Brad Semel

Illinois Department of Natural Resources
Chain O' Lakes, 8916 Wilmot Road
Spring Grove, IL 60081

RE: Invasive Plant Species Surveys and Mapping Services at Illinois Beach State Park, Lake County, Illinois

Dear Brad:

Cardno ENTRIX is pleased to submit this final report, "Invasive Plant Species Surveys and Mapping of Cattail Populations at Illinois Beach State Park, Lake County, Illinois" as partial fulfillment of the deliverables required under Contract Number RC10L06W granted from the Office of Resource Conservation, Division of Natural Heritage, Wildlife Preservation Fund Program and entered into by Illinois Department of Natural Resources (IDNR) and Cardno ENRTRIX on 23 April, 2010. The draft report includes a hard copy and an electronic version of the data, maps and text.

We have enjoyed working with you on this project and are confident our product has enabled the IDNR to move forward with invasive species control projects at Illinois Beach State Park. We appreciate your flexibility in our time of emergency with other projects. We hope that you will consider Cardno ENTRIX for future work in Illinois Beach State Park as well as throughout Illinois.

If you have any question or further needs, please contact me at 207-276-3311.

Sincerely,

Patti Reilly

CC: Barry Stuedemann
Maggie Cole

Invasive Plant Species Surveys and Mapping of Cattail Populations at Illinois Beach State Park, Lake County, Illinois

Prepared for the

Illinois Department of Natural Resources

One Natural Resources Way

Springfield, IL 60712

by

Cardno ENTRIX
1000 Hart Road, Suite 130, Barrington, IL 60010

August 12, 2011

www.cardno.com

INTRODUCTION

The purpose of this project was to survey and map cattail populations in high-quality areas of Illinois Beach State Park (IBSP), and to identify specific management areas for control efforts of the Illinois Department of Natural Resources (IDNR). In an adjusted Scope of Work (adjusted from the original contract language) IDNR has requested that Cardno ENTRIX delineate and map the locations and boundaries of invasive cattail (*Typha* sp.) stands occurring in high-quality areas of the North and South Unit of IBSP. Cardno ENTRIX provided precision-mapping, density descriptions (high/low) and summed acreage to incorporate into management plans. The dynamic data created through delineation and mapping will better assist tracking of invasive cattail populations through time, help indicate rate and direction of spread, prioritize areas for treatment, and monitor efficacy of management and control efforts in Illinois Beach State Park.

PROJECT AREA

Illinois Beach State Park is located near Zion, Illinois, along the shore of Lake Michigan and encompasses the only remaining beach ridge shoreline (approximately 6.5 miles) remaining in the state. Illinois Beach covers 4,160-acres and is a unique natural resource created by the forces of glacial advance and retreat and the steady winds across Lake Michigan. The Park has dune and swale topography with extensive marshes, oak forests and diverse animal and plant life. More than 650 species of plants have been recorded in the dunes area alone. Prickly pear cactus occurs in large colonies in the dry areas, and the wet prairies provide habitat for a wide variety of grasses and sedges. Large expanses of marsh in the swales support dense stands of cattail (some native, some invasive), bluejoint grass, prairie cordgrass, reed grass, big bluestem and sedges.

Cardno ENTRIX performed delineation and mapping of invasive cattail stands in high-quality areas of the Park that were identified as priority work areas for treatment in both the North Unit and the South units (Figure 1).

METHODS

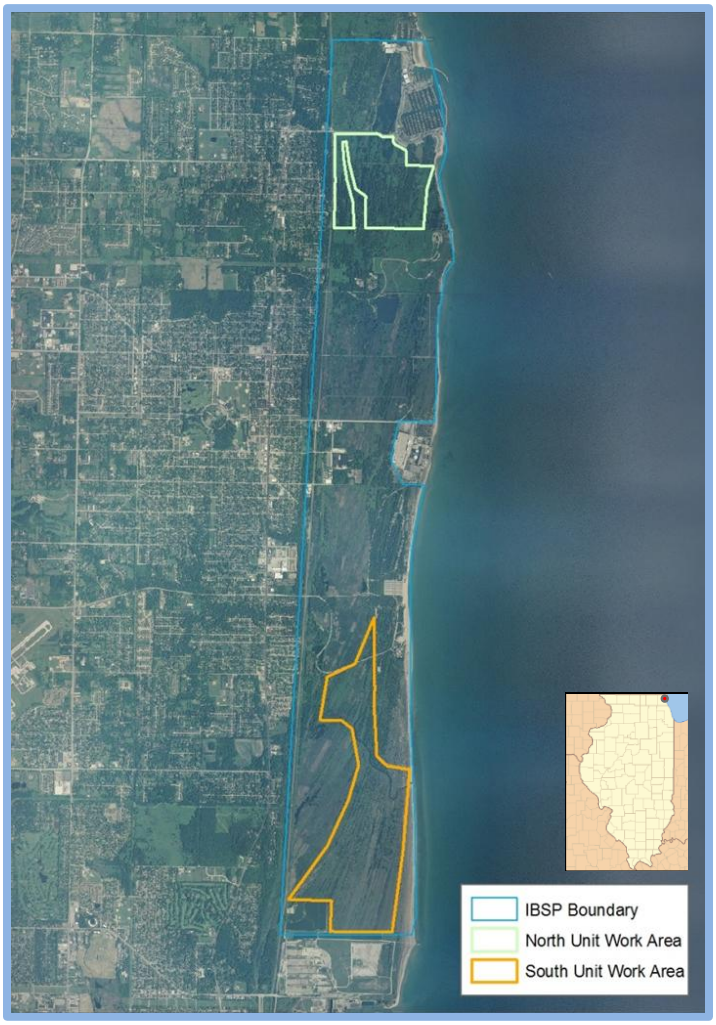
The project includes identification of invasive cattail populations using the latest high-definition, high-resolution aerial photography for the project area. Populations were identified and delineated on aerial photos and mapped in both Arc GIS 9.2 and Google Earth.

Aerial imagery provided by IDNR was agreed by both parties to be of lower quality than hoped. Google Earth imagery was found to be more helpful in that it captured the period of time just after a controlled burn in the North Unit and clearly depicted areas of invasive cattail and natural vegetation. Google Earth also provided an efficient platform for communication between Cardno Entrix and IDNR of resolution of polygon locations and final management areas.

Cardno ENTRIX staff conducted field surveys of the map-delineated locations to refine boundaries of cattail stands and assess priority rankings for treatment. A 200 ft X 200 ft grid was overlain onto aerial images using Arc GIS and the coordinates of center points of each cell were uploaded to a pocket GPS unit to be used in ground-truthing. Staff navigated in the field using GPS coordinates of grid center points to keep oriented among the cattail stands. This orientation method allowed for efficient navigation and fine-tuning boundaries of cattail stands in the field.

