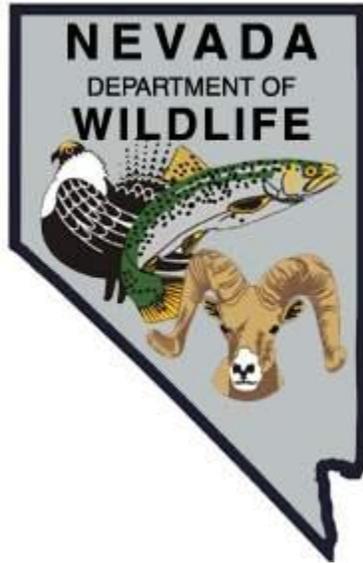


NEVADA DEPARTMENT OF WILDLIFE  
STATEWIDE SPORT FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORT

F-20-50  
2014

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, 2014 through December 31, 2014*

**SUMMARY**

The 2014 water year saw below average amounts of winter and spring precipitation within the basin for the third consecutive year. This resulted in Wildhorse Reservoir only filling to 24% capacity by May 26, a recharge of approximately 4,260 acre-ft of water. A drought related emergency dam shut-off was enacted on July 8, 2014 and the reservoir dropped to approximately 14.4% capacity or 10,250 acre-ft of water storage by November 11, 2014.

The anticipated and realized low water level and associated risk of fish mortality due to low dissolved oxygen levels during the hot summer months prompted NDOW to enact emergency fishing regulations for the second consecutive year. The emergency fishing regulation lifted the possession limit on all game fish species on May 14, 2014 and will remain in place until February 28, 2015. Noticeable increases in angler activity and angler harvest of game fish occurred during May-July, but restricted boat launching access and non-desirable fishing conditions (summer heat and high algae production) limited overall removal of trout species through August 2014. Thunderstorm activity in August and cooler nighttime temperatures dropped the surface temperature and lowered the thermocline to a safe level. This prevented a potential fish kill and revived the present habitat to a suitable, although severely diminished, level.

Twenty-three days of angler surveys on Wildhorse Reservoir contacted 336 anglers from January through December. Anglers reported fishing 1,060 hrs to catch 383 fish for annual average catch rates of 0.36 fish per hour and 1.14 fish per angler. The average harvest size for rainbow trout was 18.1 in FL, bowcutt trout averaged 19.2 in FL, wipers averaged 19.5 in TL and channel catfish averaged 27.9 in TL.

An electrofishing survey to inventory species composition occurred on August 27, 2014. Nongame and/or non-desirable fish species (yellow perch) to game fish species ratio in this survey was 0.1:1 (1 non-desirable fish:10.3 game fish), or a percent ratio of 9%:91%. Three gill nets were set on June 5, 2014 to also evaluate game fish and non-game fish composition. Nongame and/or non-desirable fish species (yellow perch) to game fish species ratio in this survey was 0.03:1 (1 non-desirable fish:33 game fish) or a percent ratio of 3%:97%. A combination of both fish population surveys together in 2014 produced a nongame and/or non-desirable to game fish species ratio of 0.1:1 (1 non-desirable fish:12.4 desirable game fish), or a percent ratio of 8%:92%.

Due to persistent drought conditions and a rapidly diminishing water level during May-July, no digital recording thermograph was installed in Wildhorse Reservoir in 2014. Additionally, no trout and no warmwater fish (channel catfish and wipers) were stocked in 2014 due to valid concerns of the diminishing water level.

A total of five days were spent conducting vertical plankton tows to survey for quagga mussel veliger presence. A total of 20 individual samples were evaluated, with all but one coming back as negative. The sample taken at the mouth of the canyon on August 25 came back with a positive qPCR for zebra mussels. Subsequent sampling in September and October resulted in a negative qPCR. Visual surveys of the exposed shoreline and the removed boat ramp resulted in no adult quagga mussels being observed. To date, no quagga mussels have been detected in lab analysis or tactile surveys from Wildhorse Reservoir.

## **BACKGROUND**

Historically, Wildhorse Reservoir has been managed as a quality trout fishery. Since the mid-1940's, the reservoir has 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 17 years, Wildhorse Reservoir received an annual average of 105,000 catchable sized trout and 62,000 sub-catchable and fingerling sized trout.

Anglers at Wildhorse Reservoir average 30,000 angler use 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 in the reservoir 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. 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. As a result of the expanding yellow perch population, an initial stocking of wipers (white bass x striped bass hybrid) was completed in 2002. Control of undesirable fish species is the primary management challenge and success of the trout fishery is directly related to the abundance of these undesirable fish species and reservoir water levels.

