COLORADO RIVER RECOVERY PROGRAM
FY 2014 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: 123a

I. Project Title: Nonnative fish control in the Green River

II. Bureau of Reclamation Agreement Number(s):
USFWS Vernal: R13PG40020
UDWR Moab: R14AP00007

III. Principal Investigator(s):

M. Tildon Jones, USFWS
1380 S 2350 W
Vernal, UT 84078
435-789-0351
tildon_jones@fws.gov

Julie Howard, Chris Michaud, Zach Ahrens, UDWR
1165 S Hwy 191, Suite 4
Moab, UT 84532
435-259-3781
juliehoward@utah.gov, cmichaud@utah.gov, zachahrens@utah.gov

IV. Abstract: This project consisted of three components: **a)** remove smallmouth bass on the Green River in Dinosaur National Monument between Echo Park and Split Mtn (RM 344.5-319.5), **b)** remove smallmouth bass in Desolation/Gray Canyons (Green River RM 215.3-129.8), and **c)** remove walleye and other nonnative fishes in the lower Green River from Tusher diversion to the Colorado River confluence (RM 128-0). All three components were completed. Combined, the United States Fish and Wildlife Service (USFWS) and the Utah Division of Wildlife Resources (UDWR) completed eleven passes and a targeted sampling pass for spawning bass in the Echo-Split reach, resulting in the removal of 2,768 smallmouth bass. UDWR completed two smallmouth bass removal passes in Desolation and Gray Canyons, resulting in the removal of 1,626 smallmouth bass. UDWR also enacted spring and fall walleye removal passes on the lower Green River, resulting in the removal of 153 walleye.

V. Study Schedule: 2004-ongoing

VI. Relationship to RIPRAP:
GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
III.A. Reduce negative interactions between nonnative and endangered fishes.
III.A.2. Identify and implement viable active control measures.

GREEN RIVER ACTION PLAN: MAINSTEM

III. Reduce impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).

III.A. Reduce negative impacts to endangered fishes from sportfish management activities.

III.A.4. Develop and implement control programs for nonnative fishes in river reaches occupied by the endangered fishes to identify required levels of control. Each control activity will be evaluated for effectiveness, and then continued as needed.

VII. Accomplishment of FY 2014 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1 & 2: Smallmouth bass removal-Echo Park to Split Mtn.

The two field stations completed eleven passes, plus an additional "surge" pass targeted at removing spawning adults in Island Park. For all passes combined, we removed 2,768 smallmouth bass, including 862 adults[1], 1,687 sub-adults[2], and 219 fish <100 mm in length (Table 1). The majority of fish <100 mm were age-1 fish spawned in 2013. These fish were present in the first four passes and grew into sub-adult sizes by mid-July. Of the 862 adult bass, 44 were large enough to be classified as piscivores[3] occupying the same trophic level as adult Colorado pikeminnow. We did not attempt to adjust size classes to accommodate within season growth of sub-adult fish. It appeared some fish that would have been classified as sub-adults, based on their length at the beginning of the season, had grown into adult size by the end of the season in late September when they were captured.

The catch rate for all bass was 12.1 fish/hour. We captured 3.77 adults per hour and 8.33 sub-adults per hour. The catch rate for 2014 was much lower than 2013, and comparable to 2005 and 2006 (Figure 1). Catch rates over the season remained relatively stable until late August and September (Fig. 2). Catch rates for adults increased slightly starting with pass 6. In looking at length-frequencies for each pass, this increase corresponded to sub-adult fish starting to grow into the adult size class (Figs. 3a-b). We captured only two Floy-tagged bass in 2014: a red tag and a green tag. Both fish were tagged in 2011, and moved only slightly from their original capture location.

The majority of bass captured this year were sub-adults, as shown by length-frequency histograms (Figs. 3a-b). These fish largely represent bass spawned in 2012, with a smaller group spawned in 2013. These fish grew during the sampling season, and the 2012 cohort started to reach adult size (>200 mm) by the end of September. We compared the 2014 length frequency data to 2009 in order to compare the 2012 year class to a group of bass spawned in 2007, another year of successful reproduction. Years 2014 and 2009 allow us to compare the recruitment and growth of these year classes as they reach age-2. In 2014, sub-adult bass were, on average, larger than those in 2009 (Fig. 4). Sub-adults in 2014 were more numerous than in 2009, and also comprised a larger

[1] TL > 200mm
[2] 100mm < TL < 199mm
[3] TL > 325mm

proportion of the overall catch. This shows the 2012 year class was able to grow quickly over the last two years. Length-frequencies also suggest that the majority of bass in this reach belong to two year classes produced in 2012 and 2013. The number of "piscivore" bass captured in 2014 (n=44) was very similar to the number captured in 2013 (n=49).

We also captured seven other species of nonnative fish this year (Table 2), including black bullhead, black crappie, bluegill, green sunfish, northern pike, walleye, and white sucker and their hybrids. All 43 walleye were large enough to be classified as piscivores, as well as 14 of the 15 northern pike captured. Walleye total captures and catch rates increased to the highest level observed in this study (Fig. 5).

Island Park "surge"

Based on observations of spawning fish and aggregations of young-of-year in previous years, crews implemented passes specifically targeted at disrupting and removing spawning adults in Island Park in 2014. The UDWR's Vernal office conducted four passes (6/16, 6/18, 6/24, 7/2/2014) under 123b (see 123b 2014 annual report), and USFWS conducted one pass[4] (6/20) under this project. UDWR Vernal initiated passes as soon as water temperatures and flow were conducive to electrofishing.

Evidence of spawning was observed (adults expressing gametes) during passes 3and 4 in early to mid-July. Although river temperatures at the Jensen USGS gauge had reached 16°C by June 21, flows were still around 10,000 cubic feet per second (CFS) and did not stabilize until July. This is due in part to releases from Flaming Gorge for the Larval Trigger Study. Our regular passes began on June 26, and went through the spawning period until the end of September. Bass appeared to spawn relatively late this year, and we caught very few young-of-year bass as a result.

Task 3: Smallmouth bass removal- Desolation and Gray Canyons

Two removal passes were completed by UDWR in Desolation and Gray Canyons in 2014 (6/14-6/20/2014 & 7/18-7/25/2014). Approximately 1,626 smallmouth bass were removed during 112 hours of electrofishing by UDWR (Table 3). Of the bass captured, 2% were young-of-year (<100 mm), 79% were sub-adults (100 mm to ≤199 mm), and 19% were adults (>200 mm); four percent (n=56) were over 325 mm and are considered piscivorous competitors to adult Colorado pikeminnow. Smallmouth bass capture rates were higher during the first pass when discharge was between 11,000-15,500 CFS and water temperatures ranged between 15.5-17.7°C (USGS gauge Jensen, UT; #09261000); almost 70% of bass captured were encountered during the first pass. During the second pass discharge ranged between 3,000-3,300 CFS and water temperatures ranged between 24.2-26.6°C. Although smallmouth bass capture rates were lower for the second pass than the first, capture rates from the second pass were still higher than those from

[4] Pass was completed as an extension of bass removal occurring upstream in Yampa Canyon

preceding years of the study. The UDWR Vernal office completed a trip through Desolation and Gray Canyons in late July-early August as part of their three-species monitoring effort; smallmouth removed during that pass have been included in Table 1 (n=75).

