Using Invasive Species Data and Tools to Inform Management Priorities

Jennifer Dean
NY Natural Heritage Program
FEMC Annual Meeting
December 13, 2019
www.nyimapinvasives.org

iMapInvasives
Sharing information for strategic management

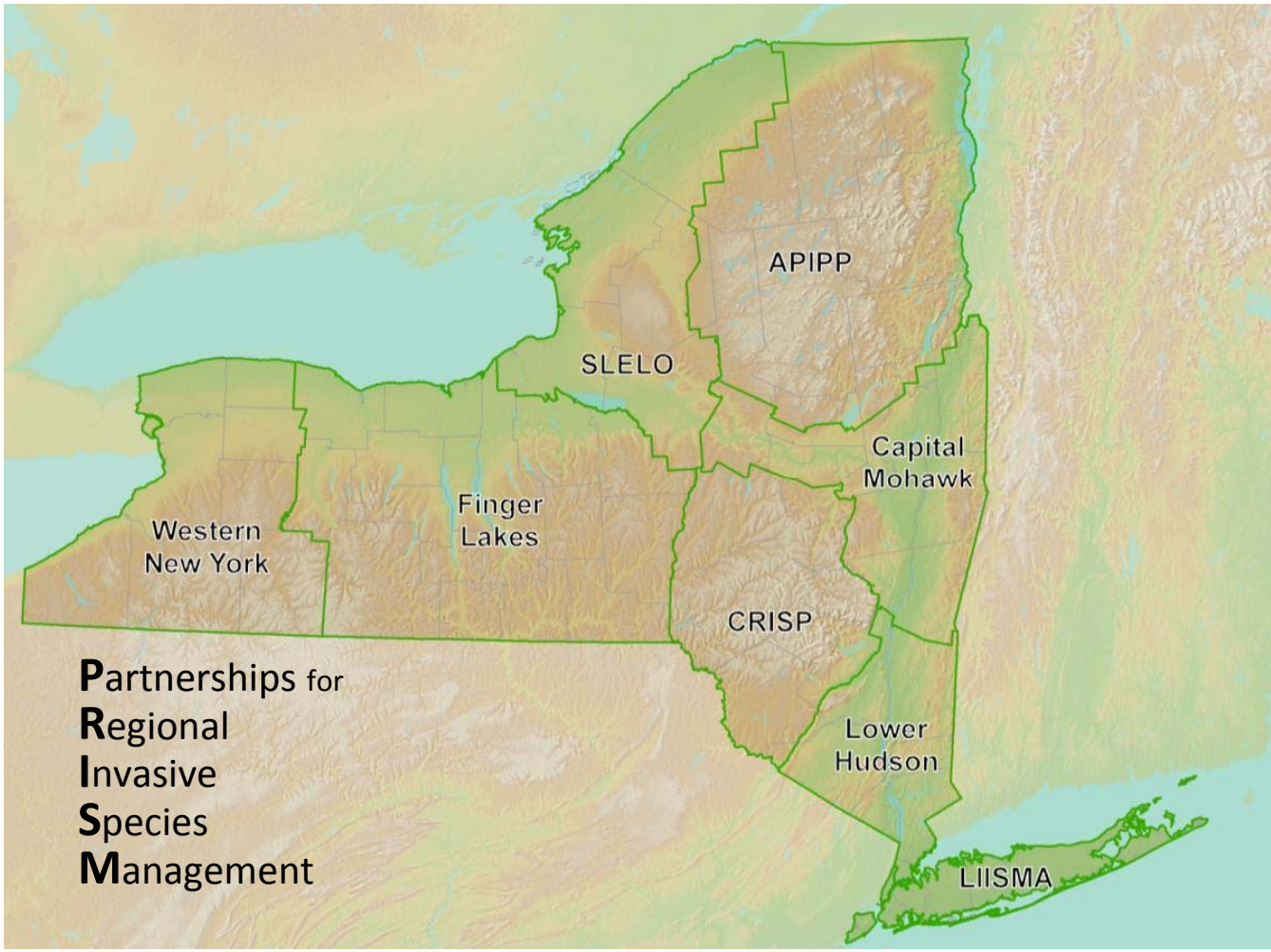
Coordinated invasive species efforts across New York

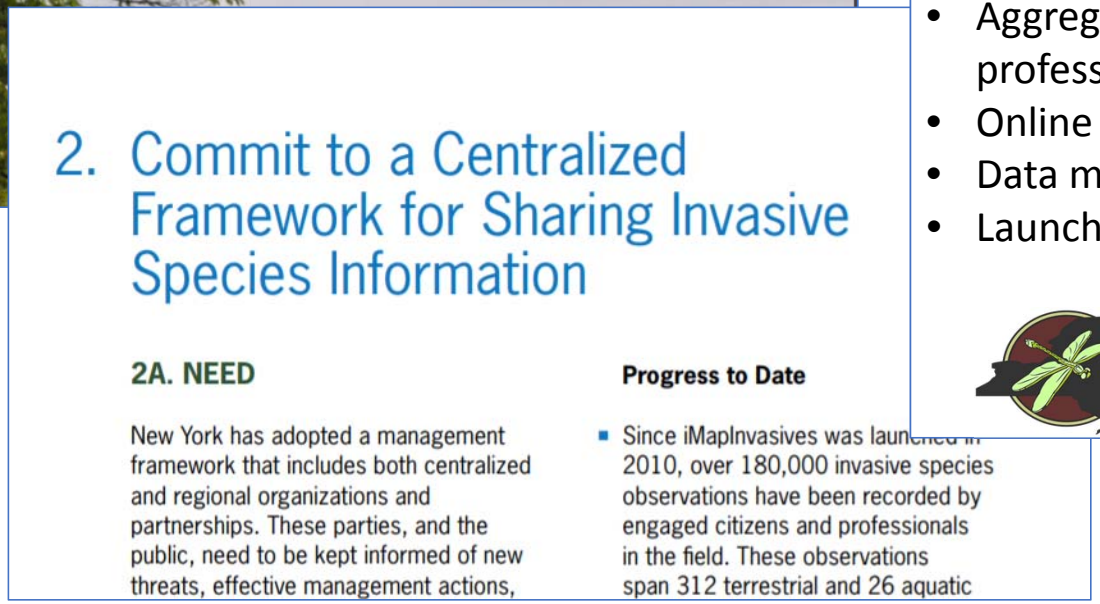
- NYS Agency programs
- PRISMs = Regional hubs
- Invasive species council
- Advisory Committee
- Research Institute
- Information sharing

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE OF OPPORTUNITY. | Agriculture and Markets

