NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE SPORT FISHERIES MANAGEMENT

FEDERAL AID JOB PROGRESS REPORT

F-20-54
2018

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, 2018 through December 31, 2018*

SUMMARY

The 2018 water year saw below average amounts of winter and spring precipitation within the basin, thus resulting in Wildhorse Reservoir only filling to 96% of capacity (68,640 acre-ft) by May 7. Reservoir discharge occurred from May 8 to November 24, with irrigation demands dropping the reservoir level to approximately 66% of capacity (47,100 acre-ft).

With improved reservoir storage conditions, 19 days of angler surveys were conducted, contacting 226 anglers. They reported fishing 758 hours to catch 554 fish for annual average catch rates of 0.73 fish per hour and 2.45 fish per angler. The average harvest size for rainbow trout was 17.8 in TL, bowcutt trout was 17.6 in TL, and yellow perch (only from December) was 8.9 in TL. Overall, angler visitation and harvest continued to increase compared to previous years during drought.

Wildhorse Reservoir was stocked with 98,827 trout (76,751 catchable size of >8.0 in TL and 22,076 sub-catchable/fingerling of <8.0 in TL) in 2018. On April 25, approximately 14,250 4.5 in channel catfish were stocked to augment the depleted catfish stock.

Fish population surveys occurred on May 30, June 20, and September 18 and consisted of gill netting to inventory species composition and trout carryover and two electroshocking surveys to document occurrence of white crappie and to collect general data about the fisheries after four years of drought. Three gill nets were fished 42 hours overnight to capture 30 rainbow trout, 3 bowcutt trout, 1 brown trout, 1 smallmouth bass, 15 yellow perch, 1 Lahontan tui chub, and 3 bridgelip suckers. Sixty-four percent of the catch was comprised of game fish. Electrofishing surveys were conducted in June and September, capturing 366 fish dominated by smallmouth bass and yellow perch.

On June 20 and 21, artificial fish habitat structures consisting of 5 Root Wads, 2 Root Wad kits, 1 Trophy Tree, 1 Safe Haven kit, 6 Honey Hole shrubs, 6 Honey Hole Trees, and 2 Fishiding Fortress were constructed and submerged around the reservoir. Structures were placed in between 6.0 and 15.0 feet of water in order to target areas most valuable to a variety of fishes.

Wildhorse Reservoir was first sampled to detect quagga mussels on May 29, with samples coming back positive for *zebra* mussels via PCR testing. These results initiated additional sampling and, again, when sampled June 19 and July 10, zebra

mussels were detected at one site in July. A final round of sampling occurred in October and resulted in negative results for zebra and quagga mussel via PCR. However, all samples analyzed through microscopy came back negative. As water levels dropped in late summer, visual surveys of the exposed substrate produced no evidence of invasive 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 25 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 24,000 days per year, making it one of the top 10-fished waters in the state of Nevada. Fluctuating reservoir water levels and nuisance nongame fish species are the two management challenges associated with this fishery. Natural succession towards nongame fish dominance prompted periodic chemical fish eradication as a management tool to restore desirable fishes.

The last chemical treatment in Wildhorse Reservoir along with several drainage streams was in September 1988. Additionally, as a biological control of nuisance fishes, smallmouth bass were introduced in the fall of 1989, and then augmented again in July 1990. Channel catfish were first introduced in July 1993. Illegally introduced yellow perch were discovered in 1996 and rapidly established dominance in the reservoir. Because of an expanding yellow perch population, wipers (white bass x striped bass hybrid) were initially stocked in 2002 to control their progression. 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 and associated angler visitation.

OBJECTIVES and APPROACHES

Objective: General Sport Fisheries Management

Approaches:

- Conduct a general fisheries assessment through scheduled surveys to monitor for marked fish returns and body condition of game fish during drought recovery conditions.
- Conduct an evaluation of water quality/quantity and make recommendations on trout stocking allocations consistent with available habitat.
- Purchase and stock 10,000 channel catfish.
- Monitor the fishery through electroshocking and gill netting surveys to determine species composition, presence of white crappie (introduced in

2017), and collect general fishery data after four years of drought.

- Sample for 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 substrates in conjunction with veliger sampling.

PROCEDURES

Angler surveys were scheduled periodically throughout the fishing season (January through December) to document angler harvest, success, and interest as it pertained to recovery after the extended drought and impacts on the fishery. Angler data 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 May 30, 2018, fished overnight, and retrieved the following morning. Gill net locations occurred along the east side of Hendrick's Arm Cabin, the mouth of Brown Cove in the canyon, and the west side Rock Spring Cove. All fish species were targeted for capture. All captured fish were identified by species, counted and measured, and examined for identifying marks or tags. Trout were also weighed for body condition analysis.

Electroshocking surveys were conducted during the nighttime hours on June 20 and again on September 18. The spring survey on June 20 focused on the south end of the reservoir at the old roadbed, Hot Creek, and the inlet. The fall survey occurred in the canyon arm, Hendrick's Bridge, and Penrod Arm riprap.

June 20, 2018 Electroshocking Survey

Pulse - DC	**Pulse Width(millisec)** – 6	**Time** – 2100-2215
Volts – 600	**Pulse Freq.(per sec)** – 60	**Water Condition** –algae light, reservoir at high capacity (~ 91%)
Output (amps) 8-10	**Shocking Time (sec)** –900 seconds = (15 mins.)	**Water Temp(°F**) – 61

September 18, 2018 Electroshocking Survey

Pulse - DC	**Pulse Width(millisec)** – 5	**Time** –1850 - 2010
Volts – 600	**Pulse Freq.(per sec)** – 60	**Water Condition** –algae moderate, reservoir at Avg. capacity (~ 68%)
Output (amps) -10	**Shocking Time (sec)** –2,003 seconds = (33 mins.)	**Water Temp(°F**) – 59

In 2017, funding was acquired through the Habitat Conservation Fee program for the Eastern Region Aquatic Habitat Development Project. Funding was used to purchase artificial habitat structures for use in South Fork and Wildhorse reservoirs. Structures were purchased from Mossback Fish Habitat, Pond King Honey Hole, and Fishiding.com and were made of nontoxic "scuffed" PVC trunks with composite limbs, poly pipe limbs, and PVC flats that simulate shrubs, trees, or roots found in a natural environment. Three different types of Mossback structures consisted of Root Wads, Root Wad Kits with 3 Posts, Safe Haven, and Trophy Tree Kits. All structures were constructed on site at Wildhorse Reservoir on June 20-21, transported by boat, and submerged at various locations. Artificial fish habitat structures consisted of 5 Root Wads, 2 Root Wad Kits, 1 Trophy Tree, 1 Safe Haven Kit, 6 Honey Hole Shrubs, 6 Honey Hole Trees, and 2 Fishiding Fortress. Suitable locations were initially determined using bathometric maps and then installed using a fish finding sonar. All structures were placed in at least 6.0 ft of water and not more than 15.0 ft in order to target areas where young fishes would be most vulnerable to predation.

