

Service Unit :
Reporting Office :
Procedure Number :
Species : Invasive Plant Species
Title : Invasive Plant Species Inventory and Mapping Initiative
Survey Type : II ___ III ___ IV ___

I. JUSTIFICATION

Through out the United States, invasive plant species are increasing in number and in frequency. Invasive species are widespread and extremely damaging to native ecosystems. Many national, state and local organizations are initiating surveys to locate and inventory areas of infestation. Invasive species threaten the mission of the U.S. Fish and Wildlife Service to effectively conserve native fish, wildlife and their habitats. USFWS Region 5 has initiated an effort to systematically identify, locate and map invasive plant species occurring on refuge lands in order to develop an effective integrated management program.

The purpose of this survey and mapping effort is to conduct a basic plant inventory documenting invasive species location, abundance, and distribution on refuge lands. The Service has reviewed The New England Wildflower Society's (NEWFS) initiative, the National Park Service, Forest Service and BLM methods, North American Weed Management Association, National FWS Promise Team efforts and the current initiative with the USGS, "One if by Sea, Two if by Land" project. Aspects of these methods have been combined to develop this straight forward survey method to get the effort started. We will continue to coordinate with on going work of other agencies and organizations as the data is collected and evaluated.

Refuges will use this information to guide the development of control, monitoring and evaluation projects. The data resulting from this survey will be instrumental in developing refuge CCPs, Habitat Management Plans and Integrated Pest Management Plans. The survey data will also be collected and provided to the Regional GIS specialist who will develop GIS coverages for refuges and consolidate regional coverages for prioritization initiatives for species control, monitoring rate of species spread, and evaluation.

II. STATISTICAL CONSIDERATIONS

There are minimal statistical considerations for this survey procedure. This is an inventory and mapping effort consisting of species occurrence and species abundance, there is no sample size. The survey will be implemented on as much of the refuge land base as possible. More statistically sound survey methods will be developed for control and monitoring efforts in the future.

III. DATA COLLECTION PROCEDURE

The goal of this effort is to inventory the refuge as completely as feasible using a grid system or line transects. The survey data will be integrated into a geographic information system (GIS) using a global positioning system (GPS) unit for the mapping portion of the survey. Information will be collected using the procedures outlined below (See Appendix A for Survey/Mapping Form):

A. Establishing Survey Location

The survey is to be conducted systematically. This can be achieved by using either a grid system or line transects to cover as much of the refuge as possible. The spacing between transect lines or the grid should reflect a distance that is the most suitable for the area/habitat type based on visibility. Spacing throughout the refuge can vary. Areas with known low expectance of invasives, may have wider spaced grid/transects, where areas with a high potential for invasives such as river corridors, parking areas, trail heads, auto tour routes and old homesteads need to be more intensely surveyed. Heavily managed areas should also receive more thorough searches, such as fire, farming, and logging sites. In this effort, focus on doing a thorough job on a smaller area of the refuge rather than sparsely covering the entire area. When selecting inventory sites, priority should be given to the highest valued resource management areas based on the refuge's goals and objectives.

Use the Digital Orthophoto Quarter Quad, (DOQQ) maps and refuge boundaries to assure complete coverage of the refuge. There are many approaches, one may be to select a series of points (waypoints) at alternating refuge boundaries as a means to guide the surveyor ensuring complete coverage of the selected area. Hand held compasses seem to work better than the ones built into the GPS units.

B. Conducting the Survey

1. Years. This work will continue for many years, depending on the size of the refuge. After the initial survey of the refuge, on-going documentation of invasive species should accompany this effort. When staff are doing other survey work such as the breeding bird counts, boundary posting, trail maintenance, etc. the GPS unit should be carried along and data collected, especially UTM coordinates when an invasive is encountered. (See Appendix B. Continuous Data Collection Form).

2. Time of Year. The survey must be conducted during the growing season. Identification of some plant species may need to be made specifically during the flowering or fruiting periods.

