

# Wisconsin Conservation Congress

## Wildlife Health and Invasive Species Study Committee Meeting Minutes



<b>ORDER OF BUSINESS</b>	<b>July 21, 2012</b>	<b>9:00AM</b>	<b>Mead Wildlife Area Visitors Center</b>
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### I. ORGANIZATIONAL MATTERS

#### A. CALL TO ORDER

<b>MEETING CALLED TO ORDER BY</b>	Chairman Mike Riggle at 9:00 AM
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#### B. ROLL CALL

<b>ATTENDEES</b>	Al Brown, Tracy Swedlund, Mike Riggle, Jim Kirchner, Marc Schultz, Matt Schleis, Ed Guptill, Ed Harvey Jr, Tony Grabski, Randy Voegeli, Steve Knesie, Lindsey Long (DNR), Pete Dunn (DNR), Mindy Wilkinson (DNR)
<b>EXCUSED</b>	Stan Brownell, Alvin Bochler
<b>UNEXCUSED</b>	Mike Bader
<b>GUESTS</b>	Mark Gaikowski (USGS), Greg Stacey (DNR Water guard program)

#### C. AGENDA APPROVAL/REPAIR

<b>DISCUSSION</b>	No changes made
<b>ACTION</b>	Approved

#### D. REVIEW COMMITTEE MISSION STATEMENT

<b>DISCUSSION</b>	No changes
<b>ACTION</b>	Approved as read

#### E. PUBLIC COMMENTS

<b>DISCUSSION</b>	None
<b>ACTION</b>	

### II. INFORMATION & ACTION ITEMS

#### A. WILDLIFE DISEASE UPDATE

**DR. LINDSEY LONG**

<b>DISCUSSION</b>	Dr. Long presented an overview of the activities of wildlife health division and their procedures for investigating disease problems. She discussed necropsy techniques and findings in some of the
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	common diseases of wildlife. EHD(enzootic hemorrhagic diarrhea) in deer and the possible expansion of this disease due to climate change was discussed. WNV (west nile virus) and lead toxicity in birds was discussed. WNS (white nose syndrome) in bats was discussed see attachment #1. CWD incidents, testing results and surveillance plans were discussed see attachment #2. Dr. Long reported that Iowa has a positive CWD in a wild deer.	
ACTION	None	
PERSON(S) RESPONSIBLE	DEADLINE	

**B. LAW ENFORCEMENT UPDATE**

**PETE DUNN WDNR**

DISCUSSION	Law enforcement updates Captive cervid farms. Last year there were 26 incidents investigated on captive cervid farms. 18 new escapes and 5 wild deer with cow tags in the ears. The fact that all federal funding for CWD testing is gone was discussed. Pete explained the role of DNR in regulating captive cervids.	
ACTION	none	
PERSON(S) RESPONSIBLE	DEADLINE	

**C. WATER GUARD PROGRAM**

**GREG STACEY WDNR**

DISCUSSION	Greg Stacey presented the current status of the water guard program. He explained that zebra and quagga muscle in Lake Michigan for the period of 1992 -2009 has cost WE Energies \$28,429,000 to keep intake pipes clear. He explained the problems faced by western states and how aggressive they are in boat inspection, certification and fines for violations. Fines are \$5000 for non compliance in some states.	
ACTION	none	
PERSON(S) RESPONSIBLE	DEADLINE	

**D. NR 40 REVIEW**

**MINDY WILKINSON WDNR**

DISCUSSION	Mindy presented an update on NR 40 Emerald Ash Borer and the upcoming Invasive Species Council meeting see attachment #3	
ACTION	none	
PERSON(S) RESPONSIBLE	DEADLINE	

**E. USGS WORK ON MISSISSIPPI INVASIVE SPECIES**

**MARC SCHULTZ & MARK GAIKOWSKI USGS**

DISCUSSION	See attachment #4 Marc and Mark presented the latest developments on the battle with invasives in the Mississippi.	
ACTION	none	
PERSON(S) RESPONSIBLE	DEADLINE	