Smallmouth bass catch rates for adult and sub-adults (total length≥100 mm) for Desolation and Gray canyons have increased by approximately 400% from 4.38 fish per hour in 2012 to 16.22 fish per hour in 2014, doubling the previous highest catch rate recorded for the project in 2004 (Fig. 6). Prior to this year's sampling, adult catch rates had been on the decline, however, adult catch rates increased from 1.48 in 2011 to 3.7 bass per hour in 2014. Sub-adult catch rates also increased from 2.92 in 2011 to 13.05 bass per hour in 2014. Although increases were seen in both sub-adult and adult catch rates, close to 80% of bass captured this year were sub-adults ranging in total length between 100-199 mm with a median total length of 165 mm (Fig. 7). The increase in sub-adult catch documented this year demonstrates the potential for successful spawning and recruitment within this reach. This size distribution and change in catch rate matches the trend seen in the Echo to Split reach, where successful year classes in 2012 and 2013 were demonstrated in 2014's catch.

During the first few years of this project (2004-2006) the distribution of smallmouth bass within Desolation and Gray Canyons extended approximately 35 miles downstream from the put-in at Sand Wash (RM 215.3); that is, smallmouth bass were found in less than half of the roughly 80 mile reach. However, sampling in 2014 has illustrated that the smallmouth bass distribution has extended downstream and encompasses the entire 80 mile reach from Sand Wash to Swasey's boat ramp (RM 131.8; Fig. 8).

In addition to the smallmouth bass in the reach, numerous other nonnative and native species were captured (Table 4). Green sunfish have increased in number from 19 captured in 2012 to 73 captured in 2014. Green sunfish ranged in total length from 47-132 mm with a median total length of 102 mm and were distributed throughout the reach. Walleye (n=33) were also distributed throughout the reach but were only captured during the first pass. All walleye captured were over 375 mm and are therefore considered piscivorous competitors to Colorado pikeminnow; they ranged in total length from 382-585 mm with a median total length of 505 mm. One northern pike (TL=555 mm) was captured which exceeded the 450 mm piscivorous competitor threshold. Common nonnatives like channel catfish and carp were present throughout the reach but were not netted, however, channel catfish over 400 mm, considered piscivorous competitors to Colorado pikeminnow, were removed (n=8).

All species of endangered fish were encountered, with razorback sucker being the most common (301), followed by Colorado pikeminnow (34), humpback chub (42), and bonytail (1).

Task 4: One removal pass from Green River State Park to the confluence with the Colorado River

Because of the increasing threat of walleye presence in Colorado pikeminnow nursery areas downstream of Desolation and Gray Canyons, extra walleye removal work was added in 2014 under tasks 4 and 5. Due to low water conditions and risk of damage to motorized craft in cobble substrate downstream from Green River State Park, Task 4 was limited to the lower Green River reach between Ruby Ranch and the confluence with the Colorado River (RM 97-0). A single removal pass was completed in the fall by UDWR (10/14-10/22/2014) using two aluminum jon boats, each with a single netter. During this time discharge ranged from 3,440-2,990 CFS (USGS station Mineral Bottom, UT; #09328920) and main channel temperatures (measured on-site) ranged from 13.0 to 17.0°C during sampling hours. Total nonnative catch per unit effort (CPUE) was 0.4 fish per hour over 69 hours of electrofishing. Total CPUE for all species was 3.13 fish per hour. Captures and catch rates are summarized in Table 5. Total catch rates across all species varied by sub-reach but show no apparent trend across the entire reach (Fig. 9).

Captures of target nonnative species included two walleye with total lengths of 493 mm and 499 mm at RM 39.0 and 7.4, respectively, one smallmouth bass with total length of 261 mm at RM 5.5, and one channel catfish with total of 620 mm at RM 89.8. All walleye and channel catfish were above respective total length thresholds for piscivorous competition with adult Colorado pikeminnow (375 mm and 400 mm). Gizzard shad accounted for 86% of nonnative catch and 11% of total catch (n=24), with total lengths ranging from 104-310 mm and median total length of 135 mm.

Six Colorado pikeminnow were captured, with total lengths ranging from 393-542 mm and median total length of 492 mm. Fin clips were collected from four previously unmarked pikeminnow for genetic analysis by Wade Wilson of SNARRC. All pikeminnow were captured in the Stillwater Canyon reach (RM 52.2-0.0). Razorback suckers comprised 82% of total catch (n=177) and a consistent proportion of CPUE throughout the reach (Figure 9). Total lengths of razorback suckers ranged from 332-520 mm, with a median total length of 440 mm. Ninety-two percent of razorbacks (n=163) were previously marked, including one fish with a 400 kHz tag. Twenty razorback suckers displayed anal fin tuberculation and of these, six were ripe males. Three previously marked adult bonytails were also captured, with total lengths of 257 mm, 272 mm and 282 mm. All bonytails were captured within the Labyrinth Canyon reach (RM 97.0-52.2).

Task 5: Spring walleye removal- Tusher diversion to Ruby Ranch, lower Green River

Under spring walleye removal efforts, the UDWR completed 14 removal days between Tusher diversion (RM 128) and Ruby Ranch (RM 97) that concluded by 5/29/ 2014. Due to low flows on the Green River in early spring, passive gear (fyke, hoop and trammel nets) and angling gear was used for the first five removal days (143.5 hours). Once flows

allowed, motorized aluminum jon boats were used to electrofish the reach for the last nine days of removal (46.5 hours). Otoliths were collected from approximately 30 walleye captured during the spring removal effort. These samples will be submitted to Kevin McAbee for potential natal origin studies.

Early season netting, trapping and angling occurred between 3/30/2014 and 4/24/2014 when discharge ranged between from 2,000-6,290 CFS (mean=2,967 CFS; USGS station Green River, UT; #09315000) and water temperature varied from 8-14°C. Fyke, hoop and trammel nets and angling were ineffective at capturing walleye in this reach. One walleye was captured after 17.48 hours of angling (CPUE=0.06 fish per hour) and one was captured after 57.53 hours of trammel netting (CPUE=0.02 fish per hour). The effectiveness of trammel netting was compromised by limited access and net entanglement issues. Low flows in early spring allowed only shore and canoe based net sets while increasing current and debris in mid-April tangled nets and traps.

Two electrofishing passes were completed (5/5, 5/6, 5/13-5/15/2014 and 5/19, 5/27-5/29/2014) between the Tusher diversion (RM 128) and Ruby Ranch (RM 97). One-hundred-forty-nine walleye were removed during 46.5 hours of sampling. The catch rate for the spring electrofishing removal effort was 3.2 fish per hour. There was no apparent trend in catch rate per mile for walleye in this reach (Figure 10). Total length of walleye encountered ranged from 233-553 mm (median=447 mm; Figure 11). Ninety-three percent of the walleye removed (n=138) were piscivorous competitors (TL>375). Catch rates for walleye decreased from 4.02 to 2.33 between the first and second passes. River flows and temperatures differed between pass one (mean=9,140 CFS, 11.2-15.7°C) and pass two (mean=11,031 CFS, 16.8-20°C).

Based on field observations, it does not appear that walleye are successfully spawning or recruiting in the lower Green River. No ripe males were encountered during sampling and only one gravid female was detected. No young-of-year walleye have been captured on the lower Green River in recent years. Only one walleye captured in 2014 measured less than 300 mm (TL=233 mm).

