

Great Lakes Aquatic Invasives TCN: *Where are we one year later?*

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

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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 list 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:

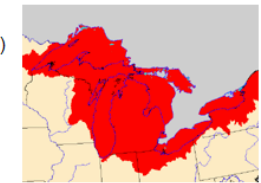
Common Name:

Status:

Pathway:

Sort by:

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>Percottus</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>Carassius</i> (1)	Cyprinidae	<i>Corbicula</i> (1)	Corbiculidae
<i>Lycopus</i> (10)	Lamiaceae*	<i>Chauna</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		
<i>Polygonum</i> (80)	Polygonaceae*	<i>Misgurnus</i> (1)	Gobiidae		

* = Plant family originally targeted by "Tri-trophic" TCN

Target Genera (black) +
Watchlist Genera (blue)
(# spp. in North America)

= 2,550 Species
in 101 Genera



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].

07N 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 the two ponds, and another small cluster of *Pistia* was 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.
This specimen was brought in by G. Coombs. It is located near City of Middleton. 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. 0, 0.5 mi. N of Century Ave. in Co. Hwy. 0.

Co. No. 142[4]
22/Sep/2008
Det. T. S. Cochran, Theodore S. 23/Sep/2008

UNIVERSITY OF WISCONSIN - HERBARIUM (WIS)



Details

Comments

Linked Resources



UMMZ : M

University of Michigan Museum of Zoology - Mollusks

Share 0

Tweet 0

Catalog #: UMMZ-MOL-0048617

Taxon: *Lasmigona compressa* (I. Lea, 1829)

Family: Unionidae

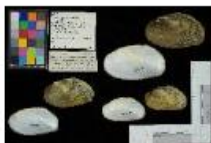
Collector:

Locality: United States, Michigan, Jackson, South Branch Kalamazoo River, 4.0 mi. W of Pulaski

Specimen Images



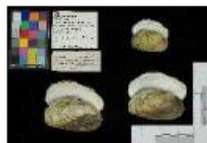
Large Version



Large Version



Large Version



Large Version

Record Id: 7680f405-be34-41e0-8877-c49ef0ab98d6

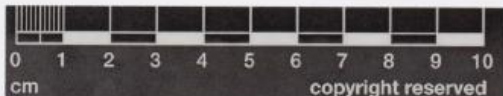
Usage Rights: CC BY-NC-SA (Attribution-NonCommercial-ShareAlike)

For additional information on this specimen, please contact Muse (ptuck@umich.edu)





