

NEVADA DEPARTMENT OF WILDLIFE STATEWIDE FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORTS

F-20-53
2017

CHIMNEY RESERVOIR
WESTERN REGION



**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
JOB PROGRESS REPORT**

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

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

SUMMARY

The water level in Chimney Reservoir was the highest it has been since the mid-1980s and the boat ramp was accessible to launch boats throughout the year. Water went over the spillway for the first time in decades and water releases for irrigation occurred from April to October.

Chimney Reservoir is managed as a general warmwater fishery, but is a trophy warmwater fishery for wiper and tiger muskie. Tiger muskie was introduced into the reservoir in November 2015 and October 2017 and was stocked to control carp abundance. More intensive monitoring of the fisheries in Chimney Reservoir has occurred since 2015 in order to better analyze the effects of piscivorous fish species on forage fish species.

Fish monitoring occurred throughout the spring, summer, and fall using several survey methods. Electrofishing, gill netting, frame netting, and beach seining were the primary survey methods used to estimate trends in CPUE among species. Some species were weighed and measured in order to collect body condition information and stomach samples were obtained from a small number of walleye.

BACKGROUND

Chimney Reservoir is located on the Little Humboldt River and is fed by the North Fork Little Humboldt River and the South Fork Little Humboldt River. The reservoir was built in 1974 to provide water storage for downstream irrigation. When full, Chimney Reservoir covers 2,150 surface acres and stores 35,000 AF, with an average depth of 16 feet and a maximum depth of 55 feet.

Chimney Reservoir is managed as a general warmwater fishery and a warmwater trophy fishery. Currently walleye, wipers, crappie, channel catfish, largemouth bass, yellow perch, and tiger muskie are the warmwater gamefish present. In the early 1990's, trout were stocked, but did not become established. Both forks of the Little Humboldt River support Lahontan cutthroat trout in the headwaters, which contribute a very limited trout fishery in Chimney Reservoir.

OBJECTIVES

General Management Objectives

- Conduct a general fisheries assessment through opportunistic angler contacts and mail-in, angler questionnaire data.
- Analyze stream gauge data collected by the Department of Conservation and Natural Resources on the North and South Forks of the Little Humboldt rivers (above the reservoir) and Little Humboldt River (below the reservoir).
- Augment the fisheries with approximately 200,000 walleye fry, 2,000 channel catfish, and 2,000 wipers by utilizing source stock from other states as well as purchasing fish from approved commercial/government suppliers.
- Augment the largemouth bass population with 1,000 largemouth bass from a suitable nearby water.
- Monitor fish species abundance and body condition (relative weight) by conducting 2 net-nights of gill netting, 2 net-nights of frame netting, 5 electroshocking transects, and 3 beach seining transects.
- Conduct quagga mussel veliger sampling through plankton tows at established transects at least twice per year.
- Monitor for the presence of quagga mussels by conducting substrate sampling around boat docks and reservoir substrates when on-site.
- Collect at least 5 each of crappie, walleye and channel catfish during netting and electroshocking surveys for mercury level analysis by EPA.

Study Specific Objectives

- Collect stomach samples from wiper, walleye over 16 inches, and all sizes of tiger muskie. Hook-and-line sampling and beach seining will be the methods used to capture fish.
- Augment the tiger muskie population by stocking 1,000 purchased from an approved commercial supplier.

PROCEDURES

General Management Objectives

Conduct a general fisheries assessment through opportunistic angler contacts and mail-in angler questionnaire data. Mail-in, angler questionnaire data and angler success data for 2016 was summarized. No opportunistic angler contacts were made while conducting other work at Chimney Reservoir in 2017.

Analyze stream gauge data collected by the Department of Conservation and Natural Resources on the North and South Forks of the Little Humboldt Rivers (above the reservoir) and Little Humboldt River (below the reservoir). Nevada Division of Water Resources (NDWR) provided stream gauge data on water delivered to Chimney Reservoir in the South Fork Little Humboldt River and North Fork Little Humboldt River during 2017 along with reservoir capacity levels throughout 2017.

Augment the fisheries with approximately 200,000 walleye fry, 2,000 channel catfish, and 2,000 wipers by utilizing source stock from other states, as well as purchasing fish from approved commercial/government suppliers. Walleye fry and channel catfish were stocked in 2017.

Augment the largemouth bass population with 1,000 largemouth bass from a suitable nearby water. The largemouth bass population was not augmented in 2017.

Monitor population of fish species by conducting 2 net-nights of gill netting, 2 net-nights of frame netting, 5 electroshocking transects, and 3 beach seining transects. Monitoring fish species was completed by gill netting, frame netting, electroshocking, and beach seining throughout the year. Six frame net net-nights, 12 gill net net-nights, 4,000 seconds of electroshocking, and four 100 meter beach seining transects were completed to assess fish populations in 2017 (Table 1). Length and weight measurements were recorded in order to gather information on body condition.