## **OBJECTIVES and APPROACHES**

Objective: General Sport Fisheries Management

Approach:

- Conduct a general fisheries assessment through opportunistic angler contacts.

Objective: Monitor impacts of undesirable fish on the rainbow trout fishery and the effectiveness of wipers in controlling these species.

Approach:

- Examine spawning/recruitment potential of black basses by monitoring water temperature variations using a digital recording thermograph.
- Examine growth and use of forage fish by capturing a minimum of 75 black bass through electrofishing in late summer.
- Set experimental gill nets for 3 net-nights in the spring.
- Analyze wiper data and write up final report of study.
- 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**

A minimum of two days of angler surveys were scheduled per month. 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 4, 2014, fished overnight and retrieved in the morning of the following day. Gill net locations were in the west side of State Park Island, 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 by species, counted and measured for length and examined for identifying marks or tag. Captured trout were also weighed for body condition appraisal.

The electrofishing survey was conducted during the nighttime hours of 1915 to 2215 on August 27, 2014. The twin anode Coffelt/Clark electrofishing barge with two bow netters was used. The electrofishing 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. Electrofisher settings and other relevant information during this inventory are listed in the following:

### August 27, 2014 Electrofishing Survey

<b>Pulse - DC</b>	<b>Pulse Width(millisecond) – 5</b>	<b>Time –1915-2215</b>
<b>Volts – 680</b>	<b>Pulse Freq.(per sec) – 60</b>	<b>Water Condition –algae moderate, reservoir at low capacity (~16%)</b>
<b>Output (amps) -5-6</b>	<b>Shocking Time (sec) – 4,710 seconds = (78 mins.)</b>	<b>Water Temp(°F) – 64</b>

Wildhorse Reservoir was sampled on June 23, July 14, August 25, September 22, and October 20 for quagga mussels. Sampling included checking artificial samplers and making vertical plankton net tows at two separate locations (only two sample locations in 2014 due to low water levels). Two samples were taken at each of the sample sites, resulting in 20 individual samples, and sent out to two individual labs for analysis.

### **FINDINGS**

#### General Sport Fisheries Management

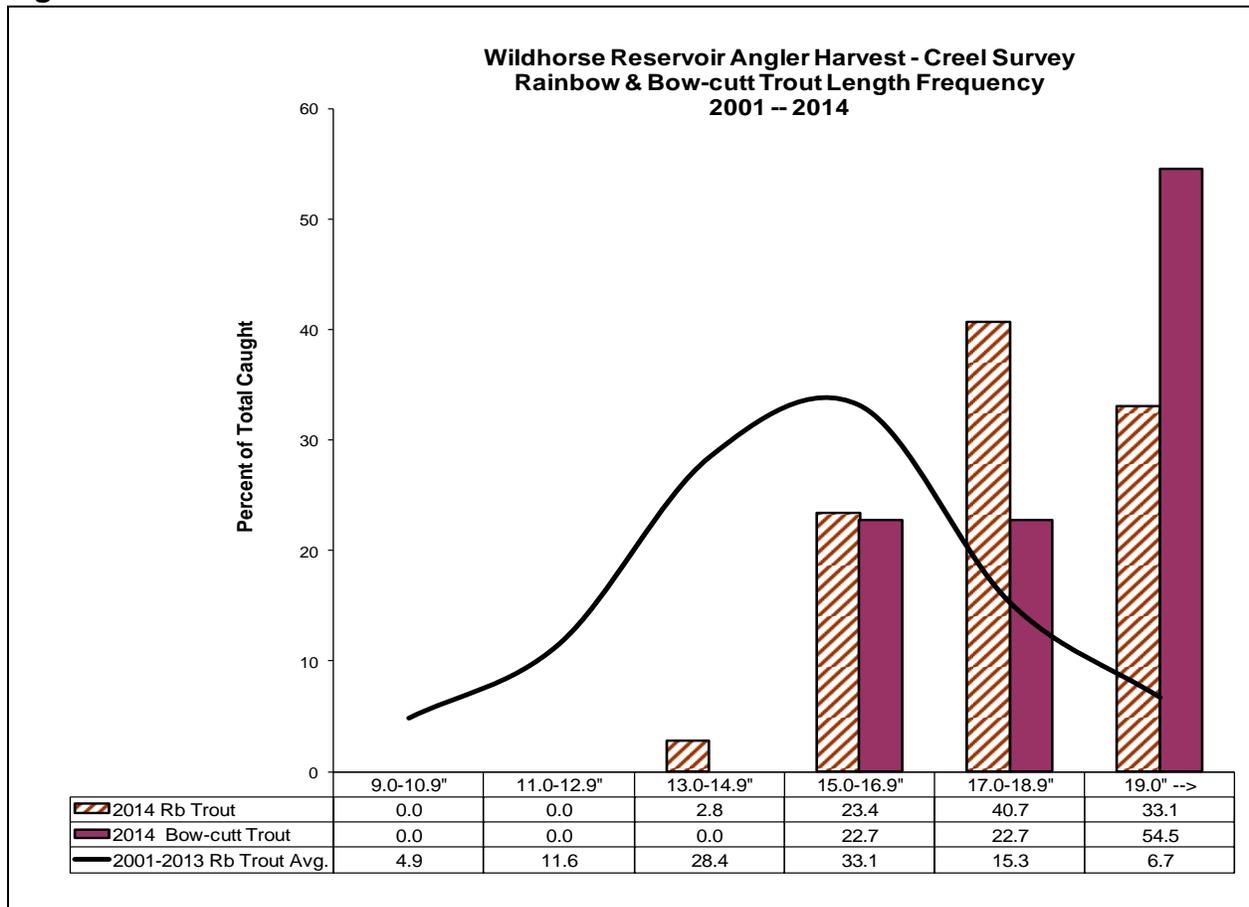
##### Opportunistic Angler Contacts and Surveys

