

Digital Transfer of Aquatic Plants Survey Data

by
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GIS Analyst
2004

based on
**A SURVEY OF THE AQUATIC
VASCULAR PLANTS
OF THE UPPER DELAWARE RIVER**
by
**Pennsylvania Science Office
The Nature Conservancy
Middletown, PA
1994**

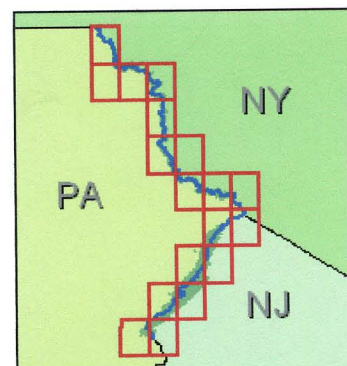


ABSTRACT

A data processing task was needed by Delaware Water Gap NRA (DEWA) to transpose field tabular and spatial data from "A Survey of Aquatic Vascular Plants of the Upper Delaware River" (The Nature Conservancy, 1994), into various digital formats. The project consisted of two main components.

The first was the transforming of survey data from hardcopy documents of the final report into digital files that are compatible with the NPS standard Relational Database Management Systems. The second was the digitizing of hand-drawn field mapping data from hardcopy paper maps into digital map products.

These digital mapping files are in the NPS standard GIS format and in DEWA's accepted coordinate and projection systems.



Survey's area

1994 Aquatic Vascular Plants Survey in the Upper Delaware River

Under contract with National Park Service, The Nature Conservancy conducted a survey of aquatic vascular plants along a 122 mile stretch of the Upper Delaware River between Hancock, New York and the Delaware Water Gap in 1991 and 1992. A total of 196 sites were inventoried and 28 species of plants were recorded.

Nine of the species were considered species of concern in at least one of the bordering states of New Jersey, New York, or Pennsylvania. Four of the species of concern - Podostemum ceratophyllum, Potamogeton illinoensis, Potamogeton perfoliatus, and Ranunculus trichophyllus - were common or abundant in the study area, while the remaining five species of concern - Callitriche verna, Isoetes riparia, Nuphar microphyllum, Orontium aquaticum, and Potamogeton zosteriformis - were not located in their respective states. Fifty-seven historical occurrences of the species of concern were searched and forty-three were confirmed as extant. Thirty-one sites were noted as significant because of the exceptional diversity or vitality of their aquatic vegetation. The aquatic vascular plant flora in this section of the Delaware River appeared to be thriving, due in large part to good water quality and moderate impacts by man.

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DATABASE CREATION

Microsoft Access is the NPS standard for distributed databases, and a relational database was developed in MS Access to enter, store, display, summarize, and analyze survey data.

This database can be used in conjunction with the GIS Theme Manager to display, zoom in on an area of the survey, identify where the sampling has occurred and view the actual data for those sampling locations that are stored in Access using Access forms, reports, tables or queries.

The database structure was developed after studying relational databases developed in other parks and offered as examples by the Northeast Region Inventory and Monitoring Team.

Phase one included creating the main data tables of the database. Phase two consisted on adding several lookup tables and forms for entering and editing the data from the report. Phase three was finishing a complete database that includes a user interface or "MainMenu"; forms for entering and displaying the data; an automated report by location.

An ArcView-Access connection tool was generated to allow the GIS software and Access database to work together. They are linked on the LocationID identifier between the two applications.

DATA DICTIONARY

The database created includes profiles of the 196 sites that were surveyed in the Upper Delaware River in 1991 and 1992. In the final report from 1994, the description of each site was given in a format consisting of seven major headings described below: SITE, QUADRANGLE, STATE-COUNTY, DRBC MILEAGE, LOCATION, DATE OF SURVEY and SPECIES AND SITE CONDITIONS. An eighth heading, COMMENTS, was optional, depending on the amount of information that was available about the site.

SITE: each site was assigned a number (beginning with "1") in a north to south sequence. This site number corresponds to the number on the accompanying map, upon which the location and size of the site are shown. The sites and maps are grouped by topographic quadrangle. In the Access database this information is now under **LocationID** (*tblLocations*) field.

QUADRANGLE: the U.S.G.S. 7.5 minute topographic quadrangle. In the database this information is now under the field **Quadrangle** (*tblLocations*)

STATE-COUNTY: this consisted of one or two states, where NJ = New Jersey, NY = New York, and PA = Pennsylvania. In the database there are now four fields with this information: **County1, State1, County2, State2** (*tblLocations*)

DRBC MILEAGE: the mileage was estimated from Delaware River Basin Commission maps. The field name is **DRBC_Mileage** (*tblLocations*)

In addition to this estimated value a calculated river mile was determined using GIS. This information resides on a new field named **Calculated_Mileage** (*tblLocations*).

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DATA DICTIONARY (continued)

LOCATION: the mileage was in air miles from a town or village. This information is now under **Description** (*tblLocations*).

DATE OF SURVEY: this varied from a single day to several days. The main table **tblDates** includes the dates of survey for each site.

SPECIES AND SITE CONDITIONS: The report from 1994 included for each site a list of species that were observed at the site. If a site overlapped two states, all of the listed species were seen in both states unless otherwise noted. For each of the species, site-specific abundance values were estimated. The abundance values were qualitative and based on the judgment of the surveyor: A (abundant); C (common); UC (uncommon); R (rare); P (species present but abundance could not be determined); or a combination of these. If voucher specimens were collected, details were provided in an appendix. All these information are now under the table **tblSpeciesDetails**, which is in a one to many relationship with the *tblLocations*.

ENVIRONMENTAL FACTORS: Depth, Current and Bottom.

Depth: the depth of the water in inches; sometimes a range of depth was used.

Current: the speed of the current; measured by a qualitative scale of: fast; moderate; slow; none; or a combination of these.

Bottom: type of bottom material; the size of the material was described on a qualitative basis of: mud; sand; pebbles; small rocks; medium rocks; large rocks; boulders; bedrock; or a combination of these.

The environmental factors are now included in the **tblConditions** table.

COMMENTS: This heading was optional. If utilized, a variety of information was included: the presence of an historical occurrence of a species of concern and whether the occurrence was confirmed; the presence of a significant aquatic bed; the presence of notable populations of species; suggestions for additional surveys; and other miscellaneous items. The species of concern, if mentioned under this heading, are listed in alphabetical order. The comments for each site are recorded now under **Comments** field (*tblLocations*).

The database includes five main tables and seven lookup tables. They are described in detail below.

