptures of stocked bonytail are more rare and the Program has yet to document spawning in the wild.

---

<sup>1</sup> To achieve naturally self-sustaining populations, adults must reproduce and recruitment of young fish into the adult population must occur at a rate to maintain the population at a minimum that meets the demographic criteria identified in the [recovery goals](#).



Figure 1. Map of the Upper Colorado River drainage.

### Colorado Pikeminnow

Wild populations of Colorado pikeminnow occur in the upper Colorado and Green River systems. These populations have been studied since the 1960s, and population dynamics and responses to management actions have been evaluated since the early 1980s. Closed-population, multiple mark-recapture estimators are being used in the Upper Colorado River Basin to derive population point estimates for Colorado pikeminnow for tracking population trends. The accuracy and precision of each point estimate is assessed by the Service in cooperation with the Recovery Program and in consultation with investigators developing the point estimates and with qualified statisticians and population ecologists. Recovery goals for the Colorado pikeminnow require the Service to evaluate annual point estimates for each population in order to determine if the estimates are accurate, precise, and reliable. The Service accepts the Colorado pikeminnow estimates described below as the best available information. However, the Service recognizes

that trends for some of these populations have declined since the first estimates were made, and that downlisting does not occur until the demographic criteria are met.

#### *Colorado River Juveniles and Adults*

Population estimates for adult Colorado pikeminnow ( $\geq 450$  mm total length [TL]) began in 1992 on the Colorado River from the Price-Stubb Diversion to the confluence with the Green River (see Figure 2). Population estimates are conducted in three consecutive years followed by two years of no estimates. In their most recent summary of those data (Osmundson and White 2013, in draft) the principal investigators conclude as follows:

*During the 19-year study period [1992-2010], the population remained self-sustaining. This was evidenced by: 1) annual abundance estimates of sub-adults (400–449 mm TL) about to recruit that indicated recruitment roughly balanced estimated adult mortality in years for which data were available, and 2) results of a weighted regression analysis of river-wide adult abundance estimates that indicated the intercept-only model as having the greatest weight, suggesting population stability. However, weighted regression of just the upper-reach adult population gave greatest weight to the quadratic model, suggesting the population increased and then later declined.*

The current downlisting demographic criteria for Colorado pikeminnow (USFWS 2002a) in the Upper Colorado River Subbasin is a self-sustaining population of at least 700 adults maintained over a 5-year period, with a trend in adult point estimates that does not decline significantly. Secondly, recruitment of age-6 (400–449 mm TL; Figure 3), naturally-produced fish must equal or exceed mean adult annual mortality (estimated to be about 20%). The average of all adult estimates (1992 – 2010) is 644. The average of the five most recent annual adult population estimates is 658. Whereas the Colorado River population appears to meet the trend or ‘self-sustainability’ criterion it has not met the abundance criteria of ‘at least 700 adults’ during the most recent five year period.

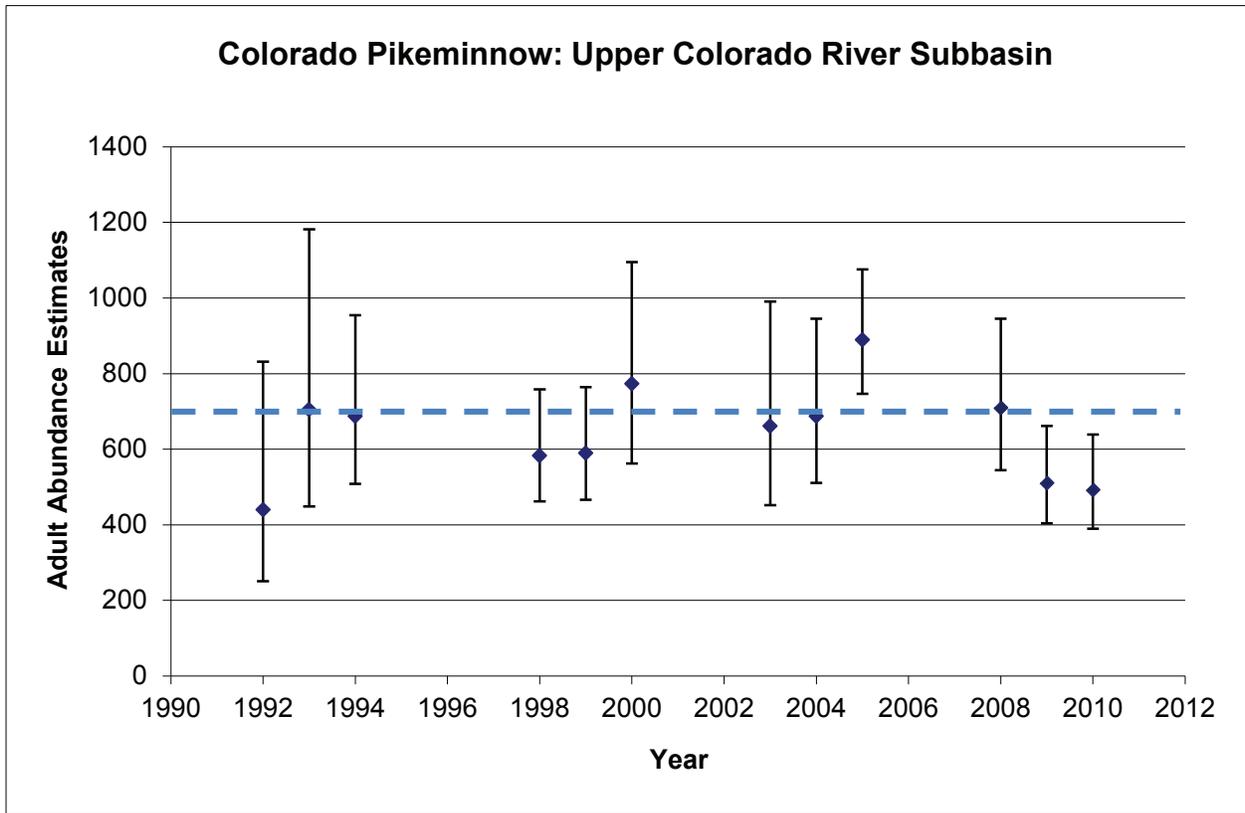


Figure 2. Adult Colorado pikeminnow population abundance estimates for the Colorado River (Osmundson and Burnham 1998; [Osmundson and White 2009](#); 2013). Error bars represent the 95% confidence intervals. Dashed horizontal line represents the current population size downlist criterion.

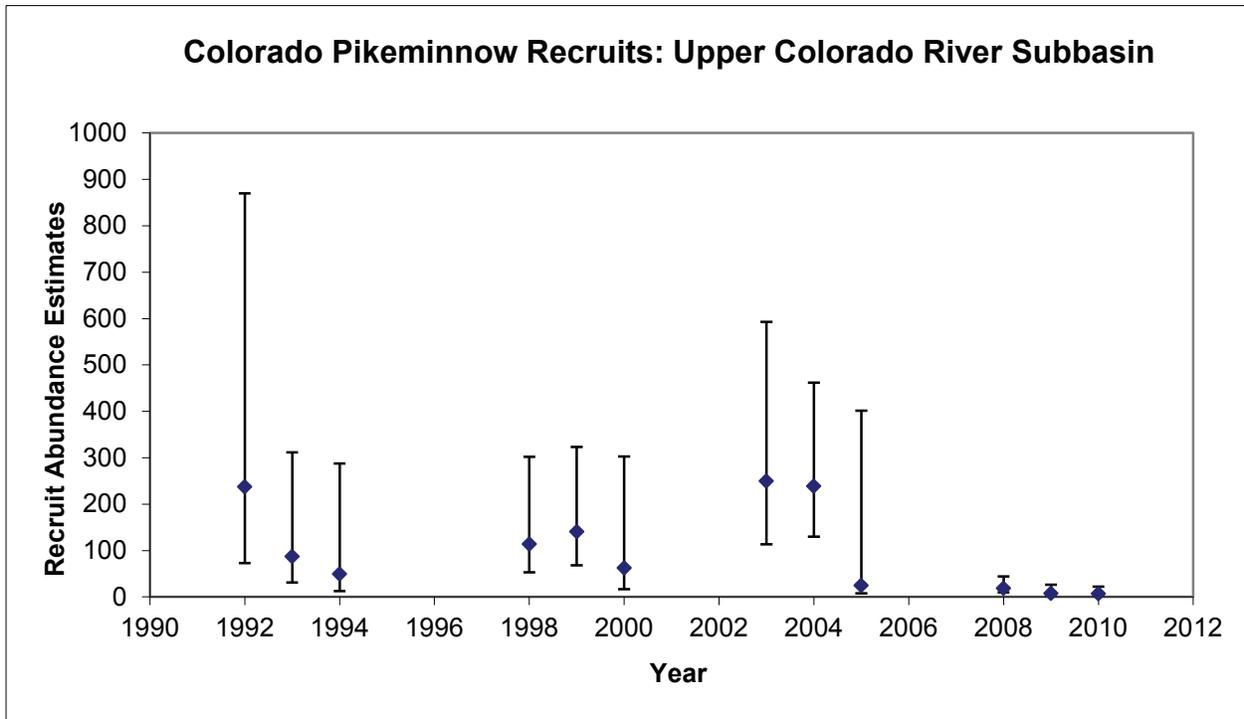


Figure 3. Colorado pikeminnow recruitment abundance estimates for the Colorado River (Osmundson and White 2009; 2013). Error bars represent the 95% confidence intervals.

#### *Green River Juveniles and Adults*

Population estimates for adult Colorado pikeminnow in the Green River subbasin began in 2000. Sampling occurs on the mainstem Green River from the Yampa confluence to the confluence with the Colorado River and includes the Yampa and White Rivers. The initial year of sampling did not include the lower Green River (near the confluence of the White River to the confluence with the Colorado River). Beginning in 2001, the sampling regime has consisted of three years of estimates followed by two years of no estimates. The first set of estimates showed a declining trend; however, estimates collected in 2006–2008 showed an increasing trend approaching the level of the estimate made in 2000 (Figure 4). The confidence intervals indicate no statistically significant difference among the estimates. The downlisting demographic criteria for Colorado pikeminnow in the Green River subbasin require that separate adult point estimates for the middle Green River and lower Green River do not decline significantly over a 5-year period, and each estimate for the Green River subbasin exceeds 2,600 adults (estimated minimum viable population [MVP] number). The average of the adult estimates is 3,020 (2000 – 2008). In addition, the recruitment of age-6, naturally-produced fish must equal or exceed mean annual adult mortality. In general, the estimates of recruitment age fish have averaged 455 and have had a positive trend (Figure 5). Beginning in 2006, recruitment has exceeded the annual adult mortality of about 20%. Despite a positive trend in the sub-basin population from 2006 – 2008, Bestgen et al. (2010) expressed concern that adult pikeminnow numbers in the Yampa River remained low from 2006 – 2008. They suspected that nonnative northern pike may have been suppressing numbers of pikeminnow.

The third round of population estimates for the Green River sub-basin is currently underway for 2011–2013 (not depicted in Figure 4): 2011–2013. Preliminary results from 2011 and 2012 indicate that the Yampa River portion of the sub-basin population remains low and may be in further decline (see Figure 6).

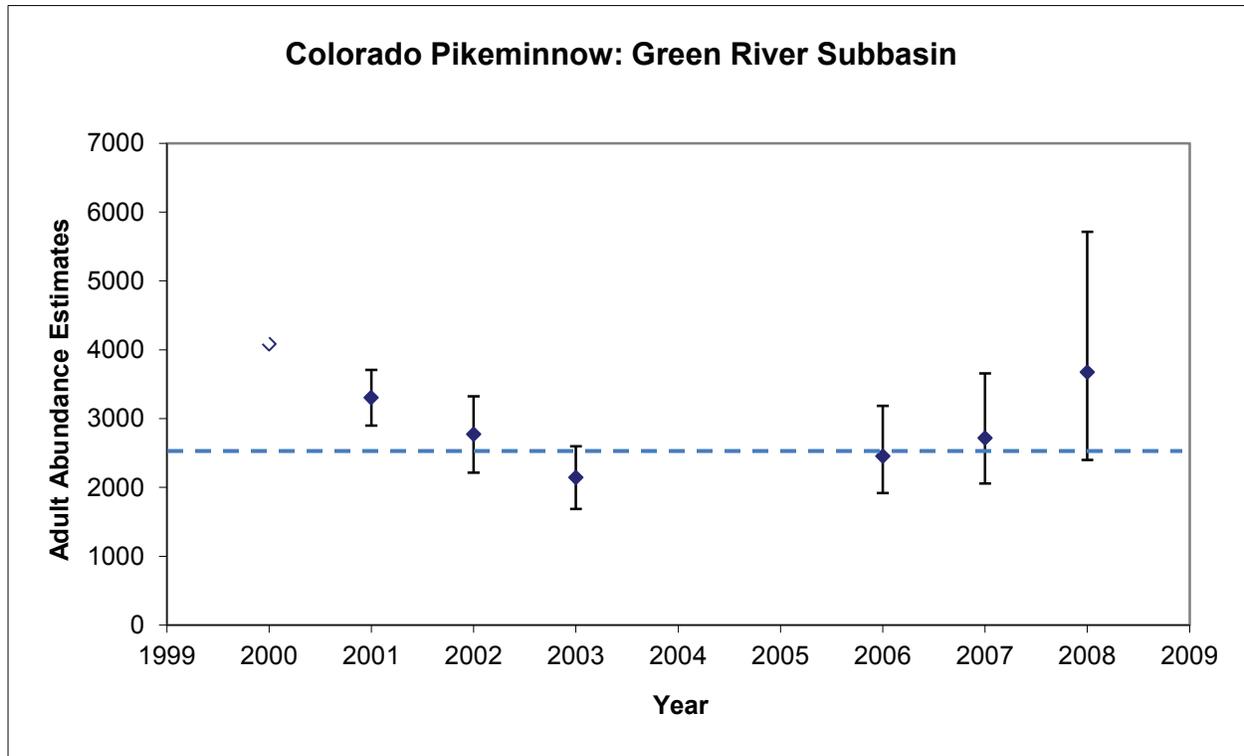


Figure 4. Adult Colorado pikeminnow population abundance estimates for the Green River (Bestgen et al. 2010). Error bars represent the 95% confidence intervals. In 2000, the lower Green River was not sampled. The data depicted for 2000 incorporates an extrapolated Lower Green River contribution to the overall population estimate and therefore lacks a confidence interval. The regression relationship for this population trend is available in Table 9 of Bestgen et al 2010. Dashed horizontal line represents the current population size downlist criterion.

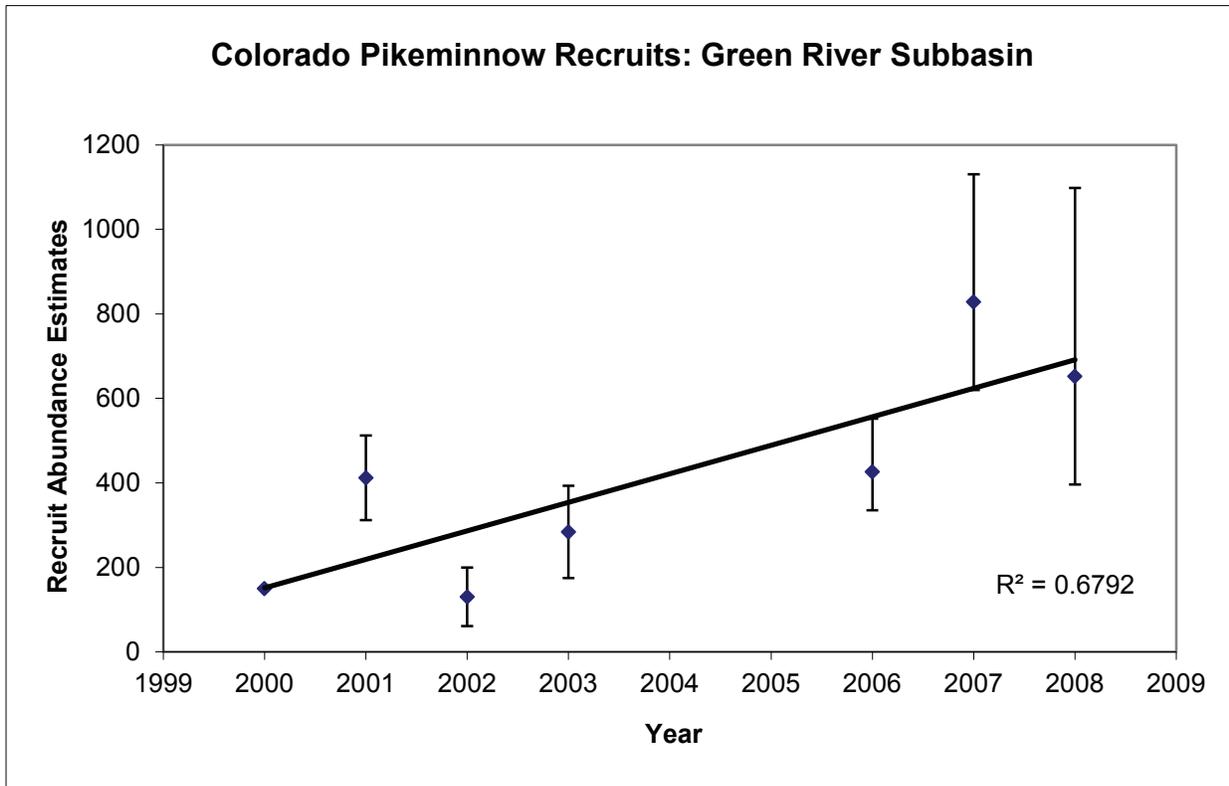


Figure 5. Estimated numbers of Colorado pikeminnow recruits (400–449 mm TL) in the Green River subbasin (Yampa, White, Middle Green, Desolation-Gray Canyons, and Lower Green) for 2001–2003 and 2006–2008. Error bars represent the 95% confidence intervals. Data from Bestgen et al. (2010).

As part of the process of revising the 2002 Recovery Goals into recovery plans, a Recovery Team for Colorado pikeminnow was assembled in late 2012 consisting of species and threat experts. During their initial discussions in November 2012, the Recovery Team linked persistent low densities of adult Colorado pikeminnow in the Yampa River to persistent high densities of nonnative predators (e.g., smallmouth bass and northern pike) (northern pike abundance shown in Figure 6). These estimates, which indicate that northern pike are outnumbering pikeminnow at least 3:1, point up the ongoing challenge of managing nonnative predators. Based on these data the Recovery Team recommended that the Service postpone a change in listing status for Colorado pikeminnow until this threat, which was specifically identified in the 2002 Recovery Goals, has been more adequately addressed. The Recovery Program began a serious campaign to remove nonnative predators from the critical habitat reaches of the Yampa River beginning in the early 2000's when it became apparent that smallmouth bass were decimating the native fish populations (Anderson 2005).

