

**RECOVERY PROGRAM
FY 2020-2021 SCOPE OF WORK for:**

Recovery Program Project Number: 126(a)

Removal of Non-native Fish in the Upper Colorado River between Grand Valley Water User's Dam [Government Highline Diversion Dam] near Palisade, Colorado, and Potash, Utah

Reclamation Agreement number: TBD

Reclamation Agreement term: October 1, 2019 – Sept. 30, 2024

Note: Recovery Program FY20-21 scopes of work are drafted in May 2019. 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.

Lead agency: U.S. Fish and Wildlife Service
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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: Removal of Non-native Fish in the Upper Colorado River between Grand Valley Water User's Dam [Government Highline Diversion Dam] near Palisade, Colorado, and Potash, Utah.

II. Relationship to RIPRAP:

GENERAL

III.A.2.c. Evaluate the effectiveness (e.g., nonnative and native fish response) and develop and implement an integrated, viable active control program.

COLORADO RIVER

III.A.6. Develop and implement program to identify required level of smallmouth bass control.

III.A.7. Develop and implement program to identify required level of northern pike control.

III.A.8. Walleye in the Colorado River

III.A.9. Other emerging nonnative fishes.

III. Study Background/Rationale and Hypotheses:

General

Significant anthropogenic changes to the physical riverine habitat have undoubtedly played an important role in the decline and endangered status of Colorado pikeminnow, humpback chub, bonytail, and razorback sucker, but changes in the biological environment may also have been equally significant. Physical changes in the riverine habitat have been accompanied by the introduction, establishment, and proliferation of nonnative fishes, and concomitant declines in native fishes in the Upper Colorado River basin. The role of nonnative fishes is often identified, in association with habitat changes, as a major obstacle to conservation of native fish communities.

At least 67 nonnative fishes have been introduced actively or passively into the Colorado River system during the last 100 years (Minckley 1982; Tyus et al. 1982; Carlson and Muth 1989; Minckley and Deacon 1991; Maddux et al. 1993). By 1980, more than 50 nonnative fishes had been actively introduced into rivers and reservoirs of the Colorado River basin (Minckley 1982; Tyus et al. 1982; Carlson and Muth 1989). Native big river fishes have disappeared from about three-fourths of their original habitat while introduced fishes have become more widespread and abundant. Former studies have also documented a decline in the abundance of native fish species as nonnative species increased in abundance (Joseph et al. 1977; Behnke 1980; Osmundson and Kaeding 1989; Quarterone 1993; Francis and Ryden 2014(b)).

Many of the nonnative fishes introduced into the Colorado River basin are suspected of adversely affecting the native main stem fishes. Warm water game fish are thought to have the greatest adverse effect on endangered native fishes. Centrarchids (e. g., largemouth bass, green sunfish, bluegill, black crappie, and smallmouth bass), ictalurids (e. g., channel catfish and black bullhead), esocids (northern pike), and percids (walleye) are frequently listed as contributors to the decline of native fishes. An increasing body of evidence characterizes the negative interactions of nonnative fishes with the endangered big river fishes (Hawkins and Nesler 1991; Minckley et al. 1991; Maddux et al. 1993; Lentsch et al. 1996; Francis and Ryden 2014(b)). Some of this evidence is indirect, including inferences from field data or results from laboratory studies of predation by nonnatives on natives. Laboratory studies have documented agonistic behavior, resource sharing, and vulnerability to predation (Papoulias and Minckley 1990; Karp and Tyus 1990; Ruppert et al. 1993; Johnson et al. 1993). Direct evidence of predation includes native fishes obtained from stomach contents of nonnative fishes and by visual observation of predation. Other means by which nonnative fishes may adversely affect native fishes are by competition for food, which limits the success of razorback sucker and Colorado pikeminnow (Papoulias and Minckley 1990; Johnson et al. 2008). The extent of predation pressure by some nonnative fishes on populations of native fishes is not exactly known. Tyus and Saunders (1996) went on to conclude that smallmouth bass along with channel catfish and northern pike were the main threat to juvenile Colorado pikeminnow and razorback sucker. During the 1990s the Yampa River experienced a dramatic increase in northern pike in critical habitat followed by an increase in smallmouth bass. Predation by these two piscivorous species wreaked havoc on the native fish community. Anderson (2004; 2005) documented significant declines of native fish densities in parts of the Yampa River between 1998 and 2004 coincident with an increase in smallmouth bass abundance. Bioenergetics modeling by Johnson et al. (2008) indicated that smallmouth bass

fish consumption was similar to northern pike and about 65 times greater than channel catfish, but if more prey fish were available, piscivory by smallmouth bass could be 10 fold the piscivory by northern pike and channel catfish. They concluded that smallmouth bass presented the greatest predatory threat to native fishes of the Yampa River. Francis and Ryden (2015) reported a decline in Colorado pikeminnow abundance in the lower Colorado River (2010-2014), while walleye populations were increasing; and they documented three juvenile Colorado pikeminnow in three walleye stomachs.

