Section I

Considerations for Future Lists

As new ideas are introduced and in the general course of progress, it is natural for evaluation and reporting of water quality conditions to evolve. Since the introduction of the integrated report format in 2002, methods for evaluating the recreation use, the human health use (via fish contaminants), and public drinking water supply use have been systematically added to the traditional aquatic life use reporting.

This section identifies future reporting possibilities and the status of each. The potential future changes include reporting on more types of waters (wetlands, inland lakes) or reporting on specific pollutants of interest (mercury).

I1. Wetlands

Ohio EPA began developing tools to determine the beneficial use status of wetlands in 1995. In 1998, the State of Ohio adopted wetland water quality standards. The wetland water quality standards assign the "wetland" use to all wetlands and codify narrative criteria that protect wetland functions, including hydrology, biological diversity and recreational aspects of a designated wetland. A new rule package including wetland numeric biological criteria has been proposed that would establish benchmarks for attainment of a tiered, ecoregion-specific wetland aquatic life use system. These rules would allow the ecological integrity of a particular wetland to be evaluated using vascular plants and/or amphibians.

With hundreds of thousands of potential wetlands to be evaluated, methods to accurately characterize the overall status of wetlands in an assessment unit (which may include large numbers of undesignated wetlands) are being considered. A probabilistic and targeted evaluation of wetland quality was used to evaluate wetland condition in the Cuyahoga River watershed and a random sample approach to assess wetland quality was used to evaluate wetland condition of central Ohio urban wetlands. The results of the urban studies are below.

Wetlands are well known for their "kidney-on-the-landscape" functions even though these services are rarely assessed quantitatively and usually not in urban contexts. The problem of "kidney failure," by exceeding the capacity of a wetland to assimilate additional hydrologic inputs, nutrients, or sediments, is almost never addressed. Ohio EPA assessed a simple random sample of 100 wetland sites (out of 649) mapped wetlands in Franklin County (Columbus), Ohio. Sites selected ranged in size from 0.04 to 3.6 ha (0.1 to 8.9 acres) with an average size of 0.77 ha (1.9 ac). The average depressional wetland was half as small as a riverine wetland, averaging 0.45 ha (1.1 ac) versus 1.0 ha (2.5 ac), respectively.

The 100 points evaluated were ultimately determined to include 104 assessment units. Of the 104 wetlands, Level 2 and Level 3 assessments were able to be performed at 40.4% of the sites. A large percentage of the sites mapped as wetlands (circa 1980s) by the National Wetland Inventory (NWI) or Ohio Wetland Inventory (OWI) (42.3%) were determined to have been filled or converted to non-wetland land uses. Depressional (47%) and riverine (41%) hydrogeomorphic classes accounted for nearly all of the wetlands evaluated. Over two-thirds of urban wetlands were forested (69%) with the remainder dominated by emergent vegetation (31%). No good examples of shrub dominated wetlands were found in this study.

Based on our Level 2 assessment, nearly 60% of the urban wetlands assessed were in poor (26%) or fair (33%) condition, but over one-third were in good (31%) to excellent (10%) condition. There were significant differences in average condition between depressional and

riverine wetlands and observable differences in percentages of wetlands by condition class and HGM class. On average, urban depressional wetlands appeared to be in poorer condition than urban riverine wetlands.

Percentages of stressors declined from Category 1 (>30%) to Category 3 (<10%) with high quality wetlands having low percentages of hydrologic (8%) and habitat (7%) disturbances. The most common hydrologic disturbances were ditching, storm water, filling, and roads/RR beds; the most common habitat disturbances were mowing, clearcutting, sedimentation, toxic pollutants, shrub removal and nutrient enrichment. Depression and riverine wetlands had similar percentages of hydrologic and habitat disturbances but forested wetlands had substantially higher numbers of disturbances than emergent wetlands for hydrologic (67% to 33%, respectively) and habitat (62% to 38%, respectively) although these differences were not significant for hydrologic.

In order to identify 14 wetlands that met the criteria as potential amphibian breeding habitat, an additional 100 randomly selected wetlands were inspected. Therefore, only 7% (14/200) of urban wetlands were providing any type of amphibian habitat. Of the 14 urban wetlands monitored for amphibians three were of poor quality (1.5%), nine were of fair quality (4.5%) and two were of good quality (1%). The most common species at urban sites were Northern Leopard Frog, *Lithobates pipiens* (58.14%), Small-mouthed Salamander, *Ambystoma texanum* (14.58%), Northern Spring Peeper, *Pseudacris crucifer* (11.34%), Western Chorus Frog, *P. triseriata* (8.18%) and Northern Green Frog, *L. clamitans melanota* (7.08%). Sites had a range of from zero to six amphibian species and only two urban wetlands had any sensitive amphibian species present, each had one, the Jefferson Salamander. The largest factor restricting higher quality amphibian communities from occupying urban wetlands was the high intensity of surrounding land uses. Urban wetlands with the ability to support breeding amphibian communities are scarce (7%); those with the ability to support amphibian communities of good quality are extreme rarities (1%). Amphibian communities of excellent quality are not compatible with historical and current urban development patterns.