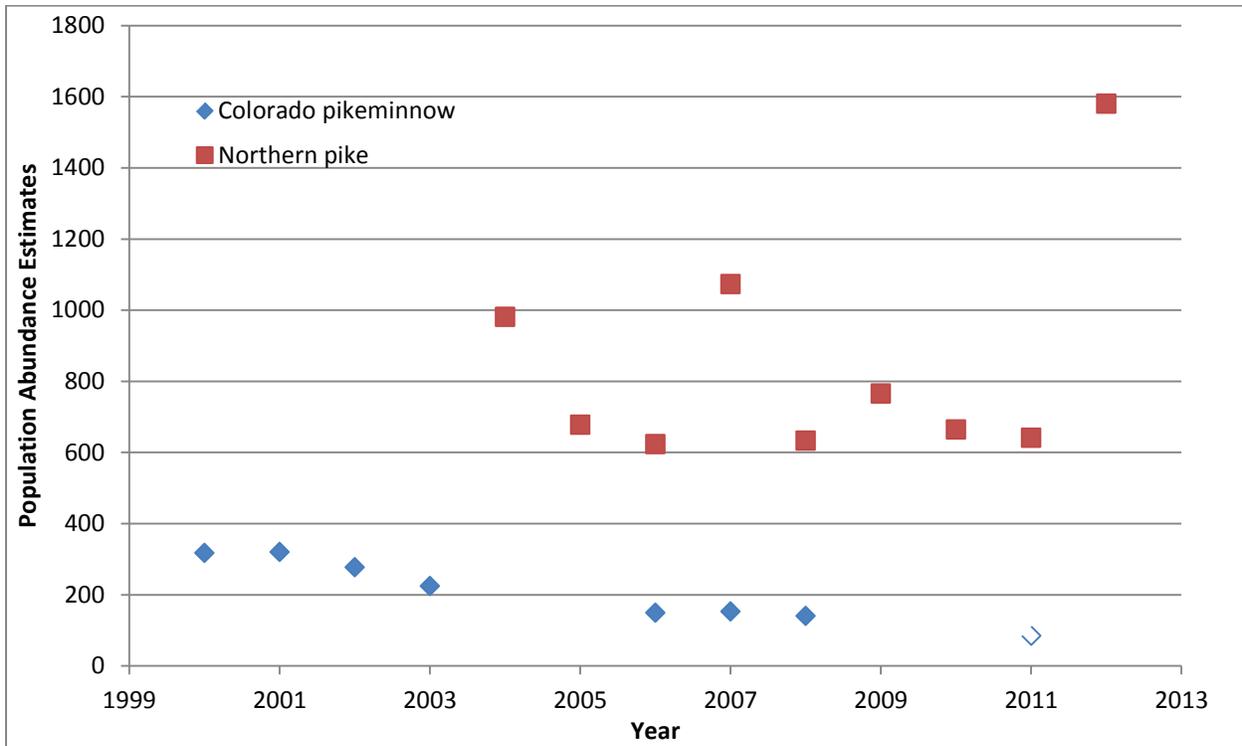


Figure 6. Comparison of Colorado pikeminnow population estimates (CPM) (2000 – 2008 data from Bestgen et al. 2010) and northern pike (Battige 2012) in the middle Yampa River. The 2011 data point for Colorado pikeminnow is preliminary. In 2012, too few Colorado pikeminnow (n=6) were collected to calculate a population estimate.

#### *Upper Basin Age-0*

Bestgen et al. 2012 recognized that the mechanism driving frequency and strength of recruitment events was likely the strength of age-0 Colorado pikeminnow production in backwater nursery habitats. Osmundson and White (2013, in draft) saw a similar relationship between a strong age-0 cohort in 1986 and subsequent recruitment of late juveniles five years later, but that relationship was more tenuous in later years. Researchers are particularly concerned with what appears to be very weak age-0 representation in the Middle Green reach (1999 thru 2008) and in the lower Colorado River (2001 thru 2008) (Figure 7).

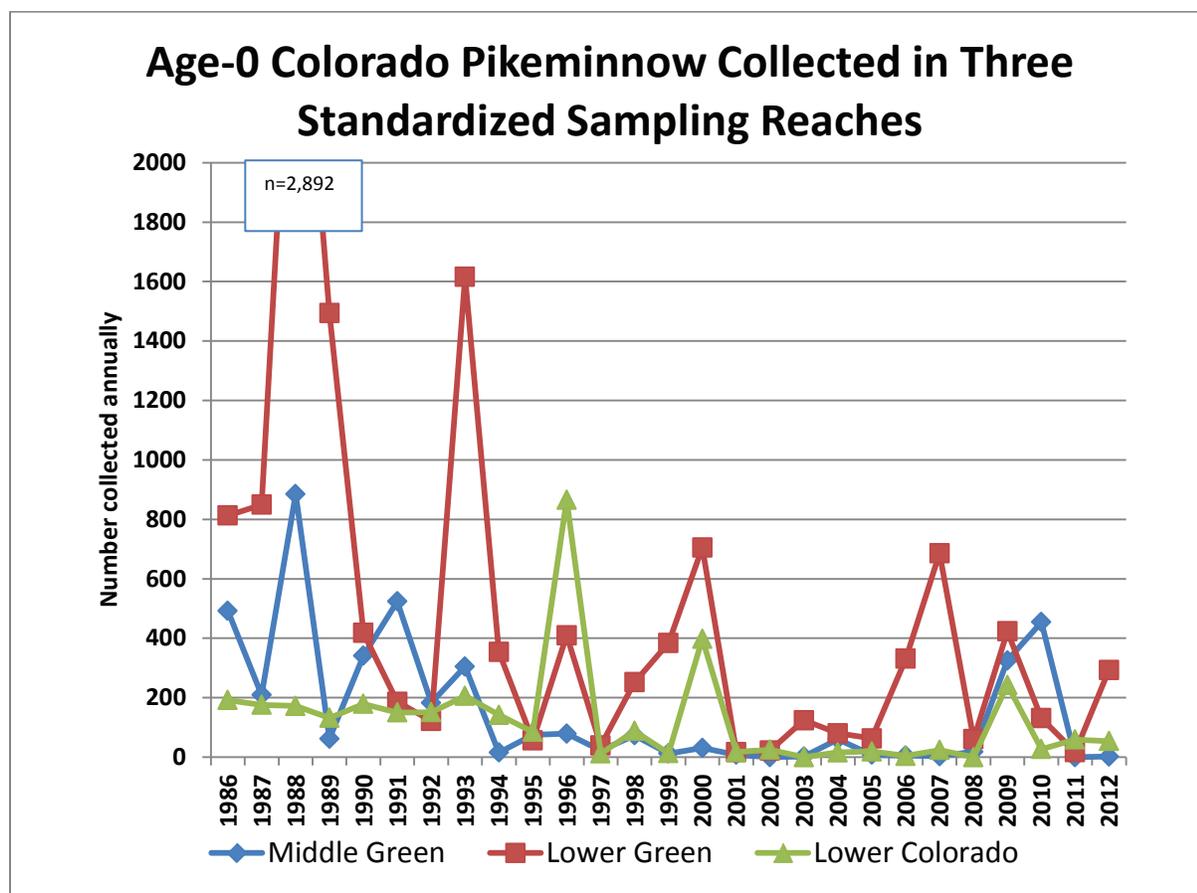


Figure 7. Numbers of age-0 Colorado pikeminnow collected each year from three different habitat reaches of river. Data from [Skorupski et al. 2012](#).

The Service's [status review of Colorado pikeminnow](#) was completed in 2011. Although a good portion of the recovery factor criteria (USFWS 2002a) are being addressed, nonnative fish species continue to be problematic and researchers now **speculate** that mercury may pose a more significant threat to Colorado pikeminnow populations of the Upper Colorado River Basin than previously recognized. Osmundson and Lusk (2012) have recently reported elevated mercury concentrations in Colorado pikeminnow muscle tissue. Mercury exposure has been reported to impair reproduction in fish. Laboratory experiments have shown diminished reproduction and endocrine impairment in fish exposed to dietary methyl mercury at environmentally relevant concentrations, with documented effects on production of sex hormones, gonadal development, egg production, spawning behavior, and spawning success.

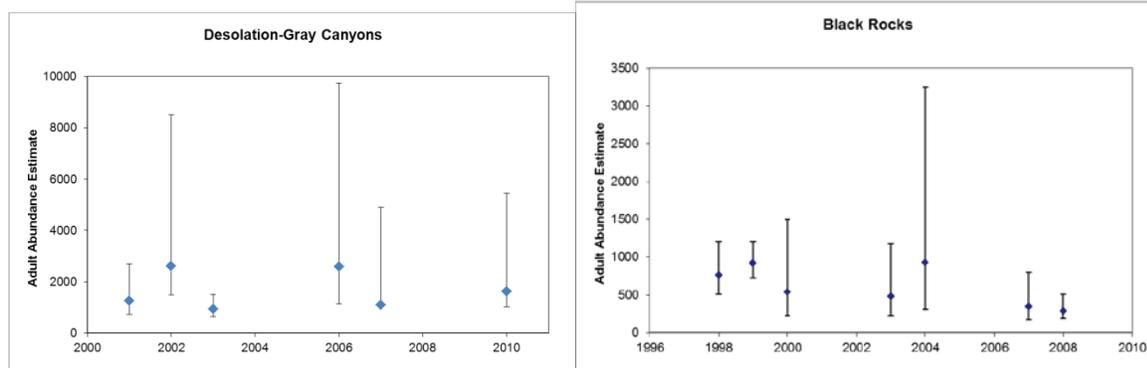
### Humpback chub

Five populations of humpback chub exist in the upper Colorado River basin and one in the lower Colorado River basin in canyon-bound reaches of the river system. Recovery goal downlist demographic criteria (USFWS 2002b) for humpback chub require each of five populations in the Upper Colorado River Basin to be self-sustaining over a 5-year period, with a trend in adult point

estimates that does not decline significantly. Secondly, recruitment of age-3 (150–199 mm TL) naturally-produced fish must equal or exceed mean adult annual mortality. And one of the five populations (e.g., Black Rocks/Westwater Canyon or Desolation/Gray Canyons) must be maintained as a core population such that each estimate exceeds 2,100 adults (estimated minimum viable population [MVP] number). (Note: data are not currently available to make mark-recapture estimates of humpback chub recruitment. In [UDWR's 2012 annual report](#), Brandon Gerig mentioned that *Gila* spp. recruitment appears strong in Westwater. )

The Yampa River population exists in the lower Yampa River Canyon and into the Green River through Split Mountain Canyon. This population is small, with an estimate of about 400 wild adults in 1998-2000. Sampling during [2003–2004](#) caught only 13 fish; too few to estimate population size. In 2007, the Recovery Program brought 400 young-of-year *Gila* spp. caught in Yampa Canyon into captivity as a research activity to determine the best methods for capture, transport, and holding at two different hatchery facilities. Approximately 15 percent of the *Gila* species were tentatively identified as humpback chub by physical characteristics; the roundtail chub have been returned to the river in Dinosaur National Monument. Geneticists at Southwest Native Aquatic Resources and Recovery Center (SNARRC), Dexter, NM, have since provided preliminary results indicating that these Yampa fish in captivity are hybrids between humpback chub and roundtail chub (Wade Wilson, U.S. Fish and Wildlife Service, personal communication). Currently, it is not known if pure humpback chubs occur in Yampa Canyon. Researchers are taking fin clip samples from all suspected humpback chub for genetic analysis. Humpback chub genetics and population status will be discussed in the revised recovery plan.

The Desolation/Gray Canyons population of wild adults was estimated at 1,300 in 2001, 2,200 in 2002, and 940 in 2003 ([Jackson and Hudson 2005](#)). Sampling in 2001 and 2002 was conducted in summer, whereas sampling in 2003 was conducted in fall. In a report on 2006–2007 estimates, researchers ([Badame 2012](#); Figure 8) indicated that this population was trending downward. Badame (2012) linked declining catch of humpback chub in the upper portions of Desolation Canyon with increasing densities of nonnative smallmouth bass. UDWR researchers recommended securing a representative sample of adults in captivity. In 2009, 25 adults were taken to Ouray National Fish Hatchery. In 2011, six sites throughout Desolation Canyon were monitored for adults, 55 individual adults were encountered, but recaptures were too few to calculate a population estimate.



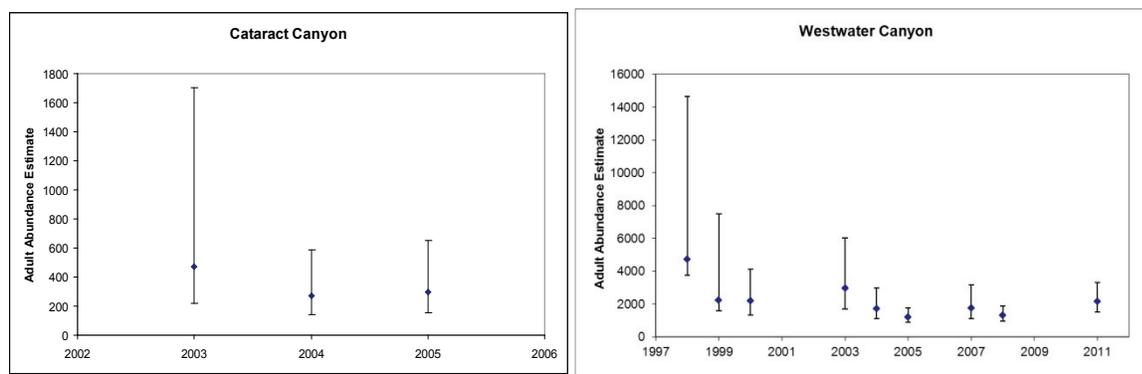


Figure 8. Adult humpback chub population estimates with confidence intervals for four populations in the upper Colorado River Basin (note that the scale differs among the graphs for the different populations). Clockwise from upper left: Desolation-Gray Canyons (from [Badame 2011, 2012](#)); Black Rocks (from Francis and McAda 2011); Westwater Canyon (from [Elverud 2011](#)); and Cataract Canyon (from Badame 2008).

On the Colorado River of the upper Colorado River basin, three humpback chub populations are recognized. Black Rocks and Westwater Canyon have enough exchange of individuals that they are considered a single core population. In Black Rocks, estimates of wild adults have varied from about 800 in 1998, 900 in 1999, and 500 in 2000 and [2003](#) (Figure 5). The most recent estimates, in 2007–2008 were 345 and 287, respectively. During the fall of 2011 and 2012, 78 and 112 individual adult humpback chub were caught respectively - similar to the numbers caught in 2007 and 2008 (61 and 74, respectively). Population estimates for Black Rocks will be calculated in 2013. Researchers caution that the numbers of largemouth bass captured in recent years have risen to levels of concern. The Westwater Canyon estimates of wild adults range from [about 4,700 in 1998 to 2,500 in 1999, 2000, and 2003](#). The 2007–2008 estimates were about 1,750 and 1,300. In 2008, this core population (Black Rock / Westwater combined) dropped below the population size downlist criterion (MVP = 2,100 adults) for the first time. In 2011, we saw some recovery in those populations where the estimate for adults in Westwater Canyon alone was 2,157; however, UDWR reports a decline to 1,507 adults in 2012. Population estimates in both Black Rocks and Westwater canyons declined dramatically during the first population estimation rotation in the late 1990s, but have remained relatively stable since that time. It should be noted that populations of native roundtail chub, a conservation agreement species that coexists with humpback chub in Black Rocks and Westwater canyons, have increased through this same period of monitoring. In addition to the potential negative interactions between humpback chub and nonnative predators discussed above, both the Westwater and Black Rocks populations are at risk of potential chemical contamination due to the proximity of a railroad located on the right bank of the Colorado River which at times transports toxic substances.

The Cataract Canyon humpback chub population is small, with [estimates of about 150 wild adults in 2003 and 66 in 2005](#). Estimates are difficult to obtain in Cataract; therefore, catch-per-unit-effort (CPUE) has been determined to be an effective replacement (began in 2008 on a 2-years-on, 2-years-off sampling regime). In 2011, UDWR reported that the Cataract population appears to be stable with CPUE ranging between 0.010 and 0.035 fish/net-hour.

As part of a Conservation Measure included in the Service's 2011 Biological Opinion on Glen Canyon Dam Operations (USFWS 2011), Reclamation entered into an agreement with geneticists at SNARRC in late 2012 to genotype the humpback chub refuge population held at SNARRC. Their objectives include estimating a genetic effective population size ( $N_e$ ) and effective/census size ( $N_e/N$ ) ratio. As these metrics serve as the basis for calculation of minimum viable population size included in the recovery goals, the results of this genetic work could have bearing on those demographic criteria (draft report anticipated in September 2013).

The Service's [status review of humpback chub](#) completed in 2011 reported that 60% of the recovery factor criteria (USFWS 2002b) have been addressed to varying degrees; however, nonnative fish species and issues dealing with the potential chemical contamination of the river from spills and pipelines continue to be problematic.

### Razorback sucker

The Recovery Program is rebuilding razorback sucker populations with hatchery stocks. As populations increase, the Program expects to generate mark recapture population estimates on adult razorback sucker comparable to the data reported for Colorado pikeminnow and humpback chub. Many stocked razorback sucker are being recaptured as part of other studies. Razorback sucker stocked in the Green and Colorado rivers have been recaptured in reproductive condition and often in spawning groups. Captures of larvae in the Green, Gunnison, and Colorado rivers document reproduction. Survival of larvae through their first year remains rare, largely due to predation by a suite of nonnative predators (e.g., black bullhead, nonnative cyprinids, smallmouth bass and northern pike) in floodplain nursery habitats. However, occasional captures of juveniles (just over age-1) in the Green and Gunnison rivers suggest that survival of early life stages is occurring. Collections of larvae by light trap in the middle Green River have been generally increasing since 2003 (Figure 9). In 2011, researchers documented spawning by razorback sucker in the White River for the first time.

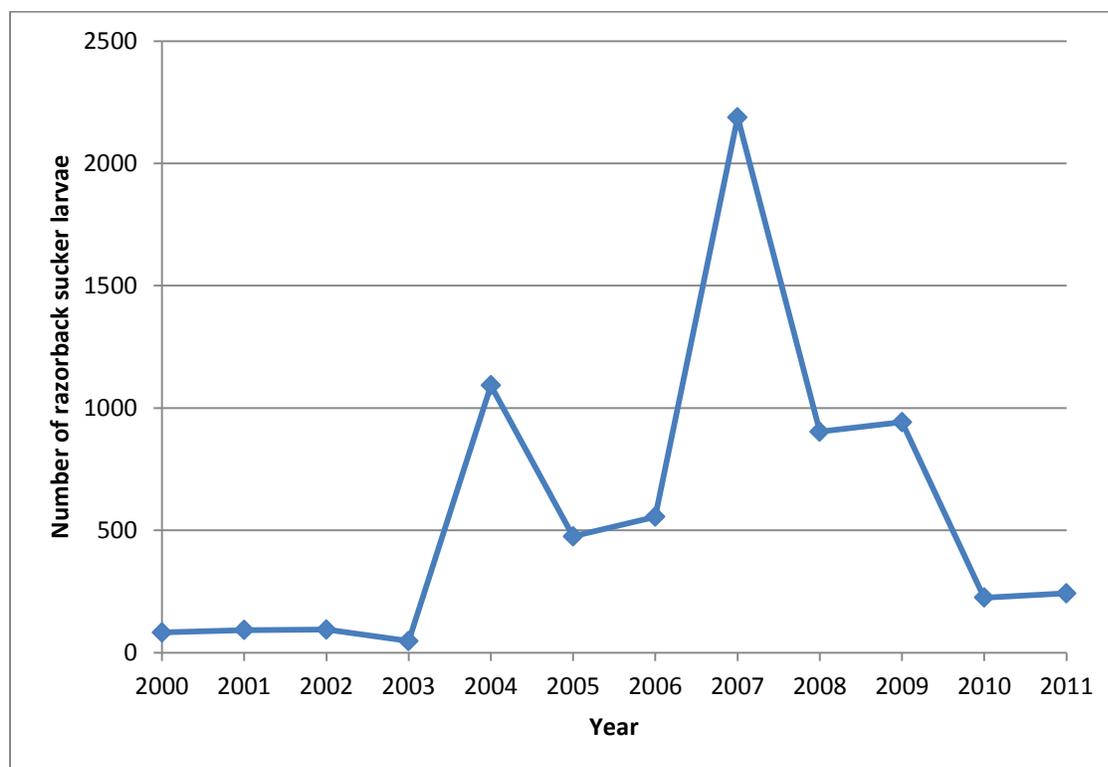


Figure 9. Numbers of razorback sucker larvae collected in light traps since 2000.