**III. MEMBERS MATTERS**

DISCUSSION		
ACTION		

**IV. ADJOURNMENT**

MEETING ADJOURNED	2:25
SUBMITTED BY	Mike Riggle
DATE	08/25/2012

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National WNS updates as of July 2012

- There is a new comprehensive USFWS WNS website: <http://whitenosesyndrome.org/>
- North American bat death total exceeds 5.5million
- G.d. has been confirmed as the cause of WNS
- WNS (& previously G.d.) has been confirmed in Europe
- Research funded by USFWS this year can be found at <http://whitenosesyndrome.org/>
- New decon protocol allow for the use of hot water (as one step in the decon process).
- White-nose syndrome has continued to spread rapidly. At the end of the 2011-2012 hibernating season, bats with WNS were confirmed in 19 states and four Canadian provinces:

Alabama	North Carolina
Connecticut	Ohio
Delaware	Pennsylvania
Indiana	Tennessee
Kentucky	Vermont
Maine	Virginia
Maryland	West Virginia
Massachusetts	New Brunswick, Canada
Missouri	Nova Scotia, Canada
New Hampshire	Ontario, Canada
New Jersey	Quebec, Canada
New York	

- The fungus that causes WNS, *Geomyces destructans*, has been confirmed in two additional states:

Iowa  
Oklahoma

- Eleven cave-hibernating bats, including four endangered species and subspecies are already affected by or are potentially at risk from WNS.

Bat species affected by WNS:

Big brown bat (*Eptesicus fuscus*)  
Eastern small-footed bat (*Myotis leibii*)  
Gray bat (*Myotis grisescens*) \*endangered  
Indiana bat (*Myotis sodalis*) \*endangered  
Little brown bat (*Myotis lucifugus*)  
Northern long-eared bat (*Myotis septentrionalis*)  
Tricolored bat (*Perimyotis subflavus*)

- Bat species on which *Geomyces destructans* has been detected:

Cave bat ( <i>Myotis velifer</i> )	Vermont
Southeastern bat ( <i>Myotis austroriparius</i> )	Virginia
New York	West Virginia
North Carolina	New Brunswick, Canada
Ohio	Nova Scotia, Canada
Pennsylvania	Ontario, Canada
Tennessee	Quebec, Canada

### WI WNS Updates as of July, 2012

- Winter 2011-2012 surveillance conducted at 115 sites thanks to voluntary landowner cooperation; no signs of WNS detected
- Closest site to WI where G.d. was detected is Maquoketa Caves State Park, IA just 30mi from the SW corner of WI (DNA of the fungus was detected via swabbing of a hibernating Big brown bat)
- Many tourists visit Maquoketa & WI tourist caves/mines in the same trip
- IA DNR is using biosecurity mats & visitor education at Maquoketa as a prevention plan
- Currently looking into biosecurity mats for WI tourist caves & mines
- Continuing WNS prevention efforts with hibernacula owners
- Continuing baseline data collection summer & winter (hibernacula surveys, acoustic & roost monitoring)
- National WNS Symposium was held in Madison in June
- Continuing to work with federal, state, and other partners, including involvement in several on-going WNS studies
- Will be presenting on WI WNS response at the Upper Midwest Invasive Species Conference in LaCrosse on Oct. 31

## 2011 CWD Update

### CWD Prevalence in Wisconsin

Since 2002, CWD prevalence within our western monitoring area has shown an overall increasing trend in all sex and age classes. Over the past 10 years, the trend in prevalence in adult males has risen from about 8 percent to about 18 percent and in adult females from about 3 percent to approximately 7 percent. During that same time, the prevalence trend in yearling males has increased from about 2 percent to about 6 percent and in yearling females from less than 2 percent to about 5 percent. We continue to see similar trends in the eastern monitoring area as well, albeit at lower prevalence levels.

