

NEVADA DEPARTMENT OF WILDLIFE  
STATEWIDE SPORT FISHERIES MANAGEMENT



FINAL REPORT

F-20-50

2014

Wilson Sink Reservoir  
Largemouth Bass Study  
EASTERN REGION



**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION  
Final Report**

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**NEVADA DEPARTMENT OF WILDLIFE, FISHERIES DIVISION**  
**Final Report**

**State:** *Nevada*  
**Project Title:** *Statewide Fisheries Program*  
**Job Title:** *Wilson Sink Reservoir Largemouth Bass Study*  
**Period Covered:** *July 1, 2009 through June 30, 2014*

**SUMMARY**

Wilson Sink Reservoir is a productive and consistent fishery supporting both rainbow trout and largemouth bass in the remote northwest sector of Elko County. Rainbow trout populations are supported and maintained by annual stocking of hatchery reared trout, whereas the largemouth bass fishery is dependent on natural reproduction every spring to carry forward the older age classes for desired angling opportunities and harvest. Limiting factors influencing the Wilson Sink Reservoir fishery include climatic conditions of periodic high runoff/flooding, extended periods of drought, diminishing aquatic habitat, and predation from avian predators (primarily American white pelican and double crested cormorants).

This study was initiated to compare the new minimum size for legal harvest of largemouth bass of 10-inches Total Length (TL) enacted on March 1, 2008 to the previous minimum size of 11 inches TL that began in 1987. Past population surveys indicated a small percentage of largemouth bass were achieving this length prior to harvest, and changing to 10 inches TL corresponds with other regional regulations regarding largemouth bass and should provide for more bass angler interest and harvest.

Thermograph data for Wilson Sink Reservoir has been recorded over the last 15 years to document the temperature regime of the upper water column and the ensuing effects that it may have on largemouth bass behavior, primarily spawning behavior and timing of the spawn. Slight variations in water temperature occur during late spring, depending on spring weather, runoff, and duration. Recorded temperature patterns indicate suitable temperature patterns for successful bass spawning activities beginning in late May and rearing of bass from late June through September.

Electrofishing surveys have proven to be the best survey method for collecting objective bass population data at Wilson Sink Reservoir. Although annual population surveys may vary from year to year due to climatic and aquatic habitat changes, the bass population has been fairly consistent as far as spawning success and recruitment of younger age classes. The change in the minimum size from 11 inches to 10 inches TL has been verified to not impact the largemouth bass population and has made available a larger percentage of legal size bass for harvest by anglers.

Angler contacts through creel surveys at Wilson Sink Reservoir over the last 14 years indicate fair angling for largemouth bass, with varied annual success dependent on reservoir conditions and boat access. Bass anglers averaged approximately four

bass per hour fished and an average harvest size of 13 inches TL for all bass measured.

## **BACKGROUND**

Largemouth bass were first introduced into Wilson Sink Reservoir in 1976 to serve as a biological control of nongame fish species found to be detrimental to the primary rainbow trout fishery. Within six years of largemouth bass introduction, nongame fish populations disappeared, with the exception of bridgelip sucker. Emphasis and management of largemouth bass as a secondary sport fishery began in 1984. Due to declining mature age class largemouth bass and annual recruitment in the population attributed to angling pressure and harvest, an 11 inch minimum harvest length regulation was implemented in 1987. The observed response was an increase in the largemouth bass population.

In the fall of 1994, the Wilson Sink Reservoir owner, Petan Ranch, drained the reservoir to facilitate repairs to the outlet gate system. On July 22, 1995, the Division [Department] of Wildlife lifted all possession limits and harvest length regulations to allow the general public to harvest game fish prior to the impending draining of the reservoir. The Division salvaged and relocated largemouth bass from the reservoir. The reservoir was drained to a small, natural conservation pool in September, repairs were completed in the winter, and the reservoir refilled the following spring of 1996. Management emphasis was directed toward the expedient recovery of the largemouth bass population by augmentation from other state, federal, private, and commercial waters. A total of 13,253 northern largemouth bass consisting of 10,400 3.5 inch, 2,125 5.2 inch, 384 5.75 inch, and 344 8 to 10 inch were liberated into Wilson Sink Reservoir in 1996. The largemouth bass fishery rapidly reestablished in the succeeding years.

