

**RECOVERY PROGRAM
FY 2014-2018 SCOPE OF WORK for:**

Recovery Program Project Number: 125

Middle Yampa smallmouth bass and northern pike removal

Reclamation Agreement number: 09-FG-40-2860 (CSU)

Reclamation Agreement term:

Note: Recovery Program FY14-15 scopes of work are drafted in May 2013. They often are revised before final Program approval and may subsequently be revised again in response to changing Program needs. Program participants also recognize the need and allow for some flexibility in scopes of work to accommodate new information (especially in nonnative fish management projects) and changing hydrological conditions.

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(see last page for revision dates and notes)

Category:

Ongoing project

Ongoing-revised project

Requested new project

Unsolicited proposal

Expected Funding Source:

Annual funds

Capital funds

Other [*explain*]

I. Title of Proposal: Evaluation of smallmouth bass and northern pike management in the middle Yampa River.

II. Relationship to RIPRAP (3/21/2012 version):

Green River Action Plan: Yampa and Little Snake rivers

III Reduce negative impacts of nonnative fishes and sport fish management activities (nonnative and sport fish management).

III.B. Implement CPW Yampa Basin aquatic wildlife management plan and the Recovery Program's Yampa River Nonnative Fish Control Strategy. Each control activity will be evaluated for effectiveness and then continued as needed. See also III.A.2.c.1&2 under General Recovery program Support Action Plan.

III.B.1.. Prevent nonnative fish introduction; reduce invasion and recruitment.

III.B.1(a). Evaluate nonnative fish escapement and control options at Elkhead Reservoir (during and after Elkhead expansion construction). See Miller et al. 2005.

III.B.1.(d)(2) Smallmouth bass

III.B.2. Control nonnative fishes via mechanical removal.

- III.B.2.a. Estimate nonnative abundance, status, trends & distribution (YS I-3).
- III.B.2.c. Identify and evaluate gear types and methods to control nonnative fishes (YS I-5)
- III.B.2.d. Remove and translocate northern pike from the Yampa River. See Hawkins et al 2005. (YS J-1).
- III.B.2.e. Remove (formerly "and translocate") smallmouth bass. (YS J-1).

See *RIPRAP* at <http://www.coloradoriverrecovery.org/documents-publications/foundational-documents/recovery-action-plan.html>]

III. Study Background/Rationale and Hypotheses

In the Yampa River, nonnative piscivorous smallmouth bass *Micropterus dolomieu* and northern pike *Esox lucius* are a predatory and competitive threat to native and endangered fishes. Northern pike have occupied the river for just over 25 years and smallmouth bass have occupied the river in significant numbers only since 1992. Northern pike were stocked into the tributary Elkhead Reservoir in the late 1970s, about the same time they first occurred in the Yampa River. In addition to Elkhead Reservoir, northern pike now occur throughout the Yampa River and portions of the middle Green River, both upstream and downstream of the Yampa River confluence, and in addition to Elkhead Reservoir they now have self-sustaining populations in Stagecoach and Catamount reservoirs where they were illegally introduced.

Smallmouth bass were extremely rare in the Yampa River until a rapid draw down of Elkhead Reservoir for dam maintenance in 1992 introduced a very large number of smallmouth bass into the Yampa River. Those fish established self-sustaining populations in the river and smallmouth bass are now abundant throughout the Yampa River downstream of Elkhead Creek. The loss of fish from the reservoir was so great in 1992 that local fishermen reported a significant decline in the smallmouth bass fishery in Elkhead Reservoir immediately after the draw down. After the establishment of smallmouth bass the native fish community declined precipitously from 68% to only 3% of all fish captured in the Juniper Springs area from 1983 to 2007 (Wick et al. 1985; Hawkins et al 2009a). During that same period, smallmouth bass increased from less than 1% to 57% of the fish community; the decline in native fish is attributed to predation by increased numbers of smallmouth bass. Smallmouth bass are also considered food-resource competitors with Colorado pikeminnow *Ptychocheilus lucius* due to their predation on small fish typically consumed by pikeminnow. The small-fish prey base has precipitously declined concurrently with the invasion of smallmouth bass and drought-related warmer water temperatures (Bestgen et al. 2007). Smallmouth bass have expanded their range downstream into Dinosaur National Monument and pose a great threat to young endangered fishes that reside there.

Both northern pike and smallmouth bass occupy reaches designated as critical habitat for the federally endangered Colorado pikeminnow, razorback sucker *Xyrauchen texanus*, humpback chub *Gila cypha*, and bonytail *G. elegans*. Northern pike are known predators of wild Colorado pikeminnow (Hawkins unpublished data) and stocked razorback sucker and are presumed predators of humpback chub and recently reintroduced bonytail. Northern pike also pose a significant predation threat to other native species such as roundtail chub *G. robusta*, flannelmouth sucker *Catostomus latipinnis*, and bluehead sucker *C. discobolus* (Martinez 1995). Northern pike were rated the 3rd greatest nonnative species of concern by experts in the Upper Colorado River Basin based on the potential effects of pike predation on endangered

and other native fishes (Hawkins and Nesler 1991). Smallmouth bass were ranked low on the list of species of concern but the ranking questionnaire was completed before their 1992 invasion into the Yampa River. The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) using more recent data determined that management actions to reduce abundance of nonnative piscivorous fish were necessary to recover endangered fishes in the Upper Basin. Colorado Parks and Wildlife (CPW), a Recovery Program participant, developed an Aquatic Wildlife Management Plan for the Yampa River Basin (Yampa Aquatic Plan) that recommended managing the reach downstream of Craig, Colorado, for native and endangered fishes by removing smallmouth bass, channel catfish *Ictalurus punctatus*, and northern pike and relocating some of those species to other waters within the Yampa Basin to provide continued sport-fishing opportunities (CPW 2010). The Yampa Aquatic Plan also recommended lethal removal of white sucker *Catostomus commersonii* because of their potential for competition and hybridization with native and endangered suckers. Reducing the number of smallmouth bass and northern pike from critical habitat should reduce predation pressure, increase forage, and reduce the influx of both species to downstream reaches and other rivers. The work described in this SOW focuses primarily on removal of smallmouth bass and northern pike and secondarily on removal of white sucker and common carp from two study sites in the Yampa River. The expected results of this work will be a reduction of smallmouth bass and northern pike and a reduction of spawning success of smallmouth bass in the study reaches. This work will also develop and identify effective and efficient techniques for reducing the targeted species. Results will be measured by a decline in the number or size distribution of the targeted species and a reduction in their colonization of downstream reaches. Ultimate successful reduction of targeted species will result in decreased predation and competition with endangered fishes and a positive response in the small-bodied fish community.

IV. Study Goals, Objectives, End Product(s): *[Include measurable outcomes and their expected due dates.]*

We are implementing control measures through active removal of nonnative smallmouth bass and northern pike in the middle Yampa River and coordinating our sampling with CPW and U.S. Fish and Wildlife Service (USFWS) who are responsible for removal of those species in other adjacent reaches. We (CSU) will be responsible for management and analysis of smallmouth bass data and CPW will be responsible for management and analysis of northern pike data collected from the Yampa River, upstream of Dinosaur National Monument.

Smallmouth bass

The goal is to reduce the number of smallmouth bass and reduce their spawning success in two study sites in the Yampa River in order to benefit native fishes and assist in the recovery of endangered fishes.

Objectives:

1. Obtain an estimate of the number of smallmouth bass in Little Yampa Canyon using a mark-recapture abundance estimator.
2. Conduct at least one adequate marking pass in Little Yampa Canyon and seven removal passes for smallmouth bass in Little Yampa Canyon and Lily Park.

3. Reduce the success of smallmouth bass spawning in the South Beach, Little Yampa Canyon, and Juniper reaches.
4. Calculate the proportion of juvenile and adult smallmouth bass removed from Little Yampa Canyon based on initial population size.
5. Remove large numbers of age-0 and age-1 smallmouth bass from a 12-mile treatment reach (RM100-112) in Little Yampa Canyon and in Lily Park in coordination with Recovery Program Project 140 (Native fish response evaluation).

Northern pike

The goal is to reduce the number of northern pike from two study sites in the Yampa River in order to benefit native fishes and assist in the recovery of endangered fishes. Coordinate removal sampling with CPW and USFWS (Primarily accomplished by CPW Project 98a and supplemented by this Project (#125)).

Objective:

Conduct eight removal passes for northern pike from the Little Yampa Canyon and Lily Park study reaches to support Project 98a.

Other species

The goal is to reduce the number of other nonnative species from two study sites in the Yampa River in order to benefit native fishes and assist in the recovery of endangered fishes.

Objectives:

1. Remove centrarchid species, black bullhead, and brook stickleback *Culaea inconstans* on all sample occasions in all areas of the two study sites on the Yampa River.
2. Remove white sucker, white sucker hybrids, and common carp in Lily Park and the lower 12-miles of Little Yampa Canyon to develop baseline data on the effort required to reduce their numbers.
3. Evaluate whether there is a change in relative abundance of common carp, white sucker and white sucker hybrids over time and between control and treatment reaches by comparing CPUE of the two species from 1-mile fish-community samples in treatment and control reaches.

Results will be reported in Annual Reports and at Annual Nonnative and Researcher's meetings.

V. Study Area:

Our research will focus on two study reaches in the Yampa River, Colorado, a 24-mile reach in Little Yampa Canyon which is from Round Bottom (RM 124) to about 1-mile upstream of Government Bridge (RM 100) and an 8-mile reach at Lily Park from Cross Mountain Canyon (RM 55.5) to the boundary of Dinosaur National Monument (RM 47.5).

Sampling Dates

We will sample for smallmouth bass with boat electrofishing from May through July using a 10-days on and 4-days off rotation including eight consecutive sampling days. Both northern pike and smallmouth bass are susceptible to electrofishing when they occupy shallow shoreline and flooded off-channel habitats during runoff flows. Spring runoff sampling also allows for safer navigation with large electrofishing boats. As discharge declines and water clears, young smallmouth bass become more susceptible to capture. During base flow from mid-July through August, we will remove primarily age-0 bass from Lily Park and the lower 12-miles of

the Little Yampa Canyon reach. Removing age-0 bass only in the 12-mile treatment reach in Little Yampa Canyon maintains the Control-Treatment study design originally designated in 2004 in support of the native fish response evaluation by Project 140.

VI. Study Methods/Approach:

Sampling protocol— Each year, we will remove smallmouth bass from each study site on multiple occasions in an attempt to reduce their number or size structure. Fish will be captured with boat electrofishing from May through mid-July when flow is sufficient (>1000 cfs) to navigate the river with 17-ft. aluminum, Jon-boats fitted with outboard jet motors. Both shorelines will be sampled concurrently with two electrofishing boats using ETS brand, pulsed –DC current. Sampling will occur in a downstream direction covering about 6 miles per day until the entire reach is sampled. Other sampling gear types such as backpack shocker, seine, trammel net, or fyke nests may also be used (Table 1). A third boat will be used to process, maintain, and transport live fish as needed. Each reach will be sampled on multiple occasions each year with an interval of 4–10 days between occasions. In the Little Yampa Canyon reach only, smallmouth bass ≥ 100 mm TL will be marked with a numbered Floy tag and released on at least one sample occasion each year to serve as a mark for abundance estimation. Prior to 2009, fish were marked on the first sample pass and removed on all subsequent passes. Starting in 2009, the marking pass may occur later in the year (around the second or third pass) in order to obtain an adequate number of marked animals. On all sample occasions prior to or after the marking pass, smallmouth bass will be removed from the river. For a description of the sampling protocol used in previous years see Hawkins et al. (2009a).

