Executive Summary of the Integrated Report to Congress on the Condition Of Water Resources in Kentucky, 2012

Kentucky
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Kentucky Energy and Environment Cabinet
Division of Water
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Executive Summary

I. Section 305(b), Volume I

The 2012 Integrated Report (IR) on the condition of water resources in Kentucky is submitted to the U. S. Environmental Protection Agency (EPA) to fulfill requirements of sections 303(d), 305(b) and 314 of the Federal Water Pollution Control (or Clean Water) Act of 1972 (P.L. 92-500), as subsequently amended. Section 305(b) of the Act requires states to assess and report water quality conditions to EPA every two years. The Kentucky Division of Water (KDOW) submits its biennial report on water quality in the integrated reporting format and has beginning with the 2006 report. This reporting format provides categories to report assessment results per designated use of assessed waterbodies, thus providing a convenient method to track waterbodies and segments by designated use and assessment results. Below are the categories assessed waterbody designated uses are assigned (Table 1).

Table 1. Reporting categories assigned to surface waters through the assessment process.

Category	Definition
1	All designated uses for water body fully supporting.
2	Assessed designated use(s) is/are fully supporting, but not all designated uses assessed.
2B	Segment currently supporting use(s), but 303(d) listed & proposed to EPA for delisting.
3	Designated use(s) has/have not been assessed (insufficient or no data available).
4A	Segment with an EPA approved or established TMDL for the listed uses not attaining full support. TMDL approval # _____
4B	Nonsupport segment with an approved alternative pollution control plan (e.g. BMP) stringent enough to meet full support level of all uses within a specified time.
4C	Segment is not meeting full support of assessed use(s), but this is not attributable to a pollutant or combination of pollutants.
5	TMDL is required.
5B	Segment does not support designated uses based on evaluated data, but based on Kentucky listing methodology insufficient data are available to make a listing determination. No TMDL needed.

While this reporting cycle is comprehensive providing a statewide update on water quality conditions of waterbodies in all river basins, or BMUs (basin management unit), the focus is on the Salt River – Licking River BMU and the Upper Cumberland River – 4-Rivers BMU. There are five BMUs in the state: 1) Kentucky River; 2) Salt-Licking Rivers; 3) Upper Cumberland and 4-Rivers; 4) Green-Tradewater; and 5) Big Sandy-Little Sandy-Tygarts. Since 1998 the KDOW (Kentucky Division of Water) has executed a five-year rotating BMU monitoring strategy. This strategy has many advantages for the state to monitor and manage water resources, namely it focuses available resources to a particular BMU once every five years providing an in-depth assessment of water quality and issues specific to regional water resources.

The assessment results use three classifications to denote relative level of designated use support: fully supporting (good to excellent water quality); partially supporting (fair water quality, does not fully meet designated use); and nonsupporting (poor water quality).

The KDOW monitors wadeable and boatable waters and lakes or reservoirs. In the ambient water quality network all stations are monitored for a suite of conventional and toxic pollutants on a monthly or bimonthly frequency. Water quality stations in a given BMU are monitored monthly once every five years, and are otherwise monitored bimonthly four of five years. When the rotating BMU monitoring strategy was adopted the KDOW expanded the primary (permanent, regular monitored stations) water quality stations to 72 and added approximately 20 additional watershed water quality stations per BMU. This has provided greater coverage of water quality stations and the flexibility to add watershed stations for monitoring watersheds for particular reasons (e.g. landuse considerations, TMDL development, intra-basin issues) for each BMU. Many of the wadeable primary water quality stations are monitored for biological community health once every five years. The KDOW develops biological monitoring plans for wadeable streams including a reference network for development and refinement of biological metrics, and targeted monitoring to address needs and fill gaps in each BMU. Probability-based monitoring design of wadeable streams (stream order 1 – 5) is employed in each BMU to provide a nonbiased assessment of water quality, laying the foundation for trends across the state. This random approach provides water quality

data that is nonbiased and can be applied to many issues and water quality needs for the KDOW. For example, nutrient gradients and other water quality variables, and given the nature of the data it is often a resource that can be drawn upon for new issues that may emerge. The TMDL section monitors waterbodies and associated watersheds to scope the extent and verify sources of each pollutant affecting a 303(d) listed waterbody as part of TMDL development. Publicly owned lakes and reservoirs are monitored per BMU to determine current water quality conditions and trophic state trend. A suite of physical and chemical variables are monitored three times during the growing season, spring, summer and fall. This interval provides data under the most environmentally stressful conditions when water quality degradation is most likely manifested.

Warmwater and Coldwater Aquatic Habitat Use Support – Streams

Statewide

Based on the NHD 1:24,000 scale, Kentucky has nearly 91,000 miles of streams, many of these miles are small, 1st and 2nd order intermittent or perennial streams up to the great rivers, the Ohio and the Mississippi that account for about 850 miles. To date, there are 10,256 miles (11.3 percent) assessed for coldwater and warmwater aquatic habitat designated uses (collectively often referred to as aquatic life use) of the approximately 91,000 miles. Of assessed miles with in-stream data, 5,138 (50 percent) fully support this designated use. The number of assessed miles not supporting these designated uses is 5,118 miles, or approximately 50 percent (Figure 1). Since the 2010 IR the number of miles not supporting aquatic life use has increased about two percent statewide. The five leading causes (pollutants) affecting water quality associated with this designated use are shown in Figure 2 by stream miles. The percentage of stream miles monitored and assessed for this use is presented by major river basin in Figure 3.

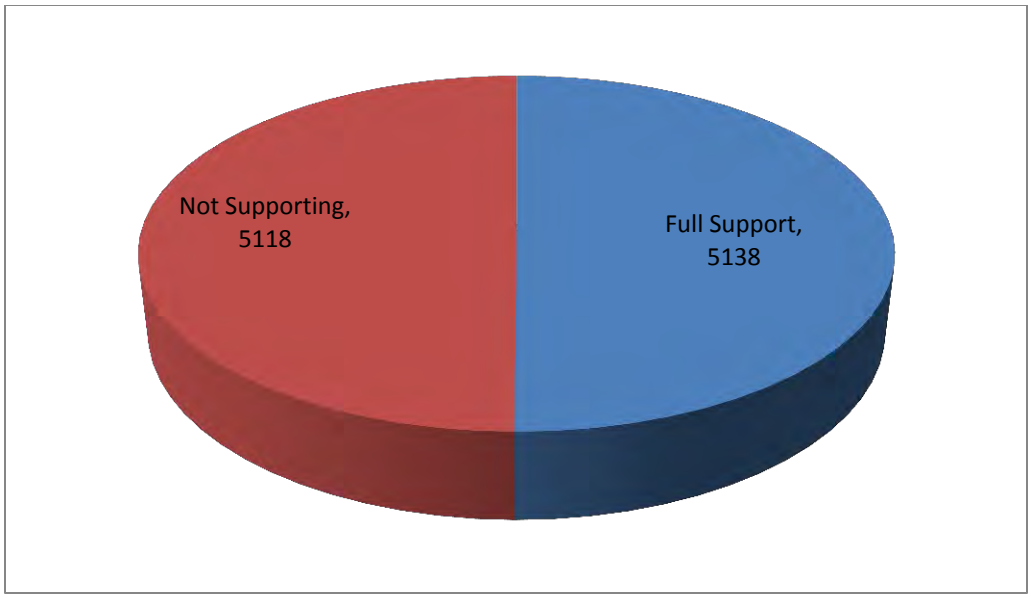

Figure 1. Support level for total stream miles monitored by all methods for aquatic life use per the 2012 Integrated Report.

