

# Invasive Plant Data Standards

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*4-County CWMA, Mapping & Data Subcommittee*

## Introduction

The goal of using collectively agreed upon data standards is to increase the *collective* utility of invasive plant data that is being recorded and managed by partner organizations. This data is collected and managed by partners for a variety of reasons such as tracking infestations to target access agreement acquisition and facilitate management; track operations; invasive plant survey and inventory, grant reporting; treatment efficacy monitoring; informing prioritization of prevention, survey, and management efforts; citizen reports and engagement; early detection; research; and many other purposes. These standards are not intended as a basis for accomplishing any of the above purposes, but rather seek to establish minimum data standards that will serve the collective good with minimal additional effort. Since invasive species easily cross jurisdictional, social, and other boundaries it is recognized that responding to plant invasions often requires awareness of invasive populations beyond one organizations scope. This approach is in line with the rationale and purpose of the data standards developed by the North American Invasive Species Management Association (NAISMA, formerly NAWMA). NAISMA's standards detail rationale for their use as such:

*These standards are intended to be compatible with most existing invasive species inventories. They are not intended to discourage other organizations from collecting additional information on invasive infestations. By using these minimum standards, information collected can be incorporated with inventories serving other purposes, thereby widening the usefulness of the collected information. These standards are intended to be as user friendly as possible, while still providing information essential at every level of invasive species management, from the site of the infestation to regional, national, and international levels.*

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Please join partners in adopting these standards and committing to share invasive species data. The value of this collective data is significant.

## Background

These standards are based off NIASMA standards and are designed to serve the needs of regional and international invasive species databases including iMapInvasives, Oregon Department of Agriculture's WeedMapper, EDDMaps, and GBIF.org as well as serving the needs of enhanced regional invasives management planning.

Regional and international datasets assist CWMA partners in integrating the data from various data contributors into one dataset. They also enable folks to realize the collective value of integrated data by making it available for online analysis and/or download. See Appendix A for additional information about regional and international data sharing tools and their data standards.

These standards are also intended to support regional invasives management planning. Two specific uses of this data for this purpose are the Weed Heuristics: Invasive Population Prioritization for

Eradication Tool (WHIPPET) and habitat suitability modelling using presence-only tools such as Maxent. These tools are currently in use in the region and adjacent states to support regional invasives management planning and their use is expected to grow in coming years. Aside from these two specific tools, our collective dataset is fundamental to objective risk assessments and crafting an effective management strategy for a given weed.

## Data Standards

Data fields described here represent the minimum standards and are not intended to prevent or discourage the collection of additional data. Standards will cover invasive plant observations. Additional standards relating to survey and treatment data standards will be considered in the future for inclusion in this document.

Data attributes will be explained with the following details for each attribute:

**Data Field Name:** This is the name that will appear on the inventory form, and on requests for information between agencies, states, and management areas. It will be the name that is used to share like information between users. It will provide common vocabulary for sharing information.

**Definition:** Provides a description and explanation of the data field.

**Why is it Useful:** Describes why this information may be important and how it will be useful in describing infestations.

**Coding:** Describes the proper way information should be entered

**Example:** Provides a sample of the proper coding.

## Field Collected Data

- Required
  - Observation Date
  - Observer Name
  - Species Name
  - Infested Area
  - Percent cover
  - Location (latitude, longitude datum)
- Highly recommended, but optional
  - Photographs
  - Habitat
  - Horizontal Accuracy

## Additional Data for Data Management & Data Sharing

- Required
  - Common Name
  - Infested area unit of measure
  - Organization
  - Universally Unique Identifier
- Highly recommended, but optional
  - Taxonomic Serial Number

## Field Collected Data

### Observation Date

**Field Name:** observation\_date

**Definition:** The date the infestation was observed in the field. It does not refer to the date information was entered into the computer.

**Why it is useful:** This field tells you when the inventory was conducted. It provides information on the time of year the observations were made. Phenology and morphology can change over the course of the year, so notation of observation/collection date is important. This field also tells you how old your information is. Is it last month, last year, or ten years ago? These cues will help you decide how reliable the information is and whether a follow-up visit to the site may be warranted.

**Coding:** Enter the date where mm equals the two digit representation of the month (10), dd stands for the two digit representation for the day of the month (03), and yyyy equals the four digits or numbers of the year (2002). The date will be in the following format mm/dd/yyyy.