Ten additional species were detected during spring sampling. Native species that were encountered include razorback sucker (n=480) with a median total length of 410 mm (300-560 mm), Colorado pikeminnow (n=35) with a median total length of 430 mm (225-600 mm), humpback chub (n=1) and bonytail (n=1); bluehead and flannelmouth sucker were present but not enumerated. Nonnative species encountered include smallmouth bass (n=2), black crappie (n=1), brown trout (n=1) and green sunfish (n=1). All were removed when captured (Table 6); common carp and channel catfish were present but not enumerated.

VIII. Additional noteworthy observations:

Echo Park-Split Mtn.

This year we caught 73 bonytail during smallmouth bass removal efforts. Thirty-nine of these fish were too small to have been tagged at the hatchery. Ouray National Fish Hatchery did stock untagged, small bonytail at Rainbow Park in June, and stocked larger PIT-tagged fish in late July. Three bonytail had tags that were not from this year's stocking, and one of these was tuberculated. We are awaiting stocking records to determine if these fish were from 2013 releases. Bonytail captures were relatively consistent through September, indicating at least some of the fish stocked in late July had survived two months. We also caught 16 roundtail chub, 21 Colorado pikeminnow, and 12 razorback sucker in the reach.

Desolation and Gray Canyons

Humpback chub captures via electrofishing during this project increased from 7 in 2012 to 42 in 2014; of the 42 captured chub only 4 were recaptures. Humpback chub ranged in total length from 135-335 mm with a median total length of 238 mm.

Lower Green River-Fall

Walleye activity has been shown to increase as light levels decrease in laboratory simulations (Einfalt et al. 2012). In an attempt to increase walleye catch rates, opportunistic night sampling was included in the fall effort. This additional effort accounted for 4% of total effort (2.8 hours), and produced no nonnative captures.

Results indicate that fall electrofishing between Ruby Ranch and the confluence with the Colorado River, limited to main channel shoreline habitat, is ineffective for targeting nonnative species at current abundances. Contrast of spring and fall sampling efforts, however, may be confounded by sampling of different reaches, seasonal variability in fish behavior, river discharge and habitat availability or accessibility.

Lower Green River-Spring

While walleye catch rates decreased as temperature and flow increased, razorback sucker catch rates showed the opposite trend. Catch per unit effort increased between the first and second passes (9.19 and 14.25 fish per hour, respectively). Removal efforts enacted in early spring (as soon as conditions allow) may lessen the impact on razorback sucker populations.

IX. Recommendations:

Echo Park-Split Mtn.

- Continue removing smallmouth bass and other nonnative predator species in these reaches, particularly monitoring the apparent increase in walleye throughout the Green River.
- Continue to initiate passes at or just before water temperatures are suitable for bass spawning.

- Refine timing of passes targeted at removing spawning adults, taking into account flows as well as temperature.

Desolation and Gray Canyons

- Continue removing smallmouth bass and other predatory fishes in Desolation/Gray Canyons by UDWR in spring when water temperatures are 16°C±2°C and discharge is favorable. Earlier sampling has been more successful for bass and walleye capture as well as for nest and spawning disturbance.
- Electrofishing units mounted on rafts are particularly susceptible to high winds where sampling efficiency may decrease significantly or, due to crew safety issues, sampling may halt altogether. It is recommended that a protocol is developed to categorize wind speed, an important environmental factor that can dramatically affect sampling.

Lower Green River-Fall

- Focus fall walleye removal between Green River State Park and Ruby Ranch (RM 120-97). This area was not sampled in fall of 2014, but may be occupied by pre-spawning walleye aggregations. Electrofishing catarafts may be used when low discharge prohibits safe navigation of this area by jon boats.
- Discontinue ineffective fall removal efforts between Ruby Ranch and the confluence with the Colorado River.

Lower Green River-Spring

- Electrofishing removal efforts should be scheduled so as to minimize possible impacts on sensitive native fish populations in the lower Green River. The most effective method of minimizing these impacts would be to coincide removal effort with Colorado pikeminnow abundance estimates (Project #128), thereby limiting disturbance in estimate off-years.
- If removal efforts are considered for spring in "off years" of Colorado pikeminnow abundance estimates, passes should be conducted as soon as flows allow after the ice breaks (typically mid-March). Razorback suckers may not be in spawning or pre-spawning aggregations at this early date. Care should be taken to avoid disturbing flooded tributaries, a habitat type of known importance to Colorado pikeminnow during this time of year. Also, researchers should focus effort on areas known to hold aggregations of walleye where possible.

X. Project Status:

Tasks 1-3: on track and on-going.

Tasks 4-5: Effective walleye removal in the lower Green River may disturb native fishes during critical spawning seasons. Determining how to mitigate these impacts within the priorities of the Recovery Program is needed to help guide future walleye removal efforts in this reach. Fall passes from Ruby Ranch to the Colorado River confluence were ineffective.

XI. FY 2014 Budget Status

A. Funds Provided: $224,178
B. Funds Expended: $224,178
C. Difference: -0-
D. Percent of the FY 2014 work completed: 100%
E. Recovery Program funds spent for publication charges: -0-

XII. Status of Data Submission:
USFWS-data are compiled and will be submitted to database manager by December 2014.

XIII. Signed: *M. Tildon Jones, Julie Howard, Chris Michaud, Zach Ahrens* 14 Nov. 2014
Principal Investigator Date

XIV. Literature Cited:

Einfalt, Lisa M., Grace, Edward J. and Wahl, David H., 2012, Effects of simulated light intensity, habitat complexity and forage type on predator—prey interactions in walleye *Sander vitreus*, *Ecology of Freshwater Fish* 2012: 21: 560-569.

Table 1. Total bass caught in Echo-Split reach by pass and size group, 2014. All fish were removed. Piscivores are adult fish above the 325mm threshold.

Pass	<100mm	Sub-adults	Adults	Piscivores	Total
1-UDWR, 26-28 June	59	205	46	6	310
2-UDWR, 29 June-1 July	38	173	35	4	246
3-UDWR, 7-9 July	52	237	77	5	366
4-UDWR, 10-12 July	65	208	69		342
5-FWS, 29-31 July	1	104	66	3	171
6-FWS, 6-8 August	1	190	143	9	334
7-FWS, 11-13 August	1	201	102	3	304
8-FWS, 15-17 August		110	94	4	204
9-FWS, 3-5 September		75	68	1	143
10-FWS, 9-11 September		135	88	8	223
11-FWS, 23-25 Sept.	1	34	69		104
Surge-FWS, 20 June	1	15	5	1	21
Totals	219	1,687	862	44	2,768

Table 2. Ancillary fish captures in the Echo–Split study reach, 2014. Piscivores are northern pike >450mm and walleye >375mm.