## **NEED**

Previous largemouth bass population surveys (2001-2007) revealed less than 12% of the bass population was reaching the 11-inch minimum harvest size. A new minimum size of 10 inches TL for legal harvest of largemouth bass (similar to other regional largemouth bass regulations) was enacted beginning on March 1, 2008.

## **OBJECTIVE**

To evaluate the new minimum size regulation on largemouth bass and the impact to the existing bass population (age class and size distribution) from July 1, 2009 to June 30, 2014.

## **EXPECTED RESULTS AND BENEFITS**

Increase overall angler use, angling diversity, and allow for increased angler harvest of largemouth bass that would normally be consumed by avian predators (white pelicans and double crested cormorants) that forage at the reservoir from May through October.

## **APPROACHES**

1. Install a digital recording thermograph to document temperature variations and localized fishery activity, primarily largemouth bass spawning behavior and timing.
2. Electroshock the black bass population one night in late summer.

## **PROCEDURES**

A digital recording thermograph was placed along the north shoreline, approximately 0.5 miles upstream from the dam at an average depth of 36-40 inches below the water surface during the spring and retrieved in summer. Data was downloaded, graphed, and stored in the regional database for analysis.

Typically, during the twilight and nighttime hours, the Clark-Coffelt electrofishing barge was utilized to survey the largemouth bass population in Wilson Sink Reservoir. The fixed, twin anode system with two bow netters was used. Sample areas included the boat launch to the rocky point to the north, the rocky shoreline at the Petan Cabin, the rocky shoreline along the canyon arm, the dam face, the delta near the main inlet, and the gravel shoreline in front of the main campground. All largemouth bass age classes were targeted for capture. All captured bass were measured and selected individuals weighed for body condition appraisal.

Scheduled angler surveys and creel surveys were implemented during the peak-fishing season from April through September to contact as many anglers as possible. Information collected included number of anglers, total hours fished, number of total fish caught and harvested, measurements and weights of fish species, and specific markings or fin clips.

