NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE SPORT FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORT

F-20-52
2016

WILDHORSE RESERVOIR
EASTERN REGION

NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION
ANNUAL JOB PROGRESS REPORT

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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, 2016 through December 31, 2016*

SUMMARY

The 2016 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 61% of capacity (43,360 acre-ft storage) by June 1. Discharge from the reservoir occurred from June 9 to October 29, with irrigation demands dropping the reservoir level to approximately 44.5% capacity or 31,800 acre-ft of water storage by December 31.

Drought relief through improved reservoir storage conditions allowed for 11 days of angler surveys, which contacted 53 anglers from January through December. Anglers reported fishing 128 hours to catch 67 fish for annual average catch rates of 0.53 fish per hour and 1.26 fish per angler. The average harvest size for rainbow trout was 14.9 in total length (TL), bowcutt trout was 21.8 in TL, and channel catfish was 31.0 in TL. Overall, angler visitation and harvest was low compared to historic levels but expected due to the climatic limits affecting the Wildhorse Reservoir fishery from 2012 to 2015.

A total of 123,841 trout of various size classes were stocked into Wildhorse over 17 days in 2016. No warmwater fish (channel catfish or wipers) were stocked in 2016 due to budget constraints and decreased abundances of non-game/non-desirable prey species (Lahontan tui chub and yellow perch).

Wildhorse Reservoir population surveys consisting of gill netting and electrofishing to inventory species composition occurred on June 6 and September 26, 2016. Three gill nets were fished 40 hours overnight to capture 26 fish (12 trout, 12 wipers, and 2 bridgelip suckers) for a 92% gamefish composition. A total of 124 fish, consisting of 39 trout, 49 smallmouth bass, three channel catfish, 16 suckers, 12 redside shiners, and five yellow perch were captured, yielding a fish composition of 73.4% gamefish to 26.6% non-game/non-desirable fish. Combining both surveys resulted in 150 fish captured (CPUE of 3.7) and a population composition of 77% gamefish to 23% non-game/non-desirable.

Wildhorse Reservoir was sampled on June 29, July 26, and October 12 for quagga mussel detection. These samplings included vertical plankton net tows at three 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 occurring in July for Microscopy. In total, 15 individual samples were

sent out for analysis, of which all resulted in negative findings.

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 size-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 27,000 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, and is directly related 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 fishery through summer electrofishing and gill net 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 regional fisheries as needed.
- Sample for 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 (May through October) 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 6, 2016, fished overnight, and retrieved in the morning of the following day. Gill net locations were in the east side of Hendrick's Arm cabin, Brown Cove in the canyon and Trophy Cove on the northeast shoreline below the BLM campground. All fish species were targeted for capture. All captured fish were identified to 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 conducted during the nighttime hours of 1915 to 2215 on September 26, 2016. The twin anode Coffelt/Clark electroshocking barge with two bow netters was used. The electroshocking survey was conducted at the southwest side of the reservoir by the State Park Island to the west shoreline and at the mouth of the canyon down to Brown Cove. All fish contacted were targeted for capture. Captured fish were identified by species and counted. Electroshocker settings and other relevant information during this inventory are listed in the following:

September 26, 2016 Electroshocking Survey

Pulse - DC	**Pulse Width(millisec)** – 5	**Time** – 1915 - 2215
Volts – 850	**Pulse Freq.(per sec)** – 60	**Water Condition** –algae moderate, reservoir at Avg. capacity (~ 44%)
Output (amps) -5-6	**Shocking Time (sec)** – 3,221 seconds = (54 mins.)	**Water Temp (°F)** – 58

Wildhorse Reservoir was sampled for quagga mussels on June 29, July 26, and October 12. These samplings included vertical plankton net tows at three 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

Figures 1 and 2 illustrate Wildhorse Reservoir's increased storage capacity for 2016. Improvements in reservoir water quantity and quality is allowing for rebuilding of the popular fishery. The last year the reservoir achieved full capacity and spilled over the spillway was 2011. Wildhorse Reservoir was down 14 vertical feet and sat at approximately 45% of capacity as of December 31, 2016.