Based on the Level 3 Vegetation IBI assessments 68% of urban wetlands were in poor (14%) or fair (54%) condition and 32% were in good (18%) or very good (14%) condition). The Level 2 and 3 assessments were in agreement regarding the poor/fair percentages but the Level 3 assessment concluded that fewer wetlands were in poor and good condition and more wetlands were in fair condition.

Ohio EPA concluded that 1) average condition of urban wetlands is not “poor” but is best characterized as “fair” with 41% of wetlands in good or better condition, 2) reference-based assessment protocols like ORAM and the Vegetation or Amphibian IBIs fairly assess urban wetland ecosystems, 3) alternate (lower) ecological standards for judging the condition of urban wetlands are not needed and would be counterproductive, 4) many urban wetlands have long-term viability as at least “fair” condition ecosystems and there should not be presumption that all urban wetland mitigation will be of poor condition, and 5) ecological services like flood storage/desynchronization should be assessed quantitatively with appropriate Level 3 protocols and not via Level 2 surrogates, or if Level 2 approaches are used they should be derived from Level 3 data sets. Although there are clearly urban wetlands that are so degraded, or so fragmented from the local hydrologic cycle, that they provide no, or nearly no ecological services this study shows that even in highly urbanized watersheds, more than half of the remaining wetlands can be of sufficient condition, or providing sufficient services, to warrant at

least “Category 2” levels of protection and mitigation ratios. The full reports can be found at: http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection_reports.aspx.

In the future Ohio EPA plans to incorporate wetland information into the Integrated Report using the following methodology:

1) Identify historic wetland resources: SSURGO data will be used to quantify the approximate area of wetland habitat thought to exist within each HUC12 at the time of European colonization. The current NRCS mapping assigns a percent hydric value to each soil map unit in this GIS layer. The total area for each type of soil within a given watershed will be multiplied by these percent hydric values and summed for the entire watershed to provide the estimate amount of historic wetlands.

2) Identify the amount of existing wetland resources: National Wetland Inventory (NWI) data, which identifies all wetlands in Ohio, is currently being generated using recent infrared and true color orthophotography (2006/2007). These data are scheduled to be completed for Ohio in late 2009 or early 2010. Wetland loss can be quantified for each HUC12 using the current NWI in conjunction with the SSURGO analysis of historic wetlands.

3) Preliminary off-site (Level I) wetland condition assessment: For all NWI wetlands within each HUC12, a preliminary GIS assessment will be conducted to quantify the wetlands most likely to be in poor, moderate, good, or excellent condition. Each emergent, scrub-shrub, and forested wetland will be buffered two different distances; from the edge of the wetland polygon to 100 meters, and from 100 to 350 meters. At this time it is anticipated that the following metrics will used in this analysis:
   a. Landscape Development Index (LDI) - 1992 National Land Cover Dataset (NLCD) data
   b. Landscape Development Index - 2001 NLCD data
   c. Percent Impervious Surface - 2001 NLCD Impervious Surface GIS Layer
   d. Percent Forested Area - NLCD Impervious Surface GIS Layer
   e. Amount of roads located within each buffer area (feet per acre) – ODOT roads GIS layer
   f. Percent of buffer area consisting of Urban land use categories – 2001 NLCD data
   g. Percent of area consisting of other NWI wetland (emergent, scrub-shrub, or forested) polygons
   h. Percent of buffer consisting of “historic forest”- defined as being labeled as forest on the most recent (30 to 40 years old) USGS 7.5 minute topographic maps. Extracted as a separate GIS layer from the Digital Raster Graphic (DRG) representation of these maps
   i. Forest stability – if total buffer area was > 60% forest on the original DRGs and >60% on the 2001 NLCD layer, wetland receives 10 points for this metric (0 points if condition is not met)
   j. Endangered/Threatened species presence within buffer – if known occurrence of an endangered or threatened species in the ODNR Natural heritage database exists within the buffer, wetland receives 10 points for this metric (0 points if condition is not met)

   All metrics will be calculated and summed for each wetland within both buffer distances (100 points each). The total metric score will be calculated by multiplying the inner buffer (100 meters) by 0.67 and the outer distance (100-350) by 0.33, and adding the

two results. Total scores will be between 0 and 100 and will be broken into quartiles for each wetland type to estimate the predicted ecological condition of all wetlands.

