



The National Institute *of* Invasive Species Science

Integrating Invasive Species Data: Solutions for Citizen Scientists

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The Problem

G l o b a l
O r g a n i s m
D e t e c t i o n &
M o n i t o r i n g

- Invasive species
 - Impact biodiversity, ecosystem function, human health, and the economy
- Issues of Data Synergy
 - Large data gaps (spatial and temporal)
 - Crosier and Stohlgren 2004 (Weed Technology)
 - Crall et al. 2006 (Frontiers in Ecology and the Environment)
 - 319 databases
 - 43% not online
- Why Not Share Data
 - Sensitive Data
 - Inability to Share



www.niiss.org

 USGS

The National Institute of Invasive Species Science

www.niiss.org

The screenshot shows the homepage of the National Institute of Invasive Species Science (NIISS). The page features a navigation menu on the left with categories like 'Gather Data', 'Browse Data', 'Contribute Data', 'Analyze Data', and 'Download Data'. The main content area is divided into several sections: 'Species Info' with a search form for scientific, common, and NRCS codes; 'In The News' with a list of recent news items; 'In Your Area' with links to select an area of interest, query the database, and view a map; and 'New At NIISS' with links to new resources like Tamarisk Habitat Suitability Maps and NIISS Factsheets. The footer contains contact information, a list of links, and the date of the last update (3/15/2007).

USGS Login Welcome guest My Profile March 16th 2007

The National Institute of Invasive Species Science

[Overview](#) [Home](#) [Contact Us](#)

Colorado State University **NASA** **NISS** **USGS**

Species Info

Interested in a specific species? We are collecting data on key invasive species.
Type a species:

Search By:	For:
Scientific Name:	<input type="text"/>
Common Name:	<input type="text"/>
NRCS Code:	<input type="text"/>

In The News

- Desert Fires' Damage Will Last [More...](#)
- New USGS Research Factsheet! [More...](#)
- USGS NAS summary graphs available [More...](#)
- USGS NAS launches alert system [More...](#)
- Volunteer Monitoring Program announced [More...](#)

[Show all](#)

In Your Area

What's in your area? Find out!

- [Select an area of interest](#)
- [Query our database](#)
- [View our map](#)

New At NIISS

- Tamarisk Habitat Suitability Map [Read more...](#)
- New NIISS Factsheet available! [Read more...](#)
- Spreadsheets & GeoRasters [Read more...](#)
- Presence attribute now added [Read more...](#)
- New at NIISS & In the News [Read more...](#)

[Show all](#)

[T-Map](#) [Tips From the Field](#) [Website Features](#) [Publications](#)

NEW [Take Citizen Scientist Survey](#) **NEW**

NIISS Flyer [PDF](#)
NIISS User's Guide Brochure [PDF](#)
Draft Business Plan (v.4.0) [MS Word](#) or [PDE](#)

Home | [About Us](#) | [Contact Us](#) |
[Gather Data](#) | [Browse Data](#) | [Contribute Data](#) | [Analyze Data](#) | [Download Data](#) |
[Data sharing agreement](#) | [Webmaster](#) | [Data usage agreement](#) Last updated 3/15/2007

<http://www.niiss.org>





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User Levels

G l o b a l
O r g a n i s m
D e t e c t i o n &
M o n i t o r i n g

- Guest: anyone visiting the website
 - View main website pages, data, and maps
 - Register
- User: anyone registered
 - Request new user level
 - Download Field Tools (EcoNab, VegSurvey, and Envelope)
 - Analyze, print, and download data and maps
- Tester
 - Test website
- Instigator
 - Create a new project
- Expert
 - Create new species, species profiles, etc

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Project Roles

G l o b a l
O r g a n i s m
D e t e c t i o n &
M o n i t o r i n g

- Project Contributor
 - Add survey data
 - Edit data they contributed
- Project Reviewer
 - Flag questionable data
- Project Authority
 - Delete, correct, or validate flagged data
- Project Manager
 - Add/ remove contributors, reviewers, and authorities to/from a project
 - Edit project information and data

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User and Project Options

Survey Data
New Sightings
Data Standards
Analyze Data
Spreadsheets
GeoRasters
Download Data
Downloads