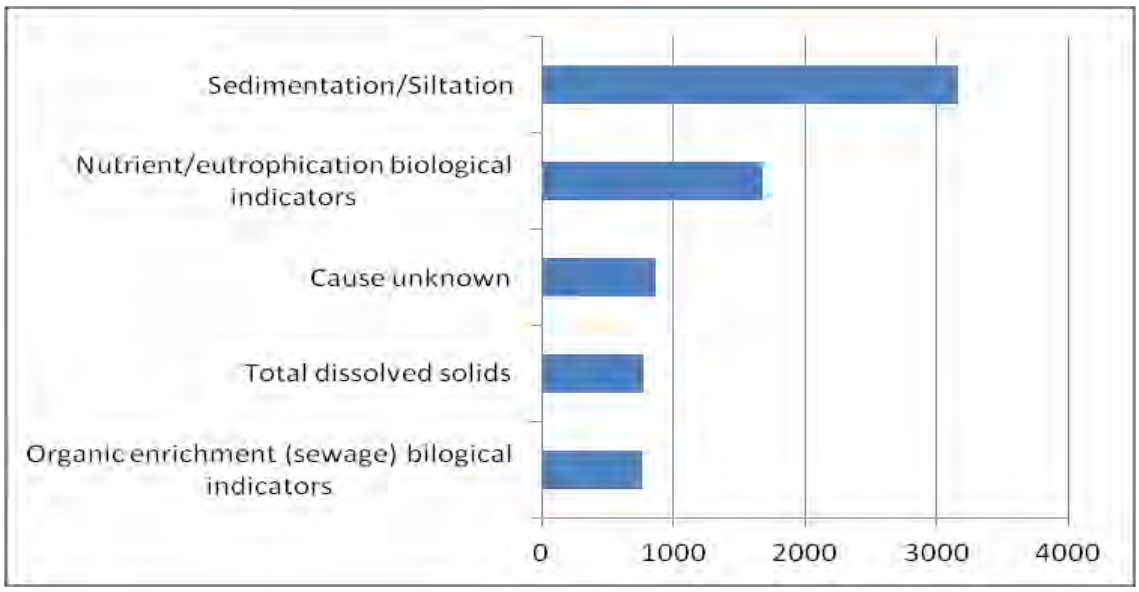

Figure 2. The five leading causes (pollutants) affecting aquatic life use water quality statewide, in miles.

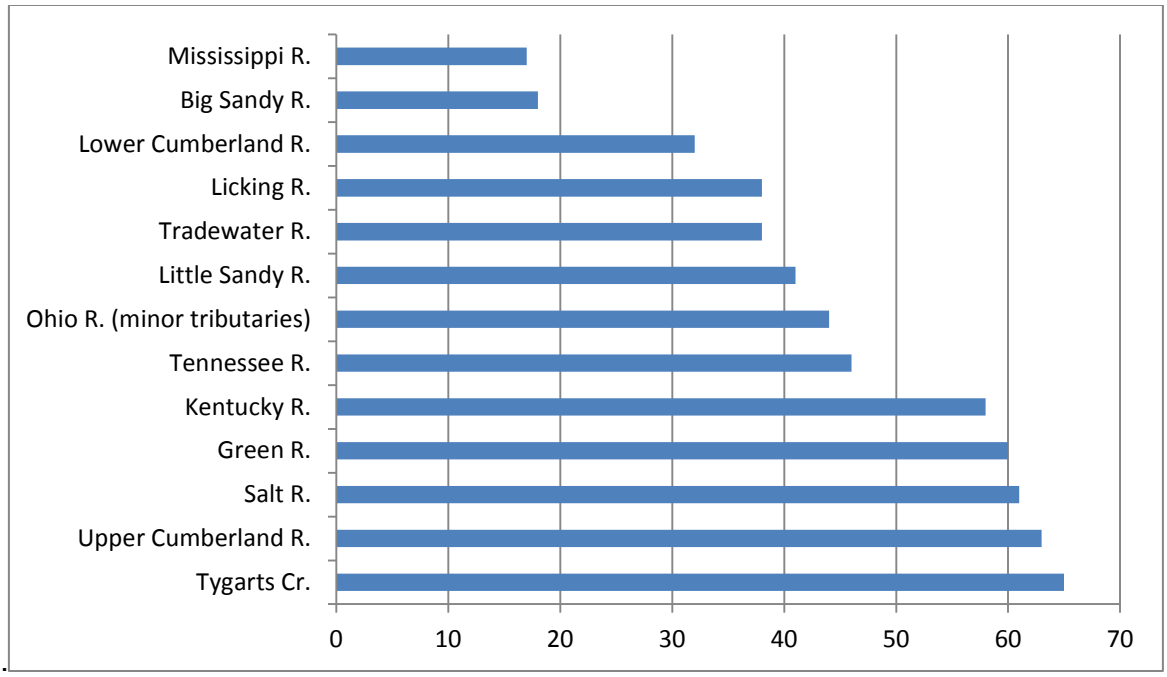

Figure 3. Percentage of aquatic life use support by major river basin, 2012

When comparing the last four 305(b) reporting cycles (2006 – 2012) for this use, support has decreased from a high of 60 percent fully supporting aquatic life use to the current 50 percent fully supporting level (Figure 4). One probable reason for this perceived decline is because much current effort is directed toward monitoring impaired watersheds in order to develop total maximum daily load (TMDL) for pollutants causing impairment to 303(d) listed waterbodies. To illustrate this point, Figure 5 depicts the total pollutant-waterbody combinations (number of pollutants per assessed waterbody) since the 2006. One will note this number increased substantially over the period 2006 – 2010, but nearly leveled-off between the 2010 and 2012 reporting cycles.