Staff also recorded the GPS coordinates of any small outlier populations of cattail that were not identified from the aerial photography. Each ground-thruthed stand was delineated as a polygon tracked on the GPS unit, uploaded into Arc GIS, given a unique identifier name and its acreage calculated.

Figure 1. Illinois Beach State Park North and South unit priority areas where delineation and mapping of invasive cattail were conducted.



A preliminary map was produced for IDNR in Arc GIS and exported into Google Earth to facilitate review. After initial review by IDNR, revised maps and an acreage table were produced. This information will be used to assist in prioritizing invasive stands for contracting of treatment in these specific polygon areas of the North and South units (Appendix 1).

Protocols for conducting the fieldwork are included in Appendix 2. North and South unit maps were finalized for review after: 1) ground-truthing, 2) identifying priority stands in the field, and 3) identifying the maximize number of acres that could be included per dollar of the treatment (Appendix 3). Through this process Cardno ENTRIX provided IDNR with hard copy maps of cattail population locations, acreages and Google Earth and Arc GIS shapefiles to accompany the bid document and negotiate a separate treatment contract.

Fieldwork and ground-truthing were delayed due to Cardno ENTRIXstaff being required to assist on the BP oil spill in the Gulf of Mexico. Field work was further delayed due to snowfall during winter months. No permits were required from IDNR and INPC to access public lands.

RESULTS AND DISCUSSION

Cardno ENTRIX identified, delineated and mapped a total of 101 invasive cattail stands accounting for approximately 204 acres of area in the North and South units of IBSP during this project. Acreage of cattail areas was totaled and prioritized into management areas for control efforts. In the North Unit work area Cardno ENTRIX identified and delineated 46 invasive cattail stands totaling approximately 33 acres, of which 26.6 acres were high-density monocultures and 6.3 acres were low density (Appendix 3). All 46 stands in the North Unit were prioritized for treatment.

In the South Unit 55 cattail stands were delineated for a total of approximately 171 acres of which 29 stands were prioritized for treatment; 68.8 acres of high-density monoculture and 16.2 acres of low-density stands.

The objective for an upcoming IDNR RFP to treat invasive cattail stands in IBSP to include the most acres of the highest priority areas for herbicide application in 2011. The number of priority sites identified by this project were adjusted by the IDNR to meet the RFP requirements. The final report identifies 75 priority stands, of approximately 85 high-density acres and 23 acres of low-density, for a total of 118 acres of invasive cattail to be treated in the North and South units of IBSP.

PROJECT COSTS

Cardno ENTRIX has included an itemized accounting of costs associated with this project and the lump sum “not-to exceed” fee of $9,925 to be paid upon receipt of this report package

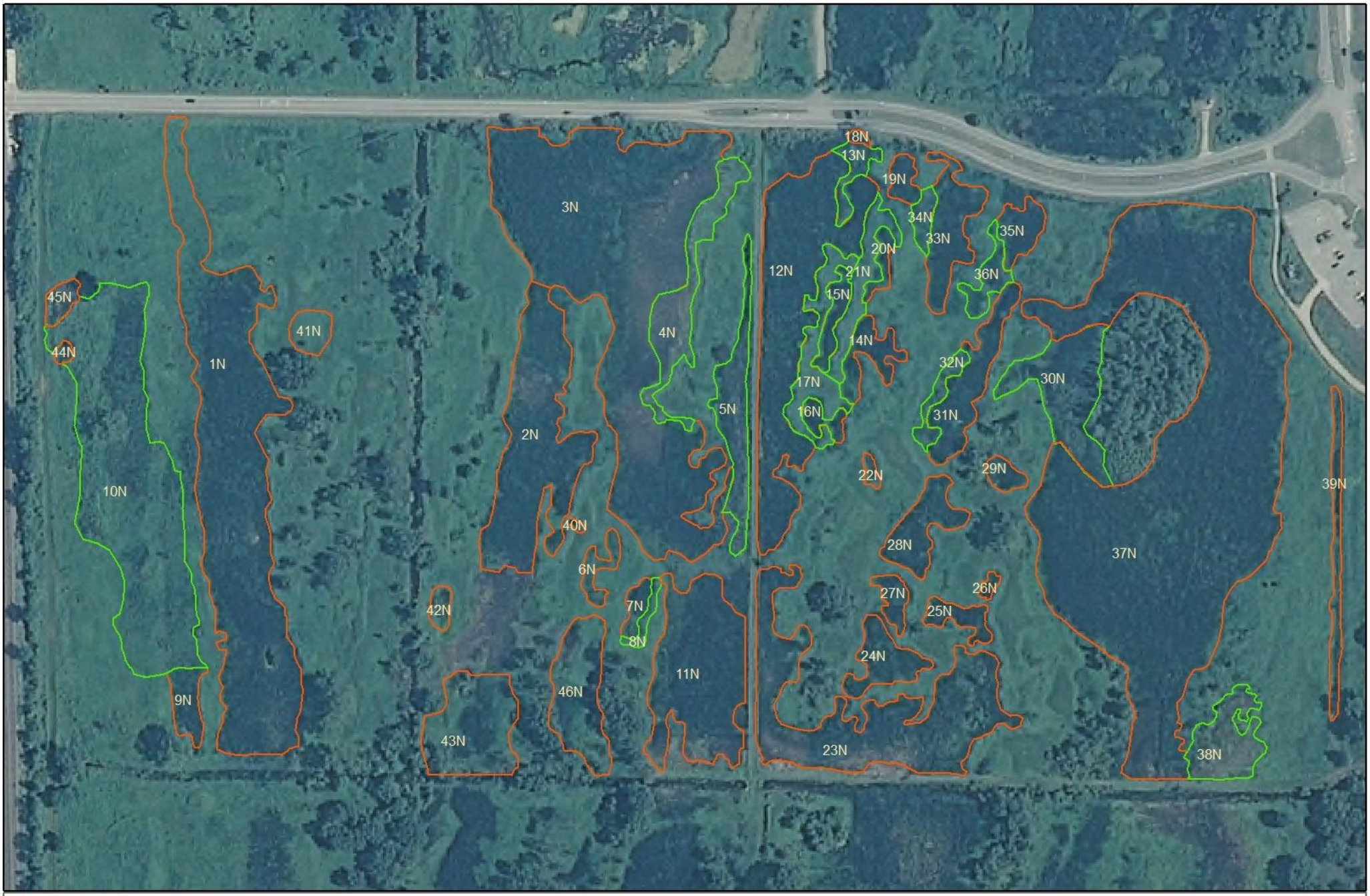
(Appendix 4). A cost of $85.00 per acre was quoted, which includes mapping, fieldwork, equipment, GIS work, and reporting. An additional $0.50 per mile will be charged for travel ($35.00 per trip for 20 field visits = $700) and a one-time $300.00 charge for travel for a coordination meeting with Cardno ENTRIX staff and IDNR. Task 1 was the priority task for this contract. A Task 2 was described to be conducted upon completion of Task 1 and be conducted until remaining funds were expended. All funds and time were expended on additional GIS mapping for Task 1. Cardno ENTRIX completed the tasks outlined in this proposal in accordance with the attached Client Agreement between Cardno ENTRIX and IDNR dated April 6, 2010.