Species	Number Captured	Piscivores
Black bullhead (*Ameiurus melas*)	1	
Black crappie (*Pomoxis nigromaculatus*)	1	
Bluegill (*Lepomis macrochirus*)	1	
Green sunfish *(Lepomis cyanellus)*	52	
White sucker and hybrids (*Catostomus commersonii*)	473	
Northern pike (*Esox lucius*)	15	14
Walleye (*Sander vitreus*)	43	43
Colorado pikeminnow (*Ptychocheilus lucius*)	21	
Bonytail (*Gila elegans*)	73	
Roundtail chub (*Gila robusta*)	16	
Gila spp. (usually TL <200mm)	2	

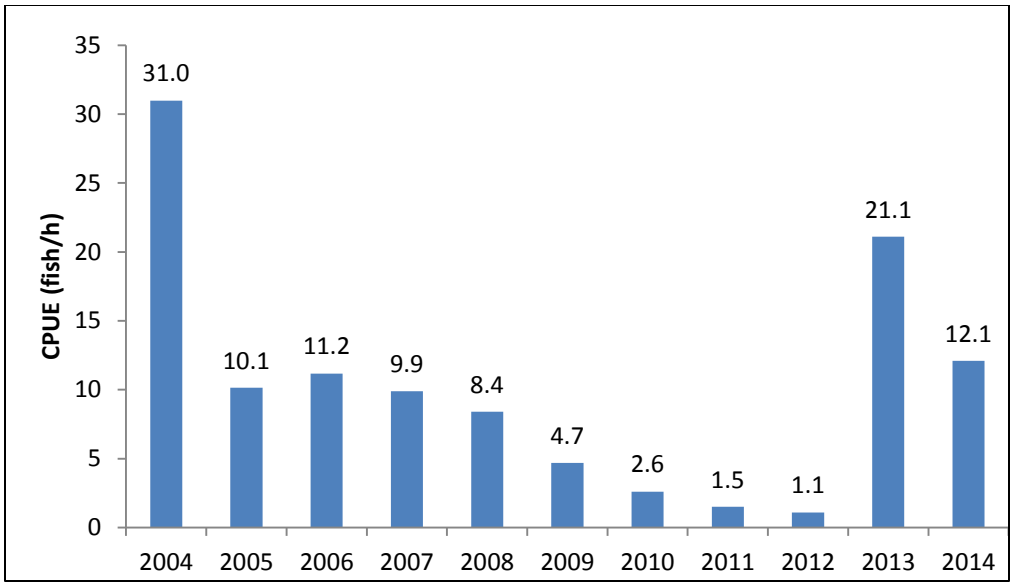

Figure 1. Catch rates for all bass captured >100mm for all passes in Echo-Split, 2004-2014.

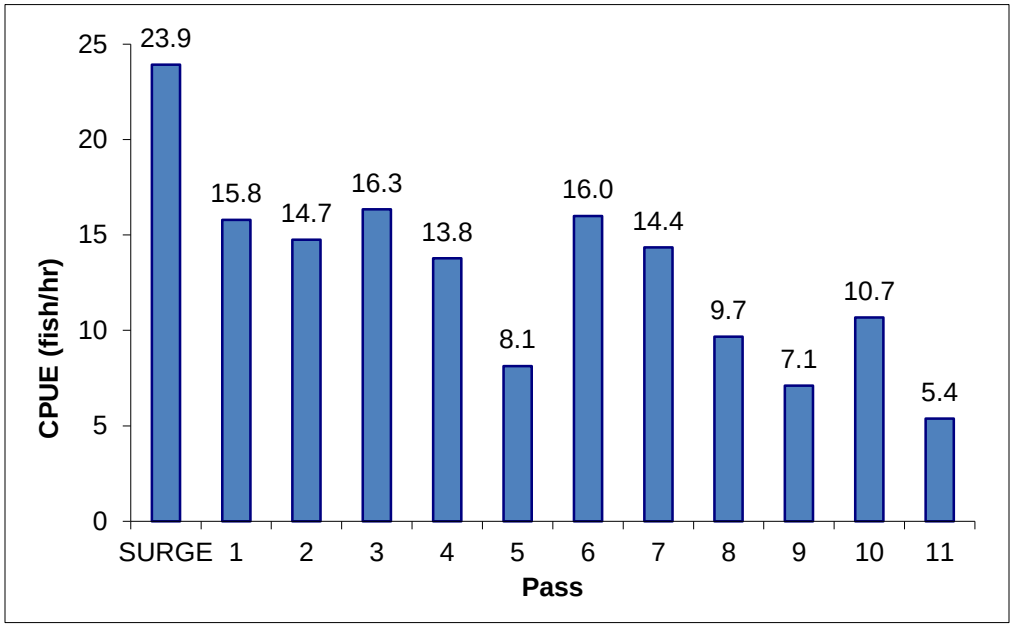

Figure 2. Catch rates for smallmouth bass >100mm in Echo-Split, for each pass, 2014.

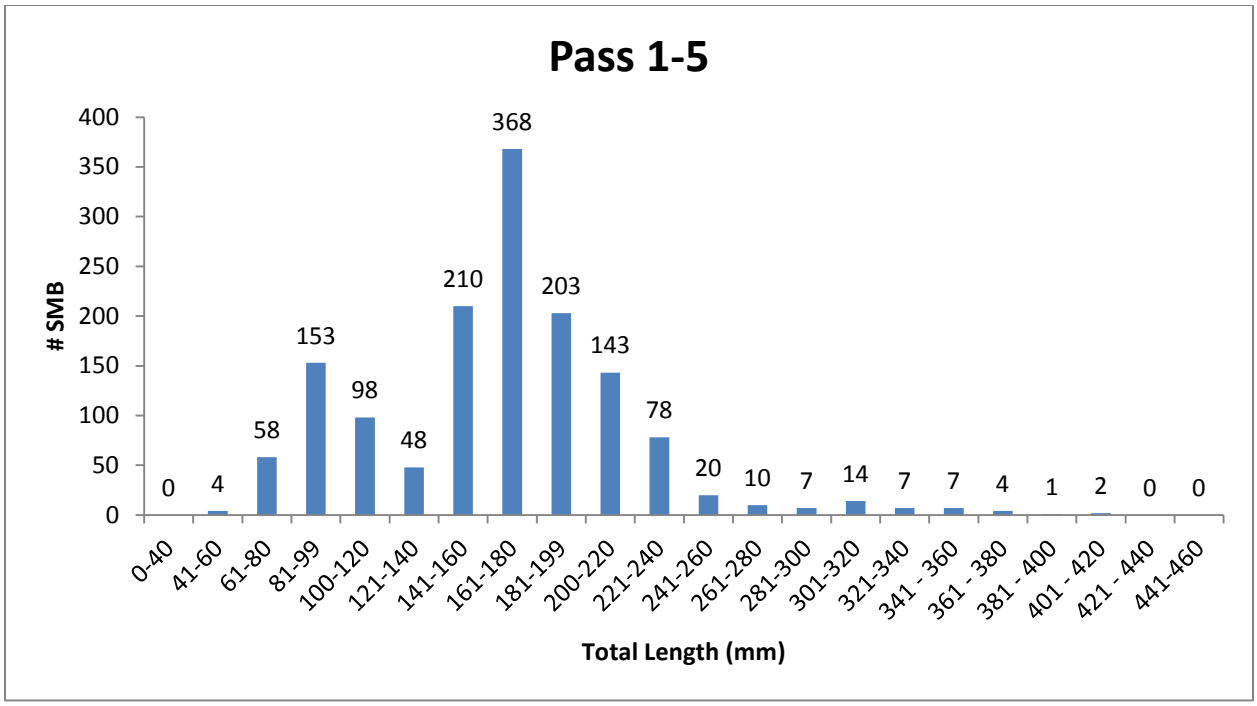

Figure 3a. Length-frequency of smallmouth bass caught in Echo-Split, 26 June-31 July 2014.

