Volunteer Invasive Weed Mapping Project at

Humboldt Bay National Wildlife Refuge
Salmon Creek Unit
Progress Report
Fall 2003

Southwest corner of the Humboldt Bay National Wildlife Refuge

Emily Walter, Restoration Coordinator, FOD
Patti Clifford, Natural Resource Specialist, USFWS
Humboldt Bay National Wildlife Refuge Complex
P.O. Box 576
Loleta, CA 95551

TABLE OF CONTENTS

I. Introduction …… 1

II. Project Organization…… 3

A. Weed prioritization …… 3

B. Staff Training…… 4

C. Volunteer Recruitment and Training…… 4
1. Recruitment …… 4
2. Training methods …… 4
3. Field training …… 6

D. Mapping ……6

E. Control …… 7

III. Accomplishments……..... 8
A. Volunteers…… 8
B. Training documents and methods…… 8
C. Invasive weed control …… 9
D. Invasive weed map …… 9

IV. Recommendations …… 11
A. Volunteer recruitment …… 11
B. Volunteer training methods …… 12
C. Staff training …… 12

V, Conclusion …… 12

LIST OF FIGURES

Figure 1. Location of Humboldt Bay National Wildlife Refuge ……... 2

Figure 2. Diagram of mapping methods …… 7

Figure 3. Location of invasive weeds on the Salmon Creek Unit …… 10

Figure 4. Mapped subunits of the Salmon Creek Unit …… 11

LIST OF APPENDIXES

Appendix 1. Volunteer recruitment flyer ……..… 13

Appendix 2. Invasive weed pictures for MAPPING PHASE I ….. 14

Appendix 3. Invasive weed list for MAPPING PHASE I ……. 15

Appendix 4. PDA/ArcPad Instructions …… 16

Appendix 5. Refuge invasive weed file and site ID formats …… 21

Appendix 6. Glossary of terms …… 22

Appendix 7. Pocket guide to use while mapping …… 24

Appendix 8. Daily sign-in sheet / mapping log …… 25

Appendix 9. Volunteer check list …… 26

I. INTRODUCTION

The Humboldt Bay National Wildlife Refuge is approximately 3000 acres in size and is located adjacent to Humboldt Bay in Humboldt County, northwestern California (Figure 1). Humboldt Bay located on a narrow coastal plain, is 0.5 to 4 miles wide and 14 miles long. The Mad and Eel Rivers bound the area on the north and south respectively. The Refuge is distributed among Seven separate units: two in the North Bay, four in the South Bay, and one in the coastal dunes adjacent to Mad River Slough. The Refuge consists of freshwater marsh, salt marsh, dune, coniferous and riparian forest communities and intertidal flats.

Humboldt Bay is considered to be an internationally significant area for migratory birds due to the number of birds that depend on it in the fall, winter and spring. The Refuge is the southernmost in a chain of Federal refuges in the United States that provide habitat for most of the world's population of Pacific brant. Many of the birds using the bay frequent areas within the Refuge on a daily basis.

The majority of land within the Refuge was historically tidally influenced. Vast expanses of wetlands around the bay, including lands within the Refuge, have been diked to prevent tidal water exchange and to promote cattle grazing and agricultural practices. Many changes in topography, hydrology, soils, and plant species composition have taken place since these lands were diked. The disturbance caused by these changes and past land use has made much of the Refuge susceptible to invasions of exotic weeds.

The Volunteer Invasive Weed Mapping Project has given Refuge staff the opportunity to begin quantifying the extent of the weed infestations. This is the first step towards developing a comprehensive weed management plan. Due to limited time and funding, the initial mapping season at the Refuge focused on mapping subunits in the Salmon Creek Unit as a pilot project. Focusing on a portion of the Refuge allowed us to test methodologies and strategies for volunteer recruitment and training, data collection, and map production. The valuable experiences and skills learned during the pilot project will be implemented in 2004. A larger scale project will begin in spring 2004, the size dependent on whether additional funds are received.

The Friends of the Dunes (FOD), the Refuge Support Group, has been instrumental in the development of this project. Their experience with volunteer recruitment and training has been invaluable.

