National Park Service
U.S. Department of the Interior

Alaska Regional Office

Alaska Exotic Plant Management Team

2010 Field Protocol

Last Modified: 3/2010

ON THE COVER
The Alaska Exotic Plant Management Team logo

Alaska Exotic Plant Management Team

2010 Field Protocol

Last Modified: 3/2010

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Acronyms

AKEPIC	Alaska Exotic Plant Information Clearinghouse
AKNHP	Alaska Natural Heritage Program
APCAM	Alien Plant Control and Monitoring Database
AKRO	Alaska Regional Office (National Park Service)
ARRA	American Recovery and Reinvestment Act
BMP	best management practice
BRMD	Biological Resources Management Division
CWMA	Cooperative Weed Management Area
EPMT	Exotic Plant Management Team
GIS	geographic information system
GLBA	Glacier Bay National Park & Preserve
GPRA	Government Performance and Results Act
GPS	global positioning system
KLGO	Klondike Gold Rush National Historical Park
NAD	North American Datum
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PFO	Trimble Pathfinder Office software
SAGA	Southeast Alaska Guidance Association
SCA	Student Conservation Association
SITK	Sitka National Historical Park
USFS	US Forest Service
USGS	US Geological Survey

Introduction

Welcome to the 2010 season with the Alaska Exotic Plant Management Team (EPMT)! We are so excited to have you working with us. You are entering the sixth working season of this EPMT and will continue a proud tradition of being part of one of the most weed free teams in the United States.

We plan on having a busy season this year and hope you are up to the challenge. In return for all of your hard work you will have the opportunity to be witness to some of the most beautiful, remote, and pristine areas of the National Park Service (NPS).

This document will guide you through this summer's field season, including setting seasonal priorities, collecting data using Trimble GPS units and a customized data dictionary, data management, collecting specimens, taking photographs, and more. This same protocol has been used in Alaska parks since 2005, ensuring the highest data quality standards and consistency across park units. The protocol itself is a GPS-based method to map exotic plant infestations and uninfested areas and collect relevant information about them. The data will be incorporated into three systems: 1) an Alaska NPS exotic plant management geodatabase, 2) a statewide database developed to track exotic plant distributions across jurisdictional boundaries, and 3) a national NPS database which tracks EPMT accomplishments nationwide.

If you have any questions, comments, or suggestions about how we can improve this protocol and the program feel free to contact us at any time. Thank you in advance for all of your hard work this season and we hope you are interested in continuing to work with the Alaska EPMT in the future.

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Background

The national parks are home to complex communities of native plants and animals that have developed over millions of years. The delicate natural balance within these communities is threatened by the invasion of exotic plants. These exotic plants are able to reproduce rapidly because the animals and diseases that keep them in check in their home ranges are missing. For example, purple loosestrife, a popular ornamental from Eurasia, chokes out native riparian vegetation throughout the Great Lakes. Spotted knapweed easily grows in a wide variety of habitats in the western United States, from 8 to 80 inch precipitation zones and over 10,000 feet in elevation. When the populations of native plants are reduced, the animals that depend upon them lack the food and shelter needed for survival.

Today, exotic plants infest approximately 2.6 million acres in the national park system, reducing the natural diversity of these places. Drawing funds from the 1999 Natural Resource Challenge set forth by Congress, the National Park Service Biological Resource Management Division (BRMD) has established rapid response Exotic Plant Management Teams (EPMT) to control exotic plants. Modeled after the approach used in wildland fire fighting, EPMTs provide highly trained, mobile strike forces of plant management specialists who assist parks in the control of exotic plants.

Each EPMT serves multiple parks within a broad geographic area (Figure 1). They work through steering committees to identify, develop, conduct, and evaluate exotic species removal projects and undertake appropriate native species restoration efforts. Each of the sixteen established teams has developed site-specific strategies for combating exotic plants that reflect the needs and resources of the more than 200 parks they serve.

The success of the EPMT derives from its ability to adapt to local conditions and needs. Each team employs the expertise of local experts and the capabilities of local agencies. Each sets its own work priorities based on the following factors: severity of threat to high-quality natural areas and rare species; extent of targeted infestation; probability of successful control and potential for restoration; opportunities for public involvement; and park commitment to follow-up monitoring and treatment.

For more information on the national EPMT program go to the EPMT website at:
http://www.nature.nps.gov/biology/invasivespecies/EPMT_teams.cfm

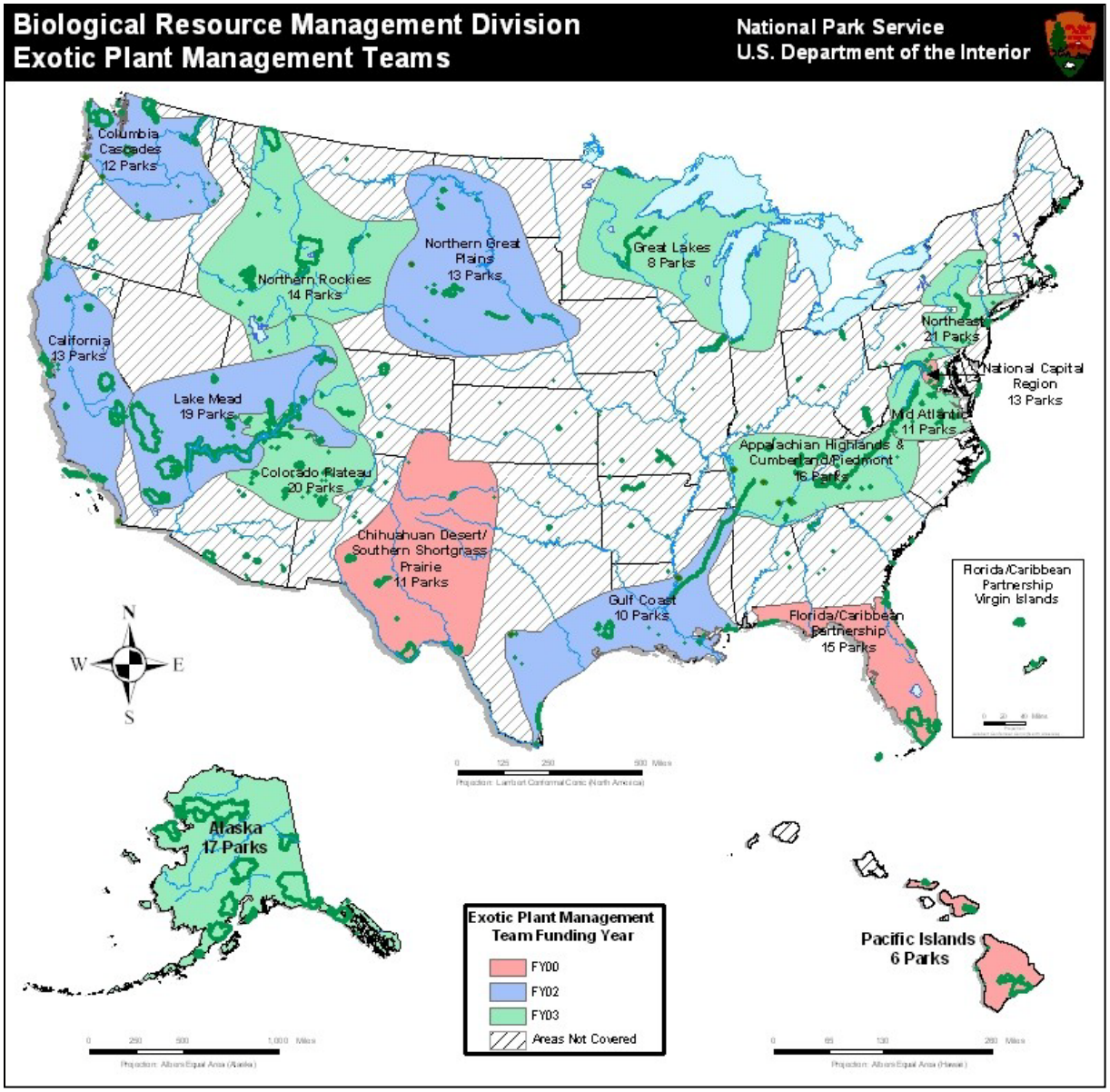


Figure 1. Map of all EPMTs across the nation.

The Alaska EPMT

People often think of Alaska as too cold or remote for invasive species to become problematic. The past decade has demonstrated that Alaska is just as vulnerable as other regions of the country, especially as climate change potentially increases the range of invasive species. Aggressive invaders such as purple loosestrife, spotted knapweed, Canada thistle, and yellow toadflax have already taken hold of areas in Alaska's wildlands. With permanent funding secured in 2003, the Alaska EPMT has been able to manage these aggressive invaders early in the invasion process on the 54 million acres of National Park Service land in Alaska (Figure 2).

Due the remote nature of many of the Alaska park units and the associated high cost of travel, the Alaska EPMT does not have a centralized crew which travels to each park like many of the EPMTs in the lower 48. Instead, the team works cooperatively with partner parks to train

existing park staff, partially fund seasonal park staff, and support internship positions. This increases the amount of on the ground time dedicated to exotic plant management at each park. In addition to park specific staff the Alaska EPMT also funds Southeast Alaska Guidance Association (SAGA) AmeriCorps crews, who assist with the treatment of larger infestations.

These personnel, combined with volunteer assistance from community groups and partnerships with neighboring land managers, work towards containing existing infestations and eradicating new or smaller infestations using manual control methods in eight Alaska park units. To date the team has eradicated nearly 300 individual infestations, including bird vetch, reed canarygrass, and other species.

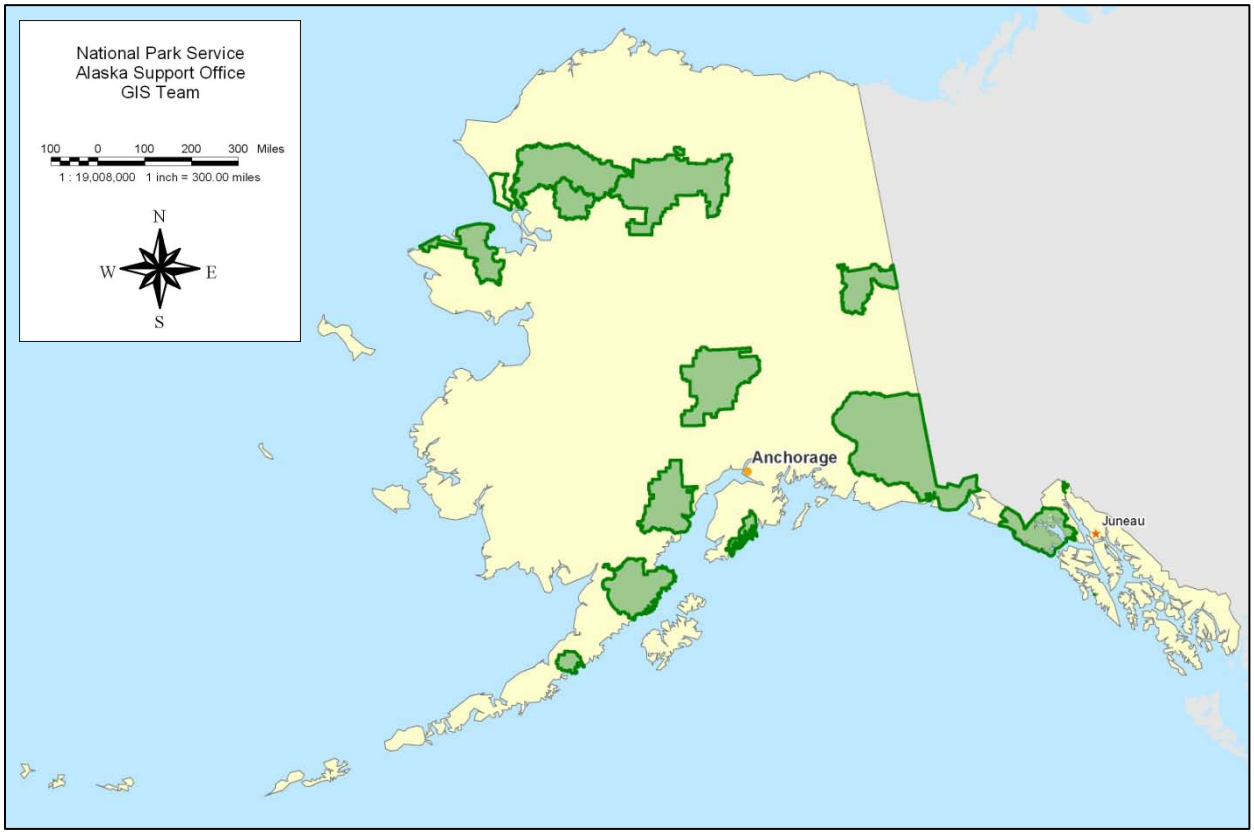


Figure 2. Map of Alaska National Park Service units.

The Alaska EPMT is unique in one other area as well. Due to several factors herbicides are not utilized in Alaska parks. An Integrated Plant Management Plan and Environmental Assessment was completed in early 2010 but given the planned workload this summer and some public concerns there are no herbicide treatments scheduled for the 2010 season. All Alaska EPMT treatments will be manual, hand-pulling treatments with all reproductive plant parts bagged and properly disposed of.

The Alaska EPMT education and outreach program engages local residents and park visitors teaching about the unique situation that faces Alaska parks when it comes to invasive weeds. The team hosts educational events to engage the general public during Alaska's short summer season, including volunteer weed pull days, summer camp presentations, 4th of July activities, and

informational booths. A few of the more creative outreach activities include creating invasive weed recipes, an invasive plant identification table with fresh samples, and a non-native flower arranging contest. These activities encourage volunteers and community members to have a more hands on learning experience with invasive plants.

For more information on the Alaska EPMT program go to the Alaska EPMT website at: http://www.nps.gov/akso/NatRes/EPMT/index.html

National Performance Reporting

It is imperative that all work completed this season gets documented properly so park and EPMT annual reports accurately reflect the team's accomplishments and efforts. The work completed is also included in Government Performance and Results Act (GPRA) reports which are then used to determine funding. The EPMT work must be properly documented in two main areas for GPRA purposes:

Acres Treated

Any control efforts conducted by the EPMT, volunteers, other park employees, etc. needs to be mapped. Control efforts should be mapped using the GPS method described in this protocol. If GPS mapping is not feasible, the work can digitized from field notes, pencil and ink sketches and other written descriptions. In order to accomplish this all the relevant information must be communicated clearly to the regional office EPMT staff. In an effort to keep the EPMT data as consistent as possible, digitizing should only be used as a last resort.

Acres Controlled/Eradicated

It is critical that previous infestations are revisited and remapped on at least an annual basis. If the infestation is not detectable, map the location where it once was with a GPS unit and indicate what plant species was there and choose the phenology code "not_detected." At the end of season, the regional office EPMT staff will use past years data and park knowledge to determine if the infestation should be considered eradicated.

Other Key Points

Data reporting

The 2010 season has more funding and more effort going out on the ground than any other Alaska EPMT season on record due to two large American Recovery and Reinvestment Act projects. These projects are funding 16 Student Conservation Association (SCA) internships at eight Alaska parks and 39 weeks of Southeast Alaska Guidance Association (SAGA) work crews. This funding has stringent reporting requirements so it is imperative that all EPMT staff members properly document the work completed this summer and submit the data to the regional office EPMT staff on the scheduled upload dates.

