Upper Mississippi River Basin Association

Water Quality Task Force Meeting

January 25, 2023

Agenda

with
Background
and
Supporting Materials

UPPER MISSISSIPPI RIVER BASIN ASSOCIATION
WATER QUALITY TASK FORCE VIRTUAL MEETING

January 25, 2023

Agenda

Connection Information

- Web, video conferencing, click on the following link:
  - https://umrba.my.webex.com/umrba.my/j.php?MTID=m517af31dd20916d825208d41728bcaaa
- Dial-in number: (312) 535-8110
  - Access code: 2556 213 9900
  - Passcode: 1234

Time	Attachment	Topic	Presenter
8:30 a.m.		Welcome and Introductions	***Heather Peters,*** *Missouri DNR*
8:35	A1-A13	Approval of the October 4, 2022 WQTF Draft Meeting Summary	***All***
8:40		Fast Limnological Automated Measurements (FLAMe) on the Illinois River	***Luke Loken,*** *USGS*
9:05	B1-B18	Fish Tissue Monitoring • National Fish Tissue Monitoring • Regional Ambient Fish Tissue monitoring program	***John Healy,*** *USEPA* ***Steve Schaff,*** *USEPA*
9:55		Break	
10:05		Fish Tissue Monitoring (Continued) • Missouri's Mississippi River data • Iowa's Mississippi River data • Discussion	***Robert Voss,*** *Missouri DNR* ***Ken Krier,*** *Iowa DNR* ***All***
11:00	C1	HABs • The Ohio River HAB Prediction Tool	***Greg Youngstrom,*** *ORSANCO*
11:25		Administrative Items	***All***
11:30 a.m.		Adjourn	

ATTACHMENT A

October 4, 2022 WQTF Draft Meeting Summary

(A-1 to A-13)

Upper Mississippi River Basin Association
Water Quality Task Force Meeting

October 4, 2022
Draft Highlights and Action Items Summary

Approval of the WQEC-WQTF June 7-8, 2022 Meeting Summary

The UMRBA Water Quality Task Force (WQTF) approved the June 7-8, 2022 draft highlights and action items summary.

UMRBA WQ Task Force Updates

How Clean is the River? Report

Lauren Salvato said that the *How Clean is the River?* report will be complete by the end of the calendar year 2022. Most recently, UMRBA staff requested that USEPA WQTF members review the metals section of the draft report to ensure that potential sources of lead were accurately represented. USEPA region staff agreed sources of metals is complicated and challenging. They also suggested recalculating the lead results and factoring in hardness. Missouri DNR staff did the calculations.

The remaining timeline is as follows:

- October: Finish remaining report components
- November: Final WQTF review
- December: Finish graphics and publish the report

UMR Interstate WQ Monitoring

Reaches 8-9 Pilot

The Reaches 8-9 Pilot Condition Assessment and Evaluation Report were finalized in July 2022. Graphics and design services were provided by Missouri DNR staff. Next steps include a conference call with the WQ Executive Committee on October 21, 2022 to strategize the types of outreach materials that would assist in securing funding for operationalizing the UMR Interstate WQ Monitoring Plan. The WQTF will be meeting on October 5, 2022 for a working session to begin updates on the Monitoring Plan and Provisional Assessment.

Emerging Contaminants

Contaminants of Emerging Concern: Thoughts and Perspectives

Dr. Christine Custer has been working on contaminant effects in bird populations since 1973 across many taxa and geographic locations. Custer provided history on bird contaminant monitoring. The earliest bird monitoring programs using hunter-donated wings and starlings collected by USFWS employees were created in the 1970s. Some factors that were important to the success of the early programs were 1) clearly defined and agreed upon project objectives, 2) engage statisticians early on, 3) integrate field work with other efforts, and 4) maintain databases. Early biotic monitoring was focused on bioaccumulative contaminants (e.g., PCBs, DDE, dioxins, mercury, and lead). Per- and polyfluoroalkyl substances (PFAS) is now one of the current contaminants of focus.

Custer is in favor of biotic sampling over water sampling because biota integrate over space and time. Water sampling is challenging because of the variation within the season, daily, episodic – weather events, and flow regime. Analytical techniques need to be able to detect low concentrations, and there must be care when sampling to not to cross contaminate samples. The UMR is even more complicated because of the different habitat types and sampling location relative to urban and rural areas, point source and nonpoint source pollution.

Custer said there is not always a good link between abiotic and biota points. For example, PFAS in sediment did a better job of predicting concentrations observed in fish. Sediment, however, did not predict what was seen in the algae and aquatic plants. There is a big gap in our understanding of how PFAS move through the system. Furthermore, concentrations of PFAS are ever-changing. We do not know which PFAS are problematic, but we do know it is not necessarily the most abundant PFAS. Total nest failures from PFDA exposure were documented in Belgium (Groffen et al., 2019) and PFDoA associated with reduced hatching success was documented in Norway (Tarfu et al., 2014).

Custer's own research on PFAS in tree swallows resulted in PFAS detections at every site sampled. Two sites were contaminated with aqueous film forming foam point source exposure. The sites sampled represented several regions with large city, urban, and industrial exposure profiles.

Giblin asked if Custer would suggest a multi-media approach (e.g., water, sediment and biotic framework) for the UMRB contaminants of emerging concern (CEC) monitoring plan. Custer replied she is partial to tree swallows. The downside is that it is time consuming to set up sites and takes a few years to establish nests. Custer suggested biotic endpoints. Fish are a good option but can be problematic because of movement into different habitats. Custer suggested picking sediment over water.

Salvato asked how Custer would suggest alternating between CEC parameters. For example, focus on PFAS one year and neonicotinoids the next. Custer thought it would be reasonable to figure out a top group of contaminants and then monitor PFAS every five years to establish some temporal variation. Neonicotinoids would be interesting to work with, but analysis methods require further development. For example, bird tissue is not yet ready to be analyzed for neonicotinoids. In follow-up, Giblin asked how concerned Custer is about neonicotinoids. Is tree swallow research missing the damage done to invertebrates because those effects are not moving up to the bird community? Custer suggested that there would be a cascading effect of not having as many birds nesting because there is not as much food. If the food base is reduced, then it impacts bird populations.

In response to a question from Voss about which parts of the bird are tested, Custer said if possible, her team will collect an egg to see if there is embryo toxicity. When there are nestlings, which are 12 days old, they will collect the contents of the GI tract and grind the entire bird. For trace elements, pharmaceuticals and personal care products, data are on collected from the liver tissue. Other avian chemical monitoring techniques include plasma, but it is not done frequently in in tree swallows because the bird is so small.

For each contaminant of interest there will be different considerations including the volume of contaminant researchers are able to obtain. For PFAS, it does not go to the protein, so fish fillet may not tell you as much as a blood sample. Voss appreciated the information, adding he was curious about the ratio of organ to tissue. Custer added there is some information on how parts like breast muscle, plasma, whole carcass, and egg relate to one another. For fish you could take the parts you are sampling and extrapolate to what may be in a whole fish.

