

# NEVADA DEPARTMENT OF WILDLIFE STATEWIDE FISHERIES MANAGEMENT



## FEDERAL AID JOB PROGRESS REPORT F-20-53 2017

### Lahontan Reservoir WESTERN REGION



**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
ANNUAL PROJECT REPORT**

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**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
ANNUAL PROJECT REPORT**

**State:** *Nevada*  
**Project Title:** *Statewide Fisheries Program*  
**Job Title:** *Lahontan Reservoir*  
**Period Covered:** *January 1, 2017 through December 31, 2017*

**SUMMARY**

It was an above average water year in the Carson Basin and snow-water equivalent was 208% of average compared to previous years (107% in 2016, 60% in 2015, 28% in 2014, and 25% in 2013). The water elevation in Lahontan Reservoir rose rapidly during spring and remained high for most of the year. Emergency water releases down the lower Carson River alleviated flooding and filled the regulating reservoirs in Lahontan Valley as well as Carson Lake and Carson sink.

Bureau of Reclamation (BOR) had a positive contact for quagga mussel veligers during routine monthly plankton monitoring in April 2011. Subsequent monitoring by Nevada Department of Wildlife (NDOW) and BOR, however, have been negative, including 2017. A boat inspection program began in spring 2013 with two decontamination stations that have been operating through the summer of 2017 were located at the North Shore Marina and at the State Parks entrance on Silver Springs side of the reservoir.

No commercial fishing for Sacramento blackfish occurred during 2017 due to the high water level. Fish become dispersed and inundated vegetation in the littoral zone interferes with seining operations.

Gill netting surveys conducted by NDOW during 2017 were successful in documenting persistence of carp, walleye, crappie, wipers, and channel catfish, with channel catfish dominating the catch. Previous annual surveys found few fish resulting from low water levels occurring from drought conditions.

Electrofishing was conducted during 2017 and was successful in documenting white bass, red ear sunfish, bluegill, largemouth bass, wiper, walleye, and catfish. No adult Sacramento blackfish were captured for examining evaluation methyl-mercury concentration.

In 2017, walleye fry were stocked to help augment natural reproduction. Wipers were stocked during May and October. Some were tagged as part of a study aimed at evaluating their status after stocking and the potential of the reservoir to support a trophy wiper fishery. Rainbow trout were also stocked for the first time in recent history resulting from the cooler, high runoff in spring that improved reservoir conditions making it suitable for trout to survive. This was a limited fishery well supported by the public, with harvest documented during creel surveys during spring and summer.

## **BACKGROUND**

Lahontan Reservoir was created in 1915 by the construction of Lahontan Dam, which impounded water from the Carson River and Truckee River (via the Truckee Canal) for farmland irrigation, hydropower, flood control, domestic water, and recreation. This was part of the Newlands Reclamation Project created by the Bureau of Reclamation.

Maximum surface area of the reservoir is 14,600 acres with a maximum storage of 319,000 acre-ft (AF). At maximum pool, the deepest point reaches 85 ft. The reservoir is eutrophic, which creates a very productive fishery. Resulting from Comstock mining practices, an estimated 7,500 tons of mercury were discharged into the Carson River drainage and, consequently, methylmercury concentrations in many fishes are above the safe state and federal consumption levels. Division of Public and Behavioral Health and NDOW advise “No consumption of fish from Lahontan Reservoir, the Carson River below Dayton, and all waters in Lahontan Valley.”

Despite the health advisory, Lahontan Reservoir continues to provide excellent recreation through angling. The prominent sport fishes include white bass, wipers (white bass x striped bass hybrid), largemouth bass, smallmouth bass, channel and white catfish, white and black crappie, yellow perch, and walleye. Fingerling wiper and larval walleye are generally stocked annually.

In 1981, NDOW began issuing a commercial fishing permit at Lahontan Reservoir in an attempt to reduce the Sacramento blackfish population. Prior to commercial fishing, substantial blackfish mortality events were documented in the reservoir at the Carson River inlet during the spring when blackfish would spawn. During the first four years of commercial operation, the average annual harvest of blackfish was nearly 350,000 lbs. In 2005, a harvest moratorium was instituted due to declining catch rates, which was viewed as a possible indication of a population decline. The blackfish harvest moratorium was withdrawn in 2008 and an annual commercial collection permit was again issued to the previous permittee.

## **OBJECTIVES**

### General Management Objectives:

- Conduct a general fisheries assessment through opportunistic angler contacts and mail-in angler questionnaire data.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) at least three times per year.
- Document dissolved oxygen and temperature when conducting quagga mussel veliger sampling.
- Monitor for the presence of adult quagga mussels by conducting tactile surveys around boat docks and reservoir substrates at least three times per year.
- Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year.