Wildhorse Reservoir was sampled on May 29, June 19, July 10, and October 10 for detecting quagga mussels. Samplings included vertical plankton net tows at three separate locations. Two samples were taken at each site during June and October for both Polymerase Chain Reaction (PCR) and microscopy analysis. As water levels dropped in late summer, visual surveys of the exposed substrates were conducted to detect adult invasive mussels

FINDINGS

Water Quality Monitoring

Figure 1 illustrates the relatively stable storage capacity for Wildhorse Reservoir in 2018, being down only eight feet and approximately 68% of capacity (48,250 acre-ft of storage) as of December 31. The last year the reservoir achieved full capacity and spilled over the spillway was in 2017 (Figure 2). Ice conditions in March and temperature patterns in April allowed for stocking hatchery trout by April 25, slightly earlier than usual.

General Sport Fisheries Management

During 2018, 19 days of angler surveys contacted 226 anglers that fished 758 hours to catch 554 fish for annual average catch rates of 0.73 fish per hour and 2.45 fish per angler. The average harvest size for rainbow trout was 17.8 in total length (TL), bowcutt trout was 17.6 in TL, and yellow perch (December 2018) was 8.9 in TL (Table 1). Overall, angler visitation and harvest continues to increase compared to previous drought years.

The average harvest size for 164 rainbow trout measured was 17.8 in TL. Figure 3 illustrates the angler caught rainbow trout length frequency compared to the cumulative 17-year average. Approximately 68% of the rainbow trout were greater than

17.0 in, significantly higher than the 32% from the 2001 through 2017 (Figure 3). The majority of rainbow trout (36%) in 2018 were 19.0 in TL or greater, a remarkable recovery from three years ago.

Figure 1.

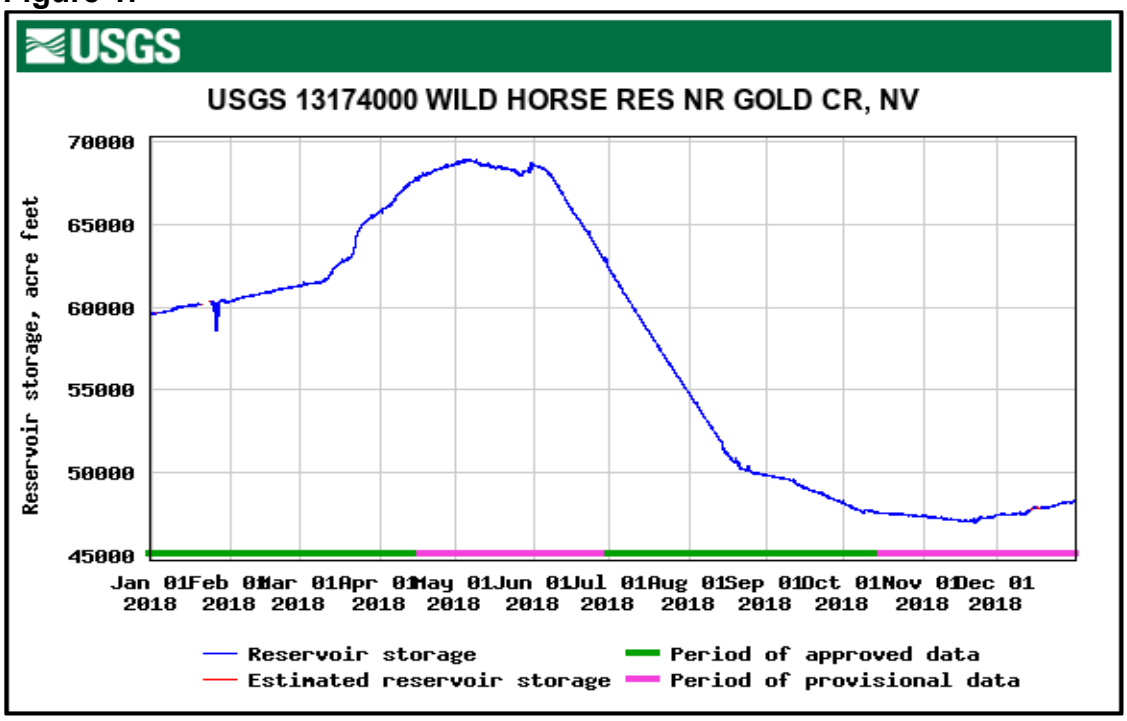


Figure 2.

