Using iMapInvasives To Track Invasive Species

Hosted by Amy Jewitt
Pennsylvania iMapInvasives Coordinator

Basic Training Webinar – October 24, 2017

What is iMapInvasives?

iMapInvasives is an online, GIS-based data management system used for:

- Documenting invasive species findings

- Learning about locations of invasive species in Pennsylvania and in surrounding states

- Documenting control and eradication efforts

- Prioritizing future survey and treatment efforts

- Sharing distribution data and management efforts with others
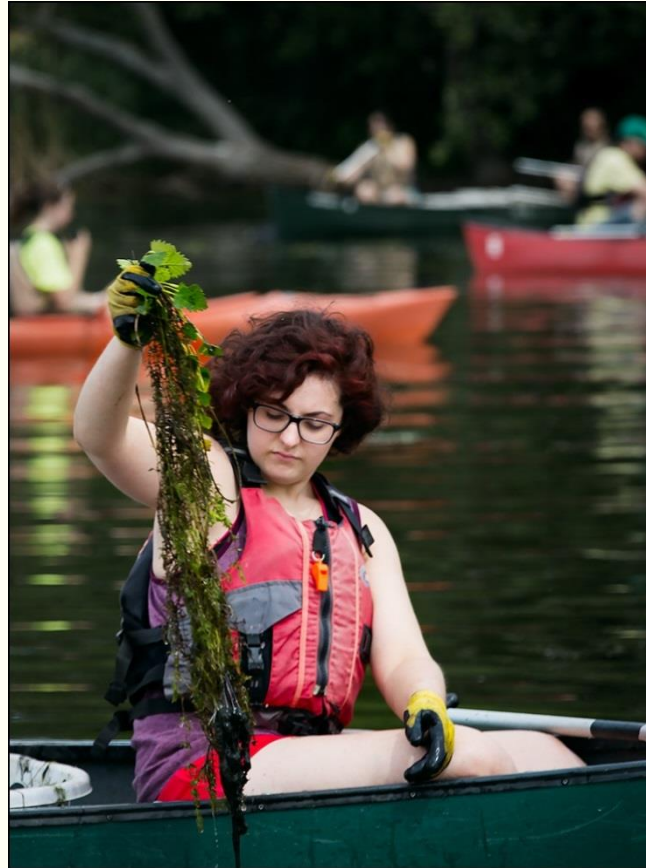
These photos show volunteers participating in a water chestnut pull. This type of event can be documented in iMapInvasives as a way to pinpoint species locations and record management efforts.

Who is iMapInvasives For?

iMapInvasives was designed for use by different types of people including:

- Citizen scientists
    - School students
    - Retirees
    - Master watershed stewards/naturalists/gardeners
    - Volunteers

- Natural resource professionals
    - State agencies
    - Non-profit organizations
    - Environmental consultants
   - Academia

- And many others!

Citizen scientist

Natural resource professional

iMapInvasives Encompasses a Broad Network

- There are currently nine U.S. states and one Canadian province participating in the network.

- Pennsylvania has been a member of the iMapInvasives network since 2013.

- Other members include:
  - Arizona
  - Florida
  - Maine
  - New York
  - Oregon
  - Saskatchewan
  - Vermont
  - West Virginia
  - Virginia
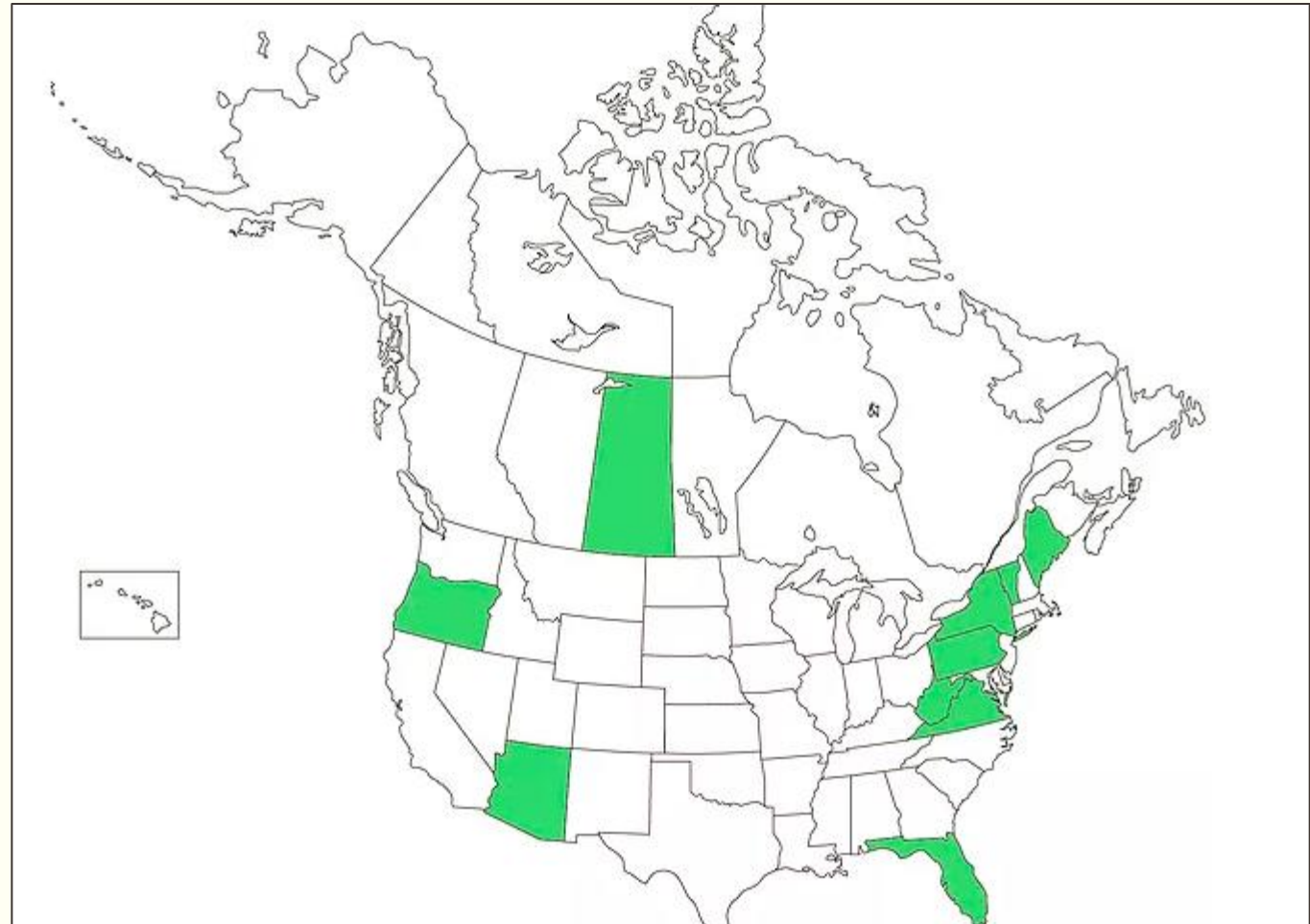
Logistics to Remember when Using iMapInvasives

Internet browsers recommended for use when accessing iMapInvasives:

✅ Google Chrome

✅ Mozilla Firefox

✅ Safari (*for Mac computers*)

Internet browser NOT to use:

❌ Internet Explorer

• Does not work well with iMapInvasives!

• If you must use Internet Explorer to access iMapInvasives, ensure that you have the most updated version installed (I.E. 11)

Pennsylvania iMapInvasives Administrators
Staff of the Pennsylvania Natural Heritage Program (PNHP)

Amy Jewitt
Pennsylvania iMapInvasives Coordinator

Kierstin Carlson
Conservation Information
Manager/Associate Manager for PNHP

Mary Walsh
Aquatic Ecologist for PNHP

GETTING DOWN TO THE BASICS

iMapInvasives 101

Logging into iMapInvasives

There are two ways to log into the Pennsylvania iMapInvasives database:

- www.paimapinvasives.org
  - > Login button

- www.imapinvasives.org
  - > Login Now button
  - > Pennsylvania button
  - > Login to PA iMapInvasives
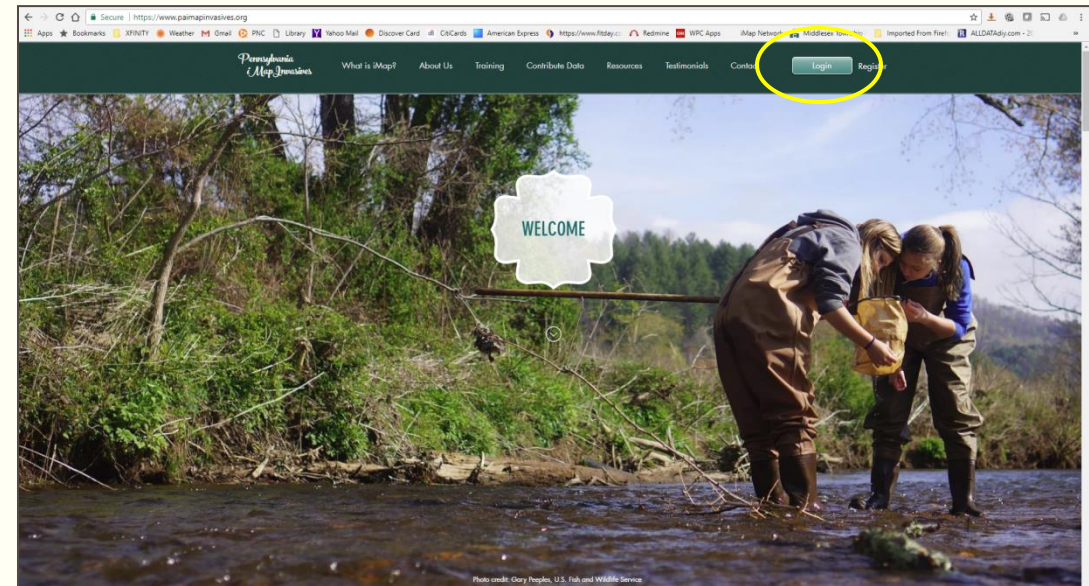
www.paimapinvasives.org
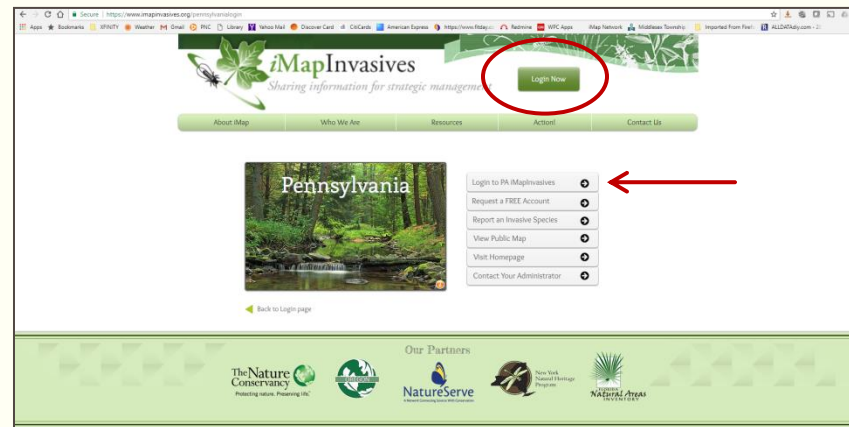
www.imapinvasives.org

Database Snapshot

Enter Data
- Enter your invasive species findings

View the Map
- Visualize findings and management efforts on the map

View Table
- View list of data and access individual observation records

Query and Reports
- Filter for the data you are interested in viewing

User Level Info
- Find out what user level you have to know what functionality you have access to.

Database Snapshot

Edit My Profile

- Update your contact information and keep track of your iMapInvasives activity.

Change my Password

- Keep your login credentials secure by updating your password.

## Manage my Alerts

- Create or deactivate your email alerts.

My iMapInvasives Data

- Use this section to view your data as well as download data appropriate to your user level.

Users Levels and Available Functionality

0 – No account

1 – View only

2 – Observation

3 – Assessment

4 – Survey

5 – Project Leader

6 – Treatment

7 – Infestation Management

8 – Organization download level

9 – Geographic download

- Your user level increases as you attend additional trainings

- When your user level increases, you gain the new level's functionality and retain the previous levels' functionality

- Only certain individuals can become Level 8 and 9 users (i.e., organization leaders, CWMA coordinators, etc.)
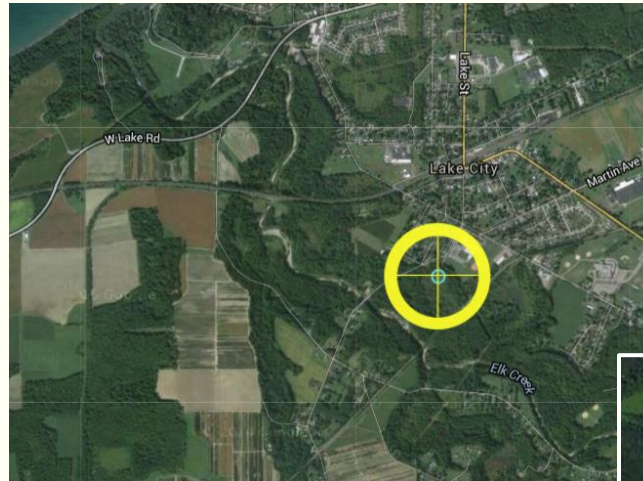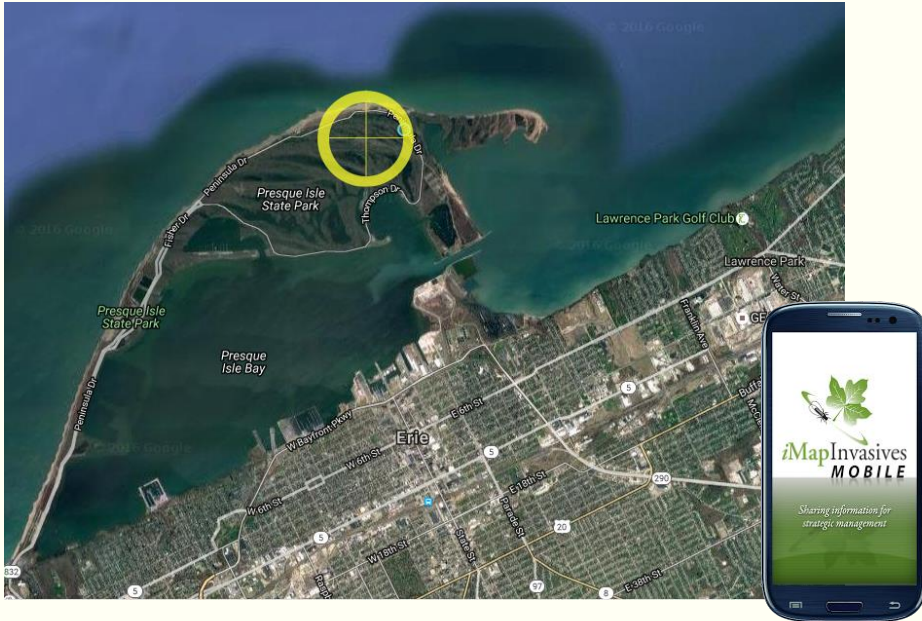

Enter observation data: User Level 2+
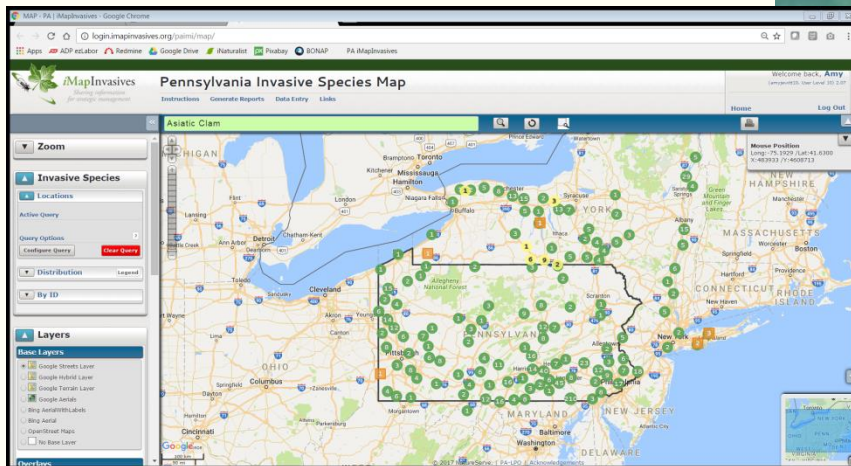
Enter survey data: User Level 4+

OBSERVATION DATA ENTRY

Found an invasive species?
Learn how to report it to iMapInvasives!

Observation Data

- An observation is a report of an invasive species, found at a specified location, on a specific date.

- Multiple observations can be made for the same population of species.

Asian clams (*Corbicula fluminea*)
Photo credit: Joe Proudman/UC Davis

Asian clams (*Corbicula fluminea*)
Photo credit: West Branch Susquehanna Restoration Coalition

Observation Data

- Enter observations manually via the desktop interface or our mobile app
  - Learn more about our mobile app during the October 30th training.

- Bulk uploading available
  - Submit large datasets to administrator for upload (75+ records)

- Observation data includes:
  - Photos
  - Observer name & organization
  - Project name (if any)
  - Species
  - Date
  - Location

Garlic mustard (*Alliaria petiolata*)
Photo credit: lusaorganics.typepad.com

Observation Data – Cultivated Species

When submitting observation data, <u>do not</u> report cultivated species (i.e., species planted in yards, gardens, or other landscaped areas.)

- Cultivated species were planted purposefully, so even though some are considered "invasive", these plants will not be treated, cut, or removed by natural resource professionals.
  - However, their presence leads to "escapees" that can invade natural areas.

- <u>Note</u>: Invasive species are still being sold in places like Lowe's, Home Depot, and local nurseries. Do your homework ahead of time and know what you are buying - never purchase an invasive species.

Callery pears (in parking lot)

Don't report this!

Callery pears (in natural setting)

Report this!

Observation Data – Cultivated Species

More examples of cultivated species not to report to iMapInvasives:

Don't report this!

Report this!