Herbicide use

While there are no herbicide treatments scheduled for this season there are future plans for herbicide use in certain areas. These areas will be determined by species combined with past mapping and control efforts. In order for an area to be considered for herbicide treatment there has to be accurate data which shows that alternative control methods (i.e. hand-pulling) have not been effective over the past three to five years. Consistent treatment and mapping of priority infestations on an annual basis is essential to meet this data need.

Photo contest

Each year the National EPMT program has a contest for photos to include in the National Annual Report cover and body. Having a photo selected brings the team major national bragging rights At least two "money shot" photos are needed from every park this year. These shots should include people (arrowheads, uniforms and other NPS symbols are always good), treatment and outreach activities, invasive plants, and great backgrounds. Staging the photo is acceptable (scenic backgrounds, wildlife, etc).

Starting the Season

Establish Park Priorities

- What will be accomplished this summer?
- What areas need to be revisited?
- What new areas need to be inventoried?
- What are the control priorities?

With the increased numbers of EPMT staff members across the state this summer it is essential that everyone has a plan of how to approach the short Alaskan growing season. First, EPMT staff should review the annual field reports for their park. The insights from previous years will be invaluable to establishing priorities for this season. Feel free to consult with the regional office EPMT staff for a state-wide perspective or a park supervisor for a local perspective. Remember that plant phenology will dictate a large part of the season's schedule. The park phenology log should be consulted and updated to help determine what species are ready for treatment at what times during the season (see the Phenology Log section on page 55). Undoubtedly, there will always be more that could have been done but with a solid set of priorities a significant amount of work can be accomplished over the summer.

To aid in developing priorities, all previous data has been merged to delineate the maximum mapped area of different species infestations over the course of the EPMT program. This data is available for GIS, as well as in summary tables sorted by different criteria (park, location, species, ranking, etc). This information will help develop real goals. For instance, if there are 250 infestations of species A (invasiveness ranking of 52) covering 13 acres and 3 infestations of species B (invasiveness ranking of 71) covering 0.009 acres, it should become evident that the priority is species B since it has a higher rank, is less abundant, and covers a much smaller area.

The invasiveness ranking is based on the Alaska Natural Heritage Program's (AKNHP) Invasive Weed Ranking Project. A complete list of all ranked species can be found at the AKNHP website: http://akweeds.uaa.alaska.edu/akweeds_ranking_page.htm

As a region wide priority, map all species with a ranking greater than 50 at a higher precision. The EPMT needs to have more precise information on distribution and extent of these highly invasive infestations for planning alternative, non-manual treatments. For example, if while mapping a line feature of pineappleweed along a trail a small patch of yellow toadflax is discovered – instead of lumping the yellow toadflax infestation data into the line feature a new point feature should be recorded of just the toadflax.

General File Management

In an effort to organize data that works well for each team and any future users, emphasis should be placed on creating a systematic file structure at each park. In most cases this has already been accomplished and should be replicated for the 2010 season. In collaboration with a park supervisor or IT staff, identify the appropriate place to store the park EPMT data that is accessible by park EPMT staff, is secure, and is routinely backed up. This may be on a local computer (C:\) or on a network drive (e.g. W:\ drive). It is best to co-locate data for 2010 with previous park EPMT data. Relocate the past year(s) folder or create a folder (such as

"EPMT_parkcode") in this location that will contain ALL of the park data, documents, etc. Within this folder, tiers of subfolders can be created.

The suggested file structure is depicted in Figure 3 with each balloon representing a folder. This is definitely not exhaustive of the possible file structures, but it is a good general framework to organize files.

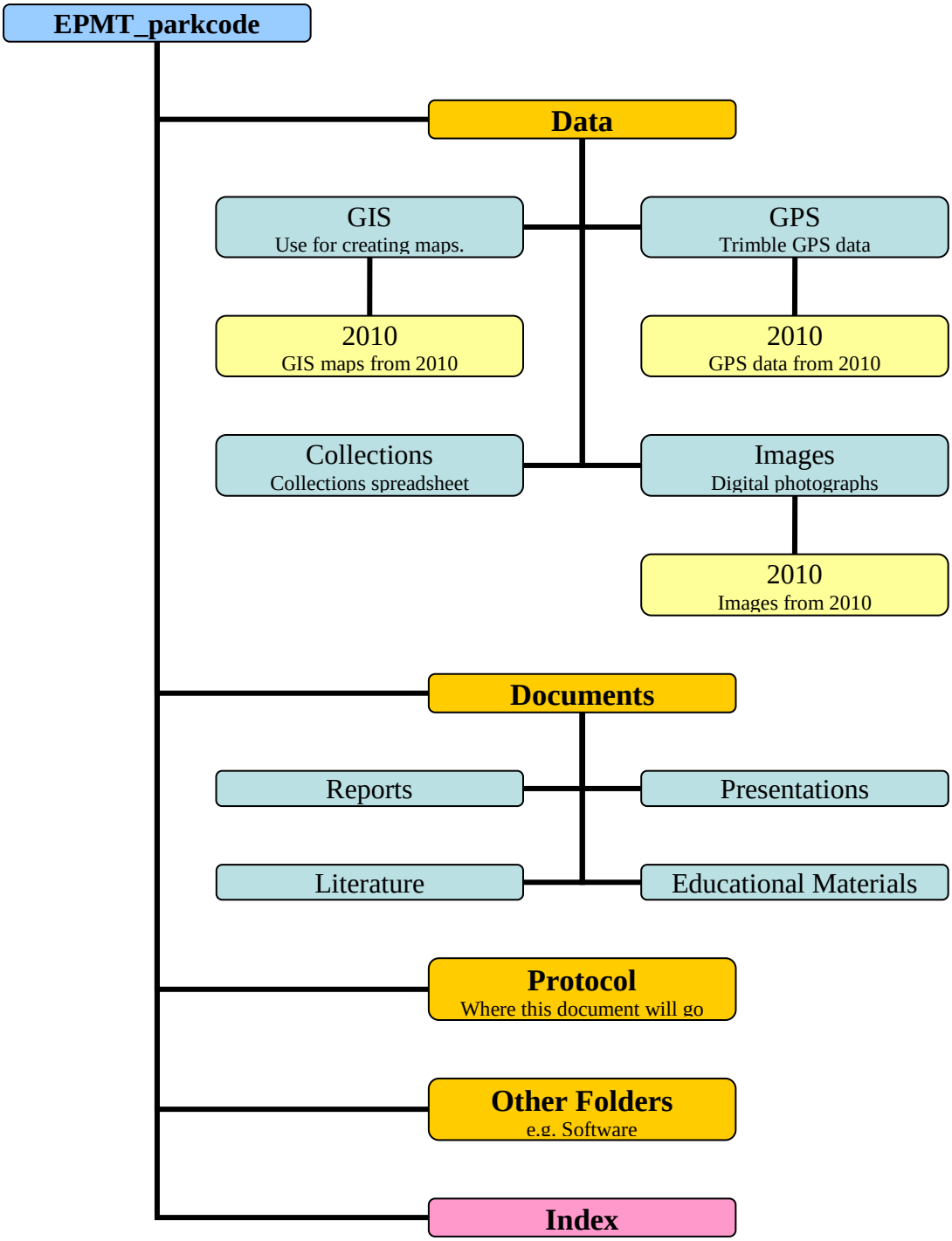


Figure 3. Example of a local file management outline.

In the root folder, create an index document (index.doc or Project_Organizer.doc) in Word that directs people to the various files within the folders. Using hyperlinks will further facilitate others to find relevant information quickly.

At the end of the season, either copy the entire folder to the regional EPMT folder (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code OR make 2 copies of the entire folder to CD or DVD. Label the CD/DVD with EPMT, park code, and year. Send one copy to the regional office and store another at the park.

All GPS and photo data must be edited and uploaded to the regional EPMT drive (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code. Please upload all data produced in the preceding two weeks by the end of each pay period throughout the summer. This will ensure that the data is being processed correctly, in a timely fashion, and it can be processed and uploaded into the national and statewide databases so the information is available for use throughout the season. For the 2010 season the upload dates are:

June 18	August 13
July 2	August 27
July 16	September 10
July 30	September 24

GPS Setup

Global positioning system (GPS) is a method using satellites to triangulate and accurately pinpoint a geographic location. The Alaska EPMT uses GPS to map invasive plant populations and treatment areas so work progress can be precisely reported. This is of the utmost importance as these reports go to partner agencies as well as Congress and are how the team justifies its existence and funding. Without accurate and comprehensive data collection the team would no longer have the support it needs to continue.

This portion of the document will serve as a guide for collecting data using Trimble GPS units; which include a customized data dictionary. The Alaska EPMT uses primarily Trimble GeoXT GPS receivers with TerraSync 4.10 and Pathfinder Office 4.10 software. This same protocol has been used in Alaska parks since 2005, ensuring the highest data quality standards and consistency across park units. The protocol itself is a GPS-based method to map exotic plant infestations and uninfested areas and to collect relevant information about these areas. The data will be incorporated into three systems: 1) an Alaska EPMT geodatabase, 2) a statewide database developed to track exotic plant distributions across jurisdictional boundaries – the Alaska Exotic Plant Information Clearinghouse (AKEPIC), and 3) a national NPS database which tracks EPMT accomplishments nationwide – Alien Plant Control and Management (APCAM) database.

It is important to note that this protocol does not provide instructions on the operation of Trimble GPS units. More detailed protocols on GPS operation should be addressed through Trimble training provided at the spring EPMT training. Reviewing the training binder may be helpful. In addition, many GPS solutions are posted on the regional GPS web pages – General GPS toolkits and the overall Regional GPS page. TerraSync software support also provides a Getting Started Guide which includes some good information.

Required Software

TerraSync is the software that operates the GPS functions on Trimble GPS units with touch screens. The current version 4.10 is available from Trimble. Any GPS unit provided by the regional office EPMT staff should be properly upgraded with the relevant software at the beginning of each season.

Microsoft ActiveSync is the software that enables the computer to communicate with the GPS units that run TerraSync software. For computers running Windows XP, the current version 4.5 is available online.

GPS Pathfinder Office (PFO) is the Trimble software that operates on the computer to transfer and process GPS data from the GPS unit. To run the process properly each park should be running the current version, Pathfinder Office 4.10, which is available from Trimble. Each park should make sure they are authorized to download and use the proper version. Check with the park GIS/GPS specialist on being able to use the park's floating PFO license.

When updating software it is best to uninstall previous versions and install new versions. Depending on the user settings for computer use, a park IT specialist may be required to facilitate the software installations. If any park is working with older software versions please let the regional office EPMT staff know since settings may be different.

Connecting to the computer

To allow a GPS unit that runs TerraSync, such as GeoXT units, to communicate with the computer, the computer must have Microsoft ActiveSync installed. For computers running Windows XP, the current version 4.5 is available online. Once ActiveSync is installed, follow these steps:

> WARNING: If you have a GeoXT 2003 (two buttons on front), these should only be connected to a computer via a USB hub. There have been many cases of power surges frying the computers! The hubs buffer this surge.

1. Connect the GPS cradle to the computer.
2. Place the GPS unit, already on, in the cradle. Insert the top end with the antennae into the cradle first and then press the bottom onto the connection pins. These pins are fragile so try to line up the unit as well as possible and do not use too much force when placing the unit into the cradle. The unit should snap into place with a single firm push.
3. Once the unit is in the cradle ActiveSync should start automatically. If ActiveSync does not start try reconnecting the GPS, reconnecting the cradle, or restarting the computer. If the GPS unit still does not connect contact the regional office EPMT staff.
4. If asked to set up a Partnership, always select the Guest partnership. Guest partnerships allow for quicker connection to the computer. The options associated with the Standard partnership are not used by the Alaska EPMT.

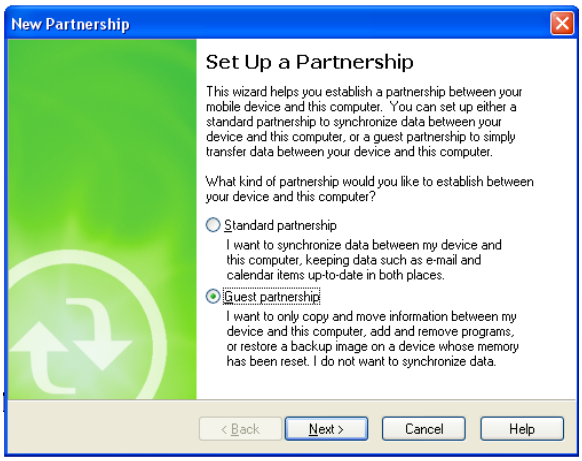


Figure 4. Screenshot of Microsoft ActiveSync Partnership setup screen.

Initial GPS Clean Up

At the beginning of the season any GPS unit to be used during the summer should go through the following clean up procedures. This will ensure that the GPS unit is running at top speed and has plenty of storage space.

> WARNING: If you have a GeoXT 2003 (two buttons on front), these should only be connected to a computer via a USB hub. There have been many cases of power surges frying the computers! The hubs buffer this surge.

1. Connect the GPS unit to the computer using ActiveSync.
2. Using PFO, download all the rover files on the GPS unit to a backup folder (see Transferring Rover Files section on page 36) and notify the park's GIS personnel, a park supervisor, or past users of the file locations. These files should be transferred using the Data Transfer Utility in Pathfinder Office **NOT** via Windows Explorer. ***Never*** transfer GPS associated files using Windows Explorer or any other means besides the PFO Data Transfer Utility.
3. With the GPS unit still connected to the computer with Active Sync, select the Mobile Device in Windows Explorer (Figure 5).

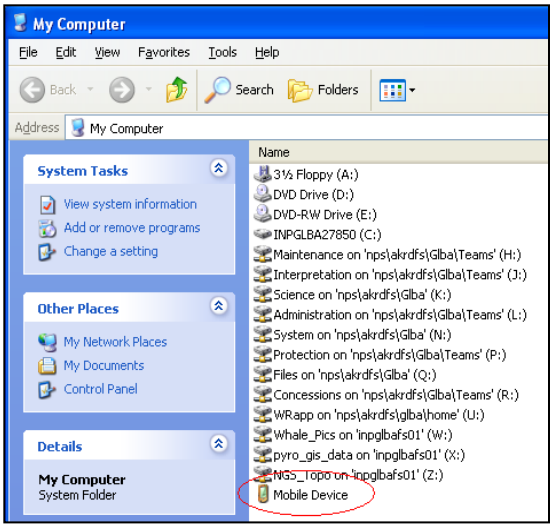


Figure 5. GPS unit as seen in Windows Explorer.

4. Navigate to \Disk\My Documents\TerraSync (most likely location), copy all files to a backup folder on the computer, and then delete them from the GPS. Look into other folders as well.
5. Backup the GPS unit using TerraSync. Select Start>Backup Now.
6. In TerraSync on the GPS unit, go to the Data screen and use File Manager to delete all previous data that is no longer needed. For example, old rover files, data dictionaries, backgrounds, etc. Some background files may still be useable if made for a similar area or purpose.
7. Backup the GPS again.

