

## Notes on Changes to Fish Consumption Advice for 2012 Advisory Update

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.** 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 there are no modifications to the statewide general advisory that applies to all inland waters.

### **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;
- 1 meal per month - all gamefish and other species not listed in other meal categories (e.g. walleye, pike, bass, catfish); and
- 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 health benefits of fish and shellfish are obtained by eating 1 to 2 meals per week.
- \* You should eat less of some species of fish from waters where higher levels of mercury, PCBs, or other contaminants have been found. Additional advice is available for these waters which include some lakes in northern Wisconsin, major rivers, the Great Lakes and other locations.

**II. 2012 SITE-SPECIFIC UPDATE.** Data from collection years 2000-2010 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 2011. In a few cases, data from 2011 collections were considered. The bulk of new data is from 2009-2010 collections representing 64 locations in 48 waterbodies. The number of sites with new mercury (only) data is 37 (28 sites collected by DNR and 9 collected by GLIFWC). The number of sites with new PCB (and mercury or other chemicals) data is 27 sites in 11 waterbodies (all collected by DNR). This year no additional data were obtained for perfluorochemicals (PFCs) or dioxin/furan congeners. Banned pesticides were quantified in 17 samples from 6 locations in 5 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.

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 2012. 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 2010 were screened for high mercury concentrations on a site-by-site, chain, or advisory reach basis. For the 37 waterbodies with new mercury data (where PCBs are not a concern), minor changes to existing advice are warranted for 7 lakes and exceptions to general advice are added to 2 lakes (Moquah/Spider Lakes in Ashland County and Lower Parks Falls Flowage in Price County). No changes were made to advice for 4 lakes that already have exceptions to the statewide advice.

The general statewide safe-eating guidelines are confirmed or reconfirmed for 24 of the 37 lakes/flowages with new data including 10 of 11 waterbodies that had not previously been tested (\*). The statewide advisory is sufficient because mercury concentrations fall in the range of the general advisory.

Forest: Bear \* (0552100)  
 Iron: Mercer \* (see Sherman Lake Vilas Co)  
 Langlade: Rabe \*  
 Lincoln: Lake Alice on WI R, Pickerel\* (1558400, T34 R8E S16), Seven Island  
 Oneida: Bearskin\*\*, Kawaguesaga, Pelican\*\*, Muskellunge (1595600, T38 R08E S10), Swamsauger \* (see Squaw L Vilas Co)  
 Price: Ten Lake \*  
 Sawyer: Chippewa Flowage\*\*, Round Lake\*\*, Teal Lake\*\*  
 Vilas: North Twin\*\*, Sherman\*\*, Squaw\*\*  
 Waushara: Huron \*, Johns \*, Little Silver \*, Wilson \* Lakes

\* denotes 11 lakes not previously sampled

\*\* refers to lakes sampled/tested by GLIFWC.

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 data that were further examined because of higher mercury concentrations or existing exceptions to the statewide advice. Modifications to the advice provided is noted:

#### Ashland

##### **English Lake**

2012: New 2010 data for black crappie (2010; n=5 Hg ave=0.134 max=0.16 ppm), largemouth bass (2010; n=4 Hg ave=0.413 max=0.5 ppm), musky (2010; n=4 Hg ave=0.528 max=0.78 ppm), walleye (2010; n=1 Hg =1.1 ppm), and yellow perch (2010; n=2 Hg ave= 0.195 max=0.23 ppm). Only 1 2010 walleye value so data from 1994 considered. **Change advice from general plus exception for walleye >17" TO general plus exception for walleye all sizes (do not eat-1 meal per month)**. Keep on 303d. Question – are walleye still present in the lake and can they be resampled?

##### **Moquah and Spider Lakes \***

2012: New sampled lake with 2010 data for bluegill (2010 Hg n=6 ave=0.513 max=0.770 ppm), largemouth bass (2010 Hg n=2 ave=0.640 max=0.710 ppm) and musky (2010 Hg n=6 ave=1.273 max=2.800 ppm). **Change advice from general TO general plus exception for bluegill (1/mo-1/wk)**. Largemouth bass results from 2011 samples are pending. Spider was previously on the 303d list and should remain and Moquah ( WIBC 2918200) should be added .