Smallmouth Bass

Until 2003, smallmouth bass were only reported as incidental, rare captures in the Upper Colorado River from Price Stubb Dam (river mile 188.3) to the Colorado/Green River confluence. However, Fish and Wildlife sampling crews involved with the channel catfish removal evaluation recorded and documented the capture of 318 smallmouth bass in main channel riverine habitats in a 39-mile reach of the Upper Colorado River from the Gunnison/Colorado River confluence to the Utah/Colorado Stateline (Burdick 2003(a)). Smallmouth bass removal became an ongoing project beginning in 2004. Dry and moderately wet hydrologic years support large reproductive year classes of smallmouth bass, and when these hydrologic conditions occur in successive years juvenile fish are able to recruit into adults. Removal coupled with good run-off years reduced catch rates of all size classes of smallmouth bass through 2006. This same trend has happened after low runoff and good smallmouth bass reproduction years in 2007, 2010, 2012, 2013 and 2018 (Francis and Ryden 2018).

Upper Colorado River (Colorado)

In the Upper Colorado River between Grand Valley Water User's Dam (GVWU; river mile [RM] 193.7) and Potash, UT (RM 47.2). However, the increase in the number of smallmouth bass reported during the channel catfish removal evaluation had biologists and managers concerned that smallmouth bass abundance could increase quickly, and further impact recovery of native endangered fishes. Smallmouth bass have the potential to predate or compete with different life stages of the four native endangered fishes.

Fish passage has been restored at the Grand Valley Irrigation Company Diversion Dam near Palisade, GVWU Dam, and at the Price-Stubb Diversion Dam. For the first time in over 100 years fish now have upstream access from the Grand Valley to upstream reaches in the Upper Colorado River. Only a fish trap at the GVWU fish passageway can prevent unimpeded movement upstream. This facility is operated as a selective fish passage where nonnative species are removed and native species are allowed to pass upstream. Smallmouth bass are located in Rifle Gap Reservoir and Highline Lake and adult smallmouth bass have been collected in the Colorado River between Rifle and Price-Stubb Dam (Anderson 1997; Burdick 2008(a)) and Price-Stubb Dam and Dewey Bridge, UT (Francis and Ryden 2013(b); Francis and Ryden 2014(b)). Both reservoirs are now outfitted with improvements to reduce escapement of nonnative fishes (a coanda screen [Rifle Gap] and a spillway net [Highline]).

Lower Gunnison River

The Redlands Dam fish passageway on the Lower Gunnison River is also operated as a selective passage facility, and the number of smallmouth bass captured in the fish trap has increased over previous years of monitoring . From

1996-2001, only one smallmouth bass was collected at the fish passage (Burdick 2001). Since that time the annual capture of smallmouth bass has been as high as twenty-two fish (Francis and Ryden 2013 (a)). About 1,800 fingerling smallmouth bass were stocked by the Colorado Division of Wildlife (CDOW) in 1973 in the Gunnison River near Delta (Wiltzius 1978) upstream from Redlands Diversion Dam. None of these stocked smallmouth bass have been subsequently captured upstream from the diversion dam (Wiltzius 1978, Valdez et al. 1982; Burdick 1995). Redlands Dam (RM 3.0) provides an effective barrier to smallmouth bass and all other fish attempting to move further upstream in the Gunnison River.

Juanita Reservoir, which can connect to Kannah Creek and eventually to the Lower Gunnison River near the town of Whitewater, also contains smallmouth bass. Ridgway Reservoir, which drains into the Uncompahgre River and eventually the Gunnison River near the town of Delta, also has an illicitly introduced population of smallmouth bass. Planning is underway to design and install an escapement prevention solution at Ridgway.