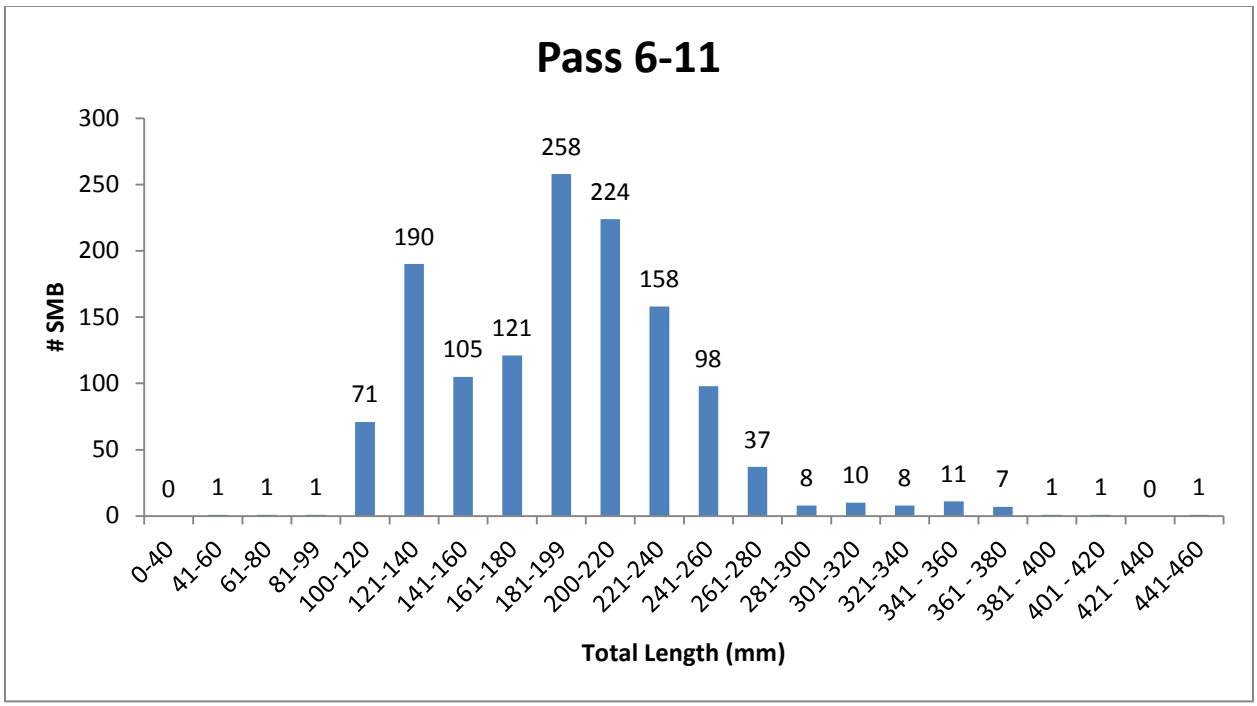

Figure 3b. Length-frequency of smallmouth bass caught in Echo-Split, 6 August-25 September 2014.

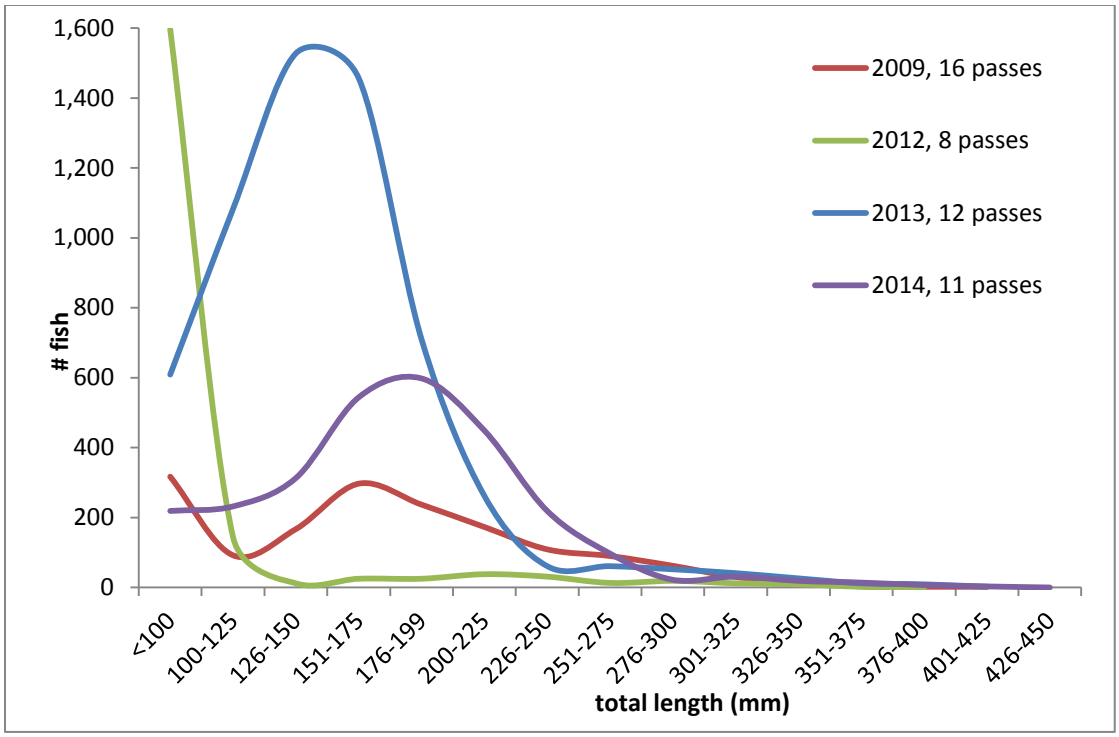

Figure 4. Length-frequencies for smallmouth bass in Echo-Split, 2009 and 2012-2104.

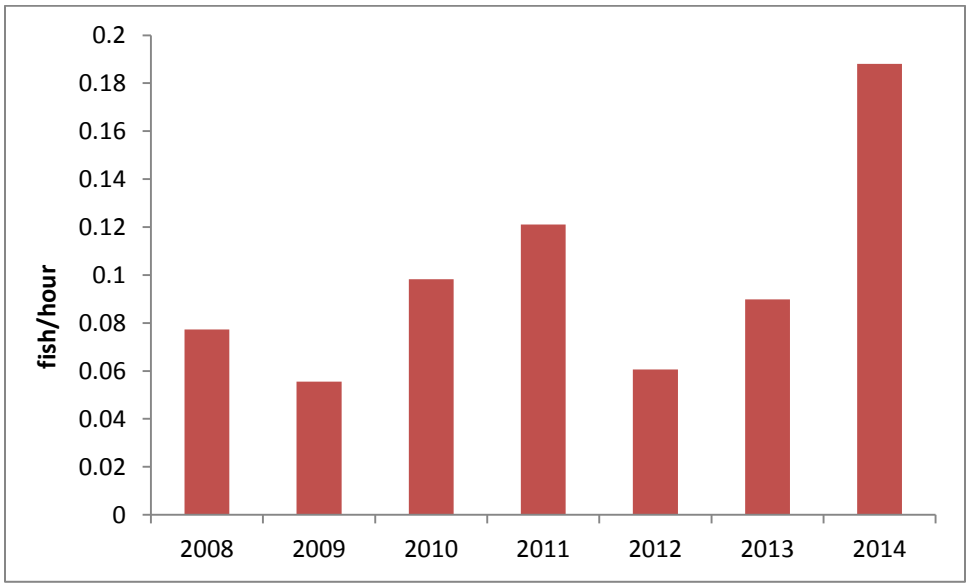

Figure 5. Catch rate for walleye in Echo-Split, all passes combined, 2008-2014.