4) All wetlands monitored by the Ohio EPA Wetland Ecology Group since its inception located within each HUC12 will be identified. The resultant Ohio Rapid Assessment Method (ORAM) for wetlands, as well as the Amphibian Index of Biotic Integrity (AmphIBI) and Vegetation Index of Biotic Integrity (VIBI), scores will be presented. As new wetlands are monitored between the reporting cycles, information within this table will change.

5) Site specific studies conducted during a given reporting cycle as part of our U.S. EPA Wetland Development Grant commitments will be summarized and included as a separate section within the Integrated Report.

Ohio EPA is accepting suggestions about this proposed methodology.

I2. Inland Lakes and Reservoirs

Ohio EPA initiated a renewed monitoring effort for inland lakes in 2008. This report assesses three of the four beneficial uses that apply to inland lakes: recreation, public drinking water supply, and human health (via fish tissue). Ohio EPA is currently in the process of updating the water quality standards rules for lakes. Once these rule updates are complete, Ohio EPA expects to include an assessment of the aquatic life use for lakes as a factor in listing watershed or large river assessment units in future 303(d) lists. This section outlines the current status of the monitoring effort for inland lakes, summarizes needed administrative rule changes, discusses recent findings about harmful algal blooms, and previews a potential methodology for assessing the lake habitat aquatic life use in future 303(d) lists.

I2.1 Background of Ohio's Inland Lake Water Quality Monitoring Program

Ohio EPA's work to assess lakes began in 1989 with a Clean Water Act Section 314 Lake Water Quality Assessment grant that supported the evaluation of 52 lakes. Various additional grants enabled the evaluation of 89 more lakes through 1995. An analysis and determination of beneficial use status for 447 public lakes (greater than 5 acres in surface area) was presented in Volume 3 of the 1996 Ohio Water Resource Inventory (305(b) report). As part of that report, Ohio EPA developed and applied the Lake Condition Index (LCI) to characterize overall lake health and to assess beneficial use status.

After dedicated U.S. EPA funding for lakes monitoring ended, Ohio EPA monitored only 53 lakes over the next 10 years. The Ohio LCI, developed by Ohio EPA between 1990 and 1996 to report on the status of lake condition in Ohio, became obsolete with the passage of Ohio's Credible Data Law (House Bill 43 (amended), effective 10/21/2003). This law requires that all decisions on impairment for surface waters (streams, lakes, wetlands) use only level 3 credible data. Ohio's LCI assessment process included a combination of level 2 and level 3 credible data to make impairment decisions.

Ohio EPA began researching ways to re-establish a lakes monitoring program in 2005. During the 2007 field season, Ohio EPA participated in the U.S. EPA-sponsored National Lakes

Survey. Ohio was assigned 19 lakes that were selected through a probability-based random selection process. The effort served as a precursor for renewed lake sampling program in Ohio.

I2.2 Status of Inland Lake Program

Ohio EPA currently has resources to monitor approximately 5-10 lakes per year using the strategy described in Section I2.2.1. Priority is being placed on lakes used for public drinking water or used heavily for recreation and suspected of being impaired for either of those uses. Secondary priorities not being addressed because of limited resources include developing a more robust sampling program, expanding to a wider variety of lakes, exploring the use of remote sensing in the screening of water quality in lakes, and attempting to track water quality changes in lakes that might be attributed to Section 319 funding and other watershed water quality improvement efforts. The objectives for monitoring inland lakes are to

- Track status and trends of lake quality
- Determine attainment status of beneficial uses
- Identify causes and sources of impaired uses
- Recommend actions for improving water quality in impaired lakes.

In this report, Ohio EPA discusses lake use impairment for recreation, public drinking water, and human health (fish tissue) and previews a methodology for including inland lakes in the aquatic life use listing. The aquatic life use listing is dependent on the rule changes to Ohio's water quality standards, which include adoption of nutrient criteria. Once the criteria are adopted into Ohio's water quality standards rules, Ohio EPA expects to be able to definitively report on the status of the aquatic life use for the following 20 lakes in the 2012 Integrated Report including:

- Buckeye Lake – Fairfield, Licking, Perry Counties
- Clear Fork Reservoir – Richland, Morrow Counties
- Swift Run Lake – Miami County
- Veterans Memorial Reservoir (Fostoria Reservoir #6) – Hancock County
- Frazier Quarry (Maysville Regional Water District Reservoir) – Muskingum County
- Dillon Lake – Muskingum County
- Cutler Lake (Blue Rock Lake) – Muskingum County
- Deer Creek Lake – Stark County
- Beaver Creek Reservoir – Seneca County
- Akron water supply reservoirs (Lake Rockwell, East Branch and LaDue Reservoirs)
- Barnesville – Belmont County (3 reservoirs)
- Woodsfield – Monroe County
- Griggs Reservoir – Franklin County
- O'Shaugnessey Reservoir – Delaware County
- Kiser Lake – Champaign County
- Lake Loramie – Shelby County

