

## **Notes on Proposed Changes to Fish Consumption Advice for 2013 Advisory Update June 2013**

Each year new contaminant data for fish from Wisconsin's waters are examined to determine the need to update fish consumption advisories. WI DNR has been testing fish for contaminants since the 1970s and sampling occurs on a schedule that varies with the pollutant type and concentrations and with the waterbody type. Any changes to fish consumption advice are made in consultation with the Department of Health (DHS).

**I. GENERAL STATEWIDE ADVICE.** Wisconsin's statewide advice is based primarily on average mercury concentrations by fish species using the 2007 "*A Protocol for Mercury-based Fish Consumption Advice*". In addition, other contaminants and factors are considered. This year we are proposing to better define the term "unrestricted" by providing more detailed information that species or fish placed in this category of no advice may be eaten "up to 4 meals per week". Recent research has found that many people want to know what "unrestricted" means and that a few people eat a lot of fish, more than the recommended regularly include 8 ounces of fish or shellfish with low contaminant levels each week" for best health outcomes.

### **SAFE EATING GUIDELINES – for most of Wisconsin's Inland (non-Great Lakes) waters\*\*:**

#### **Women of childbearing age, nursing mothers and children under 15:**

- 1 meal per week - panfish (bluegill, sunfish, crappie), yellow perch, bullheads, and inland trout;
- AND
- 1 meal per month - all gamefish and other species not listed in other meal categories (e.g. walleye, pike, bass, catfish);
- Do not eat - muskies.

#### **Women beyond childbearing age and men:**

- Unrestricted\* - panfish (bluegill, sunfish, crappie), yellow perch, bullheads, and inland trout;
- 1 meal per week - all gamefish and other species not listed in other meal categories (e.g. walleye, pike, bass, catfish);
- AND
- 1 meal per month - muskies.

\* Studies suggest including 1 to 2 servings of fish or shellfish that are low in contaminants in your diet each week can benefit your health. Eating more than that provides little additional benefit and you should rarely eat more than 4 meals of fish in one week.

\*\* You should eat less of some species of fish from waters where higher levels of mercury, PCBs, or other contaminants have been found. Different advice applies to those waters that include some lakes, major rivers, the Great Lakes and other locations.

**II. 2013 SITE-SPECIFIC UPDATE.** Fish contaminant concentrations for samples collected in years 2002-2011 were examined to determine necessary exceptions to the statewide safe-eating guidelines for species at sites where new data appropriate for consumption advice were verified in fall 2012. In a few cases, data from 2012 collections were considered. The bulk of new data is from 2010-2011 collections representing 108 locations. The number of sites with new mercury (only) data included in this update is 76 (12 sites collected by DNR, 2 by US Army and 62 by GLIFWC. This year's update included evaluation of new PCB (and mercury or other chemicals) result from 32 sites in 11 waterbodies/16 advisory reaches (all collected by DNR). Banned pesticides were quantified in 6 samples from 3 waterbodies. See the table at the end of this report for a list of site/species where new results were completed and verified. This table does not include a tally of results from other states for border waters considered. Results for some samples are still pending for perfluorochemicals (PFCs) and dioxin/furan congeners.

The protocols used to determine advice are the Great Lakes Consortium Protocol for PCBs (1997), the mercury protocols (2000 and 2007), dioxin/furan congeners (1990), chlordane (1999), and Minnesota's PFCs protocol (2008). For species-sites where no change is recommended, it may be due to either limited data or no apparent change in contaminant concentrations. Where changes are recommended it may be due to apparent changes in concentrations or due to additional data compared to past data. The following report contains the summary of the review of fish contaminant data for updating the fish consumption advisories for 2013. Additional information is available upon request.

**A. Site-specific mercury advice** – Less frequent consumption than recommended by Wisconsin's statewide general advice is recommended where fish have higher mercury concentrations as noted below. In these cases, advice more stringent than the statewide advice may be warranted.

1. Advice of 'do not eat' advice for childbearing women and children under 15 and '1 meal/month' for men and older women for sites where mercury concentrations in **gamefish** are high - (i.e. when creel sizes average 0.65 ppm and exceed 0.95 ppm (minimum n > 4).

2. Advice of '1 meal per month' advice for childbearing women and children under 15 and '1 meal/week' for men and older women for sites where mercury concentrations in **panfish** are high – (i.e. when average mercury concentrations exceed 0.22 ppm and maximum concentrations exceed 0.33 ppm (minimum n > 4).

For locations where new mercury data became available, results from 2001 to 2011 were screened for high mercury concentrations on a site-by-site, chain, or advisory reach basis. For the 76 waterbodies with new mercury data (where PCBs are not a concern), minor changes to existing advice are warranted for 7 lakes/chains and exceptions to general advice are added to 3 lakes (Winter Lake in Sawyer Co, Pipe Lake in Polk Co and Oxbow Lake In Vilas Co). Exceptions are removed for 1 lake so that only the general advice will apply to that lake (Spider/Clear Lake in Sawyer Co). No changes were made to advice for 7 lakes that already have exceptions to the statewide advice.

The general statewide safe-eating guidelines are confirmed or reconfirmed for 56 of the 76 lakes/flowages. The statewide advisory is sufficient for the following lakes/chains because mercury concentrations fall in the range of the general advisory:

|           |  |
|-----------|--|
| Barron:   | Duck **, Hemlock and Red Cedar ** in Red Cedar Hemlock Chain   |
| Bayfield: | Anderson, Atkins **, Namekagon **, Middle Eau Claire **, Pike Lake Chain **  |
| Burnett:  | Yellow Lake **, Little Yellow Lake **  |
| Chippewa: | Long **  |
| Douglas:  | Whitefish/Bardon **  |
| Forest:   | Butternut **(0692400 T40 R12E S28), Lily **  |
| Iron:     | Gile Flowage   |
| Langlade: | Sawyer/Edith **  |
| Lincoln:  | Mohawksin **   |
| Oconto:   | Boot **  |
| Oneida:   | Bearskin **, George **, Minocqua **, Pelican **, Rice River Flowage in Nokomis-Rice Chain **, Squirrel** (and Squaw under Vilas)   |
| Polk:     | Wapogasset in Wapogasset-Bear Trap Chain **, Big Butternut (2641000 T36 R17W S27)**  |
| Price:    | Round and Pike** in Pike Chain   |
| Sauk:     | Devils Lake  |
| Sawyer:   | Connor **, Chetac **, Nelson **, Lac Courtes Oreilles **, Chippewa Flowage **, Round (2395600)**   |
| Vilas:    | Big **, Big Arbor Vitae **, Big Gibson ***, Big Sand **, Horsehead **, Lac Vieux Desert **, Mamie **, North Twin in Twin Chain **, Presque Isle ** in Presque Isle Chain; Eagle**, Scattering Rice** and Cranberry** in Eagle Chain; Squaw **, Tenderfoot *** in Palmer-Tenderfoot Chain; Trout ** |
| Washburn: | Bass of Bass-Patterson **, Dunn * **, Long **, Shell **, Stone **  |

\* denotes 4 lakes not previously sampled (see below too)

\*\* refers to lakes sampled/tested by GLIFWC (see below too)

Most of the lakes listed above can be removed from 303d list if currently on the list.

Listed below are additional lakes or reaches with new mercury results were further examined because of higher mercury concentrations or existing exceptions to the statewide advice. Exceptions to the

statewide advice provide a meal frequency one level more stringent than the statewide general advice for that species and consumer group. Modifications to the advice provided is noted:

#### **Bayfield**

##### **Diamond Lake**

**2013:** New 2012 data for Largemouth bass (Hg n= 9 ave=0.262 max= 0.37 ppm ) and yellow perch (Hg n= 7 ave=0.055 max= 0.07 ppm ). **No change** (current advice is general plus exception for walleye > 19"). Need updated data for walleye.

##### **Siskiwit\*\***

**2013:** New 2012 GLIFWC data for walleye (2001-2012 Hg n=59 ave=0.655 and max=1.18 ppm). **No change** (current advice is general plus exception for walleye >16").

#### **Douglas**

##### **Lyman Lake**

**2013:** new 2012 data for black crappie (Hg n=9 ave=0.33 max=0.5 ppm) and bluegill (Hg n=6 ave=0.223 max=0.25). This lake was last tested in 1987 and walleye, if present, should be retested. **Change current advice from general plus exception for walleye >17" TO general advice plus exceptions for walleye >17 and for black crappie.**

#### **Iron**

##### **Turtle Flambeau Flowage\*\* (2294900, T42 R02E S36) and Trude Lake (2295200, T42 R02E S13)**

**2013:** New 2012 data from GLIFWC for walleye (2012, Hg n=94 2001-2012 ave=0.556 max=1.2 ppm). This waterbody has been frequently by GLIFWC (2004-2012). **No change** in advice (current advice is general plus exceptions for walleye >24" and black crappie). Keep on or add to 303d list.