Primary Contact Recreation Use Support – Streams

Statewide

Primary contact recreation use (PCR) is often referred to as swimming use since the criteria applicable to this designated use are to protect people from pathogens that may cause gastric illness if any water is ingested when swimming. There are nearly 5,070 stream miles assessed for this designated use with 70 percent of those stream miles not supporting the use and 30 percent fully supporting. This compares with 4,762

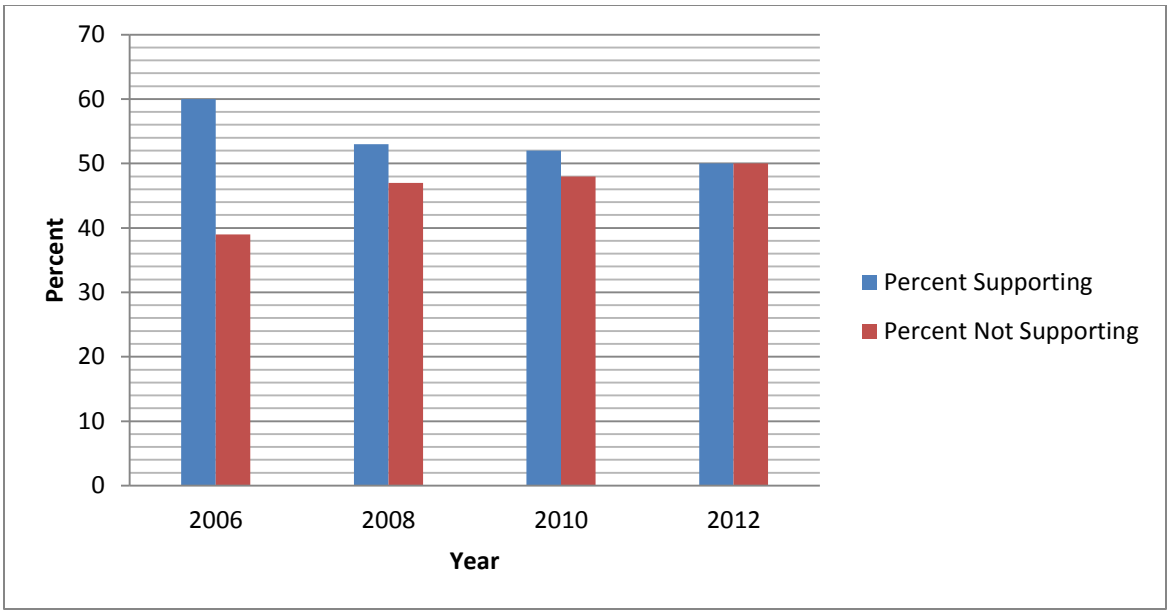

Figure 4. Percentage of statewide assessed stream miles supporting and not supporting the aquatic life use over four 305(b) reporting cycles.

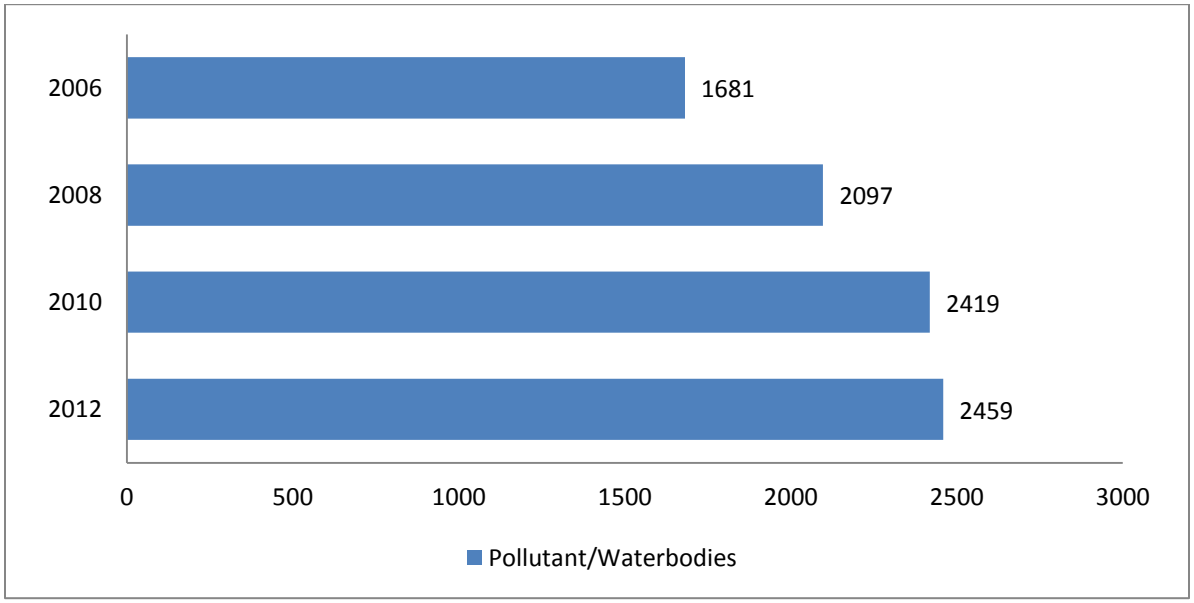

Figure 5. Pollutant/waterbody combinations over the last four 305(b) reporting cycles.

stream miles assessed for the 2010 Integrated Report (IR) with 3,268 stream miles or 69 percent not supporting the use. Compared with the 2008 IR, the percentage of stream miles not supporting is equal (70 percent); there were 4,493 stream miles assessed and 43 percent of 3,773 assessed stream miles reported in the 2006 IR

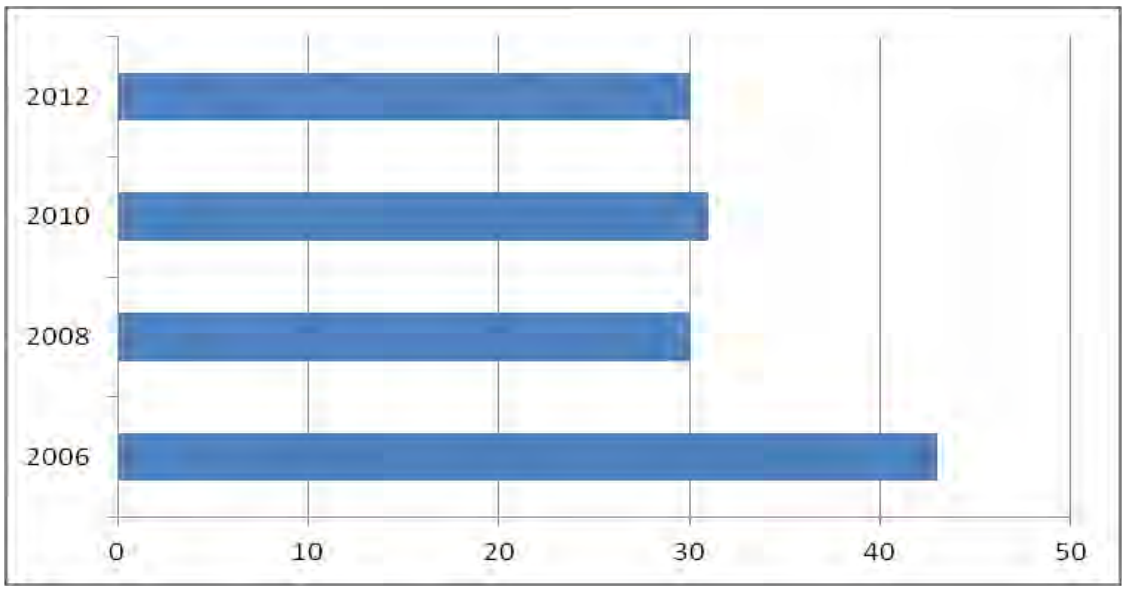

Figure 6. Percentage of assessed stream miles supporting primary contact recreation between 2006 and 2012.

