



Invasive Species Infestation Areas

DATA STANDARD REPORT

June 7, 2010

Version 1.1

**United States Department of Interior
Bureau of Land Management
National Operations Center
Data Resource Services
Denver Federal Center
Denver, Colorado 80225**

Purpose of Data Standard Report

The Data Standard Report is the necessary document for a new or revised National Data Standard. DOI Data standards process requires certain pieces of information to be documented for a data standard to be valid. The Data Standard Report is the tool BLM uses to accomplish this documentation. The completed Report is distributed for review and comment on the content of the standard. The comments are gathered and resolutions are developed through working with the appropriate data stewards, commenters and other Subject Matter Experts. More iterations can occur depending on comments and complexity of the data standard. Once all comments are resolved, the data standard report is then finalized.

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INTRODUCTION

Description of Standard

This data standard refers to the information collected, stored and managed to describe invasive species infestations found on public lands. An infestation is considered to be a presence of an organism deemed to be invasive. Each infestation location represents only one species; infestation areas of different species may overlap geographically.

Invasive species infestation areas are a method to accomplish the mission of the BLM as defined in the following acts:

- According to the Federal Lands Policy Management Act (FLPMA), BLM must manage public lands according to the principles of multiple use and sustained yield. These principles are further qualified in the act by the statutory duty that the BLM prevent unnecessary degradation of the public lands.
- Public Rangelands Improvement Act of 1987 states that the act states the BLM must manage maintain and improve public lands suitable for livestock grazing so that they become as productive as feasible.
- Plant Protection Act of 2000 (PL 106-224 includes management of undesirable plants on federal lands) authorize the BLM to manage noxious weeds and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on federal lands Section 15 of the Federal Noxious Weed Act of 1974 (7 U.S.C. 2801 et seq.), the first section and section 15 of that Act (7 U.S.C. 2801 note and 7 U.S.C. 2814).

Affected Groups

Include but not limited to: land use planners, GIS specialists, rangeland management specialists, botanists, natural resource specialists, foresters, wildlife and fisheries biologists and range technicians. This may also include partners that provide infestation information to the BLM and those with whom the BLM exchanges infestation information.

Sponsor

Rob Roudabush, Division Chief Rangeland Resources, LLWO220000

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DATA STEWARD / CONTACT INFORMATION

Office	Role	Name	Contact Information
WO-220	BLM Business Data Steward	Gina Ramos	(202) 912-7226 PH Gina_Ramos@blm.gov

DATA SET CHARACTERISTICS

Overall Security

a.	Identify Security Level
	Public. The overall NISIMS data set will contain Privacy Act (PA) information and Personally Identifiable Information (PII), portions of which may be redacted if the data is released in a publicly available forum
b.	Privacy Information
	The data will contain Privacy Act and Personally Identifiable information (names and addresses of cooperators and those individuals who have an identified, established and documented Role in the locating, mapping, identifying, treating and monitoring of invasive species). Personally Identifiable Information (PII) data will be entered and stored in the database tables containing name, address and contact information of individuals who may perform assessments or assist in identifying areas thought to be infested. Only PII data that is already considered to be in a public forum (i.e. Name and contact information listed on a Cooperating agreement) would be available for public viewing. PII for individuals not identified in a public forum may be redacted and held from public release. The BLM is preparing a Department of the Interior Privacy Impact Assessment (DOI-PIA) which may result in a System of Record notification to be filed in the Federal Register, as required.

Data Privileges

Who has create, read, update, and/or delete privileges?
<p>The state data steward for the weeds program will determine access rights to infestation areas.</p> <p>The Field Office staff that is responsible for the invasive species management will require Create, Read, Update and Delete (CRUD) privileges for their specific geographic portion of the data set. Where invasive species infestations cross Field Office, District or State boundaries, individual access will be dependent on duties assigned. In some cases, individuals will require CRUD privileges to more than one Field Office, District or State portion of the data set depending on assigned work.</p> <p>State office GIS specialist and invasive species program leads may require CRUD privileges to the entire state portion of the data set. Other SO staff will have READ permission.</p> <p>Land use planners, GIS specialists, rangeland management specialists, botanists, natural resource specialists, foresters, wildlife and fisheries biologists and range technicians, Invasive species coordinators may require CRUD privileges for specific geographic areas or portions of the data set. Access conditions and terms may be specific to each office and location within the BLM. Some portions of the data set may be reviewed and read by cooperators, contractors, state or county agencies and others as needed to accomplish the BLM mission.</p>

Data Collection & Maintenance Protocols

a.	Location Accuracy Requirements
	<p>The spatial accuracy is included within the attributes of the data.</p> <p>Spatial Accuracy: The Accuracy Measurement defines how close, measured in feet, the actual ground location is to the spatial depiction in GIS. This value would typically be determined by one of three methods: 1) the map accuracy value, if a USGS map was used to define the boundary; 2) the expected spatial accuracy achieved with GPS; or 3) the measurement of that accuracy as is noted in the National Standard for Spatial Data Accuracy (NSSDA)¹ which is a data usability standard issued by the Federal Geographic Data Committee (FGDC).</p> <p>Spatial Location Accuracy shall be +/- forty (40) feet for all areas of an Invasive Species Infestation Location polygon. Sections of the polygon that are coincident with other land or political features (e.g. county boundary) shall be duplicated to the this data set to help insure geographic integrity</p>
b.	Data Content Accuracy Requirements
	Expected data content accuracy shall be 90% accurate for initial data entry. After yearly review, data accuracy is expected to be 93%.
c.	Collection & Input Protocols:
	The data collection tool provided with the NISIMS system shall be the optimal method of data entry. Other methods used shall go through the same protocol and business rules to be entered into the NISIMS system.
d.	Update Procedures:
	Ideally, data for the discovery, identification and mapping of a Invasive Species Infestation Area AND any changes made to the boundary or status of the Infestation Area shall be input or updated in the system within 2 weeks (10 business days). At a minimum, data will be input and updated prior to the beginning of the field data collection season. This includes geographic changes and changes to attribute data. Field data collection protocols shall be followed.

Data Quality

a.	Transaction level data quality:
	Implementation will include domain value edits during data entry.
b.	Monitoring level data quality:
	State and National data stewards shall review the data set annually prior to September 30 of each year for end of year reporting. Discrepancies or deficiencies are to be reported to the appropriate Field Office data steward for clarification and update. The State and National data stewards will review any corrections to the data set again prior to December 15 of each year. Cooperating agencies and partners may choose to review portions of the data for accuracy of attributes.

Relationship to Other Standards

This data will be in the NISIMS system. Within NISIMS, infestation areas are related to treatments. There is a relationship to Party (Individual and Organization) Information for personnel who determine the infestation.

Invasive species infestation locations may cross multiple field office, district or state boundaries. Where possible, coincidental lines from other data sets shall be used to create the polygon depicting the infestation location.

Based on cooperative efforts, invasive species management areas may cross multiple field office, district, county or state boundaries. Where possible, coincidental lines from other data sets shall be used to create the polygon depicting the ISMA.

The National Invasive Species Information Management System (NISIMS) provides tools for data collection and the generation of bureau-wide analysis and statistics for invasive species infestations and treatments through a centralized geodatabase. NISIMS provides the tools to; add treatment proposal location; enter treatment proposal information and location; enter certification information; enter survey information and location; enter seed lot information; enter invasive species management area information and location; capture infestation, treatment and photo location; enter treatment information (chemical, biological, physical; manual/mechanical, revegetation and fire). The invasive species management area has no tie to any other data standard within NISIMS. The only relate exists with the organization table.