Japanese spiraea (in home garden)

Japanese spiraea (in natural setting)

Observation Data – Cultivated Species

Don't report these!
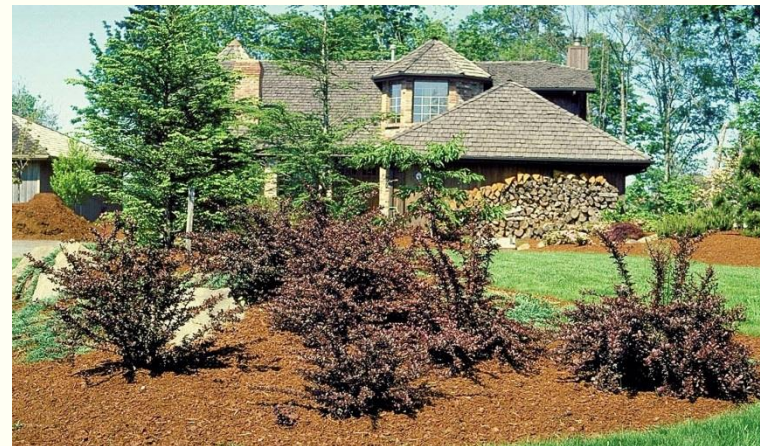
Report this!

Japanese barberry (in home gardens)

Japanese barberry (in natural setting)

Observation Data – Cultivated Species

Tree-of-heaven (in parking lot)

Don't report this!

Report this!

Tree-of-heaven (in natural setting)

Observation Data – Cultivated Species

Hardy kiwi vine (in home garden)

Report this!

Don't report this!

Hardy kiwi vine (in natural setting)

How to Enter Observation Data

Once logged into Pennsylvania iMapInvasives, click on "Enter Data" on left side of screen.
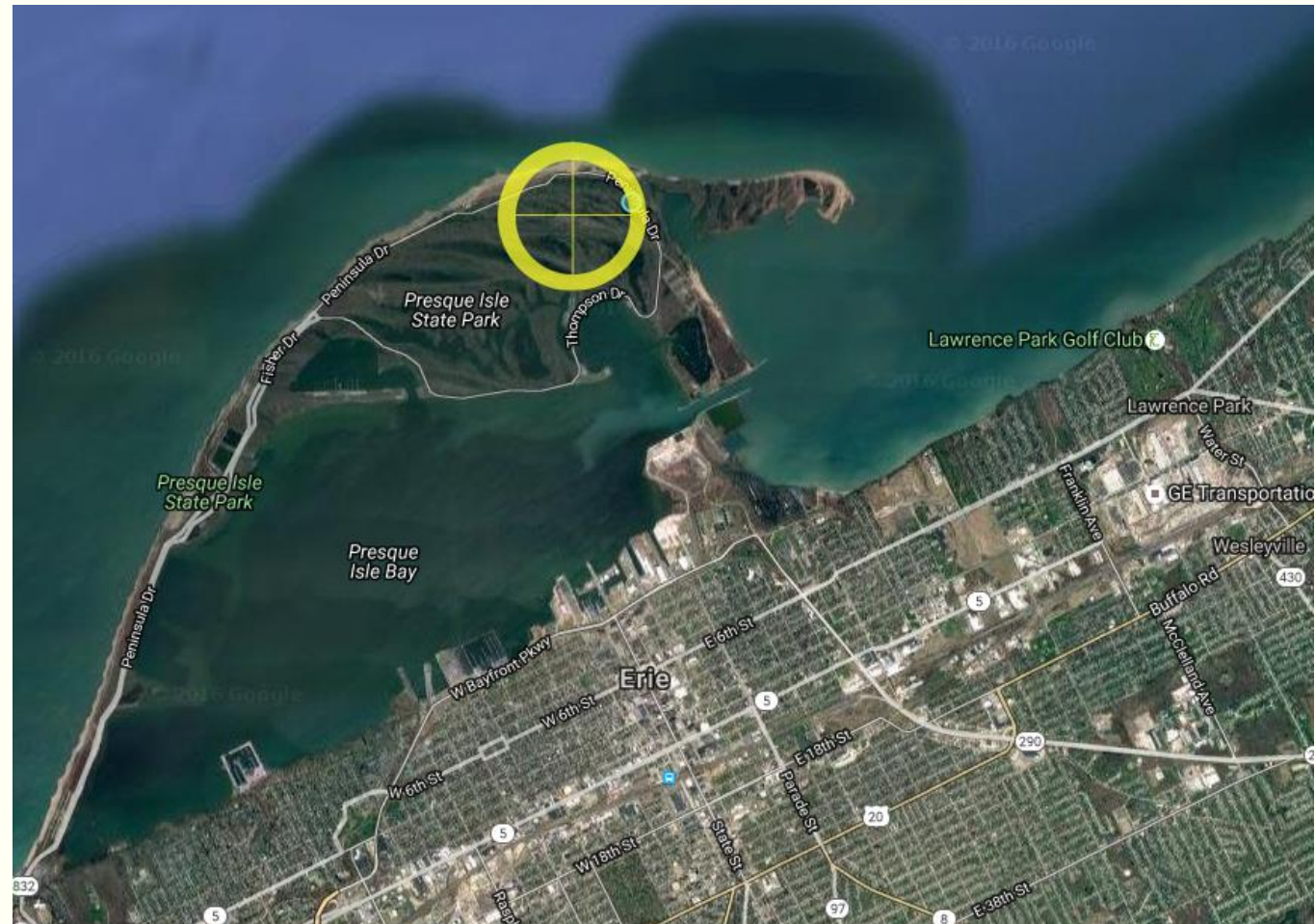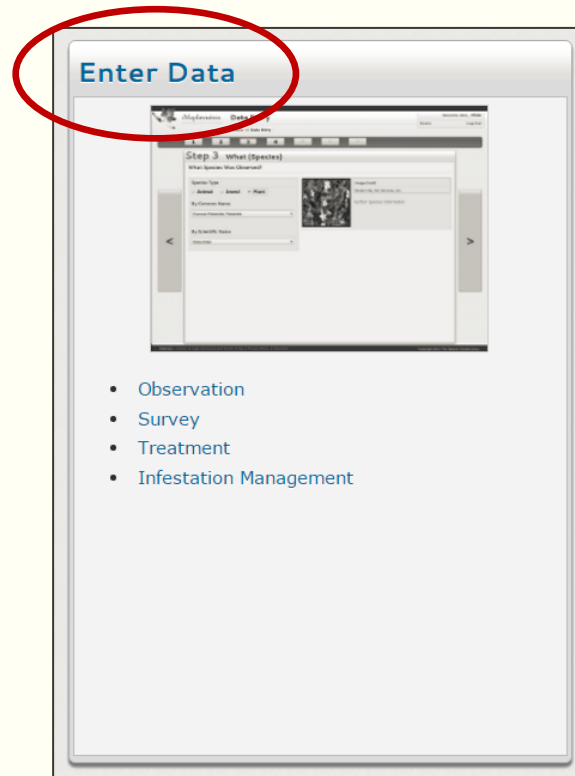
Entering Observation Data: Step 1

Add Photos

- Choose up to five photos to include with your observation.

- Categories include:
  - Close-up
  - Infestation
  - Scale
  - Two "other" categories

- Avoid taking photos from far away (except for an infestation photo).

- Take photos from various angles
  - Aerial view
  - Side view
  - Underside
  - Distinguishing features
  - Total population (infestation)

Infestation photo

Distinguishing features (close-up)

Distinguishing features (close-up)

Scale photo

Entering Observation Data: Step 2

Select the Observer

- Yourself OR

- Another person
    - You can enter data that someone else observed, but they must have an iMapInvasives login account.
    - Check drop-down list for person's name; if it doesn't appear, send an email to the Administrator to have the person's name added to our list of registered users.

Photo credit: Rhode Island Natural History Survey

Entering Observation Data: Step 3

Include Data in Project

- ## What's a project?

  - Projects provide a way to organize data into a group that can then be easily searched for or downloaded.

  - Projects also provide a way for multiple agencies to submit and share data for a common initiative.

- ## Entering data in a project is <u>optional</u>.

- ## Example projects in PA iMapInvasives:

  - NPS Flight 93 Invasive Species Survey (2013)

  - Pennsylvania Sea Grant Zebra & Quagga Mussel Database

  - Invasive Species Data from the NY Botanical Garden (2016)
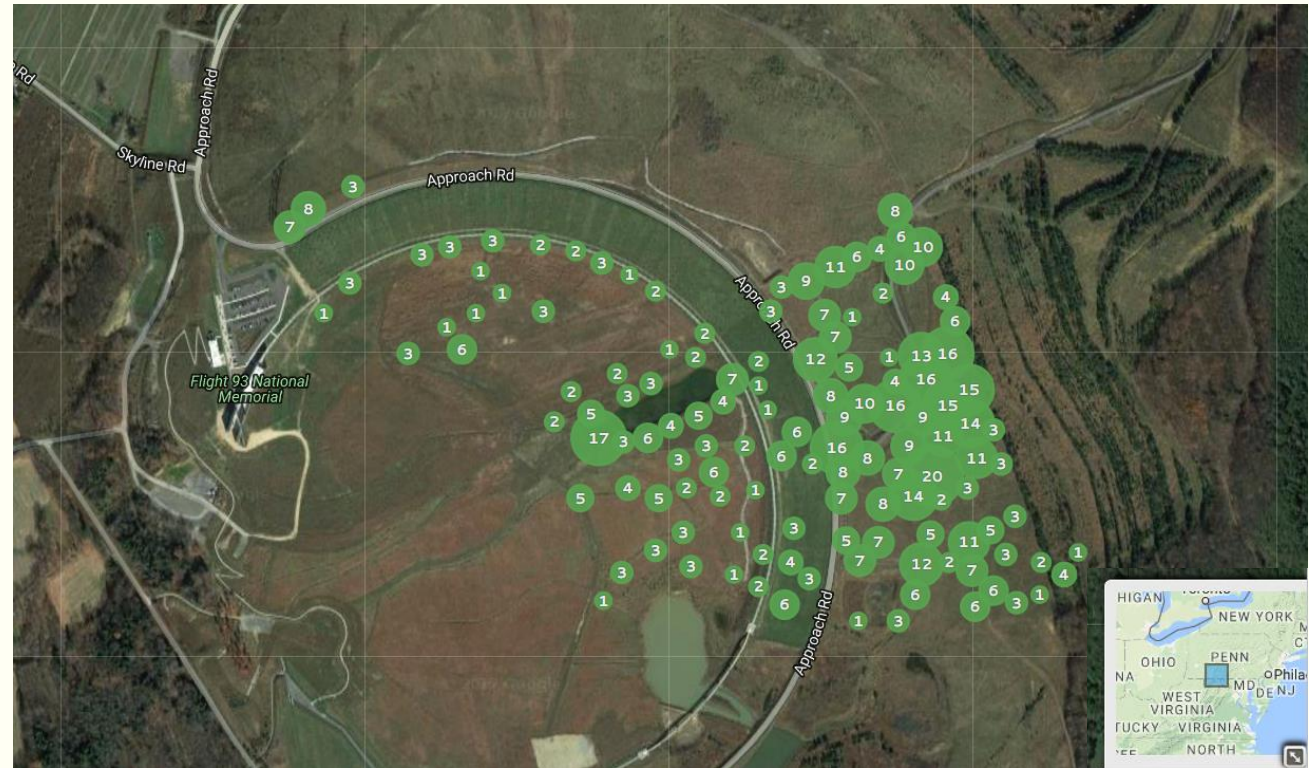
View of observation data collected at the National Park Service's Flight 93 National Memorial. This group of data is easy to query for because it's been grouped together under an iMapInvasives project (i.e., "NPS Flight 93 Invasive Species Survey [2013]).

Entering Observation Data: Step 4

Select the Species Found

- Choose which species you observed by selecting from the drop-down lists.

- Note: Beware of selecting a reported species by its common name!

  - A single species may be known by several common names.
  - Example: Rosa multiflora
  - Rosa multiflora is known by the following common names: Multiflora rose, baby rose, Japanese rose, seven-sisters rose, rambler rose, and multi-flowered rose.

- Note: Some species can be known by the same common name.

  - Example: Asian carp
  - Asian carp could mean any one of these species: Silver carp, black carp, bighead carp, grass carp, or common carp.

★ In either of these cases, make sure to check the scientific name that appears in iMap to ensure you are choosing the appropriate species.

Asian carp
Photo credit: USGS

Multiflora rose
Photo credit: National Park Service
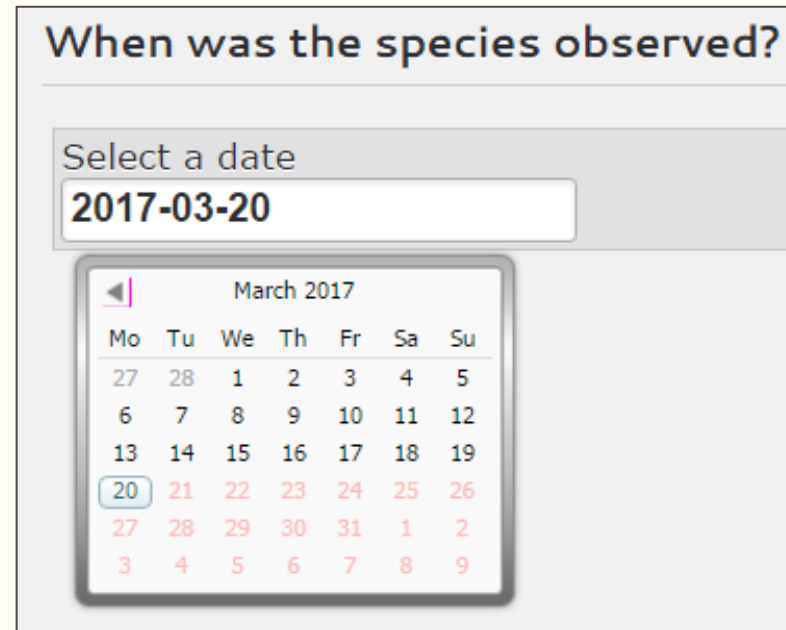
Entering Observation Data: Step 5

Select the Date

Use the calendar to choose your observation date.

<u>Note</u>: Observation date <u>cannot</u> be typed; you must "navigate" to it.

⭐ If entering data collected in the past:
- Click on the "month title bar" to bring up all the months in the present year.
- Click the "year title bar" to bring up a list of years.
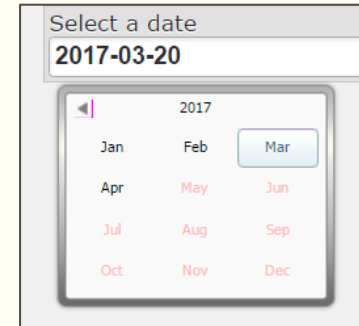
When was the species observed?

Select a date
2017-03-20

	March 2017					
Mo	Tu	We	Th	Fr	Sa	Su
27	28	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9
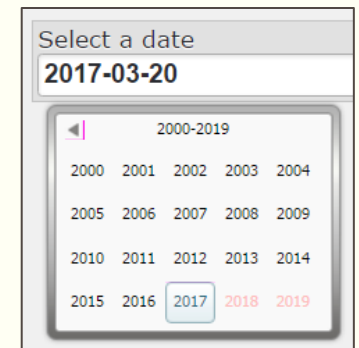
Select a date
2017-03-20

	2017	
Jan	Feb	Mar
Apr	May	Jun
Jul	Aug	Sep
Oct	Nov	Dec

Display list of months in a designated year

Select a date
2017-03-20

		2000-2019		
2000	2001	2002	2003	2004
2005	2006	2007	2008	2009
2010	2011	2012	2013	2014
2015	2016	2017	2018	2019

Display list of years

Entering Observation Data: Step 6

Identify the Observation Location

Navigate to the location where the observation was made by entering:

- GPS coordinates
  - Ex. 41.553172, -80.526448

- Address
  - Ex. 800 Waterfront Drive, Pittsburgh, Pennsylvania

- Name of a managed area
  - Ex. Gifford Pinchot State Park

- Waterbody name
  - Ex. Lake Pleasant, Pennsylvania
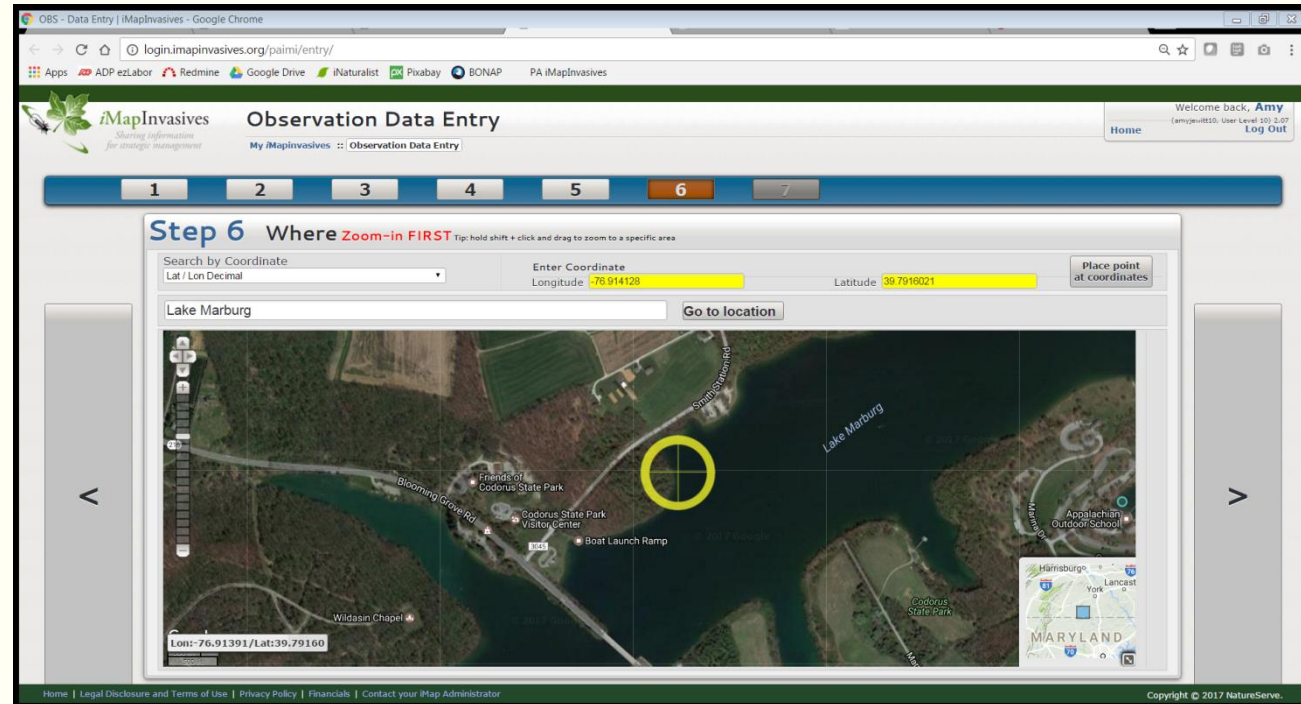
Entering Observation Date: Step 7

Once you've entered all of the required information, review your record details and submit your observation to iMapInvasives!

