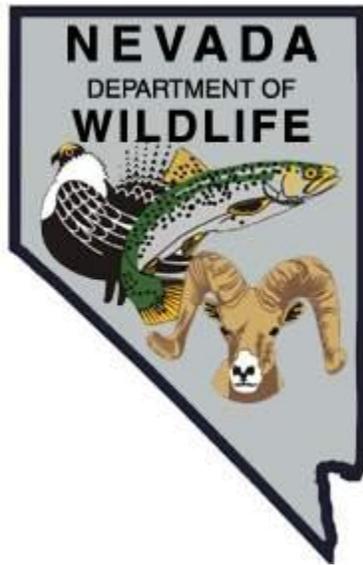


NEVADA DEPARTMENT OF WILDLIFE
STATEWIDE SPORT FISHERIES MANAGEMENT



FEDERAL AID JOB PROGRESS REPORT

F-20-49
2013

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**

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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, 2013 through December 31, 2013*

SUMMARY

The 2013 water year saw below average amounts of winter and spring precipitation within the basin for the second consecutive year, which resulted in Wildhorse Reservoir only filling to 45% capacity in May, a recharge of approximately 6,850 acre-ft of water. By November 18, 2013, the dam discharge gate was shut off and the reservoir sat at approximately 17.8% capacity or 12,660 acre-ft of water storage.

The anticipated and realized low water levels and associated risks of fish mortality due to low dissolved oxygen levels during the hot summer months prompted NDOW to enact emergency fishing regulations for Wildhorse Reservoir. The emergency fishing regulation lifted the possession limit on all trout species on June 20, 2013 and remained in place until October 15, 2013. Noticeable increases in angler activity and angler harvest of trout occurred in July, but reduced boat launching access and non-desirable fishing conditions (summer heat and high algae production) limited overall removal of trout species through August 2013. Thunderstorm activity in August and cooler nighttime temperatures dropped the reservoir surface temperature and lowered the thermocline to a safe level, thus eliminating a potential fish kill from occurring and reviving the remaining habitat to suitable, although severely diminished, levels.

Twenty-five days of angler surveys on Wildhorse Reservoir contacted 313 anglers from January through December. Anglers reported fishing a total of 882 hrs to catch 558 fish for annual average catch rates of 0.63 fish per hour and 1.78 fish per angler. The average harvest size for rainbow trout was 16.4 in FL, bowcutt trout averaged 19.8 in FL, wipers averaged 21.2 in TL, channel catfish averaged 24.8 in TL, and yellow perch averaged 9.3 in TL. A total of 63,710 trout were stocked during 2013. No warmwater fish (channel catfish and wipers) were stocked in 2013 due to drought conditions and diminishing water levels.

An electrofishing survey to inventory species composition occurred on September 9, 2013. Nongame and/or non-desirable fish species (yellow perch) to game fish species ratio in this survey was 0.5:1 (28 non-desirable fish:53 game fish), or a percent ratio of 35%:65%. Three gill nets were set on May 30, 2013 to 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 0.05:1 (4 non-desirable fish:75 game fish) or a percent ratio of 5%:95%. A combination of both fish population

surveys together in 2013 produced a nongame and/or non-desirable to game fish species ratio of 0.25:1 (32 non-desirable fish:128 desirable game fish), or a percent ratio of 20%:80%.

Over the course of 11 sampling days during the spring and summer of 2013, 26 wipers were contacted and tagged with the numeric yellow Floy tag for future identification. Three of these were recaptured wipers from previous sampling efforts and three were angler reported fish lengths and weights for a total of 32. The wipers sampled had an average size of 22.2 in TL and 92.4 oz (5.8 lbs), with fish ranging in size from 14.0 in to 27 in TL and a maximum weight of 162 oz (10.12 lbs).

A digital recording thermograph was installed in Wildhorse Reservoir in early May to monitor water temperature patterns for forecasting black bass spawning behavior during 2013. Desired bass spawning temperatures of >60°F were not consistently reached until June 1 and remained at or above that temperature throughout the rest of the spring.

A total of four days were spent collecting vertical plankton tows to survey for quagga mussel presence. A total of 24 individual samples were evaluated for the presence of quagga veligers, all of which came back as negative. Visual surveys of the artificial samplers, exposed shoreline, and the removed boat ramp resulted in no quagga mussels being observed. To date, no quagga mussels have been detected in lab analysis or tactile surveys.

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.
- Use hook-and-line to collect a minimum of 50 wipers to assess stomach contents.
- Set experimental gill nets for 3 net-nights in the spring.
- 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.
- Purchase and stock 1,500 wipers and 10,000 channel catfish.

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.

A HOBO Water Temp Pro data logger recording thermograph was installed and was placed approximately 36 in below the surface off an anchored buoy chain near the State Park Island.

The electrofishing survey was conducted during the nighttime from 1915 to 2215 hrs on September 9, 2013. The twin anode Coffelt/Clark electrofishing barge with two bow netters was used. The electrofishing survey was conducted at the southeast side of the reservoir by Goose Island, the State Park Island, 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 9, 2013 Electrofishing Survey

Pulse: DC	Pulse Width (ms): 4	Time: 1915 to 2215 hrs
Volts: 680	Pulse Freq. (per sec): 60	Water Condition: algae moderate, reservoir at low capacity (~21%)
Output (amps): 5-6	Shocking Time (sec): 2,107 s = (35 min)	Water Temp (°F): 66

Wipers were collected by hook-and-line, electrofishing, and gill netting to monitor food habits and to tag with a numeric yellow Floy tag for documenting growth, longevity, angler return, and other attributes (catch rates, angler preference, palatability, etc.). No wipers or channel catfish were stocked in 2013 due to diminishing water levels associated with regional drought conditions.

