

# ANNUAL REPORT FOR 2001



**Casey Tract Mitigation Site  
Currituck County  
Project No. 6.049001T  
TIP No. R-2228**



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## TABLE OF CONTENTS

SUMMARY .....	1
1.0 Introduction .....	2
.1 Project Description .....	2
.2 Purpose .....	2
.3 Project History .....	2
.4 Debit Ledger .....	3
2.0 Hydrology .....	5
.1 Success Criteria .....	5
.2 Hydrologic Description .....	5
.3 Results of Hydrologic Monitoring.....	6
.3.1 Site Data .....	6
.3.2 Climatic Data.....	8
.4 Conclusions .....	8
3.0 Vegetation: Casey Mitigation Site .....	11
.1 Success Criteria .....	11
.2 Description of Species.....	11
.3 Results of Vegetation Monitoring .....	12
.4 Conclusions . .....	13
4.0 Overall Conclusions and Recommendations .....	14

## TABLES

Table 1 – Hydrologic Monitoring Results .....	6
Table 2 – Vegetation Random Plots .....	12

## FIGURES

Figure 1 – Site Location Map .....	4
Figure 2 – Monitoring Gauge Location Map .....	7
Figure 3 – 2001 Hydrologic Monitoring Results .....	9
Figure 4 – 30 – 70 Percentile Graph.....	10
Figure 5 – Photo, Random Plot Locations and Planting Plan .....	29

## APPENDICES

Appendix A – Depth to Groundwater Plots .....	15
Appendix B – Site Photos .....	26

## **SUMMARY**

The following report summarizes the monitoring activities that have occurred in the past year at the Casey Tract Mitigation Site. This is the fourth year the vegetation has been monitored, and it is the third year the site has been monitored for hydrologic success. The site must demonstrate both hydrologic and vegetation success for five years.

The Casey Tract contains four surface gauges, one rain gauge and six groundwater-monitoring gauges. The site also contains 3 vegetation monitoring transects.

Hydrologic monitoring indicated that of the ten gauges on site, eight indicated inundation or saturation for over 12.5% of the growing season, while monitoring gauge 5, located in the reference wetland, indicated inundation or saturation for 2.5%. Monitoring gauge 3 is located in the upland portion of the site; therefore, saturation occurred for less than 5% of the growing season. The NCDOT recommends removing gauge 3 from the site because it is located in the upland portion of the site.

Vegetation monitoring was performed on the approximately 3.5 acres of marsh creation on this site. Based on the results of the fourth year of monitoring, the percent frequency of target species is 94.1%. This is above the required frequency (70%) stated in the 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 to the final count of plots. The vegetation component of the wetland site will be deemed successful if, at year five, the average of all plots have a scale value of 5 (75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species, and a minimum of 70% of the plots contain the target (planted) species.

Based on the monitoring results from the 2001 growing season, NCDOT recommends that hydrologic and vegetation monitoring continue.

## 1.0 INTRODUCTION

### 1.1 Project Description

The Casey Tract Mitigation Site is located in Currituck County (Figure 1) and is approximately 24 acres in size. It is designed to mitigate for the widening of NC 168; the project includes the creation of coastal marsh wetland and the preservation of forested wetlands and forested upland areas.

The site was first monitored for vegetation in 1998. In August of 1998, NCDOT installed monitoring gauges to be used for hydrologic monitoring. The 2001 annual monitoring report includes the results of both hydrologic (third year) and vegetation (fourth year) monitoring for the site.

### 1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted for five consecutive years. Success criteria are based on federal guidelines for wetland mitigation. These guidelines stipulate criteria for both hydrologic conditions and vegetation survival. The following report details the results of hydrologic and vegetative monitoring during 2001 at the Casey Tract Mitigation Site as well as local climate conditions throughout the growing season.

### 1.3 Project History

November 1997	Site Constructed
January 1998	Site Planted
August 1998	Monitoring Gauges Installed
October 1998	Vegetation Monitoring (1 yr.)
October 1999	Vegetation Monitoring (2 yr.)
November 1999	Hydrologic Monitoring (1 yr.)
August 2000	Vegetation Monitoring (3 yr.)
November 2000	Hydrologic Monitoring (2 yr.)
December 2000	Open Water Delineated
July 2001	Vegetation Monitoring (4 yr.)
March -November 2001	Hydrologic Monitoring (3 yr.)

## 1.4 Debit Ledger

Casey Tract	Mit. Plan		Ratios	TIP DEBIT
Currituck Co.				
Habitat	Acres at Start: Acres Remaining			R-2228A, BA, BB*
FWM Creation	5.5	0	0.00	5.5
FWM Preservation	11.9	0	0.00	11.9
SPH Preservation	4	0	0.00	4
Upland Mgmnt	2.4	0	0.00	2.4
<b>TOTAL</b>	<b>23.8</b>	<b>0</b>	<b>0.00</b>	

