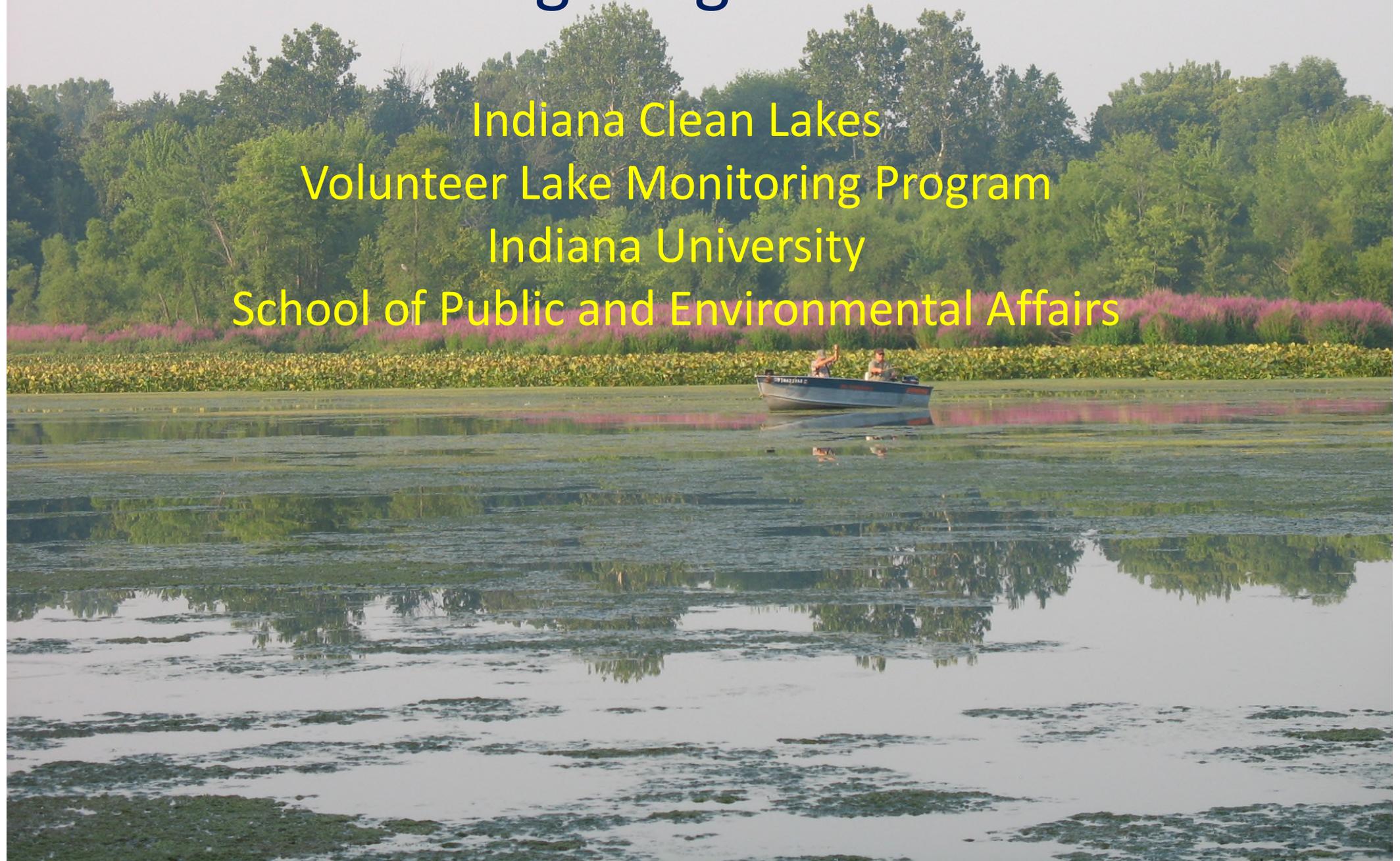


Lessons Learned From Macrophyte Monitoring Program in Indiana

Indiana Clean Lakes
Volunteer Lake Monitoring Program
Indiana University
School of Public and Environmental Affairs