We will process fish every ½-mile. Smallmouth bass that are returned to the river will be Floy tagged and released within the ½-mile section from which they were captured. Backwater and flooded tributary mouth areas will be sampled by electrofishing boat, fyke net, or block-and-shock techniques described by Nesler (1995). To determine spawning locations and timing of smallmouth bass reproduction, we will note when we observe males moving off nests and the reproductive condition of captured fish. Spawning areas will be intensively targeted for removal of nesting, spawning or nest guarding adult fish, young bass will be removed from active nests, and nest sites will be physically disrupted.

Removal effort— We will attempt to maximize the number of removal occasions each year based on time and resources.

Removal evaluation— Each year we will estimate the abundance and capture probability of smallmouth bass at Little Yampa Canyon using mark-recapture methods. We will calculate catch per unit effort (CPUE) for adult smallmouth bass for each sample occasion and obtain an average CPUE for all sample occasions each year at both sites. We will determine removal effectiveness primarily by examining changes in annual abundance of juvenile (100-199mm TL) and adult (≥ 200 mm TL) smallmouth bass in Little Yampa Canyon. We will calculate two other annual measures of removal effectiveness: removal rate and recapture rate from Little Yampa Canyon. Removal rate measures the proportion of fish removed in relation to the abundance estimate and recapture rate measures the percent of tagged fish recaptured during removal.

Intensive sampling during smallmouth bass spawning —We will use current knowledge about

smallmouth bass spawning ecology to focus and increase removal of spawning smallmouth bass starting in 2010. Once temperatures reach 16° C, we will increase removal efforts in areas with known or potential spawning habitat by organizing and coordinating a multi-agency effort known as “The Surge”. Our goal is to disrupt all stages of the spawning period, including pre-spawn nest building, spawning, and nest guarding. This activity has been shown in our annual reports to increase the catch and removal of adult fish, disrupt the spawning event, remove guarding males from active nests, and is expected to ultimately reduce the survival of young hatchlings. Removing spawning adults from nesting areas during the earlier nest building and spawning stages will create a sink in these areas for late spawners which will then be targeted for removal. Adult bass on nests are vulnerable to electrofishing gear because they are in shallow water and they have a tendency to remain and protect the nest rather than flee. Our plan is to remove spawning fish and create a void in desirable spawning habitat so that new bass can occupy those areas and be removed on subsequent sampling occasions. In that process, we will also be disrupting and decreasing the survival of eggs or young in nests. Sampling effort will be directed at river sections with concentrations of spawning bass. We will focus on the reaches between South Beach and Lower Juniper (RM 135–90), because those reaches have well-known spawning habitat. This sampling will be conducted with electrofishing aluminum jon-boats and rafts.

Additional resources during The Surge— Increased removal effort will require additional people and equipment; therefore, (CSU) will work closely with CPW to coordinate removal passes and will receive assistance from FWS crews from Vernal and Grand Junction. During intensive sampling, CSU will contribute one additional boat and one additional field technician for a total of eight people and four boats. CPW will increase sampling in South Beach, upper and lower Maybell, and Lower Juniper prior to spawning and will contribute a total of four people and three boats during intensive sampling. FWS- Grand Junction will assist with intensive sampling for 2 weeks and provide three people, two electrofishing jet boats or rafts, and two trucks. FWS-Vernal will assist for 2 weeks and provide two people and one truck with a fish hauler.

Effort required to complete one pass of the South Beach, Little Yampa Canyon, and lower Juniper reaches is about 7 days. But with one extra crew (in addition to the CSU crew), we can increase our sampling effort to complete all three reaches within 3-4 days. We will prioritize areas to sample on each future pass based on results from the previous pass. We will also allow each section to have about a 3-4-day reset period before returning to resample in order to allow spawning habitat to reset with either displaced fish or new spawners.

Prediction of spawning period—CSU will measure water temperature daily and monitor temperatures at the Maybell gage and report when temperatures are expected to reach 16° C. Based on the past five years, this will occur between late-May and the end of June. Spawning generally starts during the last part of the descending hydrograph and ends when young bass leave the nest about the time runoff drops to base flow. Bass nests are active for 10-20 days depending on temperatures and we plan to sample intensively so that almost all nests, no matter when started, would be disturbed on two to five occasions. Intensive sampling should start within 5 days of temperatures reaching 16° C and continue for approximately 4 weeks or until water levels decline to a point that the river is un-navigable.

Spawning habitat probably occurs in all reaches but nests are often dispersed along the river shoreline or in backwaters and can vary in density. We propose sampling through all three reaches at least once to discover and document either specific locations or sections of river where spawning is concentrated. We will then target spawning concentrations or river sections with high densities of spawning habitat on future removal occasions. If time and logistics allow, we will extend some effort in other reaches where spawning could be occurring after we have confirmed that spawning is occurring in known reaches. Areas that should be examined for potential spawning include the lower 5–10 miles of the Craig reach and the Maybell and Sunbeam reaches.

After spawning and during periods of low stream discharge in July and August, we will focus on removing young (age-0 and age-1) smallmouth bass from Lily Park and the lower 12-mile section of the Little Yampa Canyon study site (i.e. the original treatment reach designated in 2004). This reach is part of the control–treatment design of the native fish evaluation study (Bestgen et al. 2007). Young smallmouth bass will be captured with a 10 m-long electric seine powered by a 2000-watt generator. Other gear may include boat or backpack electrofisher, angling, seine, trap net, or cages with baited or scented attractants (Table 1). We will conduct at least three separate sampling occasions, in July and August, each about 10 days long and reaches will be sampled multiple times on each occasion. We will sample primarily shallow, low-velocity shorelines associated with backwaters, embayments, or boulders deposited from talus slopes. All native and nonnative species will be handled as they are during boat electrofishing and as specified in Table 2 unless specified differently by the state collecting permit. A summary of collecting gear, fish handling, tagging, and disposition of each species is provided in Tables 1 and 2 for State of Colorado scientific collecting permit application.

Fish handling — Fish captured with boat electrofishing will be placed in a live well, measured to the nearest mm TL, and weighed to the nearest 50 gr with 5- or 10-kg, Pesola® spring scale. Fish captured with electric seine will be weighed to the nearest 0.1 gr with an electronic scale. Fish handling time will be reduced by subsampling lengths and weights of fish, except for tagged or recaptured fish, which we will measure and weigh. All fish will be examined for tags, fin clips, pike bites, reproductive condition. Smallmouth bass ≥ 100 mm TL captured during the mark pass in Little Yampa Canyon will be tagged so that recaptured fish can provide information about abundance, growth, and movement. During removal passes starting in 2011, all smallmouth bass will be euthanized with an overdose of Tricaine methanesulfonate (MS-222). Northern pike ≥ 500 mm TL will be Floy t-tagged, given a left pelvic fin clip, and translocated to Yampa State Park Headquarters' pond as directed by CPW. Northern pike smaller than 500 mm will be euthanized. See Table 2 for sizes of each species that will be tagged, euthanized, or translocated. Fish will be tagged with a numbered, Floy® t-bar anchor tag (model FD-94) inserted through the left musculature between pterygiophores near the posterior base of the dorsal fin. Fish that are translocated will be transported in an oxygenated live well. Tag colors and numbers will be coordinated with other agencies each year.

Endangered fishes and roundtail chub will be handled per guidelines and permits of the CPW and the USFWS. All Colorado pikeminnow and roundtail chub will be captured, PIT tagged per Recovery Program protocol, their location recorded within 0.1 mile, and UTM coordinates recorded. We will record tag data for all recaptured fish originally tagged by other agencies.

All trout species and channel catfish will be measured and released in the river. Other nonnative species captured that will be euthanized include centrarchids, black bullhead *Ameiurus exile*, walleye *Stizostedion vitreum*, brook stickleback, common carp *Cyprinus carpio*, white sucker, and white sucker hybrids. Handling protocol is described in Table 2. Centrarchids, black bullhead, and stickleback will be removed on all sample occasions from both study sites. Stickleback and common carp are on the state of Colorado's prohibited species list and any other species captured that is on the Colorado prohibited species list will be removed and euthanized (Table 3). Starting in 2009, we will initiate a pilot program to determine the effort involved to remove common carp, white suckers, and white sucker hybrids using electrofishing boat and electric seine. Removal of these species will occur concurrently with removal of smallmouth bass and northern pike and will be temporarily suspended if it compromises removal of smallmouth bass or northern pike. Carp and white sucker will be removed from Lily Park and a treatment reach in the lower 12-miles of Little Yampa Canyon. Fish that are euthanized will be provided to CPW researchers, kept as a voucher specimens and cataloged into the LFL fish collection, or disposed of per state collecting permit requirements. We will evaluate if we are having a removal effect on white sucker and common carp by comparing their CPUE and relative abundance in the 1-mile community sampling sites in the upper 12-miles (control reach) with the lower 12 miles (treatment reach) of Little Yampa Canyon.

Fish Community (1-mile) sampling— We will monitor relative abundance of the fish community at four, 1-mile sites in Little Yampa Canyon and one, 1-mile site at Lily Park. These locations include RM 118.0–119.0 near Milk Creek, RM 112.5–113.5 near Sand Spring Gulch, RM 108.0–109.0 near Duffy Tunnel inlet, RM 104–103 near Morgan Gulch and RM 52.0–53.0 near Lily Park Bridge. Each site will be sampled at least monthly with boat electrofishing concurrently with smallmouth bass sampling. At each site we will net, count, and measure lengths and weights of all fish species.

Assessment of spawning success by smallmouth bass— To assess the success of spawning disruption from intensive removal of spawning adult smallmouth bass and to look for high density areas of YOY smallmouth bass that indicate nearby areas of high spawning density, we will sample the middle Yampa River longitudinally from Elkhead Creek to Dinosaur National Monument (RM 147–46) including both Juniper Canyon (2 miles) and Cross Mountain Canyon (3 miles). Sampling will occur in August when YOY smallmouth bass are relatively small but large enough to be susceptible to the sampling gear. Sampling gear will include seine, dipnet, backpack electrofisher, and electric seine. We will estimate YOY smallmouth bass abundance by their relative abundance to other species and their catch per unit effort (CPUE).