\*DCM No. 124-95, 139-94  
 Corps Action ID No. 199504770  
 DWQ No. 2937, 3016

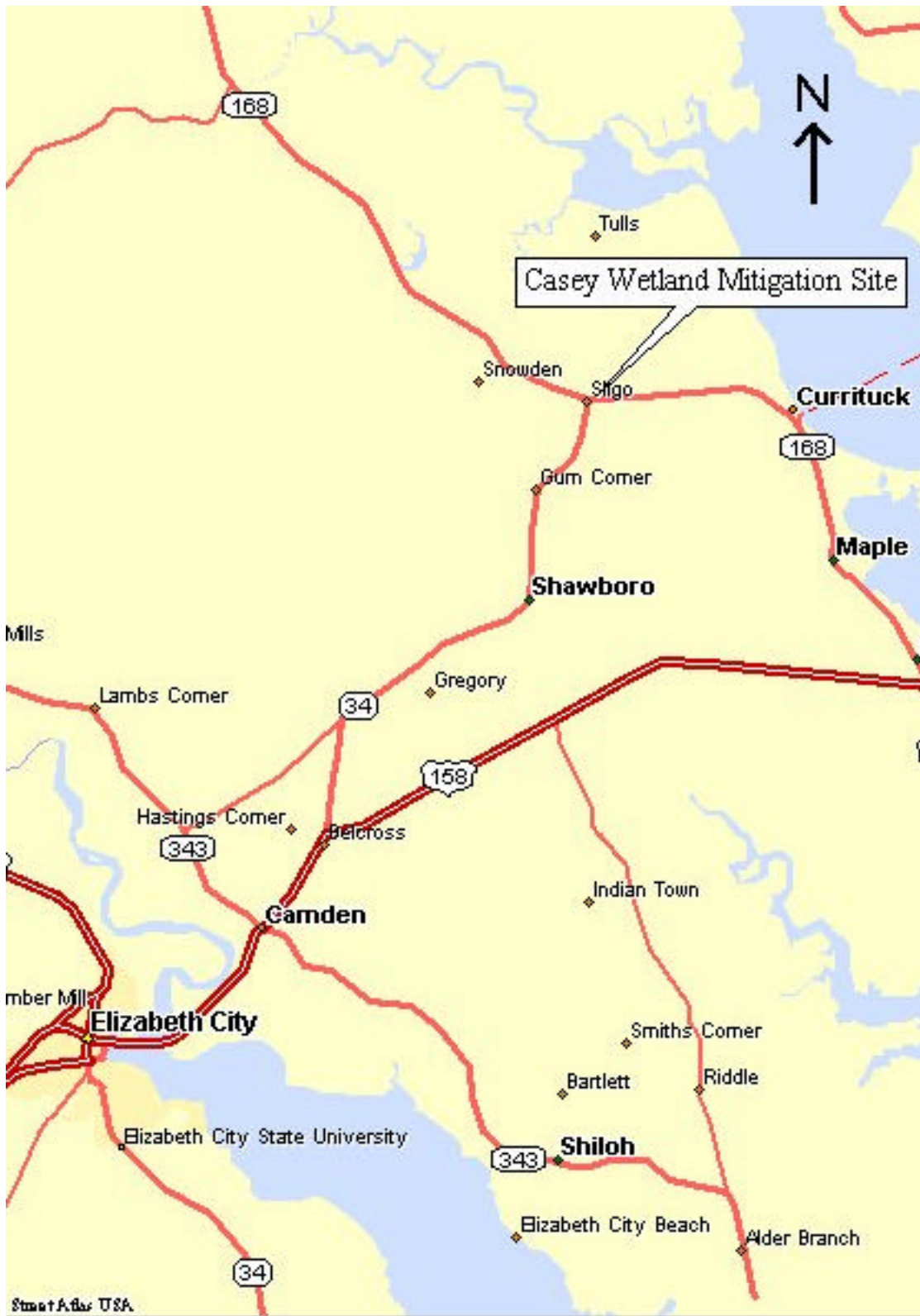


Figure 1  
Site Location Map

## **2.0 HYDROLOGY**

### **2.1 Success Criteria**

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12" of the surface) by surface or groundwater for at least a consecutive 12.5% of the growing season. Areas inundated for less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% - 12.5% of the growing season can be classified as wetlands depending upon factors such as the presence of wetland vegetation and hydric soils.

The growing season in Currituck County begins March 20 and ends November 13. These dates correspond to a 50% probability that temperatures will drop to 28°F or lower after March 20 and before November 13.<sup>1</sup> The growing season is 239 days; therefore, optimum hydrology requires 12.5% of this season, or at least 29.88 consecutive days (rounded to 30 days). A consecutive 8% would be equivalent to 19.12 days (rounded to 19 days) and a consecutive 5% would be equivalent to 11.95 days (rounded to 12 days). Local climate must also represent average conditions for the area.

### **2.2 Hydrologic Description**

Six groundwater-monitoring gauges, one rain gauge and four surface water gauges are installed at the Casey Tract (Figure 2). In August 2000, the original rain gauge was replaced with an Infinity rain gauge. The automatic monitoring gauges record daily readings of groundwater depth. Three of these groundwater-monitoring gauges are located within the reference wetland on site.

The Casey Tract site involved the construction of a channel network connected to Buckskin and Cowells Creeks, which are tributaries to Tull Creek and the lowering of site elevations to create coastal marsh areas to the elevations of the coastal marsh Reference Ecosystem areas. In addition, channels were constructed to form hydrologic connections between the roadside ditches and the channel in the northern end of the site. This connectivity will allow for tidal flushing of the constructed coastal marsh. This should provide adequate hydrologic input from the adjacent creeks, groundwater, and rainfall to sustain the necessary hydrology for coastal marsh wetland areas. The hydrologic monitoring should show the reaction of the groundwater and surface water levels to specific rainfall and tidal events.

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<sup>1</sup> Natural Resources Conservation Service, Soil Survey of Currituck County, North Carolina, p.71.

## 2.3 Results of Hydrologic Monitoring

### 2.3.1 Site Data

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each gauge. This number was converted into a percentage of the 239-day growing season. The results are presented in Table 1. Appendix A contains a plot of the groundwater depth for each monitoring gauge and the surface water depth recorded by the surface gauges. The maximum number of consecutive days is noted on each graph. The individual precipitation events, shown on the monitoring well graphs as bars, represent data collected from the Infinities rain gauge installed on site in August 2000. Figure 4 represents the hydrologic monitoring results.

Table 1  
HYDROLOGIC MONITORING RESULTS

Monitoring Gauge	< 5%	5% - 8%	8% - 12.5%	12.5%	Actual %	Success Dates
MG-1				✓	30.1	May 11-July 21
MG-2				✓	53.6	May 12-Sept 16
MG-3	✓				0	None
MG-4 (RG)				✓	27.2	May 12-July 15
MG-5 (RG)	✓				2.5	Sept 21-Sept 26th
MG-6 (RG)				✓	27.6	May 12-July 16

RG refers to the reference gauges located in the reference wetland.

The surface gauges have shown consistent surface water throughout the growing season. Monitoring gauge 3 is located in the upland area of the site at the entrance to the site, therefore it would not show hydrologic success at this elevated location. Monitoring gauge 5, located in the reference wetland, indicated saturation within 12 inches of the surface for 5 consecutive days. Four of the six monitoring gauges indicated saturation within 12 inches of the surface or less for over 30 consecutive days of the growing season.