During 2014, 336 anglers were contacted at Wildhorse Reservoir during 23 days of roving angler surveys (Table 1). A total of 1,060 hrs of fishing effort was expended to catch 383 fish, of which 91 were released (24% of total catch); despite a special “no limit” on game fish in effect. Overall angler success was 0.36 fish per hour and 1.14 fish per angler, with the highest catch rate occurring in October at 1.67 fish per hour and the lowest in August at 0.29 fish per hour.

The average harvest size for 145 rainbow trout measured was 18.1 in FL (Table 1), significantly higher than in previous years. Figure 1 illustrates angler caught rainbow trout length frequency compares to the cumulative 13-year average. Approximately 74% of the 2014 rainbow trout sampled were greater than 17.0 in, significantly higher than the 22% for the 2001-2013 average. In comparison to the post-treatment long-term average (1988-2013) harvest size of 14.5 in, the 2014 average size of rainbow trout harvested was significantly longer (+3.6 in). The lack of smaller fish being caught and the longer average size can be explained by the absence of trout stocked in 2014.

Of the 145 rainbow trout measured, 110 were weighed for body condition analysis, resulting in 14.5% (16 fish) in poor condition, 31.8% (35 fish) in fair condition, 43.6% (48 fish) in good condition, and 10% (11 fish) in excellent condition. Overall body condition for rainbow trout averaged 3.99 and rated “good.”

**Figure 1.**



Bowcutt trout continued to show a positive return to the angler, with excellent growth and an average harvest size of 19.2 in (size range 15.0 to 23.3 in FL) for 22 bowcutt trout measured. No stocking of bowcutt trout occurred in 2013 & 2014 due to a poor spawn and egg take at the spawning facilities and a limited number allotted to the region. This hybrid trout assists in biological control of undesirable fish species after they reach a size of 16.0 in or greater. They also increase recreational angling opportunities for larger trout (greater than 20 in).

Interest in fishing for warmwater fish (including black bass, wiper and channel catfish) was higher than usual due to the harvest limit being lifted in May 2014. Twenty wipers averaging 19.5 in TL, 5 channel catfish averaging 27.9 in TL, and 1 smallmouth bass averaging 12.2 in TL were sampled (Table 1).

The volunteer, Angler Drop-Box Survey was in use for the entire season, with only three surveys received from May through September 2014. Anglers reported fishing a total 32 hrs to catch 14 fish (13 trout and 1 yellow perch) for a catch rate of 4.7 fish per angler and 0.44 fish per angler hour. Approximately 38.5% (5 fish) of the angler reported catch was 17.0 in or greater.

No trout and no warmwater fish (channel catfish and wipers) were stocked in 2014 due to persistent drought conditions and valid concerns of a diminishing water level. Current environmental conditions continue to provide inadequate habitat for successful carryover and longevity of stocked trout.

### Water Quality Monitoring

Due to the ongoing drought and a rapidly diminishing reservoir water level during May-July, 2014, no digital recording thermograph was installed in the reservoir. Seasonal algae production was high throughout the summer months, but late summer thunderstorms and above average rainfall in the region during August had a cooling effect that prevented any fish kills.