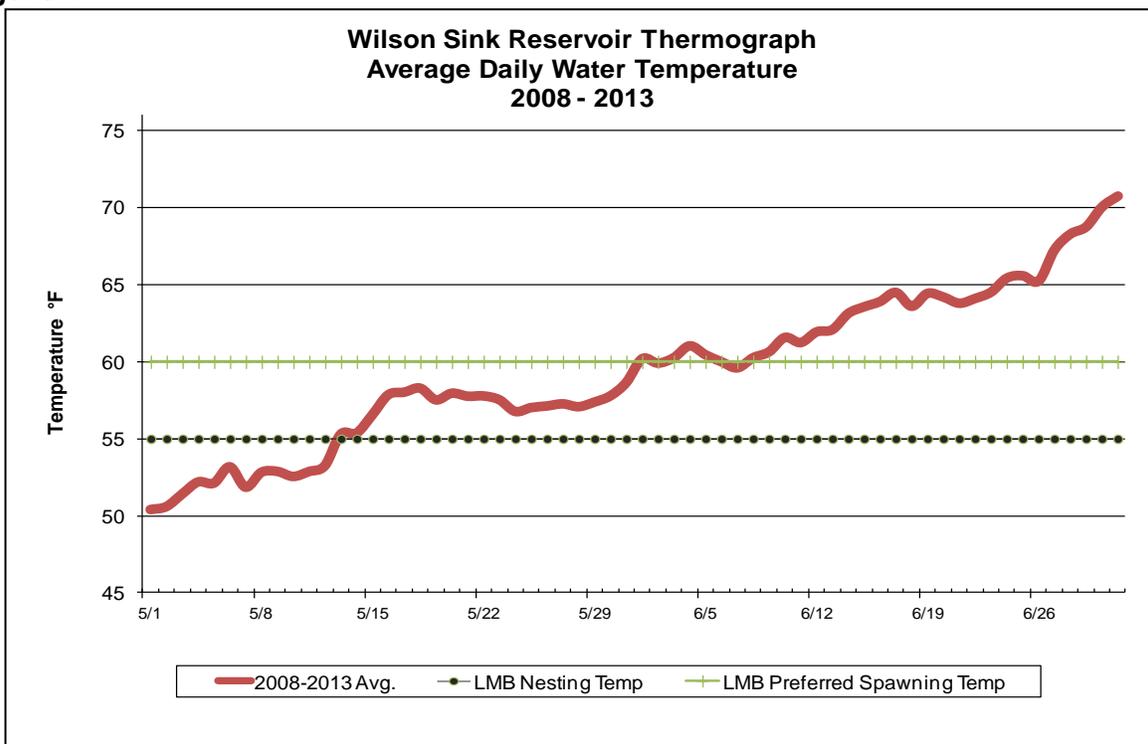
## **FINDINGS**

Daily thermograph recordings were monitored from May 1 through at least July 1 of each year, with average daily water temperature graphed out and correlated to the anticipated black bass spawning behavior. Figure 1 illustrates the average daily temperature from May 1 to July 1, 2008-2013, with typical black bass spawning behavior of nest building/preparation occurring around mid-May at 55°F and desired spawning temperature of 60°F occurring near the first week of June. Minor temperature fluctuations can occur in early June due to late season cold fronts moving through the region, but usually do not have lasting or detrimental effects on the black bass spawn.

Seasonal and annual temperature variations occur depending on regional climatic conditions (droughts, floods, extended heat waves etc.); with Wilson Sink Reservoir being no exception. For comparison, Figure 2 illustrates the 2011 temperature regime for the reservoir, with a slower warm up of the water column and probable delayed black bass spawning behavior and activity. The spring of 2011 was significant in that Wilson Sink Reservoir filled to capacity and overflowed through the spillway for approximately 12 weeks due to a 120% of average moisture content within

the basin during the winter of 2010-2011. The two to three week delay in bass spawning behavior that year should not have impacted overall spawning success, and should have typically increased reproductive success due to the increase in aquatic habitat and access to cover, improved water quality, and recharge of nutrients throughout the system. Figure 2 also illustrates Wilson Sink Reservoir's sustained temperature range from the mid-60's to the mid-70's°F throughout the course of summer, making it ideal water temperature for largemouth bass rearing and angling.