##### **Spillerberg \***

2012: New 2010 data for musky (2010, n=1, Hg=0.26), pumpkinseed (2010 Hg n=1 Hg=0.2 ppm), rock bass (2010; n=1 Hg=0.21 ppm), walleye (2010; n=5 Hg ave=0.51 max=0.62 ppm), and yellow perch (2010; Hg n=4 ave= 0.28 max=0.57 ppm). Limited sample size per species and smaller walleye range. **No change** in advice (current advice is general plus exception for yellow perch (1/mo-1/wk).

#### Dane

##### **Waubesa**

2012: New data for bluegill (2010; Hg n=8 ave=0.207 max=0.32 ppm and PCBs nd). **No change** in advice (current advice is general). Need to resample carp, walleye, and black crappie.

## Iron

### **Bearskull Lake**

2012: New 2009 data for bluegill (Hg n=6 ave=0.217 max=0.42 ppm) and largemouth bass (Hg n=9 ave=0.347 max=0.610 ppm). Change advice from general plus exceptions for walleye >18" TO general plus exceptions walleye >18" (do not eat-1/mo) and for bluegill (1/mo-1/wk).

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

2004 – 2009: New walleye data (GLIFWC) and advisory updates

2011: New 2009 GLIFWC data for walleye (2000-2009, Hg n=60 ave= 0.59 max=1.2 ppm) and DNR data for black crappie (2000-2009; Hg n=11 ave=0.229 max=0.570 ppm). Change advice from general plus exceptions for walleye >24" to general plus exceptions for walleye >24" and black crappie.

2012: New 2010 GLIFWC data for walleye (2001-2010; Hg n=72 ave=0.56 max=1.2 ppm). No change in advice (general plus do not eat-1/mo for walleye >24" and 1/mo-1/wk for black crappie). Keep on or add to 303d list.

### **Lake Six**

2012: New data for bluegill (2010; Hg n=5 ave=0.154 max=0.2 ppm) and northern pike (2002-2010; Hg n=15 ave=0.651 max=0.99 ppm). Change advice from general plus exception for yellow perch TO general plus exception for northern pike >26" (do not eat-1/mo) and yellow perch (1/mo-1/wk). Suggest retesting some smaller sizes of northern pike as samples are biased to larger sizes. Keep on or add to 303d list. Cut off would be 25" but adjusted to reflect minimum size limit of 26" on Northern pike until 2014.

### **North Bass**

2012: New 2010 data for bluegill (2010; Hg n=7 ave=0.239 max=0.350 ppm) and largemouth bass (n=9 Hg ave=0.680 max=1.100 ppm). Change advice from general plus exception for largemouth bass all sizes TO general plus exception for bluegill (1/mo-1/wk) and largemouth bass (do not eat-1/mo). Keep on or add to 303d list.

## Lincoln

### **Somo**

2012: New 2010 data for walleye (Hg n=5 ave=0.534 max=0.61 ppm). New data consists of fish less than 20". If second year confirms lower Hg, then exception could be removed. Included consideration of 1991 data for walleye since 2010 sample number is limited. Change advice from general plus exceptions for walleye >20" (do not eat-1/mo) and bluegill (1/mo-1/wk) TO walleye >22" (do not eat-1/mo) and bluegill (1/mo-1/wk). Keep on or add to 303d list.

### **Spirit River Flowage**

2012: New 2010 data for walleye (2005-2010; Hg n=9 ave=0.676 max=0.89 ppm; PCBs nd). Size of walleye is small and should be resampled to get larger sizes if they exist. No change (current advice is general plus exceptions for black crappie and bluegill). Keep on or add to 303d list.

## Marinette

### **High Falls Flowage on Peshtigo River**

2011: New 2010 data for largemouth bass (Hg n=9 ave=0.583 max=1.0 ppm) and black crappie (Hg n=6 ave=0.253 max=0.42 ppm). No change in advice (current advice is general plus exceptions advice for walleye >17" and black crappie). Keep on 303d.