Itemized Budget TableStaff	**Labor***	**Cost**	**Travel @ 0.50 mi**	**Cost**	**Total**
Barry Stuedemann	204 acres	8,585	20 trips	700	9,285
Patti Reilly	GIS mapping	640			640
Totals		9,225		700	**9,925.00**

*Labor charged on per acre basis

Appendices

Appendix 1. Maps of cattail polygon identification and delineation for the North and South unit work areas (following 2 pages).



0 75 150 300 Feet

North Unit Cattail Polygons

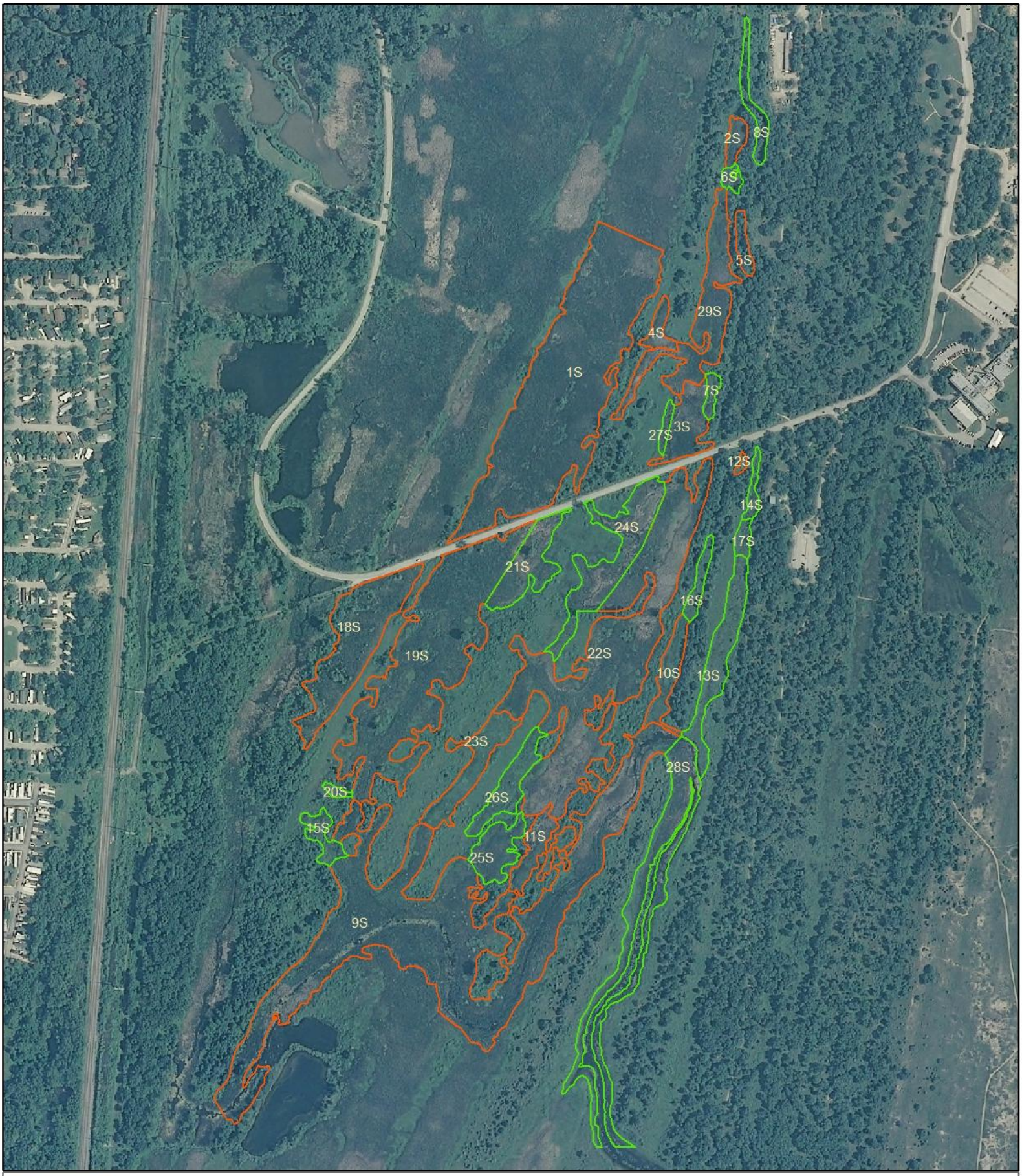
High Density 26.3 acres

Low Density 7.4 acres

Illinois Beach State Park

Contract Number RC10L06W

03/29/2011 PR



N

0 170 340 680 Feet

South Unit Cattail Polygons

High Density 68.8 acres

Low Density 16.2 acres

Illinois Beach State Park

Contract Number RC10L06W

Cardno ENTRIX

03/25/2011 PR

Appendix 2. Tables developed for cattail stands to identify polygons, density, acreage and prioritization.