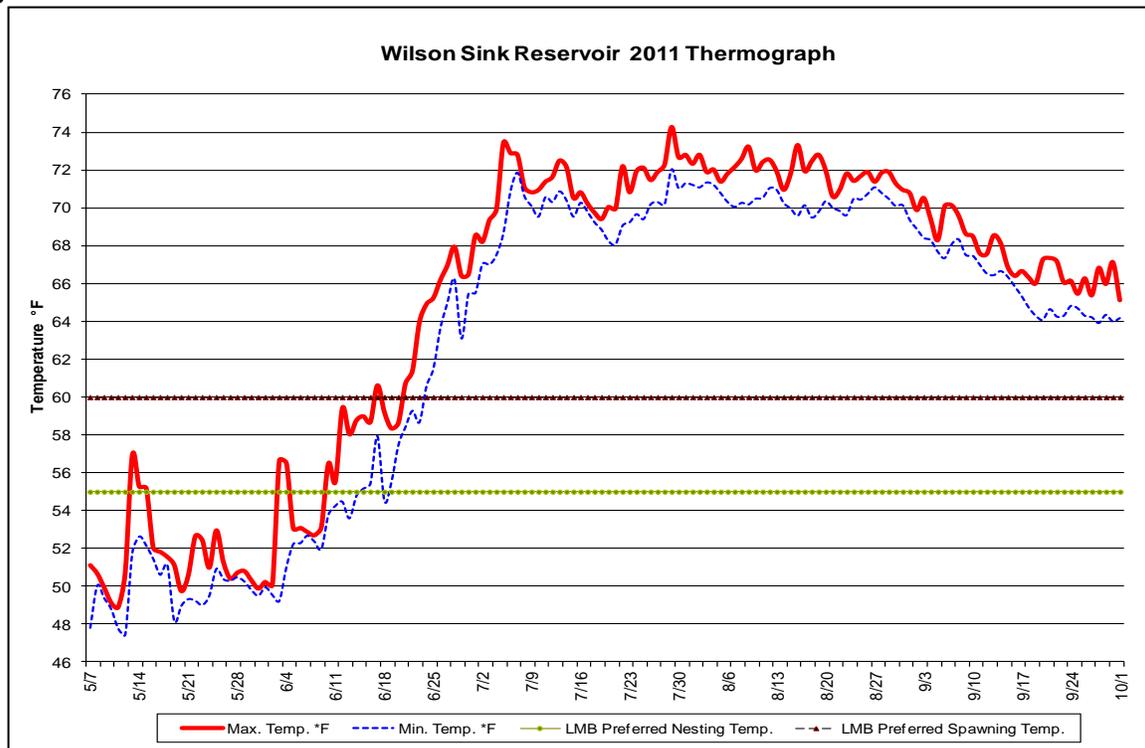
**Figure 1**



Electroshocking surveys during late spring and summer are the primary tool for gathering largemouth bass population data and have been incorporated in Wilson Sink Reservoir fishery management for over 30 years. Previous largemouth bass population surveys (2001-2007) revealed less than 12% of the bass population was reaching the 11 inch TL minimum harvest size. A new minimum size of 10 inches TL for legal harvest of largemouth bass (similar to other regional largemouth bass regulations) was enacted beginning on March 1, 2008.

During the period of 2001-2007, electroshocking surveys averaged 114 bass per hour, 136 bass measured had an average size of 8.31 inches TL, a K-factor value of 5.21, and body condition rating of good (Attachment 1). After the new regulation requiring a minimum size of 10 inches TL for bass harvest was enacted, the 2008-2014 electroshocking population surveys averaged 167 bass per hour, 95 bass measured had an average size of 8.13 inches TL, a K-factor value of 5.50, and body condition rating of good. During 2012-2014, Wilson Sink Reservoir experienced below average precipitation levels and reservoir water storage due to extended drought within the region.