Overview

- Who we are and monitoring objectives
- Need for invasive species monitoring
- Program overview
- Challenges
- Future goals

Indiana Clean Lakes Program

- ◎ Sponsored by Indiana Department of Environmental Management (IDEM)
- ◎ Administered through I.U. School of Public and Environmental Affairs (SPEA)
- ◎ Created in 1989



**Lake water
quality
assessment**

**Public
info &
outreach**



**Fed. &
State
Program
Coordin.**

**Technical
assistance**

**Volunteer
Lake
Monitoring**

Volunteer Lake Monitoring Program Objectives

- Collect water quality data that will contribute to the understanding of how Indiana lakes function
- Encourage citizen involvement
- Provide educational material to citizens

Citizen Scientist Activities

- Measure water clarity
- Qualitatively report lake water quality:
 - Recreation Potential
 - Physical Appearance
 - Water Color



Citizen Scientist Activities

- ◎ A subset of volunteers collect water samples for Total Phosphorus and Chlorophyll-a
- ◎ Dissolved oxygen and temperature monitoring
- ◎ Lake level monitoring
- ◎ Aquatic invasive species monitoring
 - ◎ Aquatic invasive plant monitoring
 - ◎ Zebra Mussel Early Detection



Why Develop the Program

1. First Line of Defense

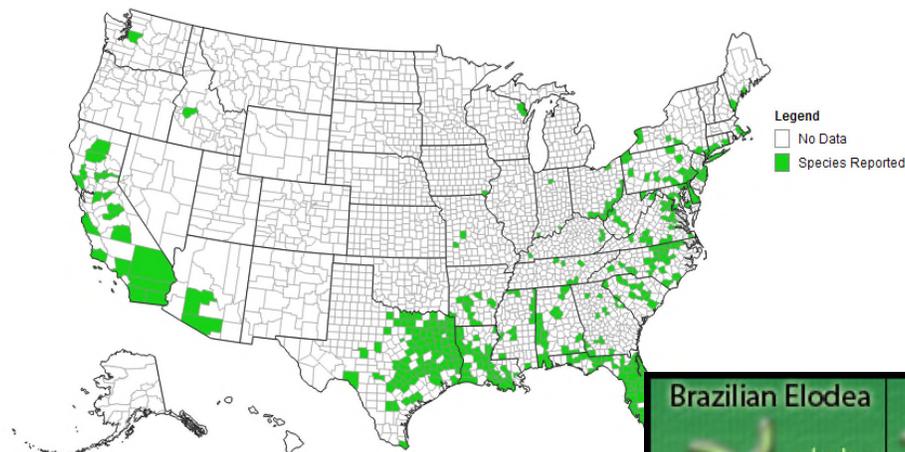
Hydrilla

- Lake Manitou

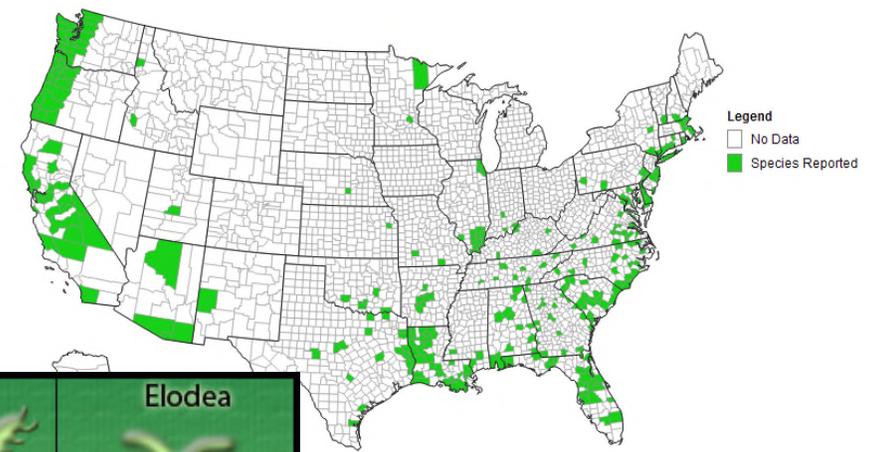
Brazilian elodea

- Griffy Lake

hydrilla (*Hydrilla verticillata*)