- Stock 1 million walleye fry and 5,000 juvenile wipers.
- Monitor sport fish populations through electroshocking four established transects in late spring/early summer.
- Monitor sport fish populations through gill netting four net-nights in late spring/early summer.
- Assess YOY fish species composition and production through beach seining at least eight locations during late spring/early summer.
- Increase habitat complexity and provide additional juvenile habitat cover.

Study Specific Objectives:

- Tag 2,000 hatchery raised wipers with color specific Floy tags.

## PROCEDURES

General Management Objectives

**Conduct a general fisheries assessment through opportunistic angler contacts and mail-in angler questionnaire data.** Information obtained from anglers included time fished; number, size and species of fish caught; location where fished; place of residence; and type of bait or lure used. Mail-in angler questionnaire data was derived from a survey mailed to 30,000 anglers purchasing a Nevada fishing license in 2016.

**Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) at least three times per year.** Lake level data was received throughout the year from USGS gauge number 10312100 near the dam. Clarity was measured directly using a Secchi disk and measurements were taken on April 26, 2017, May 3, 2017, and August 28, 2017 near the dam.

**Document dissolved oxygen and temperature when conducting veliger sampling.** Temperature and dissolved oxygen was recorded with each visit to the reservoir.

**Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates at least three times per year.** Tactile surveys were conducted through inspection of the boat dock at Churchill Beach boat launch. Buoys and rock structures near the dam were also inspected for adult quagga mussels by snorkeling during three occasions during April, May, and August.

**Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year.** Plankton tows were conducted on May 23, 2017 and August 28, 2017.

**Stock one million walleye fry and 5,000 juvenile wipers.** On April 26, 1,000,000 walleye fry were received from Gavin's Point National Fish Hatchery in South Dakota. Mortality was estimated from each box of fry and it varied between 0 to 30%.

Approximately 240,000 were stocked near the North Shore Marina in Churchill County and approximately 692,500 were stocked between Beach 8 and Beach 10 in Lyon County to help augment the natural reproduction of the reservoir's walleye population. On October 26, 2017, 3,000 wipers were received from Colorado Catch Hatchery and stocked at the North Shore Marina boat launch. An additional 1,625 wipers were stocked on June 8, 2017 (1,000 of these were tagged with Floy brad tags model FD-94 in green and numbered from 3,001 to 4,000).

**Monitor sport fish populations through electroshocking four established transects in late spring/early summer.** Electroshocking surveys were not conducted during spring due to equipment availability, however, on October 31, 2017 four areas in the “lower bay” (Churchill County) were surveyed.

**Monitor sport fish populations through gill netting four net nights in late spring/early summer.** Four gill nets were set on June 13, 2017 and allowed to fish overnight. Gill nets were set in Catfish Cut, L-Cove, Crappie Cove, and the island near the dam. Sites were chosen based on public safety, angler creel information, commercial harvester data, historical locations, and reservoir level. Nets were set perpendicular to shore and anchored with three-pound weights. Nets were 120 ft long, six feet deep, and mesh size ranged from 0.5 to 2.5 in, which increased by 0.5 in increments every 20 ft. Each net was allowed to fish over a 24-hour period.

**Assess YOY species composition and production through beach seining at least eight locations during late spring/early summer.** Beach seining surveys were conducted on June 1, 2017. Sites were chosen based on accessibility, bottom type, nearby habitat, and angler creel information. Seining was conducted in the lower bay (Beach 1, Beach 3, Beach 10, Six-Mile Beach, and Bass Cove), the Narrows (Crappie Cove, and Coyote Island), and in the upper bay (Beach 6, Beach 7, and Beach 8).

**Increase habitat complexity and provide additional juvenile habitat cover with additional habitat structures.** The structures, purchased from Mossback Fish Habitat, were made of “nontoxic, scuffed PVC trunks with composite limbs to simulate trees or root structures as found in a natural environment.” Three different types of structures were utilized and consisted of Safe Havens (Figure 1), Root Wad 3 Posts, and Trophy Tree Kits. Product dimensions and specifications are presented in Table 1.

**Figure 1.** Safe Haven Fish Habitat Structure.



**Table 1.** Mossback Habitat Specifications.

	Dimensions	Limbs	Number of Anchors
Safe Haven	50" x 50"	24	1
Root Wad 3 Post	25" x 50"	12	1
Trophy Tree Kit	50" x 50"-100"	36	2

All structures were constructed in Fallon and transported to the reservoir on a small flatbed trailer. The structures were then transported in an 18 ft aluminum Delta Angler boat to suitable locations determined from bathometric maps and proofed using a fish finder/sonar. All structures were placed in at least 6-ft of water and not more than 15 ft in order to target areas where all fish species were most vulnerable to predation. These locations and depths also function as suitable spawning habitat for warmwater species, which produce offspring that can utilize the structures as well. Structures were submerged and anchored using 6-ft of nylon coated aircraft cable attached to one or two cinder blocks. GPS locations were recorded for each structure for future monitoring purposes.

