



Aquatic Weed Control Using ArcPad, ArcGIS, ArcSDE and ArcIMS

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Aquatic Weed Control Program

- Targeted aquatic weeds – non native species: Egeria Densa, Water Hyacinth
- Method of control - weeds are physically removed or sprayed with herbicide



CA Dept. of Boating and Waterways

- Lead agency for controlling aquatic weeds in the Sacramento – San Joaquin delta area
- 368 sites in the Delta



Why Control the Weeds?

Non-native aquatic weed species:

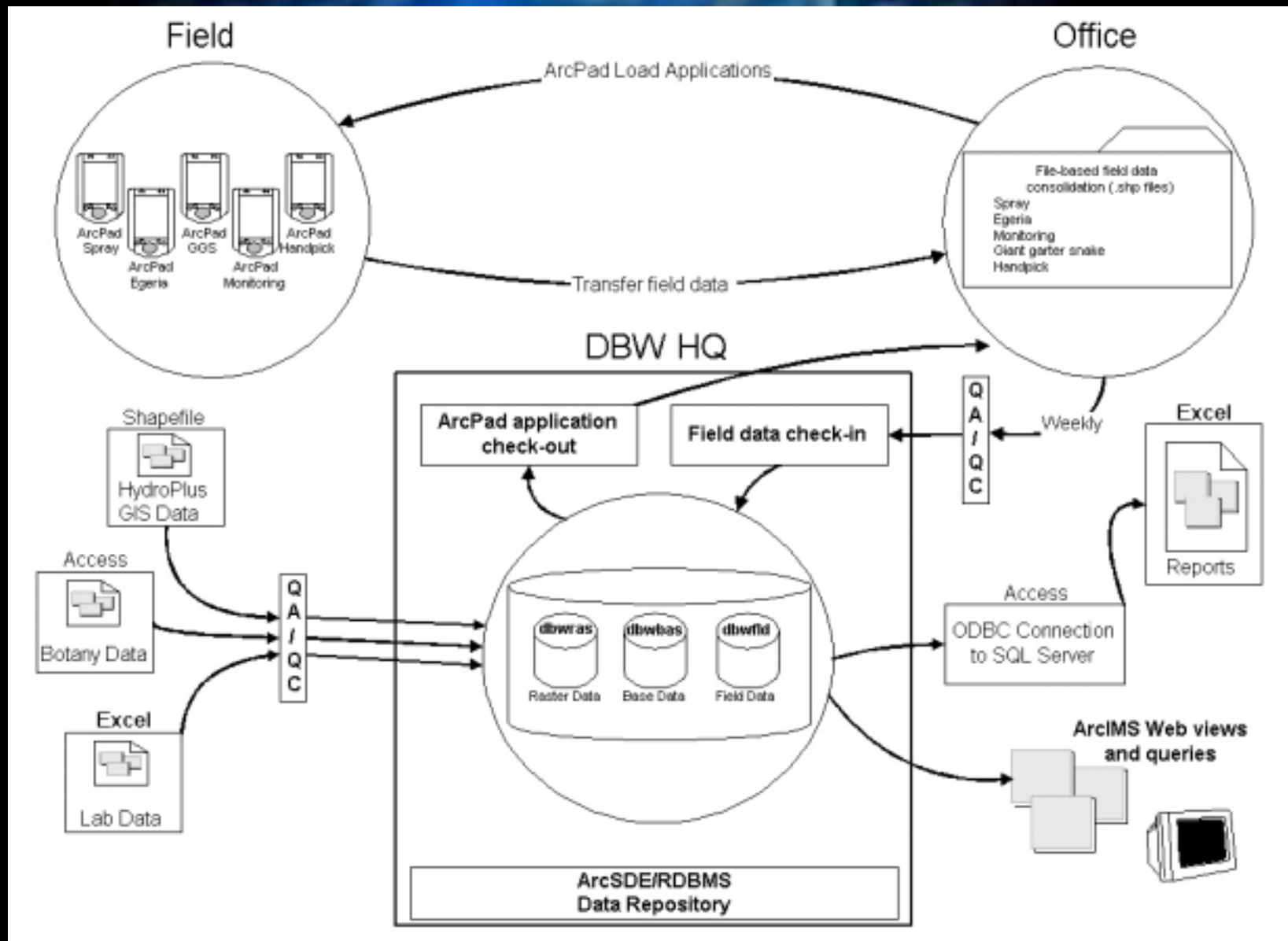
- Crowd out native vegetation
- Affect dissolved oxygen levels of the water
- Clog agricultural water intakes
- Negatively impact pumping of water from water rich northern CA to the arid southern parts of the state
- Clog waterways and interfere with recreational pursuits



Database Design

- 'dbwfld' – Field Data. Data gathered in the field that are specific only to the Aquatic Weeds Program.
- 'dbwras' – Raster Data.
- 'dbwbas' – Base Data. This includes other datasets that are often used as background layers for map production, such as county boundaries and hydrology layers.