We will spend a total of three weeks sampling all reaches by spending one week in Craig and South Beach reaches, one week in Little Yampa Canyon, Lower Juniper, and Juniper Canyon, and one week in Maybell, Cross Mountain Canyon, and Lily Park. Sampling in Craig, South Beach, and Maybell will be coordinated with and may be assisted by the CPW Area aquatic biologist and his technicians. Sampling in Little Yampa Canyon and Lily Park will coordinate and may co-occur with ongoing YOY smallmouth bass removal sampling in those two reaches. Fish will be identified in the field when possible and fish that cannot be identified in the field and voucher specimens will be euthanized and preserved for lab verification.

Smallmouth bass spawning ecology in the Yampa River

Nest location—In other river systems, smallmouth bass nests are often adjacent to some type of large cover such as a log or boulder, but nests in the Yampa River are usually exposed and not associated with large cover except when they occur near steep-cut banks. In the Yampa River, smallmouth bass nests are located in either backwaters or in other quiet (zero velocity) waters usually near shore or downstream from an obstruction that breaks the current. Nests in the Yampa River are typically about 1-m deep, but the literature reports typical depths of 0.6–1.5 m (2-5 ft). Nests are typically circular, 25–50 cm (10 to 20 in) in diameter, with predominately small-gravel substrates which, when visible, are often darker and stand out from the surrounding, silted bottom. In portions of the Yampa River we have identified several backwaters that contain congregations of nesting smallmouth bass and several sections of river that contain high densities of nesting bass opportunistically dispersed along the shoreline among suitable habitat. Some reaches, such as lower Craig and Maybell to Sunbeam, have not been sampled recently during the spawning period and the status of nest concentration in those areas is unknown. Often, water clarity is too poor during nesting in the Yampa River to visually detect nests. If nests are not visible, then we will determine spawning activity and nest location by observing gonad development via dissection, monitoring bass for abrasions on the anal or caudal fin indicating nest clearing, and monitoring bass capture locations that contain depth, velocity, and substrate typical of spawning habitat.

Environmental factors and timing—Spawning activity begins when temperatures reach about 16–18° C (60–65° F) which in the Yampa River can range from early to late June. Bestgen presented back-calculated hatching dates based on otolith increments at the 2009 Nonnative Workshop that support a start of spawning at 16° C which can vary depending on discharge volume and timing (Figure 1). Hatching date ranges from two to nine days after spawning, depending on temperatures. Optimum incubation and hatching temperatures range from 19–22°C (66–72°F) and shorten hatching time. After hatching, larvae drop into the gravel nest and they eventually emerge and remain in the nest for an additional 6–15 days. Males will often remain in the area and guard the slowly dispersing young for as long as 28 days.

Reproductive strategy—Male smallmouth bass build a nest over a period of 4–48 hours, starting primarily in the morning. There may be multiple spawning events over a single nest for several hours. Eggs are demersal and adhesive. Females may spawn over several time periods before being spent because their eggs mature at different rates. The literature reports that only about 25% of mature males nest in any given year and larger males nest earlier and often have more successful nests than smaller males. Larger males also tend to be more protective and aggressive in defense of the nest than smaller males. Males actively guard the nest and young from time of egg deposition to fry dispersal. Removing the male from a nest (typically reported in the literature by angling) often results in large losses of eggs or larvae due to predation on the young or abandonment of the nest by the male if released back to the water. However, we have observed males return to a nest after being chased away by electrofishing.

Northern pike in Little Snake River--- In October of 2012, we assisted the Wyoming Game and Fish Department with sampling refugia pools below three diversion dams including Baggs and Stateline diversions both in Wyoming and Trowel Diversion in Colorado. The purpose was to document the occurrence of northern pike in the upper reaches of the Little Snake River. Sample

gear included trammel nests and barge and Jon Boat electrofishers. We captured seven northern pike of both sexes with total lengths between 538 and 798 mm. In 2013, we will assist WGFD again with two people for two days in the spring and four days in the late summer.

VII. Task Description and Schedule:

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|------------------|--|
| Task 1 Oct-Jan | Prepare and present results of the previous year's field work at three annual Program meetings: nonnative workshop, nonnative summit workshop, and Researcher's Meeting. |
| Task 2 Feb- Mar | Contact landowners and obtain permission for private property access for sampling. Attend agency and public meetings. Hire and train field crew; purchase, prepare, and fabricate equipment. |
| Task 3 Apr - Jul | Yampa River sampling in Critical Habitat. capture, and remove smallmouth bass and northern pike. |
| Task 4 Jun-Jul | Coordinate and conduct smallmouth bass removal and spawning disruption during the spawning period. |
| Task 4.1 | Assist Wyoming Game and Fish with sampling for northern pike in the Little Snake River. |
| Task 5 Jul- Aug | Capture and remove YOY and yearling smallmouth bass from treatment sites |
| Task 6 Aug | Evaluate success of spawning by identifying distribution and relative abundance of YOY smallmouth in the Yampa River. |
| Task 7 Aug - Oct | Equipment maintenance. Data entry and analysis.
Interaction and data sharing with other biologists and researchers.
Prepare Recovery Program annual progress report. |

VIII. Deliverables, Due Dates, and Budget by Fiscal Year:

FY-2014, 2016-2018 Work

Project annual reports to Program Directors Office by November each year.

Budget Notes:

Larval Fish Laboratory, sampling and data analysis

Larval Fish Laboratory: Annual increases in budget each year are attributed only to 3% salary increase each year for LFL employees. LFL fringe benefits are 27% of the total amount of salaries and is figured into salary costs. LFL overhead rate is 17.5% and is charged to all items.

Travel: Travel costs include travel from primary residence in Fort Collins to a rental house 25 miles south of Craig, Colorado and near the project location of the Yampa River. We are stationed at the field location for 8 days of sampling on the Yampa River on each trip. Daily travel is from the rental house to various field locations on the Yampa River for daily field work. Travel to the field site from Ft Collins requires 2-3 trucks depending on the number of crew and boats being transported. During field sampling the number of trucks varies from 3-4 depending on the number of boats being transported or whether fish need to be moved to other locations. Housing costs assume ability to rent a house for the crew while at their field location

and the associated costs of cooking and providing meals while at the field location. Daily per diem rate of \$20 /day /person reflects the amount needed to purchase groceries for the crew while they are in the field and is substantially less than the IRS per diem rate for western Colorado. Mileage is based on the standard rate for Motor Pool vehicles, which varies depending on age and size of the vehicle

Personnel: Personnel include a senior biologist (P.I.), two junior biologists, and up to four seasonal technicians. Salaries include 27% fringe rate, an estimate for 2014, plus overhead. Overhead is 17.5%, per our agreement with BOR.

Supplies: Supplies are used primarily in constructing, maintaining, and repairing boats and electrofishing equipment and secondarily in maintaining other equipment for field sampling and lab analysis of specimens. Containers and preservatives are to hold field specimens and to curate specimens in the lab, preservative are formalin and ethanol for preservation of samples. Nets include seines and trammel nets, disposable goods that need replacements due to attrition. Fyke nets are stationary gear for pike sampling and need to be replaced due to attrition. Tools for repairs include hand and electrical tools to assist with repair and maintenance of sampling gear in the field. Boating gear includes personal flotation devices, straps and other rigging for aluminum jon-boats and rafts, oars, shocking boat booms, frame repair or replacement, and flooring. Estimated costs based on past expenses and current prices procured from various online sources (local vendors, NRS rafting supplies, Christiansen Inc, for net supplies)

Budget notes: Need to consider that replacement of boats and outboard engines was not included in 2014; these equipment items are aging and will need replacement over time.

FY 2014-2018

**Deliverables

Recovery Program Annual Report Nov each year.

Budget-2014

	CSU- LFL	Task Sub- total
FY 2014 Costs		
Task 1		
Labor-Biologist Sr. Researcher (\$1750/week – 4 weeks)	7,000	
Labor-Biologist Researcher III (\$1200/week – 4 weeks)	4,800	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 3 days/trip x 2 people x 3 trips)	828	
Travel- Truck mileage (\$0.40/mile x 500 miles/trip x 3 trips)	600	
Task subtotal		13,708
Task 2		
Labor-Biologist Sr.Researcher (\$1750/week – 1 week)	1,750	
Labor-Biologist Researcher III (\$1200/week – 1 weeks)	1,200	

Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 4 days x 2 people)	368	
Travel- Truck mileage (\$0.40/mile x 750 miles)	300	
Task subtotal		4,098

Task 3

Labor-Biologist Sr. Researcher (\$1750/week – 15 weeks)	26,250	
Labor-Biologist Researcher III (2 x \$1200/week – 15 weeks)	36,000	
Labor- Biological Technicians (3 techs x \$750/week x 15 weeks)	33,750	
Travel-Lodging rental house (\$1200/ month x 4 months)	4,800	
Travel-per Diem (\$20/day x 10 days/trip x 6 trips x 7 people)	8,400	
Travel- Truck Insurance and motor pool fees (\$380/yr x 4 trucks)	1,520	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 6 trips)	2,160	
Travel- Truck mileage 1-ton fish hauler (\$0.45/mile x 500 miles/trip x 6 trips)	1,350	
Travel- Truck mileage 1-ton people hauler (\$0.82 /mile x 900 miles/trip x 6 trips)	4,428	
Travel- Truck mileage gas hauler (\$0.87/mile x 200 miles/trip x 6 trips)	1,044	
Supplies- Boat Gas (3 boats x \$3.85/gal x 15 gal/day x 8 days/trip x 6 trips)	8,316	
Supplies-Field supplies (nets, booms, boots and waders, first aid, electrical safety gloves, tools, deep cycle batteries, lower unit grease and other lubricants and parts for generators. electrical connector replacement for safe electrofishing operation)	1,200	
Supplies- Boat 2-cycle oil (\$27/gal x 3 gallons/boat/trip x 3 boats x 6 trips)	1,701	
Service- Annual boat engine service at dealer (\$500/boat x 4 boats)	2,000	
Service- Boat repair and maintenance- Welding , rigging and field equipment repair	500	
Supplies- Fish transport supplies (O2 bottle rental and refill, transport fish salts)	280	
Service- Wireless broadband modem for work related email	828	
Task subtotal		134,527

Task 4

Labor-Biologist Sr. Researcher (\$1750/week – 2 weeks)	3,500	
Labor-Biologist Researcher III (2 x \$1200/week – 2 weeks)	4,800	
Labor- Biological Technicians (4 techs x \$750/week x 2 weeks)	6,000	
Travel-per Diem (\$20/day x 10 days/trip x 2 trips x 7 people)	2,800	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 2 trips)	720	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 2 trips)	810	
Task subtotal		18,630

