

**DOCUMENTING THE OCCURRENCE THROUGH SPACE & TIME  
OF AQUATIC NON-INDIGENOUS  
FISH, MOLLUSKS, ALGAE, & PLANTS  
THREATENING NORTH AMERICA'S GREAT LAKES**

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# Asian carp DNA found in Fox River

Patti Zarling, Press-Gazette Media 10:10 a.m. CDT October 22, 2014



U.S. Fish and Wildlife Service employee Anthony Rieth holds a 2-liter water sample collected from the Lower Fox River. (Photo: Submitted by U.S. Fish and Wildlife Service)



Wisconsin Outdoor Fun w/Of-fishing Section

Tests for DNA are sensitive and can detect material shed in mucus or waste from fish, or from birds who have eaten the fish elsewhere, Bob Wakeman, aquatic invasive species coordinator for the DNR, noted in a written statement. Bilge water from boats also could carry traces of the fish.

Multiple positive tests over time indicate the likelihood of live fish, Wakeman said.



U.S. Fish and Wildlife Service employees Todd Blythe and Demitra Suko filter water samples from the Lower Fox River in the mobile eDNA lab. (Photo: Submitted by U.S. Fish and Wildlife Service)

In addition to the federal DNA monitoring, DNR fisheries team members conduct a variety of netting, electroshocking and trawling operations in state waters as part of an ongoing monitoring effort.

To date, these efforts have not captured any Asian carp in any waters of the Fox River near Green Bay, Green Bay or Lake Michigan.

The species includes bighead and silver carp and the fish were introduced into the southern U.S. in the 1970s, according to the DNR. The DNA has been found upstream of barriers in Lake Calumet, seven miles from Lake Michigan on the Indiana-Illinois border, as well as in Lake Erie, the DNR noted.

— pzarling@pressgazette.com or follow her on Twitter @PGPattiZarling



Authorities are testing Fox River waters to see if live invasive Asian carp are present.(Photo: File/AP)



## Background

The Great Lakes have a long history of aquatic nonindigenous species (ANS) introductions – both intentional and unintentional. As of 2012, over 180 nonindigenous species have been reported to have reproducing populations in the Great Lakes basin, i.e. lakes Superior, Michigan, Huron, St. Clair, Erie, Ontario, and their connecting channels and water bodies within their respective drainages (Mills et al. 1993, Ricciardi 2001, Ricciardi 2006, Ricciardi unpubl. data). The two most recent ANS reported and verified established in the Great Lakes basin were *Hemimysis anomala* and *Procambarus clarkii* (fact sheet pending review).

The number of Great Lakes aquatic nonindigenous species documented in GLANSIS must be interpreted as a minimum. Identification depends on our ability to find, recognize, verify, and document new species, which is, in turn, dependent on our ability to adequately sample the Great Lakes ecosystem.

## Species Included in GLANSIS

Species are assessed for inclusion in the database on a case-by-case basis. The present database does not include waterfowl.

### The present database consists of three lists

- a core list of species **nonindigenous** to the Great Lakes basin (not native to any part of the basin),
- a list of **range expansion** species (native only to a portion of the basin),
- and a **watchlist** (not currently found in the Great Lakes but assessed in the peer-reviewed literature as of 2010 as likely to invade via current pathways).



## Generate a Non-Indigenous Species List

### Select your criteria below

A list of species matching your criteria will be generated. Species with fact sheets will have links to the fact sheets.

### SEARCH HELP

Species Category

Group

Lake (HUC):

Genus:

Species:

Common Name:

Status:

Pathway:

Sort by

- All
- Algae
- Annelids-Oligochaetes
- Annelids-Polychaetes
- Bacteria
- Bryozoans
- Coelenterates-Hydrozoans (Hydroids)
- Crustaceans-All
- Crustaceans-Amphipods
- Crustaceans-Cladocerans
- Crustaceans-Copepods
- Crustaceans-Crayfish
- Crustaceans-Mysids
- Fishes
- Insects
- Mollusks-All
- Mollusks-Bivalves (Mussels, clams, oysters)
- Mollusks-Gastropods (Snails)
- Plants
- Platyhelminthes
- Protozoans
- Rotifers
- Viruses

on right)