Three variable mesh gill nets were set in the early evening on May 30, 2013, fished overnight, and retrieved in the morning of the following day. Gill net locations were in the Hendrick’s Arm, Brown Cove in the canyon, and Trophy Cove on the Northeast shoreline. All fish species were targeted for capture. All captured fish were identified by species, counted, and measured for length. Captured trout were also weighed for body condition appraisal.

Three different survey techniques were utilized in the monitoring of quagga mussels including artificial substrate samplers, plankton tows, and visual/tactile surveys. Artificial samplers were constructed out of nylon rope, PVC and ABS pipe, and concrete cinder blocks. Samplers were set out shortly after spring thaw to allow for the creation of a biofilm. Samplers were checked visually and tactilely, paying particular attention to edges. Prior to ice up in the late fall, samplers were removed and thoroughly checked and scraped at the Elko field office. Plankton net tows were conducted June through September for all three locations. A 63 µm mesh plankton net was used to take vertical samples at various depths. These samples were then preserved in ethanol and sent off for lab analysis. Visual/tactile surveys were conducted during visits to water for plankton net sampling. Due to the large monthly water fluctuation at Wildhorse Reservoir, exposed substrate were examined regularly. As the boat ramp dock at Wildhorse Reservoir is removed from the water at the end of the year, a thorough inspection can be made of the entire dock.

FINDINGS

General Sport Fisheries Management

Opportunistic Angler Contacts and Surveys

During 2013, 313 anglers were contacted at Wildhorse Reservoir during over 25 days of roving angler surveys (Table 1). A total of 882 hrs of fishing effort was expended to catch 558 fish, of which 235 were released (42% of total catch). Overall angler success was 0.63 fish per hour and 1.78 fish per angler, with the highest catch rate occurring in January at 0.85 fish per hour, and the lowest in April at 0.31 fish per hour.

The average harvest size for 117 rainbow trout measured in 2013 was 16.4 in FL (Table 1). Figure 1 illustrates angler caught rainbow trout length frequency and compares it with the 12 year average. Approximately 32% of the 2013 rainbow trout sampled were greater than 17.0 in, significantly higher than the 21.2% for the 2001 to 2012 average. In comparison to the long-term (1988 to 2012) average harvest size of 14.4 in, the 2013 average size of rainbow trout harvested was significantly longer (+2.0 in) and illustrates continued improvement in the trout fishery.

Of the 117 rainbow trout measured, 98 fish were weighed for body condition analysis, resulting in 3.1% (3 fish) in poor condition, 19.4% (19 fish) in fair condition, 51% (50 fish) in good condition, and 26.5% (26 fish) in excellent condition. Overall body condition for the 98 rainbow trout measured was 4.29 and rated "good."

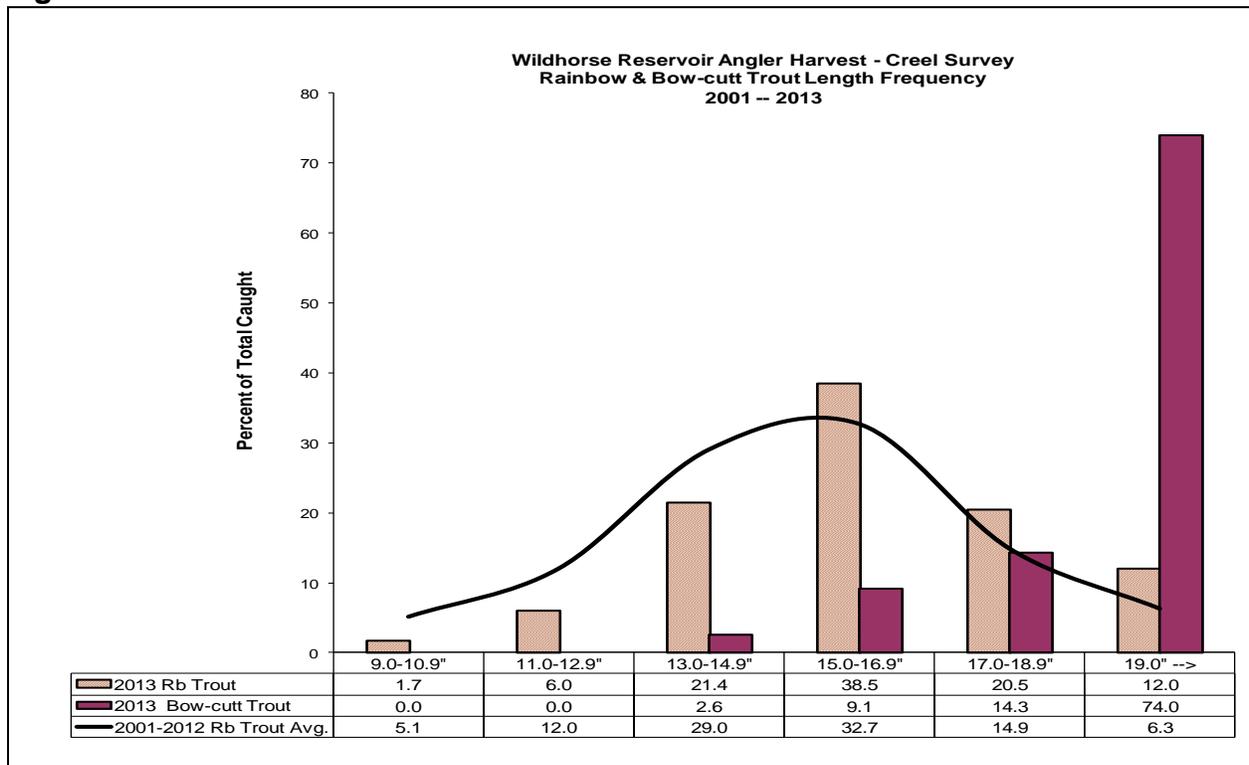
Bowcutt trout continue to show a positive return to the angler, with excellent growth and an average harvest size of 19.8 in (size range 14.2 to 24.0 in FL) for 77 bowcutt trout measured. No stocking of bowcutt trout occurred in 2013 due to a poor spawn and egg take at the spawning facilities. This hybrid 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).