Table 1. Monitoring Locations on Chimney Reservoir 2017.

Sample Number	Date	Sample Type	UTM (NAD 83)		Time		Soak Time/Shock time
			Easting	Northing	Set	Pulled	
1	11/2	Electroshock	-	-	-	-	4,000 seconds
2	8/6	Beach seine	485247	4582489	800	830	--
3	8/6	Beach seine	485342	4582749	830	900	--
4	8/6	Beach seine	485870	4583291	900	1000	--
5	8/6	Beach seine	486615	4583665	930	1000	--
6	5/23-5/25	Frame net	485921	4583306	200	1000	2 net-nights
7	5/23-5/25	Frame net	488459	4585166	225	945	2 net-nights
8	5/23-5/24	Frame net	486048	4582869	145	1200	1 net-night
9	5/23-5/24	Frame net	487340	4583671	1410	1230	1 net-night
10	5/23-5/25	Gill net	488865	4586803	1240	1030	2 net-nights
11	5/23-5/25	Gill net	485573	4583335	1300	915	2 net-nights
12	5/23-5/25	Gill net	486373	4583987	1220	930	2 net-nights
13	5/23-5/25	Gill net	485651	4583876	1100	900	2 net-nights
14	5/23-5/25	Gill net	486648	4587669	1200	830	2 net-nights
15	5/23-5/25	Gill net	484980	4582557	1050	1045	2 net-nights

Conduct quagga mussel veliger sampling through plankton tows at established transects at least twice per year. Veliger sampling did not occur in 2017.

Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates when on-site. Tactile monitoring for adult quagga mussel occurred around the dam and boat ramp areas when on-site.

Collect at least 5 each of crappie, walleye and channel catfish during netting and electroshocking surveys for mercury level analysis by EPA. Two walleye and five crappie were collected for mercury analysis and mailed to EPA in Richmond, CA.

Study Specific Objectives

Collect stomach samples from 25 wipers and 25 walleye in order to access the utilization of forage fish by wipers and walleye. Stomach samples were collected from a limited number of walleye and none was collected from wipers in 2017.

Augment tiger muskie population by stocking 1,000 tiger muskie purchased from an approved commercial supplier. Tiger muskies were stocked into Chimney Reservoir in 2017 to augment the existing population.

FINDINGS

General Management Objectives

Conduct a general fisheries assessment through opportunistic angler contacts and mail-in angler questionnaire data. No anglers were contacted while on-site conducting other fisheries work at Chimney Reservoir in 2017.

Mail-in questionnaire data for 2016 (the latest information available) at Chimney Reservoir estimated that 430 anglers fished 1,956 days to catch 351 fish. Anglers catch rates came to 0.81 fish per angler and 0.18 fish per day. The five-year averages were 1.42 fish per angler and 0.73 fish per day. Figures 1 and 2 summarize angler questionnaire data from the previous five years.

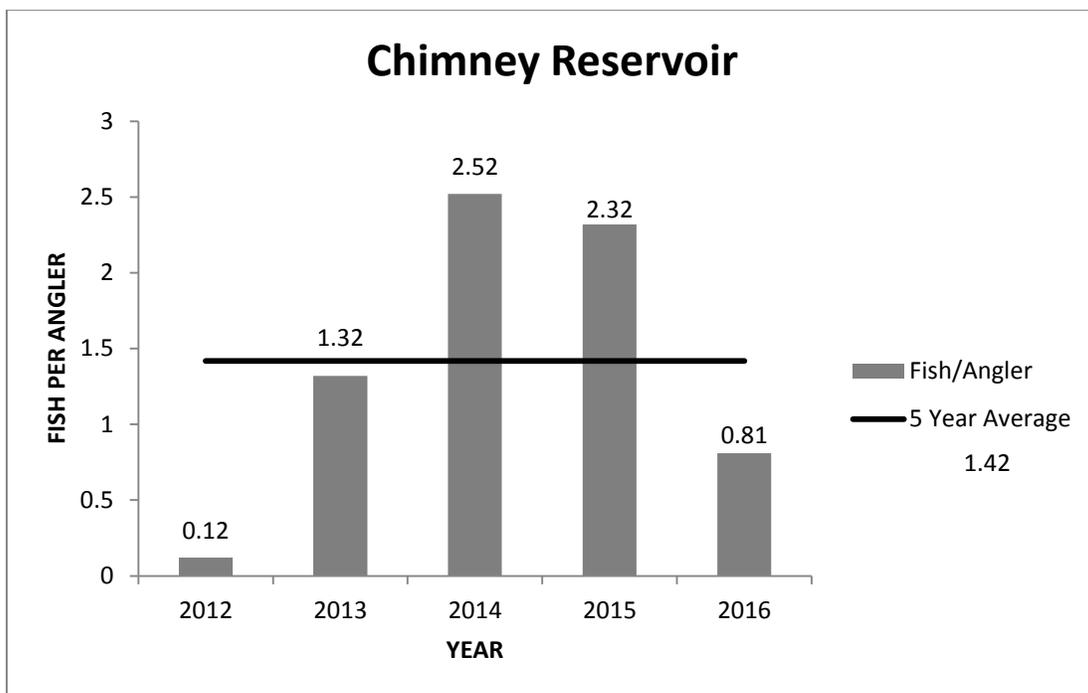


Figure 1. Chimney Reservoir Angler Questionnaire Fish/Angler, 2012-2016.

