

NEVADA DEPARTMENT OF WILDLIFE STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORT F-20-49 2013

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, 2013 through December 31, 2013*

SUMMARY

This year was a below average water year in the Carson Basin. Reservoir elevation dropped from April through October and the Nevada Division of State Parks closed all boat launches when reservoir levels dropped below safe launching levels.

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 have been negative for quagga mussels. A boat inspection program began in spring 2013; two decontamination stations were operated through the summer and were located at the Sportsman's marina and the Silver Springs boat launch.

Commercial fishing operators at Lahontan Reservoir have traditionally hauled live fish to markets outside Nevada. However, upon a suspected positive result for quagga mussels by BOR in 2011, permitted operators were required to kill all fish prior to hauling them, and to ship them on ice with no water from the reservoir. This permit revision was implemented in order to prevent the unintentional spread of quagga mussels to other waters.

Gill netting surveys were conducted with 4 nets fished, totaling 99 hrs. Crappie and wiper dominated the catch, but walleye, catfish, Sacramento blackfish, white bass, and carp were also caught.

Walleye fry were stocked again this year to help improve the fishery. Fry mortality was low (estimated at 5-20%) and 285,000 were stocked into Churchill County during April. Wipers were not stocked due to persistent drought conditions and resultant low water levels.

The ongoing drought also caused the suspension of the wiper study, which was scheduled to start in 2013. The study was aimed at evaluating the current wiper status and the reservoir's potential to support a trophy fishery. The study will be rescheduled to a time when the reservoir levels are adequate to support a sport fishery.

Collection of sport fish for mercury analysis was conducted in 2013. Mercury concentration in fish tissue was higher than average for some species, which was likely a result of the large spring runoff during 2011 that scoured upstream sediments and allowed additional mercury to become available for methylation and subsequent

bioaccumulation in fish. A “non-consumption of fish” health advisory remains in effect for Lahontan Reservoir.

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 (BOR).

Maximum surface area of the reservoir is 14,600 acres with a maximum storage of 319,000 acre-ft. At maximum pool, the deepest point reaches 85 ft. The reservoir is eutrophic, which creates a very productive fishery. As a result of 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 level. Nevada State Health Division 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 a 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) when on site.
- 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 when on-site.
- 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 gill netting four net-nights in late spring/early summer.
- Assess YOY species composition and production through beach seining at least eight locations during late spring/early summer.
- Collect sport fish for mercury monitoring in cooperation with Nevada Division of Environmental Protection.

Study Specific Objectives:

- Collect growth and catch rates through hook and line sampling and opportunistic angler contacts during spring and summer.
- Tag 2,000 hatchery raised wipers with color specific Floy tags.
- Concurrent to monitoring sport fish populations (gill netting and beach seining), assess wiper life history information including growth rates and life span.
- Use data collected through tagged fish returns to assess wiper life history information including growth rates and life span.

PROCEDURES

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 of fished; place of residence; and type of bait or lure used. Angler questionnaire data was derived from a survey mailed to 30,000 anglers purchasing a Nevada fishing license.

Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when on site. Lake level data was received from USGS gauge number 10312100 near the dam and clarity was measured directly using a Secchi disk. Secchi disk measurements were taken in May at three locations (near the dam, at mid-lake on the Churchill County basin, and in the “Narrows”).

Document dissolved oxygen and temperature when conducting veliger sampling. Temperature was recorded with each visit to the reservoir. Dissolved oxygen was not recorded during 2013 due to equipment malfunction; the D.O. probe of the Hydrolab was inoperative at the time.

Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates when on-site. Sampling was conducted through inspection of boat docks at Sportsman’s Marina and Silver Springs

boat launch. Buoys and rock structures were also inspected for adult quagga mussels by snorkeling during three occasions in spring and summer.

Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year. Veliger sampling was conducted on May 21 and September 10. Three stations have been established to sample for quagga mussel veligers. The first station was near the dam, the second was near mid-lake in the “Narrows,” and the third was near the Silver Springs boat launch, which was dry this year. Vertical tows were made from the hypolimnion to the surface and a minimum of 1,000 L of lake water was filtered through a 63- μ m mesh plankton net. Samples were taken on May 21 and September 10. The samples were preserved in 75% ethanol and were analyzed by Pisces Molecular and Eco Analysts.