FMNH 29119 *Cichlasoma maculicauda*



The Field
Museum



FMNH 63435 *Petromyzon marinus*

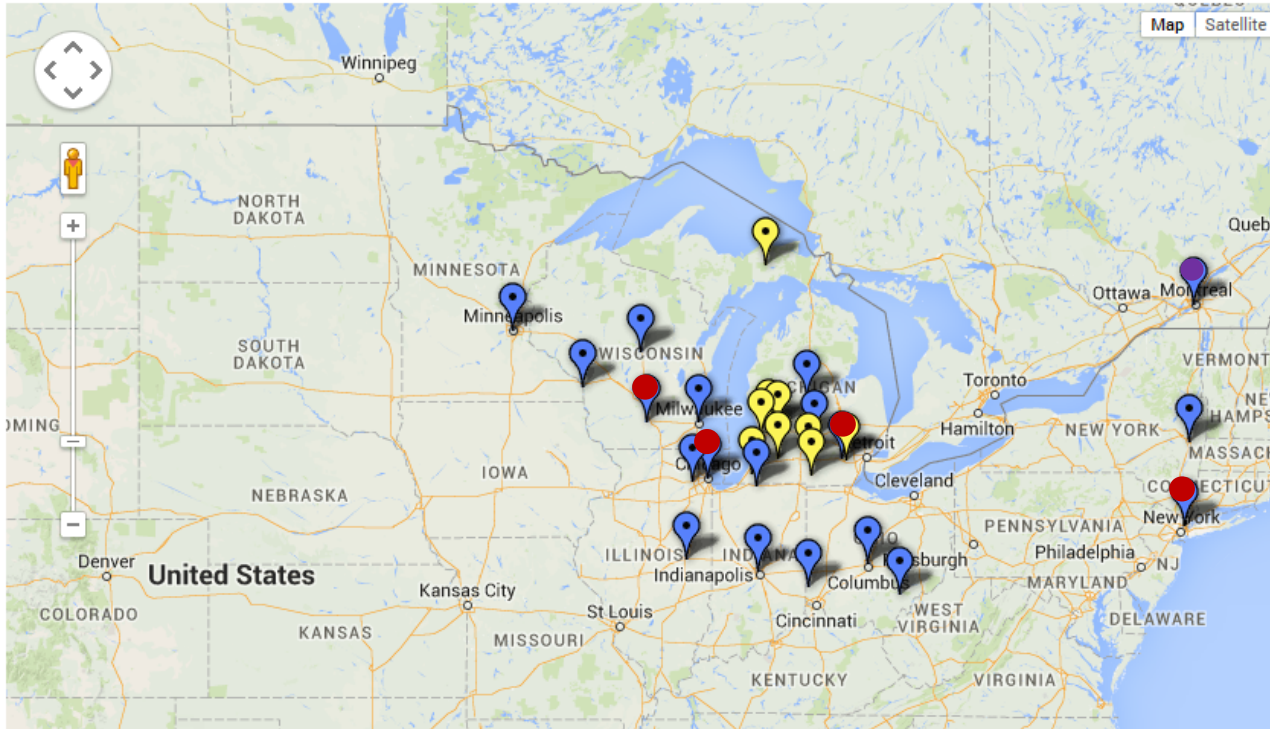
A



The Field
Museum



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 /Canadensys

(22. Arizona State Univ / Symbiota)

NETWORK OVERSIGHT & PROCESS

Training at UW-LaCrosse, Sept 2015



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



GREAT LAKES INVASIVES NETWORK

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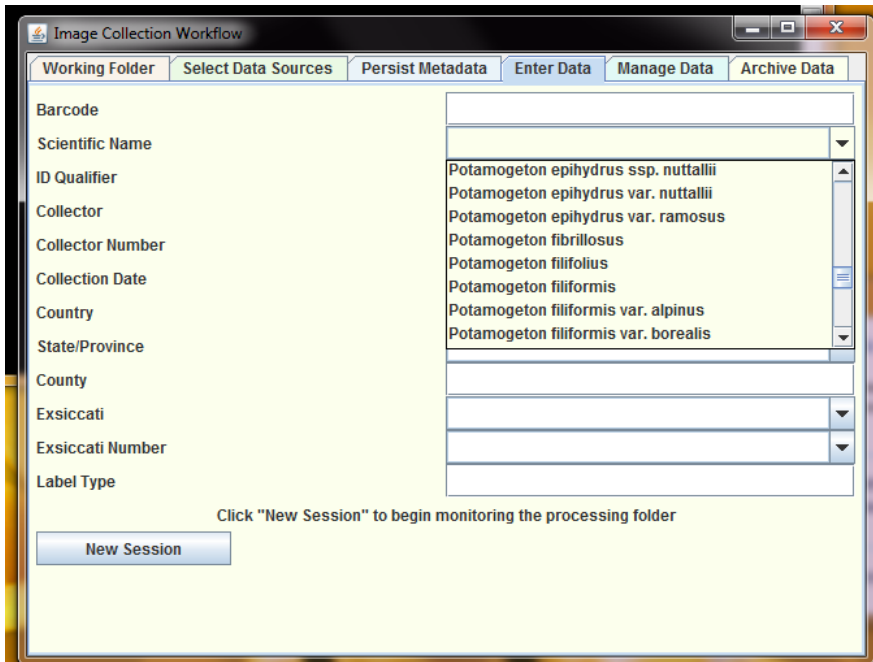
One of the greatest threats to the health of North America's Great Lakes is invasion by exotic species, several of which already have had catastrophic impacts on property values, the fisheries, shipping, and tourism industries, and continue to threaten the survival of native species and wetland ecosystems. 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.

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).

