Invasive Plant Data Standards

County CWMA, Mapping & Data Subcommittee

Introduction

The goal of data standards is to increase the *collective* utility of invasive plant data. The 4 County CWMA uses data standards that are in line with the rationale and purpose of the data standards developed by the North American Invasive Species Management Association (NAISMA). NAISMA describes their rationale:

> *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.*

The standards described in this document are designed to serve the needs of regional and international invasive species databases including iMapInvasives, Oregon Department of Agriculture's WeedMapper, and EDDMapS.

Following these standards support regional invasives management planning activities such as 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 and their use is expected to grow. Aside from these two specific tools, our CWMAs collective dataset is fundamental to objective risk assessments and crafting effective management strategies.

Please join partners in adopting these standards and commit to sharing invasive species data. Awareness of invasive species beyond your organization's scope of management is crucial for effective invasion response.

Standardized Data Collection Templates

Mobile device applications are available for use and adaptation by partners. Contact chairs of the Mapping and Data Committee to acquire data collection templates.

Data Sharing

Data requests from the 4 County CWMA are made annually in the winter; however, submissions are welcome year-round.

Within Oregon, please contribute to iMapInvasives Oregon . Contact the data manager at imapinvasivesoregon@gmail.com if you have any questions. If you are required to submit data to ODA's Weedmapper, we still recommend that you submit data to iMapInvasives Oregon even though they do periodically share data.

Within Washington State, please send reports to EDDMapS.org.

If you would like technical assistance with data sharing, please contact the chairs of the Mapping and Data Committee.

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 and treatment information.

Data attributes will be explained with the following details:

- **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 provide common vocabulary for sharing information.

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

- **Why is it Useful**

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

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

Data Fields

Data Field Name	Required or Optional
Universally Unique Identifier	Required
Observation Date	**Required**
Observer Name	**Required**
Data Source	**Required**
Scientific Name	**Required**
Common Name	**Required**
Taxonomic Serial Number	Optional
State	**Required**
County	**Required**
Latitude	**Required**
Longitude	**Required**
Datum	**Required**
Horizontal Accuracy	Optional
Location Description	Optional
Patch Size	**Required**
Percent Cover	Optional
Photographs	Optional
Distribution	Optional
Phenology	Optional
Comments	Optional
Number of Plants	Optional
Creekside	Optional
Treatment Within 3 ft of Creek	Optional
Linear Miles Treated Within 3ft of Creek	Optional
In-Water Treatment Area	Optional
Presence of Biological Controls	Optional
Biological Control Species	Optional
Control Type	Optional
Has This Population Been Previously Reported to WeedMapper?	Optional

Universally Unique Identifier (Required)
Field Name: GlobalID

Definition: The Version 4 GUID (Globally Unique Identifier) is assigned to each record to ensure that as data is collected, each record is distinct and can be referenced and queried. You can produce these codes through online generators (e.g., https://www.uuidgenerator.net/) and many commonly used databases (e.g., https://support.esri.com/en/technical-article/000011677).

Why is it Useful: This field allows for records to be shared and ensure that duplicates are not entered into any dataset aggregating system. Users and database managers alike will be able to reference a specific record across databases as the UUID travels with the record. Also, for ArcGIS users, the FIDs/OBJECTIDs autogenerated by ArcGIS do not always retain their values between GIS data manipulations and thus are not reliable unique identifiers for a variety of operations. See http://support.esri.com/en/knowledgebase/techarticles/detail/37480 for more information.

Observation Date (Required)
Field Name: Observation_date

Definition: The calendar month, day, and year the weed species was observed/recorded in the field. It does not refer to the date that the information was entered into the database.

Why it is useful: This field tells you when the occurrence was observed. 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 the information is. These cues will help you decide how reliable the information is and whether a follow-up visit to the site may be warranted.

Coding: yyyy-mm-dd, where yyyy=4-digit year, mm=2-digit month, dd=2-digit day (alphanumeric)

Example: Observation_date: 2020-08-25

Observer Name (Required)
Field Name: Observer_name

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

Why it is Useful: Within a management area, many different public and private sector individuals may have contributed to the survey. A name allows the person compiling the inventory to serve as a contact person and to verify and correct any questions on the information.

Coding: Full name; first and last name is required, middle name is optional. (text)

Example: Observer_name: Ronald J. Weed

Data Source (Required)
Field Name: Data_source

Definition: The organization who is responsible for answering questions about the data or for responding to data requests.

Coding: Full name of organization (written out with no acronyms or abbreviations). (text)

Example: Data_source: Clackamas Soil and Water Conservation District

Scientific Name (Required)
Field Name: Scientific_name

Definition: This field contains the scientific 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 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, a trail of synonyms or conserved names is retained, so the species can still be identified.

Coding: Reference scientific names of species from the 4-County CWMA Species Listing Document.