**Example:** A knapweed site was visited on October 3, 2002. You would record: observation\_date: 10/03/2002

### Observer Name

**Field Name:** observer\_name

**Definition:** The individual who collected the information in the field, at the site of the infestation.

**Why it is Useful:** This is useful information when several individuals may have contributed to an inventory. Within a management area, private landowners, the public, road crews, county agents, scout troops, and government employees may all have contributed to the survey. A name allows the person compiling the inventory to verify and correct any questions on the information.

**Coding:** Enter the full name of the individual who collected the data.

**Example:** Examiner: Ronald J. Weed

### Species Name

**Field Name:** scientific\_name

**Definition:** These fields will contain the scientific or species name of the invasive species. The scientific name follows the standard of binomial nomenclature, and consists of the genus name followed by the species name, expressed together grammatically as if they were a Latin phrase. Some species are further classified into subspecies or variety.

**Why it is Useful:** Scientific names may seem intimidating and cumbersome for some to learn, but they have a decided advantage over common names. They provide a universal code or language for naming species, so people all over the world will use the same name. Even when the name changes due to new discoveries or new information, a trail of synonyms or conserved names is retained, so the species can still be identified. Scientific names also show how groups of species are related.

**Coding:** Enter as in field guide, PLANTS Database <http://plants.usda.gov>, other reputable source. The species names in use by iMapInvasives Oregon are available for review and download at

<https://sites.google.com/site/orimapresources/orimap-guides/species-list>. We recommend that you follow iMapInvasives Oregon, or ITIS.gov conventions.

**Example:** Scientific name for Yellow Star Thistle. You would records: scientific\_name: Centaurea solstitialis

### Infested Area

**Field Name(s):** infested\_area

**Definition:** Area containing one invasive species. An infested area is defined by drawing a line around the actual perimeter of the infestation.

**Why it is Useful:** Infested area can be defined in many ways, and there is little consistency between individuals, counties, states, and countries. Is an acre of weeds: one weed plant in an acre, an acre covered with weeds, or all the lands threatened with invasion from an existing infestation? This definition provides a consistent and common method of describing infestations.

**Coding:** Infested Area: Enter the number of acres/hectares/square feet/square meters

**Example:** 2.3 acres of Oxeye Daisy (*Leucanthemum vulgare*) found outside Oregon City, OR.  
Infested Area: 2.3

## Percent Cover

**Field Name:** percent\_cover

**Definition:** Percent cover will be estimated as a percent of the ground covered by foliage of a particular invasive plant species. Cover will be recorded as a numeric value.

**Why it is Useful:** Percent cover estimates the amount or severity of an invasive plant infestation. Area tells you the extent of the population across the landscape. Percent cover tells how that weed dominates the vegetation within that area. The greater the percent cover, the more dominant the invasive plants are. Percent cover provides information on changes in weed population over time.

**Coding:** This field is percent cover, and therefore only numbers are an appropriate entry. The field should not exceed 3 digits.

**Example:** Percent Cover: 14

## Location

**Field Names:** latitude, longitude, datum

**Definition:** The location of an infestation will refer to the center of the infestation, or the center of the polygon, which defines it. Location will be described using Latitude and Longitude in the decimal degrees format. The Datum, the geodetic data system which the coordinates are based on, is required and can be found on the GPS unit, smartphone, or other technology used for recording the coordinates.

**Why it is Useful:** Location information is essential for invasive species mapping. It allows invasive species sites to be located on a map, be plotted across landscapes, and allows users to relocate a site.

**Coding:** Enter the Latitude and Longitude fields as numbers, with negative signs used where appropriate. Enter the Datum field as text.

**Example:** Location: Latitude: 42.608897 Longitude: -114.332635 Datum: WGS84

## Photographs

**Field Name:** photo1, photo2, photo3, photo4, photo5

**Definition:** A photograph that helps accomplish one of the following tasks: note identification features of a species, establish the affected habitat, or document other relevant details. Do not include more than five photographs. These fields should be hyperlinks to picture files distributed with your data or hyperlink to photos hosted online in permanent, public datastores.

**Why is it Useful:** As our data is shared regionally and internationally independent validations and quality control becomes important. Photographs help to increase the perceived reliability of the report and help data managers to perform additional quality control as desired.