Contact Us
Help
My Profile
Logout

Tester Options

- Defect List
- Computer Configurations
- Test Scripts
- Script Runs

Investigator Options

- Create a new project**

A GODM website

My Projects

<input type="radio"/>	Test Project 1	Manager
<input type="radio"/>	Test Project 2	Manager
<input checked="" type="radio"/>	Test Project 3	Manager

Registered User Options:

User Options

- My GeoRasters
- My Spreadsheets
- My Downloads
- My Jobs
- My Organisms of Interest (coming soon)
- My Areas of Interest (coming soon)

Project Role Options:

Project Contributor Options

- Join a Project
- My Uploaded Survey Data Files
- My Survey Additions
- My File Configurations
- My Code Translations

Project Reviewer Options

USGS [Logout](#) Welcome Manager [My Profile](#) May 13th 2007

*The National Institute of
Invasive Species Science*

Manage My Test Project 1 [Help](#)

[To My Profile](#)

Select a project to manage

Select a Project

Project information

Status Active Inactive


Information [View/edit project information](#)

Users requesting to be on this project

User	Requested Role	Options
TS14user2 Tester	Contributor	Approve Deny
TS14user1 Tester	Contributor	Approve Deny

Members

Member	Role	Options
Contributor Tester123	Contributor	Change Role Delete
Reviewer Tester	Reviewer	Change Role Delete
Authority Tester	Authority	Change Role Delete



Home | About Us | Contact Us |
[Gather Data](#) | [Browse Data](#) | [Contribute Data](#) | [Analyze Data](#) | [Download Data](#) |
[Data sharing agreement](#) | [Webmaster](#) | [Data usage agreement](#)

Updated 2/16/2007



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Citizen Scientist tools

G l o b a l
O r g a n i s m
D e t e c t i o n &
M o n i t o r i n g

- Geared towards citizen scientist organizations in need of a data management system
- Proposed New Features
 - Online tutorials
 - Monitoring protocols
 - QA/QC protocols
 - Customizable data entry forms
 - Cheap, easy to use digital field tools
 - School course curriculums



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 USGS



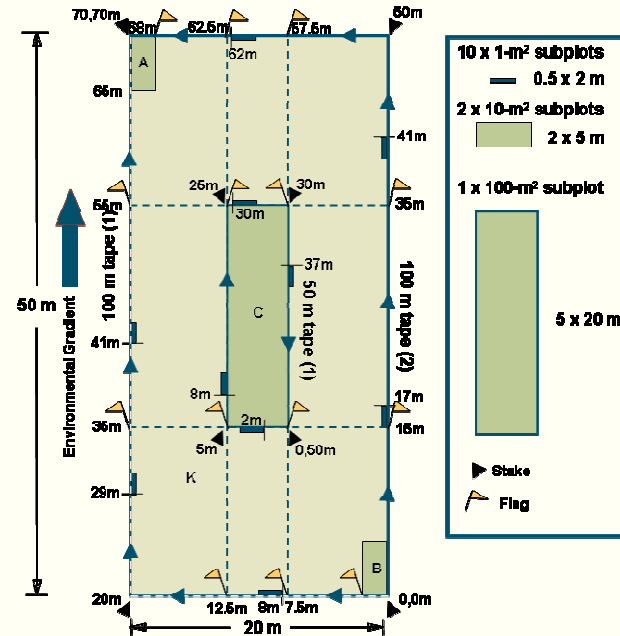
Gather Data

Field Methods

- Description
- Equipment needed
- How to setup
- References

Field Tools

- Project Envelope
 - use with ArcMap
 - survey full environmental range of species
- EcoNab
 - field data collection program that runs on your "Palm Pilot" PDA





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Vegetation Monitoring Protocols

G l o b a l
O r g a n i s m
D e t e c t i o n &
M o n i t o r i n g

- **Tiered Monitoring Approach**
- Level 1: A simple approach; least cost and time required; collect general location and presence/absence data
- Levels 2 and 3: An approach for more experienced monitoring groups; incorporates more detailed species abundance and habitat information
- Level 4: A far more detailed approach to mapping and modeling native and non-native species distributions, primarily for researchers; expensive and time-consuming

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Example Map: *Tamarix sp.* locations

The image displays two screenshots of a web-based GIS interface for the National Institute of Invasive Species Science (USGS). The top screenshot shows a national map of the United States with numerous red square markers indicating *Tamarix sp.* locations. The bottom screenshot shows a zoomed-in view of a river area with a red overlay, likely representing the distribution of *Tamarix sp.* along the riverbank. Both screenshots include a navigation menu on the left, a search bar at the top, and a legend on the right. The top screenshot also includes a scale bar in kilometers and a coordinate display at the bottom left.