2012: New 2011 data for yellow perch (2011; Hg n=6 ave=0.217 max=0.270 ppm), black crappie (2010-2011; Hg n=12 ave=0.317 max=0.590 ppm), walleye (2004-2011; Hg n=13 ave=0.851 max=1.300 ppm). No change in advice (current advice is general plus exceptions advice for walleye >17" and black crappie). Keep on 303d.

## Price

### **Lower Park Falls Flowage**

2012: New 2011 mercury data for northern pike (Hg n=6 ave=0.648 max=1.3 ppm). Change advice from general TO general plus exception for northern pike >22" (do not eat-1/mo). Lower Park Falls Flowage may already be on pre-2000 303d list and can be kept on or added.

### **Musser**

2012: New 2011 mercury data for black crappie (Hg n=6 ave 0.388 max= 0.67 ppm). Change advice from general plus exception for walleye >24" TO general advice plus exception for walleye >24" (do not eat-1/mo) and black crappie (1/mo-1/wk). Keep or add to 303d and need to resample walleye.

## Sawyer

### **Black Lake**

2012: New 2010 data for black crappie (Hg n=3 ave=0.393 max=0.48 ppm), bluegill (Hg n=4 ave=0.283 max=0.36 ppm), and largemouth bass (Hg n=5 ave=0.684 max=0.94 ppm). Change advice from general plus exception for black crappie TO general plus exceptions for black crappie and bluegill(1/mo-1/wk). Largemouth bass average in the 1 meal per month for men and older women but do not exceed the "do not eat" tissue value for younger women and children. Keep on or add to 303d list.

## Vilas

### **Trout Lake**

2012: New 2010 data for lake trout (2001-2010; Hg n=4 ave=0.435 max=0.520 ppm; PCB n=6 ave=0.159 max=0.410 ppm) and walleye (2010; Hg n=7 ave=0.156 max=0.240 ppm; PCB n=5 ave=0.000 max=0.000 ppm). No change (current advice is general). Remove from 303d if on for fish contaminants.

**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 for 27 sites in 11 waterbodies. Consumption advice will not be modified for several species from Lake Michigan; the Little Lake Buttes des Mort-De Pere reach of the lower Fox River; the Branch, Kewaunee, Sheboygan, and St. Croix Rivers; and Pools 4 to 12 of the Mississippi River. Slightly less restrictive advice will be provided for some species from Lake Michigan and Pools 7 to 12 of the Mississippi River. The advisory exceptions for channel catfish from Pool 7-8 of the Mississippi River will be removed and this reach will not be listed as having exceptions to the statewide advice. Slightly more restrictive advice is proposed for larger sizes of yellow perch from Lake Michigan and for larger walleye from the upper Menominee River reach (Pier's Gorge to the Upper Scott Flowage/Second Dam).

**Lake Superior**– No review this year since limited new data since 2011 review and last year's review was extensive. This year only a few results for lake herring, lake trout, lake whitefish, siscowet lake trout, and walleye became available from WI and no new data from Minnesota. Wisconsin's collection schedule is primarily odd years so next year's review will incorporate the results for the 2011 collections which are not yet completed. No change to advice this year.

**Lake Michigan** – For the 2012 advisory update, we have new data from WI, IL, MI and IN for brown trout, chinook, coho, lake trout, rainbow trout, and yellow perch. The 2012 recommendations are pending review by Lake Michigan states.