Initial GPS Setup

In order to maintain consistency across the parks there are a couple steps and several files that must be initially transferred to all GPS units. These files should be transferred using the Data Transfer Utility in Pathfinder Office **NOT** via Windows Explorer. ***Never*** transfer GPS associated files using Windows Explorer or any other means besides the PFO Data Transfer Utility.

Set the time zone

Due to the recent changes in Daylight Savings Time, Mobile 2003 units and newer have patches to correct for the time of year shifts. See Joel Cusick's bulletin on updating time.

1. Go to the "Start" menu of the Trimble unit
2. Tap on "Settings"
3. On the "System" tab, tap on "Clock"
4. Verify that the time zone is set to "GMT-9 Alaska" and tap OK.
5. Once the unit has been outside and received satellite information double check that the time is still correct.

Configurations

Configuration files are Trimble specific and allow a user to standardize all GPS units with the most important GPS settings to predetermined values. These files are not password protected, so settings can still be altered in the field when conditions merit.

> WARNING: If you have a GeoXT 2003 (two buttons on front), these should only be connected to a computer via a USB hub. There have been many cases of power surges frying the computers! The hubs buffer this surge.

1. Connect the GPS unit to the computer using ActiveSync.
2. Open PFO.
3. Launch the Data Transfer Utility, marked with the  button on the left side of the screen or from the Utilities menu, and connect to the GPS unit.
4. The Data Transfer Utility automatically opens in Receive mode. Select the Send tab to be able to transfer files from the computer to the GPS unit
5. Click the Add button on the right side of the window and navigate to the Configurations folder.
6. Browse to the appropriate configuration file, either GeoXT2003Summer_2010_TerraSync.tcf or GeoXHwithZephyrSummer_2010_TerraSync.tcf, depending on the type of GPS being used.
7. Click OK and then Transfer All. If an error message pops up on the GPS unit, it is mostly likely not running the current version of TerraSync.

Once the configuration file has been transferred ensure the GPS unit has been updated by following these steps:

1. Remove the GPS unit from the cradle and turn it on.
2. Turn on TerraSync and select the Setup screen.
3. Below the "Current Configuration:" box, tap on the box labeled "Change"
4. Select the transferred configuration file from the menu and tap on "Load"
5. Back at the Setup screen, tap on the "Logging Settings" box

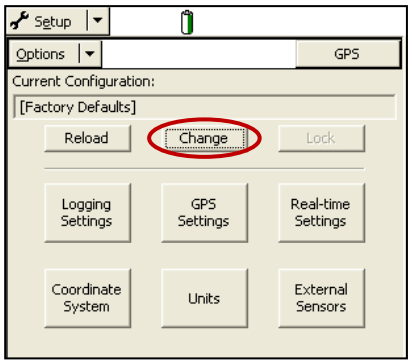


Figure 6. Where to change the Configuration in TerraSync.

6. By default, the antenna height is 1.5m. Click on the wrench icon and change the height to the user's chest height. If using an external antenna change the height to the height of the external antenna. The GPS unit or external antenna should be held at this height when collecting data.
7. Still in "Logging Settings," change the "Filename Prefix" (default 'R') to the first letter of the user's last name. If multiple users use the same GPS, assign individual letters to each unit (such as A and B) and do not modify. This allows for accountability throughout the season.

Species Data Files

All previous years' data has been transformed into species specific data files for each park (example GLBA_BROINE.imp) for use on the GPS units. Once transferred to the GPS unit using PFO, the data files can be used in one of two ways.

Data file as background

As a background, the polygons are visible on the TerraSync Map screen but the attribute information of the data file is not accessible. Multiple background files can be viewed at the same time, which would allow a background image plus several taxa, all while current features are being collected in a rover file.

1. Within TerraSync, select the Map screen.
2. From the "Layers" menu, select "Background Files" and make sure the "Show Data Files" option selected.
3. Select the data file(s) to display. The polygons are now loaded as a background image.

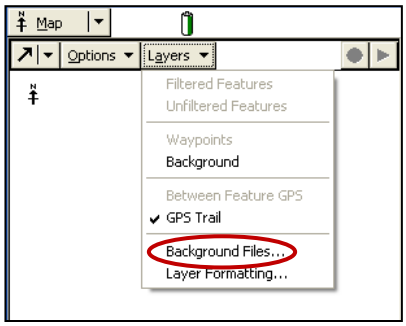


Figure 7. Selecting background files to display in TerraSync.

Data file as existing data file
When the data file is loaded as an "Existing Data File", the polygons are visible on the "Map" screen and the attribute information is accessible however, new features cannot be collected or other rover files opened.

1. Within TerraSync, select the Data screen and "Existing."
2. Highlight the appropriate taxon data file and select the "Open" button.
3. The data file is now open like a rover file, but new features **should not** be collected.
4. Under "Options" in either the Data or Map screens, the data can be manipulated with the "Filter" function, for example by management action. The filtered polygons will display as green.

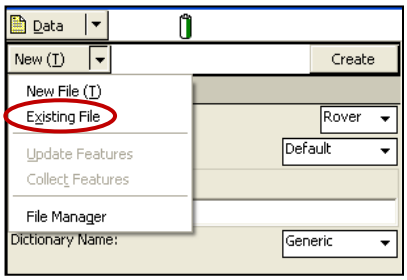


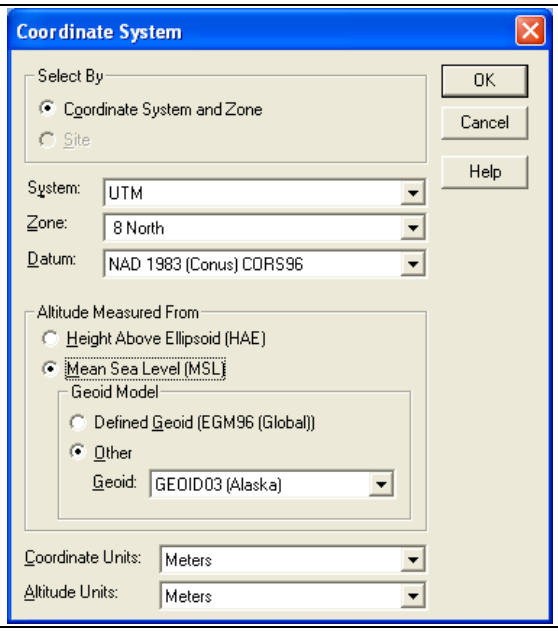
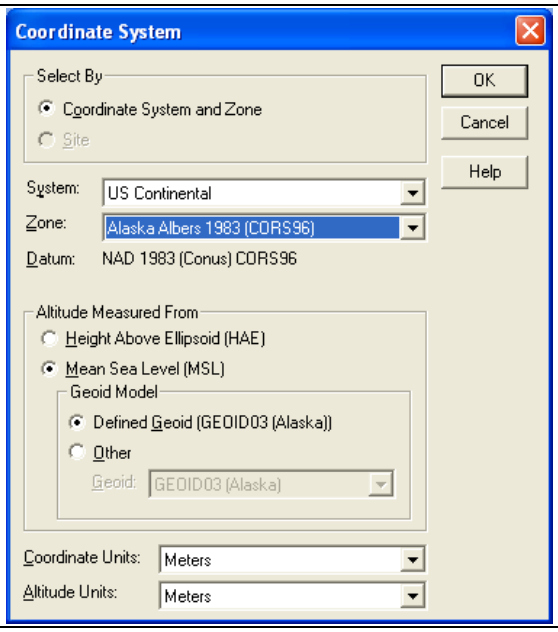
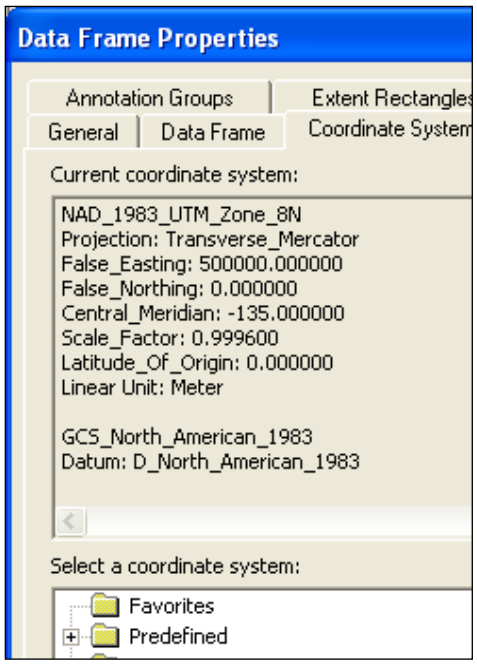
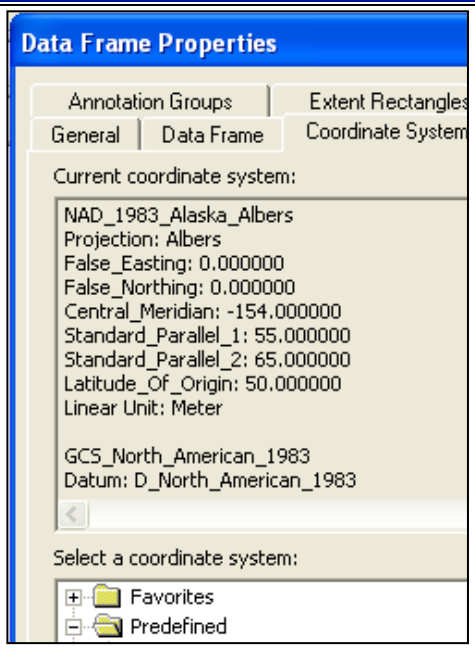
Figure 8. Selecting existing data files in TerraSync.

5. The Data screen will display the distance to the nearest polygons.
6. Any polygon's attributes can be opened by highlighting it on the Data screen and selecting "Begin."
7. From the Map screen, a polygon can be selected using the "Select" arrow from the upper left menu. This will display the summary labels. By selecting "Update Selected Feature" from the "Options" menu, all of the polygon's attributes can be seen. **Do not log positions since this would change the data.**
8. To collect new features, return to the "Data" screen, "Close" the data file, and reopen a rover file or begin a new rover file.

Data Dictionary
Data dictionaries are a method for the user to input information about the feature being collected by a GPS unit, like a digital form to fill out. This information is then translated onto the attributes table of the exported GIS shapefile once the data in downloaded at the office. This allows for clearer communication from the field and better accuracy in the data. The Alaska EPMT has a standard, customizable data dictionary that is described in more detail in the Data Dictionary section on page 23.

Coordinate Settings
A coordinate system is a way to define a location based on measuring distance and direction. A datum is a mathematical model of the size and shape of the earth. There are numerous types of coordinate systems and datums and there is no easier way to mess up the data collection process than to have software or GPS units with the incorrect coordinate settings. Use Table 1 to ensure that all software and hardware are set to the correct coordinate settings for the park in question.

Table 1. Coordinate settings for TerraSync, Pathfinder Office, and ArcGIS.

	UTM – KLGO, GLBA, and SITK	**Albers – All other Alaska parks**
TerraSync Coordinate System	System: UTM Zone: 8 North Datum: NAD 1983 (Conus) CORS96 Altitude Reference: Mean Sea Level (MSL) Altitude Units: Meters Display USNG: Off Geoid Model: Other Geoid: DMA 10x10 (Global) Coordinate Units: Meters	System: US Continental Zone: Alaska Albers83 (CORS 96) Datum: NAD 1983 (Conus) CORS96 Altitude Reference: Mean Sea Level (MSL) Altitude Units: Meters Display USNG: Off Geoid Model: Other Geoid: DMA 10x10 (Global) Coordinate Units: Meters
PFO Coordinate System		
ArcGIS Coordinate System	 Found under Predefined/Projected Coordinate Systems/UTM/NAD 1983	 Found under Predefined/Projected Coordinate Systems/Continental/North America/Alaska Albers Equal Area Conic

GPS Background Images

Having a background file displayed on a GPS unit or in PFO can be very helpful when navigating to a new location or verifying that data was correctly recorded. Follow these steps to create a useable background file for field use:

1. Make a map in ArcGIS. Some helpful information may include a background photo, USGS topographic maps, NOAA charts, park boundaries, trails, etc. Data files with the park's previous data have already been created. See Species Data Files on page 17.
2. Record the map coordinate system by double clicking on the "Layers" icon in the right navigation window. Select the "Coordinate System" tab. The map should be in the correct projected coordinate system based on the locations in Table 1. Be aware that regional data was converted from NAD 1927 to NAD 1983 in 2006.
3. Once the data is arranged in the map and the screen has the map extent needed (zoom in and out to export what is visible in the window), select "Export Map" from the "File" menu.
4. Check the "Write World File" option and save the map. Adding the resolution to the end of the file name will help remind you of what files are larger and smaller.
5. Experiment with different resolutions and qualities. Having a background image will slow down GPS unit's map drawing, so there needs to be a balance between speed and image quality. The higher the resolution and quality, the slower the image will redraw. Since map drawing is affected by how large the map is, consider creating several smaller maps for different study areas so the GPS has less to redraw at any one time.

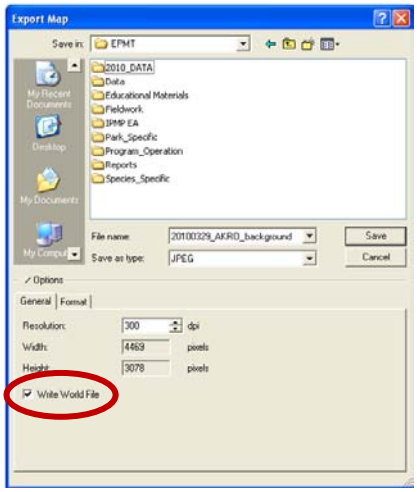


Figure 9. Export Map screen in ArcMap

6. Open PFO to test the image. This will save time versus testing the image on a GPS unit.
7. In PFO select "Coordinate System" from the "Options" menu. Define the coordinate system to match the exported map. This is only changing how the data is displayed, not how it is collected or saved. See Table 1 for the correct settings. If the needed coordinate system options are not showing up, close PFO and navigate to C:\Program Files\Common Files\Trimble\GeoData and make a copy of the current.csd file and paste it in same folder. Then delete the file current.csd making sure to rename the copy back to current.csd. Re-launch PFO, and it should rebuild the file and provide the needed options.
8. Make sure "Coordinate Units" is in meters and hit "OK."
9. Launch the Data Transfer Utility, marked with the  button on the left side of the screen or from the Utilities menu, and connect to the GPS unit.
10. Load the background in PFO by selecting "Background" from the "File" menu. Click "Add" and navigate to the image.
11. Change the coordinate system to match the coordinates just established for PFO.

12. Select “OK” and the image should load.
13. Verify the image is correctly positioned by opening a data file (.ssf or .cor) and verify that the features align with the image.

> WARNING: If you have a GeoXT 2003 (two buttons on front), these should only be connected to a computer via a USB hub. There have been many cases of power surges frying the computers! The hubs buffer this surge.

