NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE SPORT FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORT

F-20-53
2017

WILDHORSE RESERVOIR
EASTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL JOB PROGRESS REPORT

Table of Contents

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL JOB PROGRESS REPORT

List of Figures

List of Tables

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL JOB PROGRESS REPORT

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

SUMMARY

The 2017 water year saw above average amounts of winter and spring precipitation within the basin, helping ease the effects of the previous four years of drought. This resulted in Wildhorse Reservoir filling to over 100% of capacity (71,500 acre-ft storage) by April 9, 2017 and spilling through July 4, 2017. Discharge from the reservoir occurred from July 1 to October 1, with irrigation demands dropping the reservoir level to approximately 81.9% of capacity or 58,500 acre-ft of water storage by December 31.

Improved reservoir storage conditions during 2016 - 2017 allowed for 22 days of angler surveys, which contacted 105 anglers from January through December 2017. Anglers reported fishing 322 hours to catch 232 fish for annual average catch rates of 0.72 fish per hour and 2.21 fish per angler. The average harvest size for rainbow trout was 17.5 in total length (TL), bowcutt trout was 18.1 in TL, and wiper was 21.1 in TL. Overall, angler visitation and harvest increased compared to previous drought years and also expected due to the very wet winter and spilling of the reservoir.

A total of 180,921 trout (69,521 catchable size of >8.0 inch TL and 111,409 sub-catchable/fingerling of <8.0 in TL) were stocked into Wildhorse Reservoir over 24 days in 2017. This is a slight increase in total trout stocked to accommodate the full reservoir and the rebuilding of the quality trout fishery after the 2012 - 2015 drought. On June 8, 2017, approximately 10,000 6.0-inch channel catfish were stocked to augment the depleted catfish stocks.

Wildhorse Reservoir fish population surveys occurred on June 1 - 2, 2017 and consisted of spring gill netting to inventory species composition and trout carry over. Three gill nets were fished 40.5 hours overnight to capture 50 fish (39 rainbow trout, five smallmouth bass, one wiper, one channel catfish, and four bridgelip suckers) for a 92% game fish composition. The electroshocking survey was not conducted during fall 2017 due to equipment availability, but will be rescheduled during spring 2018.

Wildhorse Reservoir was sampled on June 20, July 10, July 30, and October 11 for quagga mussel detection. These samplings included vertical plankton net tows at four separate locations. Two samples were taken at each of the sample sites for the June and October samples that allowed for PCR and microscopy testing, with only one sample per site that occurred in July for microscopy. In total, 15 individual samples were sent out for analysis, all of which resulted in negative findings for quagga mussels.

BACKGROUND

Historically, Wildhorse Reservoir has been managed as a quality trout fishery. Since the mid-1940's the reservoir supported a valuable trout fishery renowned for good catch rates and harvest of quality sized-fish. The trout fishery is dependent upon hatchery stocking, as natural reproduction in the system is negligible. Over the last 24 years, Wildhorse Reservoir received an annual average of 96,000 catchable sized trout and 54,000 sub-catchable and fingerling sized trout.

Anglers at Wildhorse Reservoir fish an average of 26,000 days per year, making it one of the top 10-fished waters in the state of Nevada. Fluctuating reservoir water levels and nuisance non-game fish species are the two management challenges associated with this fishery. Natural succession towards non-game fish dominance prompted periodic chemical fish eradication as a management tool to restore desirable fish populations.

The last chemical treatment in Wildhorse Reservoir and several of the watershed drainage streams was in September 1988. Additionally, as a biological control of nuisance fishes, smallmouth bass were introduced into the reservoir in the fall of 1989, with an augmentation in July 1990. Channel catfish were first introduced in July 1993. Illegally introduced yellow perch was discovered in 1996 and rapidly established dominance in the reservoir. Because of the expanding yellow perch population, wipers (white bass x striped bass hybrid) were initially stocked in 2002 as a biological control mechanism. Uncontrolled population growth of undesirable fish species is one of the primary management challenges, along with variable reservoir water levels, both of which directly relate to the success of the trout fishery.

OBJECTIVES and APPROACHES

Objective: General Sport Fisheries Management

Approach:

- Conduct an evaluation of water quality/quantity and make recommendations for trout stocking levels consistent with available habitat.
- Purchase and stock 10,000 channel catfish.
- Survey the fisheries through summer electroshocking and gill netting four net nights in spring to determine species composition and baseline fishery data after four years of drought. Capture of smallmouth bass for possible augmentation into other regional fisheries as needed.
- Sample for the occurrence of quagga mussel veligers through plankton net tows conducted two to four times between June and September at up to three sites. Conduct visual and tactile surveys of artificial and natural solid substrates in conjunction with veliger sampling.

PROCEDURES

Angler surveys were scheduled periodically throughout the fishing season (January through November) to document angler harvest, success, and interest as it pertained to extended drought conditions and impacts on the fishery. Data collection included number of anglers, location, target species, and harvest. Harvest data included identifying species, measuring trout to fork length, collecting weights, identifying fin clips and marks, and assessing body condition. Data was compiled, analyzed, and incorporated into reports with management recommendations.

