

The Miami Conservancy District protects communities in Southwest Ohio from flooding, preserves the quality and quantity of water, and promotes the enjoyment of our waterways.

## Experts impressed with MCD level of protection

An independent group of experts in flood control says the Miami Conservancy District (MCD) offers a level of protection rarely seen in the United States. But aging infrastructure will require major reinvestment.

MCD's Board of Consultants held a four-day meeting with MCD staff in November to critically review data and technical investigations, and propose solutions to various issues. The Board of Consultants is an independent group of world-renowned experts in the fields of dam safety and related engineering topics.

"We are very impressed with the District," said Leslie Harder, Ph.D., a member of the Board of Consultants, who serves on the National Committee on Levee Safety. "When you began (the flood protection system) you took on a high level of protection, and you have continued that goal. Your goal for the Official Plan Flood is higher than almost any other in the nation, and you should be commended for that."

MCD engineers have calculated the 1913 flood to be more than a 500-year event and up to a 1,000-year event. The MCD system was designed to protect from floods even greater than the 1913 flood. Many flood protection systems in the United States are designed to the 100-year event, and few have a level of protection comparable to MCD.

Despite the praise, the Consultants also noted areas where MCD will need to continue to make capital improvements to dams and levees to ensure the system's integrity and efficient operation for the future.

"The work on the dams and levees was wonderful for the knowledge at that time," Harder said. "But the job was incomplete not because of negligence or a lack of maintenance" but because threats like underseepage weren't understood at the time the system was constructed.

The Consultants also noted that while MCD has been "extremely successful in protecting to date," the system is nearly 100 years old and "absolute protection is not possible."

The structural fixes could be expensive. The Consultants suggested that in some cases, MCD may need to consider exchanging a bit of protection for a more affordable fix to some maintenance issues – at least for the short-term. And any and all repairs to the dams and levees should be risk-based, the board said.

Besides the capital improvements that will be needed, the board encouraged MCD to include non-structural approaches to flood protection including flood proofing, supporting the purchase of flood insurance where appropriate, increasing public awareness of flood hazards, and installing early-warning systems.

"In the second 100 years, you need to move from structural (flood protection) to a full-service, multi-faceted flood risk approach," said Gerald Galloway, a member of the Board of Consultants who has advised several United States presidents on flooding and levees, most notably the Mississippi River and in New Orleans.

This was the 22nd meeting of the Board of Consultants. The 2010 meeting was the first since 1999. Only the chairman, Alfred Hendron, Ph.D. was a returning board member. Four new members were added Leslie Harder, Ph.D.; Anthony Fiorato, Ph.D.; John Smart, Ph.D.; and Gerald Galloway, Ph.D.

"We are very impressed with the District... Your goal for the Official Plan Flood is higher than almost any other in the nation, and you should be commended for that."



MEMBERS OF THE BOARD OF CONSULTANTS MET IN DAYTON IN NOVEMBER TO CRITICALLY REVIEW DATA AND TECHNICAL INVESTIGATIONS.

# PROTECTING

## Levee Accreditation

# Reports submitted but additional studies under way



**SOIL BORINGS LIKE THIS ONE IN THE HAMILTON LEVEES WERE ONLY ONE PART OF THE EXTENSIVE STUDY COMPLETED FOR LEVEE ACCREDITATION.**

After two years and nearly \$870,000 in soil borings and analyses, the Miami Conservancy District (MCD) has submitted levee accreditation reports to the Federal Emergency Management Agency (FEMA) for Butler County, and the cities of Hamilton, Middletown and Franklin.

MCD did the engineering analysis to comply with FEMA's effort to update flood insurance rate maps nationwide. For levees to be shown on the new maps as offering protection, the levees must protect to the 100-year flood (a storm event that has a 1-percent chance of occurring in any given year).

Each levee section must meet eight different requirements, says Kurt Rinehart, MCD chief engineer. MCD levees have exceeded most of the standards. One area of concern has been foundation stability or underseepage.