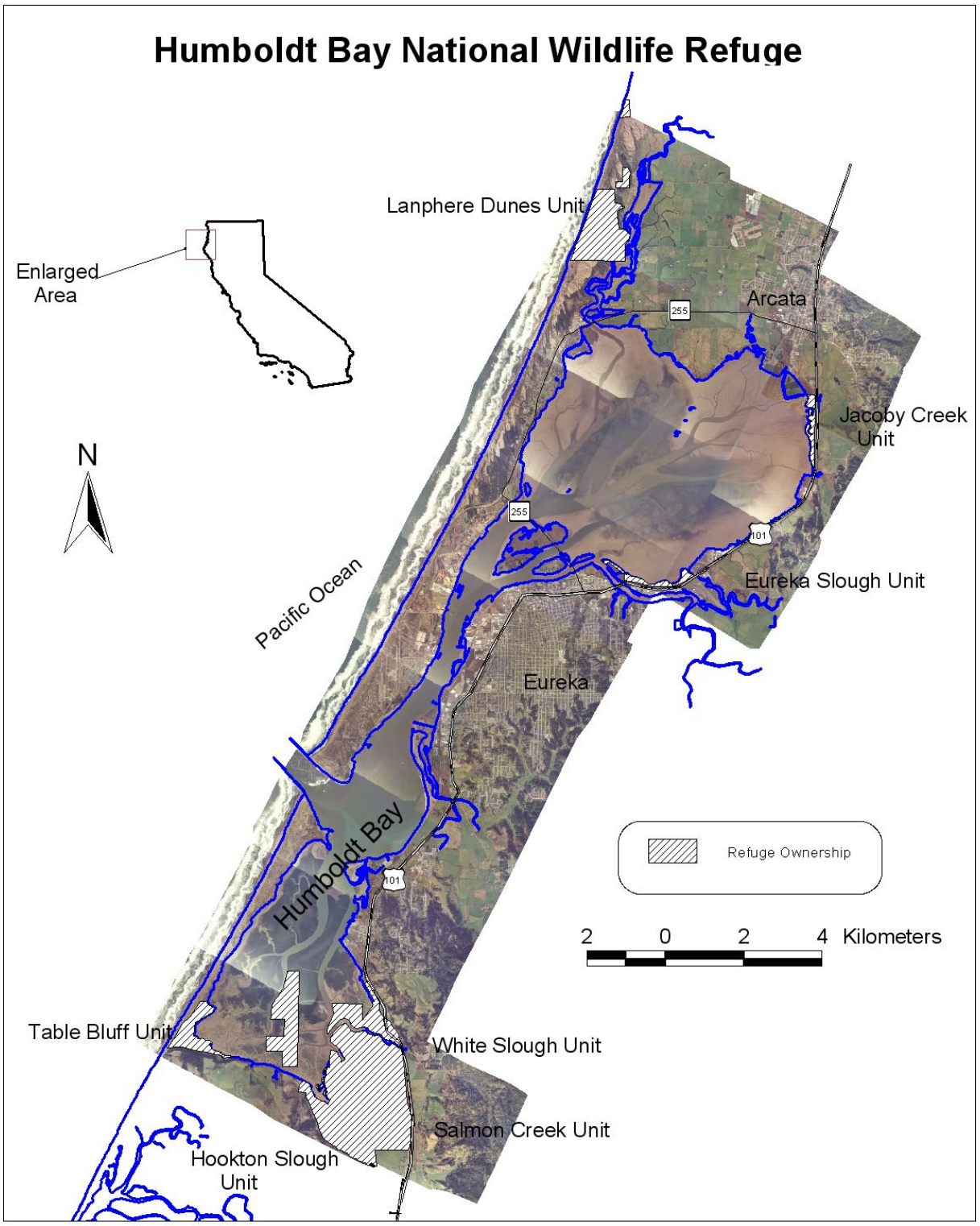

Figure 1: Location of Humboldt Bay National Wildlife Refuge

II. PROJECT ORGANIZATION

The Humboldt Bay National Wildlife Refuge Invasive Weed Mapping Project consists of five elements: weed prioritization, staff training, volunteer recruitment and training, mapping, and control. A pilot program was implemented between August and October 2003 to test this methodology in a small area in order to apply it in 2004.

A. WEED PRIORITIZATION

Given time constraints, it was decided that mapping would be completed in two phases, the first focusing on high priority weeds. Refuge staff developed a list of invasive species that were classified into the following categories of decreasing priority:

- A1. Weeds of known high invasiveness, known to be present, with known control methods.
- A2. Weeds of lesser invasiveness but in early establishment phase, with known control methods..
- B1. Species of high invasiveness, known to be present, but are in large infestations and/or need more study to control.
- B2. Species known to be present of moderate invasiveness.
- C. Species that are known to be invasive primarily in disturbed conditions such as roadsides or grazed areas.
- D. Watch List: species of high invasiveness, not known to occur, but to watch for.

(a)

(b)

(c)

Three of the A1 species: (a) Canada thistle (*cirsium arvense*), (b) fennel (*Foeniculum vulgare*), (c) bull thistle (*cirsium vulgare*)

B. STAFF TRAINING

Staff training occurred simultaneously with volunteer recruitment. The training included invasive species identification, mapping priorities, training documents development, GPS unit instructions, and mapping methodologies.

Invasive species identification and mapping priorities training were preceded by a field excursion to the refuge unit proposed for initial mapping. Strategies were developed for mapping priorities and methodologies at this time.

A system composed of a Compaq Ipaq 3970 PDA, a Holux GM 270 compact flash GPS unit, and ArcPad (a GIS program for handheld computers) was researched and purchased for this project. An initial staff training period on the use of the units was necessary before training the volunteers. This training included basic operations on the PDA, use of the GPS unit, and ArcPad instructions. Data transfer from the PDA unit to a computer with ArcView was also included.

C. VOLUNTEER RECRUITMENT AND TRAINING

RECRUITMENT

Volunteers were solicited by flyers (Appendix 1), personal invitation, and e-mail. We chose to solicit volunteers from the California Native Plant Society, Humboldt State University students, local Federal Government Agencies (BLM, USFS), current refuge volunteers, and private consulting firms (i.e. Mad River Biologists, Redwood Science Labs). Volunteers were chosen according to their previous experience and/or knowledge of plant identification; GPS, ArcPad, and GIS computer programs. Volunteers signed a volunteer agreement in which they committed to volunteering 4-8 hours a week towards this project for one year.