Example: Scientific_name: Centaurea solstitialis

Common Name (Required)
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 used in conversation. Common names are easy to pronounce and remember. There may be several common names for the same species and the same name may refer to several different species.

Coding: Reference common names of species from the 4-County CWMA Species Listing Document

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

Taxonomic Serial Number (Optional)
Field Name: TSN_Code

Definition: A unique, persistent, non-intelligent identifier for a scientific name in the context of the Integrated Taxonomic Information System (ITIS).

Why it is Useful: This is a universal identifier for species' names; it is helpful for database matching of species. The ITIS database also contains synonyms and older names. This is helpful especially when sharing historic data or between databases, so that names are easily referenced, checked for validity, and are made current while not eliminating the provided scientific name.

Coding: Numeric (TSN codes are found at http://www.itis.gov)

Example: 81339

State (Required)
Field Name: State

Definition: The state where the infestation is located.

Why it is Useful: Allows the infestation to be located within a geographic area. It also allows the easy and quick summation of information on invasive species at a political boundary below the country level.

Coding: Two-letter state abbreviation (text)

Example: OR

County (Required)
Field Name: County

Definition: The county where the infestation is located.

Why it is Useful: Allows the infestation to be located in a sub-state/province political boundary area. It also allows the easy and quick summation of information on invasive species at the county level.

Coding: Text

Example: Multnomah

Latitude (Required)
Field Name: Latitude

Definition: The exact geographic latitude (in decimal degrees) of the location of an infestation, which will refer to the center of the infestation, or the center of the polygon that defines it.

Why is it 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: Numerical. In decimal degrees to at least 5 decimal places (~1 meter)

Example: 42.608897

Longitude (Required)
Field Name: Longitude

Definition: The exact geographic latitude (in decimal degrees) of the location of an infestation, which will refer to the center of the infestation, or the center of the polygon that defines it.

Why is it 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: Numerical. In decimal degrees to at least 5 decimal places (~1 meter)

Example: -114.332635

Datum (Required)
Field Name: Datum

Definition: This is the geodetic data system that the coordinates are based on, and it can be found on the GPS unit, smartphone, or other technology used for recording the coordinates. If the geodetic Datum is not known, enter Unknown.

Why is it 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: Text

Example: WGS84

Horizontal Accuracy (Optional)
Field Name: Horizontal_Accuracy_Meters

Definition: The variability of a pair of latitude and longitude values, in meters. Due to availability of satellites and surrounding geography, there may be some variability in the accuracy of coordinates. Often, smartphones, GPS-enabled tablets, and GPS units record this information automatically. The term provides an estimate of the number of units (coordinate uncertainty) of distance in meters within which the actual occurrence may be found.

Why is it Useful: Allows for the documentation of the accuracy of a location, which will continue to improve dramatically over time with technological advances. Tracking coordinate accuracy will be increasingly important as we innovate more ways of analyzing present and historical data. For example, consider the history of location information on vouchered herbarium specimens!

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

Example: Horizontal_Accuracy_Meters: 5

Location Description (Optional)
Field Names: Location_Description

Definition: A text-based description of the place of the occurrence including easily identifiable, unique landmarks.

Why it is Useful: Location descriptions help field staff return to difficult to find infestations.

Coding: Text

Example: Location_Description: Dock on east side of Blue Lake.

Patch Size (Required)
Field Name(s): Patch_Size_SQ_FT

Definition: The area in square feet containing one invasive species type. Defined by drawing a line around the actual perimeter of the infestation as defined by the canopy cover of the plants, excluding areas not infested.

Why it is Useful: Infested area can be defined in many ways, and there is little consistency between individuals, counties, states, and countries. This definition provides a consistent and common method of describing infestations.

Coding: Numeric

Example: 2.3
Patch size can be recorded in any measurement unit. If you record patch size of infestations in acres, your field name should indicate acres. For example, Patch_Size_ACRES.

Percent Cover (Optional)
Field Name: Percent_Cover

Definition: The percentage of ground covered by the invasive species of interest within the associated patch.

Why it is Useful: Percent cover describes the extent of an infestation within a patch. Patch size tells you the extent of the population, while percent cover tells how that weed dominates the vegetation within that patch (e.g., the greater the percent cover, the more dominant the invasive plants are). Percent cover also provides information on changes in weed population over time.

Coding: Numerical. Not to exceed a maximum value of 100.

Example: Percent_Cover: 14

Photographs (Optional)
Field Name: Photographs

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. 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
Note: If you would like to host more than one photograph, add additional fields to your dataset. Photographs_2, Photographs_3.

Distribution (Optional)
Field Name: Distribution

Definition: Distribution pattern and number of plants within a patch.

Why is it Useful: Recording distribution with the provided coded values allows for a quick qualitative assessment of a patch.

Coding: Text, Coded Values. Single plant, Scattered plants, Dominant Cover, Monoculture.

Example: Distribution: Single plant.

Phenology (Optional)
Field Name: Phenology

Definition: The stage of plant development for the species of interest at the time of observation.