Underseepage is water that seeps through a dam or levee foundation. Water flowing under pressure through the foundation soils can cause soil particles to move, creating voids in the foundation which in turn allow more water to flow. This situation is called piping because the flow creates a "pipe" in the foundation, leading to instability and potential levee failure.

### Additional studies

Although MCD has submitted its reports to FEMA, MCD is continuing to study stability issues at a few of its levees.

"A few areas of concern needed additional study that we couldn't complete before the two-year deadline," says Janet Bly, MCD general manager. "Our Board of Consultants, who are national and international experts in levees, recommended we do the additional studies and resubmit our application for accreditation."

### Deaccreditation

If a levee section doesn't meet every single requirement, FEMA will deaccredit that levee section. Any levee section that is deaccredited by FEMA will be subject to floodplain regulations. This means cities will have to enforce floodplain regulations regarding development, and many homeowners will be required to purchase expensive flood insurance. (For more information on flood insurance, visit [www.floodsmart.gov](http://www.floodsmart.gov)).

Keep in mind that if a levee section is deaccredited, that doesn't mean the levee will fail, Bly says. The chances of a storm large enough to cause problems is small, and the actual risk of piping is even smaller.

"Plus, there are flood-fighting steps that can be taken to further reduce the risk of levee failure," she says. "And remember, these levees have withstood every storm since 1922."

Levee accreditation does not guarantee the levee or its performance, it simply is an indicator of compliance with certain FEMA requirements.

Besides the more than 18 miles of levee that have been studied in Butler and Warren counties, another 7.5 miles of levee are under review in Miami County. Those reports are due to FEMA by Sept. 2.

## Lockington Dam grouting

### Single biggest dam project since original construction

The single biggest investment in the flood protection system since the dams were completed in 1922 is under way. Construction for the nearly \$3.7 million grouting project at Lockington Dam will begin in 2011 and should take six months to complete.

Lockington Dam is built on fractured limestone bedrock and sand and gravel glacial deposits. Soil and rock boring tests as well as water-pressure testing have shown four large areas – both east and west of the spillway – in the dam’s foundation that are too permeable, says Kurt Rinehart, MCD chief engineer.

“We are blessed to have an abundant aquifer in this region but that means there is groundwater under the dam’s foundation all of the time,” Rinehart says.

When water rises behind the dam during high-water events, that pool of water puts pressure on the groundwater causing it to flow. That can lead to erosion and piping, creating voids, which over time could become larger and lead to dam failure, Rinehart says.

“That’s why we have to address this problem now,” Rinehart says. “The grouting project is being done to ensure the integrity of the dam and its future performance in protecting our communities.”

## Flood Protection

### Readjustment ensures everyone pays only their fair share

Miami Conservancy District (MCD) has begun the process for a readjustment of benefits to make sure that people who are protected by the flood protection system pay only their fair share.

“Flood protection assessments are based partly on property tax values,” says Janet Bly, MCD general manager. “And property values change over time. Some go up and some go down. With the readjustment, we assure that no one is paying more than their fair share.”

The contractor, Environmental Barrier Company LLC/Geo-Con of Monroeville, PA, will drill through the dam into the foundation and inject grout into the fractured bedrock and sand and gravel glacial deposits to reduce seepage through the foundation.

“The grouting won’t stop the seepage completely, but any water that does flow will move so slowly it won’t damage the foundation,” Rinehart says.

MCD previously installed 14 relief wells, toe berms and a drainage system as part of the plan to reduce underseepage at Lockington Dam.

The Lockington project is part of MCD’s Dam Safety Initiative (DSI) which began in 1999 to address vulnerabilities – like underseepage – that weren’t understood in the early 20th century when the flood protection system was designed.

Underseepage already has been addressed – with relief wells, toe berms and drainage systems – at Germantown, Taylorsville and Huffman dams. Work is under way at Englewood Dam.