I2.2.1 Lake Sampling – Lake Habitat Aquatic Life Use Assessment

Ohio EPA has implemented a sampling strategy that focuses on evaluating the water quality conditions present in the epilimnion of lakes. The sampling target consists of an even distribution of a total of ten sampling events divided over a two-year period and collected during the summer months. Key water quality parameters sampled include total phosphorus, total nitrogen, chlorophyll a, secchi depth, ammonia, dissolved oxygen, pH, total dissolved solids, and various metals such as lead, mercury, and copper. Details of the sampling protocol are

outlined in the following document, available on Ohio EPA's web page at: http://www.epa.ohio.gov/portals/35/inland_lakes/Lake%20sampling%20Procedures%206-19-06_2.pdf.

I2.2.2 Water Quality Standards for the Protection of Aquatic Life in Lakes

Presently, lakes in Ohio are designated as Exceptional Warmwater Habitat (EWH) with respect to the aquatic life habitat use designation. Revisions to Ohio's WQS that would change the aquatic life use from EWH to Lake Habitat (LH) are in progress. A primary reason for this revision is that in Ohio, a set of biological criteria apply to rivers and streams, whereas no biocriteria apply to lakes. The numeric chemical criteria to protect the LH use will remain the same as the criteria to protect the EWH use that currently applies to lakes, with a suite of nutrient criteria added. A set of numeric criteria that apply to all surface waters for the protection of aquatic life, regardless of specific use designation, will also apply to inland lakes and are referred to as "base aquatic life use criteria" in the proposed WQS rules. The base aquatic life use criteria will be the same aquatic life numeric criteria that currently apply to lakes. Examples include various metals such as copper, lead, and cadmium as well as organic chemicals such as benzene and phenol. Specific details concerning the revisions to the water quality standards rules can be reviewed on Ohio EPA's web page at the following address: http://www.epa.ohio.gov/dsw/rules/draftrules.aspx.

The chemical criteria specific to the LH aquatic life use in the proposed water quality standards rules are depicted in Table I-1. In addition to these parameters, the base aquatic life use criteria apply to lakes and can be reviewed on Ohio EPA's web page at: http://www.epa.ohio.gov/portals/35/rules/draft_1-42new_base%20ALU%20criteria_aug08.pdf.

Table I-1. Proposed Lake Habitat use criteria.
Note: All criteria are outside mixing zone averages unless specified differently.

Parameter Lake type	Form[1]	Units[2]	Statewide criteria	Ecoregional criteria				
				ECBP	EOLP	HELP	IP	WAP
Ammonia	T	mg/l	Table 43-4	--	--	--	--	--
Chlorophyll a[3]								
Dugout lakes	T	µg/l	6.0	--	--	--	--	--
Impoundments	T	µg/l	--	14.0	14.0	14.0	14.0	6.2
Natural lakes	T	µg/l	14.0	--	--	--	--	--
Upground reservoirs	T	µg/l	6.0	--	--	--	--	--
Dissolved oxygen[4] All lake types	T	mg/l	5.0 OMZM 6.0 OMZA	--	--	--	--	--
Nitrogen[3]								
Dugout lakes	T	µg/l	450	--	--	--	--	--
Impoundments	T	µg/l	--	930	740	930	688	350
Natural lakes	T	µg/l	638	--	--	--	--	--
Upground reservoirs	T	µg/l	1,225	--	--	--	--	--
pH								
All lake types	--	s.u.	A	--	--	--	--	--
Phosphorus[3]								
Dugout lakes	T	µg/l	18	--	--	--	--	--
Impoundments	T	µg/l	--	34	34	34	34	14
Natural lakes	T	µg/l	34	--	--	--	--	--
Upground reservoirs	T	µg/l	18	--	--	--	--	--
Secchi disk transparency[5]								
Dugout lakes	--	m	2.60	--	--	--	--	--
Impoundments	--	m	--	1.19	1.19	1.19	1.19	2.16
Natural lakes	--	m	1.19	--	--	--	--	--
Upground reservoirs	--	m	2.60	--	--	--	--	--
Temperature								
All lake types	--	--	B	--	--	--	--	--

[1] T = total.
[2] m = meters; mg/l = milligrams per liter (parts per million); µg/l = micrograms per liter (parts per billion); s.u. = standard units.
[3] These criteria apply as lake medians from May through October in the epilimnion of stratified lakes and throughout the water column in unstratified lakes.
[4] For dissolved oxygen, OMZM means outside mixing zone minimum and OMZA means outside mixing zone minimum twenty-four-hour average. The dissolved oxygen criteria apply in the epilimnion of stratified lakes and throughout the water column in unstratified lakes.
[5] These criteria apply as minimum values from May through October.
A pH is to be 6.5-9.0, with no change within that range attributable to human-induced conditions.
B At no time shall the water temperature exceed the average or maximum temperature that would occur if there were no temperature change attributable to human activities.