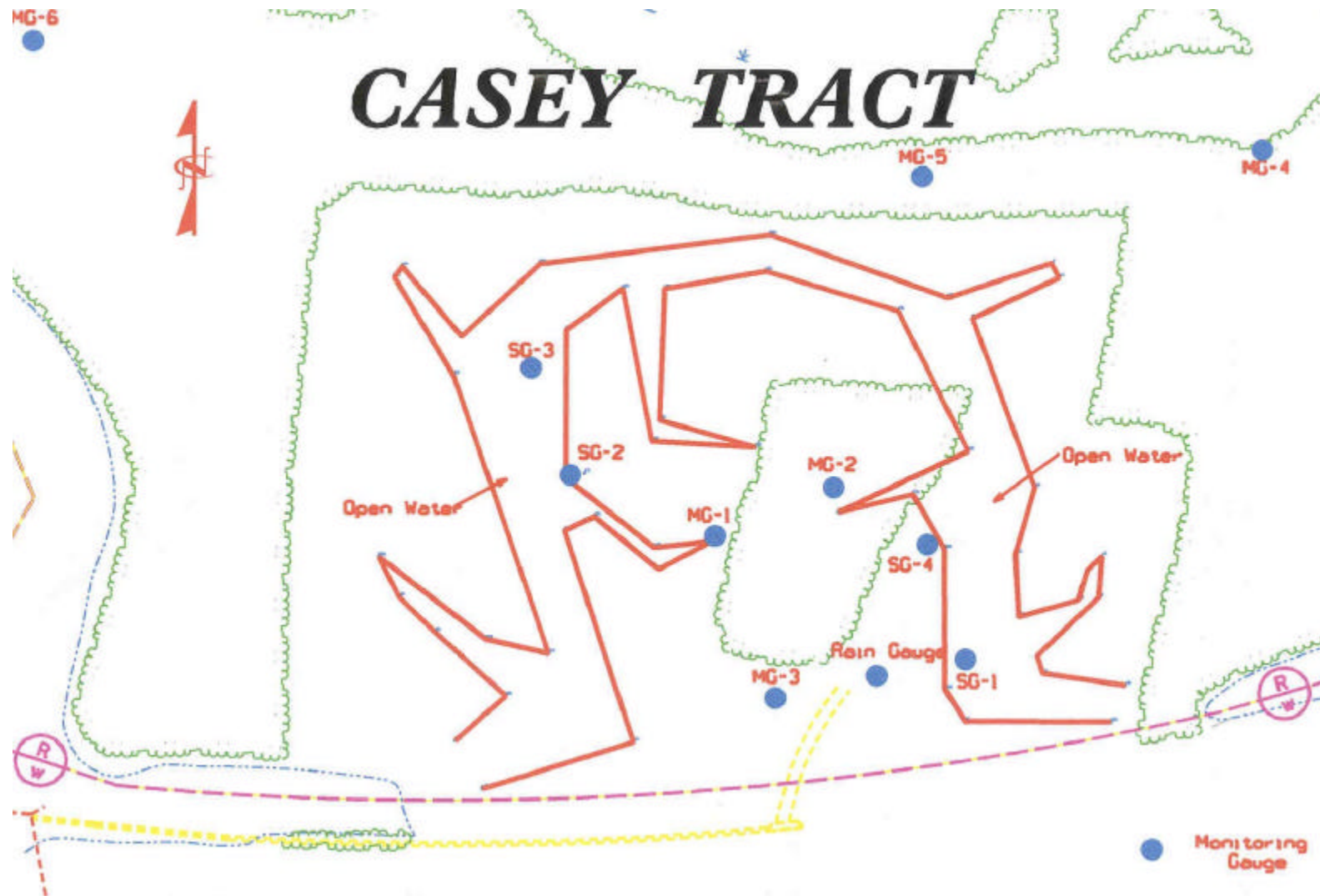


Figure 2  
Monitoring Gauge Location Map

Specific problems encountered during 2001 with the monitoring gauges are listed below. However, these problems did not affect the hydrologic success of the site.

- SG-2 stopped recording data on September 27, 2001. The gauge was replaced and programmed to begin recording data on October 3.
- SG-4 was found to contain bad data in March 2001. The gauge was replaced and programmed to record data starting on March 9, 2001.
- MG-5 stopped recording data on February 9, 2001. The gauge was reset to record data starting on March 9, 2001.

### **2.3.2 Climatic Data**

Figure 5 represents an examination of the local climate in comparison with historical data in order to determine whether 2001 was “average” in terms of climate conditions. The figure compares the on-site rainfall from 2001 with that of historical rainfall (data collected between 1946 and 1983). The graph shows 2001 rainfall totals from January 2001 through November 2001, which includes the growing season for this site. April, October and November exhibit rainfall totals well below the average monthly rainfall totals, while January, February, July and September were slightly below. March, May, June and August were within the average range.

### **2.4 Conclusions**

2001 represents the third full growing season that the hydrologic data has been examined. The monitoring gauges on site have shown saturation and inundation for long periods of time. The monthly rainfall totals are in the average to below average range. The surface gauges showed periodic inundation from October 20 to November 20 when small amounts of precipitation were recorded. The surface gauges were recording the wind tide effects from the adjacent creeks. This is expected from a site built as a coastal marsh.