Since 1995, over 334,000 subadult razorback suckers have been stocked in the Green and upper Colorado River subbasins. Two reports on survival estimates of stocked razorback sucker recommended stocking larger fish only during spring, fall and winter (Zelasko et al. 2004; 2008). From 2004–2007 approximately 96,400 fish were stocked and 1,511 recapture events from 1,470 unique individuals were encountered from 2005–2008. In 2012, tag-reading antennas were placed on a spawning bar in the middle Green River near Dinosaur National Monument in northeast Utah. A total of 52 unique razorback sucker stocked between 2004 and 2010 were detected, 88% of which had not been seen since stocking. During sampling for Colorado pikeminnow estimates, 938 and 765 razorback sucker were captured in 2011 and 2012, respectively, for the Ouray to Green River, UT reach of the main channel of the Green River. In a monitoring plan (Bestgen et al. 2012), estimates of large juvenile to adult razorback sucker in three reaches of the Green River ranged from 474 to over 5,000 within a reach. Although these estimates are highly imprecise, they provide further confirmation that stocked fish are surviving in the wild.

Three razorback sucker stocked in the San Juan River near Farmington, NM, for the San Juan Recovery Program were captured between Moab, UT and the stateline with Colorado in 2008. This demonstrates that exchange of stocked razorback sucker between the San Juan River and the Upper Colorado River is certain, and may have ramifications for recovery.

The Service's [status review of razorback sucker](#) completed in 2012 reported that 85% of the recovery factor criteria (USFWS 2002c) have been addressed to varying degrees; however, nonnative fish species continue to be problematic.

## Bonytail

Since 1996, over 380,000 tagged bonytail subadults have been stocked in the Green and upper Colorado River subbasins. Stocking continues in an effort to reestablish populations in the Upper Colorado River Basin. Until recently, very few of these stocked fish have been recaptured, most of those were captured shortly after they were stocked and in poor condition (Bestgen et al. 2008). The bonytail reintroduction effort has not been nearly as successful as the razorback sucker reintroduction effort in the Upper Colorado or San Juan river basins.

When the Recovery Program began, the bonytail had essentially disappeared and little was known about its habitat requirements. Hatchery personnel continue to experiment with: 1) improving fitness of hatchery fish prior to stocking; 2) stocking sites (e.g., floodplain habitats as opposed to the main channel); and 3) stocking times (e.g., recent research suggests that stocking when the river has warmed to bonytail spawning temperature could be advantageous). The changes in hatchery protocols have been captured in a draft revised Integrated Stocking Plan. In recent years, researchers have begun to see some encouraging results. All stocked fish receive an internal microchip tag before being released in the wild. Since 2009, an increasing number of bonytail have been detected at several locations throughout the Upper Colorado River Basin where stationary tag-reading antennas are used. During high spring flows in 2011, more than 1,100 bonytail (16.6% of the 6,804 stocked in early April of that year) were detected by antenna arrays in the breach of the Stirrup floodplain on the Green River. The Price Stubb antenna array on the Colorado River detected 88 bonytail between October 2011 and September 2012. The fish detected in the fall had been stocked above Price-Stubb in Debeque Canyon, but in the spring, some of the fish were moving upstream through the fish passage.

The Service's [status review of bonytail](#) completed in 2012 reported that 72% of the recovery factor criteria (USFWS 2002d) have been addressed to varying degrees.

### **B. Program Accomplishments, Areas of Concern, and Recommended Action Items**

Recovery Program participants accomplished a number of important objectives in 2012 and early 2013. These accomplishments are described in Table 2 below. Following that is Table 3, which describes Service concerns about shortcomings in the progress of some ongoing and future recovery actions. The second column in both of these tables identifies *how* Program accomplishments are meeting or falling short of the criteria used by the Service to evaluate whether the Recovery Program is making "sufficient progress" toward recovery. Those criteria are:

1. actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction;
2. status of the fish populations;
3. adequacy of flows; and
4. magnitude of the impact of water projects.

More detail about Program accomplishments and shortcomings can be found in the final April 2, 2013, assessment of accomplishments and shortcomings of the Recovery Program under the

Recovery Implementation Program Recovery Action Plan (RIPRAP) from March 1, 2012, through February 1, 2013 (see assessment column in the tables to the [RIPRAP](#)). Action items recommended to address concerns/shortcomings are shown in the third column of the Concerns table.

**Table 2. SIGNIFICANT ACCOMPLISHMENTS (March 1, 2012, through February 1, 2013)**

Accomplishment	Criteria Affected
<b>General – Upper Basin-wide</b>	
<p><a href="#">2012 nonnative fish management projects</a> maintained removal / disruption further into the smallmouth bass (SMB) spawning period (e.g., sampling schedules extended to exploit SMB in post-peak flows on the Yampa). Additional funding became available in the first quarter of FY13, enabling the Program to maintain expanded efforts in 2013.</p>	<p>1 – Reduce threat of extinction by removing more nonnative fishes.</p>
<p>Program participants continue to work on a comprehensive draft <i>Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy</i>.</p>	<p>The strategy, when implemented, will 1 – Reduce the threat of extinction by reducing risk of additional nonnative species introductions and improving effectiveness of nonnative fish control activities.</p>
<p>Colorado: 1) adopted a regulatory change to allow unlimited take and possession of any species on the prohibited list (e.g. burbot) provided they are immediately killed; 2) changed Master Angler Award program criteria to recognize qualifying lengths for northern pike and smallmouth bass caught in waters west of the Continental Divide in the “Kept Fish” category only; 3) adopted regulation changes to implement the 2009 Stocking Procedures as they pertain to stocking of nonsalmonid fishes in the UCRB in Colorado west of the Continental Divide, including the San Juan River basin; and 4) added language to annual fishing regulations brochure calling attention to the problem of and penalties for illegal stocking and encouraging reporting illegal stocking via Operation Game Thief. Utah: 1) continues to work toward shifting all stocking to triploid salmonids; and 2) increased the fine for individuals who move fish from \$1,000 to \$2,500 and increased the fine for individuals who illegally stock fish from \$2,500 to \$5,000.</p>	<p>1 – Reduce the threat of extinction by reducing risk of additional nonnative species introductions and improving effectiveness of nonnative fish control activities.</p>
<p>Most targets for hatchery production and stocking of endangered fish were met or exceeded. New rearing ponds completed at Horsethief Canyon Native Fish Facility near Fruita, CO in 2012 to increase razorback sucker production and perhaps raise other endangered fish species in the future. UDWR will begin variance process with fish health board to allow these fish to be stocked in Utah beginning in August 2013</p>	<p>2 – Improving status of fish populations through stocking.</p>
<p><a href="#">Standardization of electrofishing equipment</a> and techniques for both hard-bottom and inflatable boats completed. Program converting electrofishing fleet to ETS electrofishers which significantly reduce required power output and potential harm to native fishes.</p>	<p>1 – Reduce threat of extinction by improving efficiency of nonnative fish removal and minimizing harm to native species.</p>
<b>Green River</b>	
<p>Operation of Flaming Gorge Dam under the ROD and Biological Opinion was dictated by extremely low snow pack in the spring of 2012, but despite low flows in a Moderately Dry year, the larval trigger program was successfully coordinated (Larval Trigger Study Plan completed in 2012). April-July runoff was predicted as 71% of avg. and the Recovery Program requested a Reach 2 flow in excess of 8,300 cfs. Flows above that were realized for 5 days in Reach 2 after razorback sucker larvae were detected. Larval razorback sucker were detected in the Green River on May 16, 2012 and flows at Jensen's subsequently rose above 8,300 cfs for 5 days and peaked at 10,200 for 2 days. Releases from Flaming Gorge peaked at 7,780 cfs to accomplish the target. Base flows were</p>	<p>1 – Improve habitat and reduce threat of extinction; 3 – Improve flows; 4 – Reduce magnitude of project impact.</p>

>1,300 cfs from July 15 to October 1 <sup>st</sup> and all temperature targets were met.	
Utah's Green River Utah Water Acquisition Team (GRUWAT) has completed the MODSIM model of the Green River and is nearly done evaluating current and full compact water use. Two more model inputs will be evaluated pending completion by Bureau of Reclamation.	Part of a work plan leading to flow protection mechanism(s) to 1 – Maintain habitat through protected flows.
The Recovery Program has decided to proceed with an e-barrier to prevent endangered fish from becoming entrained in the Tusher Wash diversion.	1 – Improve habitat and reduce threat of extinction; 4 – Reduce magnitude of project impact.
UDWR continued the must-kill, no-limit policy for smallmouth bass and burbot in the Green River and "burbot bashes" in conjunction with WY G&F in Flaming Gorge [January & February 2013]). Utah extended must-kill, no-limit policy to walleye and northern pike and removed the bag limit for channel catfish in the Green River. UDWR is formulating plans to rotenone Red Fleet Reservoir in 2014 to address the illegal population of walleye.	1 – Reduce threat of extinction by removing more nonnative fishes.
<b>Yampa River</b>	
The Recovery Program leased its full 2000 af (418 af carried forward to 2013) from Elkhead Reservoir to maintain base flows for endangered fish in the very low-flow year of 2012. The base flow target at Maybell for a dry year is 93 cfs; between August and September 2012, the average flow was 79 cfs and the annual minimum was 38 cfs.	1 – Improve habitat through augmented flows; reduce threat of extinction by hindering smallmouth bass recruitment.
CPW continued work at Catamount Reservoir to reduce northern pike and plans to eradicate the illegally-established population of pike in Chapman Reservoir. An ice fishing tournament at Stagecoach in February 2013 required must-kill for northern pike and walleye caught by tournament participants.	1 – Reduce threat of extinction by removing nonnative fishes.
CPW agreed to forego the marking pass (thereby increasing removal) for abundance estimates of nonnative fish in the Yampa River (except for smallmouth bass in Little Yampa Canyon) for one year in 2013.	1 – Reduce threat of extinction by removing more nonnative fishes.
<b>Duchesne River</b>	
1,500 af of leased water in Big Sand Wash used for the first time in 2012 (this water became available in 2011, but wasn't needed in that wet year) CUWCD 2013	1 – Improve habitat through augmented flows; 3 – Improve flows.
<b>White River</b>	
The bag limit for smallmouth bass was removed in the reach immediately below Kenney Reservoir, allowing for unlimited harvest of this species in this reach. Removal efforts to reduce the abundance of smallmouth bass will be intensified in 2013.	1 – Reduce threat of extinction by removing nonnative fishes.
PIT tag antenna array installed near Bonanza Bridge to monitor PIT tagged endangered and 3-species fish. This is complemented by 3-Species sampling conducted by Utah and Colorado under the <a href="#">Range-Wide Conservation Agreement and Strategy for Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker</a> .	Improves monitoring to detect any 1 – Measurable population response of stocked and wild fish to improved habitat.
<b>Colorado River</b>	
In 2012, conditions were so dry that the Service adjusted targets below the dry year target of 810cfs at Palisade to lower level. Average flows between August and September were 414 cfs and the minimum was 273 cfs. A total of 37,171 af was added to baseflow in water year 2012: 19,501 af from Ruedi, 4,871 af from Williams Fork, 5,079 af from Wolford Mountain Reservoir, and 8,170 af from the Palisade Bypass Pipeline.	3 – Improve flows; 4 – Reduce magnitude of project impact.
Contracts completed for the permanent 5,412 af from Ruedi Reservoir (West Slope water users); and for the permanent 5,412 af from Granby (East Slope water users). Water deliveries from both sources are being made in 2013.	Provides mechanisms to 3 – Improve flows; 4 – Reduce magnitude of project impact.
Grand Valley Water Users reduced irrigation diversions in October by over 600 cfs (~38%). Total reduction in diversions in 2012 were estimated at 50-60KAF due to the GVWM facilities.	3 – Improve flows; 4 – Reduce magnitude of project impact.
Agreement completed so that construction on OMID irrigation efficiency project	3 – Improve flows; 4 – Reduce

can begin in 2013, with check structures operating by 2014, and construction completion in 2016.	magnitude of project impact.
2012 low flows were challenging for fish screen and passage operation, GVIC cleared the cobble bar that had formed near the fish screen return, operated screen 32% of the season and Obermeyer passage gate intermittently. Palisade Irrigation District and Reclamation repaired the 2011 high-flow damage to the Price-Stubb passage. Grand Valley Water Users Association operated fish screen when conditions allowed and removed accumulated sediment.	1 – Measurable population response of stocked and wild fish to habitat restored through fish passage and screens
Tagged fish detected in Price-Stubb fish passage October 2011 – September 2012: 88 bonytail, 1 humpback chub, 36, roundtail chub, 8 Colorado pikeminnow, 135 razorback sucker, 3 flannelmouth sucker, and 3 unidentified. 19% (n=51) of the fish passed the antennas heading upstream, 40% (n=110) in an undetermined direction, and 41% (n=114) in a downstream direction.	1 – Measurable population response of stocked and wild fish to habitat restored through fish passage.
In 2012, additional passes were devoted in the reach of the upper Colorado River from Silt to Beavertail to remove invading northern pike, focusing on backwaters and floodplain ponds. CPW began reconnaissance in floodplain and canal habitats to identify potential sources of this species.	1 – Reduce threat of extinction by removing more nonnative fishes.
<b>Gunnison River</b>	
Aspinall ROD signed on May 3, 2012. The Dry Year forecast at Whitewater called for a 1 day peak of 900 cfs for endangered fish. During the peak release from Crystal (900 cfs), additional water from tributaries resulted in a 2,500 cfs peak on April 2. The Dry Year base flow target was 750 cfs, average flow for Aug 1- Sep was 1,047 cfs, minimum for the season was 847 cfs. Peak flows called for in the EIS were met in 2012 and base flows were met with the exception of 15 days. There are no duration targets in dry years.	1 – Improve habitat through augmented flows; 3 – Improve flows; and 4 – Reduce magnitude of project impact.
<a href="#">Multi-life stage fish community monitoring on the Gunnison River mainstem and in the 18-mile Reach of the Colorado River</a> was begun in 2011. This Recovery Program project is complemented by CPW's ongoing 3-Species sampling in the Gunnison River under the <a href="#">Range-Wide Conservation Agreement and Strategy for Roundtail Chub, Bluehead Sucker, and Flannelmouth Sucker</a> .	Will 1 – Measure population response to recovery actions.
Redlands passageway operated from 18 April to 18 October, 2012. Low base flows required USFWS, in cooperation with Redlands Water and Power Company, to close the fish ladder 30 May to 04 June. A total of 8,705 fish used the passage structure in 2012; 88.6% of those were native species. Twelve Colorado pikeminnow used the structure in 2012. A grand total of 122 Colorado pikeminnow have used the structure since 1996. The fish screen operated throughout the season. Several hundred cubic yards of sediment were removed from the headgate to the fish screen.	1 – Measurable population response of stocked and wild fish to habitat restored through fish passage and screen.
CPW treated Paonia Reservoir with rotenone to remove northern pike. CPW also installed a fish screen on Juniata Reservoir, which contains illegally introduced smallmouth bass and walleye and drains into a tributary to the Gunnison.	1 – Reduce threat of extinction by reducing risk of nonnative fish escapement to critical habitat.

**Table 3. SERVICE CONCERNS** (March 1, 2012, through February 1, 2013)

Concern	Criteria Affected	Recommended Action Items
<b>General – Upper Basin-wide</b>		
<p>Despite the Recovery Program’s extensive removal efforts, nonnative and aquatic invasive species continue to threaten survival and recovery of the endangered fishes in the upper Colorado River basin. Decline of Colorado pikeminnow in the Yampa River has been linked to the persistence of nonnative predators; large-bodied predatory species of concern also appear to be expanding in other segments of critical habitat; and illegal introductions of nonnative species continues to expand. In 2012, the Colorado Pikeminnow Recovery Team was convened to review new information as it pertains to Recovery Plan revisions. The team’s preliminary assessment indicated that persistent low numbers of adult Colorado pikeminnow in the Yampa River may be caused by unacceptable densities of nonnative predators and that more effective management of nonnative fishes must occur before a change in status. The Service concurs and has deferred consideration of downlisting for this species for the time being.</p>	<p>1– Increases threat of extinction; 2 – Declining status of fish populations.</p>	<p>The Recovery Program needs to swiftly complete and fully implement an effective, comprehensive <i>Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy</i>.</p> <p>In addition, and due to the severity of concerns over the persistent and increasing threat of nonnative predators to the recovery of the endangered fish, the USFWS Regional Director postponed signing this 2012-2013 Sufficient Progress Memo until the Recovery Program <u>adopted a reasonable response plan</u>. Specifically, the Regional Director asked that the Program Director’s Office work with the States to develop an addendum to the Recovery Action Plan that identifies specific, tangible actions that can be accomplished in the next 3 years, which in the aggregate have a high likelihood of stopping the expansion of these invasive species and of reducing existing concentrations. These actions should include increased control efforts directed to sources of nonnative predators; adequate rapid response to recent and future “outbreaks”; and a strong outreach campaign that sends the message to the public that only nonnative fisheries that are compatible with endangered species recovery will be acceptable. [This response plan was transmitted to the USFWS, Regional Director, Biology and Management Committees on August 29, 2013].</p>
<p>Downward trends in some humpback chub populations (particularly Yampa Canyon and in Desolation Canyon of the Green River) have been attributed to increased nonnative fish abundance and habitat changes associated with dry weather and low river flows. Declines in adult humpback chub catch rates for sites in the upper 45 miles of Desolation Canyon correlate strongly to the appearance and persistence of a</p>	<p>2 – Declining status of fish populations.</p>	<p>The Recovery Program has committed to reducing nonnative impacts to the humpback chub population in Yampa Canyon since 2001. In 2004, the Recovery Program transitioned Project 110 from a nonnative catfish control effort in Yampa Canyon to smallmouth bass removal. That effort is ongoing and is complemented by similar efforts upstream (Projects 125, 98a, and 98b) and</p>

<p>smallmouth bass population. Declines in the proportion of first year adults (200–220 mm TL) in 2006–2007 support the idea that smallmouth bass predation may be suppressing the smaller <i>Gila</i>.</p>		<p>downstream (project 123a). In Desolation Canyon, smallmouth bass (and other nonnative species) are removed during Colorado pikeminnow population estimates (Project 128) and during specific nonnative control trips conducted under Project 123b. <i>See recommended action item identified for General Concern #1.</i></p>
<p>In 2008, the largest humpback chub population in the UCRB, the Black Rocks/Westwater core population for the first time dropped below the population size downlist criterion (MVP = 2,100 adults). In 2011, some recovery was seen with an adult population estimate of 2,157 in Westwater Canyon; however, UDWR reported a decline to 1,507 adults in 2012. The most recent Black Rocks adult population estimates in 2007–2008 were 345 and 287, respectively. During the fall of 2011, 78 individual adult humpback chub were caught in Black Rocks, and 112 in 2012, similar to the numbers caught in 2007 and 2008.</p>	<p>2 – Declining status of fish populations.</p>	<p>The Program needs to determine how to investigate age-0 and age-1 humpback chub mortality (especially in Black Rocks/Westwater and Desolation canyons) as recommended in the Research Framework). (The difficulty in working with these size classes is they can't be identified to species.) If funds are available, the Program may develop a scope of work for 2014 to investigate age-0 and age-1 humpback chub mortality. 200 age-0 <i>Gila</i> will be brought into captivity from Black Rocks/Westwater when conditions allow (relates to broodstock development once fish are determined to be humpback chub). A currently funded study at CSU, which will combine Westwater and Black Rocks data sets and explore alternative population models could shed some light on this issue from a stock assessment perspective.</p>
<p>Despite ongoing efforts to reduce selenium concentrations throughout the Upper Basin uncertainty remains to the exposure thresholds that cause specific effects in the endangered Colorado River Fish. In addition, other forms of contamination (e.g. petrochemicals, heavy metals, endocrine disruptors) could be impeding recovery.</p>	<p>2 – Declining status of fish populations.</p>	<p>The Recovery Program should support research to determine dose response information related specifically to the endangered Colorado River fish as well as necessary remediation.</p>
<b>Green River</b>		
<p>Tusher Wash diversion continues to entrain endangered fishes.</p>	<p>1 – Increases the threat of extinction.</p>	<p>The Program is closely coordinating e-barrier construction with NRCS's rebuild of the diversion structure. Construction is scheduled to begin in fall 2014, pending completion of an EIS by NRCS.</p>
<p>Northern pike densities rebounded in the middle Green River and were reported in the upper Green in Brown's Park in 2012 and 2013.</p>	<p>1 – Increases threat of extinction.</p>	<p>UDWR has 2013 funding to augment CSU's ongoing pike control in this portion of the river. <i>See recommended action item identified for General Concern #1.</i></p>
<p>Walleye captures have increased in upper and lower Green River; gizzard shad have been found in lower Green River backwaters since 2007 and have increased markedly over the</p>	<p>1 – Increases threat of extinction.</p>	<p>Red Fleet Reservoir has been recommended for reclamation (rotenone) in 2014. A microchemical analysis of otoliths from both the reservoir and the river is</p>