I2.2.3 Harmful Algal Blooms and Microcystin Testing

Although not part of listing discussion at this time, Harmful Algal Blooms (HABs) have received significant attention during the past year. In 2008, a HAB workgroup consisting of representatives of state and federal agencies, academia and volunteers was formed. Ohio Department of Natural Resources (ODNR), Ohio Department of Health (ODH) and Ohio EPA developed the State of Ohio Initiative to Address HABs in Ohio's Inland Lakes and Lake Erie and a state-wide algal toxin sampling program. The initiative consists of four phases: outreach and education, issuing advisories, tracking/ reporting/ verification, and predicting/ surveillance. Additional details about the initiative may be viewed on Ohio EPA's web page at the following address: http://www.epa.ohio.gov/LinkClick.aspx?fileticket=uGXAJmwPz8A%3d&tabid=3897.

Cyanobacteria are photosynthesizing bacteria, commonly called blue-green algae that are capable of producing toxins (cyanotoxins) that affect the skin, liver or nervous system. They can also cause water quality deterioration associated with excessive biomass production (such as depleted dissolved oxygen levels, fish kills, taste and odor problems in drinking water, and elevated trihalomethane levels).

The harmful effects of these blooms are well documented in scientific literature and are recognized by the U.S. Environmental Protection Agency (U.S. EPA), the Center for Disease Control (CDC) and the World Health Organization (WHO) as causing acute and chronic impacts in human and animal populations. U.S. EPA recognizes that CyanoHABs are increasing in spatial and temporal prevalence in the U.S. and worldwide and that their highly potent toxins are a significant hazard for human health and ecosystem viability. Cyanobacteria and their toxins are on U.S. EPA's Office of Water Unregulated Contaminant Monitoring Regulation List 3 and Contaminant Candidate List. No water quality standard has been established, but the WHO has developed a recreational threshold of 20 ppb (parts per billion).

Microcystin toxin testing results from the National Lake Survey were released in late April 2009. The survey measured a microcystin level of 78 ppb in August of 2007 at Grand Lake St. Marys, the largest lake in Ohio, located in Mercer and Auglaize counties. Ohio EPA testing in May 2009 found 48-82 ppb from five sample locations in the lake. This prompted Ohio EPA/Ohio DNR/ODH to post Water Quality Advisory signs at the three state park beaches and boat ramps at Grand Lake on the Friday before Memorial Day. In addition, because the lake is the source water for the City of Celina public water supply, testing of the finished water began to determine if microcystin would be detected in the finished water. Microcystin levels in the raw water remained above the WHO 20 ppb recreational threshold throughout the recreational season. Finished water is evaluated weekly by the Celina public water supply and there have been no detections of microcystin.

Ohio EPA, Ohio DNR and ODH monitored four canal lakes with similar nutrient impact issues for microcystin toxin: Grand Lake, Buckeye Lake, Indian Lake and Lake Loramie. Only Grand Lake and Buckeye Lake had consistent detectable microcystin levels.

Ohio EPA sampled other lakes either because of known algal blooms in the past, because the lake was part of a larger investigation, or because of National Lake Survey results. No microcystin was detected at Beaver Creek Reservoir (source water for City of Clyde), Veterans Memorial (source water for Fostoria), or Lake Rockwell (source water for Akron). At LaDue Reservoir (another water source for Akron), the National Lake Survey measured 3.5 ppb microcystin in 2007, the second highest level detected in Ohio; in 2009, detectable levels of 0.4 ppb and 0.7 ppb microcystin were measured.

Ohio EPA received several other notifications about algae blooms in the Ohio River and Lake Erie. An algae bloom at Piedmont Reservoir prompted Ohio DNR to collect a sample for microcystin, but none was found.

Ohio EPA will consider if and how HABs and algal toxins will figure in determining impairments of Recreational and Public Water Supply Uses.

I2.3 Preview of Future Listings

An important distinction between assessment of aquatic life uses of rivers and streams in Ohio versus lakes is that the former relies on biological monitoring and a comparison of those results to the biological criteria as the assessment tool. Ohio does not have biological criteria that apply to lakes. As a result, the assessment methodology for the lake habitat aquatic life use will rely solely on the results of water quality sampling and a comparison of the results to the applicable numeric criteria. This is an obvious and important difference to the weight-of-evidence approach traditionally used by Ohio for rivers and streams.