USGS Logout Welcome Alycia My Profile October 30th 2006

The National Institute of Invasive Species Science

Home About Us

Gather Data
Field Methods
Field Tools

Browse Data
By Organization
By Location
By Species
By Project
By Map

Contribute Data
Survey Data
New Sightings
Data Standards

Analyze Data
Spreadsheets
GeoRasters

Download Data
Downloads

Contact Us Help

My Profile Logout

Admin Only

Legend:
 Tamarix
 States
 Background

X=-61.84174 Y=46.6936

USGS Login Welcome guest My Profile October 24th 2007

The National Institute of Invasive Species Science

Home About Us

Gather Data
Field Methods
Field Tools

Browse Data
By Organization
By Location
By Species
By Project
By Map

Contribute Data
Survey Data
New Sightings
Data Standards
GeoRasters

Analyze Data
Spreadsheets

Download Data
Downloads
GeoRasters

Contact Us Help

Register Login

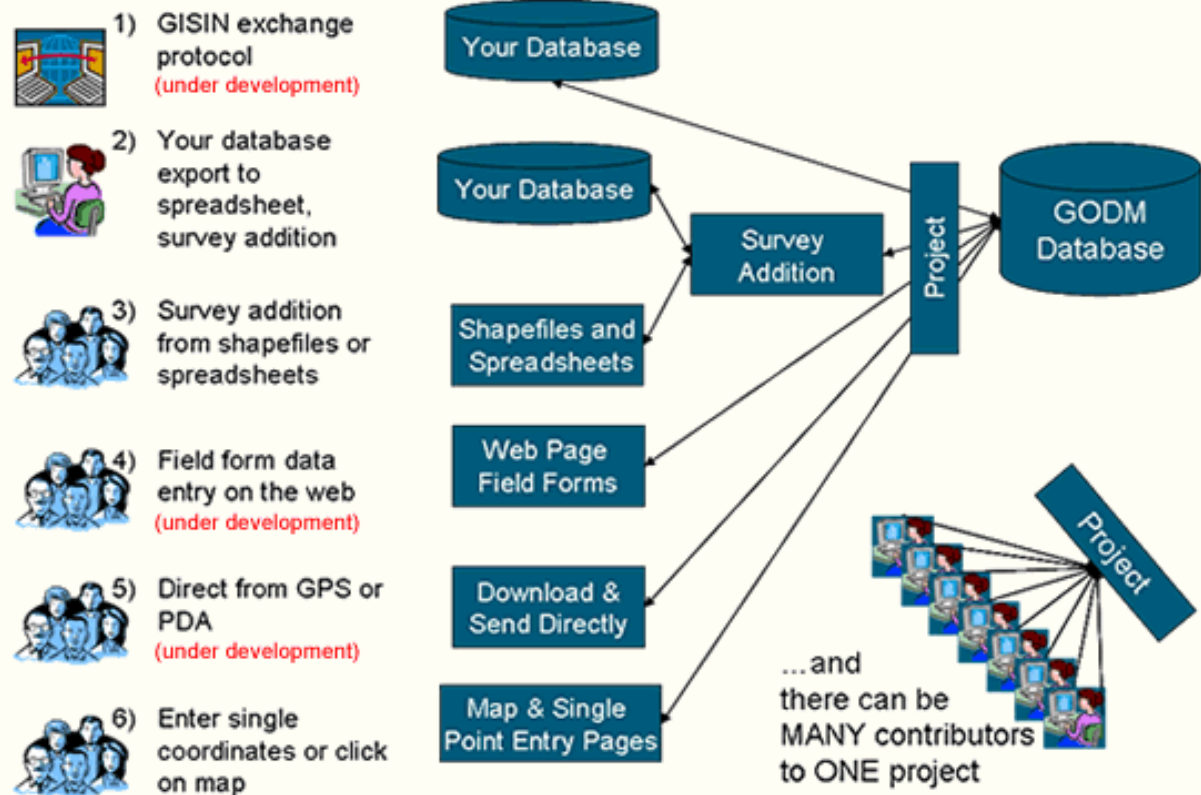
Legend:
 Tamarix
 States
 Background

UTM, Zone 13N Refresh Map



Contribute Data

6 Ways to Contribute Data to GODM



USGS



Home
About Us

Gather Data

Field Methods
Field Tools

Browse Data

By Organization
By Location
By Species
By Project
By Map

Contribute Data

Survey Data
New Sightings
Data Standards

Analyze Data

Spreadsheets
GeoRasters

Download Data

Downloads

Contact Us
Help

Register
Login

Contribute Data: Survey Data

Next Step: Select a data structure below by clicking on a table.

Dominance:

Dominant	Secondary	Tertiary
Tamarix	Bromus tectorum	Euphorbia esula
Tamarix	Euphorbia esula	Bromus tectorum
Bromus tectorum	Euphorbia esula	Tamarix
Euphorbia esula	Bromus tectorum	Tamarix

Species are entered in columns based on which are the most common. Example: A survey of the most abundant weeds along a road.

Specified Species:

Tamarix Cover (%)	Bromus Cover (%)	Picea Cover (%)
12	5	15
25	4	9
7	7	12
34	2	13

Each column has information on a different species but of the same attribute. Example: Percent cover of various tree species.

Organisms by Row:

Organism	Cover (%)	Height (m)
Tamarix ramosissima	80	1
Eleagnus angustifolia	60	3
Bromus tectorum	50	4
Euphorbia esula	12	2