Three variable mesh gill nets were set in the early evening on June 1, 2017, fished overnight, and retrieved in the morning of the following day. Gill net locations were on the east side of Hendricks's Arm Cabin, Brown Cove in the canyon, and on the West Side Spring Cove. All fish species were targeted for capture. All captured fish were identified by species, counted and measured for length, and examined for identifying marks or tags. Captured trout were also weighed for body condition appraisal.

The electroshocking survey was not conducted during fall 2017 due to equipment availability and will be rescheduled during spring of 2018. No smallmouth bass were collected in 2017 for augmentation into other regional fisheries.

Wildhorse Reservoir was sampled on June 20, July 10, July 30, and October 11 for quagga mussel detection. These samplings included vertical plankton net tows at four separate locations. Two samples were taken at each of the sample sites for the June and October samples that allowed for Polymerase Chain Reaction (PCR) and microscopy testing, with only one sample per site occurring in July for microscopy. As water levels dropped in late summer, visual surveys of the exposed substrate produced no evidence of adult, attached invasive mussels. Due to isolated, positive results for quagga mussel and zebra mussel veligers in 2012 and 2014, and the potential impacts to the Columbia River system, Wildhorse Reservoir is currently listed as a Watch List Water, which requires continued and increased monitoring.

FINDINGS

Water Quality Monitoring

Figure 1 illustrates Wildhorse Reservoir's increased and maximum storage capacity for 2017. Improvements in both reservoir water quantity and quality is allowing for continued rebuilding of the popular fishery. The last year the reservoir achieved full capacity and spilled over the spillway was in 2011 (Figure 2). Wildhorse Reservoir was only down four vertical feet and sat at approximately 82% of capacity as of December 31, 2017. Monitoring of ice conditions in March and temperature patterns in April allowed for coordination with hatchery trout stocking by April 21, 2017 (Figure 3). Higher than usual amounts of filamentous green algae associated with nutrient loading during high spring runoff resulted in a minor fish kill (oxygen depletion/anoxic water column) in the canyon section of the reservoir in September 2017.

Figure 1.