I2.3.1 Methodology Preview: Lake Habitat Use Assessment

The following protocol is intended to be used to determine the attainment status of the LH aquatic life use in the 2012 Integrated Report. This is dependent upon the completion of the water quality standards rulemaking currently in progress, which provide the foundational components necessary to complete the actual assessment process. Ohio EPA is accepting comments on the protocol outlined below for assessing the LH aquatic life use designation.

1) Comparison of individual sample concentrations for any base aquatic life use parameter sampled to the base aquatic life Outside Mixing Zone Average (OMZA) numeric criterion. If more than 10% of the samples within an assessment period (typically two years) exceed the OMZA numeric criterion, the LH use is considered to be impaired.
2) Comparison of the ammonia concentrations of the lake samples collected to the LH OMZA numeric criterion. The LH use is considered to be impaired if more than 10% of the individual samples exceed the OMZA.
3) Comparison of the average dissolved oxygen content of the epilimnetic samples of a thermally stratified lake (or samples throughout the water column of an unstratified lake) to the OMZA dissolved oxygen criteria for the LH use designation. If more than 10% of the average dissolved oxygen values do not meet the OMZA criterion, the LH use is considered to be impaired.
4) Comparison of the median pH value of the epilimnetic samples of a thermally stratified lake (or samples from throughout the water column of an unstratified lake) to the OMZA pH criteria for the LH use designation. If more than 10% of the median pH values do not meet the OMZA criterion, the LH use is considered to be impaired.
5) Comparison of the median chlorophyll a concentration of the samples collected over the sample period (typically two consecutive summers) to the applicable chlorophyll a criterion for the type of lake and ecoregion in which the lake is located. The LH use is considered to be impaired if the median chlorophyll a concentration exceeds the applicable chlorophyll a criterion.
6) Total phosphorus, total nitrogen and secchi depth parameters are used to flag potential impairment of the LH aquatic life use designation. Exceedance of these nutrient criteria is determined in a manner similar to that described for chlorophyll a. However, exceedances of the criteria for these parameters will trigger listing on the state's "watch list" rather than a determination of use impairment. Lakes listed on the watch list will be factored into the prioritization process for additional monitoring.

I2.3.2 Results

Table I-2 describes the assessment status of the LH aquatic life use designation for five lakes sampled by Ohio EPA in 2008 based on the protocol outlined in the previous section.

Table I-2. Summary of the lake habitat use assessment for lakes sampled in 2008 using the draft assessment methodology described in this section.

Note: Values in red represent an exceedance of criteria resulting in a determination of non-support of the lake habitat aquatic life use designation. Values in yellow represent an exceedance of the criteria resulting in addition to the watch list.

Lake	Eco-region[3]	Lake Type[2]	Lake Habitat Use Status	Tiered Aquatic Life Criteria							Base Aquatic Life Criteria[1] (Units are percentages)									
				chl. *a*	t-P	t-N	sec-chi	D.O (%)	pH (%)	NH_3 (%)	TDS	As	Hg	Se	Cd	Cr	Cu	Pb	Ni	Zn
				Seasonal Median Values				Percentage of Samples Exceeding the OMZA Criterion												
Clear Fork Reservoir (Richland County)	EOLP	DPI	Non-Support	**17.7 µg/L**	17.5 µg/L	615 µg/L	1.20 m	**10**	0	0	0	0	0	0	0	0	0	10	0	0
Buckeye Lake (Licking County)	EOLP	DPI	Non-Support	**76.4 µg/l**	**67.5 µg/l**	**1075 µg/l**	**0.57 m**	**70**	0	0	0	0	0	0	0	0	0	0	0	0
Swift Run Lake (Miami County)	ECBP	DPI	Non-Support	**72.1 µg/l**	**72 µg/l**	550 µg/l	0.44 m	**50**	0	0	0	0	-	0	0	0	0	0	0	0
Dillon Reservoir (Muskingum County)	WAP	DPI	Non-Support	**44.7 µg/l**	**132 µg/l**	**730 µg/l**	**0.81 m**	0	0	0	0	0	0	0	0	0	0	0	0	0
Deer Creek Reservoir (Stark County)	EOLP	DPI	Non-Support	**30.9 µg/l**	29 µg/l	**820 µg/l**	**0.66 m**	**35.7**	7.1	0	0	0	0	0	0	0	0	10	0	0

[1] Represent parameters typically included in a standard lake assessment; additional parameters sampled as necessary.
[2] DPI = Impoundment
[3] ECBP = Eastern Corn Belt Plains; EOLP = Erie-Ontario Lake Plain; WAP = Western Allegheny Plateau

I3. Mercury Reduction at Ohio EPA

Mercury is a persistent bioaccumulative toxic metal that is widely used in many products. Once mercury is released into the environment its toxicity, persistence and ability to travel up the food chain are important issues for human health and the environment. Ohio has a statewide health advisory for mercury from fish consumption for sensitive populations: women of childbearing age and children fifteen years old or younger (issued by Ohio's Department of Health).