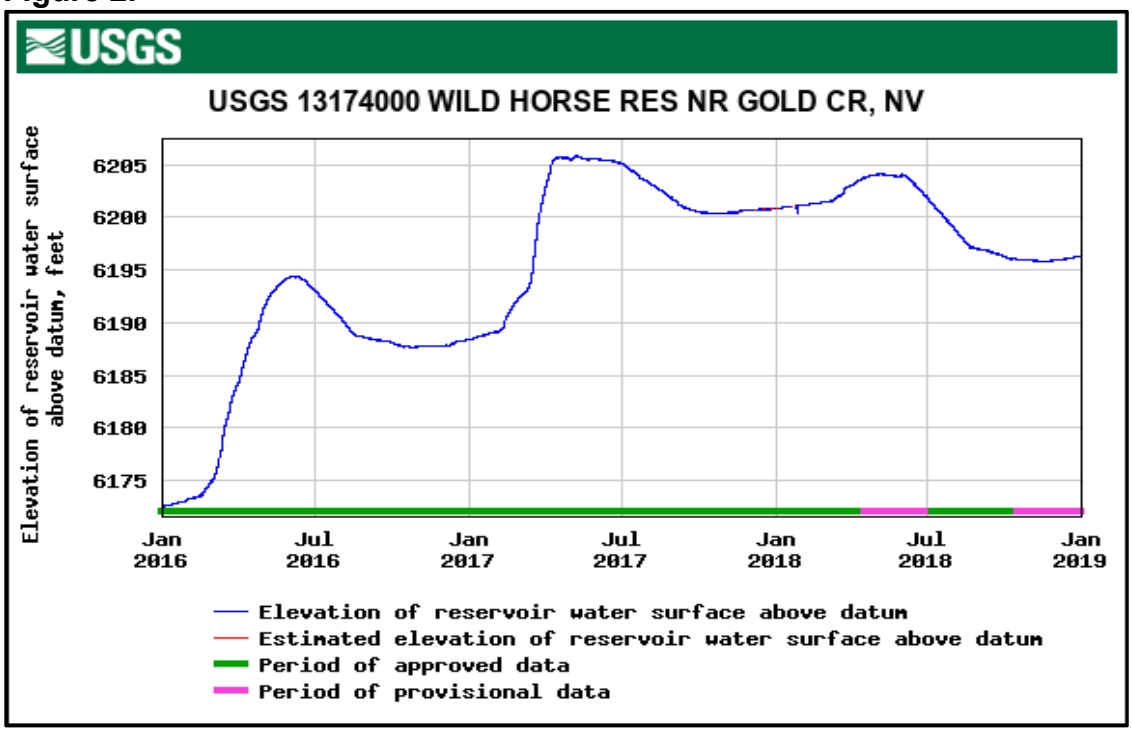
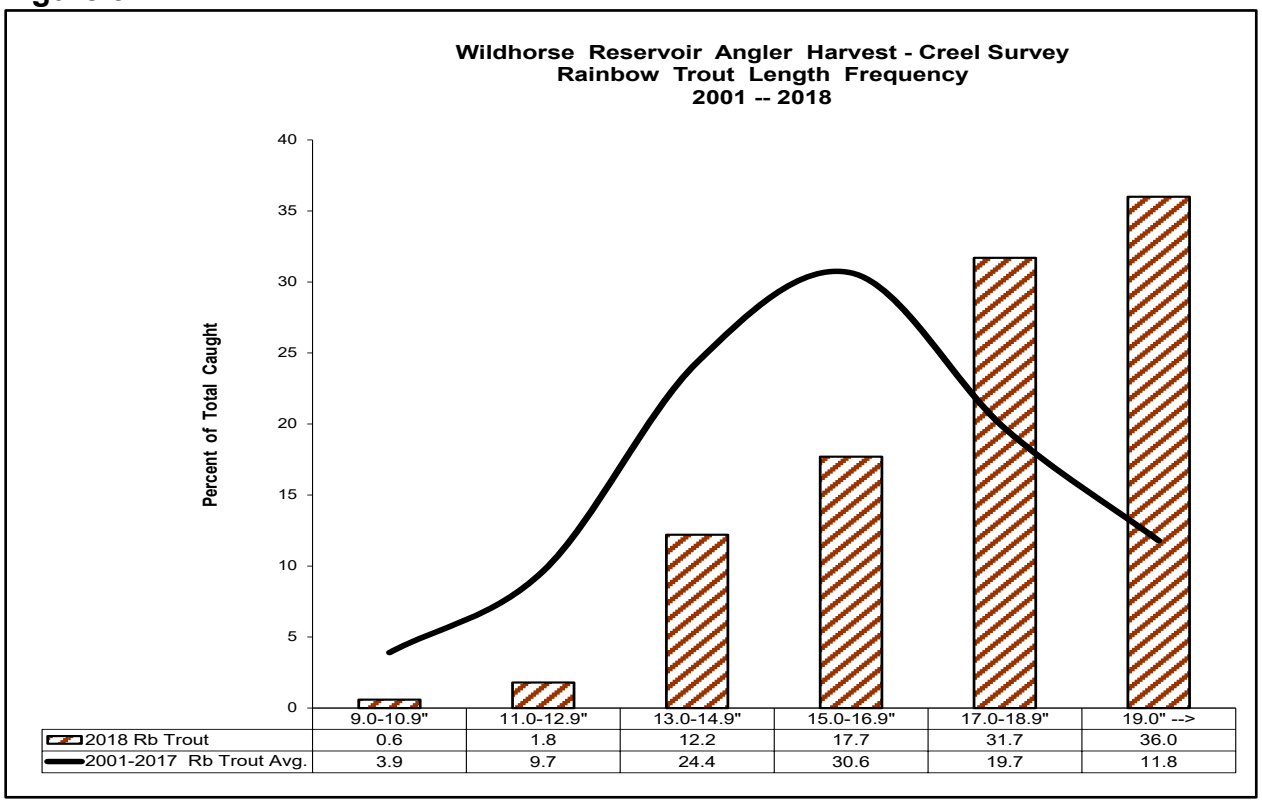


Figure 3.

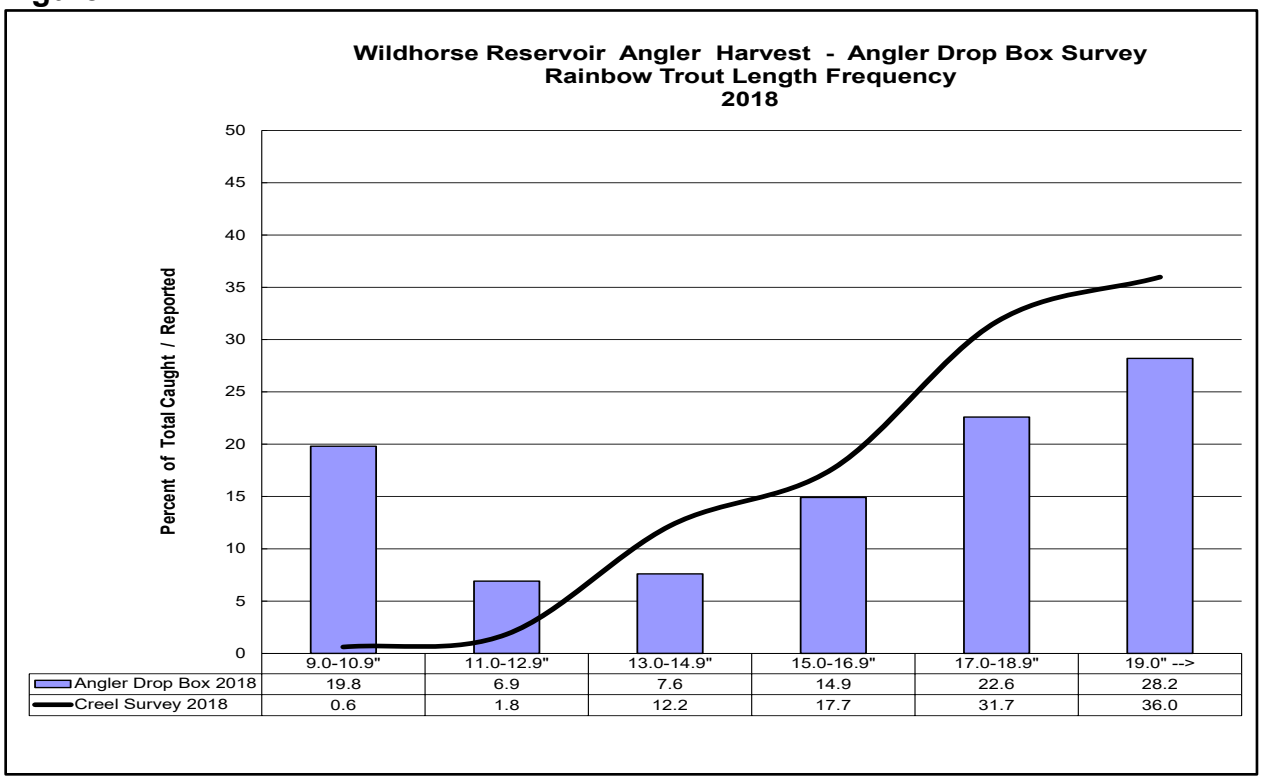


Body condition analysis was conducted on 134 rainbow trout and 6.8% of the fish were in poor condition, 21.7% in fair, 53% in good, and 18.7% in excellent body condition. Average weight was 2.3 lbs and length was 17.5 in TL, up slightly in weight from 2017. Anglers also caught five bowcutt trout with an average size of 17.6 in TL and, in December, 12 yellow perch with an average size of 8.9 in TL. This marks the first time in five years that yellow perch have shown up in creel surveys.