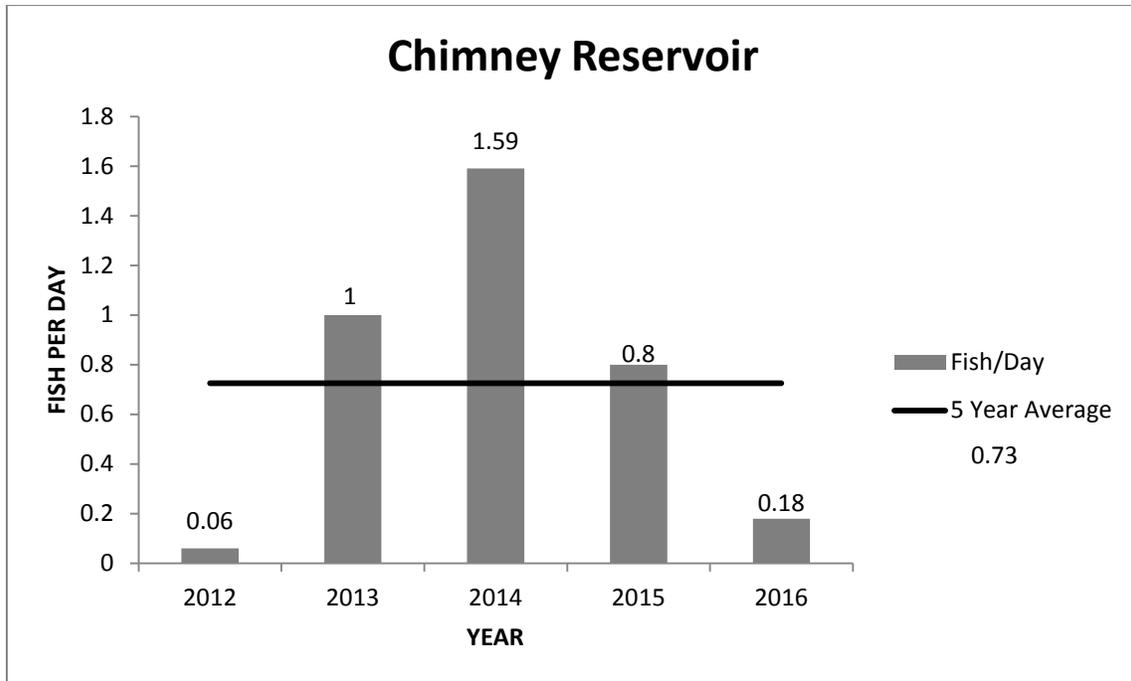


Figure 2. Chimney Reservoir Angler Questionnaire Fish/Day, 2012-2016.

During each site visit to Chimney Reservoir, a general habitat assessment was conducted at the reservoir, which included measuring water temperature, visually observing water level and water clarity, and assessing road conditions. Table 2 summarizes the information collected for 2017. Water clarity at Chimney Reservoir is typically poor and 2017 showed no exception. It was a good water year with the reservoir at capacity from April through June 2017 and relatively high during the rest of the year. There was no issue with anglers being able to access fishing areas due to road conditions.

Table 2. General Habitat Assessments at Knott Creek Reservoir 2017.

Date	Water Temperature (°F)	Water Level	Water Clarity	Road Conditions
4/26/2017	54	100%	3-4 feet visibility	Good
5/23/2017	64	100%	2-3 feet visibility	Good
8/6/2017	68	90%	< 1 foot visibility	Good
10/10/2017	51	85%	< 1 foot visibility	Good
10/26/2017	51	85%	< 1 foot visibility	Good
11/2/2017	49	80%	< 1 foot visibility	Good

Analyze stream gauge data collected by the Department of Conservation and Natural Resources on the North and South Forks of the Little Humboldt Rivers (above the reservoir) and Little Humboldt River (below the reservoir). Upstream flow data during the irrigation season (April to September) for the South Fork and North Fork Little Humboldt rivers was received from the Nevada Department of Conservation and Natural Recourses. Total discharge for both streams coming into

Chimney Reservoir during 2017 was 28,733 acre-ft. Figure 3 displays the historical annual water discharged into Chimney Reservoir.