We continue to find that disease prevalence is higher in males than females and higher in adults than yearlings. It is important to keep in mind that annual prevalence estimates are subject to sampling variation and that trends over time give us better information. These annual monitoring data are important for Wisconsin's understanding of CWD distribution and prevalence.

### 2011 CWD Sampling

- Mandatory sampling areas
- Solicited, focused sampling on the northeastern periphery of the area where CWD currently occurs, around the periphery of the Western Core Monitoring Area  
See surveillance map for details:  
[http://dnr.wi.gov/topic/wildlifehabitat/documents/surveillance\\_plan.pdf](http://dnr.wi.gov/topic/wildlifehabitat/documents/surveillance_plan.pdf)
- Voluntary sampling elsewhere within the CWD-MZ
- Minimal regional out-state surveillance (see pilot study below) with continued sick deer sampling

A total of 5328 samples were analyzed of which 239 were positive for CWD one of which was outside the CWD-MZ (see below).

### Pilot Out-state weighted surveillance

For CWD year 2011-12, in lieu of the usual rotated outstate sampling efforts, we began a pilot project to attempt to further increase the efficacy and efficiency of our outstate detection surveillance efforts. Since 2002, the DNR has enlisted the assistance of cooperative Chronic Wasting Disease sampling stations. In recent years, these stations have become increasingly vital to our CWD operations. In 2009, we began a pilot project to utilize 2 cooperative stations (one in Southeast Region, and one in South-Central Region) as field sample collection sites, as opposed to head collection sites. In 2010, we expanded our cooperative field sample collection sites to 9 stations overall. This program has been generally effective, well received by stations and hunters alike, and has made our CWD sampling operations more efficient. For the 2011 season, we pursued a pilot program that involved this methodology along with a weighted surveillance approach. Specifically, it involved working in conjunction with Wisconsin taxidermists to collect samples from deer that are brought to them for mounting as well as opportunistically collecting CWD samples at registration stations on opening weekend. The pilot was successful with 216 samples collected from the four regions. We would like to continue this sampling effort statewide in the coming year, but the decision is pending based on budget requirements.

### Washburn Co. CWD Positive

The Department of Natural Resources (DNR) detected Chronic Wasting Disease (CWD) in a wild adult doe found just west of Shell Lake in Washburn County. The 3 ½ -year old doe was euthanized by the Washburn County Sheriff's Office on a small parcel of private land. Tissue samples have been confirmed as CWD-positive at both the Wisconsin Veterinary Diagnostic Lab, and USDA's National Veterinary Services Laboratories (NVSL) in Ames, Iowa. The DNR received the final test results on March 30, 2012. Since then, additional genetic testing implies the deer is from the area and did not come from Southern Wisconsin and that the deer was more resistant to CWD which suggests we may find more positives in the area.

The location of this deer was more than 186 miles from the nearest known cases of the disease in WI wild deer. DNR field staff will be working with citizens, tribes, and local government officials to develop a response plan for the area. A Citizen Advisory Team was formed to assist in this planning effort. In order to find out if the disease is present in other wild deer in the area, the DNR will begin a focused disease surveillance effort within a 10-mile radius around the positive location. "The fall archery and gun deer hunting seasons provide an excellent, cost-effective method to collect valuable samples," said Kurt Thiede, Land Administrator for DNR. The surveillance will primarily rely upon obtaining tissue samples from hunter-killed deer during the 2012 hunting seasons. The deer seasons and antlerless quotas recommended for this fall will not be changed with the discovery of this CWD-positive deer. Hunters will be able to bring deer for disease testing to cooperating deer registration stations, meat processors, and taxidermists. The specific location of these sampling stations will be available in mid-August. In addition, we are working with local car-killed deer removal contractors to supplement our sample collection as well as working with the public to remove any sick deer reported. DNR would like to collect 1,000 samples from adult deer within a 10-mile radius of the positive deer location. This number will provide a strong picture of the extent of the disease within this area.