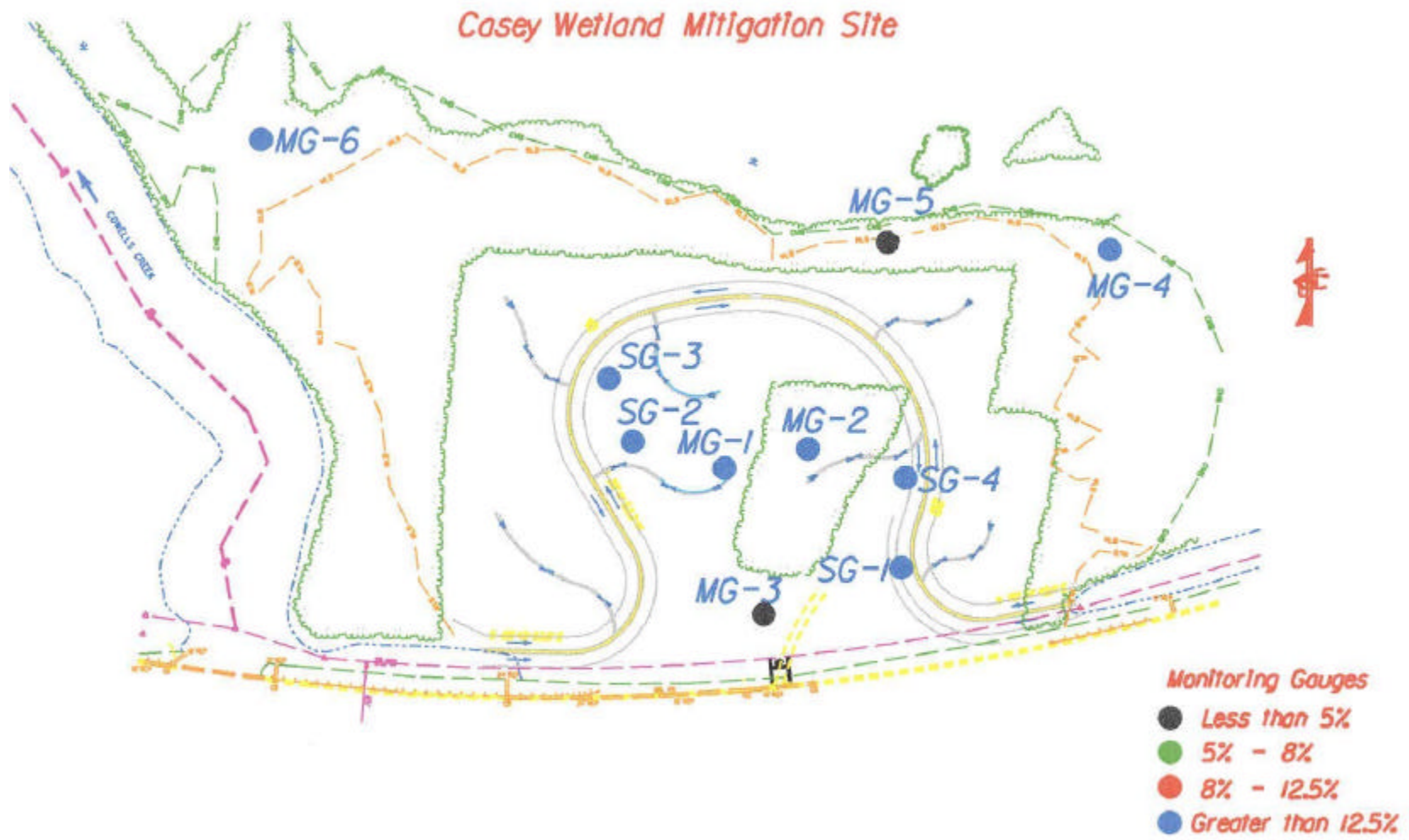


Figure 3  
Hydraulic Monitoring Map

Casey Tract 30 - 70 Percentile Graph

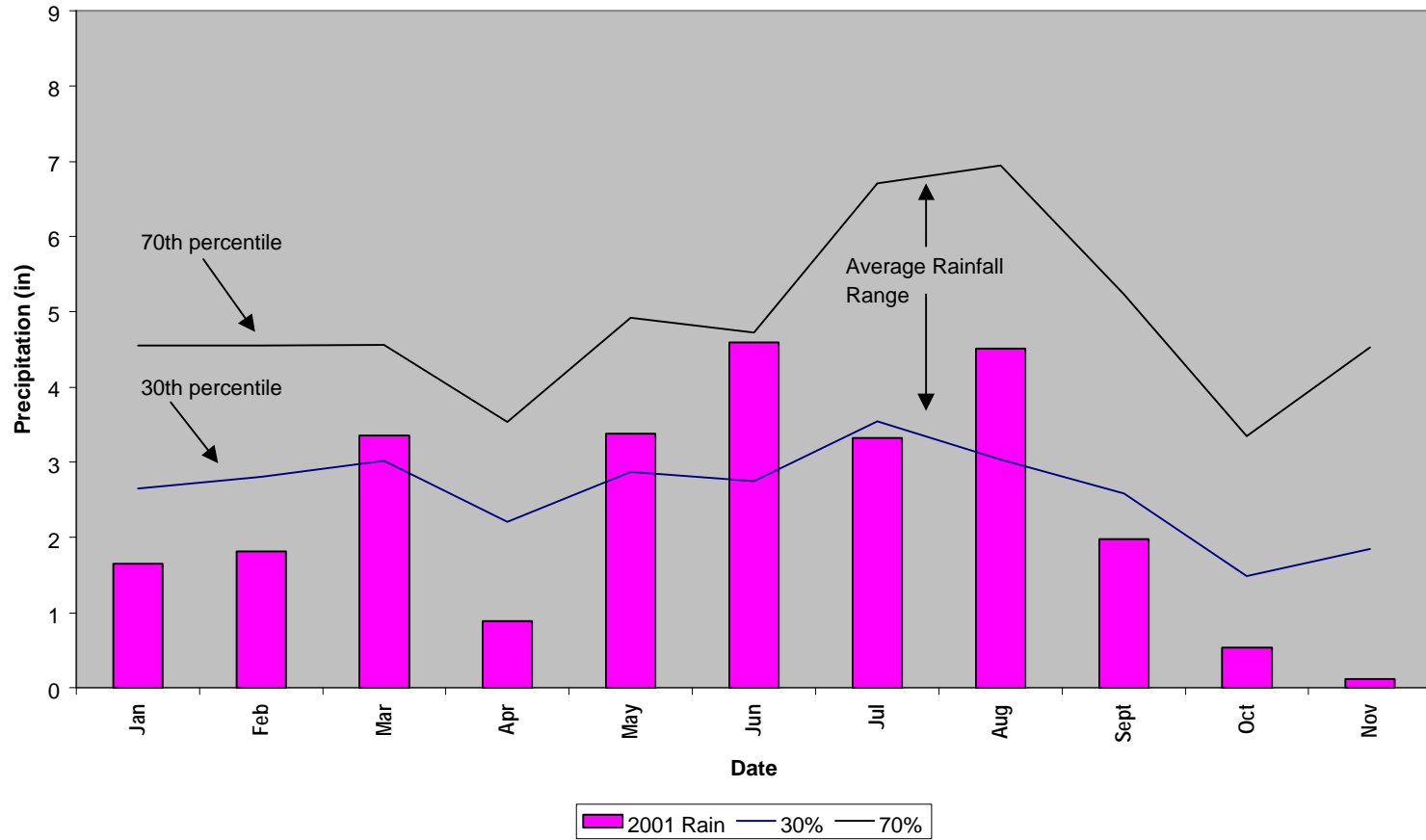


Figure 4

### **3.0 VEGETATION: CASEY MITIGATION SITE (YEAR 4 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:

##### **Zone 1: (0.63 acres)**

*Juncus effusus*, Common Rush

*Scirpus cyperinus*, Woolgrass

##### **Zone 2: (2.83 acres)**

*Cladium jamaicense*, Saw Grass

*Spartina cynosuroides*, Giant Cordgrass

### 3.3 Results of Vegetation Monitoring

#### Random Plots

Plot #	Scale Factor	<i>Juncus effusus</i>	<i>Spartina cyperinus</i>	<i>Cladonia jamaicensis</i>	<i>Spartina cynosuroides</i>	Frequency	Notes
1	2.0						Black grass, Smartweed, 2" water
2							Open water
3	3.0		✓	✓		✓	Black grass, Smartweed, <i>Ludwigia</i> sp., <i>Juncus acuminatus</i>
4	5.0		✓			✓	<i>Juncus</i> sp., Black Willow, <i>Scirpus atrovirens</i> , <i>Aster</i> sp.
5	5.0	✓	✓			✓	Smartweed, Cattail, Black Willow
6	5.0						Black Willow, <i>Ptilimnium</i> sp., <i>Juncus tenuis</i>
7	5.0		✓	✓		✓	<i>Aster</i> sp.
8	5.0			✓		✓	Cattail, Smartweed, Black grass, Goldenrod
9	5.0		✓			✓	<i>Juncus acuminatus</i>
10							Open water
11							Open water
12							Open water
13							Open water
14							Open water
15	5.0		✓			✓	Baldcypress, Black Willow, Loblolly pine, <i>Juncus acuminatus</i>
16	5.0			✓		✓	Cattail, Smartweed, Black grass, Goldenrod, <i>S. atrovirens</i>
17	5.0		✓			✓	Cattail
18	5.0	✓	✓			✓	Cattail, Ragweed
19	5.0	✓		✓		✓	<i>Scirpus</i> sp., Baldcypress
20	5.0	✓				✓	Baldcypress, Black Willow, Smartweed
21	5.0	✓				✓	Smartweed, Black grass, Cattail, <i>Scirpus atrovirens</i> , <i>Ptilimnium</i> sp., <i>J. acuminatus</i>