#### **Monroe**

##### **Lost Lake on Ranch Creek**

**2013:** New 2012 data for black crappie (2004-2012 n=8 ave=0.278 max=0.45 ppm), bluegill (2012 n=6 ave=0.27 max=0.32 ppm), pumpkinseed (2012 n=6 ave=0.172 max=0.24 ppm), and largemouth bass (2012 n=9, ave=0.574 max=0.78 ppm). **Change advice from general and exceptions for largemouth bass all size and black crappie and bluegill TO general and exceptions for largemouth bass >21", black crappie and bluegill.** The 2012 data for bluegill and largemouth bass suggest the mercury concentrations may be less than prior years' results. However, one more additional low sampling event is needed for bluegill and largemouth bass before removing exception. Both 2012 bluegill and largemouth bass results are on the cusp of falling under the general advisory but two years of lower mercury concentrations are needed and 2012 black crappie mercury concentrations still exceed exception criteria.

##### **North Flowage**

**2013:** New 2012 data for black crappie (2004-2012 n=8 ave=0.444 max=0.92 ppm), pumpkinseed (2012 n=6 ave=0.172 max=0.24 ppm), and largemouth bass (2004-2012 n=13, ave=0.732 max=1.6 ppm). **Change advice from general plus exceptions for largemouth bass all sizes and black crappie TO general plus exceptions for largemouth bass >15" and black crappie.**

#### **Oneida**

##### **Three Lakes Chain\*\***

**2013:** New 2011-12 GLIFWC data for walleye for Big\*\*, Big Stone\*\*, and Planting Ground\*\*. Mercury in all walleye from 9 lakes in the chain tested during the 2002-2012 time period total 98 in number with average Hg 0.615 and maximum Hg 1.356 ppm. There is wide range of mercury concentrations in the samples from the different lakes, sizes, and season sampled. Using all 2002-2012 that represents 9 lakes, recommendation is to **change the advice from general plus exceptions for walleye >24" and yellow perch for Big Fork, Big Stone, Dog, Fourmile, Island, and Planting Ground TO general plus exceptions for walleye >26" and yellow perch for all connected lakes in the Three Lakes Chain** (list in pdf: Planting Ground, Island, Fourmile, Big Fork, Big Stone, Dog and Big. Need to add Big, Laurel, Little Fork, Townline, Rangeline, Spirit, Big and Medicine, Long, Round, and Deer to H088 in FCS and SWDV).

##### **Sugar Camp Chain (includes Stone, Dam\*\*, Sand, Echo, and Chain) \*\***

**2013:** New 2011 GLIFWC data for walleye from Dam Lake. Using 2001-2011 data from Dam and Sand (Hg n=35 ave= 0.566, max=1.145 ppm), suggest **changing advice from general plus exception for walleye >24" TO general advice plus exception for walleye >27"**. Earlier data is all from the 1980s for several species (WE, NP, BG, YP, PS, LMB and BC) and higher concentrations of mercury were exhibited by walleye and a few NP, BC and BGs. Panfish and walleye should be resampled from one other lake in the chain (Chain, Echo, or Stone) before exception for walleye removed.

##### **Willow Flowage \*\***

**2013:** New 2011 GLIFWC data for walleye. Using 2001-2011 data (Hg n=55 ave=0.684 max=1.35) and regression, **no change** in advice (current advice is general plus exception for walleye >17"). Same conclusion using 2007-2011 data only.

#### **Polk**

##### **Pipe Lake (2490500 T35 R15W S15)**

**2013:** New results for largemouth bass (2011, n=6 ave=0.718 max=1 ppm) and bluegill (2010, n=7 ave=0.11 max=0.25 ppm) samples. **Change advice from general TO general plus exception for largemouth bass all sizes. This lake would be added to the list of waters with advisory exceptions and potentially as an impaired water.**

#### **Price**

**Butternut \*\***(2283300 T40N R01W S18 Ashland/Price Co)

**2013:** New GLIFWC 2012 data for walleye (2001-2012, Hg n=56 ave=0.725 max=1.6 ppm). **No change** (current advice is general plus exception for walleye >22") based on regression. Same conclusion using 2006-2012 data.

#### **Crowley Flowage on Flambeau River**

**2013:** New 2011 data for black crappie (2011 Hg n=6, ave=0.263 max=0.4 ppm) and walleye (2011 Hg n=9 ave=0.666 max=1.1 ppm). Earlier data is from before 1991. **Change advice from general plus exception for walleye >23" TO general plus exceptions for walleye >23" and black crappie.**

#### **Pixley Flowage on Flambeau River**

**2013:** New 2011 data for black crappie (2011 Hg n=6, ave=0.225 max=0.37 ppm) and walleye (2011 Hg n=8 ave=0.573 max=1.2 ppm). Earlier data is from 1990 and earlier. **Change advice from general plus exception for walleye >22" TO general plus exceptions for walleye >23" and for black crappie.**

#### **Sawyer**

##### **Spider\*\*/Clear Lakes**

**2013:** New 2011 GLIFWC data for walleye (2002-2011 Hg n=32 ave=0.588 max=1.3 ppm). **Change advice from general plus exception for walleye >22" TO general advisory only.** Remove from list of waters with exceptions and possibly 303d list. Last two of three years testing over 10 years show average concentrations less than 0.65 ppm and only 4 of 32 fish exceeded 0.95 ppm none of which were from 2011.

#### **Upper Holly \***

**2013:** New data for black crappie (2011, Hg n=6 ave=0.258 max=0.43 ppm) and northern pike (Hg n=9 ave=0.193 max=0.31 ppm). It is unusual for black crappie mercury to be higher than northern pike mercury so I recommend no change but resampling of black crappie to reconfirm these values. **No change** in advice (current advice is general). Otherwise, at these concentrations, black crappie would obtain more stringent advice and this lake would be added to the list of waters that have exception.

#### **Winter Lake**

**2013:** New 2011 data for black crappie (2011; Hg n=7 ave 0.27 max=0.36 ppm). Need to resample bass or walleye. **Change advice from general TO general plus exception for black crappie.** This lake would be added to the list of waters with advisory exceptions and potentially as an impaired water.

#### **Vilas**

##### **Annabelle \*\***

**2013:** New 2012 GLIFWC data for walleye (2001-2012 Hg n= 53 ave=0.702 max=1.610 ppm). **No change** (current advice is general plus exception for walleye >20)".

##### **Kentuck Lake \*\***

**2013:** New 2011 GLIFWC data for walleye (2001-2011 Hg n= 62 ave=0.386 max=1.190 ppm). **No change** (current advice is general plus exception for black crappie).

##### **Oxbow Lake \*\***

**2013:** New GLIFWC data for walleye (2001-2012 Hg n=19, ave=0.721 max=1.813 ppm). **Change advice from general TO general plus exception for walleye > 21"**. This lake would be added to the advisory exceptions and potentially to the impaired waters list if it is not already.

**B. Site-specific advice due to PCBs and other chemicals** – The list below shows the species-sites where new PCB data and other chemicals (including mercury if a concern) were recently verified. Advisory recommendations are developed in conjunction with other states for Lakes Superior and Michigan and for the Menominee, St. Louis, St Croix, and Mississippi Rivers.

New Wisconsin PCB and mercury data were obtained and included in this review for 32 sites in 11 waterbodies. No changes are proposed for consumption advice for several species with new data from Cedar Creek (all species remain 'do not eat'), the Wisconsin River (some results still pending), Lake Michigan, and Green Lake (general advice). No changes or slightly less stringent advice are proposed for several species with new data from Lake Superior and the St. Louis and lower Fox Rivers. For Green Bay and the Milwaukee and Mississippi Rivers, proposed advisory changes are either slightly more stringent, less stringent or the same depending on the species. For some reaches, results are pending for some species so advisory decisions are not proposed at this time.

**Lake Superior**– New Wisconsin data for brown trout, burbot, chinook salmon, coho salmon, lake trout, lake whitefish, northern pike, siscowett lake trout, walleye, and yellow perch. Some 2011 results pending (brown trout, lake trout, siscowet, splake, and walleye). Includes MN data but no new MN data since 2011 update.