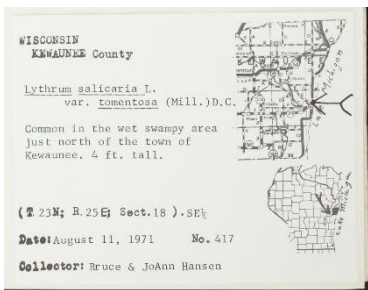
Join the network as a regular visitor and please send your feedback to Ken Cameron

DATA MANAGEMENT

1. Skeletal record & image are created *in situ*



2. Label data is extracted via OCR *ex situ*



UNIVERSITY OF WISCONSIN-MADISON
(WIS)
v 0047793 WIS
. MAPPED 072 FLORA OF WISCONSIN
WISCONSIN KJIWAUNME County
(T. 23N; B. 25 E; Sect. 18).SE $\frac{1}{4}$
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)
Home >> Collection Management >> Editor

New Occurrence Record

Collector Info

Catalog Number ? Other Numbers ? Collector ? Number ? Date ? Dupes? Auto search

Associated Collectors ? Verbatim Date ?

Latest Identification

Scientific Name ? Author ?

ID Qualifier ? Family ?

Identified By ? Date Identified ?

Locality

Country State/Province County Municipality

Locality

Locality Security

Latitude Longitude Uncertainty ? Datum ? Verbatim Coordinates

Elevation in Meters Verbatim Elevation

Misc

Habitat

Substrate

Associated Taxa

Description

Notes

Life Stage ? Sex ? Individual Count ? Sampling Protocol ? Preparations ?

Phenology ? Establishment Means ? Cultivated

Curation

Type Status ? Disposition ? Occurrence ID ? Field Number ?

Owner Code ? Basis of Record ? Language Label Project Dupe Count

Processing Status
Pending Review

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



4. Fed to / ingested by iDigBio

Consortium of Midwest Herbaria



[Home](#) [Search Collections](#) [Map Search](#) [Browse Images](#) [Inventories](#) [Interactive Tools](#)

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Welcome to the Consortium of Midwest Herbaria

While focused around the Great Lakes drainage basin, the region includes the six states that border the western Great Lakes: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. 132 herbaria are listed in Index Herbariorum (Thiers, B. [continuously updated]) from this region; we hope to eventually make data available from a majority of those collections.

The Great Lakes basin includes 84% of North American surface fresh water and includes a mixture of habitat types amidst a landscape that has been highly modified by agricultural and industrial uses and is home to 16% of the US population (US Census Bureau, 2014 estimates). Areas to the south and west of the lakes include lands which form portions of the Mississippi and Ohio River basins; much of this land escaped major glaciation. Plants and communities in the region are diverse, ranging from boreal forest to southern hardwoods, prairies, bogs and fens.

This site is brought to you in collaboration with the Southwestern Environmental Information Network (SEINet).

Plant of the Day



Photo Courtesy of the Forest Preserve District of DuPage County

What is this plant?

[Click here to test your knowledge](#)

OPEN ACCESS



Wisconsin State Herbarium at UW-Madison (WIS)

The Wisconsin State Herbarium (WIS), formerly known as the University of Wisconsin-Madison Herbarium, was founded in 1849 as a scientific collection of pressed, dried, labeled, and classified plants and fungi. It also preserves notes, illustrations, and about plants, and it maintains its own valuable Herbarium Library. The collection of more than 1.2 million specimens national, and international importance. Approximately one-fourth of its vascular plant specimens are from Wisconsin and have been databased and are searchable online. In addition, most of the world's floras are well represented, and the holdings from certain areas such as the Upper Midwest, eastern North America, western Mexico, and the Arctic (primarily lichens) are widely recognized as resources of global significance. The herbarium occupies two floors of the east wing of historic Birge Hall at the top of Bascom Hill on the UW-Madison campus. In addition to its specimen holdings, visitors to WIS have access to high-quality microscopes, an extensive library of books, reprints and maps, computer workstations, and internet connections for personal computers. WIS serves as the state of Wisconsin's official repository of plant specimen vouchers, and is active in promoting plant specimen research and education.

Wisconsin's official repository of plant specimen vouchers, and is active in promoting plant specimen research and education. The faculty, staff, and students associated with and international efforts to document, showcase, and protect plant diversity.