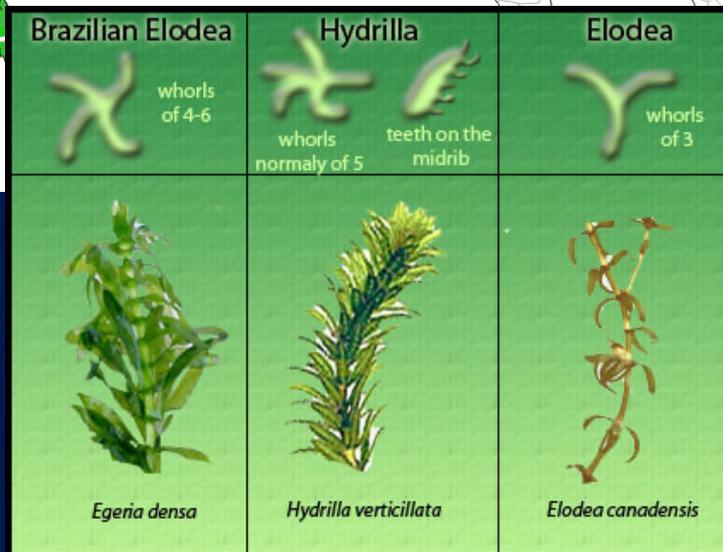


Brazilian waterweed (*Egeria densa*)