Although the overall harvest of warmwater fish (including black bass, wiper and channel catfish) was low, interest in fishing for these species continues even during the catch and release season (March 1 through June 30 for black bass). Four channel catfish measured in 2013 averaged 24.8 in TL, 6 wipers averaged 21.2 in TL, and 4 yellow perch averaged 9.3 in TL.

The Wildhorse Reservoir volunteer Angler Drop-Box Survey was in use for the entire season, with only 18 surveys received from May through July 2013. Anglers reported fishing 105 hrs to catch 193 fish (187 trout, 6 white bass/wiper, and 0 yellow perch) for a catch rate of 8.8 fish per angler and 1.8 fish per angler hour. Approximately 24.5% of the angler reported catch was 17.0 in or greater, slightly lower than the 32% of measured rainbow trout from the creel survey and lower than the 34.2% 2005 to 2012 drop-box average.

Fish stocking at Wildhorse Reservoir during 2013 resulted in adding 38,760 catchable trout and 24,950 sub-catchable and fingerling trout for a total of 63,710 trout and no warmwater fish (Table 2). This equates to a 65% decrease in total number of fish stocked in comparison to the 176,125 fish stocked during the long-term average period of 1993 to 2012. Regional drought conditions and diminishing water levels continue to provide inadequate habitat conditions for successful carryover and longevity of stocked trout.

Figure 1.



Water Quality Monitoring

A digital recording thermograph was installed in Wildhorse Reservoir on May 9 to monitor water temperature patterns associated with black bass spawning behavior during the spring and summer. Preferred bass spawning temperatures fluctuated during mid-May and finally stabilized by June 1 and continued uninterrupted through the remainder of the summer. A dramatic warm-up occurred during both the end of May and again in June, quite possibly the results of diminishing water levels. A maximum temperature of 74.3°F occurred on July 22 and continued to taper off thereafter (Figure 2).

The threat of a summertime fish kill (trout species) due to high water temperatures (>72°F), associated with low levels of dissolved oxygen (< 3.0 ppm) coupled with algae decomposition, was not realized during late summer 2013. Figure 3 illustrates dissolved oxygen levels taken during the summer of 2013. A strong thermocline

(temperature/dissolved oxygen gradient) developed by July 23 and then slowly regressed to safe levels for trout inhabitation through August, which narrowly prevented a fish kill from occurring at Wildhorse Reservoir.

Figure 2.