Task 4.1		
Labor-Biologist Sr. Researcher (\$1750/week – 1.1 week)	1,925	
Labor- Biological Technician (\$750/week x 1.1 week)	825	
Travel-per Diem (\$20/day x 8 days x 2 people)	320	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles)	405	
Field Supplies- nets, bags, electrofishing safety gloves	250	
Task subtotal		3,725
Task 5		
Labor-Biologist Sr. Researcher (\$1750/week – 4 weeks)	7,000	
Labor-Biologist Researcher III (2 x \$1200/week – 4 weeks)	9,600	
Labor- Biological Technicians (3 techs x \$750/week x 4 weeks)	9,000	
Travel-Lodging rental house (\$1200/ month x 1 months)	1,200	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 5 people)	4,000	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 4 trips)	1,440	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1,600	
Supplies- Electric seine repair and maintenance (replacement of electrical connections to maintain safe operation)	520	
Task subtotal		34,360
Task 6		
Labor-Biologist Sr. Researcher (\$1750/week – 4 weeks)	7,000	
Labor- Biological Technicians (\$750/week x 4 weeks)	3,000	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 2 people)	1,600	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1,600	
Supplies-Field supplies (nets, electrofishing booms, boots and waders for crew, first aid, rubber electrical safety gloves, maintenance tools, batteries)	800	
Task subtotal		14,000
Task 7		
Labor-Biologist Sr. Researcher (\$1750/week – 5 weeks)	8,750	
Labor-Biologist Researcher III (\$1200/week – 4 weeks)	4800	
Labor- Biological Technicians (\$750/week x 5 weeks)	4,500	
Supplies-computer software updates for tag data analysis	400	
Task subtotal		18,450
Sub Total all Tasks		241,498
CSU overhead BOR rate 17.5%		42,262

Total- CSU LFL

283,760

Budget-2015

	CSU- LFL	Task Sub- total
FY 2015 Costs		
Task 1		
Labor-Biologist Sr. Researcher (\$1800/week – 4 weeks)	7200	
Labor-Biologist Researcher III (\$1236/week – 4 weeks)	4944	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 3 days/trip x 2 people x 3 trips)	828	
Travel- Truck mileage (\$.40/mile x 500 miles/trip x 3 trips)	600	
Task subtotal		14052
Task 2		
Labor-Biologist Sr.Researcher (\$1800/week – 1 week)	1800	
Labor-Biologist Researcher III (\$1236/week – 1 weeks)	1236	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 4 days x 2 people)	368	
Travel- Truck mileage (\$.40/mile x 750 miles)	300	
Task subtotal		4184
Task 3		
Labor-Biologist Sr. Researcher (\$1800/week – 15 weeks)	27000	
Labor-Biologist Researcher III (2 x \$1236/week – 15 weeks)	37080	
Labor- Biological Technicians (3 techs x \$775/week x 15 weeks)	34875	
Travel-Lodging rental house (\$1200/ month x 4 months)	4800	
Travel-per Diem (\$20/day x 10 days/trip x 6 trips x 7 people)	8400	
Travel- Truck Insurance and motor pool fees (\$380/yr x 4 trucks)	1520	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 6 trips)	2160	
Travel- Truck mileage 1-ton fish hauler (\$0.45/mile x 500 miles/trip x 6 trips)	1350	
Travel- Truck mileage 1-ton people hauler (\$0.82 /mile x 900 miles/trip x 6 trips)	4428	
Travel- Truck mileage gas hauler (\$0.87/mile x 200 miles/trip x 6 trips)	1044	
Supplies- Boat Gas (3 boats x \$3.85/gal x 15 gal/day x 8 days/trip x 6 trips)	8316	
Supplies-Field supplies (nets, booms, boots and waders, first aid, electrical safety gloves, tools, deep cycle batteries, lower unit grease and other lubricants and parts for generators. electrical connector replacement for safe electrofishing operation)	1200	
Supplies- Boat 2-cycle oil	1701	

(\$27/gal x 3 gallons/boat/trip x 3 boats x 6 trips)		
Service- Annual boat engine service at dealer	2000	
(\$500/boat x 4 boats)		
Service- Boat repair and maintenance- Welding , rigging and field equipment repair	500	
Supplies- Fish transport supplies (O2 bottle rental and refill, transport fish salts)	280	
Service- Wireless broadband modem for work related email	828	
Task subtotal		137482

Task 4

Labor-Biologist Sr. Researcher (\$1800/week – 2 weeks)	3600	
Labor-Biologist Researcher III (2 x \$1236/week – 2 weeks)	4944	
Labor- Biological Technicians (4 techs x \$775/week x 2 weeks)	6200	
Travel-per Diem (\$20/day x 10 days/trip x 2 trips x 7 people)	2800	
Travel- Truck mileage ¾ ton people hauler	720	
(\$0.40/mile x 900 miles/trip x 2 trips)		
Travel- Truck mileage 1-ton	810	
(\$0.45/mile x 900 miles/trip x 2 trips)		
Task subtotal		19074

Task 4.1

Labor-Biologist Sr. Researcher (\$1800/week – 1.1 week)	1980	
Labor- Biological Technician (\$775/week x 1.1 week)	852	
Travel-per Diem (\$20/day x 8 days x 2 people)	320	
Travel- Truck mileage 1-ton	405	
(\$0.45/mile x 900 miles)		
Field Supplies- nets, bags, electrofishing safety gloves	250	
Task subtotal		3807

Task 5

Labor-Biologist Sr. Researcher (\$1800/week – 4 weeks)	7200	
Labor-Biologist Researcher III (2 x \$1236/week – 4 weeks)	9888	
Labor- Biological Technicians (3 techs x \$775/week x 4 weeks)	9300	
Travel-Lodging rental house (\$1200/ month x 1 months)	1200	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 5 people)	4000	
Travel- Truck mileage ¾ ton people hauler	1440	
(\$0.40/mile x 900 miles/trip x 4 trips)		
Travel- Truck mileage 1-ton	1600	
(\$0.45/mile x 900 miles/trip x 4 trips)		
Supplies- Electric seine repair and maintenance (replacement of electrical connections to maintain safe operation)	520	
Task subtotal		35148

Task 6

Labor-Biologist Sr. Researcher (\$1800/week – 4 weeks)	7000	
Labor- Biological Technicians (\$775/week x 4 weeks)	3100	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 2 people)	1600	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1600	
Supplies-Field supplies (nets, electrofishing booms, boots and waders for crew, first aid, rubber electrical safety gloves, maintenance tools, batteries)	800	
Task subtotal		14100
Task 7		
Labor-Biologist Sr. Researcher (\$1800/week – 5 weeks)	9000	
Labor-Biologist Researcher III (\$1236/week – 4 weeks)	4944	
Labor- Biological Technicians (\$775/week x 5 weeks)	3875	
Supplies-computer software updates for tag data analysis	400	
Task subtotal		18219
Sub Total all Tasks		246066
CSU overhead BOR rate 17.5%		43062
Total- CSU LFL		289128

Budget-2016

	CSU- LFL	Task Sub- total
FY 2016 Costs		
Task 1		
Labor-Biologist Sr. Researcher (\$1854/week – 4 weeks)	7416	
Labor-Biologist Researcher III (\$1273/week – 4 weeks)	5092	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 3 days/trip x 2 people x 3 trips)	828	
Travel- Truck mileage (\$0.40/mile x 500 miles/trip x 3 trips)	600	
Task subtotal		14416
Task 2		
Labor-Biologist Sr.Researcher (\$1854/week – 1 week)	1854	
Labor-Biologist Researcher III (\$1273/week – 1 weeks)	1273	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 4 days x 2 people)	368	
Travel- Truck mileage (\$0.40/mile x 750 miles)	300	
Task subtotal		4275
Task 3		

Labor-Biologist Sr. Researcher (\$1854/week – 15 weeks)	27810	
Labor-Biologist Researcher III (2 x \$1273/week – 15 weeks)	38190	
Labor- Biological Technicians (3 techs x \$798/week x 15 weeks)	35910	
Travel-Lodging rental house (\$1200/ month x 4 months)	4800	
Travel-per Diem (\$20/day x 10 days/trip x 6 trips x 7 people)	8400	
Travel- Truck Insurance and motor pool fees (\$380/yr x 4 trucks)	1520	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 6 trips)	2160	
Travel- Truck mileage 1-ton fish hauler (\$0.45/mile x 500 miles/trip x 6 trips)	1350	
Travel- Truck mileage 1-ton people hauler (\$0.82 /mile x 900 miles/trip x 6 trips)	4428	
Travel- Truck mileage gas hauler (\$0.87/mile x 200 miles/trip x 6 trips)	1044	
Supplies- Boat Gas (3 boats x \$3.85/gal x 15 gal/day x 8 days/trip x 6 trips)	8316	
Supplies-Field supplies (nets, booms, boots and waders, first aid, electrical safety gloves, tools, deep cycle batteries, lower unit grease and other lubricants and parts for generators. electrical connector replacement for safe electrofishing operation)	1200	
Supplies- Boat 2-cycle oil (\$27/gal x 3 gallons/boat/trip x 3 boats x 6 trips)	1701	
Service- Annual boat engine service at dealer (\$500/boat x 4 boats)	2000	
Service- Boat repair and maintenance- Welding , rigging and field equipment repair	500	
Supplies- Fish transport supplies (O2 bottle rental and refill, transport fish salts)	280	
Service- Wireless broadband modem for work related email	828	
Task subtotal		140437
Task 4		
Labor-Biologist Sr. Researcher (\$1854/week – 2 weeks)	3708	
Labor-Biologist Researcher III (2 x \$1273/week – 2 weeks)	5092	
Labor- Biological Technicians (4 techs x \$798/week x 2 weeks)	6384	
Travel-per Diem (\$20/day x 10 days/trip x 2 trips x 7 people)	2800	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 2 trips)	720	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 2 trips)	810	
Task subtotal		19514
Task 4.1		
Labor-Biologist Sr. Researcher (\$1854/week – 1.1 week)	2039	
Labor- Biological Technician (\$798/week x 1.1 week)	852	
Travel-per Diem (\$20/day x 8 days x 2 people)	320	
Travel- Truck mileage 1-ton	405	

(\$0.45/mile x 900 miles)		
Field Supplies- nets, bags, electrofishing safety gloves	250	
Task subtotal		3866
 Task 5		
Labor-Biologist Sr. Researcher (\$1854/week – 4 weeks)	7416	
Labor-Biologist Researcher III (2 x \$1273/week – 4 weeks)	10184	
Labor- Biological Technicians (3 techs x \$798/week x 4 weeks)	9576	
Travel-Lodging rental house (\$1200/ month x 1 months)	1200	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 5 people)	4000	
Travel- Truck mileage ¾ ton people hauler	1440	
(\$0.40/mile x 900 miles/trip x 4 trips)		
Travel- Truck mileage 1-ton	1600	
(\$0.45/mile x 900 miles/trip x 4 trips)		
Supplies- Electric seine repair and maintenance (replacement of electrical connections to maintain safe operation)	520	
Task subtotal		35936
 Task 6		
Labor-Biologist Sr. Researcher (\$1854/week – 4 weeks)	7416	
Labor- Biological Technicians (\$798/week x 4 weeks)	3192	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 2 people)	1600	
Travel- Truck mileage 1-ton	1600	
(\$0.45/mile x 900 miles/trip x 4 trips)		
Supplies-Field supplies (nets, electrofishing booms, boots and waders for crew, first aid, rubber electrical safety gloves, maintenance tools, batteries)	800	
Task subtotal		14608
 Task 7		
Labor-Biologist Sr. Researcher (\$1854/week – 5 weeks)	9270	
Labor-Biologist Researcher III (\$1273/week – 4 weeks)	5092	
Labor- Biological Technicians (\$798/week x 5 weeks)	3990	
Supplies-computer software updates for tag data analysis	400	
Task subtotal		18752
 Sub Total all Tasks		251804
CSU overhead BOR rate 17.5%		44066
Total- CSU LFL		295870