22	5.0	✓		✓		✓	Fennel, Red Maple
23							Open water
24	5.0		✓			✓	Goldenrod
25							Open water
26							Open water
27	5.0	✓	✓			✓	Cattail, Black Willow, <i>Scirpus</i> sp.
28	5.0	✓		✓		✓	Black Willow, <i>Baccharis halimifolia</i>
29	5.0	✓	✓			✓	Cattail, Smartweed, <i>Juncus</i> sp.
30							Open water
31	4.0	✓		✓		✓	Smartweed, <i>Scirpus atrovirens</i>
32							Open water
33	5.0	✓	✓			✓	Smartweed, <i>Scirpus atrovirens</i> , <i>Aster</i> sp., Black grass
34	5.0		✓			✓	Ragweed, <i>Aster</i> sp., Cattail, <i>Scirpus atrovirens</i>
35							Open water
36	5.0		✓			✓	Cattail, <i>Aster</i> sp., <i>Juncus tenuis</i>
37	5.0		✓			✓	Wax Myrtle, Fennel, <i>Juncus</i> sp., <i>Sesbania</i> sp.
38	5.0			✓		✓	Cattail, Smartweed, <i>S. atrovirens</i> , Black grass, <i>Scirpus</i> sp.
39	5.0		✓			✓	<i>Baccharis halimifolia</i>
40							Open water
41	5.0	✓				✓	Smartweed, <i>Eleocharis</i> sp.
42	5.0			✓		✓	<i>Aster</i> sp., Iris, <i>Ptilimnium</i> sp., <i>Juncus gerardi</i>
43	5.0		✓	✓		✓	Black Willow, <i>Ptilimnium</i> sp., Smartweed
44	5.0	✓				✓	<b>Phragmites, <i>Carex</i> sp., <i>Ptilimnium</i> sp.</b>
45							Open water

**Site Notes:** Marsh grasses are present throughout the site. Coverage has increased since last year's monitoring.



#### **4.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS**

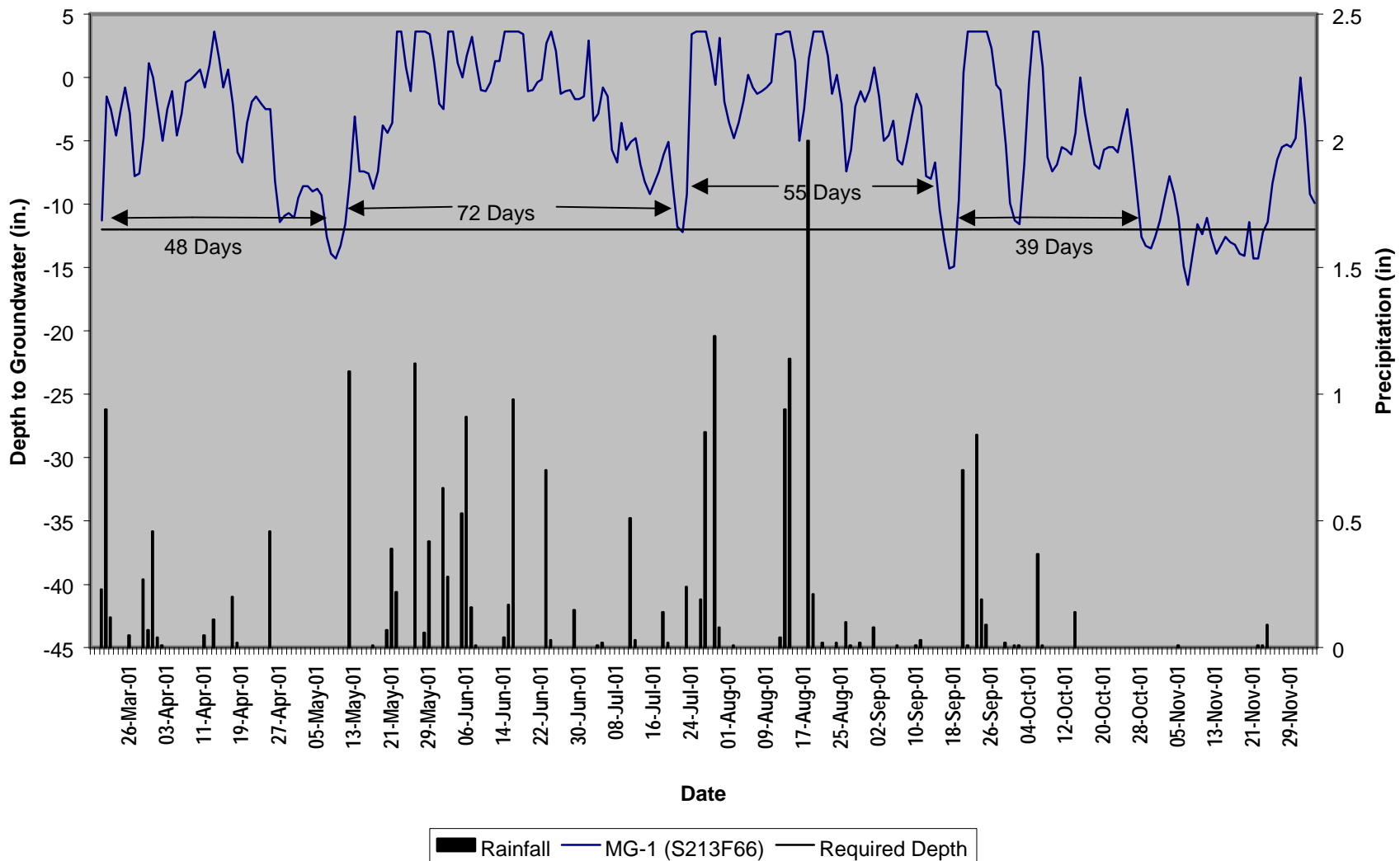
In the third full year of monitoring, eight of ten monitoring gauges indicated saturation for more than 12.5% of the growing season. The NCDOT recommends removing monitoring gauge 3 (less than 5% hydrologic success) from the site due to its location in the upland portion of the site. Vegetation monitoring yielded a percent frequency of target specie of 94.1%.