- **Brown trout**  
2007: Examined 1996-2005 data from WI, IL and MI (southern only). Recommend change from <22" 1 meal per month and >22" 6 meals per year to <25" 1 meal per month and >25" 6 meals per year.  
2009, 2010, 2011: No change in advice (<25" 1/mo and >25" 6/yr) based on average, maximum, frequency distribution and regression with length.  
2012: New PCB and mercury from WI (5 new and 3 pending from 2010) and PCBs from IL (2008). Total 2001-2010: 30 IL PCBs, 15 WI PCBs and 16 WI Hg. Suggest changing advice from '<25" 1/mo, >25" 6/yr TO '<28" 1/mo >28" 6/year' based on PCB relationship with length.
- Bloater chubs (commercial/target)  
2007, 2008, 2010, 2011: No change (current advice is 1/mo) due to PCBs and mercury less stringent than general advisory.  
2012: No new data. No change to current advice (1/mo).
- **Chinook salmon**  
2007, 2008, 2009, 2010, 2011: No change in advice (<36" 1/mo, >36" 6/yr) based on PCB relationship with length and mercury in general advisory range).  
2012: New results for PCB and Hg from WI (20 2010) and MI (10 2010 so LMI); and PCBs from IL (4 2008-09). Total 2001-2010: 4 IL PCBs, 20 WI PCBs and Hg, 10 MI so LMI PCBs and Hg. Suggest adjusting advice from <36" 1/mo and >36" 6/yr TO all sizes 1/mo based on mean PCB = 0.626 ppm and 81% of sample results in the 1/mo range.
- Lake whitefish  
2008: Examined 1997-2006 data from WI, IN and MI (southern only). Recommend no change (current advice is 1 meal per month based on average and maximum concentrations of PCBs). Dioxin/furans below 10 ppt TCDD TEcQ based on 15 samples (1998-2004).  
2012: No new data. No change to current advice (1/mo).
- Burbot  
2008: Examined 1997-2006 data from WI. Recommend no change due to limited data. Recommend additional sampling. (general advice appears to apply and PCBs are low). Of all WI mercury data, burbot may have highest concentrations of all Lake Michigan species with mercury data.  
2012: No new data. Need to resample burbot, No change in advice for now.
- **Coho**  
2008, 2009, 2011: No change (current is 1 meal per month) based on PCB concentrations 85% in 1/mo category and mercury in general advisory range.  
2012: New PCB and Mercury data from IN (6 2010) and WI (11 2010). Total 2001-2010: 22 IL PCBs, 81 WI PCBs and 79 Hg, 6 IN PCBs and 6 IN Hg. Same deal using last 5 yrs. Suggest no change in advice (current is 1/mo) based on mean PCB = 0.5 ppm and 84% of samples with concentrations in the 1/mo range.
- **Lake trout** (commercial/target)  
2007, 2009: Recommend no change (<23" 1/mo, 23-27 6/yr, and >27 do not eat) based on average, maximum, frequency distribution and regression with length.  
2010: Examined 1999-2007 data (IN =6, IL=27 composites, WI=21). Based on regression of all data, change advice TO <25" 1 meal per month, 25-29" 6 meals per year, and >29" do not eat.  
2011: New results for 5 IL samples (2000-2009, PCB n=56, ave=1.6, max=11 ppm; Hg n=18, ave=0.19, max=0.36 ppm). Based on PCB-length regression, no change (<25" 1 meal per month, 25-29" 6 meals per year, and >29" do not eat). Mercury in general advisory range. Also, dioxin/furan TEcQs needs updating and exceed 10 ppt on average based on 6 results (2002-2004).

**2012:** New PCB data from IL (1 2009) and PCB and Hg from WI (5 2010). Total 2001-2010: 27 IL PCBs, 17 WI PCBs and Hg, 3 IN PCBs and Hg. Proposed **no change** (current is <25" 1/mo, 25-29" 6/yr, >29" dne) based on PCB mean = 1.0 ppm, max=3.7 ppm and PCB-length relationship. Also, dioxin congeners an issue and need to be retested.

- **Rainbow trout/steelhead**  
2007, 2009, 2010, 2011: 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.  
**2012:** New PCB and Hg data from WI (5 2010). Total 2001-2010: 24 IL PCBs, 27 WI PCBs, 21 WI Hg, 19 MI PCBs, 19 MI Hg, 1 IN PCB, 1 IN Hg. Suggest **no change** in advice from '<22" 1/wk and >22" 1/mo" based on mean PCB =0.412 ppm, max=1.6 ppm and 65% of PCB sample concentrations in the 1 meal per month range and 30% in the 1 meal per week range.
- **Smelt (commercial/target)**  
2009: Examined 1998-2005 PCB data from WI (6), IL (5), and MI (20). No change (2008 advice is 1 meal per week all sizes) based on average and frequency distribution.  
2012: No new data. No change to current advice (1/wk).
- **Yellow perch**  
2009: Examined 1998-2006 PCB data from WI (29), IN (6), and IL (16). Recommend no change (2008 advice is 1/wk all sizes) based on average concentration and frequency distribution. Limited mercury data from WI (16) and IN (6) shows most in 1 meal per week category with rest in 1 meal per month for sensitive population – data limited.  
2010: Examined 1999-2006 data (limited new IL data). No change in advice (1/wk) based on 58% results in 1/wk category and 38% in unlimited. Mercury in general advisory range.  
**2012:** New PCB and Hg data from WI (10 Hg, 5 PCB, 5 PCB pending 2010) and PCBs from IL (4 2009). WI recommends **change advice** from 1/wk for all people and all sizes of fish TO 1/wk for YP<11" and 1/mo for YP>11". Total 2001-2010: 18 IL PCB, 21 WI PCBs, 26 WI Hg, 6 IN PCB, 6 IN Hg.