Giblin asked which classes of chemicals Custer would recommend. Custer said that was a tough question to answer but suggested with the exception of neonicotinoids, the manufactured, less persistent agricultural chemicals do not need to be on the CEC monitoring list. Polycyclic aromatic hydrocarbons – both petroleum and combustion based – are hard to work with because the impact is challenging to assess in birds. The exposure is so rapidly metabolized in the tissue. Salvato asked if there were any other research efforts in the Great Lakes Basin that can be translated to the UMRB. Custer suggested the tree swallow technique is transferable. The reality of research concentrated in the Great Lakes Basin is due to the funding opportunities offered through the Great Lakes Restoration Initiative.

USEPA PFOA-PFOA Draft Aquatic Life Use Criteria

The question posed to the WQTF was whether their state agency submitted comments on the draft PFOA/PFOA aquatic life use criteria, and what each WQTF's respective state agency is planning to do once the criteria become finalized?

Missouri – Peters said that Missouri DNR did not submit comments. The state has limited data on PFAS, with some sampling conducted with public water suppliers (PWS). Missouri DNR is also developing a PFAS sampling plan. Peters anticipates that once the standards are finalized, it will be highly reactive to stakeholders in Missouri. DNR will have to assess what it means for facilities. In the meantime, DNR is focusing on collecting more data. The data already collected can be accessed via the following link: https://modnr.maps.arcgis.com/apps/webappviewer/index.html?id=386c71927569476ebd2d0e6910424d17

Salvato recalled that the fifth Unregulated Contaminant Monitoring Rule is focused on PFAS for PWS serving more than 10,000 people. Which facilities has DNR worked with to collect PFAS data? Voss replied that DNR started with the largest facilities based on available funding and has moved towards smaller PWS. If there is a detection, then follow up sampling is conducted. Follow-up sampling also helps confirm if the detection is from actual contamination or cross contamination of the samples. Voss said the approach for developing the draft criteria is different from USEPA's previous approaches, which is a benefit of 50 years of the CWA. There are different approaches with the frequency, magnitude, and duration components of the criteria, allowing for more flexibility to the states to see what components work for them.

Iowa – Kendall said Iowa did not submit comments. Iowa DNR has a PFAS action in place and part of the plan will take into consideration whether the criteria are finalized. Monitoring has focused on sampling water facilities and have found some detections here and there. Iowa DNR is also developing messaging regarding the sources of PFAS and impact on finished water.

Illinois – Sparks said Illinois did not submit comments but were involved in the comments submitted by the Association of Clean Water Agencies. PFAS is a hot button issue, in part, because of the Illinois Attorney General lawsuit regarding PFAS contamination at a 3M plant in Cordova, Illinois. Illinois will look into adopting the criteria, once finalized in 2023. Also in 2023, Illinois EPA lab will have PFAS analysis capabilities. Sparks shared Illinois EPA's PFAS online dataset via the following link: https://www2.illinois.gov/epa/topics/water-quality/pfas/Pages/pfas-statewide-investigation-network.aspx

Minnesota – Laing said Minnesota submitted comments to USEPA. Minnesota PCA is reviewing the criteria and determining whether it will adopt them once finalized. Minnesota PCA developed site specific PFOA and PFOS standards.

Wisconsin – Mike Shupryt said Wisconsin DNR recently adopted water quality standards for PFOS and PFOA for the protection of human health, and those values are much lower (more stringent) than the ones proposed in the aquatic life use criteria. The standards are awaiting final approval from USEPA Region 5.

Voss asked since Wisconsin's criteria are more stringent, are the designated uses crossing over to multiple uses. Shupryt said that would be in the case in almost every circumstance because the PFOS pathway is by fish consumption and PFOA pathways are from drinking water, recreational contact, and incidental ingestion.

Shawn Giblin said that all of Wisconsin's long-term monitoring sites were assessed for PFAS. There were focused sampling areas where firefighting foam was historically used e.g., Madison and Fort McCoy. PFAS was added to the long-term sediment traps and up and downstream of Lake Pepin.

Cyanotoxins

State and Federal Updates and *USEPA Recommended Recreational Criteria*

How are states implementing USEPA's 2019 recommended criteria for cyanotoxins e.g., establishing criteria or using advisories? How are states implementing the three excursions e.g., more than one recreational season, within a set period, and where are they applying it (lakes or all waters?)

Iowa – Kendall said Iowa DNR's beach sampling program involves collection at 39 state beaches from the week before Memorial Day through Labor Day. Data are posted on DNR's website and state beach signage is updated weekly. Twelve total events or advisories occurred during the season between early June and August 2022. The events that did occur this summer may have been tied to summer heat waves. Kendall observed that HAB events occurred about a week to a week and a half after the heat wave. On Big Spirit Lake there was a bloom resulting in microcystin concentrations of 35-45 µg/L. The following week the bloom disappeared.

Advisories varied on waterbodies across the state. For the most part there were single events across waterbodies. Looking at advisories on an annual basis, 12 events is a below average year. The number is not too significant when the samples are taken routinely and are not event based.

In 2023, Iowa DNR will be adding a few more sampling sites and adding anatoxin and saxitoxin sampling. Similar to Wisconsin, Iowa has kits of cylindrospermopsin on hand but do not usually have detections of the toxin. Voss, Sparks, and Giblin all provided feedback on sampling anatoxin and saxitoxin. The preservatives expire more quickly, they must be kept at room temperature, and the use of it is very precise in samples. Kendall appreciated the advice. In response to a question from Salvato about the sites being added in 2023, Kendall said that one lake site was not being sampled because of a restoration project and is now back online. The second site is a city managed water body that is going back to the state to manage.

Illinois – Sparks said Illinois EPA's cyanotoxin sampling program consists of both routine and event-based response. Illinois EPA adopted USEPA's drinking water and recreational thresholds for microcystin and cylindrospermopsin and the World Health Organization's (WHO) criteria for anatoxin and saxitoxin.

- Of the 253 microcystin samples collected, there were 76 detections. Twenty-one percent of the detections were above 8 µg/L. The highest concentration observed was 478 µg/L in a lake in Lake County, Illinois.

- Of the 104 cylindrospermopsin collected, one sample had a detection of 0.34 µg/L. All samples were below the USEPA guidance value of 15 µg/L for recreational waters.

- Of the 91 saxitoxin samples collected, 21 had detections. The highest concentration observed was 1.6 µg/L, and all samples were below the WHO value of 30 µg/L.

- Of the 92 anatoxin samples collected, six had detections. The highest concentration observed was 0.40 µg/L, and all samples were below the WHO value of 60 µg/L.

Illinois EPA is also working with Phycotech to understand which taxa produce which toxins.

Sparks asked if states have an assessment process established for using cyanotoxin data. Kendall said that Iowa uses the Carlson TSI for lakes. Systems that have issues with cyanotoxin are already impaired for nutrients, so using the data in assessments has not provided additional value. Voss said Missouri uses cyanotoxin data as part of its lake nutrient criteria. If chlorophyll-a (chl-a) is exceeded more than once in three years, that will impair the lake. The nutrient criteria also include end points like fish kills, cyanobacteria cell counts and dissolved oxygen (DO). Peters added that similar to Iowa, if there is a water quality problem, the waterbody will be listed prior to being evaluated for cyanotoxin exceedances under USEPA's recreational criteria.