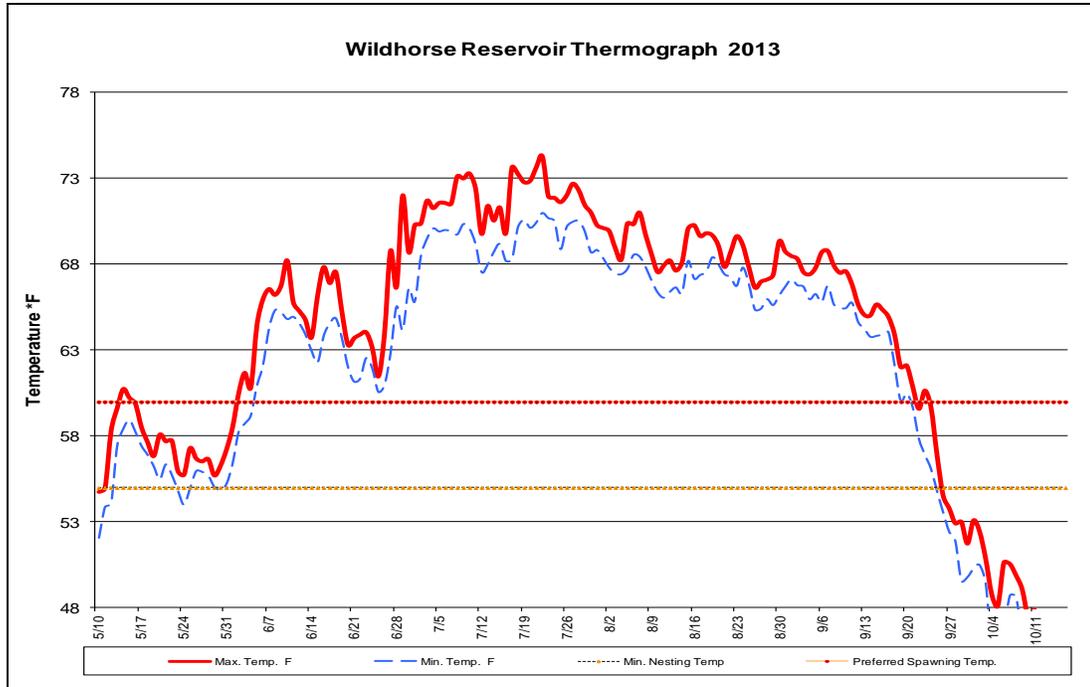
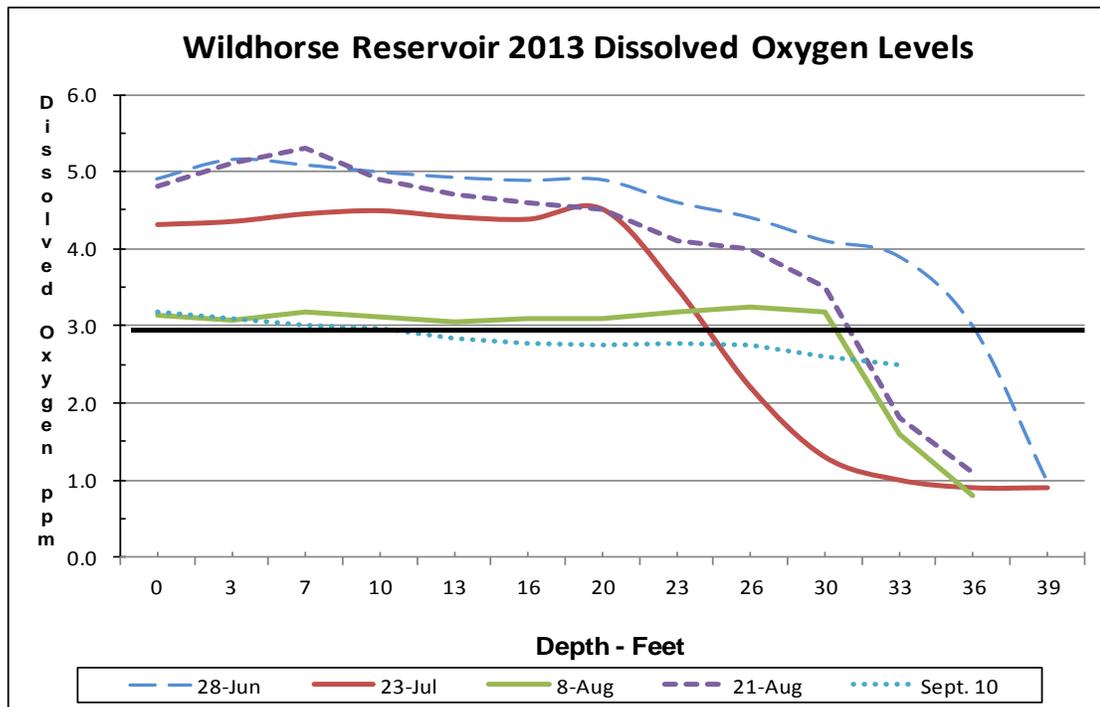


Figure 3.



Wildhorse Reservoir Fishery Study

Sport Fish Population Surveys

Three spring gill nets were fished 43 hrs to capture 79 fish, with a species composition of rainbow trout 54.5%, bowcutt trout 35.5%, wiper 1%, tiger trout 1%, brown trout 1%, smallmouth bass 1%, Lahontan tui chub 3%, and yellow perch 1%. The non-desirable fish species to game fish species ratio in this survey was 0.05:1 (4 non-desirable fish:75 game fish) or a percent ratio of 5%:95%.

Body condition factor (C-Factor) and overall body condition rating were calculated on 43 rainbow trout. The average size of the rainbow trout captured was 15.4 in TL and the overall C-Factor was 4.3 for a body condition rating of good. Approximately 68% were in good and 23% in excellent condition, similar to the 2012 gill net survey results. The largest rainbow trout captured in the gill nets was 23.2 in caught in the Hendrick's Arm set. The majority of the rainbow trout caught in the gill nets were carryover fish from the 2011-2012 stocking efforts (12 to 19 in), but larger age classes were represented and continued to provide for quality angling for larger size trout. One marked fish from the May 2011 stocking effort to evaluate the Bel-Air strain rainbow trout was captured during this survey, measuring 16.5 in and weighing in at 2.0 lbs. This adipose fin clipped fish had grown 7.9 in during 756 days of residency in Wildhorse Reservoir, similar to other marked fish returns of the same strain.