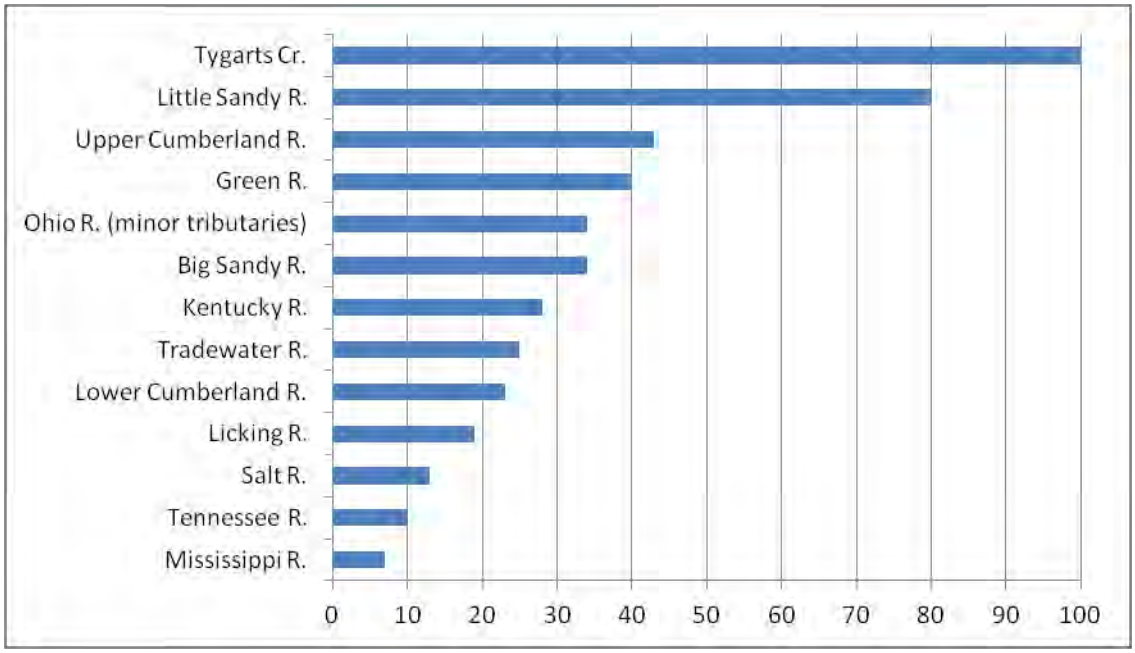

Figure 7. Percentage of assessed stream miles supporting primary contact recreation use by river basin, 2012.

Secondary Contact Recreation Use Support – Streams

Statewide

(Figure 6). Each river basin in the state and the percentage of fully supporting assessed stream miles is shown in Figure 7.

This designated use provides protection to someone recreating on a waterbody where only incidental contact or less than full body immersion is anticipated. Some examples of this recreation are boating, fishing and wading. There have been 1,989 stream miles assessed and 1,339 miles (67 percent) fully support this use, with 650 miles (33 percent) not supporting. These statistics are illustrated in Figure 8 by major river basin. The percentage of full support for this designated use has been declining slightly since the 2006 IR (Figure 9).

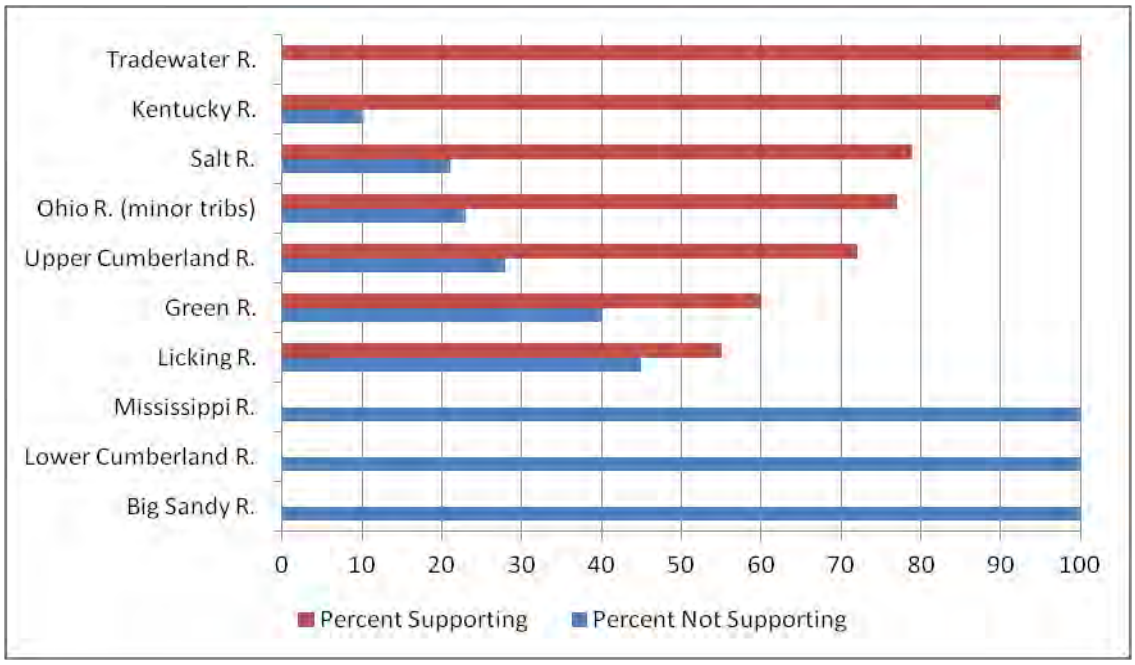

Figure 8. Percentage of stream miles supporting or not supporting secondary contact recreation by river basin, 2012[1].

[1]No miles were monitored the Little Sandy River, Tennessee River or Tygarts Creek basins.