Figure 2



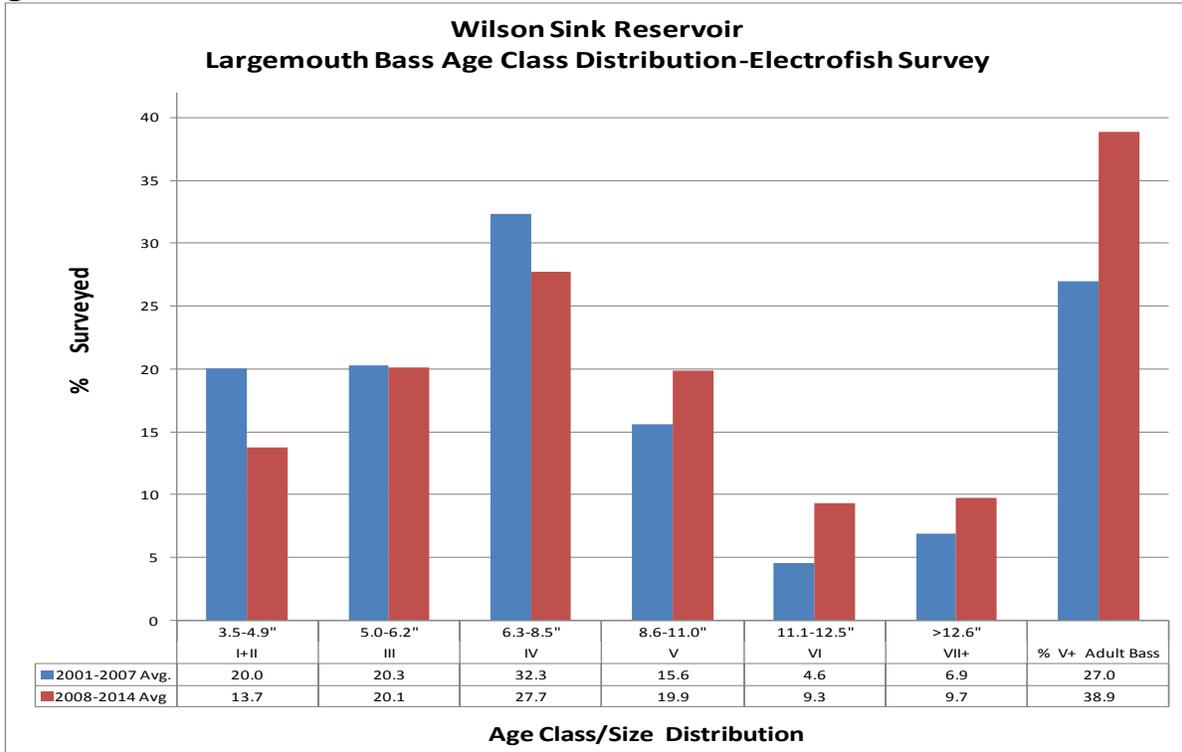
Measured bass captured during surveys were designated into six Size/Age class cohorts, from Class I through Class VII+ (3.5 in to >12.6 in). The frequency of Size/Age class cohorts in the two comparative time series is illustrated in Figure 3. The period from 2008-2014 achieved approximately 12% more adult bass with the new 10 inch size regulation in place than the previous 11 inch minimum despite the effects of extended drought experienced at the reservoir over the last 3 years.

Opportunistic angler and creel surveys for Wilson Sink Reservoir have occurred annually during peak fishing season (April-October), with typical and good results achieved by anglers. Recent social/economic factors (recession, gas prices, expendable recreational income, drought perceptions, etc.) have played a big factor in angler visitation to Wilson Sink Reservoir over the last seven years. Documented angler use is trending down despite consistent fish stocking and good fishing opportunities for both trout and bass. Success at other regional fisheries, primarily South Fork and Wildhorse reservoirs, which have easier and closer access to urban areas, larger and more diverse sport fish available, and better camping facilities, has played a major role in the diminished angler and camper visitation to Wilson Sink Reservoir.