Hydrologic monitoring will continue for a fourth year, and vegetation monitoring will continue for a fifth year in 2002 at the Casey Tract Mitigation Site.

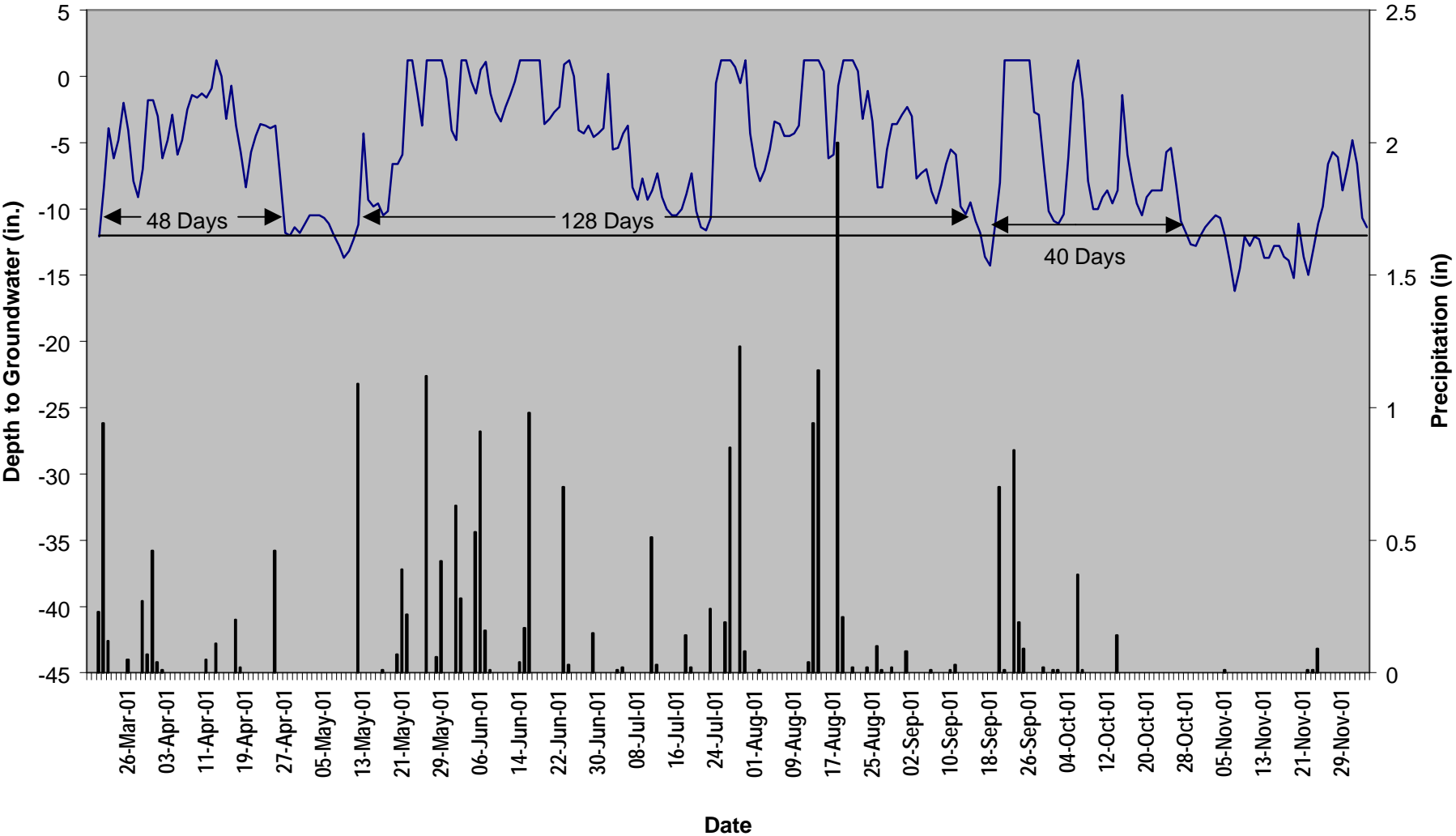