**Green Bay (incl tribs to 1<sup>st</sup> barrier except Fox R)** – No 2012 updates this year since limited new data received only for 2 species (lake sturgeon and rainbow trout) and most of 2010 data already reviewed for 2011 update. For 2011 advisory update, reviewed new data for brown trout (3), common carp(6), drum(6), lake sturgeon (5), rainbow trout (1), and smallmouth bass (9 all Little Sturgeon Bay), and yellow perch (1) including 2010 drum data. For 2011, advice was modified for brown trout, burbot, smallmouth bass, and splake, Michigan's most recent data includes walleye from 2006 from Menominee River mouth and concentrations are primarily in the 1/mo category. Also, Michigan has 2006 carp data also from the Menominee River mouth and PCB concentrations are much lower than WI's lower Bay data.

## Menominee River

**Menominee River from Pier's Gorge to Lower Scott Flowage** – Only new data is Michigan's 2010 data for redhorse and walleye from Chalk Flowage. Michigan is reviewing their advisory protocols. Michigan's 2010 data for redhorse and walleye from Chalk Hills flowage where mercury appears to be a concern. We need to resample walleye and the other species listed in the collection schedule from the impoundments. FERC data from Lower Scott Flowage 2011 also examined. Using MI and WI's mercury data for walleye, advice should be clarified for walleye from impoundments upstream of the Lower Scott Flowage (>18" do not eat – 1/mo). Michigan is revising their protocols and their advisory determinations are unclear at this time.

## Lower Fox River

**Fox River from De Pere Dam downstream to the mouth of Fox** – No 2012 updates this year since no new data. For 2011 advisory update, reviewed new data for brown trout (3), common carp(6), drum(6), lake sturgeon (5), rainbow trout (1), and smallmouth bass (9 all Little Sturgeon Bay), and yellow perch (1). For 2011, advice was modified for bigmouth buffalo, drum, lake whitefish, walleye and white sucker.

**Fox River, Little Lake Buttes Des Morts to Dam at DePere** – Most new 2010 data was reviewed last year's (2011) update and was summarized in last year's report. The summary is repeated below only for those species with new data, advice more stringent than the statewide advice, or where additional data is needed. For the 2012 review, only a few additional 2010 results became available for black crappie (5), bluegill (1), channel catfish (2), common carp (2), and yellow perch (5).

- **Black crappie**  
2011: Limited new data (2008-2010) n=3, PCB ave=0.015, max=0.044 ppm) but 5 2010 results pending. No change (not listed as exception to general advisory).  
2012: More 2010 results available (2008-2010, n=8, PCB ave=0.022, max=0.088 ppm). **No change** (general advice applies).
- **Bluegill**  
2011: New 2008 data from Wrightstown/Kaukauna (n=5, PCB ave=0.032, max=0.058 ppm) and 1 2010 sample pending. No change (not listed as exception to general advisory).  
2012: Only 1 new 2010 result, **no change** (general advice applies).
- **Carp**  
2005: No change to advice (do not eat). 1998 and 2003 data shows variable concentrations.  
2011: New results from LLBdM and downstream (2008-2010, n=21, PCB ave=1.18, max=3.6 ppm). 2 2010 samples pending. No change (current advice is do not eat).  
2012: Two new 2010 results (2003-2010, n=21, PCB ave=1.248, max=3.6 ppm). Concentrations ranges from 1/week to do not eat related to length. Need to resample above the DePere Dam. Results from LLBDM 2003 and 2010 average 2 ppm. **No change** (current advice is do not eat).

