

**COLORADO RIVER RECOVERY PROGRAM
FY 2006 and FY 2007 PROPOSED SCOPE OF WORK**

Project No.: 98a

Middle Yampa River northern pike removal and evaluation; 2006: commencement of smallmouth bass removal

Lead Agency: Colorado Division of Wildlife

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Category:

- Ongoing project
 Ongoing-revised project
 Requested new project
 Unsolicited proposal

Expected Funding Source:

- Annual funds
 Capital funds
 Other (explain)

I. Title of Proposal:

Middle Yampa River northern pike removal and evaluation; 2006: commencement of smallmouth bass removal

II. Relationship to RIPRAP:

This study will remove northern pike from the middle Yampa River, and evaluate the efficiency of that effort. Further, in 2006, smallmouth bass will be removed from a 10.2-mile section of the middle Yampa River.

Green River Action Plan: Yampa and Little Snake rivers:

- III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
III.A.1. Implement Yampa Basin aquatic wildlife management plan in reaches of the Yampa River occupied by endangered fishes. Each control activity will be evaluated for effectiveness and then continue as needed.
III.A.1.b. Control northern pike.
III.A.1.b.(1) Remove and translocate northern pike and other sport fishes from the Yampa River.

III. Study Background/Rationale and Considerations :

Study Background/Rationale:

Susceptibility of the Colorado River Basin to nonnative fish establishment has been attributed to the low diversity of the native fish fauna, a high degree of endemism of this fauna, and the highly altered physical habitat of the basin (Hawkins and Nesler 1991). Bezzerides and Bestgen (2002) report that the native fish fauna of the Colorado River Basin consists of at least 35 species, while at least 100 nonnative fishes have been introduced into the basin (Tyus and Saunders (2000). Twenty-eight of these nonnative fish species were identified as threats to native fishes through a recent survey of regional fisheries biologists (Hawkins and Nesler 1991). Of these 28 species, the northern pike (*Esox lucius*) was considered by biologists as the third greatest hazard to native fishes (Hawkins and Nesler 1991).

In Colorado, the northern pike is one of 40 known, introduced fish species currently existing within the Colorado River Basin (Nesler 2003). This species has been extensively introduced outside of the species' native range for use as a large, sportfish, and as a predator to control other fishes (Scott and Crossman 1973). Northern pike were first introduced to the Yampa River Basin of Colorado in 1977. Less than 1,000 fingerling northern pike were released into Elkhead Reservoir to predate on a large number of nonnative suckers present (Roehm 2004). Elkhead Creek is located approximately four miles upstream of Craig, and is the receiving stream of Elkhead Reservoir. This creek is tributary to the Yampa River. Movement of northern pike downstream was evidenced by collection of this species in the Yampa River, as early as 1979 (Tyus and Beard 1990). Northern pike numbers within the river had increased by the early 1980s (Wick et al. 1985; Tyus and Beard 1990). Subsequent downstream movement of northern pike into the Green River was first documented less than five years after initial release in Elkhead Reservoir (Tyus and Beard 1990). This species has since established itself has a self-sustaining population within the Yampa River.

Influences of such introductions on native fish fauna are cause for great concern, especially in areas occupied by endangered species. The Yampa River downstream of Craig is designated by the U.S. Fish and Wildlife Service (USFWS) as critical habitat for the federal- and state-listed Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*). Primary threats to these native species include competition with, and predation by nonnative fish species (USFWS 2002). The northern pike has been identified as one of two principal, nonnative hazards to juvenile and adult Colorado pikeminnow (USFWS 2002). Northern pike and Colorado pikeminnow share similar habitat in the spring and early summer during the spawning season. Both species also rely on native sympatric species, such as roundtail chub (*Gila*

robusta), flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*Catostomus discobolus*), and speckled dace (*Rhinichthys osculus yarrowi*) as prey (Tyus and Beard 1990; Nesler 1995). Further, Nesler (1995) found that the nonnative redbreasted shiner may also be a common prey item of northern pike and Colorado pikeminnow. Overall resource sharing between the two species may also increase the likelihood of northern pike predation on young and adult endangered fishes (Tyus and Beard 1990; Nesler 1995). Thus, the potential impacts of northern pike competition with, and predation of native, sympatric species (especially the Colorado pikeminnow) are severe.

