

**COLORADO RIVER RECOVERY PROGRAM
FY 2007 and FY 2008 PROPOSED SCOPE OF WORK**

Project No.: 98a

Middle Yampa River northern pike removal and evaluation; Middle Yampa River (South Beach section) smallmouth bass removal and evaluation

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; Middle Yampa River (South Beach section) smallmouth bass removal and evaluation

II. Relationship to RIPRAP:

This study will remove northern pike from the middle Yampa River, and evaluate the efficiency of that effort. Further, smallmouth bass will also be removed from one, 10.2 mile section (South Beach section) of the middle Yampa River. This effort will also be evaluated.

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 as 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 redbside

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 has 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 smallmouth bass, and evaluation of such efforts within the upper Colorado River Basin. The CDOW and Colorado State University (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 a minimum of three removal passes across 47.3 miles within the time frame that weather and river conditions allow. Further, the CDOW will work with CSU and the US Fish and Wildlife Service-Vernal office (USFWS) to complete an additional four removal passes within a 10.2 mile section (South Beach section) of the 47.3 mile 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 after pass two is completed, and one week between each of the remaining passes will be scheduled for crew recovery time and boat/equipment maintenance.

A crew of eight to nine people 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.

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 area for release in Loudy Simpson ponds (Craig), 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 ($\geq 10''$ in total length) collected from the South Beach section for release in the City of Craig municipal pond and Elkhead Reservoir, 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, minimum of 3 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 South Beach section via three or more (maximum of seven) removal passes
- 5) To estimate the number of smallmouth bass occupying the South Beach section by generating a population estimate for smallmouth bass utilizing a mark-recapture methodology (1 marking pass, minimum of 3 removal passes)
- 6) To calculate the proportion of the estimated smallmouth bass population that was removed

End Product:

Annual Reports will be prepared, peer reviewed, and distributed to interested parties following the 2007 and 2008 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). The CDOW will continue removal of smallmouth bass in the South Beach section (RM 134.2-124.0) only. Approximately two miles of river within Juniper Canyon will not be sampled, due to non-navigable riverine conditions.

VI. Study Methods/Approach:

Fyke Net and Pheromone Experimental Study

An experimental study focusing on 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 four backwaters, with and without the use of ripe, male-female northern pike pairs (as available). The backwaters of interest include: Eagles Nest backwater (RM 132.7-132.6), 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. 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. Ripe northern pike will be utilized as bait, and will be presumed to exude pheromones.

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). Capture locations for northern pike and smallmouth bass will be recorded to the nearest tenth of a river mile. Northern pike and smallmouth bass collected will be examined for the presence of FLOY tags, and fin clips. Northern pike and smallmouth bass (individuals of both species must be a minimum of 150 mm total length) will be marked with unique, yellow-colored FLOY tags, numbered from 10,001-15,000, and released alive. FLOY tag number and color will be recorded.

Colorado pikeminnow and roundtail chub captured will be scanned to determine the presence of passive integrated transponder (PIT) tags. PIT tag number will be recorded and stored in the PIT tag reader for those fish encountered with 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's associated with capture locations will also be recorded, when possible. All Colorado pikeminnow and roundtail chub captured will be released alive, 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.

Incidental contact with other nonnative game fish (including centrarchids and walleye, excluding channel catfish) will result in lethal removal. Up to 20 specimens each of black crappie, largemouth bass, and walleye of various minimum sizes, identified by Pat Martinez, CDOW Researcher, in an earlier e-mail transmission, will be provided to Martinez for bioenergetics and isotope analyses (RP Project No. C18/19). Disposal of all the aforementioned fishes will be as follows: following capture, fish will be euthanized in the field, and preserved with ice. All other dead fish not provided to Martinez will be disposed of in the Mesa County landfill southeast of Grand Junction, Colorado.