Figures 4 and 5 illustrate Wildhorse Reservoir's storage for 2014 and reservoir elevation deficits from 2011 to 2014. The last year the reservoir achieved full capacity and spilled over the spillway was in 2011. Currently, Wildhorse Reservoir is 32 vertical feet from full capacity.

### Wildhorse Reservoir Fishery Study

#### Sport Fish Population Surveys

All three spring gill nets were fished for a combined 40 hours to capture 34 fish, with a species composition of rainbow trout 61.8%, bow-cutt trout 29.5%, wiper 5.9%, yellow perch 2.9%, and Lahontan tui chub 0%. The non-desirable fish species to game fish species ratio was 0.03:1 (1 non-desirable:33 game fish) or a percent ratio of 3%:97%.

Body condition factor (K-Factor) and overall body condition rating were calculated on 21 rainbow trout caught in gill nets. The average size rainbow trout captured was 17.5 inches total length (TL) and the overall K-Factor was 4.4 for a body condition rating of good. Approximately 15% were in fair, 52% in good and 33% in excellent condition. The largest rainbow trout captured was 21.7 inches caught in the Brown Cove gill net. The majority of the rainbow trout were carryover fish from 2012-2013 stocking efforts (13 to 20 inches), but larger age classes were represented and continued to provide quality angling of larger-sized trout. No marked Bel-Air strain rainbow trout stocked in May 2011 were captured during this survey.

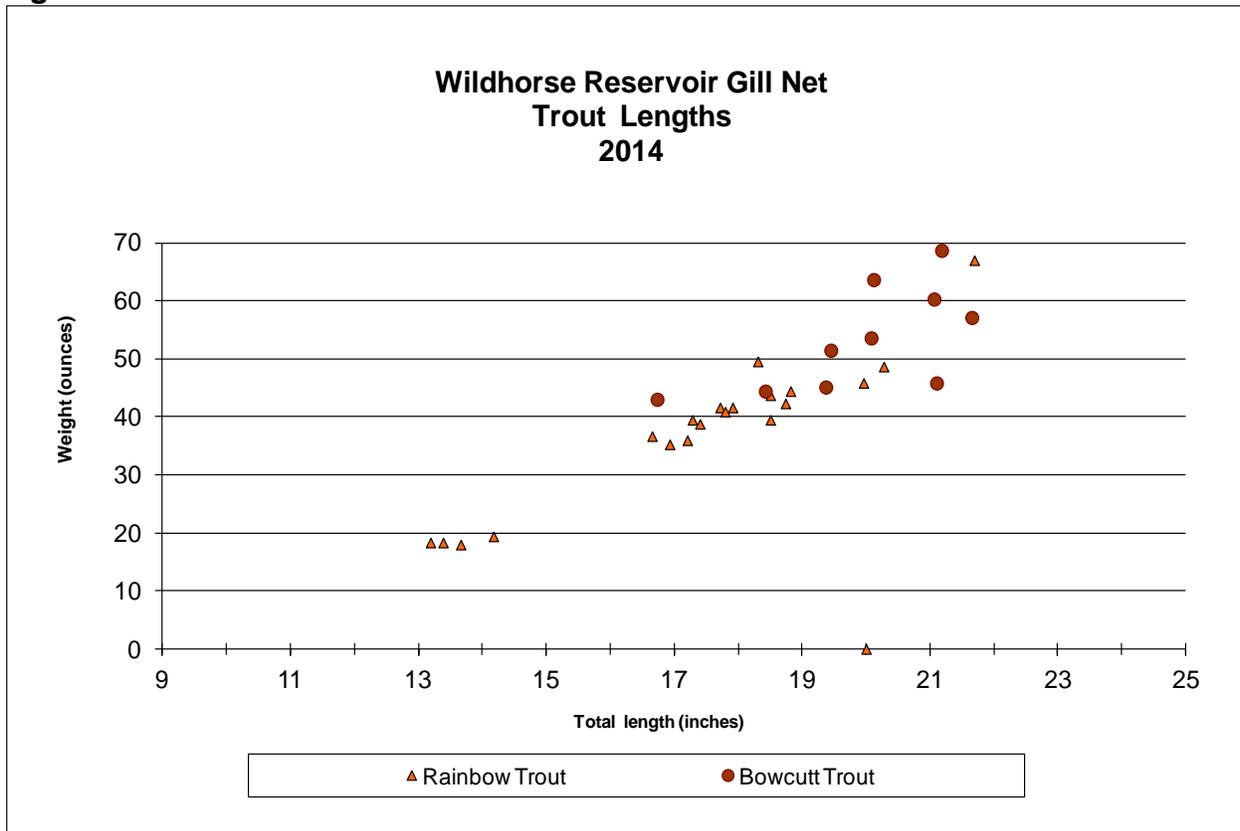
Bowcutt trout were represented in the gill net survey, with a total of 10 captured for an average size of 19.9 inches. The largest measured 21.7 inches TL (Figure 2). Utilizing rainbow trout body condition factors and ratings, bowcutt trout had an average K-Factor of 4.3 and rated good. Additionally, two wipers were captured in gill nets and had average length of 24.0 inches TL.