General Sport Fisheries Management

During 2016, 53 anglers were contacted at Wildhorse Reservoir during 11 days of roving angler surveys (Table 1). A total of 128 hours of fishing effort by 53 anglers was expended to catch 67 fish. Overall, angler success was 0.53 fish per hour and 1.26 fish per angler, an improvement over previous years, but well below the long-term trend of 1.1 fish per hour and 3.0 fish per angler.

The average harvest size for 29 rainbow trout measured was 14.9 in FL. Figure 3 illustrates angler caught rainbow trout length frequency compared to the cumulative 15-year average. Approximately 24.2% of the 2016 rainbow trout sampled were greater than 17.0 in, slightly lower than the 30% for the 2001 through 2015 average. The majority of the rainbow trout sampled were 13.0 to 16.9 in TL, representative of the fall 2015 and spring 2016 cohorts of stocked rainbow trout.

Angler interest in fishing for warmwater fish (including black bass, wiper, and channel catfish) was low due to fishery rebuilding (see Table 1). Two channel catfish with an average size of 31.0 in TL were measured in June.

The volunteer, angler drop-box survey was available to anglers the entire season, with limited and reduced surveys received in 2016. Twenty-one surveys received from May through November averaged 0.8 fish per hour and 3.8 total fish per angler, significantly higher than the creel survey findings. Figure 4 illustrates that anglers reported slightly smaller fish lengths compared to rainbow trout measured in the 2016 contact creel survey.

A total of 123,841 rainbow trout of various size classes were stocked into Wildhorse Reservoir over 17 days in 2016. No warmwater fish (channel catfish and wipers) were stocked in 2016 due to budget constraints and decreased abundances of non-game/non-desirable prey species (Lahontan tui chub and yellow perch).

Population Monitoring

All three spring gill nets combined were fished 40 hours to capture 26 fish, with a species composition of wiper 46.2%, rainbow trout 42.4%, bowcutt trout 3.9%, and

bridgelip sucker 6.9%. The non-desirable fish species to game fish species ratio in this survey was 0.08:1 (2 non-desirable:24 game fish), or a percent ratio of 8:92.

The average size of the rainbow trout captured during the gill netting survey was 11.9 in TL. The largest rainbow trout captured in the gill nets was only 14.8-inch TL and was caught in the Trophy Cove set. The majority of the rainbow trout caught in the gill nets were carryover fish from the fall 2015 through spring 2016 stocking efforts (10 to 13 inches). No marked fish from the May 2011 stocking effort of Bel-Air strain rainbow trout were captured during this survey. The one bowcutt trout captured was 26.6 in TL. Twelve wipers were captured in the gill net and angling survey and they had an average length of 20.2 in TL.

The September 26, 2016 electrofishing survey captured a total of 124 fish, with a species composition of bridge lip sucker 13%, redside shiner 10%, yellow perch 4%, smallmouth bass 40%, rainbow trout 24%, bowcutt trout 3%, brown trout 3%, tiger trout 2%, and channel catfish 2%. The 49 smallmouth bass measured varied in size from young-of-year (YOY), Class I (3.0+ inches) to 17.4 inches TL, with an average size of 6.0 in TL and dominated by the age Class II through IV cohorts (4.0-9.0 in). The 30 rainbow trout captured during electrofishing had an average size of 14.9 in TL, up significantly from the June gill netting sample size (Table 2). Non-game and non-desirable (yellow perch) fish species to game fish species ratio in this survey was only 0.4:1 (33 non-desirable:91 desired game fish), or a percent ratio of 27:73.