North Unit Stands

FID	Arc GIS Polygon ID	Google Earth+ Polygon Area Name	Description (1=High and 2 = Low)	All Areas (acre)	RFP Areas* (acre)	Final Areas (acre)
0	1	IDNR Cattails 1 - High	1	3.49	3.49	3.49
1	2	IDNR Cattails 3 - High	1	1.52	1.52	1.52
2	3	IDNR Cattails 4 - High	1	4.46	4.46	4.46
3	4	IDNR Cattails 4 - Low	2	0.56	0.56	0.56
4	5	IDNR Cattails 5 - Low	2	0.49	0.49	0.49
5	6	IDNR Cattails 6 - High	1	0.12	0.12	0.12
6	7	IDNR Cattails 7 - High	1	0.09	0.09	0.09
7	8	IDNR Cattails 7 - Low	2	0.06	0.06	0.06
8	9	IDNR Cattails 8 - High	1	0.18	0.18	0.18
9	10	IDNR Cattails 8 - Low	2	2.81	2.81	2.81
10	11	IDNR Cattails 9 - High	1	1.30	1.30	1.30
11	12	IDNR Cattails 10 - High	1	1.84	1.84	1.84
12	13	IDNR Cattails 10 - Low	2	0.13	0.13	0.13
13	14	IDNR Cattails 11 - High	1	0.22	0.22	0.22
14	15	IDNR Cattails 12 - High	1	0.15	0.15	0.15
15	16	IDNR Cattails 13 - High	1	0.09	0.09	0.09
16	17	IDNR Cattails 13 - Low	2	0.42	0.42	0.42
17	18	IDNR Cattails 14 - High	1	0.02	0.02	0.02
18	19	IDNR Cattails 15 - High	1	0.11	0.11	0.11
19	20	IDNR Cattails 16 - High	1	0.09	0.09	0.09
20	21	IDNR Cattails 16 - Low	2	0.31	0.31	0.31
21	22	IDNR Cattails 17 - High	1	0.04	0.04	0.04
22	23	IDNR Cattails 18 - High	1	1.82	1.82	1.82
23	24	IDNR Cattails 19 - High	1	0.29	0.29	0.29
24	25	IDNR Cattails 20 - High	1	0.14	0.14	0.14
25	26	IDNR Cattails 21 - High	1	0.03	0.03	0.03
26	27	IDNR Cattails 22 - High	1	0.11	0.11	0.11
27	28	IDNR Cattails 23 - High	1	0.35	0.35	0.35
28	29	IDNR Cattails 24 - High	1	0.09	0.09	0.09
29	30	IDNR Cattails 24 - Low	2	0.71	0.71	0.71
30	31	IDNR Cattails 25 - High	1	0.47	0.47	0.47
31	32	IDNR Cattails 25 - Low	2	0.13	0.13	0.13
32	33	IDNR Cattails 26 - High	1	0.43	0.43	0.43
33	34	IDNR Cattails 26 - Low	2	0.10	0.10	0.10
34	35	IDNR Cattails 27 - High	1	0.19	0.19	0.19
35	36	IDNR Cattails 27 - Low	2	0.16	0.16	0.16
36	37	IDNR Cattails 28 - High	1	6.99	6.99	6.99
37	38	IDNR Cattails 28 - Low	2	0.43	0.43	0.43
38	39	IDNR Cattails 29 - High	1	0.27	0.27	0.27
39	40	IDNR Cattails 30 - High	1	0.01	0.01	0.01
40	41	IDNR Cattails 31 - High	1	0.14	0.14	0.14
41	42	IDNR Cattails 32 - High	1	0.07	0.07	0.07
42	43	IDNR Cattails 33 - High	1	0.73	0.73	0.73
43	44	IDNR Cattails 34 - High	1	0.03	0.03	0.03
44	45	IDNR Cattails 35 - High	1	0.09	0.09	0.09
45	46	IDNR Cattails 36 - High	1	0.60	0.60	0.60
		North Unit Totals	High:	26.58	26.58	26.58
			Low:	6.31	6.31	6.31
			Total:	32.89	32.89	32.89

+ Polygon IDs different in Arc GIS shapefiles. These names are for Google Earth viewing.
** Areas have been adjusted slightly since the RFP was issued. Numbers in this table reflect the adjustment.*

Appendix 2. South Unit Stands

FID	Arc GIS Polygon ID	Google Earth+ Polygon Area Name	Description (1=High and 2 = Low)	All Areas (acre)	RFP Areas* (acre)	Final Areas (acre)
46		IDNR Cattails 100 - High A	1	22.72	x	x
47		IDNR Cattails 100 - High B	1	0.10	x	x
48		IDNR Cattails 100 - High C	1	0.09	x	x
49		IDNR Cattails 100 - Low	2	22.91	x	x
50		IDNR Cattails 101 - High	1	2.33	x	x
51		IDNR Cattails 101 - Low	2	3.40	x	x
52		IDNR Cattails 102 - High	1	4.65	x	x
53		IDNR Cattails 102 - Low A	2	3.35	x	x
54		IDNR Cattails 102 - Low B	2	3.82	x	x
55	1S	IDNR Cattails 103 - High A	1	12.07	13.07	13.07
56		IDNR Cattails 103 - High B	1	8.88	7.89	x
57	2S	IDNR Cattails 104 - High A	1	0.38	0.38	0.38
58	3S	IDNR Cattails 104 - High B	1	3.07	3.07	3.07
59	4S	IDNR Cattails 104 - High C	1	1.32	1.32	1.32
60	5S	IDNR Cattails 104 - High D	1	0.44	0.44	0.44
61	6S	IDNR Cattails 104 - High E	1	0.36	0.36	0.36
62	7S	IDNR Cattails 104 - Low A	2	0.20	0.20	0.20
63	8S	IDNR Cattails 104 - Low B	2	0.26	0.26	0.26
64	9S	IDNR Cattails 104 - Low C	2	0.65	0.65	0.65
65	10S	IDNR Cattails 104 - Low D	2	0.22	0.22	0.22
66	11S	IDNR Cattails 105 - High	1	2.12	x	x
67		IDNR Cattails 106 - High	1	0.41	x	x
68		IDNR Cattails 107 - High	1	0.73	x	x
69		IDNR Cattails 108 - High	1	0.07	x	x
70		IDNR Cattails 109 - High	1	0.08	x	x
71		IDNR Cattails 110 - High	1	0.14	x	x
72		IDNR Cattails 111 - High	1	0.04	x	x
73		IDNR Cattails 112 - High	1	0.16	x	x
74		IDNR Cattails 113 - High	1	0.61	x	x
75		IDNR Cattails 113 - Low	2	0.63	x	x
76		IDNR Cattails 114 - High	1	0.65	x	x
77		IDNR Cattails 115 - High	1	0.31	x	x
78		IDNR Cattails 116 - High	1	0.68	x	x
79		IDNR Cattails 116 - Low	2	0.42	x	x
80	11S	IDNR Cattails 200 - High A	1	18.81	18.81	18.81
81		IDNR Cattails 200 - High B	1	11.11	x	x
82	12S	IDNR Cattails 200 - High C	1	0.98	0.98	0.98
83	13S	IDNR Cattails 200 - High D	1	1.12	1.12	1.12
84	14S	IDNR Cattails 200 - High E	1	0.07	0.07	0.07
85	15S	IDNR Cattails 200 - Low A	2	1.93	1.93	1.93
86	16S	IDNR Cattails 200 - Low B	2	0.29	0.29	0.29
87	17S	IDNR Cattails 200 - Low C	2	0.57	0.57	0.57
88	18S	IDNR Cattails 200 - Low D	2	0.47	0.47	0.47
89	19S	IDNR Cattails 200 - Low E	2	0.26	0.26	0.26
90	20S	IDNR Cattails 200 - Low F	2	4.45	4.45	4.45
91	21S	IDNR Cattails 201 - High	1	3.86	3.86	3.86
92	22S	IDNR Cattails 202 - High	1	9.58	9.58	9.58
93	23S	IDNR Cattails 202 - Low A	2	0.12	0.12	0.12
94	24S	IDNR Cattails 202 - Low B	2	1.62	1.62	1.62
95	25S	IDNR Cattails 203 - High A	1	11.11	11.11	11.11
96	26S	IDNR Cattails 203 - High B	1	1.63	1.63	1.63
97	27S	IDNR Cattails 203 - Low A	2	2.86	2.86	2.86
98	28S	IDNR Cattails 203 - Low B	2	1.13	1.13	1.13
99	29S	IDNR Cattails 203 - Low C	2	1.18	1.18	1.18
		South Unit Totals	High:	120.68	73.69	65.80
			Low:	50.72	16.20	16.20
			Total:	171.40	89.90	82.01

** Areas have been adjusted slightly since the RFP was issued. Numbers in this table reflect the adjustment.*

Appendix 2 (continue)

Summary tables of North and South unit acreage prioritized to satisfy the IDNR RFP requirements for invasive cattail control.