- Chubs  
2013: No new data. No change (current advice is 1 meal per week based on PCBs).
- **Brown trout**  
2005, 2007, 2009 2011: No change (1 meal per week based on PCBs).  
**2013:** New results for 2 2011 WI samples (2001-2011, PCB n=25, ave=0.104, max=0.360 ppm; Hg n=22, ave=0.135 max=0.300 ppm). **No change** (current advice is 1 meal per week based on PCBs) and mercury less stringent than general advisory).
- **Burbot**  
**2013:** New results for 3 2011 Wi samples (2002-2011 12.8 to 25.2 inches; PCB n=17 ave=0.018 max=0.025 ppm; Hg n=17 ave=0.214 max=0.370 ppm). MN and WI agreed to **change advice from general TO 1 meal per week for sensitive population and unrestricted for general population based on low mercury and PCB concentrations.**
- **Chinook salmon**  
2007: Change to <30" 1 meal per week and >30" 1 meal per month (PCBs and Hg).  
2008, 2009, 2010, 2011: No change in advice.  
**2013:** New results for 3 2011 WI samples (2001-2011; PCB n=125 ave=0.175 max=0.580 ppm; Hg n=125 ave=0.209 max=0.470 ppm). **Change advice from <30" 1/week and >30" 1/month TO <32" 1/week and >32" 1/month based on PCB concentrations and mercury in range of general advisory).**
- **Coho salmon**  
2007: Change to all sizes 1 meal per week based on Hg SP.  
2008, 2009, 2010: No change in advice (1 meal per week).  
**2013:** New results for 3 2011 WI samples (2001-2011; PCB n=65 ave=0.022 max=0.099 ppm; Hg n=65 ave=0.067 max=0.16 ppm). **Change advice from 1 meal per week TO 1 meal per week for sensitive population and unrestricted for general population based on low mercury and PCB concentrations.**
- **Lake herring/Cisco**  
2005-2008, 2009, 2010: No change in advice (1/wk based on low PCBs and mercury less stringent than general advisory).  
**2013:** No new results (2001-2010; PCB n=75 ave=0.032 max=0.140; Hg n=70 ave=0.081 max=0.190 ppm). **Change advice from 1 meal per week TO 1 meal per week for sensitive population and unrestricted for general population based on low mercury and PCB concentrations.**
- Lake sturgeon  
2013: No new data and no change in advice (current advice is >50" 1 meal per month). Need additional samples >50".
- **Lake trout**  
2011: MN and WI samples (2001-2010, PCB n=104, ave=0.379, max=3.100; Hg n=125, ave=0.309, max=1.038 ppm; dioxin ave TEqC =7.1 ppt (2001-2007, n=12, max=17 ppt). Changed advice from '<23" 1/wk, 23-34" 1/mo, and >34" 6/yr' TO '<22" 1/wk, 22-37" 1/mo, >37" 6/yr' based on PCB and mercury relationship with length.  
**2013:** **No change** (current advice TO '<22" 1/wk, 22-37" 1/mo, >37" 6/yr' based on PCB and mercury relationship with length). New 2011 results but 10 Hg and 5 PCB results still pending (2001-2011, PCB n=126 ave=0.323 max=3.100; Hg n=121 ave=0.317 max=1.038 ppm; dioxin ave TEqC =7.1 ppt (2001-2007 n=12, max=17 ppt).
- **Lake whitefish**  
2005, 2007, 2008, 2009, 2010, 2011: No change (1 meal per week based on PCBs and mercury less stringent than general).  
**2013:** Five new WI 2011 results (2003-2011, PCB n=51 ave=0.116 max=0.76 ppm; Hg n=51 ave=0.074 max=0.25 ppm; dioxin ave TEqC=3.9 ppt (2003-2007 n=11 max=6.3 ppt). **No change** (current advice is 1 meal per week) based on PCB concentrations.
- **Northern pike**  
**2013:** Limited new data. **No change** (advice not specified). Sample of one suggests 1 meal per week for sensitive population and unrestricted for general population.
- Pink Salmon  
2013: No new results (2002-2010 PCB n=20 ave=0.017 max=0.040 ppm; Hg n=20 ave=0.037, max=0.05 ppm). Wi does not specify advice - mercury and PCB and mercury very low in unrestricted meal categories for PCBs and Hg.
- Rainbow trout  
2010: New data (11 MN). 1999-2008; PCB n=17, ave=0.053, max=0.110 ppm; Hg n=18, ave=0.071, max=0.120 ppm. No change in current advice (1/wk based on 1/wk based on PCBs and mercury less stringent than general).  
**2013:** No new data. **Change advice from 1 meal per week for all TO 1 meal per week for sensitive population and unrestricted for general population based on low levels of PCBs and mercury per discussions with MN.**
- **Siscowet lake trout**  
2005, 2007, 2008, 2008, 2010: No change (<25" 1/mo, >25" do not eat based on PCBs and dioxin/furans).  
2011: Change advice from '<25" 1/mo and >25" do not eat based on PCBs and dioxin/furans' TO '<29" 1/mo, 29-36" 6/yr, and >36" do not eat' based on PCB relationship with length. Dioxin could be removed as a pollutant in Lake Superior causing fish consumption use impairments.  
**2013:** New results for 5 WI samples but results pending for 5 additional 2011 samples (2001-2011 PCB n= 73, ave=0.733 max=5.800 ppm; Hg n=73 ave=0.375 max=1.0 ppm; dioxin ave TEqC=7.9 ppt (2001-2007 n=15, max=19 ppt). **No change** (current advice is <29" 1/mo, 29-36" 6/yr, and >36" do not eat' based on PCB relationship with length.
- Smelt  
2010: No change (unrestricted). Limited new data and for entire period (99-08). PAH samples from Ashland site all non-detect.  
2013: No new data (current advice is unrestricted).
- **Walleye** (see also St. Louis River/Superior Harbor advice)  
2010: 1999-2007 PCB n=39 ave=0.059 max=0.490 ppm; Hg n=45 ave=0.360 max=1.300 ppm. Change advice from <26" general and >26" 1 meal per month TO general advice (1 meal per week-1 meal per month).

2011: New results for 13 WI samples (2003-2009, PCB n=49, ave=0.051, max=0.430 ppm; Hg n=49, ave=0.436, max=1.500 ppm). No change (general advisory applies based on low PCBs and mercury in range of general advisory (65% in 1/mo for SP and 75% in 1/wk for GP).

**2013:** New results for 4 WI samples (2003-2011 PCB n=53 ave=0.057 max=0.43 ppm; Hg n=53 ave=0.448, max=1.5 ppm). **No change** (general advisory applies based on low PCBs and mercury in range of general advisory (68% in 1/mo for SP and 74% in 1/wk for GP).

- **Yellow perch**

2013: Five new WI results (2011 PCB n=5 ave=0.02 max=0.02 ppm; Hg n=5 ave=0.152 max=0.17 ppm). Specify advice as 1 meal per week for sensitive population and unrestricted for general population based on low levels of PCBs and mercury.

**St Louis River, Superior Harbor from Superior Entry to Fond du Lac Dam (MN)** - For the 2013 review, WI has new data for channel catfish, carp, northern pike, and walleye. No new MN data.

- **Carp**

2013: Results not yet available for 2012 samples. No change (current advice is 1/mo based on PCBs).

- **Channel catfish**

**2013:** New results for 2009 samples (2000-2009 Hg n=30 ave=0.339 max=1.2 ppm; PCB n=30 n=0.152 max=0.789 ppm). **Change from <18" general advisory (1/mo-1/wk) and >18" 1 meal per month TO general advice all sizes (1/mo-1/wk) based on average mercury and PCB concentrations.**

- **Northern Pike**

**2013:** New results for 2012 samples (2000-2012 Hg n=15 ave=0.366 max=0.56 ppm PCB n=14 ave=0.029 max=0.116 ppm). **No change** (current advice is general advisory).

- **Walleye**

**2013:** New results for 2012 samples (2000-2012 Hg n=52 ave=0.571 max=1.7 ppm PCB n=39 ave=0.074 max=0.27 ppm). **No change** (current advice is <20" general advisory and >20" is do not eat-1/month) due to mercury concentrations.

**Lake Michigan** – For the 2013 advisory update, new data from IN for rainbow trout – updates are made every other year and the 2012 review was extensive so this year there are no changes, pending further review by Lake Michigan states. WI 2012 samples are pending (chinook, rainbow trout, coho, and brown trout).

- **Rainbow trout/steelhead**

2007, 2009, 2010, 2011, 2012: No change in advice (<22" 1/wk, >22" 1/mo) based on frequency (72% in 1/mo and 24% in 1/wk) and PCB-length relationship. Mercury in general advisory range.