**Coding:** Enter the url of an image file.

**Example:** Photo1: <https://upload.wikimedia.org/wikipedia/commons/b/bd/20130425Marlach12.jpg>

## Horizontal Accuracy

**Field Name:** horizontal\_accuracy

**Definition:** Modern GNSS/GPS units report the horizontal accuracy when recording latitude and longitude coordinates. This data is typically in the form of distance measured in meters.

**Why is it Useful:** Accuracy level of GNSS/GPS units will continue to improve dramatically over time. As this happens how we use the data will change and it will become more and more important that we track the accuracy level of our GNSS devices. For precedent consider the history of location information on vouchered herbarium specimens.

**Coding:** distance in meters, as reported by GPS/GNSS device

**Example:** horizontal\_accuracy: 5

## Data for Data Management & Data Sharing

### Common Name

**Field Name:** common\_name

**Definition:** The species name expressed in the common language(s) of the country and/or region, which is generally English, but may also be Spanish or French in North America.

**Why it is Useful:** These are the names most commonly used in conversation. They are often descriptive, like Asian carp, and are always in the spoken language(s) of the country. The common names are easy to pronounce and remember. Unfortunately, there may be several common names for the same species. Conversely, the same name may refer to several different species.

**Coding:** Enter common name in field guide, or from another reputable source.

**Example:** *Centaurea stoebe* L. ssp. *micranthos* (Gugler) Hayek, you would record: Common Name: Spotted Knapweed

### Infested Area Unit of Measure

**Field Name(s):** infested\_area\_unit

**Definition:** Unit of measurement for the area of infestation. An infested area is defined by drawing a line around the actual perimeter of the infestation. While Canada and Mexico commonly use hectares or square meters to measure land, the United States uses acres or square feet as the common land measure. Since acres and hectares are not equivalent, it is important to know which Unit of Measure was used to measure the infestation.

**Why it is Useful:** All measurements require a unit to be usable and comparable across records.

**Coding:** Unit of Measure: Enter hectares/acres

**Example:** 1.6 hectares of Oxeye Daisy (*Leucanthemum vulgare* Lam.) found outside Vancouver, BC.  
infested\_area\_unit: hectares

### Organization

**Field Name:** organization

**Definition:** This field refers to the owner or manager of the data. This may be a different person or entity from the owner, or the person who collected the data. It may be an office manager or a database specialist. This is the entity responsible for answering questions about the data, or for data requests.

**Why it is Useful:** Provides contact point for questions about data. Allows consolidation/coordination of information requests. Bridges gap between those collecting information, and those managing the data.

**Coding:** Name the organization, agency, or person responsible for managing this dataset.

**Example:** Banff National Park in Alberta, Canada has been mapping invasive plants. organization: Canadian Park Service

### Universally Unique Identifier

**Field Name:** uuid

**Definition:** practically unique alphanumeric character string

**Why is it Useful:** The uniqueID field is important so that both the data submitter and the iMap Data Administrator or other data managers (e.g., ODA, Oregon Flora Project, USGS) can track which observations are new and which have already been submitted. The FID/OBJECTID automatically created by ArcMap can change during GIS manipulations and thus are not acceptable for this purpose. They are unique at any given moment, but overtime *may* not uniquely describe the same feature. UUIDs can be easily calculated on your desktop computer, or some programs such as Fulcrum generate them as data is collected. See <http://support.esri.com/en/knowledgebase/techarticles/detail/37480> for more information and <https://sites.google.com/site/orimapresources/orimap-guides/universally-unique-identifier> for more information.

### Taxonomic Serial Number

**Field Name:** tsn

**Definition:** Numeric Code

**Why it is Useful:** This is a universal identifier for species; this is helpful for database matching of species. It also handles synonyms and old names.

**Coding:** The codes used in the Integrated Taxonomic Information System can be found at: <http://www.itis.gov>.

**Example:** The ITIS TSN for zebra mussel, *Dreissena polymorpha*, would be as follows: ITIS TSN: 81339

## Additional Data Standards Templates

Template data sheets and template mobile device applications are available for use and adaptation by partners.

### Field Datasheet

Appendix B includes a two page field sheet.

### Fulcrum App Template

A template app for the Fulcrum field data collection systems has been developed. Unfortunately, it is only available by request due to Fulcrum's app template sharing capabilities. Please contact Jeff Lesh at [jlesh@conservationdistrict.org](mailto:jlesh@conservationdistrict.org) if you would like to have the Fulcrum app template shared with you. Once shared, you can modify it for your own uses, or start using as is.