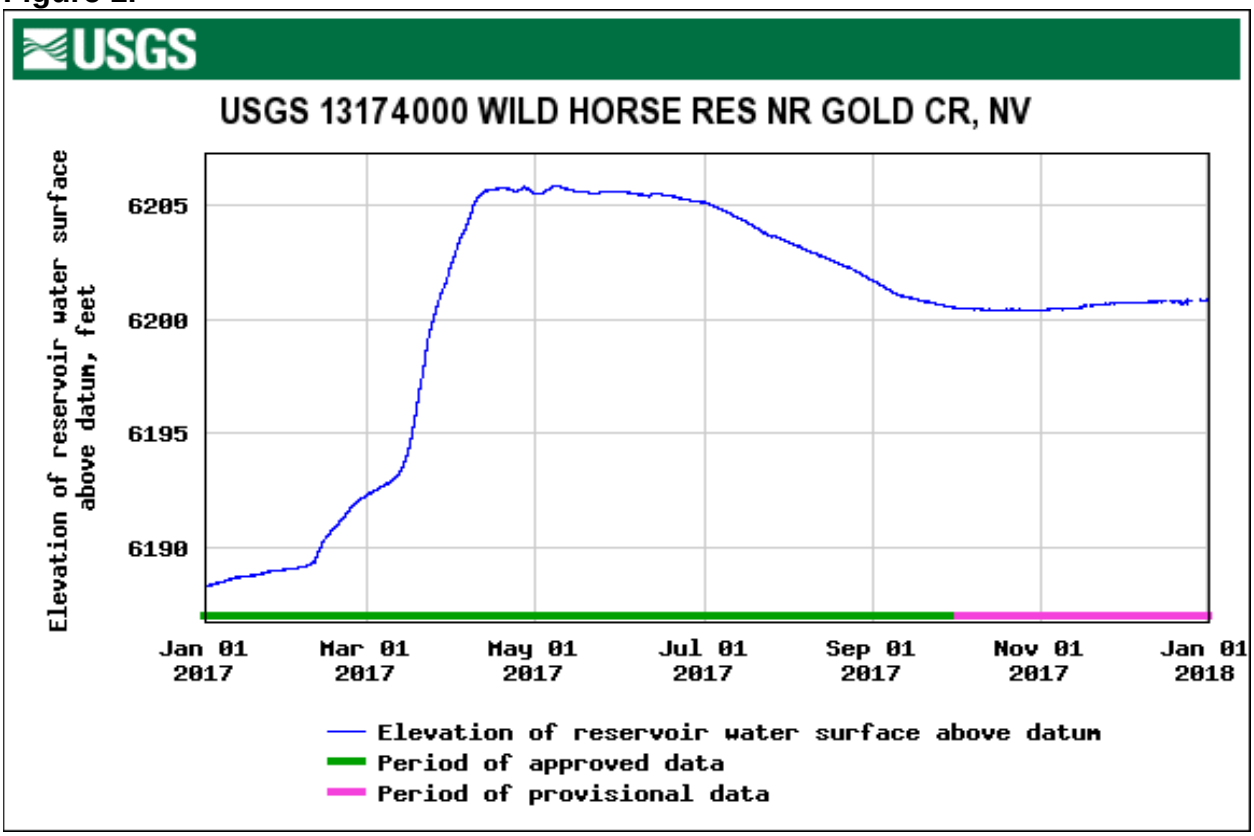
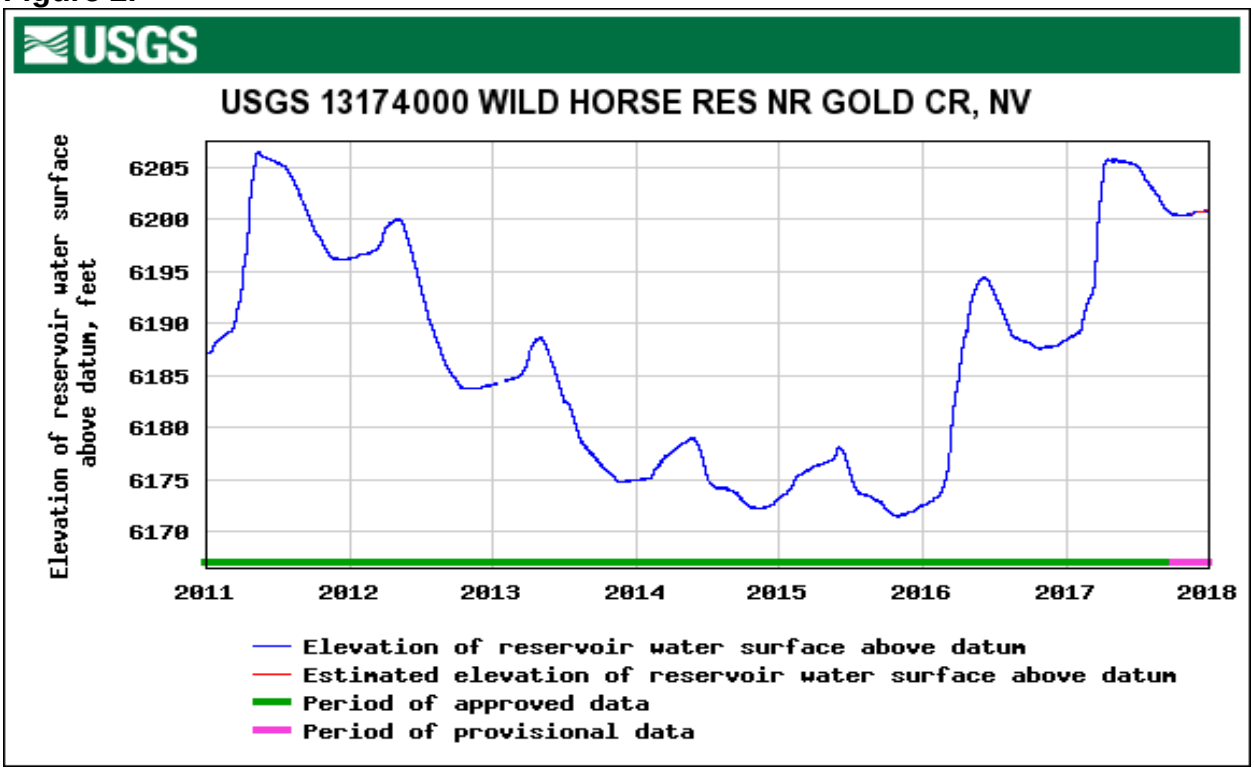


Figure 2.