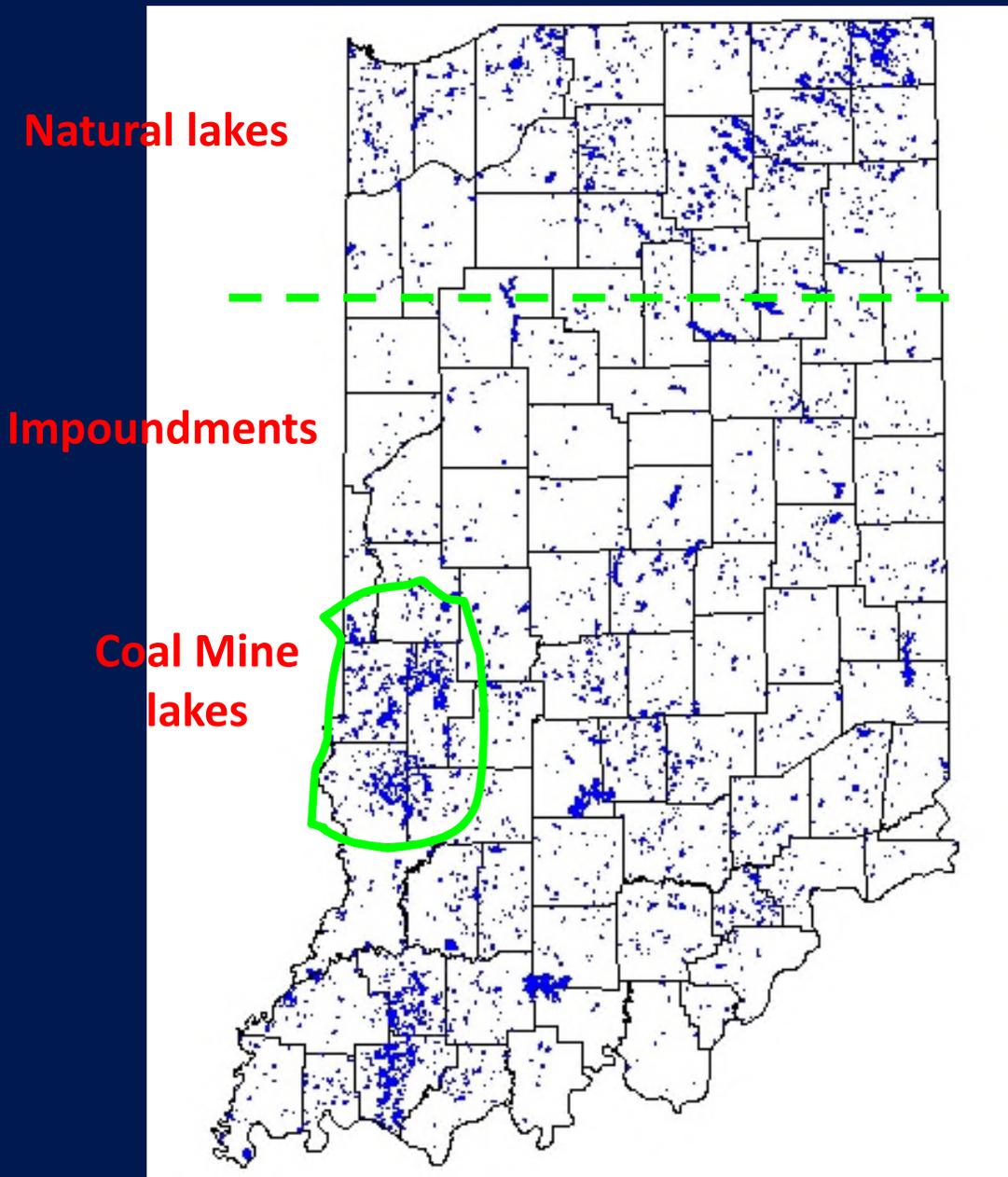


Map generated on Apr 28, 2016

EDDMapS
Early Detection & Distribution Mapping System



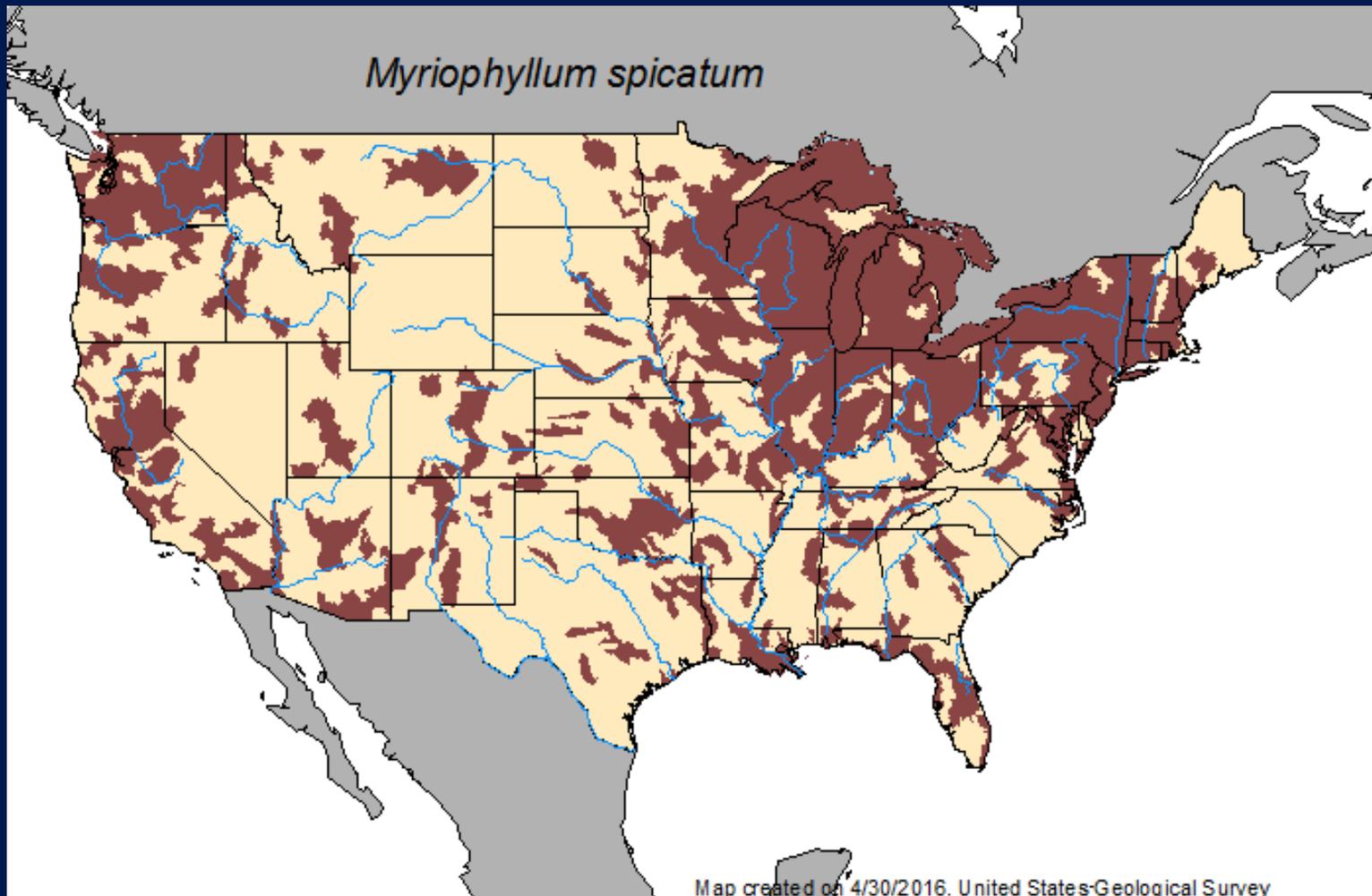
Lake Distribution



- ◎ 21,000 miles of fishable rivers and streams,
- ◎ 452 natural lakes
- ◎ 580 impoundments

Why Develop the Program