TABLE INDEX

tblLocations

tblEvents

tblConditions

tblSpeciesDetails

tblDates

tluSpecies

tluQuadrangle

tluParkCode

tluHerbarium

tluCurrent

tluBottom

tluAbundanceValue

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MAIN TABLES

tblLocations

	Field Name	Data Type	Description
?	LocationID	Number	Location ID code (Site number)
	SiteName	Text	1-10 characters name of the site
	Project	Text	Project name
	ParkCode	Text	4-characters Park Code, NONE if is an outside area. See tluParkCode.
	Description	Text	Description of this location (<256 characters)
	Quadrangle	Text	The USGS 7.5 minutes topographic quadrangle. See tluQuadrangle.
	County1	Text	The county where the site is located
	State1	Text	The state where the site is located
	County2	Text	The county where the site is located
	State2	Text	The state where the site is located
	DRBC_Mileage	Number	DRBC Mileage as was estimated from Delaware River Basin Commission maps at the survey dates
	Calculated_Mileage	Number	Calculated River Mileage using GIS
	Elevation	Number	Elevation in meters
	ElevationSource	Text	Elevation source
	UTMX	Number	UTM X (easting) coordinate for the specific site's centroid (double precision to15 significant digits)
	UTMY	Number	UTM Y (northing) coordinate for the specific site's centroid (double precision to15 significant digits)
	CoordinateSource	Text	How the X and Y were determined
	CoordinateSystem	Text	Coordinate system
	Datum	Text	Datum of mapping ellipsoid
	UtmZone	Text	UTM zone
	Significant	Yes/No	If the site is a significant one or not
	Comments	Memo	Any additional comments about this sampling location

tblEvents

	Field Name	Data Type	Description
?	EventID	Text	Sampling event ID code (ex: Jul27/91)
	Project	Text	1-20 characters Project Name
	StartDate	Date/Time	Date (mm/dd/yy) when sampling began
	EndDate	Date/Time	Date (mm/dd/yy) when sampling ended

tblConditions

	Field Name	Data Type	Description
?	LocationID	Number	Location ID code
	MinDepth	Number	The min depth of the water in inches
	MaxDepth	Number	The max depth of the water in inches
	Current	Text	The speed of current; Measured by a qualitative scale of: fast, moderate, slow, none
	Bottom	Text	NR (not recorded) or Bottom material ID (check the tluBottom table)

tblSpeciesDetails

	Field Name	Data Type	Description
?	ID	AutoNumber	
	LocationID	Number	Location ID code
	TSN	Number	Taxonomic Serial Number
	AbundanceValue	Text	Site abundance value for each species
	Vouchered	Yes/No	Signifies if a voucher collection was made of that specie in 1992
	CollectorNumber	Number	Vouchered specimen collection number of J.R.Kunsman
	Herbarium	Text	Herbarium acronyms

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MAIN TABLES(continued)

tblDates

	Field Name	Data Type	Description
▶	EventID	Text	Sampling event ID code (ex: Jul27/91)
	LocationID	Number	Location ID code (Site number)

LOOKUP TABLES

tluSpecies

	Field Name	Data Type	Description
▶	TSN	Number	Taxonomic Serial Number
	CommonName	Text	Common Name
	DocLatinName	Text	Scientific Name as documented in report
	RarityPA	Yes/No	If it is a specie of concern or not in PA
	RarityNJ	Yes/No	If it is a specie of concern or not in NJ
	RarityNY	Yes/No	If it is a specie of concern or not in NY

tluQuadrangle

	Field Name	Data Type	Description
?	Quadrangle	Text	The USGS 7.5 minutes topographic quadrangle
	States	Text	States in the quadrangle

tluParkCode

	Field Name	Data Type	Description
?	ParkCode	Text	4-characters Park Code, NONE if is an outside area
	ParkName	Text	Park Name
	ParkType	Text	Park Type

tluHerbarium

	Field Name	Data Type	Description
?	Herbarium	Text	Herbarium acronyms
	FullName	Text	Herbaria - the full name
	State	Text	Location

tluCurrent

	Field Name	Data Type	Description
?	ID	AutoNumber	
	Current	Text	The speed of current; Measured by a qualitative scale of: fast, moderate, slow, none or combination

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LOOKUP TABLES (continued)

