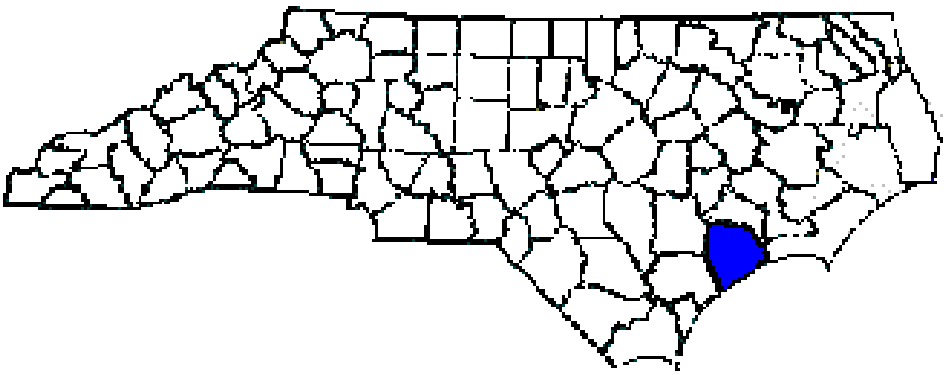
ANNUAL REPORT FOR 2008



Stella Bridge Mitigation Site
Onslow County
TIP No. B-2938

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North Carolina Department of Transportation
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SUMMARY

The following report summarizes the monitoring activities that have occurred in the 2008-year at the Stella Mitigation Site. The 2008-year represents the third year of hydrology and vegetation monitoring following construction. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful. The site was constructed to serve as mitigation for future impacts in the White Oak River Basin.

The site must be monitored for five years following site construction or until success criteria are met. The success of the marsh vegetation component of the wetland site will be determined in accordance with National Marine Fisheries Service guidelines. The site is monitored with thirty vegetation plots and four surface water monitoring gauges.

In March 2006, four surface water gauges were installed to monitor hydrology on the site. Two of the surface gauges were positioned in the restoration portion of the mitigation site. Two surface gauges were installed as reference gauges within the adjacent preservation area.

Hydrologic success criteria is based on the approved mitigation plan and requires the establishment of hydrologic conditions comparable in hydrologic frequency and duration to those of the existing reference wetlands adjacent to the areas being restored. Hydrographs from the gauges in the reference marsh will then be compared to those in the restored marsh as a component of the annual monitoring report. The 2008-year represents the third year of hydrologic monitoring for the Stella Bridge Site. The two surface water monitoring gauges showed periods of inundation similar to that of the two reference gauges during the 2008 monitoring year

For the vegetation monitoring for the marsh grass area, the target species and scale values were 90% and 4.8, respectively.

Based on the results from the third year of monitoring, NCDOT will continue to monitor vegetation and hydrology at the Stella Bridge Mitigation Site during 2009.

1.0 INTRODUCTION

1.1 Project Description

The site was constructed to serve as mitigation for future impacts in the White Oak River Basin. The Stella Bridge site is located adjacent to the newly constructed bridge over the White Oak River on SR 1101 in Carteret County and SR 1442 in Onslow County (see Figure 1). As a component of the project, the existing causeway was removed and the area graded to the elevation of the adjacent wetland. Within the project area, a brackish marsh lies along the southern and western bank of the White Oak River. Existing marsh vegetation primarily consists of big cordgrass (*Spartina cynosuroides*), black needle rush (*Juncus roemerianus*) and saltmeadow cordgrass (*Spartina patens*) along the edges of the causeway. An occasional Eastern red cedar (*Juniperus virginiana*), wax myrtle (*Myrica cerifera*), and yaupon holly (*Ilex vomitoria*) exist throughout the marsh.