2. Track spread of invasive species



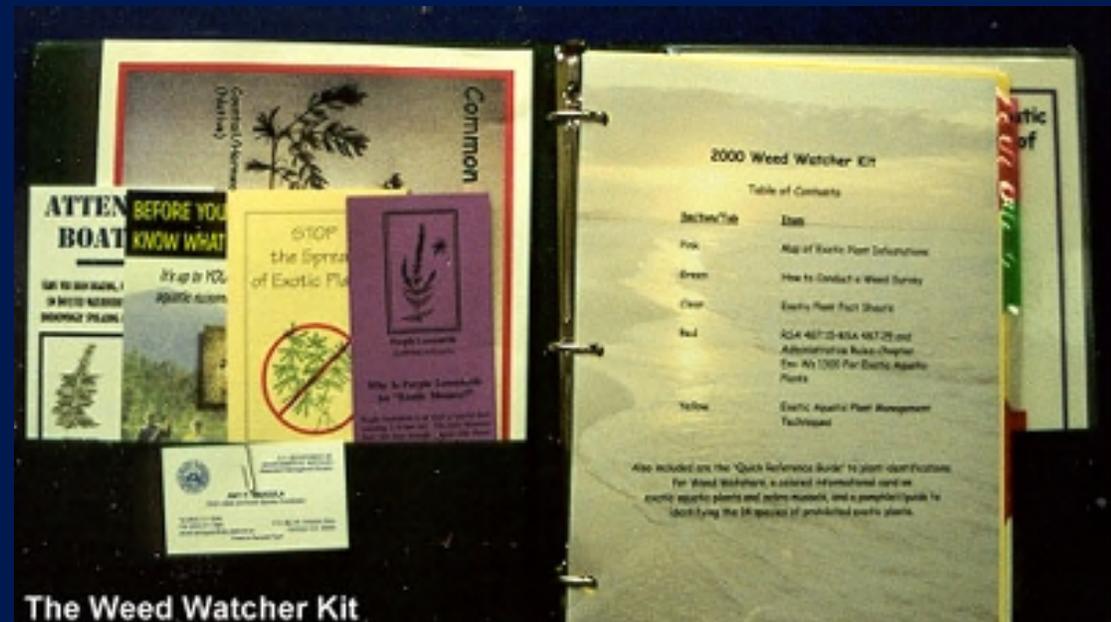
Why Develop the Program

3. Education and engagement opportunities for citizen scientist



Program Design

- Structured from existing programs
 - Monitoring toolkit
- Training workshops
 - Plant identification
 - Plant mapping
 - Data reporting