Why is it Useful: Recording distribution with the provided coded values allows for a quick qualitative assessment of a patch.

Coding: Text, Coded Values. Seed, Seedling, Rosette, Sapling, Bolting, Flowering, Fruiting, Dormant, Dead.

Example: Phenology: Bolting.

Comments (Optional)
Field Name: Comments

Definition: Any information you think is relevant to your observation that cannot be captured within the provided fields.

Why is it Useful: There are cases where supplemental information is needed.

Coding: Text.

Example: Heard a great joke while observing this knotweed. What do you call a chicken that is afraid of the dark? *A Chicken*.

Number of Plants (Optional)
Field Name: Number_of_Plants

Definition: The number of plants of interest within a patch.

Why is it Useful: When the density of an infestations decreases, a fine level of detail like the number of plants of interest within a patch can assist in tracking change over time.

Coding: Numerical

Example: 4

Creekside (Optional)
Field Name: Creekside

Definition: Creek side is either right or left bank (looking downstream) of flowing water, both banks, or not applicable for infestations not near flowing water.

Why is it 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. Treatment information along streams is important to collect for accurate DEQ 2300A Permit Reporting.

Coding: Text

Example: Right

Treatment Area Within 3ft of Creek (Optional)
Field Name: Treatment_Within_3ft_Creek

Definition: Documentation of amount of terrestrial surface area or linear miles treated within 3 ft (measured horizontally) of a waterbody in a calendar year. For calculating treatment areas, count each area once regardless of the number of applications to that same area each year.

Why is it Useful: This metric is tracked for DEQ 2300A Permit Reporting when herbicide application occurs within 3 feet of a creek or water body.

Coding: Numerical. Percentage.

Example: 50

Linear Miles Treated Within 3ft of Creek (Optional)
Field Name: MilesTreated_3ft_Creek

Definition: Documentation of amount linear miles treated within 3 ft (measured horizontally) of a waterbody in a calendar year. For calculating treatment areas, count each area once regardless of the number of applications to that same area each year. Multiply your patch size by the percent treated within 3 feet of the creek. If you treated one side of the creek divide the calculated value by 3 or if both sides of the creek were treated, divide the calculated value by 6. This will calculate the linear feet treated within 3 feet of the creek. Divide this value by 5280 to find the linear miles treated within 3 feet of the creek.

Why is it Useful: This metric is tracked for DEQ 2300A Permit Reporting when herbicide application occurs within 3 feet of a creek or water body.

Coding: Numerical.

Example: 0.5

In-Water Treatment Area (Optional)
Field Name: InWater_Treatment_Area_AcreFeet

Definition: Documentation of amount of surface area treated in a waterbody within a calendar year. For calculating treatment areas, count each area once regardless of the number of applications to that same area each year.

Why is it Useful: This metric is tracked for DEQ 2300A Permit Reporting when herbicide application occurs on a creek or water body.

Coding: Numerical.

Example: 2.5

Presence of Biological Controls (Optional)
Field Name: Biocontrol_Presence

Definition: Indicates whether Biological Control Agent(s) were present on observed species. Photo documentation is encouraged, especially if biological control species is unknown.

Why is it Useful: Documentation of biological control helps managers track presence and abundance of active biological controls.

Coding: Text. Yes or No

Example: Yes

Biological Control Species (Optional)
Field Name: Biocontrol_Species

Definition: Indicates the species of observed biocontrol.

Why is it Useful: Knowledge of the host for biocontrol agents, insects, and pathogens can aid in positive identification for the observed species. It can also influence areas searched for in future surveys and help to predict a potential range of spread for pathogens and biocontrol agents.

Coding: Text.

Example: *Galerucella pusilla*

Biological Control Comments (Optional)
Field Name: Biocontrol_Comments

Definition: Notes to document information about biocontrol agents and hosts, such as count, incidence, severity, and phenological or life stage of development.

Why is it Useful: Knowledge of the host for biocontrol agents, insects, and pathogens can aid in positive identification for the observed species. It can also influence areas searched for in future surveys and help to predict a potential range of spread for pathogens and biocontrol agents.

Coding: Text.

Example: 10 adult *Galerucella pusilla* observed on purple loosestrife. Effective damage.

Control Type (Optional)
Field Name: Control_Type

Definition: Defines what type of control method was used to treat a particular species.

Why is it Useful: Recording the control type indicates which infestations have received treatment and which have yet to receive treatment.

Coding: Text. Biocontrol, Chemical, Cultural, Manual, Mechanical, None

Example: Chemical

Has This Population Been Previously Reported to WeedMapper? (Optional)
Field Name: WeedMapper_Report

Definition: Indicates whether the infestation has been previously reported to the Oregon WeedMapper Database.

Why is it Useful: When sharing data to Oregon WeedMapper, this field can filter new infestations for submission.

Coding: Text. Yes, No.

Example: No