Table 3. Total smallmouth bass captured by pass and size class in Desolation and Gray Canyons, 2014. *These numbers are approximations as some data were lost for this pass.

Pass	YOY <100mm	Subadults 100-199mm	Adults >199mm	Total
1-UDWR Moab	25	879	196(42)	1100
2- UDWR Moab*	5	394	128(26)	526
3-UDWR Vernal	0	48	27(4)	75
Totals	30	1321	351(72)	1701

Table 4. Ancillary species encountered in Desolation/Gray Canyons 2014.

Species	**Number Captured (piscivores)**	**CPUE (fish/hr)**
Green sunfish *(Lepomis cyanellus)*	73	0.88
Walleye (*Sander vitreus*)	33(33)	0.68
Black crappie (*Pomoxis nigromaculatus*)	10	0.12
Black bullhead (*Ameiurus melas*)	1	0.01
Northern pike (*Esox lucius*)	1(1)	0.01
Colorado pikeminnow (*Ptychocheilus lucius*)	34	
Razorback sucker (*Xyrauchen texanus*)	301	
Bonytail (*Gila elegans*)	1	
Humpback chub (*Gila cypha*)	43	

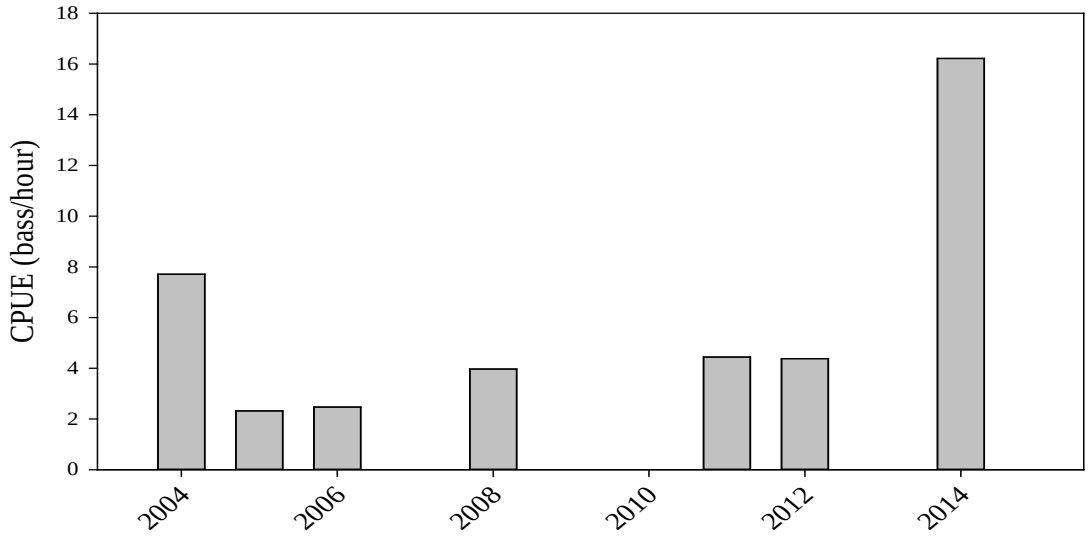

Figure 6. Smallmouth bass (subadult and adult) annual catch rate in Desolation/Gray Canyons, 2004-2014.

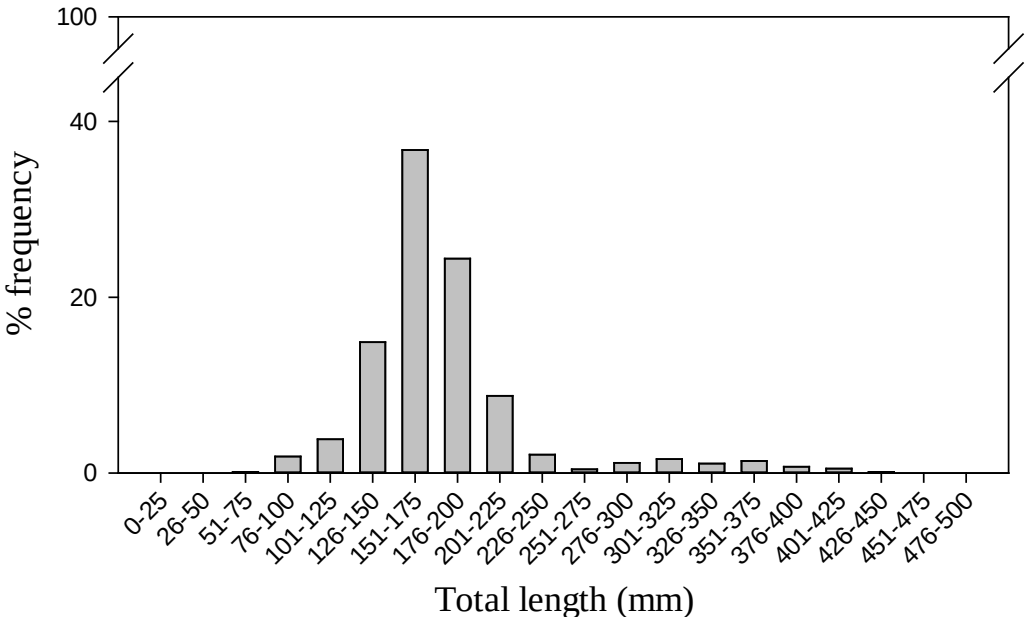

Figure 7. Smallmouth bass (sub-adult and adult) length frequency distribution in Desolation/Gray Canyons, 2014.