Each row contains information on a different organism.

Single Species:

X	Y	% Cover
-104.5	40.56	15
-104.36	40.38	9
-105.94	41.6	12
-103.58	39.98	13

The file only contains coordinates for a single organism.

Describe the columns in your file

<p>Column Has: <input type="text" value="Organism"/></p> <p>Contains: <input type="text" value="Organism Name"/></p> <p>Format: <input type="text" value="Scientific Name"/></p> <p>Dominance: <input type="text" value="Primary (1st)"/></p>	<p>Column Has: <input type="text" value="Organism"/></p> <p>Contains: <input type="text" value="Organism Name"/></p> <p>Format: <input type="text" value="Scientific Name"/></p> <p>Dominance: <input type="text" value="Secondary(2nd)"/></p>	<p>Column Has: <input type="text" value="Treatment"/></p> <p>Contains: <input type="text" value="Control Agent"/></p> <p>Value Format: <input type="text" value="Custom Code"/></p>	<p>Column Has: <input type="text" value="Treatment"/></p> <p>Contains: <input type="text" value="Number"/></p> <p>Target species column: <input type="text" value="DOMINANT"/></p> <p>Control agents are: <input type="text" value="In another column"/></p> <p>Column: <input type="text" value="BIOCONTROL"/></p> <p>Units are: <input type="text" value="In next pull down menu"/></p> <p>Units: <input type="text" value="Count per hectare"/></p>	<p>Column Has: <input type="text" value="Attribute"/></p> <p>Contains: <input type="text" value="Number"/></p> <p>Species column: <input type="text" value="DOMINANT"/></p> <p>Attribute types are: <input type="text" value="In next pull down menu"/></p> <p>Type is: <input type="text" value="Infested Area"/></p> <p>Units are: <input type="text" value="In next pull down menu"/></p> <p>Units: <input type="text" value="Meters Squared"/></p>
---	--	---	--	--

DOMINANT	SECONDARY	BIOCONTROL	NUMBER	INFESTEDAR
tamarix	Elaeagnus angustifolia	Diorhabda elongata	100	100
Euphorbia esula	Descuraina sophia	Aphthona lacertosa	500	1000
Euphorbia esula	Agropyron smithii	Aphthona nigricutis	500	500



Download Data

- allows you to download organism locations as a textfile, csv file, or shapefile