NEW YORK STATE | Parks, Recreation and Historic Preservation



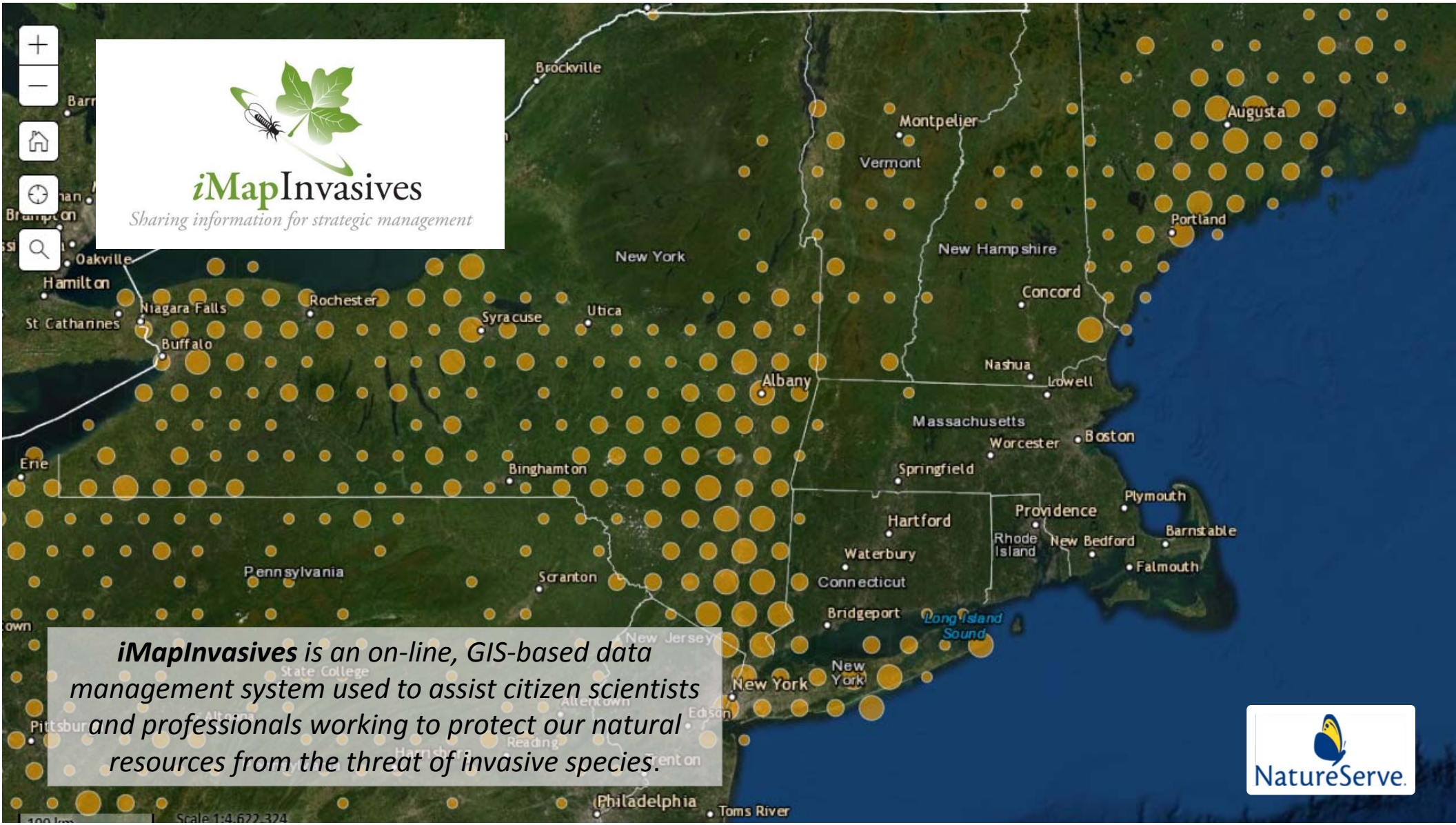


New York State's standardized and centralized invasive species database

- Aggregates data from the public and professionals
- Online and GIS-based for easy data sharing
- Data managed by NYNHP through NYS DEC
- Launched in 2010

New York Natural Heritage Program

NEW YORK STATE OF OPPORTUNITY Department of Environmental Conservation

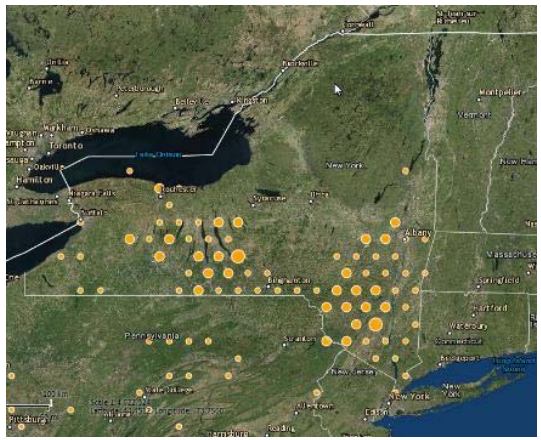

iMapInvasives
Sharing information for strategic management
Brockville
Montpelier
Augusta
Vermont
Portland
New Hampshire
New York
Concord
Oakville
Hamilton
Niagara Falls
Rochester
Syracuse
Utica
St Catharines
Buffalo
Albany
Nashua
Lowell
Massachusetts
Worcester
Boston
Erie
Binghamton
Springfield
Plymouth
Providence
Hartford
Barnstable
Rhode Island
New Bedford
Waterbury
Falmouth
Pennsylvania
Scranton
Connecticut
Bridgeport
Long Island Sound
New Jersey
New York
New York
State College
Allentown
Edison
Reading
Trenton
Philadelphia
Toms River
Scale 1:4,622,324
iMapInvasives is an on-line, GIS-based data management system used to assist citizen scientists and professionals working to protect our natural resources from the threat of invasive species.
NatureServe

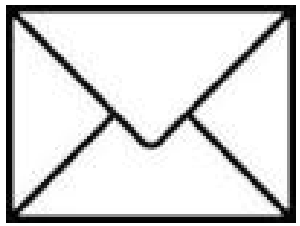
iMapInvasives as New York's centralized database

Reporting tools and data uploads

Tracking Control Efforts and Results

Species Distributions and Reports

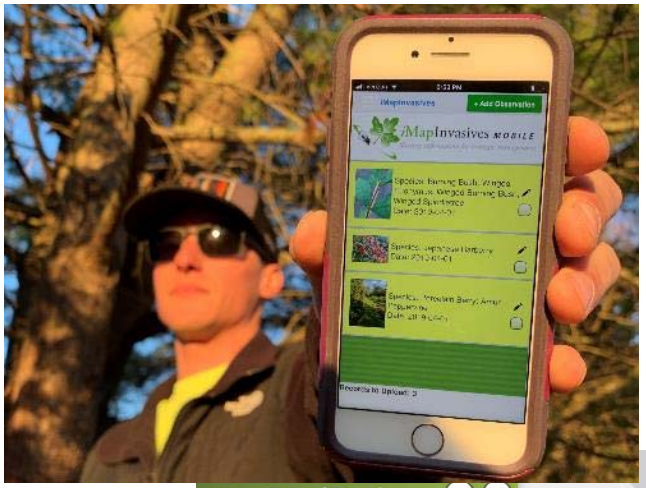


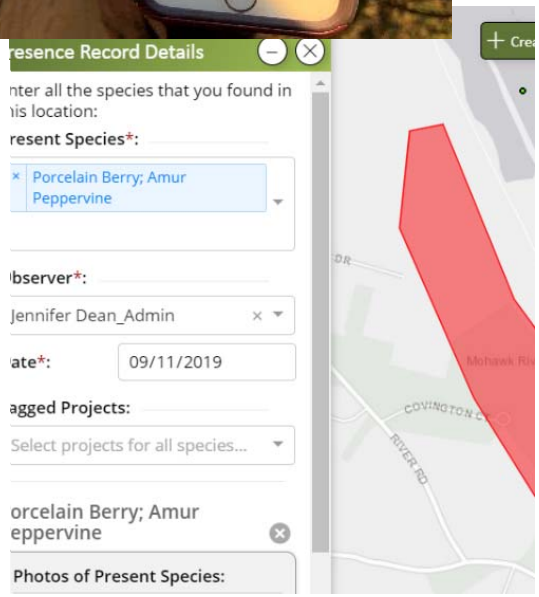


Early Detection Alerts

Aggregating data from many sources

- Uploads / Crosswalks of existing data from partner organizations
    - Local, State, and Federal Agencies
    - Land/ Water Managers
    - Researchers
    - Museum Data
- Data entered by citizen scientists & professionals
- Data collected via custom mobile tools
    - Esri Collector and Survey 123





Web Map Services from iMapInvasives:

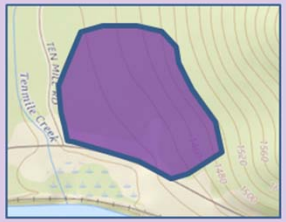
Bring in the live data to partner ArcGIS and web applications

NYIS.info website is embedding live maps of confirmed species data

Types of data within iMapInvasives

Searched Area

Where did you look?