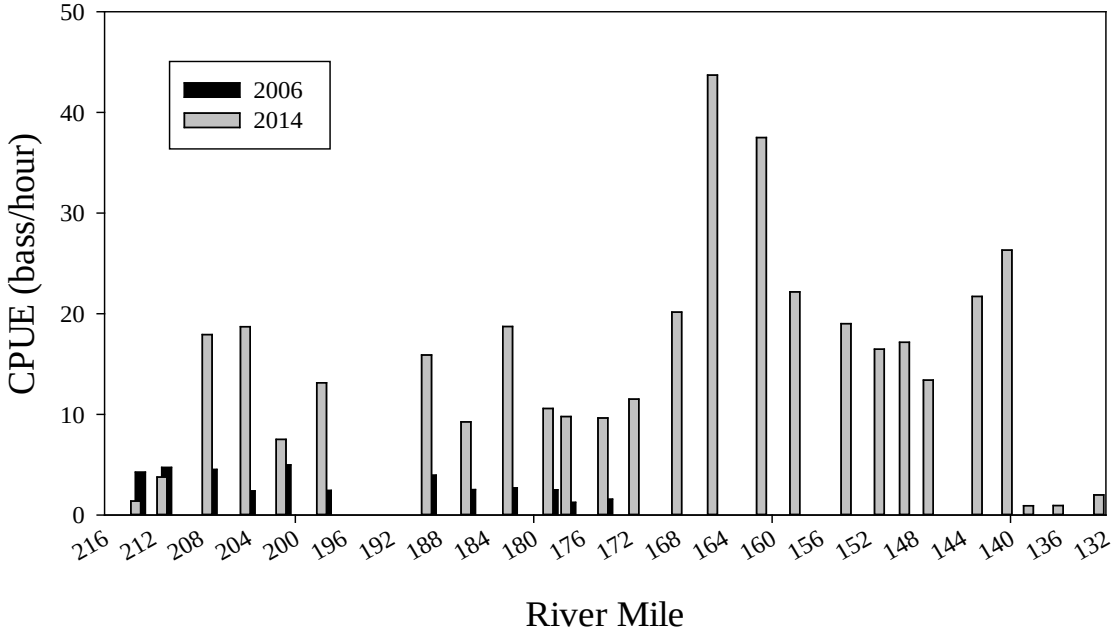

Figure 8. Smallmouth bass catch per unit effort (CPUE) by river mile in Desolation/Gray Canyons, 2006 and 2014.

Table 5. Capture and catch rate by species for fall walleye pass, 2014.

Species	Number Captured	CPUE (fish/hr)
Bonytail (*Gila elegans*)	3	0.04
Channel catfish (*Ictalurus punctatus*)	1	0.01
Colorado pikeminnow (*Ptychocheilus lucius*)	6	0.09
Gizzard shad (*Dorosoma cepedianum*)	24	0.35
Smallmouth bass (*Micropterus dolomieu*)	1	0.01
Razorback sucker (*Xyrauchen texanus*)	177	2.57
Walleye (*Sander vitreus*)	2	0.03

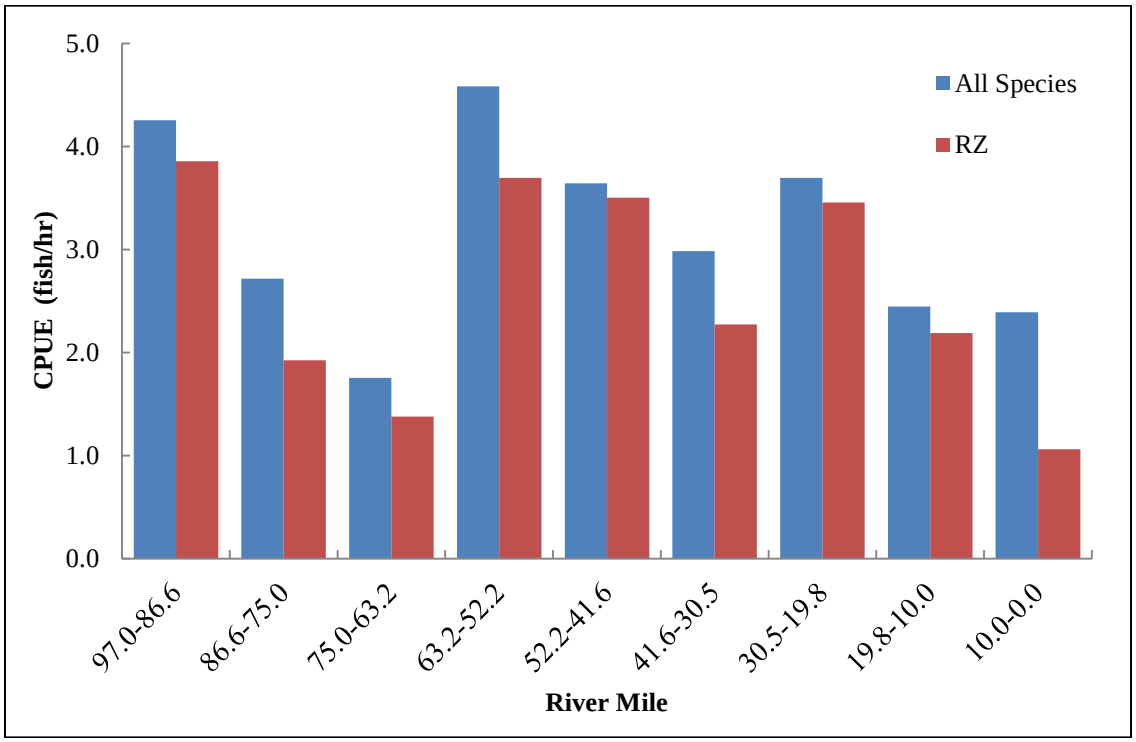

Figure 9. Catch rates for all species by sub-reach during fall walleye removal, 2014.

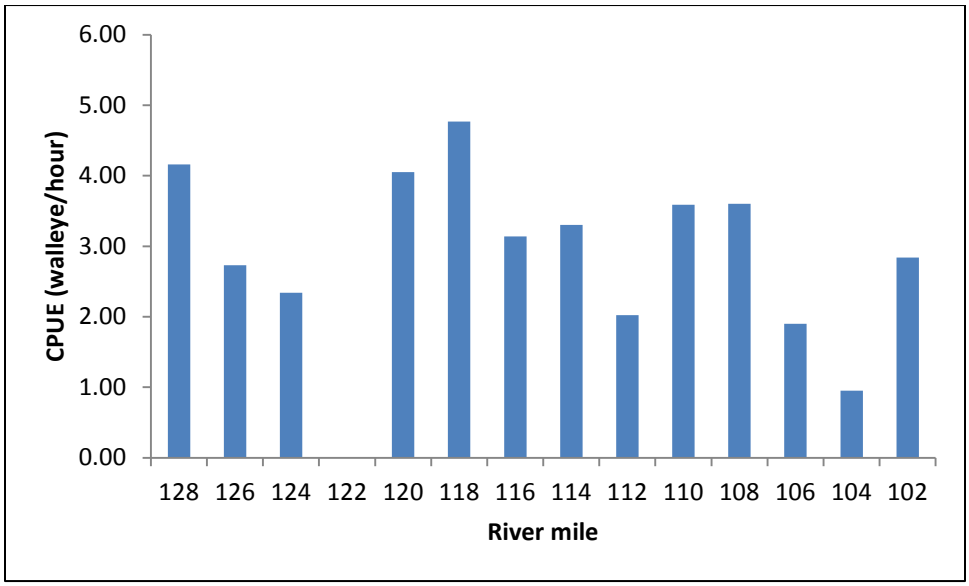

Figure 10. Catch per unit effort for walleye between Tusher diversion (RM 128) and Ruby Ranch (RM 97), spring 2014.