Such negative interactions between introduced, nonnative sportfish and native fishes have prompted biologists to develop management plans comprising control of nonnative fishes. By 1997, a strategic plan for nonnative fish control was developed for the upper Colorado River Basin (Tyus and Saunders 1996), and implemented by the Upper Colorado River Endangered Fish Recovery Program (Upper Colorado Recovery Program (USFWS 2002)). The three basic strategies recommended for nonnative fish control within the plan are predation, removal, and exclusion. An Aquatic Wildlife Management plan (CDOW 1998) specific to the Yampa Basin was developed by the Colorado Division of Wildlife (CDOW) in 1998 as part of the implementation process for recovery of endangered fishes. This plan suggests reducing northern pike abundance in riverine habitats, and evaluating such actions via monitoring for significant depletion of target species, temporally and spatially. A Nonnative Fish Management Policy (UCRRIP 2004) was adopted by the Upper Colorado Recovery Program in 2004. This policy indicates that the overall goals of nonnative fish management are to: 1) attain and maintain fish communities where populations of the endangered and other native fish species can persist and thrive, and 2) recovery goals for the endangered species can be achieved. Most recently, the CDOW and five other states have developed, and are signatories to a range-wide conservation agreement (UDWR 2004a) and strategy (UDWR 2004b) for the flannelmouth sucker, bluehead sucker, and roundtail chub. The goal of the agreement and strategy is to ensure the persistence of populations of the three species throughout the species' ranges. Successful implementation of such nonnative fish management goals will benefit endangered fishes, and sympatric, native non-listed fish species, as well.

This proposed study is one of several designed for removal of northern pike and evaluation of such efforts within the upper Colorado River Basin. In 2006, the CDOW will also begin removal of smallmouth bass in one, 10.2 mile section of river, complementing the efforts of Colorado State University (CSU). The CDOW and CSU have cooperatively worked together to develop the logistics within this proposal. These collaborative efforts will increase the efficiency and effectiveness of removing northern pike and smallmouth bass within the middle Yampa River. Evaluation of the removal efforts will assist the Upper Colorado Recovery Program in attaining nonnative fish management goals.

Study Considerations:

The CDOW will complete four passes across 47.3 miles within the time frame that weather and river conditions allow. Further, in 2006, the CDOW will complete two additional passes within a 10.2 mile section, for a total of six passes in this reach. The first two passes (mark-recapture) will occur in a three week time period. Subsequent passes will consist of two weeks of effort (six/seven days on the river and two travel days). . One week between pass two through five/six will be scheduled for crew recovery time and boat/equipment maintenance.

Ideally, four removal passes would be preferred to three removal passes. Hawkins et al. (2004) estimated northern pike population sizes of 565 (485-675 95% CI) in 2003 and 974 (769-1279 95% CI) in 2004, within the study area. Capture probabilities of 21% and 23% were also determined in 2003 and 2004, respectively, by Hawkins et al. (2004). Three removal passes would collectively remove 54% of the estimated 2004 northern pike population, assuming a capture probability of 23%. An additional 11% of the population would be removed with a fourth pass. A fifth pass would remove an added 8%. Thus, in theory, a minimum of four removal passes would remove 65% of the northern pike population.