Walleye

Little to no large bodied fishing effort has been expended in the Colorado River below the Colorado/Utah state line to the confluence of the Green River in years when the Colorado pikeminnow estimate work is on its two year rest cycle. In 2010, during Colorado pikeminnow estimate work, walleye captures were equal to pikeminnow captures, in these reaches, at 46. The two year cycle of no work in these reaches passed (2011 & 2012) and then in 2013, walleye captures during the Colorado pikeminnow estimate work significantly increased to 268. In the spring of 2014 walleye captures were still high at 109. Additional work in the summer and fall 2013 produced another 23 walleye (Francis and Ryden 2013(b)). Additional experimental work in the fall 2014 produced an additional 107 walleye (Francis and Ryden 2014(b)). In addition, for the first time in 9 years of centrarchid removal work, 2012 produced 4 walleye in the Grand Valley reaches (Francis 2012(a)). Years 2015 through 2018 Colorado River work removed a total of 407 adult walleye from lower Westwater Canyon to the confluence of the Green River (Michaud et al 2018). With adult Colorado pikeminnow estimated abundances falling in both the Green and Colorado Rivers in concert with the expansion of the walleye population, it is imperative that we have a 'surge' type effort in the lower rivers (important nursery areas for young-of year and juvenile Colorado pikeminnow and razorback sucker) in both the spring and fall in future years if we wish to see recovery of Colorado pikeminnow and razorback sucker.

Johnson et al (2014) had success in determining that (through chemical fingerprinting) eight walleye collected between Silt, Colorado and Beavertail Tunnel, Colorado (2004-2006; RM 248.0 to 197.0) originated from Rifle Gap Reservoir. In response, Colorado Parks and Wildlife constructed a fish screen, in Rifle Creek, to prevent escapement of non-native fishes from the reservoir. This study also determined Starvation and Red Fleet Reservoirs were contributing walleye to the Green River which drains into the Colorado River just above Cataract Canyon. Additionally, some walleye collected in the Green River had fingerprints that suggested they were Green River residents. At the lower terminus of the Upper Colorado River lies Lake Powell which also has a robust walleye fishery, as does McPhee Reservoir which drains into the Dolores River and eventually the Colorado River just upstream of Dewey Bridge, UT. All of these potential source populations have exacerbated the predatory and competitive threat to both listed and unlisted native fishes in the Colorado River.

Control of Nonnative Fish by Mechanical Removal

Control of smallmouth bass and other nonnative fish species is a primary emphasis, along with habitat restoration, propagation and stocking, and instream flow management within the Recovery Program for the four endangered fish species. In the strategic plan for the control of nonnative fishes in the Upper Colorado River Basin (Tyus and Saunders 1996), “control” was defined as “reducing the numbers of one or more nonnative species to levels below which they are no longer an impediment to the recovery of endangered fish species.” The goal for nonnative fish control or management in the Upper Colorado River Basin is to reduce the adverse impacts of nonnative fishes on the endangered fishes which will hopefully increase the distribution and abundance of the endangered fishes and contribute to their recovery. It is not likely that nonnative fishes that have become established in the Upper Colorado River Basin can be eliminated. However, preventive measures and active control programs could be implemented to reduce the abundance of nonnative fishes in riverine and adjacent floodplain habitats. Consequently, then, reducing the abundance of some problematic, nonnative fishes would reduce the potential for predation and competition on native listed and non-listed fishes. Management to promote recovery of listed fish species may have to include long-term or periodic suppression of some problematic nonnatives, such as mechanical removal, that minimizes impacts to remaining native fishes.

IV. Study Goals, Objectives, End Product(s):

A. Study Goals

The purpose of this ongoing study is to remove as many centrarchids (e. g., largemouth bass, green sunfish, bluegill, black crappie, and smallmouth bass), esocids (northern pike), percids (walleye), clupeids (gizzard shad), and non-native catostomids (white sucker and white sucker by native sucker hybrids) as possible of all sizes in main channel riverine habitats in a 68.9-mile reach of the Upper Colorado River between GVWU Dam and Westwater Wash in eastern Utah and in a 63.8-mile reach of the Upper Colorado River between Cisco and Potash Utah. The goal is to reduce the abundance of non-native fishes as quickly as possible in these reaches which will ultimately benefit native listed fishes, and possibly contribute to their recovery.