The volunteer, angler drop-box survey was available the entire season, and showed good participation in 2018. Anglers submitted 85 surveys from April through November, where 96 anglers fished 402 hours to capture 748 fish. Fish caught were comprised of 736 trout, which came to catch rates of 1.9 fish per hour and 7.8 fish per angler, significantly higher than contact creel survey findings. However, drop-box data reported similar rainbow trout length frequencies when compared to the contact creel survey (Figure 4). Approximately 28% of the trout caught in 2018 were 19 inches or greater, the highest recorded over the past 12 years.

Angler interest in fishing for warmwater fish (includes black bass, wiper, and channel catfish) was considered low due to their fisheries still rebuilding after the drought (see Table 1). Five smallmouth bass with an average size of 11.9 in TL were measured in July, but were undersized for legal harvest. No wipers or catfish were measured in 2018. Angling for yellow perch has regained some interest, with 12 yellow perch, averaging 8.9 in TL, caught during ice fishing in December. Multiple age classes have been observed during population surveys, from YOY to adults up to 11 inches.

Figure 4.



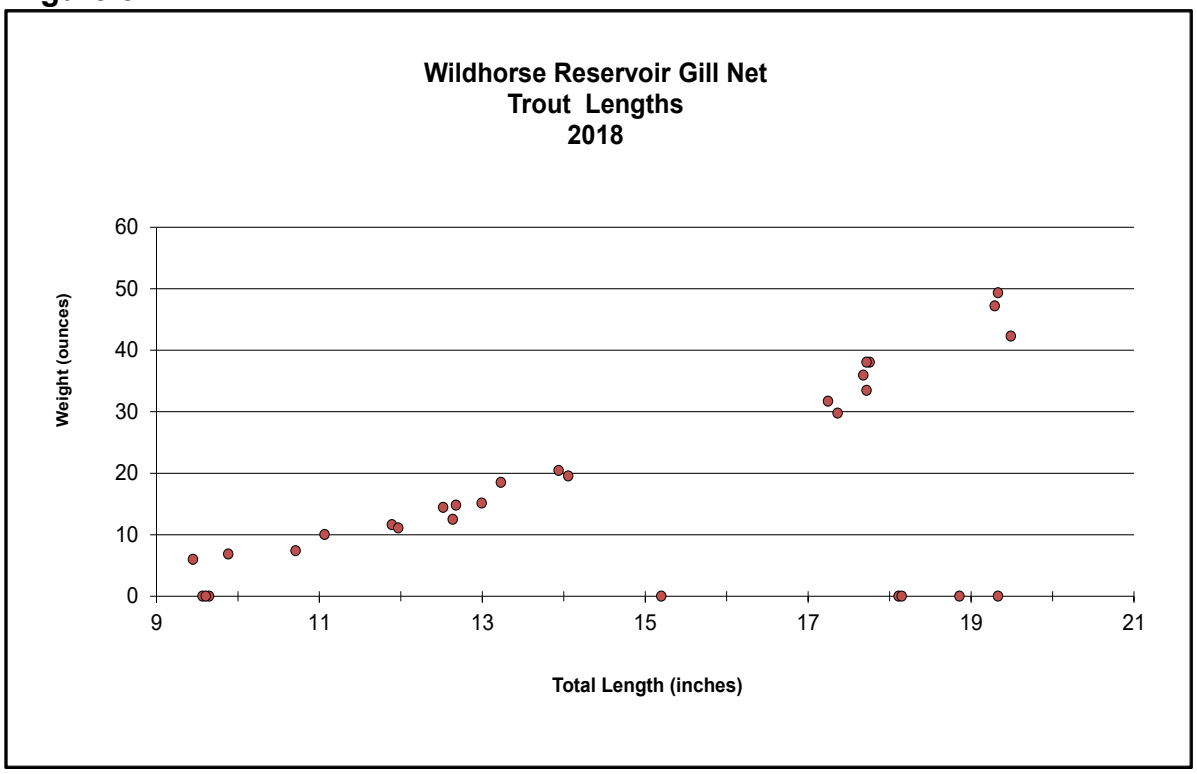
Wildhorse Reservoir was stocked with 98,827 trout (76,751 catchable size of >8.0 in TL and 22,076 sub-catchable/fingerling of <8.0 in TL) in 2018 (Table 4). The majority were rainbow trout, but 7,992 (6.6 in TL) were brown trout and 12,105 (7.5 in TL) cuttbow trout stocked in October to augment depleted stock of piscivorous species. On April 25, approximately 14,250 (4.5 in) channel catfish were stocked to augment depleted catfish stocks. This was the second augmentation of channel catfish since 2012.

Population Monitoring

Three spring gill nets were fished 42 hours to capture 55 fish, with a species composition of rainbow trout at 54.6%, bowcutt trout at 5.5%, brown trout at 1.9%, smallmouth bass at 1.9%, yellow perch at 27.3%, bridgelip sucker at 5.5%, and Lahontan tui chub and redside shiner at 1.9%. The nongame, nondesirable fish species to game fish species ratio was 0.6**:**1.0 (20**:**35), or a percent ratio of 36%:64%.

The average size of the rainbow trout during the spring gill net survey was 12.8 in TL and the largest was 19.5 in TL caught at Rock Spring Cove. The majority of the rainbow trout caught were carryover from fall 2017 stocking efforts (11 to 14 inches, Figures 5). Body condition analysis was conducted on 25 of 30 rainbow trout, resulting in an average of 21 oz and an overall body condition rating of 4.16 (Good).

Figure 5.



The June 20 and September 18 electroshocking surveys captured 366 fish, with a composition of smallmouth bass at 57%, yellow perch at 24%, rainbow trout at 10%, bridgelip sucker at 4%, redside shiner at 2%, and channel catfish at 1%. Other incidental but noteworthy fish captured were one white crappie at 5.3 in TL and one tiger trout at 16.3 in TL. The 37 rainbow trout averaged 13.7 in TL, up about an inch from fish caught during May in the gill nets at 12.8 in TL.

The 149 smallmouth bass varied in size from young-of-year (>2.0 in) to 16.2 inches TL. The average size was 7.1 in TL and dominated by age Class II-IV cohorts (4.0 to 9.0 in). weights were taken from 41 for body condition analysis, resulting in an average of 10.6 in TL and 11.7 oz for a body condition rating of 5.77 (Excellent) (Figure 6).