Stock one million walleye fry and 5,000 juvenile wipers. A total of 285,000 walleye fry averaging 0.5 in were stocked on April 24. Fish were received from Gavin’s Point National Fish Hatchery in South Dakota. They were planted near Blackbird Point in Churchill County. Juvenile wipers were not stocked this year due to persistent drought conditions and resultant low water levels.

Monitor sport fish populations through gill netting four net nights in late spring/early summer. Locations of gill net sets were in L-Cove, Crappie Cove, Blackbird Point, and 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 3-lb weights. Nets were 120 ft long, 6 ft deep, and mesh sizes ranged from 0.5 to 2.5 in, which increased 0.5 in increments every 20 ft.

Assess YOY species composition and production through beach seining at least eight locations during late spring/early summer. Beach seining was not accomplished during 2013 due to rapidly receding reservoir levels. Muddy beaches made it difficult to walk and effectively collect a sample.

Collect sport fish for mercury monitoring in cooperation with Nevada Division of Environmental Protection. Fillets of Sacramento blackfish, wiper, walleye, crappie, channel catfish, smallmouth bass, white bass, and white catfish were sent to EPA lab in Richman, CA for analysis.

Collect growth and catch rates through hook and line sampling and opportunistic angler contacts during spring and summer. Persistent drought conditions and resultant low water levels have resulted in postponement of this study.

Tag 2,000 hatchery raised wipers with color specific Floy tags. Persistent drought conditions and resultant low water levels have resulted in postponement of this study.

Concurrent to monitoring sport fish populations (gill netting and beach seining), assess wiper life history information including growth rates and life span. Persistent drought conditions and resultant low water levels have resulted in postponement of this study.

Use data collected through tagged fish returns to assess wiper life history information including growth rates and life span. Persistent drought conditions and resultant low water levels have resulted in postponement of this study.

FINDINGS

Conduct a general fisheries assessment through opportunistic angler contacts and mail-in angler questionnaire data. Currently, Lahontan Reservoir holds the Nevada record for walleye (15 lbs 4 oz caught in 1998) and wiper (25 lbs 9 oz caught in 2009). In 2013, 23 anglers were contacted; catching 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 which represents an increase from 2010 - 2012. Angler catch rates in 2012 were 1.21 fish per hour and 2.07 fish per day. Angler catch rates in 2011 were 0.54 fish per hour and 1.21 fish per day. In 2010, catch rates were 0.26 fish per hour and 0.74 fish per day. Angler use in 2013 was similarly low to the previous 3 years and was likely due to low reservoir levels; however, catch rates were up in 2013, which was likely the result of concentrated fish populations near the dam due to extremely low water levels during summer and fall.

Angler use reported from the mail-in angler questionnaire was again low in 2012 (Table 1), which was likely due to low reservoir levels. Angler catch rate was up from 2011, but down substantially from the 6 year average of 7.94 fish per angler day.

Table 1

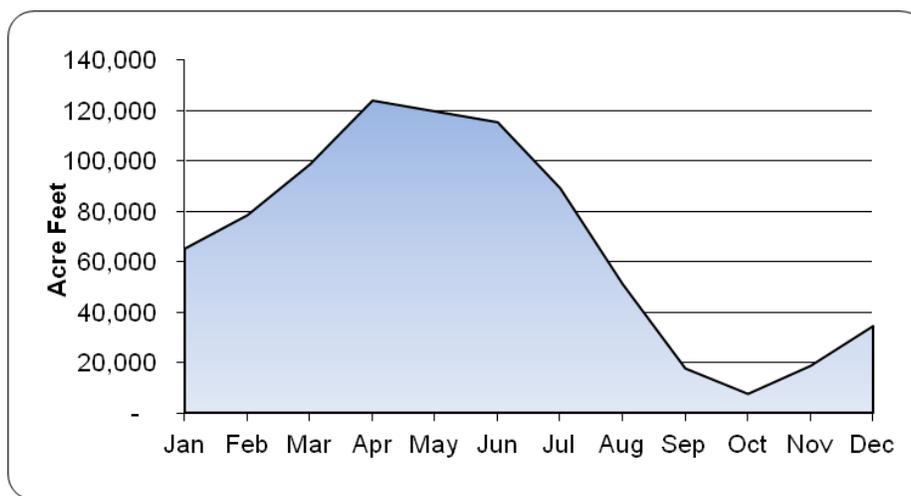
Historical, Mail-in, Angler Questionnaire Survey Summary

	2007	2008	2009	2010	2011	2012
No. Anglers	5,432	2,020	3,375	2,495	2,267	2,651
No. Days Fished	43,304	11,082	18,065	13,110	10,668	17,208
No. Fish Caught	260,005	66,960	46,804	28,845	19,208	35,494
No. Fish Per Angler Day	6.00	33.01	2.59	2.20	1.80	2.06
Average Storage	152,744	76,139	76,887	93,203	189,783	132,729

Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when on site. Figure 1 shows reservoir levels as measured by USGS gauge 10312100. Measurements reported here were taken from the first of each month.