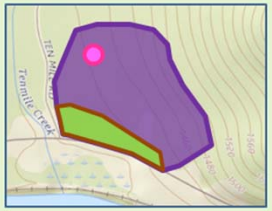


Polygon showing the area covered that day, at that site, while looking for and/or treating invasive species.

- *Base record to all other types.*

Presence

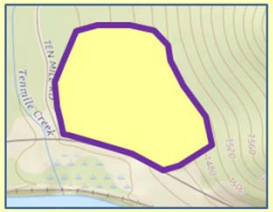
What did you find?



Location(s) (polygon, line, or point) that document one or multiple species present per location

Not Detected

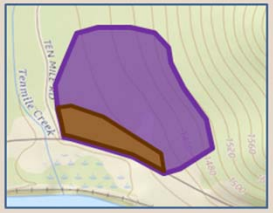
What didn't you find?



One or more species looked for but not found.

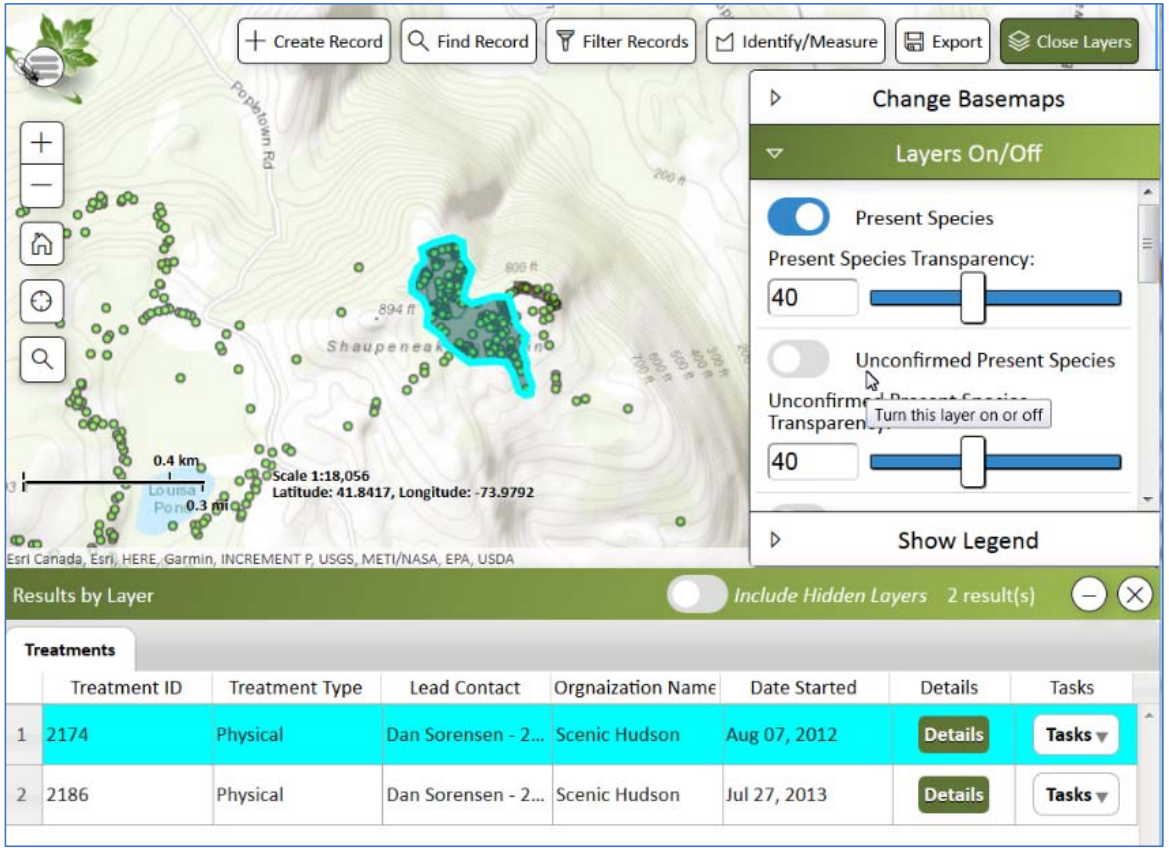
Treatment

What did you treat?