Budget-2017

	CSU- LFL	Task Sub- total
FY 2017 Costs		
Task 1		

Labor-Biologist Sr. Researcher (\$1910/week – 4 weeks)	7640	
Labor-Biologist Researcher III (\$1311/week – 4 weeks)	5244	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 3 days/trip x 2 people x 3 trips)	828	
Travel- Truck mileage (\$0.40/mile x 500 miles/trip x 3 trips)	600	
Task subtotal		14792

Task 2

Labor-Biologist Sr. Researcher (\$1910/week – 1 week)	1910	
Labor-Biologist Researcher III (\$1311/week – 1 weeks)	1311	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 4 days x 2 people)	368	
Travel- Truck mileage (\$0.40/mile x 750 miles)	300	
Task subtotal		4369

Task 3

Labor-Biologist Sr. Researcher (\$1910/week – 15 weeks)	28650	
Labor-Biologist Researcher III (2 x \$1311/week – 15 weeks)	39330	
Labor- Biological Technicians (3 techs x \$822/week x 15 weeks)	36990	
Travel-Lodging rental house (\$1200/ month x 4 months)	4800	
Travel-per Diem (\$20/day x 10 days/trip x 6 trips x 7 people)	8400	
Travel- Truck Insurance and motor pool fees (\$380/yr x 4 trucks)	1520	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 6 trips)	2160	
Travel- Truck mileage 1-ton fish hauler (\$0.45/mile x 500 miles/trip x 6 trips)	1350	
Travel- Truck mileage 1-ton people hauler (\$0.82 /mile x 900 miles/trip x 6 trips)	4428	
Travel- Truck mileage gas hauler (\$0.87/mile x 200 miles/trip x 6 trips)	1044	
Supplies- Boat Gas (3 boats x \$3.85/gal x 15 gal/day x 8 days/trip x 6 trips)	8316	
Supplies-Field supplies (nets, booms, boots and waders, first aid, electrical safety gloves, tools, deep cycle batteries, lower unit grease and other lubricants and parts for generators. electrical connector replacement for safe electrofishing operation)	1200	
Supplies- Boat 2-cycle oil (\$27/gal x 3 gallons/boat/trip x 3 boats x 6 trips)	1701	
Service- Annual boat engine service at dealer (\$500/boat x 4 boats)	2000	
Service- Boat repair and maintenance- Welding , rigging and field equipment repair	500	
Supplies- Fish transport supplies (O2 bottle rental and refill, transport fish salts)	280	
Service- Wireless broadband modem for work related email	828	
Task subtotal		143497

Task 4	
Labor-Biologist Sr. Researcher (\$1910/week – 2 weeks)	3820
Labor-Biologist Researcher III (2 x \$1311/week – 2 weeks)	5244
Labor- Biological Technicians (4 techs x \$822/week x 2 weeks)	6576
Travel-per Diem (\$20/day x 10 days/trip x 2 trips x 7 people)	2800
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 2 trips)	720
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 2 trips)	810
Task subtotal	19970
Task 4.1	
Labor-Biologist Sr. Researcher (\$1910/week – 1.1 week)	2101
Labor- Biological Technician (\$822/week x 1.1 week)	904
Travel-per Diem (\$20/day x 8 days x 2 people)	320
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles)	405
Field Supplies- nets, bags, electrofishing safety gloves	250
Task subtotal	3980
Task 5	
Labor-Biologist Sr. Researcher (\$1910/week – 4 weeks)	7640
Labor-Biologist Researcher III (2 x \$1311/week – 4 weeks)	10488
Labor- Biological Technicians (3 techs x \$822/week x 4 weeks)	9864
Travel-Lodging rental house (\$1200/ month x 1 months)	1200
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 5 people)	4000
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 4 trips)	1440
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1600
Supplies- Electric seine repair and maintenance (replacement of electrical connections to maintain safe operation)	520
Task subtotal	36752
Task 6	
Labor-Biologist Sr. Researcher (\$1910/week – 4 weeks)	7640
Labor- Biological Technicians (\$822/week x 4 weeks)	3288
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 2 people)	1600
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1600
Supplies-Field supplies (nets, electrofishing booms, boots and waders for crew, first aid, rubber electrical safety gloves, maintenance tools, batteries)	800

Task subtotal	14928
Task 7	
Labor-Biologist Sr. Researcher (\$1910/week – 5 weeks)	9550
Labor-Biologist Researcher III (\$1311/week – 4 weeks)	5244
Labor- Biological Technicians (\$822/week x 5 weeks)	4110
Supplies-computer software updates for tag data analysis	400
Task subtotal	19304
Sub Total all Tasks	257592
CSU overhead BOR rate 17.5%	45079
Total- CSU LFL	302671

Budget-2018

	CSU- LFL	Task Sub- total
FY 2018 Costs		
Task 1		
Labor-Biologist Sr. Researcher (\$1967/week – 4 weeks)	7868	
Labor-Biologist Researcher III (\$1350/week – 4 weeks)	5400	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 3 days/trip x 2 people x 3 trips)	828	
Travel- Truck mileage (\$0.40/mile x 500 miles/trip x 3 trips)	600	
Task subtotal		15176
Task 2		
Labor-Biologist Sr. Researcher (\$1967/week – 1 week)	1967	
Labor-Biologist Researcher III (\$1350/week – 1 weeks)	1350	
Travel-Lodging (\$80/night-2 nights/trip x 2 people x 3 trips)	480	
Travel-per Diem (\$46/day x 4 days x 2 people)	368	
Travel- Truck mileage (\$0.40/mile x 750 miles)	300	
Task subtotal		4465
Task 3		
Labor-Biologist Sr. Researcher (\$1967/week – 15 weeks)	29505	
Labor-Biologist Researcher III (2 x \$1350/week – 15 weeks)	40500	
Labor- Biological Technicians (3 techs x \$847/week x 15 weeks)	38115	
Travel-Lodging rental house (\$1200/ month x 4 months)	4800	
Travel-per Diem (\$20/day x 10 days/trip x 6 trips x 7 people)	8400	
Travel- Truck Insurance and motor pool fees (\$380/yr x 4 trucks)	1520	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 6 trips)	2160	
Travel- Truck mileage 1-ton fish hauler	1350	

(\$0.45/mile x 500 miles/trip x 6 trips)		
Travel- Truck mileage 1-ton people hauler	4428	
(\$0.82 /mile x 900 miles/trip x 6 trips)		
Travel- Truck mileage gas hauler	1044	
(\$0.87/mile x 200 miles/trip x 6 trips)		
Supplies- Boat Gas (3 boats x \$3.85/gal x 15 gal/day x 8 days/trip x 6 trips)	8316	
Supplies-Field supplies (nets, booms, boots and waders, first aid, electrical safety gloves, tools, deep cycle batteries, lower unit grease and other lubricants and parts for generators. electrical connector replacement for safe electrofishing operation)	1200	
Supplies- Boat 2-cycle oil	1701	
(\$27/gal x 3 gallons/boat/trip x 3 boats x 6 trips)		
Service- Annual boat engine service at dealer	2000	
(\$500/boat x 4 boats)		
Service- Boat repair and maintenance- Welding , rigging and field equipment repair	500	
Supplies- Fish transport supplies (O2 bottle rental and refill, transport fish salts)	280	
Service- Wireless broadband modem for work related email	828	
Task subtotal		146647
Task 4		
Labor-Biologist Sr. Researcher (\$1967/week – 2 weeks)	3934	
Labor-Biologist Researcher III (2 x \$1350/week – 2 weeks)	5400	
Labor- Biological Technicians (4 techs x \$847/week x 2 weeks)	6776	
Travel-per Diem (\$20/day x 10 days/trip x 2 trips x 7 people)	2800	
Travel- Truck mileage ¾ ton people hauler	720	
(\$0.40/mile x 900 miles/trip x 2 trips)		
Travel- Truck mileage 1-ton	810	
(\$0.45/mile x 900 miles/trip x 2 trips)		
Task subtotal		20440
Task 4.1		
Labor-Biologist Sr. Researcher (\$1967/week – 1.1 week)	2164	
Labor- Biological Technician (\$847/week x 1.1 week)	932	
Travel-per Diem (\$20/day x 8 days x 2 people)	320	
Travel- Truck mileage 1-ton	405	
(\$0.45/mile x 900 miles)		
Field Supplies- nets, bags, electrofishing safety gloves	250	
Task subtotal		4071
Task 5		
Labor-Biologist Sr. Researcher (\$1967/week – 4 weeks)	7868	
Labor-Biologist Researcher III (2 x \$1350/week – 4 weeks)	10800	
Labor- Biological Technicians (3 techs x \$847/week x 4 weeks)	10164	
Travel-Lodging rental house (\$1200/ month x 1 months)	1200	

Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 5 people)	4000	
Travel- Truck mileage ¾ ton people hauler (\$0.40/mile x 900 miles/trip x 4 trips)	1440	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1600	
Supplies- Electric seine repair and maintenance (replacement of electrical connections to maintain safe operation)	520	
Task subtotal		37592
Task 6		
Labor-Biologist Sr. Researcher (\$1967/week – 4 weeks)	7868	
Labor- Biological Technicians (\$847/week x 4 weeks)	3388	
Travel-per Diem (\$20/day x 10 days/trip x 4 trips x 2 people)	1600	
Travel- Truck mileage 1-ton (\$0.45/mile x 900 miles/trip x 4 trips)	1600	
Supplies-Field supplies (nets, electrofishing booms, boots and waders for crew, first aid, rubber electrical safety gloves, maintenance tools, batteries)	800	
Task subtotal		15256
Task 7		
Labor-Biologist Sr. Researcher (\$1967/week – 5 weeks)	9835	
Labor-Biologist Researcher III (\$1350/week – 4 weeks)	5400	
Labor- Biological Technicians (\$847/week x 5 weeks)	4235	
Supplies-computer software updates for tag data analysis	400	
Task subtotal		19870
Sub Total all Tasks		263517
CSU overhead BOR rate 17.5%		46115
Total- CSU LFL		309632

Budgets for USFWS portion is included as Appendices 1 and 2

IX. Budget Summary: Includes CSU and assisting agencies

	CSU-LFL	FWS- Grand Junction	FWS- Vernal	Total
FY-2014	283,760	14,614	14,671	313,045
FY-2015	289,128	14,958	15,014	319,100
FY-2016	295,870	15,314	15,246	326,430
FY-2017	302,671	15,678	15,481	333,830
FY-2018	309,632	16,057	15,715	341,404

X. Reviewers: P. Martinez (USFWS)
Revisions: A. Kantola 17 June 2013

XI. References:

Anderson, R. 2000. Riverine fish flow investigations. Federal Aid Project F-289-R3, Colorado Division of Wildlife, Ft Collins, Colorado.