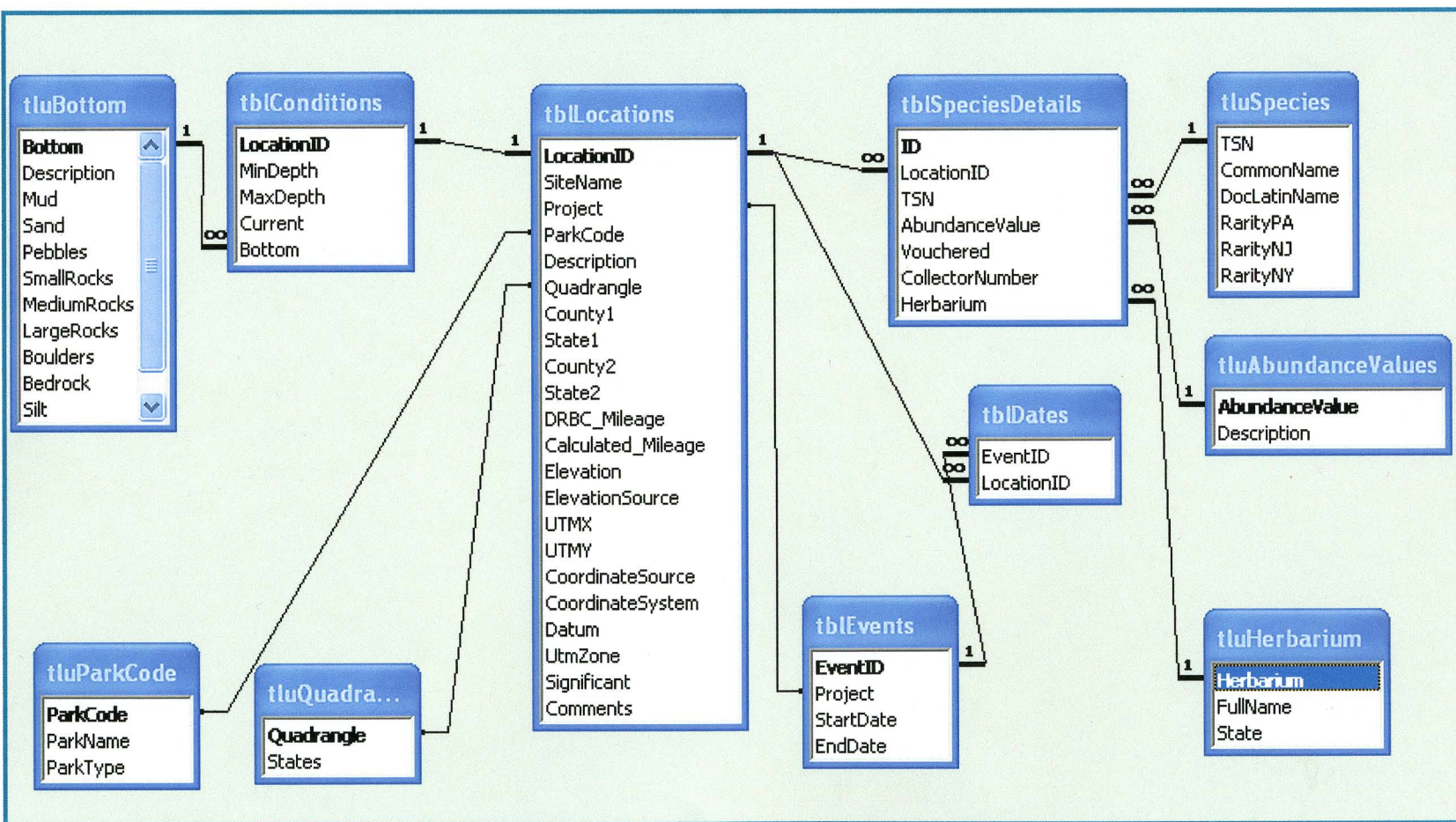
tluBottom

	Field Name	Data Type	Description
?	Bottom	Text	NR (not recorded) or Bottom material ID
	Description	Text	Type of bottom material; Described on a qualitative basis of: mud, sand, pebbles, small rocks, etc, or combination
	Mud	Yes/No	If mud was recorded or not
	Sand	Yes/No	If sand was recorded or not
	Pebbles	Yes/No	If pebbles were recorded or not
	SmallRocks	Yes/No	If small rocks were recorded or not
	MediumRocks	Yes/No	If medium rocks were recorded or not
	LargeRocks	Yes/No	If large rocks were recorded or not
	Boulders	Yes/No	If boulders were recorded or not
	Bedrock	Yes/No	If bedrocks were recorded or not
	Silt	Yes/No	If silt was recorded or not
	OrganicMaterial	Yes/No	If organic material was recorded or not

tluAbundanceValue

	Field Name	Data Type	Description
?	AbundanceValue	Text	Site abundance value for each species
	Description	Text	Description of the abundance value

DATA BASE RELATIONSHIPS



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QUALITY ASSURANCE

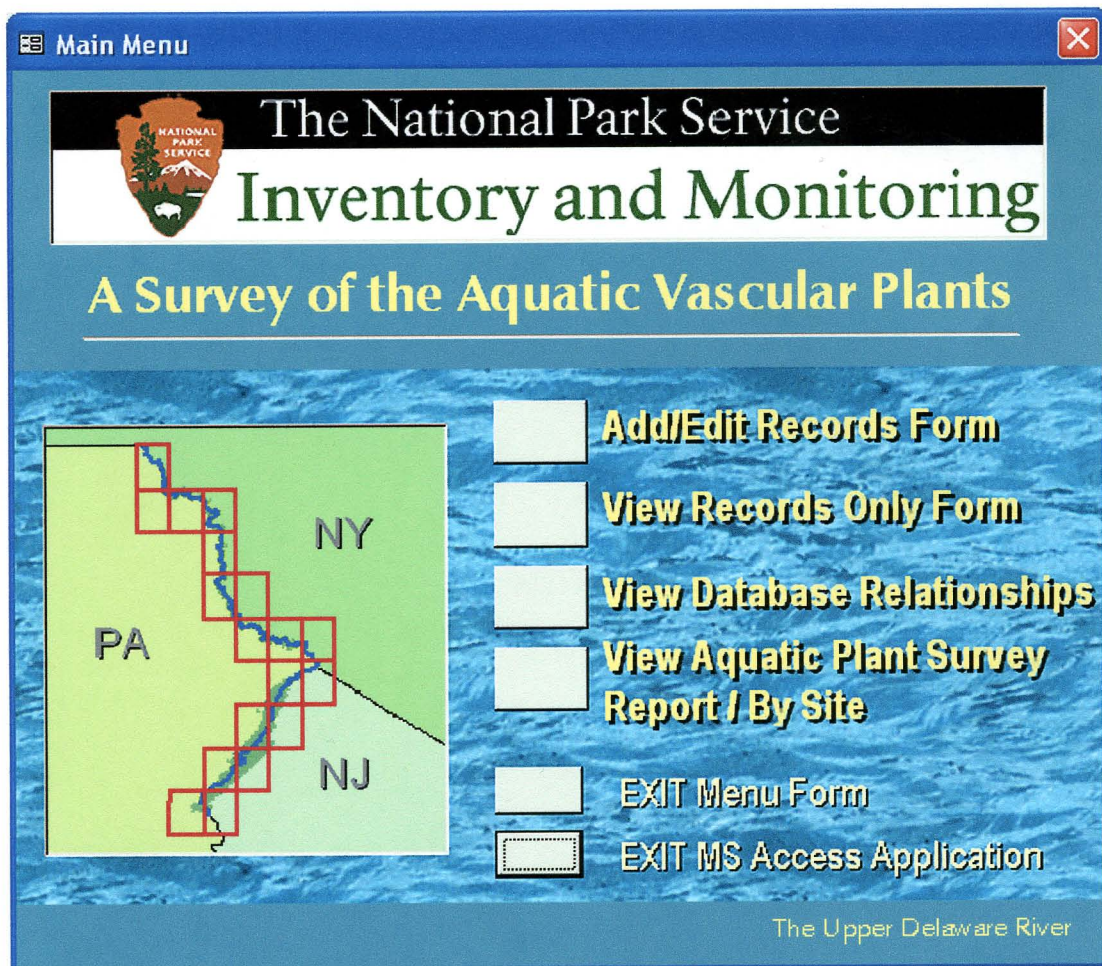
After entering the data from the report using the EntryData form (presented in the next item of this report) with controls and pull-down options, a error-check procedure was initiated. The database content was error checked against the original dataset. The details associated with each site were checked and also queries were generated to make sure the data is correct and consistent.

The conclusion of the checking procedure is that the database matches the original data from the “A Survey of the Aquatic Vascular Plants of The Upper Delaware River” report.

FORMS AND REPORTS

DATABASE MAIN MENU

A user interface or “MainMenu” was created. It includes forms for entering and displaying the data; the data tables relationships and an automated report by location.



Program's main menu

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ADD/EDIT RECORDS FORM (EntryData FORM)

Entry Data Form

AQUATIC VASCULAR PLANTS SURVEY OF THE UPPER DELAWARE RIVER

LocationID	1	DRBC_Mileage	331.7
SiteName	Site 1	Calculated_Mileage	331.2
Project	Aquatic Vascular Plants Survey	Elevation	188.1208
ParkCode	NONE	ElevationSource	Polygon centroid's Z value, derived by GIS
Description	0.25 mile downstream of Hancock bridge (over PA Rt. 191), or 0.7 mile SW of Hancock		
Quadrant	Flatbrookville	UTMX	475820.48716
	Hancock	UTMY	4644101.37311
	Lake Conn	CoordinateSource	Polygon centroid, de
County1	Wayne	CoordinateSystem	UTM
State1	PA	Datum	NAD83
County2	Delaware	UtmZone	18N
State2	NY		
Significant	☐		
Comments	Podostemum was found at an historical occurrence (Dix in 1942); Isoetes Riparia was not searched for in NY		
Save Submission			

Record: 1 of 196

Site Conditions Species Details Location Survey Dates

LocationID 1

TSN

27031 Podostemum ceratophyllum

27039

32053

32054

AbundanceValue

C

CA

P

R

R-IC

Vouchered ☒

CollectorNumber 10173

Herbarium

CM

CU

NCU

Record: 3 of

This entry form links all the main tables: *tblLocations*, *tblEvents*, *tblConditions*, *tblSpeciesDetails*, *tblDates*. It has implemented controls and pull-down options for entering the data.