Polygon(s) within, or same area as, the parent Searched Area record

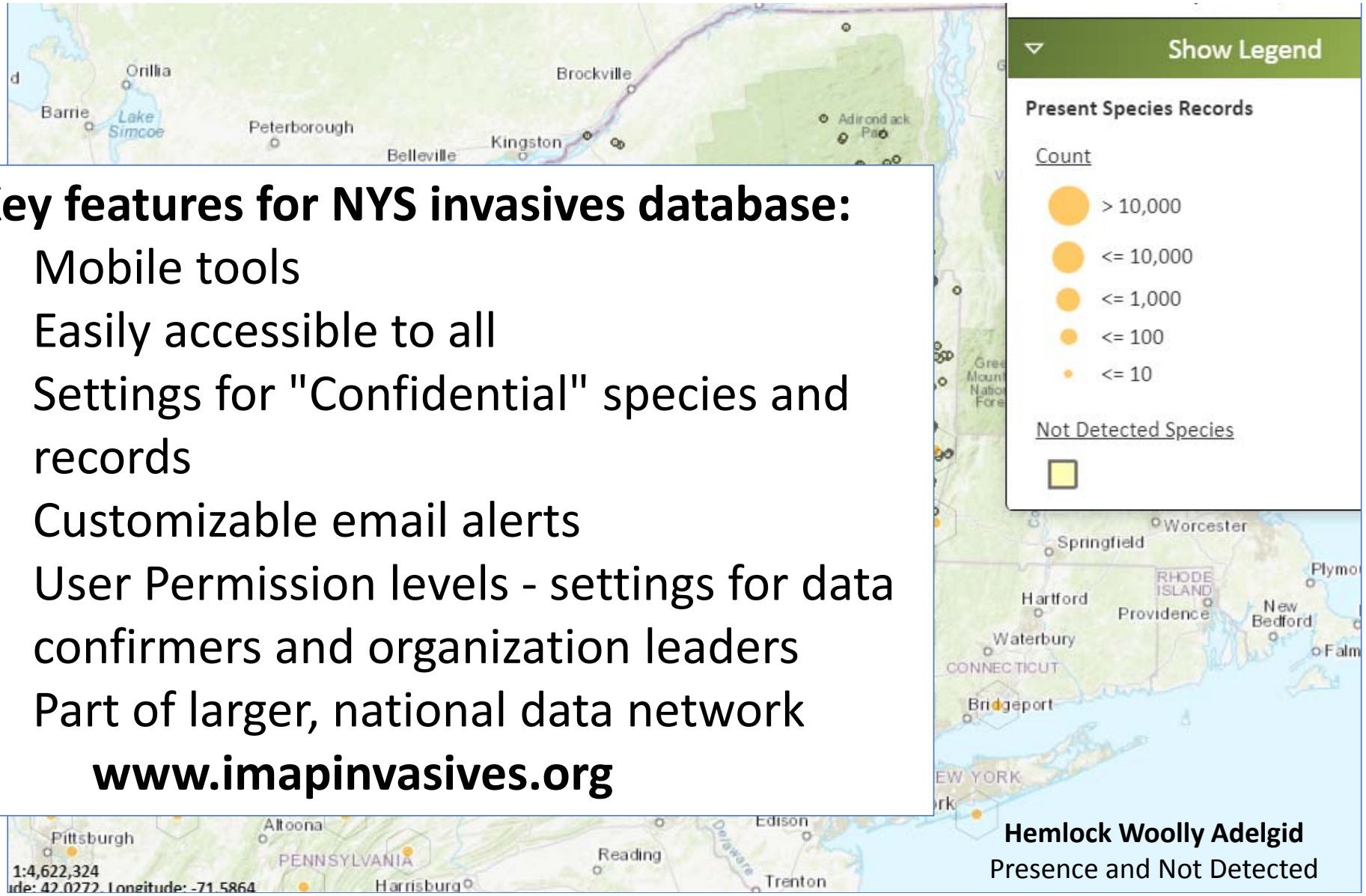
- mechanical, chemical, or biological



Key features for NYS invasives database:

- Mobile tools
- Easily accessible to all
- Settings for "Confidential" species and records
- Customizable email alerts
- User Permission levels - settings for data confirmers and organization leaders
- Part of larger, national data network

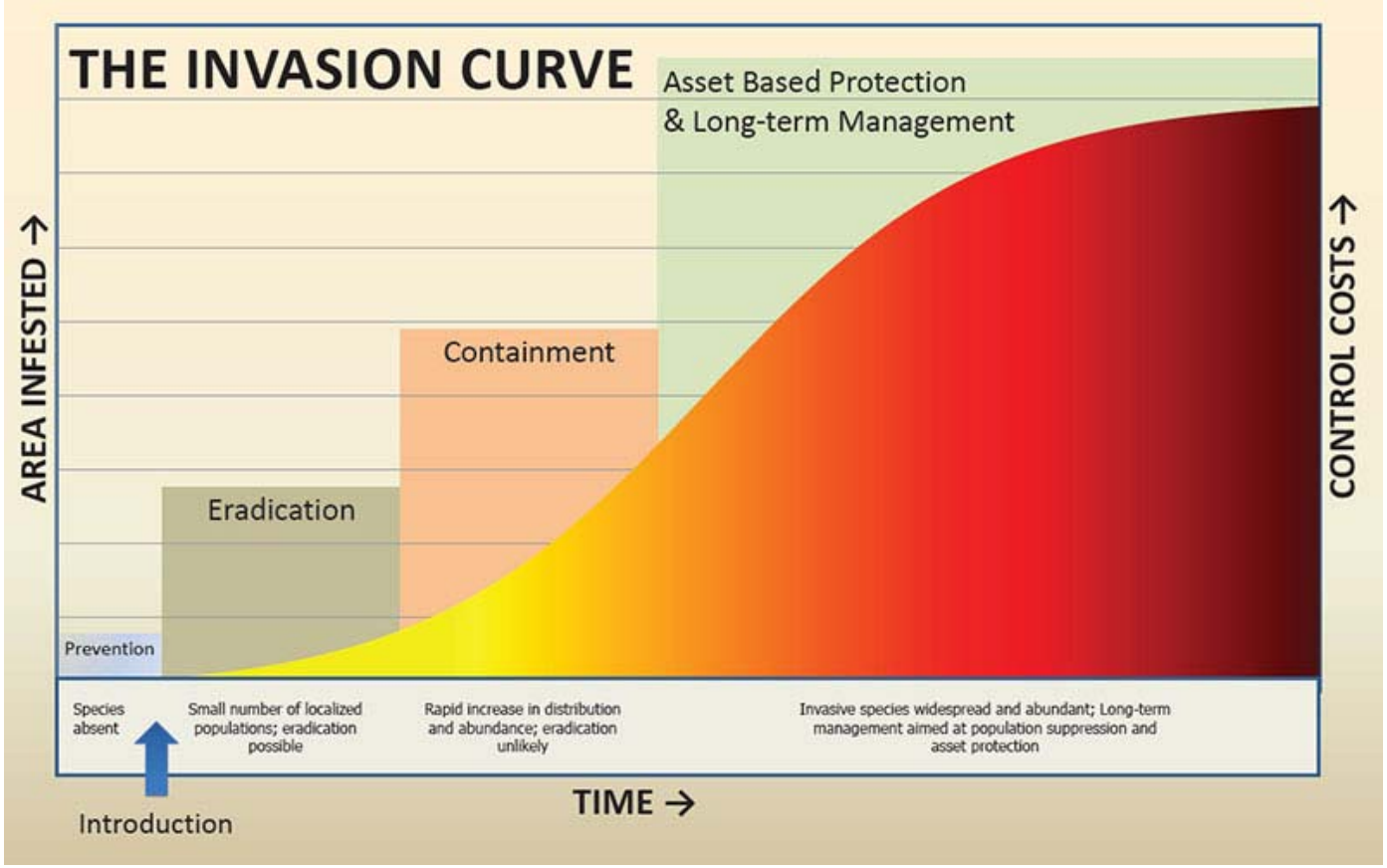
www.imapinvasives.org



Hemlock Woolly Adelgid
Presence and Not Detected

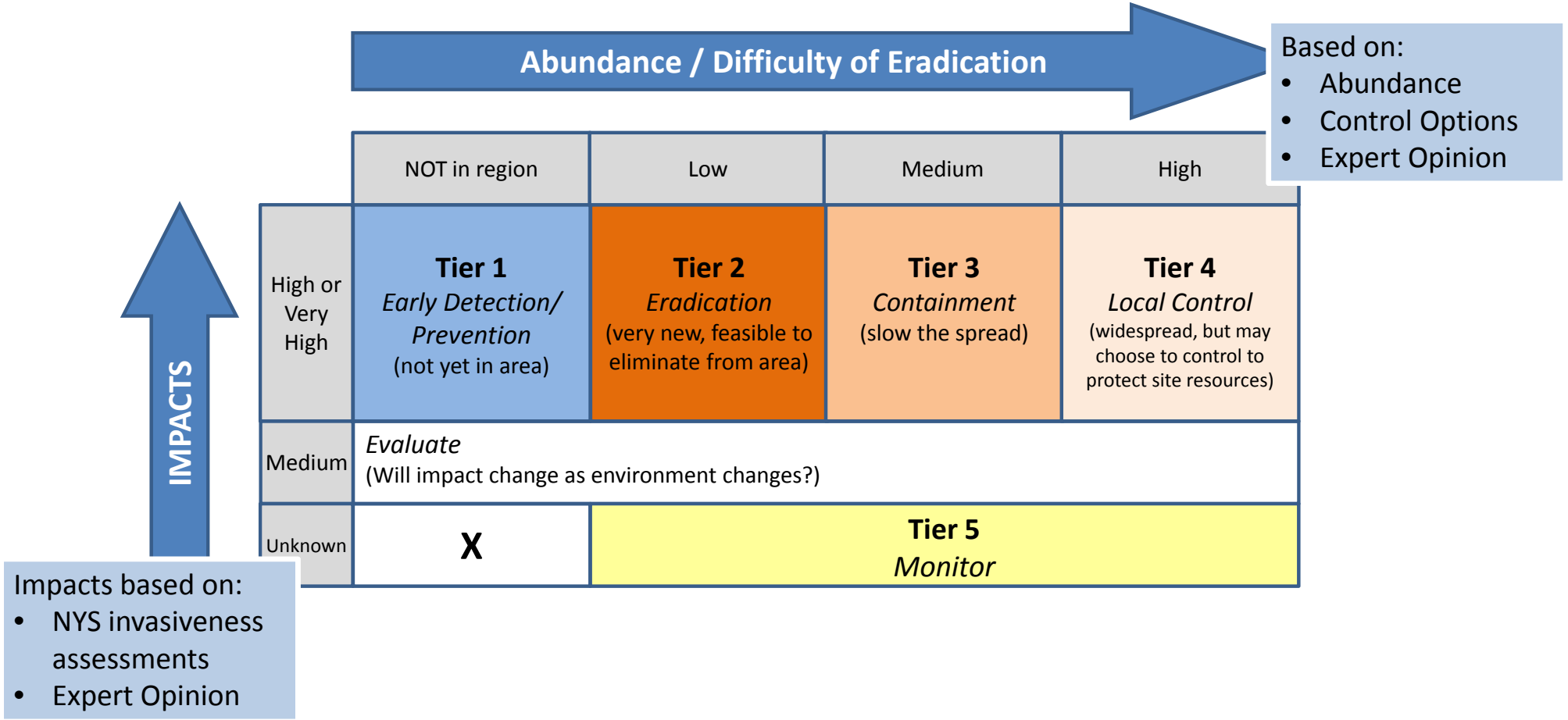
Being Strategic:

Using the data to prioritizing invasive species survey and control efforts



- Can we reduce pathways of invasion?
- Which species should we target first?
- Where will our efforts have the biggest impact?
- Will our projects be effective?

Species Tiers – creating locally-specific invasive species lists using a standardized process



Species Tiers – creating locally-specific invasive species lists using a standardized process

Terrestrial Invasive Plant Species:

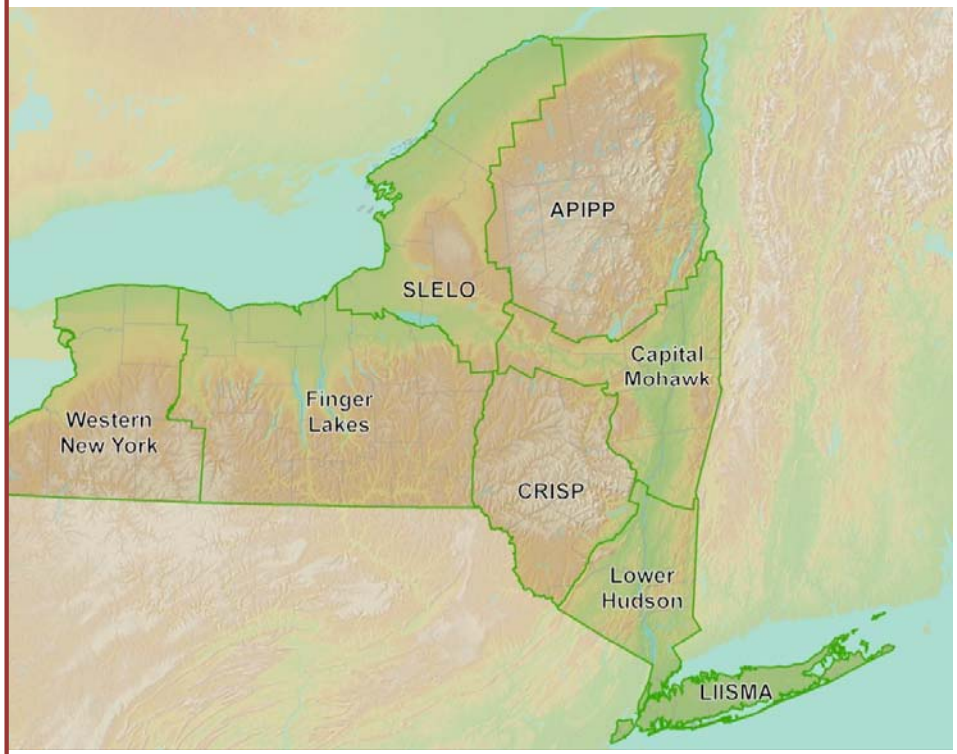
Tier 1:

1a: *Actinidia arguta*, Hardy Kiwi, Taravine
Actinidia polygama, Silver Vine
Ampelopsis brevipedunculata, Porcelain Berry
Aralia elata, Japanese Angelica Tree
Cytisus scoparius, Scotch Broom
Dioscorea polystachya, Chinese Yam
Lonicera maackii, Amur Honeysuckle
Phellodendron amurense, Amur Corktree
Pueraria montana var. lobate, Kudzu
Salix cinerea, Gray Florists willow
Salvia glutinosa, Sticky Sage
Schoenoplectus mucronatus, Bog Bulrush (one historical record in CapMo)

1b: *Corydalis incisa*, Incised Fumewort
Oplismenus hirtellus, Wavyleaf Basketgrass

Tier 2

Acer pseudoplatanus, Sycamore Maple
Arthraxon hispidus, Small Carpgrass, Hairy Joint Grass, Jointh
Clematis terniflora, Japanese Virgin's Bower, Sweet Autumn
Eleutherococcus pentaphyllus, Five-leaf Aralia
Ficaria verna ssp. Verna, Lesser celandine, Fig Buttercup



Prioritizing locations:

Where will our invasive species efforts have the biggest impact?

- Protected areas
- High conservation value
- Recreation destinations
- Agricultural resources
- High risk areas
- Areas NOT yet heavily invaded

Spatial modeling to prioritize invasive species efforts

GOAL - Help Natural Resource Managers prioritize where to focus resources for Early Detection surveys and invasive species control by coupling conservation value and risk of spread.

Basic Steps:

1) Compiled spatial data on factors influencing invasive control decisions
   - Used layers with statewide coverage and fine scale resolution
2) Created new synthesis layers
   - Driven by stakeholder feedback and expected uses

Conservation value

Protection Status

Risk of Spread

Model component details: Ecological Significance

Rare species locations, significant communities, and element distribution models

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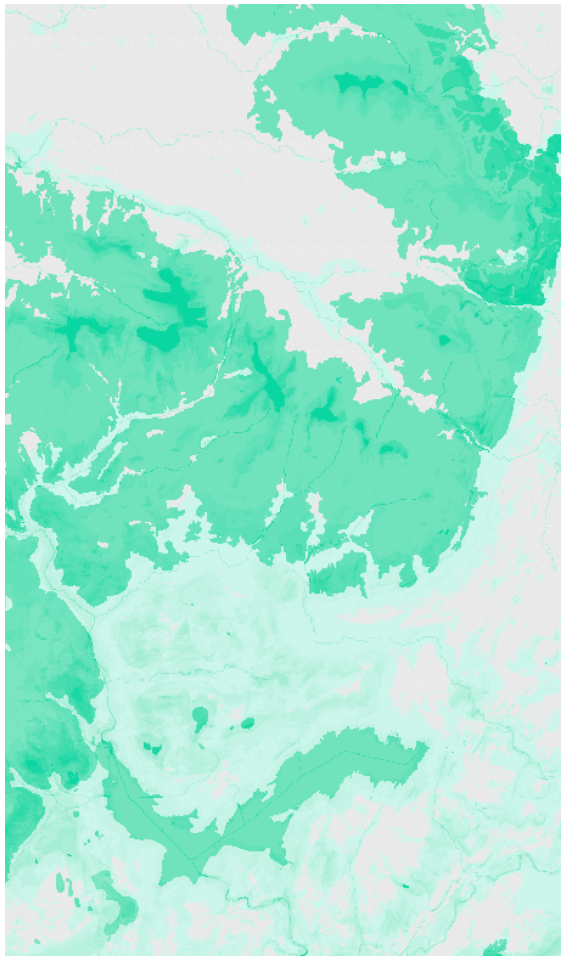
Stream Biomonitoring Unit