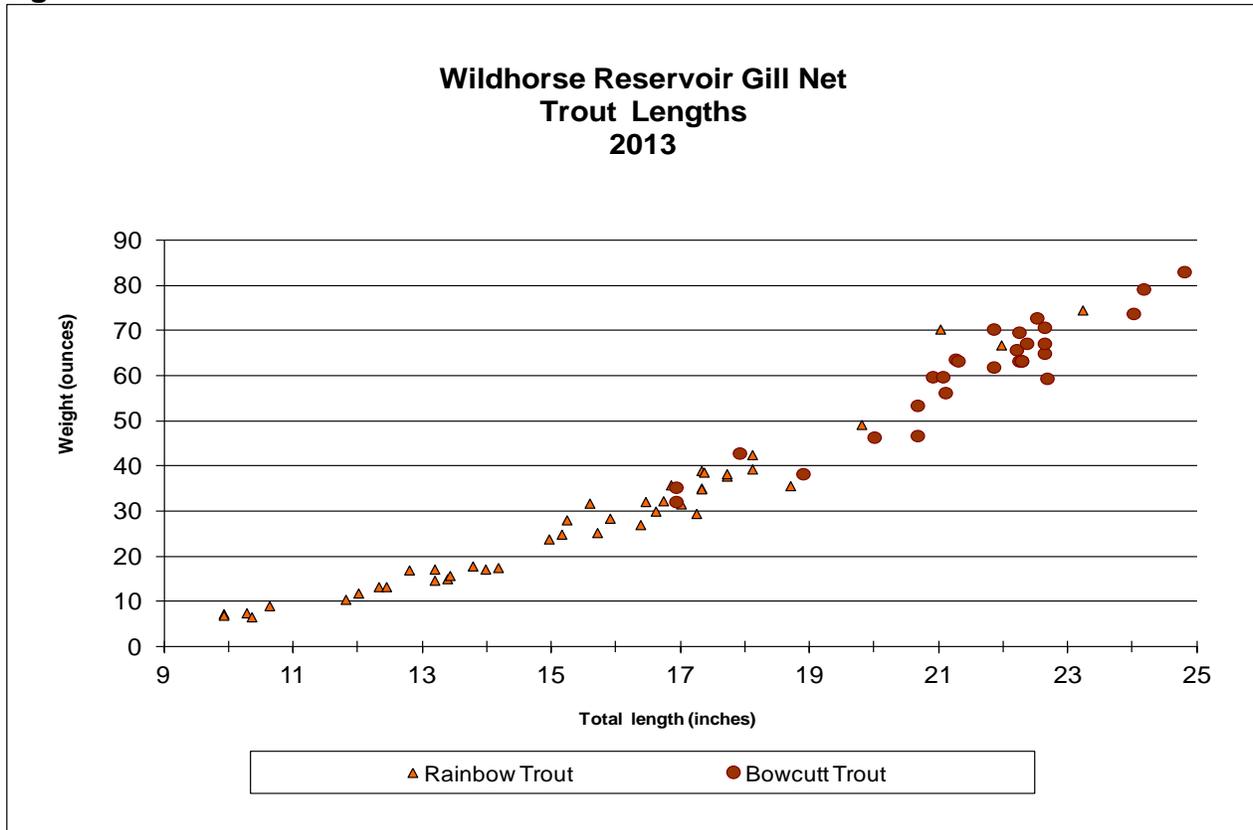
Bowcutt trout were also well represented in the gill net survey, with 28 bowcutt trout captured at an average size of 21.5 in (fall 2010 stock). The largest bowcutt trout measured 24.8 in TL (Figure 4). Utilizing rainbow trout body condition factors and ratings, the bowcutt trout had an average C-Factor of 3.8 and rated fair. One wiper was captured in the Hendrick's Arm set and had a length of 18.0 in TL.

The September 9, 2013 electrofishing survey captured 81 fish, with a species composition of yellow perch 28%, bridge lip sucker 4%, redbside shiner 3%, smallmouth bass 41%, rainbow trout 17%, bowcutt trout 3%, channel catfish 3%, and wiper and tiger trout 1%, respectively. The 33 smallmouth bass measured varied in size from young-of-year (2.0 in) to 17.2 in TL, with an average size of 9.0 in TL and a body condition rating of good. Nongame and non-desirable (yellow perch) fish species to game fish species ratio in this survey was 0.5:1 (28 Non-desirable fish:53 desired game fish), or a percent ratio of 35%:65%.

The last four years of population surveys illustrates a downward trend in both the percent and number ratio of the nongame/non-desirable species (tui chub, sucker, and yellow perch) to the desired game fish (rainbow, bowcutt, brown, and tiger trout, smallmouth bass, wiper and channel catfish). Combining both fish population surveys together in 2013 produced a nongame/non-desirable to game fish species ratio of 0.25:1 (32 non-desirable fish:128 desirable game fish) or a percent ratio of 20%:80% (Figure 6), well below the 18 year long-term average ratio of 2.3:1. Low reservoir water levels in 2013 and use of biological control agents within the fishery are having a

desired impact on the non-desirable fish community. Sadly, the low water levels (less than 20% capacity in fall 2013) are going to have a tremendous impact on all fish species in the coming years.

Figure 4



Removal of yellow perch from the non-desirable category and the sport fishery of Wildhorse Reservoir would be considered very productive and diverse, despite the effects and dynamics of fluctuating water levels. Very few adult size yellow perch (>6.0 in TL) and only two Lahontan tui chub were captured and the only non-game/non-desirable fish of concern was the bridgelip sucker. Their numbers were consistent with historic surveys and do not pose a threat like the Lahontan tui chub or yellow perch. Yellow perch YOY have been documented for the last seven years during electrofishing surveys, but they have failed to carry forward in similar numbers or percentages to the next survey season, indicating continued predation.

Wiper Assessment

Over the course of 11 sampling days during the spring and summer of 2013, 26 wipers were contacted and tagged with the numeric yellow Floy tag for future identification. Three were recaptured wipers from previous sampling efforts and three were angler harvest with reported fish lengths and weights. The wipers sampled had an average size of 22.2 in TL and 92.2 oz (5.8 lbs), with fish ranging in size from 14.0 in to 27 in TL and a maximum weight of 162.5 oz (10.2 lbs). Including the 32 wipers tagged

or reported on in 2013, 339 wipers have been tagged and/or reported for Wildhorse Reservoir over the last seven years of the study (Figure 5).