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, 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 end of June. Ten day trips across two weeks (seven/eight days on the river and two/three days travel) will constitute one pass. A minimum of three passes will be completed for northern pike removal. Seven removal 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 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. An additional four removal passes for smallmouth bass will be attempted in the South Beach section. Any northern pike encountered during the four 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 150 mm total length) captured with unique, yellow-colored FLOY tags numbered from 10,001 to 15,000. All northern pike and smallmouth bass captured and marked during the first pass will be returned to the river, alive, 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 and smallmouth bass captured on subsequent, removal passes will be marked with a different set of FLOY tags. Northern pike captured will be marked with unique, yellow-colored FLOY tags numbered from 15,001 to 20,000. These marked fish will then be removed from the river, and transported alive to Loudy Simpson ponds. Smallmouth bass (greater than or equal to 10 inches in total length) captured in the South Beach section only, will also be marked with unique, yellow-

colored FLOY tags numbered from 15,001 to 20,000. These marked smallmouth bass will then be removed from the river, and transported alive to the City of Craig municipal pond and Elkhead Reservoir. Smallmouth bass captured in the South Beach section only, that are less than 10 inches in total length, will be euthanized in the field, and preserved with ice. All euthanized smallmouth bass will be disposed of in the Mesa County landfill southeast of Grand Junction, Colorado. All other smallmouth bass captured outside of the South Beach section, but within the study area, will be marked with unique, yellow-colored FLOY tags numbered from 10,001 to 15,000, and released alive.

Two, three man electrofishing crews will utilize jon 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, smallmouth bass, Colorado pikeminnow, and roundtail chub captured will be identified, measured in total length to the nearest millimeter, and weighed to the nearest gram. Capture locations for northern pike and smallmouth bass will be recorded to the nearest tenth of a river mile. Northern pike and smallmouth bass collected will be examined for the presence of FLOY tags, and fin clips. Northern pike and smallmouth bass (greater than or equal to 150 mm total length) will be marked with FLOY tags. FLOY tag number and color will be recorded. Colorado pikeminnow and roundtail chub captured will be scanned to determine the presence of PIT tags. PIT tag number will be recorded and stored in the PIT tag reader for those fish encountered with 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

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 2007, January 2008; August-December 2008, January 2009

VIII. 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 =

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 3. (USFWS-Vernal only, to supplement CDOW removal passes in South Beach reach-monies should be provided directly to USFWS-Vernal, NOT CDOW)

Labor =

Project Biologist (GS-11 Step 4):

Salary (2, 10 hour days @ \$423/10 hour day) = **\$846**

Biological Technician (GS-8 Step 5):

Salary (2, 10 hour days @ \$326/10 hour day) = **\$652**
 Seasonal Biological Technicians (GS-5 Step 3):
 Salary (2, 10 hour days @ \$261/10 hour day) x 3 positions =
\$1,566
 Lodging = **\$600**
 Per Diem = **\$390**

Equipment (fuel) = \$200

Total = \$4,254

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 to CDOW = \$109,370
Grand Total to USFWS-Vernal = \$4,254

FY-2008 Work:

Deliverables/Due Dates:

Annual report due November 2008

FY-2008 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 Sub Total = \$112,587

IX. Changes in Number of Removal Passes and Distribution of Effort

Based on the 2007 capture probability (P) of $P = .23$ for northern pike along the portion of the Yampa River covered by project 98a and 120, it is estimated that four to five removal passes will be needed to reach the target of a 65% Exploitation Rate. In 2007 three removal passes were conducted in all reaches except South Beach to

Round Bottom, where 5 removal passes were conducted. Based on these estimates the CDOW has been close to the target for northern pike removal.

The same estimates for smallmouth bass suggest that a more substantial increase in effort is needed. Since smallmouth bass removal has only occurred in the South Beach to Round Bottom reach (RM 134.2-124.0) and population estimates and capture probabilities have been generated separately for each of the five reaches within the section covered by 98a, number of passes needed was projected for each of the five reaches (Table 1). It is estimated that in the South Beach to Round Bottom reach, 15 removal passes will be needed to achieve the goal of a 65% exploitation rate. Should removal of smallmouth bass from RM 100 to RM 80 commence in 2008, it is estimated that 5 to 7 passes will be needed to achieve the 65% exploitation rate goal.