- **Channel catfish**  
2011: New 2010 data mostly from LLBdM (PCB n=6, ave= 0.33, max=1.1 ppm; Hg n=8, ave=0.11, max=0.3 ppm) and 2 PCB results pending. Change from not listed TO '1/month'. While PCB concentrations are lower than in the past, it's popularity in this area have increased.  
2012: Two new 2010 results (2008-2010, n=8, PCB ave=0.415, max=1.1 ppm). **No change** (current advice is 1 meal per month).
- Northern pike  
2005, 2007, 2009: No change to advice (1/mo).  
2011: New 2010 data (PCB n=11, ave=0.072, max=0.1 ppm) all from LLBdM plus earlier data (2003-2007 PCB n=9, ave=0.247, max=0.53). Need samples from above DePere and additional year to verify lower LLBdM. No change (current advice is 1/mo).
- Walleye  
2005, 2009: No change to advice (1/mo).  
2011: New 2010 data all from LLBdM (n=8, ave=0.029, max=0.13 ppm) plus 2003-2007 data from further downstream (n=17, ave=0.225, max=0.68 ppm). Samples from 2006/7 from downstream of Little Rapids averaged in the 1 meal per month category. Of the 25 2003-2010 DNR samples 7 of 25 were in the 1/mo category. Only 1 year showing lower concentration plus data from Fox River Group all from LLBdM (2010, n=19, ave=0.033 and max=0.097 ppm). Need samples from above the DePere dam and follow up samples from LLBdM. No change (current advice is 1/mo).
- White bass  
2005: No change to advice (1/mo).  
2011: New 2010 data all from LLBdM (n=6, PCB ave=0.189, max=0.65) plus 2003 data from LLBdM and downstream (n=10, PCB ave=0.272, max=0.7 ppm). No change (current advice is 1/mo) pending additional samples from LLBdM and De Pere impoundment.
- White perch  
2005: No change to advice (1/mo). Need additional data.
- White sucker  
2005: Not listed. Need additional data. 1996 data suggests 1/mo.
- **Yellow perch**  
2005: Change from 1/wk to 1 meal per month.  
2011: New 2010 data all from LLBdM (n=8, PCB ave=0.04, max=0.12 ppm). Only 1 year showing lower concentration from 1 location. Need additional samples from DePere impoundment and LLBdM. No change (current advice is 1/mo).  
2012: Five new 2010 results (2003-2010, n=24, PCB ave=0.147, max=0.41 ppm). Need additional data from above the DePere Dam Impoundment and LLBdM. **No change** (current advice is 1 meal per month).

## Lakeshore

### **Branch River, Manitowoc County**

2012: New 2009 mercury and PCB data for rock bass, smallmouth bass, and white sucker. Data confirms that general advisory applies to resident fish (current advice refers only to Lake Michigan for trout and salmon). **Add statement that general advice applies to all other species. Does not need to be listed as 303d impaired due to fish contaminants.**

### **Kewaunee River**

- **Carp** – New 2010 results (2004-2010, n=12, Hg ave=0.162, max=0.330 ppm; PCB ave=1.108, max=3.900 ppm). Recommend **no change** (current advice is "6/yr). Keep on 303d list due to PCBs in fish.

**Sheboygan River – downstream of Sheboygan River Falls.** Current advice is "do not eat" all resident fish. Last reviewed in 2006 using 1995-2004 data. Data from 2011 collections were considered this year as all results are available and due to ongoing remediation efforts.