Nongame and nondesirable fish species (mostly yellow perch) to game fish species ratio from the electroshocking survey was 0.4:1.0 (110**:**256), respectively, or a percent ratio of 30%:70% (Table 3, Figure 7). Wildhorse Reservoir water recharge from the 2016/2017 above average winter precipitation has substantially improved the fisheries habitat. This improvement benefitted all species, but having good habitat will possibly increase nongame, nondesirable fish populations in the future.

Figure 6

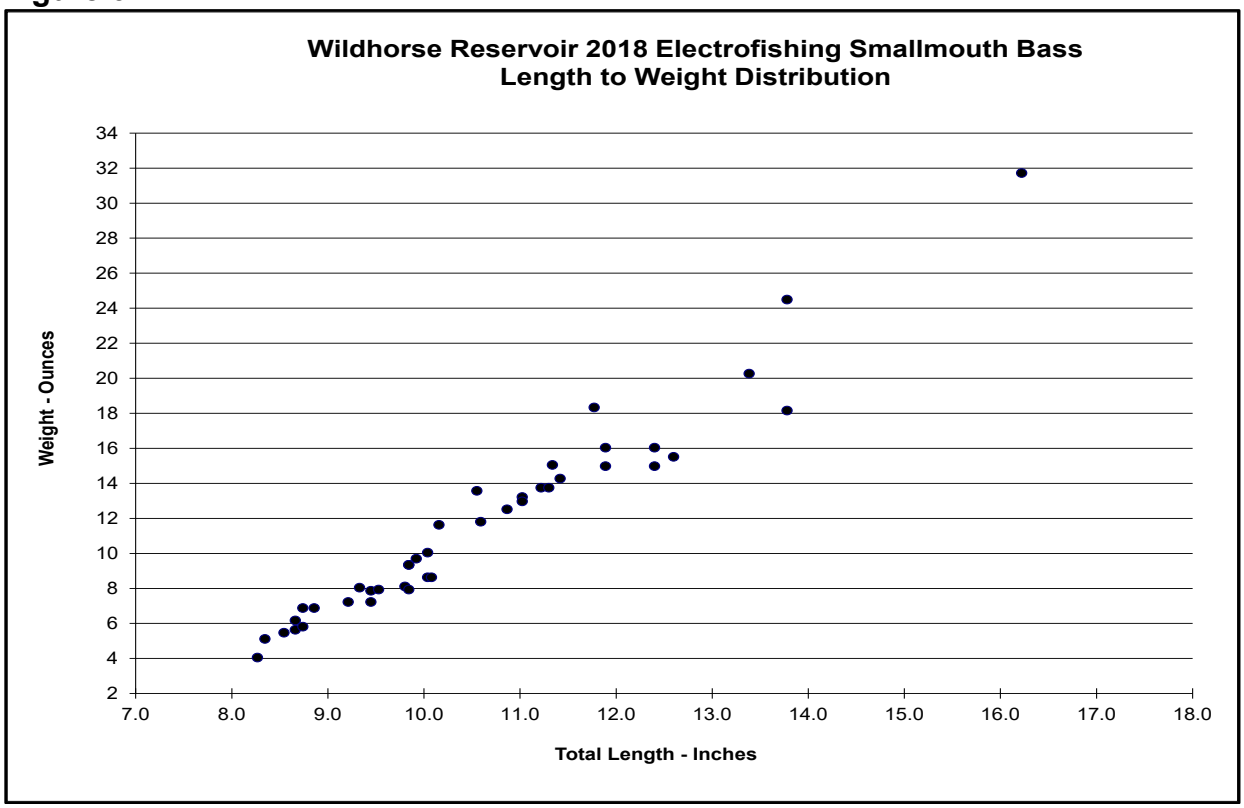
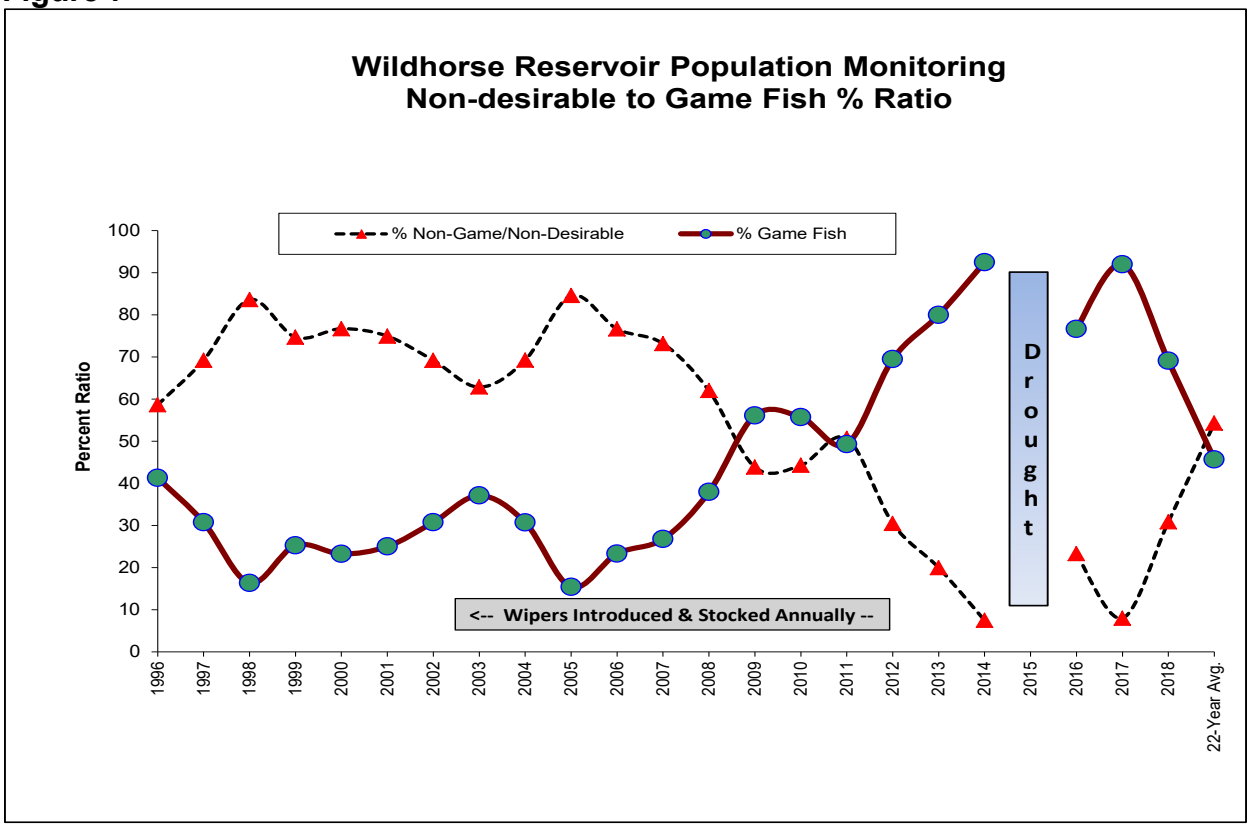


Figure 7



The return of the yellow perch (averaging 6.7 in TL for 101 measured in 2018) marks their successful reoccurrence after the four-year drought (2012 to 2015) and after successfully controlling them through stocking of piscivorous sport fish stocking from 2003 to 2012. Currently, yellow perch abundance does not appear to impose a threat on the quality trout fishery, but past reproductive success of yellow perch warrants continued monitoring.