Contact: Kenneth M. Cameron (kmcameron@wisc.edu)

Home Page: <http://herbarium.wisc.edu>

Collection Type: Preserved Specimens

Management: Data snapshot of local collection database

Last Update: 31 October 2014

Usage Rights: CC BY-NC (Attribution-Non-Commercial)

Address:

Wisconsin State Herbarium
Department of Botany, Birge Hall
430 Lincoln Dr.
Madison, WI 53706
USA
608-262-2792
<http://herbarium.wisc.edu>

Collection Statistics:

- 295790 specimen records
- 13478 (5%) georeferenced
- 179557 (61%) with images
- 262939 (89%) identified to species
- 226 families
- 1241 genera
- 4992 species
- 5372 total taxa (including subsp. and var.)
- 17 type specimens

Recordset

Search Recordset

University of Wisconsin - Madison

Specimen Records: 34,714 Media Records: 36,341

Last Update: 2015-09-28



The University of Wisconsin-Madison Herbarium, founded in 1849, is a museum collection of dried, labeled plants of state, national and international importance, which is used extensively for taxonomic and ecological research, as well as for teaching and public service. It contains the world's largest collection of Wisconsin plants, about one-third of its 1,000,000 specimens having been collected within the state. Most of the world's floras are well represented, and the holdings from certain areas, such as the Upper Midwest, eastern North America and western Mexico, are widely recognized as resources of global significance.

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Contact: Kenneth M. Cameron (kmcameron@wisc.edu)

Home Page: <http://www.botany.wisc.edu/herbarium/>

Collection Type: Preserved Specimens

Management: Data snapshot of local collection database

Last Update: 11 September 2015

Usage Rights: CC0 1.0 (Public domain)

Collection Statistics:

- 79535 specimen records
- 5611 (7%) georeferenced
- 74838 (94%) with images
- 67742 (85%) identified to species
- 33 families
- 46 genera
- 1297 species
- 1573 total taxa (including subsp. and var.)
- 8 type specimens



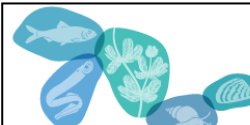
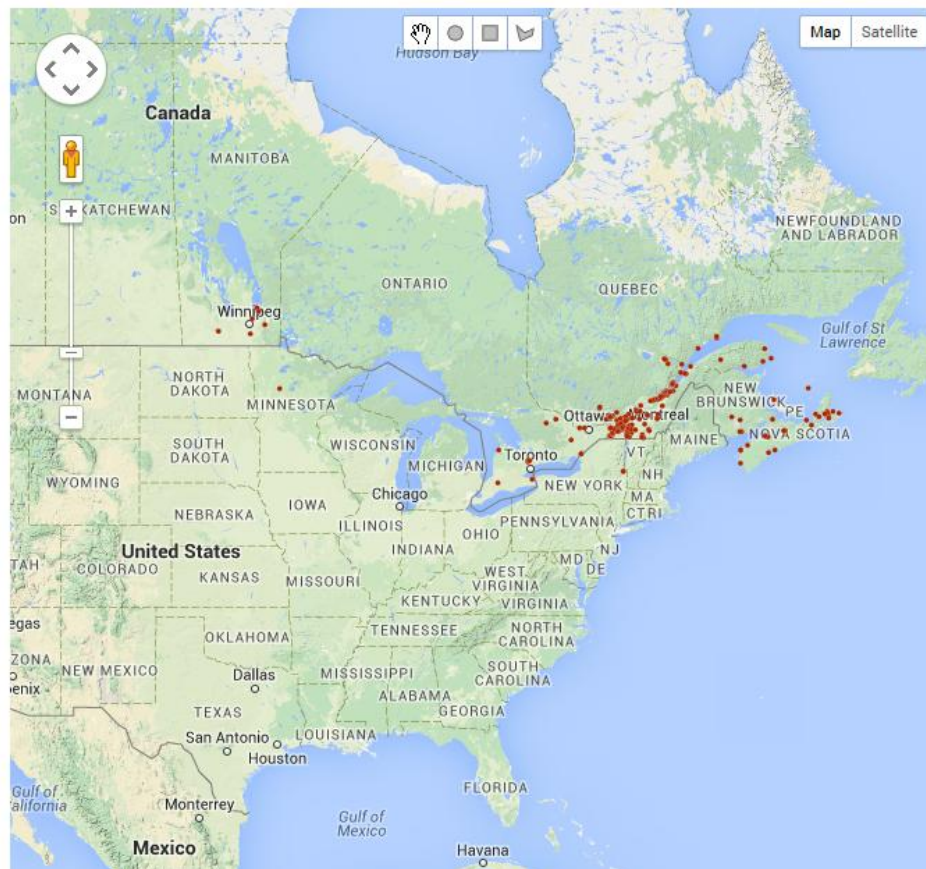
726 Results