Submerged

Divided Leaves

Simple Leaves

Leaves Feather Like

Leaves not feather like

Bladders Present

No Bladders Present

Alternate

Opposite

Clusters/tufts



Bladderwort

Whorled leaves around stem

leaves opposite or whorled, thin and wispy, leaves clasp stem and bunched at bottom

Leaves long, from a base cluster, grass like, distinctive pattern

Wild Celery

>14 leaflets per leaf, collapse when removed from water

<14 leaflets per leaf, plant hold its shape when removed from water

Uneven branches, angular at joints, cream colored bulb at base of branch clusters

Leaves paired and opposite

Mid-vein/s (not rigid)

Naiad (common and southern)/Water Nymph

Leaf Margins Smooth

Leaf margins toothed



Eurasian Water Milfoil

Native Milfoils

Starry Stone-Wort

Fanwort



Coontail or Aquatic Algae (Chara or Nitella)



leaves thin, leaf margins wavy

Curly-leaf Pondweed



leaves elliptical to thread-like, sometimes have floating leaves

Native pondweeds



evenly distributed on stem

leaves in whorls of three

American Waterweed (Elodea)

leaves in whorls of 4-6

Brazilian Elodea



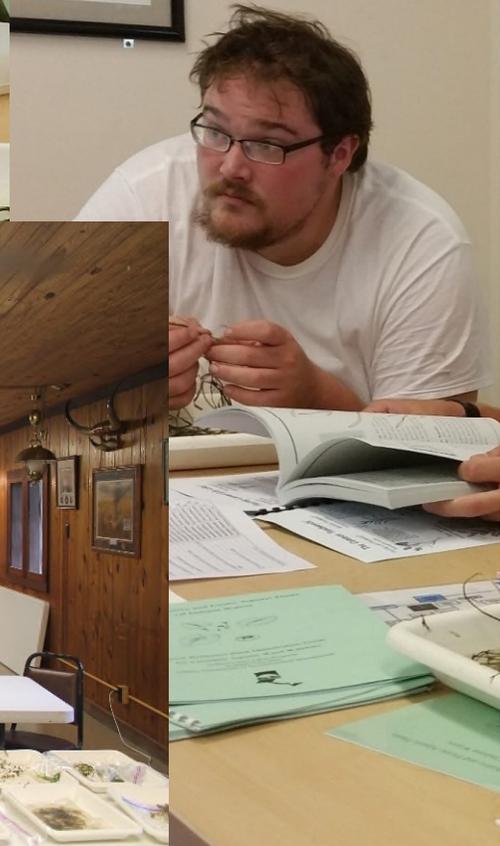
leaves in whorls of five

Hydrilla



Workshop Format





Post Sampling

- ◎ Send voucher specimens (if taken)
- ◎ Mail/scan map & plant list
- ◎ Submit time to CLP website data entry form!
 - ◎ <http://www.indiana.edu/~clp/VMenterdataAqInv.php>



Indiana Clean Lakes Program



- Home
- Events
- Lake News
- Indiana Lake Information
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 - Technical Reports
 - Water Column Newsletter
- Related Links
- Feedback
- Search

How to Enter Aquatic Invasive Species Observations

Data Entry Instructions

Please use the following directions to submit lake invasive species observations. There is additional help provided on the actual data entry form.