**2013:** New PCB and Hg data from IN (6 2011). Total 2001-2011: 24 IL PCBs, 27 WI PCBs, 21 WI Hg, 19 MI PCBs, 19 MI Hg, 7 IN PCB, 7 IN Hg. Suggest **no change** in advice from '<22" 1/wk and >22" 1/mo' based on mean PCB =0.426 ppm, max=1.6 ppm. 68% of PCB sample concentrations in the 1 meal per month range and 27% in the 1 meal per week range.

**Green Bay (incl tribs to 1<sup>st</sup> barrier except Fox R)** – New data for 13 species but some results still pending. New data from Michigan is pending also and the most recent MI data includes 2006 walleye and carp from the Menominee River mouth with PCB concentrations average in the 1/mo category but range up to "do not eat" levels.

- **Brown Trout** - Results pending for 2011 samples. No change (current advice is '<28" 1/mo and >28" do not eat'). Advice was modified with 2011 review (2006-07 PCB n=13, ave=0.775 max=1.400 ppm).
- **Burbot** -No new data therefore no change (current advice is 1 meal per week based on mercury and PCBs).
- **Carp** - Results pending for 6 2011 samples (2002-2009; PCB n=21 ave=2.692 max=15 ppm; Hg n=18 ave=0.217 max=0.38 ppm). No new data therefore no change (current advice is do not eat).
- **Channel Catfish** - New results for 2 new samples and pending for 2 2011 samples (2002-2011; PCB n=11 ave=0.913 max=2.9 ppm; Hg n=10 ave=0.09 max=0.2 ppm). **No change** (current advice is 6 meals/year).
- **Chinook Salmon** - No new samples therefore no change (current advice is <30" 1 meal per month and >30" 6/yr).
- **Drum/Sheepshead** - New results for 4 2011 samples (2002-2011; PCB n=20 ave=0.559 max=1.6 ppm; Hg n=15 ave=0.18 max=0.39). **No change** in advice (current advice is 1 meal per month) based on average and high percentage of results in the 1 per month PCB meal category.
- **Lake sturgeon** - New results for 3 2011 samples (2002-2011; PCB n=15 ave=1.05 max=5.2 ppm; Hg n=15 ave=0.3 max=0.5 ppm). **No change (current advice is do not eat)**. Maximum size tested is 58" and no open season in Green Bay.
- **Lake whitefish** - No new data therefore no change (current advice is 1 meal per month). Advice was last modified with 2009 review (2006; PCB n=12 ave=0.403 max=1 ppm; Hg n=12 ave=0.04 max=0.05 ppm).
- **Muskies** - No new samples therefore no change (current advice is >50" 6 meals/year). Advice was last modified with 2008 review based on limited data.
- **Northern pike** - New results for 9 2011 samples (2005-2011; PCB n=18 ave=0.138 max=0.43 ppm; Hg n=18 ave=0.15 max=0.44 ppm). **Change advice from 1 meal per month TO 1 meal per week <27" and 1 meal per month >27" based on average PCBs and mercury- length relationship.**
- **Rainbow smelt** – No new data and not listed. Limited data shows PCBs and Hg in unrestricted range.
- **Rainbow trout** - No new data and limited previous data. No change (current advice is 1 meal per month).
- **Smallmouth bass** - New results only for 1 2011 sample. Most samples are from mid to northern GB (2006-2011; PCB n=18 ave=0.18 max=0.53 ppm; Hg n=18 ave=0.33 max=0.62 ppm). **Change from 1/wk <17" and 1/mo >17 TO 1/wk <13" and 1/mo >13** for all based on PCBs and mercury (PCBs 1/month for all at >17" and Hg 1/month for sensitive population at >13").
- **Walleye** - New results for 8 2011 samples and 3 pending (2002-2012 PCB n=51 ave=0.422 max=3.6 ppm; Hg n=49 ave=0.031 max=1.2 ppm). **No change** (current advice is 1 meal per month).
- **White bass** - New results for 3 2011 samples (2006-2011; PCB n= 5 ave=0.822 max=1.3 ppm; Hg n=5 ave=0.1 max=0.18 ppm). **Change advice from 'do not eat' TO 6 meals per year based on PCB concentration and ranges in adjacent reaches.**

- **White perch** - New results for 4 2011 samples (2003-2011; PCB n= 23 ave=0.86 max=2.1 ppm; Hg n=20 ave=0.186 max=0.42 ppm). **No change** (current advice is 6 meals per year). 70% PCBs in 1/mo and 26% in 6/yr.
- **White sucker** - New results for 5 2011 samples (2004-2011; PCB n= 17 ave=0.13 max=.32 ppm; Hg n=19 ave=0.1 max=0.36 ppm). **No change** (current advice is 1 meal per week) 4 of 17 PCBs in 1/mo category.
- **Yellow perch** - New results for 6 2011 samples (2002-2011 PCB n= 23 ave=0.108 max=0.27 ppm; Hg n=16 ave=0.12 max=0.33). **No change** based on PCB ave and max range (current advice is 1 meal per week).

## Menominee River

**Menominee River from Pier's Gorge to Lower Scott Flowage** – New data from Michigan is pending. Most recent results for river are from 2010 redbreast and walleye from Chalk Hills impoundment considered with advisory update in spring 2012. WI 2012 samples are pending (bluegill, smallmouth bass, walleye, carp, redbreast, and white sucker). New results for 3 WI lake sturgeon from below Hattie St Bridge (See Green Bay update) and results pending for Brown trout (2) and carp (4) samples.

## Lower Fox River

**Fox River from De Pere Dam downstream to the mouth of Fox** – Samples collected in fall 2012 but most results are pending - carp (5), drum (1), northern pike (2), and walleye (11). Last reviewed for 2011 update and advice ranges from 1 meal per month to do not eat for 15 species. Remediation in this reach is estimated to be ongoing until 2015-2016 followed by blanket/capping. Below listed are the four species with new data available:

- **Bluegill** - Only two new 2012 samples (2003-2012; PCB n=12 ave=0.216 max=0.52 ppm; Hg n=2 ave=0.09 max=0.11 ppm). **No change** (1 meal per month due to PCBs).
- **Lake Whitefish** - New results for 5 2012 samples but mercury still pending (2008-2012; PCB n=11 ave=0.796 max=2.4 ppm; Hg n=6 ave=0.06 max=0.11 ppm). **No change** (current advice is 1 meal per month) based on average PCB and only 82% PCB results in 1/month.
- **Smallmouth bass** - New results for 6 2012 samples but mercury still pending (2003-2012; PCB n=19 ave=0.609 max=1.4 ppm; Hg n=13 ave=0.4 max=0.52 ppm). **No change** (current advice is 1 meal per month) based on average PCB and only 89% PCB results in 1/month.
- **White bass** - New results for 6 2012 samples (2003-2012; PCB n=20 ave=1.296 max=2.6 ppm; Hg n=19 ave=0.21 max=0.58 ppm). **Change advice from 'do not eat' TO '6 meals per year' based on average and distribution of PCB concentrations.** 50% in 1/mo, 35% in 6yr and 15% in do not eat and three sampling years.

**Fox River, Little Lake Buttes Des Morts to Dam at DePere** – For the 2013 update, new 2012 data is available for several species. Remediation was completed in 2011. The summary below is repeated for all species with advisory exceptions but only those species with new data were reviewed this year.