Fish Consumption Use Support – Streams

Statewide

This use is not a designated use in Kentucky, but it is implied as one in water quality standards (401 KAR 10:031 Section 2). Like contact recreation uses, this use is based on criteria to protect human health. Fish tissue is analyzed for possible residue

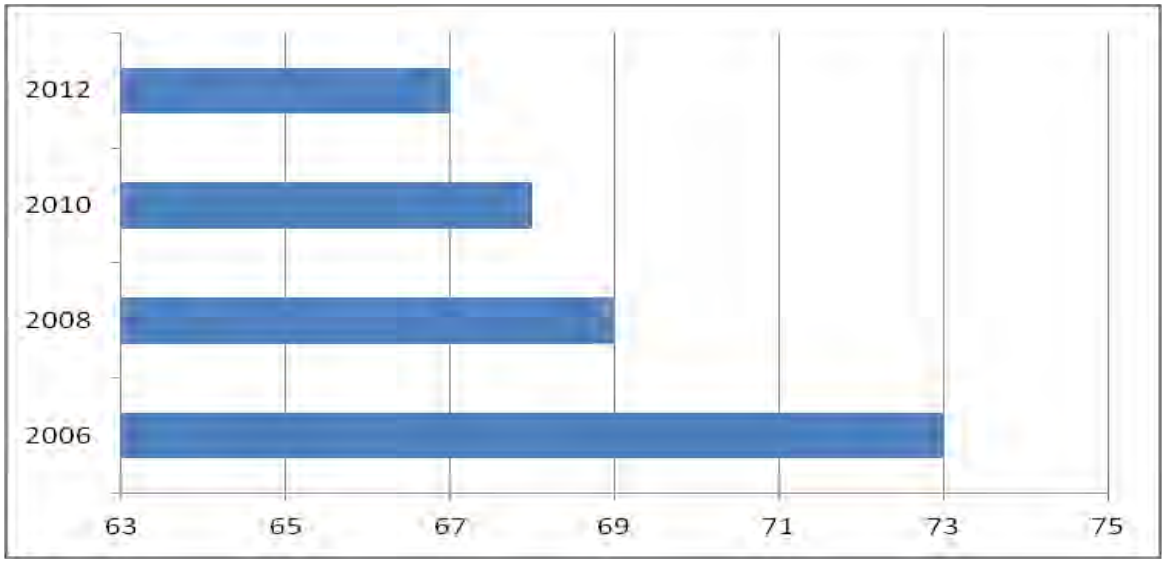

Figure 9. Statewide percentage of assessed stream miles supporting secondary contact recreation use.

of contaminants; the two of primary concern are methylmercury and polychlorinated biphenyl (PCB) chemicals. There have been 1,140 stream miles assessed for fish consumption with 695 stream miles (61 percent) fully supporting and 447 miles not supporting (39 percent). This is a decrease in supporting stream miles since the 2010 IR of one percent and four percent since the 2008 IR; however, current support has increased by 10 percent compared to the 2006 IR (Figure 10).

There is a statewide fish consumption advisory that differs from fish consumption assessed to determine whether this implied use is supporting or not based on monitored data. The latter is based on waterbody specific monitoring and comparing the fish tissue body burden results for specific pollutants (e.g. mercury, PCB, chlordane) to our water quality standards that apply. The advisory is a precautionary alert for those sensitive populations (children six years and younger and women of childbearing age) to consider limiting their consumption of fish to no more than one meal (a meal is

considered eight ounces) per week. This advisory was issued on April 11, 2000 because of low levels of mercury found in fish tissue statewide.

Domestic Water Supply Use – Streams

Statewide

Six hundred ninety stream miles are assessed for this designated use and all stream miles where this use applies is fully supporting domestic (drinking) water supply use. This level of support is the same per the 2006, 2008 and 2010 IRs.

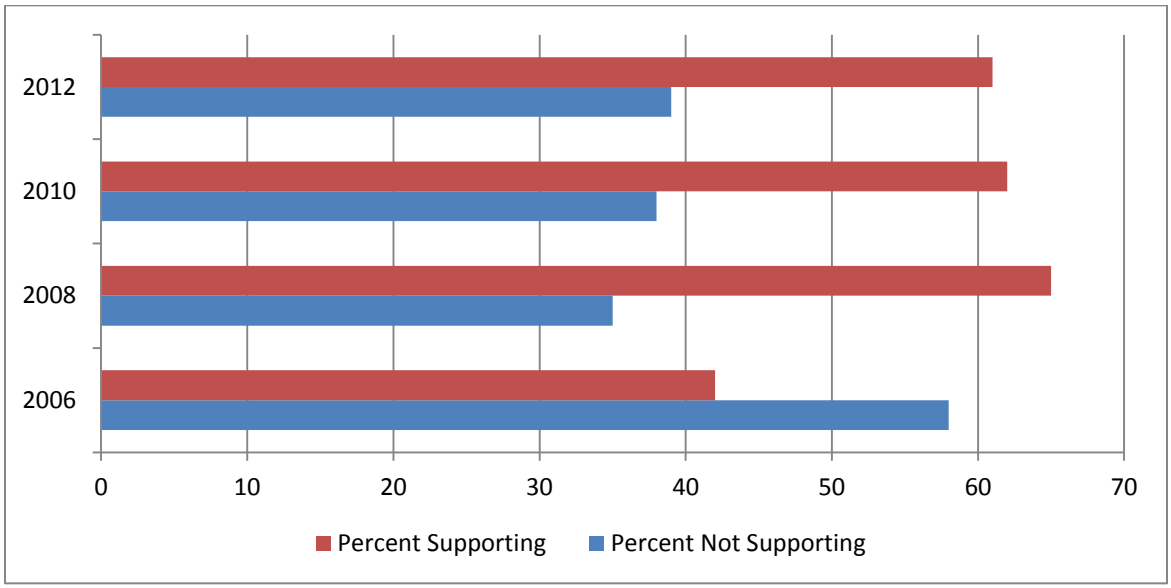

Figure 10. Percentage of assessed stream miles supporting and not supporting fish consumption use from the 2006 to 2012 305(b) reporting cycle.

Lakes and Reservoirs Fully Supporting All Assessed Designated Uses

Statewide

The lakes program was implemented in 1987 at publically owned and accessible reservoirs. The purpose was to assess the designated uses of aquatic life, secondary contact recreation and drinking water; monitoring now often extends to collect data for fish consumption and primary contact recreation. An element of 305(b) reporting is the requirement to determine trends of trophic state on the state's publically owned reservoirs. Current assessment results show 69 percent of all lakes monitored (127) support all assessed designated uses. This compares to 67 percent in 2010, 58

percent in 2008 and 61 percent in 2006 (Figure 11). The five leading causes (pollutants) identified in these waterbodies resulting in not supporting designated uses are shown by acreage in Figure 12.