(showing only georeferenced records: 354)

Map view

Table view

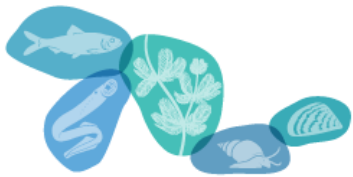
Stats view



GREAT LAKES INVASIVES NETWORK

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-  **Albion College (ALBC)** [more info](#)
-  **Central Michigan University (CMC)** [more info](#)
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-  **Herbarium, Biodiversity Centre of Ontario (OAS)** [more info](#)
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-  **Marie-Victorin Herbarium (MT)** [more info](#)



GREAT LAKES INVASIVES NETWORK

Home >> Collections >> Search Criteria >> Specimen Records

Species List

Occurrence Records

Maps

Dataset: All Specimen Collections
Taxa: *Myriophyllum heterophyllum*



1 2

Page 1, records 1-100 of 146

Central Michigan University



Myriophyllum heterophyllum Michx.

CMC00008418 C. E. Whately 170

16 July 2000

United States, Michigan, Charlevoix, Hog Island, Beaver Island, St James township

[Full Record Details](#)

Field Museum of Natural History



Myriophyllum heterophyllum Michx.

F 6744553 E. E. Sherff
U.S.A., Illinois, Cook, Chicago, 41.85000 -87.65000

10 June 1911

[Full Record Details](#)



Myriophyllum heterophyllum Michx.

F 467511 G. R. Vasey
U.S.A., Illinois, McHenry, Ringwood, 42.38330 -88.28330

[Full Record Details](#)



Myriophyllum heterophyllum Michx.

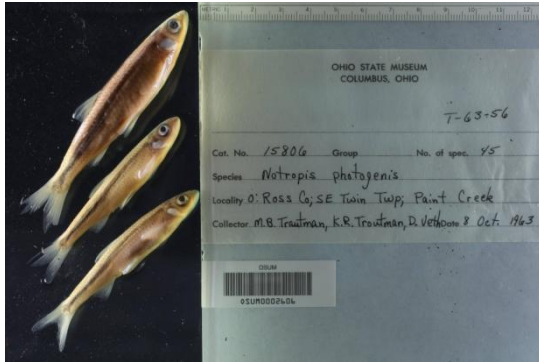
F 1328585 J. A. Steyermark 40913
U.S.A., Illinois, Cook, 41.83330 -87.85000

16 August 1941

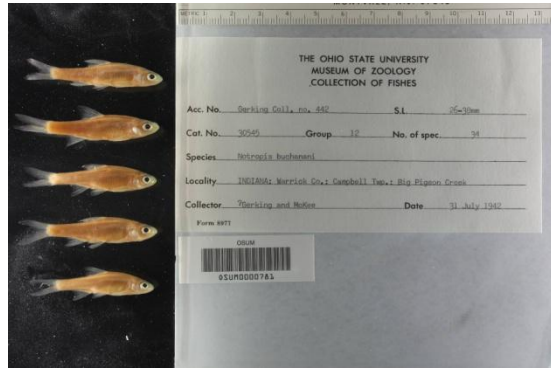
[Full Record Details](#)



RESEARCH USE



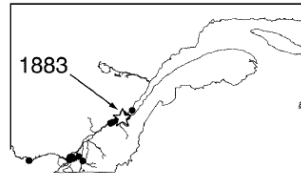
Notropis photogenis (silver shiner)