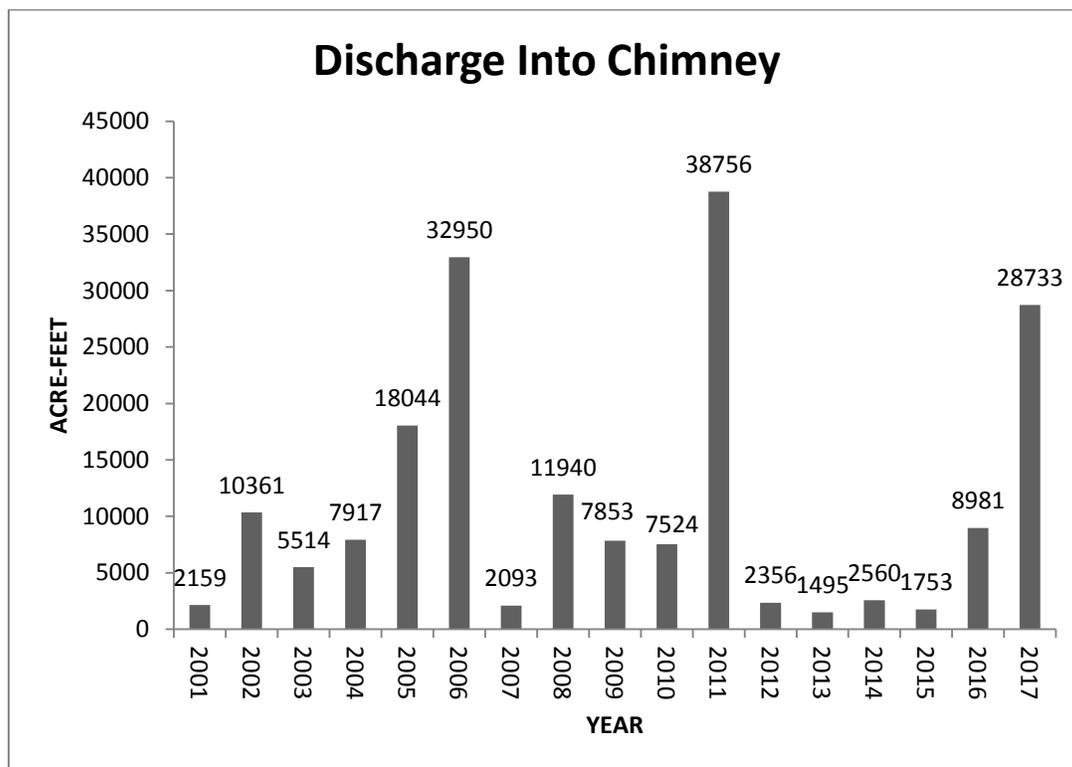


Figure 3. Annual Discharge of Water into Chimney Reservoir, 2001-2017.

During 2017, water storage was measured eleven times by Nevada Division of Water Resources. The maximum water stored occurred from April 11 through June 27, 2017 at 35,000 AF. Water was flowing over the spillway at Chimney Reservoir from April- June. Nearly 20,220 AF of water was release from Chimney Reservoir in 2017 for irrigation and stock water purposes.

Augment the population with approximately 200,000 walleye fry, 2,000 channel catfish, and 2,000 wipers by utilizing source stock from other states, as well as purchasing fish from approved commercial/government suppliers. Chimney Reservoir was stocked with 400,000 walleye fry, 2,000 channel catfish in 2017. Wipers were not stocked due to limited funding and a greater need for wiper stocking in other water bodies. Table 3 summarizes the five-year stocking history of Chimney Reservoir.

Augment the largemouth bass population with 1,000 largemouth bass from a suitable nearby water. The largemouth bass population was not augmented in 2017 due to mechanical issues with the electrofishing boat which prevented the collection of largemouth bass from a suitable nearby water.

Table 3. Five-Year Stocking History in Chimney Reservoir, 2013-2017.

Year	Species	Source	Number of Fish	Pounds of Fish	Average Size (inches)
2013	Walleye	Gavins Point NFH, SD	200,000	—	—
	Wiper	Colorado Catch	10,000	—	4
	Channel catfish	Colorado Catch	4,000	400	5
	Largemouth bass	Bilk Creek Reservoir	639	—	9.6
	White crappie	Willow Creek Reservoir	1,805	—	4.69
2014	Largemouth bass	Bilk Creek Reservoir	213	—	9.5
	White crappie	Willow Creek Reservoir	1,878	—	5.9
2015	Walleye	Gavins Point NFH, SD	500,000	—	—
	Tiger muskie	Oswald Fisheries	1,040	—	12.6
2016	Walleye	Gavins Point NFH, SD	400,000	—	—
	Wiper	Colorado Catch	1,671	191	7
2017	Walleye	Gavins Point NFH, SD	400,000	—	—
	Channel catfish	Colorado Catch	2,000	200	7
	Tiger muskie	Speas Hatchery, WYG&F	250	25	7.7