One suggestion is recommended to increase the overall percentage of northern pike removed. This recommendation is to substitute the initial marking pass with a removal pass. A 2007 population estimate for northern pike within the study reach could then be determined using a regression analysis (Li and Li 1996). This technique assumes that each successive pass removes less fish than the previous pass because the population is being depleted. The method also assumes that probability of capture remains constant. The number of northern pike caught on each successive pass (y-axis) would be regressed against the sum of all northern pike caught (x-axis). The population estimate is determined where the regression line intercepts the x-axis. A regression analysis can generate confidence intervals, albeit rather large. A test using 2004 northern pike catch data (Hawkins et al. 2004) and regression analysis resulted in a population estimate within the confidence intervals reported by Hawkins et al. (2004). A comparison of 2003-2004

(Hawkins et al. 2004) and 2005 northern pike population estimates suggests that completing a fourth removal pass may be more beneficial than estimating the number of northern pike present with a mark-recapture procedure. A routine population estimate (mark-recapture) for northern pike could be determined in 2007 when a population estimate will also be determined for Colorado pikeminnow. Such information will be required when comparing densities of northern pike and Colorado pikeminnow.

A crew of eight people, (four temporary and four permanent employees) will be required to complete this project. Temporaries will be hired for 18, 40-hour work weeks (4.5 months).. Four weeks (two weeks pre-sampling and two weeks post-sampling) of the 18 weeks will be devoted to crew training, preparation and maintenance of boats and equipment, and data entry. Temporaries will work ten to eleven weeks on the river to capture, remove, and translocate northern pike and smallmouth bass. Three to four additional weeks during the period allotted for river sampling will be dedicated to crew recovery, use of compensation time, and boat/equipment maintenance. Temporary employees will not be paid overtime wages. The four permanent employees will consist of a minimum of two fishery biologists, and at least one district wildlife manager. One fishery biologist will be stationed on each electrofishing boat at all times to handle potential stress-related injuries to fish, and personnel safety.

IV. Study Goals, Objectives, End Product:

Study Goals:

- 1) To reduce the number of northern pike occupying 47.3 river miles of critical habitat within the Yampa River downstream of Craig, Colorado (RM 134.2 – RM 60.6), thereby benefiting native fishes of the Yampa River Basin, as well as native fish communities downstream within the Green River Basin
- 2) To transport live northern pike collected from the study reach for release in Loudy Simpson ponds (Craig) and Rio Blanco Lake (White River Basin, near Meeker, Colorado), thereby increasing angler opportunities to harvest northern pike
- 3) To reduce the number of smallmouth bass occupying 10.2 river miles of critical habitat within the Yampa River downstream of Craig, Colorado (RM 134.2 – RM 124), thereby benefiting native fishes of the Yampa River Basin, as well as native fish communities downstream within the Green River Basin
- 4) To transport live smallmouth bass (>10” in total length) collected from the study reach for release in City of Craig municipal pond, thereby increasing angler opportunities to harvest smallmouth bass

Study Objectives:

- 1) To remove and translocate as many northern pike as possible within the study area via three or more removal passes
- 2) To estimate the number of northern pike occupying the study area by generating a population estimate for northern pike utilizing a mark-recapture methodology (1 marking pass, 3 removal passes), or regression analysis (4 removal passes)
- 3) To calculate the proportion of the estimated northern pike population that was removed
- 4) To remove and translocate as many smallmouth bass as possible within the study reach via a minimum of four removal passes

End Product:

An annual report will be prepared, peer reviewed, and distributed to interested parties following the 2006, and 2007 field seasons. Presentations will also be provided during the Annual Nonnative Fish Control Workshop, and at the Annual Recovery Program Researchers' Meeting.