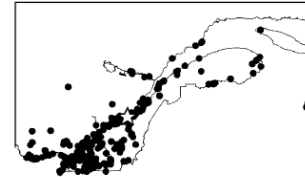
Notropis buchanani (ghost shiner)

Using Specimens to
Recognize the
Good from the Bad

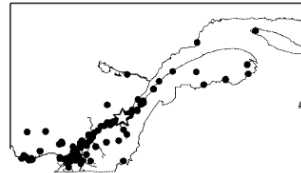
Before 1925



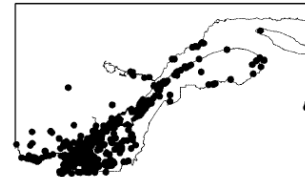
Before 1975



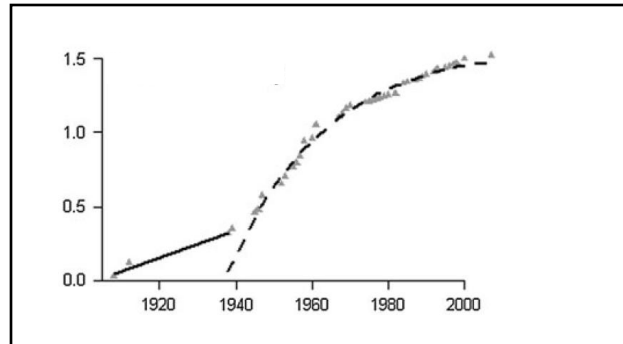
Before 1950



Before 2001



Points of Origin and
Patterns of Invasion
SPATIAL



Invasion Lag Time
TEMPORAL



Occurrence Data
Based on Vouchers!

I am biologist and specialist of invasive plants. As you probably know, I am also a very frequent user of herbarium specimens for my research program... I am presently initiating a research project having for main objective the prediction of the abundance of exotic species from the extent of the native range... I would like to extend and test this approach to a continental scale.

Since research in herbaria is labour intensive, we would like to first collect data from the jurisdictions for which herbarium web databases already exist...I presumed you are in charge of this database. Would it be possible to extract the information we need?

I would like to respectfully report an issue with your herbarium database. I was looking for the oldest specimen of Potamogeton crispus collected from Arkansas and thought I found it, but upon viewing the image, I noticed it is the wrong species. It is Potamogeton dimorphus not P. crispus.



Wisconsin State Herbarium at UW-Madison

WIS

Catalog #: v0311555WIS
Occurrence ID (GUID): 3db324d4-0b7f-456d-b1e6-b19885c9096f
Taxon: *Potamogeton crispus* L.
Family: Potamogetonaceae
Collector: Delzie Demaree 11385
Date: 11 June 1935
Verbatim Date: June 11, 1935
Locality: United States, Arkansas, Crittenden,

Specimen Images



Large Version

Collection	Total Occurrences	Occurrences w/ locality	Occurrences w/ images
CMC	3412	3398	3404
F	5782	3381	0
ILL	5536	0	5497
ILLS	38253	36733	11109
JBM	1286	191	0
JFBM-Fish	2110	2099	2062
MICH	74640	61229	66777
MIN	28953	17	28906
MOR	10219	10060	7351
MSC	7386	0	7384
MT	35383	35358	394
MU *	17547	5	17512
NY	22282	20926	11208
OAS	10230	2	10230
OS	394	0	394
OS-Fish	3522	0	3472
QFA	13321	13289	0
QUE	504	504	0
TRT	18906	18735	0
TRTE	10920	10850	0
UBC	26521	26480	3654
UMMZ-Fish	128	128	48
UMMZ-Mollusk	855	855	414
UWL	604	0	603
UWM *	7255	1715	7225
UWZM-Fish	187	187	0
UWZM-Mollusk	444	444	0
WIN	5745	5745	0
WIS *	86078	65599	86078
TOTALS	438,406	317,930	271,347

PROGRESS TO DATE
18 MONTHS

In the GLI portal:
431,160 plant records
5,947 fish records
1,299 mollusk records

*** Digitization complete**



GREAT LAKES INVASIVES NETWORK

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

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