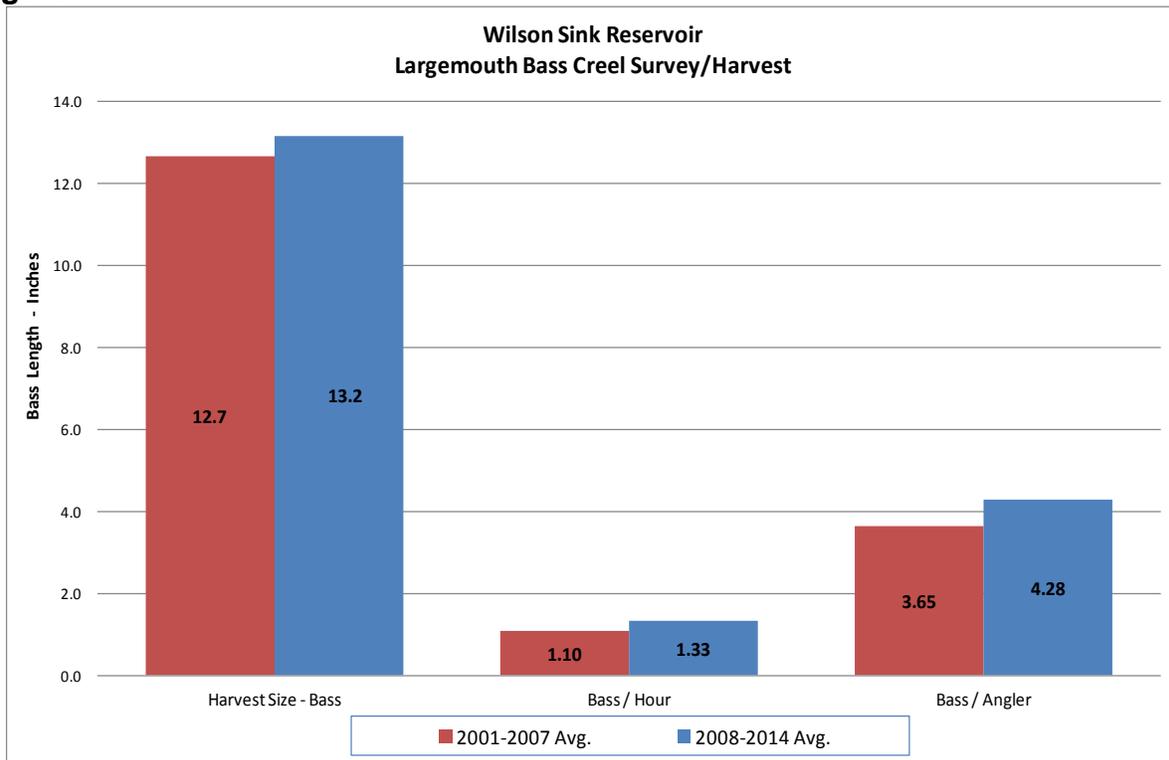
The majority of bass angling at Wilson Sink Reservoir occurs from Memorial Day weekend through Labor Day weekend, with most success coming during the post-spawn season (late June). Figure 4 illustrates the bass angling success from creel surveys during the study, with the 2008-2014 series showing an uptick in angler trend

specifics and harvest over the 2001-2007 series having the old 11 inch TL minimum bass length regulation.

**Figure 3**



**Figure 4**



## **MANAGEMENT REVIEW**

Although both survey methods of electroshocking and creel survey have indicated that the new 10 inch TL minimum size is having the desired impact on increased angler harvest, regional and extended drought conditions and diminishing aquatic habitat are having a greater impact on the success and/or stressors of the largemouth bass fishery. The largemouth bass fishery should return to consistent production levels as habitat conditions return to normal or average levels, which could take up to 3-5 years to see noticeable increases in the bass population age classes.

## **RECOMMENDATIONS**

1. Document largemouth bass population indices during population surveys including electroshocking and creel surveys.
2. Electroshock Wilson Sink Reservoir on a rotational basis as conditions allow, preferably every 2-3 years to keep a pulse on population dynamics.
3. Augment largemouth bass population when needed from approved broodstock donor sources to increase genetic variability and aid in population recovery during extended drought periods.
4. Evaluate habitat conditions and the effects of low water, water clarity and emergent aquatic weeds to the largemouth bass population and angler use.

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**Date:** November 2014

**WILSON SINK RESERVOIR**  
**Largemouth Bass Population Status - Electrofishing Survey Trends**

Year	Number of Bass / Hour	Number of Bass Measured	Average Fish Size TL Inches	RSD 10 Factor	K-Factor	Rating	
2001	85	47	8.9	60	5.08	Good	
2002	157	94	9.0	56	5.18	Good	
2003	72	115	10.0	81	4.96	Good	
2004	123	117	7.1	35	5.33	Good	
2005	83	99	6.9	38	5.20	Good	
2006	141	181	7.5	58	5.50	Good	Above Average Moisture
2007	134	298	8.8	34	5.23	Good	Drought Conditions
<b>2001 - 2007 7-yr. Avg.=</b>	<b>114</b>	<b>136</b>	<b>8.31</b>	<b>52</b>	<b>5.21</b>	<b>Good</b>	
2008	216	114	8.3	54	5.52	Good	
2009	189	119	5.9	32	5.18	Good	
2010	162	130	7.9	39	5.80	Excellent	
2011	249	142	6.9	18	6.02	Excellent	Above Average Moisture
2012	156	88	9.6	62	5.35	Good	Drought Conditions
2013	186	61	10.0	80	5.36	Good	Drought Conditions
2014	14	12	8.3	72	5.30	Good	Drought Conditions-3rd year
<b>2008 - 2014 7-yr. Avg.=</b>	<b>167</b>	<b>95</b>	<b>8.13</b>	<b>51</b>	<b>5.50</b>	<b>Good</b>	