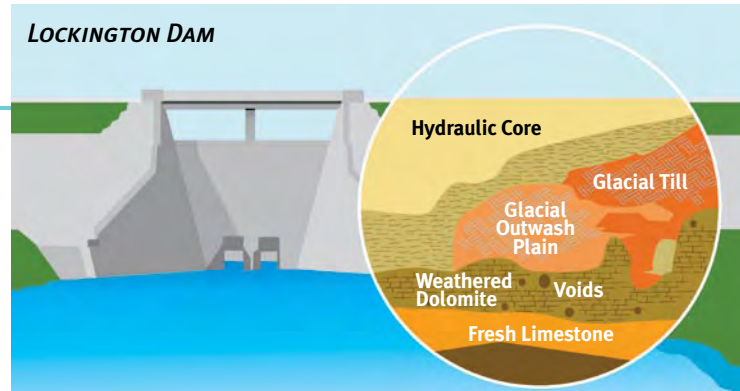
Besides addressing underseepage at all five dams, the DSI has resulted in impermeable crestwalls at three of the dams and concrete repair of floodwalls and revetment in several locations.

**NOTE: CONSTRUCTION OF THE MCD DAMS BEGAN IN 1918 AND WAS COMPLETED IN 1922.**

MCD is using Geographic Information System (GIS) and new property value information to more accurately calculate benefits, which determine assessments. Previous readjustments were completed in 1968, 1979, 1988, 1996, and 2004.

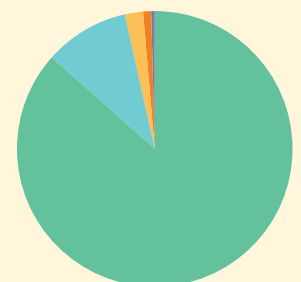
The readjustment process can happen no more than once every six years. The last readjustment took place in 2004.

The only people who pay for the flood protection system are property owners whose land flooded during the 1913 flood as well as the cities and counties that flooded. Individual assessments are based primarily on property tax valuations and the depth of flooding in 1913. Cities and counties pay a unit assessment based on the total assessment of property owners in their communities.



### Flood Protection Revenues (2010 Actual)

- Assessments (\$4,314,904)
- Intergovernmental (\$506,489)
- Other (\$57,071)
- Fees & Charges (\$110,247)
- Interest (\$11,866)



# PRESERVING

## Buried Valley Aquifer

### Network provides data within hours not weeks

A new network of wells is providing near real-time information that could keep area decision-makers informed of changing levels in the aquifer.

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Until now, groundwater-level information could be several weeks old because of the time it takes MCD staff to visit each of the observation wells, collect the data, and upload that data to MCD's server. With the real-time wells, the data is transmitted directly to a United States Geological Survey (USGS) electronic database at hourly intervals. The data is then available on the Internet and it is usually no more than an hour old.

"As a drought develops, the new network will provide groundwater-level information that is only an hour or two old compared to the information we now have which can be several weeks," says Mike Ekberg, MCD manager of water resources.

MCD is partnering with state and national agencies to create the [network](#) that measures how human water use, droughts, and floods affect the buried valley aquifer. MCD, the Ohio Department of Natural Resources (ODNR) Division of Soil and Water, and the USGS are working to create a 12-well network.

"If geothermal pumping causes a draw-down of water in the aquifer or if a drought is impacting the aquifer, we'll know it," Ekberg says, "and we'll be able to inform the people who need to discuss the options."

MCD, ODNR, and USGS are providing funding

and technology to upgrade existing observation wells. All of the information will be housed through the USGS National Water Information System.

Currently, the network has eight wells. The remaining four wells should be on line within the next two years, Ekberg says.

MCD also maintains a separate network of 98 observation wells.

"MCD observation wells provide more extensive coverage of regional aquifers than the real-time network," says Ekberg. "The data available is usually current to within one month, so it reflects recent aquifer storage conditions, which is current enough for many uses of the data."