PLANTS		PLANTS (continued)		FISH (continued)	
Genus (2147)	Family	Genus (2147)	Family	Genus (290)	Family
<i>Agrostis</i> (36)	Poaceae*	<i>Potamogeton</i> (63)	Potamogetonaceae	<i>Morone</i> (4)	Moronidae
<i>Alnus</i> (14)	Betulaceae	<i>Puccinellia</i> (31)	Poaceae*	<i>Neogobius</i> (1)	Gobiidae
<i>Alopecurus</i> (16)	Poaceae*	<i>Rorippa</i> (28)	Brassicaceae	<i>Notropis</i> (91)	Cyprinidae
<i>Butomus</i> (1)	Butomaceae	<i>Rumex</i> (55)	Polygonaceae*	<i>Noturus</i> (29)	Ictaluridae
<i>Cabomba</i> (4)	Cabombaceae	<i>Salix</i> (170)	Salicaceae*	<i>Oncorhynchus</i> (11)	Salmonidae
<i>Carex</i> (593)	Cyperaceae*	<i>Solanum</i> (104)	Solanaceae*	<i>Osmerus</i> (1)	Osmeridae
<i>Chenopodium</i> (51)	Chenopodiaceae*	<i>Solidago</i> (77)	Asteraceae*	<i>Perca</i> (1)	Percidae
<i>Cirsium</i> (95)	Asteraceae*	<i>Sparganium</i> (10)	Sparganiaceae	<i>Perccottus</i> (1)	Odontobutidae
<i>Conium</i> (1)	Apiaceae*	<i>Trapa</i> (2)	Trapaceae	<i>Petromyzon</i> (1)	Petromyzontidae
<i>Echinochloa</i> (20)	Poaceae*	<i>Typha</i> (4)	Typhaceae	<i>Phenacobius</i> (5)	Cyprinidae
<i>Egeria</i> (1)	Hydrocharitaceae	<i>Veronica</i> (34)	Scrophulariaceae*	<i>Phoxinus</i> (6)	Cyprinidae
<i>Eichhornia</i> (4)	Pontederiaceae			<i>Proterorhinus</i> (1)	Gobiidae
<i>Epilobium</i> (45)	Onagraceae			<i>Rutilus</i> (1)	Cyprinidae
<i>Fragula</i> (8)	Rhamnaceae*	FISH		<i>Salmo</i> (2)	Salmonidae
<i>Glyceria</i> (18)	Poaceae*	Genus (290)	Family	<i>Scardinius</i> (1)	Cyprinidae
<i>Hydrilla</i> (1)	Hydrocharitaceae	<i>Alburnus</i> (1)	Cyprinidae		
<i>Hydrocharis</i> (1)	Hydrocharitaceae	<i>Alosa</i> (6)	Clupeidae		
<i>Hygrophila</i> (6)	Acanthaceae	<i>Apeltes</i> (1)	Gasterosteidae	MOLLUSKS	
<i>Impatiens</i> (11)	Balsaminaceae	<i>Atherina</i> (1)	Atherinidae	Genus (113)	Family