<p>past few years in lower Colorado River backwaters. Gizzard shad have the potential to significantly affect food web ecology in backwaters and the mainstem. An illegal population of walleye in Red Fleet Reservoir is also believed to be a problematic source of this species entering the Green River.</p>		<p>underway to better understand the contribution of walleye to critical habitat from this potential source population.</p>
<b>Yampa River</b>		
<p>CWCB still needs to provide <u>the</u> accounting of past depletions for the Yampa River <b>due in 2010</b>; a back-casted baseline of current depletions; and a recommendation and justification addressing projected future depletions and whether or not additional instream flow filings or other flow protections mechanisms should be considered.</p>	<p>Hampers ability to 3 – Determine adequacy of flows.</p>	<p>CWCB is scheduled to complete accounting of past depletions using the StateCU model (Due date from YPBO- 1<sup>st</sup> report July 1, 2010; 2<sup>nd</sup> report July 1, 2015 ). The depletion accounting report will include a discussion of the need for flow protection (which would require a peak flow recommendation). A contract for the irrigated acreage assessment was awarded in February 2013. Another contract still needs to be awarded to update the dataset. The models will be updated through 2010 or 2011. Colorado has given high priority to the Yampa and Colorado river basins portion of this work. .</p>
<p>Persistent decline of Colorado pikeminnow in the Yampa River is linked to the persistence of nonnative predators.</p>	<p>1 – Increases threat of extinction; 2 – Declining status of fish populations.</p>	<p><i>See recommended action item identified for General Concern #1.</i></p>
<p>Efforts to reduce densities of smallmouth bass in Little Yampa Canyon and other reaches of the Yampa River appear to be hampered by the immigration of smallmouth bass adults and recruits from adjacent reaches, particularly upstream sources which sustain propagule pressure and the proliferative/invasive capacity of this species. Escapement of adult smallmouth bass from Elkhead Reservoir remains problematic.</p>	<p>Hampers ability to 1 – Reduce threat of extinction by decreasing numbers of nonnative fish.</p>	<p>CSU will complete the <a href="#">programmatic synthesis of smallmouth bass removal efforts</a>, providing a comprehensive evaluation of the Program’s removal efforts (draft reports due June 15 [Part 2] and August 15 [Part 3]). The Recovery Program will review the final report on escapement from Elkhead Reservoir (Part 1, completed May 1, 2013) and determine appropriate adaptive-management response. <i>See recommended action item identified for General Concern #1.</i></p>
<p>Efforts to reduce densities of northern pike in the Yampa River appear to be hampered by immigration from the buffer zone and upstream sources (Catamount, Elkhead, and the upper river).</p>	<p>Hampers ability to 1 – Reduce threat of extinction by decreasing numbers of nonnative fish</p>	<p>CSU is conducting a <a href="#">programmatic synthesis of northern pike removal efforts</a> (2011-2012) to evaluate current removal efforts in the context of northern pike life history throughout the Yampa River drainage (draft final report due to Recovery Program 9/30/13). <i>See recommended action item identified for General Concern #1.</i></p>
<p>The Recovery Program and Colorado Parks and Wildlife need to develop a drainage-wide action plan and timeline to address Yampa River northern pike management</p>	<p>Hampers ability to 1 – Reduce threat of extinction by decreasing numbers of northern pike.</p>	<p>CPW has detailed its ongoing and anticipated pike management actions throughout the drainage in its 2010 ‘Yampa River Basin Aquatic Wildlife Management Plan (CDOW 2010).’ CPW provided the Program Director’s</p>

		office a review of these actions on May 1, 2013. The Program office will work with CPW to determine if any of these management actions are not being adequately addressed and seek necessary remedies. <i>See recommended action item identified for General Concern #1.</i>
<b>Duchesne River</b>		
Extent of contribution of smallmouth bass or walleye produced in the Duchesne River below Starvation and entering Green River remains unknown. Ute Tribe apparently not currently conducting nonnative fish removal.	1 – Increases threat of extinction.	Program will rely on findings of project # C18/19 to determine how to proceed. <i>See recommended action item identified for General Concern #1.</i>
<b>White River</b>		
Revised White River flow recommendations overdue.	Hampers ability to 1 – Improve habitat through augmented flows; and 3 – Improve flows.	A working draft <i>Flow Recommendations for the Endangered Fish of the White River, Colorado and Utah</i> was sent to the Biology and Water Acquisition committees and GRUWAT on July 1, 2011. Conflicting comments were received; a response to comments was provided in 2012; and the Program has agreed that the recommendations will be finalized as part of White River Management Plan (which will then trigger development of a PBO). The Management Plan will 1) identify historic and a most likely future depletion scenario; 2) use (and refine) the Recovery Program’s draft endangered fish flow recommendations and current hydrology to identify the effects of past and future water development on endangered fish habitat; 3) develop final flow recommendations for the White River and 4) identify recovery actions needed to offset depletion effects.
Smallmouth abundance has increased in the White River, primarily within Colorado. Sampling in 2012 indicated that bass densities are highest in the uppermost section below Taylor Draw Dam and tapered off to relatively low densities approximately 20 miles downstream. There was no evidence of depletion in any of the reaches sampled more than once and spawning adult bass and evidence of recruitment were more concentrated in the uppermost sections.	1 – Increases threat of extinction.	Efforts to reduce the abundance of smallmouth bass will be intensified in 2013. Angling (conducted by agency personnel or an incentivized public event) could prove useful in this river. The Recovery Program continues to support and encourage the multi-agency effort to designate White River as native fish conservation area. See recommended action item identified for General Concern #1.
<b>Colorado River</b>		
The Recovery Program still struggles to meet flow recommendations in drought years (see discussion in the attached 15-mile Reach assessment). The Service emphasizes	Hampers ability to 1 – Improve habitat through augmented flows; and 3 – Inadequacy of	FWS and Reclamation are exploring opportunities (and would include Colorado and the River District in these discussions) to continue delivering Ruedi water (or a

the importance of meeting the flow recommendation.	flows.	portion thereof) to replace the release of 10,825 acre-feet of Ruedi Reservoir water that concluded in 2012. In addition, the OMID Canal Automation Project is expected to provide about 17,000 af of water in most years. The check structures in the OMID project are scheduled to be in place by the 2014 irrigation season, which will result in partial water savings. The project will be fully implemented in 2016.
CWCB still needs to provide the depletion accounting report.	Hampers ability to 3 – Determine adequacy of flows.	See first item under Yampa River.
CFOPs report (evaluation of options for providing and protecting additional peak flows to the 15-Mile Reach) overdue.	Hampers ability to 1 – Improve habitat through augmented flows; and 3 – Improve flows.	CFOPS Phase III (a due date of Sept 30, 2010 was identified in the 2010 RIPRAP) report should be out in draft by October 15, 2013, and final report by December 2, 2013. 2013.
Screen operators attempt to operate screens as much as possible, but in low-flow years when screen operations are reduced, many native and endangered fish are entrained in diversion canals.		HUP call participants will continue to discuss screen operation with the goal of more frequent operation at the GVIC canal (recognized as the oldest and most problematic design). The Program will continue to evaluate ways to improve screening operations and methods, and the Program will continue to fund salvage operations of fish remaining in the canals at the end of the irrigation season.
<b>Gunnison River</b>		
Northern pike may escape from Crawford Reservoir and enter the Gunnison River.	1 – Increases threat of extinction.	CPW intends to begin mechanically removing northern pike from Crawford in 2014.
<b>Dolores River (none)</b>		

### **C. Conclusion on Sufficient Progress**

Recovery Program participants need to actively pursue completion of the aforementioned action items. The Service requests that responsibilities and timeframes be identified for each action item and regular progress reports be provided to the Management Committee on these action items and their effect on meeting RIPRAP schedules. In order to support appropriate inclusion of recommended activities in annual Program budgets, the Service will make every attempt to provide the sufficient progress assessment in the early spring of each year in the future.

The reports of persistent declines in the Yampa River portion of the Colorado pikeminnow population linked to persistent high densities of nonnative predators come as very troubling news. The Service shares the concerns raised by both the Recovery Program and the Colorado Pikeminnow Recovery Team over the current status of Colorado pikeminnow. We also remain concerned over the status of wild populations of humpback chub and low survival of stocked bonytail. For these reasons, the Service's Sufficient Progress determination was extremely difficult this year. The Recovery Program needs to continue to manage all threats to endangered species recovery, but current densities and distribution of the nonnative predators appears to require even greater attention and more directed efforts.

The Service has focused on the threats arising from nonnative predators in the past several Sufficient Progress reviews. We are aware of how complicated invasive species control can be. We are also fully aware of how seriously the Recovery Program has taken this issue as demonstrated through its significant commitment of resources, particularly since 2007. However, despite the Recovery Program's ongoing commitment to control the nonnative threat, the current approach is simply not working. Therefore the Service asked the Program Director's Office and the States to elaborate on a subset of actions included in the draft Basinwide Strategy, which in the aggregate provide a high likelihood of achieving a positive response over the next three years. The Service has reviewed that list of actions and agrees that it plots a reasonable course forward. The Service will track progress on those specific actions in future Sufficient Progress reviews.

The Service recognizes significant accomplishments have occurred: a) continued cooperation to manage spring (particularly Larval Trigger Study Plan operations at Flaming Gorge Dam) and base flows throughout the basin; b) completion of the Aspinall ROD; c) a continued push forward on nonnative fish management; d) meeting razorback sucker and bonytail stocking targets; and e) successful razorback sucker spawning, continued increases in captures of stocked razorback suckers, capture of wild-produced razorback sucker in Green River floodplains, and the first-ever documented spawning of razorback sucker in the White River.

The Service strongly encourages all Recovery Program participants to: 1) remain attentive to the lingering impacts of past drought conditions (and impending impacts of a very dry 2013 water year) which exacerbate human-caused threats such as the negative effects of nonnative fishes on recovery of the endangered fishes; and 2) continue to aggressively pursue management actions to alleviate threats to the species, including providing and protecting necessary flow and habitat conditions (particularly in the 15-Mile reach) and preventing additional introductions and expansion of problematic nonnative aquatic species. The Recovery Program has made strong

progress in protecting flows and restoring habitat and, more recently, has demonstrated strong resolve to manage nonnative fishes. Nine of the 26 accomplishments listed in the table above relate to nonnative fishes, as do 12 of the 19 concerns. The Service senses that the Recovery Program is at a critical juncture in its nonnative fish management activities and must build on recent momentum to insure significant progress on this front. Therefore, the Service strongly encourages Program participants to push hard to implement the actions needed to manage problematic nonnative fishes and prevent new problematic species and any resurgence of existing problematic nonnative fishes. In addition, the Service acknowledges and strongly encourages Program participants' efforts to ensure that the Program can continue to implement recovery actions at existing levels in light of current funding authorization. Finally, we encourage the Recovery Program to continue active participation in the development and implementation of the Southern Rockies Landscape Conservation Cooperative (co-led by the Service and Reclamation), which will attempt to address impacts of landscape-level habitat changes, including those related to climate change throughout the Colorado River basin.

The Service is confident that with continued cooperation by all Recovery Program participants, the Recovery Program will continue to make significant strides toward recovery of the four endangered fishes. Based on evaluation of the status of the fish, provision of flows during drought periods, magnitude of depletion impacts, the focus on nonnative threats, and cumulative Recovery Program accomplishments and shortcomings, the Service concludes that when implemented as Conservation Measures (i.e., part of the proposed action), the Recovery Program is making sufficient progress to continue avoiding the likelihood of jeopardy resulting from depletion impacts of new projects that have an annual depletion of up to 4,500 acre feet<sup>2</sup>. Projects exceeding 4,500 acre feet or that have direct or indirect effects in addition to water depletions will be evaluated to determine if they jeopardize the species' continued existence on a case by case basis.

This concludes the Service's 2012-2013 assessment of progress. Specific questions about sufficient progress should be directed to Tom Chart, Recovery Program Director, 303-969-7322, ext. 226, [tom\\_chart@fws.gov](mailto:tom_chart@fws.gov) or Angela Kantola, Deputy Director, 303-969-7322, ext. 221, [angela\\_kantola@fws.gov](mailto:angela_kantola@fws.gov).

---

<sup>2</sup> And, continued avoidance of jeopardy for the water projects and depletions currently provided with ESA compliance by the Program, i.e., 2,037 projects depleting 2.86 million AF/YR. The 15-Mile Reach programmatic biological opinion covers an average depletion of up to 1 million acre-feet per year of existing depletions (through September 30, 1995) and up to 120,000 acre-feet of new depletions (since September 30, 1995) in the Colorado River above the confluence with the Gunnison River. The Yampa River programmatic biological opinion covers an average depletion of up to 168,000 acre-feet per year of existing depletions and up to 53,000 acre-feet per year of new depletions. The Gunnison River PBO covers all existing water depletions in the Gunnison River Basin (estimated annual average of 602,700 acre-feet/year) and future depletions up to 3,500 AF basinwide as well as future depletions up to 22,200 AF in the upper Gunnison Basin in accordance with the Upper Gunnison Basin Subordination Agreement and 12,200 AF in the Dallas Creek Project which has been contracted for but is not used at this time.

## II. IMPLEMENTATION OF ITEMS IN THE 15-MILE REACH AND GUNNISON RIVER BASIN PROGRAMMATIC BIOLOGICAL OPINIONS

### A. 15-Mile Reach

On December 20, 1999, the Service issued a final programmatic biological opinion for the Bureau of Reclamation's operations and depletions, other depletions, and funding and implementation of Recovery Program actions in the upper Colorado River upstream from the Gunnison River confluence. Known as the "15-Mile Reach Programmatic Biological Opinion (PBO)", the PBO determined that implementation of recovery actions and continued water depletions in the Colorado River would not likely jeopardize the continued existence of the endangered fishes. The PBO cites action items in the RIPRAP and charges the Recovery Program with the responsibility to ensure that these action items are completed and/or implemented. Page 74 of the PBO says: "In 2003 and every 2 years thereafter, for the life of the Recovery Program, the Service and Recovery Program will review implementation of the Recovery Action Plan actions to determine timely compliance with applicable schedules."

Also as per the PBO, in 2015, the Service is scheduled to review the status of the endangered fishes and determine if the positive population response criteria have been met. As stated in the Reinitiation Notice, the Service will provide information on the status of the species and recommendations for improving population numbers to the Recovery Program as part of their evaluation of the reinitiation criteria. The Service's Western Colorado Ecological Services Office compiled the following preview of issues they are tracking as it relates to that pending 2015 PBO review (supporting information available in attachment entitled: 2013 15-MR PBO Review).

The Service recognizes the following significant recovery accomplishments that have occurred since 1999:

1. Fish passage at the Grand Valley Project and Price-Stubb diversions;
2. Constructing and collaborating with local water users to operate fish screens in the Grand Valley Project and Grand Valley Irrigation Company canals;
3. Implementing irrigation efficiency in the Grand Valley project canal with saved water improving flows in the 15-Mile Reach;
4. Building the Horsethief Hatchery ponds for successful propagation efforts with respect to razorback sucker reintroduction.
5. Efforts to combat nonnative fish.
6. The voluntary efforts of West and East slope water users and Reclamation to assist in meeting the recommended endangered fish flows in the 15-mile Reach.

7. Initiation of the Orchard Mesa Irrigation District Improvement Project that will contribute to flow augmentation in the 15-Mile Reach.

While recognizing these accomplishments, the Service hopes the Recovery Program can build on its history of cooperation to improve in three specific recovery areas: 1) low flow management in the 15-Mile Reach during dry years; 2) achieve greater success controlling expanding populations of nonnative predators; and 3) identify and correct factors limiting wild populations of humpback chub and successful reintroduction of bonytail. The concerns raised here are specific to the Upper Colorado River, but are consistent with those raised in the Regional Director's overarching review of the Recovery Program's progress.

Low flow Management in the 15-Mile Reach:

In the 15-Mile Reach PBO the Service states that implementation of recovery action items, with future depletions will provide flows that meet the flow recommendations during August September and October. The table below presents actual average monthly flows for four 'dry' years (2002, 2003, 2004, and 2012), when the Service's recommended average monthly flow was 810cfs.

	<b>Colorado River Below the Grand Valley Diversion Average Monthly Flow</b>		
	<b>August</b>	<b>September</b>	<b>October</b>
<b>2002</b>	115.4	240.9	526.2
<b>2003</b>	611.2	1,088	1,078
<b>2004</b>	497.6	830.3	1,078
<b>2012</b>	454.1	371.7	528.6

The Service understands that without the commitments from Reclamation and the voluntary cooperation of water users, the observed monthly averages would have been lower, and in some instances drastically lower. However, when flows drop below 810 cfs researchers believe that habitat becomes compromised to the point that adult pikeminnow likely vacate the 15-Mile reach to points downstream where flows increase either due to tributary input from the Gunnison River or irrigation return flow.

With the recent expiration of the 2012 Agreement, and the subsequent contracting of the remaining marketable pool from Ruedi Reservoir, the Service lost the valuable management tool of the Ruedi 10,825 acre-foot pool to release for low flow management purposes. The Service recognizes that the Orchard Mesa Irrigation District (OMID) Canal System Improvement Project will start construction this fall. This project will provide approximately 17,000 acre-feet to the 15-mile reach, except during extremely dry conditions. We understand that this will result in approximately 30 cfs increase in flow in the 15-mile reach during irrigation season. This is also a very valuable tool for meeting fish flows in the 15-mile reach. However, it is a very different tool than a

managed pool from Ruedi reservoir, because it does not provide the flexibility of a pool of water that can be released to bolster flows during very dry periods. Also, it is our understanding that the OMID project will not provide water during extreme dry conditions, when the Orchard Mesa Check is operated.

The 2013 spring and summer hydrology presented unprecedented flow conditions – conditions that were not fully considered in the 15 Mile Reach PBO. A very unusual set of circumstance occurred in the month of April this year when air temperatures cooled, reducing mid- and high elevation runoff at the same time the irrigation season began. During April, flows measured at the Palisade gage dropped below 400 cfs for 24 days and instantaneous flow dropped below 60 cfs on April 12 and April 27. The Service’s recommended average monthly flow for April is 1,860 cfs. In July, flows were ‘flashy’ due to summer storms. However, during a five day period (July 22-26), flows dropped below 400 cfs with an instantaneous low flow of 100 cfs recorded on July 24. The recommended endangered fish flow for July is 1,480 cfs.

In light of the recent loss of 10,825 acre-feet from the Ruedi Reservoir fish pool, with the expiration of the 2012 Agreement, we strongly encourage all Recovery Program stakeholders to find solutions to meet the flow recommendations with greater frequency.