Entering an Observation – Important Note!

After creating your record, return to it using the Table on the Main Navigation page and add additional details to further describe your finding.

Entering an Observation – Important Note!

Additional details can include:

- Comments
  - Additional observers, # of species observed, site conditions, etc.

- Site directions and access information
  - Locked gate, permission required from landowner, rough terrain.

- Specimen collected? If so, where is specimen being housed at?
  - Museum, herbarium, botanical garden, etc.

*Note that your observation(s) will always appear as "Unconfirmed" once submitted. When the administrator reviews your record and confirms the species ID is accurate, your record will be labeled as either "Confirmed" or "Approximate" depending on the locational data.

Observation Data Entry – Refresher Training

- To refresh on entering an observation record, feel free to watch our YouTube training video anytime!

- Our video is available on the Training page of the Pennsylvania iMapInvasives website.

Photo credit: National Geographic Press Room
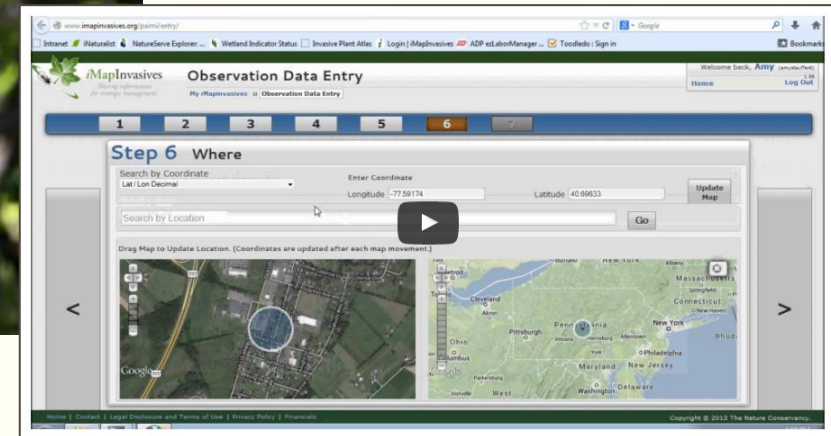
Click on me to find out more

How Data is Quality-Checked

All observations submitted to iMapInvasives are QC'ed by a species expert before being confirmed.

If data is coming from a trusted source, data is automatically confirmed.

Examples:

• Recent reports of New Zealand mudsnail in Centre County were reviewed by Dr. Robert Dillon, a gastropod expert.

• Reports of plant species are reviewed by botanists from the Western Pennsylvania Conservancy.

• Reports coming from Pennsylvania DEP are confirmed by The Morris Arboretum in Philadelphia.

Flowering rush (*Butomus umbellatus*)
Photo credit: Scott Schuette, PNHP

Eurasian water-milfoil (*Myriophyllum spicatum*)
Photo credit: Graves Lovell, AL DCNR

New Zealand Mudsnail (*Potamopyrgus antipodarum*)
Photo credit: Nick Macelko, Eco Action (PSU)
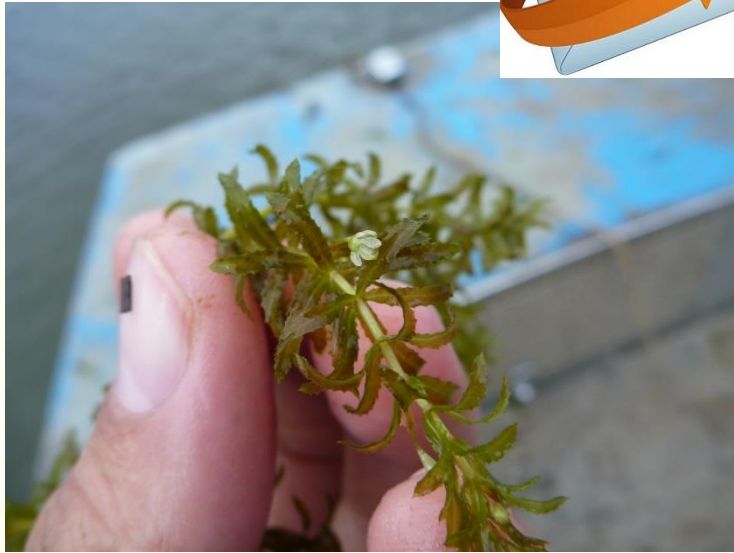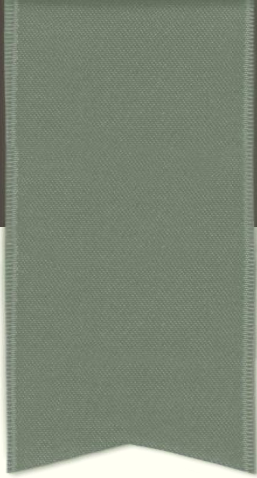
EMAIL ALERTS

Find out <u>ASAP</u> about invasive species findings that are relevant to you

Benefits of Using Email Alerts

EMAIL ALERTS THAT ARE ACTUALLY USEFUL

- Stay informed of recent invasive species findings.

- Prioritize your organization's survey and treatment efforts.

- <u>Take action</u> to prevent the spread of rare invasive species or species recently discovered in Pennsylvania for the first time.

<u>Note:</u> There are 3 alert types available in iMapInvasives. Make use of the alert(s) that best suit your needs.

Prioritize survey and treatment efforts

Photo credit: Kleinschmidtgroup.com

Take action to prevent the spread of invasive species

Photo credit: FISHBIO

Alert #1: Continual Alert

- Puts a focus on:
  - An individual or group of species which you have an interest in staying aware of.

- You choose an area of interest such as:
  - County
  - CWMA
  - Waterbody
  - All of Pennsylvania

- Which observations trigger this alert?
  - Observations found one year ago or sooner.

This is the most basic type of alert available in iMapInvasives (and also the most popular among registered users).

Example:
Alert me every time Hemlock Woolly Adelgid (HWA) is found anywhere in Jefferson County, Pennsylvania.

Hemlock Woolly Adelgid
Photo credit: Nicholas Tonelli

Other Examples of a Continual Alert

1. Alert me every time that Eurasian water-milfoil is reported <u>anywhere in Pennsylvania</u>.

Photo credit: Ontario's Invading Species Awareness Program

2. Alert me every time Black jetbead is reported <u>in or near Erie</u>, Pennsylvania.

What is a Natural Heritage Area? An NHA is a special place designated by a state or provincial Natural Heritage Program that provides critical habitat for rare species, natural communities, or geologic features and the landscape necessary to support that area.
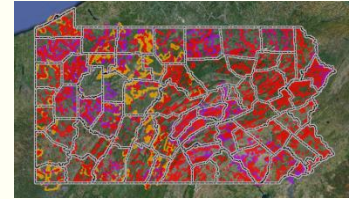
3. Alert me every time a Rusty crayfish is reported in the Elk Creek <u>Natural Heritage Area</u> (Erie Co).

Alert #2: Early Detection Alert

- Puts a focus on:
  - Species that are rare or not yet found in Pennsylvania.

- You choose an area of interest such as:
  - County
  - CWMA
  - Waterbody
  - All of Pennsylvania

- Which observations trigger this alert?
  - Observations found one year ago or sooner.

- Note: iMapInvasives considers a species "Early Detection" if there are three or fewer reports for that species in a specified geography.
  - Example: Only two reports for wavy leaf basketgrass have been reported in York County to date, making this species an "Early Detection" species.

This alert type is useful in "raising a red flag" when new or rare species are found in Pennsylvania (to aid in Early Detection and Rapid Response efforts).

Example:
Alert me if Wavyleaf basketgrass is found in Fayette County, Pennsylvania.

Other Examples of an Early Detection Alert

Policeman's helmet
(*Impatiens glandulifera*)

Not yet found in
Pennsylvania – First report
would trigger ED alert.

Chinese mitten crab
(*Eriocheir sinensis*)

Not yet found in
Pennsylvania – First report
would trigger ED alert.

Five-leaf akebia
(*Akebia quinata*)

Rare in Pennsylvania –
Additional reports would
trigger ED alert.
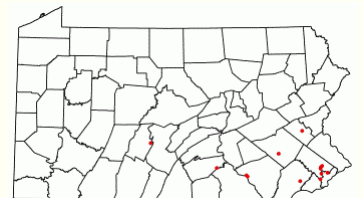
Alert #3: New to Geography Alert

- Puts a focus on:
  - A group of species (*i.e., not individual species*).
  - Species found in an area where they've never been found before.

- You choose an area of interest such as:
  - County
  - CWMA
  - Waterbody
  - All of Pennsylvania

- Which observations trigger this alert?
  - Observations reported up to 200 years ago.

This alert type is useful if you already know the species that are found in a particular place, and you want to be notified when a species never reported there before is found for the first time.

(Different from an early detection alert.)

Example:
Alert me when any NEW aquatic plant is reported in Lake Marburg (York County).
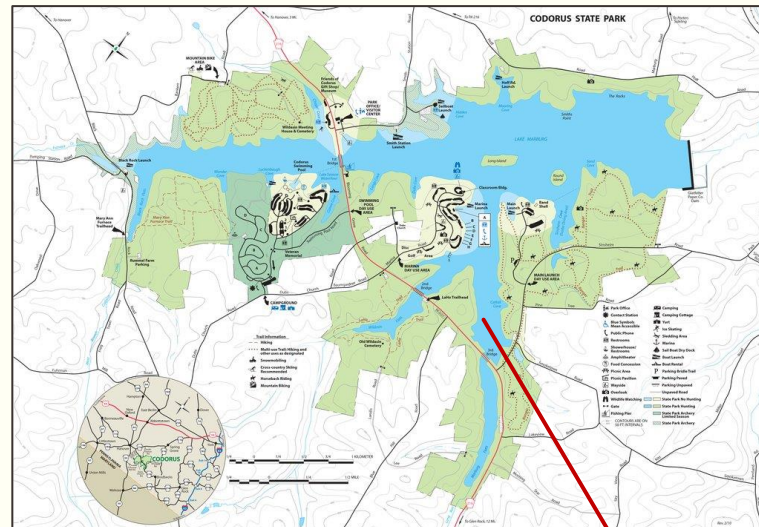
Other Examples of a New to Geography Alert

1. Alert me when any NEW plant species is reported in <u>Lancaster County</u>.
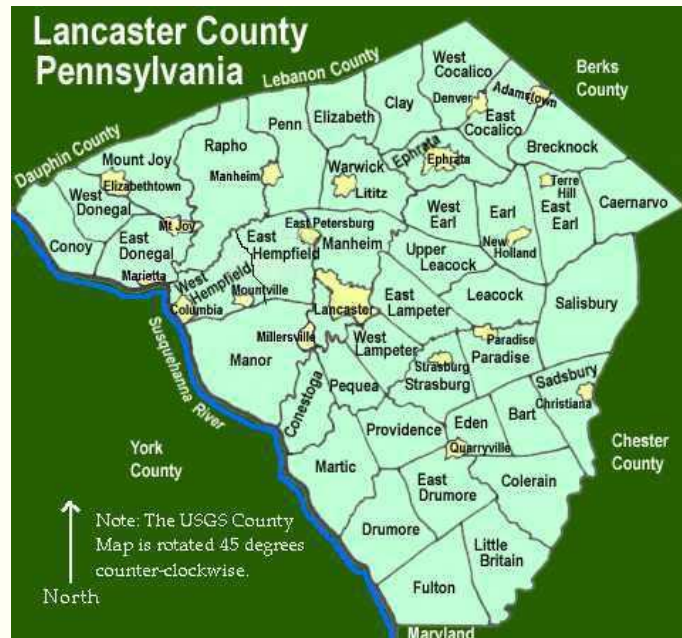
Geography Type = County

Geography Type = Waterbody
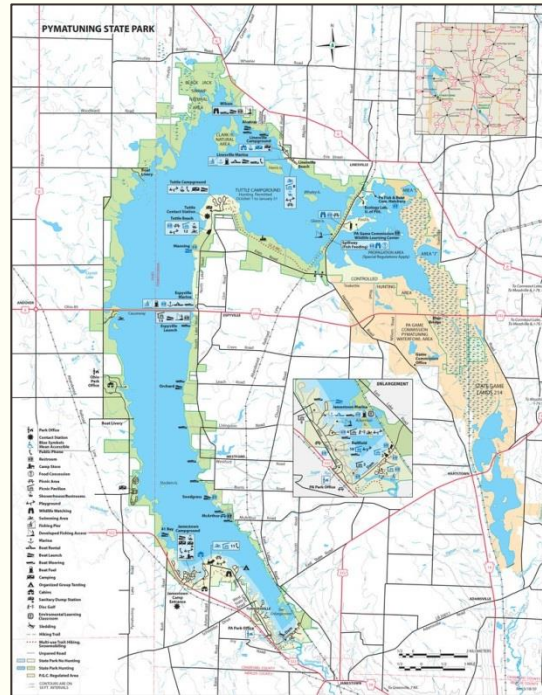
2. Alert me when any NEW aquatic animal is reported in the <u>Pymatuing Reservoir</u>.

3. Alert me when any new terrestrial plant species is reported in <u>Sizerville State Park</u>.

Geography Type = Conservation Lands

VIEWING DATA ON THE MAP

Visualizing species distributions statewide and on a local scale.
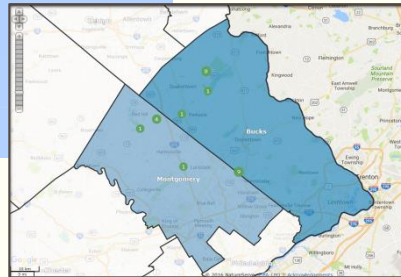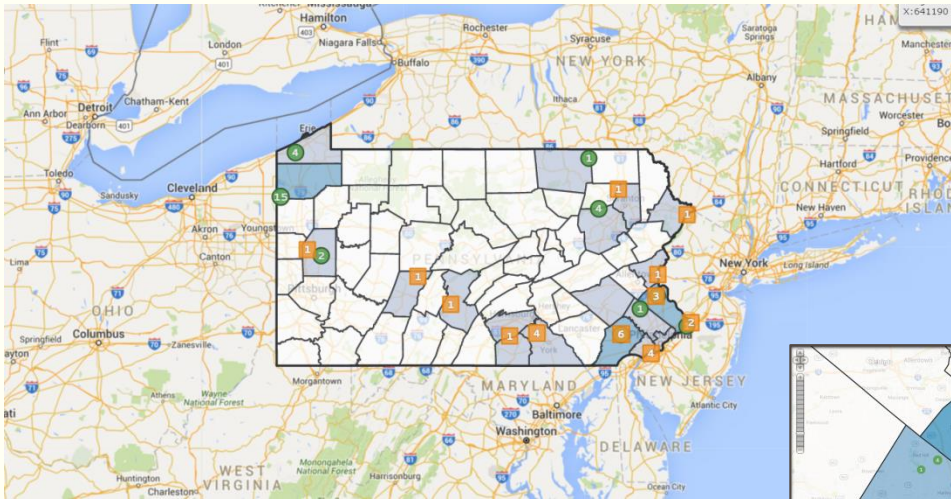
Map Viewing Capabilities

Utilize various layers on the Map to better visualize data.

- Base layers include both Google and Bing maps.

- Overlay layers include county, CWMA, HUC, major waterbodies, PNHP Natural Heritage Areas, etc.

- Easily turn on observation data (i.e., Confirmed, Unconfirmed, and Approximate).

- Turn on info for management efforts (assessment, survey, treatment, and infestation management).
  - *Requires advanced training.
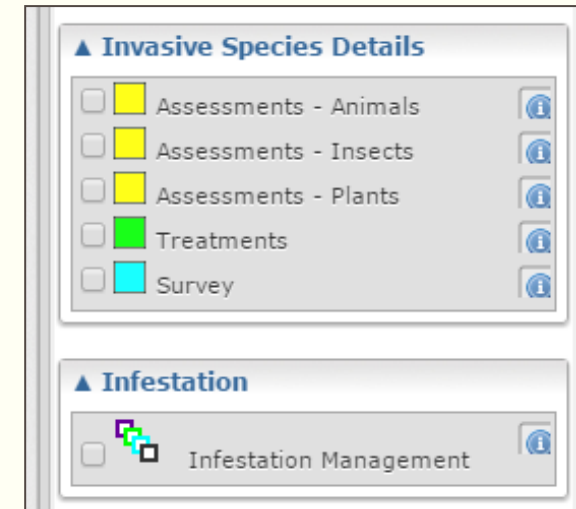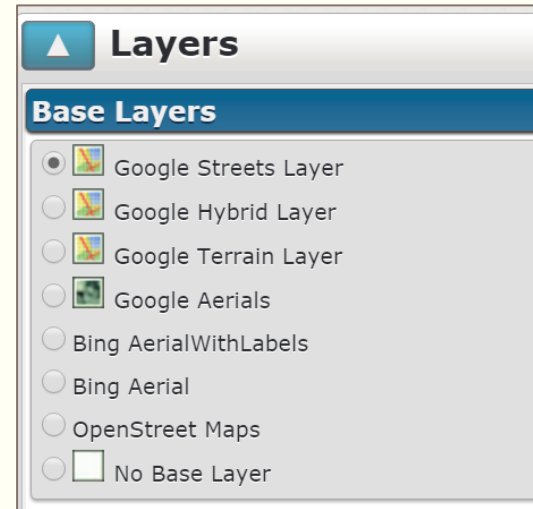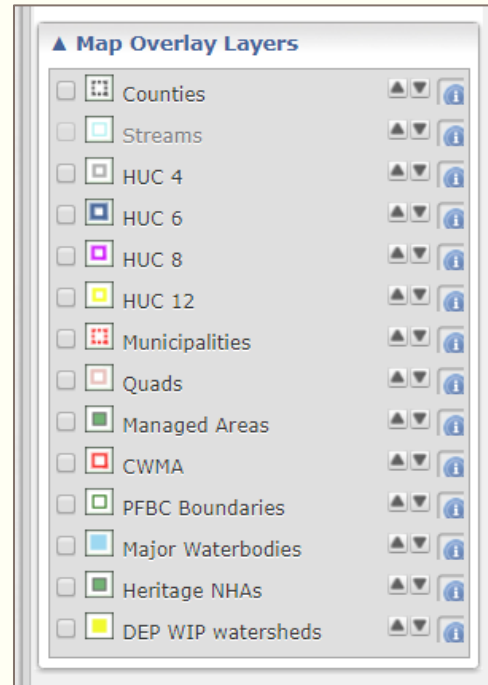
Utilizing Reference Layers

Turn on County layer.