14. Connect the GPS unit to the computer using ActiveSync.
15. Open PFO.
16. Launch the Data Transfer Utility, marked with the  button on the left side of the screen or from the Utilities menu, and connect to the GPS unit.
17. The Data Transfer Utility automatically opens in Receive mode. Select the Send tab to be able to transfer files from the computer to the GPS unit
18. Click the Add button on the right side of the window, select Background, and navigate to where the background image(s) is saved.
19. Click OK and then Transfer All.
20. On the GPS unit open TerraSync and go to the Setup screen.
21. Change the “Coordinate System” to match those defined in PFO (Table 1 page 19).
22. Go to “Map” and under “Layers” select “Background File.” Choose the correct file.
23. Under “Layers”, make sure the “Background” option is checked. Image should display. If all the coordinate systems were properly assigned there should be no error message.

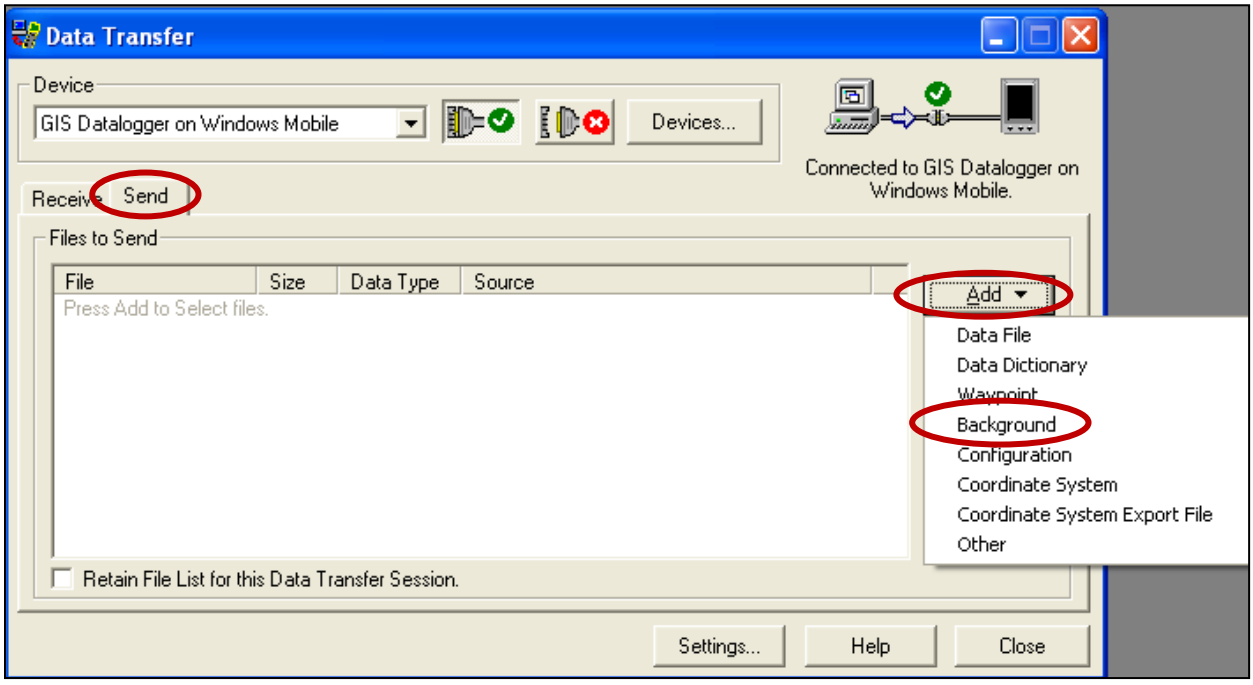


Figure 10. Selecting existing data files in TerraSync.

Data Dictionary

Data dictionaries are a method for the user to input information about the feature being collected by a GPS unit, kind of like a digital form. This information is then translated into the attributes table of the exported GIS shapefile once the data in downloaded at the office. This allows for clearer communication from the field and better accuracy in the data. The Alaska EPMT has a standard, customizable data dictionary that should be downloaded onto each GPS unit and should be filled out for each feature collected. This portion of the document will serve as a guide for understanding, customizing, and uploading the Alaska EPMT Data Dictionary.

Data Dictionary Fields

The standardized data dictionary has fields that help systematically describe plant populations throughout the state.

Table 2. Exotic plant mapping fields in the Alaska EPMT Data Dictionary.

Field Name	Field Type	Description
Location_ Name	Menu	The general area where the activity takes place with several possible in and around each park unit. The data dictionary has all LocationIDs already loaded and EPMT park staff should customize this field and arrange the locations in the order of most common usage. See Table 3 for a description of each LocationID. To visually see the delineation of each LocationID, pull up the "EPMT Location Index" theme in NPS Theme Manager and view it via ArcMap.
Disturbance_ Type	Menu	The main type of disturbance. Because most of Alaska's exotic plants grow on disturbed sites, the Alaska EPMT tracks what disturbance types are being invaded by what species. ABDHOME = Abandoned Homesite AIRSTRIP = Remote Airstrip ANIMAL = Animal Related BRSHCUT = Brush/Tree Cutting COASTAL = Coastal/Beach FLIMPRT = Fill Importation GLACIER = Glaciation GRAZING = Grazing HRBCIDE = Herbicide Application LOGGING = Logging MATEXTR = Material Extraction MINING = Mining MOWING = Mowing NONE = No Disturbance ORVDST = ORV Disturbance OTHER = Other Disturbance PLOWING = Plowing RIVER = River Action SLIDE = Landslide/Avalanche STREAM = Stream Action THERMAL = Thermal Disturbance TRAIL = Trail TRMPLNG = Trampling VOLCANO = Volcanic Action WIND = Wind Disturbance/Erosion WLDFIRE = Wildfire WNDTHRW = Windthrow
Site_ Description	Text	This field provides the opportunity to explain the exact area within the LocationID as well as any information about that area that might be important. This should enable someone who looks at this data to understand where within the LocationID the work took place without having to use GIS. Take the time while editing to be complete. Additionally, it should note if there is special significance in the location, such as remoteness, proximity to a stream or river, or potential to be easily spread into other areas.
Buffer_ Distance_M	Numeric	The buffer distance in meters that will be used to convert points and lines into polygons. Imagine the shape being created; the buffer distance is the distance in meters from the center point or line to the boundary of the infestation. The buffer distance will therefore be half the width of a linear shape or the radius of a circle around a point.
Taxon	Menu	The dominant exotic plant species of a particular infestation. All species that have been reported from Alaska NPS units are on this list. If the species of concern does not appear on the list or the identity is uncertain, enter "Other" and note the species or uncertainty in the Comments field. If the mapped area is free of exotic plants, enter "None." Remember to specifically record species with an invasiveness ranking of greater than 50 instead of as part of another species' infestation. Park staff should customize this field and arrange the species in the order of most common occurrence for each park.

Field Name	Field Type	Description
Phenology	Menu	The dominant phenology of the species at the time of mapping. This is especially important for control timing and future planning. • rosette = still young and have not reached their full size • no_flower = full size but they are not currently flowering or producing seed • full_flower = currently flowering • in_seed = currently producing seed • stand_dead = standing dead • none = no exotics present The comments can be used to clarify if the species has multiple phenologies. If monitoring a location for a species and it is not redetected, put the name of the species being searched for in the Taxon field and select "not_detected" in phenology. This will allow for better tracking of species eradications.
%_Cover	Menu	The percent of the area mapped covered with the dominant exotic species – 1-5%, 6-25%, 26-50%, 51-75%, 76-95%, 96-100%.The EPMT program has established that the area coverage is the extent of the area that a plant occupies over the ground, i.e. the area covered by the plant's shadow when the sun is straight overhead. This includes the areas between an individual plant's branches or stems. Visualize a hand with outstretched fingers represents a plant with multiple stems; the area coverage would include the area between the fingers, just about a perfect circle. This is much easier to do with small areas than with large ones, so start by practicing with small patches and be conservative with estimates (i.e., do not overestimate). Note that there is a correlation between this value and the buffer distance or size of a polygon: as the buffer distance increases for a particular group of plants, their percent cover of the total area decreases.
Stem_Count	Numeric	A stem count of the dominant exotic species. Only enter a value when there is a relatively accurate count of individual plants. If the action is a control event, this is much easier since each person can count the number of plants controlled. If the action is not a control event, do not record a value over 100 unless all it is certain that all plants were counted. If controlled plants are not counted, leave the field with the default, -9, which indicates no plants counted. A zero should only be used if there are no plants found.
Action	Menu	• Inventory = first documentation of a particular infestation • Monitor = any visit to a previously inventoried site from this year or previous years • Treatment = first control effort for a particular infestation • Retreatment = any subsequent control efforts in either the same or successive years • Manual = pulling or digging by hand • Mechanical = actions like mowing, weed-whacking, chain-sawing, etc. • Chemical = use of herbicides
%_Treated	Menu	Percentage of area treated – 1-5%, 6-25%, 26-50%, 51-75%, 76-95%, 96-100%. Make notes in comment field what was/wasn't treated. For example, removed all flowering plants or many seedlings left. The vast majority of treatment actions should be 96-100% treated.
Control_ pers_hrs	Numeric	Total person hours spent for all people involved. This is the number of people involved multiplied by the time spent on the action.
CntrlEffrt	Menu	The amount of effort required to control the infestation. For planning and evaluation, it is helpful to have a relative indicator of the control effort required. This can be projected if the infestation is not controlled or actual if it is. • Low = infestation could be manually controlled by one person in less than an hour • Medium = infestation could be controlled by one person in less than an 8 hour day • High = infestation would require multiple people or multiple days to control
Is_ Exhaustive	Menu	In general, all species should be recorded; however, if a particular species is being mapped very accurately, this option could be used to ignore other species. • Yes = all the exotic plants encountered were recorded • No = only certain species were recorded and others were overlooked

Field Name	Field Type	Description
Comments	Text	Use this is a 100 digit field to convey anything that seems important about the mapped area. Feel free to use shorthand as long as it intelligible after editing. Examples of what to include: • control might not work for a certain reason • species' identity is uncertain/not listed • who assisted with the action (ex:SAGA) • potential for spread if left untreated • data collection is incomplete • where to look if hidden • invading undisturbed plant community • apparent source of infestation • similar native species in the same area • need for monitoring
Park_Unit	Menu	The four-letter code for the park unit. Park staff should customize the default for this field.
Is_Inside_ Park	Menu	• Yes = the area mapped is located on park land • No = the area mapped is outside of the park boundary or on inholdings
Recorder_ Name	Menu	The initials of the person using the Trimble unit. Park staff should customize this field with the initials of the most likely EPMT or park staff.
Team_Name	Menu	• AKEPMT = EPMT park staff performs the action alone or with help • NPS = Non-EPMT park staff performs the action • SAGA = SAGA crew performs the action – Use this if EPMT park staff line a SAGA crew out on a site for one day but the SAGA crew completes the project unassisted • Volunteer = If EPMT park staff record the accomplishment of volunteers
2Taxon 2Phenology 2%_Cover 2StemCount 2Action 2Control_ Effort		There are fields for 9 additional exotic species other than the dominant species at a particular site. In general, it is preferred that each species is recorded individually with its own shape rather than using these additional fields. This option is provided to save time when there is a whole complement of species infesting the same area and three is no time to map them individually. Remember that if the extents of each species are not the same, this option should not be used and that any species with an invasiveness ranking of greater than 50 should have its own specific record. For each additional species, all fields must be entered – including phenology; percent cover; stem count; action; and control effort (see descriptions above) – using the additional fields provided.

Table 3. Description of locations for the field Location_Name.

Park Code	LocationID	Description	In Park
ALAG	alagnak	anywhere within the boundaries of Alagnak	Yes
ANIA	aniakchak	anywhere within the boundaries of Aniakchak	Yes
BELA	serpentine_springs	Serpentine Hot Springs and ATV trails radiating out from there	Yes
CAKR	dmts_rd	road from Red Dog Mine to port	Yes
	kakagrak_hills	abandoned military base and airstrip	Yes
	kotzebue	Kotzebue and surroundings	No
DENA	first_mile	park road from the entrance at the Parks Highway to headquarters, including headquarters, housing, sled dog area, etc	Yes
	kantishna	inholdings at the end of the park road after Wonder Lake	Yes
	mckinley_village	development along Parks Highway outside the boundary	No
	nenana_river	banks of the Nenana River	No
	park_rd	park road between headquarters and Kantishna	Yes
	parks_hwy	Parks Highway along boundary	No
	railroad	along railroad tracks, near depot, including airstrip	Yes
	south_side_denali	Denali south of the Alaska Range	Yes
GAAR	kuyuktuvuk	Kuyuktuvuk watershed, including Oolah Pass	Yes
	noatak_river	along Noatak River	Yes
GLBA	bartlett_cove	frontcountry Glacier Bay, including lodge	Yes
	beardslees	Beardslee Islands	Yes
	dry_bay	Dry Bay and vicinity within the park boundary	Yes
	dry_bay_USFS	Dry Bay and vicinity outside the park boundary	No

Park Code	LocationID	Description	In Park
GLBA	dundas_bay	Dundas Bay and surrounding areas	Yes
	east_arm	coastline of the East Arm of Glacier Bay	Yes
	glacier_bay_other	Other areas of park not in Dry Bay, Dundas Bay, or main Glacier Bay	Yes
	gustavus	Gustavus and surroundings	No
	main_bay	the portion of Glacier Bay to the south of the two arms	Yes
	west_arm	coastline of the West Arm of Glacier Bay	Yes
KATM	10000_smokes_rd	entire road leading to the valley of 10000 smokes	Yes
	brooks_camp	brooks camp and surrounding area	Yes
	katm_outer_coast	anywhere along the katmai coastline	Yes
	king_salmon	King Salmon and surroundings	No
	lake_camp	entire lake camp road, boat ramp area, and parking area	Yes
KEFJ	exit_glacier	Exit Glacier Road and associated development and trails	Yes
	kefj_outer_coast	anywhere along the Kenai Fjords coastline	Yes
	seward	Seward and surroundings	No
KLGO	chilkoot_trail	the Chilkoot Trail Unit	Yes
	dyea	Dyea and surroundings	Yes
	dyea_road	Road to Dyea and surrounding area not in park	No
	klondike_hwy	Klondike Highway above Skagway, except for White Pass Unit	No
	skagway	Skagway and surroundings	No
	white_pass	the White Pass Unit	Yes
	white_pass_railroad	Railroad corridor outside of White Pass unit	No
LACL	lacl_outer_coast	anywhere along the outer coast of LACL	Yes
	port_alsworth_nps	NPS headquarters in port alsworth and surrounding areas	Yes
	port_alsworth_town	town of port alsworth and surrounding areas	No
	twin_lakes	anywhere around twin lakes	Yes
SITK	sitka	Sitka and surroundings	No
	sitka_park	Sitka National Historic Park	Yes
WRST	chitina	Chitina and surroundings	No
	copper_center	Copper Center and surroundings	No
	copper_rvr	along Copper River	No
	edgerton_highway	Old and New Edgerton Highway from Richardson Highway to Chitina	No
	forelands	coastal area of WRST	Yes
	glenallen	Glenallen and Glenn Highway	No
	kennicott	Kennicott (Town and Mine Site), Bonanza Ridge and Root Glacier Trails	Yes
	may_creek	NPS compound, airstrip, and surrounding roads and trails	Yes
	mccarthy	McCarthy and surroundings	Yes
	mccarthy_rd	region from Copper River bridge to Kennicott River plus ATV trails	Yes
	nabesna_rd	Nabesna Road and ATV trails	Yes
	ptarmigan_lake	the Ptarmigan Lake private inholding	No
	remote_airstrip	Peavine, Huberts, Tana, Jake's, C-N confluence, Chisana so far	Yes
	richardson_highway	Richardson Highway from Gakona Junction (north) to Edgerton Highway (south) , except for Copper Center	No
	slana	area outside of the park at the entrance to the Nabesna Road	No
	tok_cut_off	along Tok Cut-off from Slana to Gakona Junction	No
WRST	viscenter	headquarters and visitor center complex	Yes
YUCH	coal_creek	coal creek camp and surrounding areas	Yes
	yukon_river	along Yukon River	Yes
	other	DESCRIBE LOCATION IN COMMENTS	

Data Dictionary Customization

Each park should feel free to customize the data dictionary using the following steps **as long as no fields are added or deleted**.