#### Nonnative Predatory Fish

As mentioned earlier, the threat to endangered fish recovery posed by nonnative predatory fishes (e.g., smallmouth bass and northern pike) is of serious concern. In fact, the threat from nonnative fish predation is currently compromising the progress the Recovery Program has made toward recovery (including progress in flow management).

As it relates specifically to the PBO, the Service is most concerned with:

1. An expanding population of northern pike (likely source – Rifle Gap Reservoir) in the Colorado River upstream of the Grand Valley Project diversion;
2. Persistent densities of smallmouth and largemouth bass in the 15-Mile Reach and downstream;
3. An emerging population of walleye in the lower Colorado River in Utah.

The Service encourages all Recovery Program partners to become fully engaged in the battle against these nonnative predators. The Service commits to joining its partners in support of Colorado Parks and Wildlife and Utah Division of Wildlife Resources as they explore new nonnative fish management options and develop policy and regulation changes needed to clearly communicate to the public that the nonnative threat is compromising Section 7 compliance for Colorado River water projects.

#### Identify / Rectify Factors Limiting Wild Populations of Humpback Chub and Bonetail Reintroduction

The Service remains concerned that wild populations of humpback chub in Black Rocks

and Westwater Canyon of the Colorado River (near the CO / UT state line) have not recovered from declines detected in the late 1990's. The reason for those population declines is uncertain. To date, the densities of nonnative predators in these canyon-bound habitats have remained low and therefore do not appear to be a major limiting factor to these endangered species. Ongoing flow management in the 15-Mile Reach and now in the Gunnison River is, in part, intended to provide habitat needed to assist in the recovery of the humpback chub, but preferred habitat for humpback chub is not well understood. We strongly encourage the Recovery Program to investigate the factors limiting a positive response in these humpback chub populations and then to implement the necessary recovery actions.

The Service is also concerned that despite a concerted propagation effort to reintroduce bonytail in the Colorado River, results to date are not encouraging. We urge the Recovery Program to continue to investigate factors limiting the successful reintroduction of this endangered species.

**B. Gunnison River Basin**

On December 4, 2009, the Service issued a final programmatic biological opinion for the Gunnison River Basin and the operation of the Wayne N. Aspinall Unit and the reconsultation for the Dallas Creek and Dolores Projects and their effects on the endangered fishes. Known as the "Gunnison River Basin Programmatic Biological Opinion (PBO)", the PBO determined that the proposed action (reoperation of the Aspinall Unit, existing water depletions in the Gunnison River basin, new depletions up to 3,500 af/yr, new depletions associated with the Upper Gunnison Subordination up to 22,200 af/yr., continuation of the operation of other Reclamation Projects in the Gunnison Basin, and other Federal, private, local, and State water projects and water uses in the Gunnison Basin) is not likely to jeopardize the continued existence of endangered fish and is not likely to destroy or adversely modify designated critical habitat. Page 83 of the PBO says: "Every 2 years, for the life of the Recovery Program, the Service and Recovery Program will review implementation of the Recovery Action Plan actions that are included in this biological opinion to determine timely compliance with applicable schedules."

*[Please see summary in attachment entitled 2013 Gunnison PBO Review]*

## LITERATURE CITED

- Anderson, R. 2005. Riverine Fish Flow Investigations. Colorado Division of Wildlife Federal Aid Project F-289-R7. Job Progress Report.
- [Badame, P.V. 2008. Population estimates for humpback chub \(\*Gila cypha\*\) in Cataract Canyon, Colorado River, Utah, 2003-2005. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)
- [Badame, P. 2011. Humpback chub population estimates for Desolation/Gray Canyons, Green River Utah. Annual Report Project 129 of the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)
- [Badame, P. 2012. Population estimates for humpback chub \(\*Gila cypha\*\) in Desolation and Gray Canyons, Green River, Utah 2006-2007. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)
- Bestgen, K.R., K. Zelasko, R. I. Compton, and T. E. Chart. 2008. [Survival, Condition, Habitat Use, and Predation On Stocked Bonytails \(\*Gila elegans\*\) In The Green River, Colorado and Utah.](#) *The Southwestern Naturalist* vol. 53 issue 4 December 2008. p. 488-494
- [Bestgen, K. R., G. B. Haines, R. Brunson, T. Chart, M. Trammell, R. T. Muth, G. Birchell, K. Christopherson, and J. M. Bundy. 2002. Status of wild razorback sucker in the Green River Basin, Utah and Colorado, determined from basinwide monitoring and other sampling programs. Final Report, Colorado River Recovery Implementation Program Project Number 22D, Denver, Colorado.](#)
- Battige, K. 2012. Middle Yampa River northern pike removal and evaluation; smallmouth bass removal and evaluation. [Annual Report Project 98a of the Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado](#)
- Bestgen, K.R., J.A. Hawkins, G.C. White, K.D. Christopherson, J.M. Hudson, M.H. Fuller, D.C. Kitcheyan, R. Brunson, P. Badame, G.B. Haines, J.A Jackson, C.D. Walford, and T.A. Sorensen. 2007. Population status of Colorado pikeminnow in the Green River Basin, Utah and Colorado. [Transactions of the American Fisheries Society. 136: 1356 – 1380.](#)
- Bestgen, K.R., K.A. Zelasko, R.I. Compton and T.E. Chart. 2008. Survival, Condition, Habitat Use, and Predation on Stocked Bonytails (*Gila elegans*) in the Green River, Colorado and Utah. *The Southwestern Naturalist* 53(4):488-494.
- [Bestgen, K.R., J.A. Hawkins, G.C. White, C.D. Walford, P. Badame, and L. Monroe. 2010. Population status of Colorado pikeminnow in the Green River Basin, Utah and Colorado, 2006–2008. Final Report of the Larval Fish Laboratory, Colorado State University to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)

- Bestgen, K. R., G. B. Haines, and A. A. Hill. 2011. Synthesis of flood plain wetland information: Timing of razorback sucker reproduction in the Green River, Utah, related to stream flow, water temperature, and flood plain wetland availability. Final Report to the Upper Colorado River Endangered Fish Recovery Program, Denver. Larval Fish Laboratory Contribution 163.
- Bestgen, K.R., K.A. Zelasko, and G.C. White, 2012 Monitoring Reproduction, Recruitment, and Population Status of Razorback Suckers in the Upper Colorado River Basin. Draft Report to the Upper Colorado River Endangered Fish Recovery Program . Larval Fish Laboratory Contribution 170.
- Central Utah Water Conservation District. 2013. 2004 – 2011 Water Management Report Duchesne River Working Group.
- CDOW. 2010. Yampa River Basin Aquatic Wildlife Management Plan. Colorado Division of Wildlife, Denver, Colorado.
- Elverud, D. 2011. Population estimate of humpback chub in Westwater Canyon, Colorado River, Utah. Annual Report Project 132 of the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Francis, T.A., and C.W. McAda. 2011. Population status of structure of humpback chub, *Gila cypha*, and roundtail chub, *G. robusta*, in Black Rocks, Colorado River, Colorado, 2007–2008. Final Draft Report of U.S. Fish and Wildlife Service to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Gerig, B. 2012. Humpback Chub in Westwater Canyon. Annual Report Project 132 of the Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado.
- Jackson, J.A., and J.M. Hudson. 2005. Population Estimate for Humpback Chub (*Gila cypha*) in Desolation and Gray Canyons, Green River, Utah 2001-2003. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.
- Larval Trigger Study Plan ad hoc Committee. 2012. Study Plan to Examine the Effects of Using Larval Razorback Sucker Occurrence in the Green River as a Trigger for Flaming Gorge Dam Peak Releases. Coordinated by the Upper Colorado River Endangered Fish Recovery Program.
- Nesler, T.P., K. Christopherson, J.M. Hudson, C.W. McAda, F. Pfeifer, and T.E. Czapla. 2003. An Integrated Stocking Plan for Razorback sucker, Bonytail, and Colorado pikeminnow for the Upper Colorado River Endangered Fish Recovery Program. Final Report of Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Nonnative Fish ad hoc Committee. [in Draft]. Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy. Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado.

Osmundson, B., and J.D. Lusk. 2012. Field assessment of mercury exposure to Colorado pikeminnow within designated critical habitat. Project ID: FFS# 6F54 and DEC#200860001.1.

Osmundson, D. B., and K. P. Burnham. 1998. Status and trends of the endangered Colorado squawfish in the upper Colorado River. Transactions of the American Fisheries Society. 127:959 – 972.

[Osmundson, D.B., and G.C. White. 2009. Population status and trends of Colorado pikeminnow of the upper Colorado River, 1991–2005. Final Report of U.S. Fish and Wildlife Service to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)

Osmundson, D.B., and G.C. White. [in Draft]. Population Structure, Abundance and Recruitment of Colorado Pikeminnow of the Upper Colorado River, 2008–2010. Report of U.S. Fish and Wildlife Service to Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado

[Skorupski, J., M. Breen, B. Kiefer, and K. Creighton. 2012. Young-of-the-year Colorado pikeminnow monitoring. Annual Report of Utah Division of Wildlife Resources to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)

[Upper Colorado River Endangered Fish Recovery Program. 2006. Evaluation of Population Estimates for Colorado Pikeminnow and Humpback Chub in the Upper Colorado River Basin. Final Report of Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.](#)

[U.S. Fish and Wildlife Service. 2002a. Colorado pikeminnow \(\*Ptychocheilus lucius\*\) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region \(6\), Denver, Colorado.](#)

[U.S. Fish and Wildlife Service. 2002b. Humpback chub \(\*Gila cypha\*\) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region \(6\), Denver, Colorado.](#)

[U.S. Fish and Wildlife Service. 2002c. Razorback sucker \(\*Xyrauchen texanus\*\) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region \(6\), Denver, Colorado.](#)

[U.S. Fish and Wildlife Service. 2002d. Bonytail \(\*Gila elegans\*\) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region \(6\), Denver, Colorado.](#)

U.S. Fish and Wildlife Service. 2011. Final Biological Opinion on the Operation of Glen Canyon Dam including High Flow Experiments and Non-Native Fish Control. USFWS, Arizona Ecological Services Office, Phoenix, Arizona.

Zelasko, K.A., K.R. Bestgen and G.C. White. 2009. Survival rate estimation and movement of hatchery-reared razorback suckers *Xyrauchen texanus* in the Upper Colorado River Basin, Utah and Colorado. Final Report of Colorado State University Larval Fish Laboratory to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Zelasko, K.A., K.R. Bestgen and G.C. White. 2011. Survival Rate Estimation Of Hatchery-Reared Razorback Suckers *Xyrauchen Texanus* Stocked In The Upper Colorado River Basin, Utah and Colorado, 2004-2007. Final Report of Colorado State University Larval Fish Laboratory, Department of Fish, Wildlife, and Conservation Biology to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
<b>Define Existing Depletions/Calculate New Depletions</b>			
a). Develop consumptive use and losses report with CRDSS model to verify level of depletions.	Colorado: IA3b	CWCB completed depletion accounting report in 2008; next report overdue. The report will include a discussion of the need for flow protection (which would require a peak flow recommendation). A contract for the irrigated acreage assessment was awarded in February 2013. Another contract still needs to be awarded to update dataset. The models will be updated through 2010 or 2011. Colorado has prioritized the Yampa and Colorado river basins portion of this work.	Apx. B, #6
b). Calculate new depletions as a 10-year moving average as determined by CWCB and reported to FWS & CRRIP every 5 years.	Colorado: IA3c	Reporting of depletions as a 10-year moving average was to begin in 2011. See above.	7
<b>Habitat Protection Element</b>			
<b>General Protection</b>			
Enforcement Agreement between FWS and CWCB.	General: IC1	Completed in 1993. See also "Flow graphs" and "Flow tables" worksheets.	8
<b>Late Summer and Fall Base-Flow Period Augmentation</b>			
a). Instream flow decree for 581 cfs in 15-mile reach during July, August, and September.	Colorado: IA4c1	Completed in 1997.	8
b). 300 cfs instream flow right for water accretions in 15-mile reach.	Colorado: IA4c2	Completed in 1997.	8
c). 5,000 acre-feet (af) annually + 5,000 af 4 out of 5 years from Ruedi.	Colorado: IA5a	Ongoing since 1989 (except second 5,000 af was not available in 2002 and 2012).	8
d). 21,650 af/year split evenly between Ruedi and water users.	Colorado: IA5b,c,d	Ongoing since 1997. In 2012, conditions were so dry that the Service adjusted targets below the dry year target of 810cfs at Palisade to lower level. Average flows between August and September were 414 cfs and the minimum was 273 cfs. A total of 37,171 af was added to baseflow in water year 2012: 19,501 af from Ruedi, 4,871 af from Williams Fork, 5,079 af from Wolford Mountain Reservoir, and 8,170 af from the Palisade Bypass Pipeline. Program still struggles to meet flow recommendations in drought years; Recovery Program participants will consider options and opportunities for meeting flow recommendations on a more consistent basis after completion of the 10,825 EA and agreements. FWS and Reclamation may explore opportunities (and would include Colorado and the River District in these discussions) to continue delivering Ruedi water (or a portion thereof) after 2012. The OMID Canal Automation Project is expected to provide water in most years to replace the 10,825 acre-feet of Ruedi Reservoir water that was lost in 2012. The check structures in the OMID project are scheduled to be in place by 2014 irrigation season.	8
e). After 2009, the water users must have agreements with the Service to provide a permanent source of the 10,825 af (divided equally between east and west slope).	Colorado: IA5e3	Contracts completed for the permanent 5,412 af from Ruedi Reservoir (West Slope water users); contracts for the permanent 5,412 af from Granby (East Slope water users) are in negotiation. Interim agreements extended through 2013 with option for two additional years.	8-9
f). 6,000 af from Wolford.	Colorado: IA5h	Ongoing since 1996 (actual amount of water available each year is based on 10% of the storable inflow to Wolford, <b>up to</b> 6,000 af). 6,000 af provided in 2000; 3,078 af in 2001; 300 af in 2002; 286 af in 2003; 0 af in 2004 and 2005 (to allow the reservoir to recover from the 2002 drought), and 5,233 af in 2006; 0 af in 2007; 3,190 af in 2008; 3,490 in 2009; 3,000 in 2010; 7,572 in 2011; and 5,079 in 2012.	10

Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
<p>g). Grand Valley Water Management - Study of canal operations showed spills from the Government Highline Canal averaged 31,400 (Aug-Oct) from 1992-1994. GVWM will reduce canal spills by 19,400 af and ~9,000 af will be returned to the Colorado River through Palisade Pipeline.</p>	<p>Colorado: IA5l</p>	<p>Construction and automation of check structures and Palisade pipeline and Highline Lake pump station complete and operational. With water saved from efficiencies, fewer canal spills, return from pipeline (irrigation season Mar-Oct) and water from the HUP pool in Green Mt reservoir (July-Oct), savings have been better than projected (&gt; 19,400 + 9,000 af = 28,400 af). Water provided for fish from Green Mtn. Reservoir (including GVWM): 2000 - 42,468 af; 2001 - 31,118 af; 2002 - 46,846 af; 2003 - 85,863 af; 2004 -42,689 af; 2005 - 83,122 af; 2006 - 40,858 af; 2007 - 79,385 af; 2008 - 107,281 af; 2009 - 148,075 af; 2010 - 96,650 af; 2011 - 41,976 af; and 2012 - 32,057 af. The Municipal/Recreation contract for Green Mountain Reservoir water was originally signed in 2002, renewed on 8/29/07 through 12/31/12, and Reclamation is in the process of working on another 1-year renewal while simultaneously pursuing a 40year contract.</p>	<p>10</p>
<p>Spring Peak Enhancement</p>			
<p>See also "Flow graphs" and "Flow tables" worksheets.</p>			
<p>a). Coordinated Reservoir Operations - in all but extremely dry or wet years.</p>	<p>Colorado: IA5i2</p>	<p>Ongoing since 1997. Spring peak flows were augmented in 1997, 1998, 1999, 2006, 2008, 2009 and 2010. Spring peak flows in 2000, 2001, 2002, 2004, and 2012 were below the 12,900 cfs threshold for implementing coordinated reservoir operations under CROS. Spring peak flows in 2003, 2005, and 2011 exceeded the 12,900 cfs threshold, but other CROS operating criteria were not met and therefore flows were not augmented. CROS implementation plan completed 2/28/06 in advance of 2006 runoff season. Due to rapid snowmelt, spring 2010 saw the highest coordinated peak flow release (73,971 af) since 1997 when CROS began. The coordinate release (CROS) for the 2010 spring peak in the 15-mile reach increased the peak by 2,500 cfs: from 21,800 cfs to 24,300 cfs.</p>	<p>11</p>
<p>b). Coordinated Facilities Operations Program - provide up to 20,000 af.</p>	<p>Colorado: IA5m2</p>	<p>Phase II report &amp; recommendations of the Executive Committee completed in 2003, but no additional water provided under CFOPS. Implementation linked to CROS (see above). With assistance of the State Engineer's Office, CWCB, and reservoir owners, FWS identified reservoirs that could participate in CFOPS. The amount of water that could be released depends on the size of an insurance pool that would be designated by FWS ~May 5 of each year from existing base flow environmental pools in Ruedi and the water users' 10,825 pool. In years where augmentation could be expanded through use of CFOPS, Service will review antecedent conditions, determine if additional augmentation is needed, and level of augmentation based on the size of the "insurance pool." CFOPS Phase III report should be out in draft by July 1, 2013, and final report by September 30, 2013.</p>	<p>11</p>
<p>Habitat Development and Maintenance Element</p>			
<p>Floodplain Restoration and Selenium Remediation</p>			
<p>Colorado subbasin floodplain management plan completed 3/06.</p>			
<p>a). Gardner Pond (29-5/8 Road Gravel Pit).</p>	<p>IIA1</p>	<p>Construction complete; Beswick pond used as a growout pond in 2010 &amp; 2011. Restoration of this "Hot Spot Complex" on hold pending completion of new Horsethief ponds. New Horsethief ponds are complete, but Service no longer recommends reconnecting gravel pits due to nonnative fish concerns.</p>	

Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
b). Jarvis.	None	Construction complete; operation ongoing. Program removed sediment build-up at the Jarvis pond inlet/outlet structure in 2012 (same as work performed in 2010 and 2003).	12
c). Adobe Creek.	IIA2	Construction for the research study complete, but no funding available through NIWQP to complete selenium remediation. The need to pursue restoration of this site for razorback sucker recovery should be revisited. Dikes placed for research study in tertiary channel should be removed.	13
d). Walter Walker.	IIA3	Construction complete; operation ongoing. More levee was removed in 2004. Habitat enhancements at the Audubon and Walter Walker sites were evaluated over a range of flows during 2006 spring runoff and performed well (i.e., as per design and construction). CDOW actively managing WW and encouraging waterfowl hunting there.	13
e). Land acquisition and levee removal.	IIA4&IIA5	PBO estimate of acquiring interest in up to 3,500 acres in the Grand Valley and along the Gunnison was quite high based on landowner response. Restoration more expensive than anticipated; few landowners were willing to participate. Program acquired 592 acres of floodplain/wetland habitat in the upper Colorado River subbasin (393.5 acres along the Colorado River and 198.2 acres along the Gunnison River), and is working to best manage the floodplain currently available. Restoration completed at Butch Craig property & Escalante SWA on the Gunnison, and the Audubon property on the Colorado. Until it is determined that there is enough habitat to support a self-sustaining population of razorback sucker in the upper Colorado River subbasin, Program participants will continue to consider using additional Federal, State, and other parcels for this purpose; however Service no longer recommends reconnecting gravel pits upon completion of operation due to nonnative fish concerns. Service and Program coordinated with landowner at Soaring Eagle Gravel Pit to determine best method for reconnection (at landowner's cost, per biological opinion) in light of potential nonnative fish invasion. Grand Junction Pipe site (Program property) was reclaimed (rotenone) in March 2012 prior to levee breaching (construction completed by private industry as per project Section 7 consultation).	13
<b>Fish Passageways</b>			
a). PBO states passage to be completed at Price-Stubbs in 2000 (or 2002 if dam removal alternative selected).	Colorado: IIB2a3&4	Completed in April 2008. Passive PIT-tag monitoring station installed in 2010. 2011 high-flow damage repaired in 2012.	13
b). GVIC fish passage.	Colorado: IIB1a3&4	Completed in 1998, and operated annually. Obermeyer gate installed in 2006; and raised when flows are low (operated intermittently [due to low flows] in 2012).	13

Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
c). Grand Valley Project (Government Highline) fish passage.	Colorado: IIB3a3	Completed in 2004 (construction was delayed due to regulatory and landowner issues and overall budget/construction priorities). Trial operations conducted in 2005 & 2006 and continued in 2006. Full operation began in 2008 (with completion of Price-Stubbs passage). In 2011, three humpback chub and 22 bonytail were collected in the passage. To date, 2 razorback sucker, 6 humpback chub, and 22 bonytail used the fishway. 8,870 fish were processed in 2011. To date, 67,071 fish have used this fish passage 2005-2006 and 2008-2011. Flannelmouth sucker and bluehead sucker comprised 33 % and 25% of the all fishes in the fish trap and white sucker and brown trout comprised 16% and 2%. Native fishes comprised 86% of the total fish during 2011, compared to 89% in 2010, 91% in 2009, and 90% in 2008. Passage could not be operated in 2012 due to low flows.	13
<b>Native Fish Stocking Element</b>		See also "Stocking" worksheet	
Raising native fish in hatcheries and grow out ponds, and stocking them in the riverine habitat.	Colorado: IVA3, IVA4, IVA5	Ongoing. The integrated stocking plan for the Upper Colorado River Basin was completed in March 2003. Annual stocking targets for subadults in the upper Colorado River subbasin are being met. Under the 2003 integrated upper basin stocking plan (Nesler et al. 2003), 5,074 hatchery-produced subadult Colorado pikeminnow were stocked in 2003 and 2004 in unoccupied reaches above diversions.	14
<b>Nonnative Fish Control Element</b>			
<b>Regulations and Agreements</b>			
a). 1996 Nonnative Stocking Procedures.	General: IIIB3	Complete; revised in 2009.	15
b). 1999 Restriction of stocking of private ponds in Colorado.	General: IIIB4	Complete; report on evaluation of Colorado's nonnative fish stocking regulations completed in July 2004.	15
c). Bag limits removed for nonnative warm-water sportfishes in critical habitat in Colorado.	Colorado: IIIB2	Complete.	15
d). Close river reaches to angling where and when angling mortality determined to be significant to native fish.	General: IIIA2d	CDOW agreed to do when and where necessary (to date, not deemed necessary).	15
e). CDOW Colorado River fisheries management plan.	Colorado: IIIB4	Plan completed in 2005.	16
<b>Removal Efforts</b>			
a). Pond Reclamation.	Colorado: IIIA2	Pond reclamation accomplished, but proved ineffective. Research initiated to document sources of nonnative fish so Program can determine if they can be controlled at the source. Final report completed February 2004.	15
b). Removal of nonnative fishes from back waters.	Colorado: IIIA3	Pilot program to remove small cyprinids and centrarchids complete; techniques and level of effort produced some short-term depletions, but provided no solutions to long-term control. Final reports completed in 2002 and 2003. Preliminary results of research on sources of nonnative fish (which may provide another avenue of control) indicate most younger centrarchids (age-0 to age-3) were produced in main channel habitats, as opposed to having escaped from floodplain ponds. However, almost 50% of age-4+ centrarchids escaped from ponds, likely during years when higher flows connected the ponds with the river. CSU investigations have resulted in otolith markers for water chemistry for reservoirs throughout the basin. Final report was delayed by PI illness, but anticipated in mid-2013.	16

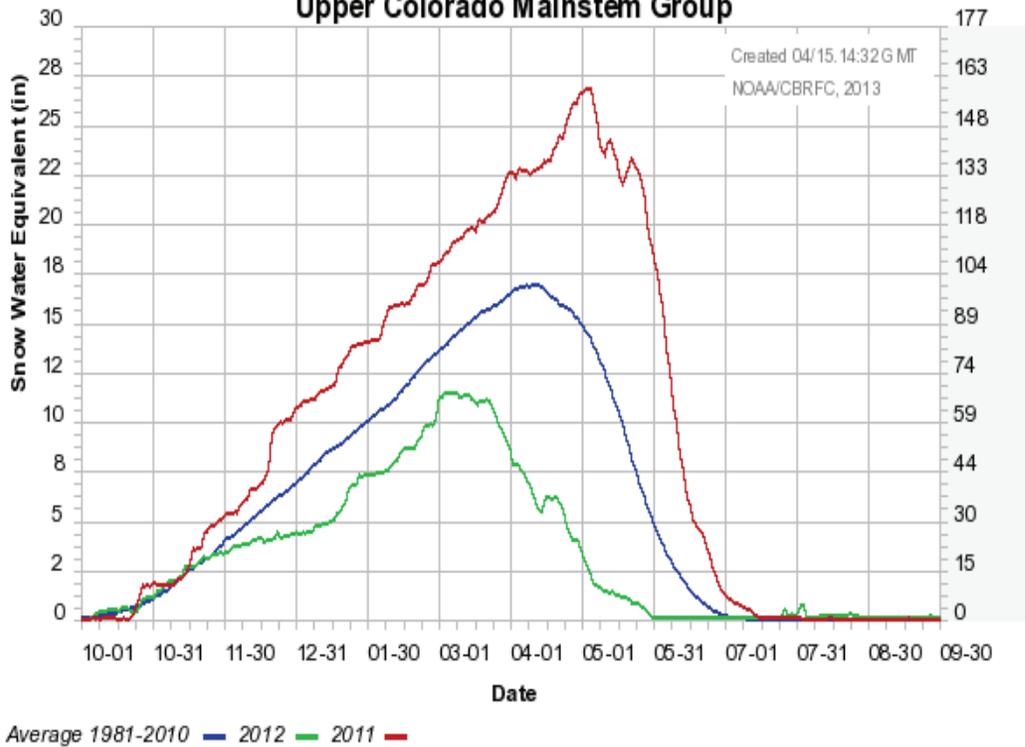
Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
c). Management of nonnative fish populations	Colorado: IIIA5&6	<p>Management of bass and other centrarchids in the Colorado River ongoing since 2004; management of channel catfish on hold pending development of effective management techniques. Centrarchid removal efforts were increased beginning in 2007; Smallmouth bass catch rates have been dropping since 2005; however catch rates for other centrarchids, including largemouth bass, have increased. Targeted control of smallmouth bass 2007 year-class continues. Adult smallmouth bass densities remained low in 2010; however capture of age-0 and age-1 smallmouth bass increased about tenfold. Largemouth bass reproduction remains a concern, but so far, these fish do not appear to be recruiting. In 2011 and 2012, effort focused on smallmouth bass concentration areas in the 15- and 18-Mile reaches. In 2013, additional passes will be devoted in the reach of the upper Colorado River from Silt to Beavertail to remove invading northern pike, focusing on backwaters and floodplain ponds. CPW will continue reconnaissance in floodplain and canal habitats to identify potential sources of this species.. Highline Lake spillway barrier net will be replaced in 2013. Screen will be constructed on Rifle Gap Reservoir in 2013 and fish escapement past the screen will be evaluated for a period five years (per biological opinion). The Service and the Program promote the use of sterile hybrid sportfish in the future. CDOW removed harvest limits on smallmouth bass in Highline Reservoir in 2011 (and in several other areas). In 2012, Colorado: 1) adopted regulatory a change to allow unlimited take and possession of any species on the prohibited list (e.g. burbot) provided they are immediately killed; 2) changed Master Angler Award program criteria to recognize qualifying lengths for northern pike and smallmouth bass caught in waters west of the Continental Divide in the "Kept Fish" category only; 3) adopted regulation changes to implement the 2009 Stocking Procedures as they pertain to stocking of nonsalmonid fishes in the UCRB in Colorado west of the Continental Divide, including the San Juan River basin; and 4) added language to annual fishing regulations brochure calling attention to the problem of and penalties for illegal stocking and encouraging reporting illegal stocking via Operation Game Thief. CPW adopted regulation changes in January 2013 to implement the 2009 Stocking Procedures as they pertain to stocking of nonsalmonid fishes in the UCRB in Colorado west of the Continental Divide</p>	16
Research, Monitoring, and Data Management Element			

Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
<p>a). Population estimates will be used to determine if Recovery Actions result in a positive population response.</p>	<p>Colorado: VB; VB3</p>	<p>The downlisting demographic criteria for Colorado pikeminnow in the Upper Colorado River Subbasin is a self-sustaining population of at least 700 adults maintained over a 5-year period, with a trend in adult point estimates that does not decline significantly. Secondly, recruitment of age-6 (400–449 mm TL; Figure 2), naturally-produced fish must equal or exceed mean adult annual mortality (estimated to be about 20%). To maintain an adult population of 700 would require an average 140 age-6 fish recruiting to the adult life stage annually. The averages of adult and recruitment-age estimates are 644 and 103 respectively. Trends in adults are stable, but recruits are negative, especially in the last 3 years of sampling; this population appears stable but may in fact be declining as a lack of due to recent poor recruitment. Black Rocks and Westwater Canyon have enough humpback chub that move between the two that they are considered a core population. Black Rocks estimates have varied from about 800 in 1998, 900 in 1999, and 500 in 2000 and 2003 (Figure 5). The most recent estimates, in 2007–2008 were 345 and 287, respectively. During the fall of 2011, 78 individual adult humpback chub were caught in Black Rocks which is similar to the numbers caught in 2007 and 2008 (61 and 74, respectively). The Westwater Canyon estimates of wild adults range from about 4,700 in 1998 to 2,500 in 1999, 2000, and 2003. The 2007–2008 estimates were about 1,750 and 1,300. In 2008, this core population (Black Rock / Westwater combined) dropped below the population size downlist criterion (MVP = 2,100 adults) for the first time. In 2011, we saw some recovery in those populations where the estimate for adults in Westwater Canyon alone was 2,157. Population estimates in both Black Rocks and Westwater canyons declined dramatically during the first population estimation rotation in the late 1990s, but have remained relatively stable since that time. Stocking of razorback sucker and bonytail continues. Razorback sucker stocked in the Green and Colorado rivers have been recaptured in reproductive condition and often in spawning groups. Captures of larvae in the Green, Gunnison, and Colorado rivers document reproduction. Survival of larvae through their first year remains rare, but occurs as evidenced by occasional captures of juveniles (just over age-1) in the Green and Gunnison rivers. Increasing numbers of stocked bonytail have been detected where stationary tag-reading antennas are used.</p>	<p>16</p>
<p>b). Recovery goal development. If population meets or exceeds recovery or Apx. D goals, it will be considered to exhibit a positive population response.</p>	<p>General: VIIA5d</p>	<p>Recovery goals complete. Revision underway.</p>	<p>16-17</p>
<p>Long-term Funding and Annual Appropriations.</p>	<p>General: VIIB</p>	<p>Complete and ongoing.</p>	<p>17</p>
<p><b>Recovery Agreements</b></p>			
<p>a). With consultations.</p>	<p>N/A</p>	<p>Ongoing</p>	<p>18</p>
<p>b). By water users controlling a majority of existing depletions above the Gunnison River.</p>	<p>N/A</p>	<p>Complete</p>	<p>18</p>
<p>Depletion Charges on New Depletions</p>	<p>N/A</p>	<p>Ongoing</p>	<p>19</p>
<p><b>Incidental Take</b></p>			
<p>a). Develop plan to monitor incidental take of endangered fish in diversion structures.</p>	<p>Colorado: VB4a</p>	<p>“Plan” complete in that fish are retrieved from canals whenever canal screens cannot be fully operated. 3/32” mesh screens on Grand Valley Project, and GVIC diversion dams prevent entrainment of adult, subadult, and juvenile fish (preventing entrainment of adult and subadult fish required is by recovery goals).</p>	<p>71</p>

Recovery Actions in 15-Mile Reach PBO	RIPRAP Item #	Status	PBO Page #
b). Estimate amount of incidental take of young razorback and pikeminnow in the 15-Mile Reach.	Colorado: VB4b	Service believes screening of diversion structures has resolved entrainment issues; anytime screens are not fully operationed, the Service conducts fall sampling in the canals to retrieve any endangered fish.	71
<b>Fish Screens (Reasonable &amp; Prudent Measures)</b>			
a). GVIC.	Colorado: IIB1b	Complete. Screen operated 125 days (59%); off 86 days (41%) in 2011. Due to low flows, screens were off 68% and on 32% of the time in the 2012 season. In 2012, GVIC cleared the cobble bar that had formed and was obstructing the fish return. Some retrofits under consideration. Evaluation of condition of surrogate	71
b). Grand Valley Project Gov't Highline.	Colorado: IIB3b	Complete. Screen operated through most of season in 2011. Screen operated when conditions allowed in 2012; accumulated sediment removed.	71
<b>Reinitiation</b>			
a). Review RIPRAP implementation.	Colorado: IA6	This is it (begun in 2003 and done every 2 years thereafter).	p.74, c.

Please scroll down and right to see all five graphs on this tab.

### Colorado Basin River Forecast Center Upper Colorado Mainstem Group

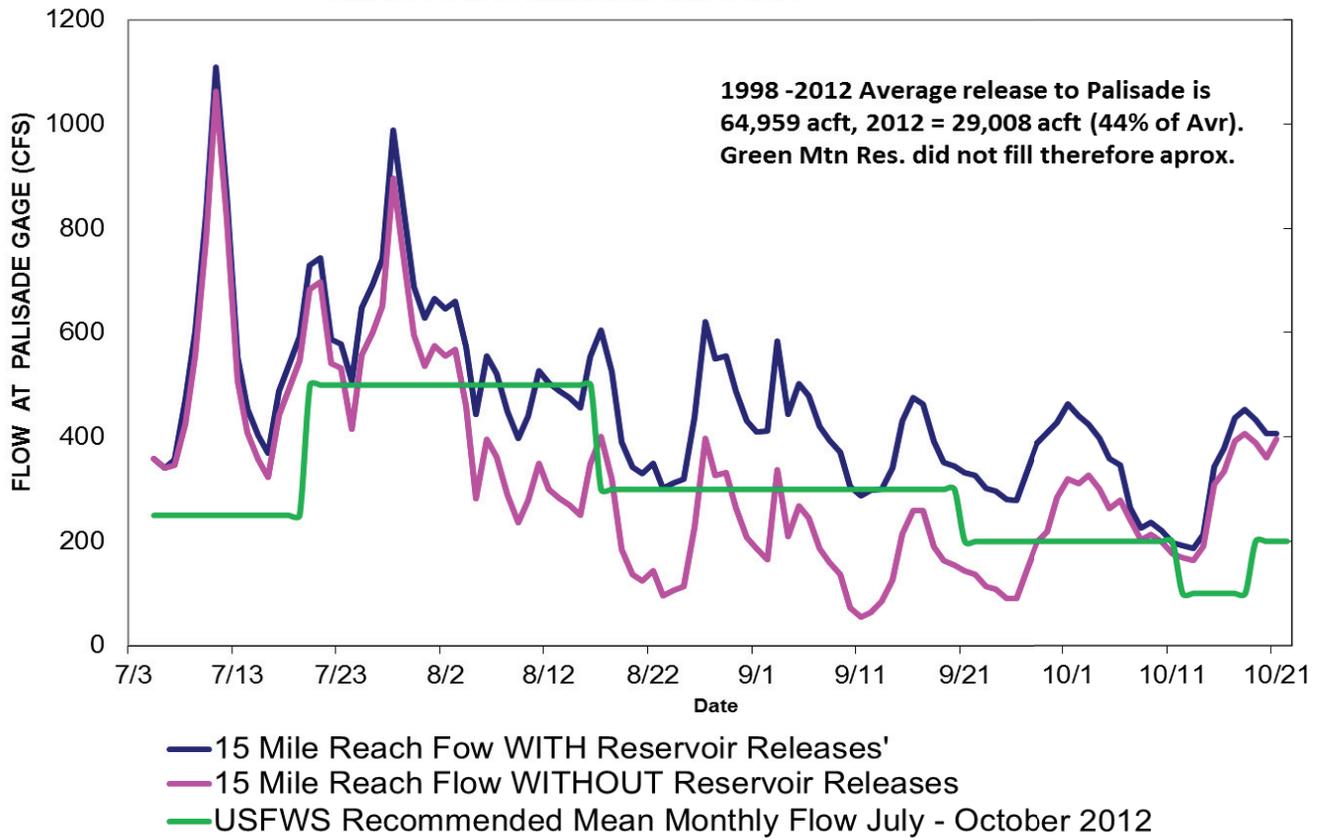


Snowpack in 2011 and 2012 were at opposite ends of the spectrum to average. With 2012's low snowpack there was no coordinated peak release from the Upper CO Reservoirs.

### FWS Peak Flow Recommendations for the Colorado River at Grand Junction

<b>23,500 cfs</b>	<b>(5 in 20 Years)</b>
<b>21,750 cfs</b>	<b>(5 in 20 Years)</b>
<b>16,700 cfs</b>	<b>(6 in 20 Years)</b>
<b>12,900 cfs</b>	<b>(4 in 20 Years)</b>
<b>CROS History (flood = 25,400 cfs)</b>	<b>4 in 20 years target met (Peaks Above 23,500 cfs)</b>
<b>6/6/1997</b>	<b>28,400 cfs</b>
<b>6/4/2008</b>	<b>25,000 cfs</b>
<b>6/9/2010</b>	<b>24,300 cfs</b>
<b>6/9/2011</b>	<b>29,000 cfs</b>

# 15-MILE REACH RESERVOIR RELEASES (Measured at the Palisade Gage) 2012 LATE SUMMER/FALL



**Coordinated Reservoir Operations**

**Peak Flows (ac-ft)**

	1997	1998	1999	2006	2008	2009	2010	2011	2012
Granby			8,515					0	0
Green Mtn	3,568	12,482	11,010	6,788	2,101	14,113	34,666	0	0
Ruedi	693	5,106	3,602	6,297	4,848	5,858	10,050	0	0
Williams Fork	946	1,672	1,543	6,625		5,044	19,982	0	0
Willow Creek			6,631			2,638		0	0
Windy Gap						2,061		0	0
Wolford Mtn	10,635	4,431	8,555	9,007		13,069	9,273	0	0
<b>Total Ac-Ft</b>	<b>15,842</b>	<b>23,691</b>	<b>39,856</b>	<b>28,717</b>	<b>6,949</b>	<b>42,783</b>	<b>73,971</b>	<b>0</b>	<b>0</b>

ac-ft  
 Total 231,809  
 Average 25,757

**Base Flows (ac-ft) for the 15-Mile Reach**

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Granby		24,223										2,574	4,602			Granby
Green Mtn	28,562	32,008	42,468	31,118	0	42,774	107	28,080	22,822	29,470	55,290	50,661	52,032	31,880		Green Mtn
Palisade Bypass					2,235	6,609	7,043	10,076	0	8,944	12,000	11,905	13,760	20,466	14,616	Palisade Bypass
Ruedi	18,722	18,376	17,158	19,210	9,877	18,901	14,782	15,876	18,204	13,203	18,892	19,261	19,263	14,107	19,051	Ruedi
Williams Fork		1,642	3,472	4,832	3,381	3,381	2,410	3,433	4,871	2,155	9,340	4,870	4,872	4,871	4,871	Williams Fork
Willow Creek		584														Willow Creek
Windy Gap											764		893			Windy Gap
Wolford Mtn	10,364	4,445	9,965	7,719	277	257		900	9,580	6,155	9,389	7,873	7,572	7,572	5,079	Wolford Mtn
<b>Total Ac-Ft</b>	<b>57,648</b>	<b>81,278</b>	<b>73,063</b>	<b>62,879</b>	<b>15,770</b>	<b>71,922</b>	<b>24,342</b>	<b>58,365</b>	<b>55,477</b>	<b>59,927</b>	<b>105,674</b>	<b>97,143</b>	<b>102,994</b>	<b>78,896</b>	<b>43,617</b>	<b>Total Ac-Ft</b>

Total = 988,995 acft  
 Average 65,933 acft  
 thru 2012

Total for program combined CROS & Base Flows = 1,220,805 acft

**GRAND VALLEY WATER MANAGEMENT PROJECT RESULTS**

	1998 1/ Acre-Feet	Water Year												Average Acre-Feet
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012		
Irrigation Diversion	285,217	240,424	252,289	256,289	249,318	277,994	245,927	249,223	206,105	261,216	295,587	267,776	254,741	
Reduced Diversion as Compared to 1998 (Pre-Project)	0	44,793	32,928	28,928	35,899	7,223	39,290	35,994	79,112	24,001	-10,370	17,441	30,476	
Palisade Pipeline	0	2,053	10,161	13,654	19,143	10,812	10,625	15,997	18,302	20,617	20,466	14,616	14,222	
<b>Total Potential Benefit to 15-Mile Reach Flows</b>	<b>0</b>	<b>46,846</b>	<b>43,089</b>	<b>42,582</b>	<b>55,042</b>	<b>18,035</b>	<b>49,915</b>	<b>51,991</b>	<b>97,414</b>	<b>44,618</b>	<b>10,096</b>	<b>32,057</b>	<b>44,699</b>	
<b>HUP Surplus Water Deliveries to the 15 Mile Re</b>	<b>NA</b>	<b>0</b>	<b>47,525</b>	<b>0</b>	<b>31,200</b>	<b>22,822</b>	<b>32,743</b>	<b>61,433</b>	<b>56,290</b>	<b>61,002</b>	<b>37,132</b>	<b>0</b>	<b>31,832</b>	

1/ The 1998 water year was chosen to represent preproject baseline conditions as all Salinity Control Program improvements were in place and a full water supply was available to the Grand Valley Water Users Association.