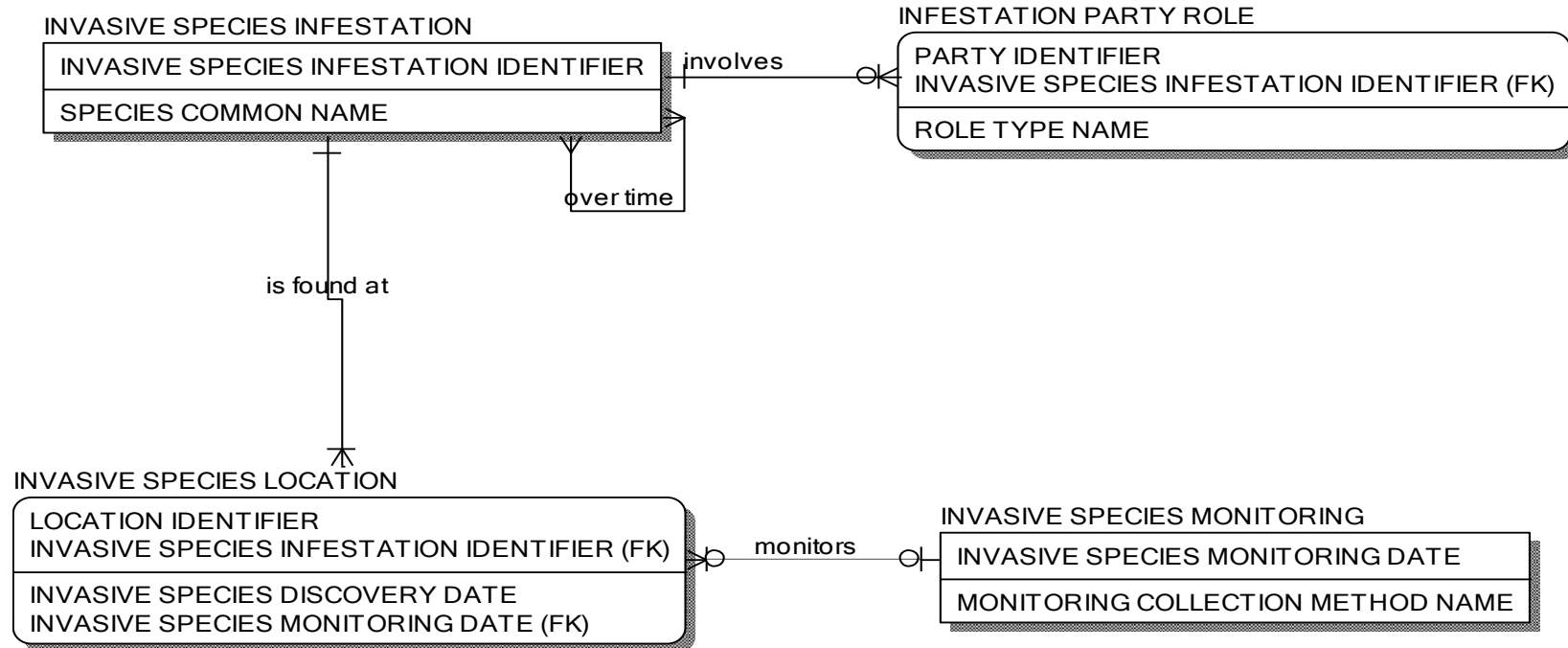
NISIMS provides tools for data collection and the generation of bureau-wide analysis and statistics for invasive species infestations and treatments through a centralized geodatabase. NISIMS provides the tools to; add treatment proposal location; enter treatment proposal information and location; enter certification information; enter survey information and location; enter seed lot information; enter invasive species management area information and location; capture infestation, treatment and photo location; enter treatment information (chemical, biological, physical; manual/mechanical, revegetation and fire). The survey area can be tied to the weed infestation through a field within the weed infestation table (weed survey id) (although not a required field). Otherwise survey area has no tied to any other standard within NISIMS.

NISIMS provides tools for data collection and the generation of bureau-wide analysis and statistics for invasive species infestations and treatments through a centralized geodatabase. NISIMS provides the tools to; add treatment proposal location; enter treatment proposal information and location; enter certification information; enter survey information and location; enter seed lot information; enter invasive species management area information and location; capture infestation, treatment and photo location; enter treatment information (chemical, biological, physical; manual/mechanical, revegetation and fire). The invasive species location is tied to treatment component location (required), photo point location (required) and survey (not required) standards within NISIMS.

DATA CHARACTERISTICS

Each data standard is to be supported by a data model which includes entities and relationships between entities. The logical data model with its associated data dictionary is included in Appendix B.

Invasive Species Infestation Conceptual Data Model



Legend: See Appendix C

Invasive Species Infestation Area Data Elements

The following is a list of the data elements and associated metadata relevant to this data standard. Any design considerations for these data elements are included in the implementation guidelines. Naming Conventions can be found in the "Data Administration and Management Handbook" BLM Manual H 1283-1.

INVASIVE SPECIES INFESTATION				DRAFT ENTITY	
Specific information about the presence of one invasive species. An infestation will only represent one (1) species.					
Data Element Name	Type	Size	Required?	Definition	Comments
INVASIVE SPECIES INFESTATION DISCOVERY DATE	date		Yes	The date the infestation of the invasive species was first observed in the field.	Note: this is the date the infestation was first observed in the field. It may not be the date of data entry.
INVASIVE SPECIES INFESTATION VERIFICATION DATE	date		Opt	The date a reported infestation is actually verified.	
INVASIVE SPECIES INFESTATION IDENTIFIER	integer		Yes	The designed primary key that will uniquely identify a single occurrence of the entity.	The system will assign the id using the date and time of the data entry.
INVASIVE SPECIES INFESTATION PHYSICAL ACCESS LIMITATION TEXT	character	100	Yes	The text that is a description of the limitations that may apply to physically accessing an infestation.	Notes made by the field observer as to the ability to access the infestation and what limitations might impede access (physical, geographic and political – no public access, wilderness, etc.)
VERIFICATION STATUS NAME	character	30	Opt	The name that designates the status of verifying the correct identification of the invasive species.	Includes the need for a verification and if the verification has been completed. See domain document
PHYSICAL ACCESS MODE NAME	character	20	Opt	The name of the type of transportation mode needed to access the area.	Notes made by the field observer regarding the different modes or methods to access the area. May include multiple modes.
(SPECIES IDENTIFIER)	character	6	Yes	The designed primary key that will uniquely identify a single occurrence of the entity.	This will be linked to the plant species code and name from the NRCS database. For non-plant species, codes have been generated and included in the species domain.

INVASIVE SPECIES INFESTATION LOCATION				DRAFT ENTITY	
An infested area is delineated by drawing the actual perimeter of the infestation as defined by the presence of an invasive species.					
Data Element Name	Type	Size	Required?	Definition	Comments

INVASIVE SPECIES INFESTATION / LOCATION IDENTIFIER			Yes	The designed primary key that will uniquely identify a single occurrence of the entity.	The identifier of the location that is considered to be one (1) infestation.
INVASIVE SPECIES INFESTATION COLLECTION BEGIN DATE	date		Opt	The date the collection of the infestation was started in the field.	The date the infestation is found in the field.
INVASIVE SPECIES INFESTATION COLLECTION COMPLETION DATE	date		Opt	The date the collection of the infestation was completed in the field.	The date all infestation information is complete and entered into the system.
INVASIVE SPECIES INFESTATION LOCATION SPECIFIC AREA TEXT	character	100	Opt	The text that provides a detailed description of the area with the infestation.	
INVASIVE SPECIES INFESTATION LOCATION GENERAL AREA TEXT	character	100	Opt	The text that provides an overall description of the area with the infestation.	
ESTIMATED GROSS INFESTED ACREAGE MEASURE	decimal		Opt	The measure of the estimated total area value (in acres) of the Infestation as estimated by ocular or other estimation techniques.	
SPECIES PHENOLOGY NAME	character	20	Opt	The name of the predominant state or stage of the species based on the type of species.	See domain document. Currently plant only
PLANT COVER CLASS CODE	character	1	Yes	A code indicating a range of cover class percent computed from the cover class method.	Legacy Data Only. See domain document. And see Sampling Vegetation Attributes, TR1734-4 (1996).
CANOPY COVER ESTIMATED PERCENT RATE	decimal		Opt	The estimated percentage rate of the ground covered by canopy cover of a particular species.	
COLLECTION METHOD NAME	character	30	Opt	The name of the collection method that is used by the BLM for inventory or monitoring of natural resources.	(Observation Method) See domain document.
COLLECTION METHOD NAME	Character	30	Opt	The name of the collection method that is used by the BLM for inventory or monitoring of natural resources.	(Plant Quantity Method) See domain document
COLLECTED PLANT QUANTITY	number		Yes	The quantity of the actual or estimated number of plants found in a location.	Example: if using acres as UNIT OF MEASURE TYPE NAME, then a estimate of 100 individuals invasives per acre would be expressed as: 100 per acre.
UNIT OF MEASURE TYPE NAME	character	20	Yes	The name that designates the type of unit of	See domain document. (Plant Quantity UOM)

				measurement which will be used in conjunction with a Measure attribute.	
INVASIVE SPECIES INFESTATION MONITORING IDENTIFIER	integer		Opt	The designed primary key that will uniquely identify a single occurrence of the entity.	To reflect changes to infestations over time. See Business rule #10

INVASIVE SPECIES INFESTATION ROLE				DRAFT ENTITY	
The individual or organization that participates in some manner with an invasive species infestation area. Comment: The person or organization and their role will be linked to the Infestation					
Data Element Name	Type	Size	Required?	Definition	Comments
PARTY IDENTIFIER	integer		Yes	The designed primary key that will uniquely identify a single occurrence of the entity.	The person or organization that has a role in the Infestation area. . This is the Legal_Entity_ID (LE_ID) and linked to name and contact information in NISIMS
ROLE NAME	character	20	Yes	The name of the role that the individual or organization plays in relationship to another entity or function.	There can be more than 1 role per infestation. See the domain document.

INFESTATION RELATIONSHIP				DRAFT ENTITY	
The relationship of one invasive species infestation to another, which can depict when an infestation splits in more than one infestation or two infestations become one infestation.					
Data Element Name	Type	Size	Required?	Definition	Comments
INVASIVE SPECIES INFESTATION IDENTIFIER 1 & 2				The identifiers from the two infestations that have a relationship.	See business rule #10
INFESTATION RELATIONSHIP REASON TEXT	character	100	Yes	The text that provides a description of why two infestations are related.	
INFESTATION RELATIONSHIP END DATE	date		Opt	The date the relationship is no longer in effect between two infestations.	
INFESTATION RELATIONSHIP BEGIN DATE	date		Yes	The date the relationship takes effect between two infestations.	