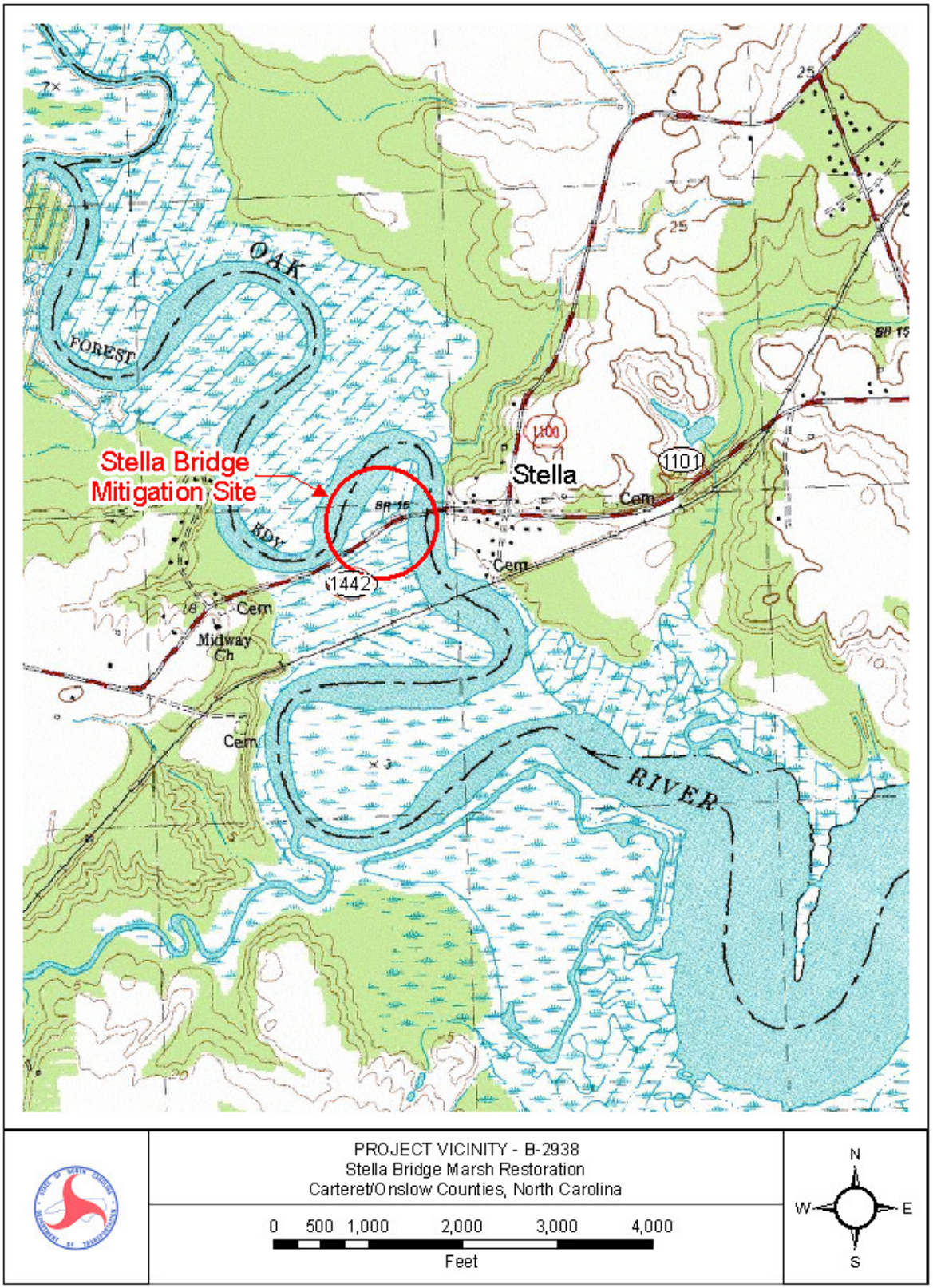
1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Vegetation success criteria are based on the National Marine Fisheries Service guidelines. Hydrologic success criteria is based on the approved mitigation plan and requires the establishment of hydrologic conditions comparable in hydrologic frequency and duration to those of the existing reference wetlands adjacent to the areas being restored. Hydrographs from the gauges in the reference marsh will then be compared to those in the restored marsh as a component of the annual monitoring report. Included in this report are analyses of hydrologic and vegetation-monitoring results and site photographs.

1.3 Project History

February 2006	Site Constructed
March 2006	Monitoring Gauges Installed
May 2006	Site Planted
March-November 2006	Hydrologic Monitoring (Year 1)
July 2006	Marsh Vegetation Monitoring (Year 1)
March-November 2007	Hydrologic Monitoring (Year 2)
July 2007	Marsh Vegetation Monitoring (Year 2)
October 2008	Marsh Vegetation Monitoring (Year 3)
March-November 2008	Hydrologic Monitoring (Year 3)

Figure 1. Site Location Map



2.0 HYDROLOGY

2.1 Success Criteria

The hydrologic success criteria is based on the approved mitigation plan and requires the establishment of hydrologic conditions comparable in hydrologic frequency and duration to those of the existing reference wetlands adjacent to the areas being restored. Hydrographs from the gauges in the reference marsh will then be compared to those in the restored marsh as a component of the annual monitoring report.