The 2003 mapping season was limited due to the timing of the grant funds which reduced the time available to recruit and train volunteers. A pilot training and mapping program was implemented for the first season. Four individuals were trained at the first training in order for each volunteer to be able to use one of the four PDA/GPS units. One additional volunteer with extensive background in GPS mapping was trained after the original training date. Further trainings for the large scale project will be arranged in early spring 2004.

TRAINING METHODS

The initial volunteer training was held at Humboldt Bay NWR on September, 2, 9am-12pm, with four volunteers attending.

Training Outline:

1. Introduction to the project and Humboldt Bay NWR
2. Overview of materials in training packets
3. Hands-on overview of how to use PDA/GPS units
4. Practice with PDA/GPS units in the field
5. Overview of plant identification of all A1 and A2 species
6. Cover estimation using a computer simulation program called DISEASE

Training in the classroom

Activating the GPS system

Practice making a polygon

FIELD TRAINING

Following the initial training day on September 2, 2003, volunteers were scheduled to review materials from the original training and to continue practicing with the PDA/GPS units. Volunteers met in pairs and individually with project staff. Volunteers reviewed plant identification and practiced distinguishing cover classes while in the field. Project staff kept records of each volunteer to follow their progress.

Most volunteers required several follow-up meetings before feeling comfortable mapping on their own. It took an average of 6.25 hours of field training before individuals were ready to begin mapping on their own. This training time is mainly due to the volunteer's inexperience with the PDA/GPS units, the ArcPad software and the volunteer's time availability. An additional cause for this lengthy training process is that project staff were still debugging equipment and had to continually make changes in order for the data to remain organized and usable.

Volunteer during a field training

Once volunteers are completely comfortable and are making minimal mistakes in their data collection we will train those who are interested in further responsibilities, such as downloading their PDA information onto the refuge computer, keeping records and logs updated, and training new volunteers.

D. MAPPING

PHASE I.

After volunteers are trained in plant identification and PDA/GPS/ArcPad use, they will map all A1, A2, and D plant species over the entire Salmon Creek Unit. Each subunit is traversed in a zigzag pattern with volunteers examining 3-5 meters on either side of the line they are walking. GPS units are used to track their movements to avoid missing or duplicating an area (Figure 2).

All occurrences are mapped as points or polygons as appropriate. Areas smaller than 5 m^2 are mapped as a point and the number of plants are recorded.

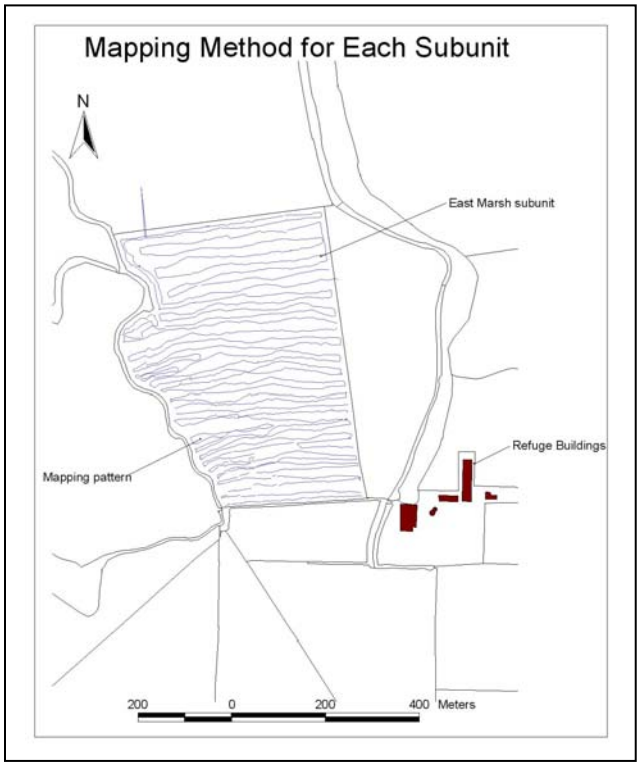

Figure 2. Diagram of Phase I mapping methods

PHASE II.
Volunteers will map all B1, B2, and C invasives along with native vegetation in the Salmon Creek Unit. Polygons will be drawn over a minimum occurrence size, with visual estimates provided of dominant invasive species. All invasives and dominant natives within the polygon are documented in the data standards files on the PDA.

This project uses the North American Invasive Plant Mapping Standards developed by the North American Weed Management Association. These standards are endorsed by the U.S. Fish and Wildlife Service. These are minimum standards designed to be compatible with existing invasive species inventories. Researchers can collect additional information when necessary. The standardization of the inventory protocol allows the information to be incorporated into inventories serving other purposes.

E. CONTROL

PHASE 1

This element is to be carried out as soon as feasible, even before full mapping is completed, and continuing through the end of the season.