1. Click on the link at the bottom of the section to access the data entry form.
2. To start, select the name of the lake you wish to submit data for, and the county it is located in using the drop-down menus.
3. Click "Choose lake".
4. Now enter the information requested in the blanks. Required information is marked with a *.
5. If you do not have a measurement for every box, please leave the extra spaces **blank**.
6. Once you have entered all of the requested information click "Review Data".
7. The information you entered will be presented for you to review.
8. **IMPORTANT!** Check your data entries very carefully. If you find a mistake, click "Edit Your Data" to make changes.
9. If the information is correct, click "Submit Your Data".
10. You will receive an email confirming your data submission.
11. If you are ready to enter data, click [here](#) and the data entry form will come up for your use.

This data entry form transmits your data to the Clean Lakes Program in Bloomington and automatically enters it into our volunteer monitoring database. This saves us from having to re-enter your data from the data cards and helps insure accuracy.

[Aquatic Invasive Species Data Entry Form](#)

Do you have Secchi depth data to submit? Please use the [Secchi data form](#) to submit it electronically!

Indiana Clean Lakes Program
IU School of Public & Environmental Affairs
1345 East Tenth Street
Bloomington, IN 47405

For questions relating to the Clean Lakes Program contact Melissa Clark: mlaney@indiana.edu
Page Last Modified: June 23rd, 2013
[CLP Admin](#)

Volunteer Data Submission Form - Aquatic Invasive Species Observations

Please enter the information for the selected lake

Required fields are marked with a *.

Lake Name: Wrong lake or county? Click [here](#) to change it.

County Name:

Volunteer First Name: *

Volunteer Last Name: *

Email Address: *

Volunteer ID Number: * - -

Sample Date: * ,

Sample Time: * : AM PM

Time Spent Monitoring: * (number of minutes)

Did you see an invasive? * Yes No

If yes, tell us about it:

Is it new to the lake? Yes No

Additional Comments:

Challenges

- Community commitment
- State partnerships
- Information Reporting

What can we do better?

Mission Changes

1. Switching from lake mapping focus to area/site specific focus
2. Identification of each plant species

Community record rather than of plant maps.