This is the first wild CWD-positive deer to found in northern Wisconsin and within the Ceded Territory where the Tribes maintain harvest and gathering rights. Under state statutes, DNR is required to enact a ban on the feeding and baiting of deer in any county that is within 10 miles of any captive or free-roaming deer that tests positive for either CWD or Tb. This CWD-positive deer is within Washburn County and is within 10 miles of Barron, Burnett, and Polk Counties. The ban on baiting and feeding within these counties took effect on May 10, 2012.

CWD is a nervous system disease of deer, moose, and elk. It belongs to the family of diseases known as transmissible spongiform encephalopathies (TSEs) or prion diseases. CWD occurs only in members of the cervid or deer family, both wild and captive. Current information suggests that CWD may be transmitted both directly through animal to animal contact and indirectly from a CWD-prion contaminated environment. Recent studies indicate that CWD prions exist in the saliva, urine, and feces of infected deer.

To learn more about CWD, please visit our web site at [dnr.wi.gov](http://dnr.wi.gov) and enter the search key word CWD or visit [KnowCWD.com](http://KnowCWD.com).

**July 2012 Wisconsin Conservation Congress  
Wildlife Health & Invasive Species Study Committee  
Invasive Species Program Updates**

**Emerald Ash Borer**

The ash tree-killing emerald ash borer has been confirmed in **Walworth County** on June 7, 2012. An infested tree has been identified in the city of Lake Geneva and an infested tree was located on a private woodlot several miles southwest of the city, less than one-half mile north of the Illinois border.



On Friday, June 8, an emerald ash borer adult (beetle) was confirmed in **Green Bay**. Infested ash trees were subsequently found last week in close proximity to where the adult EAB was discovered on a purple panel trap in July, 2009 near the Wisconsin Public Service (WPS) headquarters in downtown Green Bay.

An emerald ash borer (EAB) beetle was collected June 22, 2012 from residents in the City of **Janesville**. They removed the partially emerged beetle from one of their ash trees during the previous day. Identification of the beetle was confirmed as EAB on Monday, June 25. At least one tree on the property was confirmed by a DATCP specialist as being heavily infested.

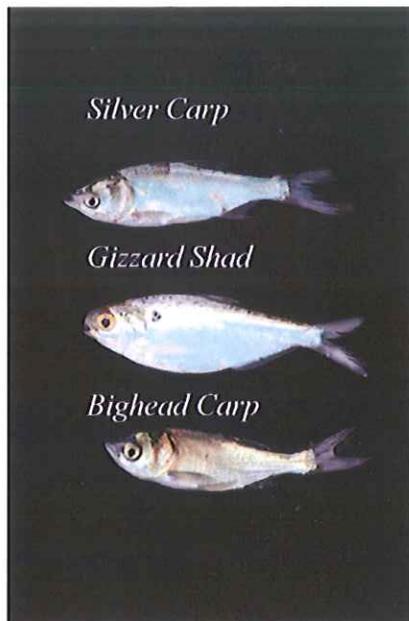
Emerald ash borer has also been confirmed for the first time on state owned lands. EAB adults were captured on two separate survey traps in the **Richard Bong State Recreation Area in Kenosha County** and confirmed as EAB June 22, 2012. Infested trees were also discovered on the property. Survey efforts in that state park and many others are happening this year under the direction of DNR forest health specialists. Visitors to RBSRA will no longer be allowed to remove firewood from the property.

For the next federal fiscal year the USDA has discontinued about \$500,000 in pass through funding to the Department of Agriculture, Trade and Consumer Protection that was supporting staff who inspect, trap and assist communities in developing control programs to minimize the impact of this tree killing pest. These funds are not being replaced with state funds.

**Asian Carp**

A male silver carp was captured in **Pool 10 Mississippi River**, according to the Iowa DNR last Thursday [June 14, 2012], by commercial fisherman, Charlie Mason in his gill nets at river mile 625.4 in Clayton Bay above Clayton, Iowa. The fish measured 755 mm (29 ¾ inches) and weighed 5.04 kg (11.1 lbs). This is only 10 miles south of Prairie du Chien and within swimming distance of the Wisconsin River. The Asian carp we have found in the Wisconsin River have all been bighead carp. The ban on the personal capture

and use of minnows for bait on the Mississippi River and elsewhere is intended to stop the spread of this species through release of bait.