Missouri – Voss said routine lake monitoring occurs through a partnership with the University of Missouri. Approximately 100-150 lakes are sampled each year during the May to September time frame. The samples are routine, as many as four per the summer growing season, and do not target blooms. To be cost effective with analysis, the samples are frozen and analyzed in bulk. The data are provided annually. The data allow Missouri DNR staff to observe what lakes are doing over time in routine conditions.

During summer 2022, the focus has been on response sampling. The Palm de Terre reservoir does not fit the typical pattern of a lake that experiences blooms. Unlike the lakes or reservoirs near heavy agricultural areas or ones that are small, Palm de Terre is classified as mesotrophic but has some of the highest microcystin detections.

USEPA Region 7 conducted sampling in urban lakes and has observed blooms in waterbodies under 10 acres. These waterbodies would not be subject to the lake nutrient criteria and are not waters of the state. Most are under municipality or county jurisdictions, but Missouri DNR does coordinate on responses such as posting signage.

There was one observed HAB in a creek below a wastewater lagoon, which likely came from the wastewater lagoon. The event occurred during a dry spell, and it made its way through the system. A week later, a rain event flushed the HAB out of the system.

Giblin asked is floodplain oxbow lakes experience a lot of HABs, and Voss replied that he is not aware of many HAB reports. The sediment and limited light are likely the reason. In response to a question from Salvato regarding how busy the HAB season was, Voss said that it was busy, but it could have been due to observation bias. Dog deaths have garnered a lot of public attention this year. Peters suggested that media awareness rather than increased education was the reason. Salvato noted the Ag and Water desk is a conglomerate of multiple news agencies in the MRB that report on issues such as HABs. Salvato encouraged participants to visit the link: https://agwaterdesk.org/.

Minnesota – Laing said Minnesota PCA has a CWA Section 106 grant to collect microcystin data for the National Lakes Assessment (NLA). The data will help generate a statewide perspective on microcystin concentrations. In response to a question from Salvato, Laing said the routine microcystin sampling is done through the NLA. Some entities in the Twin Cities Metro Area do monitor cyanotoxins routinely e.g., Ramsey County and City of Minneapolis. Laing said the University of Minnesota is developing a remote sensing tool to better predict HABs.

Laing said that for Minnesota's aquatic recreation criteria on lakes, nutrient, chlorophyll-a, and phosphorus data are used and cyanotoxin data are not. She is unsure what additional information the cyanotoxin data could provide.

Wisconsin – Gina LaLiberte said that Wisconsin DNR does not have capacity to do statewide cyanotoxin monitoring but does coordinate response monitoring with the Wisconsin Department of Health. An illness and multiple bloom reports came from Lake St. Croix from the last week of June through July 2022. These occurred on the eastern shore during calm and warm days, with winds coming from the west.

There was a report of a rash and allergy symptoms from a YMCA lake at the end of June 2022. Wisconsin DNR worked with camp staff and county public health staff to identify blooms and how to assess the conditions that would warrant a change in camp activities. Another minor bloom occurred in July 2022 containing microcystis and aphanizomena at 2-3 µg/L, below the swimming advisory level. Overall, bloom reports were lower for 2022. The waterbodies that typically have blooms experienced blooms in summer 2022.

Regarding the use of cyanotoxin data for integrated assessments, Wisconsin is not intending to use the USEPA recreational cyanotoxin levels for ambient water quality assessment because most waterbodies that would be impaired for cyanotoxins are already impaired for nutrients.

Giblin said cyanobacteria blooms were more frequent on the UMR mainstem. Giblin and co-authors published a paper on endpoints for anatoxin-a in backwaters. The study involved the development of structural equations including nutrients, water depth, water velocity, and vegetation cover as a proxy for light limitations. The more typical factors include high phosphorus and low nitrogen in the shallow back water areas. Many of the habitat solutions on the UMR are to reconnect the backwaters with the main stem. In response to a question from Salvato, Giblin said the Trempealeau refuge has a habitat restoration factsheet proposed through the Upper Mississippi River Restoration program.

Voss asked if participants have observed fish kills related to toxins on the bloom itself. LaLiberte finds it is hard to tease out the cause. When fish kills have occurred during blooms, they have been in places where staff have not been able to rule out overnight dissolved oxygen levels or in some cases fish diseases.

USEPA – Micah Bennett said there is an update to the national lake nutrient criteria models to incorporate the 2017 NLA data. The update can be found via the link: https://www.epa.gov/system/files/documents/2022-09/description-updates-lake-criterion-models.pdf.

On October 27, 2022, USEPA Regions 5 and 7 will convene the states for its annual HABs conference call. There will be a few presentations on cooperative grants that relate to HABs.

Salvato said that U.S. Government Accountability Office (GAO) published a report on the actions needed by federal agencies to manage the risk of HABs. She asked Steve Schaff and Bennett whether any of the recommendations have been disseminated down to the regional level. Bennett said USEPA has developed a response to the GAO report but has not yet gone through U.S. Office of Management and Budget (OMB). Both Schaff and Bennett were involved in a strategic plan for USEPA HABs for FY 23-26. USEPA submitted a policy to OMB in April 2022 on determining HABs and hypoxia events of national significance in freshwater systems. The process has dissolved in the process, but USEPA has generally worked out the structure that would define a HAB of national significance. Most of this work has been on hold while USEPA has been on hold because of the Bipartisan Infrastructure Law (BIL), Inflation Reduction Act (IRA), and initiatives like environmental justice that have been priorities for the Biden-Harris administration. The report can be found via the following link: https://www.gao.gov/assets/gao-22-104449.pdf.

CWA Program Updates

305(b) and 303(d) Consultation & TMDL Updates

Iowa – Kendall said Iowa DNR is waiting for the 2024 cycle to start. In January 2023, DNR staff will begin the methodology on the next set of assessments. While staff are waiting for the cycle to being, Iowa will be reaching out to Illinois EPA regarding its aluminum methodology (based on bio available aluminum). Kendall is also interested in coordinating sampling once the methodology is approved.

Minnesota – Laing said the 2022 list was approved in April 2022. There are a few pending TMDLs, such as Lake Osakis and the Lower Rainy River Watershed Restoration and Protection Strategy. There are a

few more pending TMDLs coming in later 2022 that are in the Mississippi River Basin in the Redwood and Cottonwood watersheds. Salvato asked if the One Watershed, One Plan relates to TMDLs. In response, Laing said the One Watershed, One Plan is led by the Minnesota Board of Soil and Water Resources. Partners in local communities are engaged to lay out where their priorities are with protection and restoration.

Laing also announced that Minnesota PCA will be hiring an impaired waters listing coordinator.

Wisconsin – Giblin said that Wisconsin DNR submitted TMDL priorities for Lake Pepin. Public comment periods for the 2024 list will being in November 2022 and the assessment will begin in January 2023.

Illinois – Sparks said that Illinois EPA staff streamlined R to create easier workflow and uploading data into ATTAINs.

Illinois EPA staff are currently working on two TMDLs, one in the Kaskaskia watershed and the other in the Mackinaw watershed. Neither watershed is located in the Mississippi River Basin.