V. Study Area:

The study area for this project will focus on 47.3 miles of the Yampa River just downstream of Craig, Colorado (RM 134.2) to just upstream of Cross Mountain Canyon (RM 60.6). Specific river segments to be sampled include: RM 134.2 (South Beach launch) to RM 124.0 (Round Bottom), RM 100.0 (upstream Government Bridge) to RM 91.0 (mouth of Little Juniper Canyon), RM 88.7 (downstream of Juniper Canyon) to RM 79.2 (old Maybell bridge launch), RM 79.2 to RM 71.0 (Sunbeam launch), and RM 71.0 to RM 60.6 (just upstream of Cross Mountain launch).. Northern pike will not be removed by the CDOW in 24 miles of river, RM 124 (Round Bottom) to RM 100 (near Government Bridge). CSU has established this reach as a smallmouth bass study area. These 24 miles have also been included in previous studies for northern pike removal. Therefore, CSU will remove northern pike within these stretches in conjunction with their smallmouth bass study. CSU will also remove smallmouth bass and northern pike from downstream of Cross Mountain Canyon (RM 55.5) to just downstream of the Little Snake River confluence (RM 50.5). In 2006, the CDOW will also commence removal of smallmouth bass in the South Beach section (RM 134.2-124.0). Approximately two miles of river within Juniper Canyon will not be sampled, due to non-navigable riverine conditions.

VI. Study Methods/Approach:

Hoop/Fyke Net and Pheromone Experimental Study

In 2006, an experimental study focusing on hoop and fyke net sets, as well as use of pheromones to attract northern pike will be attempted. River discharge exceeding 3,000 cfs will most likely be required to access backwaters for fyke

net sets. Fyke nets will be set in eight backwaters, with and without white sucker pheromones. The backwaters of interest include: Eagles Nest backwater (RM 132.7-132.6), Deakins backwater (RM 99.7) Maudlin Gulch (RM 97.9), Jessie Gulch (RM 97.7), Tea backwater (RM 94.5), Spring Creek (RM 81.6), Sand Creek (RM 72.8), and Overholt Draw (RM 75.0). A control (pheromone absent) and treatment (pheromone present) approach will be followed. A 1" aperture gill net will be set at the mouth of each backwater, followed by electrofishing with scare and snare, and block and shock techniques. One fyke net, also of 1" aperture will be set overnight in each backwater. The gill net will be removed once electrofishing within the backwater is completed, and the fyke net has been set successfully. All northern pike, smallmouth bass, roundtail chub, and Colorado pikeminnow captured in the gill net, via electrofishing, and in the fyke net will be identified, measured in total length to the nearest millimeter (mm), and weighed to the nearest gram (g). Northern pike and smallmouth bass collected will be examined for the presence of FLOY tags, and fin clips. Colorado pikeminnow and roundtail chub captured will be scanned to determine the presence of PIT tags. Individuals without PIT tags will be implanted with a new PIT tag following the appropriate protocol; tags for Colorado pikeminnow will be provided by the USFWS. All northern pike captured (a minimum of 200 mm in total length) will be marked with unique, colored FLOY tags (color to be determined in coordination with other studies) and released. All smallmouth bass captured (a minimum of 200 mm in total length) in the Eagles Nest backwater within the South Beach section will also be marked with unique, colored FLOY tags and released. One, 24-hour period between fyke net sets in the same backwater will elapse before the same process (gill net set, electrofish, fyke net set) will reoccur. Each fyke net will then be set with pheromone attractant. White suckers will be captured via electrofishing, and will be utilized for extraction of pheromones.

In addition, baited hoop nets will be set in the main channel, in areas away from the selected backwaters to also attract northern pike. These hoop nets will also be set overnight, and retrieved the following day. All northern pike, smallmouth bass, roundtail chub, and Colorado pikeminnow captured will be processed similarly to those captured during the fyke net study (see previous section).

Results of this experimental study may influence removal passes subsequent to the first and second passes. That is, if net sets are successful, some backwaters of interest may be focused on at the expense of sampling main channel river miles. In this situation, not all 47.3 miles of the study reach would be sampled after the completion of the first and second passes. Retaining the same methodology and effort as in previous years across the first two passes will ensure a population estimate comparable to previous years.

