Invasive Species Mapping Standards; NAISMA and Beyond

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Who am I?

- University of Georgia
  - BS Agriscience and Environmental Systems 2007
  - MS Crop and Soil Sciences 2009
- AmeriCorps Florida State Parks 2010
- EDDMapS Data Coordinator 2011-present
  - Work with agencies, programs, groups to enter existing data into the EDDMapS Database
  - Work with verifiers in the record review process
  - Process specific data requests
Center for Invasive Species and Ecosystem Health

- Center for Invasive Species and Ecosystem Health
  - Bugwood Network 1994-2008
  - Renamed Feb 2008
- Began as an image database...
- Now:
  - Aggregate distribution data (Invasive species, Crop pests, and Biocontrol Agents)
  - BugwoodVideo
  - BugwoodPresents
  - BugwoodWiki
  - Provide web hosting and build tools to make data, images, videos, and information available
  - Community of Practice for eXtension
EDDMapS

- Early Detection and Distribution Mapping System
- Web Based Electronic Reporting and Distribution Mapping
  - Invasive species mapping
  - Biological control agent release mapping
  - Plant disease resistance mapping
- Mapping Nationwide
  - Mapping projects with several provinces in Canada
- Host Websites for Regional Mapping Projects
  - Florida Invasive Species Partnership
  - Southeast Early Detection Network
  - Mid-Atlantic Early Detection Network
EDDMapS Data Recruiting

Contributors
- USDA NRCS Plants Database
- Biota of North America Program
- USFS Forest Inventory Analysis
- Florida Natural Areas Inventory Database
- Minnesota DNR
- SEWISC
- Alaska Natural Heritage Program
- Idaho Department of Agriculture

Statistics
- Records
  - Total - 2,859,078
  - Point - 1,799,849
- Users - 30,289
- Reporters - 9,178

- Mirror of Global Invasive Species Information Network (GISIN)
EDDMapS Purpose

- Electronic Early Detection Tool
- Aggregate Data
- Homeowners
- Trained citizen scientists
- Federal and State Agencies
- Herbariums/Academic Institutions
- Existing regional/topical databases
- Identify Existing Range, Gaps, and Leading Edge in Maps
- Working with all of these different groups, how can all of this data be housed together?
Easy Enough! Develop Mapping Standards

- Data Field Name
- Data Definition
- Data Requirement
- Data Type

- Standards are often set/established by a leading journal or program in that field

- EDDMapS originally based on NAWMA mapping standards

- In 2014, NAWMA expanded the scope of their program and updated their name to the North American Invasive Species Management Association and also updated the Mapping Standards

- [http://www.naisma.org/standards](http://www.naisma.org/standards)
Purpose of Changes to NAISMA Standards

- Clarification of existing fields and field definitions
- Removal of infrequently used/confusing/duplicate fields
- Addition of fields to accommodate all taxa monitoring
- Addition of fields to accommodate biological control releases and monitoring
- Allow for ease of information entry into databases
Names!
Different names but the same meaning? Different names and different meanings?

- Field Name: Canopy Cover vs. Percent Cover vs. Cover Class
  - Do they all mean the percentage of ground covered by the canopy of the invasive species?
  - What if a program uses two terms? Or more?
    - Canopy Cover - Canopy cover percentage of the native forest
    - Percent Cover - Canopy Cover of the invasive species
Required Information:

- What about privacy concerns for the “Who” or the “Where?”
  - Obfuscate reports on private property?
- “When” matters
  - Observation date of negatives, “firsts,” treatments, eradications
  - Observation dates for seasonal pests (all taxa!)
- “What” is spotted knapweed?
  - CESTM (Plants Code)
  - SK (Utah County Weed Supervisors)
  - *Centaurea stoebe ssp. micranthos*
Data Type (and Unit of Measure!)