Illinois Department of Natural Resources **Illinois Beach State Park** **North Unit and South Unit Cattails**				**March 29, 2011**	
Cattail Area Summary					
Unit Area Name	**Description** (1=High and 2 = Low)	**All Areas** (acre)		**RFP Areas*** (acre)	**Final Areas** (acre)
North Unit Totals	High:	26.58		26.58	26.58
	Low:	6.31		6.31	6.31
	Total:	32.89		32.89	32.89
South Unit Totals	High:	120.68		73.69	65.80
	Low:	50.72		16.20	16.20
	Total:	171.40		89.90	82.01
Unit Totals	High:	147.26		100.27	92.38
	Low:	57.03		22.52	22.52
	Total:	204.29		122.79	**114.90**
** Areas have been adjusted slightly since the RFP was issued. RFP area numbers in table reflect this adjustment.*					
Winning Bid			*High: $804.55 per acre* *Low: $604.85 per acre* *High Area: 84.3 acres* *Low Area: 40.7 acres* ***Total Area: 125.0 acres*** *High Cost: $67,823.57* *Low Cost: $24,617.40* ***Total Cost: $92,440.96***		
Cattail Cost Summary					
Unit Area Name	**Description** (1=High and 2 = Low)	**All Areas** (Cost)		**RFP Areas*** (Cost)	**Final Areas** (Cost)
North Unit Totals	High:	$21,382.17		$21,382.17	$21,382.17
	Low:	$5,079.50		$5,079.50	$5,079.50
	Total:	$26,461.67		$26,461.67	$26,461.67
South Unit Totals	High:	$97,092.93		$59,291.15	$52,943.25
	Low:	$40,803.26		$13,035.65	$13,035.65
	Total:	$137,896.19		$72,326.81	$65,978.91
Unit Totals	High:	$118,475.10		$80,673.32	$74,325.42
	Low:	$45,882.77		$18,115.16	$18,115.16
	Total:	$164,357.86		$98,788.48	**$92,440.58**
** Areas have been adjusted slightly since the RFP was issued. RFP area numbers in table reflect this adjustment.*					

Appendix 3. Protocol in Developing Cattail (*Typha sp.*) Management Areas:

1) Identify management area;
    a. Areas specified in North Unit (NU) and South Unit (SU).
2) Review cattail identification resources:
    a. Aerial photography;
    b. Two-foot topographic survey;
    c. Coordinate grid with center-point lat./long. for location referencing; and
    d. Previous cattail management transect information.
3) Delineate preliminary cattail communities on Google Earth and prepare Preliminary Cattail Management Area Figures.
4) Conduct initial field verification of Preliminary Cattail Management Area Figures:
    a. Identify on-site;
        i. Cattail areas,
        ii. High density cattail areas (monocultures),
        iii. Low density cattail areas (any *Typha sp.* present), and
        iv. Previously managed cattail areas.
    b. Collect on-site vegetation densities, cattail limits, and GPS tracklog.
5) Adjust cattail management areas in Google Earth based on initial field visit and prepare Pre-Final Cattail Management Area Figures.
6) Conduct field verification of Pre-Final Cattail Management Area Figures:
    a. Edit cattail areas:
        i. Using coordinate grids with center-point lat./long. for longitudinal transect verification where possible; and
        ii. Using topographic survey and historic lake shoreline sandy ridges for perimeter cattail area delineation.
    b. Verify cattail limits for High and Low Densities and collect GPS tracklog.
7) Adjust cattail management areas in Google Earth based on pre-final verification field visit and prepare Final Cattail Management Area Figures.

Protocol in Determining Management Area from Winning Bid and Developing Cattail Table

1) Resources for determining final area for cattail management:
    a. Final Cattail Management Area Figures;
    b. Google Earth cattail area acreages;
    c. Winning bid areas and unit costs;
    d. Excel spreadsheet to calculate High and Low Density areas, their associated costs, and the total cost.
2) Create Cattail Table in Excel and include Google Earth cattail areas per density designation.
3) Add areas based on acreage and winning bid cost per acre, per density.
4) Include areas for final cattail management area in the final Cattail Table:
    a. First exclude cattail areas adjacent to other large cattail areas not proposed for management; and
    b. Include isolated cattail areas where management may be most effective; and
    c. Sum areas until the target Winning Bid costs are met.

Final Cattail Management Area Figures and Cattail Table

1) Using the Final Cattail Management Area Figures and the final Cattail Table, tweak the figures to create the Final Cattail Management Area Figures for submittal to Contractor.
2) contractor and corresponding shapefiles in UTMNAD83Z16 projection that are useable by ESRI ArcGIS programs, including ArcView 3.3 thru current versions.

Appendix 4. Arc GIS metadata

ENTRIX deliverables will include electronic copies of shapefiles that are readable and editable by ESRI ArcGIS programs, including ArcView 3.3 thru current versions in UTMNAD83Z16 projection

Metadata Illinois Beach State Park Invasive Cattail Polygons Arc GIS 9.2

Description
These data were collected from aerial photographs and on the ground methods, and include polygons delineated for invasive cattail stands in both the North and South units of IBSP in priority high-quality areas.

Purpose
The purpose of these data are to provide guidance and assist in the management of invasive cattail (*Typha* sp) in IBSP

Status of the data: These data are part of a dynamic dataset that can be added or subtracted to as cattail populations decrease, increase or change locations within IBSP.

Time period for which the data is relevant: 2010 and 2011

Data storage and access information: These data are the property of the Illinois Department of Natural Resources and include attributed shapefiles and kmz files.