### Study Specific Objectives

**Tag 2,000 hatchery raised wipers with color specific Floy tags.** Tags used were model FD-94, 3/4 inch monofilament Long-T manufactured by Floy Tag & MFG, INC. On June 8, 2017, 1,000 wipers were tagged with bright green tags numbered 3001 to 4000. Fork lengths of 56-tagged fish were recorded. No anesthetic was used and tagged fish were given 15 minutes of recovery time in long troughs before being released into the reservoir at Sportsman's Marina (Churchill County). During creel surveys, anglers catching tagged wipers were asked of their location, date, size of fish, number, and color of tag.

## FINDINGS

**Conduct a general fisheries assessment through opportunistic angler contacts and mail-in angler questionnaire data.** Currently, Lahontan Reservoir holds the Nevada record-size walleye (15 lbs 4 oz caught in 1998) and wiper (25 lbs 9 oz caught in 2009). This year, 28 anglers surveyed caught mostly white bass; however, walleye, wiper, smallmouth bass, crappie, rainbow trout, and catfish were also caught. Fish measured were large adults; 3 walleye that averaged 20 inches, 10 white bass that averaged 10.45 inches, 5 crappie that averaged 12.2 inches, 4 rainbow trout that averaged 14.68 inches, 3 channel catfish that averaged 18.3 inches, and 1 smallmouth bass that measured 16 inches. The total catch rate was 0.91 fish per hour and 1.46 fish per angler-day. Comparatively in 2016, the catch rate was 0.81 fish per hour and 2.42 fish per angler-day, which represented a decrease from the historical average from 2010 to 2015. During 2015, the 17 anglers surveyed caught mostly carp along with white bass and catfish. During 2015, the catch rate was 1.05 fish per hour and 1.29 fish per day, which also represented a decrease from the 2010 to 2014 average. The 18 anglers from 2014 caught mostly white bass, but wipers and channel catfish were also caught. The overall catch rate was 1.38 fish per hour and 3.61 fish per day. In 2013,

23 anglers caught mostly white bass, but wipers and walleye were also caught. The catch rate was 2.07 fish per hour and 6.65 fish per day. More anglers were seen fishing and were surveyed in 2017 than were found over the past four years and since the water level had recently been restored from an historic low. Catch rates also improved in 2017, suggesting sportfish may be recovering from the long-term reservoir effects of drought.

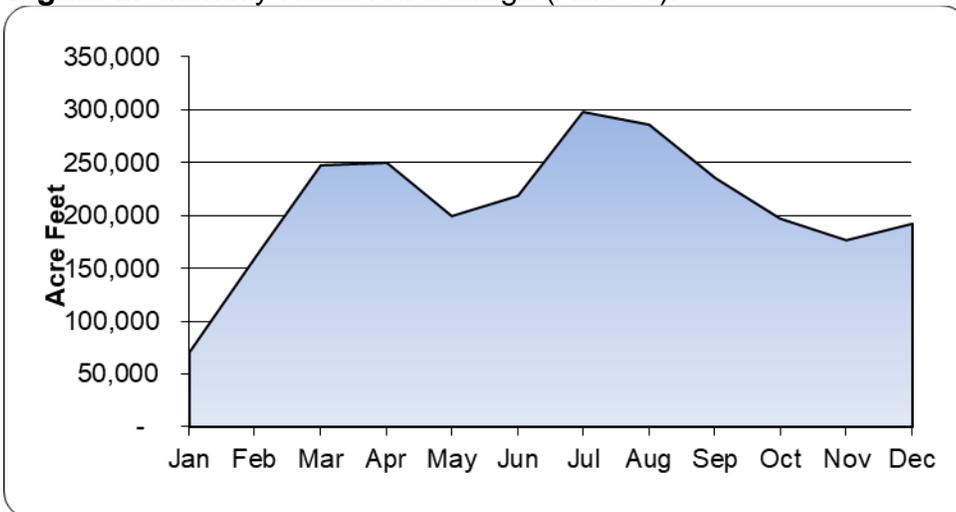
Angler use reported from the mail-in angler questionnaire was combined for Lyon and Churchill counties and showed that angler use was the highest since 2012 (Table 2). The 2016 catch rate was near average, however, the number of fish caught was well below average. It appears anglers tend to fish more when the reservoir level is high.