1. In consultation with the Refuge Ecologist and Project Leader, results of the mapping efforts will be reviewed and control efforts prioritized.
2. Monitoring of control sites will be carried out by trained volunteers
3. Species that can be manually removed will be scheduled for removal by volunteer crews. The refuge Volunteer Coordinator will work to schedule groups.
4. *Phalaris arundinacea* (reed canary grass) will be removed with heavy equipment by the refuge Engineering Equipment Operator.
5. Control methods for *Spartina densiflora* (dense-flowered cordgrass) will be determined after experiments on removal methods.

PHASE 2

After consultation with refuge managers and equipment staff, we will determine whether large scale control of priority B invasives will be carried out using methods such as large scale mowing or water level manipulation. If so, volunteers will carry out quantitative monitoring prior to control.

III. ACCOMPLISHMENTS

VOLUNTEERS

The volunteers are enthusiastic and continue to devote time to the project. Three volunteers are capable of mapping in the field alone with successful data collection. The rate of mapping has increased significantly since these volunteers have become competent with the PDA/GPS system. Invasive mapping will continue until the fall rainy season. News about this project has reached the community and there are already several individuals interested in the spring training.

TRAINING DOCUMENTS AND METHODS

Two staff members developed the training methods and documents. This was a trial and error process as we were self-trained on the use of the PDA/GPS system and mapping methodology. This season allowed training methods and documents to be field tested and revised when necessary. Skills learned this mapping season will improve the mapping process in the next season.

INVASIVE WEED CONTROL

Four areas of pampas grass and one area of reed canary grass have been removed by heavy equipment. The plants were dug up from their base and then buried. The remaining reed canary grass will be removed in spring 2004. One occurrence is located in a riparian area and is inaccessible by heavy equipment and will be manually removed by refuge staff.

Reed canary grass

Area of removed reed canary grass

INVASIVE WEED MAP

Five subunits, covering 141 acres, have been completely mapped using PHASE 1 methods. In these subunits only four species from the A1 and A2 lists were found. All reed canary grass and pampas grass (*Cortaderia jubata*) have been mapped in the previously known areas of infestation (Figure 3).