Coordinate System and Projection

UTMNAD83Z16
Datum: D_North_American_1927
NAD_1983_UTM_Zone_16N
Projection: Transverse_Mercator
false_easting: 500000.000000
false_northing: 0.000000
central_meridian: -87.000000
scale_factor: 0.999600
latitude_of_origin: 0.000000
Linear Unit: Meter

Details about this document
Prepared by Cardno ENTRIX for the Illinois Department of Natural Resources 20110808
IDNR #RC10L06W

Illinois Department of Natural Resources **March 22, 2011**
Illinois Beach State Park
North Unit Cattails

Google Earth Polygon Area Name	Description (1=High and 2 = Low)	All Areas (acre)	RFP Areas* (acre)	Final Areas (acre)
IDNR Cattails 1 - High	1	3.49	3.49	3.49
IDNR Cattails 3 - High	1	1.52	1.52	1.52
IDNR Cattails 4 - High	1	4.46	4.46	4.46
IDNR Cattails 4 - Low	2	0.56	0.56	0.56
IDNR Cattails 5 - Low	2	0.49	0.49	0.49
IDNR Cattails 6 - High	1	0.12	0.12	0.12
IDNR Cattails 7 - High	1	0.09	0.09	0.09
IDNR Cattails 7 - Low	2	0.06	0.06	0.06
IDNR Cattails 8 - High	1	0.18	0.18	0.18
IDNR Cattails 8 - Low	2	2.81	2.81	2.81
IDNR Cattails 9 - High	1	1.30	1.30	1.30
IDNR Cattails 10 - High	1	1.84	1.84	1.84
IDNR Cattails 10 - Low	2	0.13	0.13	0.13
IDNR Cattails 11 - High	1	0.22	0.22	0.22
IDNR Cattails 12 - High	1	0.15	0.15	0.15
IDNR Cattails 13 - High	1	0.09	0.09	0.09
IDNR Cattails 13 - Low	2	0.42	0.42	0.42
IDNR Cattails 14 - High	1	0.02	0.02	0.02
IDNR Cattails 15 - High	1	0.11	0.11	0.11
IDNR Cattails 16 - High	1	0.09	0.09	0.09
IDNR Cattails 16 - Low	2	0.31	0.31	0.31
IDNR Cattails 17 - High	1	0.04	0.04	0.04
IDNR Cattails 18 - High	1	1.82	1.82	1.82
IDNR Cattails 19 - High	1	0.29	0.29	0.29
IDNR Cattails 20 - High	1	0.14	0.14	0.14
IDNR Cattails 21 - High	1	0.03	0.03	0.03
IDNR Cattails 22 - High	1	0.11	0.11	0.11
IDNR Cattails 23 - High	1	0.35	0.35	0.35
IDNR Cattails 24 - High	1	0.09	0.09	0.09
IDNR Cattails 24 - Low	2	0.71	0.71	0.71
IDNR Cattails 25 - High	1	0.47	0.47	0.47
IDNR Cattails 25 - Low	2	0.13	0.13	0.13
IDNR Cattails 26 - High	1	0.43	0.43	0.43
IDNR Cattails 26 - Low	2	0.10	0.10	0.10
IDNR Cattails 27 - High	1	0.19	0.19	0.19
IDNR Cattails 27 - Low	2	0.16	0.16	0.16
IDNR Cattails 28 - High	1	6.99	6.99	6.99
IDNR Cattails 28 - Low	2	0.43	0.43	0.43
IDNR Cattails 29 - High	1	0.27	0.27	0.27
IDNR Cattails 30 - High	1	0.01	0.01	0.01
IDNR Cattails 31 - High	1	0.14	0.14	0.14
IDNR Cattails 32 - High	1	0.07	0.07	0.07
IDNR Cattails 33 - High	1	0.73	0.73	0.73

Illinois Department of Natural Resources **March 22, 2011**
Illinois Beach State Park
North Unit Cattails

Google Earth Polygon Area Name	Description (1=High and 2 = Low)	All Areas (acre)	RFP Areas* (acre)	Final Areas (acre)
IDNR Cattails 34 - High	1	0.03	0.03	0.03
IDNR Cattails 35 - High	1	0.09	0.09	0.09
IDNR Cattails 36 - High	1	0.60	0.60	0.60
North Unit Totals	High:	26.58	26.58	26.58
	Low:	6.31	6.31	6.31
	Total:	32.89	32.89	32.89

** Areas have been adjusted slightly since the RFP was issued. Numbers in this table reflect the adjustment.*

Illinois Department of Natural Resources **March 22, 2011**
Illinois Beach State Park
North Unit Cattails

Google Earth Polygon Area Name	Description (1=High and 2 = Low)	All Areas (acre)	RFP Areas* (acre)	Final Areas (acre)
IDNR Cattails 100 - High A	1	22.72	x	x
IDNR Cattails 100 - High B	1	0.10	x	x
IDNR Cattails 100 - High C	1	0.09	x	x
IDNR Cattails 100 - Low	2	22.91	x	x
IDNR Cattails 101 - High	1	2.33	x	x
IDNR Cattails 101 - Low	2	3.40	x	x
IDNR Cattails 102 - High	1	4.65	x	x
IDNR Cattails 102 - Low A	2	3.35	x	x
IDNR Cattails 102 - Low B	2	3.82	x	x
IDNR Cattails 103 - High A	1	12.07	13.07	13.07
IDNR Cattails 103 - High B	1	8.88	7.89	x
IDNR Cattails 104 - High A	1	0.38	0.38	0.38
IDNR Cattails 104 - High B	1	3.07	3.07	3.07
IDNR Cattails 104 - High C	1	1.32	1.32	1.32
IDNR Cattails 104 - High D	1	0.44	0.44	0.44
IDNR Cattails 104 - High E	1	0.36	0.36	0.36
IDNR Cattails 104 - Low A	2	0.20	0.20	0.20
IDNR Cattails 104 - Low B	2	0.26	0.26	0.26
IDNR Cattails 104 - Low C	2	0.65	0.65	0.65
IDNR Cattails 104 - Low D	2	0.22	0.22	0.22
IDNR Cattails 105 - High	1	2.12	x	x
IDNR Cattails 106 - High	1	0.41	x	x
IDNR Cattails 107 - High	1	0.73	x	x
IDNR Cattails 108 - High	1	0.07	x	x
IDNR Cattails 109 - High	1	0.08	x	x
IDNR Cattails 110 - High	1	0.14	x	x
IDNR Cattails 111 - High	1	0.04	x	x
IDNR Cattails 112 - High	1	0.16	x	x
IDNR Cattails 113 - High	1	0.61	x	x
IDNR Cattails 113 - Low	2	0.63	x	x
IDNR Cattails 114 - High	1	0.65	x	x
IDNR Cattails 115 - High	1	0.31	x	x
IDNR Cattails 116 - High	1	0.68	x	x
IDNR Cattails 116 - Low	2	0.42	x	x
IDNR Cattails 200 - High A	1	18.81	18.81	18.81
IDNR Cattails 200 - High B	1	11.11	x	x
IDNR Cattails 200 - High C	1	0.98	0.98	0.98
IDNR Cattails 200 - High D	1	1.12	1.12	1.12
IDNR Cattails 200 - High E	1	0.07	0.07	0.07
IDNR Cattails 200 - Low A	2	1.93	1.93	1.93
IDNR Cattails 200 - Low B	2	0.29	0.29	0.29
IDNR Cattails 200 - Low C	2	0.57	0.57	0.57
IDNR Cattails 200 - Low D	2	0.47	0.47	0.47