**Table 2.** Historical, Mail-in, Angler Questionnaire Survey Summary

	2009	2010	2011	2012	2013	2014	2015	2016	17 YR AVE
No. Anglers	3,375	2,495	2,267	2,651	1,304	593	312	1,343	2,824
No. Days Fished	18,065	13,110	10,668	17,208	7,556	1,793	1,620	8,138	19,145
No. Fish Caught	46,804	28,845	19,208	35,494	18,369	5,306	7,197	11,832	57,106
No. Fish Per Angler Day	2.59	2.20	1.80	2.06	2.43	3.58	23.07	8.81	6.00
Average Storage	76,887	93,203	189,783	132,729	68,273	42,844	23,157	53,986	117,897

**Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) at least three times per year.** Figure 2 shows Lahontan Reservoir water level in 2017 as measured by USGS gauge 10312100. Measurements reported recorded from the first of each month.

**Figure 2.** Monthly Reservoir Storage (Acre-Ft).



Maximum capacity of Lahontan Reservoir is 319,000 acre-ft and in 2017, the lowest storage was recorded on January 1 at 70,700 acre-ft (AF), or 22% of capacity (Table 3). In 2016, the lowest storage was recorded on September 21 at 3,820 AF, or 1% of capacity. From 2012 through 2016, the reservoir fluctuated dramatically, dropping rapidly in summer and likely affecting spawning, growth, and survival of many fish species. In 2017, the reservoir filled rapidly and remained relatively full all year, with the highest level of 305,200 AF recorded on July 13. Many of the sport fish species in Lahontan Reservoir take advantage of inundated terrestrial vegetation during spring and early summer for spawning. This vegetation also provides cover for juvenile fish during summer. When the reservoir level is low and/or drops dramatically, this crucial habitat is not available, which is detrimental to the fishery.

**Table 3.** Lahontan Reservoir Annual Storage (acre-feet).

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Jan</b>	91,200	39,530	27010	95,790	188,600	65,140	40,880	14,870	12,330	70,700
<b>Feb</b>	101,900	56,040	49600	117,200	201,600	78,410	54,480	23,790	25,220	160,600
<b>Mar</b>	110,300	74,830	71970	132,100	211,400	98,580	74,830	43,230	54,620	248,400
<b>Apr</b>	121,100	103,500	99800	176,100	216,800	123,900	95,880	57,990	85,240	249,800
<b>May</b>	106,200	107,400	115400	185,500	200,600	119,600	82,810	61,250	96,390	200,100
<b>Jun</b>	120,600	144,700	134000	202,500	184,500	115,300	73,420	37,340	121,800	218,900
<b>Jul</b>	108,900	155,900	180900	282,900	142,100	89,110	42,950	8,120	110,400	298,600
<b>Aug</b>	69,990	108,200	142700	292,200	97,040	51,010	15,580	5,870	65,570	286,300
<b>Sep</b>	30,040	66,010	95970	235,100	56,920	17,610	15,920	5,870	24,760	235,500
<b>Oct</b>	16,890	33,890	67900	194,900	33,990	7,530	8,910	5,830	4,170	197,800
<b>Nov</b>	11,540	18,670	66420	181,500	23,640	18,640	3,930	6,120	12,400	177,000
<b>Dec</b>	25,010	13,970	66760	181,600	35,560	34,450	4,540	7,600	34,930	192,800
<b>Avg.</b>	76,139	76,887	93,203	189,783	132,729	68,273	42,844	23,157	53,986	211,375

The average monthly reservoir level during 2017 was 211,375 AF. Water storage from 2013 to 2016 was below the 2008 to 2016 average of 84,111 AF and the 2000 to 2007 average of 161,519 AF. The average annual storage during 2017 represented the second highest recorded level in over 20 years, only 2006, having 226,677 AF, was higher. The lowest in recent history occurred in 2015 at 23,157 AF. Secchi depths were taken in April, May, and August and showed an average visibility of five feet (1.5 m).

**Document dissolved oxygen and temperature when conducting veliger sampling.** Dissolved oxygen was measured once in May and once in August. May measurements ranged from 9.51 mg/L (T=67°F) at the surface to 7.20 mg/L at 19 meters near the bottom (T=56°F). August measurements ranged from 6.9 mg/L (T=80°F) at the surface to 0.07 mg/L (T=67°F) at 19 meters. Water temperatures were also measured three feet below the surface on at least 10 days throughout the year and ranged from 35°F (February) to 81°F (September). Temperature and dissolved oxygen levels were suitable for warmwater fish survival throughout the year with the exception of localized areas during late August and September when some fish became stranded in areas of high temperature and little available oxygen. Several reports of fish kills were received, which were verified in some areas experiencing localized water quality issues. Poor water quality was likely due to the high reservoir level and abundant

inundated terrestrial vegetation that began decomposing and creating an anoxic layer that some fish were unable to escape. Crappie appeared to be the most vulnerable.

**Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates at least three times per year.** Physical inspection of boat docks, buoys, rocky substrates, and boats all were found negative for adult quagga and zebra mussels.

**Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year.** Veliger testing in 2017 was found negative by the Bureau of Reclamation.

**Stock one million walleye fry and 5,000 juvenile wipers.** On April 26, 1M walleye fry were received from Gavin’s Point National Fish Hatchery in South Dakota (Table 4). Mortality was estimated for each box of 50,000 fry and varied between 0 to 30%. Approximately 240,000 were stocked near North Shore Marina in Churchill County and approximately 692,500 were stocked between Beach 8 and 10 in Lyon County to help augment natural reproduction for the reservoir’s walleye population. On June 8, 2017, 1,625 wipers were received from Colorado Catch Hatchery and stocked at the North Shore Marina boat launch. An additional 3,000 wipers were stocked on October 26, 2017 (1,000 of these were Floy tagged with green tags numbered 3,001 to 4,000).

**Table 4. Lahontan Reservoir Stocking History.**

Year	County	Date	Species	Source	Number	Size (in)
2017	Lyon	4/21/2017	Rainbow	Mason Valley Hatchery	5,500	9.7
	Lyon	7/14/2017	Crappie	Willow Creek Res.	452	7
	Churchill	7/14/2017	Crappie	Willow Creek Res.	416	7
	Churchill	10/26/2017	Wiper	Colorado Catch	3,000	7
	Churchill	6/8/2017	Wiper	Colorado Catch	1,625	8
	Churchill	10/26/2017	Walleye	Colorado Catch	200	6
	Churchill	4/26/2017	Walleye	Gavins Point NFH	240,000	0.5
	Lyon	4/26/2017	Walleye	Gavins Point NFH	692,500	0.5
	Lyon	4/25/2017	Rainbow	Mason Valley Hatchery	2,008	9.7
	Churchill	6/12/2017	Rainbow	Mason Valley Hatchery	3,001	9.4
2016	Churchill	4/20/2016	Walleye	Gavins Point NFH	900,000	0.5
		5/26/2016	Wiper	Colorado Catch	2,091	5.5
2015	Churchill	4/23/2015	Walleye	Gavins Point NFH	720,000	0.5
2014	Churchill	N/A			-	
2013	Churchill	4/24/2013	Walleye	Gavins Point NFH	285,000	0.5
2012	Churchill	5/3/2012	Walleye	Gavins Point NFH	438,000	0.5
	Lyon	5/3/2012	Walleye	Gavins Point NFH	500,000	0.5
	Churchill	5/4/2012	Wiper	Colorado Catch	1,000	8
2011	Churchill	6/1/2011	Wiper	Colorado Catch	3,700	9
	Lyon	4/21/2011	Walleye	Gavins Point NFH	475,000	0.5
2010	Churchill	6/3/2010	Wiper	Colorado Catch	3,162	8
	Churchill	4/23/2010	Walleye	Gavins Point NFH	365,000	0.5
	Lyon	4/23/2010	Walleye	Gavins Point NFH	400,000	0.5
2009	Churchill	5/27/2009	Walleye	Gavins Point NFH	486,540	0.5
	Lyon	5/27/2009	Walleye	Gavins Point NFH	437,838	0.5

**Monitor sport fish populations through gill netting four net nights in late spring/early summer.** Gill netting data for 2017 is presented in Table 5 along with the gill netting history. From 2005 to 2007, intensive gill netting surveys resulted in an average of 376 net hours; however, in the years since that time, effort has been lessened.

**Table 5.** Lahontan Reservoir Gill Net Data, 2005 - 2016.

	White bass		Walleye		Crappie		Wiper		Sac. Blackfish		Catfish Combined		Net Hours
	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	
<b>2017</b>	<b>0</b>	<b>0.00</b>	<b>2</b>	<b>0.02</b>	<b>1</b>	<b>0.01</b>	<b>2</b>	<b>0.02</b>	<b>0</b>	<b>0.00</b>	<b>13</b>	<b>0.14</b>	<b>96</b>
2016	1	0.01	3	0.04	1	0.01	0	0.00	0	0.00	10	0.14	72
2014	4	0.04	9	0.10	3	0.03	0	0.00	4	0.04	41	0.45	92
2013	6	0.06	5	0.05	21	0.21	13	0.13	7	0.07	23	0.23	99
2012	1	0.01	20	0.22	54	0.60	5	0.06	13	0.15	38	0.42	89.5
2011	0	0.00	9	0.09	14	0.14	0	0.00	1	0.01	8	0.08	99
2010	1	0.01	8	0.08	13	0.12	1	0.01	22	0.21	61	0.58	106
2009	0	0	4	0.05	43	0.52	1	0.01	19	0.23	30	0.36	83
2007	266	0.74	105	0.29	78	0.22	262	0.73	28	0.08	160	0.44	360
2006	892	2.19	211	0.52	58	0.14	320	0.78	0	0	55	0.13	408
2005	2	0.01	57	0.16	5	0.01	21	0.06	0	0	19	0.05	360