Anderson, R. 2004. Riverine fish flow investigation. Quantification of impacts of the 2002 drought on native fish populations in the Yampa and Colorado rivers. Colorado Division of Wildlife, Fort Collins, Colorado.

Bestgen, K. R., Walford, C. D, and A. A. Hill. 2007. Native fish response to removal of non-native predator fish in the Yampa River, Colorado. Final Report Upper Colorado River Basin Recovery Implementation Program Project Number 140. Larval Fish Laboratory Contribution 150. Colorado State University.

CPW (AKA CDOW; Colorado Division of Wildlife). 2010. Aquatic Wildlife Management Plan: Yampa River Basin, Colorado. Colorado Division of Wildlife, Aquatic Wildlife Section, Denver.

Kaeding, L R and M. A. Zimmerman. 1983. Life history and ecology of the humpback chub in the Little Colorado and Colorado rivers of the Grand Canyon. Transactions of the American Fisheries Society 112:577-594.

Karp, C.A. and H. M. Tyus 1990. Humpback chub (*Gila cypha*) in the Yampa and Green river, Dinosaur National Monument, with observations on roundtail chub (*G. robusta*) and other sympatric species. Great basin Naturalist 50: 257-264.

Hawkins, J. A. and T. P. Nesler. 1991. Nonnative fishes of the Upper Colorado River Basin: an issue paper. Larval Fish Laboratory, Colorado State University, Ft. Collins, Colorado.

Hawkins, J. C. Walford, and T. Sorensen. 2005. Northern pike management studies in the Yampa River, 1999–2002. Contribution number 137 of the Larval Fish Laboratory, Colorado State University, Ft Collins.

- Hawkins, J. C. Walford, and A. Hill. 2009a. Smallmouth bass control in the middle Yampa River, 2003–2007. Contribution number 154 of the Larval Fish Laboratory, Colorado State University, Ft Collins.
- Hawkins, J., C. Walford, B. Wright, J. Logan. and A. Hill. 2009b. Evaluation of smallmouth bass and northern pike management in the middle Yampa River. Annual Report to the Colorado River Recovery Program. 28 pp.
- Mann, R. H. K. 1980. The numbers and production of pike (*Esox lucius*) in two Dorset rivers. *Journal of Animal Ecology* 49:899-915.
- Marsh, P.C. and D. R. Langhorst. 1988. Feeding and fate of wild larval razorback sucker. *Environmental Biology of Fishes* 21:59-67.
- Martinez, P. J. 1995. Coldwater Reservoir Ecology. Colorado Division of Wildlife Federal Aid in Fish and Wildlife Restoration Project. # F-242R-2, Job Final Report, Ft. Collins.
- McAda, C. M. 1983. Colorado squawfish, *Ptychocheilus lucius* (Cyprinidae), with a channel catfish, *Ictalurus punctatus* (Ictaluridae), lodged in its throat. *The Southwestern Naturalist* 28:119-120.
- Nesler, T. P. 1995. Interactions between endangered fishes and introduced game fishes in the Yampa River, Colorado, 1987-1991. Final Report. Colorado River Recovery Implementation Program Project number 91-29, Federal Aid Project SE-3. Colorado Division of Wildlife, Aquatic Research Section, Ft. Collins, Colorado.
- Vanicek, C. D. 1967. Ecological studies of native Green River fishes below Flaming Gorge Dam, 1964-1966. PhD. Dissertation, Utah State University, Logan.
- Wick, E. J., J. A. Hawkins, and C.A. Carlson. 1985. Colorado squawfish and humpback chub population and habitat monitoring, 1981-1982. *Endangered Wildlife Investigations*, Colorado Division of Wildlife, Denver, CO.
- White, G. C., D. A. Anderson, K. P. Burnham, and D. L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. Los Alamos National Laboratory, LA-8787-NERP, Los Alamos, New Mexico.

Table 1—Sampling gear that may be used by CSU on the Yampa River.

Electrofishing: boat, bank, backpack, or seine.

Nets: Gill, trammel, dip, hoop, fyke, or trap; cages (i.e. minnow traps) - various lengths and mesh sizes.

S seines: various lengths and meshes.

Angling: with bait, lures or artificial flies.

Suction devices to collect larvae or young.

All gear may be baited or scented with attractants.

Table 2—Summary of handling, tagging, and disposition requirements for fish captured by CSU researchers in the Yampa River, 2009.

Species	Tag type	Disposition
Native-Colorado pikeminnow	RFID-PIT	measured, marked, and released at capture site
Native-roundtail chub	RFID-PIT	measured, marked and released at capture site
Native-Other species, bluehead sucker flannelmouth sucker hybrid native suckers mountain whitefish speckled dace mottled sculpin	None	measured and released at capture site
Nonnative-northern pike	Gray Floy tag	Removal Passes: If ≥ 500 mm then then measured, marked and moved to Yampa State Park Headquarters' pond or as directed by CPW. Fish < 500 mm euthanized. During low-flow sampling, euthanize all sizes if transportation is not feasible. Northern pike recaptured with Orange Floy tags that indicate escapees from Catamount Reservoir will be euthanized and held as requested by CPW biologist B. Atkinson.
Nonnative-smallmouth bass	Gray Floy tag	Mark Pass: If < 100 mm TL then euthanized, if ≥ 100 mm TL then measured, marked and released. Removal Passes: All sizes euthanized.
Nonnatives: bluegill black crappie green sunfish largemouth bass pumpkinseed yellow perch walleye black bullhead common and grass carp burbot gizzard shad white sucker white sucker hybrids stickleback spp.	None	Common carp, white sucker, and white sucker hybrids will only be removed from the treatment reaches which include the lower 12 miles of Little Yampa Canyon and Lily Park. All other species will be measured, euthanized, and either buried or provided to other researchers.

Nonnatives: salmonids (trout) channel catfish	none	measure and release at capture site
Nonnative-Prohibited fish species per Colorado Revised Statutes-see list below.	none	measured, euthanized, and preserved

Table 3—List of Prohibited Aquatic species per Colorado Revised Statutes, Title 33, Article VII, 12, adopted by the Wildlife Commission on **05/09/2013** :
<http://wildlife.state.co.us/SiteCollectionDocuments/DOW/RulesRegs/Regulations/Ch00.pdf> (pages 19-20)

1. Amphibians
 - a. Frog, African clawed.
 - b. Frog, Green.
 - c. Toad, Marine.
2. Crustaceans
 - a. Crayfish, Rusty.
 - b. Ponto-Caspian echinogammarid amphipod.
 - c. Shrimp, Killer of the genus *Dikeroqammarus*, including, but not limited to, *Dikeroqammarus villosus*.
 - d. Water Fleas, Fish Hook and Spiny: *Cercopagis pengoi*, *Bythotrephes lomgimanus*, and *Daphnia lumholtzii*.
3. Fish
 - a. Alewife.
 - b. Bass, Butterfly peacock of the genus *Cichla*, including, but not limited to, *Cichla ocellaris*.
 - c. Bitterling.
 - d. Bowfins: *Amiidae*.
 - e. Burbot (Ling, Freshwater cusk).
 - f. Carp of the following genera: *Aristichthys* (including but not limited to bighead carp); *Catla* (including but not limited to catla); *Catlocarpio* (including but not limited to giant barb); *Carrassius*; *Cirrhinus* (including but not limited to mrigal); *Cyprinus*; *Hypophthalmichthys* (including but not limited to silver carp and largescale silver carp); *Labeo* (including but not limited to rohu); *Mylopharyngodon* (including but not limited to black carp); and *Tor* (including but not limited to mahseers). However, grass carp and common carp, including koi and goldfish may be possessed as otherwise provided for in these regulations.
 - g. Catfish, Walking.
 - h. Eel, Asian Swamp.
 - i. Gars: *Lepisosteidae*.
 - j. Gobies: *Gobiidae*.
 - k. Ide.
 - l. Loaches of the genus *Misgurnus*, including, but not limited to, Oriental weatherfish, Chinese fine-scaled loach, and the Eurasian weatherfish.

- m. Perch, African of the genus Lates, including, but not limited to, Nile perch.
 - n. Perch, White
 - o. Pickerel, Chain.
 - p. Piranha: Including members of the genera Serrasalmus and Pygocentrus.
 - q. Rudd.
 - r. Ruffe, Eurasian.
 - s. Snakeheads or murrels: Members of the genera Channa, Parachanna and Ophicephalus.
 - t. Sticklebacks: Members of the genera Apeltes, Aulorhynchus, Gasterosteus and Pungitius.
 - u. Tilapia: All species. However, blue tilapia, Mozambique tilapia, Nile tilapia, and their hybrids may be imported and possessed for fish culture and educational purposes, provided the fish and their progeny are held in facilities screened or otherwise designed to prevent their escape and are not otherwise released into waters of the state. Screen mesh size shall be no larger than 1/4" diameter. For the purposes of this regulation, "fish culture" means the raising of fish for sale as food or for export, by a licensed aquaculturist, and "educational purposes" means the raising of fish by educational facilities or for public display in public aquaria, zoos, or other similar facilities.
 - v. Trahira.
 - w. Zander.
4. Mollusks
- a. Apple snails: Pomacea.
 - b. European valve snail (European stream valvata).
 - c. Giant rams-horn snail.
 - d. Mussel, Quagga.
 - e. Mussel, Zebra.
 - f. Mysterysnails of the genera Cipangopaludina and Viviparus, including but not limited to Japanese mysterysnail, Chinese mysterysnails, Banded mysterysnail, Olive mysterysnail, and Viviparus viviparus.
 - g. New Zealand mudsnail.