The last five years of population surveys continue to illustrate a positive trend in both the percent and number ratio of the non-game/non-desirable species (tui chub, sucker, and yellow perch) to the desired game fish (rainbow, bowcutt, brown, tiger trout, smallmouth bass, wiper, and channel catfish). Combining both fish population surveys together in 2016 produced a non-game/non-desirable fish to game fish ratio of only 0.3:1 (35 non-desirable **:** 115 desirable game fish), or a percent ratio of 23**:**77, well below the 20-year average ratio of 2.1**:**1. Low reservoir water levels during 2012 through 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 in the above average winter precipitation during 2016 has improved the fishery habitat in Wildhorse Reservoir, which benefitted all species.

Only five yellow perch YOY (< 4.0 in TL) and no Lahontan tui chub were captured in 2016, with the only non-game/non-desirable fish of concern being the bridgelip sucker, whose numbers are consistent with historic surveys and do not pose a competitive threat like the Lahontan tui chub or yellow perch. Yellow perch young-of-year have been documented for the last eight years during electrofishing surveys, but they have failed to carry forward in similar numbers or percentages to the next survey season, indicating continued predation on the juveniles.

Quagga Mussel Surveys

Wildhorse Reservoir was sampled on June 29, July 26, and October 12. These samplings incorporated vertical plankton net tows at three 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 occurring in July for Microscopy. In total, 15 individual samples were sent out for analysis, of which all resulted in negative findings.

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 2016 fishing season with only fair results reported but expected with fishery rebuilding and recovery from the drought.

- The electrofishing survey to monitor for black bass and gill netting surveys to monitor species composition was completed in the summer. Limited population surveys revealed excellent success in reducing the non-game fish/non-desirable to game fish ratio and good carryover and growth of stocked trout.

- Wipers and channel catfish were not stocked in 2016 due to budget constraints.

- 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.

- Conduct an electrofishing 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 wiper and 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 2017

Table 1

WILDHORSE RESERVOIR

2016 Creel Census Angler Use and Harvest Summary

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	**Totals**
No. Days Checked	1	1	1	0	2	1	1	0	0	1	1	2	**11**
Avg. Water Temp.	Ice=16"	Ice=19"	Ice		54	66	70			0	51	Ice=12"	**48.2**
No. Anglers Checked	5	10	0		7	6	7				13	5	**53**
No. of Hours Fished	11	11			15	13	18				50.5	9	**128**
Total Fish Caught	1	0			1	28	3				29	5	**67**
Total Fish Harvested	1	0			0	17	2				27	0	**47**
Rainbow Trout	0	0			0	15	1				27	0	**43**
Brown Trout	0	0			0	0	0				0	0	**0**
Bow-cutt Trout	1	0			0	0	1				0	0	**2**
Tiger Trout	0	0			0	0	0				0	0	**0**
Black Bass	0	0			0	0	0				0	0	**0**
Wiper	0	0			0	0	0				0	0	**0**
Channel Catfish	0	0			0	2	0				0	0	**2**
Yellow Perch	0	0			0	0	0				0	0	**0**
Average Measured Fish Harvest Size													
Rainbow Trout No.	0	0			0	13	1			0	15	0	**29**
Avg. Size (FL-inches)						13.7	14.6				16.0		**14.9**
Brown Trout No.	0	0	0	0	0	0	0			0	0	0	**0**
Avg. Size (FL-inches)													
Bow-cutt Trout No.	1	0				0	1				0	0	**2**
Avg. Size (FL-inches)	19.5						24.0						**21.8**
Tiger Trout No.	0	0	0	0	0	0	0			0	0	0	**0**
Avg. Size (FL-inches)													
Black Bass No.	0	0	0	0	0	0	0			0	0	0	**0**
Avg. Size (TL-inches)													
Wiper	0	0				0	0			0	0	0	**0**
Avg. Size (TL-inches)													
Channel Catfish No.	0	0				2	0			0	0	0	**2**
Avg. Size (TL-inches)						31							**31.0**
Yellow Perch No.	0	0	0	0	0	0	0			0	0	0	**0**
Avg. Size (TL-inches)													
Angler Catch Rate													
Fish / Hour	0.09				0.07	2.15	0.17					0.56	**0.53**
Fish / Angler	0.20				0.14	4.67	0.43					1.00	**1.26**

* Reservoir water and game fish levels rebuilding due to 2012-2015 drought; Angler visitation & interest limited.