BUSINESS RULES

Rules under which data is used and modified (See H 1283-1, Data Administration and Management Handbook, Chapter 8 – Documenting Business Rules)

1. Unique Identification

Each unique infestation will have a unique computer-generated identification number once uploaded to the National Database. Infestations will be unique by species in a specific geographic area. Multiple infestations (different species) can occur in the same geographic location; each unique infestation will have a unique identifier.

Business Rule Source and Description

Guidance

Type of Business Rule

Current Implementation

Guideline

Computer Application.

2. Infestation Data Type

Infestations may be collected as points, lines or polygons, but shall be stored and displayed only as polygons. Infestation data collected as a point shall be buffered by a field-estimated acreage to create polygon features. Linear features will be buffered by the observer to create a polygon.

Business Rule Source and Description

Guidance

Type of Business Rule

Current Implementation

Guideline

Computer Application

3. Infestation Acres

Acres of Infestation do not necessarily represent the total acres surveyed in a particular area. Infestations may cross invasive species survey area boundaries and may exist in multiple invasive species management areas.

Business Rule Source and Description

Guidance

Type of Business Rule

Current Implementation

Guideline

Manual Process

4. Single Specie Infestation

Each infestation represents only one species, therefore infestations may overlap in a specific geographic area. If multiple species are identified, then multiple infestation records will be generated. Use species name and code from NRCS Plants Database for all weeds.

Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guideline	Manual Process

5. Infestation Distance

Infestations of the same species must be forty (40) yards apart to be a unique infestation unto itself (system will calculate this distance). Infestations closer than 40 yards shall be treated as one infestation, requiring the use of buffers to create one (1) polygon for the infestation.

Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guideline	Computer Application

6. Infestation Point Collection Size

Infestation Points collected may be buffered by estimated acre size to create polygon features.

Infestation Points may be collected in 1 of 3 size class groupings:

<= 0.1 acre buffered to 0.1 acre,

0.1-0.5 acre buffered to 0.5 acre

0.5-5.0 acres buffered to 2.5 acres

The resulting buffer will be stored and displayed as a polygon feature.

Maximum acre size a user can collect point information is 5 acres, however the resulting polygon in the system will be displayed and reported as 2.5 acres.

If the infestation is expected to be larger than 2.5 acres, program guidance is to traverse or encircle the infestation during mapping to collect it as a polygon feature with a true acreage value.

Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guideline	Computer Application

7. Infestation Polygon Collection

Any field collected spatial data pertaining to a specific infestation that is at least one-tenth (0.1) acre in size shall be stored and displayed as a polygon feature (see Rule 6 above for other options to produce a polygon feature).

Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guidelines	Computer Application

8. Infestation Line Definition

Infestations may be collected in the field as a line feature. These lines shall be buffered by an appropriate buffer size, assigned by the data collector and based on first-hand knowledge of the infestation. The collector defines the buffer direction and buffer distance in yards, meters or feet based on visual assessment of the infestation. Infestations may only be represented as polygon features.	
Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guidelines	Computer Application




9. Canopy Coverage Estimation

The Field Observer collecting infestation data may estimate the canopy coverage percentage (1-100%). Using different techniques of canopy estimation may result in different levels of precision.	
Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guidelines	Manual

10. Infestation Change over Time


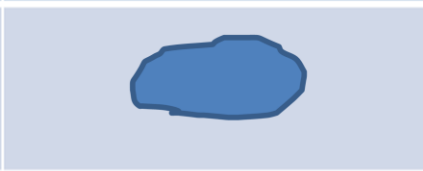
Infestations may change over time. These changes may result in invasive species increasing or diminishing due to treatments, disturbances or naturally occurring causes. As the geometry of an infestation changes, it may expand into another, adjacent infestation, creating one larger infestation, or it may split into separate infestations.

When an infestation is collected in the field, it is assigned a unique Infestation ID that is created based on the date and time of collection. The infestation may be monitored in subsequent visits to the infestation site. When a monitoring event is collected, the Infestation Identifier remains the same as the original site of the infestation and a Monitoring Identifier is added to the record that is created based on the date and time of the monitoring information collection. This will denote the original collection and discovery of the infestation versus subsequent visits to the infestation site. Each monitoring event may create a new spatial geometry area of the infestation. This allows the specialists to see how an infestation may change over time due to the effects of the treatments that may have occurred at the infestation site.

Year 1	Year 2	Year 3
		
Discovery of Infestation Infestation ID #1 Monitoring ID <u>null</u>	Monitoring of the infestation occurs: Infestation ID #1 Monitoring ID #1	Monitoring of the infestation occurs: Infestation ID #1 Monitoring ID #2




The Monitoring ID is a system-generated number based on date/time of the monitoring event. Each subsequent visit to an infestation will result in a newly assigned Monitoring ID for that visit to that infestation. Each visit to an infestation after the original discovery and reporting will result in a new Monitoring ID.

Two or more infestations become one: If an infestation expands into an adjacent infestation, the observer shall record the date that the new relationship is first observed. The (Invasive Species) Infestation Relationship will be used to explain the new relationship between the two previously unrelated infestations. If there are three (3) infestations that merge into one, there would be two records entered in the infestation relationship entity/table. (If 4 infestations merge into one, there would be 3 records in the relationship table, etc.)

Year 1	Year 2
	
Infestation ID #1 Infestation ID #2	Infestation ID #1

The above example depicts infestations that are observed in year one, monitored in year 2 and found to have merged into 1 infestation. The infestation retains the original infestation ID of #1 and the second infestation (#2) is retained as a historical record. The Invasive Species Infestation Relationship contains information that infestation #2 is now included with infestation #1 and only one infestation is monitored.

An infestation splits into more than one infestation: If an infestation divides into two or more individual parcels, the observer shall record the date. The (Invasive Species) Infestation Relationship will be used to explain the relationship between the two or more new infestations.

Year 1	Year 2	Year 3
		
Infestation ID #1	Monitoring of the infestation occurs: Infestation ID #1	Monitoring of the infestation occurs: Infestation ID #1 Infestation ID#2

The above example depicts an infestation that is observed in year one, monitored in year 2 and in year 3 is found to have split into 2 infestations which are over 40 yards apart. One infestation retains the original infestation ID and the second infestation is assigned a new infestation ID. The Invasive Species Infestation Relationship (entity) contains the information that the second infestation originated from the first infestation but is now considered a unique infestation.

Business Rule Source and Description	
Guidance	
Type of Business Rule	Current Implementation
Guidelines	Manual

11. Spatial Data Projection

All data collected and input into the GIS shall be stored with a data conforming to the current BLM state policy for datum.	
Business Rule Source and Description	
Guidance; Best Management Practice; Program lead guidance	
Type of Business Rule	Current Implementation
Guidelines	Manual Process and Computer Application

OTHER MATERIAL

Other supporting material that aids in the understanding or use of the data standard

Federal Laws, Regulations, and Policies that apply to weeds and invasive species (includes pesticides use):

BLM Manual 9011 and Handbook H-9011-1 – Provides policy for conducting chemical pest control program under an integrated pest management approach.

BLM Manual 9014 - Provides guidance and procedures for planning and implementing biological control in integrated pest management programs.

BLM Manual 9015 – Provides policy relating to the management and coordination of noxious weeds activities among BLM, organizations, and individuals.

Carlson-Foley Act of 1968 – Directs agency heads to enter upon lands under their jurisdiction with noxious plants and destroy noxious plants growing on such land.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) regulates how to clean up spills of hazardous materials and when to notify agencies in case of spills

Departmental Manual 209 – Prescribes policy to control undesirable or noxious weeds on the lands, waters, or facilities under its jurisdiction to the extent economically practicable, and as needed for resource protection and accomplishment of resource management objectives.

Departmental Manual 517 – Prescribes policy for the use of pesticides on the lands and waters under its jurisdiction, and for compliance with the Federal Insecticide, Fungicide, and Rodenticide Act, as amended.

Executive Order 13112 of February 3, 1999 directs federal agencies to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.

Federal Food, Drug, and Cosmetic Act the USEPA establishes tolerances (maximum) legally permissible levels) for pesticide residues in food
Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) establishes procedures for the registration, classification, and regulation of all pesticides.

FLPMA – Directs the BLM to “take any action necessary to prevent unnecessary and or undue degradation of the public lands.”

Food Quality Protect Act of 1996 mandates a single, health-based standard for all pesticides in all foods: provides special protections for infants and children

Noxious Weed Control Act of 2004 established a program to provide assistance through states to eligible weed management entities to control or eradicate harmful, nonnative weeds on public and private lands.

Plant Protection Act of 2000 (PL 106-224 includes management of undesirable plants on federal lands) authorize the BLM to manage noxious weeds and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on federal lands

Public Rangelands Improvement Act (PRIA) – Requires that BLM will manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible.

Resources Conservation and Recovery Act (RCRA) regulates the disposal of toxic wastes, including the disposal of used herbicides, and provides authority for toxic waste cleanup actions when there is a known operator.

BLM Fire Program Aquatic Invasive Species Guidance <http://web.blm.gov/internal/fire/FEM/docs/aquatic.pdf>

DOMAINS SPECIFIC TO THIS DATA STANDARD

[Link to domains specific to this data standard](#)

APPENDIX A: DOI DATA CATEGORIES

Data Subject Areas and Information classes are categories of information that support a DOI line of business. According to the DOI Data Standardization Handbook, one or more categories must be identified for a data standard. Any changes to these categories and their definitions would be made through the DOI Data Advisory Committee (DAC).