Monitor population of fish species and body condition (relative weight) by conducting 2 net-nights of gill netting, 2 net-nights of frame netting, 5 electrofishing transects, and 3 beach seining transects. Crappie, walleye, channel catfish, tiger muskie, yellow perch, carp, and Sacramento blackfish were caught during sampling in 2017. A total of 148 crappie were caught averaging 172 mm TL, nine walleye averaging 443 mm TL, nine channel catfish averaging 317 mm TL, two tiger muskie averaging 200 mm TL, eight yellow perch averaging 130 mm TL, and seven Sacramento blackfish averaging 122 mm TL. Surveys caught 172 carp, but none were measured or weighed. Results of gill netting, frame netting, beach seining, and electroshocking surveys are summarized in Table 4 and Figure 4.

When caught, walleye, channel catfish, and crappie were measured and weighed to assess body condition. Relative weight (W_r) is an index calculated as:

$$W_r = (W/W_s) * 100$$

Where W is the individual weight of a fish, W_s is the length-specific standard weight predicted from a weight-length regression developed to represent a species across a geographic range. The standard weight equation (W_s) used in this analysis was obtained from Blackwell et al. 2000. The relative weight index uses 100 as a benchmark for the standard body condition of fish. Measures over 100 are considered good condition and measures less than 100 are considered poorer condition with severity depending on the distance from the benchmark of 100 (Guy and Brown 2007).

The relative weight index for crappie ($n=75$) ranged from 72.2 to 207.7 with an average of 138.2, for channel catfish ($n= 8$) ranged from 84.4 to 157.8 and averaged 119.9, and walleye ($n=9$) ranged from 61.0 to 206.3 and averaged 113.9. These species appear to be healthy and making good use of forage.

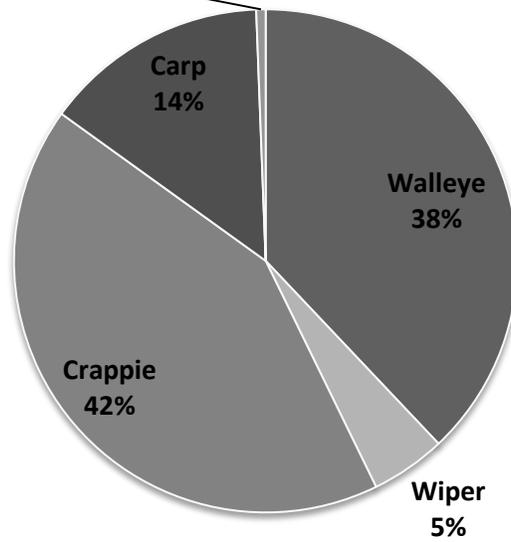
Table 4. Chimney Reservoir Results Based on Survey Method.

Survey Method		CPUE
<i>Electrofishing</i>		
	Tiger muskie	1.8 fish/hour
	Crappie	51.3 fish/hour
	Yellow perch	7.2 fish/hour
	Walleye	2.7 fish/hour
	Sacramento Blackfish	2.7 fish/hour
	Carp	66.6 fish/hour
	All fish	132.3 fish/hour
	Trophy sportfish*	1.8 fish/hour
	General warmwater sportfish**	61.2 fish/hour
<i>Gill nets</i>		
	Channel catfish	0.67 fish/net night
	Crappie	5.75 fish/net night
	Walleye	0.5 fish/net night
	Carp	6.75 fish/net night
	All fish	13.67 fish/net night
	Trophy sportfish*	0 fish/net night
	General warmwater sportfish**	6.92 fish/net night
<i>Frame nets</i>		
	Crappie	4.17 fish/net night
	Carp	1.83 fish/net night
	All fish	6 fish/net night
	Trophy sportfish*	0 fish/net night
	General warmwater sportfish**	4.1 fish/net night
<i>Beach seine</i>		
	Crappie	1 fish/100m
	Channel catfish	0.25 fish/100m
	Sacramento Blackfish	1 fish/100m
	Carp	1.5 fish/100m
	All fish	3.75 fish/100m
	Trophy sportfish*	0 fish/100m
	General warmwater sportfish**	1.25 fish/100 m