Table 2

Wildhorse Reservoir
Population Sampling Catch Record
2016

SPECIES	Net/Sample #	#1-3	Electrofish	TOTALS	% of Species Composition
	Date:	6/6/2016	9/26/2016		
Rainbow Trout	Number of Fish Sampled	11	30	***41***	**27.3**
	Avg. Size (Inches-FL)	11.9	14.9	***14.1***	
Bow-Cutt Trout	Number of Fish Sampled	1	3	***4***	**2.7**
	Avg. Size (Inches-FL)	26.6	22.0	***23.2***	
Brown Trout	Number of Fish Sampled	0	4	***4***	**2.7**
	Avg. Size (Inches-FL)		17.4	***17.4***	
Tiger Trout	Number of Fish Sampled	0	2	***2***	**1.3**
	Avg. Size (Inches-FL)		21.2	***21.2***	
Largemouth Bass	Number of Fish Sampled	0	0	***0***	**0.0**
	Avg. Size (Inches-TL)				
Smallmouth Bass	Number of Fish Sampled	0	49	***49***	**32.7**
	Avg. Size (Inches-TL)		6.0	***6.0***	
Wiper	Number of Fish Sampled	12	0	***12***	**8.0**
	Avg. Size (Inches-TL)	20.2		***20.2***	
Channel Catfish	Number of Fish Sampled	0	3	***3***	**2.0**
	Avg. Size (Inches-TL)		22.8	***22.8***	
Yellow Perch	Number of Fish Sampled	0	5	***5***	**3.3**
	Avg. Size (Inches-TL)		3.6	***3.6***	
Tui Chub	Number of Fish Sampled	0	0	***0***	**0.0**
	Avg. Size (Inches-TL)				
Red Side Shiner	Number of Fish Sampled	0	12	***12***	**8.0**
	Avg. Size (Inches-TL)		3.6	***3.6***	
Bridgelip Sucker	Number of Fish Sampled	2	16	***18***	**12.0**
	Avg. Size (Inches-TL)	8.1	7.9	***7.9***	
	TOTAL FISH	26	124	***150***	
	Hours Sampled	39.5	0.90	***40.4***	
	% Non-desirable Fish	7.7	26.6	***23.3***	
	Fish / Net-Shocking Hour	0.66	137.8	***3.7***	
	Reservoir Water Temp. °F	64.4	57.8		
	** Wildhorse Res. Storage Capacity at time of survey (Approx. % Acre-Feet)	61%	44%		

Gill Net & Electrofishing Survey Locations:

1. Mouth of Brown Cove. Experimental Mesh gill net, 150 feet long.
2. Trophy Cove, North Side, buoy set. 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 -- Mouth of Canyon, Brown Cove, Hendrick's Arm, State Park Island & Penrod culvert.

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

Figure 1.