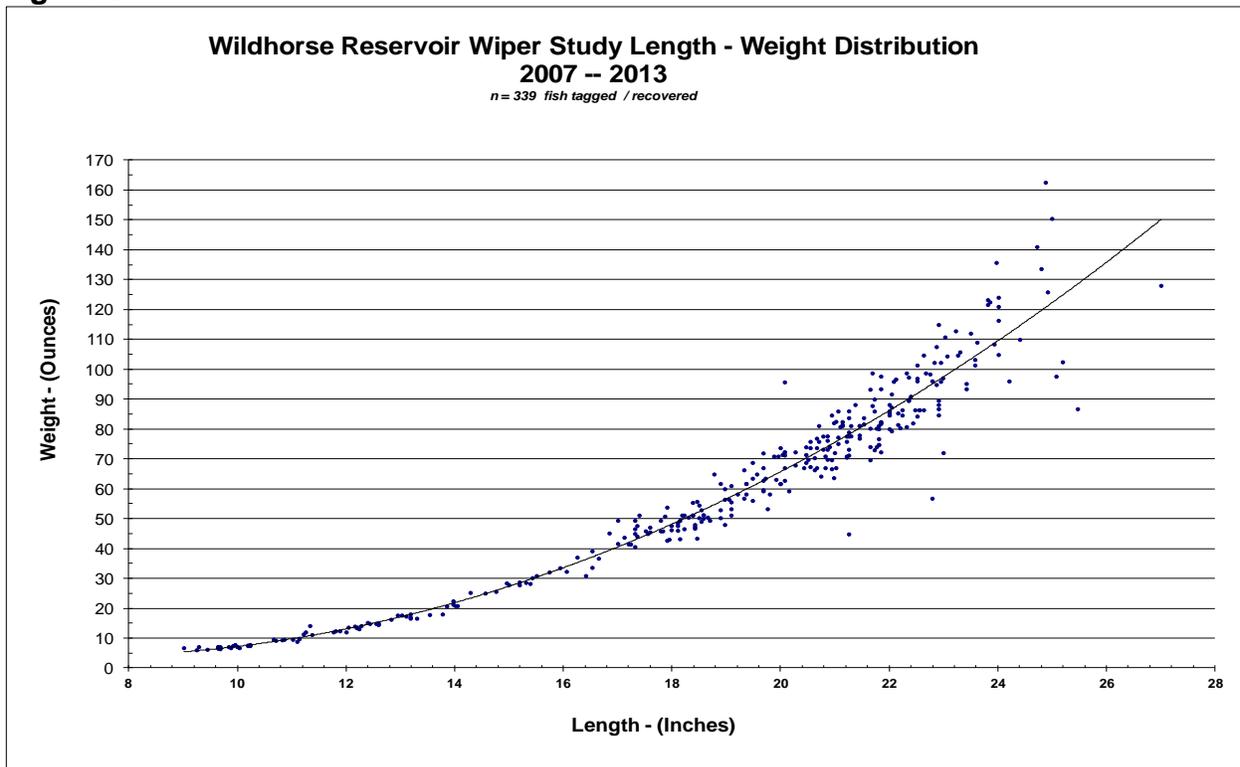
Of the 25 wipers collected during angling surveys in 2013, 6 of these fish had empty stomachs (24%), while the other 19 fish had stomach contents ranging from 1 item up to 62 food items (Chironomids). Other items counted included unidentified (decomposed) fish species at 19% Frequency of Occurrence (FOC), rainbow trout planter at 4.8% FOC, yellow perch YOY and unidentified minnows at 4.8% FOC, Annelida (leeches) at 14.3% FOC, Diptera (Midge larvae/pupae) at 42.9% FOC, and Decapoda (crayfish parts) at 14.3% FOC. Yellow perch YOY and unidentified/decomposed minnow species made up 23.8% FOC of the total number of food items counted in 2013, down slightly from the 2012 sample. Aquatic invertebrates are an important dietary item during the spring of the year until YOY minnows appear in early summer. Predation on small fish (yellow perch, tui chub YOY) are the primary management objective of stocking wipers into Wildhorse Reservoir, and based on the findings within the seven year wiper study, they are exceeding the management goal of assisting and keeping undesirable fish populations in check.

Recovery of tagged fish has been limited, with 2 tags recovered in 2008, 3 tags recovered in 2009, 7 tags recovered in 2010, 4 tags recovered in 2011, 9 in 2012, and 6 in 2013, for a summative total of 31 fish. Of the 6 tagged wipers reported in 2013, 3 were caught and harvested by anglers, 2 were caught and released by anglers that reported harvest information (date, length and weight), and the last wiper was recaptured from previous NDOW sampling and surveys.

Recovered and or angler reported tagged wiper specimens in 2013 revealed an average growth increase of 6.6 in (range of 1.1 to 13.8 in) for an average increase of 54% in total length since initial tagging. The reported harvest or recovery of tagged fish data showed an average increase of 51.1 oz (range of 10.2 to 105 oz), for an average of 415% weight increase since initial tagging date. The six wipers had an average tag retention/read recovery of 1,157 days or 3.17 yrs (range of 310 d to 2,333 d) of residency in the reservoir after tagging.