B. Objectives

1. Remove all sizes of centrarchids (e. g., largemouth bass, green sunfish, bluegill, black crappie, and smallmouth bass), esocids (northern pike), percids (walleye), clupeids (gizzard shad), and non-native catostomids (white sucker) in the Upper Colorado River (and associated floodplain ponds) by boat and raft-based electrofishing, and

C. End Products

Analyze field data; Prepare annual RIP reports.

V. Study Area:

Upper Colorado River:

GVWU Dam downstream to Loma boat landing (RM 193.7 – 152.6) & the Lower Gunnison River (RM 3.0 – 0.0)

Loma Boat Launch to Westwater Wash (RM 152.6 – 124.8)

Rifle Bridge to Beavertail Mountain¹ (RM 240.4 – 195.7) [added in 2004] [CPW's reach from 2012-2019]

Silt to Rifle¹ (RMs ~ 250.0 – 240.4) [added in 2007] [removed for 2009/2010/2011] [CPW's reach from 2012-2019]

Cisco to Potash, UT (RM 111.0 – 47.2) [added in 2013]

VI. Study Methods/Approach:

Temporarily reducing riverine smallmouth bass and northern pike populations appears viable under certain environmental conditions but both species can easily reverse these reductions in population abundance and return to pre-removal abundances under favorable environmental conditions (Breton et al. 2014; Zelasko et al. 2015). Therefore, mechanical removal efforts will attempt to reach eradication of nonnative fish populations in the river. However, recent synthesis reports investigating effectiveness of in-river removal efforts for northern pike and smallmouth bass determined that reducing in-river populations of these two species would not be successful unless in-river reproduction and reservoir escapement were controlled (Breton et al. 2014; Zelasko et al. 2015). Therefore, mechanical removal efforts will continue to temporarily suppress riverine populations, and will focus on reducing in-river reproduction when feasible. Simultaneously, Program partners will work on other means to reduce in-river reproduction and reservoir escapement, in order to make mechanical removal more effective and to attempt to reach complete eradication of riverine populations.

General–Study Direction and Evolution

December 2003. One of the conclusions agreed upon by participants at the December 2003 Nonnative Fish Control Workshop in Grand Junction was that smallmouth bass posed a greater threat to native fishes than other nonnative game fishes (e.g., channel catfish). Northern pike was viewed as the present number one threat to native fishes. At this workshop, the priority was established to start removing smallmouth bass from the Upper Colorado River in western Colorado as soon as possible to head off a possible increase in the abundance of this species. Recovery of listed native fishes might be more attainable if the threats (i.e., predation and competition) posed by certain nonnative fishes, such as smallmouth bass, could be minimized or eliminated.

FY2006 Study Modifications. The decision was made during the December 14, 2005, Biology Committee meeting to obtain an abundance estimate for smallmouth bass in concentration areas of the Upper Colorado River from Price Stubb Dam to Westwater, Utah. In essence this endeavor entailed marking and releasing smallmouth bass during an initial pass starting in the summer of 2006, and lethally removing and recording previously marked smallmouth bass in all subsequent passes. Smallmouth bass were marked in the river segments from Price Stubb Dam to Fruita State Park in the Upper Colorado River and a 2.3-mile segment of the Lower Gunnison River. These river segments were identified as moderate to high concentrations areas for smallmouth bass based on capture data from the summers of 2004 and 2005. An additional first pass was added to accomplish the marking. Four successive passes were performed during 2006 in the concentration areas to lethally remove smallmouth bass as was conducted in both 2004 and 2005.

¹ Rifle to Beavertail and Silt to Rifle reaches are sampled by CPW under SOW 126b, but reporting for those reaches will be incorporated under this project.

Population estimates for smallmouth bass were completed from 2007-2012, to track population abundance.

The number of removal passes for areas of low densities of smallmouth bass as determined from 2004 and 2005 capture data was reduced during 2006. These river segments included the canyon-bound reaches of Ruby and Horsethief canyons to Westwater, Utah (RM 152.6 – 127.6). The reduced effort in these reaches was re-directed to increase the number of removal passes in river segments where smallmouth bass had proliferated over the past two years. One such river reach was the 45-mile reach of the Upper Colorado River from the Rifle Bridge to Beavertail Mountain and, in particular, the 10 mile river segment from Rifle to Rulison. In 2005, the number of smallmouth bass collected in these reaches increased 11 fold and catch effort increased about 5.5 times. Re-focusing the removal effort resulted in a zero net budget change.