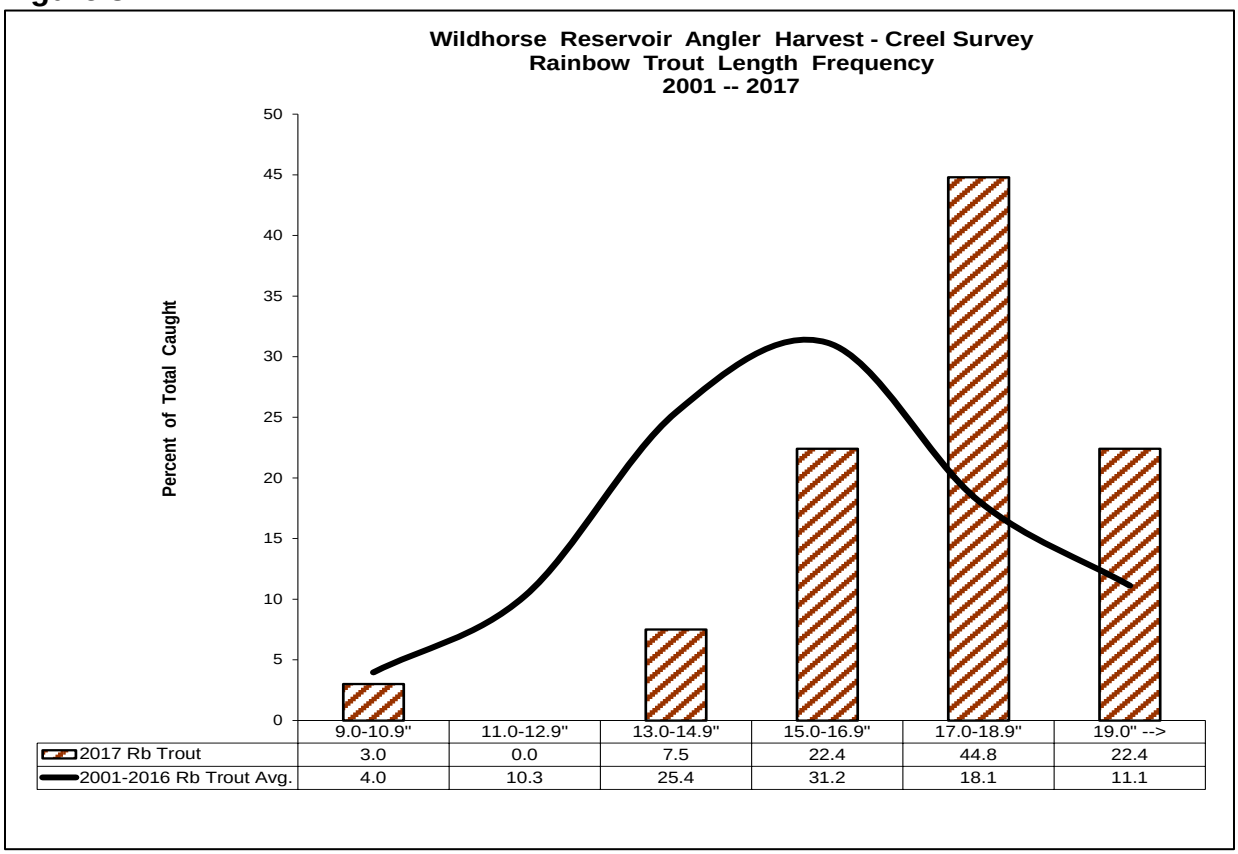


General Sport Fisheries Management

During 2017, 105 anglers were contacted while fishing at Wildhorse Reservoir during 22 days of roving angler surveys (Table 1). A total of 322 hours of fishing effort by 105 anglers were expended to catch a total 232 fish. Overall annual angler success was 0.72 fish per hour and 2.21 fish per angler, an improvement over last year, but still slightly below the long-term trend of 1.1 fish per hour and 3.0 fish per angler.

The average harvest size for 67 rainbow trout measured during the survey was 17.5 in TL. Figure 3 illustrates angler caught rainbow trout length frequency in 2017 compared to the cumulative 16-year average. Approximately 67.2% of the 67 rainbow trout sampled were greater than 17.0 in, significantly higher than the 29% for the 2001 through 2016 average (Figure 3). The majority (45%) of the rainbow trout sampled were 17 to 18.9 in TL, representing the fall 2015 and spring 2016 cohorts of stocked rainbow trout. Of the 67 rainbow trout measured during the survey, 51 were weighed for body condition analysis. Approximately 7.8% of the fish weighed were in poor condition, 17.6% in fair, 68.6% in good, and 5.9% in excellent body condition. Average weight was 2.2 pounds and 17.5 in TL, up from 2016 values. Three bowcutt trout with an average size of 18.1 in TL and one brown trout (20.0 in TL) were also documented in the angler surveys.

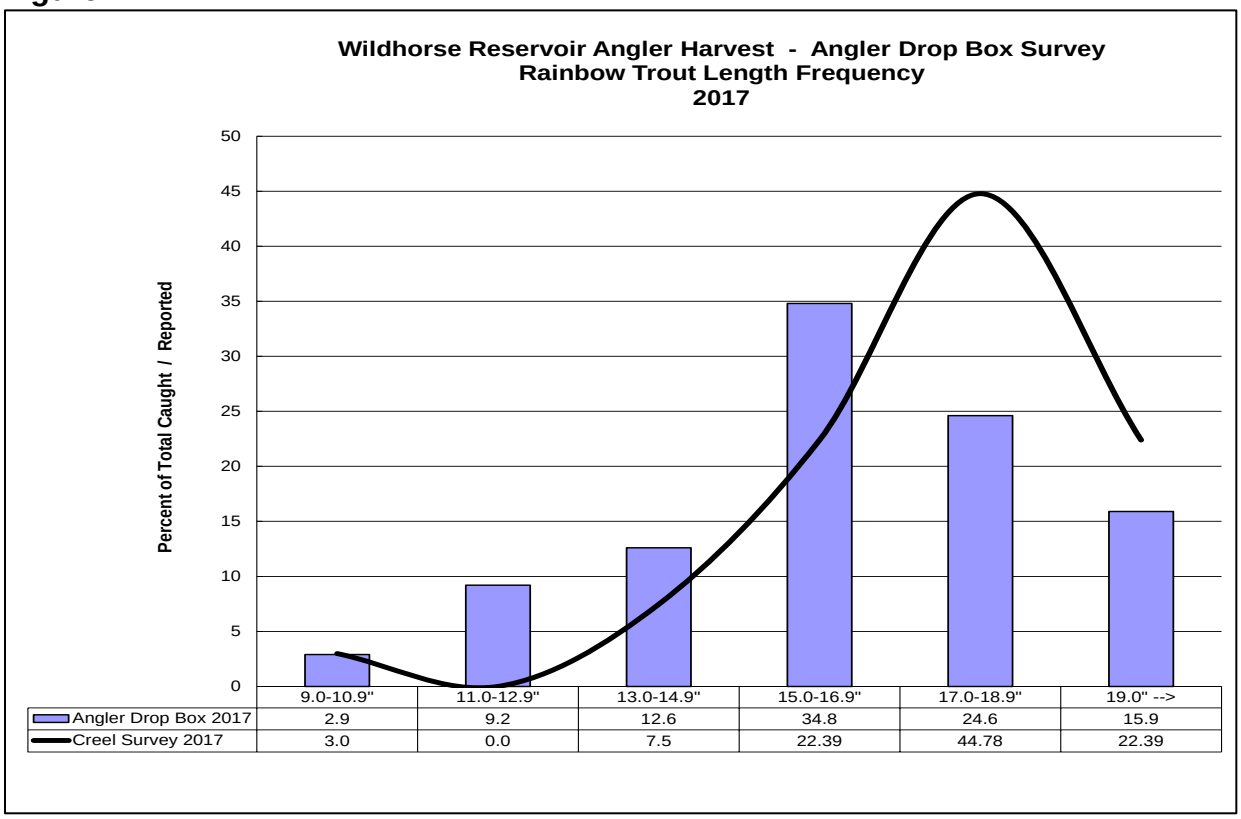
Figure 3.