The Milwaukee Journal Sentinel, June 19: The Army Corps of Engineers reported that of the 2,378 water samples taken throughout 2011 in the **canal system above the electric barrier**, a total of 34 samples were positive. This year, after just one day of sampling the waters above the barrier, the Army Corps reports it landed 17 positive results from 114 water samples. In other words, the percentage of samples that tested positive for Asian carp DNA last year was about 1.5%. This year, so far, it has jumped to almost 15%.

The Asian Carp Regional Coordinating Committee (ACRCC) announced July 16, 2012 that no Asian carp were found during a three-day intensive search for the invasive species in Lake Calumet within the Chicago Area Waterway System (CAWS).

### Wisconsin Invasive Species Council

This Council is advisory to the DNR and is established by c.15.347 and the Council's duties are listed in c.23.22. The Council began meeting in 2004 and initially focused on the establishment of the Invasive Species Rule. DNR is responsible for providing staff support and works to coordinate projects between the internal Department Invasive Species Team and the Council. The Council's **committees include:** Research & Regulations Committees, Education Committee and the Interagency Committee.

#### Membership:

##### Public Sector Representatives (up to 7)

Paul Schumacher  
*Chair*, Wisconsin Association of Lakes

Gregory D. Long, ASLA  
Nursery Industry

Kenneth Raffa  
University of Wisconsin

James Reinartz  
University of Wisconsin

Pat Morton  
The Nature Conservancy

James Kerkman  
Council on Forestry

##### State Agency Representatives

Shelly Allness  
Department of Tourism

Travis Olson  
Department of Administration

Todd Matheson  
Department of Transportation

Brian Kuhn  
Department of Agriculture, Trade and Consumer Protection

Jack Sullivan  
Department of Natural Resources

### **NR40 Regulatory revisions**

Background: NR 40 – Wisconsin’s Invasive Species Rule was established on September 1, 2009 after several years of work by the Department of Natural Resources Invasive Species Team and the Wisconsin Invasive Species Council. The purpose is to prevent the spread of “nonindigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” This rule was updated by Act 55 to align boater “no transport laws” with the rule on October 28, 2009. The only other change to date has been the emergency listing used to add White-nose syndrome to rules December 8, 2010 which has since been included via permanent rule.

How many species are currently listed?	
Plants	73
Aquatic Invertebrates	11
Terrestrial Invertebrates	8
Algae/ Cyanobacteria	6
Terrestrial Vertebrates	4
Fungi	1
Fish & Crayfish	all non-native fish are regulated

The rule is currently being revised as the “Round 1” species that were listed when the rule was established were widely recognized invasive species with little commercial value. In the current revisions or “Round 2” some species proposed for listing have some level of commercial use. The Department has been using stepped enforcement that begins with an educational approach for voluntary compliance to increase awareness of the rule. Because this rule is enforced by the Land, Water, Science and enforcement and Forestry Divisions the early focus has been on building consistent protocols across divisions. The Department of Agriculture, Trade and Consumer Protection is the lead for enforcement lead at licensed nurseries.

The NR40 Rule change (SS-04-12) scope was approved by the Board of Natural Resources on June 27, 2012. The language of the scope statement is posted at the Wisconsin Legislative Documents archive and was approved by Governor Walker on March 12, 2012: [http://docs.legis.wisconsin.gov/code/register/2012/675b/scope\\_statements/ 7](http://docs.legis.wisconsin.gov/code/register/2012/675b/scope_statements/7)  
The anticipated final rule date is still approximately November 2014.

The Wisconsin Invasive Species Council is still working with the Species Assessment Groups to research and evaluate species proposed for listing under the rule. The Council has scheduled a meeting to review all of the proposed changes to the rule’s species list for October 22, 2012. Opportunities for public input include the Council meeting and the following meetings and listening sessions: Public Listening Sessions, Council meetings, Economic Impact Assessment and review period, and official Public Hearings.