Figure 1

Monthly Reservoir Storage (Acre-Ft)



Maximum capacity at Lahontan Reservoir is 319,000 acre-ft and, in 2013, the lowest storage was reported on September 16 at 3,920 acre-ft, or 1% of capacity (Table 2). From 2008 to 2010, and again during 2012 to 2013, the reservoir level fluctuated dramatically and dropped rapidly in the summer, which likely affected spawning, growth and survival of many fish species. During 2011, however, reservoir levels increased throughout the year and did not drop as dramatically in the fall. This was due to a late and wet spring and summer. Many of the sport fish species in Lahontan use inundated vegetation during spring and early summer as spawning habitat; additionally, it provides cover for their young during the summer. When reservoir levels are low and/or drop dramatically, this crucial habitat is not available, which has a detrimental impact on the fishery. The average monthly reservoir level during 2013 was 68,273 acre-ft (AF), which was similar to 2008 (76,139 AF) and 2009 (76,887 AF); however, the minimum storage level during 2013 was the lowest on record in the previous 80 years (prior to this date, July 21 1992 at 4,000 AF held this record). Maximum reservoir storage in 2013 was reached on April 7 (much sooner than usual) at 125,600 AF or 39% of capacity. At this level, much of the vegetation in bays, the river inlet, and sandy beaches was not inundated. Secchi depths were taken on May 20 and average visibility was 6.2 ft.

Document dissolved oxygen and temperature when conducting veliger sampling. Dissolved oxygen was not measured during 2013 due to equipment failure. Water temperature was measured at 3 ft below the surface on at least 10 days throughout the year and ranged from 64°F (May) to 71°F (September), which was suitable for warmwater fish species.

Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates when on-site. Physical inspection of boat docks, buoys, rocky substrates, and boats all came up negative for adult quagga and zebra mussels.

Table 2

Lahontan Reservoir
Annual Storage (acre-feet)

	2006	2007	2008	2009	2010	2011	2012	2013
Jan	221,277	159,900	91,200	39,530	27010	95,790	188,600	65,140
Feb	245,282	174,900	101,900	56,040	49600	117,200	201,600	78,410
Mar	274,233	205,600	110,300	74,830	71970	132,100	211,400	98,580
Apr	235,779	231,900	121,100	103,500	99800	176,100	216,800	123,900
May	301,658	233,400	106,200	107,400	115400	185,500	200,600	119,600
Jun	312,396	223,100	120,600	144,700	134000	202,500	184,500	115,300
Jul	272,916	182,500	108,900	155,900	180900	282,900	142,100	89,110
Aug	217,263	136,500	69,990	108,200	142700	292,200	97,040	51,010
Sep	172,965	92,600	30,040	66,010	95970	235,100	56,920	17,610
Oct	152,970	65,340	16,890	33,890	67900	194,900	33,990	7,530
Nov	152,302	59,460	11,540	18,670	66420	181,500	23,640	18,640
Dec	161,079	67,730	25,010	13,970	66760	181,600	35,560	34,450
Avg.	226,677	152,744	76,139	76,887	93,203	189,783	132,729	68,273

Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year. Plankton tows were conducted twice this year, low water levels during summer (less than 15 ft) made it difficult to get a vertical tow accomplished without inundating the equipment with mud. Results of NDOW and BOR sampling were shared at the annual Aquatic Invasive Species Task Force meeting. Preliminary results, sampling protocol, and an explanation of the potential positive results from previous BOR veliger sampling was presented by BOR during the 2012 annual meeting. In 2013, all NDOW and BOR veliger testing results were negative.

Stock one million walleye fry and 5,000 juvenile wipers. The fish were received from Gavin's Point National Fish Hatchery in South Dakota. A total of 285,000 walleye fry averaging 0.5 in was stocked on April 24 (Table 3). Four boxes each containing approximately 2 gal of water at a temperature of 61°F were tempered for a minimum of 30 min to reach a reservoir temperature of 64°F before releasing fry. Mortality was estimated at 5-20%. The fry were planted near Blackbird Point in Churchill County. Juvenile wipers were not purchased due to persistent drought and resultant low water levels.