	9.0-10.9"	11.0-12.9"	13.0-14.9"	15.0-16.9"	17.0-18.9"	19.0" -->
2017 Rb Trout	3.0	0.0	7.5	22.4	44.8	22.4
2001-2016 Rb Trout Avg.	4.0	10.3	25.4	31.2	18.1	11.1

The volunteer, angler drop-box survey was available to anglers the entire season, with limited surveys received in 2017. Thirty-eight surveys received from April through December averaged 1.3 fish per hour and 5.5 total fish per angler, significantly higher than the contact creel survey findings. In contrast, Figure 4 illustrates that volunteer angler surveys reported slightly smaller fish lengths compared to rainbow trout measured in the 2017 contact creel survey.

Figure 4.



Angler interest in fishing for warmwater fish (including black bass, wiper, and channel catfish) was low due to fishery rebuilding (see Table 1). Two wipers with an average size of 21.1 in TL were measured in May.

A total of 180,921 trout (69,521 catchable size >8.0 inches TL and 111,409 sub-catchable/fingerling <8.0 inches TL) were stocked into Wildhorse Reservoir over 24 days in 2017. This is a slight increase in total trout stocked to accommodate the full reservoir and rebuilding of the quality trout fishery after the 2012 - 2015 drought. Of the total, 18,260 5.3 in TL brown trout were stocked in July and 30,851 7.5 in TL cuttbow trout were stocked in October 2017 to augment depleted stock of these piscivorous trout species.

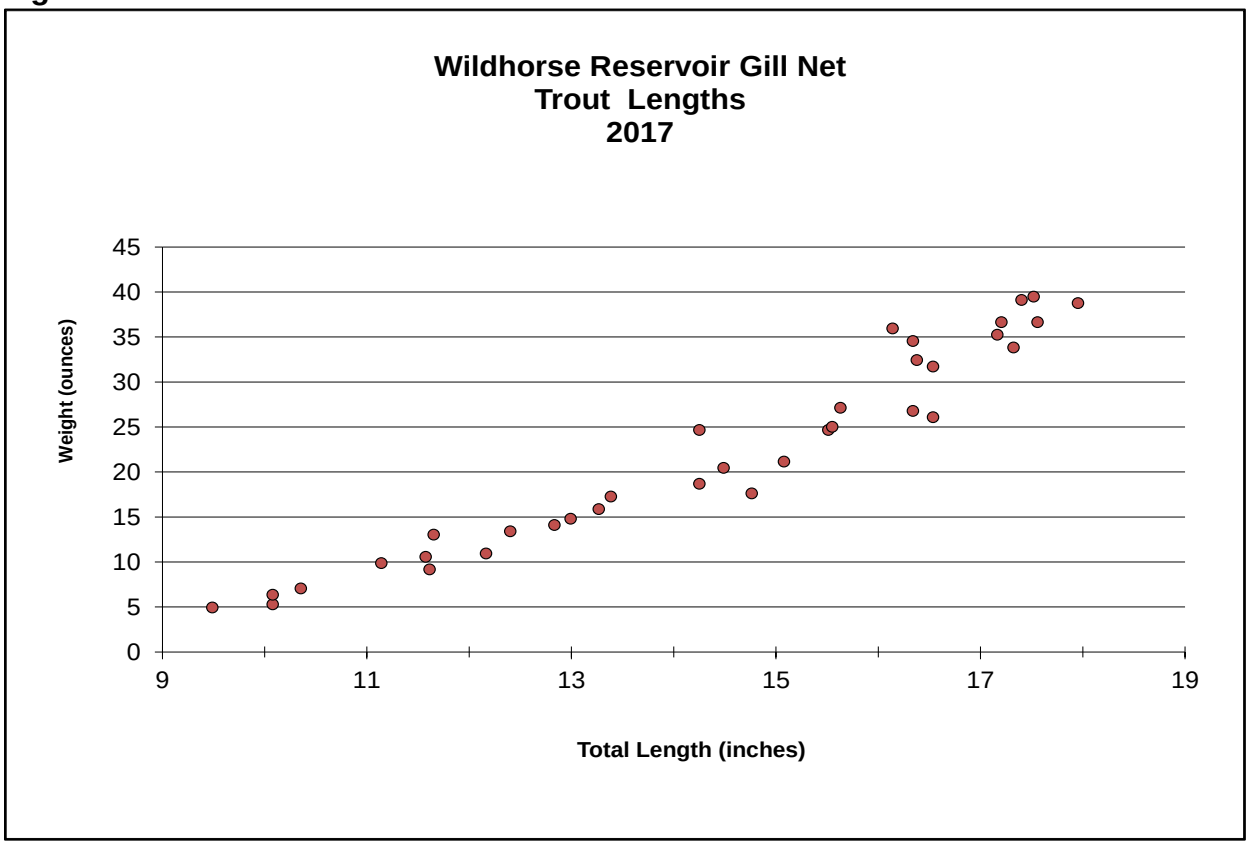
On June 8, 10,000 6.0-inch channel catfish were stocked into Wildhorse Reservoir in conjunction with other regional warmwater fish stocking. This is the first augmentation of channel catfish since 2012.