3. Time of Day. The survey can be conducted anytime during daylight hours.

4. Weather Conditions. This survey is not weather dependent.

5. Replication of Survey. The goal of this survey is to cover the entire refuge at least once. There may be areas of heavy infestation that may require additional visits.

6. Observation Period at Each Infestation Site. The amount of time at each infestation site will vary depending upon the ease of identifying the plant species, and the size of infestation.

7. Sampling Location. The sampling locations will be recorded using a GPS unit. Each location (Infestation) will be given an ItemID which will be unique and used to identify that particular infestation. This ItemID will relate the information collected by the GPS onto the data sheets. If the infestation is small, UTM coordinates are taken from the center of the area and the area of the infestation is estimated. If the infestation is large, the location data will be collected as a GIS polygon. Also for large monoculture infestations, such as phragmites, a recent map can simply be ground truthed with UTM coordinates collected at outer boundaries to see if it is still accurate and then total area calculated in ArcView. (For more information see Appendix C).

8. Number of Observers. This survey can be conducted with one or two observers. Larger refuges may choose to use one or more teams to survey the entire refuge.

9. Qualifications and Training of Surveyors. Qualified observers must be capable of identifying plant species and operating a GPS unit.

10. Equipment Needed. A “Resource” grade GPS unit, such as the Trimble GeoExplorer 3, GeoXT, or other similar units are recommended for Invasive Species mapping (Cost is approximately 4K). The next best choice, because of funding limitations is the GPSMAP 76S (~\$350.00) with the Mighty Mouse antenna. This model appears to be better than the Garmin Etrex because the antenna improves performance under a canopy situation and it holds more points. The third recommendation is the Garmin Etrex (~\$350.00) or better, as new models continue to improve performance. The software that goes with the Garmin is Mapsource with the “US Roads and Recreation” version preferred.

The Minnesota Department of Natural Resources has developed a very useful ArcView 3.2 extension that will download data directly from the GPS unit and turn it into a shapefile. This is preferable to using the MapSource product.

GIS software such as ArcView or ArcInfo is recommended.

Digital base layers that are recommended include orthophotos (DOQQ) and Refuge boundaries.

IV. DATA ANALYSIS AND REPORTING PROCEDURES

A. Recording Plant Data

1. Field Sheets. The Invasive Plant Species Survey/Mapping Form (Appendix A) will be used as the field record to document infestation site information.

2. Data Fields. The following information will be recorded for each infestation site.

Refuge Name: Self explanatory.

Org. Code: The FWS numeric organization code for the refuge, this will enable the use of the data with other FWS datasets.

GPS Receiver Type: Enter Make and Model.

Division: Self explanatory.

Survey Date: The date the species was observed in the field. Enter the date where YYYY equals the four digit year (2002), mm equals the two digit representation of the month (04) and dd stands for the two digit representation for the day of the month (29). IE. A bittersweet site was visited on April 29, 2002. Survey Date: (20020429).

Name of Surveyor: Enter the name of the actual person(s) doing the survey.

File Names: The names of any GPS or GIS files associated with the data on this sheet.

GPS Location Information:

ItemID A unique identifier for each infestation. It may be anything you like as long as it is unique.

Coordinates X and Y These are to be recorded as **UTM NAD83** meters in the zone appropriate for your refuge.

Type There are two types of point features; **PlantPoint**, a single point, with area, representing an infestation or **PolyPoint**, a point that is one of several points delineating a polygon representing the infestation. The **Line** feature can be used with a buffer distance and direction to create a polygon or a **Polygon** feature can be used.

Area The area covered by the infestation in square meters(only needed for plantpoints).

Species Record the alphanumeric symbols from the USDA Plant Code in this block. See the Appendix D for the codes of common invasive species. Use the USDA Plant database (<http://plants.usda.gov/>) to obtain the code if a species is missing from the attached plant list. If the plant can not be accurately identified in the field, bring a specimen into the office for definitive identification.