Biological Assessment Profile (stream quality metrics)

Ryan Hagerty; USFWS

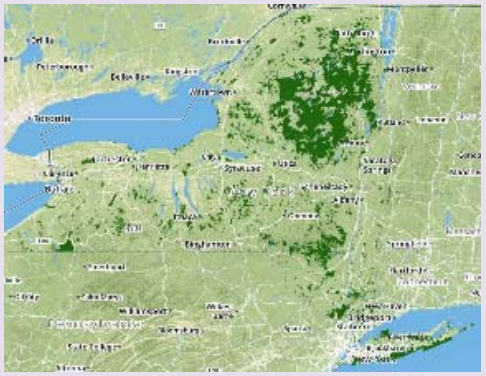
Predicted native mussel richness



Model component details: Protected or Natural

NYPAD

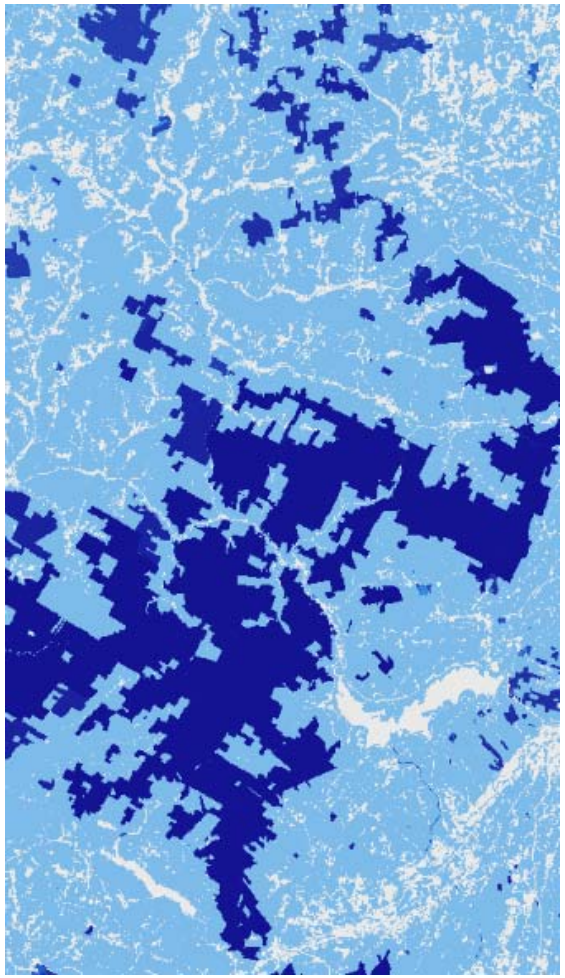
New York Protected Areas Database



Further lifted by NYNHP Biodiversity Index score

National Land Cover Database

Cover Type = Natural Cover

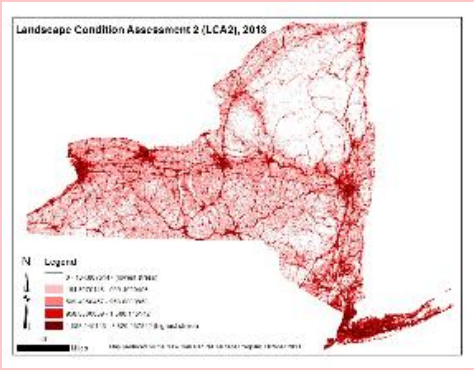


Model component details: Risk of Spread

Landscape Condition Assessment (LCA)

- Transportation network
- Urban and Industrial Development
- Utility Corridors
- Land use-Land Cover