In 2007, study direction was modified again. Four additional removal passes were added for the Grand Valley portion of the project area. Two additional passes were performed by Fish and Wildlife personnel and two by Colorado Division of Wildlife (CDOW) personnel. The last two removal passes performed by the CDOW were in river reaches where high concentration or high abundance of smallmouth bass had been determined during the past five years of sampling. This sampling regime continued from 2008-2011.

Further modifications to the sampling protocol were implemented in 2011 from earlier sampling years (2007-2010). Removal efforts in the 45-mile reach between Rifle Bridge and Beavertail Mountain were continued but the number of removal passes was reduced from three to one. The reduced effort in the Rifle to Beavertail reach was re-allocated to increase removal passes (two total) in some of the Grand Valley reaches of the Colorado River (RMs 185.3-152.6). The principal investigator believed it was imperative to re-allocate this effort from the Rifle to Beavertail Mountain reaches to the Grand Valley reaches for 2011 because the smallmouth bass cohort produced in 2010 in the Grand Valley reaches appeared to be stronger than that of 2007, which was recognized as one of the strongest year classes in the upper Colorado River basin rivers. It was uncertain if this 2010 cohort would overwinter, and that would not be known until the 2011 summer sampling was underway. The Service was responsible for performing this “re-allocated” effort and would not affect the removal effort (two passes) performed by the CDOW (RP project no. 126(b)), which usually occurred in September. This reallocation of effort resulted in no additional costs to the 2011 budget for this project.

Sampling modifications were necessary to remain within the new budget prescribed by the Recovery Program for FY2012. These changes were directly related to the Recovery Program’s 20% budget reduction from the FY2009, FY2010, and FY2011 budget (\$157,200/fiscal year). The sampling modifications included, 1) reducing the number of removal passes from 10 to 6 in the Grand Valley reaches, 2) eliminated sampling in the 25-mile reach from the Loma Boat Landing to the Westwater BLM ranger station, UT, and the 4-mile reach between Government Highline Dam and the Cameo XCEL bridge. Colorado Parks and Wildlife shifted their efforts to the reach between Rulison and Beavertail.

Sampling modifications for FY2013 and FY2014 included; 1) suspending the marking pass in the Grand Valley reaches, 2) increasing the number of removal passes in the Grand Valley reaches from 6 (FY2012) to 8) completing two overnight trips removing centrarchids from the 25-mile reach between Loma boat landing to the Westwater, UT, BLM ranger station landing, and 4) CPW completed all work upstream of Beavertail Mountain with scope of work 126(b).

A final synthesis report describing results from 2004 to 2006 was completed in January

2008 (Burdick 2008(a)).

Methodology

To date, sampling efforts have focused on a reach and not river-wide scale. Two electrofishing craft (per Upper Colorado River Recovery Program SOP) worked both shorelines of a reach to complete a pass. For logistical considerations, the entire 68.9-mile section of the Upper Colorado River from GVWU Dam to Westwater Wash, Utah, was divided into three different sub-reaches based on hydro-geomorphic features.

Three general sub-reaches were sampled between 2004 and 2014. These included, 1) a 10.1-mile section between GVWU and Palisade and the 15-mile section that extends from Palisade to the Gunnison/Colorado River confluence (RMs 185.5–171), 2) the 18-mile reach that extends from the confluence of the Gunnison and Colorado rivers to the Loma Boat Landing (RMs 171.0–152.6), and 3) Ruby and Horsethief canyons (RMs 152.6–124.8) which extends from the Loma Boat Landing to the Westwater, Utah. The 15- and 18-mile sub-reaches flow through a wide alluvial section of the lower Grand Valley; the canyon-bound sub-reach is considered a quasi-alluvial sub-reach. The number of sampling occasions (i.e., passes) in the 15-mile reach has been affected by the availability of sufficient water for sampling craft to operate due to extended drought periods. Sampling the 3-mile section between Price-Stubbs and Grand Valley Irrigation dams has also been reduced due to poor access and low-water conditions in mid- to late-summer when smallmouth bass catch rates are highest.

A 45-mile reach of the Upper Colorado River from the Rifle Bridge (RM 240.7) to Beavertail Mountain in Debeque Canyon (RM 195.7) will have been sampled with raft electrofishing for the eleven most recent years (2004 – 2014) of this study. This river reach was outside the original defined removal area. However, there were unsubstantiated reports that anglers had encountered smallmouth bass in these upstream reaches, and it was determined that a “reconnaissance” sampling trip was warranted to substantiate or refute these claims. Burdick (2011(b)) reported 11 northern pike removed in this reach and Francis (2012(b)) reported 16 northern pike removed by CPW in this reach providing additional support to work in this reach. Sampling regime for this 45-mile reach (2004-2010) has been two complete passes and a third pass in high concentration areas of smallmouth bass. However, only one pass was completed in these upper reaches in 2011 and only two were completed in 2012-2014.