REPORT BY SITE

AQUATIC VASCULAR PLANTS SURVEY

SITE: 1

Date of survey: Jul14/92

Significant: ☐

Park Code: NONE

State-County PA Wayne
NY Delaware

Quadrangle: Hancock

Location: 0.25 mile downstream of Hancock bridge (over PA Rt. 191), or 0.7 mile SW of Hancock

DRBC River Mile: 331.7

Calculated River Mile: 331.2

Elevation: 188.1208 meters

Site centroid coordinates (UTM, NAD83, 18N):

UTMX: 475820.48716

UTMY: 4644101.37311

SPECIES:

Latin Name: (TSN)	Abundance Value:	Vouchered:	Herbarium: Collector No.:
Elodea sp. 38936	C	☐	
Isoetes riparia 17140	R	☐	
Podostemum ceratophyllum 27031	C	☒	CM 10173
Potamogeton perfoliatus 39011	UC	☐	
Ranunculus trichophyllus 18578	UC	☒	PAC 10174

SITE CONDITIONS:

Min Depth: 6 inches

Max Depth: 24 inches

Current: Moderate

Bottom: Small Rocks

Legend

Abundance value:

- A - Abundant
- C - Common
- UC - Uncommon
- R - Rare
- P - Present

Depth:

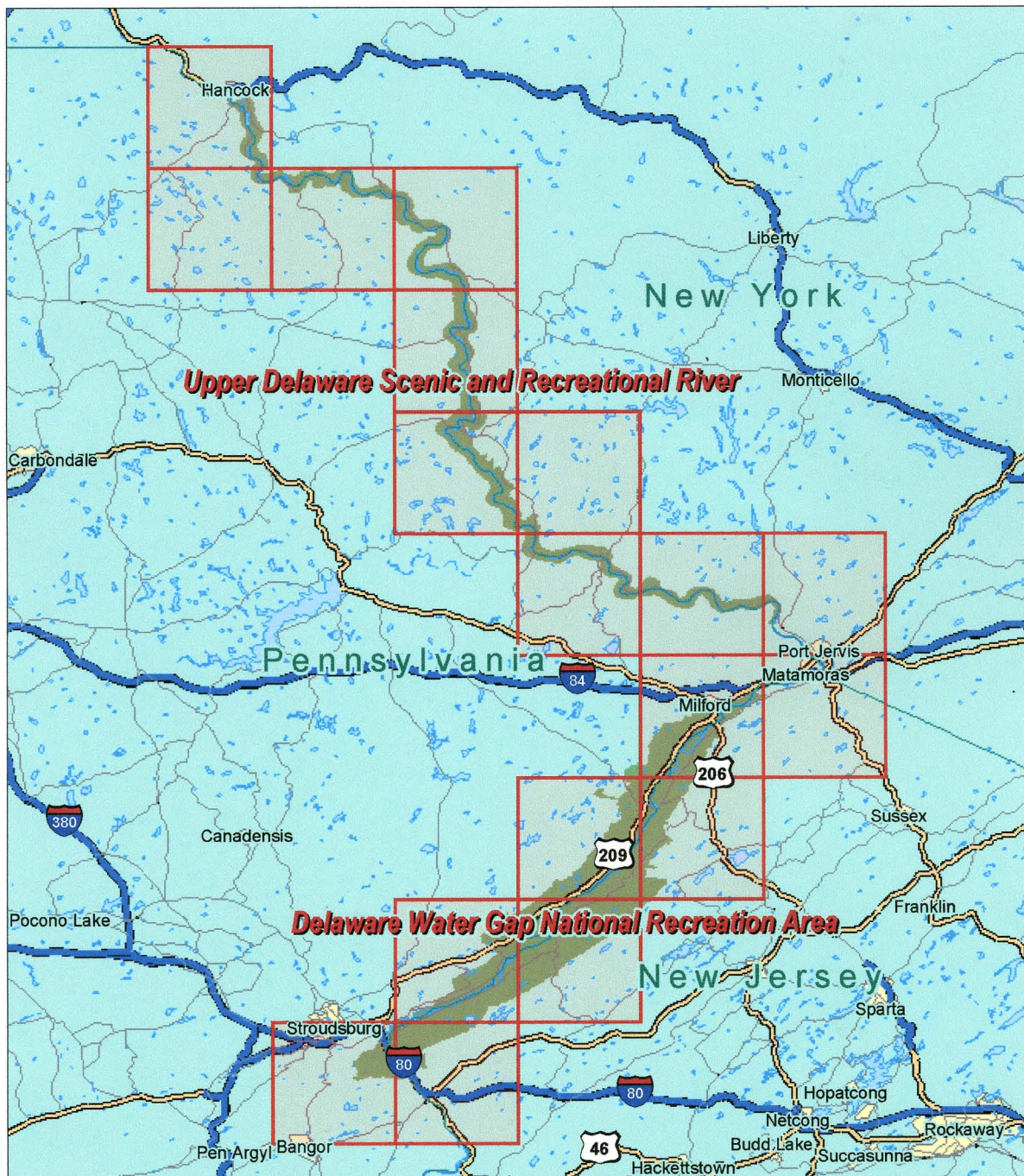
- 0 - Not Recorded

Comments: Podostemum was found at an historical occurrence (Dix in 1942); Isoetes Riparia was not searched for in NY

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DIGITAL MAP PRODUCTS

Using the hand-drawn field mapping data of the Aquatic Survey Report from 1994, digital map products were created. The sites polygons were digitized at a 1:2400 scale, using as a background DEWA's Aerial Photography from March 2002, and additional Aerial Photography from Terra Server for the remaining areas. Were used also 7.5 minute USGS quads.