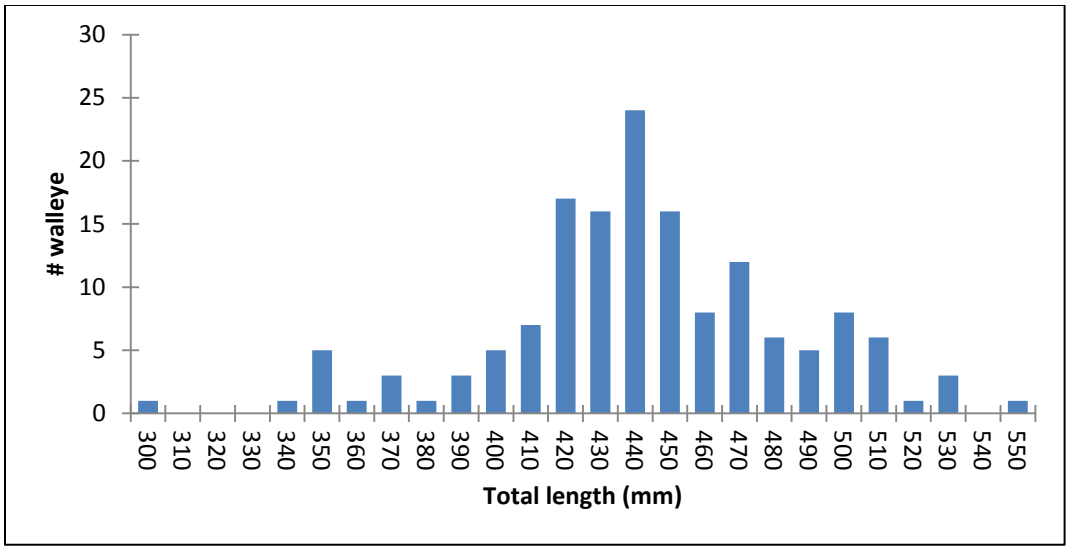

Figure 11. Length frequency distribution of walleye captured in the Tusher diversion (RM 128) to Ruby Ranch (RM 97) reach, spring 2014. One outlier (TL = 233 mm) is omitted from this figure.

Table 6. Ancillary fish captures for electrofishing passes only in the Tusher diversion (RM 128) to Ruby Ranch (RM 97) reach, spring 2014

Species	Number captured	CPUE (fish/hour)
Smallmouth bass (*Micropterus dolomieu*)	2	0.04
Brown trout (*Salmo trutta*)	1	0.02
Black crappie (*Pomoxis nigromaculatus*)	1	0.02
Green sunfish (*Lepomis cyanellus*)	1	0.02
Colorado pikeminnow (*Ptychocheilus lucius*)	35	0.75
Razorback sucker (*Xyrauchen texanus*)	481	12.11
Humpback chub (*Gila cypha*)	1	0.02
Bonytail (*Gila elegans*)	1	0.02

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R13PG40020

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 123a

Project Title: **Smallmouth bass control in the Green River**

Principal Investigator: M. Tildon Jones
1380 S 2350 W, Vernal, UT 84078
(435) 789.0351; tildon_jones@fws.gov

Project/Grant Period: Start date (Mo/Day/Yr): 10/1/2012
End date: (Mo/Day/Yr): 09/30/2015
Reporting period end date (Mo/Day/Yr): 9/30/2014
Is this the final report? Yes _____ No __X__

Performance: Task 1, eight removal passes, was completed between 29 July and 25 September. We removed 1,504 smallmouth bass during these passes, as well as nine other nonnative species or hybrids. With the submission of this report, Task 6 is complete. There is no outstanding work remaining for which USFWS is responsible.

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R14AP00007

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: 123a

Project Title: Smallmouth bass control in the Green River

Principal Investigator: Julie Howard/Christopher Michaud/Zach Ahrens
1165 S Hwy 191 Suite 4
Moab, UT 84532
juliehoward@utah.gov
cmichaud@utah.gov, zachahrens@utah.gov,
435-259-3781/435-259-3784

Project/Grant Period: Start date: 05/01/2014
End date: 09/30/2018
Reporting period end date: 09/30/2014
Is this the final report? Yes _____ No __X__

Performance:

Task 2 was completed: Four removal passes were successfully completed (6/26-6/28/14, 6/29-7/1/14, 7/7-7/9/14, 7/10-7/12/14) on the Green River from Echo Park (RM 344.5) to Split Mountain (RM 319.5). A total of 1264 smallmouth bass were removed with total lengths ranging from 55 mm to 416 mm with a median total length of 166 mm. Of the bass captured 18% were YOY (<100 mm), 64% were sub-adults (100 mm to ≤199 mm), and 18% were adults (>199 mm) where 1% (n=15) were over 325 mm and considered piscivorous and a threat to endangered fishes. A total of 303 white suckers were removed with total lengths ranging from 68-392 mm with a median total length of 115 mm. These data were reported to the PI in September of 2014. These data were analyzed and reported within the annual report for project #123a by November of 2014 (task 6 was completed).

Task 3 was completed: Two removal passes were successfully completed (6/14-6/20/2014, 7/18-7/25/2014) in Desolation and Gray Canyons on the Green River from Sand Wash boat ramp (RM 215.3) to Swasey's boat ramp (RM 129.8). Approximately 1,630 smallmouth bass were removed with total lengths ranging from 75 mm to 486 mm with a median total length of 171 mm. Of the bass captured, 2% were YOY (<100 mm), 79% were sub-adults (100 mm to ≤199 mm), and 19% were adults (>200 mm) where 4% (n=56) were over 325 mm. A total of 73 green sunfish were also captured ranging in total length from 47 mm-132 mm with a median total length of 102 mm. A total of 33 walleye were captured ranging in total length from 382 mm to 585 mm with a median total length of 505 mm. These data were analyzed and reported within the annual report for project #123a by November of 2014 (task 6 was completed).

Task 4 was completed: One removal pass was completed (10/14-10/22/2014) in Labyrinth and Stillwater Canyons on the Green River from Ruby Ranch (RM 97.0) to the confluence with the Colorado River (RM 0.0). The reach between Green River State Park (RM 120.0) and Ruby Ranch (RM 97.0) was excluded from sampling due to inaccessibility resulting from low water.

Two adult walleye (TL=493,499) were removed, along with one adult smallmouth bass (TL=261 mm) and one channel catfish (TL=620 mm). The walleye and channel catfish were above the total length thresholds (375 mm and 400 mm, respectively) at which individuals are considered piscivorous and a threat to endangered fishes. Twenty-four gizzard shad were removed with total lengths ranging from 104 mm to 310 mm and a median total length of 135 mm. Razorback sucker captures (n=177) accounted for 82% of the total catch. Total length of razorbacks captured ranged from 332 mm to 520 mm, with a median total length of 440 mm. These data were analyzed and reported within the annual report for project#123a by November of 2014 (task 6 was completed).

Task 5 was completed: Five early season field trips were completed (3/20, 4/4, 4/7-4/8 and 4/24/2014) on the Green River below the Tusher Diversion (RM 128-126.5). Trammel, hoop nets, fyke nets and angling gear were used in an effort to remove walleye; however, only two walleye and four razorback suckers were captured over the 143 hour sampling effort. Two electrofishing passes were successfully completed (5/5, 5/6, 5/13-5/15/2014 and 5/19, 5/27-5/29/2014) between the Tusher Diversion (RM 128) and Ruby Ranch (RM 97). One hundred forty nine walleye were removed with total lengths ranging from 233-553mm (median=447 mm). Ninety-four percent of walleye captured were piscivorous (TL>375 mm) and a threat to endangered fishes. These data were analyzed and reported within the annual report for project #123a by November of 2014 (task 6 was completed).