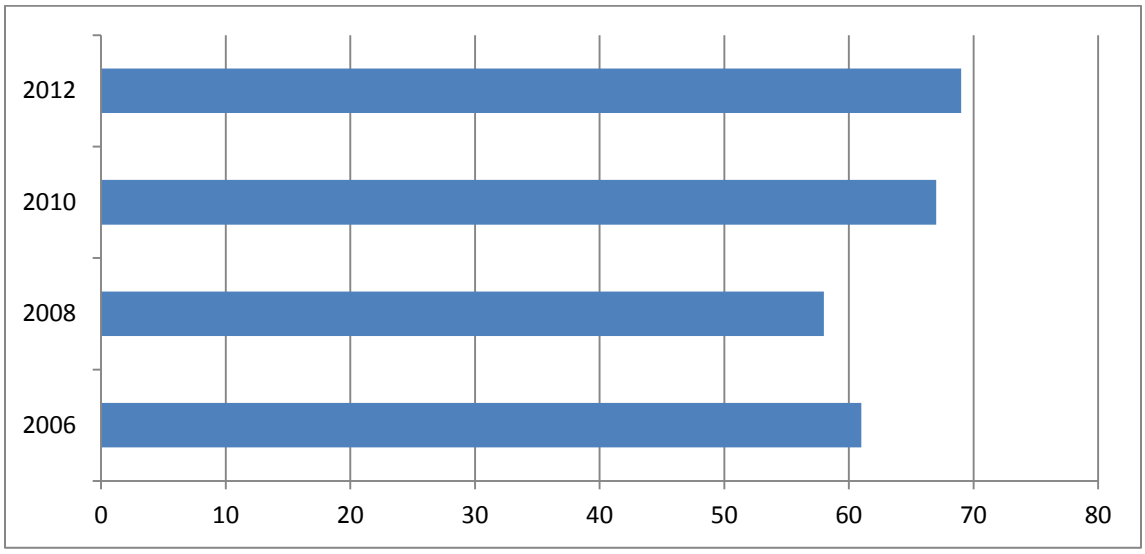

Figure 11. Percent of monitored and assessed lakes that fully support all assessed uses, 2006 through 2012.

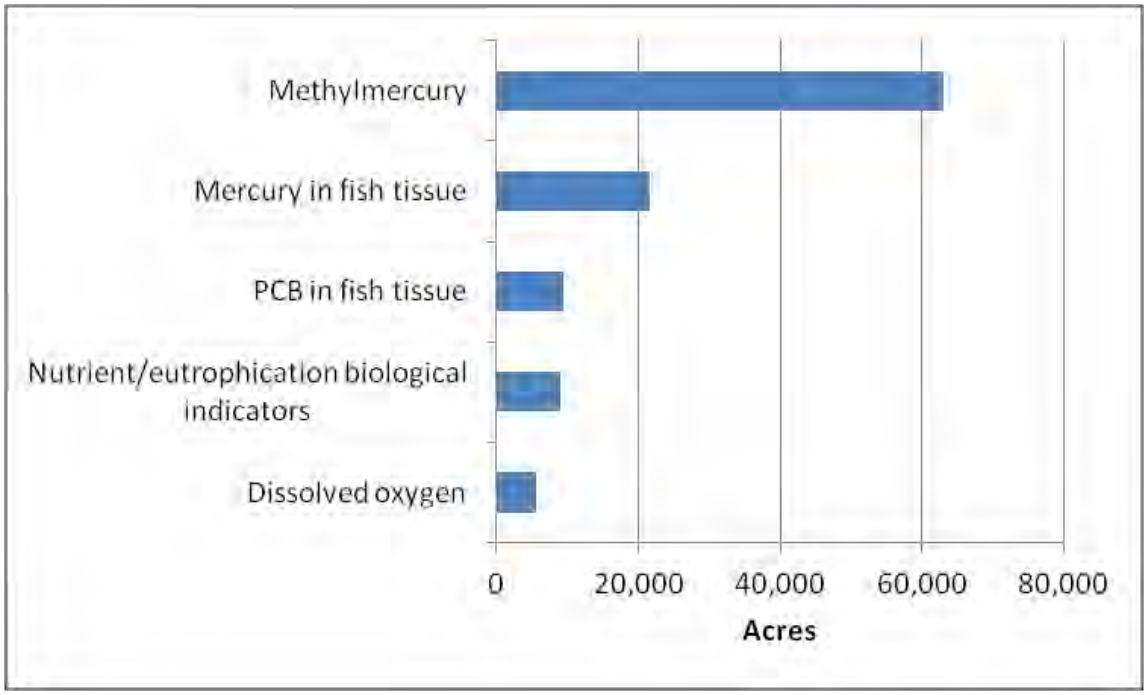

Figure 12. Five leading causes (pollutants) identified by as affecting lakes, ponds and reservoirs, 2012.

Aquatic Habitat Designated Use – Lakes and Reservoirs

Statewide

There are 222,076 surfacewater-acres that are publicly accessible statewide, a prerequisite for this monitoring program. Of those acres 99 percent (220,033 acres) have been assessed. Currently, 211,312 out of 220,033 acres assessed fully support this designated use. This is a 96 percent support level, and has remained relatively constant since the 2006 IR (Figure 13).

Primary Contact Recreation – Lakes and Reservoirs

Statewide

This designated use support is based on bacteria (*Escherichia coli*) and pH criteria for support determination. There are relatively few surface acres assessed out of the 219,557 acres designated. Of those monitored and assessed, 61,930 acres (100 percent) support. This compares to 99.7 percent in 2010, 100 percent in 2008 and 100 percent in 2006 (Figure 14).