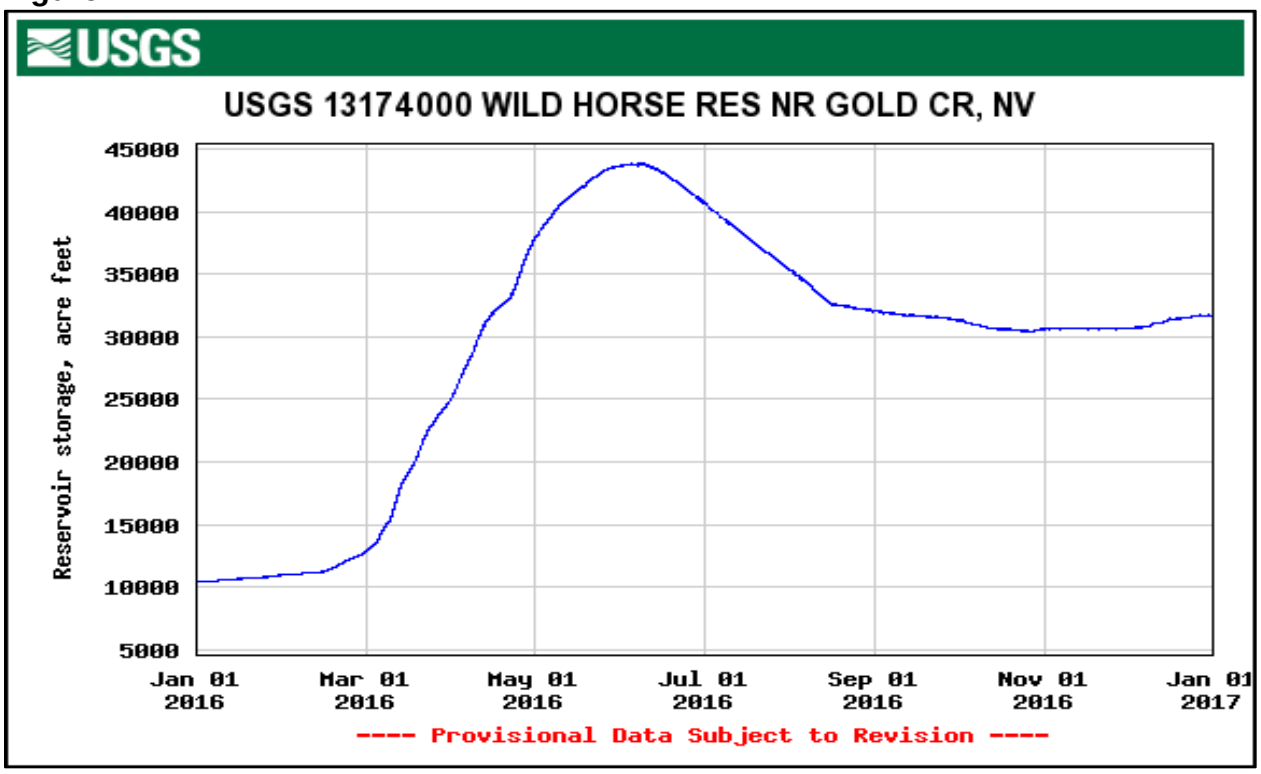

Figure 2.