1. Save a copy of the data dictionary to the park's local EPMT file management folder
2. Open the data dictionary using the PFO Data Dictionary Editor. The simplest way is to just double click on the data dictionary – the editor will open automatically.
3. Double click on the attribute or click on the Edit Attribute button to bring up the Edit Attribute window.
4. Arrange the order of attribute values using the up and down arrows in the lower right corner of the Attribute Values portion of the window. Arrange the attribute values so that the most commonly used values are at the top of each list. For example, a specific park code and the location IDs associated with that park should be at the top.
5. Delete any attribute values that will never be used in the specific park. For example, delete the initials of individuals who do not work at the park or the Location_Name of areas not at the park.

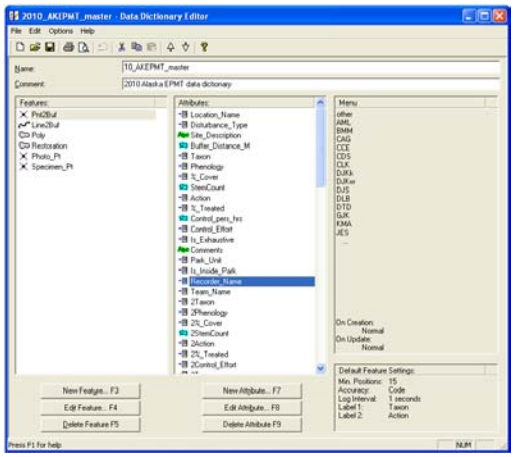


Figure 11. Data Dictionary Editor

6. Set the values that are use for most records as defaults if desired. Double click on the attribute and double click on the name in the Menu Attribute Values list which is to be the new default. Check the Default box on the Edit Attribute Value window and this attribute will be the new default for this drop-down menu.
7. Any field which is altered as described above must be altered in all feature classes (Pnt2Buf, Line2Buf, Poly, etc). An easy way to do this is by copying the altered data field (Ctrl+c), then pasting it into the other feature classes (Ctrl+v), and then deleting the duplicate unaltered field it replaces (Delete key).
8. Save the modified file with the user's initials (e.g. 2010_AKEPMT_WSR.ddf).

If possible, only use one data dictionary during the season. Once the data dictionary is customized for the park it must be loaded onto the GPS unit.

> WARNING: If you have a GeoXT 2003 (two buttons on front), these should only be connected to a computer using a USB hub. There have been many cases of power surges frying the computers! The hubs buffer this surge.

1. Connect the GPS unit to the computer using ActiveSync.
2. Open PFO.
3. Launch the Data Transfer Utility, marked with the  button on the left side of the screen or from the Utilities menu, and connect to the GPS unit.

4. The Data Transfer Utility automatically opens in Receive mode. Select the Send tab to be able to transfer files from the computer to the GPS unit
5. Click the Add button on the right side of the window and navigate to where the customized data dictionary is saved.
6. Click OK and the Transfer All.

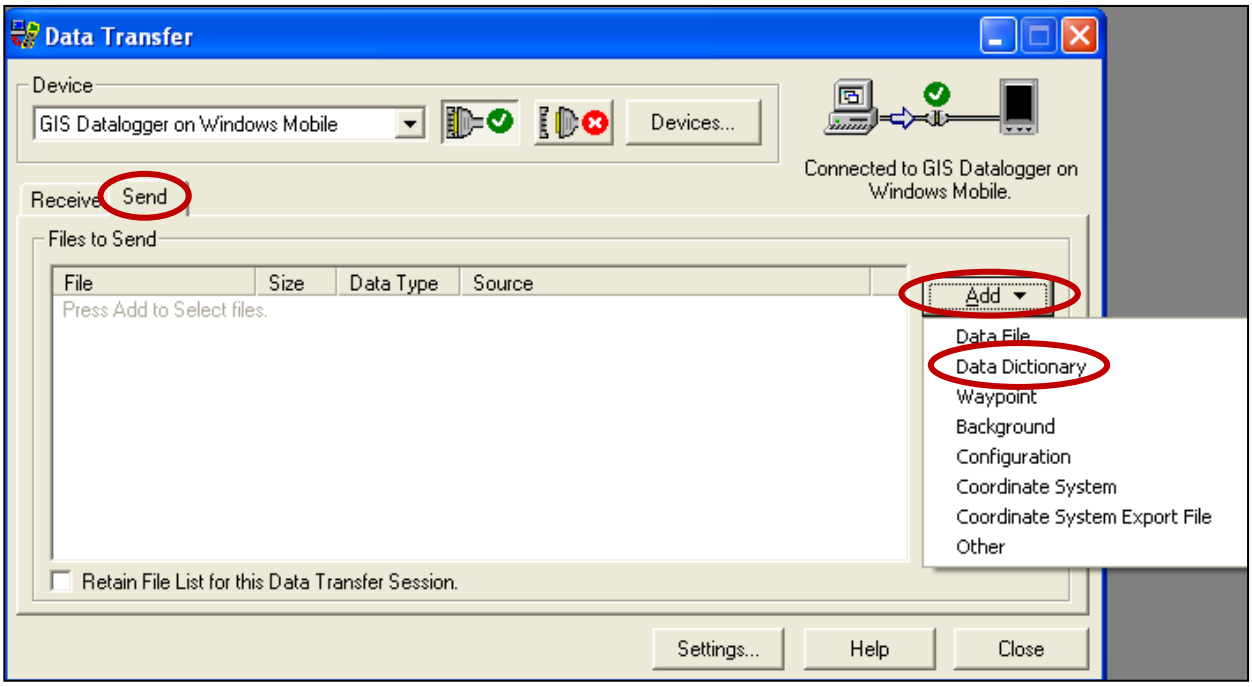


Figure 12. Transferring a customized data dictionary to a GPS unit.

Collecting GPS Data

When assessing an infestation of exotic plants, the first question to ask: can this patch be best represented as a point, a line, or a polygon? Because all patches take up 2-dimensional space, they are all actually polygons. Using GPS units to map exact polygons may result in a more accurate representation of the infestation but it also takes significantly more time. Time can be saved by mapping certain infestations as points or lines and using a "buffer distance" that will be used by the regional office EPMT staff to create polygons. The buffer distance should **always** be measured in meters.

In addition to mapping existing infestations, areas which are inventoried or monitored with no exotic species found should also be documented. This is critical baseline data since the absence of exotics is just as valuable as the presence of exotics. Use the "none" or "0" option for the data fields to record the absence of exotic plants.

Points
Use points on a very small patch of plants in a general circular shape. Use a "buffer distance" representing the radius of the circle to capture the size of the patch.

Lines
Use a line to represent a long string of plants along a trail, roadside, shoreline, or similar edge. Walk the midline of the patch with a "buffer distance" equal to half the width of the linear patch.

Polygons
Actual polygons are best used to map large or irregular shapes that are not well-represented by points or lines. They should be used to map most infestations of species with an invasiveness ranking of greater than 50, in order to provide sufficient precision to be able to document short-term changes in patch shape.

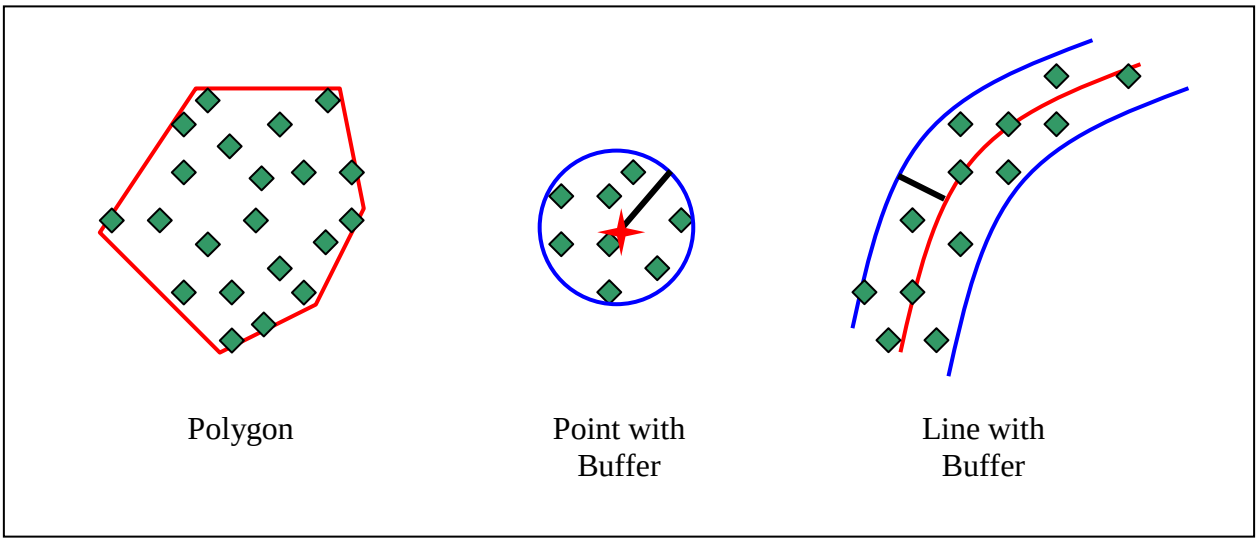


Figure 13. The three feature types (in red) for mapping infestations (in green) are displayed with, if applicable, the buffer distance (in black) and the completed buffers (in blue).

General Tips for Using the GPS

1. If not using an external antenna, hold the GPS unit at chest height or higher and away from the body while recording a feature so the GPS antenna can "see" more sky. Wherever it is held be sure to double check the "Antennae Height" setting on the unit.
2. If mapping an infestation in an area with a heavy vegetative canopy consider using an external antenna. Be sure to double check the "Antennae Height" setting on the unit.
3. The logging interval (how often the unit records a position within a feature) has been set in the data dictionary to one second for points and five seconds for lines and polygons. This is the desired interval; however, when satellite availability is marginal the 5 seconds may be too long to collect sufficient points. It is recommended to record at least 15 positions for points and enough positions for lines and polygons to delineate the shape (more around corners and curves, fewer for straight sections). In this situation, temporarily change the logging interval to 1 second.
   - While in the Data screen, select "Options"> "Logging Interval"
   - Change the "Logging Interval" to "1s"
   - When good satellite coverage resumes, readjust the interval to "5s"
4. For the integrity of the data, it is a good idea to begin a new rover file every few hours rather than using the same one all day. Also, make sure each event (different location, different crew, etc) is in a separate rover file.
5. GPS units have a "Pause" function to stop the recording of positions temporarily while the feature is still open. This is helpful when maneuvering around an object or obstacle without mapping the deviation. The "Pause" button appears at the top right of the Map screen as a green arrow or pause symbol, depending on the activity at the time.
6. If mapping a large area with multiple common species (such as a long road) and suddenly stumble upon an unusual species, the unusual species should be mapped more accurately then simply lumping it into the larger polygon. In this case, stop the existing feature, map the specific feature, then resume the original feature. If the new feature will be a point (including photo point or collection), then use the "Nest" option:
   - Pause the original feature being collected.
   - Within the Data screen, select "Options" > "Nest" > and select appropriate feature type.
   - Record the new feature.
   - When the new feature is complete hit OK and the original feature which was paused will return to the screen.

   If the new feature will be a line or polygon, then stop, map the new one, and resume:
   - Stop the original feature by clicking "OK."
   - Map the new feature and close it like normal.
   - To resume the original feature, go to the feature type menu and switch from "Collect" to "Update Features."
   - Select the feature to resume. It is probably the second feature listed. There is a comment bar along the bottom of the screen that will help differentiate.
   - Click "Begin" followed by "Log."

- Select “Continue Feature (Append)” to continue adding points to the original feature.
- To collect new features, go to the feature type menu and switch from “Update” back to “Collect.” Only recent features can be updated in this manner, so do not map multiple new features and plan to return to the original feature.

7. Turn on/off sounds when collecting positions
   - On the Start Menu tap on “Settings”
   - On the “Personal” tab, select “Sounds and Notifications”
   - On the “Volume” tab, check “Programs” and “Notifications” and adjust the volume bar.
8. Offset feature. In general, all features should be mapped as exactly as possible. However, this might not always be possible due to satellite coverage (e.g., under trees, next to a building) or physical barriers (e.g. river, fallen trees). In these cases, it is possible to map a set distance away from the target and then set the offset and direction. The offset applies to the whole feature, so plan ahead.
   - With the feature already open and paused, select “Offset” from the “Options” menu.
   - For a line or polygon, the direction is the direction the target is from the recorder as the segment is walked. The horizontal distance is the distance of the line being walked from the targets edge.
   - For a point, there are 5 options: Distance-Bearing, Distance-Distance, Triple Distance, Bearing-Bearing, Triple Bearing. See this Quick Start file for more information.

Monitoring

At the very least all control sites from previous years should be monitored and retreated this summer. This will allow the team to determine which treatments are working and which are not. Ideally, any documented infestation should be monitored whether or not it has been treated. It is generally recommended for any exotic plant control that the site be monitored several years into the future due to the potential for re-sprouts from the seed bank. For control sites where there are exotic plants present upon return, control the site again and plan to return within a month or so to evaluate the effectiveness.

Restoration

For parks engaged in restoration activities, a polygon feature should be collected to record the total number of person hours, what native species were added, and in what form the native plants were. The fields are described in Table 4 on page 32. Additional fields for a revisit date and description of care/maintenance and survival rate are included, but they may be easier filled in after the fact in PFO.

Table 4. Restoration fields in the Alaska EPMT Data Dictionary.