Utilizing Reference Layers

Turn on HUC 6 layer (Hydrologic Unit Code).

Note: HUCs are a term used to describe watersheds based on their size.
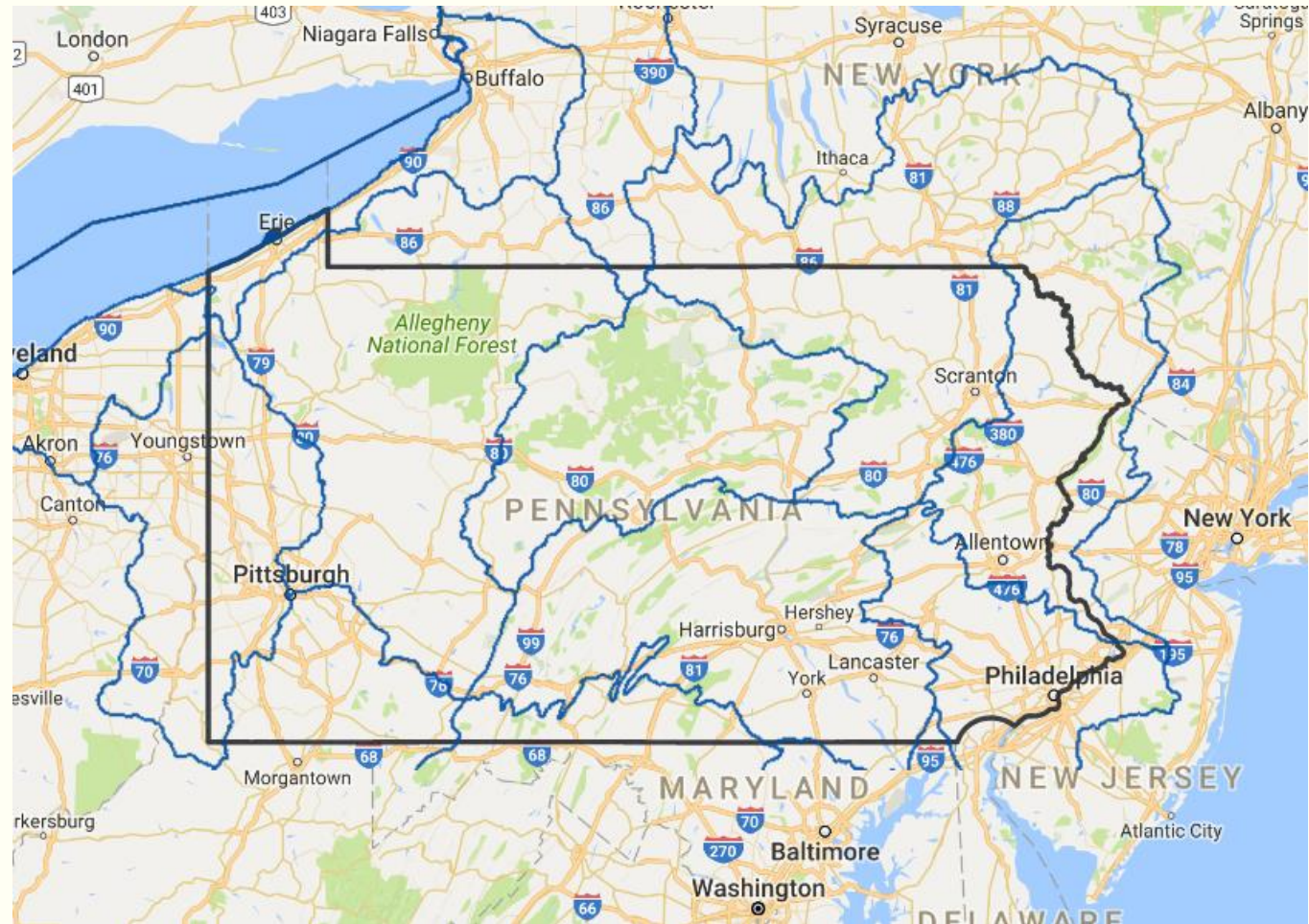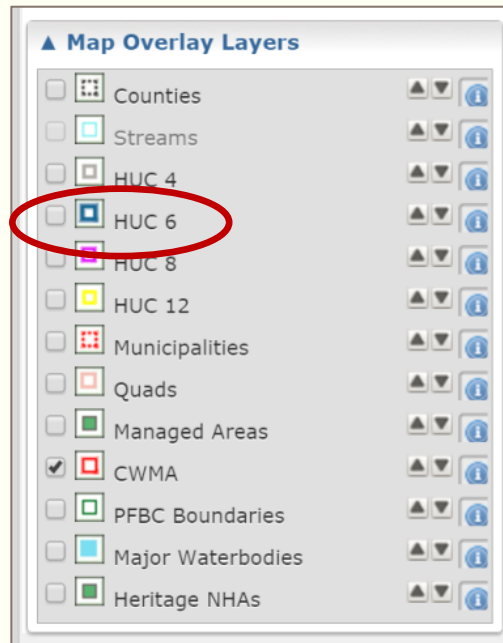
Utilizing Reference Layers

Turn on HUC 8 layer
(Hydrologic Unit Code).
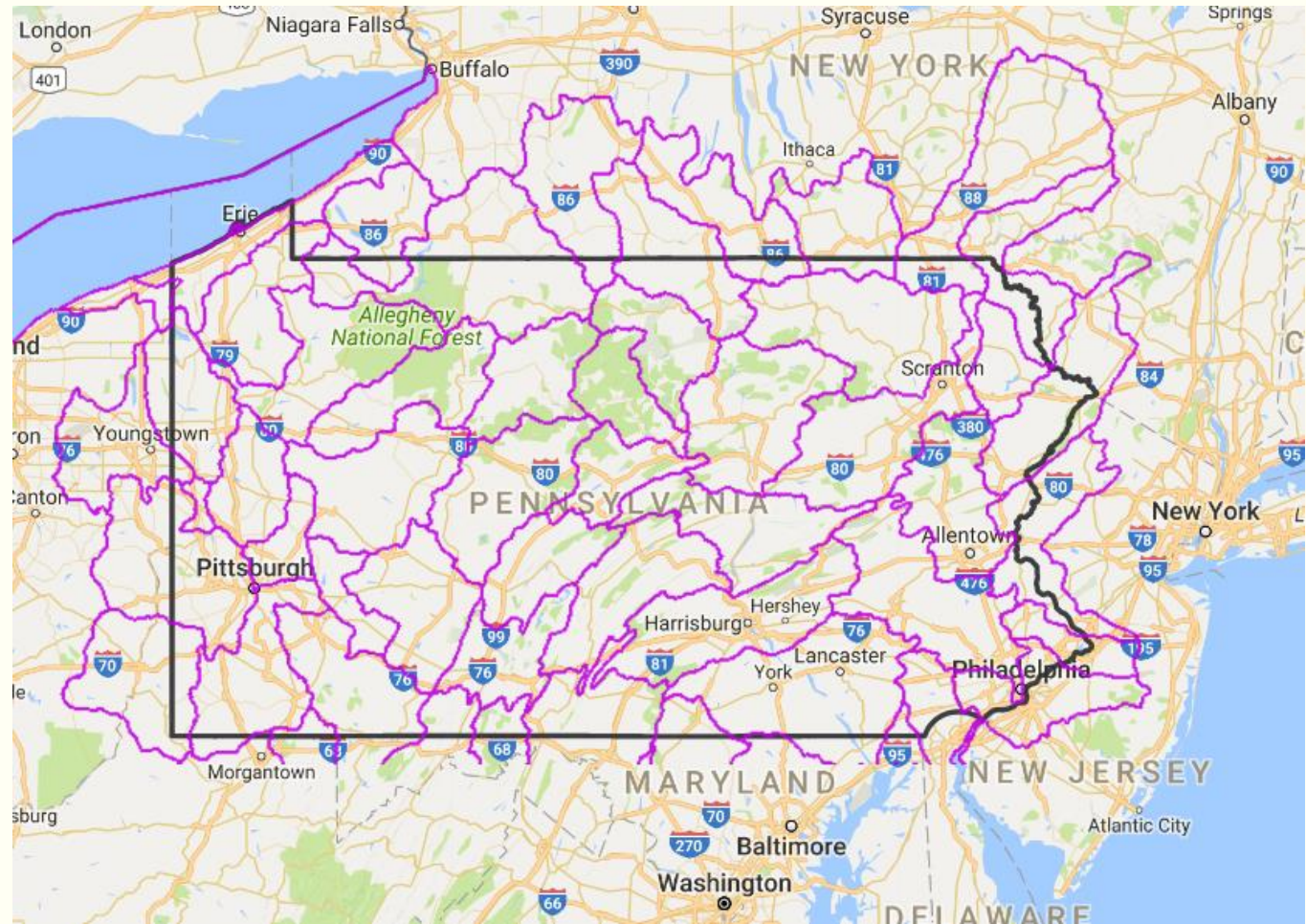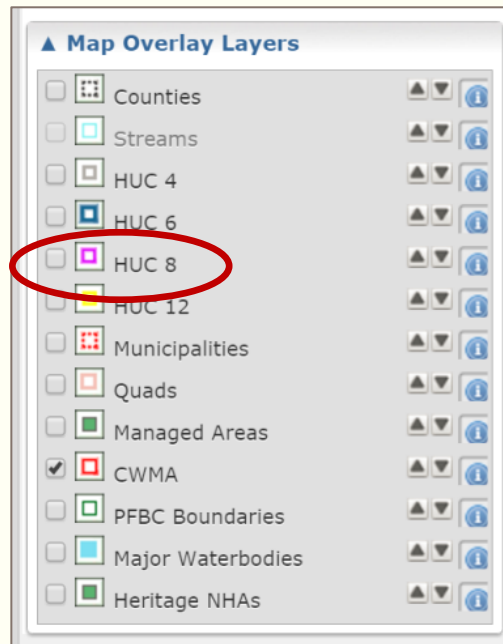
Utilizing Reference Layers

Turn on HUC 12 layer
(Hydrologic Unit Code).
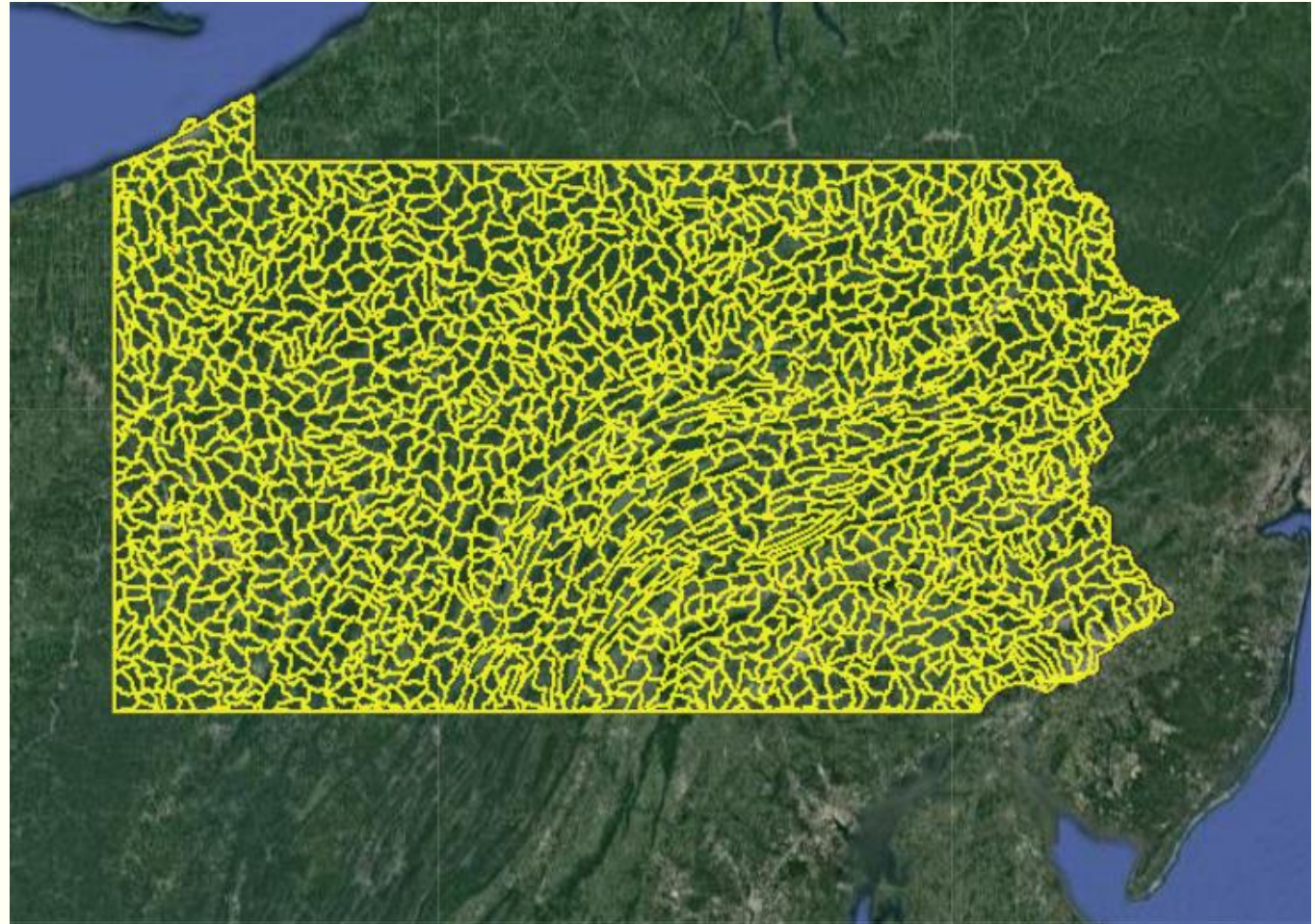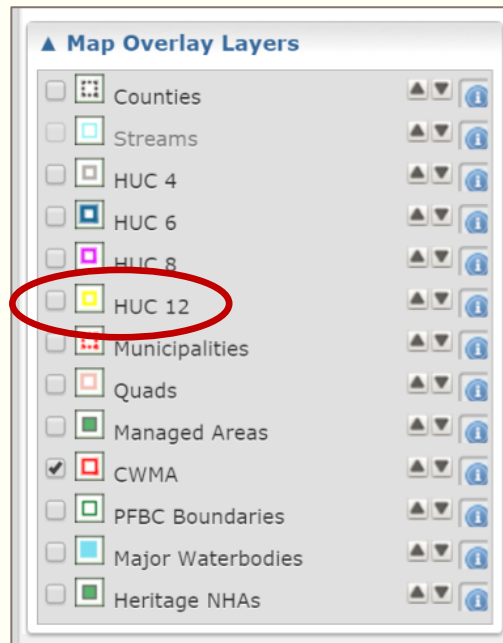
Utilizing Reference Layers

Turn on CWMA (Cooperative Weed Management Area) layer.

Note: In Pennsylvania, there are 5 CWMAs, 3 of which are active.

Active CWMAs:

- Lake Erie Watershed CWMA

- Sinnemahoning Invasive Plant Management Area

- Southern Laurel Highlands Plant & Pest Management Partnership

Inactive CWMAs:

- Juniata CWMA

- Delaware River Invasive Plant Partnership
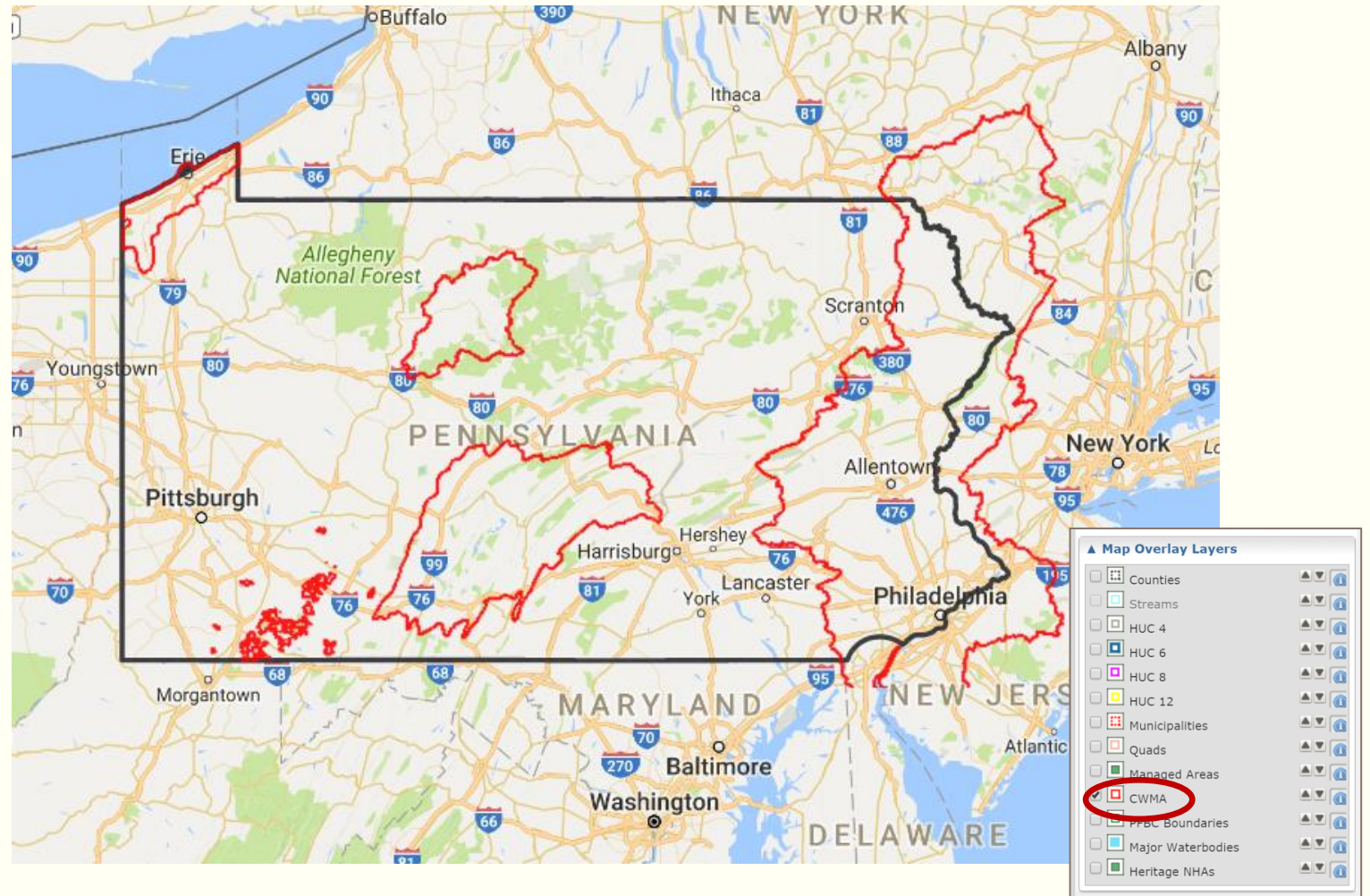
Utilizing Reference Layers

Turn on Streams Layer.