Main Study

Capturing and removing northern pike within main channel and backwater habitat will be the focus of this sampling effort. Further, in 2006, capturing and removing smallmouth bass in a 10.2 mile portion of the study area will also be completed. Incidental contact with Colorado pikeminnow and roundtail chub will be handled per the protocol below. This study will occur between the middle of April and the beginning of July. Ten day trips across two weeks (seven/eight days on the river and two/three days travel) will constitute one pass. Four total passes will be completed for northern pike removal. Six total passes will be attempted for smallmouth bass removal in the South Beach section. The first two passes for northern pike, one mark and one recapture pass, will involve sampling 47.3 river miles. The two subsequent passes may involve focusing on hot spots or areas of potentially high concentrations of northern pike. If fyke/hoop net sets are successful during the experimental study and access to backwaters is still possible, such nets may be set during the third and fourth removal passes. In such situations, all 47.3 miles of river would not be sampled. Sampling would still occur within portions of each river segment previously described. The first four passes for smallmouth bass in the South Beach section will coincide with the first four passes for northern pike in the same area. Two additional removal passes for smallmouth bass will occur in the South Beach section. Any northern pike encountered during the two additional removal passes for smallmouth bass will also be removed. The first pass will include marking all northern pike and smallmouth bass (individuals of both species must be a minimum of 200 millimeters total length) captured with unique, colored FLOY tags (color to be determined in coordination with other studies). Only smallmouth bass captured within the South Beach section will be marked. All northern pike and smallmouth bass captured and marked during the first pass will be returned to the river near the fish collection location. Further, ripe female northern pike captured on the first pass will be stripped of eggs before these fish are marked and returned to the river. Northern pike captured on the three subsequent passes will be marked, removed, and transported alive to Loudy Simpson ponds and Rio Blanco Lake. Smallmouth bass captured on the five subsequent passes within the South Beach section will be marked and removed. Captured smallmouth bass larger than 10" in total length will be transported alive to City of Craig municipal pond. Smallmouth bass 10" or less in total length will be lethally removed, and provided to Pat Martinez (CDOW Aquatic Researcher) for bioenergetics and isotope analyses.

Two, three man electrofishing crews will utilize john boats with outboard jet units within each river segment to perform mark-recapture sampling in the main channel. Each crew will simultaneously move downstream with Smith Root GPP 5.0 electrofishers. One crew will work one side of the river, while the second crew will work the other side. Island perimeters will also be electrofished. One mark and three recapture passes (one pass is equivalent to crews electrofishing the left and right banks) will be completed through each

river segment. Each river segment will be electrofished once per day, constituting one pass. No river segment will be electrofished on consecutive days, to allow for fish to recover and redistribute.

Backwaters where the CDOW has obtained permission to sample will also be included within the study. Both crews will sample backwater areas along both sides of the river. A trammel net will be used with a block and shock technique. Backwater habitats will be sampled until the river recedes and habitat is no longer accessible. Output power will be adjusted within backwaters based upon changes in river conductivity. Additionally, output power will be reduced during the boat approach to the blocked mouth. Both processes will minimize the potential for electrofishing injuries to fish.

A third, chase boat, will be operated by two additional crew members to process northern pike at a maximum of 2.0 mile intervals, depending on the number of fish caught. All northern pike, Colorado pikeminnow, and roundtail chub captured will be identified, measured in total length to the nearest millimeter, and weighed to the nearest gram. Northern pike collected will be examined for the presence of FLOY tags, and fin clips. Colorado pikeminnow and roundtail chub captured will be scanned to determine the presence of PIT tags. Individuals without PIT tags will be implanted with a new PIT tag following the appropriate protocol; tags for Colorado pikeminnow will be provided by the USFWS. Capture locations for Colorado pikeminnow and roundtail chub will be recorded to the nearest tenth of a river mile. UTM coordinates associated with capture locations will also be recorded, when possible. All Colorado pikeminnow and roundtail chub captured will be released immediately. Any native fish captured that is visibly stressed will not be processed, but rather returned to the location of capture within the river, immediately. Smallmouth bass encountered with FLOY tags will be measured for total length and weighed to the nearest gram. FLOY tag # and color will be recorded. All smallmouth bass captured outside of the South Beach section will be released. The capture or release river location will be recorded to the nearest 2.0 miles, for recaptured smallmouth bass. Incidental contact with other nonnative game fish, including up to 40 channel catfish, will result in lethal removal. These fish will be provided to Pat Martinez (CDOW Aquatic Researcher) for bioenergetics and isotope analyses.