Subject Area: A collection of data classifications representing broad categories of information that support a line of business.

Information Class: A logical grouping of entities that are subcategories of the subject areas.

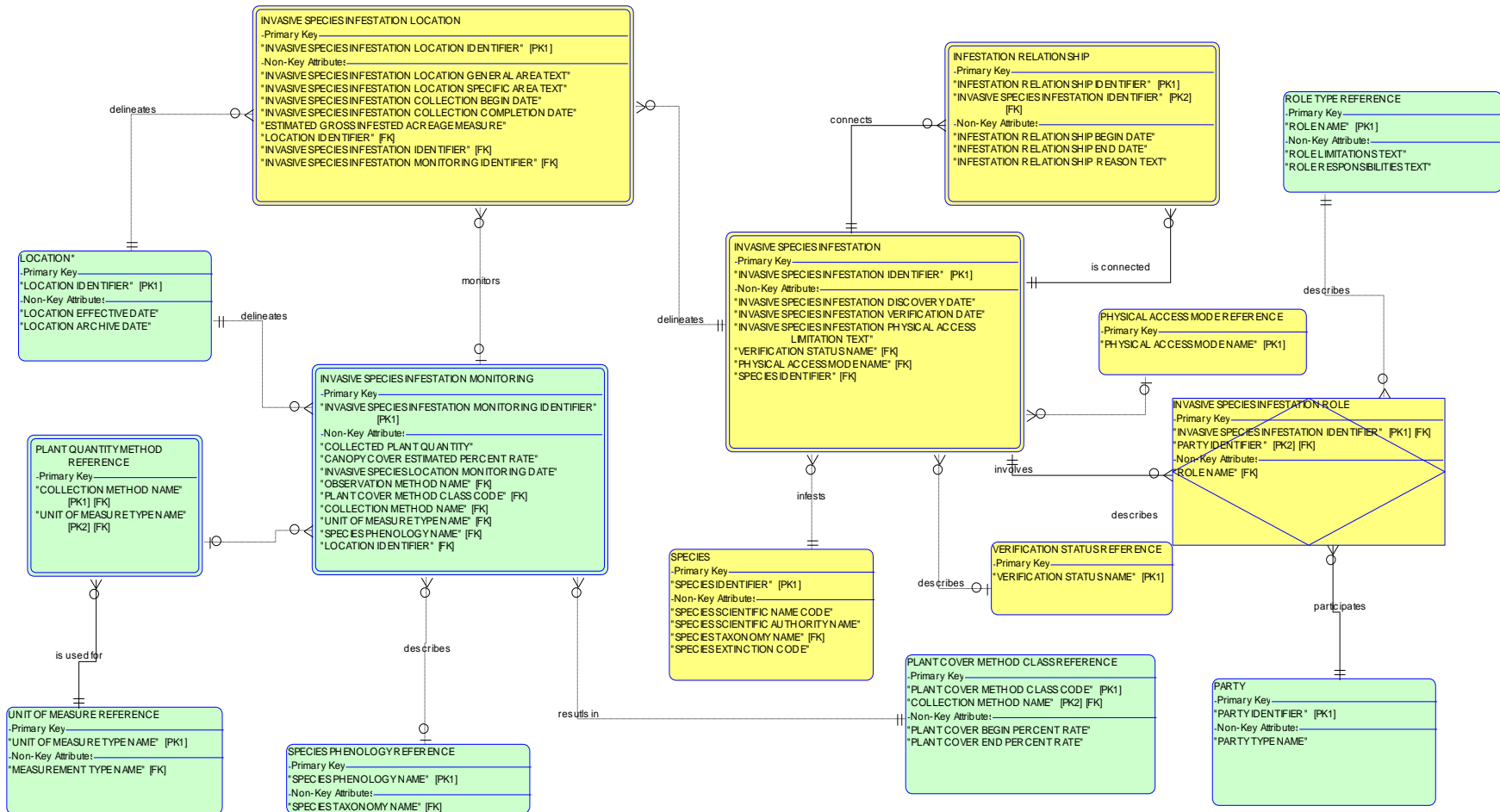
Only the Subject Areas and Information Classes that are appropriate to this data standard are included in this listing. For the full list of Subject Areas and their Information Classes please see http://web.blm.gov/data_mgt/guidelines/DOI_SubjectArea_InfoClass.doc

This standard proposal covers the following DOI Subject Areas and Information Classes:	
GEOSPATIAL AND GEOGRAPHY	<i>Information about data that includes a terrestrial coordinate system or geographic reference. This includes geospatial data sets, mapping, imagery, coverage's, elevations, and features.</i>
<ul style="list-style-type: none"> • Location 	<i>Information about an identifiable place of existence. A geographic or spatial identification assigned to a region or feature based on a specific coordinate system, or by other precise information such as a street address, a postal address, a descriptive location, a legal land definition, etc. Location data types primarily consist of Vector data</i>
<ul style="list-style-type: none"> • Map 	<i>A graphic depiction on a flat surface of the physical features of the whole or a part of the earth or other body, or of the heavens, using shapes to represent objects and symbols to describe their nature. Maps generally use a specified projection and indicate the direction of orientation.</i>
<ul style="list-style-type: none"> • Spatial Data Set 	<i>A collection of spatial data and its related descriptive data, organized for efficient storage and retrieval. A simple data set might be a single file with many records, each of which references the same set of fields. A more robust spatial data set includes data about the spatial locations and shapes of geographic features, recorded as points, lines, areas, pixels, grid cells, or TIN (Triangulated Irregular Network) sample points, as well as their attributes</i>
NATURAL AND CULTURAL RESOURCE	<i>Information about the natural and ecological resources, cultural resources, cultural resources, archaeological, and paleontology resources, and national heritage resources of the nation.</i>

<ul style="list-style-type: none"> • Biological Resource 	<i>Information about genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity</i>
PROTECTION	<i>Information about activities that protect something or someone from exposure, injury, damage, or destruction.</i>
<ul style="list-style-type: none"> • Endangered Species Protection 	<i>Information about all activities performed to protect plants and animals that are in danger of extinction throughout all or a significant portion of its range, in accordance with the Endangered Species Act of 1973.</i>
<ul style="list-style-type: none"> • Habitat Protection 	<i>Information about all activities performed to protect the environment in which an organism or biological population lives and grows.</i>
SCIENCE AND INNOVATION	<i>Information about any domain of knowledge accumulated by scientific study and organized by general principles; includes scientific research and innovation when goal is the creation of new scientific and/or technological knowledge</i>
<ul style="list-style-type: none"> • Agricultural Science 	<i>Information about the science, art and business of cultivating the soil, producing crops and raising livestock</i>
<ul style="list-style-type: none"> • Biological Science 	<i>Information related to the branch of science that deals with the science of life and life processes, including the study of structure, origin, evolution, and distribution of living organisms</i>

APPENDIX B: LOGICAL DATA MODEL

The entities in green are not part of this standard and do not need to be reviewed. They are provided to show context and provide relationships to other data only. To improve viewing, zoom to 200%; to print a larger version, use the 11"x17" model on the same webpage as this document.



Legend: See Appendix C

Data Dictionary

This lists entities and attributes (in alphabetical order, not hierarchical or chronological order) in the logical data model shown above.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Required?	Key*	Definition
INFESTATION RELATIONSHIP		DRAFT ENTITY					
The relationship of one weed infestation to another, which can depict when an infestation splits in more than one infestation or two infestations become one infestation.							
		INFESTATION RELATIONSHIP IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		INFESTATION RELATIONSHIP REASON TEXT	character	100	Yes		The text that provides a description of why two infestations are related.
		INFESTATION RELATIONSHIP END DATE	date		Opt		The date the relationship is no longer in effect between two infestations.
		INFESTATION RELATIONSHIP BEGIN DATE	date		Yes		The date the relationship takes effect between two infestations.
		INVASIVE SPECIES INFESTATION IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
INVASIVE SPECIES INFESTATION		DRAFT ENTITY					
Specific information about the presence of one invasive species.							
		INVASIVE SPECIES INFESTATION DISCOVERY DATE	date		Yes		The date the infestation of invasives was first observed in the field.
		INVASIVE SPECIES INFESTATION VERIFICATION DATE	date		Opt		The date a reported infestation is actually verified.
		INVASIVE SPECIES INFESTATION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		INVASIVE SPECIES INFESTATION PHYSICAL ACCESS LIMITATION TEXT	character	100	Yes		The text that is a description of the limitations that apply to physically accessing an infestation.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Required?	Key*	Definition
		VERIFICATION STATUS NAME	character	30	Opt	FK	The name that designates the status of verifying the invasive species identification, including the need for a verification and if the verification has been completed.
		PHYSICAL ACCESS MODE NAME	character	20	Opt	FK	The name of the type of transportation mode needed to access the area.
		SPECIES IDENTIFIER	integer		Yes	FK	The designed primary key that will uniquely identify a single occurrence of the entity.

INVASIVE SPECIES INFESTATION LOCATION**DRAFT ENTITY**

An infested area is defined by drawing the actual perimeter of the infestation as defined by the presence of an invasive species.