Note: In order to turn on this layer, you must be zoomed in far enough on the map for the layer to appear.
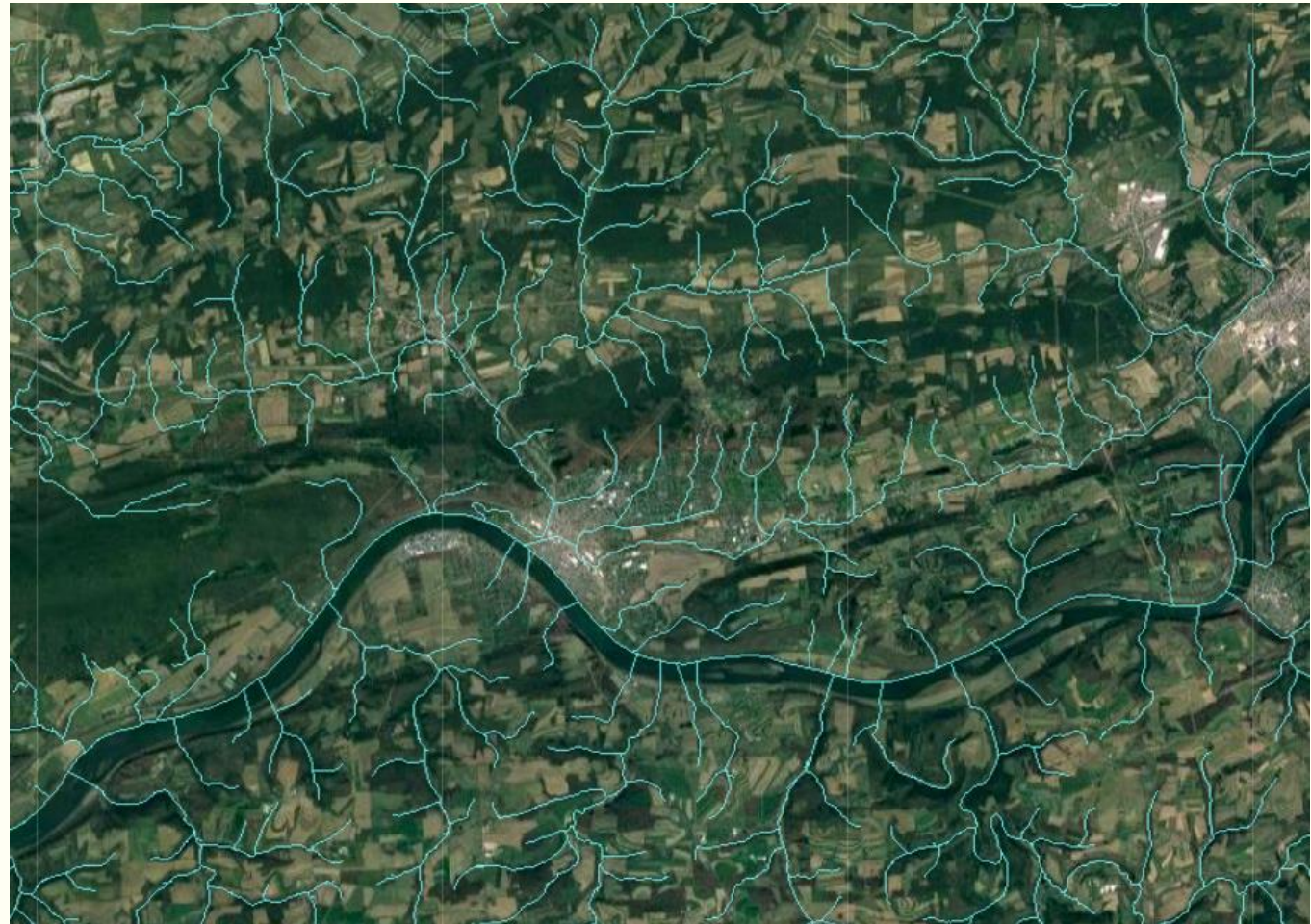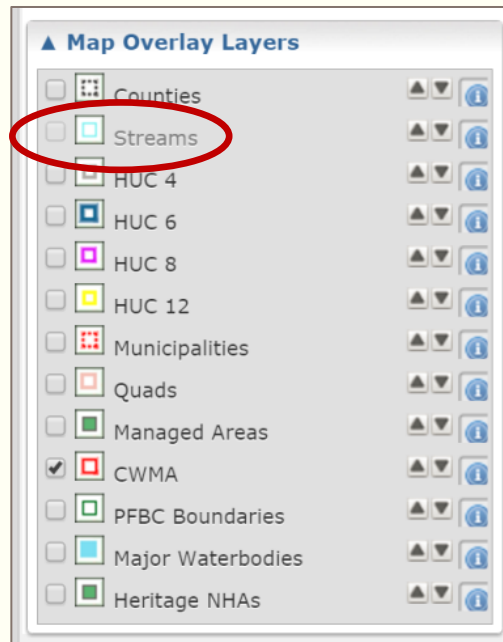
Understanding Map Symbology

When viewing data in iMapInvasives, the following map view is something you're bound to see.

So, what does it mean?
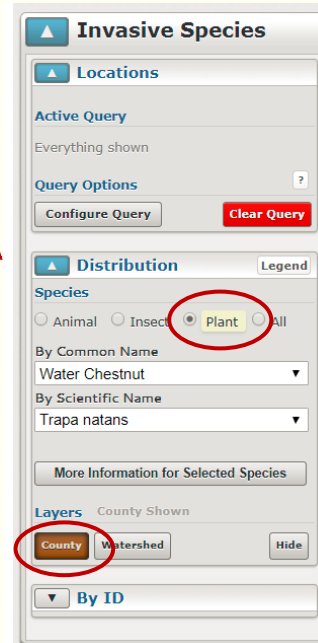
- Numbers inside circles/squares represent the amount of observations found at a certain location.

🟢 Green circles represent precise-location data that's been QC'ed by the administrator.

🟧 Orange squares represent non-precise (approximate) location data that's been QC'ed by the administrator.

🟡 Yellow circles represent unconfirmed precise or approximate data that has not yet been QC'ed by the administrator.
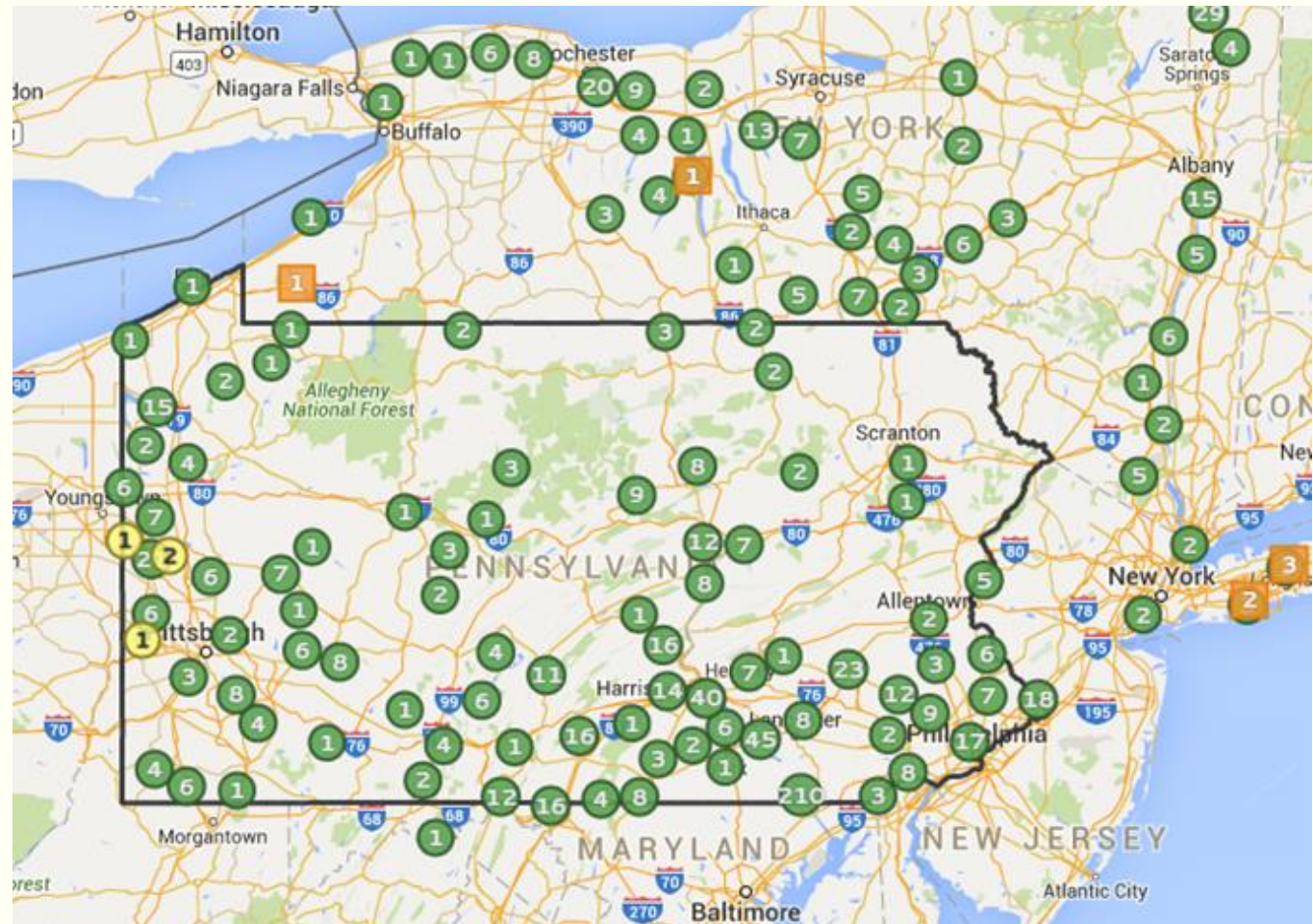
View County-Level Data on Map

On Map:

- Click on arrow next to "Distribution" section.

- Choose animal/insect/plant radio button, then select species.

- Click on "County" button.

- In "Map Overlay Layers" section, turn on "Counties" to view county names.

- **Example:** Water chestnut (*Trapa natans*)

  - According to data received, water chestnut has been found in Warren, Luzerne, Dauphin, Berks, Bucks, and Montgomery counties.
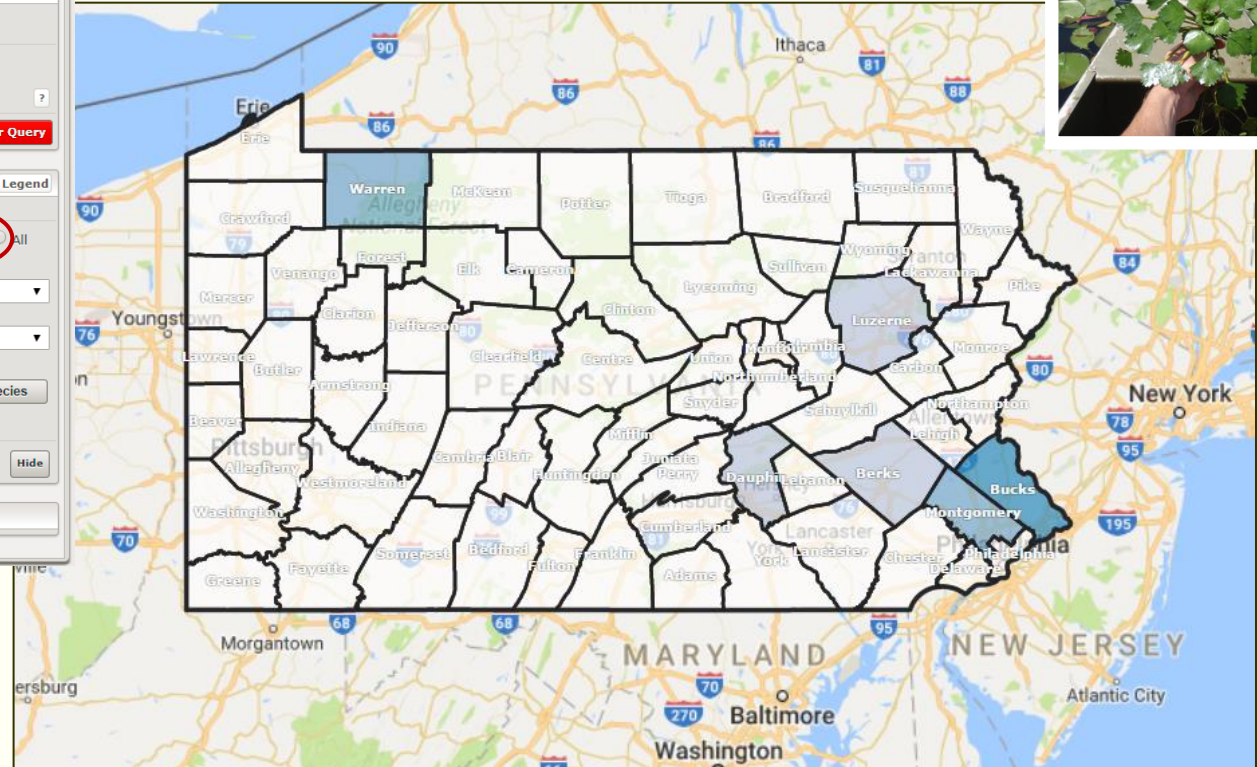
Note: Different shades of blue represent the number of observations reported for a certain species in a particular county. The darker the blue, the higher the amount of observations reported in that county. This info is <u>not</u> a representation of population density.

View Watershed-Level Data on Map

On Map:

- Click on arrow next to "Distribution" section.

- Choose animal/insect/plant radio button, then select species.

- Click on "Watershed" button.

- **Example**: Zebra mussel (*Dreissena polymorpha*)

  - According to data received, zebra mussel has been found in 15 (HUC 6) watersheds within Pennsylvania.
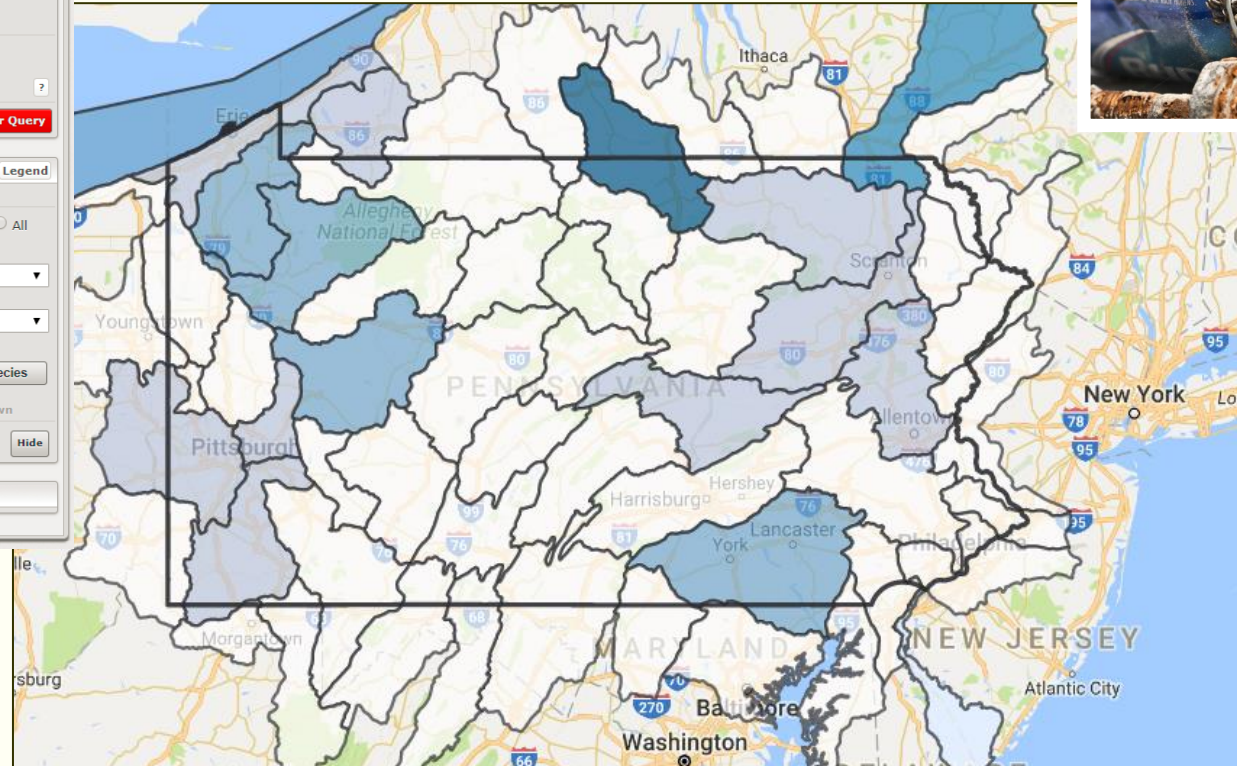
Note: Different shades of blue represent the number of observations reported for a certain species in a particular watershed. The darker the blue, the higher the amount of observations reported in that county. This info is <u>not</u> a representation of population density.