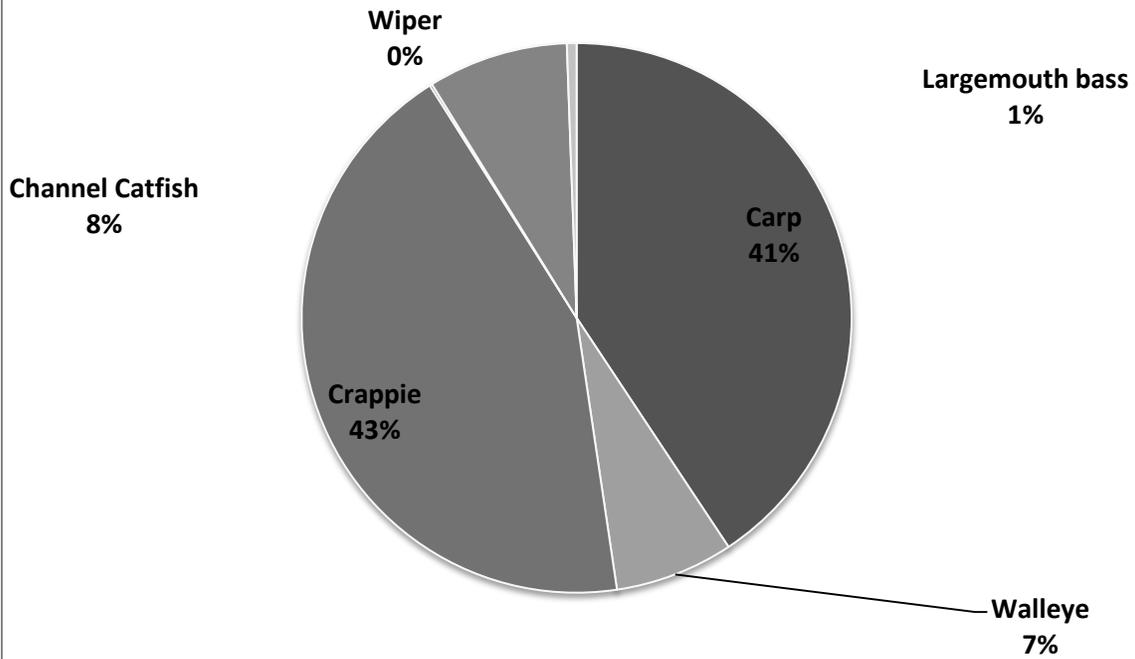
*Trophy sportfish = tiger muskie and wiper