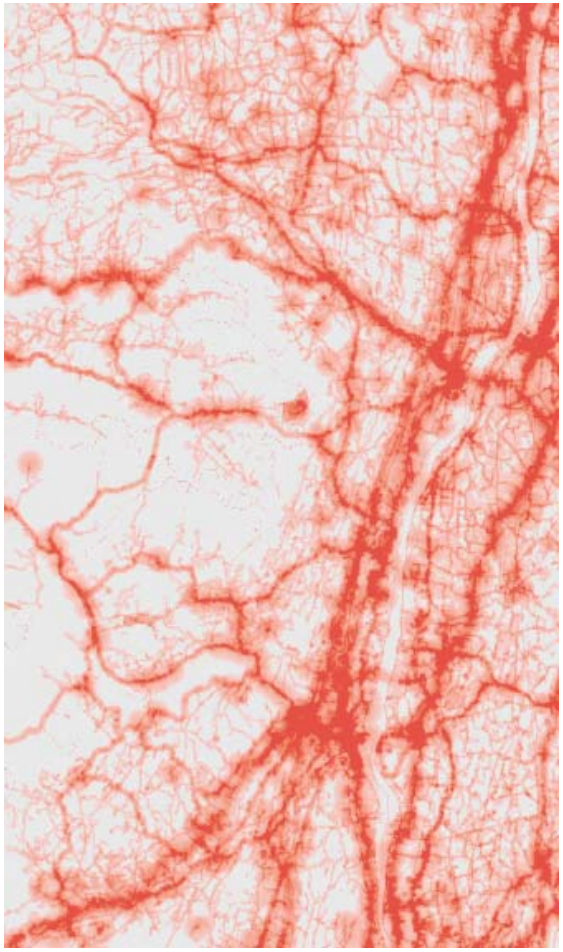
created by NYNHP



Recreation Use of Natural Areas

- Boat Launches
- Campgrounds
- Trailheads

From NYS DEC data

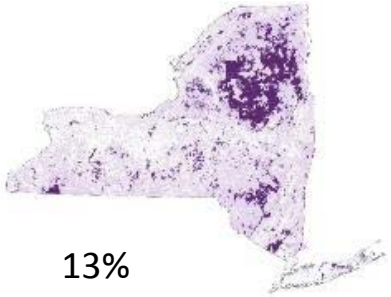


Comprehensive Score:
Ecological Significance + Protected or Natural + Risk

Ecological Significance

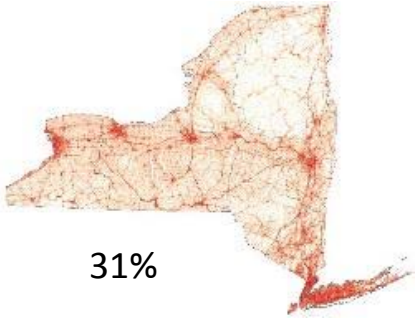
56%

Protected or Natural



13%

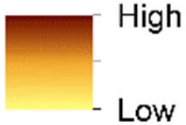
Risk of Spread

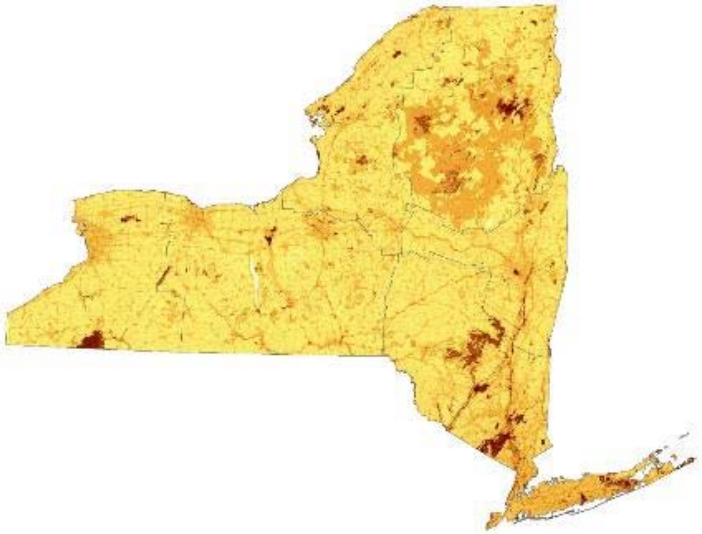


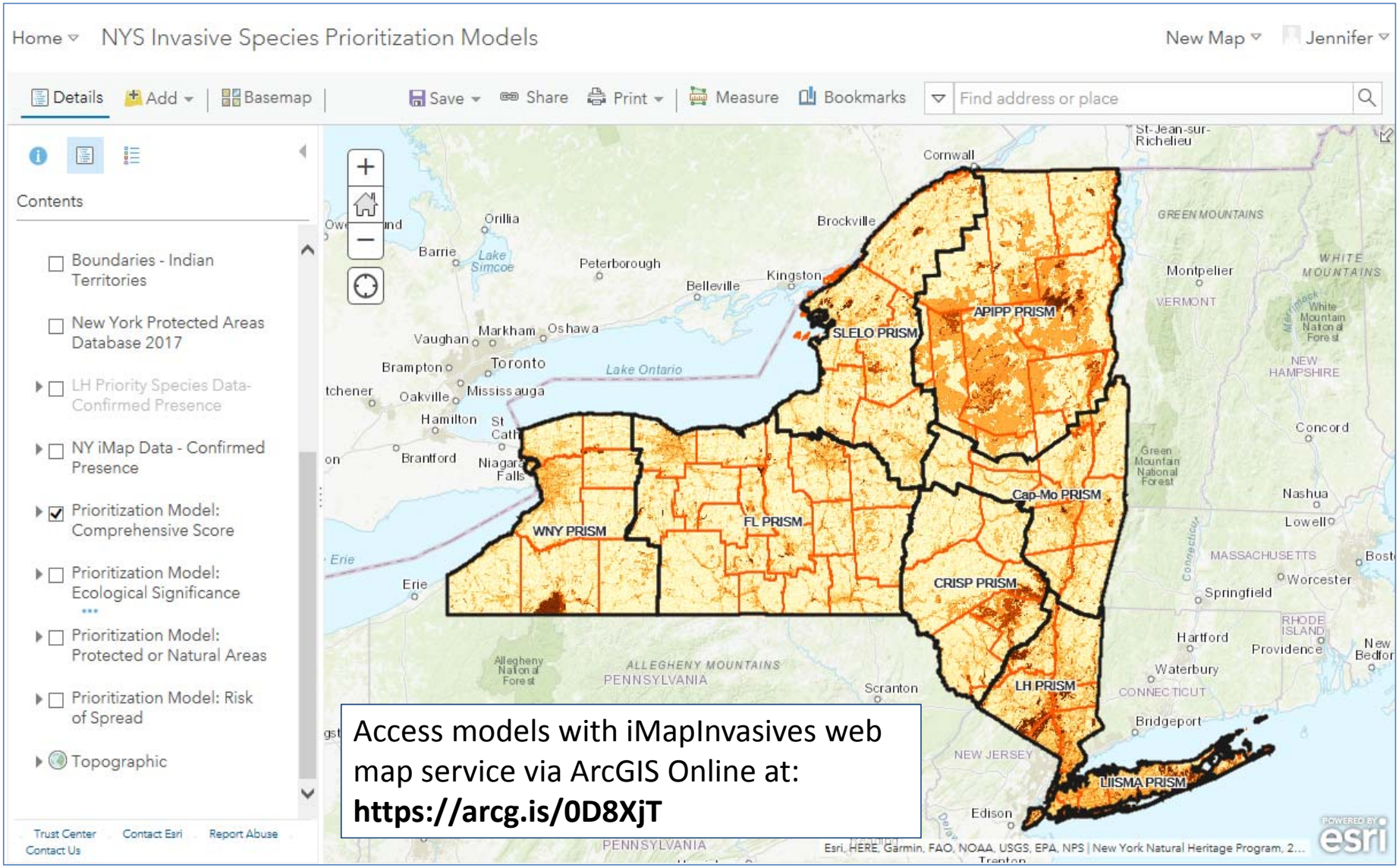
31%

Comprehensive Score

Areas of high conservation value with high risk of new invasions and dispersal



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NYS Invasive Species Prioritization Models
New Map
Jennifer
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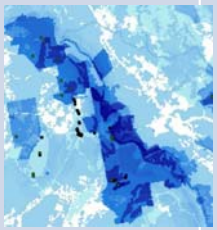
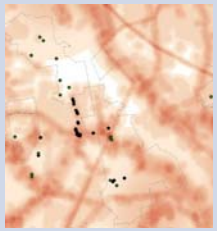
Boundaries - Indian Territories
New York Protected Areas Database 2017
LH Priority Species Data-Confirmed Presence
NY iMap Data - Confirmed Presence
Prioritization Model: Comprehensive Score
Prioritization Model: Ecological Significance
Prioritization Model: Protected or Natural Areas
Prioritization Model: Risk of Spread
Topographic
Trust Center
Contact Esri
Report Abuse
Contact Us
APIPP PRISM
SLELO PRISM
WNY PRISM
FL PRISM
Cap-Mo PRISM
CRISP PRISM
LH PRISM
LIISMA PRISM
Access models with iMapInvasives web map service via ArcGIS Online at:
https://arcg.is/0D8XjT
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | New York Natural Heritage Program, 2...
esri

Combining Location and Species Prioritization:

Example for local invasive species planning

Ecological Significance	Risk of Spread	# of iMap locations	Action
			For candidate parcels, compare model values and number of reports as proxy for invasive species work
High	High	Low	Focus **PRISM Staff** surveys for Tier 1 and 2 species (Run IPMDAT on infestations)
High	Low	Low	Encourage **PRISM volunteers** to survey and report Tier 3 and 4 species

Moving beyond prioritization:

Creating a decision tool to help managers allocate resources across invasive species, areas, and actions that achieve their objectives.