Also, data from some of these wells goes back more than 29 years providing a valuable record of how aquifer storage has fluctuated during wetter and drier years. However, as technology continues to improve, the day may come when nearly all MCD observation wells are equipped to report groundwater level conditions current to within the hour.

Data from this network is available on the MCD website at [miamiconservancy.org](http://miamiconservancy.org)

**COLLEEN HARRIS, PRESIDENT OF ENVIRO-MEDICAL WASTE, LOGS PRESCRIPTIONS TURNED IN DURING A MIAMISBURG TAKE-BACK PROGRAM**



## Drugs in our waterways

### How much is too much?

A 12-month study by MCD found trace amounts of acetaminophen, ibuprofen, triclosan (an antibacterial agent used in products like toothpaste and soaps) and other products in the Great Miami River.

Researchers believe one of the ways the drugs make their way to rivers is when people flush their unused or unwanted medications down the toilet. Wastewater treatment plants and septic systems may not be able to eliminate all of the drug.

*Story continued on page 8*

## Septic systems target of Water Resources program

Many of the homes in our community are connected to city water treatment plants that treat our home's wastewater. But about 1 million Ohio households live beyond city sewers, and the wastewater is treated directly on their land using septic systems. Septic systems aren't regulated like water treatment plants, and it's up to the homeowner to care for the system.

All too often homeowners don't know enough about how to care for their system properly. If not regularly maintained, raw sewage from septic systems can make its way to river and streams and groundwater supplies, polluting drinking water and the places we play, paddle and fish. In the Great Miami River Watershed, there are hundreds of thousands of septic systems.

That's why the Aquifer Preservation Subdistrict (APS) is helping to fund programs in Butler, Clark, and Shelby counties that reduce the number of poorly maintained septic tanks – systems that if left untreated could lead to contaminated water resources.

In 2010, the Sidney-Shelby County Health District received \$35,000 from the APS to implement and manage a program in Shelby County to share the cost of sewage disposal systems upgrades. In Clark

County, the Clark Soil and Water Conservation District received \$35,000 from the APS to implement and manage a program to share the cost of septic tank pump-outs.

In 2010, the APS also helped fund several other projects to protect water resources.

- The Lockington Volunteer Fire Association received \$5,500 to acquire supplies, equipment and training for better emergency response to protect surface and groundwater.
- The City of Dayton received \$15,000 to prevent oils and debris from flowing to the Mad River from a Street Maintenance Department parking lot.
- The City of West Carrollton received \$16,850 to develop a master plan for a site along the Great Miami River. Use of low-impact techniques such as permeable pavements will help reduce runoff, clean the water and recharge the aquifer.
- The Boonshoft Museum of Discovery received \$25,000 to help fund the development and installation of a water-related interactive display. (See Boonshoft Museum story below.)

## Boonshoft set to install new exhibit featuring water

Water is not only abundant in the region, but it's become a major marketing drive with the Dayton Development Coalition's H2Open for Business campaign. And now the Boonshoft Museum of Discovery is working to help the region better understand the impact of water on our communities.

The museum is planning a major, permanent exhibit focusing on the area's unique relationship to water covering everything from aquifers to rivers and history to water protection.

The Boonshoft Museum of Discovery is the premier regional provider of interactive science learning experiences.

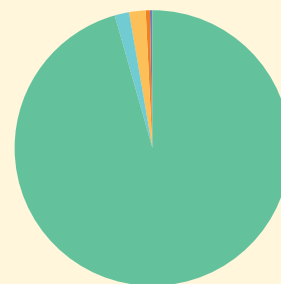
Bringing together the history, science, and culture of water conservation, the exhibit is designed to have a meaningful impact on visitors and generate a greater respect and personal responsibility for water resources in the region.

The Miami Conservancy District is working with the museum on the installation. Other partners in the project include the City of Dayton, Montgomery County, CH2MHill, Terran Corporation, Crown Solutions, Central State's International Center for Water Resources Management.