Field Name	Field Type	Description
Location_ Name	Menu	The general area where the restoration activity takes place with several possible in and around each park unit. The data dictionary has all LocationIDs already loaded and EPMT park staff should customize this field and arrange the locations in the order of most common usage. See Table 3 for a description of each LocationID. To visually see the delineation of each LocationID, pull up the "EPMT Location Index" theme in NPS Theme Manager and view it via ArcMap.
Disturbance_ Type	Menu	The main type of disturbance. See Table 2 for a complete description of options.
Site_ Description	Text	This field provides the opportunity to explain the exact area within the LocationID as well as any information about that area that might be important. This should enable someone who looks at this data to understand where within the LocationID the work took place without having to use GIS. Take the time while editing to be complete. Additionally, it should note if there is special significance in the location, such as remoteness, proximity to a stream or river, or potential to be easily spread into other areas.
Comments	Text	This is a 100 digit text field to convey anything that seems important about the mapped area. Feel free to use shorthand as long as it intelligible after editing.
Park_Unit	Menu	The four-letter code for the park unit. Park staff should customize the default for this field.
Is_Inside_ Park	Menu	• Yes = the area mapped is located on park land • No = the area mapped is outside of the park boundary or on inholdings
Recorder_ Name	Menu	The initials of the person using the Trimble unit. Park staff should customize this field with the initials of the most likely EPMT or park staff.
Team_Name	Menu	• AKEPMT = EPMT park staff performs the restoration alone or with help • NPS = Non-EPMT park staff performs the restoration • SAGA = SAGA crew performs the restoration – Use this if EPMT park staff line a SAGA crew out on a site for one day but the SAGA crew completes the project unassisted • Volunteer = If EPMT park staff record the restoration accomplishments of volunteers
Person_ Hours	Numeric	Total person hours spent for all people involved. This is the number of people involved multiplied by the time spent on restoration.
Native_taxon	Text	Record the scientific name of the native species used during restoration.
#_Planted	Numeric	Number of individuals planted. If seeds, describe the volume and/or weight and clarify in the comments field.
Type	Menu	Form of the native plant being used during restoration: cutting, fruit, individual, rhizome, runner, seed, seedling, stem, or transplant.
2Native_ taxon 2#_Planted 2Type		Additional fields for 4 more native species used during restoration.
Revisit_Date*	Date	Date of site revisit.
Care_ Maintenance*	Text	Description of any care or maintenance that occurred at the site after the initial restoration.
Survival_ Rate*	Text	Description of the survival rate of the native plants added to the restoration area.

* These fields are likely best populated in the office through PFO.

Navigating to Previously Recorded Polygons

Particularly when treating and monitoring previously documented sites, it is important to be able to relocate a site. Using the Map Screen is generally much easier than using the "Navigation" screen.

Using Map Screen

On the Map Screen the previously recorded polygons and the current GPS position are all visible. As the recorder walks a trail will be displayed. This can be used to determine the proximity to the desired polygon. If this is not enough there is the Nav Target option:

1. In the Map Screen select the "Options" menu.
2. "Nav Start" should be "GPS," which is the current position. A single flag will appear on the Map Screen.
3. Click the destination on the screen and then select "Nav Target" as "Map Point." Two crossed flags will appear Map Screen. Alternatively, the "Nav Target" can be set to the polygon desired if the data file has been opened in the Data screen. By selecting the polygon, under "Options" the target can be set as either the "Start/End" or generally better the "Centroid."
4. The blue line connecting these two locations is the direct path. Under "Options", selecting "Cross-Track Light Bar" will display a bar at the top of a map that will indicate the relative direction of travel needed to get to the target. However, this only works when moving.

Using Navigation Screen

Set the "Nav Start" and "Nav Target" as described above. The "Navigation" screen will display a number of variables of the GPS position relative to the target, including distance, heading, bearing, etc. The cross-track bar will display on the top as well to show relative direction of travel needed. The central circle also shows the desired path. While moving and holding the GPS unit in front, the arrow within the central circle will point in the desired direction.

Processing GPS Files

All GPS data collected this summer will be processed using Pathfinder Office (PFO) software, Trimble's desktop data management software. At the beginning of the season, make sure the software is updated and that it will continually update by selecting the option in the help menu (Figure 7). Depending on the park's administrative computer settings, automatic updates may not be possible. Talk to local IT staff for assistance.

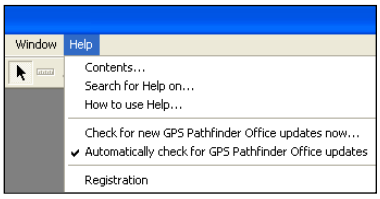


Figure 14. Enable Pathfinder Office to automatically update.

All GPS and photo data must be edited and uploaded to the regional EPMT drive (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code by the end of every pay period. This will ensure that the data is being processed correctly, in a timely fashion, and it can be processed into the national and statewide databases so the data is available for use throughout the season. For the 2010 season the upload dates are:

June 18	August 13
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July 16	September 10
July 30	September 24

Setting up a Project

1. Open PFO.

2. The first time GPS files are downloaded for the season; create a new project for the park by selecting the "New" at the bottom of the Select Project window (Figure 8), which should open automatically every time PFO is opened. To get to the Select Project window manually, navigate: File (top left hand corner of screen) > project.

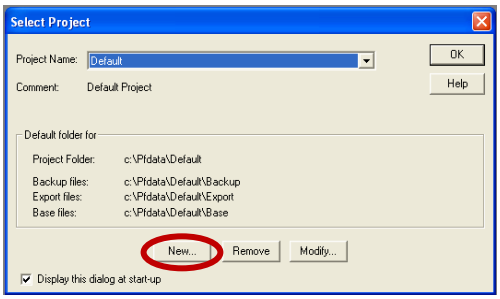

Figure 15. PFO Select Project window.

3. Give the Project Name the title "2010_EPMT_(park code)" and browse to the local park file management structure …\Data\GPS\2010 folder for the "Project Folder." Creating the new project creates 3 new folders within …\Data\GPS\2010 – Backup, Base, and Export.

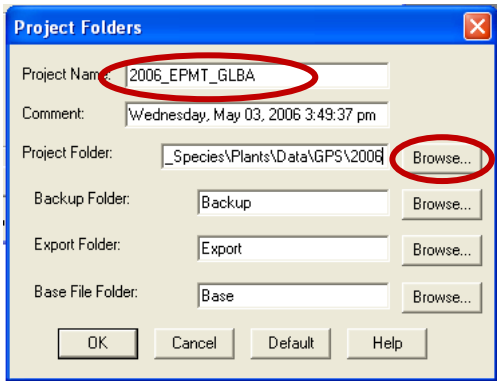

Figure 16. PFO new project setup.

4. Select “OK”

5. Click “Yes” when it asks, “Folder already exists. Do you want to continue?”

6. In Windows Explorer, create one more folder named “Final_Edits” within the same project folder.

7. For the rest of the season, select this 2010_EPMT_(park code) project name from the drop down menu that appears in the Select Project window.

Transferring Rover Files

Transfer the GPS rover files (.ssf) from the GPS unit to the project folder as soon as possible after data collection.

> WARNING: If you have a GeoXT 2003 (two buttons on front), these should only be connected to a computer using a USB hub. There have been many cases of power surges frying the computers! The hubs buffer this surge.

1. Connect the GPS unit to the computer using ActiveSync.
2. Open Pathfinder Office.
3. Launch the Data Transfer Utility, marked with the  button on the left side of the screen or from the Utilities menu, and connect to the GPS unit.
4. On the Receive Tab click “Add” and then “Data File” (Figure 10).
5. Select all the files needing to be transferred.
6. Click “Transfer All.”
7. Back up your rover files immediately in the project Backup folder.

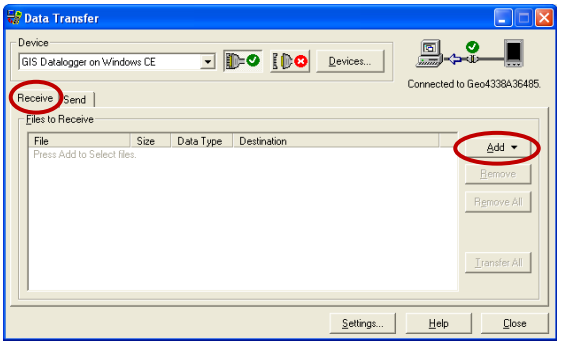

Figure 17. PFO Data Transfer utility.

Differential Correction

1. Once the rover files have been transferred, launch the Differential Correction Wizard, marked with the  button on the left side of the screen or from the Utilities menu.
2. Add the file that needs to be corrected. Each rover file should be processed individually to get the quality control values for the rover log spreadsheet (see Rover File Log Process section on page 40).
3. Ensure that the Processing Type is Automatic Carrier and Code Processing. Click Next.

4. Click Change to double check that the settings are correct:
   - On the Settings Tab the following options should be selected: Standard for Code Processing Technique, “Use data collection filter settings” for GPS Filtering; and at the bottom of the window check the “Re-connect real-time positions” box.
   - On the Output Tab the following options should be selected: “Connected only” for Output Positions and “Standard” for Audit File Contents.
   - On the Base Tab the following options should be selected: “Standard” for Base Data Processing Technique.
5. Click OK and Next.
6. Search for a base station by clicking Select next to the Base Provider Search field. Generally, the best selection is the base station closest to where the data was collected. Sometimes different base stations may have to be selected. Update the base provider list periodically by selecting “Update List” (Figure 11). Talk to regional office EPMT staff or local park staff if there are questions about which base station to select. After selecting a station click OK.

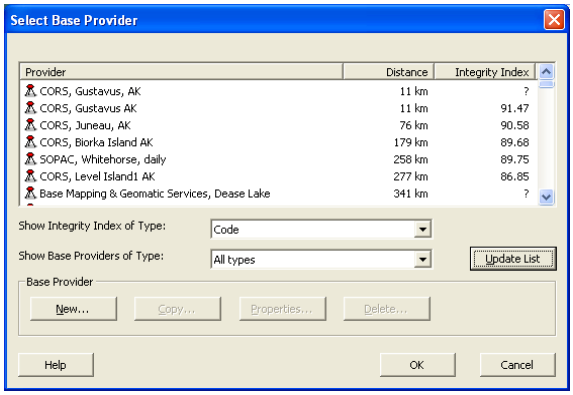

Figure 18. PFO Differential Correction – base provider search.

7. Do not change any of the base station information or reference positions but do select the “Confirm base data and position before processing” box at the bottom of the window.
8. Correct files by clicking “Start”
9. Assuming good differential correction (ideally over 90%), fill out the rover file status log using values that appear at the end of differential correction or that are saved in a text file in the project folder. See the Rover File Log Process section on page 40. This file is critical for regional office EPMT staff to troubleshoot issues at the end of the season.

```
------------------------------------------------
Differential Correction Summary:
    1 file processed.  In this file:
       1265 (94.1%) of 1345 selected positions were code corrected by post-processing
          0 (0.0%) of 0 selected positions were carrier corrected by post-processing

    Estimated accuracies for 1265 corrected positions are as follows:
            Range       Percentage
            ----------  ----------
             0-15cm           -
            15-30cm           -
            30-50cm           -
             0.5-1m           -
               1-2m       100.0%
               2-5m           -
                >5m           -

Differential correction complete.
```

Figure 19. Differential Correction Summary text file.

10. If the file did not correct well:
    - Try other nearby base stations,
    - Wait a few hours and try again. The base station files may need to be updated.
    - Contact the regional office EPMT staff. We may be able to download files manually.
    - If the GPS data was collected with WAAS it may be sufficient without correction.

11. Back up the .cor files immediately by copying them into the project Backup folder.

Editing Files

In order to ensure high data quality, review and edit every rover file within a few days of the data collection.

1. Copy the corrected files from the project folder into the "Final_Edits" folder and add the prefix "edited_" to the beginning of each file name. For example, R051015A.cor becomes edited_R051015A.cor. Copying and renaming the file before editing ensures that the original corrected file is not overwritten with the editing process.

2. Check the validity of positions, once differentially corrected, to make sure they match what was recorded in the field. Using a background image will help with this.

3. For point features, click "Delete" in the Feature Properties window to see that the positions are a reasonably tight cluster. The "Delete" does not delete positions but it gets rid of the feature grouping the positions. Random points may need to be deleted using the "Delete" in the Position Properties window, such as points more than a few meters from the center of a point where the recorder may have inadvertently walked away while still collecting positions. Once the feature looks good, click "Undelete" in the Feature Properties window to regroup the positions.

4. For a line or polygon, positions that double back or cause loops in the feature will need to be deleted. Generally the positions with the highest value in "Horiz. Precision" should be deleted since they have the most likely error.

5. Document position deletions in the Rover File Log spreadsheet. See the Rover File Log Process section on page 40.

6. If a feature was recorded as the wrong type (e.g. line collected as point), contact the regional office EPMT staff for assistance.

7. Review the attributes attached to each features to check that the information is accurate and complete.

8. Elaborate on location descriptions or comments and eliminate any bad data. If there are any shorthand comments now is the time to convert it to complete thoughts. Anything in the comments field will be viewable by the public, so make them understandable and appropriate for all audiences. Species can be abbreviated by using the first three letters of the genus and species. For example, *Leucanthemum vulgare* would be leuvul.

9. Take the necessary time to make the data as finished and complete as possible. These files will be transformed into GIS data at the end of the season for anyone to peruse. Are any attribute fields blank? Are all the attributes correct? Do they make sense?

10. In the project folder, maintain the Rover File Log spreadsheet (See the Rover File Log Process section on page 40). Save the spreadsheet locally with the park code as a prefix to keep track of which rover files still need to be edited. List any issues, deletions, deviations from the protocol, or field notes recorded for each rover file.

11. Copy the Final_Edits files into the project Backup folder.

12. Periodically burn a CD of or otherwise backup the project folder.

13. All GPS must be edited and uploaded to the regional EPMT drive (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code by the end of every pay period. This will ensure that the data is being processed correctly, in a timely fashion, and it can be processed into the national and statewide databases so the data is available for use throughout the season. For the 2010 season the upload dates are:

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14. Once the editing process is complete, the file does not have to be touched again.

15. Once all edited files are complete, let the regional office EPMT staff know and they will transform the files into GIS shapefiles to ensure consistency among park units. The shapefiles will be sent back to each park to assist with preparing the seasonal report (See the Seasonal Report section on page 57).

Whitney's Editing Strategy – I think it's most efficient to first look at the shapes of all the features and do the necessary deletions of positions to make the shapes true to life. I'll do this for the entire cor file. I then start at the beginning again and quickly flip through the features looking at the attributes for blank data fields (yes, even I sometimes forget to populate a field). I populate the field if I can accurately recall what it should have been. I then start at the beginning for the last time to carefully review the attribute information, replace any shorthand, and otherwise clarify comments. This strategy works for me to assure the spatial and attribute data get the attention they both need.

Rover File Log Process

Each park should maintain a rover file log to assist the regional office EPMT staff with the post-processing of the season's data. Table 5 describes the fields that should be filled out on the rover file spreadsheet. This spreadsheet has been formulated and protected to try and prevent any confusion. All blue fields will automatically be populated. If there are any questions on the process or issues with the spreadsheet, please contact the regional office EPMT staff.

Table 5. Rover File Log spreadsheet fields.

Field Name	Description
Filename	Name of the rover file being transferred, corrected, and edited.
Transfer Initials	The three digit initials of the individual transferring the rover file. This drop-down menu can be edited before the season begins to reflect only the individuals working in the park.
Date of Transfer	The date the transfer took place. mm/dd/yyyy format
Base Station Used	Name of the base station used for the differential correction.
# Original Positions	The number of positions in the uncorrected rover file. This can be found in the Differential Correction Summary text file.
# Corrected Positions	The number of positions in the rover file that were corrected. This can be found in the Differential Correction Summary text file.
% of Positions kept after correction	This field is automatically populated.
0-15 cm 15-30 cm 30-50 cm 0.5-1 m 1-2 m 2-5 m >5 m	Enter the percent of corrected positions which fall into each of these estimated accuracy ranges. This can be found in the Differential Correction Summary text file.
Editor's Initials	The three digit initials of the individual conducting any editing to the file. This drop-down menu can be edited before the season begins to reflect only the individuals working in the park.
Date Edited	The date the edits took place. mm/dd/yyyy format
Edited/Reviewed Descriptions?	Yes or No. This field serves as a reminder for what data needs to be revisited by the editor.
Positions Checked?	Yes or No. This field serves as a reminder for what data needs to be revisited by the editor.
Positions Deleted?	Yes or No. This field serves as a reminder for what data needs to be revisited by the editor. If any positions were deleted explain why in the comments field.
Issues/Comments	Include information about anything in the process that was unusual or why any positions were deleted.