Table 1. Smallmouth bass capture probability, population estimates, and number of passes needed to achieve a 65 % Exploitation rate in all 5 reaches sampled in project 98a.

Reach	Capture Probability	Population Estimate	Number of Passes Needed to Achieve 65% Exploitation
Southbeach (RM 134.2-124.0)	0.07	1139	15
Juniper (RM 100.0-91.0)	0.21	241	5
Upper Maybell (RM 88.7-79.2)	0.16	371	7
Lower Maybell (RM 79.2-71.0)	NA	NA	NA
Sunbeam (71.0-60.6)	0.23	76	4

Given the time and flow restrictions, at the current level of efficiency it will not be possible to achieve the number of removal reaches suggested for South Beach. As such the Principal Investigators of for 98a suggest that efforts be increased in some reaches to better meet the above criteria for number of passes needed. The 98a PI's suggest that removal passes be completed as follows:

- South Beach: 6 removals for NPK and SMB
- Juniper: 6 removals for NPK and SMB
- Upper Maybell: 6 removals for NPK and SMB
- Lower Maybell: 3 removals for NPK
- Sunbeam: 3 removals for NPK

Additional Costs to Scope of Work

The above removal suggestions would result in a minimum of 29 on River days, seven days more than needed in 2007. Therefore, at least one extra trip consisting of

seven work days will be needed to complete the work. The expenses listed below are in addition to the 2007 SOW for 98a. The changes are for Task 2 and Task 3 from the 2007 SOW. In addition to costs associated with the increased effort in 2008, the 2008 SOW will reflect the increase in per diem rates and temporary employee wages that have occurred subsequent to the 2007 field season. These costs are also itemized below:

Task 2: Maintenance

Boat Fuel: \$1000.00
Generator Fuel: \$200.00
Truck Mileage: \$500.00
Increase in temporary employee wages from \$11.30/hr to \$12.35/hr: \$502.00
Increase in Per Diem rate from \$31.00/day to \$42.00/day = \$220.00
TOTAL: \$2422.00

Task 3: Sample Study Area

Seasonal Employees

Labor – for an additional two 40 hour work weeks for 4 seasonal employees

2 40 hour weeks (@ \$12.35/hour = \$988.00) + Benefits (11.69% = \$115.50) + Indirect Costs (34.8% = \$384.02) = \$1,489.52 * 4 positions = **\$5,950.16**
Increase in temporary employee wages from \$11.30/hr (2007) to \$12.35/hr: **\$3,358.00**

Lodging – for an additional 8 night work trip for 4 seasonal employees

Lodging (8 nights/trip @ \$55.00/night = \$440.00) * 4 positions = **\$1,760.00**

Per Diem – for an additional trip for 4 seasonal employees

Per Diem (10 day trip @ \$420.00/trip) * 4 positions = **\$1,680.00**
Increase in per diem rate from \$31.00/day (2007) to \$42.00/day (2008) = **\$2,470.00**

Wildlife Manager III's

Lodging – for an additional 8 night work trip for 4 Wildlife Manager III's

Lodging (8 nights/trip @ \$55.00/night = \$440.00) * 4 positions = **\$1,760.00**

Per Diem – for an additional trip for 4 Wildlife Manager III's

Per Diem (10 day trip @ \$390.00/trip) * 4 positions = **\$1,680.00**
increase in per diem rate from \$31.00/day to \$42.00/day= **\$2470.00**

TOTAL ESTIMATED ADDITIONAL COSTS: \$21,870.00

X. Budget Summary:

FY 2007: \$109,370 to CDOW and \$4,254 to USFWS-Vernal;

FY 2008: \$112,587 plus additional pass costs (\$21,870.00) = \$134,457.00

XI. Reviewers:

Biology Committee

XII. References:

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