### **Statewide Strategic Plan:**

The Wisconsin Invasive Species Council is wrapping up the planning process for “*Looking forward: A statewide strategic plan for invasive species.*” This planning process will result in a statewide strategic plan to minimize impacts of invasive species on our economy, protect human health and maintain our natural heritage. Together,

government agencies and public partners will develop balanced cost-effective approaches to minimize additional introductions of invasive species into Wisconsin and carefully manage the species already established in the state.

This plan is not intended to replace existing project or species specific plans. It will provide an overarching strategy and draw recommendations from individual plans for areas that require additional resources. The statewide plan will identify common themes and areas of common interest where increased cooperation will help achieve strategic goals. The plan will help develop the business case for invasive species prevention and control and be shared with leaders, decision makers and natural resource user groups.

Timeline: The elements of the plan: *Prevention, Early Detection, Rapid Response, and Control* are being addressed at the 2011-2012 council meetings by using each meeting as a topic work day. For each element, the following questions will be asked of the group:

- Who is working on this area in Wisconsin?
- What is the cost of these actions? What is the benefit?
- What are the top two short term strategies to improve our capacity?

Each planning session begins with presentations to help frame the issue and describe the current work taking place in Wisconsin. A facilitated roundtable follows that is used to answer the three questions, identify linkages and articulate short term strategies to include in the strategic plan.

**11/17/2011 Early Detection**

**Sponsor: Brian Kuhn, DATCP**

Presentations: Technology, strategy and current capacity.

**01/17/2012 Economic Impacts**

**Sponsors: Paul Schumacher, WI Lakes & Shelly Allness, Tourism**

Presentations: UW and DNR economists, recent case studies of the costs of invasive species and control spending.

**03/13/2012 Prevention**

**Sponsor: Ken Raffa, UW**

Presentations: Policy, jurisdiction and preemption.

**06/21/2012 Rapid Response**

**Sponsor: Jim Reinartz, UW**

Presentations: Agency capacity, pathways and resources for reducing risk.

**09/18/2012 Control**

**Sponsor: Kurt Thiede, DNR**

Presentations: Technology, strategy and current capacity.

**11/13/2012 Plan Review**

**For more information contact:**

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Melinda.Wilkinson@wi.gov

## Task Force Participation

USGS-UMESC researchers participate on the following taskforces:

- (1) MN-WI Task Force on Asian carp in the UMR and St. Croix;
- (2) UMRBA ANS Task Force; (3) Minnesota Governor Dayton's Asian Carp Summit; (4) Great Lakes Basin ANS Task Force, and
- (5) Mississippi Interstate Cooperative Resource Association (MICRA).

All these organizations and task forces share a desire to control and manage invasive species, although their focal areas, responsibilities, and authorities are unique.



## Field Research Update

Field research in 2010 focused on assessment of the ecological effects of Asian carp on river and avian foodwebs on the Illinois and Upper Mississippi Rivers.

It appears that Asian carp have a detrimental effect on desirable and native fish and other wildlife.

- ✓ UMESC determined native fish from waters with high densities of Asian carp in the Illinois River, had about 1/4<sup>th</sup> the total fat (lipid) content and lower levels of essential fatty acids like DHA and EPA in muscle tissue, thus effecting the capability of these fish to survive and thrive.
- ✓ Fish like sauger, smallmouth bass, bigmouth buffalo, white bass, and freshwater drum had lower reproductive success in high Asian carp infested waters.
- ✓ Tree swallows on the UMR have more fat (lipid) than birds on the Illinois River, indicating effects of Asian carp higher in the food web.