Data collected will be analyzed to determine northern pike population estimates, length frequency distributions, and catch per unit effort. Length frequencies and catch per unit effort will also be determined for Colorado pikeminnow and roundtail chub. Data collected regarding Colorado pikeminnow will be provided to the USFWS.

VII. Task Description and Schedule:

Task 1. Establish landowner contacts, and obtain permission to access property (backwaters) for fish sampling.

Schedule: February and/or March of 2006 and 2007

Task 2. Plan logistics, hire and train personnel, order and maintain equipment, and prepare for sampling.

Schedule: February-April of 2006 and 2007

Task 3. Sample study area to capture, remove, and translocate northern pike and smallmouth bass. Limited data entry.

Schedule:

Hoop/Fyke Net and Pheromone Experimental Study:

April 10-April 14, 2006

First pass: April 17-April 26, 2006; representative dates in 2007

Second pass: April 27-May 5, 2006; representative dates in 2007

Third pass: May 15-May 26, 2006; representative dates in 2007

Fourth pass: June 5-June 16, 2006; representative dates in 2007

Fifth and Sixth passes in South Beach section: June 26-July 7, 2006

Task 4. Maintenance of equipment. Data entry, data analysis, and prepare final report. Present findings during the Annual Nonnative Fish Control Workshop, and at the Annual Recovery Program Researchers Meeting. (Task 4 in FY-2007 budget reflects additional labor for preparation and presentation of 2004-2007 synthesis report).

Schedule:

August-December 2006, January 2007; August-December 2007, Jan 2008

VIII. FY-2006 Work:

Deliverables/Due Dates:

Annual report due November 2006

FY-2006 Budget by Task:

Task 1.

Labor =

Two Wildlife Manager IIIs:

Lodging (8 nights @ \$55.00/night = \$440) x 2 positions = **\$880**

Per diem (10 days @ \$31/day = \$310) x 2 positions = **\$620**

Total = \$1,500

Task 2.

Labor =

Four seasonal technicians (Technician Is):

Salary (2, 40 hour weeks @ \$11.30/hour = \$904) + Benefits
(11.69% = \$106) + Indirect costs (34.8% of \$1,010 = \$352) =
\$1,362 x 4 positions = **\$5,448**

Equipment =

Smith Root GPP 5.0 Electrofisher control box (per Smith Root) = **\$6,816**

Dip nets, fish measuring boards, and fish scales = **\$1,500:**

(12 short and long handles with interchangeable net heads @
\$75/each = \$900; 5 fish measuring boards @ \$40/each = \$200; 8
spring scales @ \$50/each = \$400)

Fish hauling tank and regulators, aerators, and oxygen = **\$4,068:**

(2 fish tank and regulators @ \$1,500/each=\$3,000; 6 re-circulating
aerator set-ups @ \$150/each = \$900; 8 oxygen tanks rental @
\$21/each = \$168)

FLOY tags, guns, and needles (per FLOY Tag) = **\$1,386:**

(2,000 tags @ \$520/1,000 tags = \$1,040; 5 guns @ \$50/each =
\$250; 12 needles @ \$8/each = \$96)

PIT tags and implanter (per Biomark) = **\$2,300**

(500 tags @ \$4.50/tag = \$2,250; 2 sets of one dozen implanters @
\$25/dozen = \$50)