Missouri – Voss said Missouri DNR is behind on the 2022 cycle because of disagreements with USEPA Region 7. Voss does not anticipate the list being submitted to USEPA Region 7 until April or May 2023. The work left to complete before the list is approved is public notice, response to comments, and approval from the Missouri Clean Water commission.

Regarding TMDLs, Peters said 22 TMDLs were approved on 12 waterbodies. One of them was Center Creek, which has impairments from mining. Voss said other efforts include more in-stream modeling for permitted facilities to determine if new limits are needed instead of waiting for the waterbody to be placed on the 303(d) list. Missouri DNR are following up on older listings with DO impairments and improving QUAL2k modeling in streams. Another effort with the lake nutrient criteria is conducting a reasonable potential analysis to determine if permitted facilities in the watershed of an impaired lake are contributing to the impairment. Most of the time the answer is no, which means the cause of the impairment is nonpoint source (NPS) runoff. Missouri DNR staff are trying to figure out what a TMDL looks like for NPS. BATHTUB and SWOT modeling as well as land use evaluations will help shape TMDLs.

The more complex systems will be evaluated further down the line. For example, in the Lake of the Ozarks area there are 100 miles of stream impaired between two dams, and there are a lot of residents in the area. Missouri DNR staff will likely have to model this area in 25 different segments and put it back together. In response to a question from Adam Schnieders on the methodology used to determine no reasonable potential for point sources (PS) to cause or contribute, Voss replied that it involves spread sheet exercises of factors like effluent concentrations and nutrient attenuation. There is some BATHTUB modeling involved to see what is entering the lake from the PS and how the lake responses. If the facility is removed and conditions remain the same, the PS is not likely contributing to the impairment.

Illinois River Basin NGWOS

Jim Duncker provided an update on the Illinois River Basin Next Generation Water Observing System (NGWOS) and the Integrated Water Availability Assessment (IWAA). He noted that the project is in its third fiscal year. As a reminder the priority issues for the NGWOS are nutrients: 1) to better understand

nutrient cycle processes in agriculture and urban areas, 2) increase resolution of spatial distribution, and 3) to understand legacy nutrients.

In 2022, super gages were built across the basin. Twelve were either upgraded or newly installed. Super gages include continuous water quality data for water temperature, pH, DO, specific conductance, chl-a, phycocyanin, and turbidity. Goals with HABs research are to 1) identify the algal community by collecting baseline information and comparing historical algal community assemblages, 2) improve early detection, 3) deploy multi spectral cameras, and 4) link multi spectral cameras to remote sensing data.

Duncker shared the data that was developed from the June 2021 HAB near Starved Rock Lock and Dam (L&D). The data are provisional but display the technology and resources of the NGWOS approach. With the help of partners that were out in the field, USGS staff were notified of the bloom. Data collected could correlate chl-a sonde data with discrete water sampling. Satellite imagery was also used to capture a 10-mile reach on either side of Starved Rock L&D. This allows researchers to see the full extent of the bloom. The satellite imagery is being analyzed by remote sensing staff to observe historical imagery of the basin and understand changes over time.

Another tool being deployed on the Illinois River Basin is FLAMe (Fast Limnological Automated Measurements). During May 2022 the takeaways from the survey are as follows:

- Carbon dioxide: The river is supersaturated everywhere. There is a large increase at the Chicago wastewater treatment plant (WWTP) outfall. Overall, the urban portion of the river was elevated compared to the downstream, more rural portion of the river.

- Methane: The urban portion of the river was elevated.

- Dissolved oxygen: Throughout the river, DO is close to saturation

- Nitrate: High values were observed coming out of the Chicago WWTP and a few of the agriculture dominated basins e.g., Sangamon River and Hansen Backwater Lake.

Also in 2022, a helicopter-based survey was deployed to characterize and define underlying geology in detail. Using bore logs, the data are smoothed in between points. The same instruments will be deployed in January 2023 in the basin. The urban portion of the watershed will not have a dataset as the survey tool cannot fly over infrastructure.

Salvato asked if the information on surficial and underlying geology in the Fox River is made available to the Wisconsin DNR or useable for the Fox River TMDL? Duncker replied that the Madison USGS office has been in touch with Wisconsin DNR staff. The data were collected in March 2022 and will be released in October 2022. Shupryt said Fox River TMDL is focused on TSS and phosphorus, so the use of the surficial and underlying geology data is not yet clear. Duncker offered himself as a resource if Wisconsin DNR staff want to have additional discussions on potential uses of the data. Salvato asked for more information on the NOWCAST model and timeline for development for the Illinois River Basin. Duncker replied that the model is currently used on beaches in Ohio as well as several inland lakes. Researchers have not yet determined if the model will translate for a river system. More information can be found via the following link: https://pubs.usgs.gov/of/2009/1066/. Dunker said the model can be used to forecast both HABs and nutrient loads.

Sparks asked if there is a plan to look at the tributaries that are contributing high nitrate values. Dunker said it was considered and can be ran on smaller tributaries and vessels. However, the area is a critical zone observatory. The study led by Dr. Kumar at the University of Illinois and involves airborne LiDAR. Acknowledging the research ongoing in the Sangamon River area, USGS is coordinating with Dr. Kumar. In regards to the FLAMe tool, the plan is to hit major tributaries of the Illinois River on a quarterly basis with an emphasis on nutrients.

Voss asked how the carbon dioxide data are being used and if it was to show algae productivity or respiration. In response, Duncker said he would defer to the lead researcher, but understands the data are for carbon and nutrient cycles.

Nutrients

State and Federal Updates and *Usage of Credits for Dischargers*

In addition to state nutrient updates, the WQTF was also asked to whether state agencies are implementing nutrient criteria, and whether they allowing nutrient credit trading for permitted point sources to offset their own nutrient discharges? If so, are nonpoint sources used as part of the credit training?

Minnesota – Laing said Minnesota is updating its nutrient reduction strategy. PCA has been involved in nutrient trading since 1997, including both point to point and point to nonpoint. There are not many participants and PCA is thinking about ways to create more opportunities and understand difficulties with trading. In 2022 a guidance document was released on trading. PCA has convened a watershed group to understand the challenges and barriers to trading.

Iowa – Schnieders said that Iowa is looking into an update to the NRS around the time of its 10 year anniversary.

On the nonpoint source side, Iowa Department of Agriculture and Land Stewardship is the lead. Millions of dollars continue to pour in whether it is from American Rescue Plan Act, BIL, USDA's Regional Conservation Partnership Program and Environmental Quality Incentives Program or others. A variety of partnerships have been awarded, one of which is Climate-Smart Agriculture. This will hopefully translate to more practices implemented across the landscape in Iowa. Some NPS innovation that has recently occurred has been the development and recruitment of conservation agronomists, allowing farmers to work with a trusted advisor. Iowa has used funding to purchase a cover crop inter-seeder and has it available in Polk County to rent out. The batch and build model is a single fiscal agent for the construction and financing of multiple bioreactors, saturated buffers, constructed wetlands, and oxbows. This has been successful and allowed for the projects to be completed seamlessly and removed a lot of barriers for farmers.