		INVASIVE SPECIES INFESTATION LOCATION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		INVASIVE SPECIES INFESTATION LOCATION SPECIFIC AREA TEXT	character	100	Opt		The text that provides a detailed description of the area with the infestation.
		INVASIVE SPECIES INFESTATION LOCATION GENERAL AREA TEXT	character	100	Opt		The text that provides an overall description of the area with the infestation.
		INVASIVE SPECIES INFESTATION COLLECTION BEGIN DATE	date		Opt		The date the collection of the infestation was started in the field.
		INVASIVE SPECIES INFESTATION COLLECTION COMPLETION DATE	date		Opt		The date the collection of the infestation was completed in the field.
		ESTIMATED GROSS INFESTED ACREAGE MEASURE	decimal		Yes		The measure of the estimated total area value (in acres) of the Infestation as estimated by ocular or other estimation techniques.
		LOCATION IDENTIFIER	integer		Yes	FK	The designed primary key that will uniquely identify a single occurrence of the entity.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Required?	Key*	Definition
		INVASIVE SPECIES INFESTATION MONITORING IDENTIFIER	integer		Opt	FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		INVASIVE SPECIES INFESTATION IDENTIFIER	integer		Yes	FK	The designed primary key that will uniquely identify a single occurrence of the entity.
INVASIVE SPECIES INFESTATION ROLE							
The individual or organization that participates in some manner with an invasive species infestation area.							
		INVASIVE SPECIES INFESTATION IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		PARTY IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		ROLE NAME	character	20	Yes	FK	The name of the role that the individual or organization plays in relationship to another entity or function.
PHYSICAL ACCESS MODE REFERENCE							
DRAFT ENTITY							
The domain values for the type of transportation mode needed to access the area.							
		PHYSICAL ACCESS MODE NAME	character	20	Yes	PK	The name of the type of transportation mode needed to access the area.
VERIFICATION STATUS REFERENCE							
DRAFT ENTITY							
The domain of valid values for the status of the verification of species identification.							
		VERIFICATION STATUS NAME	character	30	Yes	PK	The name that designates the status of verifying the invasive species identification, including the need for a verification and if the verification has been completed.
						*Key	(PK: Primary Key) (FK: Foreign Key which is PK of related entity) (PK, FK: Foreign Key part of PK)

The following entities shown on the logical data model are not part of this standard but are here for informational purposes.

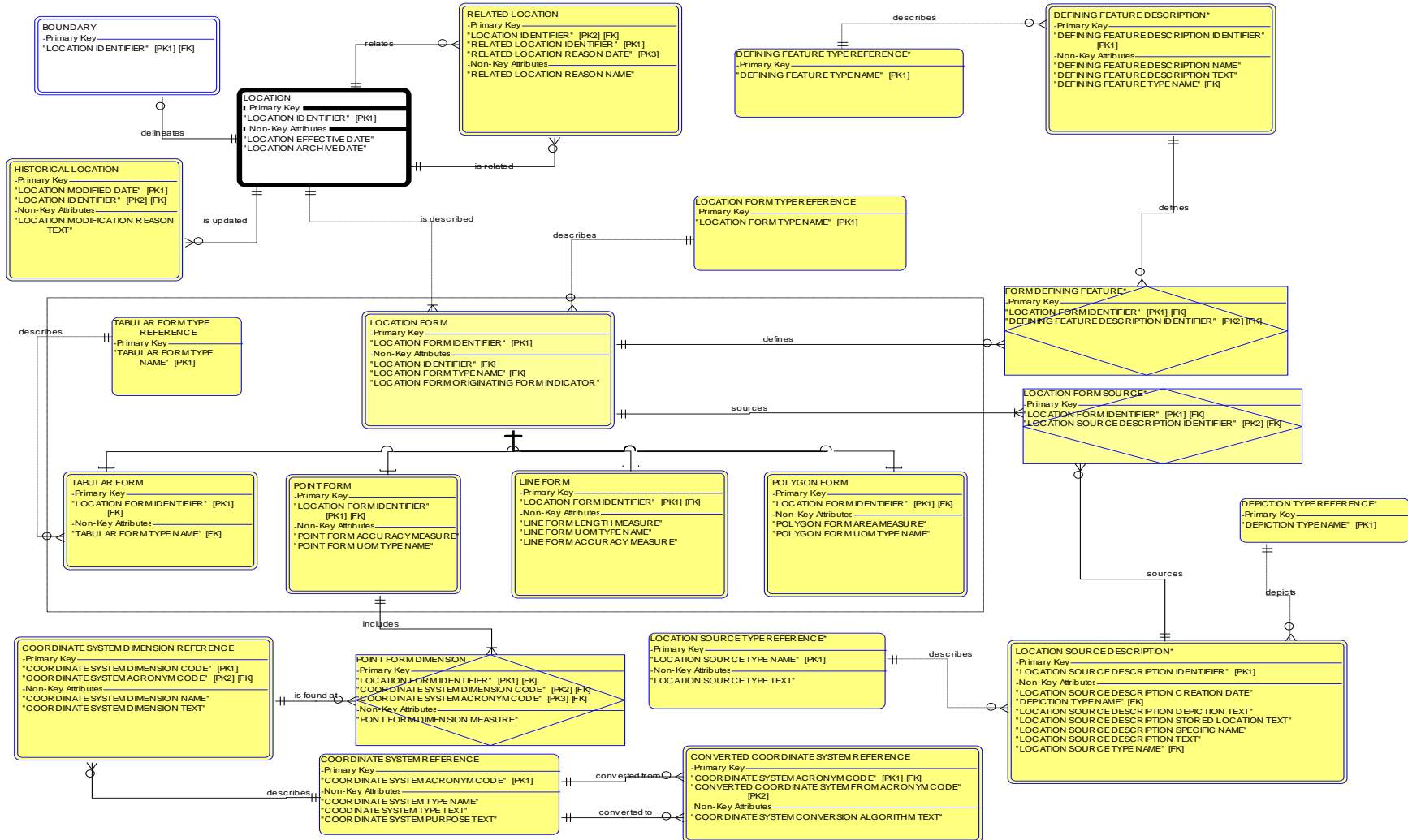
Entity Name	Entity Description	Logical Data Element Name	Type	Size	Required?	Key*	Definition
INVASIVE SPECIES INFESTATION MONITORING		CONCEPTUAL ENTITY					
Conceptual Information about method and class used for collecting information on changes to vegetation. THIS IS NOT A LOGICAL ENTITY.							
		INVASIVE SPECIES INFESTATION MONITORING IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		CANOPY COVER ESTIMATED PERCENT RATE	decimal		Yes		The estimated percentage rate of the ground covered by canopy cover of a particular species.
		COLLECTED PLANT QUANTITY	number		Opt		The quantity of the actual or estimated number of plants found in a location.
		INVASIVE SPECIES LOCATION MONITORING DATE	date				The date on which the information was collected on the invasive species.
		COLLECTION METHOD NAME	character	30	Yes	PK, FK	The name of the collection method that is used by the BLM for inventory or monitoring of natural resources.
		UNIT OF MEASURE TYPE NAME	character	20	Opt	PK, FK	The name that designates the type of unit of measurement which will be used in conjunction with a Measure attribute.
		OBSERVATION METHOD NAME	character	30	Opt	FK	The name that designates the type for how the observation was conducted.
		PLANT COVER METHOD CLASS CODE	character	1	Yes	FK	A code indicating a range of cover class percent computed from the cover class method.
		SPECIES PHENOLOGY NAME	character	20	Opt	FK	The name of the predominant state or stage of the species based on the type of species.
		LOCATION IDENTIFIER	integer		Yes	FK	The designed primary key that will uniquely identify a single occurrence of the entity.
LOCATION		DRAFT ENTITY					
A defined place that requires a way to locate it by some means. Note: Entities linked to Location have the potential for a geospatial aspect.							
		LOCATION ARCHIVE DATE	date		Opt		The date which is the calendar year, month, and day when the position of the Location is considered no longer valid but has historical value.
		LOCATION EFFECTIVE DATE	date		Yes		The date which is the calendar year, month, and day when the position of the Location was produced.
		LOCATION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Required?	Key*	Definition
PARTY		DRAFT ENTITY					
General information (the name) about the individuals and organizations (agencies, companies, etc.) which interact with the BLM.							
	PARTY IDENTIFIER	integer			Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
	PARTY TYPE NAME	character	12		Yes		The name of the category of Legal Entity being described (e.g. Individual, Organization).
PLANT COVER METHOD CLASS REFERENCE		DRAFT ENTITY					
The domain of values for the classes within a specific plant cover method.							
	PLANT COVER END PERCENT RATE	decimal			Yes		The percentage rate ending point for a plant cover class code for a species or species life history.
	PLANT COVER BEGIN PERCENT RATE	decimal			Yes		The percentage rate starting point for a plant cover class code for a species or species life history.
	PLANT COVER METHOD CLASS CODE	character	1		Yes	PK	A code indicating a range of cover class percent computed from the cover class method.
	COLLECTION METHOD NAME	character	30		Yes	PK, FK	The name of the collection method that is used by the BLM for inventory or monitoring of natural resources.
PLANT QUANTITY METHOD REFERENCE		DRAFT ENTITY					
The domain of types of collection methods for counting vegetation.							
	COLLECTION METHOD NAME	character	30		Yes	PK	The name of the collection method that is used by the BLM for inventory or monitoring of natural resources.
	UNIT OF MEASURE TYPE NAME	character	20		Yes	PK	The name that designates the type of unit of measurement which will be used in conjunction with a Measure attribute.
SPECIES		DRAFT ENTITY					
A species in one of the four kingdoms of living organisms of interest to the BLM.							
	SPECIES IDENTIFIER	integer			Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
	SPECIES SCIENTIFIC AUTHORITY NAME	character	100		Opt		The name of the individual who classified the species or agent and assigns the Scientific name (NAWMA). (Comment: the name is the last name or an accepted abbreviation from a published reference).
	SPECIES SCIENTIFIC NAME CODE	character	10		Opt		The code of 3-10 digits for the scientific names. Plant codes are a useful, short cut method for recording plant names in the field. Business rule: BLM uses the NRCS database. Example Hyoscyamus niger (black henbane) - code is HYNI.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Required?	Key*	Definition
		SPECIES TAXONOMY NAME	character	40	Yes	FK	The name which is the taxonomic Latin name assigned to a specific item for that level of the species taxonomy. i.e. Plant would be valid for kingdom.
		SPECIES EXTINCTION CODE	character	10	Yes		A code that designates if the species is extinct or not.
ROLE TYPE REFERENCE							CONCEPTUAL ENTITY
The domain of valid values of roles for an individual or organization.							
		ROLE NAME	character	20	Yes	PK	The name of the role that the individual or organization plays in relationship to another entity or function.
		ROLE LIMITATIONS TEXT	character	200	Yes		A description of any limitations imposed on the responsibilities.
		ROLE RESPONSIBILITIES TEXT	character	200	Yes		A general description of responsibilities of this role.
SPECIES PHENOLOGY REFERENCE							DRAFT ENTITY
The domain of valid values for the phenology, the stage of life of a species.							
		SPECIES PHENOLOGY NAME	character	20	Yes	PK	The name of the predominant state or stage of the species based on the type of species.
		SPECIES TAXONOMY NAME	character	40	Yes	FK	The name which is the taxonomic Latin name assigned to a specific item for that level of the species taxonomy. i.e. Plant would be valid for kingdom.
UNIT OF MEASURE REFERENCE							DRAFT ENTITY
The domain of valid values for unit of measurement.							
		UNIT OF MEASURE TYPE NAME	character	20	Yes	PK	The name that designates the type of unit of measurement which will be used in conjunction with a Measure attribute.
		MEASUREMENT TYPE NAME	character	10	Opt		The name that designates what type of measurement is being done.