U.S. EPA is allowing states to identify waters for a special 303(d) list category devoted to mercury issues (5M). While moving in this direction would be preferable as a way to focus on this important pollutant, Ohio EPA has decided that such a move is not possible for this report. At the same time, Ohio EPA is taking action to decrease mercury pollution and these efforts are summarized here.

I3.1 Ohio Law

House Bill 443 was made law on January 4, 2007. The law has the mercury product regulations created initially in House Bill 583 and Senate Bill 323, establishing sales bans for certain mercury products. Public and private schools through high school were not to purchase mercury, mercury compounds or mercury-measuring devices for classroom use as of April 6, 2007. Mercury thermometers and mercury-containing novelty items were not to be sold in Ohio as of October 6, 2007. The sale of novelty items that have mercury cell button batteries are banned starting in 2011. Mercury thermostats were not to be sold or installed as of April 6, 2008. There are exemptions to the sales bans.

I3.2 Ohio Projects

Currently the Ohio EPA is working in several areas seeking to reduce mercury emissions and increase awareness:

- identification of air sources of mercury, including identification of waterbodies in the State impaired by mercury predominantly from atmospheric deposition, potential emissions sources contributing to deposition in the State, and adoption of appropriate State-level programs to address in-state sources

- identification of other potential multi-media sources of mercury, such as mercury in products and wastes, and adoption of appropriate State-level programs (note that mercury-containing products may be a source of mercury to the air and other media during manufacturing, use, or disposal)

- quantifying multi-media mercury reductions achieved by scrubber systems installed at Ohio power plants in response to the northeastern states' lawsuit

- adoption of statewide mercury reduction goals and targets, including percent reduction and dates of achievement, for air and other sources of mercury, as well as reduction targets for specific categories of mercury sources where possible

- multi-media mercury monitoring, including water quality, air deposition, and air emissions monitoring

- standardizing reporting for all publicly owned treatment works with mercury variances in relation to submitting data for the annual Pollutant Minimization Program report

- investigating mercury in various types of wastewater, including
    - primary materials industries, including primary metal production, oil refining, and coal facilities
    - facilities processing steel scrap (continuous casting and steel foundries)
    - publicly-owned treatment works, which looks at indirectly discharging industries through the pretreatment program and facility Pollutant Minimization Plan
    - coal power plant wastewater from scrubbers, ash ponds and "Low Volume" wastewaters
    - other industries in interactive allocation segments to get an accurate accounting of mercury in the segments

- working to control discharges from the State's one mercury cell sodium/chlorine plant. The current consent order includes reducing fugitive air emissions that have contributed to storm water discharges of mercury. The plant will be scrubbing cell emissions with water and sending those discharges to the plant's zero discharge process treatment system. The consent order also requires the company to track mercury mass balances through the facility, and recycle where possible. This includes using collected storm water as process water make-up

- public documentation of the State's mercury reduction program in conjunction with the State's Integrated Report, and public reporting of progress in carrying out the State's programs and reducing in-State mercury sources

- coordination across States, where possible, such as multi-State mercury reduction programs. Ohio EPA has representatives in several organizations that work toward this goal.

In addition, several specific projects are underway as described below.

Mercury Collection and Recycling
Mercury collection and recycling occurs at several facilities in Ohio. Names and contact information for these facilities are available on the Ohio EPA website (http://www.epa.ohio.gov/ocapp/Recycle.aspx).

Mercury Switch Removal Program moved to the National Program
In September 2006, Ohio was one of the first states to partner with the National Mercury Vehicle Switch Recycling Program (NMVSRP) to collect automobile mercury switches. Initially Ohio administered the incentive program. While Ohio EPA administered the program, auto recyclers in Ohio collected for recycling 41,310 mercury-containing automobile switches and $123,900 in incentives were awarded. NMVSRP took over all aspects of Ohio's switch collection program in September, 2008 including incentives. Currently Ohio works to direct auto recyclers to the National program and assist them when they have questions.