Only two wipers have been caught since 2013, however, during 2015 and 2016, several large wipers (greater than 10 lbs) were caught during commercial seining operations. Sacramento blackfish showed an increase in CPUE to 0.15 during 2012 only to have it drop back to 0.07 in 2013, 0.04 in 2014, and none during 2016 and 2017. Numbers of Sacramento blackfish harvested by the commercial operator remained similar during 2014 and 2015, averaging approximately 1,300 lbs per month. However, due to low reservoir levels and concern over Sacramento blackfish populations, commercial operations were only conducted during November (500 lbs harvested) and December (795 lbs harvested) of 2016 and no commercial fishing occurred in 2017. During 2015, crappie was the most abundant species caught, however, only one was caught in 2016 and 2017. Two walleye were caught in 2017, which represented a historical low. In 2012, the CPUE was 0.22, which was the highest during the past seven years. This, coincidentally, was an above average water storage year prior to 2017. White and channel catfish were evaluated together and previously appeared to be the least affected by the four-year drought. Fish per net-hour nearly doubled during 2013 and 2014 (0.23 and 0.45, respectively) only to have declined to 0.14 in 2016 and 2017, which was near the ten-year low. This past drought appears to have affected catfish abundance.

Recent white bass densities have remained low compared to densities documented in 2006 and 2007. In Lahontan Reservoir, white bass tend to exhibit large boom and bust cycles. This is represented in Table 5 by a low CPUE of 0.01 during 2005, a high CPUE of 2.19 in 2006, and again a low CPUE of 0.00 in 2009. This is likely attributed to good water years when spawning activity was highly successful due to the abundance of inundated vegetation, which provides protection to YOY and increases survival. In 2014 and again in 2015, juvenile white bass dominated beach seining surveys, which suggests a successful spawn during the spring. However, CPUE of adults remained low during 2016 and 2017, which suggests poor recruitment.

Wild populations of sport fish in Lahontan Reservoir continued to persist despite dramatic fluctuations and extreme low water levels experienced over the past four years. Reservoir levels rebounded during the summer of 2017 as the Carson Basin snowpack was approximately 208% of average, sportfish populations are expected to recover if reservoir levels remain at least average over the next couple of years.

**Monitor sportfish populations through electrofishing four established transects in late spring/early summer.** Thirty-one fish were caught during electroshocking surveys in 2017. Ten white bass averaged 10.37 inches, six walleye averaged 17.59 inches, five largemouth bass averaged 12.38 inches, five Sacramento blackfish averaged 5.92 inches, two redear sunfish averaged 6.75, and two bluegill caught averaged 2.66 inches. One channel catfish (30.31 inches) and one wiper (11.97 inches) were also caught.

**Assess YOY species composition and production through beach seining at least eight locations during late spring/early summer.** Beach seining was conducted on June 1, 2017 and eight fish were caught: one white bass (5.5 inches), one walleye (9.8 inches), two carp, three crappie (8.9 inches), and one large channel catfish (18 inches). Conditions had improved from previous year when no beach seining was conducted in 2016 due to reservoir conditions and only one transect was completed in 2015 due to extremely low water levels.

**Increase habitat complexity and provide additional juvenile habitat cover with additional habitat structures.** Installation of habitat structures was completed throughout the course of several months and GPS locations were recorded for each structure (Table 6, Figure 3). Several structures placed during the spring of 2016 had to be moved to deeper water by late summer due to a rapidly declining reservoir level. The reservoir level remained high in 2017 and movement was not necessary. Boat anglers were observed fishing near these structures and anecdotal information suggests that structures attracted a higher concentration of fish, which anglers targeted. It is likely that structures are attracting larger fish by providing a concentrated forage base of younger, non-game and game fish species. Locations chosen for 2017 were similar to 2016 and placing structures in “clumps” should provide a larger single unit area for fish to escape predation.