Historic EPMT Data

Accessing the historic EPMT data for each park is a valuable tool in understanding the invasive weed situation at each park. While this protocol does not go into detail on how to use ArcGIS, it does walkthrough the steps needed to access this historic data:

1. Open a new map in ArcMap.

2. Select the NPS arrowhead logo from the Theme Manager Toolbar.

3. Load either park specific data or all of the regional data (see Figure 13) by dragging the filenames into the ArcMap Table of Contents.

4. Information about the polygons can be found using "Identify" or selecting the polygons and looking at the "Attribute Table." Note: the themes may not work in earlier versions of ArcMap, so upgrade to ArcGIS 9.2.

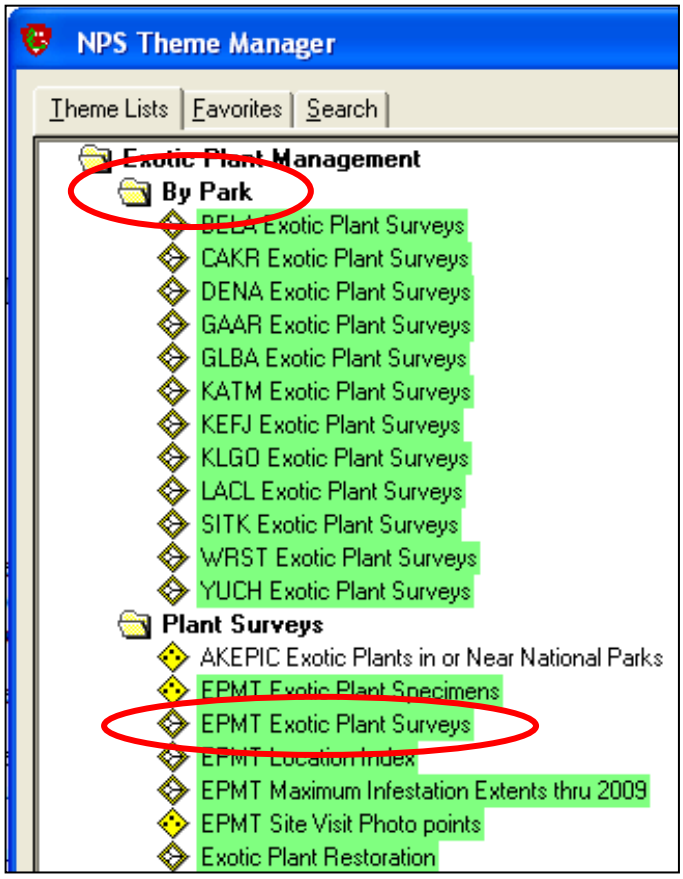

Figure 20. Location of historic EPMT data in NPS Theme Manager.

Photo Management

This season EPMT staff will be working in some of the most scenic areas in the entire country. The urge to take numerous photos could very well be overwhelming and all staff members are actually encouraged to give in to this urge. Photos are an excellent tool for exotic plant management. Photos help the program not only visually document infestations and on-the-ground management efforts for internal purposes but they also convey to others the issues Alaska parks are facing and those natural areas which the team is working so hard to protect. Several excellent photo opportunities include:

- Before and after photos of infestations that are controlled
- Volunteer events
- Any treatment or data collection work in action
- New or uncertain species, range expansions, or particularly nasty infestations
- Close-up shots of particular species to aid in identification
- Restored plant communities
- Education and outreach events
- EPMT staff and others working with exotic plants

As with GPS data, all photo data must be edited and uploaded to the regional EPMT drive (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code by the end of every pay period. This will ensure that the data is being processed correctly, in a timely fashion, and it can be processed into the national and statewide databases so the data is available for use throughout the season. For the 2010 season the upload dates are:

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Photo Points

It is possible to link photos to the GPS data which is collected in the field via software called GPS-PhotoLink. While this in not always necessary there are certain situations where it would be very beneficial including before and after photos of a large scale treatment effort or photos of a previously undocumented species. If there is a situation that would benefit from this use the GPS "Photo_pt" feature in the data dictionary. This data will later be coupled with GPS-PhotoLink software by the regional office EPMT staff to bring the photo together with the position and attribute information.

Before taking photos

1. Set the camera's clock as close to the GPS clock as possible (8 hours less than UTC time during AK daylight savings). Recheck this at least monthly.

2. Resolution should be set as high as reasonable given the memory card constraints. The preferred file size for a .jpg is greater than 1 MB per photo.

3. **Each day prior to taking the first photo point picture**, take a picture of the GPS screen showing the time **with seconds**. This step is **critical** for the GPS-PhotoLink software. To display the time on the GPS unit within TerraSync on the Status screen select UTC Time from the dropdown menu (Figure 6). Verify the image is legible. Be aware that the screen is very reflective and not easy to take a good picture of clearly. Holding the GPS at an arm's length or using the macro (flower) setting when the GPS is closer may also improve the focus.

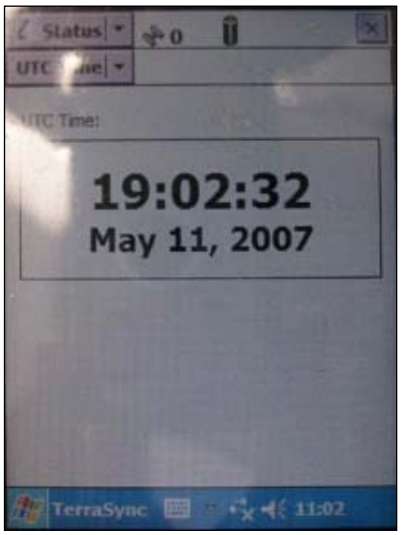

Figure 21. Screen shot of GeoXT showing UTC time with seconds. Alaska daylight savings time is 8 hours less.

When taking photos

1. **Before** the photo is taken, collect a Photo_Pt feature using the Trimble unit at the spot where the photo will be taken. Table 6 lists the fields in the Photo_Pt data dictionary.

2. After the Photo_Pt is collected, take the photo(s) standing in the same position. If the subject of the photo changes such that the description in Photo_Pt is no longer valid or the position changes, a new Photo_Pt will need to be recorded.

Table 6. Photo_Pt fields in the Alaska EPMT Data Dictionary.

Field Name	Field Type	Description
Photographer	Menu	The initials of the person taking the photo point. Park staff should customize this field with the initials of the most likely EPMT or park staff.
Location_ Name	Menu	The general area where the activity takes place with several possible in and around each park unit. The data dictionary has all LocationIDs already loaded and EPMT park staff should customize this field and arrange the locations in the order of most common usage. See Table 3 for a description of each LocationID. To visually see the delineation of each LocationID, pull up the "EPMT Location Index" theme in NPS Theme Manager and view it via ArcMap.
Comments	Text	Short description/title of image. Such as "Visitor Center dandelions." This description will later be watermarked onto the image with GPS-Photo Link.
Internal	Text	Longer description/comment. Such as, "Area will be treated next week." This comment will be embedded in attributes and not displayed on image. Record more specific location/event information here. This is what will give lasting value to the image.
LookDir	Menu	Direction the photo was taken in, i.e. the direction the photographer was facing while taking the picture.
Filename	Text	Record image number/file name. This may be feasible in the field or easier to edit in PFO.

Managing Photos

In an effort to not be overwhelmed by the sheer number of photos, it is recommended that photos are managed – meaning uploaded, organized, and the deletion of useless or repetitive photos – at the same time that spatial data is edited in Pathfinder Office. To smooth the process consider the follow photo management suggestions:

1. Maintain folders by event, such as 20090613_WeedPull, under the EPMT_parkcode\Data\Images\2010 folder in the park's file management system. This will allow park and regional staff to locate a photo with greater ease.

2. Step through the "Photo_pt" features in Pathfinder Office with an image browser window open at the same time and ensure that the attribute information is complete. If incomplete, modify the attributes to be accurate. Ensure that the image name is in the Filename field.

3. Save images that are associated with Photo_Pt features in a folder under the event folder. Example: If there are three images associated with a Photo_Pt feature collected at an outreach event on the 4th of July they would be saved at EPMT_parkcode\Data\Images\2010\20100704_Outreach\Photo_Pt

4. Delete any photos that are unusable – blurry, too dark/light, etc.

5. Delete any photos that are repetitive. While having multiple photos of an event is useful, strive for quality over quantity.

6. Always keep the original, unmodified, unedited images. **DO NOT** rotate, resize, brighten, or darken any original photo since there is a risk of losing all data embedded in the photo. Resaved any images that require editing with another name, such as [original filename]_edited.

7. As with GPS data, all photo data must be edited and uploaded to the regional EPMT drive (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code by the end of every pay period. This will ensure that the data is being processed correctly, in a timely fashion, and it can be processed into the national and statewide databases so the data is available for use throughout the season. For the 2010 season the upload dates are:

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Photo Contest

Each year the National EPMT program has a contest for photos to include in the National Annual Report cover and body. Having your photo selected brings our team major national bragging rights. These shots should include people (arrowheads, uniforms and other NPS symbols are always good), treatment and outreach activities, invasive plants, and great backgrounds. Staging the photo is acceptable (glacier background, wildlife, mountains). Examples of great pictures are those that tell a story about the work that the EPMT does and show the majesty of the Alaska parks. Think about the background and the subject. Here are some great examples from the 2009 season:

Voucher Specimens

What to Collect

In order to back up observations of plants in the field, voucher specimens should be collected under the following circumstances:

- Any species previously unrecorded in a park unit should be collected.
- Any species that cannot be positively identified should be collected **following consultation with others to ensure it is not rare**. Photos and a GPS point can be a good interim measure to help id the species, particularly if there are few specimens.
- Any species with a significant range expansion or found in remote areas should be collected, with priority given to species of greater concern.

Prior to collecting voucher specimens, check with the park research permit and collections manager to verify that the necessary paperwork and permissions are completed to conduct collections within the park.

In 2010, make an effort to fully collect all specimens previously reported but not collected. Refer to the spreadsheet AK_EPMT_Master_Exotics.xls for a list of all the species reported for each park with a column for when the plant was collected. Data for collection years before 2005 were taken from the I&M database, NPSpecies, and may need verification with each park herbarium. Let the regional office staff know of any changes needed to this spreadsheet.

Collection Process

Follow these steps to correctly collect a voucher specimen:

1. A photo should be taken of the whole plant prior to collection following the photo protocol.

2. A GPS "Specimen_Pt" should be recorded to account for as many fields as possible. See Table 7 for a description of the "Specimen_Pt" data dictionary fields.

3. Collect the specimen. All parts of the plant should be represented, including roots and flowers or fruits, and should be preserved using a plant press or heavy books with newspaper. Each species should be dried within newspaper and labeled with the information below or a unique collection number (the collector's initials followed by a number – WSR001, WSR002) that relates back to the spreadsheet. Review the University of Alaska Museum of the North's Instructions for Plant Collecting for more detailed instructions on proper plant collecting.

4. Information about the specimen collected should be recorded in the spreadsheet (park ID)_Collections_2010.xls. It may not be feasible to record all fields, but an effort should be made to populate as many fields as possible using the field data associated with the "Specimen_Pt". Fields in bold in Table 8 are required.

5. At the end of the season, obtain the accession number and catalog numbers from the park's collections curator.

6. Verify that each specimen is identified by at least its unique collection number (the collector's initials followed by a number – WSR001, WSR002).

7. Communicate with the Regional Office EPMT staff at the end of the season about sending specimens for mounting or mounting and labeling specimens locally.

8. At the end of the season ensure the spreadsheet (park ID)_Collections_2010.xls is transferred to W: drive in the park's incoming folder within the regional folder.

Table 7. Specimen_Pt fields in the Alaska EPMT Data Dictionary.

Field Name	Field Type	Description
Collection_ Date	Date	Date specimen collected. This field populates automatically.
Location_ Name	Menu	The general area where the activity takes place with several possible in and around each park unit. The data dictionary has all LocationIDs already loaded and EPMT park staff should customize this field and arrange the locations in the order of most common usage. See Table 3 for a description of each LocationID. To visually see the delineation of each LocationID, pull up the "EPMT Location Index" theme in NPS Theme Manager and view it via ArcMap.
Collector_ Name	Menu	The initials of the collector. Park staff should customize this field with the initials of the most likely EPMT or park staff.
Park_Unit	Menu	The four-letter code for the park unit. Park staff should customize the default for this field.
Site_ Description	Text	This field provides the opportunity to explain the exact area within the LocationID as well as any information about that area that might be important. This should enable someone who looks at this data to understand where within the LocationID the specimen was collected without having to use GIS. Take the time while editing to be complete. Additionally, it should note if there is special significance in the location, such as remoteness, proximity to a stream or river, or potential to be easily spread into other areas.
Taxon	Menu	The scientific name of the species collected. All species that have been reported from Alaska NPS units are on this list. If the species collected does not appear on the list or the identity is uncertain, enter "Other" and note the species or uncertainty in the SuggestSpecName field. Park staff should customize this field and arrange the species in the order of most common occurrence for each park.
Suggest_Spp_ Name	Text	Use this name to record what species was collected if the species name is not found in the Taxon drop down menu.
Habitat	Text	Field to make more specific habitat description
Soil_Texture	Menu	• Clay = smallest particle size (<3.9 µm – not gritty in mouth); a marble-sized hunk rolled between fingers will form a ball. • Silt = small particles (3.9-62.5 µm – will feel gritty in mouth); a marble-sized hunk rolled between fingers may form a ball. • Sand = larger particle size (0.0625 mm -2 mm); a marble-sized hunk rolled between fingers will not form a ball. • Loam = relatively even concentration of sand, silt, and clay; a marble-sized hunk rolled between fingers will seem to form a ball, but it will fall apart once pressure is released. • Gravel = largest particles (2-75 mm)
Soil_ Moisture	Menu	dry, moist, wet, or other
Exposure	Menu	N, NE, E, SE, S, SW, W, NW
Slope_Site	Menu	flat, gentle, steep, other
Species_ Abundance	Menu	rare, infrequent, common, abundant, other
Assoc_Spp	Text	Field to enter other nearby native and non-native species. Feel free to use the 6 digit species codes.

Field Name	Field Type	Description
Comments	Text	Use this is a 100 digit field to convey anything extra that seems important about the specimen or collection area. Feel free to use shorthand as long as it intelligible after editing.
Photographed?	Menu	Yes/No – All specimens SHOULD be photographed
Collnum*	Text	Collection number. Initials followed by number. e.g. WSR001
Photo_ Filename*	Text	Filename of specimen photo
Determiner*	Text	Person who identified the specimen
Determiner_ Date*	Date	Date determiner identified the specimen
NPS_ Accession*	Text	NPS accession number
NPS_ Catalog*	Text	NPS catalog number
Native*	Menu	Nativity of specimen – Yes, No, or Unk
Collection_ Number*	Text	Identifying number of specimen (initials followed by number)

* These fields are likely best populated in the office through PFO.