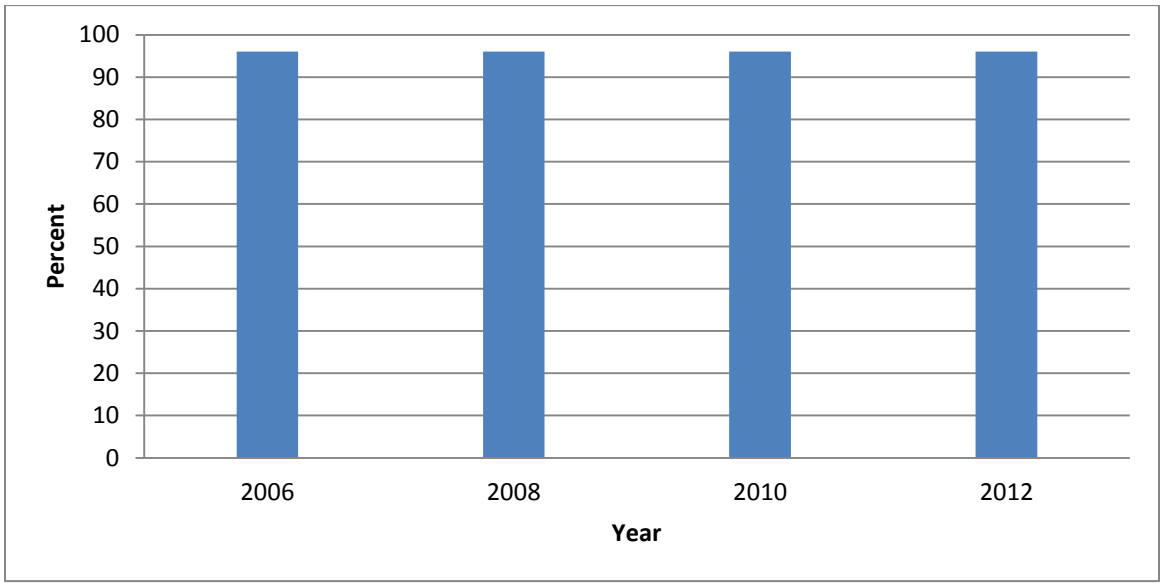

Figure 13. Percentage of reservoir and lake surface acres fully supporting aquatic life designated uses, 2006 – 2012.

Secondary Contact Recreation – Lakes and Reservoirs

Statewide

Secondary contact recreation criteria are developed to protect people from incidental contact with water, such as boating, fishing or wading, i.e. less than full body immersion. The methodology of assessing this designated use support is provided in Chapter 3.2. This reporting cycle includes 215,749 surfacewater-acres assessed with nearly 99 percent (212,969 acres) of those acres supporting this use. In comparison to the three previous 305(b) reporting cycles, this is an increased percentage of designated use support over the span of 2006 to present (Figure 15). It should be noted there were only 23,441 acres monitored and assessed in the 2006 IR; this number increased substantially in the 2008 IR, reaching 213,814 acres assessed.

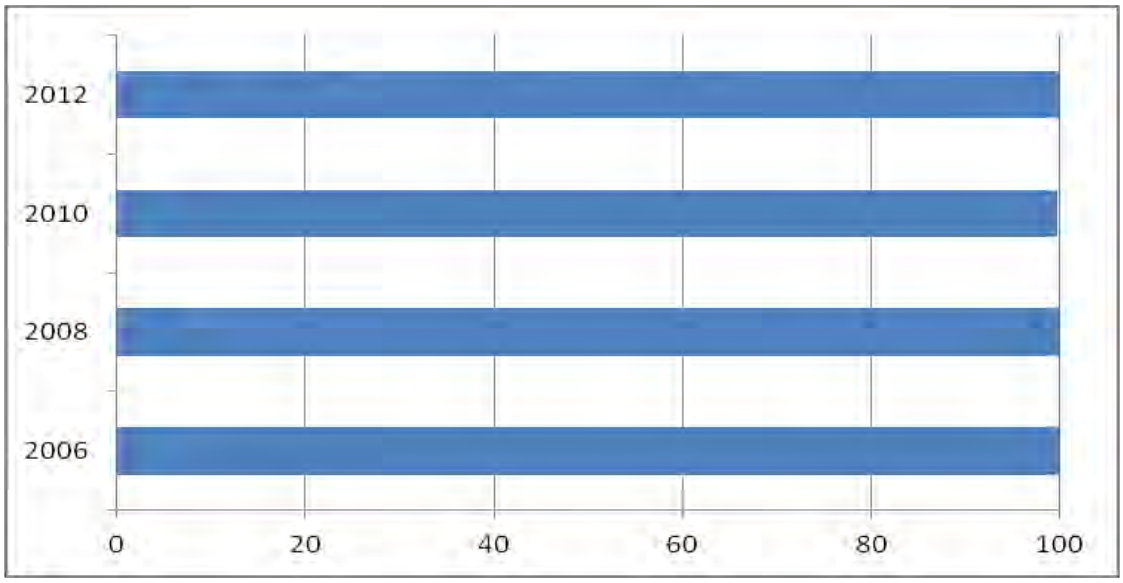

Figure 14. Percentage of reservoir surface acres that fully support primary contact recreation use, 2006 through 2012.

Fish Consumption Use – Lakes and Reservoirs

Statewide

Fish consumption is not a designated use in Kentucky water quality standards, but the use is implied in 401 KAR 10:031 Section 2 and through human health criteria in Section 6. There were 205,452 surfacewater-acres assessed in the current IR, with 121,113 surfacewater-acres (59 percent) supporting that use. Lake Cumberland, with

50,250 surface acres, does not support fish consumption due to mercury in fish tissue. This one major reservoir not supporting fish consumption is 60 percent of the total acres (84,339) not supporting. Percentage of monitored acreage of reservoir and lake surface water that fully support this implied use has remained relatively constant, although it has increased by four percent as seen in the 2010 IR, and remained stable in the current report (Figure 16).

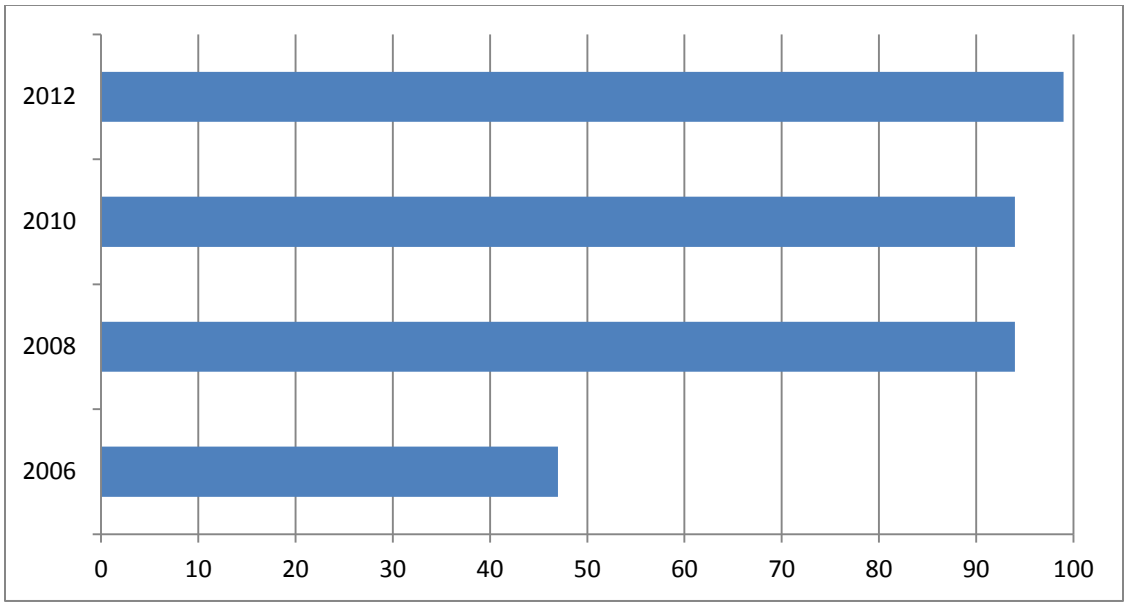

Figure 15. Percentage of assessed reservoir and lake surfacewater-acres that fully support secondary contact recreation designated use.