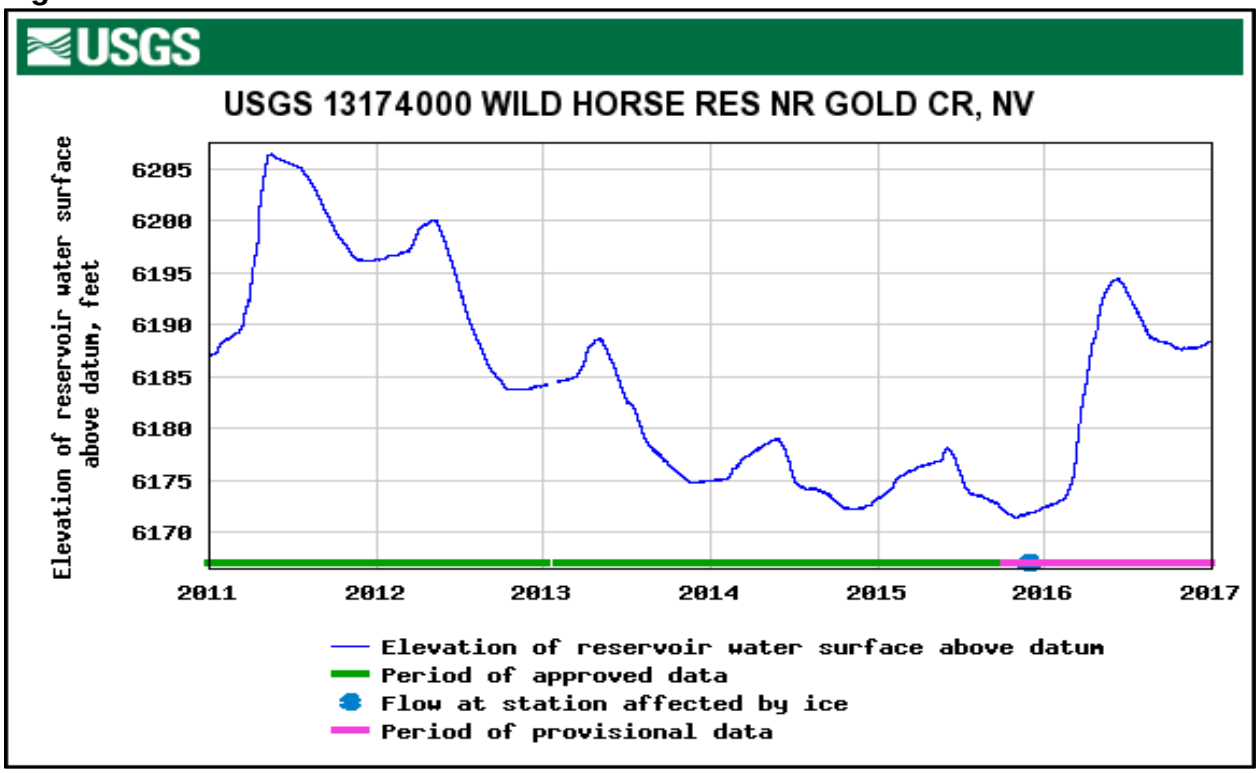

Figure 3.