Population Monitoring

All three spring gill nets combined were fished 40.5 hours to capture 50 fish, with a species composition of rainbow trout 78.0%, smallmouth bass 10%, wiper 2%, channel catfish 2%, and bridgelip sucker 8%. The non-desirable fish species to game fish species ratio in this survey was 0.09**:**1 (4 non-desirable**:**46 game fish), or a percent ratio of 8:92.

The average size of the rainbow trout captured during the gill net survey was 14.6 inches total length (TL). The largest rainbow trout captured in the gill nets was 18.3 inches TL and was caught in the West Side Spring Cove set. The majority of the rainbow trout caught in the gill nets were carryover fish from the fall 2015 and spring 2016 stocking efforts (15 to 18 inches, Figure 5). Body condition analysis was conducted on 35 of the 39 rainbow trout, resulting in the rainbow trout averaging 22.3 ounces of body weight and an overall body condition rating of 4.24 (Good).

Figure 5.



The last six years of population surveys continue to illustrate a positive trend in both the percent and number ratio of the nongame/non-desirable species (tui chub, bridgelip sucker, and yellow perch) to the desired game fish (rainbow, bowcutt, brown, and tiger trout, smallmouth bass, wiper, and channel catfish). The 2017 gill net survey results of 0.09**:**1 (4 non-desirable**:**46 game fish) nongame/non-desirable fish to game fish ratio continue to exemplify the recovery of the rainbow trout fishery (Table 2).

Low reservoir water levels during 2012-2015 and use of biological control agents within the fishery are having the desired impact on the non-desirable fish community. However, significant reservoir water recharge from the above average winter precipitation during 2016 - 2017 has substantially improved the fishery habitat in Wildhorse Reservoir, which benefits all species and possibly increases nongame/non-desirable fish populations in the coming years.

No yellow perch or Lahontan tui chub were captured in 2017, with the only non-game/non-desirable fish of concern being the bridgelip sucker, whose numbers were consistent with historic surveys and do not pose a threat like the Lahontan tui chub or yellow perch. Minimum numbers of yellow perch young-of-year have been documented for the last eight years during electroshocking surveys, but have failed to carry forward in similar numbers or percentages to the next survey season, indicating continued predation on the younger age classes.

Quagga Mussel Surveys

Wildhorse Reservoir was first sampled on June 20, with all of those samples coming back positive for zebra mussels via the PCR testing. Table 4 shows all of the samples taken with the associated values representing the number of copies per sample, creating a proxy for mussel biomass. These results initiated additional sampling and again the reservoir was sampled on July 10 and July 30, which also included an additional sample site at the south end of the reservoir. These rounds of sampling resulted in four of eight samples coming back positive for zebra mussels. All of these sampling events included an equal number of samples that went for microscopy analysis (veliger detection), all of which came back as negative. By the end of July, the amount of algae in the reservoir was interfering with testing and sampling was suspended until the algae levels dropped. The final round of sampling occurred on October 11, which resulted in negative results for both PCR and microscopy analysis. As water levels dropped in late summer, visual surveys of the exposed substrate produced no evidence of invasive mussels.

Due to isolated, positive results for quagga mussels and zebra mussels in 2012 and 2014, and the potential impacts to the Columbia River system, Wildhorse Reservoir is currently listed as a Watch List Water, which requires continued and increased monitoring.

MANAGEMENT REVIEW

- Angler surveys were conducted throughout the 2017 fishing season with great results reported as the fishery rebuilds, and drought recovery has exceeded expectations, primarily from the high water events of 2016 - 2017.
- The gill netting surveys to monitor species composition was completed in the late spring. Limited population surveys revealed excellent success in reducing the non-game fish/non-desirable fish to game fish ratio and good carryover and growth of

stocked trout. The electroshocking survey to monitor for black bass and species composition will be completed in spring 2018.
- Channel catfish were stocked in June 2017.
- Quagga mussel surveys were completed and the samples were sent to labs for analysis.