Quagga Mussel Surveys

In 2018, Wildhorse Reservoir was first sampled on May 29 and all samples came back positive for *zebra* mussels via PCR testing. Table 6 shows associated values representing the number of copies per sample, creating a proxy for mussel biomass. These results initiated additional sampling on June 19 and July 10, with mussels only documented at one site in July.

Phytoplankton within the reservoir begins to build in July and reaches densities in August and September that hamper PCR testing at the lab level. The final round of veliger sampling occurred in October, with negative results found through PCR analysis. During 2018, all samples sent out for microscopy analysis came back negative. As water levels dropped in late summer, visual surveys of the exposed substrate produced no evidence of adult invasive mussels.

Artificial Fish Habitat Construction

Purchased habitat structures were constructed on site at Wildhorse Reservoir on June 20 and 21, transported, and installed at predetermined locations by boat. Twenty-three artificial fish attractors consisting of 5 Root Wads, 2 Root Wad Kits, 1 Trophy Tree, 1 Safe Haven Kit, 6 Honey Hole Shrubs, 6 Honey Hole Trees, and 2 Fishiding Fortress were submerged in the reservoir. Suitable locations were determined based on bathometric maps and located in the reservoir using fish finding sonar. All structures were placed in at least 6 ft of water and not more than 15 ft in order to target areas where small and juvenile fishes would be most vulnerable to predation (Photograph1). Locations and depths of habitat structures also occur in suitable spawning habitat for warmwater fishes. Offspring will utilize the structures as protection from predation by other fishes. GPS locations were recorded for each structure for future monitoring. A map of habitat structures and their coordinates are provided in Figure 8 and Table 5.

MANAGEMENT REVIEW

- Angler surveys were conducted throughout the 2018 fishing season, with promising results as the fishery begin to rebuild. Drought recovery has exceeded expectations, primarily from high precipitation during 2016 and 2017.
- Monitoring water storage and quality allowed for spring trout stocking to begin in April.

- Gill netting surveys to monitor species composition was completed in late spring. Two electrofishing surveys (spring and fall) monitoring black bass and total species composition revealed good numbers of smallmouth bass and yellow perch.
- Channel catfish were stocked in June 2018.
- Quagga mussel surveys were completed and the samples were sent to labs for analysis. However, with most likely false positive results, the reservoir remains on the quagga mussel watch list.

Photograph 1. Sonar screen shot of Mossback fish habitat after placement into Wildhorse.

RECOMMENDATIONS

- Continue angler surveys to develop an accurate assessment of angler use and harvest of sport fish to document fishery rebuilding and potential.
- Conduct an electroshocking survey to assess age class distribution, body condition, and RSD of black bass.
- Continue population sampling to monitor game fish/nongame fish ratios.
- Monitor the need for stocking piscivorous fish species in an effort to reduce nongame fish abundance. Continue channel catfish augmentation when necessary and evaluate their effectiveness as an added control of nongame fish while providing diversified angling opportunity having trophy fish potential.
- Utilize adaptive management practices during severe climatic conditions to offset resource losses.

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Fisheries Biologist III, Eastern Region

Date: January 2019

Table 1

WILDHORSE RESERVOIR

2018 Creel Census Angler Use and Harvest Summary

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	**Totals**
No. Days Checked	3	2	1	1	2	2	2	1	1	1	1	2	**19**
Avg. Water Temp.	Ice=9"	Ice=6-7"	43	46	54	62	73	76	60	50	49	Ice=8"	**57.0**
No. Anglers Checked	30	12	2	8	16	29	70	8	5	5	2	39	**226**
No. of Hours Fished	88.5	21.5	6	24	45	92	251	34	30	7.5	3.5	155	**758**
Total Fish Caught	43	20	4	27	54	97	162	38	29	1	10	69	**554**
Total Fish Harvested	30	8	4	3	14	20	74	16	24	1	0	45	**239**
Rainbow Trout	29	8	4	3	14	20	69	16	24	1	0	27	**215**
Brown Trout	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Bow-cutt Trout	1	0	0	0	0	0	0	0	0	0	0	4	**5**
Tiger Trout	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Black Bass	0	0	0	0	0	0	5	0	0	0	0	0	**5**
Wiper	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Channel Catfish	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Yellow Perch	0	0	0	0	0	0	0	0	0	0	0	14	**14**
Average Measured Fish Harvest Size													
Rainbow Trout No.	26	6	4	3	14	16	54	16	7	1	0	17	**164**
Avg. Size (FL-inches)	17.3	18.7	17.6	18.7	18.9	18.4	17.3	17.2	19.0	20.9		18.4	**17.8**
Brown Trout No.	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Avg. Size (FL-inches)													
Bow-cutt Trout No.	1	0	0	0	0	0	0	0	0	0	0	4	**5**
Avg. Size (FL-inches)	17.6											17.6	**17.6**
Tiger Trout No.	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Avg. Size (FL-inches)													
Black Bass No.	0	0	0	0	0	0	5	0	0	0	0	0	**5**
Avg. Size (TL-inches)							11.9						**11.9**
Wiper	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Avg. Size (TL-inches)													
Channel Catfish No.	0	0	0	0	0	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	0	12	**12**
Avg. Size (TL-inches)												8.9	**8.9**
Angler Catch Rate													
Fish / Hour	0.49	0.93	0.67	1.13	1.20	1.05	0.65	1.12	0.97	0.13	2.86	0.45	**0.73**
Fish / Angler	1.43	1.67	2.00	3.38	3.38	3.34	2.31	4.75	5.80	0.20	5.00	1.77	**2.45**