- **Carp** – New 2011 (n=4) results from middle and upper river plus 2004 results show ave PCB = 7.068 and max= 19 ppm. Recommend **no change** to advice (current advice is 'do not eat').
- **Channel catfish** – New 2011 (n=5) results from middle river plus 2004 results show PCBs average 5.4 ppm and max = 7.9 ppm. Recommend **no change** to advice (current advice is 'do not eat').
- Northern pike – Limited/pending 2011 results. No change (current advice is 'do not eat').
- Pumpkinseed – Limited new 2011 results. No change (current advice is 'do not eat').
- **Rock bass** – New 2011 (n=8) results from upper river plus 2004 results. PCBs average 1.162 ppm and max=2.4 ppm, No samples from lower river therefore recommend **no change** (current advice is 'do not eat').
- **Smallmouth bass** – New 2011 (n=12) results from 2 locations (upper and middle river). With 2004 results, PCBs ave=1.910 and max= 4.7 ppm. 50% in 'do not eat; range. Recommend **no change** (current advice is 'do not eat').
- **White sucker** – New 2011 results (n=13) from two locations (upper and middle river) plus 2004 results. PCBs ave = 3.5 and max=9.7 ppm. Recommend **no change** (current advice is 'do not eat').

## St. Croix

**St. Croix River from St. Croix Falls to Stillwater** – No new data this year. Last examined in 2008 based on joint analysis of 1997-2006 MN and WI data. General advisory applies with 1/mo exceptions for buffalo (bigmouth and smallmouth), channel catfish, and white bass.

**St. Croix River downstream of Stillwater** – New MN data for white bass only. No new WI data this year for this reach.

- Buffalo – No new results (2002-2009, smallmouth buffalo Hg n=18 ave=0.17 max=0.302 ppm; PCB n=9 ave=0.234 max=0.735 ppm). Current advice is 1/mo for buffalo >22" based on PCBs and mercury in general range.
- **White bass** – New results for Mn samples (2002-2011, Hg n=25 ave=0.248 max=0.407 ppm; PCB n=22 ave=0.178 max=0.39 ppm). **No change** in advice (1 meal per month all based on PCBs). While average PCB concentration is in 1/wk for all, 36% of samples are in the 1/mo category including 8 of the 18 2011 samples. Need to retest white bass from upstream reach also.

**Mississippi River** – For the 2012 review, new WI data is available for several species from Pools 4 to 12. WI and MN data were combined and advisory updates determined jointly. Species not listed fall under general advisory. Also, see PFOS section G.

**Mississippi Pool 4** – MN has new data for white bass.

- Crappie (Black and White) – No new data for 2012 review. Last examined for 2011 update (1/wk all due to PFOS).
- Bluegill – No new data for 2012 review. Last examined for 2011 update (1/wk all due to PFOS).
- Buffalo (Bigmouth and Smallmouth) – No new data for 2012 review. Last examined for 2011 update (1/mo all due to PCBs).
- Carp – No new data for 2012 review. Last examined for 2011 update (1/mo all due to PCBs).
- Channel catfish – No new data for 2012 review. Last examined for 2011 update (1/ mo all due to PCBs).
- Flathead catfish – No new data for 2012 review. Last examined for 2011 update (general and >20 "1/mo PCBs).
- **White Bass** – New MN data for 2012 update (2002-2011; Hg n=54 ave=0.21 max=0.627; PCB n=51 ave=0.36 max=0.8 ppm; PFOS in 1/wk range). **No change** (1 meal per month all sizes due to PCBs).

**Mississippi River Pools 5, 5a, and 6** – WI has new 2010 data for bluegill, crappie, carp, channel catfish, sm buffalo and white bass.

- **Bluegill** – New 2010 WI data (2001-2010; Hg n=18 ave=0.083 max=0.13 ppm; PCB n=20 ave=0.005 max=0.030; PFOS n=10 ave=63 max=99 ppb). **No change** (1 meal per week based on PFOS).
- **Carp** – New 2010 WI data (2001-2010; Hg n=43 ave=0.131 max=0.272; PCB n=35 ave=0.153 max=0.81 ppm; PFOS n=3 ave=20 max=26 ppb). **No change** (current advice is general).
- **Channel Catfish** – Only 1 new 2010 results (2002-2010, Hg n=31 ave=0.123 max=0.34 ppm; PCB n=29 ave=0.196 max=0.7 ppm; PFOS n=6 ave=9.57 max=18.3 ppb). **No change** (current advice is 1 meal per month).
- **Crappie** – New 2010 WI data (2001-2010; Hg n=19 ave=0.111 max=0.18; PCB n=15 ave=0.01 max=0.041 ppm; PFOS n=4 ave=81 max=106 ppb). **No change** (current advice is 1 meal per week based on PFOS).
- **Buffalo** – New smallmouth 2010 WI data along with bigmouth data (2001-2010; Hg n=51 ave=0.118 max=0.535; PCB n=34 ave=0.154 max=0.73 ppm). **No change** (current advice is general).
- **White bass** – New 2010 WI data (2001-2010, Hg n=43 ave=0.247 max=0.63, PCB n=33 ave=0.232 max=0.62 ppm, PFOS n=3 ave=163 max=178 ppb). **No change** (current advice is 1 meal per month due to PCBs).