<i>Iris</i> (52)	Iridaceae	<i>Babka</i> (1)	Gobiidae	<i>Bithynia</i> (1)	Bithyniidae
<i>Juncus</i> (123)	Juncaceae	<i>Benthophilus</i> (1)	Gobiidae	<i>Cipangopaludina</i> (2)	Viviparidae
<i>Lupinus</i> (165)	Fabaceae*	<i>Garassius</i> (1)	Cyprinidae	<i>Corbicula</i> (1)	Corbiculidae
<i>Lycopus</i> (10)	Lamiaceae*	<i>Channa</i> (2)	Channidae	<i>Dreissena</i> (2)	Dreissenidae
<i>Lysimachia</i> (42)	Primulaceae	<i>Clupeonella</i> (1)	Clupeidae	<i>Elimia</i> (50)	Pleuroceridae
<i>Lythrum</i> (13)	Lythraceae	<i>Cottus</i> (33)	Cottidae	<i>Gillia</i> (1)	Hydrobiidae
<i>Marsilea</i> (12)	Marsileaceae	<i>Ctenopharyngodon</i> (1)	Cyprinidae	<i>Lasmigona</i> (9)	Unionidae
<i>Mentha</i> (13)	Lamiaceae*	<i>Cyprinella</i> (30)	Cyprinidae	<i>Monodacna</i> (1)	Cardiidae
<i>Myosotis</i> (12)	Boraginaceae	<i>Cyprinus</i> (1)	Cyprinidae	<i>Pisidium</i> (13)	Sphaeriidae
<i>Myosoton</i> (1)	Caryophyllaceae	<i>Enneacanthus</i> (3)	Centrarchidae	<i>Potamopyrgus</i> (1)	Hydrobiidae
<i>Myriophyllum</i> (14)	Haloragaceae	<i>Esox</i> (4)	Esocidae	<i>Radix</i> (1)	Lymnaeidae
<i>Najas</i> (8)	Najadaceae	<i>Gambusia</i> (24)	Poeciliidae	<i>Sphaerium</i> (20)	Pisidiidae
<i>Nasturtium</i> (5)	Brassicaceae	<i>Gymnocephalus</i> (1)	Percidae	<i>Valvata</i> (8)	Valvatidae
<i>Nitellopsis</i> (3)	Characeae (algae)	<i>Hypophthalmichthys</i> (2)	Cyprinidae	<i>Viviparus</i> (3)	Viviparidae
<i>Nymphoides</i> (7)	Menyanthaceae	<i>Knipowitschia</i> (1)	Gobiidae		
<i>Pistia</i> (1)	Araceae	<i>Lepisosteus</i> (4)	Lepisosteidae		
<i>Pluchea</i> (11)	Asteraceae*	<i>Lepomis</i> (13)	Centrarchidae		
<i>Poa</i> (96)	Poaceae*	<i>Leuciscus</i> (1)	Cyprinidae	* = Plant family originally targeted by "Tri-trophic" TCN	
<i>Polygonum</i> (80)	Polygonaceae*	<i>Misgurnus</i> (1)	Cobitidae		