The August 27, 2014 electrofishing survey captured 113 fish, with a species composition of yellow perch 0%, bridge lip sucker 6%, redbreast shiner 3%, smallmouth

bass 68%, rainbow trout 10%, bowcutt trout 3%, brown trout 2%, tiger trout 1%, channel catfish 2% and wiper 5%. The 77 smallmouth bass measured varied in size from 3.0 to 17.2 inches TL, with an average size of 6.8 inches TL and dominated (72%) by age Class II-III cohorts (4 to 8 in TL fish). Nongame and non-desirable fish species to game fish species ratio in this survey was 0.1:1(1 non-desirable to 10.3 desired game fish) or a percent ratio of 9%:91%.

The last four years of population surveys continue to illustrate a downward trend in nongame/non-desirable species (tui chub, sucker, and yellow perch) to desired game fish (rainbow, bowcutt, brown, tiger trout, smallmouth bass, wiper, and channel catfish) ratio. Combining both fish population surveys from 2014 shows a nongame/non-desirable fish to game fish ratio of only 0.08:1 (1 non-desirable: 17.2 desirable game fish) or a percent ratio of 8%:92% (Table 3, Figure 3). This is well below the 19 year average of 2.2:1 ratio. Low reservoir water levels during 2012-2014 and management using biological control agents are having the desired impact on the non-desirable fish community. Sadly, the low water levels (less than 15% capacity in fall 2014) will most likely have a tremendous impact on all fish species in the coming years.

**Figure 2.**



Removal of yellow perch from the non-desirable category and the desirable sport fishery of Wildhorse Reservoir would be considered very productive and diverse, despite the effects and dynamics of fluctuating water levels. Only one adult-sized yellow perch (>6.0 in TL) and no Lahontan tui chub were captured in 2014, 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 to the sport fishery like the Lahontan tui chub or yellow perch. Yellow perch young-of-year were documented over the last seven years during electrofishing surveys. They have failed to carry forward in similar numbers or percentages to the next season, indicating continued predation on their population.

From 2007-2014, a total of 343 wipers have been tagged, recaptured, reported by anglers or documented during population surveys, and incorporated into the Wildhorse Reservoir wiper fishery database. The average initial size of these fish was 18.9 in TL and 3.9 lbs. Through December 2014, a total of 35 (10%) wiper tag returns have been documented, with an average size of 21.8 in TL, weight of 5.24 lbs and average longevity of 2.29 years of residency since time of tagging. Tagged wipers are averaging approximately 1.9 inches TL and 15 oz per year of growth. Final write up of the fishery study and utilization of wipers in controlling non-desirable fish species and the expected benefits to the rainbow trout fishery will be completed in 2015.

### Quagga Mussel Surveys

The sample taken at the mouth of the canyon on August 25, came back with a positive qPCR for zebra mussels. Subsequent sampling in September and October resulted in negative qPCR results for Wildhorse. The results of a single positive detection leads to an assumption of contamination during the sampling process or a false positive measured at the lab. Because there are no zebra mussels in Wildhorse Reservoir, the contamination of sampling equipment could have come from zebra mussel detected at the South Fork Reservoir on July 14. Any zebra mussel DNA present in samples, which later was not detected, could be attributed to an introduction of dead mussel DNA into a reservoir just prior to sampling.

With the low water level of the reservoir, visual surveys of exposed substrate produced no evidence of invasive mussels. Due to isolated, positive results for quagga mussel DNA 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 entire 2014 fishing season with fair to good fishing reported despite low water conditions, with few marked trout recovered (Bel-Air strain rainbow). Lifting of all game fish limits helped reduce total biomass within the reservoir, although fair to good numbers of game fish remain.
- The installation and retrieval of the recording thermograph were not completed due to dropping water levels.

- The electrofishing survey to monitor for black bass and composition of other fish species was completed in late summer. Population surveys revealed excellent success in controlling the non-game fish/non-desirable to game fish ratios and good carryover of planted trout in the spring gill nets. Tagged wipers were documented in 2014 and will be incorporated into the final write up of the study.
- Trout, wipers, and channel catfish were not stocked due to low water conditions.