The display is scheduled to open in June.

### Aquifer Preservation Revenues (2010 Actual)

- Assessments (\$904,723)
- Intergovernmental (\$15,000)
- Other (\$19,500)
- Grants (\$4,737)
- Interest (\$2,832)



### Mark Your Calendar

- Dayton Children's Water Festival, Wednesday, May 11, University of Dayton
- Dayton Water Conference, Monday and Tuesday, May 16 and 17  
[daytonwaterconference.org](http://daytonwaterconference.org)
- Butler County Water Festival, Friday, Oct. 14, at Miami University – Hamilton Campus

# PROMOTING

## 35th anniversary

# Trail began as 8.2-mile loop in downtown Dayton



**MIAMI CONSERVANCY DISTRICT EMPLOYEES SWEEP THE RECREATION TRAIL WEEKLY FROM MARCH TO DECEMBER.**

Ride along the miles and miles of uninterrupted Great Miami River Recreation Trail and you might not realize that the trail began as a mere 8.2-mile loop in downtown Dayton back in the 1970s. It celebrates its 35th anniversary this year.

As early as 1972, the River Corridor Committee of the Dayton Area Chamber of Commerce completed studies that suggested developing the trail and other amenities along the Great Miami River and its tributaries. The bikeway was among the 10 projects labeled ‘early start projects’ by the committee.

Montgomery County, the Dayton Area Chamber of Commerce and private donations paid for MCD to construct the bikeway, which was dedicated on May 31, 1976 with 30,000 people attending the event, according to MCD reports.

By July 2011, the trail will run uninterrupted from the southern tip of the city of Franklin north to beyond the city of Troy. Another 10 miles or more of trail also are located in Middletown and Hamilton.

“I’ve enjoyed the bikeways and trails around Dayton ever since the first loop around the Miami River was developed,” says Tom Kohn, an avid trail user. “In the last eight years, I’ve been able to bike to work daily from March to November from Wolf Creek trail to the Iron Horse trail, covering 85 percent of my route on the bikeways.”

When the trail is complete, it will run 90-plus miles from Piqua in the north to Hamilton in the south.

## Trail maintenance never ends

Having a recreation trail along the river has great benefits like picturesque views. But it has its challenges, too, like mud and debris from high-water events and geese droppings.

Dayton, Moraine, West Carrollton, Miami Township, Miamisburg, Franklin, and Hamilton – pay MCD to maintain the trail in their communities. Each week, from March 1 through Dec. 1, MCD employees sweep the 35 miles of recreation trails owned and/or maintained by MCD, typically sweeping about 1,000 total miles of trail per year.

Keeping the trail clear is a priority but one that is a challenge to achieve.

“The challenge is that we can sweep one day and a high-water event – or geese – can undo all of our efforts the next,” says Jamie Johnson, MCD field operations manager. “Keeping the trail completely clear is a little like trying to keep the tide from a sandcastle.”

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*Thomas (Tom) Kohn*



### MCD becomes OGCA member

**The Miami Conservancy District has joined the newly formed Ohio's Great Corridor Association. The association is creating and seizing river-related opportunities for urban and rural communities to work together to bring vitality to the corridor. Ohio's Great Corridor features the cities along the Great Miami River from Piqua to Hamilton. To join the association, call 937-229-4665.**

## State Water Trails

### Designation could boost riverfront investment

With the Great Miami, Mad and Stillwater rivers now creating Ohio's largest water trail system, local officials are hoping to see increased riverfront investment.

Studies have shown that kayakers and canoeists can spend more than \$50 a day on food and lodging, says Sarah Hippensteel, MCD program development specialist. Ohio saw a 34-percent increase in kayak/canoe registrations in a five-year period ending in 2008, according to the ODNR Division of Watercraft.

"So, with the increased statewide recognition of our water trails, businesses in our riverfront communities could see more foot traffic in the coming years," Hippensteel says.