Ohio Hospital Project
Ohio EPA works with The Ohio Hospital Association to reduce the generation of hospital waste, including mercury, which hospitals commonly have in thermometers, blood pressure monitors and other equipment. A formal agreement between the two organizations was signed as part of

Ohio Pollution Prevention Week, September 20-24, 1999. The Ohio Healthy Hospitals Pollution Prevention Initiative is based on a federal agreement signed by U.S. EPA and the American Hospital Association. The goal of the program is to provide tools to support hospitals' continued efforts to minimize the production of pollutants and reduce the amount of waste generated.

Ohio Mercury Reduction Group
The Ohio Mercury Reduction Group (OMRG) works to reduce the use, release, and emission of mercury in Ohio; to evaluate relevant departmental mercury programs and regulations, collect and assess data, promote the use of mercury alternatives and the collection of retired mercury and products; and educate industry, government and the general public on ways to reduce the sources of mercury in Ohio. Its members include representatives from local health departments and POTWs, Ohio EPA, the Ohio Department of Health, and Bowling Green State University. The primary goal of OMRG is "to protect the environment and public health in Ohio against mercury exposure and the adverse effect of mercury."

The group was officially approved by the Director in May 2001. Some of the primary action items of OMRG include:

- assess the needs of participating Agencies with mercury issues and develop projects to address them
- educate homeowners, schools, medical facilities; manufacturers; trade associations, and others on mercury hazards
- review and maintain a Web page on mercury issues
- facilitate the collection of mercury and retired mercury-containing devices.

I3.3 Interagency Groups

Members of the Ohio EPA are involved in several collaborative groups with representatives from various organizations and agencies.

- Great Lakes Regional Collaboration (GLRC) – formed with members from the federal Great Lakes Interagency Task Force, the Council of Great Lakes Governors, the Great Lakes Cities Initiative, Great Lakes tribes and the Great Lakes Congressional Task Force. The group includes members from non-governmental organizations and other interests in the Great Lakes Region. The GLRC created a strategy (released in December 2005) to restore the Great Lakes basin. Most recently the GLRC released a draft document that describes a strategy to phase-down mercury in products within the Great Lakes drainage area, which includes a portion of northern Ohio.

- Binational Toxics Strategy Mercury Workgroup – The Binational Toxics Strategy Mercury Workgroup is comprised of representatives from state governments, the United States and Canadian federal governments, and several environmental groups. Its purpose is to set mercury reduction goals applicable to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin.

- Ohio River Sanitation Commission (ORSANCO) NPDES Workgroup – This on-going workgroup developed a common framework for monitoring power plant ash pond and scrubber discharges for low-level mercury. These data will be used, along with ORSANCO's mixing zone phase-out, to reduce mercury discharges to the Ohio River.

- Quicksilver Caucus – The Quicksilver Caucus (QSC) was formed in May 2001 by a coalition of State environmental association leaders to collaboratively develop holistic approaches for reducing mercury in the environment. Caucus members who share mercury-related technical and policy information include the Environmental Council of the States (ECOS), the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), the National Association of Clean Air Agencies (NACAA), the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), the Association of State Drinking Water Administrators (ASDWA) and the National Pollution Prevention Roundtable (NPPR). The QSC's long-term goal is that State, Federal, and International actions result in net mercury reductions to the environment. The QSC is working collaboratively and in partnership in three priority areas:
  - stewardship approaches for reducing mercury in the environment and managing safe, long-term storage of elemental mercury nationally and internationally
  - multi-media approaches for a mercury-based TMDL taking into account the contributions of the air and waste program as well as using their statutes to craft solutions
  - approaches to decrease the global supply and demand for mercury.

Ohio Sport Fish Consumption Advisory – The current Ohio Sport Fish Tissue Monitoring Program has monitored contaminants in sport fish since 1993. Three state agencies participate: the Ohio Department of Natural Resources (ODNR), the Ohio Environmental Protection Agency (Ohio EPA) and the Ohio Department of Health (ODH). Both ODNR and Ohio EPA collect fish throughout Ohio's jurisdictional waters. Ohio EPA analyzes the fish samples, reviews the data and issues fish consumption risk assessment evaluations. ODH releases fish consumption advisory issuance information to the public and provides fish consumption information to Ohio citizens as part of the Women's, Infant's and Children's (WIC) and the Help Me Grow (HMG) Programs' activities. Information is distributed where fishing licenses are sold, through pamphlets available in four languages, and via the Internet. See http://www.epa.ohio.gov/dsw/fishadvisory/index.aspx.

I3.4 Ohio Resources

A number of videos, fact sheets, and presentations are available on the Ohio EPA website that relate to mercury. These include household mercury fact sheets, an introduction to mercury issues, a guide for dealing with mercury by school administrators, an informational sheet for building awareness of mercury in schools, information about mercury in industry, and suggestions for developing a community mercury reduction program.