### **RECOMMENDATIONS**

- Continue angler surveys to develop an accurate assessment of angler use and harvest of all sport fish during extended drought periods, and look for remaining marked trout stocked in 2011.
- Conduct an electrofishing survey to assess age class distribution, body condition, and Relative Stock Density of the black bass population when relevant.
- Continue to monitor reservoir water quality (temperatures and dissolved oxygen) in spring/summer to evaluate and predict timing of black bass spawning and harvest limits placed upon remaining fish populations.
- Continue population sampling to monitor game fish/non-game fish ratios.
- Continue stocking piscivorous fish 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 drought conditions to offset resource losses.

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Fisheries Biologist, Eastern Region

Date: February 2015

Table 1

**WILDHORSE RESERVOIR**  
**2014 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	0	1	1	5	3	3	1	2	1	1	23
Avg. Water Temp.	Ice=14"	Ice= 19"		51	61	66	75	73	63	57	40	Ice=2"	60.8
No. Anglers Checked	44	71		0	25	103	49	22	7	13	2	0	336
No. of Hours Fished	122	235.5			97	337	144.5	64.5	13.5	40	6.0		1,060
Total Fish Caught	38	96			34	106	51	19	4	25	10		383
Total Fish Harvested	30	60			24	89	35	15	4	25	10		292
<i>Rainbow Trout</i>	24	43			20	75	31	14	4	22	8		241
<i>Brown Trout</i>	0	0			0	0	0	0	0	0	0		0
<i>Bow-cutt Trout</i>	6	17			0	2	0	0	0	2	2		29
<i>Tiger Trout</i>	0	0			0	0	0	0	0	0	0		0
<i>Black Bass</i>	0	0			1	0	0	0	0	0	0		1
<i>Wiper</i>	0	0			0	14	3	1	0	1	0		19
<i>Channel Catfish</i>	0	0			3	1	1	0	0	0	0		5
<i>Yellow Perch</i>	0	0			0	0	0	0	0	0	0		0

**Average Measured Fish Harvest Size**

<i>Rainbow Trout No.</i>	16	34			15	35	22	14	3	3	3		145
<i>Avg. Size (FL-inches)</i>	17.4	17.6			17.9	18.3	18.9	18.5	18.6	18.7	19.4		18.1
<i>Brown Trout No.</i>	0	0			0	0	0	0	0	0	0		0
<i>Avg. Size (FL-inches)</i>													
<i>Bow-cutt Trout No.</i>	5	12			0	2	0	0	0	1	2		22
<i>Avg. Size (FL-inches)</i>	20.5	18.7				18.0				18.5	20.1		19.2
<i>Tiger Trout No.</i>	0	0			0	0	0	0	0	0	0		0
<i>Avg. Size (FL-inches)</i>													
<i>Black Bass No.</i>	0	0			1	0	0	0	0	0	0		1
<i>Avg. Size (TL-inches)</i>					12.2								12.2
<i>Wiper</i>	0	0			0	15	3	1	0	1	0		20
<i>Avg. Size (TL-inches)</i>						19.1	21.2	18.5		21.3			19.5
<i>Channel Catfish No.</i>	0	0			3	1	1	0	0	0	0		5
<i>Avg. Size (TL-inches)</i>					25.5	30	33						27.9
<i>Yellow Perch No.</i>	0				0	0	0	0	0	0	0		0
<i>Avg. Size (TL-inches)</i>													

**Angler Catch Rate**

Fish / Hour	0.31	0.41			0.35	0.32	0.35	0.29	0.30	0.63	1.67		0.36
Fish / Angler	0.86	1.35			1.36	1.03	1.04	0.86	0.57	1.92	5.00		1.14

\* All gamefish limits lifted on 5/14/2014 due to drought conditions and low reservoir levels