Monitor sport fish populations through gill netting four net nights in late spring/early summer. Gill net data for 2013 is included in the gill netting history in Table 4. From 2005 to 2007, intensive gill net surveys resulted in an average of 376 net hours; however, in the years since that time, effort has been lessened. For the purpose of evaluation, the use of catch per unit effort (CPUE, in fish caught per hour) is used for comparison instead of total number caught to compensate for the inconsistency in total annual net hours.

Table 3

Lahontan Reservoir
Stocking History

Year	County	Date	Species	Source	Number	Size (in)
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
2008	Churchill	4/22/2008	Walleye	Gavins Point NFH	400,000	0.5
	Lyon	4/22/2008	Walleye	Gavins Point NFH	700,000	0.5

Table 4

Lahontan Reservoir
2005 - 2013 Gill Net Data

	White bass		Walleye		Crappie		Wiper		Sac. Blackfish		Net Hours
	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	
2013	6	0.06	5	0.05	21	0.21	13	0.13	7	0.07	99
2012	1	0.01	20	0.22	54	0.60	5	0.06	13	0.15	89.5
2011	0	0.00	9	0.09	14	0.14	0	0.00	1	0.01	99
2010	1	0.01	8	0.08	13	0.12	1	0.01	22	0.21	106
2009	0	0	4	0.05	43	0.52	1	0.01	19	0.23	83
2007	266	0.74	105	0.29	78	0.22	262	0.73	28	0.08	360
2006	892	2.19	211	0.52	58	0.14	320	0.78	0	0	408
2005	2	0.01	57	0.16	5	0.01	21	0.06	0	0	360

White bass numbers increased slightly from the past few years; however, their abundance continued to be extremely low compared to densities documented in 2006 and 2007. In Lahontan, white bass tend to exhibit large boom and bust cycles in population numbers. This is represented in Table 4 by the low CPUE of 0.01 during 2005, the 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 is highly successful due to the abundance of inundated vegetation, which provides protection to YOY white bass and results in increased survival.

Wipers were also caught at a slightly higher rate in 2013; however, all other species were caught at lower CPUE. Sacramento blackfish had an increase in CPUE to 0.15 during 2012 only to have it drop back to 0.07 in 2013. Crappie were caught at a rate of 0.21 fish per net hour during 2013, which decreased from 2012 but still similar to the 8 year CPUE average of 0.25. Walleye catch rate dropped to from 0.22 in 2012 to 0.05 CPUE in 2013.

There continues to be wild populations of sport fish in the reservoir despite the dramatic fluctuations and extreme low water level experienced over the past three years. Unfortunately, reservoir levels are forecasted (as of Feb 2014) to be extremely low during the summer of 2014 (4,000 AF) by mid July, therefore populations are not expected to rebound in the near future.

Assess YOY species composition and production through beach seining at least eight locations during late spring/early summer. Beach seining was not accomplished during 2013 due to rapidly receding water levels, which resulted in muddy conditions.

Collect sport fish for mercury monitoring in cooperation with Nevada Division of Environmental Protection. A health advisory, issued by the Nevada Division of Public and Behavioral Health, is in effect that recommends anglers consume no fish from the Carson River Basin below Dayton, including Lahontan Reservoir, due to mercury concentrations found in fish. Fish were analyzed for mercury in 2013; results are shown in Table 5. Similar to the 2012 results, 2013 mercury concentration in fish tissue was higher than average, which was likely due to high spring runoff experienced during 2011. During high runoff events, mercury is scoured from sediments above the high water line in the Carson River and transported to Lahontan Reservoir. Mercury becomes available for bacterial methylation in lake sediments and then benthic organisms take it up. It quickly works its way up the food chain and bioaccumulates in fish.

MANAGEMENT REVIEW

White crappie appear to be doing well, CPUE from gill net surveys and angler surveys were good. Between white and black crappie, white crappie make up approximately 90% of the catch annually. Walleye fry stocking augments natural reproduction in the reservoir and during extremely low water such as in 2008-2010 and 2012-2013, when natural reproduction was limited, it may prove beneficial.

