



# 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

**September 10, 2014**

### Memorandum

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

From: Regional Director, Region 6 *Nancy E. Walsh*

Subject: 2013—2014 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 January 10, 2005, Final Programmatic Biological Opinion on the Management Plan for Endangered Fishes in the Yampa River Basin

#### **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 2013—2014 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 22, 2014, assessment of accomplishments and shortcomings of the Recovery Program under the Recovery Implementation Program Recovery Action Plan (RIPRAP) from February 1, 2013, through January 31, 2014, is incorporated in the tables to the RIPRAP found at on the Recovery Program's website (<http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-action-plan.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 September 20, 2013.

## 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 that would indicate when threats to the species would be ameliorated. A minimum viable population is identified for each species as a gauge for recovery. In addition, key requirements of the population criteria include 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. However, since 2009, increasing numbers of bonytail have been detected by stationary PIT-tag reading antennas located throughout the upper Colorado River basin. Survival of stocked fish may be improving or the relatively new stationary antennas may be a better method of detecting stocked fish than other, ongoing active sampling methods.

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<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 to track 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 delisting would not occur until the demographic criteria are met and threats to the species are addressed to the point that the species is no longer threatened or endangered.

### *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. Secondarily, 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. Osmundson and White (2013) determined that recruitment rates were less than annual adult mortality in six years and exceeded adult mortality in the other six years when sampling occurred. The estimated net gain for the 12 years studied was 32 fish  $\geq 450$  mm TL. 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.

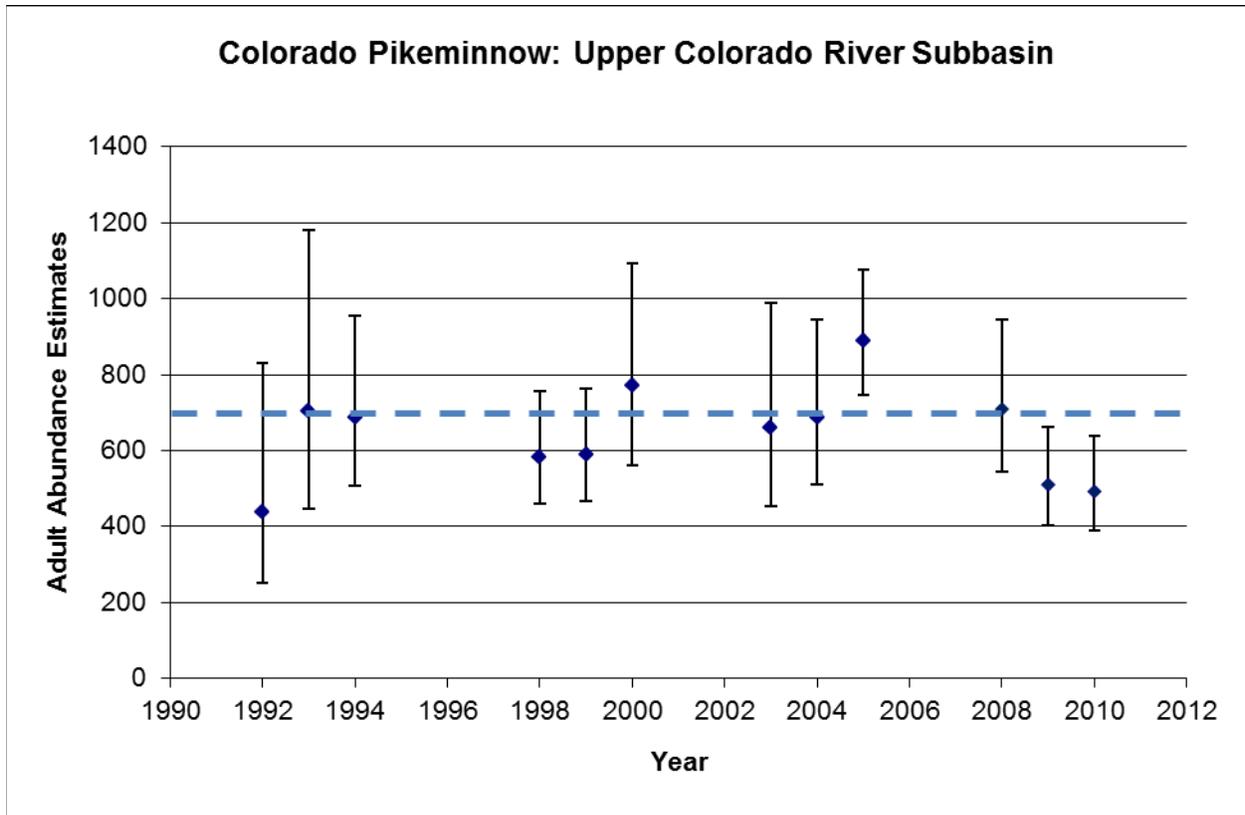


Figure 2. Adult Colorado pikeminnow population abundance estimates for the Colorado River (Osmundson and Burnham 1998; [Osmundson and White 2009](#); 2013). Error bars represent the 95% confidence intervals. Dashed horizontal line represents the current population size downlist criterion.

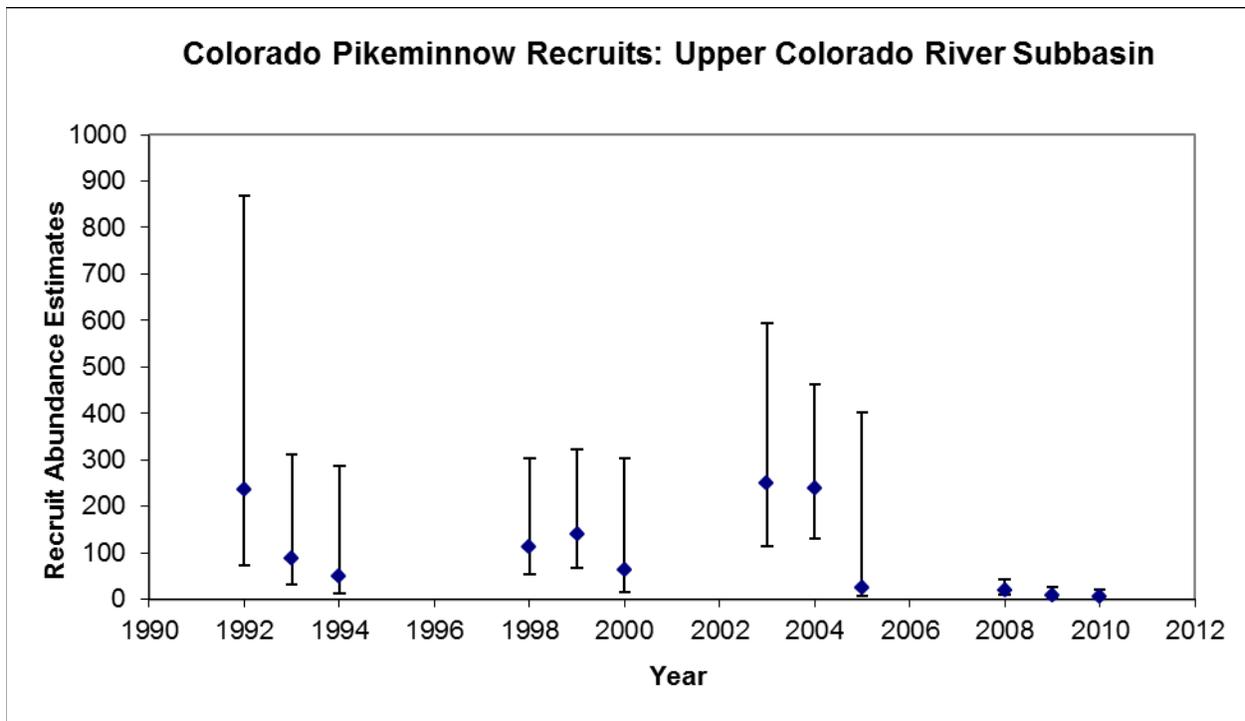


Figure 3. Colorado pikeminnow recruitment abundance estimates (calculated using the same mark recapture methodology as for the adults) for the Colorado River (Osmundson and White 2009; 2013). Recruits are age-6 (400-449mm TL). Error bars represent the 95% confidence intervals.

#### *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 indicated 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 first two sets of adult estimates was 3,020 (2000 – 2008). 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.

Data from the third round (2011–2013) of population estimates for the Green River sub-basin are still being analyzed (thus no confidence intervals are shown for the 2011–2013 estimates in

Figure 4). Preliminary results from this analysis indicate adults and sub-adults are in decline throughout the entire Green River sub-basin. 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).