Target Genus  
 Watchlist Genus  
 (no. spp. In North America)

2,550 species  
 101 genera

## Digitization TCN: Great Lakes Invasives- Collaborator Map



**1. Univ of WI-Madison (WIS)**

**2. Univ of WI-Steven's Point**

**3. Univ of WI-Milwaukee**

**4. Univ of WI-LaCrosse**

**5. University of Minnesota**

**6. Michigan State Univ**

**7. Field Museum (F / FMNH)**

**8. University of Illinois / ILNHS**

**9. Morton Arboretum \*\*\***

**10. University of Notre Dame**

**11. Butler University**

**12. Univ of Michigan (MICH)**

**13. Western Michigan Univ**

**14. Central Michigan Univ**

**15. MI Small Herbaria Network ++**

**16. Miami University**

**17. Ohio State University**

**18. Ohio University**

**19. NY Botanical Garden (NY)**

**20. New York State Museum**

**21. Université de Montréal**

**22. AZ State Univ / Symbiota**

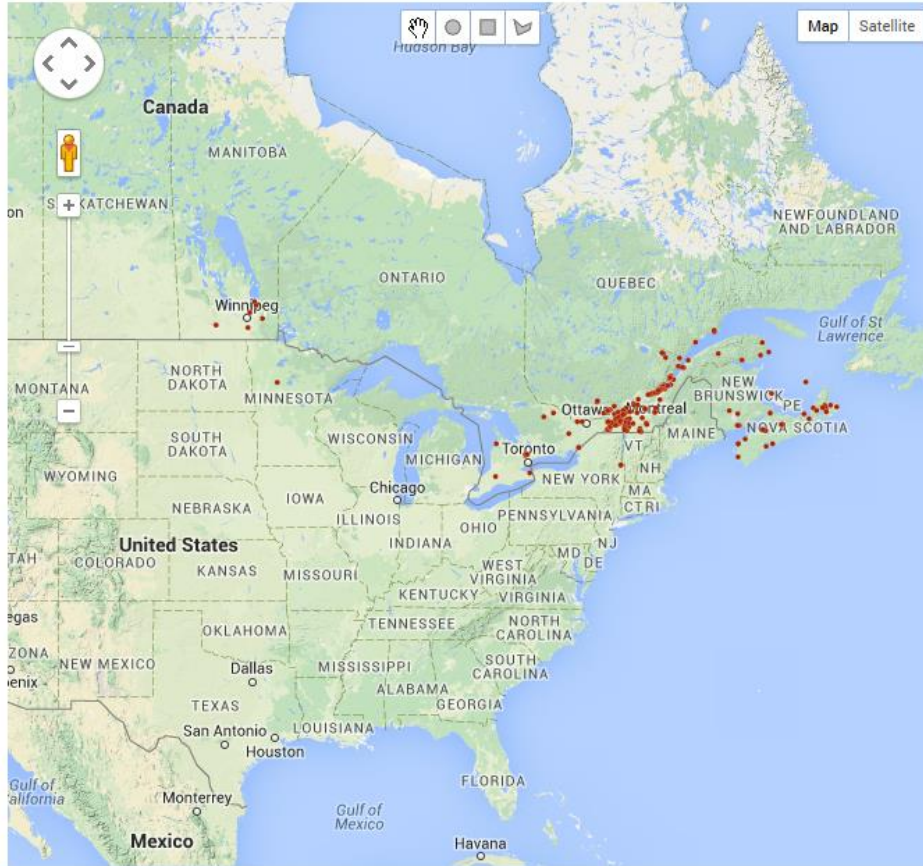


## 726 Results

(showing only georeferenced records: 354)

Map view Table view Stats view

Search Download Display



### Create a new filter

Genus

Filter contains: **Lythrum**

Lythrum

---

### Current filters

Genus  
Lythrum (contains)



# 153 DATA RESOURCES CONTAINING 182 COLLECTIONS



## SEARCH

What do you want to find?

Search  
Options

Search  
Now



## JOIN

**Find out how** to become a part of the VertNet community. Collections from all corners of biodiversity are welcome.

No backbone required.



## LEARN

We've got **workshops** ...and **guides & tutorials** ...and **publications & video**.

All kinds of help.



## TALK

Tell us what's on your mind, what you need, and how to make **VertNet** better.

We want your feedback.



MUSSELPdb  
Introduction  
Browse  
d'basing

## The Freshwater Mussels (*Unionoida*) of the World (and other less consequential bivalves)

FM(U)otW(aolcb) is the web version of the MUSSEL Project Database. Follow the links to browse the data or use the search fields. Either way, you win!

Page last updated  
8 August 2013

[Click here](#) to read the database disclaimer.

Taxa known only as fossils are highlighted in **gray**. Those without representatives in fresh waters are highlighted in **gold**.

Search:  scientific name

Bivalvia

top

### Bivalvia: orders

#### Arcoida: 1 family

Arcoids are primarily marine. However, one family is represented in fresh waters.

#### Myoidea: 5 families

Myoids are also primarily marine bivalves, but there are freshwater species as well.



#### Mytiloidea: 1 family

There are a few secondarily freshwater species in this order, but otherwise mytiloids are primarily marine.



#### Pterioidea: 1 family

There are not really any freshwater pterioids, but at least one fossil family has been assigned to a freshwater clade.

#### Unionoidea: 12 families

These are the freshwater mussels. There are six modern families, restricted entirely to fresh waters. In addition, there are several fossil families.



#### unknown: 2 families

Some bivalve families (typically fossils) can't be convincingly assigned to an order at this time.

#### Veneroidea: 20 families

There are several groups of freshwater veneroids, including Sphaeriidae, Cyrenidae (= Corbiculidae) and Dreissenidae. There are also a number of freshwater species in primarily marine families.







V 0254231 WIS



Wisconsin Dane County  
Araceae  
*Pistia stratiotes* L.