- **Bluegill** - New 2012 results from samples taken downstream of Little Rapids (2008-2012; PCB n=14 ave=0.032, max=0.078 ppm). Mercury not quantified due to limited volume per fish. Average and 72% of results in unrestricted PCB meal category. **No change** (general advisory of unrestricted-1 meal per week).
- **Carp** - No new results therefore no change (current advice is "do not eat"). Most recent data and 2012 review (2003-2010; PCB n=21 ave=1.248 max=3.6 ppm). Need samples from DePere Dam impoundment. Results from LLBDM 2003 and 2010 average 2 ppm. Data from Pace is whole fish so not used for advisory purposes (35 carp from OU1 to 3 in 2012: PCB ave=0.205 max=2.38 (16-24" carp).
- **Channel catfish** - No new results therefore no change (current advice is 1 meal per month). Most recent data from 2008-2010 (PCB n=8 ave=0.415 max=1.1 ppm).
- **Northern pike** - Only three new 2012 results from downstream of Little Rapids Dam (2003-2012; PCB n=23 ave=0.156 max=0.53 ppm; Hg n=23 ave=0.12 max=0.29 ppm). Most samples collected from Little Lake Buttes des Morts. New samples, n=3 plus older from the lower end of this reach also span 1/wk-1/mo PCB category. **Change advice from 1 meal per month TO general advisory** based on average PCB (1/wk) and mercury concentrations (47% in 1/wk and 17% in 1/mo for Hg SP and 56% in PCB 1/wk, 26% 1/mo).
- **Smallmouth bass** – No new results therefore no change( current advice is general 1/mo-1/wk). Results from Pace for 30 smb from OU1-3 in 2012: PCB ave=0.175 max=0.495 ppm (10-17"); 70% 1/wk, 26% 1/mo.
- **Walleye** - New results for 7 2012 samples from downstream of Little Rapids Dam plus 2003-2010 data from upstream (2003-2012; PCB n=32 ave=0.209 max=0.68 ppm; Hg n=32 ave=0.13 max=0.43 ppm). Samples from above the DePere Dam still appear to have higher PCB concentrations than walleye samples from Little Lake Buttes Dam Mort. Overall of the 32 2003-2012 DNR samples 32% fell in the 1 per month PCB meal category. 2012 samples all in the 1 meal per month category. Pace's data for 60 walleye from OU1-3 in 2012: PCB ave=0.461 max=2.38 ppm (10-18.8 inches); 36% 1/mo 30% 1/wk 15% 6/yr. **No change** (current advice is 1/mo).
- **White bass** - New results for 10 2012 samples (2003-2012; PCB n=26 ave=0.229 max=0.7ppm; Hg n=25 ave=0.15 max=0.47 ppm). Average and maximum PCB concentrations from both LLBdM and above DePere are in 1 per month PCB meal category. **No change** (current advice is 1/mo).
- **White perch** - No new results therefore no change (current advice is 1/mo). Need additional data.

- Yellow perch - No new results therefore no change (current advice is 1 meal per month). Review spring 2012 of most recent results (2003-2010 PCB n=24 ave=0.147 max=0.41 ppm).

## Upper Fox

**Green Lake** - New 2011 data for Cisco/Lake Herring (Hg n=5 ave=0.139 max=0.3ppm; PCB n=5 ave=0.01 max=0.05 ppm) and Lake Trout (2006-2011 Hg n=16 ave=0.138 max=0.44 ppm; PCB n=16 ave=0.12 max=0.76 ppm). **No change** (current advice is general). Mercury and PCBs concentrations fall under general advisory scheme. Only 1 (24.4") of 16 lake trout fell into the 1 meal per month PCB range.

## Milwaukee Basin System

### **Cedar Creek above Cedarburg including Cedarburg Pond**

2013: New results for 16 2012 samples representing several species from Cedarburg Pond. Mercury concentrations in general advisory range. Black bullheads (2012 PCB n=4 all nondetect), common carp (2012 PCB n=1 nondetect), northern pike (2002-2012 PCBs n=4 all nondetect), rock bass (2002-2012 PCB n=8 all nondetect) and white sucker (2002-2012 PCB n=7 all nondetect). **No change** to advice (current advice is general).

### **Cedar Creek from Cedarburg to the Milwaukee River including Zuenert Pond**

2013: New results for 2012 samples for several species from Columbia Pond. Data also available from consultant.

- **Black bullhead** – New results for 5 new 2012 samples (2012; PCB n=5 ave=0.826 max=1.8 ppm). Only 1 year of data in the last 10 and 2012 results in the 1/mo to 6/year range. **No change** to advice (current advice is do not eat any fish) based on limited 1 year data from 1 location within this reach still undergoing remediation.
- **Black crappie** – No new data (2002 PCB n=2 ave=0.66 max=0.71 ppm) therefore **no change** in advice (current advice is do not eat any fish).
- **Common carp** – New results for 5 2012 samples (2002-2012, PCB n= 6 ave=8.983 max=16 ppm; Hg n= 5 ave=0.116 max=0.13 ppm). **No change** in advice (current advice is do not eat any fish).
- **Largemouth bass** – New results for 5 new 2012 samples (2002-2012; PCB n=8 ave=0.61 max=1.5 ppm; Hg n=5 ave=0.133 max=0.18 ppm). **No change** in advice (current advice is do not eat any fish).
- **Northern pike** – New results for 3 2012 samples (2002-2012 PCB n=4 ave=0.93 max=1.4 ppm; Hg n=4 ave=0.185 max=0.26 ppm). **No change** in advice (current advice is do not eat any fish) based on limited 1 year data from 1 location within this reach still undergoing remediation.
- **Pumpkinseed bluegill** – New results for 5 2012 samples (2002-2012 PCB n=5 ave=0.549 max=1.5 ppm). **No change** in advice (current advice is do not eat any fish) based on limited 1 year data from 1 location within this reach still undergoing remediation.
- **Rock bass** – New results for 4 2012 samples (2002-2012 PCB n=6 ave=0.94 max=1.4 ppm). **No change** in advice (current advice is do not eat any fish) based on limited 1 year data from 1 location within this reach still undergoing remediation.
- **Shiners** – small whole fish samples 3 to 5" long average over 2 ppm PCBs.
- **White sucker** – New results for 7 new 2012 samples (2002-2012 PCB n=8 ave=2.723 max=6.1 ppm; Hg n=2 ave= 0.155 max=0.18 ppm). **No change** in advice (current advice is do not eat any fish).

**Milwaukee River downstream of City of Grafton to Estabrook Falls including Lincoln Creek** -- New data for Black crappie, Channel Catfish, Common Carp, Largemouth bass, Northern pike, Redhorse, Smallmouth bass. New results pending or limited results for green sunfish and pumpkinseed.

- **Black crappie** - Changed advice from 6 meals/year to 1 meal/month in 2004 and from 1/ month to 1/ week in 2009. New results for 5 new 2012 samples (2002-2012 PCB n=18 ave=0.111 max=0.28 ppm; Hg n=5 ave= 0.138 max=0.26 ppm). **No change** in advice (current advice is 1 meal per week).
- **Bluegill** - Three new samples for bluegill, pumpkinseed, and green sunfish (2012 ; PCB n=3 ave=0.143 max=0.23 ppm), **Add bluegill with advice of 1 meal per week.**
- **Bullhead** - One new sample plus results for 2008 yellow bullhead (2008-2012; PCB n=2 ave=0.48 max=0.62 ppm). **Add bullheads with advice of 1 meal per month.**
- **Channel catfish** - New results for 4 2012 samples (2012-2012 PCB n=4 ave=1.175 max=3.0 ppm; Hg n=4 ave= 0.22 max=0.26 ppm). **Add advice at 6 meals per year** for this previously untested species.
- **Carp** - New results for 3 new 2011 and 12 new 2012 samples (2012-2012 PCB n=32 ave=1.806 max=5.7 ppm; Hg n=26 ave= 0.133 max=0.28 ppm). **No change** (current advice is do not eat).
- **Largemouth bass** - New results for 4 new 2012 samples (2002-2012 PCB n=7 ave=0.125 max=0.28 ppm; Hg n=7 ave= 0.364 max=0.5 ppm). **No change** in advice (current advice is 1 meal per month). Two years with PCB average in 1/week but limited sample size.
- **Northern pike** - New results for 3 new 2012 samples (2002-2012 PCB n=10 ave=0.267 max=1.1 ppm; Hg n=9 ave= 0.197 max=0.36 ppm). **Change advice from 6/yr TO 1 meal per month based on average and maximum PCB concentrations.**
- **Redhorses** - New results for 1 new 2011 and 14 new 2012 samples but results still pending for 2 2012 Hg results (2002-2012 PCB n=31 ave=0.964 max=4.5 ppm; Hg n=23 ave= 0.155 max=0.37 ppm). **No change** (current advice is 1/mo) based on PCB average and 68% of results in 1/mo category.
- **Rock bass** - Only 1 new 2012 sample (2002-2012; PCB n=9 ave=0.164 max=0.480 ppm). **No change** in advice (current is 1 meal per week).

- **Smallmouth bass** - New results for 8 2012 samples (2002-2012; PCB n=23 ave=0.242 max=0.6 ppm; Hg n=22 ave=0.26 max=0.51 ppm). **No change** (current advice is 1 meal per month).
- Walleye - No new data therefore no change (current advice is 1 meal per month). Need additional samples.

### **Milwaukee River downstream of Estabrook Falls to Estuary including the Menomonee and Kinnickinnic Rivers** - New 2012 data for several species but some results pending.