Abundance: *Estimate* the number of plants you have encountered. Enter the alpha-code from A-E for this category. This information combined with the distribution will provide an idea of the extent of the infestation. It is not an “exact” count, just an estimate.

Distribution: Distribution relates to what a particular species infestation looks like on the landscape. Enter the alpha-code from A-E for this category. Select only one block. Again, this is just an estimate. See below for distribution qualifiers:

Infrequent occurrence: Widely separated individuals disconnected by at least 10 meters, typically over large acreage. No pattern to the distribution.

Evenly throughout: Individual plants occur at fairly regular intervals, and may be separated by anywhere from 25 feet to 50 meters. This spatial arrangement can occur on even small parcels. There often appears to be a pattern to the distribution.

Localized Patches: These are isolated clumps of a species, often at or near the initial site of introduction. They may or may not be surrounded by another pattern of distribution. There may be just one patch or several; there are never many. The patches can be quite large in size. Depending on the size of the site the patches may or may not be located in close proximity to one another. However, they are typically widely spaced, usually occurring no closer together than 100 meters. Compare to frequent stands below.

Frequent Stands: Similar to a localized patch, only occurring with more frequency and in large numbers. Typically large clumps of plants occurring close together, but not touching. A rule of thumb would generally be 5 -10 meters apart. Many stands are usually in view at once. The key here is many stands, occurring frequently, and close together.

Densely throughout: Many plants growing singly or in clumps close together or touching one another. A monoculture. An individual cannot walk through the site without stepping on or touching the target species at all times. Small gaps in coverage are acceptable, large ones are not.

Stage: Note the plant life stage at time of identification, i.e. Berries/fruit; flower; leaves; or

other.

Comments: Note any other pertinent information concerning the infestation site.

3. *Electronic Data Transcription.* The location information collected by GPS must be reunited with the information on the data sheets. If this is not done automatically through the data dictionaries then it must be done by hand in ArcView. All of the information that is collected on the data sheets must be entered in the appropriate record in the shapefile for each species. For more information see Appendix C.

B. Data Analysis

After the completion of the survey, all GIS data and survey data will be provided as attributed shapefiles to the Regional Refuge GIS Specialist (Rick Schaufler), who will then overlay the refuge data on Digital Orthophotos Quarter Quad (DOQQ), national land coverage data (NLCD), or the most recent cover type map and provide that information back to the refuge. A Regional map of all invasive species locations on all refuges, as well as separate overlay maps for each weed species will be developed. This information will guide individual refuges and the Region in developing control and monitoring initiatives.

MANAGEMENT ACTION THRESHOLDS

The plant inventory information will be used to develop an integrated approach to eradication, control and/or monitoring.

DATA STORAGE PROCEDURES

An excel data spreadsheet will be used for data storage. Plant nomenclature will be used as defined in the International Taxonomic Information System (ITIS). The web site for additional information about this system is: (<http://www.itis.usda.gov>). A look up table will be developed in an excel computer program that will accompany this work which will link the USDA Plant name with ITIS.

SPECIAL CONSIDERATIONS

The USFWS definition of an invasive species as follows:

An "invasive species" is defined as a species that is 1) non-native (or alien) to the ecosystem under consideration **and** 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
(Executive Order 13112).

I. ADDITIONAL RESOURCES

Photo identification and plant life history websites:

www.invasivespecies.gov/profiles

www.nps.gov/plants/alien/factmain.htm

www.nps.gov/plants/alien/factmain.htm

<http://tncweeds.ucdavis.edu/photos.html>

<http://parks.state.co.us/cnap> (publications volumn 4)

<http://nas.er.usgs.gov> (USGS database of maps for nonindigenous aquatic species.)

Official Plant list and taxonomic names:

USDA Plant database (<http://plants.usda.gov/>)

USDA International Taxonomic Information System (<http://www.itis.usda.gov>).

Federal Organizations:

National American Weed Management Association

(<http://www.nawma.org>)

USGS maintained site: (<http://invasivespecies.gov>)