Table 8. Collections spreadsheet fields.

Field Name	Description
Collnum	Initials followed by number. e.g. WSR001
Park	Four letter park acronym. e.g. GLBA, DENA
Scientific Name	Best identification possible. AKNHP will verify all identifications and modify as necessary.
General Locality	General location of specimen. e.g. Parks Highway or Bartlett Cove.
Specific Locality	Specific location of specimen. e.g. 1.5 miles from park boundary on east side of road.
Lat (DD)	Latitude in decimal degrees. e.g. 59.68595
Long (DD)	Longitude in decimal degrees. e.g. -135.56987
GPS/Map	Source of lat/long - from GPS or calculated from map.
Map Datum	Map datum used for lat/ long (NAD27, 83 etc).
Elev	Elevation of collection.
Elev unit	ft or m
Habitat	Describe habitat. e.g. roadside, coastal meadow, riparian, spruce forest
Soil Texture	Soil texture. Clay = smallest particle size (<3.9 µm – not gritty in your mouth); a marble-sized hunk rolled between your fingers will form a ball. Silt = small particles (3.9-62.5 µm – will feel gritty in mouth); a marble-sized hunk rolled between your fingers may form a ball. Sand = larger particle size (0.0625 mm -2 mm); a marble-sized hunk rolled between your fingers will not form a ball. Loam = relatively even concentration of sand, silt, and clay; a marble-sized hunk rolled between your fingers will seem to form a ball, but it will fall apart once pressure is released. Gravel = largest particles (2-75 mm)
Soil Moisture	Soil moisture (wet, moist, dy, other)
Exposure	Which way the site faces (N, S, E, W, etc)
Slope	Angle of site (flat, gentle, steep)
Abundance	Relative abundance of species at location (abundant, common, infrequent, rare)
Assoc. spp.	Other native or non-native species growing in the area.
Collector(s)	Enter as: Heys, J. Enter multiple collectors separated by commas with "&" before the last collector: Heys, J. & Rapp, W.
Collection Date	full date (6/25/2006)
Determiner	Person who identified specimen.
Det Date	Date specimen was identified (9/27/2006).

Field Name	Description
Photo#	Name of digital image or full path to image.
NPS Accession #	Generally, the entire set of specimens will receive the same accession number from the park's curator.
NPS Catalog #	Each specimen will get a unique number from the park's curator. If 3 common dandelions are collected, make 3 separate rows, each with its own catalog #.
Notes	Any other taxonomic or collection notes/comments, such as flower color (some blossoms fade with drying, some colors intensify), odor, conspicuous use by animals, specimen looks like a hybrid or doesn't match descriptions, etc.

Time Log

In an effort to better determine how EPMTs across the nation are performing, the national EPMT program tracks very specific information about the amount of time spent and people involved in every activity that the team performs, not only in the field but also in the office. This information is used to calculate more accurate costs per acre for various treatment activities and to provide overall transparency to National Park Service management and Congress.

In order for this to happen it is important that all EPMT staff keep specific, daily information on the amount of time spent on various work activities throughout the summer. A spreadsheet, Park_TimeLog_2010.xlsx, includes all of the required fields needed for this process.

As with GPS data, this log must be edited and uploaded to the regional EPMT drive (W:\ARO\NaturalResources\EPMT\2010_DATA\2010_INCOMING) under a folder with the park code by the end of every pay period. This will ensure that the time log is being processed correctly, in a timely fashion, and prevent a backlog at the end of the season. For the 2010 season the upload dates are:

June 18	August 13
July 2	August 27
July 16	September 10
July 30	September 24

Some things to keep in mind to make the process easier:

- Copy the spreadsheet Park_TimeLog_2010.xlsx to the park's local EPMT file management folder and change "Park" to the park's four digit acronym.
- This log does not have to be detailed to the minute – 15 minute increments are enough.
- To facilitate completing this log it is helpful to carry a pocket notebook in the field and make daily notes on a calendar in the office.
- If **field work** is being conducted with several EPMT staff members, consider assigning the time tracking duties to a single individual. This will prevent duplicate entries in the log.
- It is up to each park how to handle this log. Some parks use a single log for the entire season and every staff member updates it. Some parks assign each staff member a log and each person is responsible for tracking their own time. These logs are then combined at the end of the season. Use the method that works best for the park's situation.
- If EPMT members will be stationed in the field for an extended period it might be helpful to print out a paper copy of the log to facilitate completion.
- The drop-down menus are customizable and the lists are found on the "Pull-down Menus" sheet. Delete the options that do not apply and update the initials field **before** data entry begins.
- To save time, once a local copy of the spreadsheet is created, pre-fill all the Park fields with the park's code from the drop-down menu.

Time Log Process

The log is relatively straight forward. Table 9 describes the fields that should be filled out on the time log spreadsheet. An example of a completed time log for a full day can be seen in Table 10. This spreadsheet has been formulated and protected to try and prevent any confusion. All blue fields will automatically be populated. Any fields which require entry will turn red once data entry begins. Be sure that the log contains no red cells prior to the regional upload. **Every line must have a date, start time, and stop time.** If there are any questions on the process or issues with the spreadsheet, please contact the regional office EPMT staff.

Table 9. Time Log spreadsheet fields.

Field Name	Description
Date of activity	The date the activity took place. mm/dd/yyyy format
Time Start	Time the activity began. This must be entered in military time with no punctuation. Example: 1:00pm would be entered as 1300 or 1:15 would be entered as 1315.
Time End	Time the activity ended. This must be entered in military time with no punctuation. Example: 1:00pm would be entered as 1300 or 1:15 would be entered as 1315.
Park	The four digit park code where the activity took place. For most parks this can be pre-filled at the beginning of the season.
Activity Category	The type of activity. Available choices are listed below. The bolded ones are the most commonly used and extra care should be taken to ensure that they are accurate. Administrative Tasks / Hiring Activities / Project Planning Conference/Workshop / Meeting / **Report Writing** **Control Work** / Misc Park Activities / **Restoration** **Data Collection** / Partnership Development / Time Lost Due to Injury **Data Management** / Personnel Management / Training **Education & Outreach Activities** / **Prep & Cleanup** / **Travel** Equipment Maint/Repair / Presentation Preparation / Other
Location	The location or LocationID where the activity took place. If the activity is Control Work, Data Collection, or Restoration make sure this field accurately reflects the LocationID where the work occurred. See Table 3 for a detailed list of LocationIDs.
Activity Description	A brief description of what the activity entailed.
Recorder's Initials	The three digit initials of the individual filling out the spreadsheet. This drop-down menu can be edited before the season begins to reflect only the individuals working in the park.
Associated Rover File	If the activity is associated with a GPS rover file (i.e. anything having to do with Control Work, Data Collection, or Restoration), record the associated file(s) name into the log.
# of EPMT staff	The number of individuals who participated in the activity whose salary is paid or partially paid with EPMT funding.
# of other NPS staff	Any other NPS staff member who participated in the activity who is not funded with EPMT funding.
# of SCA	Any member of the Student Conservation Association who participated in the activity.
# of SAGA	Any member of the Southeast Alaska Guidance Association who participated in the activity.
# of volunteers	Any volunteers associated with the activity. Use the Activity Description to include the names of the volunteers,
# of other people	Any other participants associated with the activity. For example, other federal or state employees.

Table 10. An example of a 1-day trip in GLBA with two EPMT staff, one other NPS employee, one SCA, two volunteers and a 8 person SAGA crew. The fields shaded blue are automatically calculated.

Day of Week	Date of activity	Time Start	Time End	Park	Activity	LocationID	Activity Description	Recorder's Initials	Assc Rover File	# of EPMT staff	# of other NPS staff	# of SCA	# of SAGA	# of Vols	# of other	Total People	Hours	Total Person Hours
Mon	6/7/2010	0800	1000	GLBA	Prep & Cleanup	Office	Prepare for field work	BMM	none	2	1	1	0	0	0	4	2	8.00
Mon	6/7/2010	1000	1100	GLBA	Travel	Travel	Skiff to Island	BMM	none	2	1	1	8	2	0	14	1	14.00
Mon	6/7/2010	1100	1530	GLBA	Control Work	main_bay	Manual control of SONARV	BMM	R060215a	2	1	1	8	2	0	14	4.5	63.00
Mon	6/7/2010	1530	1630	GLBA	Travel	Travel	Return to BC	BMM	none	2	1	1	8	2	0	14	1	14.00
Mon	6/7/2010	1630	1700	GLBA	Prep & Cleanup	Office	Clean up from field	BMM	none	2	0	1	0	0	0	3	0.5	1.50

Phenology Log

Throughout the season, park EPMT staff should record when exotic species first flower and first set seed using the parkcode_Phenology_2010.xls spreadsheet. This spreadsheet should be saved in the local park file management structure so it can be accessed easily throughout the season. It may be easiest to print out the sheet on weather resistant paper, routinely write down the dates throughout the summer, and enter the information into the spreadsheet at the end of the summer.

Printing this spreadsheet and carrying it into the field provides two benefits:

1. Having the sheet on hand while conducting invasive surveys will increase the likelihood of it actually being filled out.

2. The sheet will serve as a species reference list since is includes both the scientific and common names of the species found in the park.

It is possible that different locations in parks have ecological and meteorological factors that lead to different phenology timing. Consult with previous season's phenology logs and park staff to determine where these areas are and record the phenology information for these areas on separate sheets.

Table 11. Example of the Phenology Log.

Year 2010	**Park**	**Sublocation**	
Taxon	**Common Name**	**Date of First Flower**	**Date of Seed Set**
Achillea millefolium	common yarrow		
Achillea ptarmica	sneezeweed		
Allium schoenoprasum	wild chive		
Alopecurus geniculatus	water foxtail		
Alopecurus pratensis	meadow foxtail		
Amaranthus retroflexus	pigweed		
Arabis glabra	tower rockcress		
Brassica napus	rape		
Brassica rapa	field mustard		
Bromus inermis	smooth brome grass		
Capsella bursa-pastoris	shepherd's purse		

Seasonal Report

The seasonal report for a park is the chance to summarize what has been learned and accomplished with regard to exotic plant management over the course of the season. These are immensely valuable for record-keeping and future planning, and it will also demonstrate to supervisor's and other park staff the quality of work. Be as thorough as possible with this. Feel free to borrow from previous years rather than completely recreating the wheel.

New Report Format

For the first time this season Alaska EPMT park summary reports will be submitted to the National Resource Publication Management division under the National Resource Data Series for publication on their website http://www.nature.nps.gov/publications/NRPM/index.cfm. This allows the Alaska reports to go through a standardized peer review process and be accessed on a national level.

A blank report template and a walkthrough document on the report formatting is saved at W:\ARO\NaturalResources\EPMT\2010_DATA\2010_OUTGOING\Report

Wrangell-St. Elias National Park & Preserve staff completed their 2009 summary report in this new format and it is available at http://www.nature.nps.gov/publications/NRPM/nrds.cfm

The Editorial Style Guide for Park Science and Natural Resources Year in Review is another reference for writing NPS reports - https://science1.nature.nps.gov/naturebib/biodiversity/2007-6-5/Editorial_Style_Guide.pdf

What Should the Report Include?

As far as timing goes, the data processing must be complete by September 1 or two weeks prior to the seasonal staff's end date. Determine who at the park level should review the document. Some suggestions include anyone who actively participated in the EPMT program, a park ecologist or botanist, any supervisors. Draft reports should be sent to regional EPMT staff at least two weeks prior to the seasonal staff's end date or September 15th (whichever is earlier) for review. If that presents a problem, let the regional EPMT staff know as soon as possible. Please provide a version in MS Word. Acrobat PDF versions will be made by the regional EPMT staff once the Peer Review process is complete.

In addition to submitting the actual report, each park should submit a copy of the Manuscript Submittal Form with Section 1 filled out. The regional EPMT staff will fill in the rest of the form and submit is once the report is finalized.

Abstract/Executive Summary

A succinct summary of the season that could include total number of species inside/outside of park, areas surveyed, new species found, species eradicated, acres inventoried/infested/treated, etc. This may be the only opportunity to inform someone so be as specific as possible!

Introduction
There is no need to provide an overview of why invasive plants are a problem for Alaska. Instead, focus on the park unit's history of exotic plant surveys and management efforts - the context of the work in 2010.

Methods
This section should explain how the park's priorities were determined, why areas were selected for survey, what areas were surveyed, how thoroughly/frequently they were surveyed, and what control methods and personnel were utilized.

There is no need to go into detail about the data collection protocol in this section. A simple citation of this protocol will suffice.

Results
This section should be the main focus of each report. Let the reader know what actions were taken to control the infestations found, so that the data does not have to speak for itself. Include:

Accomplishments
This section should discuss a park's accomplishments in the main integrated weed management areas: Prevention, Inventory, Control, Monitoring, Restoration, and Education/Outreach. The season's completed time log is a useful tool to highlight projects and activities.

Distribution
Summarize 2010 exotic plant distribution (diversity and relative species abundance in front country and backcountry) in comparison to what has been documented in previous year's reports and data. Highlight any new species or situations of particular concern. If there are any eradicated populations, species colonizing natural areas, or any other unusual or noteworthy event, be sure to include it in this section.

Park Species
Include a table that lists all the invasive species documented in and around the park. This should include all species that have ever been documented not just the ones from the 2010 season. The easiest way to construct this table is to use the Master Exotics spreadsheet and add any additional species documented during the 2010 season. If there are species on the master list that should not be there, let the regional EPMT staff know. Include in this table if the species was documented in 2010 and in what parts of the park it was seen (e.g. Park Headquarters, Park Road, Backcountry, Outside Park). If the species has been eradicated, include it in the list but indicate that when it was last observed.

Discussion and Recommendations
Make recommendations for next year to improve how things can be done at the park or region level. Be thorough with everything that could be done, even if it seems unlikely to happen. Also include anything else that might be important – every insight on any perceptions, concerns, ideas, or problems is helpful.

Formatting Standards

Use the standards described in the National Resource Data Series template. These standards cover font use and layout. The following sections spell out formatting specific to the Alaska EPMT reports,

Scientific Name Use

Use the common and scientific names that appear in the master exotics table so that they are consistent throughout the park report and the region. Common names should not be capitalized unless they have a proper name (e.g. European mountain-ash or common dandelion). Scientific names should have the genus capitalized and be italicized with the exception of abbreviations used (e.g. *Taraxacum officinale* ssp. *officinale* or *Melilotus* spp.).

A species scientific name should be included in parenthesis after the first use in the document of the common name. After that point only the common name should be used.

Figures and Maps

Pictures are a great way to show the work that has been accomplished at each park. Be sure to include various photos to help demonstrate all of the on-the-ground work the EPMT has completed in 2010.

Maps are optional but helpful in illustrating priority areas. If assistance with GIS data is needed to complete maps, please contact the Regional Office staff no later than August 23 so the data can be properly processed.