Field research in 2010, 2011 and 2012 included

- ✓ Comparisons of the digestive enzyme activity of Asian carp versus native filter-feeding fish on the Illinois (IL), Wabash (IN), and James River (SD). Comparing the digestive enzyme activity of these species in different river systems allowed us to assess whether the differences observed in the Illinois River also occur in fish in other habitats with different food resources. This was critical to confirm that one microparticle formulation could be used in different habitats to selectively deliver control agents to Asian carp while having minimal effects on native species.
- ✓ Collections of digestive tract samples of Asian carp and native planktivores to compare the microbial communities present in these fish. Identifying unique microbial communities in bighead carp and silver carp could allow the development of microbial source tracking procedures that could complement environmental DNA (eDNA) monitoring of Asian carp.

## Laboratory Research Update

As part of an **integrated pest management (IPM) approach**, UMESC has been conducting investigations to identify Asian carp biological and physiological characteristics for use in the development of control tools and techniques to selectively control Asian carps with minimal impact on native species.

UMESC's approach is to work concurrently to 1) identify control agents with greater specificity for Asian carp, and 2) develop methods to selectively deliver control agents to Asian carp because of their greater filtration capacity and the greater activity of certain enzymes in the digestive tract of Asian carp compared to native filter-feeding fish.

Cooperative agreements are also being formed with private companies to develop microparticles using novel compound capture technologies that have the capacity to deliver biocides to targeted groups of fish. Funding for these projects is provided by the Great Lakes Restoration Initiative.

## Coordination & Cooperation (GLRI) – Asian Carp & Zebra Mussels

USGS has been given the **science lead** for the (GLRI) Asian carp projects by the President's Council for Environmental Quality under John Goss' direction. USGS is coordinating with over 50 partners through annual science meetings; February 2011 in Chicago and March 2012 in La Crosse to discuss GLRI project status, collaborations, and future efforts.

### UMESC ASIAN CARP ACTIVITIES

The objectives of UMESC research are:

#### Identification of Potential Control Agents for Toxicant Screening Program

- Viterbo University collaboration - **synthesized different formulations of GD-174**; compound previously found to have selectivity to common carp
- Initiated studies with GD-174 and other candidate compound
- Compared the metabolism of rotenone by silver & bighead – identified different metabolic pathways are used by these closely related species
- Developed chemical database of over 274 compounds which will be used to screen larger databases for potential piscicides – the database will soon be served on-line to allow access by other researchers

#### Technologies Using Targeted Oral Delivery for Species-Specific Control

- Filtration efficiency of Asian carps - **microparticle size testing completed – target size range selected (50-100 µm)**
- Microparticle preparation - **multiple microparticle formulations tested; testing with biocide-laden microparticles planned for winter 2012.**
- Gut physiology of native and non-native planktivores
  - ✓ **Tested 19 digestive enzymes - Results show unique species differences** (gizzard shad, bigmouth buffalo, Asian carp); beginning to assess geographic differences
  - ✓ **Compared trypsin activity between silver carp and gizzard shad** – silver carp have more trypsin and more “active” trypsin than gizzard shad
- University of Wisconsin-La Crosse collaboration - morphology of gill rakers from Asian carp and native planktivores. Prepared **2- and 3-dimensional images of gizzard shad and silver carp gill-rakers**. The inter-raker spacing of the gill rakers of gizzard shad differed based on both season and location while those of silver carp did not. This suggests that one microparticle size range could be



Gizzard shad

Silver carp

effective against Asian carp regardless of location or season. It also suggests that the potential impact to gizzard shad could differ based on location and season.