RECOMMENDATIONS

- Continue angler surveys to develop an accurate assessment of angler use and harvest of all sport fish during fishery rebuilding and fishery potential.
- Conduct an electroshocking survey to assess age class distribution, body condition, and Relative Stock Density of the black bass population when relevant.
- Continue population sampling to monitor game fish/non-game fish ratios.
- Monitor the need for stocking piscivorous fish species in an effort to reduce non-game fish abundance. Continue channel catfish augmentation when necessary and monitoring/evaluation to provide added control of non-game fish and a diversified angling opportunity with trophy fish potential.
- Utilize adaptive management practices during severe climatic conditions to offset resource losses.

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Fisheries Biologist, Eastern Region

Date: February 2018

Table 1

WILDHORSE RESERVOIR

2017 Creel Census Angler Use and Harvest Summary

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	**Totals**
No. Days Checked	2	2	2	1	3	5	2	0	1	1	2	1	**22**
Avg. Water Temp.	Ice=13"	Ice=20"	Ice=25"	49	55	64	77			49	42	Ice=6"	**56.0**
No. Anglers Checked	0	3	0	0	22	42	26		0	6	6	0	**105**
No. of Hours Fished		6			62	135	84			12	23.0		**322**
Total Fish Caught		1			40	98	28			28	37		**232**
Total Fish Harvested		0			13	28	16			2	20		**79**
Rainbow Trout		0			9	27	16			2	19		**73**
Brown Trout		1			0	0	0			0	0		**1**
Bow-cutt Trout		0			2	0	0			0	1		**3**
Tiger Trout		0			0	1	0			0	0		**1**
Black Bass		0			0	0	0			0	0		**0**
Wiper		0			2	0	0			0	0		**2**
Channel Catfish		0			0	0	0			0	0		**0**
Yellow Perch		0			0	0	0			0	0		**0**
Average Measured Fish Harvest Size													
Rainbow Trout No.	0	0	0	0	7	32	11			2	15	0	**67**
Avg. Size (FL-inches)					14.6	17.3	18.3			18.8	18.6		**17.5**
Brown Trout No.		1	0	0	0	0	0			0	0	0	**1**
Avg. Size (FL-inches)		20											**20.0**
Bow-cutt Trout No.		0			2	0	0			0	1	0	**3**
Avg. Size (FL-inches)					13.7						27.0		**18.1**
Tiger Trout No.		0	0	0	0	1	0			0	0	0	**1**
Avg. Size (FL-inches)						14.9							**14.9**
Black Bass No.		0	0	0	0	0	0			0	0	0	**0**
Avg. Size (TL-inches)													
Wiper		0			2	0	0			0	0	0	**2**
Avg. Size (TL-inches)					21.1								**21.1**
Channel Catfish No.		0			0	0	0			0	0	0	**0**
Avg. Size (TL-inches)													
Yellow Perch No.		0	0	0	0	0	0			0	0	0	**0**
Avg. Size (TL-inches)													
Angler Catch Rate													
Fish / Hour		0.17			0.65	0.73	0.33			2.33	1.61		**0.72**
Fish / Angler		0.33			1.82	2.33	1.08			4.67	6.17		**2.21**

Table 2

Wildhorse Reservoir
Population Sampling Catch Record
2017

	Net/Sample #	#1-3	Electrofish		
	Date:	6/2/2017	*No Survey*		
SPECIES				**TOTALS**	% of Species Composition
Rainbow Trout	Number of Fish Sampled	39		***39***	**78.0**
	Avg. Size (Inches-FL)	14.6		***14.6***	
Bow-Cutt Trout	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-FL)			***#DIV/0!***	
Brown Trout	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-FL)			***#DIV/0!***	
Tiger Trout	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-FL)			***#DIV/0!***	
Largemouth Bass	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-TL)				
Smallmouth Bass	Number of Fish Sampled	5		***5***	**10.0**
	Avg. Size (Inches-TL)	11.3		***11.3***	
Wiper	Number of Fish Sampled	1		***1***	**2.0**
	Avg. Size (Inches-TL)	22.8		***22.8***	
Channel Catfish	Number of Fish Sampled	1		***1***	**2.0**
	Avg. Size (Inches-TL)	27.2		***27.2***	
Yellow Perch	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-TL)			***#DIV/0!***	
Tui Chub	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-TL)				
Red Side Shiner	Number of Fish Sampled	0		***0***	**0.0**
	Avg. Size (Inches-TL)			***#DIV/0!***	
Bridgelip Sucker	Number of Fish Sampled	4		***4***	**8.0**
	Avg. Size (Inches-TL)	7.7		***7.7***	
	TOTAL FISH	50	0	***50***	
	Hours Sampled	40.5		***40.5***	
	% Non-desirable Fish	8.0		***8.0***	
	Fish / Net-Shocking Hour	1.23		***1.2***	
	Reservoir Water Temp. °F	60.5			
	** Wildhorse Res. Storage Capacity at time of survey (Approx. % Acre-Feet)	103%			