Searching for Species Locations – Example Purple Loosestrife

From the Map:

- Type in the common or scientific name in the top search bar (i.e., Purple loosestrife OR *Lythrum salicaria*).

- 🔍 Click the magnifying glass icon to search the map.

- Watch as data appears…
  - Note that data from New York and Virginia show as well. These are also iMapInvasives states.

- Option to view county data by using "Distribution" tool.

- To better understand data on the map, turn on some reference layers…
  - Ex. CWMAs, Heritage NHAs, Managed Areas, Counties, etc.
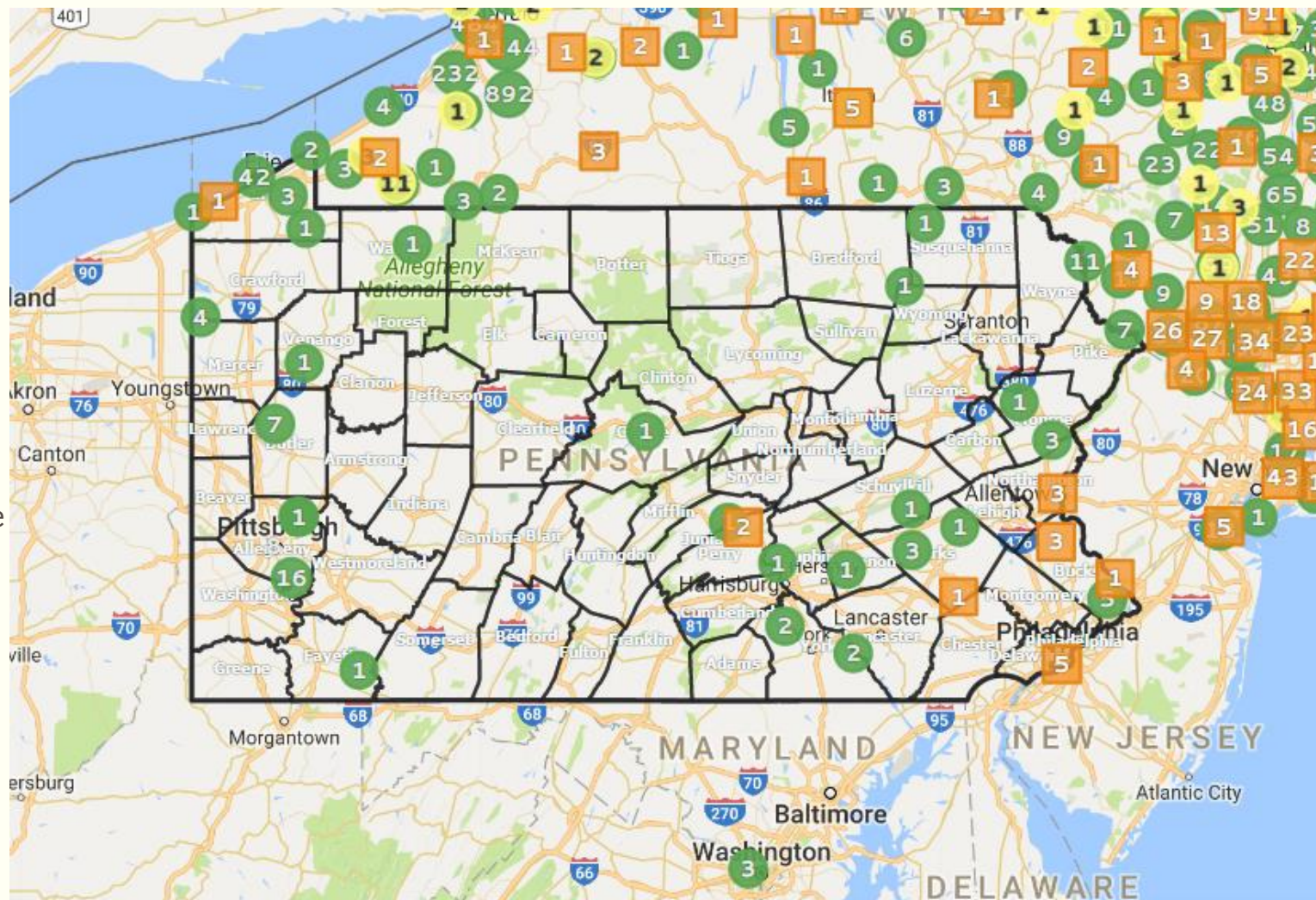
Dynamic Data Viewing

Water Chestnut (*Trapa natans*)

Dynamic Data Viewing – Add Reference Layers

Water Chestnut (*Trapa natans*)

Dynamic Data Viewing – Access Individual Records

Water Chestnut (*Trapa natans*)

Dynamic Data Viewing – Add Reference Layers

Water Chestnut (*Trapa natans*)

VIEWING DATA IN DIFFERENT FORMATS

Map, Table, and Report Views

View Data in Different Formats – Map View

Map View

▪ Easily view Confirmed, Approximate, and Unconfirmed data with a visual understanding of where a species is located in the state.

▪ Note: Approximate data can be mapped according to: County, Rural municipality, Section, Site, Town/Township, Township/Range, Waterbody, or a Custom approximation.
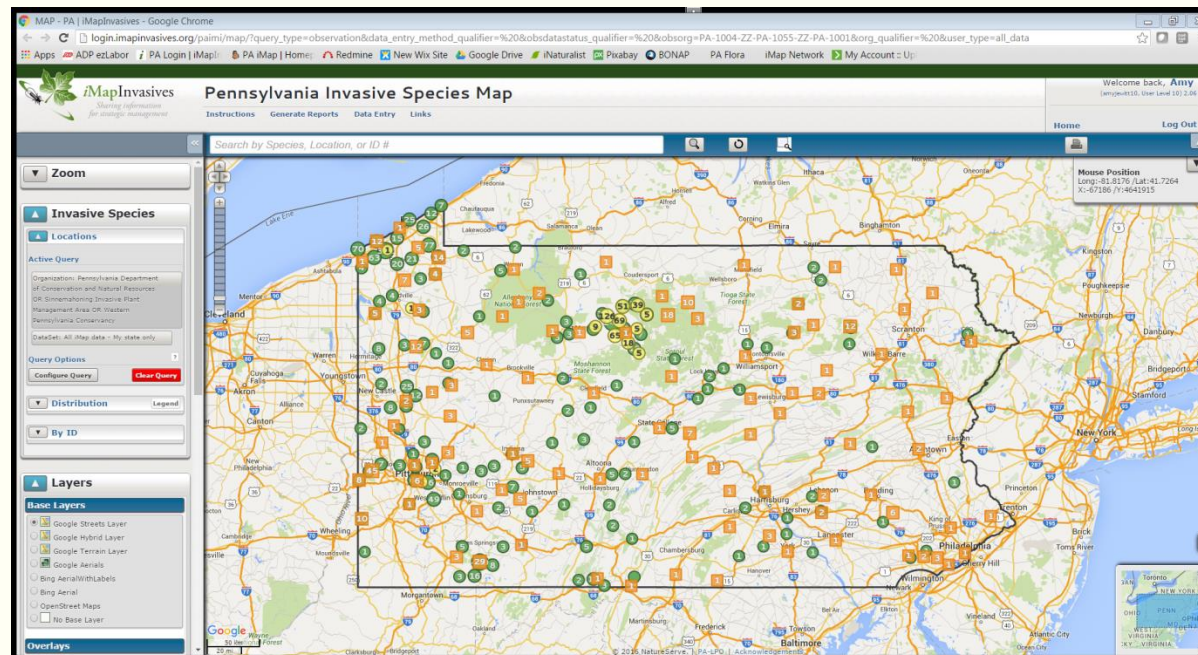
\# = Amount of observations

🟢 = Confirmed and precise
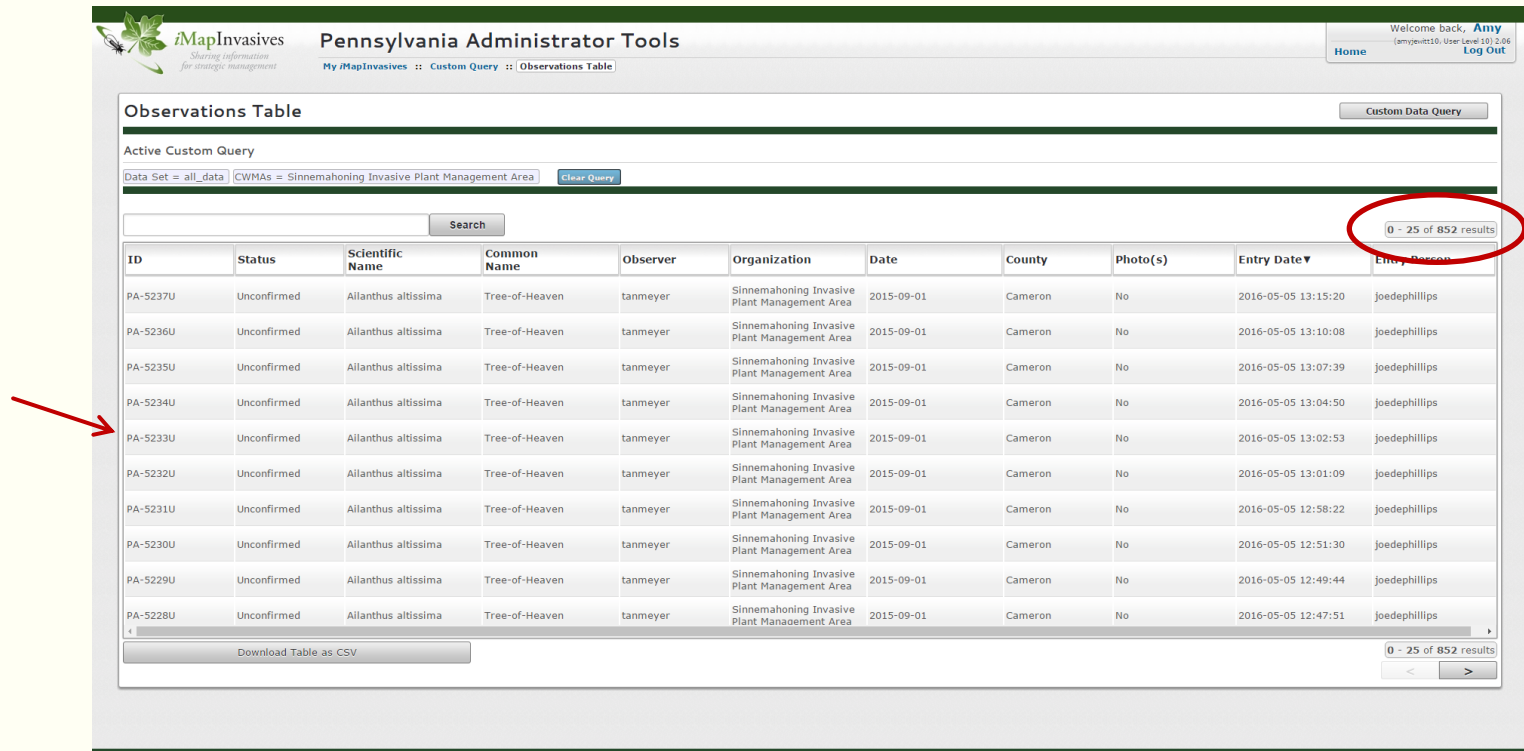
🟧 = Confirmed and approximate

🟡 = Unconfirmed (precise or approximate)

Viewing Data in Different Formats – Table View

Table View

- View total number of records and click on any record to view more details about it.

Viewing Data in Different Formats – Report View

Report View

- Perform basic data analysis via a Report.
  - Example: The following 2016 report describes the number of observations reported in the Sinnemahoning Cooperative Weed Management Area (SIPMA).

- Analysis Results:
  - A total of 852 observations were reported in 4 counties.
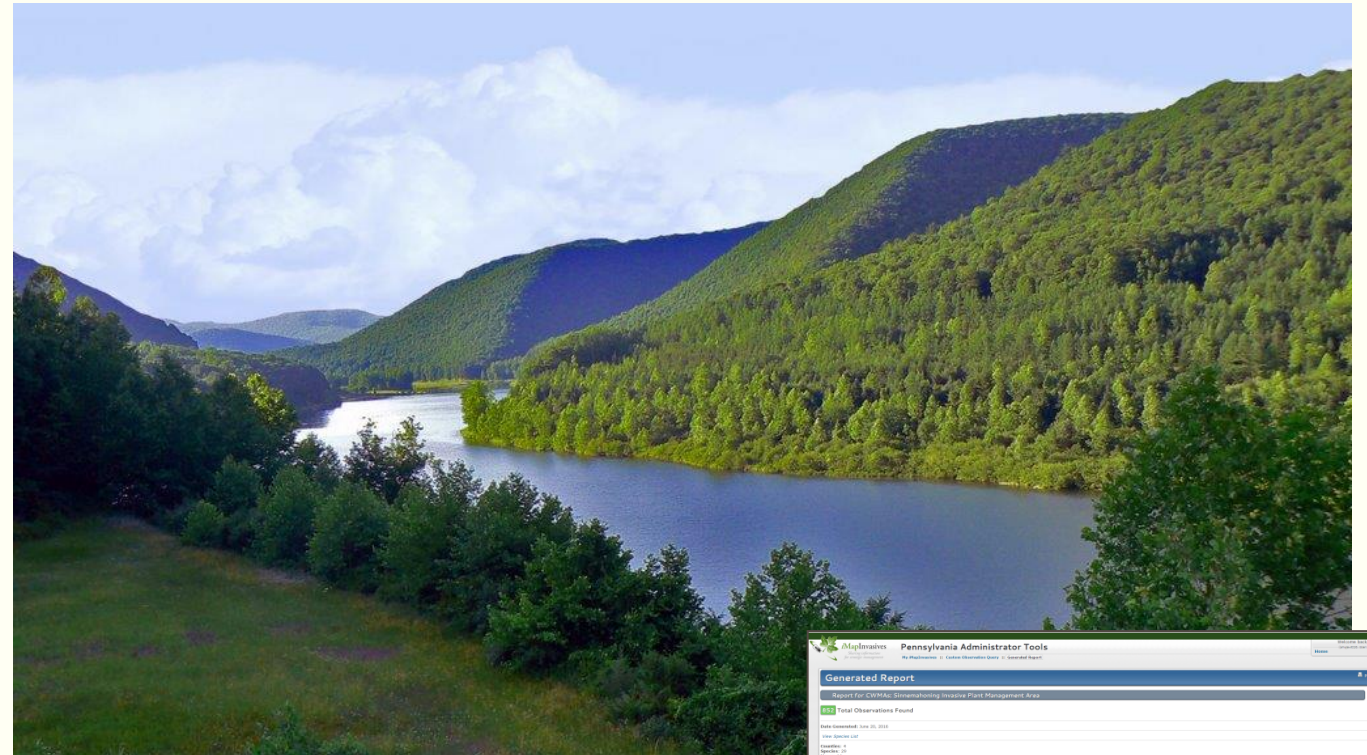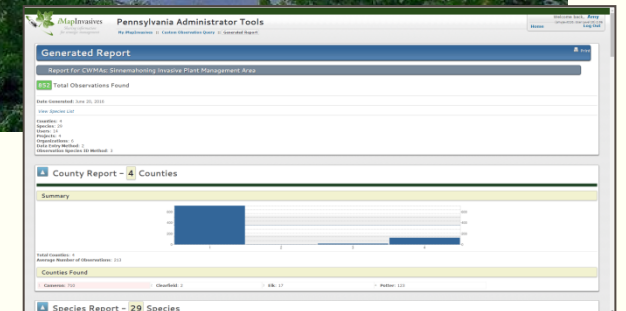 - A total of 29 species were observed by 14 users in 4 different iMapInvasives projects.

Photo credit: www.panoramio.com

DATA ANALYSIS VIA CUSTOM QUERIES

Making use of the Custom Observation Query Tool

Searching for Species Locations

Okay, so maybe you're interested in finding all the confirmed locations of a particular species.
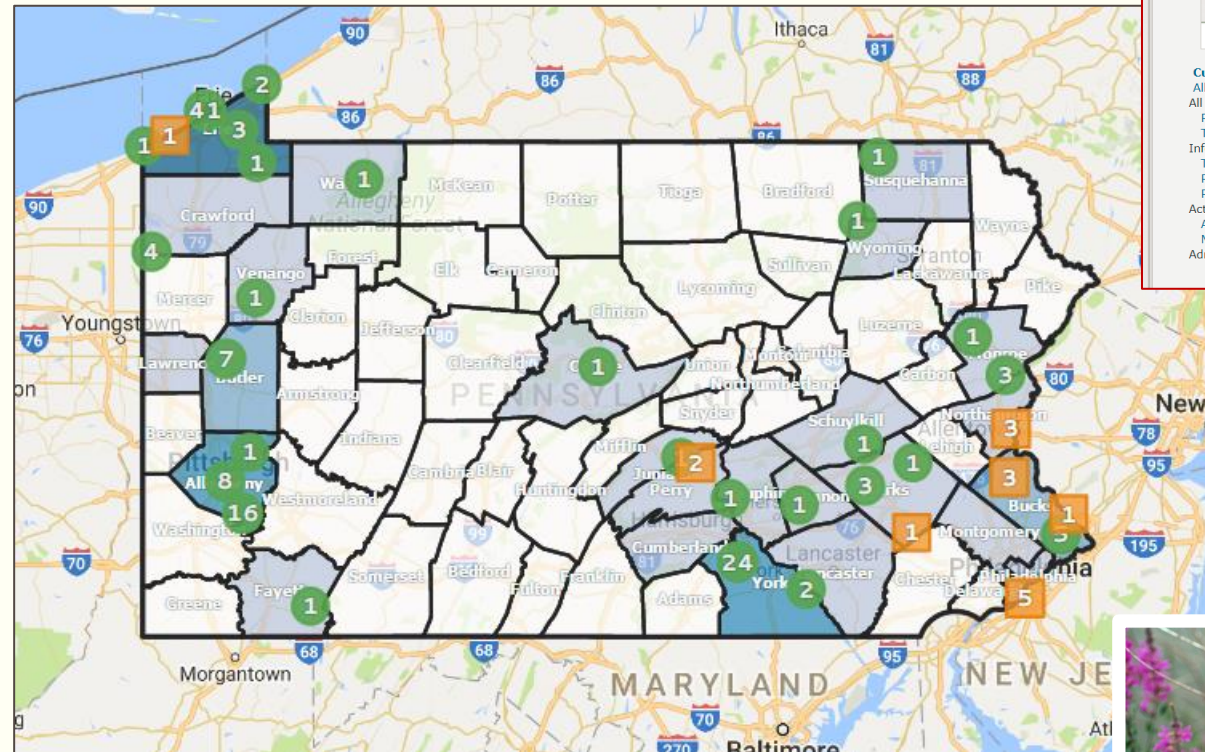
How do you query for this data?