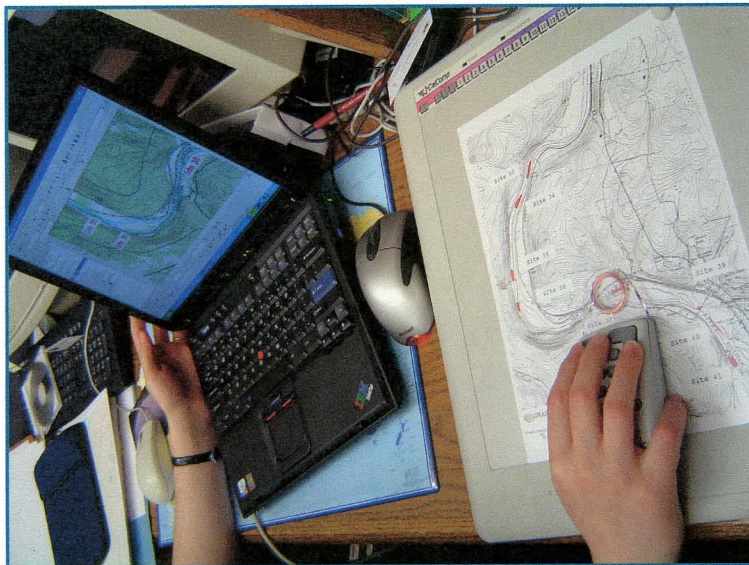


Map of the Upper Delaware River. The study area began at Hancock, NY and extended south of Delaware Water Gap, at the Slateford Creek, PA

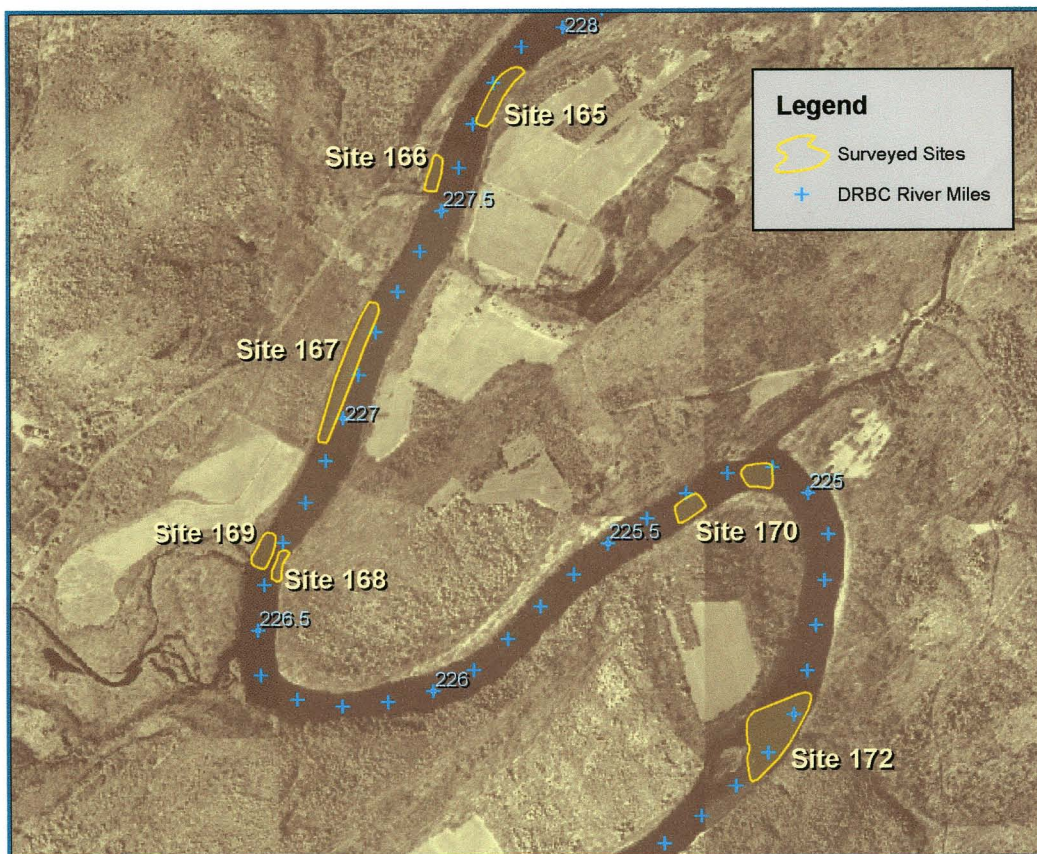
Digital Transfer of Aquatic Plants Survey Data

DIGITIZING PROCESS

A digitizing Drawing Board was used to put into a digital format (shapefile) the scanned maps used during the survey.

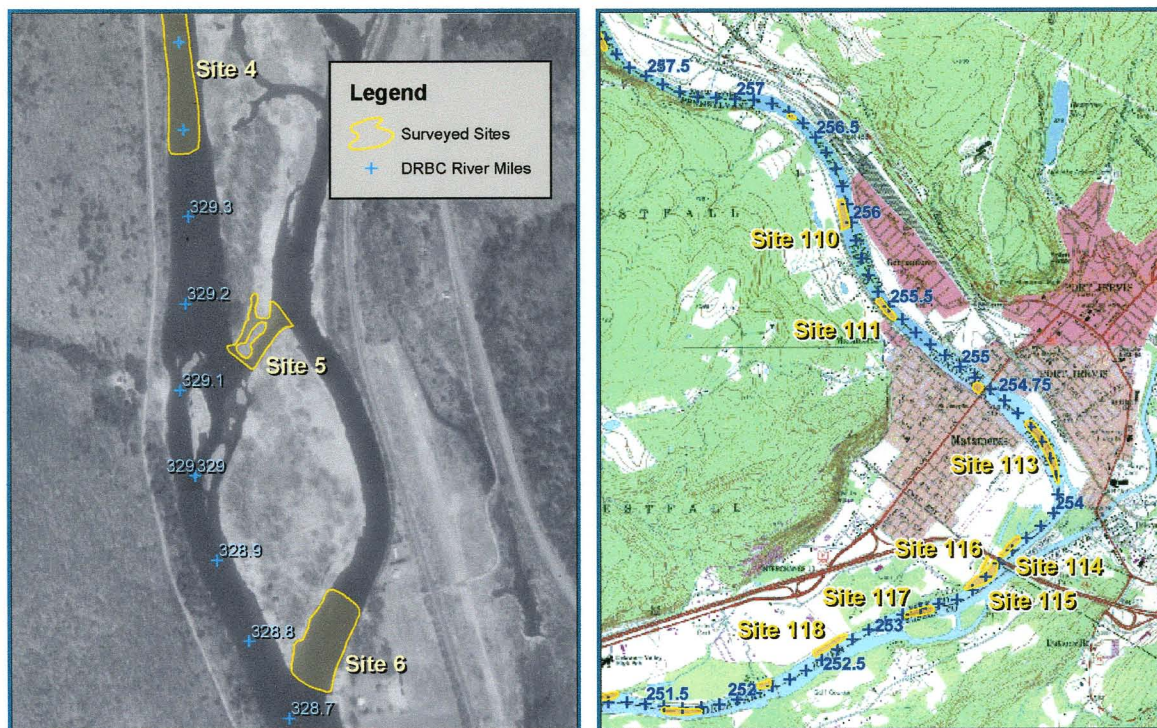


A digitizing tablet was used connected to the PC using ArcMap Digitizer features under editing tools.



2002 Aerial Photography for DEWA used in the digitizing process

DIGITIZING PROCESS (continued)



The aquatic vascular plants surveyed sites were digitized having as a reference 1 m aerial photography and the USGS 7.5 minute 1:24,000 topographic maps.

For each sampling site the centroid point was generated and the geographic coordinates and elevation were determined. These values are entered in the database, in the tblLocations table.

The final shapefiles are named:

- Sites.shp
- Centroids.shp

The metadata was created and is provided in APPENDIX II.