For PS pollution, Iowa DNR recently completed an optimization tour to help improve practices at WWTPs at no additional costs. On the trading front, Iowa has a nutrient reduction exchange. There is not a regulatory driver to the permitting approach, but rather a technology or performance-based measure percent removal achieved 75% phosphorus removal and 66% nitrogen (the DNR equivalent).

Consistent with the USEPA memos published in 2022, Iowa cities have been interested in investing in the watershed and being credited for future use. One mechanism to get cities on board is a MOU

developed by the Sand County Foundation between Iowa DNR and a city. The legal arrangement has been a good mechanism to provide regulatory certainty. Cedar Rapids and Ames are the most active and have been at it for a few years. Examples include retiring agriculture land and using it for pollinator habitat. The biggest innovation is the Soil and Water Outcomes Fund. The products are no-till and practices implemented on the landscape. The city pays for the water quality benefit and Cargill or Pepsi-Co pay for the carbon offset, so the practices have stacked benefits.

Illinois – Sparks said that between 2017 and 2021, state-wide nitrate loading increased 10% while phosphorus loading increased 30%. If flow is normalized, then nitrate has decreased 10% and phosphorus has remained the same. Illinois EPA contracts with a University of Illinois professor to calculate nitrogen loads for the Rock River watershed and phosphorus loading for the Illinois River watershed.

For credits and discharge, WWTP permit provisions allow for trades between facilities. As of today, there is no one using these.

Wisconsin – Kevin Kirsch says like Minnesota, trades began in the 1990's but there was not a driver in place. With the adoption of the statewide phosphorus criteria, trading took off. Water quality criteria for rivers and streams is 100 µg/L and 75 µg/L, respectively. There are over 50 facilities involved in water quality trading. Two of the facilities are point to point trades and the remainder are involved in NPS trades, implemented within their watersheds. The trade ratios range from 3:1 or 2:1, and DNR has a guidance document on how to calculate the credits. Most NPS practices range from stream-based stabilization projects to a lot of cropland practices e.g., nutrient management planning, no-till, and cover crops. Adaptive management is also a compliance option and can be implemented over 20 years to get down to 0.5 mg/L. The facility is expected to work with partners in the watershed and work on plant optimization with the goal of meeting the water quality criteria. This involves monitoring and watershed planning and is less precise quantification of credits than with water quality trading.

Over 100 facilities are engaged in a multiple discharger variance. This option was developed in collaboration with USEPA in which facilities pay $50 per pound, which is directed to county conservation offices for the implementation of NPS practices. Finally, Wisconsin has a water quality trading clearing house and Kirsch hopes to expand the ability for trading with more facilities. Note that all of the options are alternative compliance options for PS. For NPS, DNR still relies on TMDLs, farmer led groups, and nine key element plans to address NPS pollution.

In response to a question from Schnieders, Kirsch said that trading is for sediment and phosphorus only. Wisconsin does not have nitrogen criteria and Kirsch does not believe there is a driver for nitrogen trading.

Missouri – Peters said Missouri is working on a total phosphorus (TP) reduction rule as part of the NLRS, separate from the nutrient lake criteria (science and technology driven, not water quality). It is a state only nutrient reduction regulation. Peters anticipates that total nitrogen will follow. Like Iowa, Missouri is using 75% reduction for phosphorus but would like to know how the 66% number was generated.

In conjunction with TP rule, Missouri DNR is also working on nutrient credits for dischargers. Peters would like to learn from others how values of the credits are determined. This would serve the NLRS but also for the water quality driven TMDLs or watershed where nutrients are an issue. For TMDLs, trades

would have to be local. In the statewide trading option, credits can be traded from anywhere in the state. DNR will allow for a 1:1 trade for point source but less than a 1:1 ratio for NPS.

In response to a question from Salvato about what the TP reduction would entail, Peters said the rule would apply to all domestic WWTPs and major facilities that discharge over one million gallons per day. The reduction would require a 1 mg/L design equivalent or a 75% reduction in TP, calculated one of four different ways. Together the facilities make up 92-94% of the flow, and therefore this rule would not apply to smaller WWTP because of cost burdens. Peters said that the rules are five to ten years from being finalized. Facilities may have the option to do a schedule of compliance if there is a cost factor. At least one industrial facility that produces fertilizers and agricultural chemicals cannot reduce nutrient discharges without creating RCRA hazardous waste. They can only utilize trading.

Schnieders said the 66% reduction for nitrogen and 75% reduction for phosphorus is shorthand for the 10:1 (N:P) ratio i.e., publicly owned treatment works can reduce P from 4 mg/L to 1 mg/L and can reduce N from 25 mg/L to 10 mg/L. Iowa found percent removal was more achievable, and there is also consideration of the strength of effluent waste from upstream point sources for the facility. Regarding the question about credit ratios, Iowa DNR has flexibility built into state rules. An incentive for cities to create agricultural-urban partnership is by offering a credit ratio of 1:1. Eventually DNR plans to create guidance and rules after learning from implementation. Recently, Iowa DNR memorialized nutrient reduction exchange and included a clause on regulatory certainty. An example of a lesson learned is with the nutrient tracking tool model. Cities involved in ag-urban partnership have all requested a fast track on modeling. In other words, cities are willing to take less credit because the modeling process is lengthy and delays implementation of the program.

Administrative Items

Future Meetings

The next WQTF meeting will be convened January 25, 2023 in a virtual meeting format.

Participants

Ryan Sparks	Illinois Environmental Protection Agency
Nicole Vidales	Illinois Environmental Protection Agency
Dan Kendall	Iowa Department of Natural Resources
Adam Schneiders	Iowa Department of Natural Resources
Kim Laing	Minnesota Pollution Control Agency
Heather Peters	Missouri Department of Natural Resources
Robert Voss	Missouri Department of Natural Resources
Karen Hagerty	U.S. Army Corps of Engineers, Rock Island District
Micah Bennett	U.S. Environmental Protection Agency, Region 5
Chelsea Paxson	U.S. Environmental Protection Agency, Region 7
Steve Schaff	U.S. Environmental Protection Agency, Region 7
Zachary Leibowitz	U.S. Environmental Protection Agency, Region 7
Christine Custer	U.S. Geological Survey, Upper Midwest Environmental Science Center
Kathi Jo Jankowski	U.S. Geological Survey, Upper Midwest Environmental Science Center
Jim Duncker	U.S. Geological Survey, Central Midwest Water Science Center
Kelly Warner	U.S. Geological Survey, Central Midwest Water Science Center
Erin Spry	Upper Mississippi River Basin Association
Lauren Salvato	Upper Mississippi River Basin Association
Kevin Kirsch	Wisconsin Department of Natural Resources
Gina LaLiberte	Wisconsin Department of Natural Resources
Mike Shupryt	Wisconsin Department of Natural Resources
Shawn Giblin	Wisconsin Department of Natural Resources

ATTACHMENT B

Regional Ambient Fish Tissue Monitoring Program Overview

(B-1 to B-18)

Regional Ambient Fish Tissue (RAFT) Monitoring Program

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Kansas City, KS
(913) 551-7017

Project Background

- The Regional Ambient Fish Tissue Monitoring Program was created in 1977.
- The RAFT program provides analytical and field support for the states within EPA Region VII.
- U.S. EPA region VII is the only EPA region which offers this type of support for states.