**Fish produced and stocked by facility in 2012**

<u>Facility</u>	<u>Species</u>	<u>Target</u>	<u>Stocked</u>	<u>Percent</u>
Grand Valley	Razorback sucker	14,895	15,722	106%
Ouray	Razorback sucker	14,895	16,168	109%
Wahweap	Bonytail	10,660	5,427	51%
Mumma	Bonytail	5,330	5,551	104%

**Razorback sucker stocked by river**

<u>Facility</u>	<u>River</u>	<u>Target</u>	<u>Stocked</u>	<u>Percent</u>
Grand Valley	Upper Colorado	6,620	6,951	105%
	Gunnison	3,310	3,555	107%

**Bonytail stocked by river**

<u>Facility</u>	<u>River</u>	<u>Target</u>	<u>Stocked</u>	<u>Percent</u>
Wahweap	Colorado	2,665	2,732	103%
Mumma	Colorado	2,665	2,720	102%

**Total Numbers of Fish Stocked in the Upper Colorado and Gunnison Rivers Since 1995****Razorback Sucker Stocking in the Upper Colorado and Gunnison Rivers**

<b>Year</b>	<b>Stocking Goal</b>	<b># Stocked</b>	<b>% Target</b>
1995	Upper Colorado River experimental stocking plan (13,100 in various size ranges)	316	2.4%
1996	13,100 in various size ranges	1,112	8.5%
1997	13,100 in various size ranges	2,926	22.3%
1998	26,200 in various size ranges	606	2.3%
1999	58,600 in various size ranges	6,155	10.5%
2000	104,800 in various size ranges	29,826	28.5%
2001	104,800 in various size ranges	6,199	5.9%
2002	State Stocking Plans (CO = 16,440 300+ mm; UT = 18,500 >300 mm)	11,374	69.2%
2003	Integrated Stocking Plan (9,930 per reach)	5,541	55.8%
2004	Integrated Stocking Plan (9,930 per reach)	6,153	62.0%
2005	Integrated Stocking Plan (9,930 per reach)	10,284	103.6%
2006	Integrated Stocking Plan (9,930 per reach)	10,726	108.0%
2007	Integrated Stocking Plan (9,930 per reach)	10,064	101.3%
2008	Integrated Stocking Plan (9,930 per reach)	12,949	130.4%
2009	Integrated Stocking Plan (9,930 per reach)	17,975	181.0%
2010	Integrated Stocking Plan (9,930 per reach)	9,926	100.0%
2011	Integrated Stocking Plan (9,930 per reach)	12,019	121.0%
2012	Integrated Stocking Plan (9,930 per reach)	10,506	105.8%

**164,657**

<b>Bonytail Stocking in the Upper Colorado and Gunnison Rivers*</b>			
<b>Year</b>	<b>Stocking Goal</b>	<b># Stocked</b>	<b>% Target</b>
2000	State Stocking Plans (CO = 12,000 200+ mm; UT = 16,280 $\mu$ =200 mm)	36,274	223%
2001	State Stocking Plans (CO = 12,000 200+ mm; UT = 16,280 $\mu$ =200 mm)	37,968	233%
2002	State Stocking Plans (CO = 12,000 200+ mm; UT = 16,280 $\mu$ =200 mm)	16,464	101%
2003	Integrated Stocking Plan (5,330 200+ mm per reach)	6,303	118%
2004	Integrated Stocking Plan (5,330 200+ mm per reach)	3,985	75%
2005	Integrated Stocking Plan (5,330 200+ mm per reach)	6,067	114%
2006	Integrated Stocking Plan (5,330 200+ mm per reach)	5,554	104%
2007	Integrated Stocking Plan (5,330 200+ mm per reach)	5,570	105%
2008	Integrated Stocking Plan (5,330 200+ mm per reach)	5,896	111%
2009	Integrated Stocking Plan (5,330 200+ mm per reach)	5,085	95%
2010	Integrated Stocking Plan (5,330 200+ mm per reach)	2,450	46%
2011	Integrated Stocking Plan (5,330 200+ mm per reach)	5,454	102%
2012	Integrated Stocking Plan (5,330 200+ mm per reach)	5,452	102%
		<b>142,522</b>	
* Some bonytail may have been stocked prior to 2000, but these numbers not yet included.			

**Colorado pikeminnow Stocking in the Upper Colorado River Basin**

Year	Stocking Goal	Colorado River		Gunnison River	
		# Stocked	% Target	# Stocked	% Target
2003	Integrated Stocking Plan (1,125 150+ mm per reach)	2,405	214%	1,051	93%
2004	Integrated Stocking Plan (1,125 150+ mm per reach)	1,809	161%	1,200	107%
		<b>4,214</b>		<b>2,251</b>	<b>6,465</b>

**FINAL**

**2013 Gunnison PBO Review of Action Items Status**

In the December 4, 2009, final Gunnison River Basin Programmatic Biological Opinion (PBO), the Service determined that the proposed reoperation of the Aspinall Unit, the proposed Selenium Management Program, and the remaining Recovery Action Plan items are sufficient to avoid the likelihood of jeopardy and/or adverse modification of critical habitat for depletion impacts for existing depletions (estimated average annual 602,700 af/year) and future depletions (37,900 af/year), as defined in the proposed action. Page 83 of the PBO says: "Every 2 years, for the life of the Recovery Program, the Service and Recovery Program will review implementation of the Recovery Action Plan actions that are included in this biological opinion to determine timely compliance with applicable schedules." A review of action items from the PBO follows below, with status updates in italics.

TERMS AND CONDITIONS (From pages 80 – 81 of PBO)

1. Reclamation will work through the Recovery Program technical committees to develop a Study Plan to evaluate the effects of the proposed operations of the Aspinall Unit and how it improves habitat and thereby contributes to recovery. The Study Plan should be completed within one year of the finalization of this biological opinion and should focus on previously identified uncertainties related to geomorphic processes, floodplain inundation, and temperatures (see Uncertainties section). The Study Plan should also include an evaluation of the effects of reoperation on critical habitat in the Colorado River from the Gunnison River confluence to Lake Powell.

*Study plan completed in May 2011; implementation in progress with fish community monitoring begun in FY11. Evaluation of effects of reoperation on critical habitat in the Colorado River from the Gunnison River confluence to Lake Powell will occur after the flow recommendations in the upper reaches have been evaluated.*

2. Reclamation will provide to the Service and Recovery Program a concise annual operations report by December 31 of each year. The primary purpose of the annual report is to provide an assessment of how well operations of the Aspinall Unit contributed to meeting target flows in the Gunnison and Colorado Rivers. The report should include information on the planned operations based on the forecast and the actual operations; flows provided at Whitewater and below the Redlands; the Colorado River at the Colorado/Utah state line and at the Cisco gage; and any operational issues (spillway inspections, etc.).

*Annual operations reports provided. 2012 report addressed peak flows, half bank and peak flow duration, base flows, flow differences between the Gunnison River at Whitewater and the Gunnison River below the Redlands Diversion Dam, flows at the Colorado/Utah Stateline, and operational issues (none). Releases from Crystal Dam were increased and decreased throughout the 2012 water year for the purpose of maintaining the changing target base flows at the Whitewater gage. In addition, releases were adjusted to match increased or decreased flows through the Gunnison Tunnel in efforts to conserve water. On June 30, 2012, releases were*

*made to satisfy the Black Canyon one-day peak flow water right. Peak flows called for in the EIS were met in 2012 and base flows were met to a very high degree. Due to the dryness of the year there were no duration day targets to be met. The consistent success of meeting base flows throughout 2012 while still meeting the authorized purposes of the Aspinall Unit clearly shows the successful implementation of the EIS. See Attachment 1.*

3. Eight months after the final PBO is issued Reclamation will complete a MOA or similar mechanism, with appropriate parties, to develop the Selenium Management Program.

4. Six months after the final PBO is issued, and every 6 months thereafter, Reclamation will provide an update to the Service on the status of the development of Selenium Management Program.

5. Eighteen months after the final PBO is issued, Reclamation will provide the draft Selenium Management Program document, and a final document with associated agreements with key cooperators to the Service within 24 months.

*Selenium Program Formulation Document was developed by the Selenium Management Program (SMP) Workgroup and finalized in December 2011*

6. Implementation of the initial components of the SMP not already underway will begin within 5 years of issuance of this opinion.

*SMP implementation begun in January 2012. The SMP continued to implement Off-farm and On-farm improvements in 2012 (e.g., funding, planning and construction in various stages for ~55 miles of existing irrigation laterals in the Uncompahgre and North Fork valleys). NRCS continued to fund on-farm projects that reduce salinity and selenium (on ~3,350 acres in 2012). An optimization study for the Uncompahgre Project and a comprehensive study to improve participation in the Colorado River Salinity Control Program in the Lower Gunnison Basin were also initiated in 2012.*

7. Reclamation will provide annual water quality summary reports to the Service by December 31 of each year.

*“Selenium Management Program Gunnison River Basin, Colorado Annual Progress Report 2012” Prepared by Selenium Management Program Workgroup, Compiled by Bureau of Reclamation*

8. Reclamation will provide a report on biological monitoring (including fish monitoring in the Gunnison and Colorado Rivers) to the Service by December 31 in years when monitoring is conducted.

*“Selenium Management Program Gunnison River Basin, Colorado Annual Progress Report 2012 also summarized biological and water quality data collected during the previous fiscal year (Oct. 2010 through Sept. 2011).*

## CONSERVATION RECOMMENDATIONS (From pages 81 – 82 of PBO)

### Dolores River

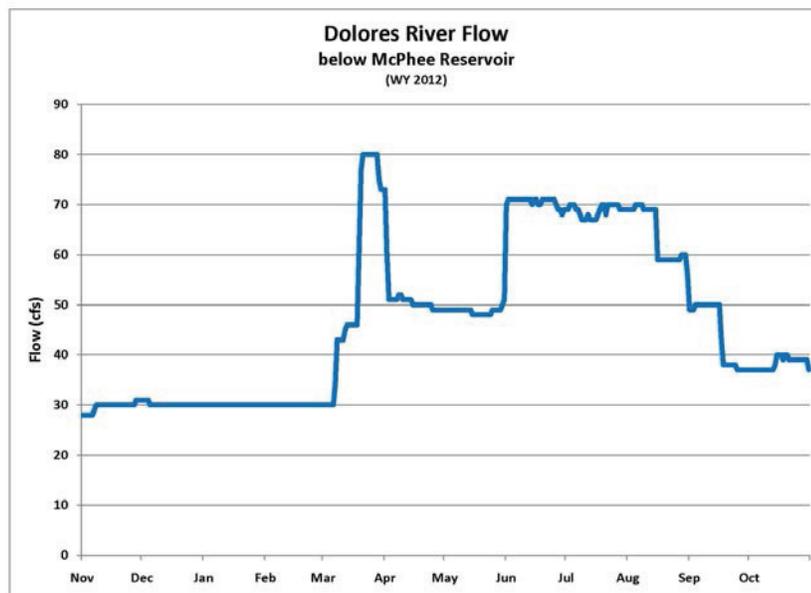
1. The Service recommends that Reclamation continue support efforts of the three species conservation strategy (UDWR 2006) on a range-wide basis, including conservation efforts on the Dolores River.

*The Bureau of Reclamation has been an active participant of the Dolores River Dialogue since its inception in 2004, and is currently active in the Implementation Team efforts to manage downstream releases to the lower Dolores River (from McPhee Dam to the confluence of the San Juan Miguel River) for the Native fishes and rafting. Reclamation has: set up a pit-tag array upstream of Disappointment Creek to monitor the movement of native fishes in the Dolores River, established early water temperature suppression criteria to prevent premature spawning before a large controlled release from McPhee Dam, developed release ramping criteria that will perform sediment movement and channel maintenance while achieving boater goals for rafting.*

2. The Service recommends that Reclamation continue to work with the Dolores Project Biology Committee to consider spill and flow management options to benefit the native fishery in the middle and lower Dolores River while continuing to honor commitments related to downstream rafting.

*The Biology committee was setup as an advisory committee for fishery pool management only. Reclamation and the Dolores Water Conservancy District are actively involved with the DRD and IT in performing spill management.*

*Reclamation takes an active role with the Biology Committee in identifying base needs and possibilities. Annual base release budgets are agreed upon by all members.*



3. The Service recommends that Reclamation continue to take an active role in the Dolores River Dialogue, in particular activities related to native fish.

*A final "Way Forward" report presented nine potential management opportunities that may assist with the improvement of the native fish: spill management, base flow management, sediment transport flows, habitat maintenance flows, thermal regime modification, reducing the effects of introduced coldwater species, reducing the effects of introduced warm water species, and supplementing native fishes.*

*Upon completion of the A Way Forward final report, an Implementation Team (IT) consisting of water managers, NGOs, and State and Federal Agencies was formed to find ways to implement the nine recommendations. The IT, with financial assistance of the Colorado Water Conservation Board, has completed its first iteration of "The Lower Dolores River Implementation Monitoring and Evaluation Plan For Native Fish" dated August 2012. Public comments to the plan are being received and the second iteration will be issued in August 2013. An electronic version of this plan and appendices can be obtained from the Dolores River Dialogue website: <http://ocs.fortlewis.edu/drd/>*

#### Selenium

1. We recommend that the Recovery Program initiate investigations to determine appropriate levels of selenium to insure recovery of Colorado pikeminnow and razorback sucker. We recognize any new studies would follow established Recovery Program protocol for priority and funding.

*The Recovery Program has not funded any new selenium investigations, but does collect tissues from endangered fish / surrogate species as part of Gunnison River fish community monitoring. Muscle plugs were collected again in 2012 from endangered fish and surrogate species (evaluation funded outside of Program). Results from this selenium study will be used in the new Selenium Management Program (SMP) to determine baseline selenium concentrations and evaluate effectiveness of selenium remediation efforts.*

### Aspinall Unit Operations for Calendar Year 2012 under the Gunnison River PBO

In water year 2012, Western Colorado experienced an intense drought. With the Record of Decision for the Final Aspinall Unit Operations EIS that was signed on May 3, 2012, peak and base flow targets were established for the Whitewater gage near Grand Junction, Colorado to aid in the recovery of four endangered fish; the Humpback Chub, Bonytail Chub, Razorback Sucker, and the Pikeminnow. This report will assess how well the 2012 operations of the Aspinall Unit provided sufficient releases of water at critical times and quantities necessary to avoid unnecessary harm to the endangered fish species and their essential habitat while continuing to meet the authorized purposes of the Aspinall Unit.

**Peak Flows** As mentioned previously, 2012 was considered a dry year. Year type is determined by the forecasted April through July inflow volume to Blue Mesa Reservoir. Dry years are defined as years where the forecasted inflow volume is below 380,000 acre-feet. The April 1<sup>st</sup> issue of the runoff forecast predicted 330,000 acre-feet of inflow to Blue Mesa Reservoir. Forecasts after this date continued to drop, and the actual April through July inflow volume for 2012 totaled 206,000 acre-feet. The runoff forecast placed 2012 into a dry year category with a peak flow target of 900 cfs at the Whitewater gage.

### Peak Flow and Duration Day Targets at Whitewater

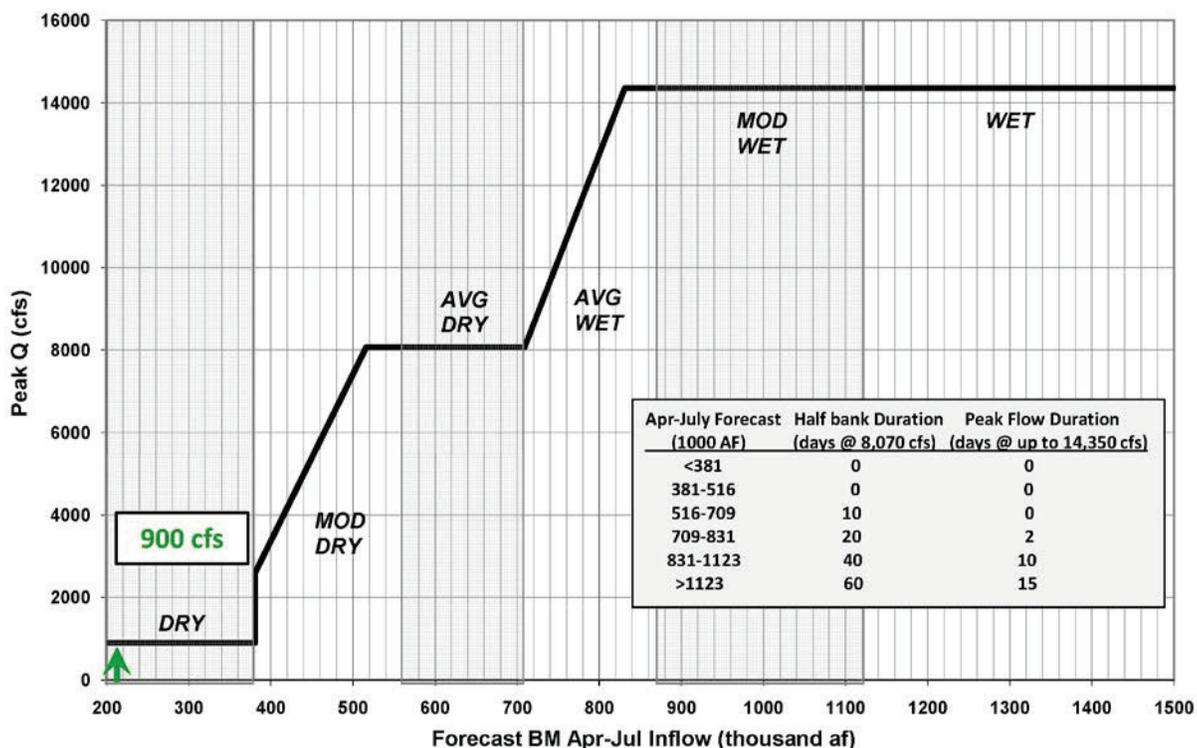


Figure 1. Peak flow and duration day targets at the Whitewater gage as determined by April-July Forecasted Inflow.

The 900 cfs peak target flow for 2012 was met without the need for supplementary releases from the Aspinall Unit.

Half Bank and Peak Flow Duration The number of duration days at half-bankfull flows and at the peak flow are also dependent on the forecasted inflow volume to Blue Mesa Reservoir. The table insert in Figure 1 shows the duration of days at peak flow and half bank capacity flows for ranges of forecasted inflow volume to Blue Mesa Reservoir. As with the peak flow target determination, low forecasts for runoff to Blue Mesa Reservoir put the duration targets in the dry category and removed the requirement to meet the half bank flow or peak flow for any duration.

Base Flows Base flow recommendations were determined by a study conducted by the Fish and Wildlife Service (Figure 2). Year type for base flow is also determined by the April-July forecasted inflow volume to Blue Mesa Reservoir, so 2012 followed the targets for a dry year. When a year is considered dry or moderately dry, additional releases are made in the spring and fall months to provide flows above the 750 cfs Redlands Water and Power Company water right in order to meet requirements for the fish ladder and screen. It is important to note the stipulation in the drought rules which states that if Blue Mesa Reservoir content drops below 600,000 af during a dry or moderately dry year, the Whitewater base flow target is reduced from 1050 cfs to 900 cfs until the reservoir content exceeds 600,000 af. In 2012, Blue Mesa Reservoir content was below 600,000 af for the entire year, so base flows during the June and July months were reduced to 900 cfs.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Wet</b>	1050	1050	1050	1050	1050	1500	1500	1500	1050	1050	1050	1050
<b>Mod Wet</b>	1050	1050	1050	1050	1050	1500	1500	1500	1050	1050	1050	1050
<b>Avg Wet</b>	1050	1050	1050	1050	1050	1500	1500	1050	1050	1050	1050	1050
<b>Avg Dry</b>	1050	1050	1050	1050	1050	1500	1500	1050	1050	1050	1050	1050
<b>Mod Dry*</b>	750	750	750/790	750/890	750/890	1050	1050	1050	750/890	750/790	750/790	750
<b>Dry*</b>	750	750	750/790	750/890	750/890	1050	1050	750/890	750/890	750/790	750/790	750

\*During March through November in Moderately Dry and Dry type years, additional releases will be made as necessary to provide flows above the 750 cfs anticipated to be diverted by the Redlands Water and Power Company, for the fish ladder and fish screen as shown.

Figure 2. Base flow recommendations to support critical flows and habitat for the endangered fish.

In 2012, flows dropped below the base flow targets for a total of 15 days. Most of the time flows below the baseflow target only lasted for a day or two. Flows were below the target for 8 days in December, but most of this occurred when the Redlands canal diversion was closed and flows below the dam were over 600 cfs. For comparison, during the similar drought year of 2002, flows were below the baseflow target levels for weeks at a time in the absence of the supplementary releases provided for in the EIS. Dry year 2002 would have had 102 days below base flow targets, had they been in place. This

shows a clear, overall success of implementing the plan stated in the Final Aspinall EIS. Figure 3 shows the actual flows recorded by the Whitewater gage compared to the corresponding target base flows for the same time. Actual flows were above the base flow targets for the majority of the year.

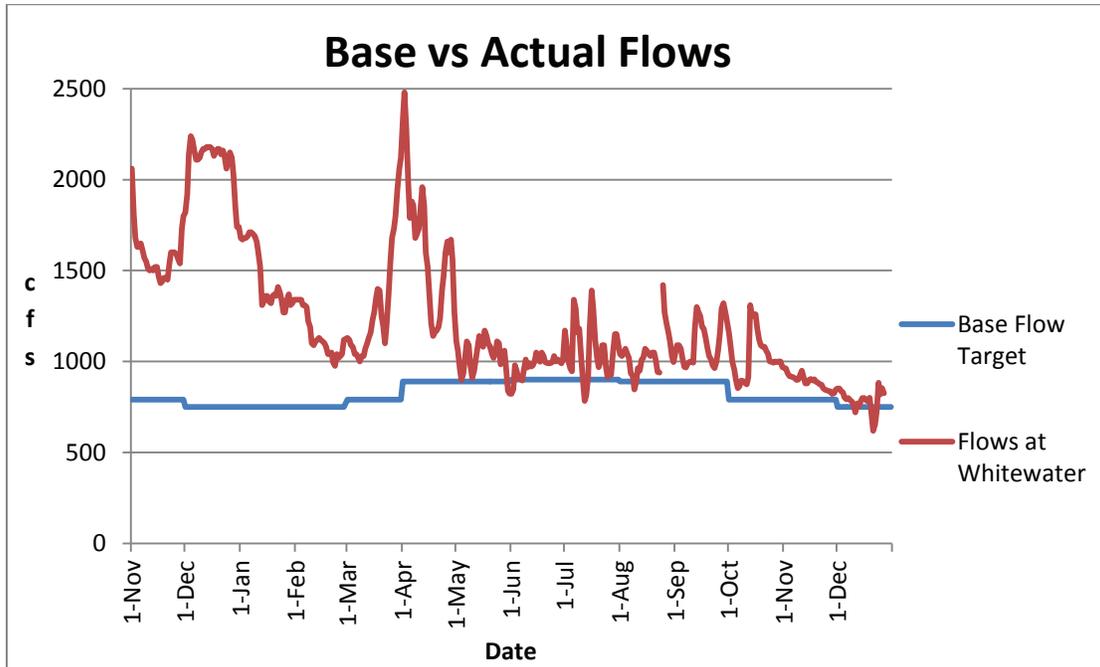


Figure 3. Nov. 2011 – Dec 2012 Base Flows vs. Actual Flows at Whitewater Gage.

Gunnison River Flow differences between the Gunnison River at Whitewater and the Gunnison River below the Redlands Diversion Dam remained consistent up to the Redlands Power Canal shutting down for maintenance at the start of November, which greatly increased the amount of water below the dam. In addition to Aspinall operation meetings, phone conferences comprised of interested parties were held on a weekly basis throughout the summer months to ensure the communication between entities concerned with the operations and flows in the immediate area. Even in this extremely dry year, these conferences helped make it possible to meet base flow demands and have an operational fish ladder, screen and canal through the driest months. Figure 4 shows the fluctuations in flow between the Gunnison River at the Whitewater gage and the Gunnison River below the Redlands Diversion Dam.

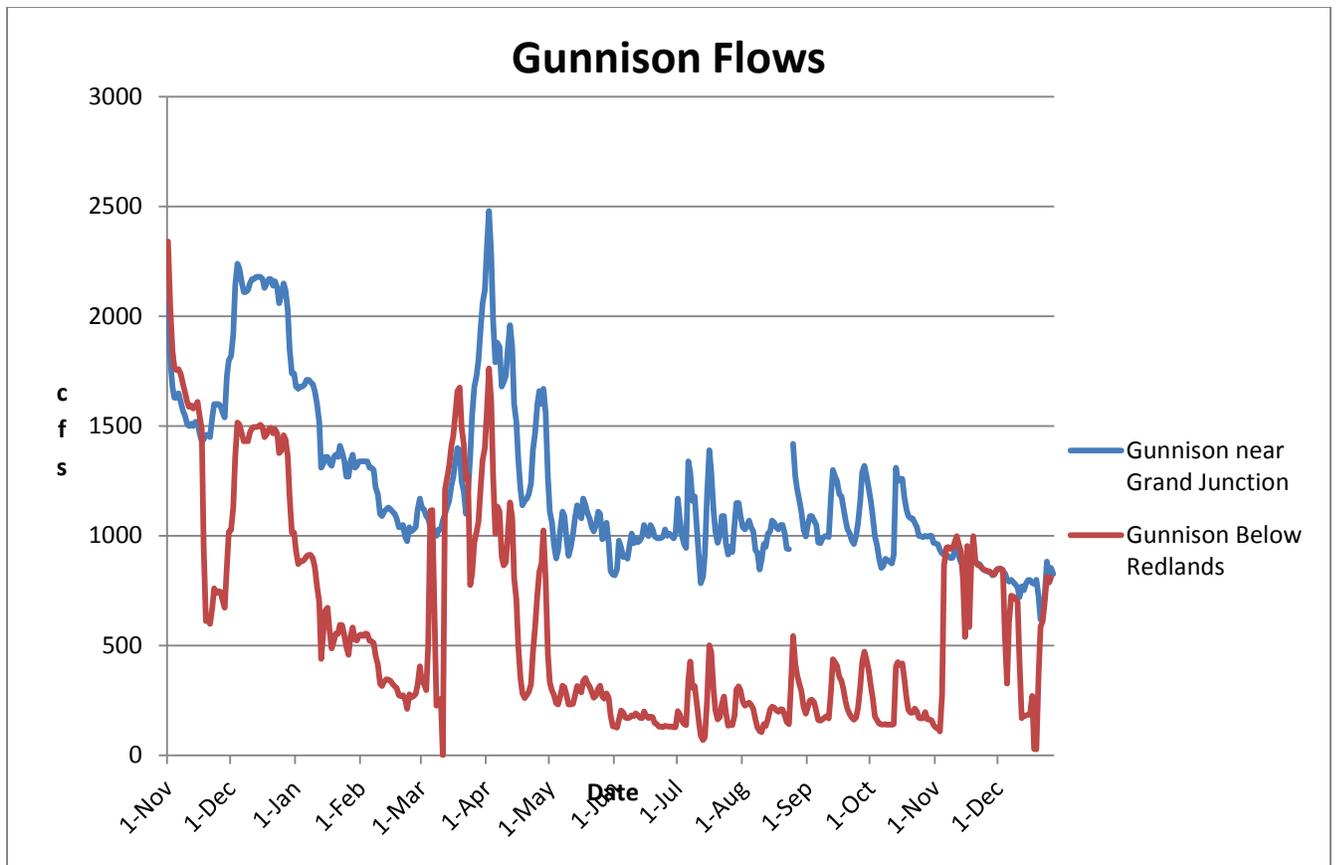


Figure 4. Gunnison River flows as measured at Whitewater and below the Redlands Diversion Dam.

Flows below the Redlands Diversion Dam were below 300 cfs a total of 201 days in 2012. For 181 of those days, Redlands Power Canal carried water in excess of 750 cfs. Figure 5 shows the flows in the Gunnison River below the Redlands Diversion Dam and flows in the Redlands Power Canal along with lines indicating the 300 cfs target flow for the Gunnison River below the dam and Redlands' 750 cfs water right.

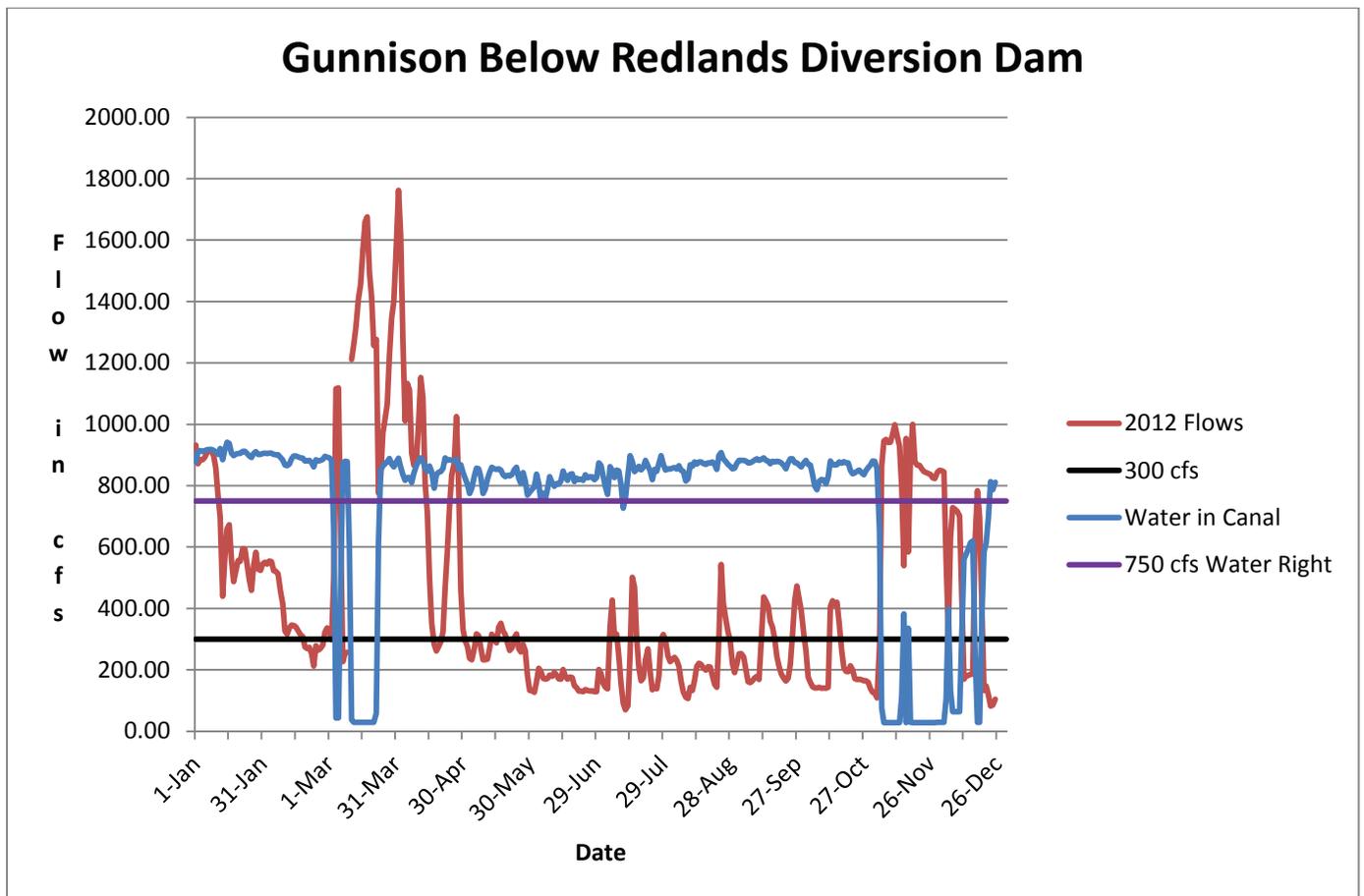


Figure 5. Gunnison River flows below Redlands Diversion Dam with target and Redlands Canal flows with water right.

Colorado River Flows at the Colorado/Utah Stateline closely matched the flows at the Cisco, UT gage. Flows tended to range between 5,000 cfs and 2,000 cfs for both gages, with the Cisco gage experiencing a 6,000 cfs peak at the beginning of April. Figure 6 shows the river flows at the Colorado/Utah Stateline gage and the Cisco, UT gage.

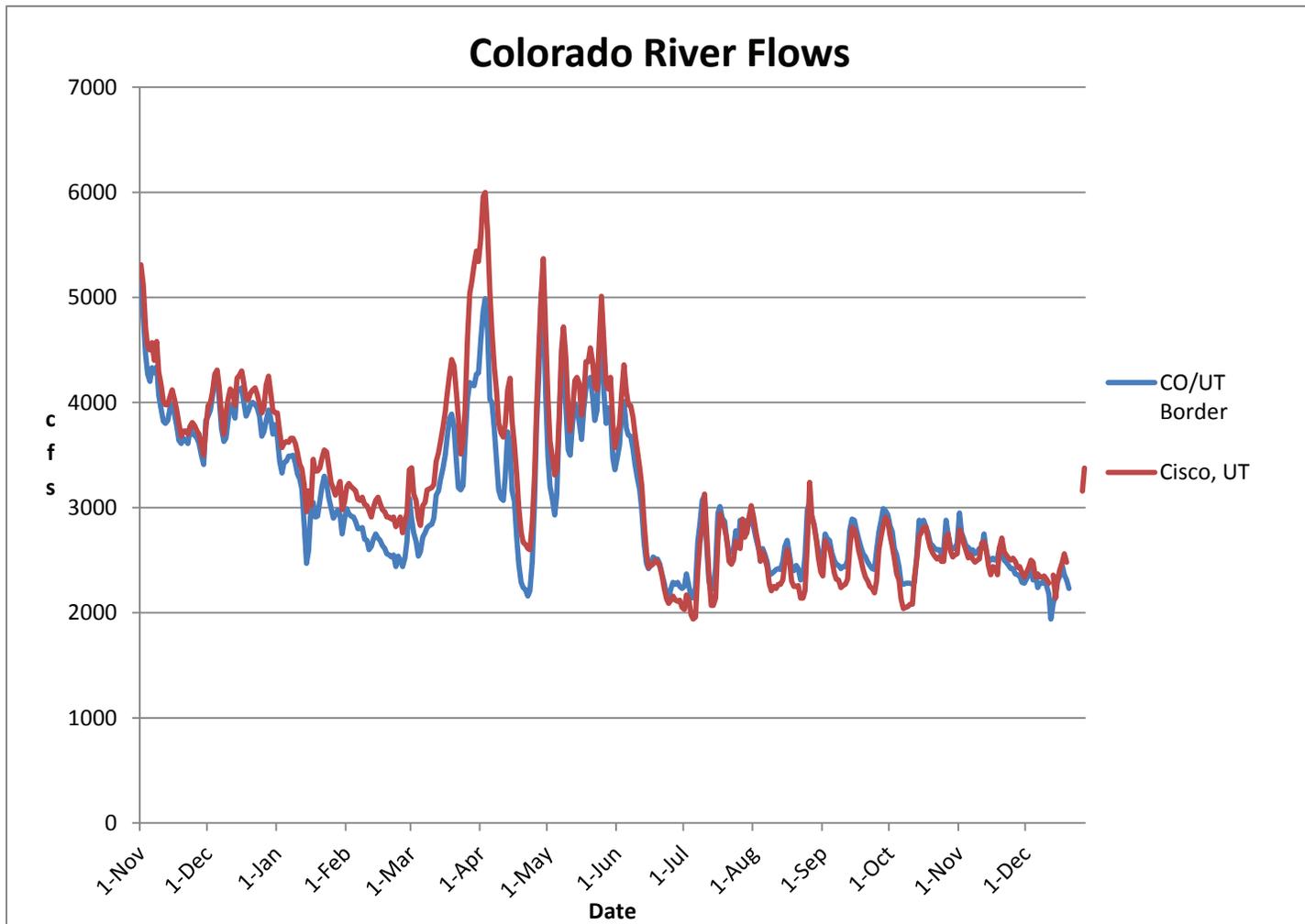


Figure 6. Colorado River flows at the Colorado/Utah Stateline gage and the Cisco, UT gage.

Operational Issues There were no operational issues that impeded flows from the Aspinall Unit to the Whitewater gage during the 2012 water year.

**Summary** Releases from Crystal Dam were increased and decreased throughout the year for the purpose of maintaining the changing target base flows at the Whitewater gage. In addition, releases were adjusted to match increased or decreased flows through the Gunnison Tunnel in efforts to conserve water. On June 30, releases were made to satisfy the Black Canyon one-day peak flow water right.

Peak flows called for in the EIS were met in 2012 and base flows were met to a very high degree. Due to the dryness of the year there were no duration day targets to be met. The consistent success of meeting base flows throughout 2012 while still meeting the authorized purposes of the Aspinall Unit clearly shows the successful implementation of the EIS.