### Development of Rapid Molecular Surveillance Tools to Detect Asian

- Army Corps of Engineers collaboration – Environmental DNA (eDNA) 1) decrease processing time (improve sample throughput), 2) calibrate eDNA response to fish populations to allow eDNA monitoring to predict fish population size, 3) validate species specificity, and 4) identify and evaluate vectors of eDNA transmission (e.g., *fish-eating birds, barges, etc.*) to determine the whether these vectors could cause positive eDNA responses.
  - ✓ Initial method modifications have given **sample-to-detection results in as little as 4 hours**; work continues to validate these findings.
  - ✓ Compared eDNA extraction methods – will likely result in modification to current eDNA processing procedures
  - ✓ Developed 19 potential markers for bighead carp and silver carp for possible incorporation into the screening program
  - ✓ Fed silver carp to bald eagles at the National Eagle Center in Wabasha, MN then collected fecal material for 7 days post-feeding, sample analysis in progress; feeding trials planned with cormorants and white pelicans (Brookfield Zoo, August 21012)
- University of Illinois Urbana-Champaign collaboration – identifying bacterial populations in Asian carp and native planktivore GI tract to determine whether **microbial tracking** could detect Asian carp.
  - ✓ Completed DNA sequencing of >200 Asian carp and native planktivore samples
  - ✓ Analysis of >83% of sequences completed
  - ✓ Hindgut microbial communities of indigenous fishes (e.g., gizzard shad) were clustered closer to each other than to Asian carps.
  - ✓ Foregut communities were generally different from hindgut communities for gizzard shad and silver carps.
  - ✓ Specific microbial populations associated with grass carp, gizzard shad, and silver carp were observed, suggesting primers specifically targeting these microbial populations can be designed and used as biomarkers in Asian carp surveillance.
- University of Minnesota and Minnesota DNR collaboration – eDNA surveillance of Asian carp in the UMR and connected Minnesota waters.
  - ✓ New collaboration being established to process samples to determine the presence or absence of Asian carp eDNA in the UMR and in connected Minnesota waters

### Evaluate Physical Methods to Disrupt Asian Carp Spawning Behavior and Decrease Egg Viability

- Purdue University collaboration – assess the **effects of electricity on eggs** of Asian carp and native species; evaluate placement of electrical barriers downstream of spawning sites.
  - ✓ Completed tests with native test species and with bighead carp; electricity limited Asian carp egg survival only at voltage gradients that are impractical for field use.

## UMESC DREISSENID (Quagga and Zebra) MUSSEL ACTIVITIES



- New York State Museum collaboration – **collaborative effort to evaluate the potential non-target effects of ZEQUANOX®, a killed *Pseudomonas fluorescens* bacterium product that may be effective in controlling dreissenid mussels.**
  - ✓ Met with AIS specialists from Iowa, Minnesota, and Wisconsin to identify **locations for field trials in 2012**. In 2011 caged zebra mussels were placed in Lake Carlos (MN), Lake Pepin (MN), and Lake Shawno (WI) for 2012 field trials. Mobile bioassay laboratory being readied for field trials.
  - ✓ Completed non-target evaluations with glochidia and newly-transformed juveniles of several native mussel species, tests with native fishes are in progress, tests with year-old+ native mussels are planned for 2013
  - ✓ Additional work selected for funding by Legislative Citizens Commission on Minnesota Resources (LCCMR) – field trials and additional laboratory investigations of ZEQUANOX®
- Filtration efficiency of Native & Zebra Mussels –
  - ✓ **~10-fold greater filtration rate in Zebra mussels compared to natives**
- Gut physiology of Native & Zebra Mussels –
  - ✓ **Seasonality** – determined the digestive enzyme activity in native and zebra mussels. Digestive enzyme activity was decreased in native mussels sampled in the fall compared to summer as water temperatures decreased while digestive enzyme activity in zebra mussels remained constant.
  - ✓ University of Wisconsin-La Crosse collaboration – graduate student expanding work with native mussels and zebra mussels to include mayflies and caddis flies

## **Cooperative IPM Activities with other USGS Centers**

USGS Columbia Environmental Science Center – Assessment of **carp pheromones (attractants & repellants); use of alternative Great Lakes food resources (blue-green algae, dreissenid mussel feces); and risk assessment modeling**

USGS Illinois Water Science Center – Assessment of **inter-basin transfer** of AIS

USGS Rocky Mountain Science Center – Assessment of **physical control methods** of AIS, such as pulse pressure technology (e.g., waterguns)

For additional information on USGS AIS research activities, please visit: <http://www.umesc.usgs.gov/>  
or <http://cida.usgs.gov/glri/>