ARCVIEW TO ACCESS CONNECTION TOOL

An ArcView-Access connection tool was generated to allow the GIS software and Access database to work together. They are linked on the *SiteName* identifier between the two applications

This tool is a Visual Basic (VB)Script script that hyperlink from a feature in ArcView 8.x to a filtered form in Microsoft Access.

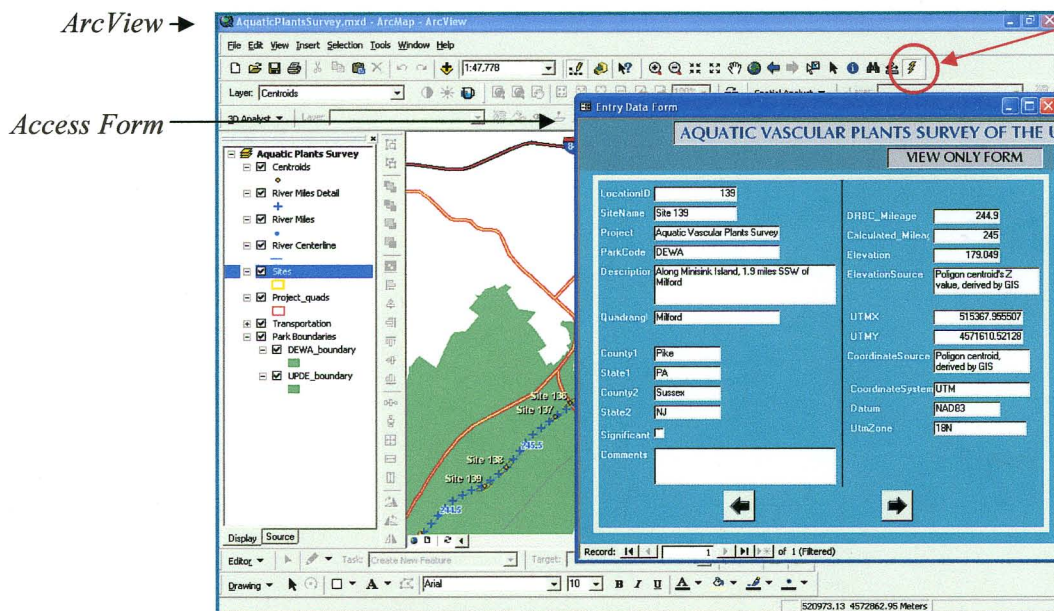
ARCVIEW TO ACCESS CONNECTION TOOL (continued)

The name of the script used is: AccessHyperlink.bas, listed in the APPENDIX I

The VBScript is imported into ArcView 8.x, and then a hyperlink is created. The procedure is described below.

Steps:

- (1) Open VBE by selecting Tools|Macros|Visual Basic Editor
- (2) Select File|Import File and navigate and open AccessHyperlink.bas. This should add the module to the Project document (not the Normal document)
- (3) Select Tools|References and check the reference to 'Microsoft Access 9.0 Object Library'
- (4) Replace "C:\AquaticPlantsSurvey\Aquatic_Plants_Survey.mdb" with the location and name of the db you want to use
- (2) Replace "C:\" with the drive letter so it is the same drive as (4)
- (3) Replace "ViewOnly" with the name of the form you want to filter
- (4) Modify ("[SiteName]=" & Chr(34) & thestring & Chr(34)) - replace [SiteName] with the name of the field you want to filter on. Note that you must use Chr(34) to represent double quotes if you are passing a string. You do not need it if you are passing a number.
- (5) Close VBE and return to ArcMap
- (6) Open the Layer Properties for the layer you want to hyperlink from and navigate to Display|Hyperlink
- (7) Check the box next to support hyperlinks and select the field you want to use. Select Macro and copy and paste Project.AccessHyperlink.Hyperlink into the box. Do not click Create.
- (8) Click OK to exit the Layer Properties window and try the hyperlink tool.



The hyperlink allow the user to click on a survey site and view the corresponding MS Access data form

DELIVERABLES

ACCESS DATABASE

Aquatic_Plants_Survey.mdb

The database including profiles of the 196 sites that were surveyed in the Upper Delaware River in 1991 and 1992.

The original data source is the report named "A Survey of Aquatic Vascular Plants of the Upper Delaware River" (The Nature Conservancy, 1994).

Forms and Reports included:

MainMenu Form

A user interface created to access the data in different ways. It includes forms for entering and displaying the data; the data tables relationships and an automated report by location.

EntryData Form

A form for data entry. It links all the main tables: *tblLocations*, *tblEvents*, *tblConditions*, *tblSpeciesDetails*, *tblDates*. It has implemented controls and pull-down options for entering the data.

ViewOnly Form

A form created for data viewing. This form displays information about all 196 sites by site location. It can not be use to modify data, having read-only properties.

Sites Report

A report by site, on a letter format paper, friendly for printing.

GIS DATA

Sites.shp

The shapefile including the geographic extent of the 196 sites surveyed. They were digitized at a 1:2400 scale.

Sites_metadata.htm

The metadata file associated with the Sites shapefile.

Centroids.shp

The shapefile which includes each sampling site's centroid. It was generated using GIS software and it has associated the geographic coordinates and elevation data.

Centroids_metadata.htm

The metadata file associated with the Centroids shapefile.

ArcView 8.3 Project: AquaticPlantsSurvey.mxd

An ArcMap project including the shapefiles generated and the Access hyperlink tool described in the report.

AccessHyperlink.bas Visual Basic (VB) Script

The VB Script for the ArcView to Access Tool. This tool is a utility that hyperlink from a feature in ArcView 8.x to a filtered form in Microsoft Access.

REPORTS

TheAquaticVascularPlantsSurvey.doc

The original "A Survey of the Aquatic Vascular Plants of the Upper Delaware River" Report. (The Nature Conservancy, 1994).

DigitalTransferReport.doc

The present report in a digital and paper format.

APPENDIX I – ARCVIEW TO ACCESS CONNECTION TOOL – VISUAL BASIC SCRIPT

AccessHyperlink.bas

Attribute VB_Name = "AccessHyperlink"

'The following VBScript is based on the GOTOaccess.zip script created by Steve Carson and posted on the ESRI site. It was modified on September 11, 2003 by Kristina Callahan 'This script will hyperlink from a feature in ArcMap to a filtered form in Microsoft Access. Works for me using ArcGIS 8.2, Access 2000, and Windows 2000.

'Import this module into ArcMap

' (1) Open VBE by selecting Tools|Macros|Visual Basic Editor

' (2) Select File|Import File and navigate and open AccessHyperlink.bas. This should add the module to the Project document(not the Normal document)

' (3) Select Tools|References and check the reference to 'Microsoft Access 9.0 Object Library'

' (4) Replace " C:\AquaticPlantsSurvey\DB\Aquatic_Plant_Reports.mdb" with the location and name of the database you want to use

' (2) Replace "C:\\" with the drive letter so it is the same drive as (4)

' (3) Replace "ViewOnly" with the name of the form you want to filter

' (4) Modify ("[SiteName]=" & Chr(34) & thestring & Chr(34)) - replace [SiteName] with the name of the field you want to filter on. Note that you must use

' Chr(34) to represent double quotes if you are passing a string. You do not need it if you are passing a number.