Gill Net & Electrofishing Survey Locations:

1. Mouth of Brown Cove. Experimental Mesh gill net, 150 feet long.
2. Warm Springs Cove, West Side, Experimental Mesh gill net, 150 feet long.
3. Hendrick's Arm, across from cabin, Northeast side. Experimental Mesh gill net, 150 feet long.
4. Electrofish -- **Spring 2018**

** Wildhorse Reservoir 100% of Capacity = 71,500 Acre-Feet of Storage (Source: nrcs.usda.gov/data/water/basin_reports/nevada/)

Table 3

Wildhorse Reservoir Fish Stocking

2017

Date	# of Fish Stocked	Pounds	Avg. Size (in.)	Species	Fish / Pound	Strain	Stocking Location	Water Temp.	Tank Temp.
April 21, 2017	8,680	2,000	8.3	Rainbow	4.3	Eagle Lake	St. Park Boat Launch	47	51
April 24, 2017	6,180	2,000	9.3	Rainbow	3.1	Eagle Lake	St. Park Boat Launch	46	51
April 25, 2017	7,720	2,000	8.7	Rainbow	3.9	Eagle Lake	St. Park Boat Launch	46	53
April 25, 2017	7,720	2,000	8.7	Rainbow	3.9	Eagle Lake	St. Park Boat Launch	46	51
April 27, 2015	1,564	1,700	14.0	Rainbow	0.9	Eagle Lake	St. Park Boat Launch	47	51
May 1, 2017	1,564	1,700	14.0	Rainbow	0.9	Eagle Lake	St. Park Boat Launch	47	51
May 2, 2017	1,564	1,700	14.0	Rainbow	0.9	Eagle Lake	St. Park Boat Launch	52	51
May 3, 2017	1,288	1,400	14.0	Rainbow	0.9	Eagle Lake	St. Park Boat Launch	54	51
May 16, 2017	7,000	2,000	8.9	Rainbow	3.5	Eagle Lake	St. Park Boat Launch	55	53
May 31, 2017	3,630	1,000	8.8	Rainbow	3.6	Eagle Lake	St. Park Boat Launch	63	52
May 31, 2017	2,712	850	9.2	Rainbow	3.2	Eagle Lake	St. Park Boat Launch	63	52
June 8, 2017	10,000	750	5.5	Ch. Catfish	13.3	Arkansas/CO	St. Park Boat Launch		
June 21, 2017	6,600	2,000	8.0	Rainbow	3.3	Eagle Lake	Sho-Pai Launch	70	53
June 23, 2017	9,872	1,600	7.5	Rainbow	6.2	Marlette / Tahoe	St. Park Boat Launch	67	53
June 28, 2017	1,888	320	7.5	Rainbow	5.9	Marlette / Tahoe	St. Park Boat Launch	72	53
July 7, 2017	18,260	1,100	5.3	Brown	16.6	Sheep Creek	St. Park Boat Launch	74	53
October 3, 2017	10,675	1,750	7.4	Cuttbow	6.1	Marlette / Tahoe	St. Park Boat Launch	54	52
October 4, 2017	9,536	1,600	7.5	Cuttbow	6.0	Marlette / Tahoe	St. Park Boat Launch	50	51
October 12, 2017	10,640	2,000	7.8	Cuttbow	5.3	Marlette / Tahoe	St. Park Boat Launch	48	52
October 13, 2017	10,380	2,000	6.0	Rainbow	5.2	Tahoe	St. Park Boat Launch	52	53
October 13, 2017	10,215	2,000	6.0	Rainbow	5.2	Tahoe	St. Park Boat Launch	50	51
October 18, 2017	20,234	679	4.4	Rainbow	30.0	Eagle Lake	St. Park Boat Launch	53	52
October 18, 2017	8,760	2,000	8.3	Rainbow	4.4	Tahoe	St. Park Boat Launch	53	52
October 19, 2017	9,709	1,900	7.9	Rainbow	5.1	Tahoe	St. Park Boat Launch	51	52
October 25, 2017	4,530	1,000	8.2	Rainbow	4.5	Kamloop	St. Park Boat Launch	50	52
Total Catchable Trout (>8.0 inch):	**69,521**	**23,350**	*x= 3.0 fish/lb.*				Avg. Water Temp. =	54.6	51.9
Total Sub-catchables Trout (4.0-7.9 inch):	**111,409**	**14,949**	*x= 7.5 fish/lb.*						
Total Fingerling Trout (< 3.9 inch):	**0**	**0**							
Total Warm Water Fish:	**10,000**	**750**							
TOTALS	***190,921***	***39,049***							

2017 Totals = 123 % of average number of fish stocked over the last 23 years (x= 155,002 fish stocked/year)

Brown Trout = 18,260 Sub-catchables

Tiger Trout = 0 Catchable

Cuttbows = 30,851 fish in 2017, split equal numbers with South Fork Reservoir

Table 4. 2017 Quagga Mussel Sampling Results.

Date	Boat Ramp	Canyon	Sho Pia	South End
20-Jun	5300	1470	4960	
10-Jul	0	0	0	813
30-Jul	0	560	3310	52.3
11-Oct	0	0	0	0