No large walleye were caught during gill netting in 2013. During 2012, more than half (60%) of the walleye caught during gill netting surveys 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, during 2013, no walleye less than 10 in was caught suggesting reproduction and survival of juveniles may be limited during extremely low water years.

All wipers caught during gill netting were in the 7.5-10.1 in range suggesting that stocking 8 in fish during 2012 was successful; however, growth was slow during 2013.

Table 5

**Lahontan Reservoir
Hg Sampling 2013**

Species	Length mm	Weight grams	Mercury_Wet (mg/kg)	Species	Length mm	Weight grams	Mercury_Wet (mg/kg)
Sac. Blackfish	380	810	1.40	Crappie	203	120	1.40
Sac. Blackfish	381	820	2.00	Crappie	239	200	2.80
Sac. Blackfish	385	770	1.60	Crappie	296	380	3.20
Sac. Blackfish	304	440	0.85	Crappie	219	150	1.70
Average	363	710	1.46	Crappie	243	200	1.40
Wiper	247	225	2.20	Average	240	210	2.10
Wiper	251	225	2.70	White catfish	257	265	3.30
Wiper	238	210	2.50	White catfish	343	620	2.90
Wiper	233	200	3.00	White catfish	280	360	1.70
Wiper	253	240	3.00	Average	293	415	2.63
Average	244	220	2.68	Channel Catfish	368	620	2.60
Walleye	353	400	4.10	Channel Catfish	382	690	2.20
Walleye	368	405	4.10	Channel Catfish	433	900	4.00
Walleye	381	520	3.70	Average	394	737	2.93
Walleye	322	300	3.30	White Bass	234	200	2.30
Average	356	406	3.80	White Bass	247	205	3.40
Smallmouth Bass	225	130	2.00	White Bass	239	210	3.20
Average	225	130	2.00	Average	240	205	2.97

No large-scale mortality events were reported during 2013. It was evident that all fish populations benefitted from the above average reservoir levels during 2011; however, population survey results in 2012 and 2013 indicated that overall reproduction and survival of sport fish and forage fish was negatively affected during 2012-2013.

The Truckee Canal breached in 2008 and, after temporary repairs, the Army Corps of Engineers allowed for a maximum of 350 cfs to be diverted from the Truckee River to Lahontan Reservoir in 2009. Very limited flows occurred in 2010 and no flows were observed in 2011. Major reconstruction of portions of the canal was completed during 2012 and 350 cfs flow at Derby Dam has continued almost continuously since that time, although, by the time water reaches the reservoir, the actual flow is about 200 cfs due to evaporation and infiltration.

RECOMMENDATIONS

A study should be initiated to determine the effectiveness of current regulations on white bass and wipers as soon as it is determined that stocking is again a viable option. On several occasions during 2011 and 2012, anglers were found to be harvesting up to ten wipers per day, which is consistent with the current fishing regulations in effect at Lahontan Reservoir. Wipers do not reproduce and NDOW must augment them annually, and therefore this amount of harvest may not be sustainable. Wipers have also proven to grow to world class sizes in Lahontan Reservoir and, if favorable conditions exist, it will support a trophy fishery. Wipers should be stocked as

either fry or catchable-sized fish in order to avoid a gap in age and size class, which is likely to occur in the absence of augmentation.

General Management Objectives:

1. Conduct a general fisheries assessment through opportunistic angler contacts and mail-in, angler questionnaire data.
2. Conduct a general habitat assessment through visual observations of water quantity (lake level) and water quality (clarity) when on site.
3. Document dissolved oxygen and temperature when conducting veliger sampling.
4. Monitor for the presence of quagga mussels by conducting substrate sampling around boat docks and reservoir substrates when on-site.
5. Conduct quagga mussel veliger sampling through plankton tows at established transects at least three times per year.
6. Stock 1 million walleye fry and 5,000 10-in wipers.
7. Monitor sport fish populations through gill netting four net-nights in late spring/early summer.
8. Assess YOY species composition and production through beach seining at least eight locations during late spring/early summer.

Study Specific Objectives:

1. Collect growth rate and catch rates through hook-and-line sampling and opportunistic angler contacts during spring and summer.
2. Tag 2,000 hatchery raised wipers with color specific Floy tags.
3. Concurrent to monitoring sport fish populations (gill netting and beach seining); assess wiper life history information including growth rates and age class distribution.
4. Use data collected through tagged fish return to evaluate wiper population densities, survival, growth, age class distribution and other life history information.

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Western Region

Date: February 2014