Retention pond; assoc. *Eichhornia crassipes* and *Potamogeton nodosus*. Banks lined with *Phalaris arundinacea*, *Typha angustifolia*, and a stretchy *Sida* sp.  
These were the only water plants noted. Collected and brought in by G. Coombs. Identified, pressed, labeled, and mounted by T. S. Cochran as No. 142[4].

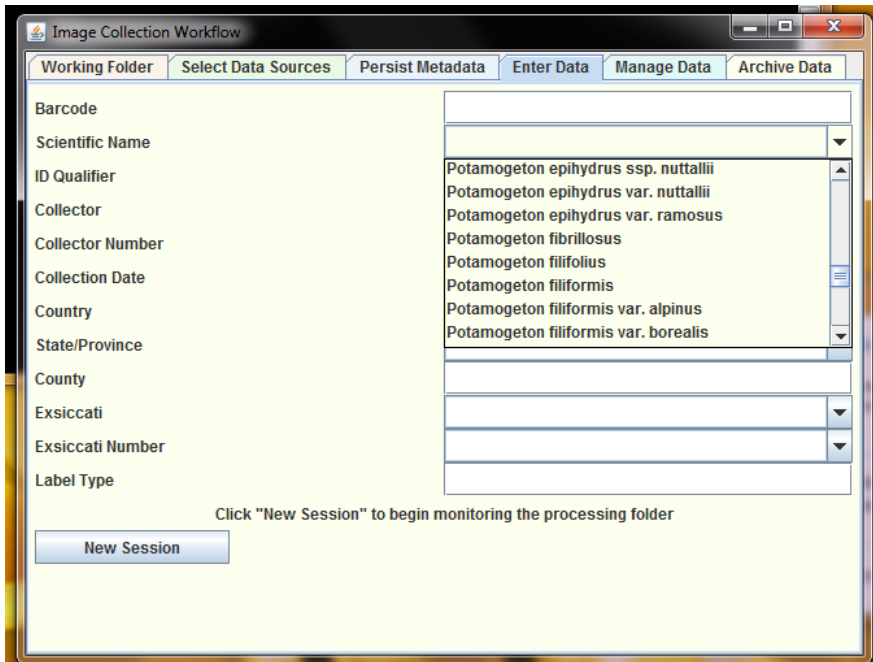
OTN 09E 06 NW4 NW4

Both *Eichhornia* and *Pistia* grow in intermittent clusters all along the perimeter of the north pond. A single small cluster of *Pistia* was seen in the south pond at the culvert. In fact, the two plants, and another small cluster of *Pistia*, were noted in a little pool in the wetland outside the second, gated outlet at the southwest corner of the north pond. No second cluster again for three weeks. The system in question is the *Washburn* Water City of Madison. Northern of two retention ponds in Orchard Hills park, between 0.5 mi. E of Pleasant Branch Rd. and 0.5 mi. W of Co. Hwy. Q, 0.5 mi. N of Century Ave. in Co. Hwy. M.

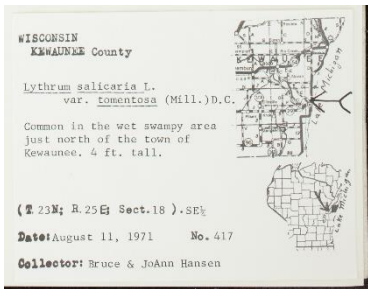
Col. No. 142[4]  
22/Sep/2008  
Det. Theodore S. 23/Sep/2008  
UNIVERSITY OF WISCONSIN - MADISON HERBARIUM (WIS)



# 1. Skeletal record is created by imagers



## 2. Label data is extracted via OCR



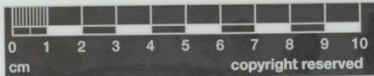
UNIVERSITY OF WISCONSIN-MADISON (WIS)  
v 0047793 WIS  
. MAPPED 072 FLORA OF WISCONSIN  
WISCONSIN KJIWAUNME County  
(T. 23N; B. 25 E; Sect. 18 ).SE¼  
August 11, 1971 No. 417  
Collector: Bruce & JoAnn Hansen  
Lythrum salicaria L.  
var. tomentosa  
(Mill. )D.C  
Common in the wet swampy area just north of  
the town of Kewaunee. 4 ft. tall.