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North Unit Cattails

Google Earth Polygon Area Name	Description (1=High and 2 = Low)	All Areas (acre)	RFP Areas* (acre)	Final Areas (acre)
IDNR Cattails 200 - Low E	2	0.26	0.26	0.26
IDNR Cattails 200 - Low F	2	4.45	4.45	4.45
IDNR Cattails 201 - High	1	3.86	3.86	3.86
IDNR Cattails 202 - High	1	9.58	9.58	9.58
IDNR Cattails 202 - Low A	2	0.12	0.12	0.12
IDNR Cattails 202 - Low B	2	1.62	1.62	1.62
IDNR Cattails 203 - High A	1	11.11	11.11	11.11
IDNR Cattails 203 - High B	1	1.63	1.63	1.63
IDNR Cattails 203 - Low A	2	2.86	2.86	2.86
IDNR Cattails 203 - Low B	2	1.13	1.13	1.13
IDNR Cattails 203 - Low C	2	1.18	1.18	1.18
South Unit Totals	High:	120.68	73.69	65.80
	Low:	50.72	16.20	16.20
	Total:	171.40	89.90	82.01

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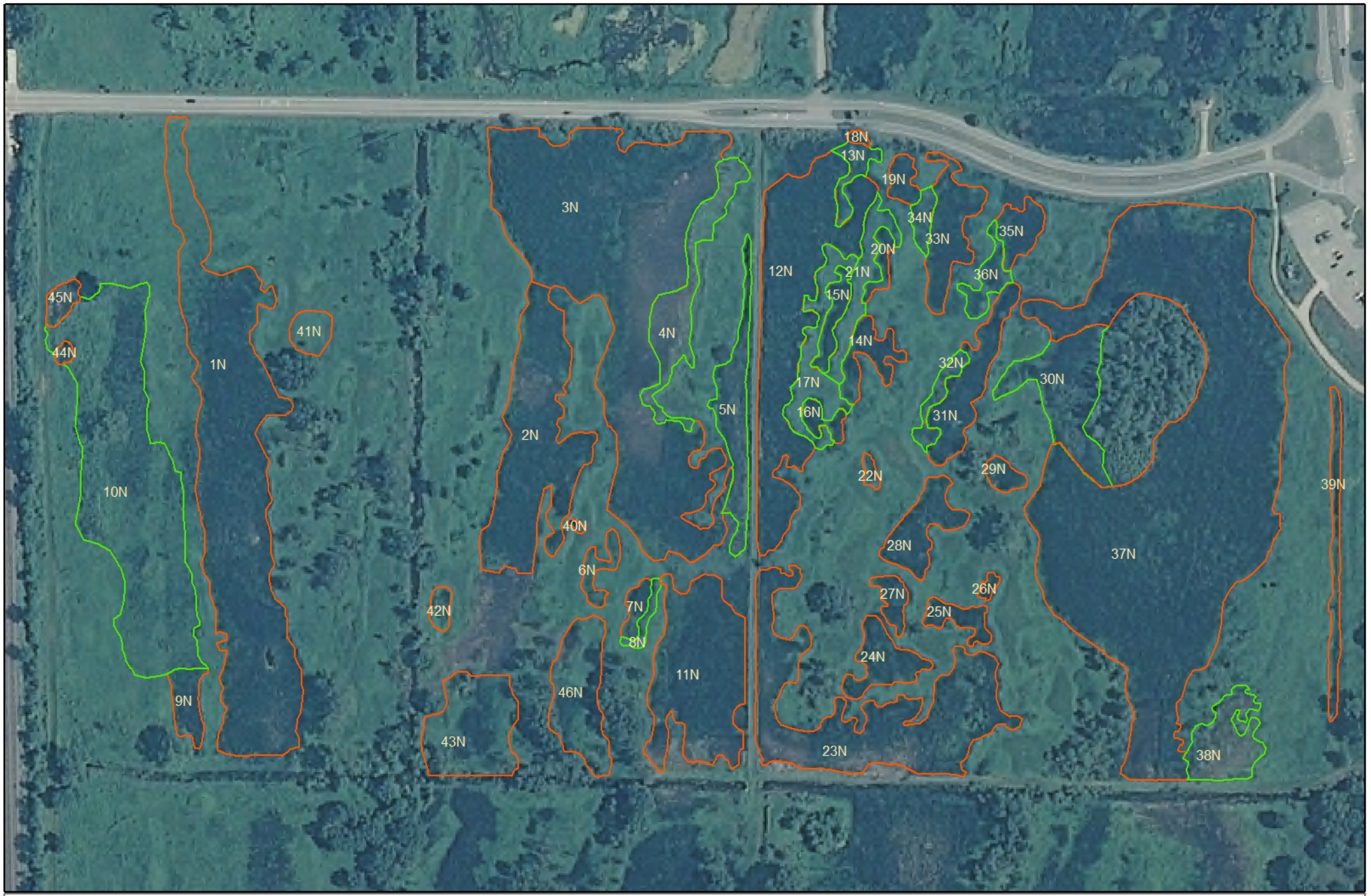