Table 2

**Wildhorse Reservoir  
Population Sampling Catch Record  
2014**

Net/Sample #		#1-3	Electrofishing		
Date:		6/5/2014	8/27/2014		
<b>SPECIES</b>				<b>TOTALS</b>	<b>% of Species Composition</b>
<i>Rainbow Trout</i>	Number of Fish Sampled	21	11	<b>32</b>	<b>21.8</b>
	Avg. Size (Inches-FL)	17.5	18.1	<b>17.7</b>	
<i>Bow-Cutt Trout</i>	Number of Fish Sampled	10	4	<b>14</b>	<b>9.5</b>
	Avg. Size (Inches-FL)	19.9	20.6	<b>20.1</b>	
<i>Brown Trout</i>	Number of Fish Sampled	0	2	<b>2</b>	<b>1.4</b>
	Avg. Size (Inches-FL)		17.5	<b>17.5</b>	
<i>Tiger Trout</i>	Number of Fish Sampled	0	1	<b>1</b>	<b>0.7</b>
	Avg. Size (Inches-FL)		20.3	<b>20.3</b>	
<i>Largemouth Bass</i>	Number of Fish Sampled	0	0	<b>0</b>	<b>0.0</b>
	Avg. Size (Inches-TL)				
<i>Smallmouth Bass</i>	Number of Fish Sampled	0	77	<b>77</b>	<b>52.4</b>
	Avg. Size (Inches-TL)		6.9	<b>6.9</b>	
<i>Wiper</i>	Number of Fish Sampled	2	6	<b>8</b>	<b>5.4</b>
	Avg. Size (Inches-TL)	24	21.9	<b>22.4</b>	
<i>Channel Catfish</i>	Number of Fish Sampled	0	2	<b>2</b>	<b>1.4</b>
	Avg. Size (Inches-TL)		21.9	<b>21.9</b>	
<i>Yellow Perch</i>	Number of Fish Sampled	1	0	<b>1</b>	<b>0.7</b>
	Avg. Size (Inches-TL)	7.5		<b>7.5</b>	
<i>Tui Chub</i>	Number of Fish Sampled	0	0	<b>0</b>	<b>0.0</b>
	Avg. Size (Inches-TL)				
<i>Red Side Shiner</i>	Number of Fish Sampled	0	3	<b>3</b>	<b>2.0</b>
	Avg. Size (Inches-TL)		3.6	<b>3.6</b>	
<i>Bridgelip Sucker</i>	Number of Fish Sampled	0	7	<b>7</b>	<b>4.8</b>
	Avg. Size (Inches-TL)		8.2	<b>8.2</b>	
TOTAL FISH		34	113	<b>147</b>	
Hours Sampled		40.0	1.31	<b>41.3</b>	
% Non-desirable Fish		2.9	8.8	<b>7.5</b>	
Fish / Net-Shocking Hour		0.85	86.3	<b>3.6</b>	
Reservoir Water Temp. °F		59.7	64.0		
** Wildhorse Res. Storage Capacity at time of survey (Approx. % Acre-Feet)		23%	16%		

**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. State Park Island, West side. Experimental Mesh gill net, 150 feet long.
4. State Park Is, West Shoreline, Mouth of Canyon, Brown Cove Electrofish 8/27/2014

\*\* 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 - 2014**

Year	Electrofish Survey		Gill Net Survey		Surveys Combined		
	No.	Ratio	No.	% Ratio	No.	Ratio	% Ratio
1996	1.2:1	54:46	1.4:1	58:42	1.4:1	59	41
1997	1.3:1	56:44	5.2:1	84:16	2.4:1	71	29
1998	13.4:1	93:7	3.1:1	75:25	5.6:1	85	15
1999	1.5:1	59:41	8.3:1	89:11	3.1:1	75	25
2000	2.6:1	72:28	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	3.0:1	75:25	2.8:1	73	27
2003	2.0:1	67:33	1.0:2	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	86:14	2.1:1	68:32	5.5:1	85	15
2006	3.2:1	76:24	3.0:1	80:20	3.3:1	77	23
2007	3.2:1	76:24	1.8:1	65:35	2.7:1	73	27
2008	1.0:1.2	46:54	10.7:1	92:8	1.6:1	62	38
2009	1.1:1	52:48	0.12:1	11:89	0.8:1	44	56
2010	1.3:1	57:43	0.21:1	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	0.15:1	13:87	0.4:1	31	69
2013	0.5:1	35:65	0.05:1	5:95	0.3:1	20	80
2014	0.1:1	9:91	0.03:1	3:97	0.1:1	8	92
19-Year Avg.			9-Year Avg.		<b>2.2:1</b>	<b>60.1</b>	<b>39.9</b>