Example: Show me all reported data for Purple loosestrife in Pennsylvania.

Custom Observation Query

- Click on "Query and Reports" from main navigation page.

- In "Species" section, select the "Plant" radio button.

- Then select "Purple loosestrife" from the Common name list, or "*Lythrum salicaria*" from the Scientific name list.

- Choose to view your data on the Map, in a Table, or in a Report.

- Report results
  - 149 observations
  - 25 impacted counties
  - 16 organizations submitting data

Map view of all Purple loosestrife data reported to iMapInvasives from across Pennsylvania.
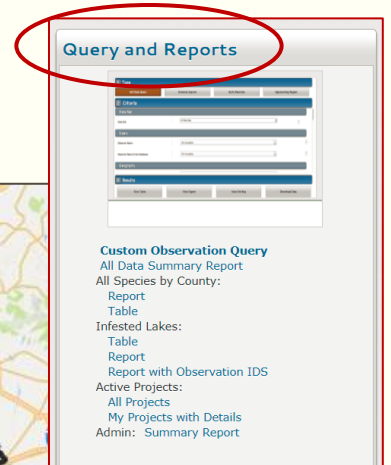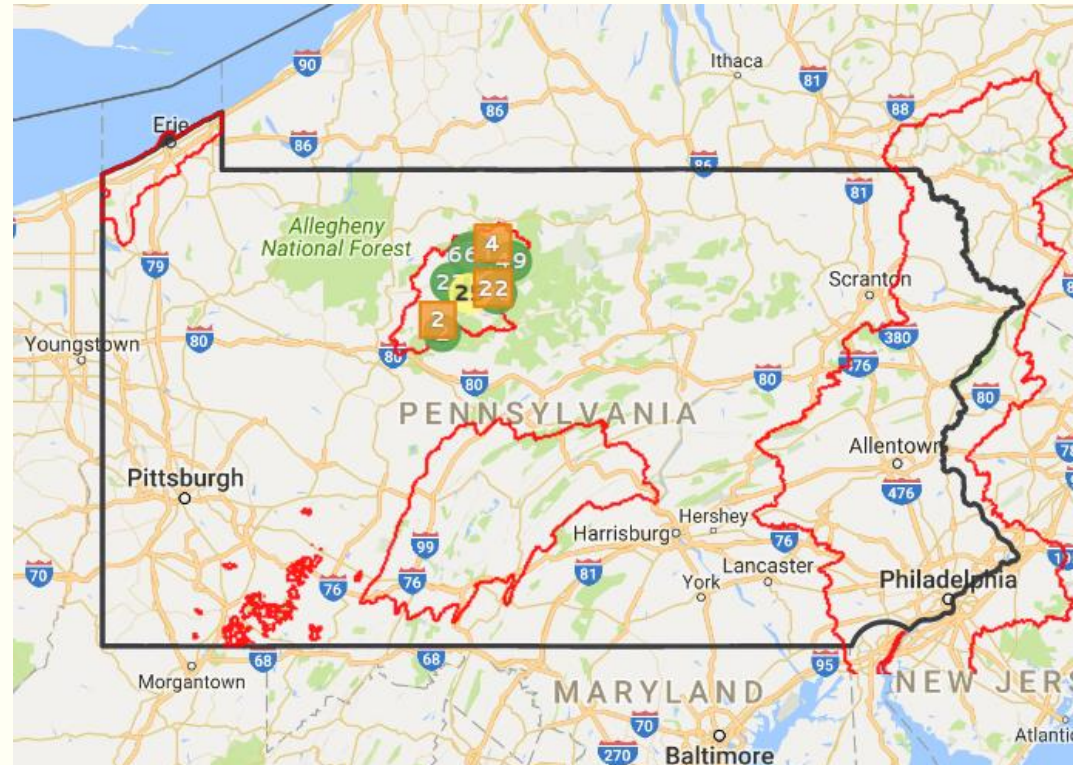
Custom Observation Query

Perhaps you're a land manager wanting to know all the various species that have been found in a particular area.

How do you query for this data?

Example: Show me all the data reported for species found in the Sinnemahoning Cooperative Weed Management Area (CWMA).

Custom Observation Query

- Click on "Query and Reports" from main navigation page.

- In "Geography" section, select "CWMAs" from the Geography Type list.

- Then in the "Geography Value" section, select "Sinnemahoning Invasive Plant Management Area".

- Choose to view your data on the Map, in a Table, or in a Report.

- Report results

  - 878 observations

  - 29 species reported

  - Species include various terrestrial and aquatic plants, one insect, and two aquatic animals. *(All species are listed individually in report.)*

Map view of all data reported to iMapInvasives that falls within the Sinnemahoning CWMA..
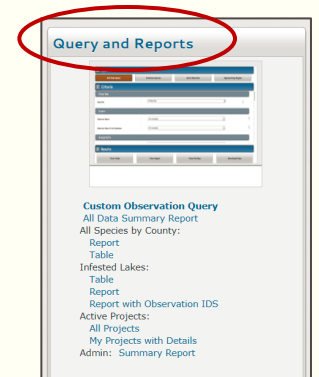
Custom Observation Query

In 2016, you partnered with two local organizations to gather data on invasive species. Now you want to know how much data has been reported to iMapInvasives and by who for that effort.

Example: Show me all data reported in 2016 by the following organizations:

- Pittsburgh Parks Conservancy

- Allegheny County Conservation District

- Western Pennsylvania Conservancy

Photo credit: Leelanau Conservancy

Custom Observation Query

- Click on "Query and Reports" from main navigation page.

- In the "Organization" section, select the three organizations previously mentioned.

- In the "Date Observed Range" section, choose "1/1/2016" as a start date and "12/31/2016" as an end date.

- Choose to view your data on the Map, in a Table, or in a Report.

- Report results

  - 240 observations

  - 29 species reported

  - 20 users submitting data (names provided)
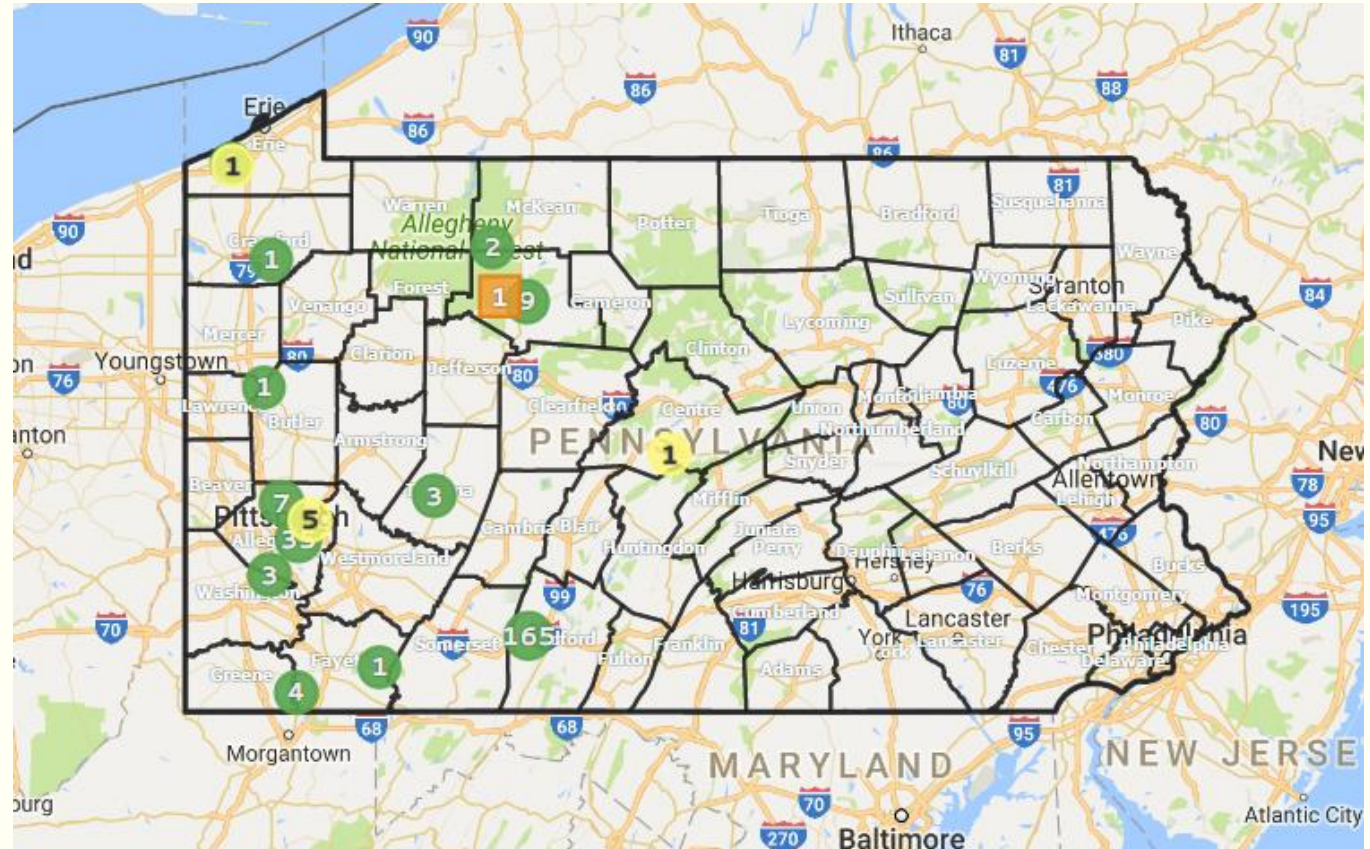
Note: For this particular example, another option would be to set up a "project" and tag all data collected by each organization as being part of this project. This would allow for the data to be easily searched for by a project member or downloaded by a project leader.

Custom Observation Query

You're a Watershed Specialist working for a local County Conservation District and want to know which invasive species have been found in a lake known for its recreational usage.

Example: Show me data for all the reported invasive species found in Lake Marburg (York County).

Photo credit: Live Trading News

Custom Observation Query

- Click on "Query and Reports" from main navigation page.

- In "Geography" section, select "Waterbody" from the Geography Type list.

- Then in the "Geography Value" section, select "Lake Marburg (York)".

- Choose to view your data on the Map, in a Table, or in a Report.

- Report results
  - 189 observations
  - 3 species reported
  - Species include Hydrilla, Eurasian-water milfoil, and Virile crayfish

Map view of all invasive species data points observed in Lake Marburg. To learn what species were found, choose to view your query in a Report.

Alligator-weed

Virile crayfish
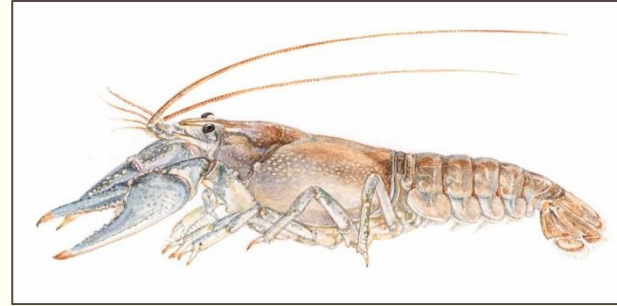
EARLY DETECTION & HIGH PRIORITY SPECIES

Be on the lookout for these and other important invasive species!

Early Detection Species

What is an "Early Detection" species?

An "ED" species is:

- Newly established in Pennsylvania.

- A species thought to be in Pennsylvania but is not well-documented.

- A species not found in Pennsylvania but expected to arrive (based on professional judgment).

- Considered to be at least moderately invasive.

Red Swamp Crayfish (*Procambarus clarkii*)
Photo credit: © Ted van den Bergh/Flickr

Examples of "Early Detection" Species – Alligator-Weed

- <u>Name</u>: Alligator-weed (*Alternanthera philoxeroides*)

- <u>Invasive Details</u>: Can alter ecosystem processes such as water flow, levels of dissolved oxygen, and rates of sedimentation.

- Severely impacts community structure and composition.

- Creates a dense layer in aquatic habitats that outcompetes other species for light.

- <u>Where is it Now?</u>: Found in various parts of North America. Though not in Pennsylvania, it is located nearby in Virginia, North Carolina, and Kentucky.

(Location data provided by NatureServe Explorer.)

Alligator-weed (*Alternanthera philoxeroides*)
Photo credit: Melissa McMasters/Flickr
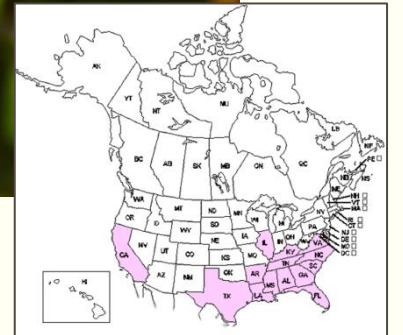
Examples of "Early Detection" Species – Golden Mussel

- <u>Name</u>: Golden mussel (*Limnoperna fortunei*)

- <u>Invasive Details</u>: Threatens native biodiversity by suffocating and starving native bivalves and biofouling in water systems.

- <u>Where is it Now?</u>: This species is not yet known to inhabit North America. Currently, it's been found in Argentina, Bolivia, Paraguay, Uruguay, and Brazil, as well as parts of Asia.

  (Location data provided by USGS NAS.)

Golden Mussel (*Limnoperna fortunei*)
Photo credit: The Pantanal Safari (blogger)

Examples of "Early Detection" Species - Nutria

<u>Name</u>: Nutria (or Coypu)
Myocastor coypus

<u>Invasive Details</u>: Destroys vegetation and habitat in wetlands by overgrazing.

<u>Where is it Now?</u>: Nutria is found in various parts of North America.

Specifically on the Eastern seaboard, Nutria is found in New Jersey, Delaware, Maryland, Virginia, North Carolina. In Canada, it can be found in Ontario.

(Location data provided by NatureServe Explorer.)

Nutria (*Myocastor coypus*)
Photo credit: Florida Wildlife Magazine

Examples of "Early Detection" Species – Bullseye Snakehead

Name: Bullseye Snakehead (*Channa marulius*)

Invasive Details: Has the potential to impact native fishes and crustaceans.

Where is it Now?: Established in Florida.

(Location data provided by NatureServe Explorer.)

Bullseye Snakehead (*Channa marulius*)
Photo credit: Vance Crain/Flickr

High Priority Species

What is a "High Priority" species?

An "HP" species is:

- Found in Pennsylvania but is not yet widespread.
    - Found in less than 1/3 of Pennsylvania counties
- Considered to be at least moderately invasive.

Banded Mysterysnail (*Viviparus georgianus*)
Photo credit: © Thomas Palmer/Flickr

Examples of "High Priority" Species – Common Frogbit

- **Name**: Common Frogbit (*Hydrocharis morsus-ranae*)

- **Invasive Details**: Forms large, dense free-floating mats which limit light penetration and nutrients.

- Reduces growth of native submerged aquatic plants.

- Can fill water column in shallow areas, strongly affecting much of the native aquatic life.

- **Where is it Now?**: In Pennsylvania, this species has been found in Warren and Mercer counties.

  (Location data provided by Pennsylvania iMapInvasives.)
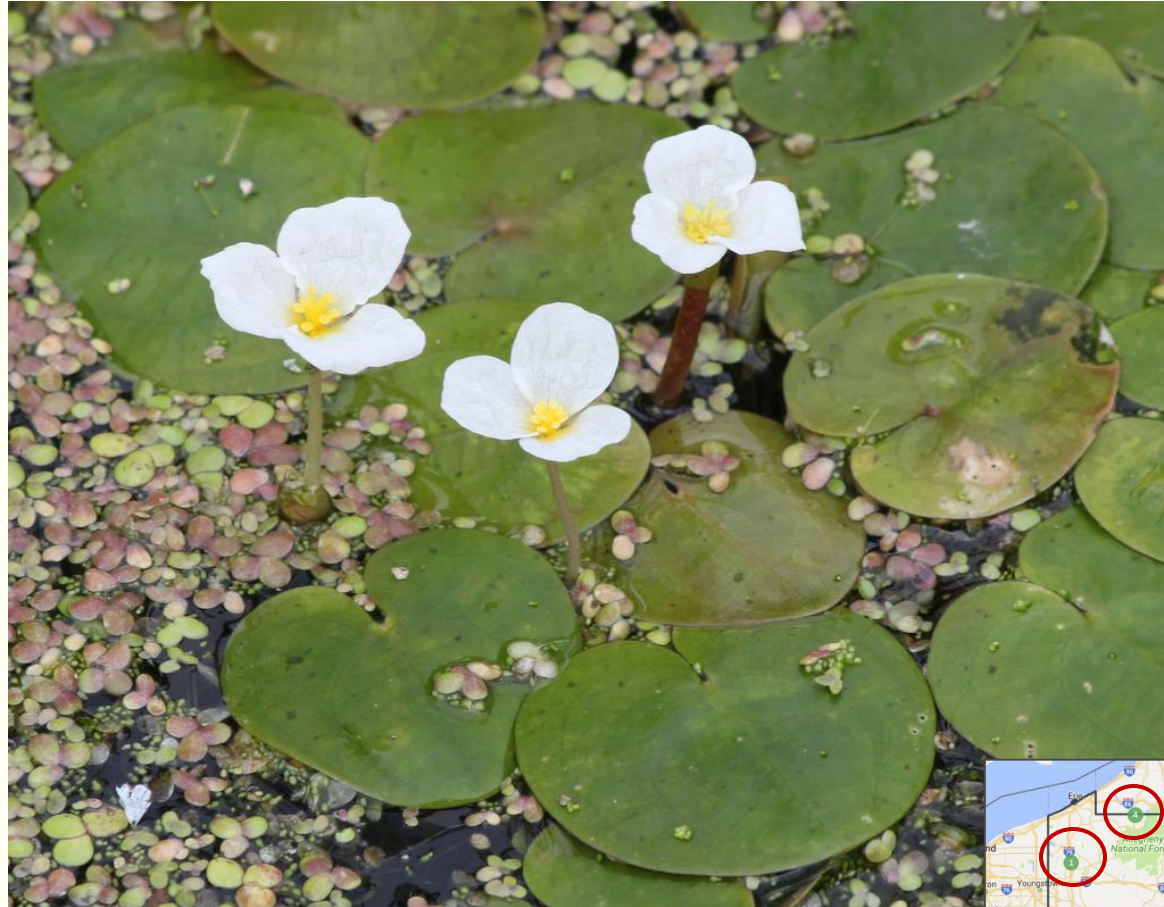
Common Frogbit (*Hydrocharis morsus-ranae*)
Photo credit: Hans Zwitzer/Flickr

Examples of "High Priority" Species – Virile Crayfish

- <u>Name</u>: Virile Crayfish (*Orconectes virilis*)

- <u>Invasive Details</u>: Competes with and displaces native fish and crayfish.