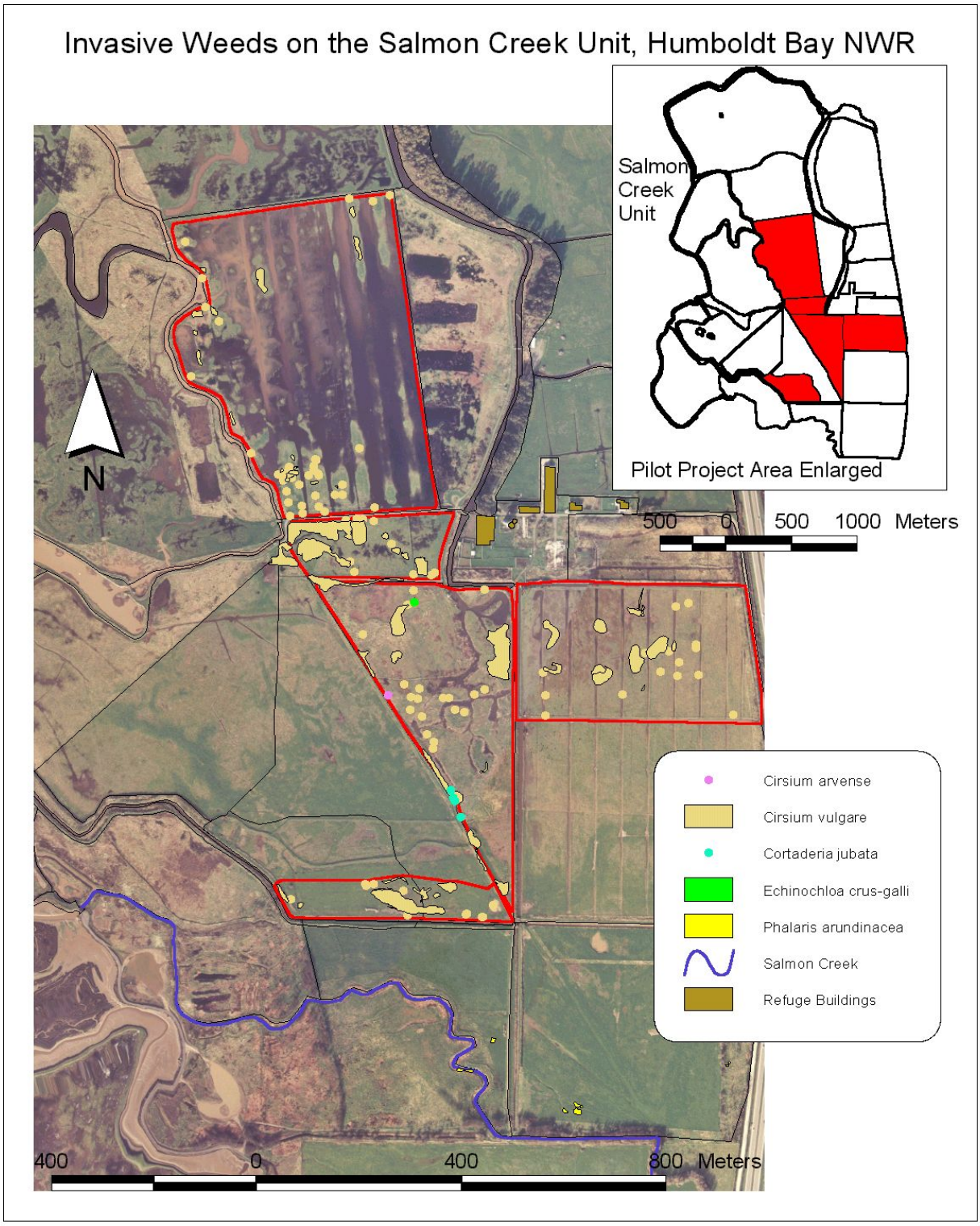

Figure 3. Location of invasive weeds on the Salmon Creek Unit

Our data indicate that eight of the species from the A1 and A2 lists do not occur in these subunits. None of the to-watch species from the D list were found in any of these subunits (Figure 4).

Figure 4. Mapped subunits of the Salmon Creek Unit

Invasives not-present in mapped subunits

Conium maculatum *Cyperus esculentus* *Foeniculum vulgare* *Hedera helix* *Phalaris arundinacea* *Rubus discolor* *Vinca major*	*Cirsium arvense* *Conium maculatum* *Cortaderia jubata* *Cyperus esculentus* *Echinocloa crus-galli* *Foeniculum vulgare* *Hedera helix* *Phalaris arundinacea* *Rubus discolor* *Vinca major*

IV. RECOMMENDATIONS FOR 2004 SEASON

VOLUNTEER RECRUITMENT

Beginning volunteer recruitment in early spring will greatly benefit this project. Initial training time is fairly extensive. If a solid base of volunteers are trained by late-spring to early-summer the number of volunteers and the land area mapped will be considerably larger.

We trained a group of diverse volunteers with differing backgrounds, some with computer skills, and some with botanical skills. Those with computer skills were able to excel quicker than those without because they were more familiar and comfortable working with the PDA's. Volunteers

with botanical backgrounds had a difficult time learning how to use the PDA/GPS units, but once they caught on they became the most skilled volunteers because of their ability to identify plant species. They will be very important during phase II mapping, when it will be necessary for volunteers to identify all plant species within the unit they are mapping. We have concluded that recruiting volunteers with a strong botanical background is a priority.

VOLUNTEER TRAINING

We had one four-hour training to explain all aspects of the project to the volunteers. We propose to have three four-hour trainings in the spring, focusing on overview of the project and PDA/GPS units, use of PDA/GPS units in the field, and plant identification. It has also been suggested that an overview of the PDA via a classroom overhead would be useful in helping to walk the volunteers through the programs. We will be looking into the possibility of this.

Project staff spent a lot of one-on-one time with the volunteers in the field after their initial volunteer training. We will pair volunteers in the field to help each other, especially those with separate skills such as computer vs. botanical. Once the volunteers feel they are ready to begin mapping on their own, project staff will go into the field with them and make sure they are following the correct methods of mapping.

STAFF TRAINING

The Nature Conservancy weed database training will greatly improve the data collection process. Further training in the use of ArcPad and ArcView will benefit the project. Collaborating on volunteer training methods and recruitment with participating Refuges would be helpful.

V. CONCLUSION

This year we developed a successful training program for mapping invasives at the refuge. We have created useful training materials and methods and are looking forward to improving training during the next season. Volunteer input has been an important component to the development of this project. This project will become stronger over time with a growing volunteer base. The need for volunteers with mapping experience and botanical knowledge will be crucial to make this into a sustainable volunteer program.

Appendix 1. Outreach Flyer

FREE TRAINING:

- **In use of PDA/GPS unit and ArcPad Software**
- **In identification of invasive plant species**

The U.S Fish and Wildlife Service (USFWS) and Friends of the Dunes (FOD) are partnering on a new and exciting project. We will be using new PDA/GPS units to map all invasive wetland and dune plant species at the Humboldt Bay National Wildlife Refuge (primarily the Salmon Creek Unit). With this information we will be able to closely monitor invasive plants as well as prioritize and begin removal of these invasives at the Refuge.

USFWS and FOD are looking for volunteers who have experience or are interested in botany and learning a new computer program. Volunteers must be willing to commit 4-8 hours a week through September.

Training will be held
Saturday, Sept. 2nd
9am – 12pm
at the Humboldt Bay NWR

Limited Space, Sign-up today

Please call Emily at 444-1397 with information about your experience/interest and time availability for this project.