Location Logical Data Model

Data Model that provides information on standard attributes for feature level metadata. It is **not part of this data standard** and does not need to be reviewed for the data standard, merely provides more information and relationships.



Legend: See Appendix C

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Req'd?	Key*	Definition
BOUNDARY							DRAFT ENTITY
The edge of a location that demarks the change from one location to another location.							
		LOCATION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
CONVERTED COORDINATE SYSTEM REFERENCE							DRAFT ENTITY
The domain of values for the algorithm used to convert from one coordinate system to another.							
		COORDINATE SYSTEM CONVERSION ALGORITHM TEXT	character	60	Yes		The text that contains the algorithm used to convert from one coordinate system to another.
		COORDINATE SYSTEM ACRONYM CODE	character	10	Yes	PK, FK	The code that is considered the acronym for the coordinate system type.
		CONVERTED COORDINATE SYSTEM FROM ACRONYM CODE	character	10	Yes	PK	The code for the coordinate system that is being converted from (to another coordinate system).
COORDINATE SYSTEM DIMENSION REFERENCE							DRAFT ENTITY
The dimensions that are part of given coordinate system type.							
		COORDINATE SYSTEM DIMENSION TEXT	character	100	Yes		The text that further describes the dimension for a given coordinate system type.
		COORDINATE SYSTEM DIMENSION CODE	character	10	Yes	PK	The code that is used to designate a dimension for a coordinate system type.
		COORDINATE SYSTEM DIMENSION NAME	character	10	Yes		The name associated with a code that is used to designate a dimension for a coordinate system type.
		COORDINATE SYSTEM ACRONYM CODE	character	10	Yes	PK, FK	The code that is considered the acronym for the coordinate system type.
COORDINATE SYSTEM REFERENCE							DRAFT ENTITY
A reference framework consisting of a set of points, lines and/or surfaces; including a set of rules used to define the positions of points in space in either two or three dimensions.							
		COORDINATE SYSTEM TYPE TEXT	character	100	Yes		The text that describes the particular coordinate system type.
		COORDINATE SYSTEM TYPE NAME	character	40	Yes		The name given to a particular coordinate system type.
		COORDINATE SYSTEM ACRONYM CODE	character	10	Yes	PK	The code that is considered the acronym for the coordinate system type.
		COORDINATE SYSTEM PURPOSE TEXT	character	100	Yes		The text that describes the purpose or purposes of a given coordinate system type.
DEFINING FEATURE DESCRIPTION*							APPROVED ENTITY: BLM
The values associated with second level of detail that can be used to define / create the location, based on the Defining Feature Type Name. There is not a finite set of values for this.							
		DEFINING FEATURE DESCRIPTION NAME	character	40	Opt		The name that identifies a more specific description of the feature from which the arcs are derived to create polygon boundaries. This information further describes the physical or mapping feature that makes up the polygon boundary.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Req'd?	Key*	Definition
		DEFINING FEATURE DESCRIPTION TEXT	character	200	Yes		The text that provides further details on the Defining Feature Description.
		DEFINING FEATURE DESCRIPTION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		DEFINING FEATURE TYPE NAME	character	30	Yes		The name that identifies the high-level category for the actual physical or mapping characteristics (features) from which the arcs are derived.
DEFINING FEATURE TYPE REFERENCE*							APPROVED ENTITY: BLM
A domain for the description of the characteristic (feature) constructed from a geographic feature that was used to create the location boundary.							
		DEFINING FEATURE TYPE NAME	character	30	Yes	PK	The name that identifies the high-level category for the actual physical or mapping characteristics (features) from which the arcs are derived.
DEPICTION TYPE REFERENCE*							APPROVED ENTITY: BLM
The domain of values for the way a location is depicted either in scale or resolution.							
		DEPICTION TYPE NAME	character	10	Yes	PK	The name that designates the detail with which the location is depicted, either in resolution or scale.
FORM DEFINING FEATURE*							APPROVED ENTITY: BLM
The defining features associated with a specific location form.							
		LOCATION FORM IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		DEFINING FEATURE DESCRIPTION IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
HISTORICAL LOCATION							DRAFT ENTITY
The date and reason why a location's information has changed. Business Rule: this is for administrative changes, not necessarily for corrections to data.							
		LOCATION MODIFICATION REASON TEXT	character	200	Yes		The text which is the explanation for why data about a location has changed for administrative reasons.
		LOCATION MODIFIED DATE	date		Yes	PK	The date which is the calendar year, month, and day when the position of the Location was last modified.
		LOCATION IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
LINE FORM							DRAFT ENTITY
A series of connected, co-ordinate points forming a simple linear feature. It is used to represent rivers, and roads, or to form the boundary of polygons. (GIS dictionary) Note: In our current physical environment this includes all types of straight and curved lines including ones that intersection.							
		LOCATION FORM IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		LINE FORM LENGTH MEASURE	decimal		Yes		The measure of the length of the line described in the Line Form UOM Type Name.
		LINE FORM UOM TYPE NAME	character	20	Yes		The domain value associated with the Unit of Measure used for the Line Form Length Measure.
		LINE FORM ACCURACY MEASURE	decimal		Yes		The measure that describes how close, in Line Form UOM Type Name the actual location is to the spatial depiction.

Entity Name	Entity Description	Logical Data Element Name	Type	Size	Req'd?	Key*	Definition
LOCATION		DRAFT ENTITY					
A defined place that requires a way to locate it by some means. Note: Entities linked to Location have the potential for a geospatial aspect.							
		LOCATION ARCHIVE DATE	date		Opt		The date which is the calendar year, month, and day when the position of the Location is considered no longer valid but has historical value.
		LOCATION EFFECTIVE DATE	date		Yes		The date which is the calendar year, month, and day when the position of the Location was produced.
		LOCATION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
LOCATION FORM		DRAFT ENTITY					
The form in which the location is described such as the description, shape, or appearance of the location.							
		LOCATION FORM IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		LOCATION IDENTIFIER	integer		Yes	FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		LOCATION FORM TYPE NAME	character	10	Yes	FK	The type of form in which the location is described or appears. point, line, polygon, tabular
		LOCATION FORM ORIGINATING FORM INDICATOR	character	3	Yes		The value that indicates if this is the way in which the location was first drawn/described. (yes, no)
LOCATION FORM SOURCE*		APPROVED ENTITY: BLM					
The actual origin of the location sources that were used to create a specific location form.							
		LOCATION FORM IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		LOCATION SOURCE DESCRIPTION IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
LOCATION FORM TYPE REFERENCE		DRAFT ENTITY					
The domain for the type of form in which the location is described or appears whether in words, numbers of features (point line, polygon). This has been called feature in geospatial communities.							
		LOCATION FORM TYPE NAME	character	10	Yes	PK	The type of form in which the location is described or appears. point, line, polygon, tabular
LOCATION SOURCE DESCRIPTION*		APPROVED ENTITY: BLM					
The values that provide a second level of detail about the location (coordinate) source origin. Note: there is not a finite set of these values.							
		LOCATION SOURCE DESCRIPTION CREATION DATE	date		Yes		The date on which the location source was originally created. This could just be a year (ccyy).
		LOCATION SOURCE DESCRIPTION STORED LOCATION TEXT	character	100	Yes		The text that provides the additional description of where the coordinate source can be found
		LOCATION SOURCE DESCRIPTION DEPICTION TEXT	character	20	Yes		The text that describes the actual resolution or scale in which the location is depicted. Examples for Resolution: 1 meter, 10 feet. Examples for Scale: 1 in 10,000, 1 in 100. This does not have a domain or list of valid values.
		DEPICTION TYPE NAME	character	10	Yes	FK	The name that designates the detail with which the location is depicted, either in resolution or scale.