- Reduces snail, macroinvertebrate, and macrophyte abundance and biodiversity.

- <u>Where is it Now?</u>: Found in several watersheds located along the Pennsylvania/Maryland border.

(Location data provided by USGS NAS.)
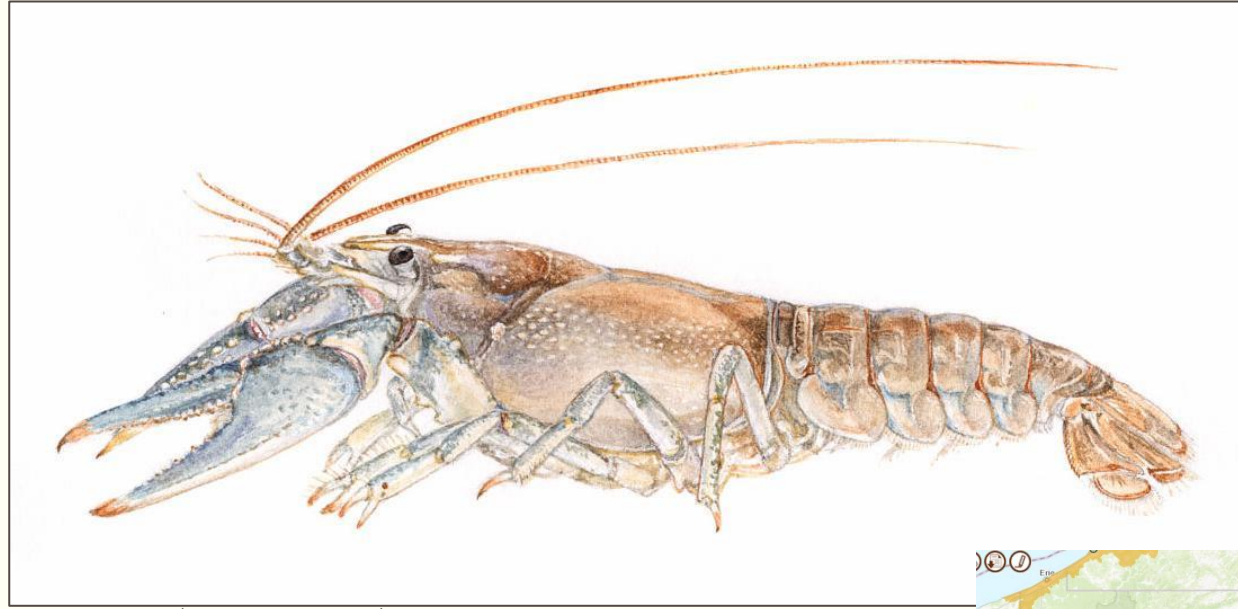
Virile Crayfish (*Orconectes virilis*)
Photo credit: Aleta Karstad/Flickr
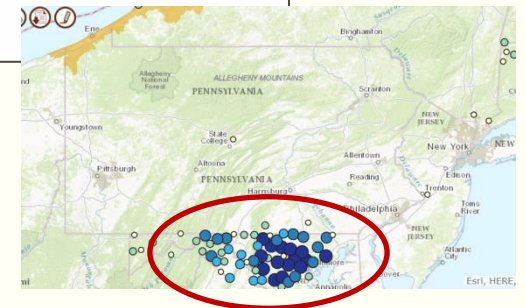
Examples of "High Priority" Species – European Swallow-Wort

- <u>Name</u>: European Swallow-Wort (*Cynanchum rossicum*)

- <u>Invasive Details</u>: Forms dense monocultures which displace native vegetation, alter habitats, and reduce biodiversity.

- Threatens rare and vulnerable ecosystems in the Lower Great Lakes Basin.

- <u>Where is it Now?</u>: According to the BONAP database, European swallow-wort has been found in Cumberland, York, Lancaster, and Chester counties in Pennsylvania.

(Location data provided by the Biota of North America Program.)

European Swallow-Wort (*Cynanchum rossicum*)
Photo credit: www.pbase.com

Examples of "High Priority" Species – Spotted Lanternfly

- <u>Name</u>: Spotted Lanternfly (*Lycorma delicatula*)

- <u>Invasive Details</u>: This insect has the potential to greatly impact the viticulture, tree fruit, plant nursery, and timber industries

- Poses a significant economical threat to Pennsylvania's agricultural industries (many of them worth <u>millions</u> or even <u>billions</u> of dollars).

- Early detection is vital to effective control measures.

- <u>Where is it Now?</u>: Quarantined areas in Pennsylvania currently exist in Berks, Bucks, Chester, Lehigh, Northampton, and Montgomery counties.

(Location data provided by the PA Department of Agriculture.)

Spotted Lanternfly (*Lycorma delicatula*)
Photo credit: The Morning Call

PA IMAPINVASIVES WEBSITE

A few highlights from our website!

Be on the Lookout!

- These are species which are not yet in Pennsylvania, but could arrive at any time.

- If you find any of these species, be sure to report your findings to iMapInvasives ASAP so the appropriate officials may be contacted.

- "Be an Early Detector" brochure available for download – created by PNHP staff.

Water Primrose
(Ludwigia grandiflora ssp. hexapetala)
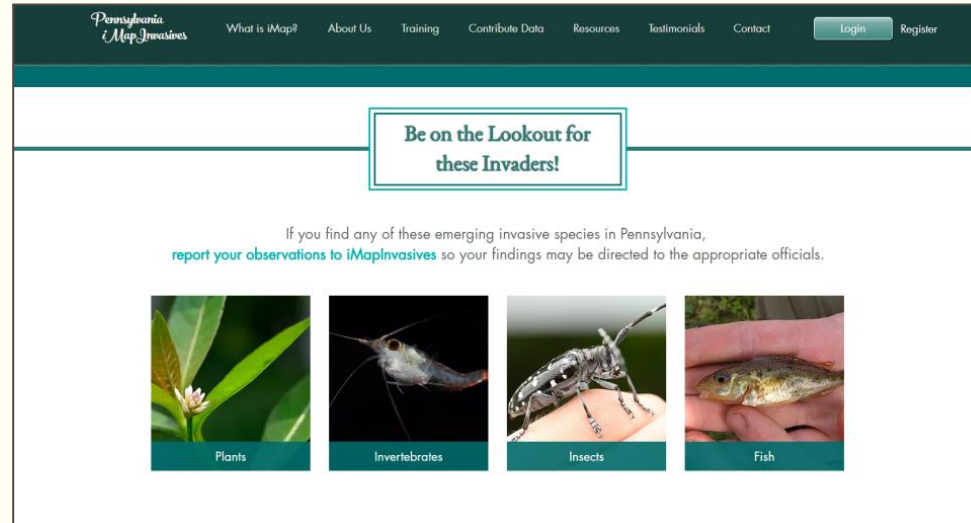
Tracked Species

Learn what species are tracked in Pennsylvania iMapInvasives by viewing all species at once, or choose to view by category:

- Early Detection

- High Priority

- Noxious Weeds

- PFBC Banned

- Terrestrial, Aquatic, & Wetland Plants

- Mammals

- Fish

- Birds

- Reptiles

- Invertebrates

- Diatoms

- Algae
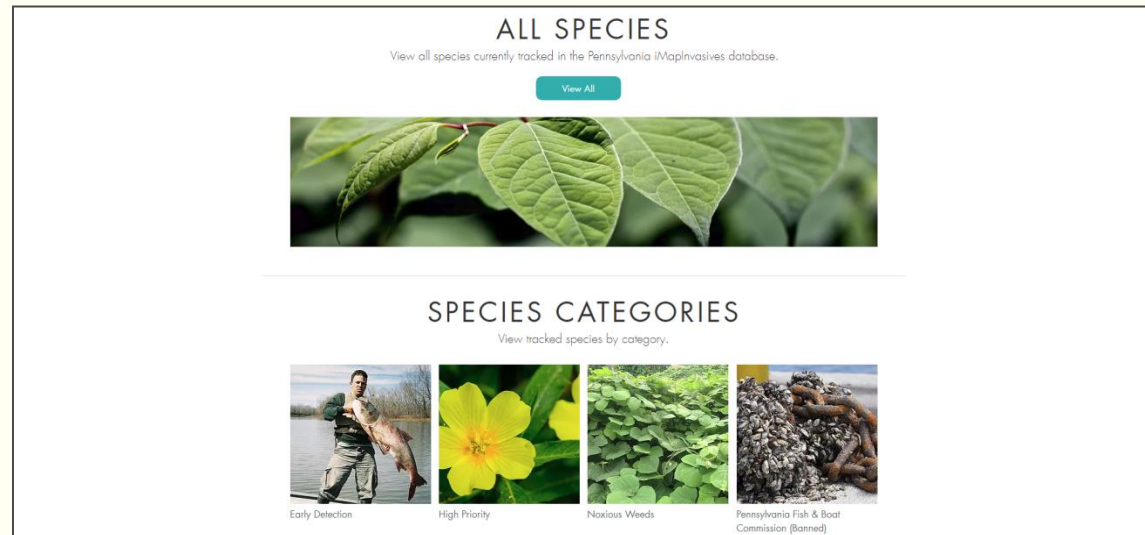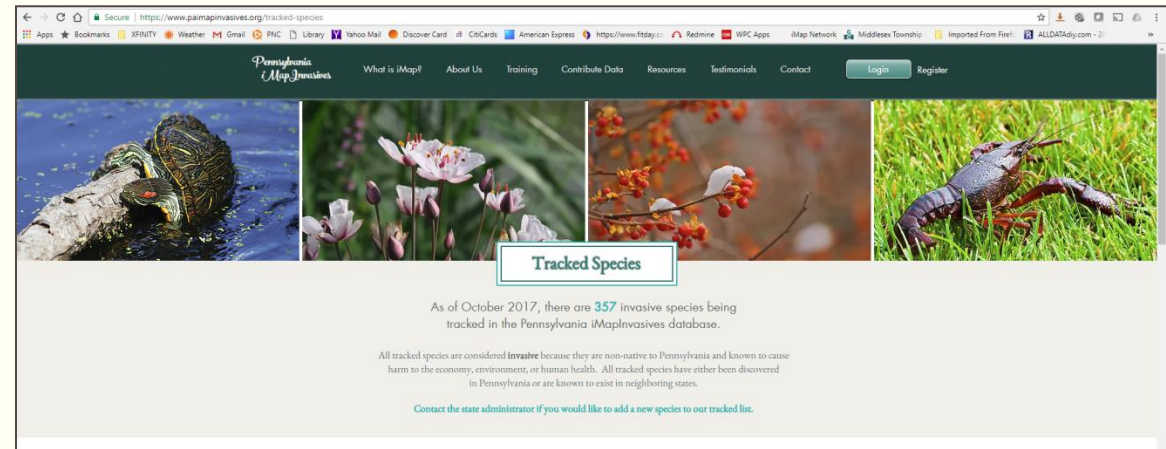
Gallery of Invaders

Learn about many of the species invading Pennsylvania as well as others found in nearby states by reviewing species profiles in our Gallery of Invaders.

Categories include:

- Aquatic & Facultative Plants

- Invertebrates

- Fish

- Reptiles

- Pathogens

- Algae
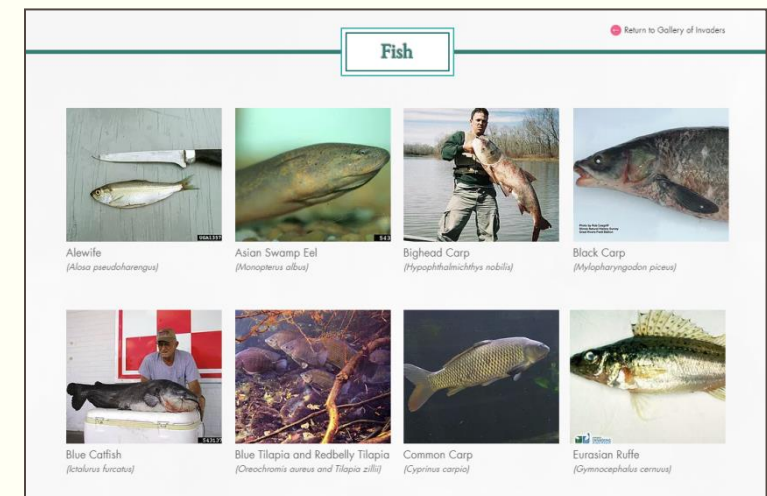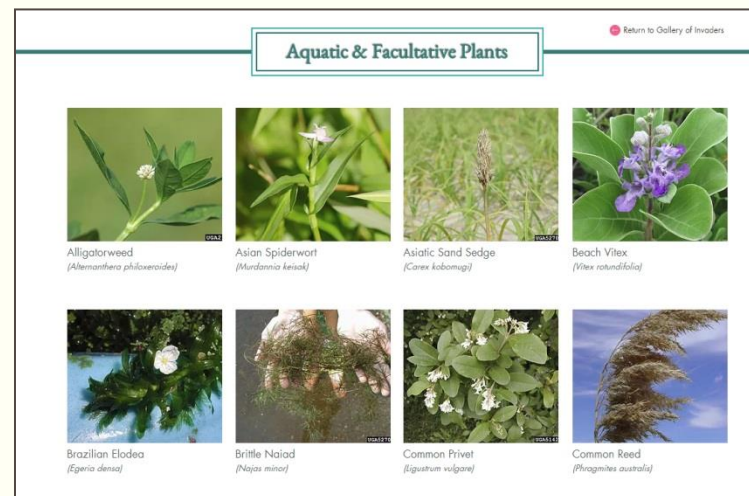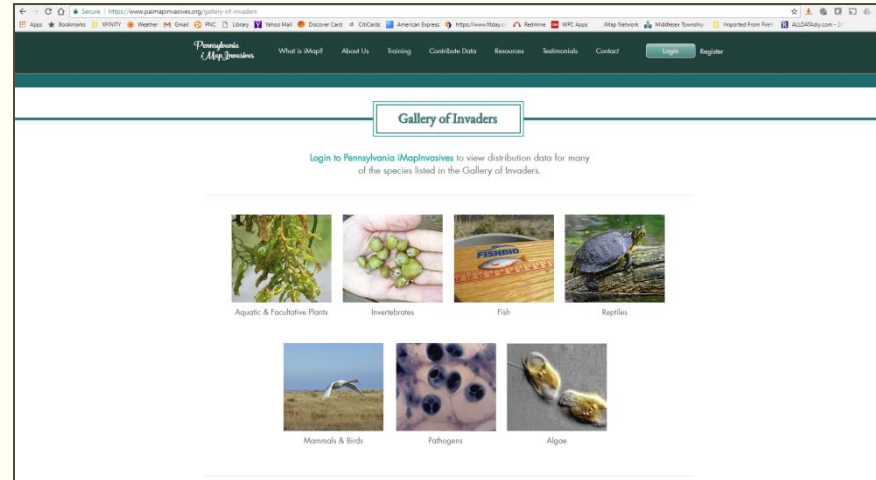
Newsletters – Read All About It!

- Read through our collection of quarterly newsletters and learn how people are putting iMapInvasives to use!

- Recent stories include:
  - Pittsburgh Parks Conservancy uses iMapInvasives to manage invasive species in city parks
  - Common frog-bit found for the first time in Lake Wilhelm in Mercer County
  - Get to know hardy kiwi vine (invasive species profile)
  - iMapInvasives testimonial from Benjamin Mummert, Director of Land Stewardship at the Central Pennsylvania Conservancy

Do you have a story to share regarding your use of iMapInvasives, or perhaps an important invasive species finding?

Send us your story!

Reference Guides and FAQs

FAQs

- Review our FAQs to become more familiar with the "in's" and "out's" of the iMapInvasives database.

Reference Guides

- Do you need assistance on how to use the tools available in iMapInvasives? Check out our reference guides which show various ways you can enter data, learn how to create email alerts, and refresh on querying capabilities.
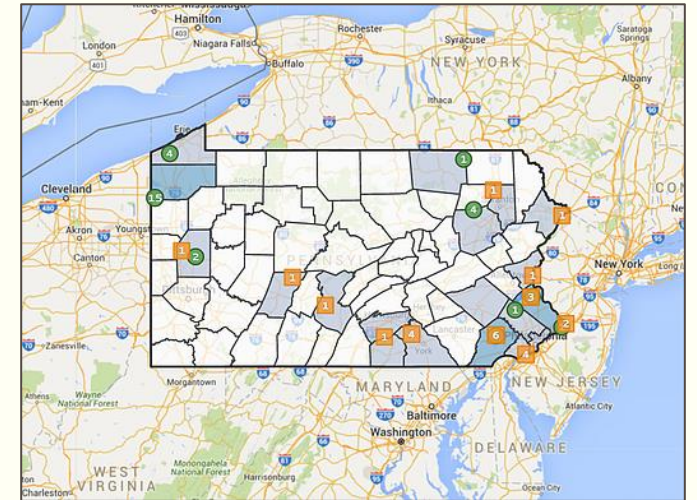
Upcoming Training Opportunities

- Reporting with the Mobile App
  - October 30, 2017
  - Report data to iMapInvasives while in the field.

- Advanced Training
  - November 9, 2017
  - Learn how to enter assessment, survey, treatment, and infestation management data.

- Examples of Using iMapInvasives
  - December 12, 2017
  - Hear stories of how people all across Pennsylvania are putting iMapInvasives to use.

Register to attend one or all three of these trainings here!

CLICK HERE »

Almost Done… Share Your Feedback

Questions for webinar participants:

1. Name one thing you learned today about iMapInvasives that is relevant to your work with invasive species.

2. Is there anything you would like to know that was not covered during today's training?

Questions?

Amy Jewitt

Pennsylvania iMapInvasives Coordinator

ajewitt@paconserve.org

412-586-2305

www.paimapinvasives.org