Appendix 2. Invasive Weeds A1 and A2 pocket guide

(FRONT)

Canada thistle
Cirsium arvense

bull thistle
Cirsium vulgare

English ivy
Hedera helix

poison hemlock
Conium maculatum

fennel
Foeniculum vulgare

(BACK)

Himalaya berry
Rubis discolor

pampas grass
Cortaderia jubata

parking lot sedge
Cyperus esculentus

barnyard grass
Echinochloa crus-galli

periwinkle
Vinca major

Appendix 3. Invasive weed list for MAPPING PHASE I

A1. Weeds of high invasiveness, known to be present, with known control strategies

Latin Name	Common Name	Code
Cirsium arvense	Canada thistle	cirarv
Cirsium vulgare	bull thistle	cirvul
Conium maculatum	poison hemlock	conmac
Cortaderia jubata	pampas grass	conjub
Cyperus esculentus	parking lot sedge	cypesc
Foeniculum vulgare	fennel	foevul
Hedera helix	English ivy	hedhel
Phalaris arundinacea	reed canary grass	phaaru
Rubus discolor	Himalaya berry	rubdis

A2. Weeds of lesser invasiveness but in early colonization stage, known control strategies

Latin Name	Common Name	Code
Echinochloa crus-galli	barnyard grass	echcru
Vinca major	periwinkle	vinmaj

D. WATCH LIST: Species of high invasiveness not known to occur, but to look for

Latin Name	Common Name
Oxalis pes-caprae	Bermuda buttercup
Acacia spp.	acacia
Alisma lanceolatum	water plantain
Bellarida trixago	bellardia
Calystegia sylvatica	white morning glory
Cytisus scoparius	Scotch broom
Erica lusitanica	Spanish heath
Genista monspessulana	French broom
Hypericum perforatum	Klamathweed
Oenothera glazioviana	evening primrose
Oxalis rubra	purple oxalis (clover)
Vicia benghalensis	purple vetch
Zostera japonica	invasive eelgrass

Appendix 4. PDA / ARCPAD INSTRUCTIONS

Table of Contents

I. PDA Instructions
- A. Memory check.
- B. Power check
- C. Check GPS settings

II. ArcPad Instructions
- A. Open ArcPad
- B. Set GPS Options
- C. GPS a polygon, point, polyline
- D. Turn on GPS unit
- E. Check satellite constellation and PDOP
- F. Start collecting GPS data

III. Data Standards/Metadata
- A. Data entry into attribute tables.

IV. Trouble shooting

I. PDA

To turn on the unit press the silver button on the top right corner.
The stylus is used to tap the screen to navigate around programs and settings.

A. First check the available memory and power.

1. Tap the windows start icon at the top left of the screen. The menu appears.
2. Tap **Settings**.
3. Tap **System**. Tap **Memory**. Tap **Storage Card**.
   Check the memory space available on the storage card. If there is not much memory available, data must be downloaded and then deleted from the unit.
4. To close Tap **OK** in the upper right corner.

B. This returns you to the system menu. Scroll to **Power** and Tap to open.

1. Note the battery power remaining. It should be 80 – 100%.
2. Tap Standby. Note approximate hours remaining. There should be at least 5.
3. Tap **OK** in upper right corner twice to close.

C. Check GPS settings.

1. Tap Start
2. Tap Programs
3. Select **GPS Viewer**
   The settings should be:

Com port : **Com 6**
Baud rate: **4800**
If the settings are different, use the arrow on the right of the rectangular box to scroll and change the settings.

4. Tap **Open GPS** and then check the box next to **WAAS**.
5. Tap **Close GPS**.
6. To close GPS Viewer Tap the **X** in the right corner.

II. ArcPad Instructions

A. Open ArcPad

1. Tap **ArcPad** icon to open.

B. In the top toolbar Tap the arrow to the right of the **Tools** button. Tap **Options** to open the ArcPad **Options** dialog box. This allows you to set up the GPS options.

1. The **Protocol** page is used to specify the protocol, datum and other GPS settings. The
following settings should be selected. If they are not, then use the arrows to the right of the rectangular box to scroll to the correct setting.
Protocol: **NMEA 0183**
GPS Datum**: WGS84**

2. Tap the GPS icon to open the **GPS** page. It is used to specify communication settings for your GPS receiver. The following settings should be selected. If they are not, then use the arrows to scroll to the correct setting.
Port**: Com 6**
Baud**: 4800**
Parity**: None**
Databits**: 8**
Stop Bits: **1**
RTS control**: enable**
DTR control**: enable**

Use the arrows on the right of the pages to scroll between pages.

3. The **Quality** page is used to specify thresholds for your GPS receiver.
Select non-compulsory warnings. **Check** maximum PDOP and enter **8**.

4. The **Capture** page is used to specify data capture rules for your GPS receiver.
Check enable averaging.
Number of positions to average:
Points: **40**
Vertices:**20**
Streaming vertices interval:**4**

Use the right arrow to scroll to the Display page.

5. The **Display** page is used to specify various display options in ArcPad.
   Display units: **metric**

This should be all the options that you will need to select. Tap **OK** to close the Options window.

C. To GPS a polygon, point or line, you need to start a new map.

1. Open the arrow next to the open file icon on the left of the top toolbar. Select new map.
2. To add a layer to the map.
   a. Tap arrow next to the + button in the top toolbar.
   b. Select add layer.
   c. Select storage card. GIS folder.
   d. Place a check next to the layer you want to add. Tap **OK**.
3. To start a new layer:
   a. Tap the arrow next to open file in the top toolbar.
   b. Select new layer.
   c. Choose type of shapefile (point, polygon).
   d. Import data base file called **refuge weeds_standards**.
   e. For a tracklog choose polyline and tap the + symbol to add an attribute table. Name the field in the attribute table **subunit**. Tap **OK** to close.
4. To save the shapefile:
   a. Name the shapefile **(species 6 letter code, unit #_subunit code)**
   b. Save in the GIS folder.
   c. Location: storage card.
   Select **OK** to save.