2.2 Hydrologic Description

Hydrologic monitoring occurs throughout the growing season in the restoration area by using surface water gauges. Two surface water gauges were placed in the restored Brackish Marsh area. Two surface water gauges were placed in the reference Brackish Marsh area located within the project area. Hydrologic success criteria was based on the establishment of hydrologic conditions comparable in hydrologic frequency and duration to those of the existing reference wetlands. The surface water gauges record surface water levels every three hours. Monitoring data for 2008 represents the third year of hydrologic monitoring for the site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

Groundwater monitoring was not required as a component of the Stella Bridge mitigation site. Only surface water monitoring gauges were installed per the permit conditions. Appendix A includes graphs of the data recorded at each surface water gauge. Both of the surface gauges as well as the two reference gauges show that the site is demonstrating frequent periods of inundation.

2.3.2 Climatic Data

Precipitation is not the primary hydrologic input for this site and was not included in this report. It is expected that the site would show the required periods of inundation regardless of area rainfall totals.

2.4 Conclusions

The 2008-year represents the third year of hydrologic monitoring for the Stella Mitigation Site. Both of the surface water gauges indicated inundation patterns similar to that of reference gauges.

NCDOT will continue to monitor the Stella Bridge Mitigation Site for hydrology in 2009.

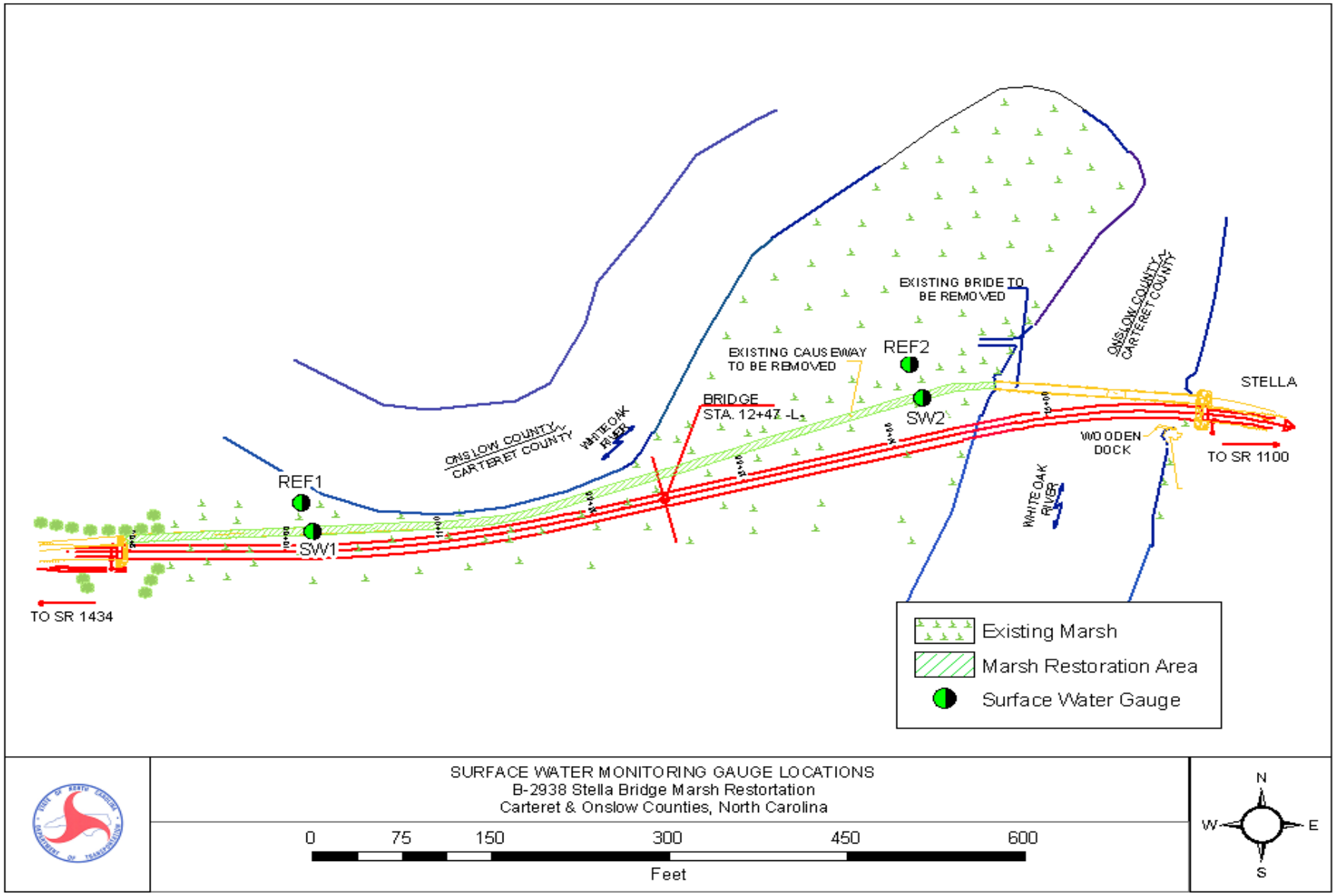


Figure 2. Monitoring Gauge Location Map

3.0 VEGETATION: STELLA BRIDGE MITIGATION SITE (YEAR 3 MONITORING)

3.1 Success Criteria

The vegetative marsh success of the wetland site will be determined in accordance with NMFS Guidelines. Monitoring plots found to be located within the open water channel will not be evaluated and will not count toward the final count of plots. The vegetation component of the wetland site will be deemed successful if the following criteria are met:

1. At year five, the average of all plots should have a scale value of 5 (>75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species.
2. A minimum of 70% of the plots shall contain the target (planted) species.

3.2 Description of Species

The following marsh grass species were planted in the Wetland Restoration Area:

Spartina cynosuroides, Big Cordgrass

Spartina patens, Saltmeadow Cordgrass

Juncus roemerianus, Black Needle Rush

3.3 Results of Vegetation Monitoring

Table 1. Vegetative Monitoring Results

Plot #	Scale Factor	*Spartina cynosuroides*	*Spartina patens*	*Juncus roemerianus*	Frequency	Comments (other species noted)
1	5.0			⇨	⇨	
2	5.0		⇨	⇨	⇨	Marsh-elder
3	5.0			⇨	⇨	
4	5.0			⇨	⇨	
5	4.0					Marsh-elder, Saltgrass
6	5.0			⇨	⇨	
7	5.0					Marsh-elder, Saltgrass
8	5.0			⇨	⇨	
9	5.0			⇨	⇨	
10	5.0			⇨	⇨	
11	5.0			⇨	⇨	
12	5.0			⇨	⇨	
13	5.0		⇨	⇨	⇨	
14	3.0		⇨		⇨	
15	5.0		⇨		⇨	
16	5.0			⇨	⇨	Saltgrass
17	5.0		⇨		⇨	Marsh-elder, Saltgrass
18	5.0			⇨	⇨	
19	5.0		⇨	⇨	⇨	
20	4.0			⇨	⇨	Saltgrass
21	5.0			⇨	⇨	Saltgrass
22	5.0		⇨	⇨	⇨	Saltgrass
23	5.0			⇨	⇨	Saltgrass
24	4.0		⇨		⇨	
25	5.0			⇨	⇨	Smooth Cordgrass, Saltgrass
26	5.0	⇨		⇨	⇨	Saltgrass
27	5.0					Marsh-elder, Saltgrass, Pennywort
28	5.0		⇨	⇨	⇨	Marsh-elder, Saltgrass
29	5.0	⇨	⇨		⇨	
30	5.0			⇨	⇨	
Frequency (Percentage of Plots with Desired Species)					90.0%	
Sum Scale Value					145.0	
Total Number of Plots					30	
Vegetative Cover (Scale Value)					4.8	

3.4 Conclusions

Percent Frequency of Target Species **90 %**
Frequency of 70% required.

Vegetative Cover Scale Value **4.8**

Scale Value of 5 required for year 5.

The site was planted in May 2006. Planted vegetation is surviving and beginning to spread throughout the site. Frequency and coverage are on track for year two.

NCDOT proposes to continue vegetation monitoring at the Stella Bridge Mitigation Site.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2008-year represents the third year of hydrologic monitoring for the Stella Bridge Mitigation Site. The two surface water restoration gauges were compared to the two reference gauges. Both of the surface water gauges indicated inundation patterns similar to that of reference gauges.