Table 2

Wildhorse Reservoir
Population Sampling Catch Record
2018

	Net/Sample #	#1-3	Electrofish	Electrofish		
	Date:	5/30/2018	6/20/2018	9/18/2018		
SPECIES					**TOTALS**	% of Species Composition
Rainbow Trout	Number of Fish Sampled	30	9	28	***67***	**15.9**
	Avg. Size (Inches-FL)	12.8	13.9	13.5	***13.2***	
Bow-Cutt Trout	Number of Fish Sampled	3	3	0	***6***	**1.4**
	Avg. Size (Inches-FL)	12.0	13.6		***12.8***	
Brown Trout	Number of Fish Sampled	1	0	0	***1***	**0.2**
	Avg. Size (Inches-FL)	17.7			***17.7***	
Tiger Trout	Number of Fish Sampled	0	0	1	***1***	**0.2**
	Avg. Size (Inches-FL)			16.3	***16.3***	
White Crappie	Number of Fish Sampled	0	1	0	***1***	**0.2**
	Avg. Size (Inches-TL)		5.3		***5.3***	
Smallmouth Bass	Number of Fish Sampled	1	76	133	***210***	**49.9**
	Avg. Size (Inches-TL)	5.6	5.8	8.2	***7.3***	
Wiper	Number of Fish Sampled	0	0	0	***0***	**0.0**
	Avg. Size (Inches-TL)					
Channel Catfish	Number of Fish Sampled	0	4	1	***5***	**1.2**
	Avg. Size (Inches-TL)		11.5	6.6	***10.5***	
Yellow Perch	Number of Fish Sampled	15	72	14	***101***	**24.0**
	Avg. Size (Inches-TL)	6.3	6.9	6.3	***6.7***	
Tui Chub	Number of Fish Sampled	1	0	0	***1***	**0.2**
	Avg. Size (Inches-TL)	5.7				
Red Side Shiner	Number of Fish Sampled	1	4	4	***9***	**2.1**
	Avg. Size (Inches-TL)	5	3.3	3.3	***3.5***	
Bridgelip Sucker	Number of Fish Sampled	3	5	11	***19***	**4.5**
	Avg. Size (Inches-TL)	8.3	6.2	7.6	***7.3***	
	TOTAL FISH	55	174	192	***421***	
	Hours Sampled	42.0	0.25	0.83	***43.1***	
	% Non-desirable Fish	36.4	46.6	46.6	***30.9***	
	Fish / Net-Shocking Hour	1.31	698.8	231.3	***9.8***	
	Reservoir Water Temp. °F	61.2	70.0	60.0		
	** Wildhorse Res. Storage Capacity at time of survey (Approx. % Acre-Feet)	96%	91%	68%		

Gill Net & Electrofishing Survey Locations:

1. Mouth of Brown Cove. Experimental Mesh gill net, 150 feet long.
2. Rock Spring 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 South End, Old HWY & inlet, Hot Cr. Coves.
5. Electrofish -- Fall 2018 North End Canyon, Hendrick's Bridge & Penrod HWY rip-rap.

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

Table 3

Wildhorse Reservoir Non-game and Non-desirable (Yellow Perch) to Game fish Ratios 1996 - 2018

Year	Electrofish Survey		Gill Net Survey		Surveys Combined		
	No. Ratio	% Ratio	No. Ratio	% Ratio	No. Ratio	% Ratio	
1996	1.4:1	59:41	1.4:1	58:42	1.4:1	59	41
1997	1.3:1	56:44	5.2:1	86:14	2.3:1	69	31
1998	13.4:1	93:7	3.0:1	75:25	5.1:1	84	16
1999	1.5:1	60:40	8.3:1	89:11	3.6:1	75	25
2000	2.6:1	73:27	4.3:1	81:19	3.3:1	77	23
2001	2.6:1	72:28	4.2:1	81:19	3.0:1	75	25
2002	2.3:1	70:30	2.2:1	69:31	2.3:1	69	31
2003	2.0:1	67:33	0.5:1	33:67	1.7:1	63	37
2004	2.0:1	66:34	4.3:1	81:19	2.3:1	69	31
2005	6.3:1	82:18	2.1:1	68:32	5.5:1	85	15
2006	3.2:1	76:24	4.0:1	80:20	3.3:1	77	23
2007	3.2:1	76:24	1.8:1	65:35	2.7:1	73	27
2008	0.8:1.0	46:54	10.7:1	91:9	1.6:1	62	38
2009	1.1:1	52:48	0.1:1	11:89	0.8:1	44	56
2010	1.3:1	57:43	0.2:1	17:83	0.8:1	44	56
2011	1.4:1	59:41	0.0:1	0:100	1.0:1	51	49
2012	0.8:1	44:56	0.2:1	13:87	0.4:1	30	70
2013	0.5:1	35:65	0.1:1	5:95	0.3:1	20	80
2014	0.1:1	9:91	0.03:1	3:97	0.1:1	7	93
2015	Drought Conditions -- No Survey						
2016	0.4:1	27:73	0.09:1	8:92	0.3:1	23	77
2017	No Survey		0.09:1	8:92		8	92
2018	0.4:1	30:70	0.6:1	36:64	0.5:1	31	69
22 - Year Avg.				*22 -Year Avg.*	**2.0:1**	**54.3**	**45.7**

Table 4

Wildhorse Reservoir Fish Stocking

2018

Date	# of Fish Stocked	Pounds	Avg. Size (in.)	Species	Fish / Pound	Strain	Stocking Location	Water Temp.	Tank Temp.
April 25, 2018	14,250	328	4.5	Ch. Catfish	43.5	Arkansas/CO	St. Park Boat Launch	53	53
May 2, 2018	2,255	500	8.2	Rainbow	4.5	Eagle Lake	St. Park Boat Launch	52	52
May 2, 2018	6,750	1,500	8.2	Rainbow	4.5	Eagle Lake	St. Park Boat Launch	52	52
May 8, 2018	7,920	2,000	8.6	Rainbow	4.0	Eagle Lake	St. Park Boat Launch	63	50
May 8, 2018	8,200	2,000	8.5	Rainbow	4.1	Eagle Lake	St. Park Boat Launch	60	52
May 9, 2018	7,340	2,000	8.8	Rainbow	3.7	Eagle Lake	St. Park Boat Launch	58	53
May 9, 2018	7,340	2,000	8.8	Rainbow	3.7	Eagle Lake	St. Park Boat Launch	58	53
October 3, 2018	8,600	2,000	8.3	Rainbow	4.3	Erwin/Arlee	St. Park Boat Launch	58	53
October 3, 2018	3,440	800	8.3	Rainbow	4.3	Erwin/Arlee	St. Park Boat Launch	58	53
October 4, 2018	3,255	700	8.1	Cuttbow	4.7	Marlette / Tahoe	St. Park Boat Launch	57	53
October 4, 2018	8,151	1,900	8.4	Rainbow	4.3	Erwin/Arlee	St. Park Boat Launch	56	51
October 5, 2018	10,060	2,000	7.9	Rainbow	5.0	Erwin/Arlee	St. Park Boat Launch	56	51
October 5, 2018	4,024	800	7.9	Rainbow	5.0	Erwin/Arlee	St. Park Boat Launch	58	53
October 8, 2018	2,816	800	8.9	Cuttbow	3.5	Marlette / Tahoe	St. Park Boat Launch	55	53
October 9, 2018	6,034	1,350	8.2	Cuttbow	4.5	Marlette / Tahoe	St. Park Boat Launch	51	51
October 11, 2018	4,650	1,000	8.1	Rainbow	4.7	Erwin/Arlee	St. Park Boat Launch	48	50
October 11, 2018	7,992	900	6.6	Brown	8.9	Sheep Creek	St. Park Boat Launch	48	50
Total Catchable Trout (>8.0 inch):	**76,751**	**18,550**	***x= 4.1 fish/lb.***				Avg. Water Temp. =	55.4	51.9
Total Sub-catchables Trout (4.0-7.9 inch):	**22,076**	**3,700**	***x= 6.0 fish/lb.***						
Total Fingerling Trout (< 3.9 inch):	**0**	**0**							
Total Warm Water Fish:	**14,250**	**328**							
TOTALS	***113,077***	***22,578***							