Home
About Us

Gather Data
Field Methods
Field Tools

Browse Data
By Organization
By Location
By Species
By Project
By Map

Contribute Data
Survey Data
New Sightings
Data Standards

Analyze Data
Spreadsheets
GeoRasters

Download Data
Downloads

Contact Us
Help

Register
Login

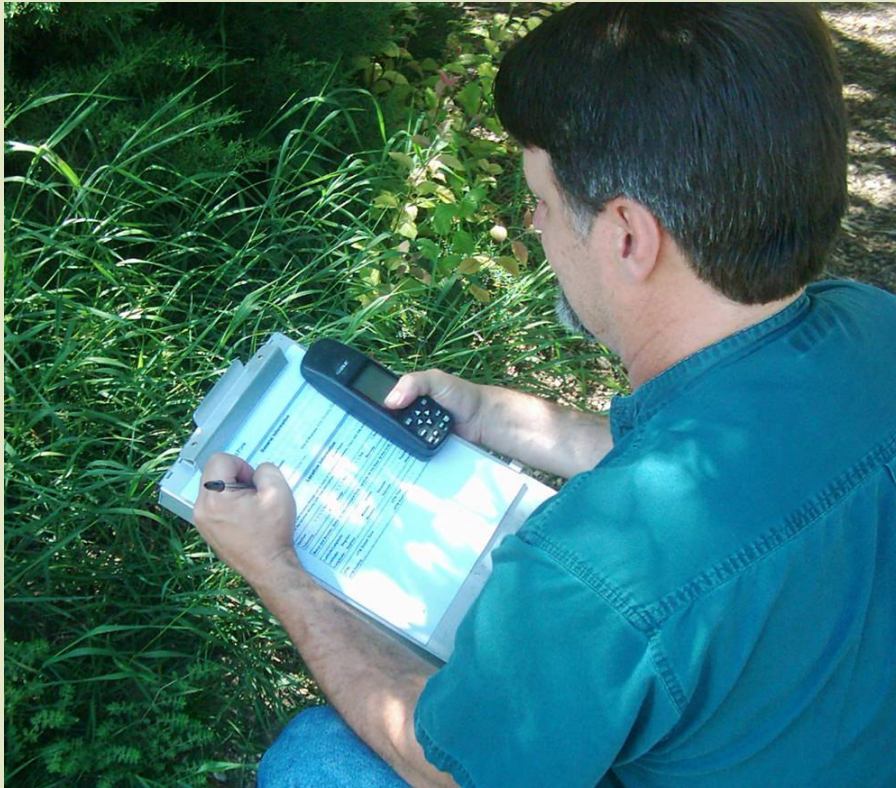
West (East-West Coordinate: Float)	North (North-South Coordinate: Float)	East (Unknown: Float)	South (Unknown: Float)	Height (Attribute: Float)	Average annual precipitation, Gray (GIS Layer: Float)	Average annual temperature, Gray (GIS Layer: Float)	Minimum average annual temperature, Gray (GIS Layer: Float)	MODIS three year average EVI, Range (GIS Layer: Float)	MODIS three year average EVI, Mean (GIS Layer: Float)	MODIS three year average EVI, Date of Peak (GIS Layer: Float)
-99.969	38.858	-99.969	38.858	1.692	56.266	11.888	4.2353	2090.8	610.69	172.73
-100.07	38.814	-100.07	38.814	2.1	56.238	11.905	4.2223	1917.7	805.95	184.39
-99.938	38.714	-99.938	38.714	1.597	56.405	11.986	4.3495	2162.1	1037.4	194.96
-99.915	38.811	-99.915	38.811	1.4	56.311	11.974	4.3188	2070.4	825.44	181.42
-99.849	38.942	-99.849	38.942	1.597	58.561	11.692	4.1783	2398.4	1027.6	191.25
-100.05	38.921	-100.05	38.921	0.4	59.294	11.597	4.0366	2044.1	974.59	188.92
-99.833	38.857	-99.833	38.857	2.1	57.733	11.844	4.2797	2140.7	670.49	176.06

Input Field Data

Automatically add satellite data

Field Tools

The Past



+ Manual entry

The Future




+ Automatic upload

Project Manger Online Data Entry Form Creation

- Create a form
- View print version
- Collect data

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[My Profile](#) October 24th 2007



Edit an existing field form

[To Form List](#)

Home
About Us

Gather Data
Field Methods
Field Tools

Browse Data
By Organization
By Location
By Species
By Project
By Map

Contribute Data
Survey Data
New Sightings
Data Standards
GeoRasters

Analyze Data
Spreadsheets

Download Data
Downloads
GeoRasters

Contact Us
Help

My Profile
Logout

Admin Only

Field Form Information

Name: *

Instructions:

Please the percent cover for each species.