' (5) Close VBE and return to ArcMap

' (6) Open the Layer Properties for the layer you want to hyperlink from and navigate to Display|Hyperlink

' (7) Check the box next to support hyperlinks and select the field you want to use.

' Select Macro and copy and paste Project.AccessHyperlink.Hyperlink into the box.

' Do not click Create.

' (8) Click OK to exit the Layer Properties window and try the hyperlink tool.

```
Declare Function ShellExecute Lib "shell32.dll" Alias _  
    "ShellExecuteA" (ByVal hwnd As Long, ByVal lpOperation _  
    As String, ByVal lpFile As String, ByVal lpParameters _  
    As String, ByVal lpDirectory As String, ByVal nShowCmd _  
    As Long) As Long
```

```
Declare Function apiFindWindow Lib "User32" Alias "FindWindowA" _  
    (ByVal lpclassname As Any, ByVal lpCaption As Any) As Long
```

```
Global Const SW_SHOWNORMAL = 1
```

```
Sub Hyperlink(pLink, pLayer)
```

```
On Error GoTo eh:
```

```
    Dim pHyperlink As IHyperlink
```

```
    Set pHyperlink = pLink
```

```
    Dim pFLayer As IFeatureLayer
```

```
    Set pFLayer = pLayer
```

```
    Dim thestring As String
```

```
    thestring = pHyperlink.Link
```

```
    Dim hwnd
```

```
    Dim StartDoc
```

```
    hwnd = apiFindWindow("OPUSAPP", "0")
```

```
'opens Microsoft Access database
```

```
    StartDoc = ShellExecute(hwnd, "open", "C:\AquaticPlantsSurvey\DB\Aquatic_Plant_Reports.mdb", "", "C:\",  
SW_SHOWNORMAL)
```

```
    Dim Accapp As Access.Application
```

```
    Set Accapp = GetObject("C:\AquaticPlantsSurvey\DB\Aquatic_Plant_Reports.mdb")
```

```
    Accapp.DoCmd.OpenForm "ViewOnly", acNormal, ("[SiteName]=" & Chr(34) & thestring & Chr(34))
```

```
    Exit Sub
```

```
eh:
```

```
    MsgBox "Something isn't working!"
```

```
End Sub
```

APPENDIX II – SHAPEFILES METADATA

Sites.shp

Metadata also available as

Metadata:

- [Identification Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification Information:

Citation:

Citation Information:

Originator: Geta Dragut

Publication Date: May 2004

Title: Sites

Geospatial Data Presentation Form: vector digital data

Other Citation Details:

The hand-drawn field mapping data from a Survey Report - 1994 were used on digitizing the polygons.

Online Linkage: \\GISLAPTOP1\C\$\I&M_Project\Shapes\Digitized\Sites.shp

Description:

Abstract:

A data processing task was needed by DEWA to transpose field tabular and spatial data into various digital formats of the 1994 Aquatic Plant Survey Report. A survey of aquatic vascular plants was conducted in a 122 mile stretch of the Upper Delaware River between Hancock, New York and the Delaware Water Gap in 1991 and 1992. A total of 196 sites were inventoried and twenty-eight species of plants were recorded. Nine of the species are considered species of concern in at least one of the bordering states of New Jersey, New York, or Pennsylvania. Four of the species of concern - *Podostemum ceratophyllum*, *Potamogeton illinoensis*, *Potamogeton perfoliatus*, and *Ranunculus trichophyllus* - were common or abundant in the study area, while the remaining five species of concern - *Callitriche verna*, *Isoetes riparia*, *Nuphar microphyllum*, *Orontium aquaticum*, and *Potamogeton zosteriformis* - were not located in their respective states. Fifty-seven historical occurrences of the species of concern were searched and forty-three were confirmed as extant. Thirty-one sites were noted as significant because of the exceptional diversity or vitality of their aquatic vegetation. The aquatic vascular plant flora in this section of the Delaware River appeared to be thriving, due in large part to good water quality and moderate impacts by man.

Purpose:

The purpose was the digitizing of hand-drawn field mapping data from hardcopy paper maps into digital map products. These digital mapping files are in the NPS standard GIS format and in DEWA's accepted coordinate and projection systems.

Time Period of Content:

Time Period Information:

Multiple Dates/Times:

Single Date/Time:

Calendar Date: 1994

Single Date/Time:

Calendar Date: 2004

Currentness Reference: Survey Finished in 1994, and sites digitized in 2004

Status:

Progress: Complete

Maintenance and Update Frequency: As needed

APPENDIX II (continued)

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -75.292453

East_Bounding_Coordinate: -74.686679

North_Bounding_Coordinate: 41.949368

South_Bounding_Coordinate: 40.947817

Keywords:

Theme:

Theme_Keyword_Thesaurus: Water

Theme_Keyword: Aquatic

Theme_Keyword: Vascular

Theme_Keyword: Plants

Theme:

Theme_Keyword_Thesaurus: Underwater

Place:

Place_Keyword: Upper Delaware

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Geta Dragut

Contact_Organization: Delaware Water Gap NRA

Contact_Position: GIS Intern

Contact_Address:

Address_Type: mailing address

Address: 294 Old Milford Road

City: Milford

State_or_Province: PA

Postal_Code: 18337

Country: USA

Contact_Voice_Telephone: 570 296 6952 x11

Contact_Electronic_Mail_Address: geta@rdsbv.ro

Contact_Electronic_Mail_Address: geta_dragut@partner.nps.gov

Native_Data_Set_Environment:

Microsoft Windows 2000 Version 5.1 (Build 2600) Service Pack 1; ESRI ArcCatalog 8.3.0.800

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: G-polygon

Point_and_Vector_Object_Count: 197

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 18

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -75.000000

APPENDIX II (continued)

Latitude_of_Projection_Origin: 0.000000
False_Easting: 500000.000000
False_Northing: 0.000000
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 0.000256
Ordinate_Resolution: 0.000256
Planar_Distance_Units: meters
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1983
Ellipsoid_Name: Geodetic Reference System 80
Semi-major_Axis: 6378137.000000
Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:
Entity_Type:
Entity_Type_Label: Sites
Attribute:
Attribute_Label: FID
Attribute_Definition: Internal feature number.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.
Attribute:
Attribute_Label: Shape
Attribute_Definition: Feature geometry.
Attribute_Definition_Source: ESRI
Attribute_Domain_Values:
Unrepresentable_Domain: Coordinates defining the features.
Attribute:
Attribute_Label: SiteName
Attribute_Definition: Name of the site
Attribute:
Attribute_Label: LocationID
Attribute_Definition: Location ID code (Site number)
Attribute_Definition_Source: Survey Report, 1994

Distribution_Information:

Resource_Description: Downloadable Data
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Transfer_Size: 0.153

Metadata_Reference_Information:

Metadata_Date: 20040527
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization:
REQUIRED: The organization responsible for the metadata information.