D. To turn on the GPS unit:

1. Select the arrow to the right of the satellite button on the top toolbar.
2. Tap GPS active. A red circle with a yellow cross in the center should appear in the center of the screen.

If you receive an error message here. GPS Viewer may still be on or you may need to soft reboot. Go to Trouble shooting at the end of these instructions.

E. You should check the satellite constellation and PDOP.

1. Select the arrow to the right of the satellite button on the top toolbar.
2. Tap GPS position window. The square boxes with numbers are the satellites. The black boxes are satellites that the GPS is receiving information from and the red boxes the GPS is attempting to get a fix.
3. The PDOP is in the lower right-hand corner and should not exceed 8.
4. The TCOG should be set as true north.

F. If all the settings are correct and you have enough satellites to have an acceptable

PDOP you are ready to start to GPS.

1. In the 3rd toolbar. If it is not showing, go to tools button in top toolbar. Use arrow to open. **Select** toolbars. Highlight browse and edit toolbars so a check appears next to each.
2. Now open the point button by selecting the arrow next to it.
3. Select the type of shapefile you are creating (point, polyline, polygon). A red box should appear around the symbol. Press the arrow to close the menu.
4. To start receiving GPS points into your file you must select one of the three satellite buttons in the bottom toolbar. The far left satellite button is for taking point shapefile data. The middle satellite button is for polygons when you want to average vertices. The right satellite button is for streaming vertices. This is when you want to slowly walk around the area you need to GPS.
5. When you are done creating the (point, polyline, polygon) press the corresponding shape in the bottom toolbar. This will end/close the shapefile.

III. Data standards.

A. Data entry into attribute tables.

1. Feature attribute properties can be attached to the shapefile by several ways.
   a. When a point feature is collecting points the feature attribute table will open. Select the field by Tapping twice to the right of the abc symbol. This will allow you to type in data with the keyboard.
   b. When a polygon feature is finished tap the polygon symbol to end data collection and open attribute table. Fill in fields by tapping twice on the right of the abc symbol and using the keyboard.
   c. Feature properties can be accessed by selecting the feature with the select arrow on the third tool bar and tapping the feature. This will open the feature attribute window and allow you to fill in data.

<u>Troubleshooting</u>

<u>Soft reboot</u>

The PDA may freeze because of the size of some of the files used in ArcPad, or for other unknown to me reasons. This problem can be solved by a soft reboot of the system. There is a small hole in the bottom right of the unit. The stylus is inserted briefly into this hole. The unit will reboot and your problem should go away. After you reboot go back to the power page and
under the **On battery power** heading, uncheck the box next to **turn off device if not used for ____ minutes**.

Turning ArcPad off may also solve a freezing problem.

<u>If GPS won't activate</u>

Check GPS Viewer to see if you left the GPS on in that program. Go to the start icon. Then go to programs select GPS viewer. If the GPS is on through this

program a rectangular box on the mid-to-upper right of the screen will say **close GPS**. Tap this box and try to activate the GPS in ArcPad again. If it doesn't work, try the soft reboot.

Appendix 5. Refuge Invasive Weed File and Site ID formats

File formats

Use the dominant weed in the polygon for the shapefile name.

For a polygon shapefile you would use this format.
species six letter code, unit #_subunit code, date
For example: A polygon shapefile of Cirsium vulgare, GPS'd with unit 3 in the duck pond subunit on the 15th, the file name would look like this:
cirvul3_dup15

For a point shapefile you would use this format.
species six letter code unit #pt_subunit code, date
For example: A point shapefile of Cirsium vulgare, GPS'd with unit 3 in the duck pond subunit on the 15th, the file name would look like this:
cirvul3pt_dup15

For a tracklog use this file format.
Three letter subunit code unit# _tracklog

For example: A tracklog made using unit 3 in the duck pond subunit would look like this:
dup3_tracklog

Site ID Formats

The site ID format is the 3 letter code for the subunit the GPS unit # _ and the number of point or polygon you are on. This may start from 1 or a later number depending on whether the subunit has been partially GPS'd.
Some examples:
The first point or polygon GPS'd for the day in the sms subunit with unit 4.
sms4_1
The next point or polygon GPS'd for the day would be **sms4_2**
We are running consecutive ID numbers to make it easier. It doesn't matter if the previous number was a point or polygon.

This example is for a continuation of a subunit on a second day. We will have the shapefiles still on the unit so you can see what part of the unit has been mapped. We will also have a list of ID numbers for the species mapped so you will know what numbers to start with.

Example: The list said the last ID number for Cirsium vulgare mapped in subunit sms with unit 4 was 13. Your first ID number will be **sms4_14**.

Appendix 6. Glossary of Terms

2D Mode: A two-dimensional GPS position that includes only horizontal coordinates. It requires a minimum of 3 satellites.

3D Mode: A three-dimensional GPS position that includes horizontal coordinates and elevation. It requires a minimum of 4 satellites.

ArcPad: GIS software for handheld computers

Attributes: The information used to describe a map feature.