Project Background

- The RAFT program has two monitoring strategies, status and trend.

  Status - shows the amount of toxicants in the edible portion of fish tissue and is used by state agencies to issue or remove a fish tissue consumption advisory from a water body.

  Trend – shows the trends in the concentration of toxicants in fish tissue.

Site Selection

- All RAFT sample sites are targeted locations and were selected because of a high probability of finding contaminants.

Sample Types

- One sample consists of three to five fish of the same species with the smallest fish being at least 75% of the length of the largest fish.
- Fish are not aged and a sex determination is not made.
- Status - One sample of a bottom feeder and one sample of a predator. The edible portion (fillet) is analyzed for contaminants.
- Trend - One sample of a bottom feeder, preferably common carp. The whole body is analyzed for contaminants.

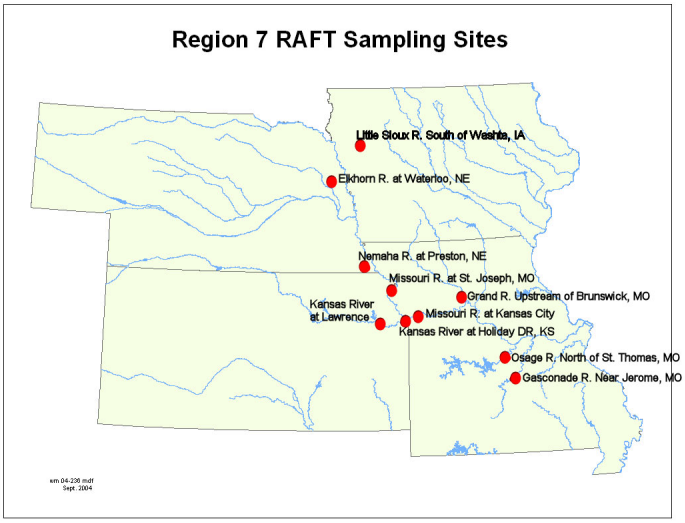
Resources provided to each state

- Nebraska -60 Total, 5 Trend, 55 Status
- Iowa -35 Total, 5 Trend, 30 Status
- Missouri -25 Total, 5 Trend, 20 Status
- Kansas -25 Total, 5 Trend, 20 Status

- Lab Can process up to 150 samples

Trend Monitoring Locations

- The results presented in the following graphs are the results of the average concentration of the specific contaminant in 10 sites which have regularly been sampled by the RAFT program since 1985.



Trend Graphs

- For the purpose of the presentation of the trend data, the results for two consecutive years were averaged since each site is sampled once every other year.
- In the event a sample is shown to contain toxicant levels less than the detection limit, a value of one half the detection limit was assigned and was used for the calculation of the average.

Wildlife Criteria

- Belted Kingfisher
  - NOAEL Based Toxicological Benchmark
  - Benchmark Values used were reported in Sample et al. (1996)
  - Chlordane 4.20 mg/Kg
  - Mercury 0.013 mg/Kg
  - PCBs 0.355 mg/kg
  - DDT 0.006 mg/Kg

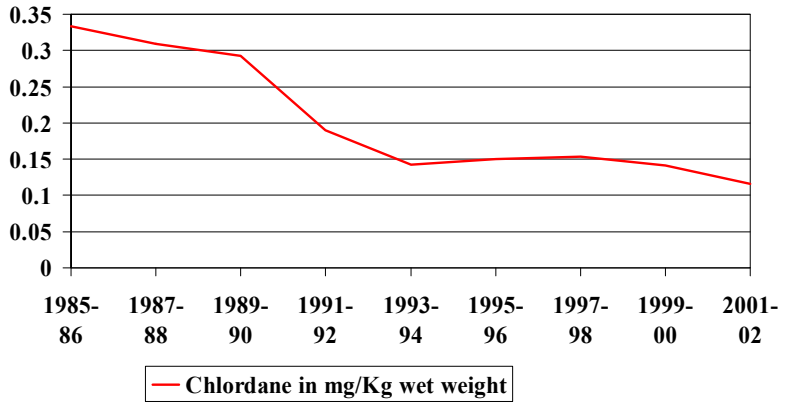
Wildlife Criteria

- River Otter
  - NOAEL Based Toxicological Benchmark
  - Assumption 100% of diet is fish
  - Consumption rate 0.22 Kg/Kg BW/Day
  - Chlordane 2.091 mg/Kg
  - Mercury 0.068 mg/Kg
  - PCBs 0.636 mg/Kg
  - DDT 0.364 mg/Kg

Chlordane

- Chlordane is an organochlorine pesticide which was used extensively until most uses were banned in 1988. Chlordane is still widely distributed in fish due to its long half life and its ability to concentrate in biological materials.
- The Chlordane values reported on the following graph is the concentration of Technical Chlordane and its metabolites.

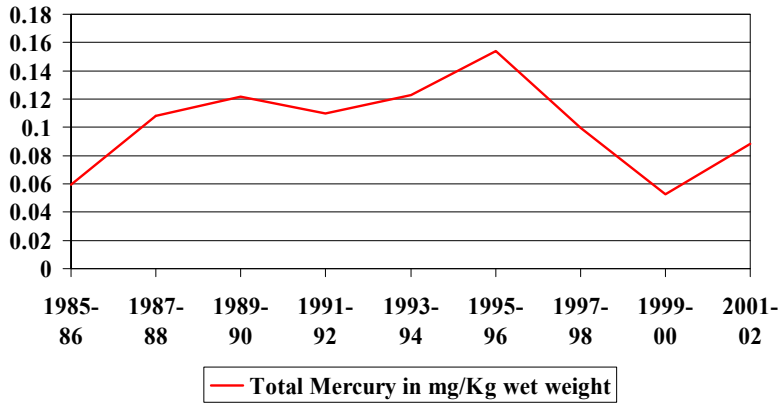
Chlordane in Whole Fish Tissue from 1985 to Present



Mercury

- Mercury is widely distributed in the environment due to both natural and anthropogenic releases.
- Mercury is found in fish primarily in the form of methylmercury.
- The values reported in the following graph are the total mercury concentrations of the samples, the exact methyl mercury concentration is not known.