**Figure 3**

**Wildhorse Reservoir Population Monitoring  
Non-desirable to Game Fish % Ratio**

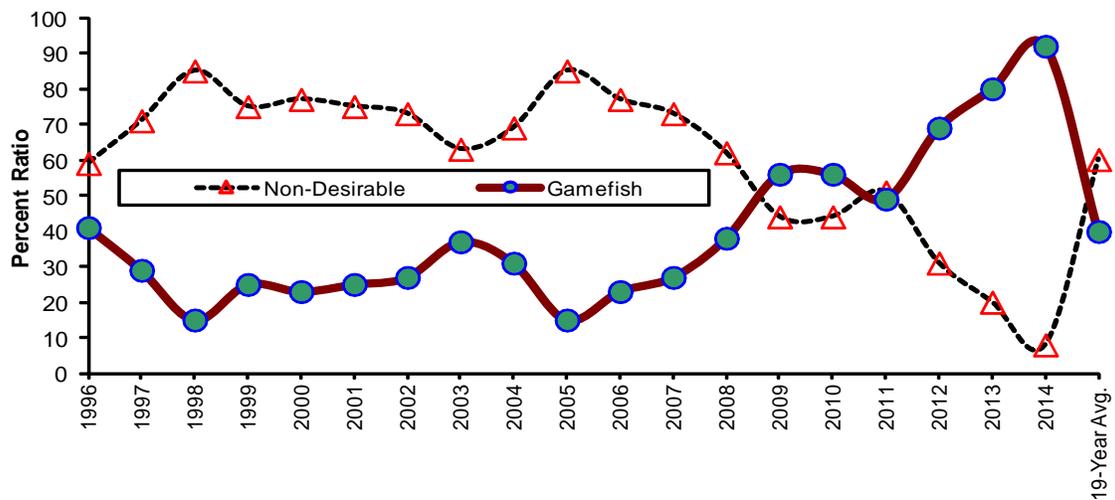


Figure 4

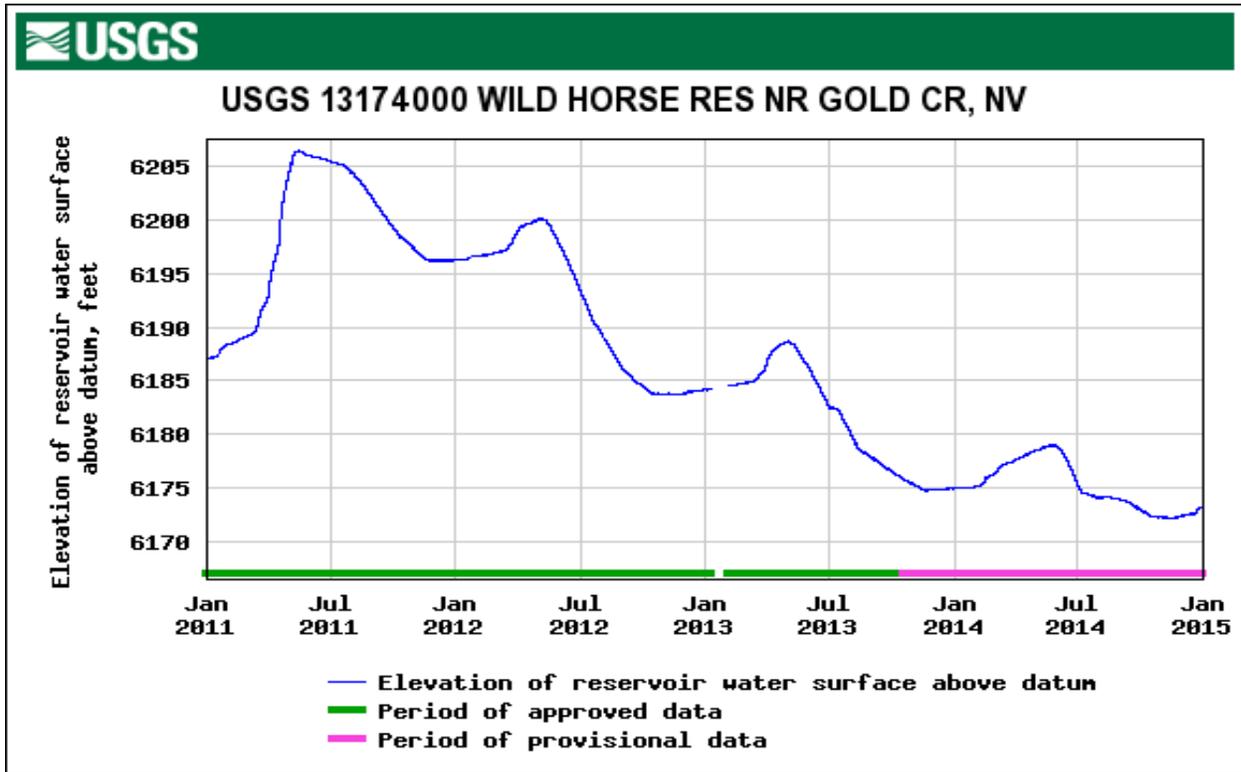


Figure 5