**WILSON SINK RESERVOIR**  
**Electrofishing Survey Largemouth Bass % Age Class Distribution**

Year	Percent of Age Class						Adult Bass	
	I+II 3.5-4.9"	III 5.0-6.2"	IV 6.3-8.5"	V 8.6-11.0"	VI 11.1-12.5"	VII+ >12.6"		
2001	13	13	38	3	8	25	1987 - - 11 inch Minimum size regulation implemented	
2002	46	18	19	10	2	5		
2003	37	30	11	7	4	6		
2004	9	31	49	7	0	5		
2005	25	16	38	16	3	2		
2006	9	20	47	15	7	3		Above Average Moisture
2007	1	14	24	51	8	2		
<b>2001 - 2007 7-yr. Avg.=</b>	<b>20.0</b>	<b>20.3</b>	<b>32.3</b>	<b>15.6</b>	<b>4.6</b>	<b>6.9</b>	<b>27.0 % V+ Adult Bass</b>	
2008	22	14	19	22	15	11	2008 - - 10 inch Minimum size regulation implemented 3/1/2008	
2009	33	23	34	4	3	2		
2010	10	21	39	14	5	11		
2011	6	35	46	10	1	2		Above Average Moisture
2012	5	7	28	38	12	10		Drought Conditions
2013	0	8	28	31	15	18		Drought Conditions
2014	20	33	0	20	14	14		Drought Conditions
<b>2008 - 2014 7-yr. Avg.=</b>	<b>13.7</b>	<b>20.1</b>	<b>27.7</b>	<b>19.9</b>	<b>9.3</b>	<b>9.7</b>	<b>38.9 % V+ Adult Bass</b>	

*All age class size distributions are approximations based on previous Wilson Reservoir bass scale readings.*

## Wilson Sink Reservoir Largemouth Bass Creel Survey/Harvest Data

	<b>2008-2014 Avg.</b>	2014	2013	2012	2011	2010	2009	2008	<b>2001-2007 Avg.</b>	2007	2006	2005	2004	2003	2002	2001
<b># Days Checked</b>	<b>13.7</b>	12	12	14	15	15	15	13	<b>23.0</b>	18	19	21	30	30	31	12
<b># Bass Anglers Checked</b>	<b>13.1</b>	2	3	13	25	10	24	15	<b>21.6</b>	22	39	11	20	12	13	34
<b>Hours Fished - Bass</b>	<b>42.7</b>	6	11	37	86	34	70	55	<b>81.9</b>	75.0	231.0	29.0	69	45.0	35.5	89
<b># Fish Harvested - Bass</b>	<b>18.9</b>	2	9	36	8	10	47	20	<b>11.4</b>	16	25	17	10	5	6	1
<b>Harvest Size - Bass</b>	<b>13.2</b>	13.7	13.6	11.6	13.5	13.7	12.80	13.2	<b>12.7</b>	12.8	12.4	13.3	13.5	13.9	13.5	9.3
<b>Bass / Hour</b>	<b>1.33</b>	0.33	1.55	3.35	1.17	0.76	1.20	0.98	<b>1.10</b>	2.19	2.22	1.62	0.99	0.44	0.06	0.15
<b>Bass / Angler</b>	<b>4.28</b>	1.0	5.7	9.54	4.04	2.60	3.50	3.60	<b>3.65</b>	7.41	8.26	4.27	3.40	1.67	0.42	0.09
	10-inch Minimum Size								11-inch Minimum Size							