To date, 31 (9.2%) of the 339 tagged wipers have been accounted for through angler harvest and/or survey collection methods. The 31 reported tagged wipers had an average size of 18.1 in TL and 55.9 oz at time of tagging and had an average residency within the reservoir of 673.9 d (1.85 yrs) before capture. Summative averages of the 31 reported wipers at time of harvest or capture revealed an average size of 21.5 in TL and 79.6 oz for an average total growth increase of 3.9 in TL and 30.1 oz (2.1 in TL and 16.3 oz per year of residency average, respectively).

Figure 5



Warmwater Fish Stocking

No warmwater fish stocking of wipers or channel catfish was accomplished in 2013 due to low reservoir water volume associated with regional drought conditions. Evaluation of stocking these species will be assessed on a yearly basis and adjusted accordingly.

Quagga mussel surveys

Wildhorse Reservoir was sampled on June 11, July 23, August 21, and September 10, which included checking two artificial samplers and plankton completing net tows at three separate locations. Two samples were taken at each of the three sample sites and sent out to two individual labs for analysis. A total of 24 individual samples were sent for analysis with all test results being negative for quagga and zebra mussels. As water levels at the reservoir continued to drop throughout the summer, visual surveys of the exposed substrate produced no evidence of invasive mussels as well. Surveys of the artificial samplers and the removed boat ramp were also negative for mussels. Due to isolated, positive results for quagga mussels in 2012, 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 2013 fishing season with good fishing reported despite low water conditions, with few marked trout recovered (Bel-Air strain rainbow).
- The installation and retrieval of the recording thermograph were completed.
- The electrofishing survey to check for black bass and composition of other fish species was completed in late summer. Population surveys revealed success in controlling the non-game fish/non-desirable to game fish ratios and good carryover of planted trout in the spring gill nets.
- Angling for wipers occurred in the spring and summer with fair success, and tagged fish continued to be reported back to the department and entered into the database. One trophy fish certificate for wiper was caught and reported on May 3, 2013 and weighed in at 10 lbs 6 oz.
- Wipers and channel catfish were not stocked due to low water conditions.

RECOMMENDATIONS

- Continue angler surveys and assessments to develop an accurate assessment of angler use and harvest of all fish species, and look for marked trout.
- Conduct an electrofishing survey to assess age class distribution, body condition, and Relative Stock Density of black bass populations.
- Continue to monitor reservoir water temperatures in spring to evaluate and predict black bass spawning timing and possible success.
- 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 the food habit study of the wiper bass in Wildhorse Reservoir in an effort to determine their impacts upon non-game fish, specifically tui chub and yellow perch.
- Continue wiper and channel catfish augmentation when necessary and monitoring/evaluation to provide added control of non-game fish and provide diversified angling opportunities 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 2014

Table 1

WILDHORSE RESERVOIR
2013 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	2	1	4	1	5	0	2	2	2	1	25
Avg. Water Temp.	Ice=13"	Ice=16"	Ice=21"	43	57	70	72		65	50	47	Ice = 8"	57.7
No. Anglers Checked	40	54	11	4	61	24	88		8	20	3	0	313
No. of Hours Fished	106.5	149.5	36	6.5	217	93.5	222.5		10	36	4.5	0	882
Total Fish Caught	90	117	19	2	143	39	114		6	25	3	0	558
Total Fish Harvested	54	57	13	1	68	21	77		6	23	3		323
<i>Rainbow Trout</i>	17	36	11	1	54	15	57		2	17	3		213
<i>Brown Trout</i>	0	0	0	0	0	0	0		0	0	0		0
<i>Bow-cutt Trout</i>	36	19	2	1	10	0	19		2	5	0		94
<i>Tiger Trout</i>	0	0	0	0	0	0	0		0	0	0		0
<i>Black Bass</i>	0	0	0	0	0	0	1		0	0	0		1
<i>Wiper</i>	0	0	0	0	4	1	0		1	0	0		6
<i>Channel Catfish</i>	0	0	0	0	0	5	0		1	0	0		6
<i>Yellow Perch</i>	1	2	0	0	0	0	0		0	0	0		3

Average Measured Fish Harvest Size

<i>Rainbow Trout No.</i>	14	25	11	0	24	7	19		2	12	3		117
<i>Avg. Size (FL-inches)</i>	17.2	15.6	14.7		15.3	17.1	17.5		18	17.8	18.1		16.4
<i>Brown Trout No.</i>	0	0	0	0	0	0	0		0	0	0		0
<i>Avg. Size (FL-inches)</i>													
<i>Bow-cutt Trout No.</i>	26	18	2	1	9	0	14		2	5	0		77
<i>Avg. Size (FL-inches)</i>	20.5	19.5	20.9	19.9	19.2		18.8		20.7	21			19.8
<i>Tiger Trout No.</i>	0	0	0	0	0	0	0		0	0	0		0
<i>Avg. Size (FL-inches)</i>													
<i>Black Bass No.</i>	0	0	0	0	0	0	1		0	0	0		1
<i>Avg. Size (TL-inches)</i>							16.2						16.2
<i>Wiper</i>	0	0	0	0	4	1	0		1	0	0		6
<i>Avg. Size (TL-inches)</i>					22.6	19.7			16.9				21.2
<i>Channel Catfish No.</i>	0	0	0	0	0	3	0		1	0	0		4
<i>Avg. Size (TL-inches)</i>						23.5			28.5				24.8
<i>Yellow Perch No.</i>	1	3	0	0	0	0	0		0	0	0		4
<i>Avg. Size (TL-inches)</i>	8.5	9.6											9.3