Waders, lifejackets, rain gear, electrofishing gloves = **\$2,130:**

(4 pairs of waders @ \$75/each = \$300; 5 lifejackets @ \$110/each
= \$550; 4 sets of heavy duty rain gear jackets and pants @
\$200/each = \$800; 16 pairs of gloves @ \$30/each = \$480)

GPS units (1 @ \$150/each) = **\$150**

Two-way radios (4 sets @ \$75/each) = **\$300**

Gill nets (2 @ \$250/each) = **\$500**

Net pens (2 @ \$100/each) = **\$200**

Factory calibration of Smith Root GPP 5.0 (3 @ \$250 each) = **\$750**

Maintenance of boats and trailers, excluding fuel (per Chuck's Marine,
Marine Max, and Mercs and More)= **\$4,372** (includes replacement,
repair, and maintenance of boat and trailer parts: (6 tune-ups @
\$100/ each =\$600; 6 spare jet sleeves/liners @ \$42/each = \$252; 3
spare impellers @ \$450/each = \$1,350; 9 spare water pumps and
kits @ \$60/each = \$450; 6 spare throttle and steering cables
@\$45/each = \$270; motor oil and grease @ \$800; 2 spare batteries
@ \$50/each = \$100; 6 trailer bunks @ \$50/each = \$300; trailer
lights and bearings = \$250)

Boat fuel (3 @ \$1,100/each) = **\$3,300**

Maintenance of generators (oil and fuel) = **\$750**

Maintenance of electrofishers = **\$900:**

(Spare anodes, cathodes, plugs, booms, wiring, and hardware)

Total = \$34,870

Task 3.

Labor =

Four seasonal technicians (Technician Is):

Salary (14, 40 hour weeks @ \$11.30/hour = \$6,328) + Benefits (11.69% = \$740) + Indirect costs (34.8% of \$7,068 = \$2,460) = \$9,528 x 4 positions = **\$38,112**

Lodging (8 nights/trip @ \$55.00/night = \$440/trip x 5 trips = \$2,220/pos. x 4 positions = **\$8,800**

Per diem (10 days/trip @ \$296/trip x 5 trips = \$1,480/pos. x 4 positions = **\$5,920**

Four Wildlife Manager IIIs:

Lodging (8 nights/trip @ \$55.00/night = \$440/trip x 5 trips = \$2,220/pos. x 4 positions = **\$8,800**

Per diem (10 days/trip @ \$296/trip x 5 trips = \$1,480/pos. x 4 positions = **\$5,920**

Total = \$67,552

Task 4.

Labor =

Four seasonal technicians (Technician Is):

Salary (2, 40 hour weeks @ \$11.30/hour = \$904) + Benefits (11.69% = \$106) + Indirect costs (34.8% of \$1,010 = \$352) = \$1,362 x 4 positions = **\$5,448**

Total = \$5,448

Grand Total = \$109,370

FY-2007 Work:

Deliverables/Due Dates:

Annual report due November 2007

FY-2007 Budget by Task:

Task 1.

Labor =

Two Wildlife Manager IIIs:

Lodging (8 nights @ \$55.00/night = \$440) x 2 positions = **\$880**

Per diem (10 days @ \$31/day = \$310) x 2 positions = **\$620**

Total = \$1,500

Task 2.

Labor =

Four seasonal technicians (Technician Is):

Salary (2, 40 hour weeks @ \$11.30/hour = \$904) + Benefits
(11.69% = \$106) + Indirect costs (34.8% of \$1,010 = \$352) =
\$1,362 x 4 positions = **\$5,448**

Equipment =

135 Mercury OptiMax Jet Drive Motor (per Clark Boats) = **\$7,785**

Dip nets, fish measuring boards, and fish scales = **\$1,500:**

(12 short and long handles with interchangeable net heads @
\$75/each = \$900; 5 fish measuring boards @ \$40/each = \$200; 8
spring scales @ \$50/each = \$400)