** General warmwater sportfish = walleye, channel catfish, crappie, yellow perch, and largemouth bass

2014 Species Composition



2015 Species Composition



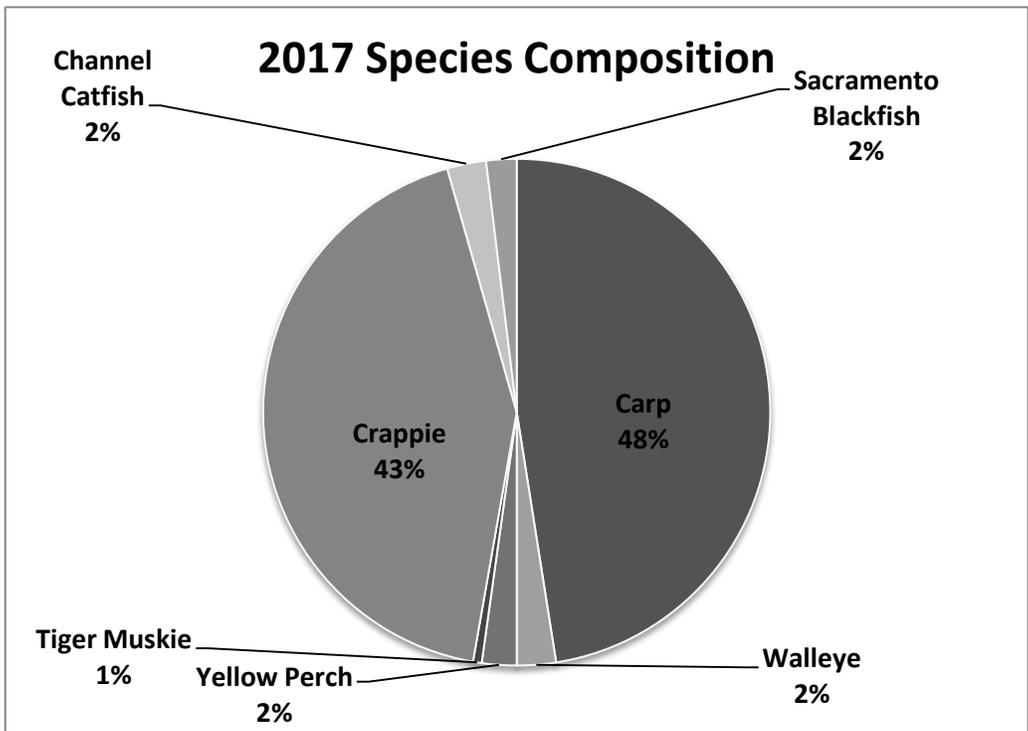
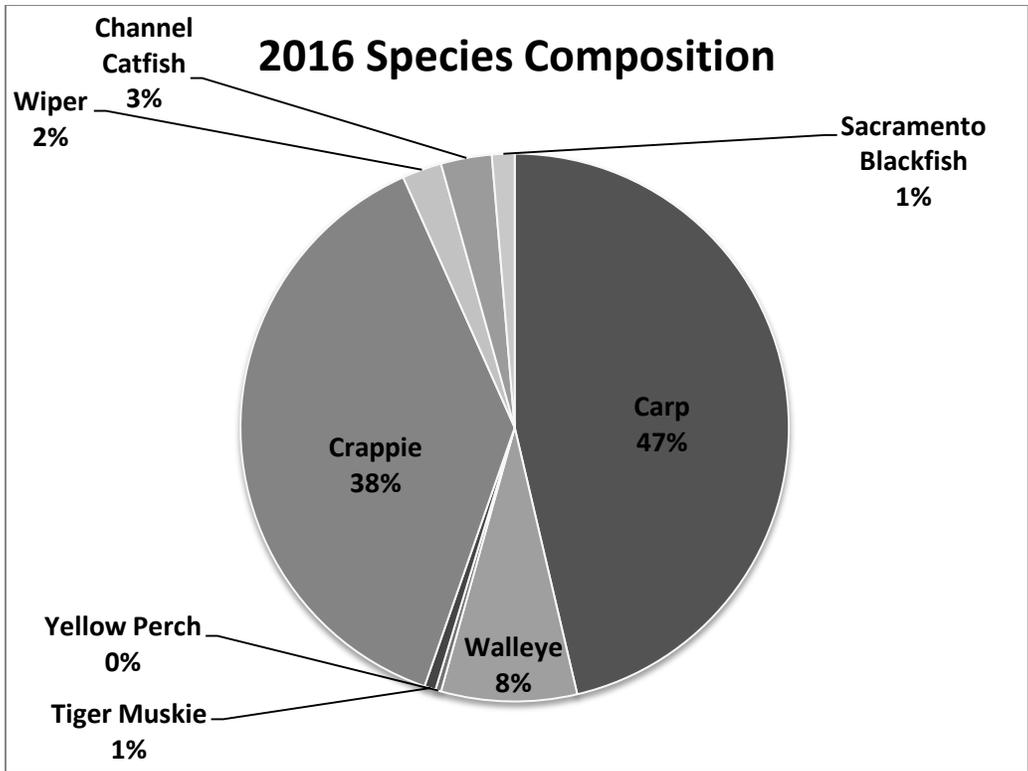


Figure 4. Fish Species Composition in Chimney Reservoir, 2014- 2017.

Conduct quagga mussel veliger sampling through plankton tows at established transects at least twice per year. Veliger sampling was not conducted due to high winds and poor sampling conditions when sampling was scheduled.

Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates when on-site. Tactile monitoring for adult quagga mussels occurred along the dam and boat ramp areas when on-site. All areas were negative for adult quagga mussels.

Collect at least 5 each of crappie, walleye and channel catfish during netting and electroshocking surveys for mercury level analysis by EPA. Chimney Reservoir has a health advisory issued by the Nevada Division of Public and Behavioral Health for the consumption of fish. It is recommended that no walleye be consumed and for any other species that no more the one 8-ounce meal per month be consumed. In 2017, two walleye and five crappie were collected and the average mercury level for walleye was 1.10 mg/kg and for crappie was 1.35 mg/kg. Results of mercury analysis are summarized in Table 5. Based on this new information, angler consumption for both crappie and walleye changes to a one 4-ounce meal per month.

Table 5. EPA Mercury Analysis Results for Walleye and Crappie 2017.

Species	Length (mm)	Weight (g)	Mercury (mg/kg)
Walleye	360.0	560.0	1.00
Walleye	360.0	510.0	1.20
Crappie	145.0		1.40
Crappie	150.0		1.30
Crappie	152.0		1.50
Crappie	155.0		1.30
Crappie	163.0		1.40

Study Specific Objectives

Collect stomach samples from 25 wipers and 25 walleye in order to access the utilization of forage fish by wipers and walleye. Stomach samples were collected from nine walleye in 2017. No wipers were caught that were large enough to obtain stomach samples. Stomach sample results are summarized in Table 6.

Table 6. Walleye Stomach Content - Chimney Reservoir, 2017.

Species	Total Length	Stomach Contents
Walleye	740	Empty
Walleye	510	Midges and unidentified fish parts
Walleye	160	Midges
Walleye	170	Empty
Walleye	580	Empty
Walleye	610	Unidentified fish bones
Walleye	500	Crappie
Walleye	360	Crappie
Walleye	360	Crappie

Augment tiger muskie population by stocking 1,000 tiger muskie purchased from an approved commercial supplier. Tiger muskie averaging 7.7 inches were stocked ($n=250$) into Chimney Reservoir on October 10 to augment the original population introduced in 2015. During the November 2, 2017 electroshocking survey, two tiger muskie were caught that had measured 200 mm in TL. Stomach samples were not obtained because of their small size and concerns for causing excess stress and possibly death.