2018 Totals = 72% of average number of fish stocked over the last 24 years (x= 156,439 fish stocked/year). Poor winter/spring runoff. Reservoir at ~66% capacity Nov. 2018

Brown Trout = 7,992 Sub-catchables

Tiger Trout = 0 Catchable

Cuttbows = 12,105 fish in 2018

Figure 8

Wildhorse Reservoir Artificial Habitats Locations

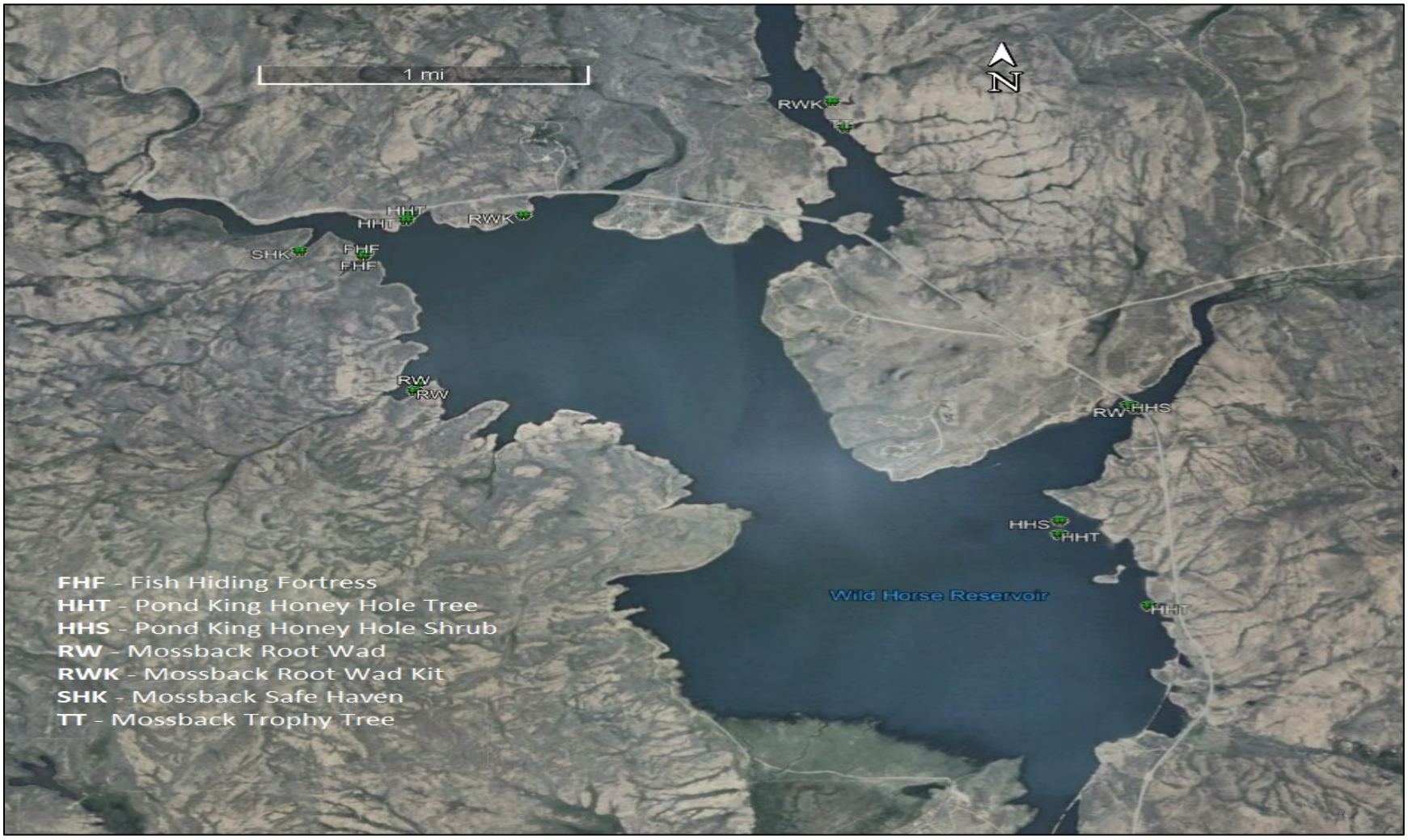

Table 5

Wildhorse Reservoir Artificial Habitats Locations

Structure Type	Easting	Northing	Type
Pond King Honey Hole Tree	600994.6070	4612433.6310	HHT
Pond King Honey Hole Shrubs	600916.1190	4614028.8310	HHS
Mossback Root Wad	600944.5310	4613997.8050	RW
Mossback Root Wad Kit	599495.1480	4616491.9890	RWK
Mossback Safe Haven Kit	596937.4220	4615221.2200	SHK
Mossback Root Wad	597523.4940	4614154.0220	RW
Mossback Root Wad	597508.7220	4614095.4110	RW
Mossback Trophy Tree	599557.3290	4616275.7550	TT
Mossback Root Wad Kit	598008.7810	4615532.1670	RWK
Pond King Honey Hole Tree	597444.0000	4615480.0000	HHT
Pond King Honey Hole Tree	597465.9000	4615528.5000	HHT
Pond King Honey Hole Shrubs	600577.1600	4613098.8300	HHS
Pond King Honey Hole Tree	600575.9000	4612991.5000	HHT
Fish Hiding Fortress	597243.0300	4615184.9400	FHF
Fish Hiding Fortress	597256.6000	4615213.6000	FHF

HHT - Pond King Honey Hole Tree
HHS - Pond King Honey Hole Shrub
RW - Mossback Root Wad
RWK - Mossback Root Wad Kit
SHK - Mossback Safe Haven Kit
TT - Mossback Trophy Tree
FHF - Fish Hiding Fortress

Table 6

2018 Quagga Mussel Sampling Results

Date	Boat Ramp	Canyon	Sho Pia
29-May	1380	792	589
19-Jun	0	0	0
10-Jul	0	3300	0
10-Oct	0	0	0