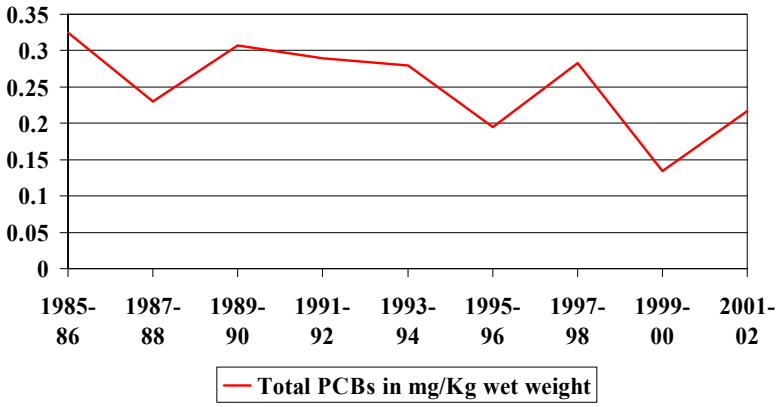
Mercury in Whole Fish Tissue From 1985 to Present



Poly Chlorinated Biphenyls (PCBs)

- Mixtures of PCB congeners were marketed under the trade name Arochlor. Production and use was banned in 1979 but, this chemical group is extremely persistent in the environment and bio-accumulates through the food chain.
- The PCB values reported in the following graph is the sum of results of the following Arochlors:
  - Arochlor 1248
  - Arochlor 1254
  - Arochlor 1260

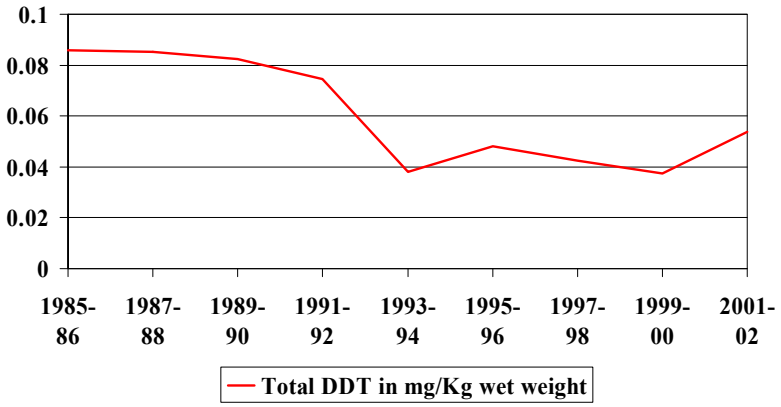
PCBs in Whole Fish Tissue From 1985 to Present



Dichloro-diphenyl-trichloroethane (DDT)

- DDT is an organochlorine pesticide which has not been marketed in the U.S. Since 1972. It (and its breakdown products) is however ubiquitous due to its widespread use in previous decades.
- The DDT metabolite p,p'DDE was found to be the most prevalent form of this organochlorine pesticide.
- The DDT values reported in the following graph are the results of the sum of the following:
  - p,p'DDT
  - p,p'DDD
  - p,p'DDE

DDT in Whole Fish Tissue From 1985 to Present



Status

- The following graphs show the concentration of various toxicants in the status fish tissue samples collected for the RAFT program since 1985, these samples were collected throughout EPA region VII.
- These samples include a total of approximately 130 samples per year.
- In the event a sample is shown to contain toxicant levels less than the detection limit, a value of one half the detection limit was assigned and was used for the calculation of the average.

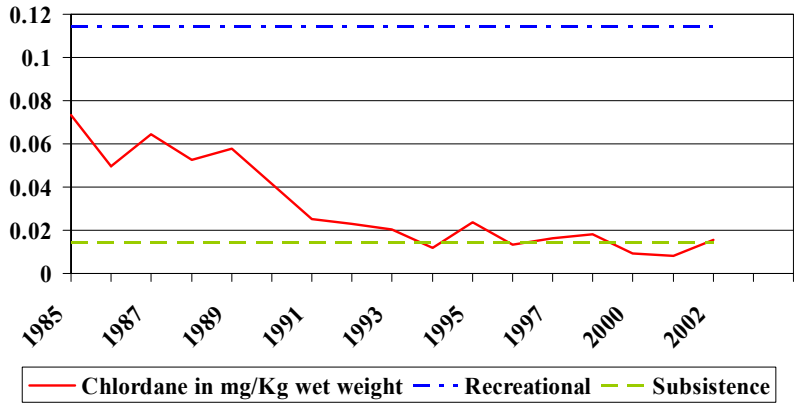
Screening Value

- Screening Value – The concentration of Target analytes in fish or shellfish tissue that are of potential public health concern and that are used as threshold values against which levels of contamination in similar tissues can be compared.
- The screening values were taken from The EPA Guidance for Assessing Chemical Contaminant data for Use in Fish Advisories, Volume 1. This publication is available online at: http://www.epa.gov/ost/fishadvice/volume1/index.html

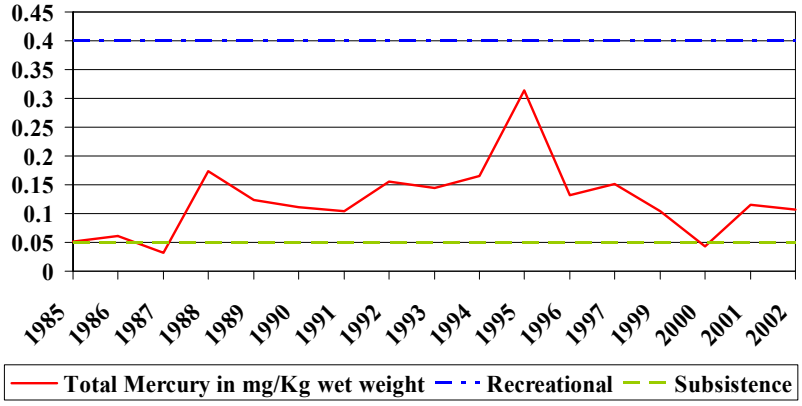
Screening Value Assumptions

- The screening value assumes no cooking losses of contaminants.
- Skin on fillet.
- 8 oz. uncooked and 6 oz uncooked meal size.
- Average body weight 154 lbs
- Recreational consumption rate 17.5 g/Day or 2.3 fish meals per month
- Subsistence consumption rate 142.4 g/Day or about 18.9 fish meals per month.
- Carcinogens 10^{-5} Risk Level (1 excess case of cancer in 100,000).
- 70 year lifetime

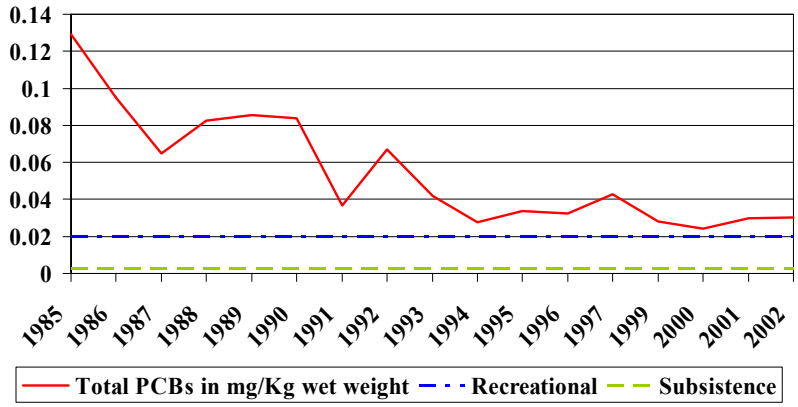
Chlordane



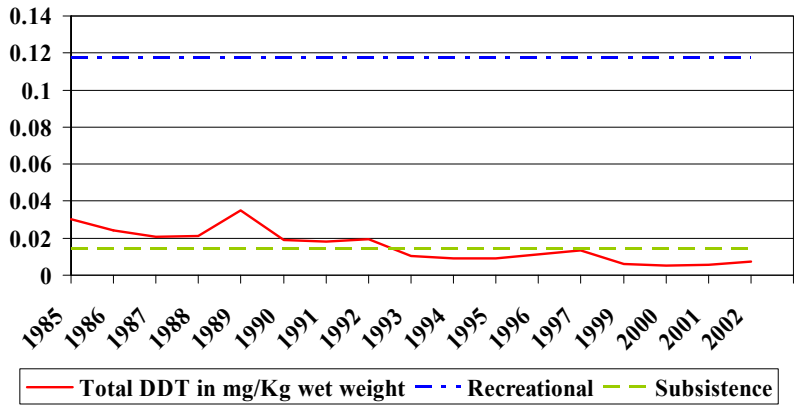
Total Mercury



Poly chlorinated biphenyls (PCBs)