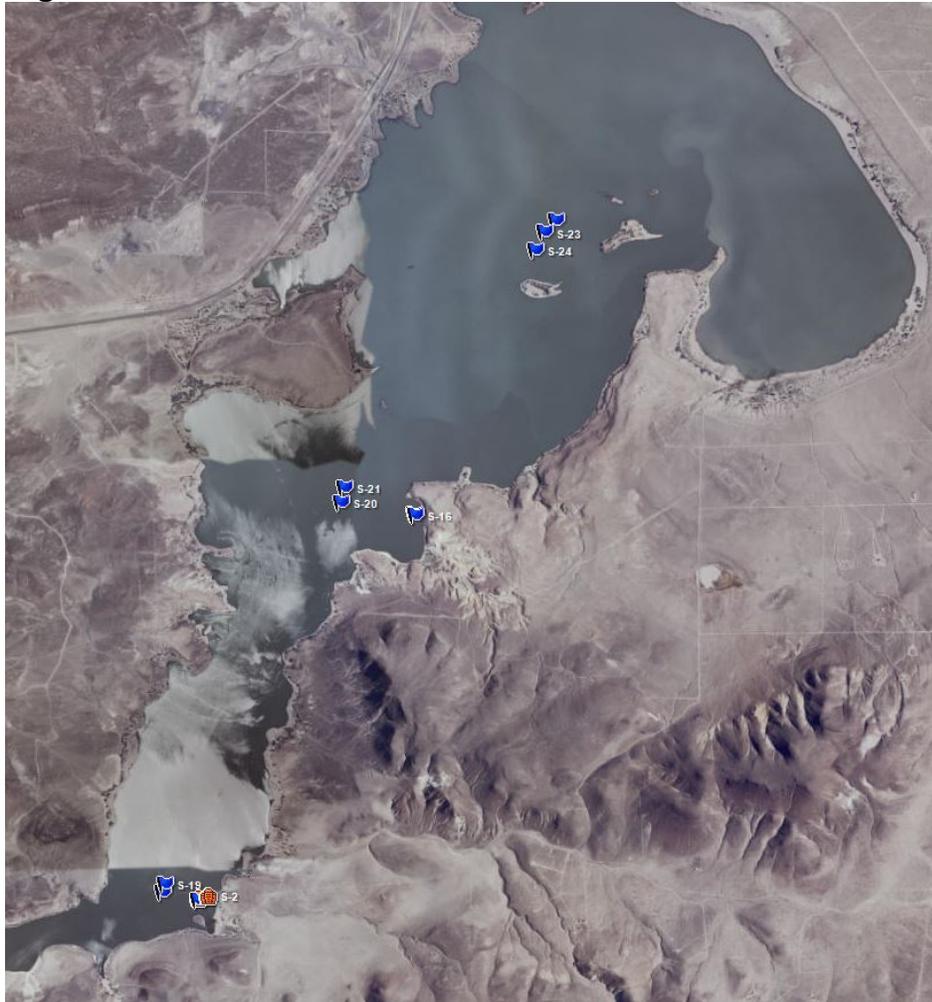
### Study Specific Findings

**Tag 2,000 hatchery raised wipers with color specific Floy tags.** Only 1,000 wipers were tagged during 2016 and another 1,000 in 2017 due to time constraints and concern over fish stress resulting from the longer handling time required for tagging wipers that did not receive anesthesia. On June 8, 2017, wipers were given bright green Floy tags (model FD-94) numbered 3001 to 4000. Fork lengths of 56-tagged fish averaged 201 mm (7.9 inches) and all fish appeared healthy before and after tagging. During 2016, tagged wipers averaged 161 mm (6.3 in) (Figure 4). Thirteen (13) wipers tagged during 2016 were reported caught by anglers during 2017; these fish averaged 14.3 inches and ranged from 13.0 to 15.5 inches.

**Table 6.** Mossback Habitat GPS Locations, 2016 and 2017.

Label	Water Body	Easting	Northing	Zone
S-1	Lahontan	319286.07	4363829.56	11
S-13	Lahontan	319226.45	4363812.09	11
S-14	Lahontan	319222.71	4363803.18	11
S-15	Lahontan	320683.68	4366264.11	11
S-16	Lahontan	320684.12	4366260.66	11
S-18	Lahontan	319001.37	4363859.19	11
S-19	Lahontan	319015.51	4363910.63	11
S-2	Lahontan	319292.59	4363831.72	11
S-20	Lahontan	320205.28	4366352.37	11
S-21	Lahontan	320233.36	4366447.82	11
S-22	Lahontan	321636.25	4368146.84	11
S-23	Lahontan	321560.52	4368067.29	11
S-24	Lahontan	321498.88	4367957.85	11

**Figure 3.** Mossback Habitat Locations, 2016.



**Figure 4.** Floy-Tagged Wiper, 2016.



## **MANAGEMENT REVIEW**

All sport fish species appeared to show effects of the prolonged drought. Carp dominated the angler catch (89% of total catch) during 2016 however; during 2017, white bass dominated the catch suggesting that reservoir conditions improved. Catch rates improved in 2017 and high reservoir storage levels should provide more angling opportunity next year.