- Black crappie - No new data. No change in advice (current advice is 6/year) based on 1993 data.
- Bluegill - No new data. No change in advice (current advice is 1/mo).
- **Carp** - New results for 2 2012 samples but 2 additional results pending from Kinnickinnic and 4 from Menomonee River(2002-2012; PCB n=9 ave=8.533 max=20 ppm; Hg n=7 ave=0.056 max=0.12 ppm). **No change** to advice (current advice is 'do not eat').
- Channel catfish - No new data. No change in advice (current advice is 1 meal per month) based on 2 results from 2006.
- **Northern pike** - Only 1 new sample (2006-2012; PCB n=2 ave=0.35 max=0.54; Hg n=2 ave=0.205 max=0.23 ppm). **No change** in advice (current advice is 6/yr).
- **Redhorse** - New results for 5 2012 redhorse samples but 2 PCB result pending (2002-2012; PCB n=11 ave=0.94 max=1.8 ppm; Hg n=12 ave=0.168 max=0.54 ppm). **No change** (current advice is 6/yr).
- **Rock bass** - New results for 3 2012 samples (2002-2012; PCB n=6 ave=0.323 max=0.6 ppm; Hg n=3 ave=0.207 max=0.26 ppm). **No change** (current advice is 1/mo).
- **Smallmouth bass** - New results for 7 2012 samples (2002-2012; PCB n=17 ave=0.434 max=0.8 ppm; Hg n=14 ave=0.245 max=0.59 ppm). **No change** in advice (current advice is 1 meal per month).
- **Walleye** - New results for 6 2012 samples (2002-2012; PCB n=33 ave=0.685 max=3 ppm; Hg n=30 ave=0.252 max=0.7 ppm). **Change advice from 1/mo TO 1/mo for walleye <22" and 6/yr for walleye >22"** based on 55% in 1 meal per month range and PCB-length regression.
- **White sucker** - New results for 6 2012 samples but 1 PCB pending (2002-2012; PCB n=11 ave=0.691 max=1.3 ppm; Hg n=8 ave=0.11 max=0.2 ppm). **No change** (current advice is 6/yr).
- Yellow perch - No new data. No change in advice (current advice is 1/wk based on 2002 Harbor samples).

### **Wisconsin River**

**Wisconsin River from dam at Merrill downstream to the dam at Nekoosa** – no new data, last tested 2009, advisory exceptions for carp and redhorse.

#### **Wisconsin River from Nekoosa Dam to Petenwell Dam (Petenwell Flowage)**

- **Carp** - New PCB and Hg results for 5 2011 samples but 5 dioxin/furan result pending (2003-2011; PCB n=16 ave=0.988 max=2 ppm; Hg n=16 ave=0.307 max=0.5 ppm). **No change pending results** (current advice is do not eat all sizes). Advice based on PCBs would be 6 meals/year.
- **Channel catfish** - Results pending for 2012 samples - PCB and mercury (6) and dioxin/furans (3). **No change pending results** (current advice is 1/mo <25" and >25" 'do not eat').
- White bass - No new data since 2005. No change (current advice is 1/mo all sizes).

#### **Wisconsin River from Petenwell Dam to Castle Rock Dam (Castle Rock Flowage)**

- **Carp** - New results for 5 2012 samples but 5 dioxin/furan result pending (2004-2012; PCB n=10 ave=0.22 max=0.52 ppm; Hg n=10 ave=0.267 max=0.44 ppm). **No change pending results** (current advice is do not eat all sizes). Advice based on PCBs would be 1 meal per month.

**Wisconsin River from Castle Rock Dam to Wisconsin Dells** - No new data, last tested 2005, advisory exceptions for carp and channel catfish.

**Wisconsin River from Wisconsin Dells to Prairie du Sac Dam including Lake Wisconsin** – New PCB and Hg results for 2012 fillet samples of Black crappie (n=12), Bluegill (10), Largemouth bass (6), Northern pike (9), Smallmouth bass (3), and walleye (13) all fall under the statewide general advisory. In addition, mercury results in whole fish samples of bluegill (n=32) and pumpkinseed (10) were used to examine availability of mercury from Gruber's Grove sediment and are presented in another report.

- **Carp** - New results for 5 2012 samples (2003-2012; PCB n=16 ave=0.363 max=1.2 ppm; Hg n=16 ave=0.251 max=0.45 ppm) and dioxin/furan results pending for 3 samples. **No change pending results** (current advice is 1 meal per month for carp <23" and do not eat carp >23"). Advice based on PCBs would be 1 meal per month.
- Lake Sturgeon - No new results since 2003 (current advice is 1/mo for sturgeon <70" and do not eat sturgeon >70").

**Wisconsin River from Prairie du Sac Dam to the Mississippi River** - No new data, last tested 2007, advisory exceptions for carp and Lake sturgeon.

**Rock River and Lake Koshkonong** – Results for new 2011 walleye, buffalo and carp samples still mostly pending.

**Mississippi River** – For the 2013 review, new WI PCB, Hg, and PFC data is available for several species from Pools 3 and 4. Also new 2012 data from MN for several species from Pools 4, 5-6 7-8, and 9. Also,

see PFOS section G. Species not listed fall under general advisory and have no new data for this review year.

### Mississippi River Pool 3

- **Bluegill:** New results for 5 WI samples (2006-2011, PCB n=10 ave=0.085 max=0.23 ppm, Hg n=9 ave=0.092 max=0.13 ppm, PFOS n=19 ave=134 max=440 ppb). **No change** (1 meal per week due to PFOS).
- **Crappie** (Black and White): No new data for 2013 review. Last examined for 2011 update (1/wk all due to PFOS).
- **Carp:** New results for 5 WI samples. **No change** (1 meal per month) due to PCBs (2001-2011 PCB n=24 ave=0.415 max=1.4 ppm; Hg n=29 ave=0.177 max=0.35 ppm; PFOS n=5 ave=55 max=167 ppb).
- **Channel catfish:** New results for 4 WI samples. **No change** (1 meal per month) due to PCBs (2006-2011 PCB n=16 ave=0.554, max=1.3 ppm; Hg n=20 ave=0.176 max=0.565 ppm).
- **Carp sucker:** New results for 5 WI samples (2011 PCB n=5 ave=0.213, max=0.57 ppm; Hg n=5 ave=0.115 max=0.21 ppm). **No change** (general advisory).
- **Sauger:** Only 1 new WI result (2001- 2011 PCB n=12 ave=0.088, max=0.22 ppm; Hg n=17 ave=0.118 max=0.207 ppm; PFOS n=2 ave=42 max=67 ppb). **No change** (general advisory).
- **Walleye:** New data for 4 WI samples (2001-2011 PCB n=15 ave=0.116 max=0.28 ppm; Hg n=20 ave=0.147 max=0.319 ppm; PFOS n=7 ave= 66 max=103 ppb). **No change** (general advisory).
- **White Bass:** New results for 5 WI samples (2001-2011 PCB n=24 ave=0.218 max=0.42 ppm; Hg n=28 ave=0.166 max=0.433 ppm, PFOS n=15 ave=78 max=154 ppb). **Change from 1 meal per month based on PCB concentrations TO general advisory.**