DDT and Metabolites



U.S. EPA National Study of Chemical Residues in Lake Fish Tissue

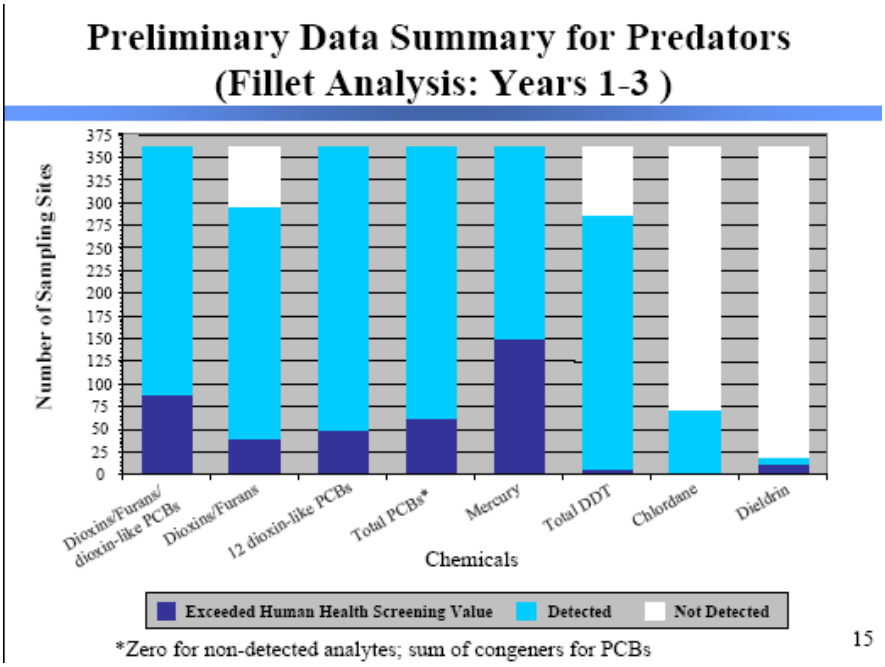
- The U.S. EPA National Study of Chemicals in Lake Fish Tissue (NFTS) is a a screening-level study to estimate the national distribution of selected persistent, bioaccumulative and toxic chemical residues in fish tissue from lakes and reservoirs of the contiguous United States.

Study Basics

- The NFTS is the first national fish tissue survey to be based on a random sampling design, and will be used to develop national estimates of the mean levels of persistent, bioaccumulative and toxic chemicals in fish tissue.
- EPA worked with partner agencies over a four-year period to collect fish (749 samples during years 1 through 3) from 500 randomly selected lakes and reservoirs of the estimated 270,000 lakes and reservoirs in the continental United States.

Analytes

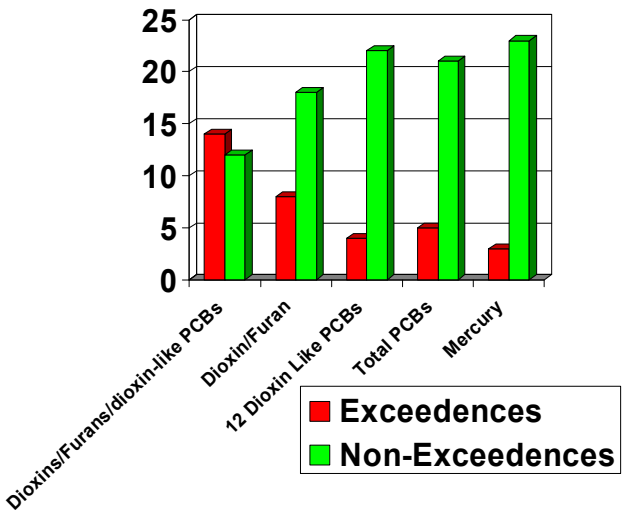
- 2 metals (mercury and arsenic)
- 17 dioxins and furans
- 159 PCB congener measurements
- 46 pesticides
- 40 other organics (e.g., phenols)
- PBDEs (Year four samples only)



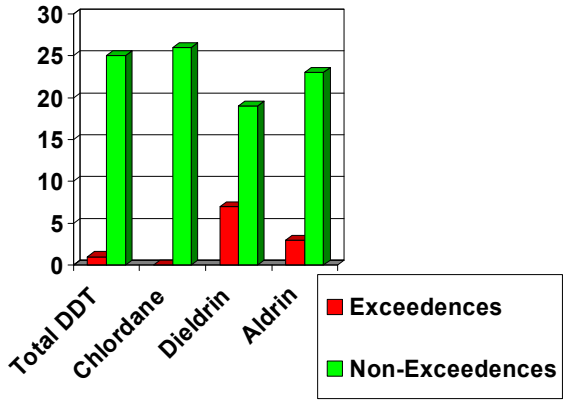
Regional Contaminants

- In EPA Region VII there were a total of 26 fish samples from 13 sites which were collected for the first three years of the National Fish Tissue Study.
- Of these 13 sites, one of the sites had the highest concentration of both dieldrin and aldrin of all the samples analyzed nationwide for years 1,2, and 3 of the NFTS.

Number of Samples which Exceeded Screening Values



Number of Samples which Exceeded Screening Values



NFTS Year 4

- In year 4 of the NFTS a total of 22 samples were collected from a total of 11 sites
- The analytical data (not including PBDEs) will be complete in January 2005.
- The analytical data for PBDEs will be completed in the summer of 2005.

NFTS Final Report

- The National Study of Chemical Residues in Fish Tissue final report will be completed by June 2006.
- Information on the study can be found online at: http://www.epa.gov/waterscience/fishstudy

ATTACHMENT C

The Ohio River HAB Prediction Tool Abstract

(C-1)

Twenty-five years of discharge data was used to develop two cyanobacteria HABs (cyanoHAB) predictive models for 20 sites along the 981 mile length of the Ohio River. The models were developed based on the flow conditions prior to two cyanoHABs that occurred on the river in 2015 and 2019. The first model predicts if a bloom will occur in the current year (the occurrence model), while the second predicts if a bloom will persist (the persistence model). The predictions are expressed in terms of probabilities and are generated in real-time as a component of a risk characterization tool/web application. In addition to the model results, the tool was designed with visualization options for studying water quality trends among eight river sites currently collecting data that could be associated with or indicative of bloom conditions. As part of a larger HAB strategy for the Ohio River the tool is used by water utilities and resource managers to assess river conditions and focus limited resources into at-risk areas. The prediction models are updated with new data each year and current effort includes linking to the National Weather Service's ensemble hydrological forecasts, which will allow for forecasts of bloom occurrence one to two months ahead of when blooms would be expected on the river.