Domestic Water Supply – Lakes and Reservoirs

Statewide

There are 181,850 surfacewater-acres assessed for this designated use. Of those acres, 181,264 acres (>99 percent) fully support the use, with 586 acres not supporting the use. All waterbodies not meeting this use is due to nutrient enrichment resulting in taste and odor concerns.

II. Section 303(d), Volume II

Volume II of the IR addresses the section of the Clean Water Act requiring states to submit a list of waters impaired for any designated use. Specifically, the 303(d) list is a subset of the 305(b) list of assessed waters; those requiring a TMDL (total maximum

daily load) be developed for each pollutant that exceeds the water quality standard. The TMDL is a calculation of the total amount of a pollutant a waterbody can assimilate while meeting applicable designated uses (warmwater and coldwater aquatic habitat; primary and secondary contact recreation; domestic water supply; outstanding state resource water; and fish consumption [an implied use]). For the 2012 IR cycle there are

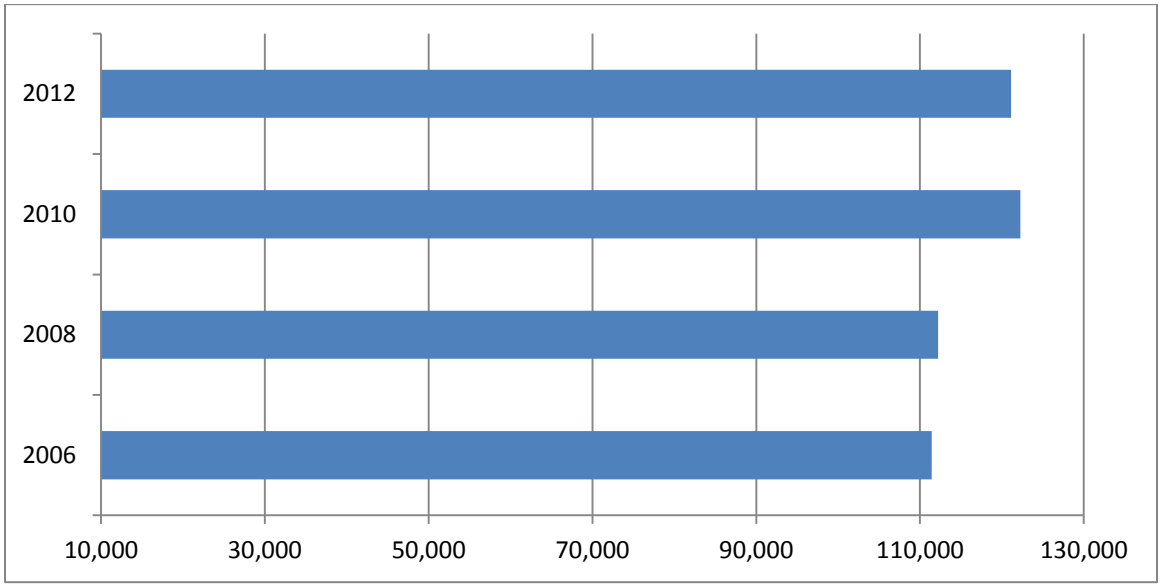

Figure 16. Number of reservoir and lake surfacewater-acres that support fish consumption, 2006 through 2012.

2,459 pollutant-waterbody combinations (PWC). Currently, 57 TMDLs are scheduled for completion during federal fiscal year (FFY) 2012 and 50 in FFY 2013. There are 775 pollutant-waterbody combinations presently under development. At the time of writing this report, EPA has approved 314 PWCs. Based on current monitored data the KDOW is requesting 76 PWC be delisted given current results. If EPA denies any of these requests the waterbodies and associated pollutants will be maintained on the 303(d) list requiring development of a TMDL. Figure 17 indicates the various stages of the TMDL process (including requested delistings) statewide for Kentucky.

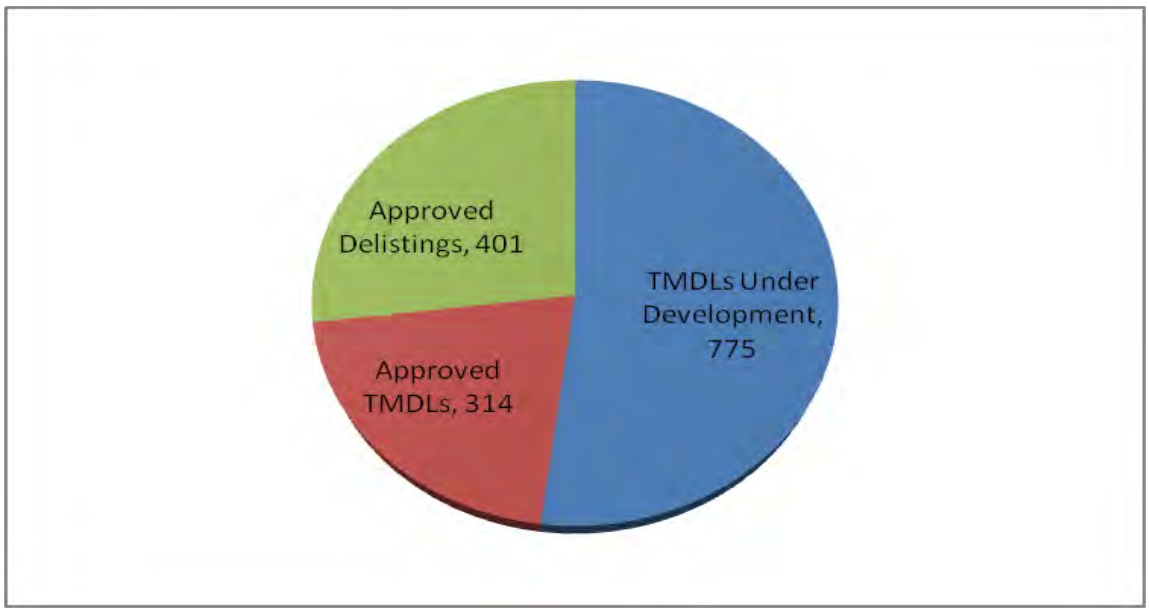

Figure 17. Status of the TMDL process in Kentucky through the 2010 Integrated Report cycle.