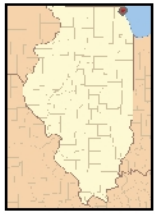

0 75 150 300 Feet

North Unit Cattail Polygons

High Density 26.3 acres

Low Density 7.4 acres

Illinois Beach State Park

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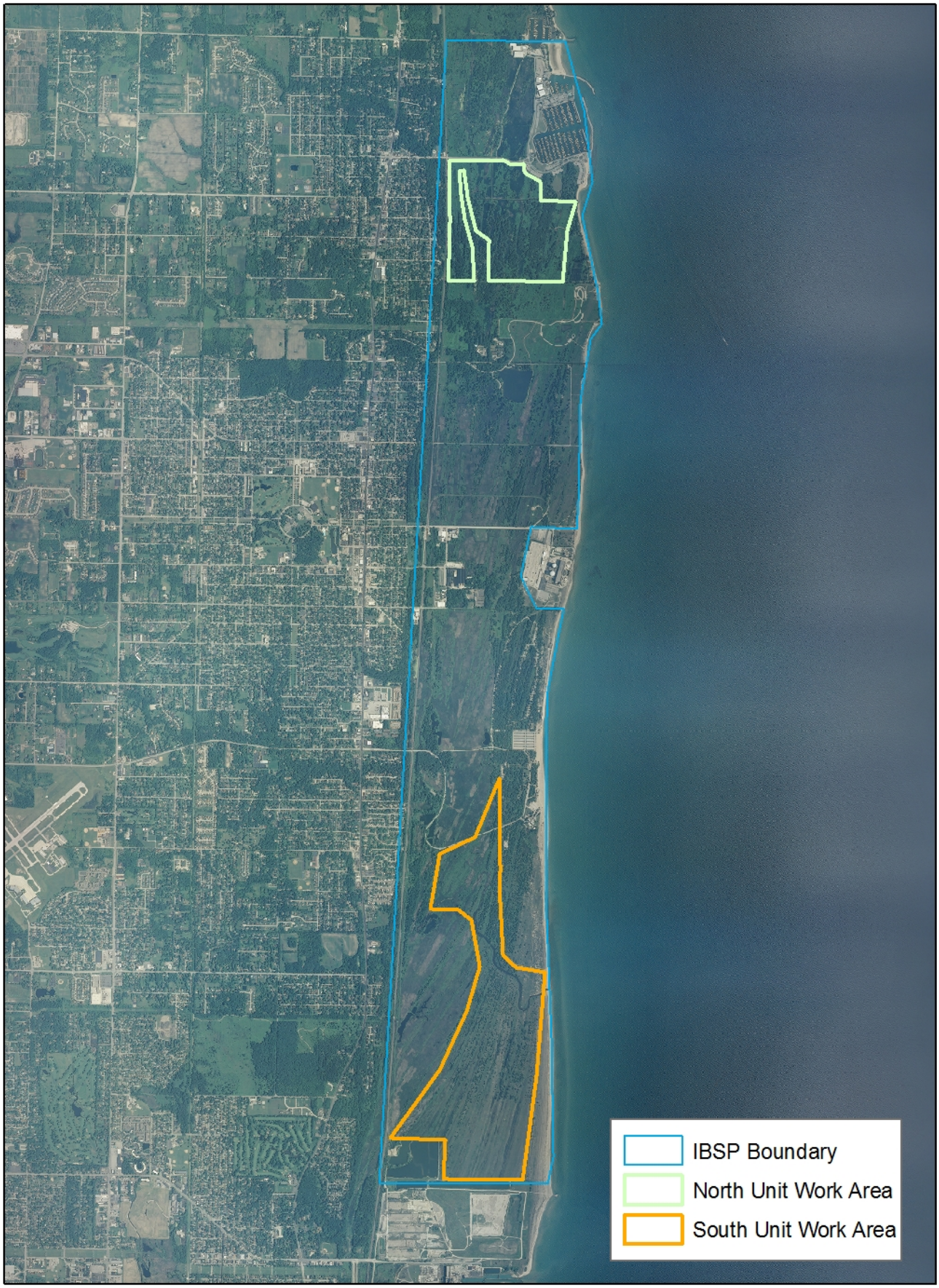
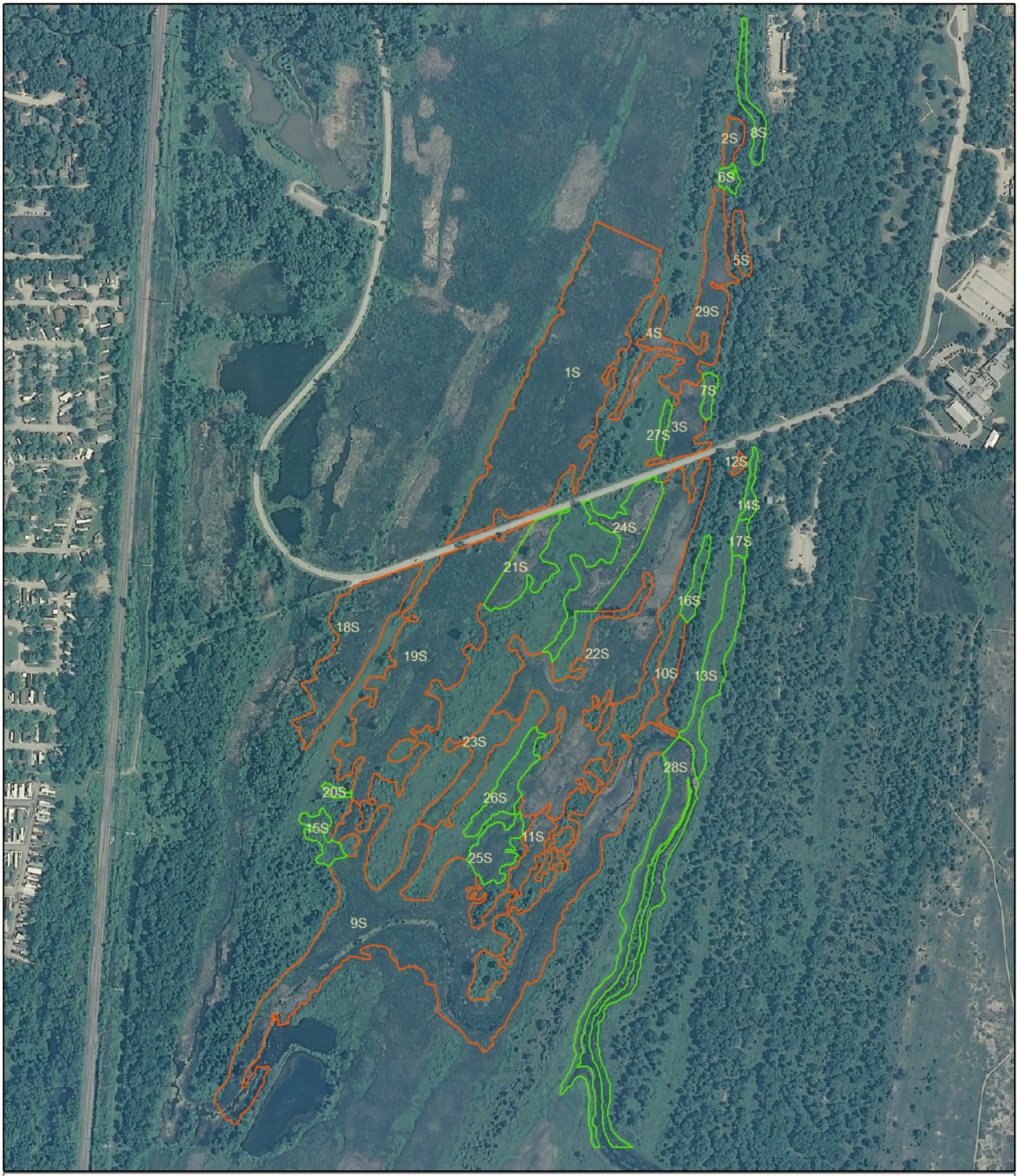
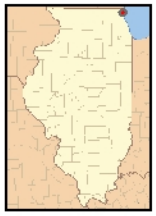

IBSP Boundary
North Unit Work Area
South Unit Work Area





0 170 340 680 Feet

South Unit Cattail Polygons

High Density 68.8 acres

Low Density 16.2 acres

Illinois Beach State Park

Contract Number RC10L06W

Cardno ENTRIX

03/25/2011 PR