APPENDIX II (continued)

Contact_Person: REQUIRED: The person responsible for the metadata information.
Contact_Address:
Address_Type:
REQUIRED: The mailing and/or physical address for the organization or individual.
City: REQUIRED: The city of the address.
State_or_Province: REQUIRED: The state or province of the address.
Postal_Code: REQUIRED: The ZIP or other postal code of the address.
Contact_Voice_Telephone:
REQUIRED: The telephone number by which individuals can speak to the organization or individual.
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998
Metadata_Time_Convention: local time
Metadata_Extensions:
Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>
Profile_Name: ESRI Metadata Profile

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Centroids.shp

Metadata also available as

Metadata:

- [Identification Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

Identification Information:

Citation:

Citation_Information:

Originator: Geta Dragut

Publication_Date: May 2004

Title: Centroids

Geospatial_Data_Presentation_Form: vector digital data

Online_Linkage:

\\GISLAPTOP1\C\$\AquaticPlantsSurvey\Shapes\Digitized\Centroids.shp

Description:

Abstract:

A data processing task was needed by DEWA to transpose field tabular and spatial data into various digital formats of the 1994 Aquatic Plant Survey Report. A survey of aquatic vascular plants was conducted in a 122 mile stretch of the Upper Delaware River between Hancock, New York and the Delaware Water Gap in 1991 and 1992. A total of 196 sites were inventoried and twenty-eight species of plants were recorded. Nine of the species are considered species of concern in at least one of the bordering states of New Jersey, New York, or Pennsylvania. Four of the species of concern - *Podostemum ceratophyllum*, *Potamogeton illinoensis*, *Potamogeton perfoliatus*, and *Ranunculus trichophyllus* - were common or abundant in the study area, while the remaining five species of concern - *Callitriche verna*, *Isoetes riparia*, *Nuphar microphyllum*, *Orontium aquaticum*, and *Potamogeton zosteriformis* - were not located in their respective states. Fifty-seven historical occurrences of the species of concern were searched and forty-three were confirmed as extant. Thirty-one sites were noted as significant because of the exceptional

APPENDIX II (continued)

diversity or vitality of their aquatic vegetation. The aquatic vascular plant flora in this section of the Delaware River appeared to be thriving, due in large part to good water quality and moderate impacts by man.

Purpose: The Site's centroids were generated using GIS.

Time_Period_of_Content:

Time_Period_Information:

Multiple_Dates/Times:

Single_Date/Time:

Calendar_Date: 1994

Single_Date/Time:

Calendar_Date: 2004

Currentness_Reference: Survey Finished in 1994, and sites digitized in 2004

Status:

Progress: Complete

Maintenance_and_Update_Frequency: As needed

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -75.291726

East_Bounding_Coordinate: -74.688251

North_Bounding_Coordinate: 41.948888

South_Bounding_Coordinate: 40.948142

Keywords:

Theme:

Theme_Keyword_Thesaurus: Water

Theme_Keyword: Aquatic

Theme_Keyword: Vascular

Theme_Keyword: Plants

Theme_Keyword: Centroids

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Geta Dragut

Contact_Organization: Delaware Water Gap NRA

Contact_Position: GIS Intern

Contact_Address:

Address_Type: mailing address

Address: 294 Old Milford Road

City: Milford

State_or_Province: PA

Postal_Code: 18337

Country: USA

Contact_Voice_Telephone: 570 296 6952 x11

Contact_Electronic_Mail_Address: geta@rdsbv.ro

Native_Data_Set_Environment:

Microsoft Windows 2000 Version 5.1 (Build 2600) Service Pack 1; ESRI ArcCatalog 8.3.0.800

Spatial_Data_Organization_Information:

Direct_Spatial_Reference_Method: Vector

Point_and_Vector_Object_Information:

SDTS_Terms_Description:

SDTS_Point_and_Vector_Object_Type: Entity point

Point_and_Vector_Object_Count: 196

APPENDIX II (continued)

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: Universal Transverse Mercator

Universal_Transverse_Mercator:

UTM_Zone_Number: 18

Transverse_Mercator:

Scale_Factor_at_Central_Meridian: 0.999600

Longitude_of_Central_Meridian: -75.000000

Latitude_of_Projection_Origin: 0.000000

False_Easting: 500000.000000

False_Northing: 0.000000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.000256

Ordinate_Resolution: 0.000256

Planar_Distance_Units: meters

Geodetic_Model:

Horizontal_Datum_Name: North American Datum of 1983

Ellipsoid_Name: Geodetic Reference System 80

Semi-major_Axis: 6378137.000000

Denominator_of_Flattening_Ratio: 298.257222

Entity_and_Attribute_Information:

Detailed_Description:

Entity_Type:

Entity_Type_Label: Centroids

Attribute:

Attribute_Label: FID

Attribute_Definition: Internal feature number.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain:

Sequential unique whole numbers that are automatically generated.

Attribute:

Attribute_Label: Shape

Attribute_Definition: Feature geometry.

Attribute_Definition_Source: ESRI

Attribute_Domain_Values:

Unrepresentable_Domain: Coordinates defining the features.

Attribute:

Attribute_Label: Id

Attribute:

Attribute_Label: SiteName

Attribute_Definition: Name of the site's centroid

Attribute:

Attribute_Label: LocationID

Attribute_Definition: Location ID code (Site number)

Attribute_Definition_Source: Survey Report, 1994

Attribute:

Attribute_Label: X

Attribute_Definition: X Coordinate

APPENDIX II (continued)

Attribute_Definition_Source: Derived by GIS

Attribute:

Attribute_Label: Y

Attribute_Definition: Y Coordinate

Attribute_Definition_Source: Derived by GIS

Attribute:

Attribute_Label: Mileage

Attribute_Definition: DRBC Mileage

Attribute_Definition_Source: Derived by GIS

Distribution_Information:

Resource_Description: Downloadable Data

Standard_Order_Process:

Digital_Form:

Digital_Transfer_Information:

Transfer_Size: 0.038

Metadata_Reference_Information:

Metadata_Date: 20040604

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization:

REQUIRED: The organization responsible for the metadata information.

Contact_Person: REQUIRED: The person responsible for the metadata information.

Contact_Address:

Address_Type:

REQUIRED: The mailing and/or physical address for the organization or individual.

City: REQUIRED: The city of the address.

State_or_Province: REQUIRED: The state or province of the address.

Postal_Code: REQUIRED: The ZIP or other postal code of the address.

Contact_Voice_Telephone:

REQUIRED: The telephone number by which individuals can speak to the organization or individual.

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Time_Convention: local time

Metadata_Extensions:

Online_Linkage: <<http://www.esri.com/metadata/esriprof80.html>>

Profile_Name: ESRI Metadata Profile

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