Projection: Latitude / Longitude UTM

Volunteer Data: No Yes *Will data collected using this field form be collected by volunteers?*

Metadata: *Edit existing metadata for this field form*

Species:

- Species added will appear in the table below as you build your form*
- A presence attribute will appear by default with each species added*

Species & Attributes Displayed On This Field Form

Euphorbia esula	wolf's milk; wolf's-milk; leafy spurge; spurge	<input type="button" value="Add Attribute"/>	<input type="button" value="Change"/>	<input type="button" value="Delete"/>
	Percent Cover		<input type="button" value="Change"/>	<input type="button" value="Delete"/>
Cirsium arvense	Canadian thistle; Canada thistle; field thistle; Californian thistle; creeping thistle	<input type="button" value="Add Attribute"/>	<input type="button" value="Change"/>	<input type="button" value="Delete"/>
	Vigor		<input type="button" value="Change"/>	<input type="button" value="Delete"/>

[Home](#) | [About Us](#) | [Contact Us](#) |

[Gather Data](#) | [Browse Data](#) | [Contribute Data](#) | [Analyze Data](#) | [Download Data](#) |

[Data sharing agreement](#) | [Webmaster](#) | [Data usage agreement](#) |

A GODM website Updated 9/27/2007

Customized Online Data Entry Form

Previewing Grasslands Survey

[To Form List](#)

Please the percent cover for each species.

Enter the date of the observation

Date:	October	▼	24th	▼	2007
Notes:	<input type="text"/>				

Enter the location information

Datum:	WGS_84	▼
Zone:	-- Select --	▼
Easting ¹ :	<input type="text"/>	
Northing ² :	<input type="text"/>	
Accuracy ³ (meters):	<input type="text"/>	

Field Form

Euphorbia esula (wolf's milk; wolf's-milk; leafy spurge; spurge)	
Percent Cover	<input type="text"/>
Cirsium arvense (Canadian thistle; Canada thistle; field thistle; Californian thistle; creeping thistle)	
Vigor	Dead ▼

¹ X coordinate; data must be between approximately 100,000 and 900,000 meters (Example: xxxxxx.x)

² Y coordinate; data must be between approximately 0 and 9,328,000 meters. (Example: xxxxxxx.x)

³ Approximate accuracy of your GPS unit in meters. We only accept data below 10 meters in accuracy

Customized PDA tools

- Create a form on-line
- Download program to PDA
- Collect data
- Connect to website and automatically upload data