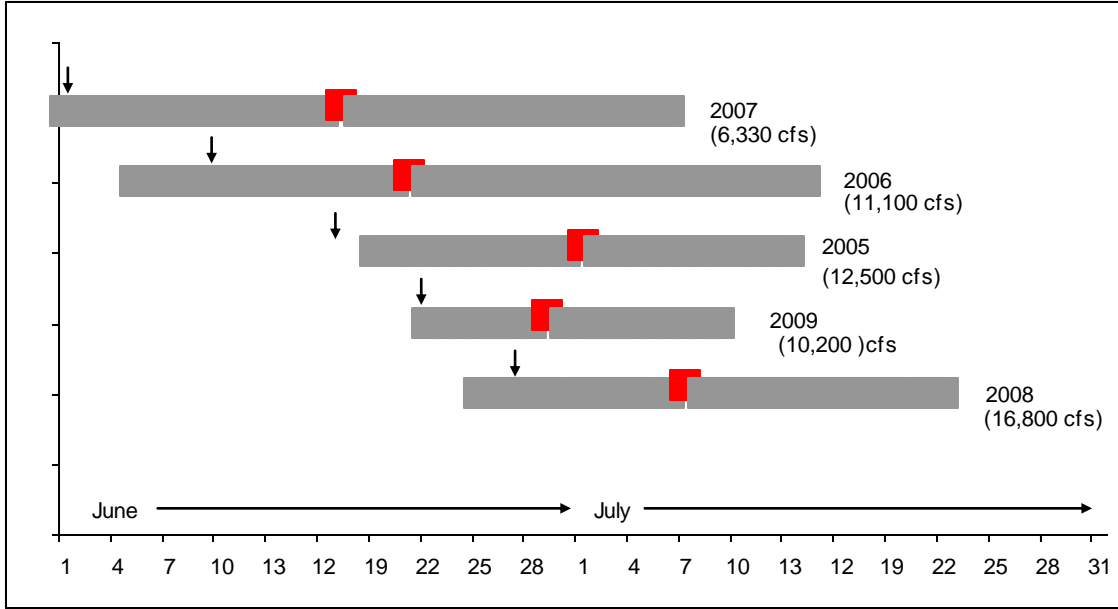


Figure 1—Estimated spawning dates for smallmouth bass in the Yampa River based on daily otolith increments. First and last dates of spawning shown by grey bars and average spawning date shown with raised dark block (in red). First occurrence of 16⁰ C marked by arrow and maximum daily peak discharge for each year marked in parentheses to right. Data for 2005–2008 from Bestgen and Hill 2009 nonnative workshop presentation for Project 140. Spawning dates estimated based on 8 days prior to hatch. Dates for 2009 estimated from field observations.

Project 125-Appendix-1

RECOVERY PROGRAM

Recovery Program Project Number: 125

FY 2014-2015 SCOPE OF WORK for:

(Remove spawning adult smallmouth bass from the middle Yampa River)

Reclamation Agreement number: R10PG40095

Reclamation Agreement term: *Oct. 1, 2013 – Sep. 30, 2018*

Supporting agency: Fish and Wildlife Service

Colorado River Fishery Project – Grand Junction (CRFP-GJ)

Submitted by: Travis Francis, Fishery Biologist

Dale Ryden, Project Leader

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Date Last Modified: 6/17/2013 10:22:00 AM; ATK comments 5/17/13

XII. Task Description and Schedule:

Description

Task 1. provide a three-person field crew for **eight days**^a with administrative support sometime from mid-June to mid-July; provide either jet-powered electrofishing hard-bottom craft or row-powered electrofishing inflatables.

^a reduced from 10 to 8 days from since FY2011 to remain with budget limits set by the Recovery Program

Task 1. 6/2014-7/2014; 6/2015-7/2015

XIII. Deliverables, Due Dates, and Budget by Fiscal Year:

FY 2014

Deliverables: *Tasks 1*

FY 2014									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14	1	0	78.63	0	0		0
		Administrative Officer GS-09	1	0	42.15	0	0		0
		Fishery Biologist GS-11	1	40	46.53	0	0		1861.2
		Fishery Biologist GS-07	1	40	31.76	0	47.64		1270.4
		Crew leader Tech. GS-06	1	80	30.88	25	46.32		3628.4
		Biological Tech. GS-05	1	80	18.39	25	27.58		2160.7
	Labor Subtotal								8920.7
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Computer Supplies and Peripherals						0
		Office Supplies	Ink Cartridges and paper						0
		Office Supplies	Cell, SAT, and Office phone service						0
		Field Equipment	GSA vehicle lease per month	2	each	344.02	0.5		344.02
		Field Equipment	Mileage	1,800	miles	0.31	1		558
		Field Equipment	Boat Gasoline 91 octane	400	gallons	4.12	1		1648
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	100	1		100
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	100	1		100
	Equipment Total								2,750
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Moffat County GSA Per Diem Rate 2013	3	77	44	15	8	2	2943
	Travel Total								2943
	USFWS Grand Jct.								14,614

*Misc. Field Supplies

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or

replaced, but use of these funds for a “typical” field season for one study would include the following:

Spark plugs for generators – 5 at \$7 each = \$35

Synthetic oil for generators - 5 quarts at \$7 each = \$35

Generator repair/tune-up - 5 hrs @ \$75/hr = \$375

Electrical Gloves - 3 pairs @ \$65/pair = \$195

Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600

Replace any missing NRS HD-brand tie-down straps:

Ten 2-ft straps @ \$4.20 each = \$42

Five 3-ft straps @ \$4.30 each = \$21.50

Ten 4-ft straps @ \$4.70 each = \$47

Five 6-ft straps @ \$5.05 each = \$25.25

Five 9-ft straps @ \$5.7 each = \$28.50

Five 12-ft straps @ \$6.15 each = \$30.75

Replace any missing D-style carabiners, each boat needs:

10 @ \$7.50 each = \$75

Mesh rig bag – 1 @ \$50 each = \$50

5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” etc.

FY 2015

Deliverables: *Tasks 1*

FY 2015									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	0	80.99	0	0	0
		Administrative Officer GS-09		1	0	43.41	0	0	0
		Fishery Biologist GS-11		1	40	47.93	0	0	1917.2
		Fishery Biologist GS-07		1	40	32.72	0	49.07	1308.8
		Crew leader Tech. GS-06		1	80	31.81	25	47.71	3737.55
		Biological Tech. GS-05		1	80	18.94	25	28.41	2225.45
	Labor Subtotal								9189
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Computer Supplies and Peripherals						0
		Office Supplies	Ink Cartridges and paper						0
		Office Supplies	Cell, SAT, and Office phone service						0
		Field Equipment	GSA vehicle lease per month	2	each	354.34	0.5		354.34
		Field Equipment	Mileage	1,800	miles	0.32	1		576
		Field Equipment	Boat Gasoline 91 octane	400	gallons	4.24	1		1696
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	100	1		100
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	100	1		100
	Equipment Total								2,826
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Moffat County GSA Per Diem Rate 2013	3	77	44	15	8	2	2943
	Travel Total								2943
	USFWS Grand Jct.								14,958

*Misc. Field Supplies

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following:

Spark plugs for generators – 5 at \$7 each = \$35

Synthetic oil for generators - 5 quarts at \$7 each = \$35
Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
Electrical Gloves - 3 pairs @ \$65/pair = \$195
Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600

Replace any missing NRS HD-brand tie-down straps:

Ten 2-ft straps @ \$4.20 each = \$42
Five 3-ft straps @ \$4.30 each = \$21.50
Ten 4-ft straps @ \$4.70 each = \$47
Five 6-ft straps @ \$5.05 each = \$25.25
Five 9-ft straps @ \$5.7 each = \$28.50
Five 12-ft straps @ \$6.15 each = \$30.75

Replace any missing D-style carabiners, each boat needs:

10 @ \$7.50 each = \$75
Mesh rig bag – 1 @ \$50 each = \$50
5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” etc.

Out-year budgets for Yampa Surge: 2016-2018

THESE BUDGETS ARE ESTIMATES ONLY AND MAY NOT REPRESENT ACTUAL COSTS

FY 2016

Deliverables: *Tasks 1*

FY 2016									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	0	83.42	0	0	0
		Administrative Officer GS-09		1	0	44.72	0	0	0
		Fishery Biologist GS-11		1	40	49.36	0	0	1974.4
		Fishery Biologist GS-07		1	40	33.7	0	50.54	1348
		Crew leader Tech. GS-06		1	80	32.76	25	49.14	3849.3
		Biological Tech. GS-05		1	80	19.51	25	29.26	2292.3
	Labor Subtotal								9464
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Computer Supplies and Peripherals						0
		Office Supplies	Ink Cartridges and paper						0
		Office Supplies	Cell, SAT, and Office phone service						0
		Field Equipment	GSA vehicle lease per month	2	each	364.97	0.5		364.97
		Field Equipment	Mileage	1,800	miles	0.33	1		594
		Field Equipment	Boat Gasoline 91 octane	400	gallons	4.37	1		1748
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	100	1		100
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	100	1		100
	Equipment Total								2,907
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Moffat County GSA Per Diem Rate 2013	3	77	44	15	8	2	2943
	Travel Total								2943
	USFWS Grand Jct.								15,314

*Misc. Field Supplies

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following:

Spark plugs for generators – 5 at \$7 each = \$35

Synthetic oil for generators - 5 quarts at \$7 each = \$35
Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
Electrical Gloves - 3 pairs @ \$65/pair = \$195
Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600

Replace any missing NRS HD-brand tie-down straps:

Ten 2-ft straps @ \$4.20 each = \$42
Five 3-ft straps @ \$4.30 each = \$21.50
Ten 4-ft straps @ \$4.70 each = \$47
Five 6-ft straps @ \$5.05 each = \$25.25
Five 9-ft straps @ \$5.7 each = \$28.50
Five 12-ft straps @ \$6.15 each = \$30.75

Replace any missing D-style carabiners, each boat needs:

10 @ \$7.50 each = \$75
Mesh rig bag – 1 @ \$50 each = \$50
5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” etc.

FY 2017

Deliverables: *Tasks 1*

FY 2017									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	0	85.92	0	0	0
		Administrative Officer GS-09		1	0	46.06	0	0	0
		Fishery Biologist GS-11		1	40	50.84	0	0	2033.6
		Fishery Biologist GS-07		1	40	34.71	0	52.06	1388.4
		Crew leader Tech. GS-06		1	80	33.74	25	50.62	3964.7
		Biological Tech. GS-05		1	80	20.09	25	30.14	2360.7
	Labor Subtotal								9747.4
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Computer Supplies and Peripherals						0
		Office Supplies	Ink Cartridges and paper						0
		Office Supplies	Cell, SAT, and Office phone service						0
		Field Equipment	GSA vehicle lease per month	2	each	375.92	0.5		375.92
		Field Equipment	Mileage	1,800	miles	0.34	1		612
		Field Equipment	Boat Gasoline 91 octane	400	gallons	4.5	1		1800
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	100	1		100
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	100	1		100
	Equipment Total								2,988
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Moffat County GSA Per Diem Rate 2013	3	77	44	15	8	2	2943
	Travel Total								2943
	USFWS Grand Jct.								15,678

*Misc. Field Supplies

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following:

Spark plugs for generators – 5 at \$7 each = \$35

Synthetic oil for generators - 5 quarts at \$7 each = \$35
Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
Electrical Gloves - 3 pairs @ \$65/pair = \$195
Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600

Replace any missing NRS HD-brand tie-down straps:

Ten 2-ft straps @ \$4.20 each = \$42
Five 3-ft straps @ \$4.30 each = \$21.50
Ten 4-ft straps @ \$4.70 each = \$47
Five 6-ft straps @ \$5.05 each = \$25.25
Five 9-ft straps @ \$5.7 each = \$28.50
Five 12-ft straps @ \$6.15 each = \$30.75

Replace any missing D-style carabiners, each boat needs:

10 @ \$7.50 each = \$75
Mesh rig bag – 1 @ \$50 each = \$50
5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” etc.