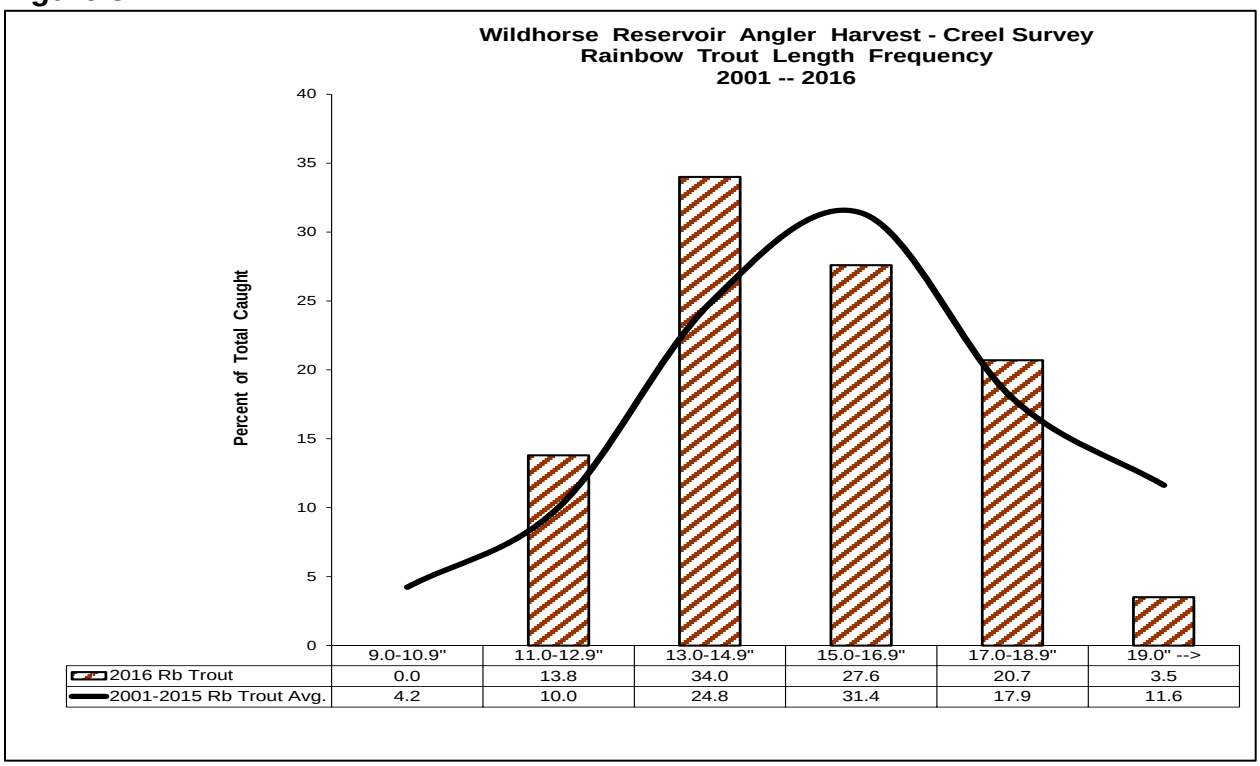
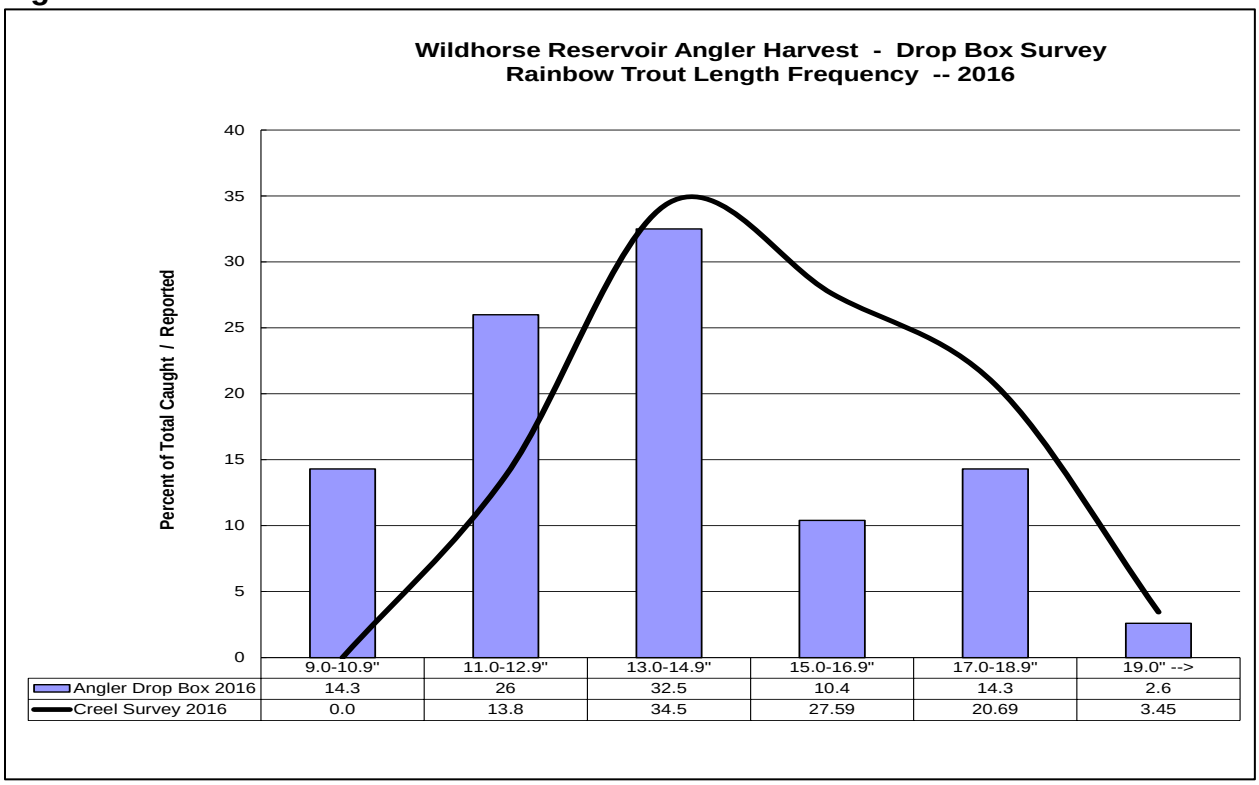
Figure 4.