**APPENDIX A**

**DEPTH TO GROUNDWATER PLOT**

### Casey Tract Monitoring Gauge MG-1

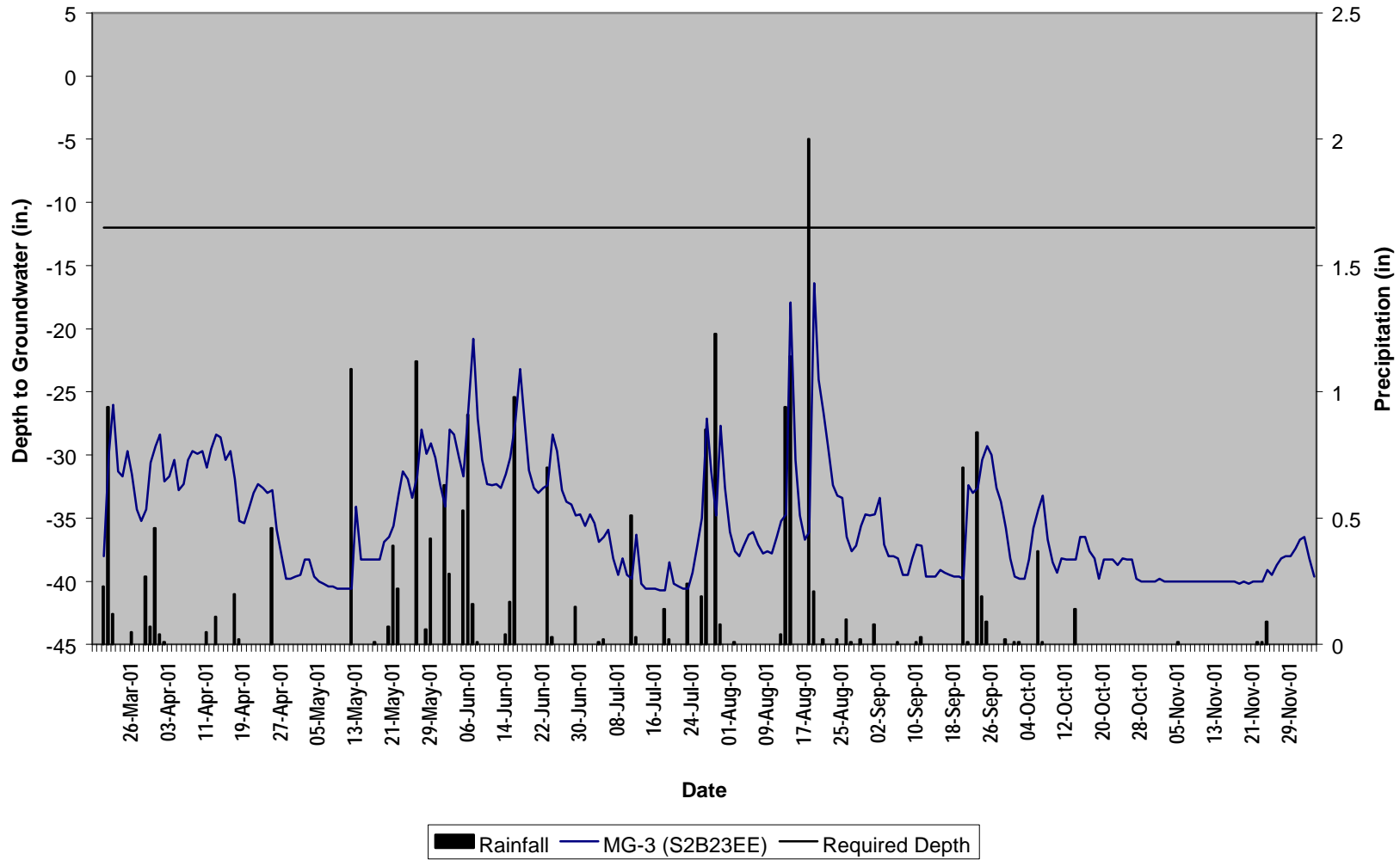


### Casey Tract Monitoring Gauge MG-2

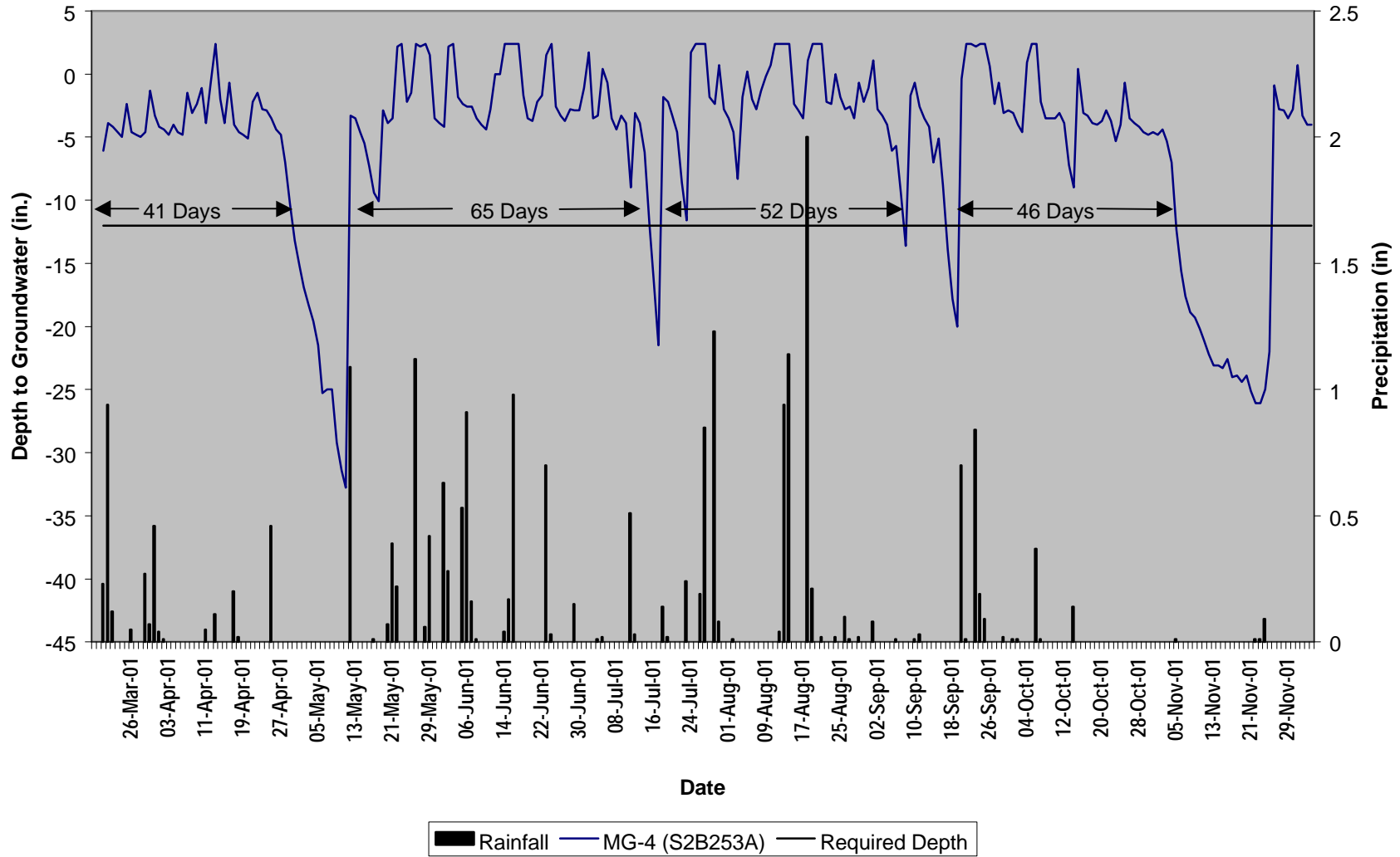