For the vegetation monitoring in the marsh grass area, the target species and scale values were 90% and 4.8, respectively. Frequency and coverage are on track for the third year of monitoring.

NCDOT will continue to monitor the Stella Bridge Mitigation Site for vegetation and hydrology in 2009.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

PHOTO AND VEGETATION PLOT LOCATIONS, SITE PHOTOS

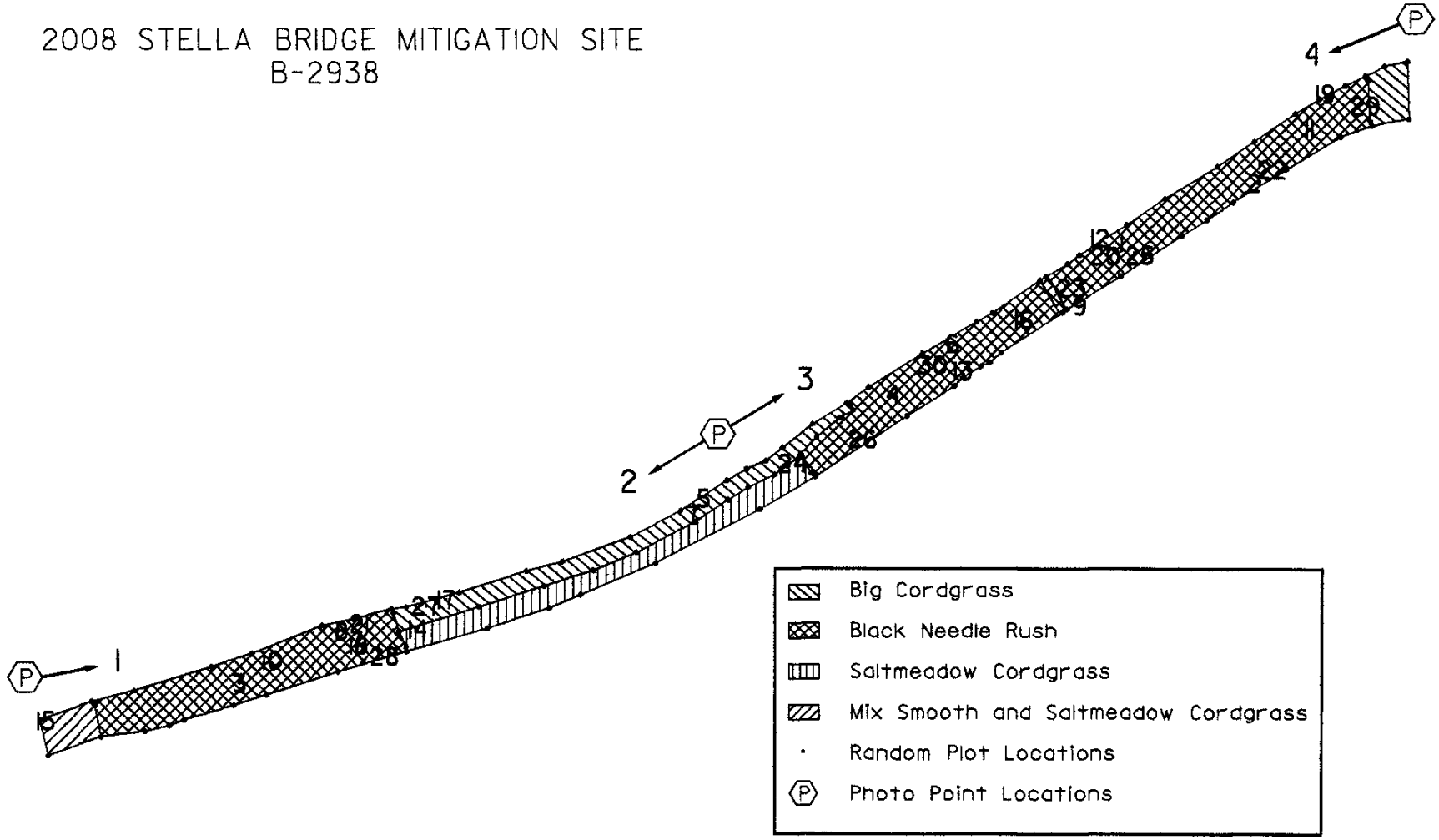
Stella Bridge

Photo 1

Photo 2

Photo 3

Photo 4

July 2007

2008 STELLA BRIDGE MITIGATION SITE
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