

# ANNUAL REPORT FOR 2004



**Cedar Point Mitigation Site  
Carteret County  
Project No. 6.16901T  
TIP No. R-2105 AB**



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TABLE OF CONTENTS

SUMMARY ..... 1

1.0 INTRODUCTION ..... 2

    1.1 Project Description ..... 2

    1.2 Purpose ..... 2

    1.3 Project History ..... 2

2.0 HYDROLOGY ..... 4

    2.1 Success Criteria ..... 4

    2.2 Hydrologic Description ..... 4

    2.3 Results of Hydrologic Monitoring ..... 4

        2.3.1 Site Data ..... 4

        2.3.2 Climatic Data ..... 7

    2.4 Conclusions ..... 7

3.0 VEGETATION ..... 9

    3.1 Success Criteria ..... 9

    3.2 Description of Species ..... 9

    3.3 Results of Vegetation Monitoring ..... 10

    3.4 Conclusions ..... 11

4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS ..... 11

FIGURES

FIGURE 1. SITE LOCATION MAP ..... 3

FIGURE 2. GAUGE LOCATION MAP ..... 5

FIGURE 3. PLOT OF DAILY FLOODING PATTERN ..... 6

FIGURE 4. 30-70 PERCENTILE GRAPH ..... 8

APPENDICES

APPENDIX A. GAUGE DATA GRAPHS

APPENDIX B. SITE PHOTOS AND PHOTO POINT LOCATIONS

## 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 third year of monitoring following construction. The site was monitored in 2004 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 twice daily with the same frequency and duration as adjacent marsh systems.

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

Vegetation has improved greatly since the site was replanted in May 2003. The frequency and average percent cover is on track for the second year of monitoring. *Spartina alterniflora* is coming in naturally in higher elevations outside of the silt fence.

A silt fence was installed during construction to prevent erosion. It will be removed prior to the start of the growing season.

NCDOT will continue to monitor for hydrology and vegetation at the Cedar Point Mitigation Site.

## 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 2004; this is the third year that the site has been monitored 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 (1 yr.)
August 2002	Vegetation Monitoring (1 yr.)
May 2003	Site Tilled and Supplemental Planting
March-November 2003	Hydrologic Monitoring (2 yr.)
August 2003	Vegetation Monitoring (1yr. Restart)
March-November 2004	Hydrologic Monitoring (3 yr.)
July 2004	Vegetation Monitoring (2 yr.)



Figure 1. Site Location Map

## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

Though most mitigation sites are monitored according to federal wetland hydrology criteria, NCDOT and cooperating agencies decided that the Cedar Point Mitigation Site should be evaluated using different criteria. This is due mainly to the fact that the site is 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.

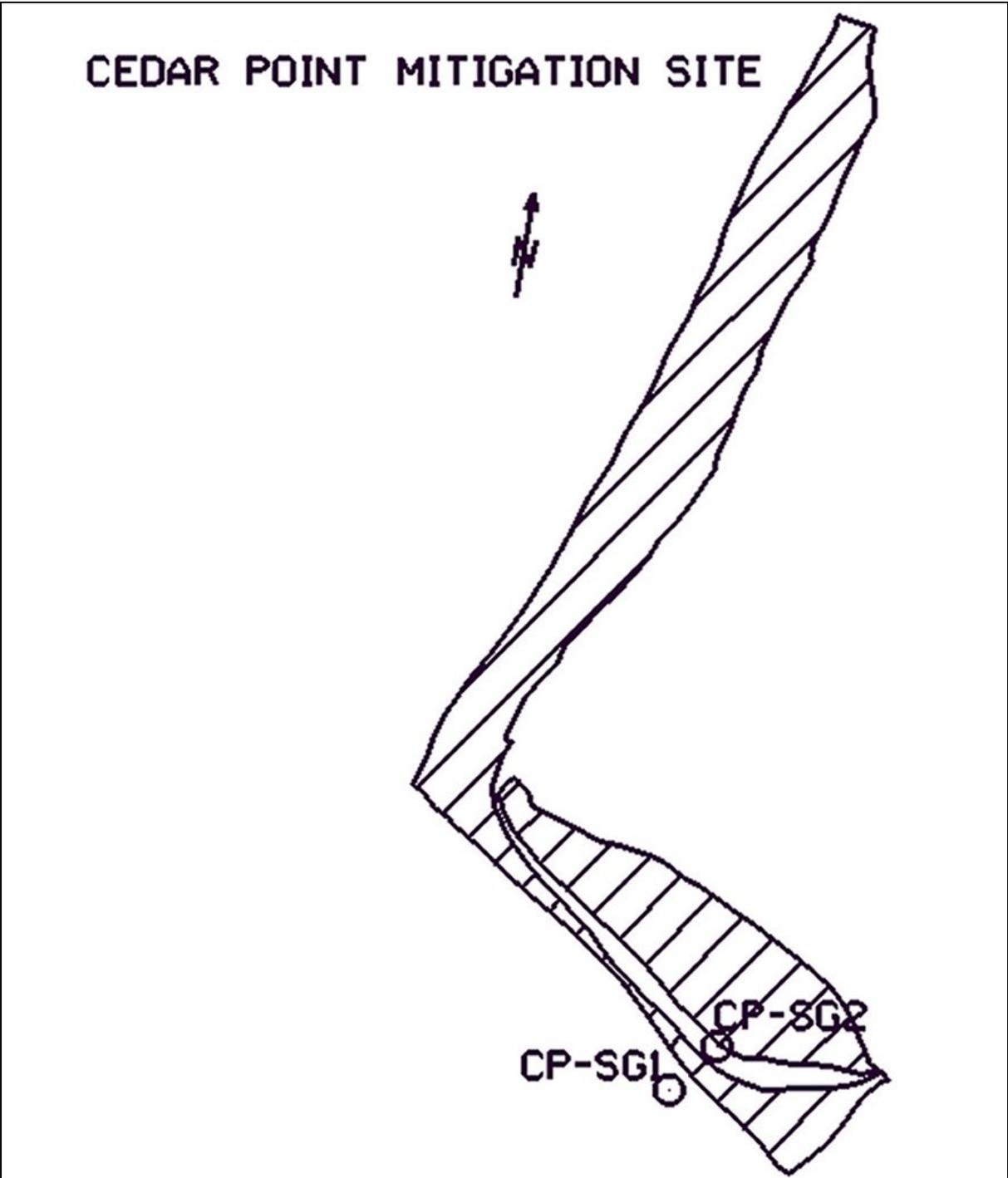
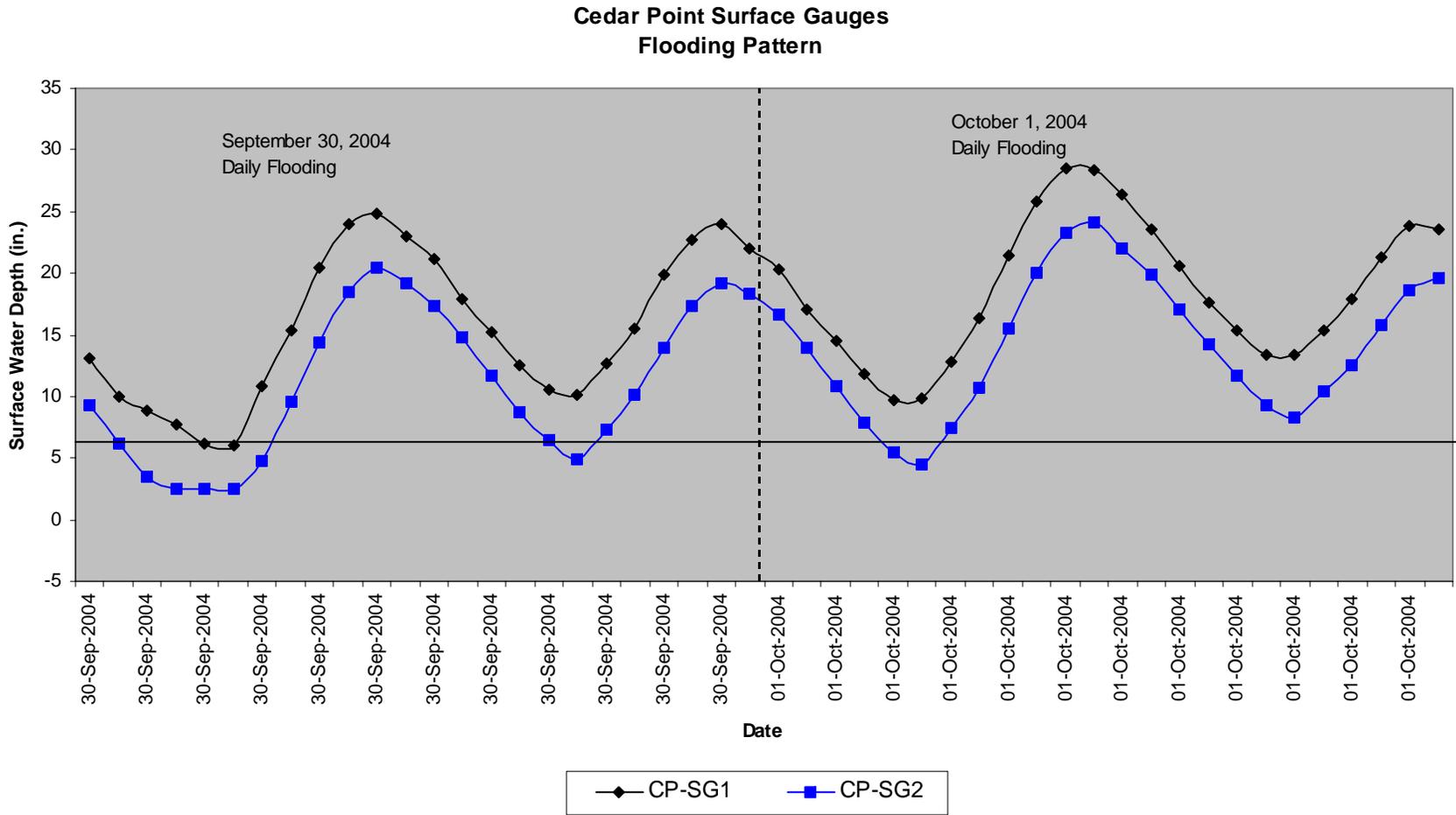


Figure 2. Gauge Location Map

Figure 3. Plot of Daily Flooding Pattern (2-day period shown)



### **2.3.2 Climatic Data**

Figure 4 is a comparison of monthly rainfall (November 2003- August 2004) to historical precipitation for the area. The rainfall data for the months of September-November 2004 were not available, therefore were not included in the graph. The two lines represent the 30<sup>th</sup> and 70<sup>th</sup> percentiles of monthly precipitation for Morehead City, NC. These percentiles represent monthly rainfall data collected between 1973 and 2004. The State Climate Office of North Carolina at NC State University provided the data.

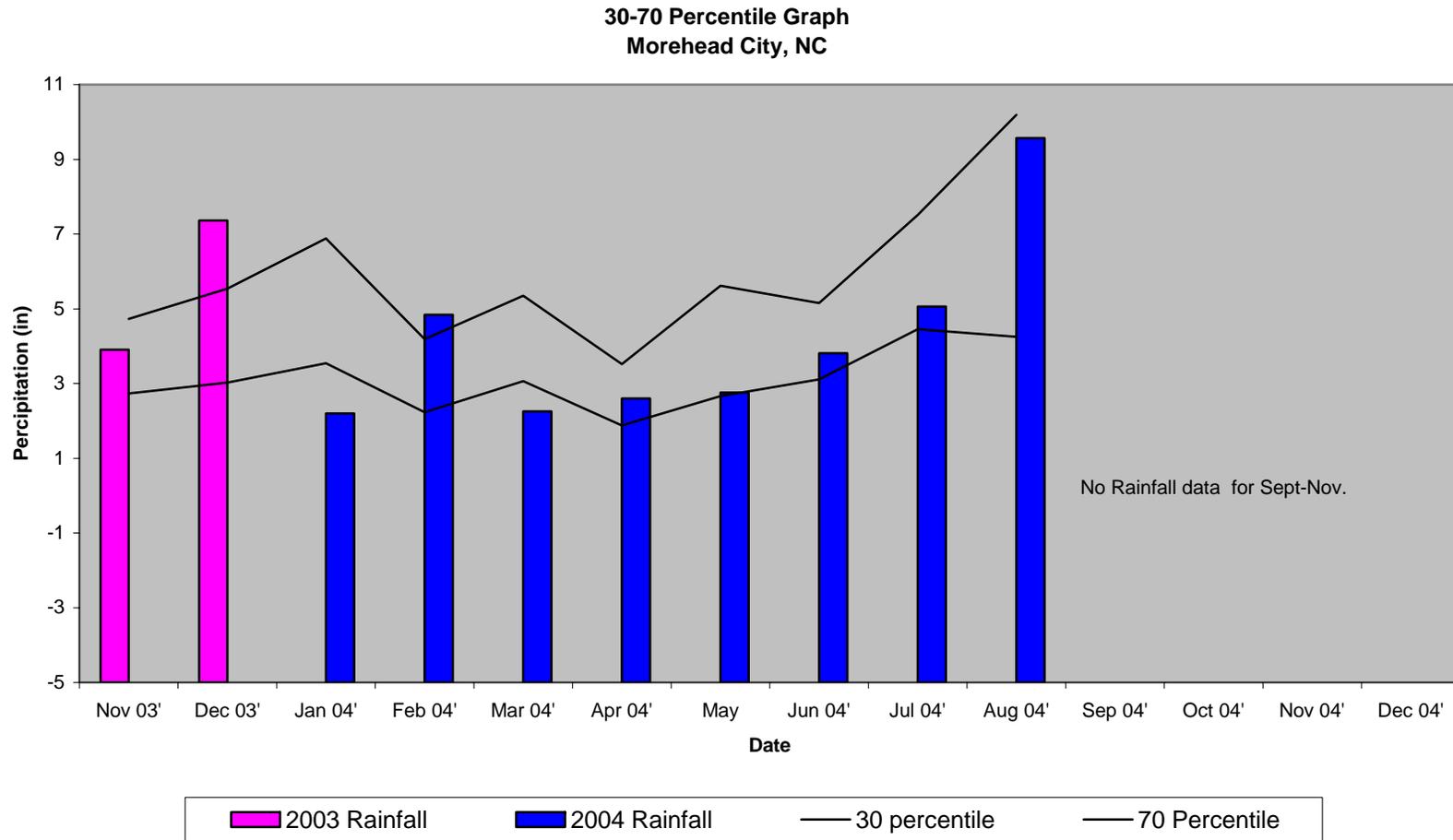
For the 2004-year, December (03') and February experienced above average rainfall. The months of January, March and May recorded below average rainfall for the site. November (03'), April, June, July, and August experienced average rainfall. Overall, the site met the hydrologic criteria in a year of average climate conditions. However, precipitation is not the primary hydrologic input for the site; thus, 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.

NCDOT will continue hydrology monitoring at Cedar Point Mitigation Site.

Figure 4. 30-70 Percentile Graph



### **3.0 VEGETATION: CEDAR POINT MITIGATION SITE (YEAR 2 MONITORING)**

#### **3.1 Success Criteria**

The site will be considered a success 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

Plot #	Scale Factor	<i>Spartina patens</i>	<i>Spartina alterniflora</i>	Frequency	Comments
1	4.0		■	■	
2	4.0		■	■	
3	0.0				Bare Ground
4	4.0		■	■	
5	0.0				Bare Ground
6	4.0		■	■	
7	4.0		■	■	
8	3.0		■	■	
9	4.0		■	■	
10	0.0				Bare Ground
11	3.0		■	■	
12	3.0	■	■	■	
13	5.0		■	■	
14					Open Water
15	4.0		■	■	
16	5.0		■	■	
17	4.0		■	■	
18	4.0		■	■	
19	5.0		■	■	
20	3.0		■	■	
21	3.0		■	■	
22	3.0		■	■	
23	5.0		■	■	
24					Open Water
25	4.0				
26	5.0		■	■	
27	5.0		■	■	
28	5.0		■	■	
29	5.0		■	■	
30	0.0				Bare Ground
Frequency (Percentage of Plots with Desired Species)		3.6%	82.1%	82.1%	
Sum Scale Value				98.0	
Total Number of Plots				28	
Vegetative Cover (Scale Value)				3.5	

**Site Notes:** Other species noted: Glasswort

### **3.4 Conclusions**

Vegetation on the Cedar Point Site has improved greatly since tilling, replanting, and fertilization in May 2003. This can be seen in photos 1, 2, and 5. Frequency and coverage are on track to meet the success criteria. *Spartina alterniflora* is coming in naturally in higher elevations, outside of the silt fence.

A silt fence was installed during construction to prevent erosion. It will be removed prior to the start of the growing season.

NCDOT will continue to monitor vegetation on the Cedar Point Mitigation Site.

### **4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS**

The third 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) illustrates that the site is flooding twice daily under average climatic conditions. The two days in the plot were chosen at random and represent typical conditions during the growing season.

Vegetation has improved greatly since the site was replanted in May of 2003. The frequency and average percent cover is on track for the second year of monitoring. *Spartina alterniflora* is coming in naturally in higher elevations, outside of the silt fence.

A silt fence was installed during construction to prevent erosion. It will be removed prior to the start of the growing season.

NCDOT will continue to monitor for hydrology and vegetation at the Cedar Point Mitigation Site.

**APPENDIX A**  
**GAUGE DATA GRAPHS**

**APPENDIX B**  
**SITE PHOTOS AND PHOTO POINT LOCATIONS**

# Cedar Point



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5

CEDAR POINT MITIGATION SITE  
2004 Photo and Random  
Plot Locations

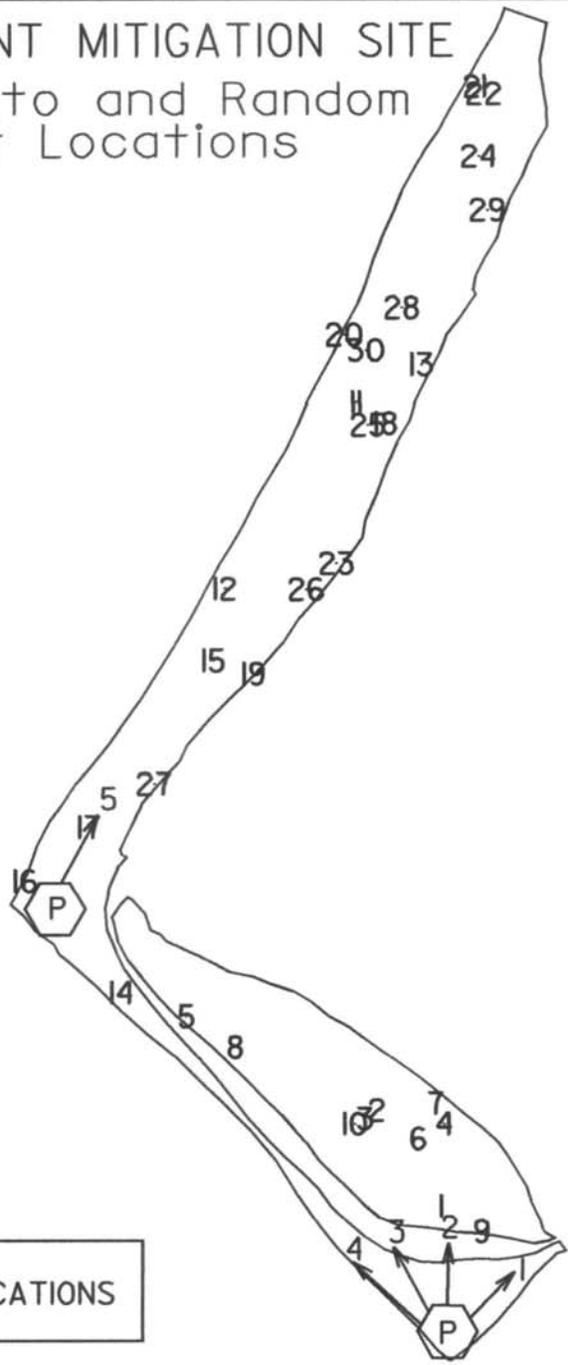


 PHOTO LOCATIONS