### Mississippi Pool 4

- **Crappie** (Black and White) – New results for Mn samples and 4 new WI samples (2002-2012 PCB n=8 ave=0.01 max=0.04 ppm; Hg n=16 ave=0.103 max=0.16 ppm; PFOS n=8 ave=32 max=100 ppb). **Change from 1/wk all due to PFOS TO general advisory.**
- **Bluegill** – New results for Mn samples and 5 WI samples samples (2001-2012 PCB n=22 ave=0.009 max=0.11 ppm; Hg n=13 ave=0.078 max=0.13 ppm; PFOS n=14 ave=50 max=152 ppb). **No change** (current advice is 1/wk all due to PFOS).
- **Buffalo** (Bighouth and Smallmouth) – New results for MN samples and 5 Wi samples (2002-2012 PCB n=28 ave=0.283 max=1.175 ppm; Hg n=37 ave=0.137 max=0.4 ppm). **No change** (current advice is 1 meal per month) due to PCBs.
- **Carp** – New results for MN samples and 5 WI samples (2001-2012 PCB n=32 ave=0.294 max=0.85 ppm; Hg n=36 ave=0.163 max=0.33 ppm; PFOS n=10 ave=34 max=57 ppb). **No change** (current advice is 1/mo for all due to PCBs).
- **Channel catfish** – New result for Mn samples and 2 WI samples samples, PCB results pending for 3 samples (2002-2012 PCB n=30 ave=0.521 max=1.65 ppm; Hg n=33 ave=0.111 max=0.27 ppm). **No change** (current advice is 1/ mo all due to PCBs).
- **Flathead catfish** – New results for MN samples (2002-2012 PCB n=8 ave=0.344 max=0.709 ppm; Hg n=11 ave=0.339 max=0.709 ppm). **Change from <20" general advice and >20 "1/mo for all due PCBs TO 1 meal per month for all due to PCBs.**
- **Drum** - New results for MN and 5 WI samples (2002-2012 PCB n=9 ave=0.064 max=0.242 ppm; Hg n=17 ave=0.2 max=0.32 ppm). **No change** (general advisory).
- **Largemouth bass** - New results for MN samples (2002-2012 PCB n=8 ave=0.036 max=0.06 ppm; Hg n=14 ave=0.225 max=0.435 ppm). **No change** (general advisory).
- **Northern pike** - New results for MN samples (2002-2012 PCB n=8 ave=0.036 max=0.05 ppm; Hg n=13 ave=0.129 max=0.233 ppm). **No change** (general advisory).
- **Carp suckers** - New results for 5 WI samples (2011 PCB n=5 ave=0.119, max=0.2 ppm; Hg n=5 ave=0.224 max=0.32 ppm). **No change** (general advisory).
- **Sauger** - New results for MN samples (2001-2012 PCB n=7 ave=0.05 max=0.09 ppm; Hg n=9 ave=0.168 max=0.537 ppm). **No change** (general advisory).
- **Smallmouth bass** - New results for MN samples (2001-2012 PCB n=12 ave=0.074 max=0.13 ppm; Hg n=19 ave=0.231 max=0.368 ppm). PFOS in 1/week range. **No change** (general advisory).
- **Walleye** - New results for MN samples (2001-2012 PCB n=23 ave=0.144 max=0.24 ppm; Hg n=31 ave=0.129 max=0.282 ppm). PFOS in 1/week range. **No change** (general advisory).
- **White Bass** – New results for MN samples and 5 Wi samples (2002-2012 PCB n=57 ave=0.338 max=0.8 ppm; Hg n=61 ave=0.209 max=0.627; PFOS n=16 ave=99 max=155 ppb). **No change** (1 meal per month all sizes due to PCBs).
- **Yellow perch** – New results for MN samples (2012 PCB composited 4 fish in 1 sample; PCB=0.025, Hg =0.373 ppm). **No change** (general advisory).

### Mississippi River Pools 5, 5a, and 6.

- **Buffalo** (Bighouth and smallmouth) – New results for 2012 Mn samples ((2001-2012 PCB n=36 ave=0.15 max=0.73 ppm; Hg n=53 ave=0.117 max=0.535 ppm). **No change** (general advisory).
- **Bluegill** – New results for 2012 MN samples (2001-2012 PCB n=21 ave=0.005 max=0.030 ppm; Hg n=19 ave=0.09 max=0.21 ppm; PFOS n=10 ave=63 max=99 ppb). **No change** (1 meal per week based on PFOS).
- **Crappie** – New result for 2012 MN samples (2001-2012; PCB n=16 ave=0.011 max=0.041 ppm; Hg n=17 ave=0.111 max=0.18; PFOS n=4 ave=82 max=106 ppb). **No change** (current advice is 1 meal per week based on PFOS).
- **Carp** – New result for 2012 MN samples (2001-2012; PCB n=38 ave=0.169 max=0.876 ppm; Hg n=48 ave=0.128 max=0.272 ppm; PFOS n=3 ave=20 max=26 ppb). **No change** (current advice is general).
- **Channel Catfish** – New result for 2012 MN samples (2002-2012, PCB n=32 ave=0.194 max=0.7 ppm; Hg n=36 ave=0.125 max=0.34 ppm; PFOS n=6 ave=10 max=18 ppb). **Change advice from 1/mo TO general advisory.**

- **Flathead catfish** – New results for MN samples (2002-2012 PCB n=16 ave=0.093 max=0.25 ppm; Hg n=22 ave=0.268 Hg max=0.66 ppm). **No change** (current advice is general).
- **Drum** - New results for 2012 MN samples (2002-2012 PCB n=13 ave=0.192 max=0.311 ppm; Hg n=35 ave=0.17 max=0.405 ppm). **No change** (general advisory).
- **Largemouth bass** - New results for 2012 MN samples (2002-2012 PCB n=25 ave=0.046 max=0.13 ppm; Hg n=36 ave=0.158 max=0.372 ppm). **No change** (general advisory).
- **Northern pike** - New results for MN samples (2002-2012 PCB n=8 av17=0.032 max=0.08 ppm; Hg n=29 ave=0.142 max=0.379 ppm; PFOS n=5 ave=112 max=230 ppb). **No change** (general advisory).
- **Sauger** - New results for MN samples (2001-2012 PCB n=9 ave=0.038 max=0.1 ppm; Hg n=23 ave=0.187 max=0.458 ppb). **No change** (general advisory).
- **Smallmouth bass** - New results for MN samples (2001-2012 PCB n=12 ave=0.066 max=0.13 ppm; Hg n=24 ave=0.219 max=0.516 ppm; PFOS n=10 ave=84 max=150 ppb). **No change** (general advisory).
- **Walleye** - New results for MN samples (2001-2012 PCB n=35 ave=0.043 max=0.11 ppm; Hg n=41 ave=0.166 max=0.536 ppm; PFOS n=9 ave=60 max=103 ppb). PFOS in 1/week range. **No change** (general advisory).
- **White Bass** – New results for MN samples (2002-2012 PCB n=35 ave=0.248 max=0.62 ppm; Hg n=48 ave=0.262 max=0.63 ppm; PFOS n=3 ave=163 max=178 ppt). **No change** (1 meal per month all sizes due to PCBs).
- **Yellow perch** – New results for MN samples (2012 PCB composited 4 fish in 1 sample; PCB=0.025, Hg =0.109 ppm). **No change** (general advisory).

### **Mississippi River Pools 7 and 8**

- **Buffalo** (Bigmouth and smallmouth) – New results for 2012 MN samples (2001-2012 PCB n=14 ave=0.08 max=0.43 ppm; Hg n=17 ave=0.1 max=0.197 ppm). **No change** (general advisory).
- **Bluegill** – New results for 2012 MN samples (2001-2012 PCB n=5 ave=0.013 max=0.025 ppm; Hg n=8 ave=0.09 max=0.145 ppm). **No change** (general advisory).
- **Crappie** – New result for 2012 MN samples (2001-2012; PCB n=7 ave=0.015 max=0.025 ppm; Hg n=8 ave=0.123 max=0.19 ppm). **No change** (current advice general).
- **Bowfin** – No new data and reviewed with 2012 update. No change (current advice is the general statewide). Recommend resampling of bowfin for mercury given higher mercury levels in Pool 9.
- **Carp** – New result for 2012 MN samples (2001-2012; PCB n=32 ave=0.17 max=0.82 ppm; Hg n=31 ave=0.136 max=0.255 ppm). **No change** (current advice is general).
- **Channel Catfish** – New result for 2012 MN samples (2002-2012; PCB n=34 ave=0.154 max=0.5 ppm Hg n=38 ave=0.109 max=0.32 ppm;). **No change** (current advice is general).
- **Flathead catfish** – New result for 2012 MN samples (2002-2012 PCB n=6 ave=0.047 max=0.17 ppm; Hg n=10 ave=0.225 max=0.357 ppm). **No change** (current advice is general).
- **Drum** - New results for 2012 MN samples (2002-2012 PCB n=8 ave=0.131 max=0.411 ppm; Hg n=25 ave=0.235 max=0.48 ppm). **No change** (general advisory).
- **Largemouth bass** - New result for 2012 MN samples (2002-2012 PCB n=17 ave=0.044 max=0.44 ppm; Hg n=40 ave=0.197 max=0.547 ppm). **No change** (general advisory).
- **Northern pike** - New result for 2012 MN samples (2002-2012 PCB n=14 ave 0.02 max=0.05 ppm; Hg n=25 ave=0.168 max=0.489 ppm). **No change** (general advisory).
- **Sauger** - New results for MN samples (2001-2012 PCB n=7 ave=0.021 max=0.055 ppm; Hg n=13 ave=0.177 max=0.291 ppb). **No change** (general advisory).
- **Smallmouth bass** - New result for 2012 MN samples (2001-2012 PCB n=9 ave=0.028 max=0.052 ppm; Hg n=37 ave=0.239 max=0.502 ppm). **No change** (general advisory).
- **Walleye** - New results for MN samples (2001-2012 PCB n=14 ave=0.055 max=0.13 ppm; Hg n=21 ave=0.183 max=0.339 ppm). **No change** (general advisory).
- **White Bass** – New results for MN samples (2001-2012 PCB n=13 ave=0.164 max=0.4 ppm; Hg n=22 ave=0.218 max=0.491 ppm). **No change** (general advisory).
- **Yellow perch** – New results for MN samples (2012 PCB composited 4 fish in 1 sample; PCB=0.025, Hg =0.113 ppm). **No change** (general advisory).