In response to an increased walleye catch from Cisco to the confluence of the Green during spring Colorado pikeminnow abundance estimate work, another 63.8-mile reach was added in the Upper Colorado River from Cisco, UT (RM 111.0) to Potash, UT (RM 47.2) in 2013. Francis and Ryden (2016(b)) reported removing 292 walleye in 2013, 216 walleye in 2014, and 407 walleye from 2015 through 2018 (Michaud et al 2018).

Within the Grand Valley, between Grand Valley Diversion Dam and Loma, CO, there are many off channel gravel pit ponds which connect with the river at various stages during run-off. These off-channel habitats are important pre-spawn staging areas for adult native fishes and they are important nursery areas for young-of-year native fishes. However, these gravel pit ponds have become sources for many of the non-native centrarchids, northern pike, white sucker and gizzard shad found in the main-stem river. Little effort had been expended at these locations since the inception of this project. As a recommendation in our 2014 annual report and with the approval of the UCRRP and Biology Committee, mechanical removal may be expended in these these gravel pit ponds (where we have access). Electrofishing, trap netting, gill netting, trammel netting, seining, and cast netting will be utilized at these locations.

FY 2020-2021

Sampling Protocol

Sampling for FY2020-2021 will include; 1) eight removal passes conducted in the Grand Valley reaches, 2) two removal passes from the 25-mile reach between Loma boat landing to the Westwater BLM ranger station, UT, 3) four walleye removal passes conducted from Cisco to Potash, UT, 4) one month's removal from streamside gravel pit ponds in the Grand Valley, and 5) CPW will complete all work upstream of Beavertail Mountain with scope of work 126(b). The UCRRP 2019-2020 non-native workshop conclusions could change these protocols.

Fish Disposal. All smallmouth bass, other centrarchids, northern pike, walleye, gizzard shad, grass carp, and yellow perch collected will be lethally removed. White sucker will be removed at levels that don't interfere with the primary objective of removing piscivores. Disposal of all these fishes will be as follows: following capture, fish will be euthanized afield and preserved with ice. All dead fish will be held on station in freezers and disposed of in the Mesa County landfill southeast of Grand Junction.

Data Analyses. All smallmouth bass captured within each of the sub-reaches will be enumerated in 2020-2021 similar to that during former years (2004 – 2019). Total numbers of smallmouth bass, largemouth bass and walleye collected and catch/effort (fish/hr) will be also determined for each sub-reach per sampling pass. Length data will be recorded for 2020-2021 similar to that during former years (2004 – 2019) to determine the size structure of smallmouth bass removed.

Data analyses similar to that employed between 2004 and 2019 will be used to analyze the 2020-2021 field data.

VII. Task Description and Schedule:

- Task 1. Eight removal passes in the Grand Valley.
Schedule: 6/2020 – 10/2020; 6/2021 – 10/2021
- Task 2. Two removal passes for the 25 mile reach between Loma and Westwater
- Task 3. Four walleye removal passes from Cisco to Potash
- Task 4. One month of removal from streamside gravel pit ponds in the Grand Valley.
- Task 5. a) Electronically input field data; b) analyze data; c) prepare annual RIP reports and presentations.
Schedule: a) 9/2020 – 11/2020; 9/2021 – 11/2021
b) & c) 11/2020, 11/2021

VIII. Deliverables, Due Dates, and Budget by Fiscal Year: Budget Summary: Please See Interagency Agreement Cost Estimating Tool Spreadsheet

FY2020

USFWS-GJ

\$241,163.90

FY2021
USFWS-GJ \$246,036.37

2020-2021 Total = \$487,200.27

Estimated Budget Summary for Fiscal Years 2022-2024:

FY2022
USFWS-GJ \$263,832.64

FY2023
USFWS-GJ \$269,387.34

FY2024
USFWS-GJ \$275,178.57

2022-2024 Total = \$808,398.55

5-Year Total = \$1,320,285.50

IX. Reviewers: Program Staff and Biology Committee

X. References:

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