Angler Catch Rate

Fish / Hour	0.85	0.78	0.53	0.31	0.66	0.42	0.51		0.60	0.69	0.67		0.63
Fish / Angler	2.25	2.17	1.73	0.50	2.34	1.63	1.30		0.75	1.25	1.00		1.78

Table 2

Wildhorse Reservoir Fish Stocking

2013

Date	# of Fish Stocked	Pounds	Avg. Size (in.)	Species	Fish / Pound	Strain	Stocking Location	Water Temp.	Tank Temp.
April 29, 2013	7,800	2,000	8.6	Rainbow	3.9	Shasta	St. Park Boat Launch	54	53
April 30, 2013	7,800	2,000	8.6	Rainbow	3.9	Shasta	St. Park Boat Launch	49	51
May 1, 2013	9,450	1,500	7.4	Rainbow	6.3	Eagle Lake	St. Park Boat Launch	50	52
June 11, 2013	15,500	250	3.4	Brown	62.0	Egan	St. Park Boat Launch	64	53
October 21, 2013	7,000	2,000	8.9	Rainbow	3.5	Tahoe	St. Park Boat Launch	54	52
October 22, 2013	7,000	2,000	8.9	Rainbow	3.5	Tahoe	St. Park Boat Launch	48	52
October 23, 2013	7,000	2,000	8.9	Rainbow	3.5	Tahoe	St. Park Boat Launch	47	54
October 29, 2013	2,160	600	8.9	Rainbow	3.6	Tahoe	St. Park Boat Launch	46	51
Total Catchable Trout:	38,760	10,600	<i>x= 3.7 fish/lb.</i>				Avg. Water Temp. =	51.5	52.3
Total Sub-catchables Trout:	9,450	1,500							
Total Fingerling Trout:	15,500	250							
Total Warm Water Fish:	0	0							
TOTALS	63,710	12,350							

2013 Totals = 36% of average number of fish stocked over the last 20 years (x= 176,125 fish stocked/year)

Brown Trout = 15,500 Fingerling

Tiger Trout = 0 Catchable

Bowcutts = 0 fish in 2013 - poor spawn and recruitment at Marlette Lake in June 2013

Table 3

**Wildhorse Reservoir
Population Sampling Catch Record
2013**

		Net/Sample #	#1-3	Electrofishing		
		Date:	5/31/2013	9/9/2013		
SPECIES				TOTALS	% of Species Composition	
<i>Rainbow Trout</i>	Number of Fish Sampled	43	14	57	35.6	
	Avg. Size (Inches-FL)	15.4	16.5	15.7		
<i>Bow-Cutt Trout</i>	Number of Fish Sampled	28	2	30	18.8	
	Avg. Size (Inches-FL)	21.5	17.5	21.2		
<i>Brown Trout</i>	Number of Fish Sampled	1	0	1	0.6	
	Avg. Size (Inches-FL)	19.8				
<i>Tiger Trout</i>	Number of Fish Sampled	1	1	2	1.3	
	Avg. Size (Inches-FL)	15.5	19.8	17.7		
<i>Largemouth Bass</i>	Number of Fish Sampled	0	0	0	0.0	
	Avg. Size (Inches-TL)					
<i>Smallmouth Bass</i>	Number of Fish Sampled	1	33	34	21.3	
	Avg. Size (Inches-TL)	12.4	9	9.1		
<i>Wiper</i>	Number of Fish Sampled	1	1	2	1.3	
	Avg. Size (Inches-TL)	18	24.4	21.2		
<i>Channel Catfish</i>	Number of Fish Sampled	0	2	2	1.3	
	Avg. Size (Inches-TL)		27.6			
<i>Yellow Perch</i>	Number of Fish Sampled	1	23	24	15.0	
	Avg. Size (Inches-TL)	11.5	3.5	3.8		
<i>Tui Chub</i>	Number of Fish Sampled	2	0	2	1.3	
	Avg. Size (Inches-TL)	6.4				
<i>Red Side Shiner</i>	Number of Fish Sampled	0	2	2	1.3	
	Avg. Size (Inches-TL)		4.3	4.3		
<i>Bridgelip Sucker</i>	Number of Fish Sampled	1	3	4	2.5	
	Avg. Size (Inches-TL)	8.7	9.7	9.5		
TOTAL FISH		79	81	160		
Hours Sampled		43.0	0.59	43.6		
% Non-desirable Fish		5.1	34.6	20.0		
Fish / Net-Shocking Hour		1.84	137.3	3.7		
Reservoir Water Temp. °F		53.5	65.6			
** Wildhorse Res. Storage Capacity at time of survey (Approx. % Acre-Feet)		39%	21%			

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, South side, East of Highway 225. Experimental Mesh gill net, 150 feet long.
4. Goose Is, State Park Is, Mouth of Canyon, Brown Cove Electrofish 9/9/2013

Table 4

Wildhorse Reservoir Non-game and Non-desirable (Yellow Perch) to Game fish Ratios 1996 - 2013

Year	Electrofishing Survey		Gillnet Survey		Surveys Combined		
	No. Ratio	% Ratio	No. Ratio	% Ratio	No. Ratio	% 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
18-Year Avg.				8-Year Avg.	2.3:1	63.0	37.0

Figure 6