### **Mississippi River Pool 9** – WI has new 2010 data for bowfin and carp.

- **Buffalo** (Bigmouth and smallmouth) – New results for 2012 MN samples (2001-2012 PCB n=4 ave=0.123 max=0.371 ppm; Hg n=11 ave=0.098 max=0.234 ppm). **Change advice from general advisory (1/wk-1/mo) TO 1 meal per month for all due to PCBs.**
- **Bluegill** – New results for 2012 MN samples (2001-2012 PCB n=2 ave=0.023 max=0.025 ppm; Hg n=3 ave=0.087 max=0.091 ppm). **No change** (general advisory).
- **Crappie** – New result for 2012 MN samples (2001-2012; PCB n=2 ave=0.018 max=0.025 ppm; Hg n=4 ave=0.101 max=0.152 ppm). **No change** (current advice general).
- **Bowfin** – No new data since 2012 update. **No change** (current advice is <29" 1 meal per month and >29" do not eat based on mercury concentrations). Recommend resampling Bowfin from Pool 9 for mercury since 2010 mercury is below exception criteria but 2 years of data are needed to confirm.
- **Carp** – No new data since 2012 update. **No change** (current advice is general advisory for carp <25" and 1 meal per month for carp >25" due to PCBs).
- **Channel Catfish** – New result for 2012 MN samples (2002-2012; PCB n=7 ave=0.144 max=0.486 ppm; Hg n=13 ave=0.134 max=0.208 ppm;). **No change** (current advice is general).

- **Flathead catfish** – New result for 2012 MN samples (2002-2012 PCB n=2 ave=0.133 max=0.24 ppm; Hg n=7 ave=0.298 max=0.568 ppm). **No change** (current advice is general).
- **Drum** - New results for 2012 MN samples (2002-2012 PCB n=3 ave=0.074 max=0.181 ppm; Hg n=11 ave=0.136 max=0.361 ppm). **No change** (general advisory).
- **Largemouth bass** - New result for 2012 MN samples (2002-2012; PCB n=10 ave=0.032 max=0.07 ppm; Hg n=21 ave=0.242 max=0.465 ppm). **No change** (general advisory).
- **Northern pike** - New result for 2012 MN samples (2002-2012; PCB n=5 ave 0.019 max=0.03 ppm; Hg n=16 ave=0.156 max=0.337 ppm). **No change** (general advisory).
- **Sauger** - New results for MN samples (2002-2012 PCB n=73ave=0.025 max=0.03 ppm; Hg n=11 ave=0.206 max=0.366 ppm). **No change** (general advisory).
- **Smallmouth bass** - New result for 2012 MN samples (2002-2012 PCB n=4 ave=0.019 max=0.025 ppm; Hg n=13 ave=0.249 max=0.569 ppm). **No change** (general advisory).
- **Walleye** - New results for MN samples (2002-2012; PCB n=4 ave=0.026 max=0.03 ppm; Hg n=18 ave=0.163 max=0.304 ppm). **No change** (general advisory).
- **White Bass** – New results for MN samples (2002-2012; PCB n=4 ave=0.097 max=0.316 ppm; Hg n=11 ave=0.164 max=0.56 ppm). **No change** (general advisory).
- **Yellow perch** – New results for MN samples (2012 PCB composited 4 fish in 1 sample; PCB=0.025, Hg =0.093 ppm. **No change** (general advisory).

**Mississippi River Pools 10-12** – No new data this year. Bluegill, carp, and white bass last reviewed in spring 2012.

**C. DIOXIN and FURANS** – Dioxin/furan congeners are being quantified in Wisconsin River carp and channel catfish collected in 2012 to update the dioxin based advice but not yet available. Dioxin/furan based ‘do not eat’ advice applies to carp and channel catfish from some sections of the Wisconsin River. In past years, dioxin/furan concentrations required advisories for some species of fish from Lakes Superior and Michigan. Occasional testing of Siscowet lake trout, lake trout, and lake whitefish should be conducted and is also potentially a concern in large Lake Michigan lake trout.

**D. PBDES** – WI DHS’s GLRI grant is supporting analysis of collected samples for PBDE congeners over collection years 2010 to 2012. With the results available since 2002 to the 2011 collection year, we have results available for 144 samples representing 19 species from 18 waterbodies.

**E. BANNED PESTICIDES** – New dieldrin, DDT metabolites, and chlordane isomer results available for 6 2011 samples from Big Green cisco and lake trout, Wisconsin River Bighead carp, and Devils Lake brown trout. Results these for these 6 samples were mostly below detection levels (LOD) with the exception of the Big Green Lake trout that has quantifiable but low levels. And, p,p-DDE concentrations were above the level of detection in 4 of the 6 samples but the maximum value was 0.6 ppm in the Devils Lake Lake trout.

Based on a review of concentrations in samples collected from 2001-2010, most samples are at low or nondetectable concentrations (less than LOD, LOQ or reporting levels). Few 2001-2010 results exceed FDA tolerance levels: 0 of 343 dieldrin results exceed 0.3 ppm; no total DDT results exceed 5 ppm; and 7 of 343 total chlordane results exceed 0.3 ppm.

A Great Lake Consortium advisory protocol is available for chlordane. Out of the 2001-2010 total chlordane values (n=343), 23 fall in the 1 meal per week concentration range. These 23 tend to be Siscowet lake trout and lake trout from Lakes Michigan and Superior. PCB based consumption advice for those species remains more stringent.

The maximum total DDT for 2001-2010 samples was 1.27 ug/g in a Lake Michigan lake trout. In 2009, the SLOH began quantifying only 3 isomers (p,p’DDT; p,p’DDE, and p,p’DDD) due to difficulty in quantifying the low levels of the o,p’ isomers so most of the post 2009 total DDT concentrations are based on a sum of the three p,p’ isomers. P,p’-DDE is the DDT metabolite that is found in highest concentrations in Wisconsin fish.

**F. PERFLUOROCHEMICALS (PFCs)** – PFC chemicals were quantified in 24 2011 fish samples from the Mississippi River Rivers Pools 3 and 4. Additional samples were analyzed under the DHS-GLRI

grant in 40 other 2011 samples from Green Bay, Lakes Michigan and Superior, and the Peshtigo River. Additional results are pending for DHS-GLRI funded PFC results for additional 2011 and 2012 samples.

PFCs are a family of manmade chemicals that have been used for decades to make products that resist heat, oil, stains, grease and water. Some of the chemicals in the PFC group are perfluorooctane sulfonate (PFOS;  $C_8F_{17}SO_3$ ) and perfluorooctanoic acid (PFOA;  $C_8F_{15}O_2$ ). The chemical structures of PFCs make them extremely resistant to breakdown in the environment

<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcshealth.html>. MN DOH developed a risk assessment of PFOS. A variety of health effects occur in laboratory animals exposed to high doses of PFOS, the PFC that accumulates in fish. The most sensitive effects (i.e., effects observed at the lowest dose causing adverse effects) are decreased high-density lipoprotein (HDL or good cholesterol) and changes in thyroid hormone levels in some animals. Special cleaning and cooking precautions used to reduce contaminants like PCBs that concentrate in fat are not effective with PFOS. The fish consumption advice issued due to PFOS is based on preventing ingestion greater than 0.08  $\mu\text{g}/\text{kg}\text{-bw}/\text{day}$ . Limited data suggest fate and accumulation in fish of this chemical may be different than that exhibited by PCBs.

PFOS-based consumption advice was required for bluegill and crappies from Pools 3 to 6 (all 1 meal per week) from the Mississippi River. With the new data, crappie from Pool 4 will not have exceptions due to PFOS. Advice for other species/locations in the Mississippi River applies due to PCBs. PFOS in several species from Pools 3 to 6 are in the 1 meal per week range but PCB based advice is more stringent. PFOS concentrations from other locations tested do not require exceptions to the statewide general advice based on the partial 2010-2011 dataset. The waterbody with the highest concentrations after the Mississippi River appears to be Lake Michigan.

**G. SPECIES-SITES NEWLY VERIFIED DATA - Table 1.** List of waters with new contaminant data for species listed showing name, county, collector, species and form, and count of results (mercury, PCBs, banned pesticides, dioxin/furans, PBDEs, and PFCs). Only edible forms (fillets) are used for advisory determination. A tally of data from other states for boundary waters is not included.



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