Aerators and oxygen = **\$726:**

(4 re-circulating aerator set-ups @ \$150/each = \$600; 6 oxygen
tanks rental @ \$21/each = \$126)

FLOY tags, guns, and needles (per FLOY Tag) = **\$1,386:**

(2,000 tags @ \$520/1,000 = \$1,040; 5 guns @ \$50/each = \$250; 12
needles @ \$8/each = \$96)

Waders, lifejackets, rain gear, and electrofishing gloves = **\$2,130:**

(4 pairs of waders @ \$75/each = \$300; 5 lifejackets @ \$110/each
= \$550; 4 sets of heavy duty rain gear jackets and pants @
\$200/each = \$800; 16 pairs of gloves @ \$30/each = \$480)

GPS units (1 @ \$150/each) = **\$150**

Two-way radios (4 sets @ \$75/each) = **\$300**

Gill nets (2 @ \$250/each) = **\$500**

Net pens (2 @ \$100/each) = **\$200**

Factory calibration of Smith Root GPP 5.0 (3 @ \$250 each) = **\$750**

Maintenance of boats and trailers, excluding fuel (per Chuck's Marine,
Marine Max, and Mercs and More) = **\$7,372** (includes
replacement, repair, and maintenance of boat and trailer parts: (6
tune-ups @ \$100/ each = \$600; 6 spare jet sleeves/liners @
\$42/each = \$252; 3 spare impellers @ \$450/each = \$1,350; 9 spare
water pumps and kits @ \$60/each = \$450; 1 spare jet drive pump
@ \$3,000; 6 spare throttle and steering cables @ \$45/each = \$270;
motor oil and grease @ \$800; 2 spare batteries @ \$50/each =
\$100; 6 trailer bunks @ \$50/each = \$300; trailer lights and
bearings = \$250)

Boat fuel (3 @ \$1,000/each) = **\$3,000**

Maintenance of generators (oil and fuel) = **\$500**

Maintenance of electrofishers = **\$900:**

(Spare anodes, cathodes, plugs, booms, wiring, and hardware)

Total = \$32,647

Task 3.

Labor =

Four seasonal technicians (Technician Is):

Salary (14, 40 hour weeks @ \$11.30/hour = \$6,328) + Benefits
(11.69% = \$740) + Indirect costs (34.8% of \$7,068 = \$2,460) =
\$9,528 x 4 positions = **\$38,112**

Lodging (8 nights/trip @ \$55.00/night = \$440/trip x 5 trips =
\$2,220/pos. x 4 positions = **\$8,800**

Per diem (10 days/trip @ \$296/trip x 5 trips = \$1,480/pos. x 4
positions = **\$5,920**

Four Wildlife Manager IIIs:

Lodging (8 nights/trip @ \$55.00/night = \$440/trip x 5 trips =
\$2,220/pos. x 4 positions = **\$8,800**

Per diem (10 days/trip @ \$296/trip x 5 trips = \$1,480/pos. x 4
positions = **\$5,920**

Total = \$67,552

Task 4.

Labor =

Four seasonal technicians (Technician Is):

Salary (4, 40 hour weeks @ \$11.30/hour = \$1,808) + Benefits
(11.69% = \$211) + Indirect costs (34.8% of \$2,019 = \$703) =
\$2,722 x 4 positions = **\$10,888**

Total = \$10,888

Grand Total = \$112,587

IX. Budget Summary:

FY 2006: \$109,370

FY 2007: \$112,587

X. Reviewers:

Biology Committee

XI. References:

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- U.S. Fish and Wildlife Service. 2002. Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region 6, Denver, Colorado.
- Wick, E.J., J.A. Hawkins, and C.A. Carlson. 1985. Colorado squawfish and humpback chub population and habitat monitoring, 1983-1984. Endangered wildlife investigations. Final report SE 3-7. Colorado State University Larval Fish Laboratory (Fort Collins, Colorado) and Colorado Division of Wildlife (Denver, Colorado).