Objectives:

Minimize negative impacts to:

- Environment
- Industry
- Recreation
- Human health and safety

Maximize
cost-effectiveness

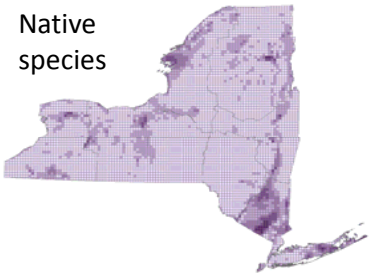
Using these management strategy options:

- Direct intervention
- Search, destroy, prevent
- No direct action

Jennifer Price Tack
NY Invasive Species Research Institute

Inputs

- **Species-specific data**
  - Tier classification
  - Dispersal parameter values*
  - Impacts to the objectives (from assessments)
  - Effects of management actions*
  - Costs of management*
  - iMap occurrence locations



- **Block-specific data**
  - Value for the objectives
  - Value as an invasion pathway

- **PRISM-specific values***
  - Weights of objectives
  - Budget constraints

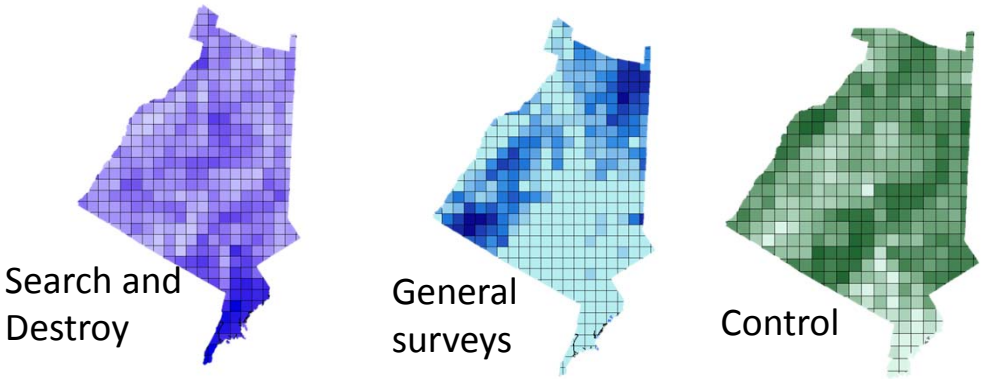
* Elicited from PRISM leaders

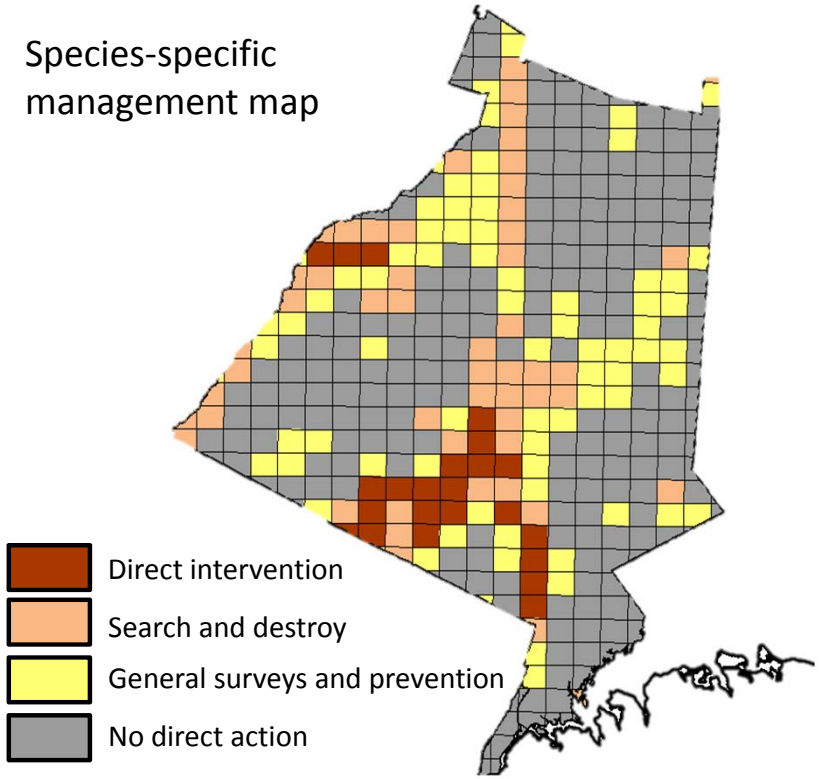
Optimization Modeling

Outputs for each PRISM

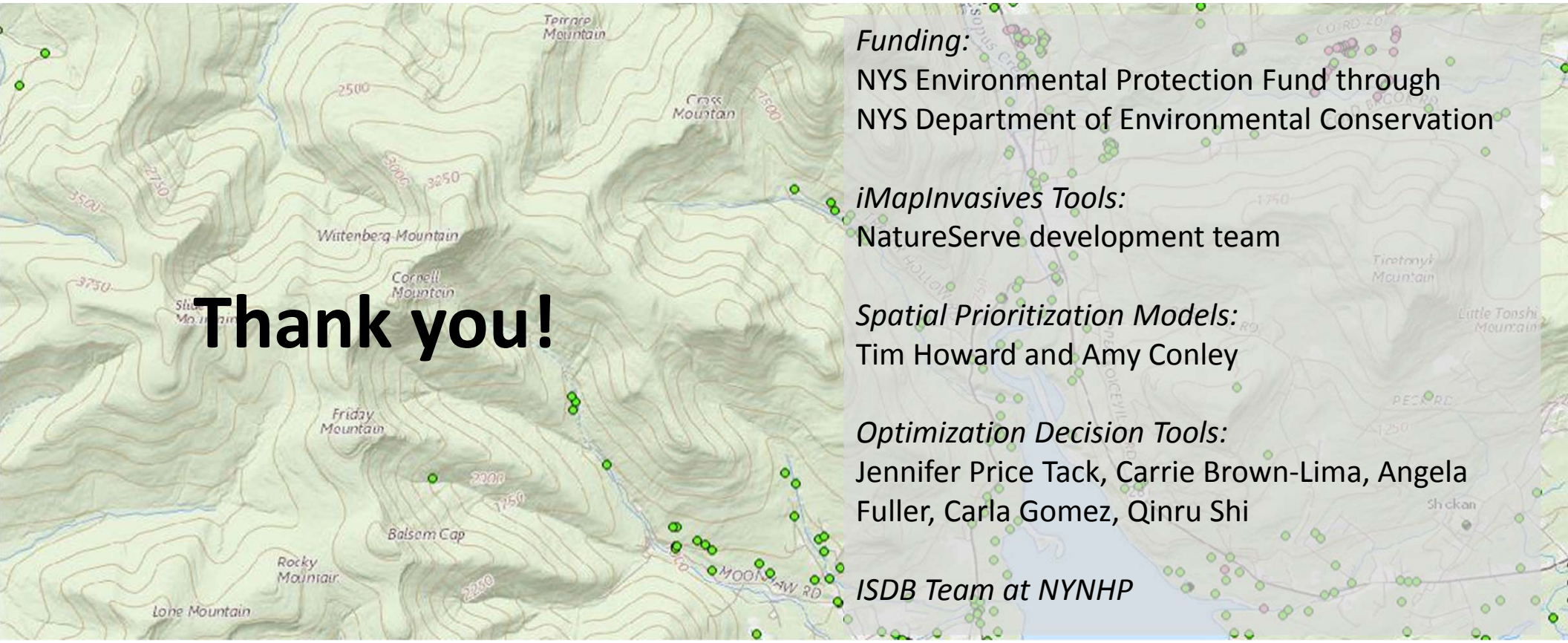
1. Per species, per 5km block, which management strategies to implement?
   - No direct action
   - Search, Destroy, Prevent
   - Direct Intervention

2. Cumulative maps highlight areas where many species should be targeted





3. Under given budget scenarios, how should funds be allocated?



Thank you!

Funding:
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iMapInvasives Tools:
NatureServe development team

Spatial Prioritization Models:
Tim Howard and Amy Conley

Optimization Decision Tools:
Jennifer Price Tack, Carrie Brown-Lima, Angela Fuller, Carla Gomez, Qinru Shi

ISDB Team at NYNHP

www.nyimapinvasives.org
dean@nynhp.org

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Sharing information for strategic management

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