The Ohio Water Trail program not only gives the Great Miami, Mad and Stillwater rivers statewide recognition but will provide additional funding for projects like MCD's three river recreation maps. The free, waterproof maps show the public access points along the rivers as well as provide a variety of safety information. Since 2004, MCD has distributed more than 45,000 maps.

The three rivers are part of the new Great Miami River Watershed Water Trail – the largest water trail system in Ohio. The Great Miami River Watershed (GMRW) Water Trail was announced by the Ohio Department of Natural Resources Division of Watercraft at an August news conference in downtown Dayton. The trail collectively offers 265 miles of waterway accessible to recreational boaters, fishermen and wildlife watchers.

**LOCAL OFFICIALS GATHER AT THE CONFLUENCE OF THE GREAT MIAMI AND MAD RIVERS TO CELEBRATE STATEWIDE TRAIL DESIGNATION.**



## MCD by the numbers

MCD participates in a variety of programs and projects that have a significant impact – sometimes in a single year, other times over the long term. Check out some of 2010 efforts that are making a difference in the watershed.

**21 and 1,707** – The number of times any of MCD's dams stored water in 2010 protecting downstream communities, and the total number of storage events at the dams since their completion in 1922.



**2010 RIVER CLEANUP**

**2,460 and 65,480** – The number of pounds of trash collected by MCD employees, and the total trash collected by all volunteers during the 2010 Clean Sweep of the Great Miami River from Indian Lake to the Ohio River. MCD staff collected trash from the river corridor between Carillon Park and West Carrollton.

**156, 65, 45** – The number of miles in the Great Miami River, the Mad River and the Stillwater River designated as Ohio Water Trails. These three rivers

collectively offer more than 265 miles of waterway that are accessible for recreational boaters to paddle and enjoy.

**80, 20, 4** – The number of citizens, students and teachers trained as volunteer Miami Valley Stream Team monitors in 2010. These volunteers monitor the quality of area streams and waterways.

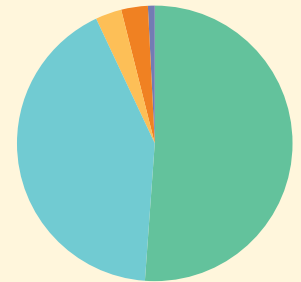
**162 and 1,019** – The number of confidential nitrate screenings MCD provided to well owners in 2010 and since the program began in 2007.

**6** – The number of cities, universities and businesses in the Great Miami Watershed that have attained or retained Groundwater Guardian Green Site (GGGS) status. GGGS sites are MCD, City of Vandalia, City of Tipp City, Wright State University, Concord Township in Miami County and MillerCoors (Trenton Brewery). For more information about becoming a GGGS, contact Theresa McGeady at 937-223-1278 x3239 or at [tmcgeady@miamiconservancy.org](mailto:tmcgeady@miamiconservancy.org).



## River Corridor Improvement Revenues (2010 Actual)

- Assessments (\$249,223)
- Intergovernmental (\$204,000)
- Other (\$15,142)
- Grants (\$14,608)
- Interest (\$4,098)



## Mark your calendar

■ Friday, May 20 -- Miami Valley Cycling Summit at the Kroc Center in Dayton  
[cyclingsummit.com](http://cyclingsummit.com)

■ Clean Sweep of the Great Miami River

• Saturday, May 7: Southern section from Middletown to the Ohio River

• Friday and Saturday, July 15 and 16: Sidney to Franklin

• Saturday, July 23: Logan County to Indian Lake

[greatmiamirivercleanup.org](http://greatmiamirivercleanup.org)

■ River Ride

• Miamisburg – Saturday, July 9

• Dayton – Saturday, July 30

[drivelesslivemore.org](http://drivelesslivemore.org)

■ River Days in Hamilton,

Ohio, Sept. 10 and 11. Contact Tony Taub 513-844-2050 x228



# A message from the general manager

## Conservancy Court

MCD is governed by a Conservancy Court comprised of one common pleas court judge from each of the counties within the Conservancy District boundaries. The Conservancy Court appoints MCD's Board of Directors and Board of Appraisers, and approves their plans.