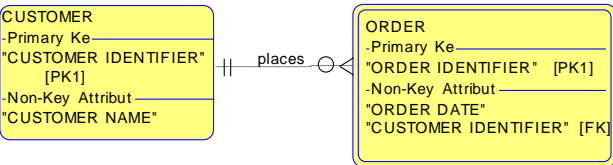
Entity Name	Entity Description	Logical Data Element Name	Type	Size	Req'd?	Key*	Definition
		LOCATION SOURCE DESCRIPTION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.
		LOCATION SOURCE DESCRIPTION TEXT	character	200	Yes		The text that provides further details on the Location (coordinate) Source Description.
		LOCATION SOURCE DESCRIPTION SPECIFIC NAME	character	40	Opt		The name that identifies a more specific description of the location (coordinate source).
		LOCATION SOURCE TYPE NAME	character	40	Yes	FK	The name that identifies the general category for the origin of the location coordinate, representing a compilation of the state adopted source codes. The domain contains those values that would most likely be used in the determination of source codes for the data set.
LOCATION SOURCE TYPE REFERENCE*							APPROVED ENTITY: BLM
The domain for the types of sources for the original location description / form.							
		LOCATION SOURCE TYPE NAME	character	40	Yes	PK	The name that identifies the general category for the origin of the location coordinate, representing a compilation of the state adopted source codes. The domain contains those values that would most likely be used in the determination of source codes for the data set.
		LOCATION SOURCE TYPE TEXT	character	100	Yes		The text that describes the Location Source Type.
POINT FORM							DRAFT ENTITY
A zero-dimensional abstraction of an object, with its location specified by a set of coordinates. (GIS dictionary)							
		LOCATION FORM IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		POINT FORM ACCURACY MEASURE	decimal		Yes		The measure that describes how close the spatial depiction of the point is to the actual location.
		POINT FORM UOM TYPE NAME	character	20	Yes		The name of the domain value associated with the Unit of Measure used for the Point Form Accuracy Measure.
POINT FORM DIMENSION							DRAFT ENTITY
The measure associated with each dimension of a Coordinate System.							
		PONT FORM DIMENSION MEASURE	decimal		Yes		The measure that is associated with a specific coordinate system dimension.
		LOCATION FORM IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		COORDINATE SYSTEM DIMENSION CODE	character	10	Yes	PK, FK	The code that is used to designate a dimension for a coordinate system type.
		COORDINATE SYSTEM ACRONYM CODE	character	10	Yes	PK, FK	The code that is considered the acronym for the coordinate system type.
POLYGON FORM							DRAFT ENTITY
An area bounded by a closed line. It is used to describe spatial elements, such as administrative and political boundaries and areas of homogeneous land use and soil types. (GIS dictionary). Note: In our physical environment, this includes all types of polygons, including ones that overlap.							
		LOCATION FORM IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity.

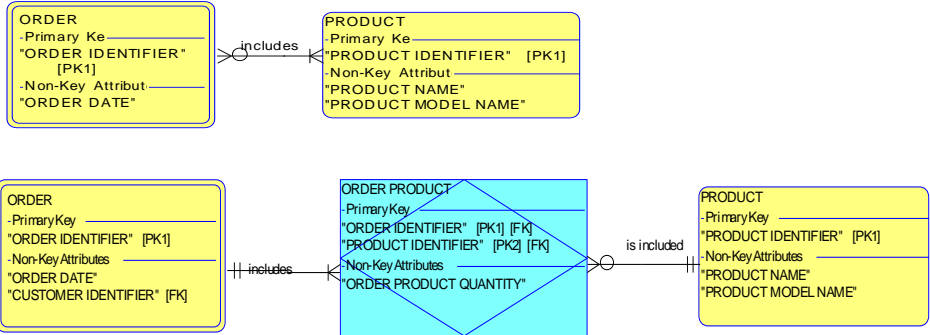
Entity Name	Entity Description	Logical Data Element Name	Type	Size	Req'd?	Key*	Definition
		POLYGON FORM UOM TYPE NAME	character	20	Yes		The name of the domain value associated with the Unit of Measure used for the Polygon Form Length Measure.
		POLYGON FORM AREA MEASURE	decimal		Yes		The area of the polygon described in the Polygon Form UOM Type Name.
RELATED LOCATION							DRAFT ENTITY
A valid relationship between two LOCATIONS for a specific reason.							
		RELATED LOCATION IDENTIFIER	integer		Yes	PK	The designed primary key that will uniquely identify a single occurrence of the entity. The first location that has a relationship with another location.
		RELATED LOCATION REASON NAME	character	40	Yes		The name that indicates the reason why two locations are related. Possible values: multi-part polygon, polygon lines, overlapping polygons.
		RELATED LOCATION REASON DATE	date		Yes	PK	The date when two locations became related for the reason stated.
		LOCATION IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
TABULAR FORM							DRAFT ENTITY
Descriptive information about a location, usually alphanumeric. This can be a single name or a combination of attributes that make up an address.							
		LOCATION FORM IDENTIFIER	integer		Yes	PK, FK	The designed primary key that will uniquely identify a single occurrence of the entity.
		TABULAR FORM TYPE NAME	character	20	Yes	FK	The name of the sub-category of the location form type which is true for tabular or alphanumeric descriptions of a location.
TABULAR FORM TYPE REFERENCE							DRAFT ENTITY
The domain for the type of tabular form that is being used to describe the location.							
		TABULAR FORM TYPE NAME	character	20	Yes	PK	The name of the sub-category of the location form type which is true for tabular or alphanumeric descriptions of a location.

*Key (PK: Primary Key) (FK: Foreign Key which is PK of related entity) (PK, FK: Foreign Key part of PK)