## Friesner Herbarium, Butler University (BUT)

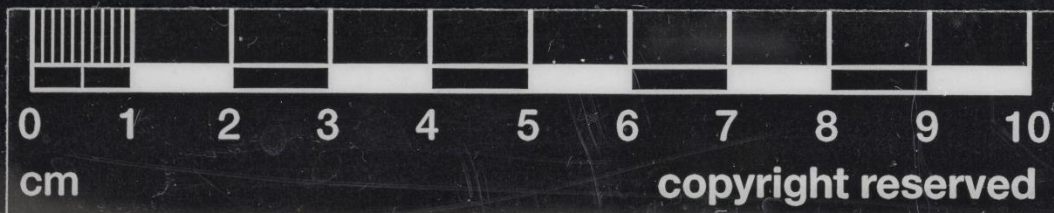
## 3. Data is parsed and edited in Symbiota by regional data managers



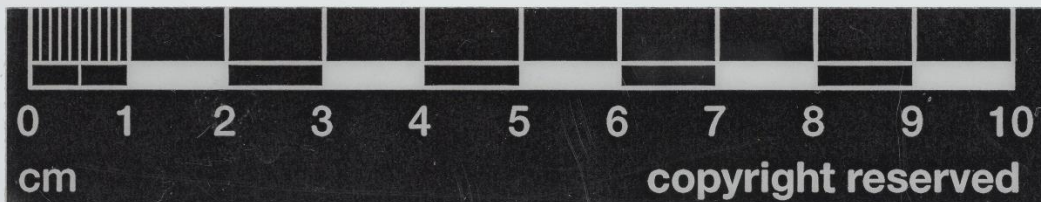
## 4. Fed to / ingested by iDigBio



The Field  
Museum  
copyright reserved

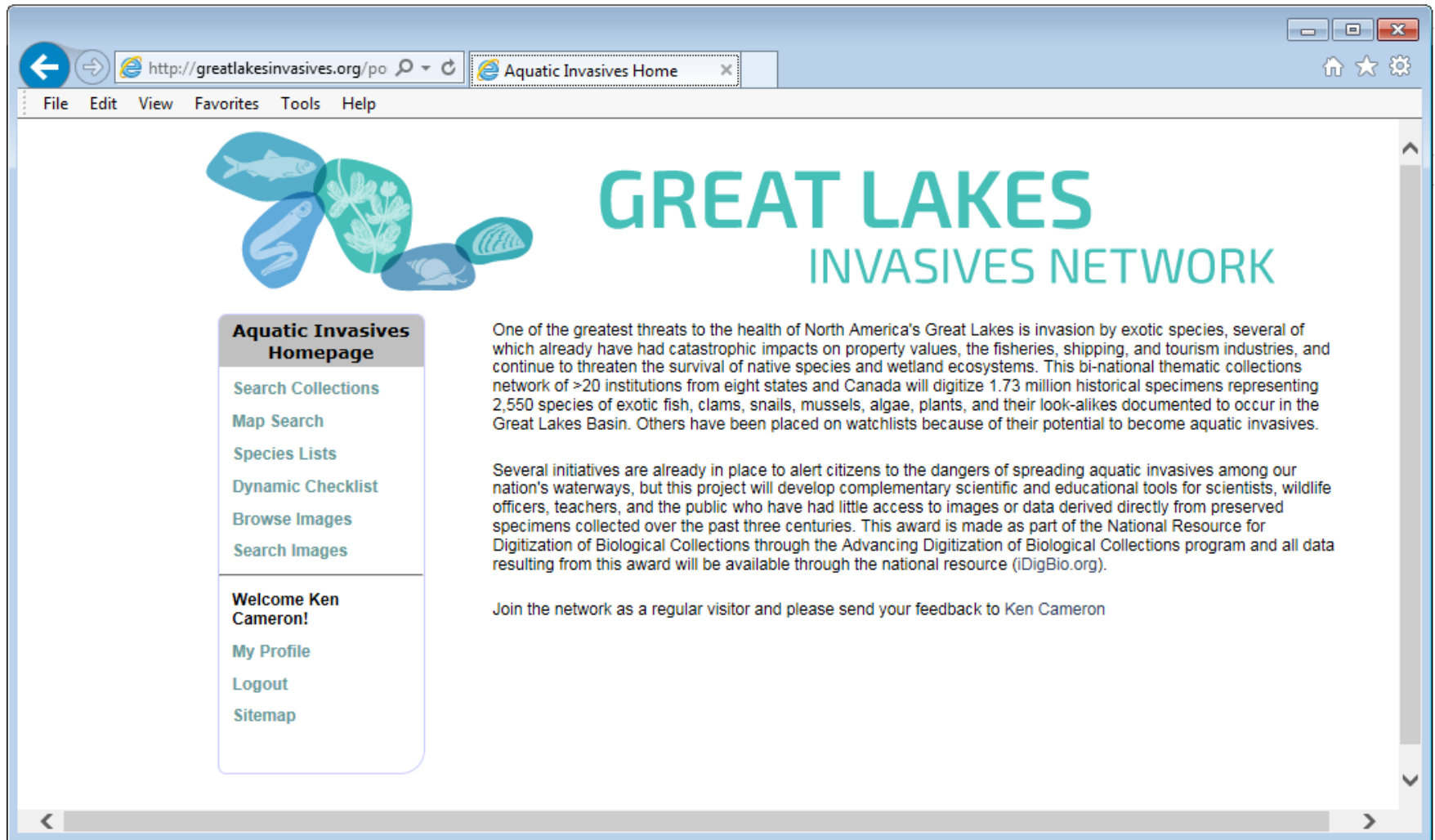


The Field  
Museum



The Field  
Museum

# GreatLakesInvasives.org



The screenshot shows a web browser window with the address bar displaying <http://greatlakesinvasives.org/po>. The browser's address bar also shows a tab titled "Aquatic Invasives Home". The website's main header features a logo on the left consisting of stylized blue and green shapes representing a fish, a frog, a plant, and a mussel. To the right of the logo, the text "GREAT LAKES" is displayed in a large, bold, teal font, with "INVASIVES NETWORK" in a smaller, teal font below it.

On the left side of the page, there is a vertical navigation menu with a grey header that reads "Aquatic Invasives Homepage". Below this header, the menu items are: "Search Collections", "Map Search", "Species Lists", "Dynamic Checklist", "Browse Images", and "Search Images". A horizontal line separates these items from a personalized welcome message: "Welcome Ken Cameron!". Below the welcome message are the links "My Profile", "Logout", and "Sitemap".

The main content area on the right contains two paragraphs of text. The first paragraph states: "One of the greatest threats to the health of North America's Great Lakes is invasion by exotic species, several of which already have had catastrophic impacts on property values, the fisheries, shipping, and tourism industries, and continue to threaten the survival of native species and wetland ecosystems. This bi-national thematic collections network of >20 institutions from eight states and Canada will digitize 1.73 million historical specimens representing 2,550 species of exotic fish, clams, snails, mussels, algae, plants, and their look-alikes documented to occur in the Great Lakes Basin. Others have been placed on watchlists because of their potential to become aquatic invasives."

The second paragraph reads: "Several initiatives are already in place to alert citizens to the dangers of spreading aquatic invasives among our nation's waterways, but this project will develop complementary scientific and educational tools for scientists, wildlife officers, teachers, and the public who have had little access to images or data derived directly from preserved specimens collected over the past three centuries. This award is made as part of the National Resource for Digitization of Biological Collections through the Advancing Digitization of Biological Collections program and all data resulting from this award will be available through the national resource (iDigBio.org)."

At the bottom of the main content area, there is a short message: "Join the network as a regular visitor and please send your feedback to Ken Cameron".



# GREAT LAKES INVASIVES NETWORK