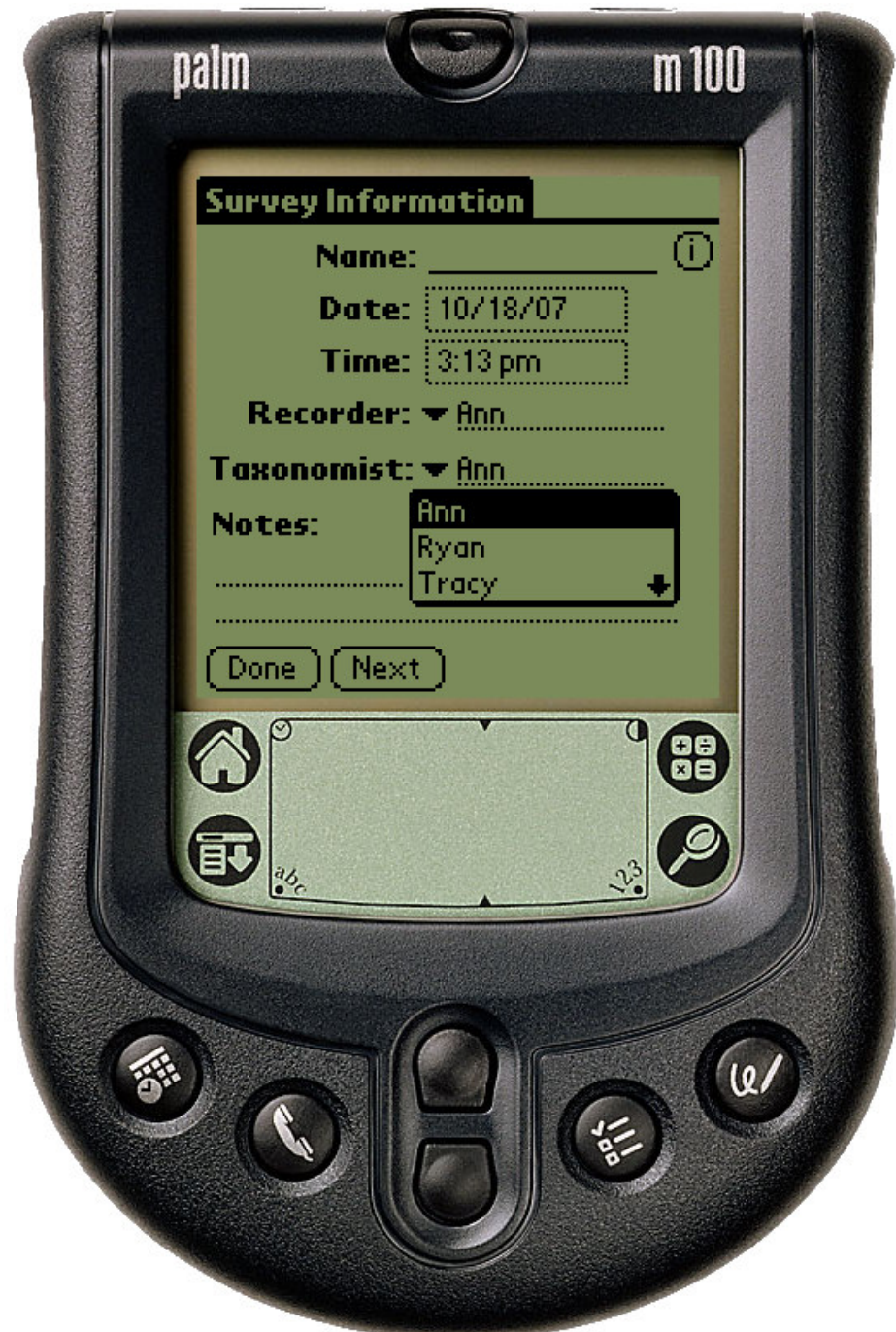
1)



Customized PDA tools

- Create a form on-line
- Download program to PDA
- Collect data
- Connect to website and automatically upload data

2)



Customized PDA tools

- Create a form on-line
- Download program to PDA
- Collect data
- Connect to website and automatically upload data

3)



Customized PDA tools

- Create a form on-line
- Download program to PDA
- Collect data
- Connect to website and automatically upload data

4)



Customized PDA tools

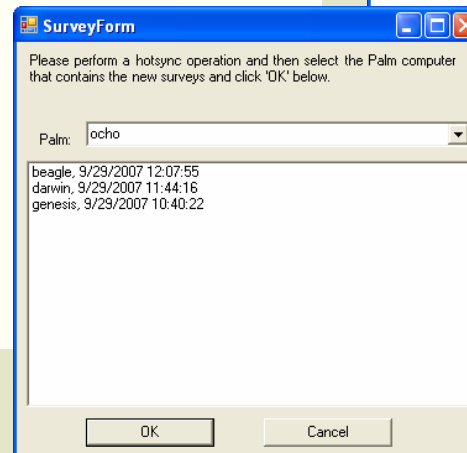
PDA with internet connection

- Connect to website
- Automatically upload data



PDA without internet connection

- Download & Install GODM Connection to PC
- Connect PDA to PC
- Run program





- Watch lists
- Prioritize species
 - Spread
 - Dominance
- Priority locations
- Etc.

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Tom Stohlgren, Catherine Jarnevich, Tracy Davern, Geneva Chong (USGS), Jim Graham, Greg Newman, Paul Evangelista, Dave Barnett, Rick Shory, Sunil Kumar, Sara Simonson, Nate Ament, and Mohammed Kalkhan (CSU), with help from . . .

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For more information contact:

