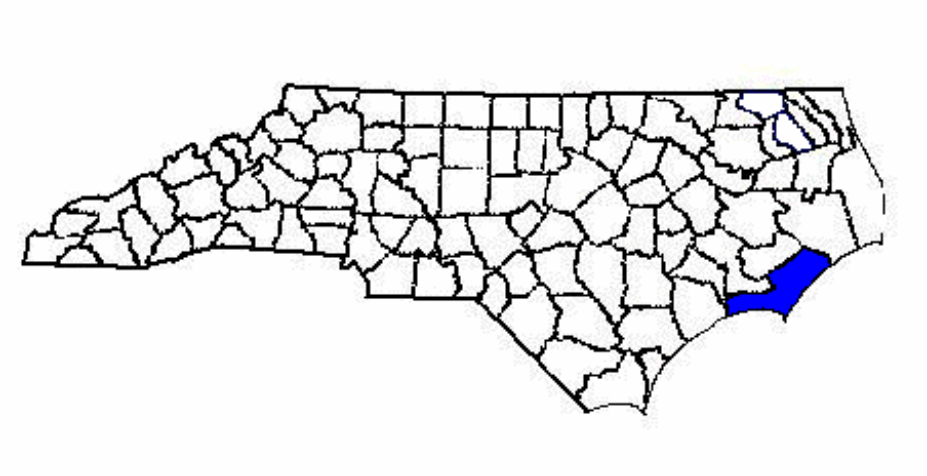
ANNUAL REPORT FOR 2006



Cedar Point Mitigation Site
Carteret County
TIP No. R-2105 AB

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North Carolina Department of Transportation
January 2007

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

SUMMARY

The Cedar Point Mitigation Site, located in Carteret County, serves as mitigation for marsh impacts within the White Oak River Basin. Located adjacent to NC 24, the site was constructed in 2002 and is in its fifth year of hydrology and fourth year of vegetation monitoring following construction. The site was monitored in 2006 for both hydrologic and vegetation success.

Hydrologic monitoring consisted of examining the data from two onsite surface gauges. The primary hydrologic input is surface water from an onsite channel that is connected to open water. Therefore, the hydrologic success criteria are based on site flooding. The site must flood with the same frequency and duration as adjacent marsh systems.

The fifth year of hydrology monitoring indicates that the Cedar Point Mitigation Site is functioning as planned. The surface gauges indicate that the site is being flooded twice daily during the growing season. An examination of the water levels over a two-day period (Figure 3) illustrated that the hydrologic success criteria has been met.

The site was tilled and replanted in May of 2003. Vegetation on site has improved greatly as seen in the photos. Frequency and coverage are on track for the fourth year of monitoring. *Spartina alterniflora* is coming in naturally throughout the site. The 2006 monitoring was completed when tide waters were receding.

Based on the hydrologic monitoring, the Cedar Point Mitigation Site met the success criteria for the site during the 2006-growing season. The site has demonstrated hydrologic success for five consecutive years. NCDOT proposes to discontinue hydrology monitoring but will continue to monitor the site for vegetation.

1.0 INTRODUCTION

1.1 Project Description

The Cedar Point Mitigation Site is located in Carteret County adjacent to both NC 24 and the White Oak River (Figure 1). The site was designed as an emergent marsh. A constructed channel within the site promotes tidal exchange within the mitigation area.

1.2 Purpose

In order to demonstrate successful mitigation, both the hydrologic and vegetation conditions of the new site must be monitored. This report details the hydrologic and vegetation monitoring on the Cedar Point Mitigation Site in 2006; this is the fifth year for hydrology monitoring and fourth year of vegetation monitoring following construction.

1.3 Project History

March-May 2002	Site Construction
May 2002	Site Planted
June 2002	Surface Gauges Installed
June-December 2002	Hydrologic Monitoring (Year 1)
August 2002	Vegetation Monitoring (Year 1)
May 2003	Site Tilled and Supplemental Planting
March-November 2003	Hydrologic Monitoring (Year 2)
August 2003	Vegetation Monitoring (Year 1 Restart)
March-November 2004	Hydrologic Monitoring (Year 3)
July 2004	Vegetation Monitoring (Year 2)
March-November 2005	Hydrologic Monitoring (Year 4)
August 2005	Vegetation Monitoring (Year 3)
March-November 2006	Hydrologic Monitoring (Year 5)
June 2006	Vegetation Monitoring (Year 4)

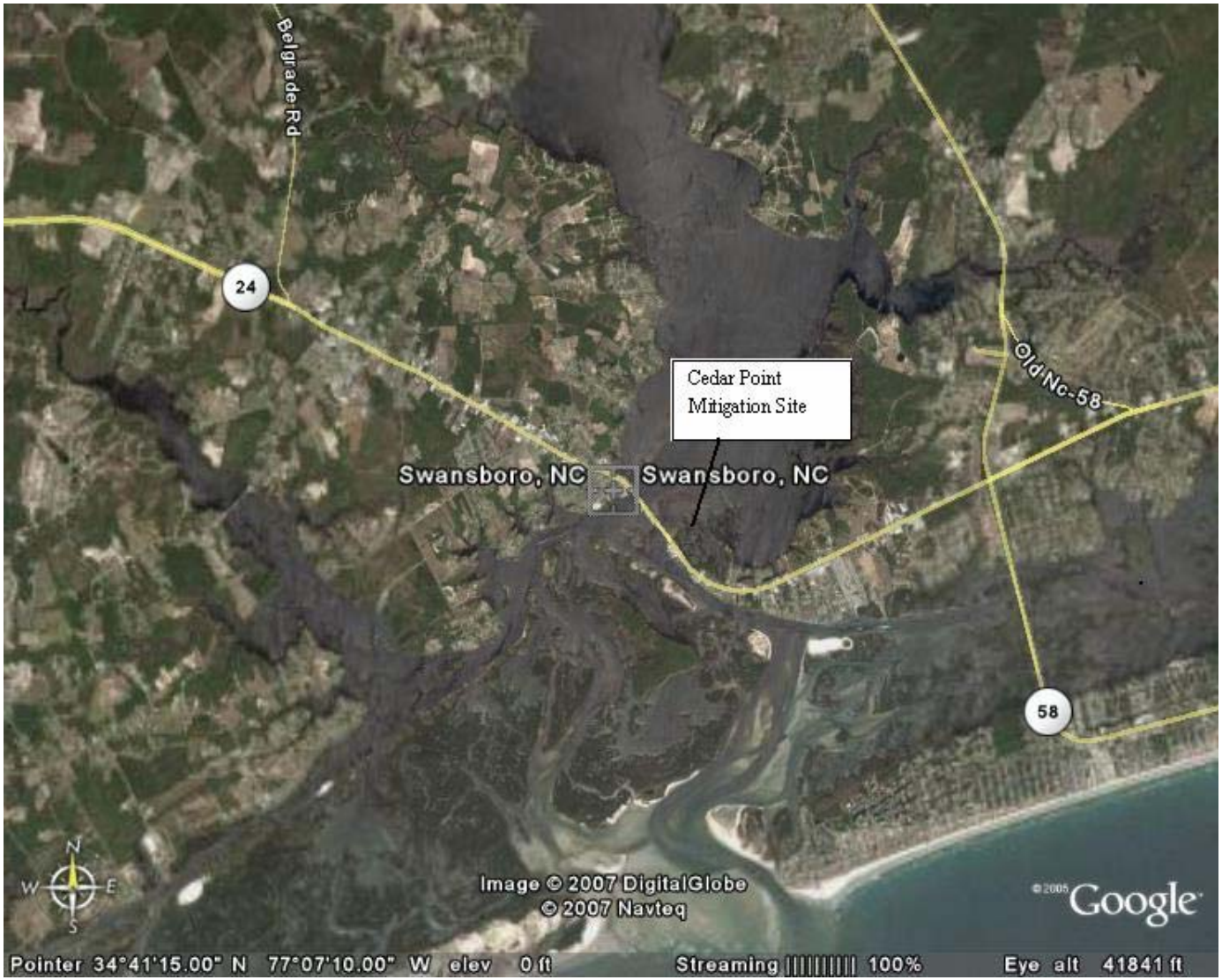


Figure 1. Site Location Map

2.0 HYDROLOGY

2.1 Success Criteria

Mitigation sites are often monitored according to federal wetland hydrology criteria, however, NCDOT and cooperating agencies decided that the Cedar Point Mitigation Site should be evaluated using different criteria. This is due to the site being located on the coast and it receives its primary hydrologic input from an onsite channel that is connected to open water. The site's flooding regime, if it is consistent with that outside of the mitigation area, will determine hydrologic success. The site must be flooded twice daily and have the same elevation and duration as flooding outside of the mitigation area in order to be considered successful. The site will be monitored for three years or until success criteria are met. Local rainfall is monitored to ensure site success in average local climate conditions, though rainfall is not the primary hydrologic input.

2.2 Hydrologic Description

Due to the site's proximity to the White Oak River, as well as the constructed channel designed to increase tidal exchange, the Cedar Point Site is monitored by surface water gauges (Figure 2). These gauges should indicate if the site is flooded twice daily as is required for success. The flooding regime of the site is expected to be the same as that measured for the biological benchmarks for *Spartina alterniflora*, since it can reflect long-term tidal fluctuations. A rain gauge was not installed as surface water is the primary hydrologic input to this site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

Appendix A contains plots of data recorded at both of the surface gauges on the site. The plots show the depth of surface water recorded by each gauge.

Figure 3 is a surface water plot of the data recorded at both gauges over a two-day period. This figure illustrates that flooding occurs twice daily as required in the permit conditions. The two days in the plot were chosen at random and are representative of conditions throughout the growing season.

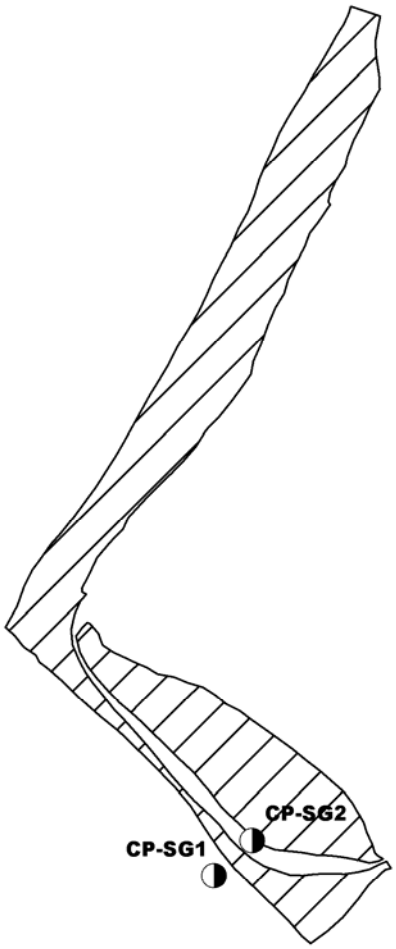


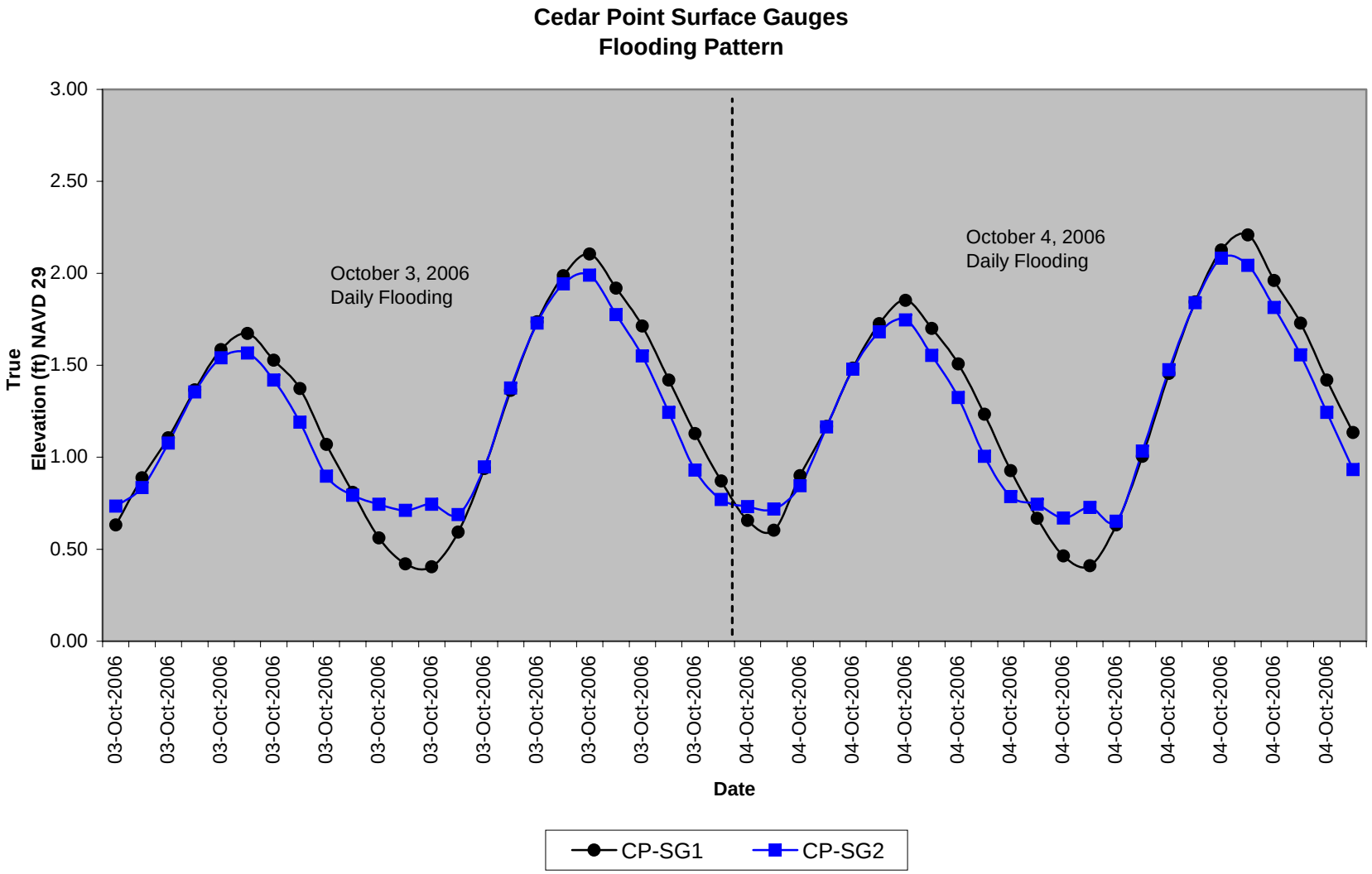
Figure 2. Gauge Location Map

◑ Surface Gauge

1:1,200
1 inch equals 100 feet
100 50 0 100
Feet

N

Figure 3. Plot of Daily Flooding Pattern



2.3.2 Climatic Data

A comparison of monthly rainfall for the period of January through November 2006 to historical precipitation (collected between 1975 and 2006) for Morehead City, North Carolina is represented in Figure 4. This comparison gives an indication of how 2006 relates to historical data in terms of climate conditions. The NC State Climate Office provided all of the local rainfall information.

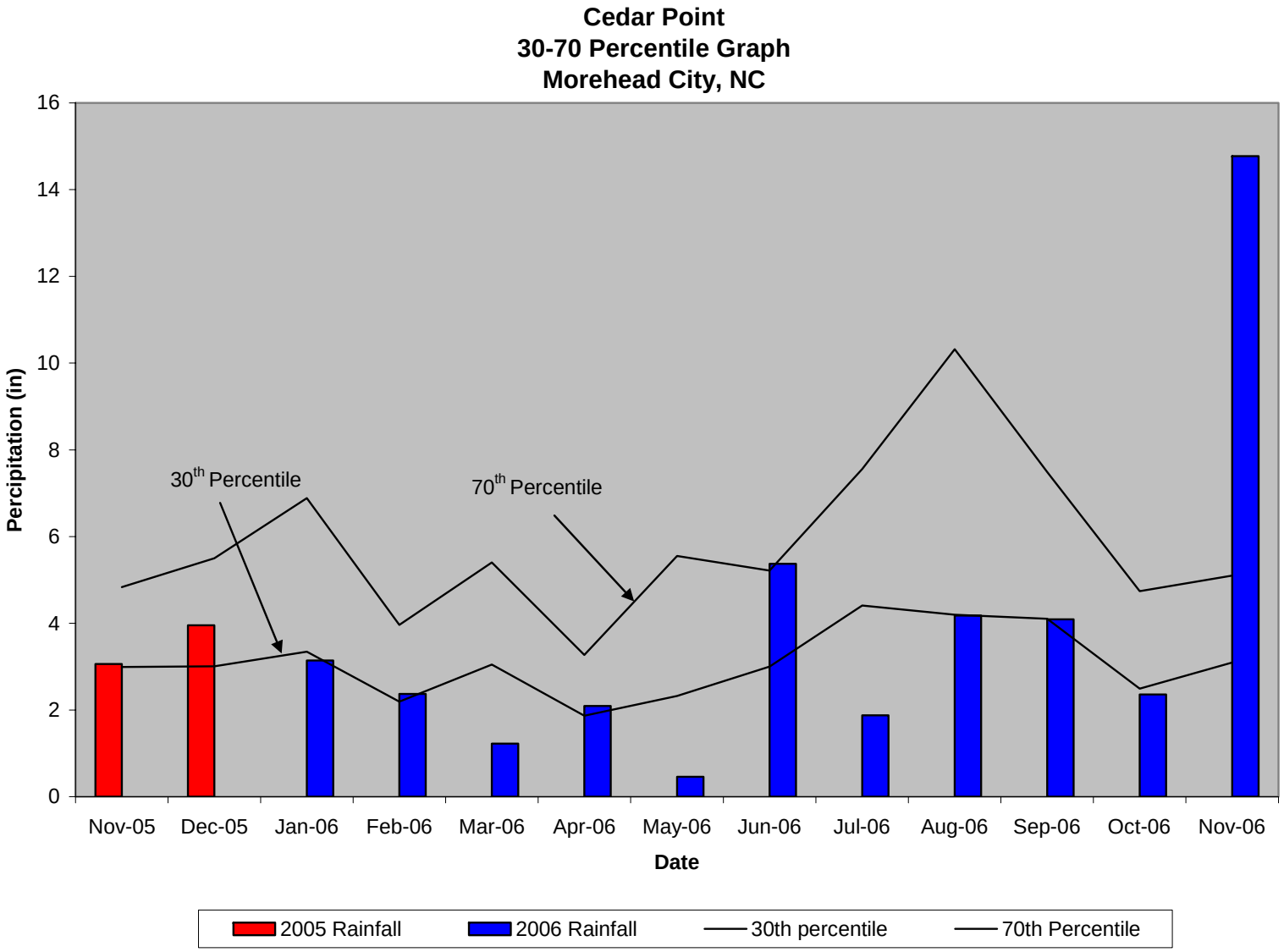
Precipitation is not the primary hydrologic input for the site; therefore, it is expected that the site would show the required flooding regardless of area rainfall totals.

2.4 Conclusions

The surface gauges indicate that the site is being flooded twice daily during the growing season. An examination of the water levels over a two-day period (Figure 3) illustrates that the site floods twice daily under average climatic conditions. The two days in the plot were chosen at random and are representative of typical conditions during the growing season.

This is the fifth consecutive year that the site hydrology has met the success criteria; therefore, NCDOT proposes to discontinue hydrologic monitoring.

Figure 4: 30-70 Percentile Graph



3.0 VEGETATION: CEDAR POINT MITIGATION SITE (YEAR 4 MONITORING)

3.1 Success Criteria

The site will meet the success criteria if the calculated value for frequency is 5.0 and the calculated value for average percent cover is at least 80% by the end of the fifth growing season.

3.2 Description of Species

The following species were planted in the Wetland Restoration Area:

Spartina alterniflora, Smooth Cordgrass

Spartina patens, Salt Meadow Hay

3.3 Results of Vegetation Monitoring

Table 1. Vegetation Monitoring Results

Plot #	Scale Factor	*Spartina patens*	*Spartina alterniflora*	Frequency	Comments
1	3.0		x	x	
2	5.0		x	x	
3	5.0		x	x	
4	5.0	x	x	x	Marsh-elder
5	3.0		x	x	
6	5.0		x	x	Glasswort
7	5.0		x	x	Glasswort, Marsh-elder
8	5.0		x	x	
9	4.0		x	x	
10	5.0		x	x	
11	0.0				Bare Ground
12	5.0		x	x	
13	5.0		x	x	Marsh-elder
14	5.0		x	x	
15	5.0		x	x	Glasswort
16	3.0	x	x	x	Glasswort
17	4.0		x	x	Glasswort
18	5.0		x	x	Glasswort
19					Open Water
20	5.0		x	x	
21	5.0		x	x	
22	5.0		x	x	
23	1.0		x	x	Glasswort
24	1.0		x	x	
25	5.0		x	x	Glasswort
26	5.0		x	x	
27	4.0		x	x	
28					Open Water
29					Open Water
30	1.0		x	x	
Frequency (Percentage of Plots		7.4%	96.3%	96.3%	
with Desired Species)					
Sum Scale Value				109.0	
Total Number of Plots				27	
Vegetative Cover (Scale Value)				4	

Site Notes: Other species noted: glasswort and marsh-elder. Tide waters were receding when site was being monitored.

3.4 Conclusions

Percent Frequency of Target Species **96.3 %**

Frequency of 80% required for year 5.

Vegetative Cover Scale Value **4**

Scale Value of 5 required for year 5.

The site was tilled and replanted in May of 2003. Vegetation on site has improved greatly as seen in the photos. Frequency and coverage are on track for the fourth year of vegetation monitoring. *Spartina alterniflora* is coming in naturally throughout the site.

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

The fifth year of hydrology monitoring indicates that the Cedar Point Mitigation Site is functioning as planned. The surface gauges indicate the site is being flooded twice daily during the growing season. An examination of the water levels over a two-day period (Figure 3) illustrates the site is flooding twice daily under normal conditions. The two days in the plot were chosen at random and represent typical conditions during the growing season.

The site was tilled and replanted in May of 2003. Vegetation on site has improved greatly as seen in the photos. Frequency and coverage are on track for the fourth year of vegetation monitoring. *Spartina alterniflora* is recruiting naturally into the site. The 2006 monitoring was completed when tide waters were receding.

Based on the hydrologic monitoring, the Cedar Point Mitigation Site met the success criteria for the site during the 2006-growing season. The site has demonstrated hydrologic success for five consecutive years. NCDOT proposes to discontinue hydrology monitoring and will continue to monitor the site for vegetation.

APPENDIX A
GAUGE DATA GRAPHS

APPENDIX B
SITE PHOTOS AND
PHOTO AND PLOT LOCATIONS MAP

Cedar Point

Photo 1

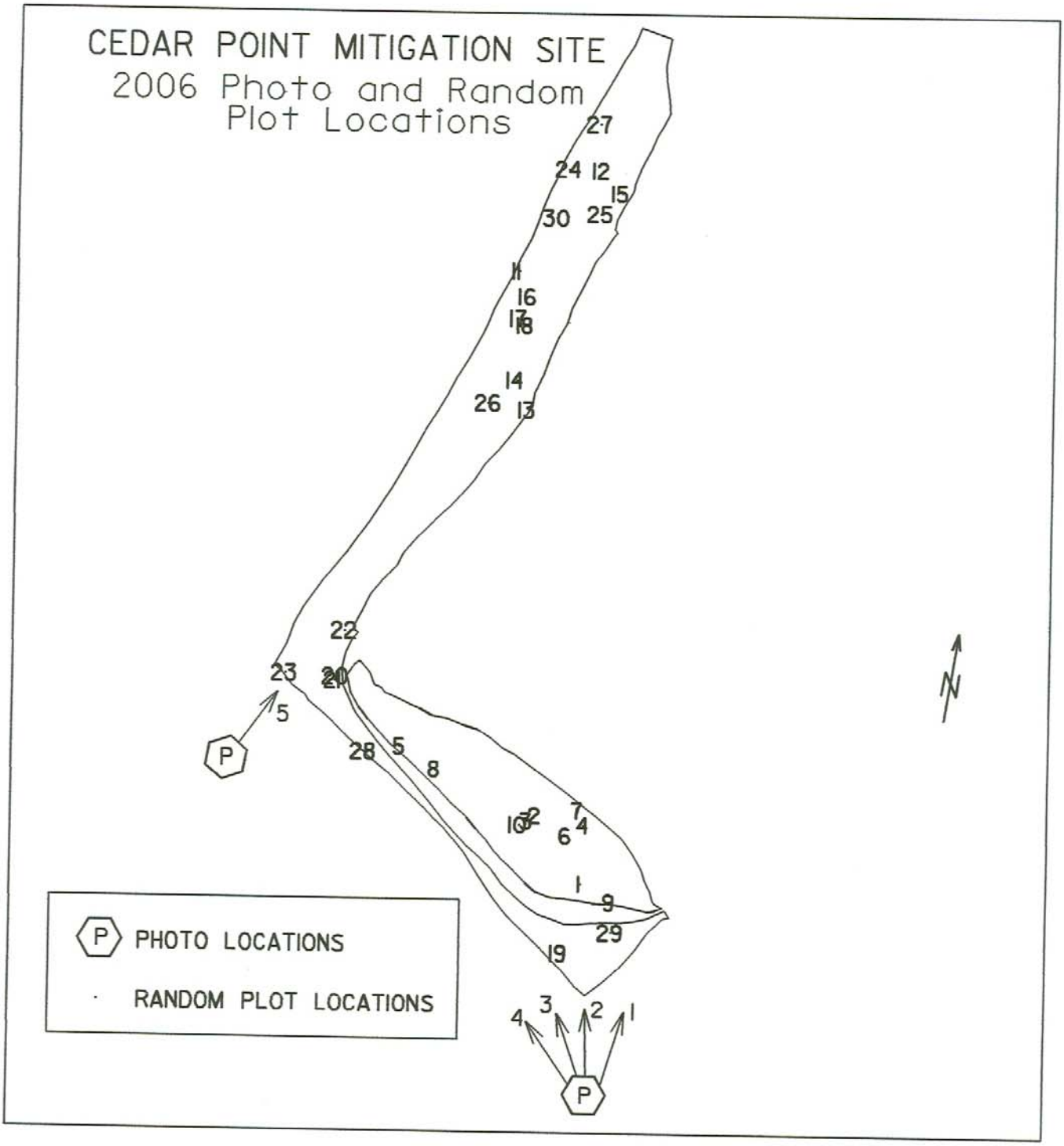
Photo 2

Photo 3

Photo 4

Photo 5

June 2006


CEDAR POINT MITIGATION SITE
2006 Photo and Random
Plot Locations
27
24
12
15
30
25
11
16
17
18
14
26
13
22
23
21
5
P
28
5
8
10
2
7
4
6
1
9
29
19
3
2
1
4
P
N
P PHOTO LOCATIONS
RANDOM PLOT LOCATIONS