- **Field Name: Infested Area**
  - **Data Type: Numeric**
    - 5 ... what? 5 acres, 5 square feet, 5 hectares? A separate field with Infested Area Units and the units for each record entered is recommended

- **Field Name: Collection Date**
  - **Data Type: date (mmddyyyy)**
    - 03082016
Data Type (and Unit of Measure!)

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Changes to NAISMA Standards

- Removal of Surveying Standards
  - Duplication of many fields
  - Confusing for data recorders

- Addition of Identification Credibility
  - Allows observer to note level of confidence of species identification
  - Informs subsequent data users as to the quality of the data provided
  - Encourage further investigation into suspect occurrence records

- Location - Decimal Degrees Latitude and Longitude
  - Removed options for documenting location with multiple systems (i.e. Public Land Survey System, UTM, Legal, metes and bounds, Quad Number and Name)
  - Streamlines data sharing and Lat/Long can be converted to other systems as needed
Changes to NAISMA Standards

- Addition of fields for wildlife monitoring
  - Taxonomic Serial Number
    - Useful for database matching all species
    - Accommodates synonyms and out-of-date names
  - Number Observed
    - Similar function to “infested area” field for plants
  - Sex
    - Aids in identification for species where there is a difference in appearance between genders (size, color, ornamentation, etc.)
    - Useful in modeling programs for population trends and external/environmental impacts on species gender (e.g. temperature-dependent sex determination, location-dependent sex determination, etc.)
Changes to NAISMA Standards

- Added Fields
  - Life Stage
    - Useful in monitoring programs to know when to plan surveys
    - Useful in modeling programs to know influence of external/environmental factors on species’ life cycles
  - Host Species
    - Necessary for identification of certain biological control agents and invasive insects
    - Aids in modeling programs for potential invasive insect spread, based on host species’ distribution
Priority Agenda
Enhancing the Climate Resilience of America’s Natural Resources

COUNCIL ON CLIMATE PREPAREDNESS AND RESILIENCE

October 2014
Chapter II: Foster Climate-Resilient Lands and Waters

Fight the Introduction and Spread of Invasive Species:
One of the most pervasive threats to resilience is the establishment and spread of invasive species - these non-native plants, animals, and pathogens not only displace native species and disrupt ecosystems, but also cause economic harm. A program designed to identify and find invasive species before they have spread, and eliminate them before they have caused significant harm, is both ecologically effective and cost effective. Within twelve months, the Secretary of the Interior, working with other members of the National Invasive Species Council, including Department of Commerce (NOAA), EPA, and USDA, will work with states and tribes to develop a framework for a national Early Detection and Rapid Response (EDRR) program that will build on existing programs to assist states and tribes in forestalling the stress caused by the establishment and spread of additional invasive species populations, thereby improving the resilience of priority landscapes and aquatic areas. This will include the development of a plan for creating an emergency response fund to increase the capacity of interagency and inter-jurisdictional teams to tackle emerging invasive species issues across landscapes and jurisdictions.
NISC staff should establish a task team to inventory and develop, as needed, data management standards, formats and protocols to ensure inter-operability to support information transfer, national distribution mapping, and awareness of species occurrences and spread. The all taxa-focused task team should be made up of representatives, as appropriate, from FICMNEW, ITAP, ANSTF, ANSTF regional advisory panels, non-federal national and regional database programs, USDA PLANTS, NAL, ITIS, USGS NAS, USGS BISON, GISIN, NatureServe, NAISMA and NA-IPC.
SAFEGUARDING AMERICA'S LANDS AND WATERS FROM INVASIVE SPECIES
A National Framework for Early Detection and Rapid Response

Data Recording and Sharing
Once the species identification is confirmed, the species occurrence should be reported to:

- Specific entities that may be identified in reporting protocols or information transfer protocols designated by agencies, regulation, or law, and/or
- General entities such as:
  - USGS Nonindigenous Aquatic Species database, http://inas.er.usgs.gov/
  - PLANTS database (for native and invasive species), http://plants.usda.gov
  - iMapinvasives, http://imapinvasives.org/