GENERAL MANAGEMENT REVIEW

The above average snowpack in 2017 resulted in Chimney Reservoir filling to capacity and water flowing over the spillway for the first time since the 1980s. The huge influx of water caused fish to spread throughout the reservoir into areas that were not typically inundated. Monitoring surveys proved to be a challenge with the large amount of surface acres of water. No wipers or largemouth bass were found during the monitoring surveys and only two tiger muskie were caught during surveys. Since the introduction of tiger muskie, only four have been caught during sampling.

Angler success, which was measured as fish per day and fish per angler from the mail-in, angler questionnaire data was below the five-year average at Chimney Reservoir in 2016. In 2016, anglers caught 0.18 fish per day and 0.81 fish per angler. The five-year averages are 0.73 fish per day and 1.4 fish per angler. The 2015 angler questionnaire results were above this average, and indicated the fishery was rebounding from the 2011 chemical treatment. The current 2016 results did not meet the standards described in the General Warmwater Fishery Concept of 1.0 to 2.0 fish per day, and the five-year average did meet the standards either. Fish species representing a General Warmwater Fishery Concept showed that gill netting CPUE was 6.92 fish/net night (range of 0.9 to 15.7 fish per net night), which was consistent with other Nevada fisheries. Only two tiger muskie were captured in 2017 while electroshocking. With a small number of tiger muskie captured during the last two years, it is difficult to make an assessment on the tiger muskie population. In addition, no wipers were captured in 2017.

Crappie, walleye, and channel catfish were measured and weighed in order to collect information about body condition. For these species, the average relative weight indices were above the benchmark of 100, implicating fish in good body condition. Several factors influence relative weight such as time of year fish are sampled. Fish can be pre- or post-spawn or forage conditions may change throughout the year. This was the first year to assess body condition of fish in Chimney Reservoir and, over time, specific standard weights will be established for individual species. Increased sampling at various times of the year, therefore, is required.

Monitoring results for adult quagga mussels along the shoreline and boat ramp were negative in 2017. Ongoing monitoring and boater education should help prevent establishment of aquatic invasive species into Chimney Reservoir and the Little Humboldt River.

Five crappie were collected for mercury analysis and the average concentration was 1.35 mg/kg, which was significantly greater than the previous samples obtained in 2006 when they averaged 0.69 mg/kg. Additional crappie will be obtained in 2018 to continue to monitor the mercury levels in crappie from Chimney Reservoir.

Tiger muskie were introduced in November 2015 and augmented in 2017 in an effort to control the carp abundance. Monitoring results showed that carp were the most abundant fish species and represented 48 percent of the fishes sampled in 2017. Continued fish monitoring along with collection of stomach samples from tiger muskie will indicate if tiger muskie has an impact on the carp population in the reservoir. However, tiger muskie continues to be difficult to locate and catch during surveys. Only two tiger muskie were sampled in 2016 and two in 2017. These tiger muskie were sampled only a few months after they were stocked, so inferences on health and status of the population are difficult to make. Generally, water clarity in Chimney Reservoir is less than six inches, which could play a factor in the foraging efficiency of tiger muskie.

RECOMMENDATIONS

- Conduct a general fisheries assessment through opportunistic angler contacts and mail-in, angler questionnaire data.
- Analyze stream gauge data collected by the Department of Conservation and Natural Resources on the North and South Forks of the Little Humboldt rivers (above the reservoir) and Little Humboldt River (below the reservoir).
- Augment the fisheries with approximately 200,000 walleye fry or 2,000 catchable walleye, 2,000 channel catfish, 2,000 wipers, 1,000 yellow perch, 1,000 bluegill, 1,000 crappie, 1,000 largemouth bass, and 1,000 tiger muskie by utilizing source stock from other states, nearby in-state sources, as well as purchasing fish from approved commercial or government suppliers.
- Monitor populations of fish species and body condition (relative weight) by conducting 2 net-nights of gill netting, 2 net-nights of frame netting, 5 electroshocking transects, and 3 beach seining transects.
- Conduct quagga mussel veliger sampling through plankton tows at established transects at least twice per year.
- Monitor for the presence of quagga mussels by conducting tactile surveys around boat docks and reservoir substrates when on-site.
- Collect at least 5 crappie during netting and electroshocking surveys for mercury analysis by EPA.
- Augment the Sacramento blackfish population by stocking 2,000 adults.
- Collect stomach samples from walleye, wiper, and tiger muskie to assess forage fish utilization.

REFERENCES

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