APPENDIX C: READING A LOGICAL DATA MODEL

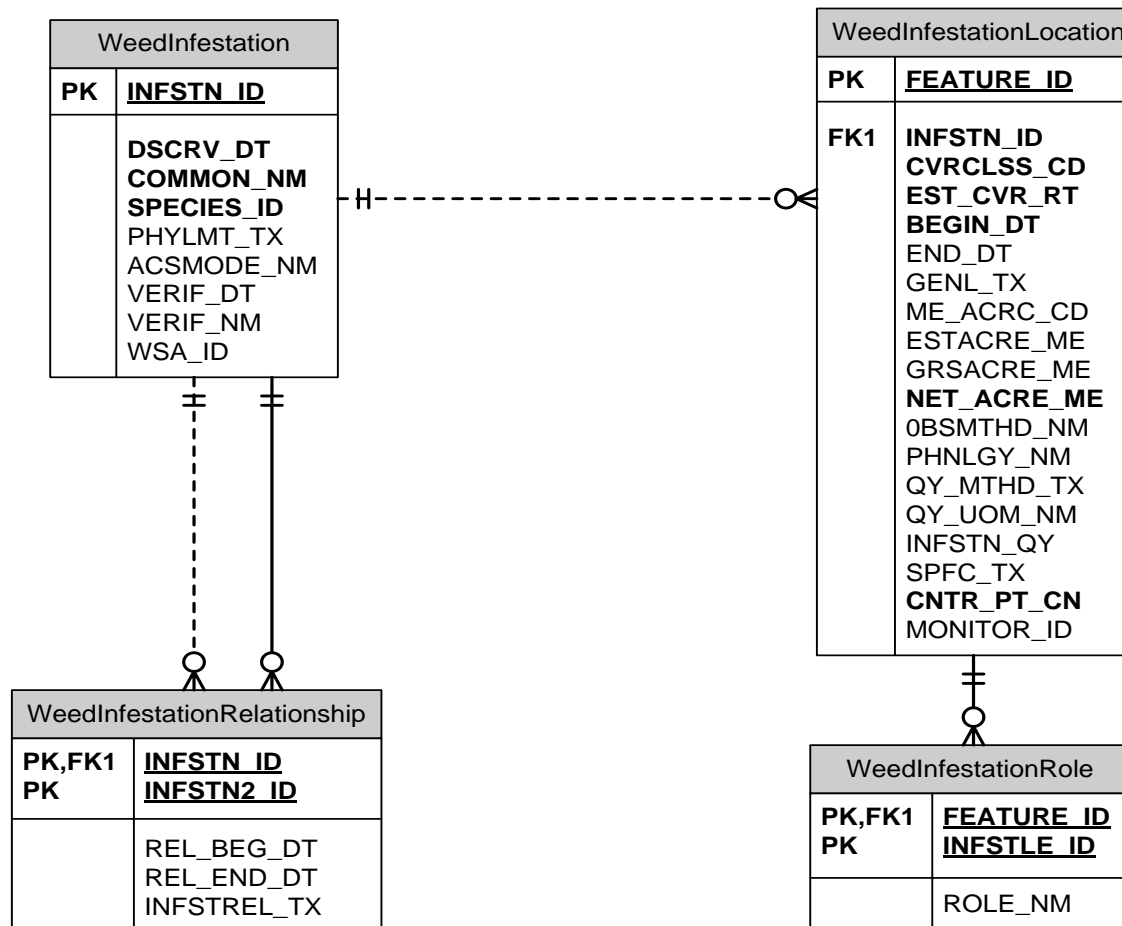
<div style="border: 1px solid black; padding: 5px; background-color: #ffffcc;"> <p>CUSTOMER</p> <p>-Primary Ke</p> <p>"CUSTOMER IDENTIFIER" [PK1]</p> <p>-Non-Key Attribut</p> <p>"CUSTOMER NAME"</p> </div>	<p>ENTITY</p> <ul style="list-style-type: none"> The noun or object on something of relevance to the business Shown as a box, with the name (singular in capital letters at the top, example below: ORDER) <p>ATTRIBUTES</p> <ul style="list-style-type: none"> The adjective which is the data or information about an entity; describes an entity (ORDER NUMBER, ORDER DATE) Has only one valid value for an occurrence of an entity at any given time The same value of an attribute may describe more than one entity occurrence PK = Primary Key – uniquely identifies an occurrence of an entity (one customer may have same name as another customer, so CUSTOMER IDENTIFIER is unique for a customer) FK = Foreign Key – the primary key of the parent entity is a Foreign key in the child entity The Word Identifier indicates that this will be a designed key, its format is not known, but the modeling tool required a format and size. The actual content and size of the identifier will be determined during design.
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 <p>The line includes optionality (minimum occurrences, inner symbol) and cardinality (maximum occurrences, symbol next to entity) = one 0 = zero < or > = many</p>	<p>RELATIONSHIP</p> <ul style="list-style-type: none"> The verb which shows an association between entities and represents business rules Represented by a line between two entities with active verb or verb phase (all small letters) Reading : Left to right (A CUSTOMER places zero to many ORDERS) and right to left (An ORDER is placed by one and only one CUSTOMER) Because a Customer can have many Orders, the Customer is considered the Parent Entity and the Order is considered the Child Entity). So the way you read it is normally from the Parent Entity to the Child Entity
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	<p>Many to Many:</p> <ul style="list-style-type: none"> In a logical data model, many to many relationships are resolved. In the example to the left an ORDER includes one to many PRODUCTS and a PRODUCT can be in zero or many ORDERS. <p>Associative Entity:</p> <ul style="list-style-type: none"> resolves the many to many with the diamond symbol
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APPENDIX D: NISIMS INFESTATION PHYSICAL DESIGN

The National Invasive Species Information Management System (NISIMS) is a collection of modules which provide tools for data collection and the generation of analysis and statistics for invasive species infestations and treatments through a centralized, national geodatabase. The Invasive Species Infestation Area feature class component of NISIMS is the information collected, stored and managed to describe invasive species infestation areas on public lands. The physical design for Invasive Species Infestation Areas is depicted as:



WeedInfestation (INVASIVE SPECIES INFESTATION AREAS)

Attribute Name	Logical Data Element	Data Type	Size	Req'd?	Required for Hand Held	Domain / Comment	Alias
INFSTN_ID	Invasive Species Infestation Identifier	integer		YesGen*	No		
PHYLMT_TX	Invasive Species Infestation Physical Access Limitation Text	character	100	No	No		
ACSMODE_NM	Physical Access Mode Name	character	20	No	No	Physical_Access_Mode_Name	
SPECIES_ID	Species Identifier	integer		Yes	No	From Species table	
COMMON_NM	Species Common Name	character	40	Yes	Yes	From Species table	Common Name
VERIF_DT	Invasive Species Infestation Verification Date	date		No			
VERIF_NM	Verification Status Name	character	30	No	No	Verification_Status_Name	Verification Status
DSCRV_DT	Invasive Species Infestation Discovery Date	date		No	No		Discovery Date
WSA_ID	Weeds Survey Area Identifier	integer		Yes	No	From Survey Area Feature Class	

WeedInfestationRelationship (Invasive Species)

Attribute Name	Logical Data Element	Data Type	Size	Req'd?	Required for Hand Held	Domain	Alias
REL_BEG_DT	Infestation Relationship Begin Date	datetime		No			
REL_END_DT	Infestation Relationship End Date	datetime		No			
INFSTN_ID	Invasive Species Infestation Identifier	integer		YesGen*	No		
INFSTN2_ID	Infestation Relationship Identifier	integer		YesGen*	No		
INFSTREL_TX	Infestation Relationship Reason Text	character	100	No			

YesGen*: Unique identifier Generated programmatically

WeedInfestationLocation (INVASIVE SPECIES)**FEATURE CLASS**

Attribute Name	Logical Data Element	Data Type	Size	Req'd?	Required for Hand Held	Domain / Comment	Alias
FEATURE_ID	Location Identifier	integer		Yes	No	(unique id of the Polygon)	
INFSTN_ID	Invasive Species Infestation Identifier	integer		Yes	No	(unique id of the infestation)	
BEGIN_DT	Invasive Species Infestation Data Collection Begin Date (see note below)	date		Yes	Yes		Collection Date
END_DT	Invasive Species Infestation Data Collection Completion Date	date		No			
ME_ACRC_CD	Coordinate Source Code	character	5	No		Measurement_Accuracy_Code	
NETACRE_ME	No logical attribute (calculated) (see Notes below)	decimal		Yes	No		Net Infested Acres
GENL_TX	Invasive Species Infestation Location General Area Text	character	100	No			
SPFC_TX	Invasive Species Infestation Location Specific Area Text	character	100	No			
CNTR_PT_CN	No Logical Attribute	character	50	YesCalc*	No		Center Point
GRSACRE_ME	Polygon Form Acre Measure (see Notes below)	decimal		Yes	No		Calculated Gross Acres
EST_CVR_RT	Canopy Cover Estimated Percent Rate (see Notes below)	decimal		Yes	Yes		Percent Cover
CVRCLSS_CD	Plant Cover Class Code (see Notes below)	character	1	Yes	No	Cover_Class_Code	Cover Class Code
ESTACRE_ME	Estimated Gross Infested Acreage Measure	decimal		No			
OBSMTHD_NM	Observation Method Name	character	30	No		Observation_Method_Name	Observation Method
PHNLGY_NM	Species Phenology Name	character	20	No		Plant_Phenology_Name	
QY_MTHD_TX	Plant Quantity (Collection Method Method Name)	character	30	No		Plant_Quantity_Method_Text	
QY_UOM_NM	Unit of Measure Type Name	character	20	No		Plant_Quantity_UOM_Type_Name	
INFSTN_QY	Collected (Infestation) Plant Quantity	number	10	No			
MONITOR_ID	Invasive Species Infestation Monitoring Identifier	integer					

YesCalc *: Calculated based on centroid of the polygon

Notes on attributes for WeedInfestationLocation

EST_CVR_RT	<p>Should be estimated if using a CoverClassName and CoverClass Code, based on business rules. Past. Now would like to have this generated the CoverClass Code using the Greater Yellowstone CoverClassName.</p> <p>A numeric estimate of the area of ground covered by the vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included. All current estimation will be entered as a percentage, 1 to 100.</p> <p>Legacy data shall be evaluated and entered as a percentage based on data steward guidance and firsthand knowledge of the infestation.</p> <p>If inventory procedures include the use of cover classes such as the Greater Yellowstone Area, 10 point codes, or Daubenmire codes, the midpoint of the cover class will be entered as the percent cover value as calculated using the indicated method. (NAWMA Definition) Example: Percent of cover for 100 weeds on a 10 acre site is not dense, 100 weeds on a 1 meter square is dense.</p>
BEGIN_DT	Generated by the GPS Unit during field data collection
CVRCLSS_CD	<p>There should be a Cover Class Method: generated from % cover: Now, want to assume that the Cover Class Method is always Greater Yellowstone and have this field generated based on the Percent Cover Field.</p> <p>Use for legacy data. See the domain criteria and cover class mid-point values.</p>
NETACRE_ME	<p>Formula to calculate Net Acre Measure: Acres= infestation acres * estimated canopy cover percent)</p>
GRSACRE_ME	<p>calculated programmatically based on infestation poly perimeter. Calculated Gross Infested Acreage is preferred over the Estimated Gross Infested Acreage</p>

WeedInfestationRole (INVASIVE SPECIES)

Attribute Name	Logical Data Element	Data Type	Size	Req'd?	Required for Hand Held	Domain	Alias
INFSTLE_ID	Party Identifier (Generated by depicting the relationship to the <i>Person</i> or <i>Organization</i> table to create a unique occurrence)	integer		Yes	No	From Person/Organization tables	
FEATURE_ID	Location Identifier	integer		Yes			
ROLE_NM	Role Name	character	20	No		Role_Name	