Species occurrences may also be reported to a specific agency that hosts a taxonomic collection, such as at the USDA Agricultural Research Service, Smithsonian, or other agency, state, or regional database, as appropriate. Aggregating data from existing da-
EDDMapS Tools

- Local and National Distribution Maps
- Identification and Management
- Nationwide Invasive Species Mapping
- Biocontrol Release Maps
Top 15 species within 10 miles of Jim Woodruff L&D-Lake Seminole-Apalachicola Chattahoochee & Flint Rivers

- Japanese climbing fern, Lygodium japonicum
- mimosa, Albizia julibrissin
- sacred bamboo, Nandina domestica
- coral ardisia, Ardisia crenata
- Japanese honeysuckle, Lonicera japonica
- Chinese privet, Ligustrum sinense
- island applesnail, Pomacea maculata
- Chinese tallowtree, Triadica sebifera
- house sparrow, Passer domesticus
- kudzu, Pueraria montana var. lobata
- chinaberry, Melia azedarach
- coco yam, wild taro
- glossy privet, Ligustrum lucidum
- European starling, Sturnus vulgaris
- cogongrass, Imperata cylindrica
Report an Invasive Plant Occurrence

Species

Pest:
Search for a species

Infestation

Status:  Positive  Treated

Observation Date (?): 03/08/2016

Infested Area (?):  

Gross Area (?):  

Canopy Closure (?):  

Habitat (?):  

Abundance:  

Plant Description:
- Mature
- Sapling/immature
- Seedling/Rosette
- In Flower
- In Fruit
- Seeds
- Dormant/Dead
- Unknown
Site Revisit Information

Use this form for site revisits including treatments, monitoring and evaluations.

Status: • Positive (?) • Treated (?) • Eradicated (?)

Revisit Type
Select One

Revisit Date
03/08/2016

Abundance/Density
Select One

Canopy Closure (?)
Select One

Infested Area (?)

Reporter
Rebekah Wallace

Growth Stage
[ ] Flower [ ] Fruit [ ] Seedling [ ] Seeds [ ] Dormant/Dead [ ] Unknown

Upload Images with Your Revisit Report:
For verification purposes, take at least two digital images, a close up of the species and one of the site.

Image 1: [Choose file] (jpg, < 4 mb)
Caption:

Image 2: [Choose file] (jpg, < 4 mb)
Caption:

Comments - Describe in detail what was done during the revisit.

Save this Revisit
EDDMapS 3.0 Coming Soon

- Negative data support
- Better clustering on point maps
- Color coding - positive, negative, eradicated, under treatment?
- Color coding - historic records (herbarium) vs recent reports
- Email validation
- Finally, follow-ups with users after reports and after review
Positive
Treated
Negative
Eradicated
Record ID: 2641651
Reporter: Joshua Wysor Louisville Metro Parks: Natural Areas Div.
Observation Date: 26 Jun 2010
EDDMapS Pro Summer 2016

- Ability to select an area of interest on a map through a web interface and download both the satellite imagery and EDDMapS points/polygons to their smartphones and tablets
- Ability to view existing infestations (with background imagery) from smartphones and tablets where both the infestations and current location are displayed when users don’t have cellular connectivity
- Ability add new infestations including drawing polygons (with background imagery available) from a smartphone or tablet when users don’t have cellular connectivity and sync back to EDDMapS when devices are back on cellular or WiFi connectivity

- Ability to revisit/update existing infestations sites with treatment or size expansion/reduction from a smartphone or tablet when users don’t have cellular connectivity and sync back to EDDMapS when devices are back on cellular or WiFi connectivity
Select area on web - State
Select area on web - County
Download selected data
Directions to Point
Drop a new point
Do a revisit
Sync back to servers
Goal is to have EDDMapS Pro completed by June 2016
Hablas Español?
IveGot1
Breeding population of Burmese Pythons found at Disney's Animal Kingdom.

OK