## Data Sharing

The process of collecting and managing your data can be intimidating. Data consolidators are considerate of data submitter's challenges. Please review your data for quality frequently and certainly prior to submitting your data. Typically, data requests are made annually in the late fall, however, data submissions are welcome year-round. Within Oregon please contribute data to [iMapInvasives Oregon](https://sites.google.com/site/orimapresources/) (<https://sites.google.com/site/orimapresources/>). Contact Linsey Wise at [imapinvasivesoregon@gmail.com](mailto:imapinvasivesoregon@gmail.com) if you have any questions. If you submit data to iMapInvasives Oregon please do not also submit to ODA Weedmapper, unless you are required to do so. If you are required to submit data directly to ODA's Weedmapper, we still recommend that you submit data to iMapInvasives Oregon even though they do periodically share data. The reason for this is that ODA's WeedMapper only tracks a subset of the attributes supported by iMapInvasives, only tracks listed noxious weeds, and data sharing only occurs sporadically at

this time. Within Washington State, please send reports to EDDMaps.org using their [bulk upload process](https://www.eddmaps.org/tools/directions.pdf) (<https://www.eddmaps.org/tools/directions.pdf>).

Attribute	Regional & International Data Sharing					Regional Management Planning		NAISMA Standards
	iMapInvasives Oregon – Occurrence	iMapInvasives Oregon – Assessment - Plants	WeedMapper	EddMaps	GBIF	Eradication Prioritization (e.g. WHIPPET)	Predictive Modeling – Presence Only	
Observation Date	R	R	R	R	R	O	O	R
Observer Name	R	R	R	R	R	O	O	R
Species Name	R	R	R	R	R	R	R	R
Infested Area		R	O	R	?	R	O	R
Percent Cover		R		R	?	R	O	R
Location	R	R	R	R	R	R	R	R
Photographs	O	O		O	O			
Horizontal Accuracy					?	O	O	
Common Name	R	R	R	O	R	O		O
Infested area unit of measure		R		R	?	R	O	R
Source of Data	R	R	R	R	R	O	O	R
Universally Unique Identifier	O	O	O		R	O	O	
Taxonomic Serial Number					?	O	O	O
Additional Required Fields	N	N	Y	Y	?	N		Y
Additional Optional Fields	Y	Y	Y	Y	Y	Y	Y	Y

R- Required O- Optional ? – Unsure/Needs Research Y – Yes N – No

## Appendix A: Regional and International Data Standards

- iMapInvasives Oregon
  - <https://sites.google.com/site/orimapresources/orimap-guides/required-fields>
  - <https://sites.google.com/site/orimapresources/orimap-guides/data-types-assessments>
- EddMaps
  - <https://www.eddmaps.org/west/report/plants.cfm?>
  - <https://www.eddmaps.org/tools/directions.pdf>
  - <https://www.eddmaps.org/training/EDDmapS.pdf>
  - <https://www.eddmaps.org/tools/datadictionary.pdf>
- GBIF.org
  - <http://www.gbif.org/publishing-data/summary>
- WeedMapper
  - [spreadsheet](#)
  - [instructions](#)
- NAISMA
  - <http://www.naisma.org/mapping-standards>

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# 4 County CWMA Weed Observation Field Datasheet

Observer \_\_\_\_\_ Date: \_\_\_\_\_ Organization: \_\_\_\_\_ GNSS/GPS datum: \_\_\_\_\_

Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						
Species	Gross Area (ft <sup>2</sup> )	% Cover	Habitat Type	Latitude	Longitude	Photo file
notes:						

Habitat Type
Abandoned lot/Old home site
Ag. Field
Aquatic: Freshwater
Developed/Disturbed area
Edge: Field/forest
Edge: Lake
Edge: Roadside
Edge: Trail
Edge: Upland/wetland
Fencerow
Floodplain
Forested Understory
Forests: Conifer
Forests: Hardwood
Forests: Mixed
Grassland/Prairie/Meadow
Old Field
Open Field
Other
Park
Pasture/Rangeland
Right-of-Way
Riparian
River: near shore
Rocky Outcrops
Ruderal
Wetlands: Bog
Wetlands: Marsh
Wetlands: Swamp
Yard/Garden

### Reverse side of field sheet