Stocking walleye fry augments the natural reproduction occurring in the reservoir and during extremely low water such as in 2008 through 2010 and 2012 through 2016, when natural reproduction was limited, it may prove beneficial. Walleye population numbers were low during 2017, but available habitat was plentiful. Therefore, additional stocking of walleye fry should quickly rebuild their population structure and abundance.

One large walleye was caught during electroshocking, which suggested the population has the ability to natural propagate. Habitat conditions during 2017 were good. During 2012, more than half (60%) of the walleye caught gill netting were under 10 in, which was a large increase from previous years and suggested that natural reproduction was successful and/or an increase in survivorship of stocked fry occurred during early spring. Conversely, between 2013 and 2016, no walleye less than 10 in were caught suggesting reproduction and survival of juveniles was limited during extremely low water years. Only large walleye were caught during commercial seining in 2015 and gill netting in 2014 and 2016. None was caught during 2017.

Several large wipers were observed during 2015 and 2016, however, none were observed in 2017. During 2013, wipers caught when gill netting ranged from 7.5 to 10.1 in suggesting that stocking 8.0 in fish during 2012 was successful, though the growth rate was slow. Wipers averaging 6.0 inches were stocked again during 2016, with 13-tagged wipers returned to creel in 2017. Growth was estimated at approximately 6.0 to

7.0 inches from May 2016 to July 2017. Continued monitoring of the tagged fish will provide insight into the growth rates the reservoir can provide and the effectiveness of the recent size-limit regulation change of two fish at 15-inches.

No large-scale fish mortality was reported during 2016, but in 2017, localized areas were found to have water quality issues. It was evident that fish populations benefitted from above average reservoir levels in 2011, however, surveys from 2012 to 2016 indicated that overall reproduction and survival of sport fish and forage fish were negatively affected by drought conditions. High reservoir storage levels in 2017 and going into 2018, and abundant vegetative cover should provide beneficial reproductive habitat for most sport fish.

The Truckee Canal breached in 2008 and, after temporary repairs, the Army Corps of Engineers allowed a maximum of 350 cfs to be diverted from the Truckee River to Lahontan Reservoir in 2009. Very limited flow occurred in 2010 and no flow was observed in 2011. Major reconstruction of portions of the canal was completed during 2012 and from 2013 to 2015, 350 cfs at Derby Dam continued to flow and by the time water reached the reservoir the actual flow dropped to about 200 cfs due to evaporation and infiltration. The canal flowed for most of 2013 and the early part of 2014, 2015, and 2016. When flows in the Truckee River cannot meet downstream demands in the Truckee Basin or flows from the Carson River are high enough to meet Carson Basin demands, the canal is turned off and flow is suspended to Lahontan Reservoir. The Truckee River Operating Agreement between the Bureau of Reclamation, Pyramid Lake Paiute Tribe, State of Nevada, State of California, and Truckee Carson Irrigation District was finally signed after nearly 27 years of conflict and negotiations. It is currently unknown what effect, if any, this will have on the flows from the Truckee River to Lahontan Reservoir because a “normal” water year has not happened since then, it has either been drought or flood.

The addition of protective cover for juvenile warmwater game fish continued in 2017 and further monitoring population structure, habitat use, and angler fishing success will examine if artificial habitats result in higher angler catch rates, larger size fish, and an increase in abundance. Even though angling was less successful during 2014 and 2015, it was likely a result of persistent drought and subsequent low reservoir levels. Artificial habitat was placed in the reservoir where cover was limited. In addition to providing cover for juvenile warmwater game fish, artificial habitat should provide protection for other forage fish species.

## **RECOMMENDATIONS**

### General Management Objectives:

- Conduct a general fisheries assessment through opportunistic angler contacts and mail-in, angler questionnaire data.
- Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) at least three times per year.
- Document dissolved oxygen and temperature when conducting veliger sampling.

- Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates at least three times per year.
- Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year.
- Stock one million walleye fry and 5,000 juvenile wipers.
- Monitor sport fish populations through gill netting four net-nights in late spring/early summer.
- Monitor sport fish populations through electroshocking four established transects in late spring/early summer.
- Concurrent to electroshocking surveys, collect white bass if they are abundant to augment the depauperate population in Washoe Lake.
- Coordinate with the commercial fishing operation to collect 20 Sacramento blackfish for examining mercury concentrations.
- Increase habitat complexity and provide additional juvenile habitat cover with additional artificial habitat structures.

Study Specific Objectives:

- Continue to collect tag return data, evaluate data collected, and make recommendations.

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