Butler County  
*Honorable Keith M. Spaeth*

Clark County  
*Honorable Richard J. O'Neill*

Greene County  
*Honorable Stephen A. Wolaver*

Hamilton County  
*Honorable Robert P. Ruhlman*

Miami County  
*Honorable W. McGregor Dixon Jr.*

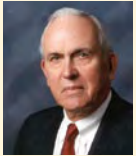
Montgomery County  
*Honorable Barbara P. Gorman*

Preble County  
*Honorable David N. Abruzzo*

Shelby County  
*Honorable James F. Stevenson*

Warren County  
*Honorable Neal Bronson*

## Board of Directors



**Gayle B. Price, Jr.**  
President



**William E. Lukens**  
Vice President



**Thomas B. Rentschler**  
Member

## Board of Appraisers

*David K. Galbreath, Jr.*  
Realtor, Troy, OH

*Robert Harris*  
Appraiser, Dayton, OH

*James E. Sherron*  
Attorney, Middletown, OH

## Experts help guide MCD future

Two questions every organization should ask itself over and over are, "Are we doing the right things?" and "Are we doing things right?"

We ask these questions of ourselves on a routine basis at MCD. Periodically, we survey our stakeholders, and from time to time we bring in the big guns – the Board of Consultants.

Arthur Morgan, the engineer who designed the flood protection system, established the first Board of Consultants – a panel of experts who critically reviewed the proposed flood protection system, and made recommendations – back in 1914. Since then, various Boards of Consultants have met more than 20 times, the latest in November of 2010.

Our most recent [Board of Consultants](#) is made up of five national and international experts in

concrete structures, dam safety, levee safety, and flood risk management policy. In 2010, board members studied various current and proposed projects and issues facing MCD, and made a series of recommendations that we already have begun to implement.

It's been almost 100 years since the Great Flood of 1913 devastated the Dayton region giving birth to MCD. Since then, many properties in communities along the rivers have remained flood-free, despite storms that would have inundated them prior to the development of the MCD system. MCD's 2010 Board of Consultants' expertise helps to sustain our flood protection system today and into the future. With the board's guidance, MCD will continue to "do the right things" and "do things right."

## How much is too much? *story continued from page 4*

Locally, "we are talking about trace amounts," says Mike Ekberg, MCD water resources manager. For example, based on MCD sampling, you would have to drink eight glasses of river water a day for 4,000 years to equal the ibuprofen in one Advil tablet.

"The problem," says Ekberg, "is no one knows what a truly safe amount is. In other parts of the country where they have found trace amounts of estrogen-related chemicals and other reproductive steroids in the water, they are also seeing male fish with female organs."

And that concerns researchers.

"The fish are our canary in the coal mine," says Yo Chin, a professor at Ohio State University's School of Earth Sciences and an Ohio Sea Grant researcher, in a 2010 National Oceanic and Atmospheric Administration Coastal Services Center [article](#) "They are an early warning sign that we need to be paying attention to."

Nationally, pharmaceutical take-back programs are gaining interest. People can drop off unused or unwanted medications at a local collection site, with police often overseeing the collection process. The drugs are later incinerated. Locally, MCD has worked for two years with the Dispose of Unwanted Medications Properly (DUMP) organization to

sponsor take-back programs in several watershed communities. MCD also worked with the City of Miamisburg, and Hamilton and Warren counties on take-back programs in 2010.

"Until, we know the impact of pharmaceuticals in our rivers and streams, we'd rather err on the side of caution," Ekberg says. "So taking advantage of pharmaceutical take-back programs is an easy way to keep pharmaceuticals out of our waterways."



## To contact us...

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