Future Goals

- Partnership Building Within the State



- Crowd Sourcing

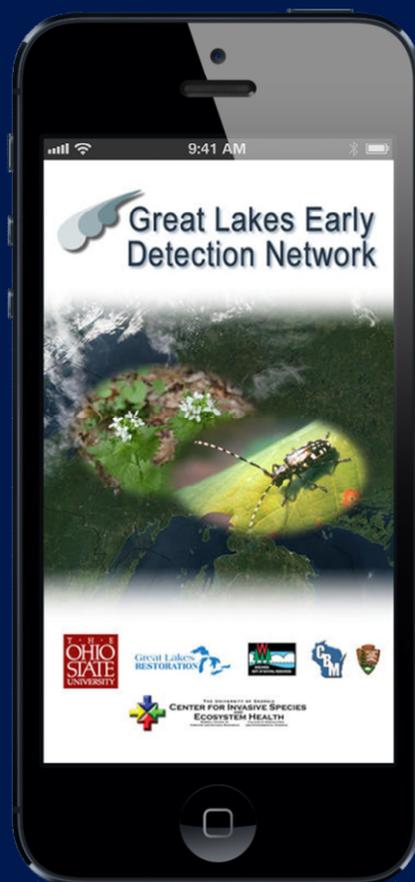




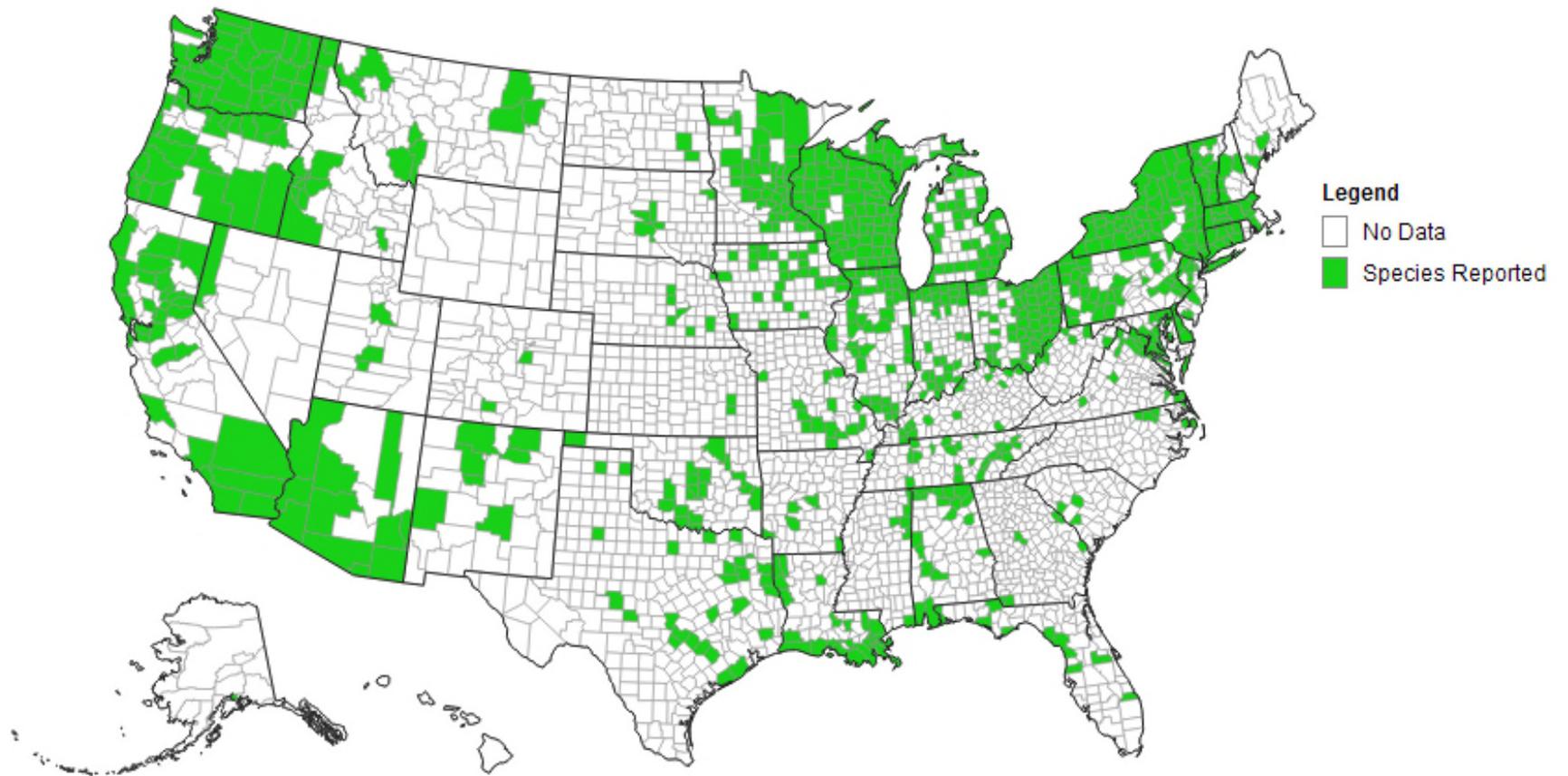
BRING THE POWER OF EDDMAPS TO YOUR SMARTPHONE

Introducing BugwoodApps - comprehensive mobile applications that engage users with invasive species, forest health, natural resource and agricultural management

iPhone | iPad | Android



Eurasian water-milfoil (*Myriophyllum spicatum*)



Map generated on Apr 28, 2016

EDD MapS
Early Detection & Distribution Mapping System

Supporters



U.S. Army Corps
of Engineers®



Questions?

Melissa Clark

Bill Jones

Volunteer Lake
Monitoring
Communities for all
the existing
resources



THE UNIVERSITY OF GEORGIA
**CENTER FOR INVASIVE SPECIES
AND
ECOSYSTEM HEALTH**
WARNELL SCHOOL OF FORESTRY AND NATURAL RESOURCES COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

IDEM



**SCHOOL OF PUBLIC AND
ENVIRONMENTAL AFFAIRS**

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