



MISSOURI DEPARTMENT OF CONSERVATION

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ROBERT L. ZIEHMER, Director

May 22, 2015

Terris Cates
Integrity Engineering
1714 East 10th Street
P.O. Box 700
Rolla, MO 65402

Dear Mr. Cates,

Thank you for contacting the Missouri Department of Conservation (Department) for information on the goggle-eye (also known as rock bass) population in the Gasconade River in relation to the Weeks Hollow Waste Water Treatment Plant (WWTP).

The Department is the agency responsible for fish, forests and wildlife in the state of Missouri. As such we regularly use scientifically based sampling and study methods to better understand and manage fish populations in our rivers and lakes.

The following is information put together by Fisheries Management Biologist Nick Gironde regarding the population of goggle-eye in this section of the Gasconade. This data is collected from the sites used to monitor the smallmouth bass special management area and control areas. **Sampling was not designed to assess whether the WWTP outfall is having an effect on the river.** However, past sampling efforts did occur between six and 14 miles above the waste water outfall and between five to 14 miles below the wastewater outfall. Therefore this summary will look at population changes both over time (from 2007 to 2013) and at locations above and below the WWTP.

The most recent sampling occurred during the fall 2013, but the results were influenced by significant environmental factors which happened prior to the sample. The watershed upstream of the sampled stretch of river received upwards of 16 inches of rain from July 30th until August 8th. One small watershed in Pulaski County received seven of those inches in fewer than two hours one evening. Most of this rainfall came during intense storms in short periods of time, resulting in extensive flooding. **Due to the excessive rainfall, river levels were higher than average during the normal sampling period, making electrofishing difficult. This is likely the main reason for the low sample size.** In addition, flooding was so intense it removed most of the woody habitat from the river instead of developing more large woody debris, which is important habitat for goggle-eye.

Rock bass population estimates in the middle Gasconade River were higher during 2013 when compared to 2011, but still lower than 2009 and 2007 (Table 1). Total and Stock (goggle-eye over four inches) Catch Per Unit Effort (CPUE) values continue to decline and 2013's values are the lowest recorded. 2009's data depicted a large cohort at six inches. This year class is now gone from the population. The majority of fish from the 2009 and 2013 samples are between 5.0 to 7.9 inches. This seems to be the normal historic

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trend for this section of the Gasconade River. However, despite the low population sampled in 2013 and 2011, Proportional Stock Density (PSD) (the percentage of goggle-eye over four inches) and Relative Stock Density (RSD-8) (the percentage of four inch and bigger goggle-eye that are over eight inches) are the highest sampled in this section of the river (Table 1).

Table 1: Goggle-eye population characteristics from the middle Gasconade River

Year	Effort (Hrs)	Sample size	Total CPUE	Stock CPUE	Pop. Est. (mi)	PSD	RSD-8	RSD-9
2013	12.1	245	20.2	18.0	704	36	16.5	2.8
2011	23.8*	810	34.0	33.3	570	54	11.0	0.25
2009	12.3	1055	85.8	84.2	1275	28	5.1	0.01
2007	4.9	465	94.9	88.4	1377	33	6.7	1.40
2006	10.0	554	55.5	41.7	n/a	22	6.7	0.00
2005	9.7	364	37.5	31.23	n/a	34	8.9	1.32

*2 boat samples

CPUE = Catch Per Unit Effort, or a measure of total fish population

PSD = Proportional Stock Density, or the percentage of goggle-eye that are over four inches

RSD-8 = Relative Stock Density, or the percentage of all four inch and bigger goggle-eye that are eight inches

RSD-9 = Relative Stock Density, or the percentage of all four inch and bigger goggle-eye that are nine inches

There is no significant difference in samples above and below the WWTP in respect to CPUE, Stock CPUE, PSD or RSD-8 when compared to each other among or between years (Table 2). The trends described above for the goggle-eye population in the middle Gasconade River are no different than those found above and below the WWTP.

Table 2: Goggle-eye population characteristics Above and Below Weeks Hollow WWTP.

Year	Effort (Hrs)	Sample size	Total CPUE	Stock CPUE	PSD	RSD-8	RSD-9
Above Weeks Hollow							
2013	4.15	54	13	12	32	12	0
2011	4.91	264	54	49	47	11	1
2009	2.70	142	53	52	31	6	0
Below Weeks Hollow							
2013	8.00	201	25	22	41	14	3
2011	18.97	546	29	28	58	11	1
2009	9.60	914	95	93	27	5	0

The goggle-eye population on this section of river looks to be trending downward since 2009. The one disturbing trend seen on both tables and in the data set is that the goggle-eye population is skewed towards larger adults with few smaller fish being recruited into the population. This can be understood in the RSD-8 values of the

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2013 sample, because they are the highest since 2005. The low total number of fish sampled suggests a less than desirable goggle-eye population in the short term.

These trends are most likely attributed to the repeat historic flooding of 2010, 2011, and 2013. A recent study conducted on the Meramec River investigated the influence of water levels on the river's goggle-eye population by correlating the population of goggle-eye at age three to river levels during the year those fish were spawned. The results were that any out of the bank flooding that occurred from the spawn until the end of the year significantly decreased that year's recruitment of goggle-eye. Years with stable water and little to no flooding had large year classes of goggle-eye at age 3 (Ward, in press). If these trends hold true for the Gasconade River, then year classes of fish that would be of the catchable size over that past few summers would have been greatly reduced due to the recent flooding. If the flood of 2008 is also added to this thought process, then the Gasconade River's goggle-eye population has only had favorable recruitment conditions in 2009 and 2012.

The immediate future of the goggle-eye population in the middle Gasconade River does not look bright. **Any added stressors would not help the recovery of this population to levels seen in the late 2000s. To see a rebound of catchable goggle-eye, the river needs to experience normal water levels with good available habitat in submerged trees, boulders and vegetation.** The next scheduled sampling for goggle-eye population in the middle Gasconade River is in fall 2015.

If you have any additional questions about this report please feel free to contact me at 573-522-4115, ext 3346 or by email at Audrey.Beres@mdc.mo.gov.

Sincerely,



Audrey Beres
Policy Coordinator

c: Nick Girondo, AJ Pratt, Bruce Drecktrah