Data Flow



Office

- Data and custom ArcPad template are loaded onto all hardware

Environmental Monitoring

- Water is monitored before and after herbicide application including, water temperature and dissolved oxygen levels
- Water samples are collected for testing in a lab
- Data are output into quarterly and yearly reports for CA Water Control Board and other involved government agencies



Out in the Field

ArcPad forms are filled out, while in the field:

- Location of where boat was loaded
- Location of water samples taken and other environmental monitoring occurred
- GPS position of where herbicides were applied
- Location where boat was loaded, unloaded
- Observations of species of concern



Customizing ArcPad

ArcPad forms were customized to:

- Enforce data integrity
- Sum chemical usage
- Autopopulate required ID fields
- Enforce “Business Process”

Load Boat

Page 1 Page 2

BOATID 2938xs

SPRAYDATE 06/17/200

WEED Water hyacinth

Spray Line

Page 1 Symbology

BOATID 2938xs

SPRAYDATE 06/17/200

SITEID 667

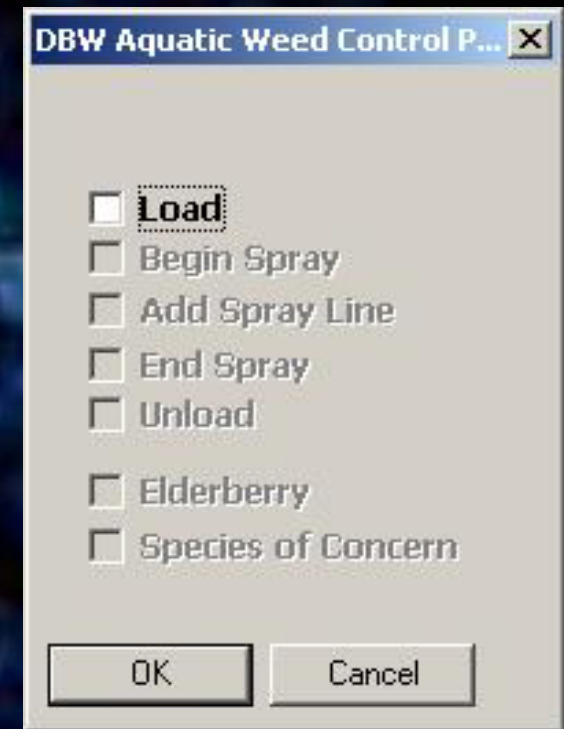
COUNTY Sacramento

WEED Water hyacinth

OK Cancel

Business Process

- Load the Boat
- Begin Spraying
- Add Sprayline – apply herbicide
- End Spray
- Unload the Boat
- Species of Concern - Observations



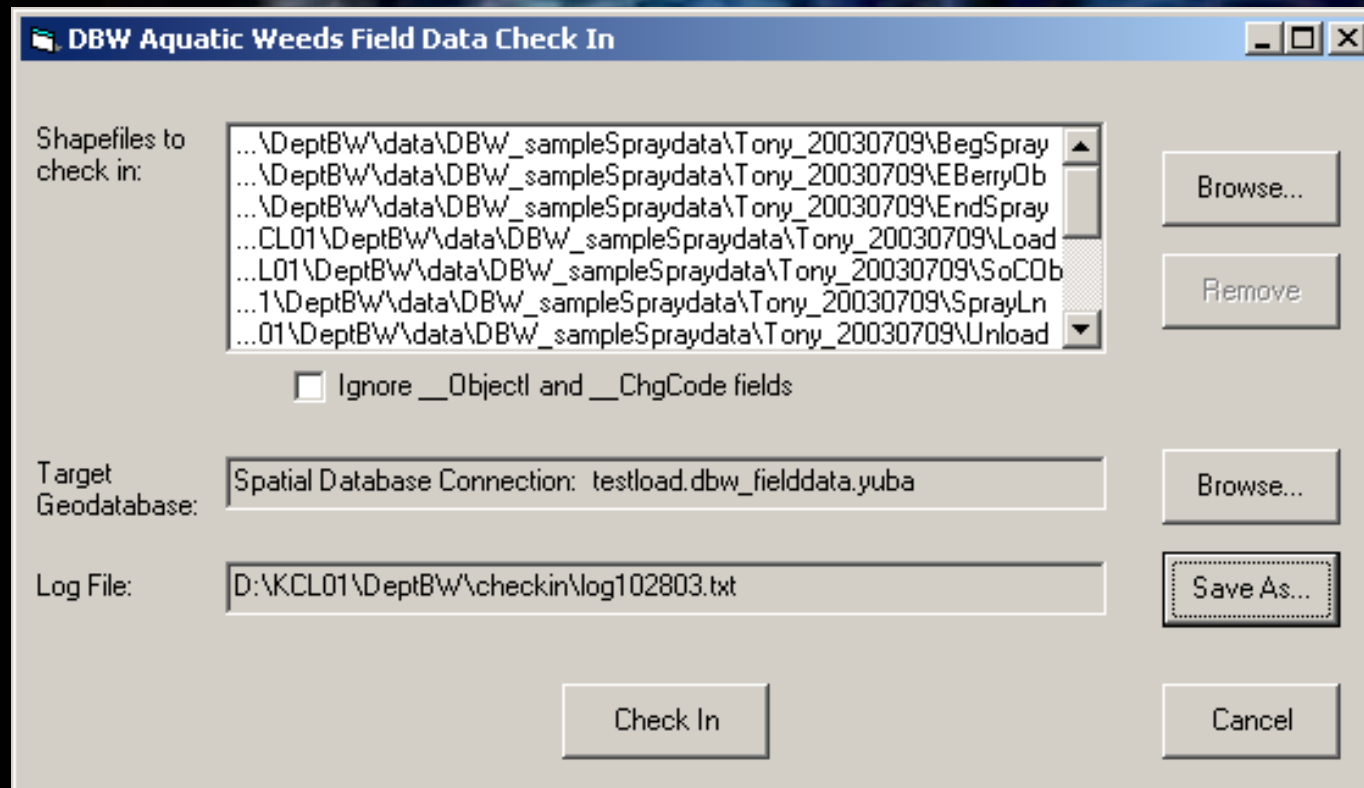
Custom ArcPad Toolbar

- Activate the template by clicking the pencil icon
- Can exit template by clicking red icon
 - No functionality will occur outside the template (auto populating fields, summing of chemicals used, etc.)
- Can go back into template by clicking the green icon
- Can fill out Species of Concern forms at any time after the boat is loaded
- Template enforces DBW Business Process



Data Check-in

- Field data are first checked for quality assurance then loaded into the geodatabase using a custom bulk check-in tool



Other data

- Water quality data are collected using multi-parameter water quality instrumentation in shapefile format
- Botany data are collected and entered into an Access database
- Lab data – water samples are collected in the field and analyzed in a lab
- These data are checked for quality assurance and then loaded into the data repository

Data Extraction Tool–Report Generation

- Once loaded into the repository, data are extracted out of the geodatabase for use in monthly, quarterly and annual reports using a custom data extraction tool
- Built using Microsoft Access queries, forms
- Flexibility – new queries can be built as needed

The screenshot shows the 'DBW Aquatic Weed Program - Data Extraction' window. It features a 'Report Date Range' section with 'From' and 'To' date pickers set to 1/1/2003 and 11/11/2003, respectively, and a 'Change Dates' button. Below this are two columns of data categories: 'Daily Crew Data' and 'Botany Surveys' on the left, and 'Monitoring/ Lab Data' on the right. Each category has a list of checkboxes. In the 'Daily Crew Data' section, 'Application Data Sorted by Month' is checked. In the 'Botany Surveys' section, 'Botanical Site Inventories' is checked. The 'Monitoring/ Lab Data' section has four unchecked options: 'Chemical Residue Results', 'Biotoxicology Results', 'Hydrology Data - Monitoring', and 'Water Quality Characteristics'. At the bottom, there is a 'Target Excel File' text box with a 'Browse...' button, and two buttons: 'Extract Data' and 'Close'.

The screenshot shows the 'Report Date' dialog box. It prompts the user to 'Enter Reporting Date Range:'. The 'From' date is set to 7/1/2003 and the 'To' date is set to 7/31/2003. At the bottom, there are two buttons: 'Start Reporting' and 'Cancel'.

ArcIMS - Intranet

Using ArcIMS, DBW staff can:


- Access GIS related maps, data
- Print maps specific to site, chemical applied, crew member involved, etc.
- Get information for meetings, public questions

ArcIMS - Intranet

Aquatic Weed Program Test Viewer - Microsoft Internet Explorer

Address: http://10.1.1.15/webste/awp_test/viewer.htm

Aquatic Weed Program Test Viewer



Layers

- AWP - Spray Lines (2003)
- AWP - WQ Monitoring (2003)
- AWP - Sides
- Large Cities
- Large Rivers
- Lakes
- Counties
- SPOT Ortho
- CA Hillshade

Refresh Map

Map created by OWA Intranet Technology

AWP - WQ Monitoring (2003)

Rec	DBWFLD.GIS.HPGIS_DATA_A.OBJECTID	DBWFLD.GIS.HPGIS_DATA_A.SAMPLEID	DBWFLD.GIS.HPGIS_DATA_A.SITEID	DBWFLD.GIS.HPGIS_DATA_A.SAM
1	296	H823-896403-2	023	CG/SF
2	297	H823-896403-2	023	CG/SF

Zoom In

Map: -128876.47, 7592.92 - Image: 200, 224 - ScaleFactor: 17.5209741825503

Internet



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