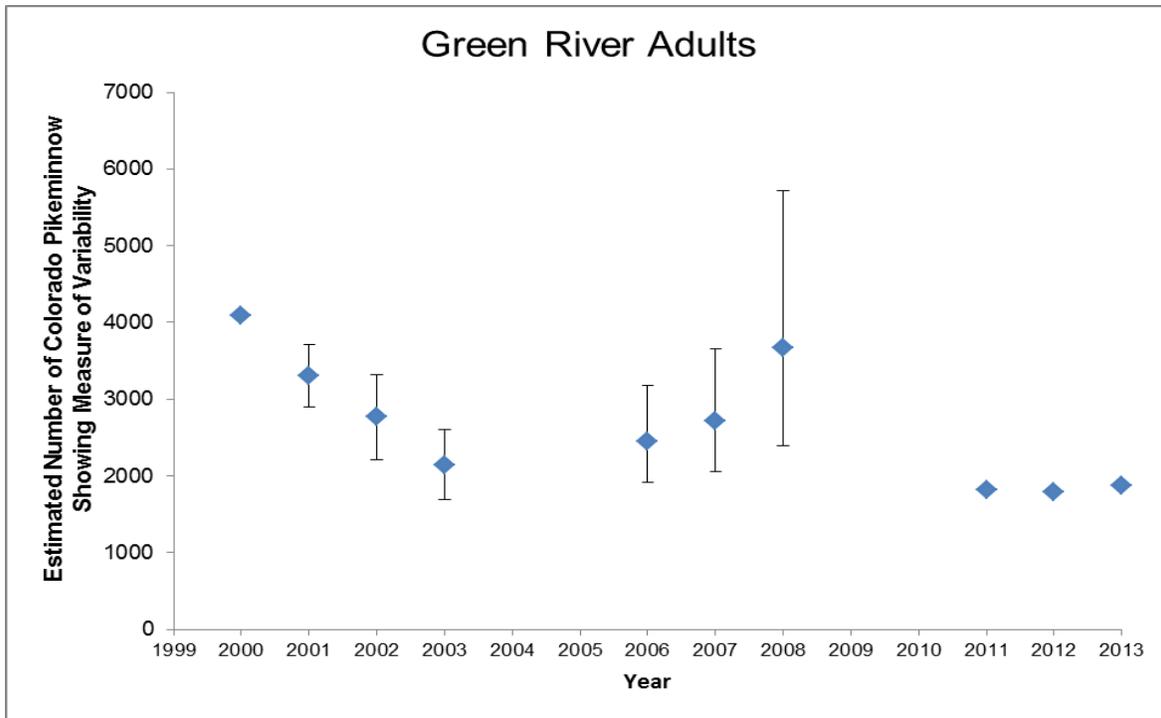


Figure 4. Adult Colorado pikeminnow population abundance estimates for the Green River (2000-2008 estimates from Bestgen et al. 2010; preliminary estimates from 2011-2013 (Bestgen, personal communication). Error bars represent the 95% confidence intervals. In 2000, the lower Green River was not sampled. The data depicted for 2000 incorporates an extrapolated lower Green River contribution to the overall population estimate and therefore lacks a confidence interval.

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%.

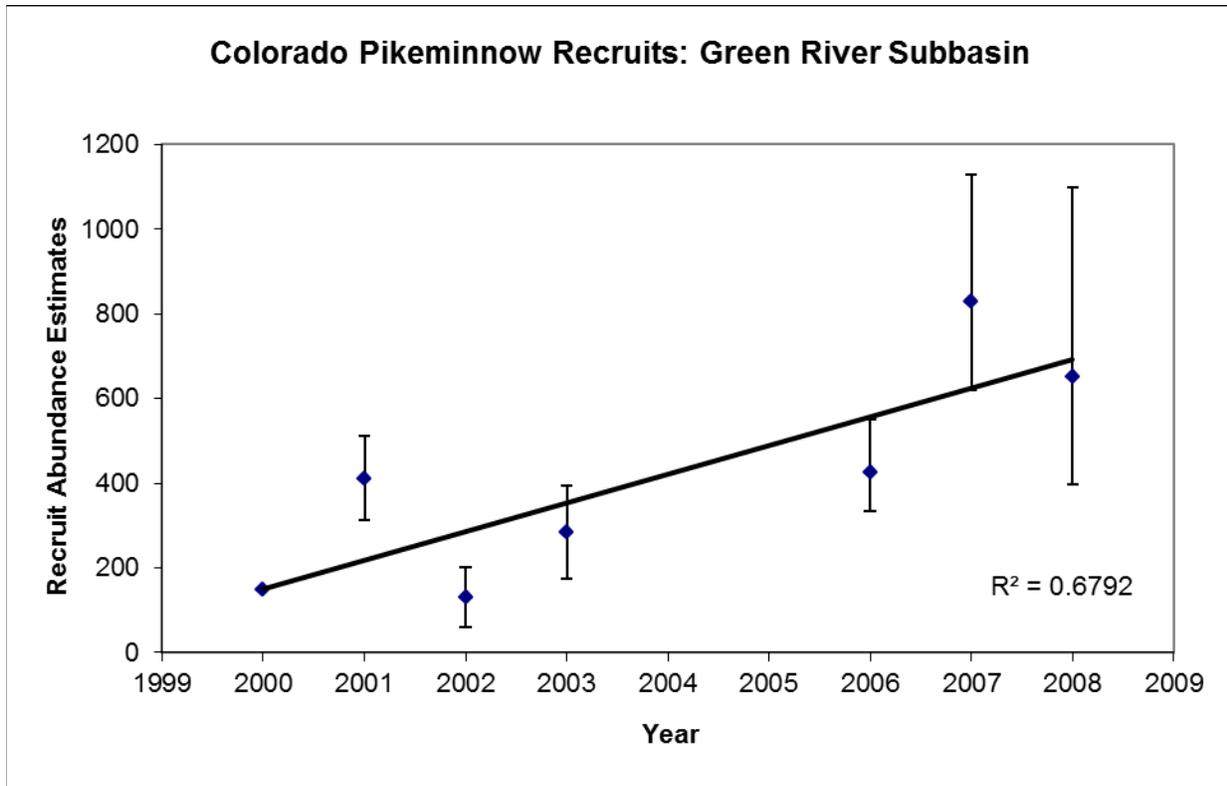


Figure 5. Estimated numbers of Colorado pikeminnow recruits (400–449 mm TL) in the Green River subbasin (Yampa, White, Middle Green, Desolation-Gray Canyons, and Lower Green) for 2001–2003 and 2006–2008. Error bars represent the 95% confidence intervals. Data from Bestgen et al. (2010). Estimates of recruitment for the most recent 2011–2013 sampling period are pending.

As part of the process of revising the 2002 Colorado Pikeminnow Recovery Goals into recovery plans, a recovery team for Colorado pikeminnow was assembled in late 2012 consisting of species and threat experts. During 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 initiated a campaign to remove nonnative predators from the critical habitat reaches of the Yampa River in the early 2000s when it became apparent that smallmouth bass were decimating the native fish populations (Anderson 2005).

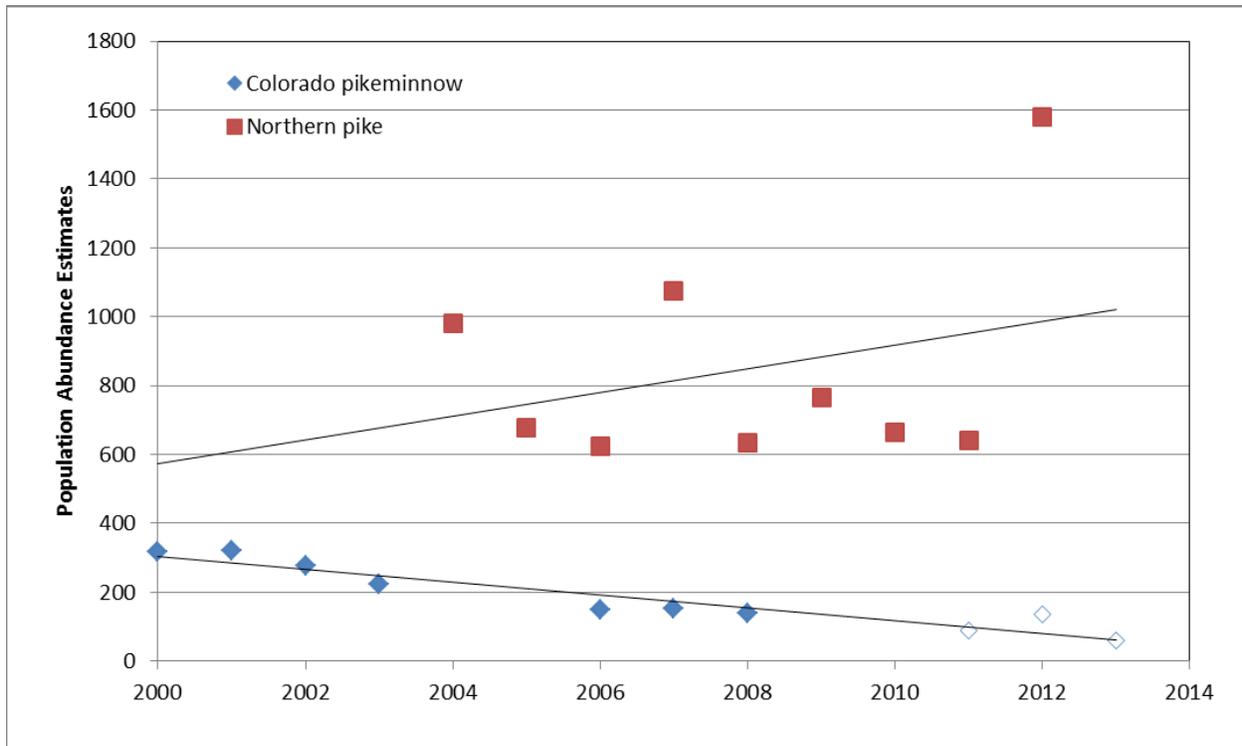


Figure 6. Comparison of Colorado pikeminnow population estimates (CPM) (2000 – 2008 data from Bestgen et al. 2010) and northern pike (Battige 2012) in the middle Yampa River. The 2011-2013 data points for Colorado pikeminnow are preliminary. Northern pike population estimates were not conducted in 2013.

#### *Upper Basin Age-0*

Bestgen et al. 2010 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). In some years, Reclamation has released higher summer base flows in the Green River for a few years based on the understanding that this may improve survival of young Colorado pikeminnow and disadvantage smallmouth bass.

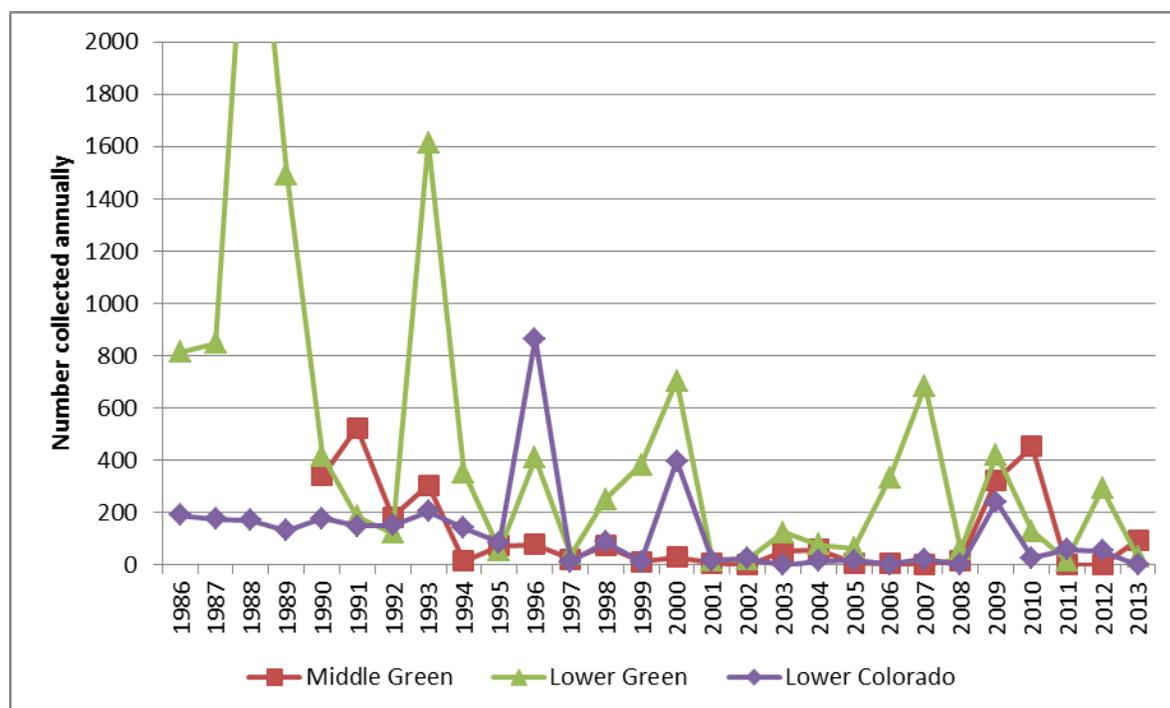


Figure 7. Numbers of age-0 Colorado pikeminnow collected each year from three different habitat reaches of river. A total of 2,892 Age-0 were collected in the lower Green River in 1988; the significance of strong Age-0 cohorts collected in the late 1980's was discussed in Bestgen et al. 2010. Data from Harding et al. 2013.

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; the highest concentrations were from the largest adults collected from the Green and Colorado river sub-basins. Mercury exposure has been reported to impair reproduction in fish (Batchelar et al. 2013; J. Lusk, U.S. Fish and Wildlife Service, personal communication). 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. The San Juan River Recovery Implementation Program is conducting a population viability analysis for Colorado pikeminnow to determine how impaired reproduction (cause - heavy metal or selenium) would affect population dynamics and therefore, potentially influence adult demographic recovery criteria. Mercury is a global pollutant (International Conference on Mercury as a Global pollutant - <http://www.mercury2013.com/>); remediation is obviously beyond the scope of this Recovery Program.

## Humpback chub

Five populations of humpback chub exist in the upper Colorado River basin and one occurs in the lower Colorado River basin in canyon-bound reaches of the river system. Recovery goal downlisting 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. In addition, 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 humpback chub 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 (*Gila* identified as roundtail chub were returned to the river in Dinosaur National Monument [DNM]). Geneticists at Southwest Native Aquatic Resources and Recovery Center (SNARRC), Dexter, NM, have since provided preliminary results indicating that the Yampa fish in captivity were hybrids between humpback chub and roundtail chub (Wade Wilson, U.S. Fish and Wildlife Service, personal communication). These fish were considered unsuitable for broodstock and were released into the Green River in DNM. 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 beginning in 2003, sampling was shifted to fall to avoid capturing Colorado pikeminnow that use Desolation Canyon for spawning. 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 in the 2006–2007 estimates 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.

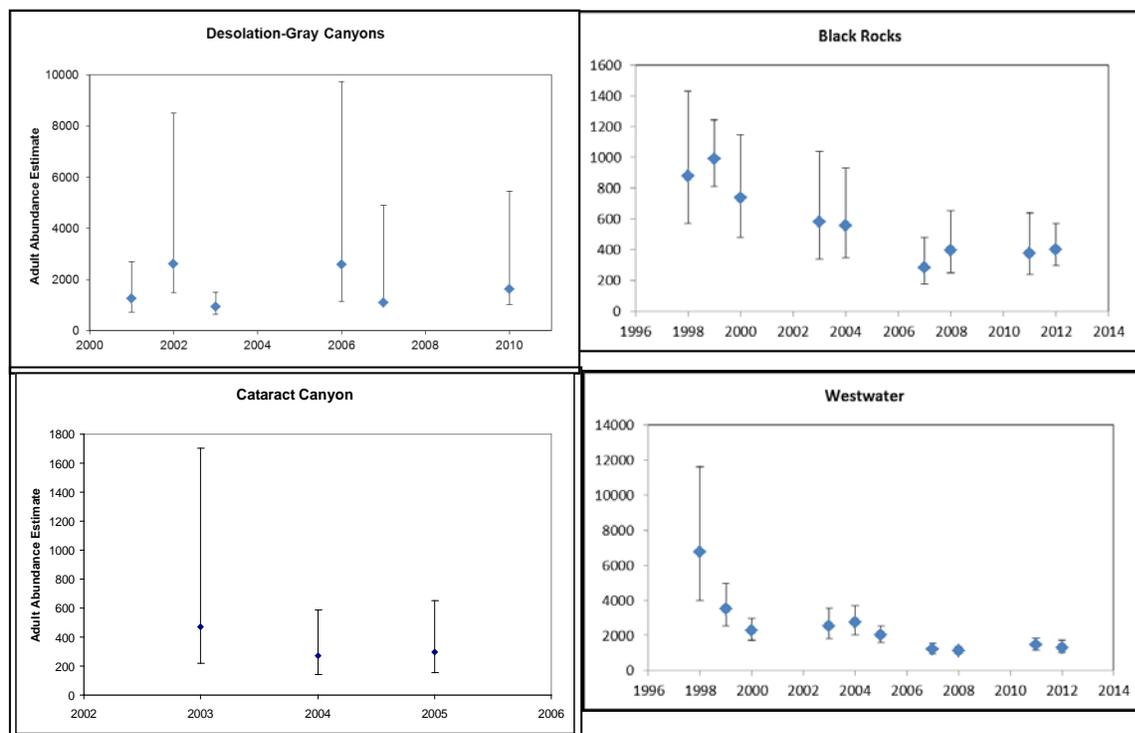


Figure 8. Adult humpback chub population estimates with confidence intervals for four populations in the upper Colorado River Basin (note that the scale differs among the graphs for the different populations). Clockwise from upper left: Desolation-Gray Canyons (from [Badame 2011, 2012](#)); Black Rocks (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 for 2011 and 2012 were 379 and 403, respectively. Researchers caution that 78 largemouth bass and the same number of gizzard shad were collected in Black Rocks in 2012. This represents a ten-fold increase over the 2011 catch. 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. The large declines in humpback chub densities in both Black Rocks and Westwater Canyons occurred in the late 1990's and are not attributed to more recent increases of nonnative predators in the Colorado River.

In 2008, the core population (Black Rocks / 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 1,467;

however, UDWR reported 1,315 adults in 2012. The core population estimates in 2011 and 2012 were 1846 and 1718, respectively (Figure 9). 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. Colorado State University's recent robust population estimate analysis more clearly indicated that declines in the Westwater and Black Rock humpback chub populations are due to lapses in recruitment (i.e. adult survival rates have remained stable). Principle investigators agree that reinitiating an age-0 monitoring component is advisable. It should be noted that whatever is affecting humpback chub recruitment has not affected sympatric populations of native roundtail chub (a conservation agreement species), Roundtail chubs populations in both canyons have remained stable or have increased since population estimation started. In addition to the potential and recent 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.

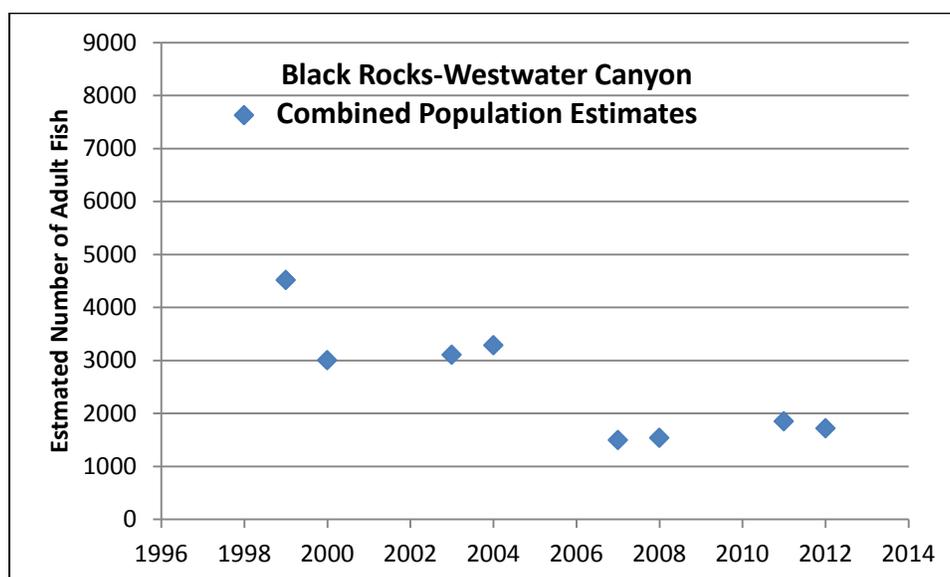


Figure 9. Combined population estimates for humpback chub in Black Rocks and Westwater Canyon based on a robust open model created by Dr.'s Bestgen and White, Colorado State University. The 2002 Recovery Goal downlist criteria for these combined ("core population") estimates is 2,100 adults.

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. Despite additional effort to sample below Big Drop Rapid, no additional humpback chub were encountered in the new riverine habitat created by low Lake Powell levels.

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. The 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 (final report anticipated by the end of July 2014).

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 a decrease in the availability of warm, food-rich floodplain areas and predation by a suite of nonnatives when the flood plain nursery habitats are available (Bestgen et al. 2011). 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; in 2012, the largest collection of light trapped larvae occurred (4,196; Figure 10). In 2011, researchers documented spawning by razorback sucker in the White River for the first time.

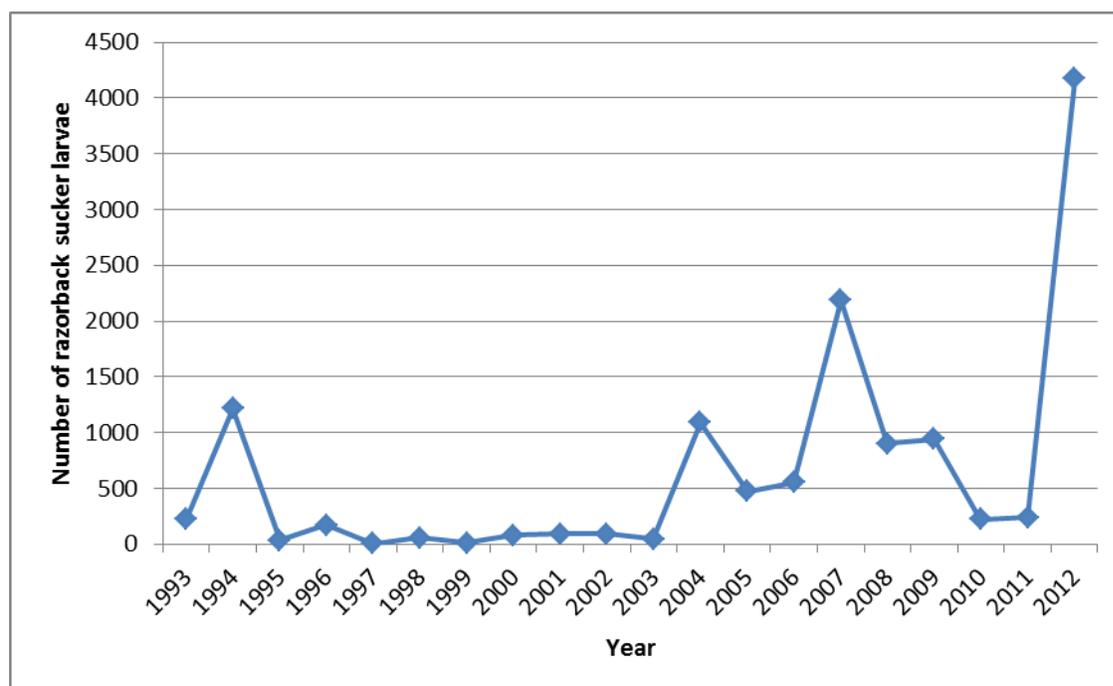


Figure 10. Numbers of razorback sucker larvae collected in light traps in the middle Green River since 1993.

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 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 antennae were placed on a spawning bar in the middle Green River near Dinosaur National Monument in northeast Utah. Fifty-two 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, Utah 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 state line 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 downlisting 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 efforts in the Upper Colorado and 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 138 bonytail between October 2011 and September 2013. The fish detected in fall 2011 had been stocked above Price-Stubb in Debeque Canyon, but in spring 2012, some of those 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 2013 and early 2014. These accomplishments are described in Table 1 below. Following that is Table 2, 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 22, 2014, assessment of accomplishments and shortcomings of the Recovery Program under the Recovery Implementation Program Recovery Action Plan (RIPRAP) from February 1, 2013, through January 31, 2014 (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 1. SIGNIFICANT ACCOMPLISHMENTS**  
(February 1, 2013, through January 31, 2014)

Accomplishment	Criteria Affected
<b>General – Upper Basin-wide</b>	
<p><a href="#">2013 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 removal focused on northern pike in the Colorado River near Rifle Creek and on smallmouth bass in the White River).</p>	<p>1 – Reduce threat of extinction by removing more nonnative fishes.</p>
<p>Program participants completed and adopted the comprehensive <a href="#">Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy</a>. Adoption of <a href="#">the Strategy was approved by the States of Colorado, Wyoming, and Utah</a>.</p>	<p>Implementing the strategy 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>Researchers continued to investigate relationships between smallmouth bass spawning/recruitment and environmental conditions to serve as the basis for a future flow manipulation study (likely targeting the Green River below Flaming Gorge Dam). Program partners have initiated efforts to establish compatible sportfisheries and have begun to eradicate nonnative fish sources (e.g., Paonia [fall 2012] and Miramonte [fall 2013]) and have plans to expand this effort (e.g., Red Fleet Reservoir). CPW has committed to re-setting the Elkhead Reservoir sportfishery in fall 2015 (with public involvement beginning in fall 2014). As of 2014, the Program ceased all translocation of nonnative predators to any fishery within the upper Colorado River basin. Must-kill regulations for northern pike, burbot, and walleye implemented on Jan 1, 2014 in Utah (Colorado and Green rivers and tributaries; also includes smallmouth bass) and Wyoming (Green River and Little Snake drainages), paired with a wasting allowance that allows anglers</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>

<b>Accomplishment</b>	<b>Criteria Affected</b>
to easily dispose of fish. Utah also implemented no limits on channel catfish for all of the Green, Colorado, and San Juan drainages in Utah.	
Most targets for hatchery production and stocking of endangered fish were met or exceeded. In 2013, hatchery managers began to shift some hatchery production / capacity from razorback sucker to bonytail and target stock size of razorback sucker was increased to 350mm TL (12 inches) and for bonytail 250mm TL (10 inches). UDWR completed variance process with fish health board to allow fish from new rearing ponds at Horsethief Canyon Native Fish Facility to be stocked in Utah.	2 – Improving status of fish populations through stocking.
<b>Green River</b>	
2013 was characterized as a moderate-dry runoff year (second in a row under the Larval Trigger Study Plan). Reclamation operated Flaming Gorge Dam under the ROD and Biological Opinion to meet or exceed a target of 8,300 cfs at Jensen. There were 25 days above 8,300 cfs (18 days during larval presence). Biologists detected razorback sucker larvae in the Green River on 26 May. Reclamation ramped up releases on 28 May; achieved peak release of 5,700 cfs on 04 June; and initiated ramp down on 08 June. UDWR biologists detected larvae in the Stewart Lake outlet canal, operated outlet gates and a picket weir to entrain larvae, but preclude large-bodied predators. Excellent larval razorback growth documented over ~2 months of inundation. On 31 July, UDWR began draining Stewart Lake. A total of 613 Age-0 razorback sucker were collected, of which 592 were released alive to the Green River.	1 – Improve habitat and reduce threat of extinction; 3 – Improve flows; 4 – Reduce magnitude of project impact.
Service/PDO worked with energy companies to remediate energy development impacts to one of the Program’s Green River floodplain properties and suspend development that posed risk to endangered fish at the Ouray NFH.	1 – Improve habitat and reduce threat of extinction from contaminants associated with energy development.
Program Director’s office is undertaking selenium analysis of YOY razorback sucker that resided in Stewart Lake over summer of 2013. Samples include larval fish (baseline), juvenile fish (test subjects), and fathead minnow (ecological surrogate). Results should indicate risk to razorback from selenium contamination during summer growth. The Service's EC annual report provides updates on Se remediation activities at Pariette Draw on the Green River. The Bureau of Reclamation (in coordination with UDWR) continues to remediate Se concentrations at Stewart Lake as per the Stewart Lake BO (2005).	1 – Reduce threat of extinction from contaminants.
UDWR drafted the report "Positive Barriers to Sportfish Escapement from Starvation Reservoir" and is working with Program partners to investigate possible screening solutions.	1 – Reduce threat of extinction by preventing escapement of nonnative fishes.
UDWR and WYG&F continued tournaments to provide incentives for targeted burbot harvest (“burbot bashes”) in Flaming Gorge. UDWR is formulating plans to rotenone Red Fleet Reservoir to address the illegally introduced population of walleye, but first needs to complete NEPA and develop a lake management plan.	1 – Reduce threat of extinction by removing more nonnative fishes.
<b>Yampa River</b>	
The 2013 spring snowpack was well below average therefore the Recovery Program purchased an additional 1,000 af from Elkhead Short Term lease pool in May. Summer releases totaled ~5,700 af (annual 5000 af + carryover from the 2012 Short Term Lease). Late spring, and late summer moisture helped the Program meet flow targets and allowed carrying the 2013 Short Term lease (1000 af) into 2014. The base flow target at Maybell is 134 cfs; the lowest summer monthly average (August) was 143 cfs; however a minimum daily flow of 56 cfs was recorded in August and 30 days fell below the minimum between July and September.	1 – Improve habitat through augmented flows; reduce threat of extinction by hindering smallmouth bass recruitment.
<b>Duchesne River</b>	
1,500 af of DOI-leased water in Big Sand Wash supported base flows for the second time in 2013. Flows from Daniels Diversion continue to be delivered.	1 – Improve habitat through augmented flows; 3 – Improve

Accomplishment	Criteria Affected
	flows.
<b>White River</b>	
Public meetings held in Vernal, Craig, and Rangely to kick off development of a White River Management Plan (fall 2013). CWCB secured funding for contractor to develop plan.	Expected to lead to 1 & 3 – Improving habitat through protecting/augmenting flows.
PIT tag antenna array installed near Bonanza Bridge to monitor PIT tagged endangered and 3-species fish. Data collected in 2013. Preliminary data analysis expected in 2014 by PDO. The PIT antenna detections are augmented by 3-Species field 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>	
A total of 29,917 af was added to baseflow in water year 2013: 10,412 af from Ruedi, 3,957 af from Granby, 1,500 af from Wolford Mountain Reservoir, 2,513 from Green Mountain, and 11,535 af from the Palisade Bypass Pipeline.	3 – Improve flows; 4 – Reduce magnitude of project impact.
Water deliveries from 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) began in 2013. The 15 Mile Reach PBO required that an agreement be executed by the water entities and the Service to furnish a permanent source of water to be provided annually to the 15-Mile Reach to benefit endangered fishes. The Fish & Wildlife Service is satisfied with the permanent sources and considers the contracts and NEPA compliance for Ruedi and Granby that formalized these permanent sources to satisfy the PBO requirement for permanent agreement.	Provides mechanisms to 3 – Improve flows; 4 – Reduce magnitude of project impact.
OMID check structures constructed in time to provide saved water in 2014 irrigation season.	3 – Improve flows; 4 – Reduce magnitude of project impact.
GVIC fish screen operated 59% of the season and Obermeyer passage gate was open allowing passage 57% of the season in 2013. Grand Valley Water Users Association operated GVP fish screen when conditions allowed during the 2013 low-flow year operating the passage 49 days (17 May – 5 July). A total of 13,401 fish used the ladder; 79.9% native species or native hybrids. Two razorback sucker and one razorback x flannelmouth hybrid were collected in 2013. White sucker was the predominant non-native species collected. All nonnative species encountered are removed from the river.	1 – Measurable population response of stocked and wild fish to habitat restored through fish passage and screens 1 – Reduce threat of extinction by removing more nonnative fishes
Tagged fish detected in Price-Stubbs fish passage October 2011 – September 2013: 138 bonytail, 79 roundtail chub, 1 Colorado pikeminnow, 239 razorback sucker, and 1 flannelmouth sucker.	1 – Measurable population response of stocked and wild fish to habitat restored through fish passage.
CPW constructed screen in Rifle Creek below Rifle Gap Reservoir. Fish escapement past the screen will be evaluated for at least the next five years.	1 – Reduce threat of extinction by preventing escapement of nonnative fishes.
In 2013, additional passes were continued in the reach of the upper Colorado River from Silt to Beavertail to remove invading northern pike, focusing on backwaters and floodplain ponds. CPW continued reconnaissance in floodplain and canal habitats to identify potential sources of this species and is investigating how to reclaim LaFarge pond.	1 – Reduce threat of extinction by removing more nonnative fishes.
<b>Gunnison River</b>	
2012 hydrology resulted in widespread poor water conditions leading into 2013. The May 1, 2013 April-July inflow forecast for Blue Mesa Reservoir was 335,000 AF. Actual 2013 April-July inflow to Blue Mesa was 346,000 AF, the fifth lowest since 1937 and categorized as a “Dry Year” exceeded 93% of the time. April-July runoff at the Whitewater gage near Grand Junction was only 22 percent of average. Based on the May 1, 2013, inflow forecast to Blue Mesa, the ROD for Aspinall targets at the Whitewater gage resulted in a maximum flow in	1 – Improve habitat through augmented flows; 3 – Improve flows; and 4 – Reduce magnitude of project impact.

Accomplishment	Criteria Affected
<p>a 900 cfs peak and 750 or 890 cfs for Redlands irrigation during baseflow at the for the second year in a row. 2012 and 2013 were two very dry years; during the non-irrigation season (12/11/12 - 4/27/13), there were 103 days below 750 cfs. The gage was iced over during some of this period; therefore, estimates were made. Even so, in 2013, the end-of-month content (380KAF) of Blue Mesa was 201KAF below the icing target of 581KAF. In 2012, Blue Mesa reservoir was well below the icing target by 254KAF.</p>	
<p><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>.</p>	<p>1 – Measure population response to recovery actions.</p>
<p>Redlands passageway operated from 29 April to 15 October, 2013. 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 16,687 fish used the passage structure in 2013; 83% of those were native species. Two Colorado pikeminnow and one razorback sucker used the structure in 2013. A grand total of 124 Colorado pikeminnow have used the structure since 1996. The fish screen operated throughout most of the season. (Operation began April 29, the canal was dewatered for repairs November 3, and the screens were up and running again November 14. The screens were pulled on five occasions during the irrigation season to clear debris or make repairs, totaling 23 days of non-operation.)</p>	<p>1 – Measurable population response of stocked and wild fish to habitat restored through fish passage and screen.</p>
<p>Muscle plugs collected again in 2013 from endangered fish and surrogate species for contaminants evaluation funded outside the Recovery 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.</p>	<p>1 –Reduce threat of extinction from contaminants.</p>
<b>Dolores River</b>	
<p>CPW treated Miramonte Reservoir with rotenone to remove its illegally introduced population of smallmouth bass.</p>	<p>1 – Reduce threat of extinction by reducing risk of nonnative fish escapement to critical habitat.</p>
<p>CPW and USBR cooperated to install a PIT antenna in the Dolores River near Disappointment Creek. Working with the University of Utah and others, USBR also funded installation of a similar system upstream of confluence with the Colorado River to monitor native fishes. Reclamation provided 3,000 pit tags to UDWR for tagging and endangered fish and 3-species.</p>	<p>Will help detect changes in 2 – status of fish populations.</p>

**Table 2. SERVICE CONCERNS** (February 1, 2013, through January 31, 2014)

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. Preliminary results from the most recent rotation (2011-2013) of Colorado pikeminnow population estimates indicate adults and sub-adults are in decline throughout the entire Green River sub-basin. Catch of sub-adults and adults in the Colorado River in 2013 were also near lowest observed in the history of this project. 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 concurred 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 fully implement the comprehensive <i>Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy</i> and continue work with the States to implement the specific, tangible actions added to the RIPRAP in 2013 (Table 2.a), which in the aggregate have a high likelihood of stopping the expansion of invasive species and of reducing existing concentrations. Adequate progress has been made to control nonnative predator escapement from Elkhead and Starvation Reservoirs. CPW secured funding through CWCB’s Species Conservation Fund to reduce northern pike spawning habitat at Walton Creek. The Service agrees that the impacts of non-native fish on recovery of the listed species must be controlled. If Colorado is unwilling to pursue must-kill regulations throughout the Upper Basin in Colorado, we urge the state to pursue a comprehensive suite of alternative actions, in concert with Program partners, to achieve the necessary biological outcome.</p>
<p>Completion of a revised integrated stocking plan is behind schedule.</p>	<p>Hampers ability to 2 – Improve status of fish populations through stocking.</p>	<p>Revised draft sent for Biology Committee review July 31, 2014.</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 smallmouth bass population. Declines in the proportion of first year adults (200–220 mm TL) in 2006–2007 support the</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 downstream (project 123a). In Desolation Canyon, smallmouth bass (and other nonnative species) are</p>

<b>Concern</b>	<b>Criteria Affected</b>	<b>Recommended Action Items</b>
idea that smallmouth bass predation may be suppressing the smaller <i>Gila</i> .		removed during Colorado pikeminnow population estimates (Project 128) and during specific nonnative control trips conducted under Project 123b. Complete recommendations for and implement humpback chub broodstock development.
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. CSU recently conducted a robust population analysis using Program MARK to generate population and survival estimates and capture probabilities for adult humpback chub captured for Westwater Canyon and Black Rocks combined from 1998 – 2012. These core population estimates were 1846 and 1718 for 2011 and 2012, respectively. CSU’s analysis more clearly indicated that declines in the Westwater and Black Rock humpback chub populations are due to lapses in recruitment (i.e. adult survival rates have remained stable). PI’s agree that reinitiating an age-0 monitoring component is advisable.	2 – Declining status of fish populations.	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. The Program will develop a scope of work 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 to develop a humpback chub broodstock.
Despite accomplishments that have reduced selenium concentrations throughout the Upper Basin, uncertainty remains as 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 such as mercury, endocrine disruptors) could be impeding recovery.	2 – Declining status of fish populations.	The Recovery Program will support research and coordinate with the San Juan Program to determine dose response information related specifically to the endangered Colorado River fish as well as necessary remediation. Also, the Service will consult with EPA on proposed revised fish tissue-based criteria for selenium with respect to impacts on the endangered fish.. The San Juan River Recovery Implementation Program is conducting a population viability analysis for Colorado pikeminnow to determine how impaired reproduction, (linked to elevated levels of heavy metal s or selenium) would affect population dynamics.

Concern	Criteria Affected	Recommended Action Items
<b>Green River</b>		
In 2013, 104 days were below 1,500 cfs and 47 days were below 1,300 cfs minimum summer baseflow targets at Green River, Utah.	Hampers ability to 1 – Improve habitat through augmented flows	
Delays in development of Reclamation’s revised Green River hydrology model caused Utah to revise the Green River Flow Protection schedule	Delays 1 – Legal protection of flows needed for recovery.	Complete modeling work and maintain revised schedule to implement flow protection in FY 16-17.
Backwater synthesis report describing relationship of backwater development to sediment availability and peak flows in Reach 2 and integrating biological and physical data on backwaters is behind schedule.	Delays ability to 1 – Improve habitat through augmented flows	Complete draft final report (anticipated summer, 2014) and launch evaluation of Green River flow recommendations (scope of work for evaluating the recommendations in review; scope for conducting experiment to disadvantage smallmouth bass anticipated later in summer 2014).
Old Charley Wash, an important 'dry year' sampling site identified in the Larval Trigger Study Plan is currently unavailable as USFWS has been unable to renew lease with Northern Ute Tribe.	Hampers ability to 1 – Improve habitat through augmented flows	Service will continue government-to-government consultation with Northern Ute Tribe and request that the lease be renewed.
Tusher Wash diversion continues to entrain endangered fishes. PIT antennas installed in the Green River canal in March 2013 and operated throughout the irrigation season indicated entrainment of approximately 500 razorback sucker and 100 Colorado pikeminnow along with one humpback chub).	1 – Increases the threat of extinction.	The Program is planning a fish exclusion system for the canal. NRCS’s rebuild of the diversion structure is scheduled to begin in fall 2014, pending completion of an EIS by NRCS. NRCS has agreed to incorporate fish passage into this structure; USBR is pursuing a fish exclusion system through a separate process.
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 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 a problematic source of this species entering the Green River.	1 – Increases threat of extinction.	Red Fleet Reservoir has been recommended for reclamation (rotenone). (A microchemical analysis of otoliths from both the reservoir and the river detected emigration of walleye from Red Fleet Reservoir.) UDWR adjusted work to add spring and fall passes for walleye and gizzard shad removal in lower Green River in years when Colorado pikeminnow population estimates are not conducted.
<b>Yampa River</b>		
CWCB still needs to provide the accounting of past depletions for the Yampa River due in 2010; 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.	Hampers ability to 3 – Determine adequacy of flows.	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

Concern	Criteria Affected	Recommended Action Items
		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. .
Persistent decline of Colorado pikeminnow in the Yampa River is linked to the persistence of nonnative predators.	1 – Increases threat of extinction; 2 – Declining status of fish populations.	<i>See recommended action item identified for General Concern #1.</i>
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 that sustain propagule pressure and the proliferative/invasive capacity of this species. Escapement of adult smallmouth bass from Elkhead Reservoir remains problematic. Population estimates for adult bass in Little Yampa Canyon in 2013 were 5 times that of 2012. Subadult density in this reach was also very high.	Hampers ability to 1 – Reduce threat of extinction by decreasing numbers of nonnative fish.	CSU completed the <a href="#">programmatic synthesis of smallmouth bass removal efforts</a> , providing a comprehensive evaluation of the Program’s removal efforts. The expanded Yampa River “surge” effort to target smallmouth bass was continued in 2013 and 2014. CPW has committed to re-setting the Elkhead Reservoir sportfishery in fall 2015 (with public involvement beginning in fall 2014).
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).	Hampers ability to 1 – Reduce threat of extinction by decreasing numbers of nonnative fish	Pike removal is being expanded up to Steamboat Springs in 2014. 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 6/1/14). <i>See recommended action item identified for General Concern #1.</i> CPW should convert the Stagecoach Reservoir northern pike marking study into a removal effort in 2015.
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	Hampers ability to 1 – Reduce threat of extinction by decreasing numbers of northern pike.	CPW has continued work at Catamount Reservoir to reduce northern pike. CPW has plans to eradicate the illegally established population of northern pike in Chapman Reservoir, as well (see also discussion for Yampa III.B.1.d.(1)(b)). Ice fishing tournament at Stagecoach in February 2014 required must-kill for northern pike and walleye caught by tournament participants. CPW has secured funding for habitat improvement at Walton Creek. The PDO and CPW met on March 25, 2014 and determined that the PDO’s concerns with the Yampa Aquatic Management Plan

Concern	Criteria Affected	Recommended Action Items
		<p>raised in May 2013, which were largely focused on future management of northern pike in Stagecoach Reservoir, were subsequently addressed through finalization of the Basinwide Strategy (see action item #1) and development of the NNF addendum to last year's Sufficient Progress memo (see item #2). The PDO and CPW agreed that revision of the Aquatic Management Plan is not necessary / worthwhile, because the more recently approved Basinwide Strategy and Sufficient Progress addendum accurately reflect current management approaches. <i>See recommended action item identified for General Concern #1.</i></p>
<b>Duchesne River</b>		
<p>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.</p>	<p>1 – Increases threat of extinction.</p>	<p>Program will rely on findings of project # C18/19 to determine how to proceed. UDWR installed a temporary screen in the spillway channel at Starvation Res in 2014 and is pursuing a more permanent solution. <i>See recommended action item identified for General Concern #1.</i></p>
<b>White River</b>		
<p>Schedule in the approved scope of work for developing the White River Management Plan appear to be slipping</p>	<p>Hampers ability to 1 – Improve habitat through protected/augmented flows; and 3 – Inadequacy of flows.</p>	<p>CWCB is working on contracting and the Program Director's office will continue to track progress over the next year. Previously established due dates were: model completion fall 2014; plan completion winter 2015; and PBO summer 2015. The Water Acquisition Committee will examine these dates for revision on September 8, 2014.</p>
<p>Smallmouth abundance has increased in the White River,. 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. Sampling in 2013 shows that fish spawned in 2012 were captured further downstream into Utah, resulting in a large increase in fish captured in that reach during 2013. 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 (above Douglass Creek). Efforts to</p>	<p>1 – Increases threat of extinction.</p>	<p>Efforts to reduce the abundance of smallmouth bass were intensified in 2013 and again in 2014 with increased effort by both USFWS and CPW in the Taylor Draw to state line reach in 2014. Angling (conducted by agency personnel or an incentivized public event) could prove useful in this river (however, public access is very limited, so utility is uncertain). CPW should pursue basinwide 'must kill' regulations for SMB and other worst of the worst nonnative predators. The Recovery Program continues to support and encourage the multi-agency effort to designate White River as native fish conservation area. <i>See</i></p>

<b>Concern</b>	<b>Criteria Affected</b>	<b>Recommended Action Items</b>
reduce the abundance of smallmouth bass through electrofishing were as high as possible in 2013.		<i>recommended action item identified for General Concern #1</i>
<b>Colorado River</b>		
The Recovery Program still struggles to meet flow recommendations in drought years. The Service emphasizes the importance of meeting the flow recommendation.	Hampers ability to 1 – Improve habitat through augmented flows; and 3 – Inadequacy of flows.	The Program is working to improve the overall strategy for flow augmentation in the 15-Mile Reach to be considered each spring and adjusted as the year progresses, addressing all possible sources of water, priorities, antecedent conditions, projected flows and supplies, including OMID, Grand Valley Project, CFOPS, etc. FWS and Reclamation are exploring opportunities (and would include Colorado and the River District in these discussions) to continue delivering Ruedi water (or a 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 complete and will result in partial water savings beginning in the 2014 (current) irrigation season. The project will be fully implemented in 2016.
In April 2013 (not a baseflow month), flows at Palisade dropped below 810 cfs for 29 days creating an 'April Hole'. Possible contributing factors included: 1) cold weather shutoff of mid-elevation runoff; 2) irrigation season starts; 3) Shoshone call 'relaxation; 4) low storage in upstream reservoirs resulting in conservative management of reservoir releases.	Hampers ability to 1 – Improve habitat through augmented flows	Grand Valley Water Users cut back their irrigation diversions during the 'April Hole' by >800 cfs. CWCB has reviewed hydrology and characterizes 'April Holes' of the magnitude seen in 2013 as very rare. In the future, water users and the Service will address the potential for this situation to recur as part of the normal HUP calls regarding water management for the 15 Mile Reach and determine what measures if any should be taken based on current conditions. This should avoid a repeat of the extreme low flows in the spring. The Service and water users will formalize specific recommendations prior to the 2015 irrigation season to deal with the situation should it recur in the future and implement those recommendations as needed to avoid or mitigate April low flows.
CWCB still needs to provide the depletion accounting report that was due July 1, 2010.	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)	Hampers ability to 1 – Improve habitat through augmented	CFOPS Phase III (a due date of Sept 30, 2010 was identified in the 2010 RIPRAP) draft report distributed

<b>Concern</b>	<b>Criteria Affected</b>	<b>Recommended Action Items</b>
overdue.	flows; and 3 – Improve flows.	April 2; final report anticipated by September 1, 2014.
Screen operators attempt to operate screens as much as possible, but in low-flow years when screen operations are reduced per operations agreements. In 2013 alone, 17,865 native fish were salvaged from the GVIC and GVP canals after the irrigation season.	Hampers ability to 1 – restore habitat through fish passage and screens.	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.
Walleye captures in the Colorado River went from being ‘rare’ during 2003-2009 to ‘common’ in 2010, and then increased dramatically by 2013. Distribution within the lower reach in 2010 appeared to be restricted below RM 80; however, by 2013, captures extended upstream to RM 112, indicating an upstream range expansion. Unlike smallmouth and largemouth bass, whose primary distribution is in the upper reach, walleye directly overlap in habitat with small size classes of both Colorado pikeminnow and razorback sucker.	1 – Increases threat of extinction.	In 2013, because of increased numbers of non-native piscivores collected during spring Colorado pikeminnow sampling, two additional passes were added from Cisco to Dewey Bridge and one pass was added from Dewey Bridge to Potash. The Service also is adding 2014 fall passes to remove walleye in lower Colorado reaches (Cisco to Potash) and UDWR is adding removal passes for the Lower Green.
Highline Lake spillway barrier net was to be replaced in 2013 (replacement net received in 2011, but could not be installed due to lake conditions; major dredging at Highline occurred in the fall of 2013 and net installation deferred to early 2014 [prior to refilling the Lake]). 2013 outlet testing resulted in uncontrolled releases.	Hampers ability to 1 – Reduce threat of extinction by preventing escapement of nonnative fishes.	CPW has installed replacement net and purchased tube nets to be used to prevent fish escapement in future annual outlet testing.
<b>Gunnison River</b>		
The high density northern pike source population in Crawford Reservoir remains of extreme concern due to its invasive potential in the Gunnison River.	1 – Increases threat of extinction.	CPW began mechanical removal of northern pike from Crawford in 2014 removing an estimated 74% of the adult population in the reservoir.
Illegal introduction of smallmouth bass in Ridgway Reservoir was confirmed in 2013. Sampling demonstrated multiple size classes, but low densities of adult fish, indicating the population may be expanding from initial introduction. Densities of smallmouth bass near the spillway were high, indicating a high risk of escarpment from reservoir spilling.	1 – Increases threat of extinction.	Program Partners are working on a response. Tri-County is operating the reservoir to prevent spilling in 2014, which appears to be feasible. CPW is considering regulations, screening, chemical reclamation, and harvest incentives.
<b>Dolores River (none)</b>		

Table 2.a.

Upper Colorado River Endangered Fish Recovery Program  
Nonnative Fish Management Actions: an Addendum to the Recovery Action Plan  
July 2014 Update on Progress

River / Action	Responsible Entity(s)	New RIPRAP #	2013	2014	2015	Out years	PDO update 7/2014
<b>General ( in addition to ongoing projects / actions)</b>							
Finalize the UCR Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy (Basinwide Strategy).	Program Director's Office (PDO)	III.D.	X				<i>Complete; Feb, 2014.</i>
Cease translocation of all nonnative predators to any fishery within the UCR.	States / Program	III.E.		X	X	X	<i>Implemented 2014 field season.</i>
The States will commit to remove northern pike and / or replace them with a Compatible (compatible with recovery) species (as identified in the Basinwide Strategy) throughout the UCR Basin. Specific waters will be targeted based on risk of escapement, opportunity and available resources.	States / Program	III.F.	States will convey this message in their Fishing Brochure / Guidebook starting in 2014				<i>CPW treats Paonia Res and holds must kill fishing derby at Stagecoach. UDWR treats Stewart prior to inundation.</i>
Implement 'must kill' regulations for northern pike throughout the UCR basin (exceptions may include waters where northern pike are being replaced by tiger muskie).	WY and UT	III.F.1.		X	X	X	<i>Done in WY (Must kill and nongame fish designation) . Done in UT.</i>
Continue discussions concerning "must kill" regulations on northern pike throughout the UCR Basin to develop a proposal supported by law enforcement for regulatory consideration.	CO	III.F.2.	X	X	X	X	<i>It appears that CPW cannot or will not bring a 'must kill' proposal to their Commission.</i>
Remove smallmouth bass and / or replace them with a Compatible species (as identified in the Basinwide Strategy) everywhere they occur throughout the UCRB (exceptions = McPhee Res., Lake Powell Res., and upstream of Flaming Gorge Dam; and 'containment' may prove to be a viable management option for smallmouth bass at Starvation Res ). Specific waters will be targeted based on risk of escapement, opportunity and available resources.	States / Program	III.G.	States will convey this message in their Fishing Brochure / Guidebook starting in 2014				<i>CPW treats Miramonte. Progress being made to renovate Elkhead, but delayed 1year. Questionable response to reports of an invasion at Ridgway.</i>
Implement 'must kill' regulations for smallmouth bass throughout the UCR basin (see exceptions above).	WY and UT	III.G.1.		X	X	X	<i>UT implemented in the Green River downstream of Flaming Gorge Dam. All WY</i>

River / Action	Responsible Entity(s)	New RIPRAP #	2013	2014	2015	Out years	PDO update 7/2014
							<i>bass populations currently above Flaming Gorge Dam; will add regulations if show up elsewhere.</i>
Continue discussions concerning "must kill" regulations on smallmouth bass throughout the UCR Basin to develop a proposal supported by law enforcement for regulatory consideration.	CO	III.G.2.	X	X	X	X	<i>It appears that CPW cannot or will not bring a 'must kill' proposal to their Commission. Program partners are taking action (via letter writing to DNR).</i>
The States are dedicated to reducing burbot numbers through all means practicable (including targeted removal) throughout the UCR Basin. Current management practices (e.g., 'must kill' regulations; fishing derbies at Flaming Gorge) considered adequate.	States / USFWS	III.H.	States will convey this message in their Fishing Brochure / Guidebook starting in 2014				
Implement 'must kill' regulations for burbot throughout the UCR basin. Done in WY and UT. Wyoming and Utah implementing burbot bash; WY research projects.	WY and UT	III.H.1.	X	X	X	X	<i>Done in WY and UT. WY and UT implementing burbot bash; WY research projects.</i>
Continue discussions concerning "must kill" regulations on burbot (as a preemptive measure) throughout the UCR Basin to develop a proposal supported by law enforcement for regulatory consideration.	CO	III.H.2.	X	X	X	X	<i>It appears that CPW cannot or will not bring a 'must kill' proposal to their Commission. Program partners are taking action (via letter writing to DNR).</i>
Promote increased production of sterile gamefish (e.g., hybrids, triploids), as Compatible sport fish.	Service / States / Program	III.I.	X	X	X	X	<i>In discussions in WY,UT&amp;CO.</i>
Work with State Wildlife agencies and water user groups to increase awareness amongst States' legislatures and the courts of the ecological and financial ramifications of illicit introductions.	States and PDO via the Implementation Committee	III.J.	X	X	X	X	<i>Ongoing in all states. (WY reg changes (leg)); PDO spoke to Judicial College in Reno; raised at IC mtg Sept 2013.</i>
<b>Yampa River (in addition to ongoing projects)</b>							

River / Action	Responsible Entity(s)	New RIPRAP #	2013	2014	2015	Out years	PDO update 7/2014
Elkhead Reservoir – establish a compatible sport fishery		III.B.1.a. (2)(a)					<i>Ongoing – justifiably delayed 1yr; Sherman Hebein working with Ray Tenney on ‘Elkhead Reservoir Fishery Reclamation Plan’</i>
Coordinate / schedule drawdown with Colorado River Water Conservation District (CRWCD)	CPW / Program / CRWCD	III.B.1.a. (2)(a)(i)	X				
Develop / Implement Communications Plan	CPW / Program	III.B.1.a. (2)(a)(ii)	X				
Complete necessary environmental compliance	CPW / CRWCD	III.B.1.a. (2)(a)(iii)	X	X			
Identify and secure sources of replacement compatible sport fish.	CPW	III.B.1.a. (2)(a)(iv)	X	X			
Treat reservoir and necessary habitats in the upper Elkhead Creek drainage.	CPW / Program / CRWCD	III.B.1.a. (2)(a)(v)		X			
Stock compatible sport fish	CPW	III.B.1.a. (2)(a)(vi)			X		
Evaluate / retreat if necessary	CPW / Program / CRWCD	III.B.1.a. (2)(a)(vii)				X	
<b>Walton Creek confluence area</b>							
Evaluate feasibility of habitat modification to eliminate / reduce northern pike spawning habitat.	CPW / Program / BOR	III.B.1.d. (1)(b)(i)	X	X			<i>CPW secured \$500K for modification from CWCB / SCF. Program may contribute to feasibility / design.</i>
Modify habitat as indicated through feasibility investigations.	CPW / Program / BOR	III.B.1.d. (1)(b)(ii)		X	X	?	<i>Very encouraging – TNC was a major player in making this happen.</i>
<b>Upper River (upstream of Hayden, CO)</b>							
Increase mechanical removal of northern pike in main channel and floodplain habitats as directed by Colorado Parks and Wildlife.	CPW / Program	III.B.2.d. (1)		X	X	X	<i>CPW and CSU reinstate removal in this reach in 2014</i>
<b>Stagecoach Reservoir.</b>							

River / Action	Responsible Entity(s)	New RIPRAP #	2013	2014	2015	Out years	PDO update 7/2014
Convert and extend the ongoing northern pike escapement study to a removal effort (will require an addendum to existing FERC Biological Opinion).	CPW / potentially Program in outyears	III.B.1.f.		X	X	X	<i>No progress – CPW believes removal is not worthwhile unless UYWCD manipulates spring resv. elevations.</i>
<b>White River</b>							
Determine and implement an adequate level of mechanical removal to reduce smallmouth bass.	CPW / Program	III.B.2.a.	X	X	X	X	<i>Implementing as much mechanical removal as possible below Kenney; New techniques in discussion.</i>
Develop a measure of successful suppression of SMB	Program	General: III.B.2.a. (1)		X			<i>Pending.</i>
<b>Green River (in addition to ongoing projects)</b>							
Direct new (or shift existing) nonnative fish removal efforts to address increasing numbers of walleye.	Program	III.A.4.d.	X	X	X	X	<i>Updated SOW for UDWR. (4) sampling trips in lower Green during Spring 2014 yield 149 walleye.</i>
Develop a management strategy to address escapement of walleye (and smallmouth bass) from Starvation Reservoir.	UDWR	III.A.4.e.	Dec., 2013				<i>UDWR produces a timely feasibility report; installed a temporary screen in spill channel during spring 2014 runoff; and is pursuing a permanent solution.</i>
Implement recommendations from the management strategy.	UDWR / Program	III.A.4.e. (1)		X	X	X	<i>Pending.</i>
<b>Colorado River ( in addition to ongoing projects)</b>							
Upstream of Grand Valley Project dam: Determine and implement an adequate level of mechanical removal in the main channel. More importantly, use all techniques available to eradicate northern pike (and other nonnative species of concern) from floodplain habitats.	CPW / Program	III.A.9.	X	X	X	X	<i>CPW: a) implements significant mechanical removal; b) coordinates with BOR on future levee work at La Farge Pond.</i>

River / Action	Responsible Entity(s)	New RIPRAP #	2013	2014	2015	Out years	PDO update 7/2014
							<i>Program investigates applicability of 'sonic cannon'.</i>
Develop a measure(s) of successful suppressions of northern pike (and other nonnative species of concern).	Program			X			<i>Pending</i>
Direct new (or shift existing) nonnative fish removal efforts to address increasing numbers of walleye in the lower river.	Program	III.A.8.	X	X	X	X	<i>USFWS removed 109 walleye (346 - 600 mm TL) during 2014 CPM pop estimate trips from RM 108 (just downstream of Cisco) to RM 3.5 (just above the confluence).</i>

### 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 spring of each year in the future.

The Service recognizes significant accomplishments have occurred over the course of the past year, including: a) continued cooperation to manage spring (particularly Larval Trigger Study Plan operations at Flaming Gorge Dam) and base flows throughout the basin; b) Reclamation's efforts to meet endangered fish flow targets under their new Aspinall ROD; c) ceasing translocation of nonnative predators to any location in the Upper Basin, a serious commitment to reclaim the Elkhead Reservoir and contain nonnatives at Starvation Reservoir, and eliminating a source of smallmouth bass at Miramonte Reservoir; d) meeting razorback sucker and bonytail stocking targets; and e) continued encouraging reports of an expanding population of razorback sucker throughout the Upper Basin including reports of 600+ wild produced young that were entrained and reared in Stewart Lake in spring 2013 and released to the Green River.

Despite good cooperation among Program partners and a comprehensive suite of recovery actions, the Service remains concerned with recent reports of low densities of Colorado pikeminnow in the Green and Colorado River sub-basins. And, we remain concerned over low numbers of humpback chub in many Upper Basin locations. We believe several specific recovery actions should receive greater attention in the coming year. We categorize those actions under: 1) nonnative fish management; 2) flow management; and 3) reducing endangered fish entrainment in irrigation canals.

#### *Nonnative Fish Management*

Overall, the Service is very pleased with the Program's progress on the action items developed during our review last year. However, a clear, coordinated, basin-wide message that conveys a zero tolerance stance on the worst-of-the-worst nonnative predators (burbot, walleye, northern pike, and smallmouth bass) and progress on reducing abundance of non-natives, appears to have stalled. The Service agrees that the impacts of non-native fish on recovery of the listed species must be controlled. If Colorado is unwilling to pursue must-kill regulations throughout the Upper Basin in Colorado, we urge the state to pursue a comprehensive suite of alternative actions, in concert with Program partners, to achieve the necessary biological outcome. Also, we implore partners in the upper Yampa River drainage to replace the tagging study at Stagecoach Reservoir with a removal effort. The Service fully supports this change in project objective and is more than willing to modify the existing FERC biological opinion to implement that change if necessary.

#### *Flow Management*

We fully agree with the Program that finalizing endangered fish flow recommendations for the White River is an essential step to recovery. We are concerned that the timeline for development of a White River management plan is slipping. We encourage the Program to secure the services of a contractor and start the necessary demand / fish needs modeling by this time next year. Also, we encourage Program partners to continue to push forward to protect endangered fish flows in the Green River. Finally, we ask that Program partners continue to explore flexibility in operations and storage throughout the upper Colorado River drainage, particularly during dry years and with respect to priorities and antecedent conditions, to reduce the amount of time flows drop below 810cfs in the 15-Mile Reach.

*Endangered fish entrainment at irrigation canals*

The number of endangered fish detected in the Green River irrigation canal (Tusher Wash Diversion) in 2013 was astonishing. The Service believes that Program partners are responding with an appropriate sense of urgency to remedy this problem. However, we must stress how vitally important it is to the health of lower Green River endangered fish populations that a solution to entrainment be implemented at this site as quickly as possible.

The Service shares the Recovery Program's concern about the number of native and endangered fish salvaged each year from Grand Valley canals following the irrigation season. We don't know if the screens at the GVIC, GVP, and Redlands diversions can be operated more frequently, but we implore program partners to thoroughly investigate this issue to determine if / how the Recovery Program can assist the irrigation companies to further reduce entrainment.

The Recovery Program has made strong progress in protecting flows and restoring habitat and has demonstrated strong resolve to manage nonnative fishes in recent years. Eight of the 26 accomplishments listed in the table above relate to nonnative fishes, as do 11 of the 28 concerns. As mentioned last year, 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 tight budgets. The Service will assist and support the Program by identifying accomplishments and important recovery actions that remain as we revise the Colorado River endangered fish recovery plans.

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 2013-2014 assessment of progress. Specific questions about sufficient progress should be directed to Tom Chart, Recovery Program Director, 303-236-9885, tom\_chart@fws.gov or Angela Kantola, Deputy Director, 303-236-9882, angela\_kantola@fws.gov.

## II. IMPLEMENTATION OF ITEMS IN THE YAMPA RIVER BASIN PROGRAMMATIC BIOLOGICAL OPINIONS

On January 10, 2005, the Service issued a [final programmatic biological opinion on the Management Plan for Endangered Fishes in the Yampa River Basin](#). Known as the "Yampa River Programmatic Biological Opinion (PBO)", this document determined that implementation of the [Management Plan for Endangered Fishes in the Yampa River Basin](#) would not likely jeopardize the continued existence of the endangered fishes. The PBO cites action items in the Program's Recovery Action Plan (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 states: "In 2006 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. The Service recently conducted this review (2012) in consultation with Recovery Program partners (see attached status report) and concluded that the Recovery Program is making sufficient progress in accomplishing most of the action items listed in the PBO. Although the schedule for some tasks has slipped, the PBO recognized this might happen. Page 73 of the PBO states: "The Recovery Action Plan is an adaptive management plan because additional information, changing priorities, and the development of the States' entitlement may require modification of the Recovery Action Plan. Therefore, the Recovery Action Plan is reviewed annually and updated and changed when necessary and the required time frames include changes in timing approved by means of the normal procedures of the Recovery Program, as explained in the description of the proposed

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<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.

action.” If the circumstances surrounding changes in the Recovery Action Plan impact the listed species in a manner(s) not previously considered, reinitiation of the PBO may be needed.

The Service recognizes the following significant recovery accomplishments that have occurred since 2005:

1. Completion of Elkhead Reservoir enlargement and subsequent base flow augmentation from Recovery Program pool and leased water.
2. Installation and maintenance of screens on Elkhead Reservoir outlet towers.
3. Completion of the comprehensive [Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy](#).
4. Analysis of escapement of nonnative fish from Elkhead Reservoir and commitment to reset the reservoir fishery through reclamation.
5. Ongoing and expanded mechanical removal of nonnative fish in the Yampa River.
6. Removal of more than 10,000 northern pike from Catamount Reservoir by CPW as part of an effort to restore the trout fishery and reduce downstream impacts on native and endangered fish.
7. Evaluation of fish entrainment in the Maybell Canal. (The Service has concluded that due to relatively low rates of entrainment detected, an exclusion device would not be cost effective. However, the Recovery Program should offset impacts at the Maybell Canal by completing the Yampa River nonnative fish control actions identified in the RIPRAP addendum [as required in the 2012-2103 Sufficient Progress memo] in a timely manner.)

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) achieve greater success controlling expanding populations of nonnative predators, eliminating nonnative species at their sources, and preventing introduction of new nonnative species; 2) identify and correct factors limiting wild populations of humpback chub; and 3) complete the update of the model which accounts for past depletions to monitor impacts to peak flows on the Yampa River in critical habitat and assess need for peak flow protection. The concerns raised here are specific to the Yampa River, but are generally consistent with those raised in the Regional Director’s overall review of the Recovery Program’s progress.

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