Attribute table: A table containing descriptive attributes for a set of geographic features.

Coordinate system:
1.A reference system used to measure horizontal and vertical distances on a planimetric map. A coordinate system is usually defined by a map projection; a speroid of reference; a datum; one or more standard parallels; a central meridian; and possible shifts in the x- and y- directions to locate x,y positions of point, line and polygon features.
2. In ArcPad, a system with units and characteristics defined by a map projection. A common coordinate system is used to spatially register geographic data for the same area.

Datum: A set of parameters and control points used to accurately define the three-dimensional shape for the earth. The datum defines the geographic coordinate system that is the basis for the planar coordinate system. For example, the North American Datum for 1983 (NAD83) is the datum for map projections and coordinates within the United States and throughout North America.

Global positioning system (GPS): A constellation of 24 satellites, developed by the U.S. Department of Defense, that orbit the earth at an altitude of 20,200 kilometers. These satellites transmit signals that allow a GPS receiver anywhere on earth to calculate its own location.

NMEA 0183: A standard data communication protocol used by GPS receivers.

North American Datum of 1927 (NAD27): The primary local geodetic datum used to map the United States during the middle part of the 20th century, referenced to the Clarke spheroid of 1866 and initial point at Meades Ranch, Kansas. It is gradually being replaced by the North American Datum of 1983.

PDA: Personal digital assistant. A handheld computer.

Position Dilution of Precision (PDOP): An indicator of satellite geometry for a constellation of satellites used to determine a position. Positions with a higher PDOP value generally constitute poorer measurement results than those with lower PDOP.

Shapefile: A vector format for storing location, shape and attributes of geographic features. It is store in a set of related files and contains one feature class.

Universal Transverse Mercator (UTM): A commonly used projected coordinate system that divides the globe into 60 zones, starting at –180 degrees longitude. Each zone extends north-south from 84 degrees north to 80 degrees south, spans 6 degrees of longitude, and has its own central meridian.

World Geodetic System of 1984 (WGS84): The most widely used geocentric datum and geographic coordinate system today. GPS measurements are based on wgs84.

Appendix 7. Pocket Guide to Use While Mapping

(FRONT)

Sample of Refuge Weed Standards

DATA STANDARDS	EXAMPLES
DATE (YR/MO/DAY)	20030902
SITE ID	sms1_1
OBSERVER_	Rachael Carlson
CONTACT INFO	
DATA SOURCE	
STATE	
COUNTY	
UNIT	
SUBUNIT	
LOCAL OWNER	
NATIONAL OWNER	USFW
SPECIES	cirvul
WEED RATING	
INFESTED AREA	
GROSS AREA	
COVER	2
TREATMENT	
COORDINATE	
DATUM	
YEAR	
EASTING_	
NORTHING	
DATA ACCURACY	3-25 meters
SPECIES2	hedhel
COVER2	trace
SPECIES3	
COVER3	
SPECIES4	
COVER4	
# OF PLANTS PER/POINT	
COMMENTS	

Highlighted fields require entry

(BACK)

File Name:

Tracklog	dup4_9tracklog
Polygon	cirvul4_9dup
Point	cirvul4pt_9dup

A1.

Latin Name	Common Name	Code
Cirsium arvense	Canada thistle	cirarv
Cirsium vulgare	bull thistle	cirvul
Conium maculatum	poison hemlock	conmac
Cortaderia jubata	pampas grass	conjub
Cyperus esculentus	parking lot sedge	cypesc
Foeniculum vulgare	fennel	foevul
Hedera helix	English ivy	hedhel
Phalaris arundinacea	reed canarygrass	phaaru
Rubus discolor	Himalaya berry	rubdis

A2.

Latin Name	Common Name	Code
Echinochloa crus-gall	barnyard grass	echcru
Vinca major	periwinkle	vinmaj

Cover class	Range of coverage
Trace	< 1%
1	1-5%
2	5-25%
3	25-50%
4	50-75%
5	75-95%
6	95-100%

Appendix 8. Daily sign-in sheet / mapping log

REFUGE INVASIVE WEED PROJECT
DAILY LOG

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Volunteer Name	Date	Time Out	Time In	PDA #	Subunit	Last Site ID #	Downloaded
Comments:							

Appendix 9. Volunteer Check List

CHECK IN

____ Check "UPDATE" section in blue binder for new information

____ Fill out Daily Log sign-in sheet

____ Have a walkie talkie (on) and leave one on with someone in building

____ Have a black binder with you

____ Look over plant species to refresh memory

____ Check all PDA settings

____ Open Arcpad – check settings under options

ONCE OUTSIDE

____ Add Layer (sckrunit and bldings)

____ Activate GPS

____ Add Layers (add all previous layers created in the subunit that you are working on)

____ At starting point create your tracklog

You're ready to go. Create a "new layer" for all new shapes (pt, polygon) and species.

CHECK OUT

____ Inactivate GPS

____ New Map

____ Close all programs and turn PDA off

____ Complete daily log in blue binder including last site ID # (both logs) and necessary comments

____ Connect PDA to charger

____ Turn all walkie talkies off and put away

____ Fill out volunteer hours at front desk