**Mississippi River Pools 7 and 8** - WI has new 2010 data for bowfin, channel catfish, and carp and MN new data for channel catfish.

- **Channel Catfish** – New WI 2010 data (2002-2011; Hg n=35 ave=0.107 max=0.32 ppm; PCB n=32 ave=0.148 max=0.5 ppm). Only 5 of 32 PCB results in 1/mo category. **Change advice from 1 meal per month based on PCBs TO general advisory.** This reach would have no exceptions to the statewide general advice and this reach could be considered for removal from the 303d list but bowfin should probably be resampled for mercury.
- **Carp** - New 2010 WI and 2011 MN data (2001-2011; Hg n=29 ave=0.14 max=0.255 ppm; PCB n=30 ave=0.173 max=0.82 ppm). **No change** (current advice is the general statewide).
- **Bowfin** - New 2010 WI data (2001-2011; Hg n=5 ave=0.518 max=0.88 ppm; PCB n=5 all nondetect). **No change** (current advice is the general statewide). Recommend resampling of bowfin for mercury given higher mercury levels in Pool 9.

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

- **Bowfin** – New WI data (2006-2010; Hg n=10 ave=0.607 max=1.300 ppm; PCB n=10 ave=0.042 max=0.110 ppm). **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** – New WI and MN data (2006-2011; Hg n=18 ave=0.166 max=0.230 ppm; PCB n=14 ave=0.217 max=0.610 ppm). **Change advice from 1 meal per month all sizes to 1 meal per month for carp >25" due to PCBs.**

**Mississippi River Pools 10-12** – WI has new 2010 data for bluegill, carp, and white bass.

- **Bluegill** – New WI data (2004-2010; Hg n=10 ave=0.068, max=0.110 ppm and PCB nd). **No change to advice** (current advice is general advisory).
- **Carp** – New WI data (2001-2010; n=27 Hg ave=0.158 max=0.280 ppm; PCB n=27 ave=0.187 max=0.880 ppm). **Change advice from 1 meal per month for carp >22" TO 1 meal per month for carp >25"**. Additional larger samples may allow removal of exceptions to general **advice**.
- **White bass** – New WI data (2002-2010; Hg n=14 ave=0.158 max=0.430 ppm; PCB n=14 ave=0.092 max=0.390 ppm). **No change** to advice (current is general).

**C. DIOXIN and FURANS** – No new dioxin/furan data was obtained for this year's review (see previous year's reports). 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** – No additional PBDE data is available this year. So far, the Department has analyzed 80 samples collected from 2003 to 2009 from 30 different locations located in 30 waterbodies for PBDE congeners.

**E. BANNED PESTICIDES** – New dieldrin, DDT metabolites, and chlordane isomer data were obtained for 17 samples from 6 locations in 5 waterbodies. 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. PERFLUORO CHEMICALS (PFCs)** – No new data for PFC chemicals were quantified in fish samples since 2009. 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<sub>8</sub>F<sub>17</sub>SO<sub>3</sub>) and perfluorooctanoic acid (PFOA; C<sub>8</sub>F<sub>15</sub>O<sub>2</sub>). 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 µg/kg-bw/day. Limited data suggest fate and accumulation in fish of this chemical may be different than that exhibited by PCBs.

PFOS-based consumption advice is required for bluegill and crappies from Pools 3 to 6 (all 1 meal per week) from the Mississippi River. 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.

**G. SPECIES-SITES NEWLY VERIFIED DATA - Table 1.** List of waters with new contaminant data for species listed showing name, county, region, collector, region, species and form, and count of results (PCBs, dioxin/furans, banned pesticides, mercury, 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.