FY 2018

Deliverables: *Tasks 1*

FY 2018									
	Labor	Title	# of employees	Hours	Reg. Rate	OT Hours	OT Rate		Total
		Project Leader GS-14		1	0	88.5	0	0	0
		Administrative Officer GS-09		1	0	47.44	0	0	0
		Fishery Biologist GS-11		1	40	52.37	0	0	2094.8
		Fishery Biologist GS-07		1	40	35.75	0	53.62	1430
		Crew leader Tech. GS-06		1	80	34.76	25	52.13	4084.05
		Biological Tech. GS-05		1	80	20.7	25	31.04	2432
	Labor Subtotal								10040.85
	Equipment & Supplies	Category	Item	Quantity	Unit	Rate	Duration		Total
		Office Supplies	Computer Supplies and Peripherals						0
		Office Supplies	Ink Cartridges and paper						0
		Office Supplies	Cell, SAT, and Office phone service						0
		Field Equipment	GSA vehicle lease per month	2	each	387.2	0.5		387.2
		Field Equipment	Mileage	1,800	miles	0.35	1		630
		Field Equipment	Boat Gasoline 91 octane	400	gallons	4.64	1		1856
		Field Equipment	Motor, Generator, Boat Repair (Based on 10 year depreciation and replacement costs)	1	see basis	100	1		100
		Field Equipment	*Misc. Field Supplies See Justification	1	see basis	100	1		100
	Equipment Total								3,073
		Type Of Travel	Number of Travelers	Hotel Costs	Per Diem	TAV Fee	# days	# of trips	Total
		Moffat County GSA Per Diem Rate 2013	3	77	44	15	8	2	2943
	Travel Total								2943
	USFWS Grand Jct.								16,057

*Misc. Field Supplies

Exact use of the money in this line item will vary from year to year depending on what equipment needs to be maintained, repaired, or replaced, but use of these funds for a “typical” field season for one study would include the following:

Spark plugs for generators – 5 at \$7 each = \$35

Synthetic oil for generators - 5 quarts at \$7 each = \$35
Generator repair/tune-up - 5 hrs @ \$75/hr = \$375
Electrical Gloves - 3 pairs @ \$65/pair = \$195
Dura-Frame electrofishing dip nets – 2 @ \$300 each = \$600

Replace any missing NRS HD-brand tie-down straps:

Ten 2-ft straps @ \$4.20 each = \$42
Five 3-ft straps @ \$4.30 each = \$21.50
Ten 4-ft straps @ \$4.70 each = \$47
Five 6-ft straps @ \$5.05 each = \$25.25
Five 9-ft straps @ \$5.7 each = \$28.50
Five 12-ft straps @ \$6.15 each = \$30.75

Replace any missing D-style carabiners, each boat needs:

10 @ \$7.50 each = \$75
Mesh rig bag – 1 @ \$50 each = \$50
5-gallon plastic gasoline jerry cans – 5 @ \$20 each = \$100

Other potential uses for these same funds could include replacing hand tools (ratchet and sockets, screw drivers, vise grips, pliers, Allen wrenches, crescent wrenches, hammer, etc.), WD-40, bailing wire, duct tape, electrical supplies (12 and 14 gage wire for the boats, junction boxes, extra male & female plugs, wire nuts, fuses, Ohm meter, electrical tape), batteries (C, AA and AAA), Gott 5-gallon water jugs, shovels, 5-gallon buckets, cargo nets, fix chips or cracks in vehicle windshields, bulbs, lenses, and wiring to fix trailer lights and pigtails, new electrofishing spheres, wire rope for replacing electrofishing “witches brooms,” etc.

XIV. Budget Summary:

FY2014 USFWS-GJ \$ 14,614

FY2015 USFWS-GJ \$ 14,958

2014-2015 Total = \$ 29,572

Estimated Budget Summary for Fiscal Years 2016-2018:

FY2016 USFWS-GJ \$ 15,314

FY2017 USFWS-GJ \$ 15,678

FY2018 USFWS-GJ \$ 16,057

2016-2018 Total = \$ 47,049

5-Year Total = \$ 76,621

XV. Reviewers: Program Staff and Biology Committee

XVI. References: NA

Project 125-Appendix-2

RECOVERY PROGRAM

Recovery Program Project Number: 125

FY 2014-2015 SCOPE OF WORK for:

(Remove spawning adult smallmouth bass from the middle Yampa River)

Reclamation Agreement number: R10PG40095

Reclamation Agreement term: *Oct. 1, 2013 – Sep. 30, 2018*

Supporting agency: Fish and Wildlife Service

Colorado River Fishery Project – Vernal (CRFP-Vernal)

Submitted by: Aaron Webber / Tildon Jones

Colorado River Fish Project

U. S. Fish and Wildlife Service

1380 S 2350 W

Vernal, UT 84078

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Date Last Modified: ATK revisions 6/17/13

2014

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-11 Biologist	\$45.06	80	\$3,605
1 GS-5 Tech/ WG-5 Boat Operator	\$18.91	80	\$1,513
Overtime for tech	\$28.37	20	\$567
Subtotal			\$5,685
Travel			
Lodging and per diem (2 people/day x \$123/person x 8 nights)			\$1,968
Subtotal			\$1,968
Equipment			
(2 trucks/trip x 550 mi/truck x \$0.31/mi x 2 trips) Vernal to Craig and during boat shuttles, round trip			\$682
(12 gal gas/boat x 2 boats/day x \$4.00/gal x 10 days)			\$960
(2 qts motor boat oil/boat x 2 boats/day x \$11.00/qt x 10 days)			\$440
GSA truck (rate/mo x # truck-months)	\$313	0.5	\$157
Boat propellers, boating equipment replacement/repair, safety equipment (PFDs, etc)			\$500
Subtotal			\$2,739
TASK 1 TOTAL			\$10,392

Task 2- Data Analysis, Project Administration

Labor

GS-9 Admin Assist.	\$36.89	116	\$4,279
Subtotal			\$4,279
TASK 2 TOTAL			\$4,279
SOW TOTAL			\$14,671

2015

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-11 Biologist	\$45.96	80	\$3,677
1 GS-5 Tech/ WG-5 Boat Operator	\$19.29	80	\$1,543
Overtime for tech	\$28.94	20	\$579
Subtotal			\$5,799
Travel			
Lodging and per diem (2 people/day x \$123/person x 8 nights)			\$1,968
Subtotal			\$1,968
Equipment			
(2 trucks/trip x 550 mi/truck x \$0.32/mi x 2 trips) Vernal to Craig and during boat shuttles, round trip			\$704
(12 gal gas/boat x 2 boats/day x \$4.00/gal x 10 days)			\$960
(2 qts motor boat oil/boat x 2 boats/day x \$11.00/qt x 10 days)			\$440
GSA truck (rate/mo x # truck-months)	\$320	0.5	\$160
Boat propellers, boating equipment replacement/repair, safety equipment (PFDs, etc)			\$500
Subtotal			\$2,764
TASK 1 TOTAL			\$10,531

Task 2- Data Analysis, Project Administration

Labor			
GS-9 Admin Assist.	\$38.65	116	\$4,483
Subtotal			\$4,483
TASK 2 TOTAL			\$4,483
SOW TOTAL			\$15,014

2016				
	Task Activity	Rate \$/h	Hours	Cost
Task 1				
Labor				
	GS-11 Biologist	\$46.88	80	\$3,750
	1 GS-5 Tech/ WG-5 Boat Operator	\$19.68	80	\$1,574
	Overtime for tech	\$29.52	20	\$590
	Subtotal			\$5,915
Travel				
	Lodging and per diem (2 people/day x \$123/person x 8 nights)			\$1,968
	Subtotal			\$1,968
Equipment				
	(2 trucks/trip x 550 mi/truck x \$0.33/mi x 2 trips) Vernal to Craig and during boat shuttles, round trip			\$726
	(12 gal gas/boat x 2 boats/day x \$4.00/gal x 10 days)			\$960
	(2 qts motor boat oil/boat x 2 boats/day x \$11.00/qt x 10 days)			\$440
	GSA truck (rate/mo x # truck-months)	\$325	0.5	\$163
	Boat propellers, boating equipment replacement/repair, safety equipment (PFDs, etc)			\$500
	Subtotal			\$2,789
	TASK 1 TOTAL			\$10,672
Task 2- Data Analysis, Project Administration				
Labor				
	GS-9 Admin Assist.	\$39.43	116	\$4,574
	Subtotal			\$4,574
	TASK 2 TOTAL			\$4,574
	SOW TOTAL			\$15,246
2017				
	Task Activity	Rate \$/h	Hours	Cost
Task 1				
Labor				
	GS-11 Biologist	\$47.82	80	\$3,826
	1 GS-5 Tech/ WG-5 Boat Operator	\$20.07	80	\$1,606
	Overtime for tech	\$30.11	20	\$602
	Subtotal			\$6,033
Travel				
	Lodging and per diem (2 people/day x \$123/person x 8 nights)			\$1,968
	Subtotal			\$1,968

Equipment

(2 trucks/trip x 550 mi/truck x \$0.34/mi x 2 trips) Vernal to Craig and during boat shuttles, round trip				\$748
(12 gal gas/boat x 2 boats/day x \$4.00/gal x 10 days)				\$960
(2 qts motor boat oil/boat x 2 boats/day x \$11.00/qt x 10 days)				\$440
GSA truck (rate/mo x # truck-months)	\$332	0.5		\$166
Boat propellers, boating equipment replacement/repair, safety equipment (PFDs, etc)				\$500
	Subtotal			\$2,814
	TASK 1 TOTAL			\$10,815

Task 2- Data Analysis, Project Administration**Labor**

GS-9 Admin Assist.	\$40.22	116		\$4,666
	Subtotal			\$4,666
	TASK 2 TOTAL			\$4,666
	SOW TOTAL			\$15,481

2018

Task Activity	Rate \$/h	Hours	Cost
Task 1			
Labor			
GS-11 Biologist	\$48.77	80	\$3,902
1 GS-5 Tech/ WG-5 Boat Operator	\$20.47	80	\$1,638
Overtime for tech	\$30.71	20	\$614
	Subtotal		\$6,153
Travel			
Lodging and per diem (2 people/day x \$123/person x 8 nights)			\$1,968
	Subtotal		\$1,968
Equipment			
(2 trucks/trip x 550 mi/truck x \$0.35/mi x 2 trips) Vernal to Craig and during boat shuttles, round trip			\$770
(12 gal gas/boat x 2 boats/day x \$4.00/gal x 10 days)			\$960
(2 qts motor boat oil/boat x 2 boats/day x \$11.00/qt x 10 days)			\$440
GSA truck (rate/mo x # truck-months)	\$332	0.5	\$166
Boat propellers, boating equipment replacement/repair, safety equipment (PFDs, etc)			\$500
	Subtotal		\$2,836
	TASK 1 TOTAL		\$10,957
Task 2- Data Analysis, Project Administration			
Labor			
GS-9 Admin Assist.	\$41.02	116	\$4,758

Subtotal	\$4,758
TASK 2 TOTAL	\$4,758
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SOW TOTAL	\$15,715

2014	\$14,671
2015	\$15,014
2016	\$15,246
2017	\$15,481
2018	\$15,715
2014-2018 Total:	\$76,127