■ Rainfall — MG-2 (S2B224D) — Required Depth

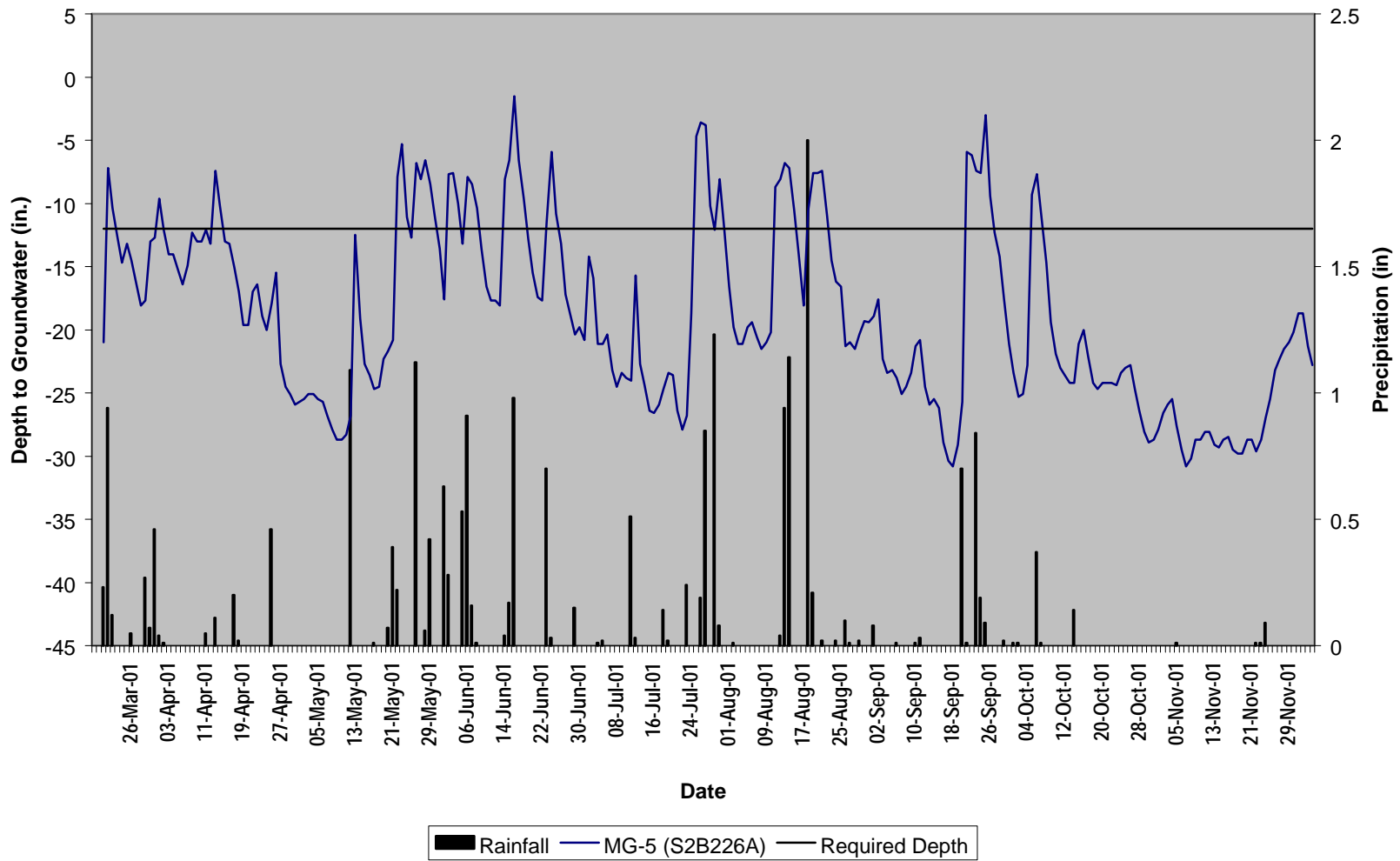
### Casey Tract Monitoring Gauge MG-3



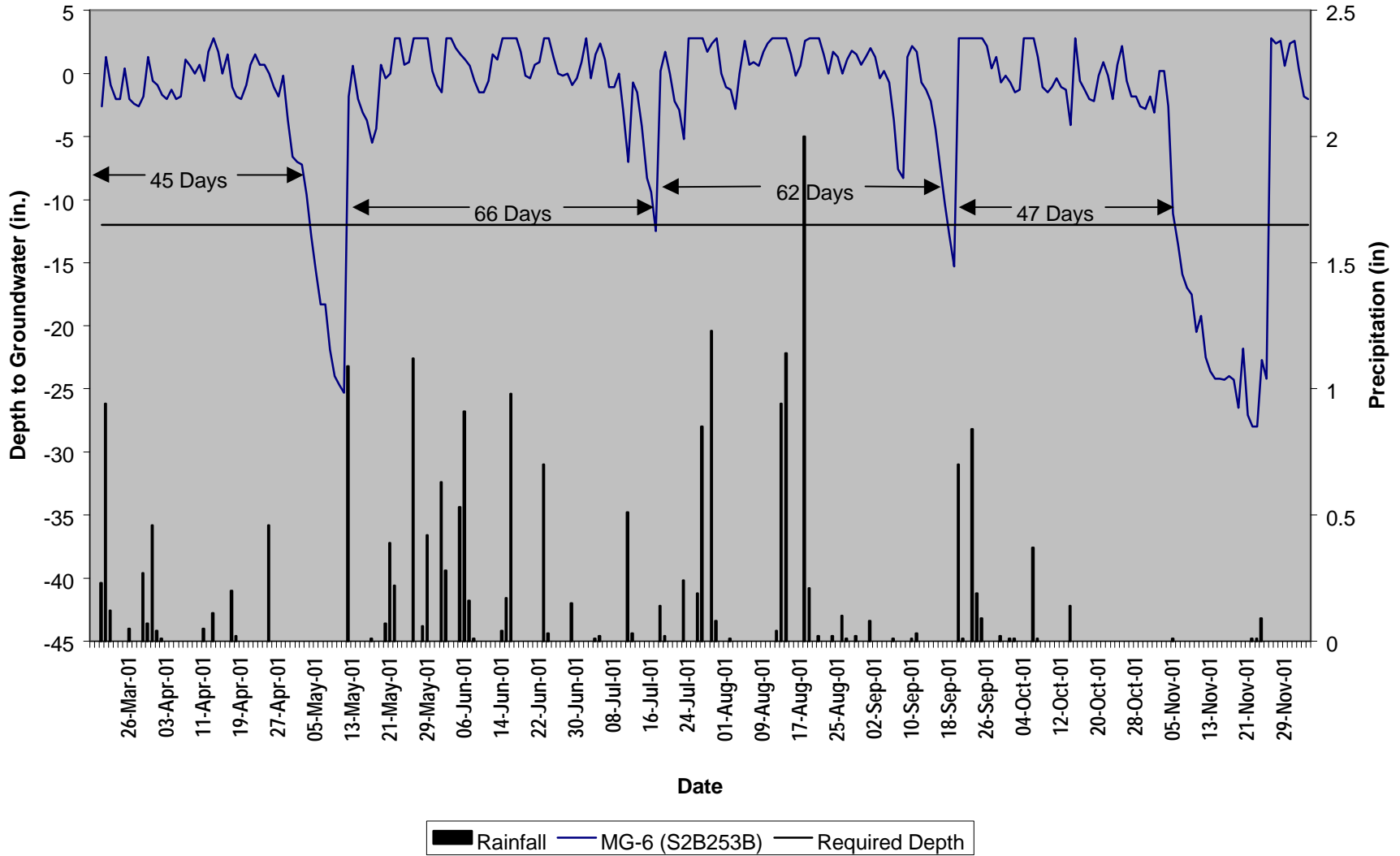
### Casey Tract Monitoring Gauge MG-4



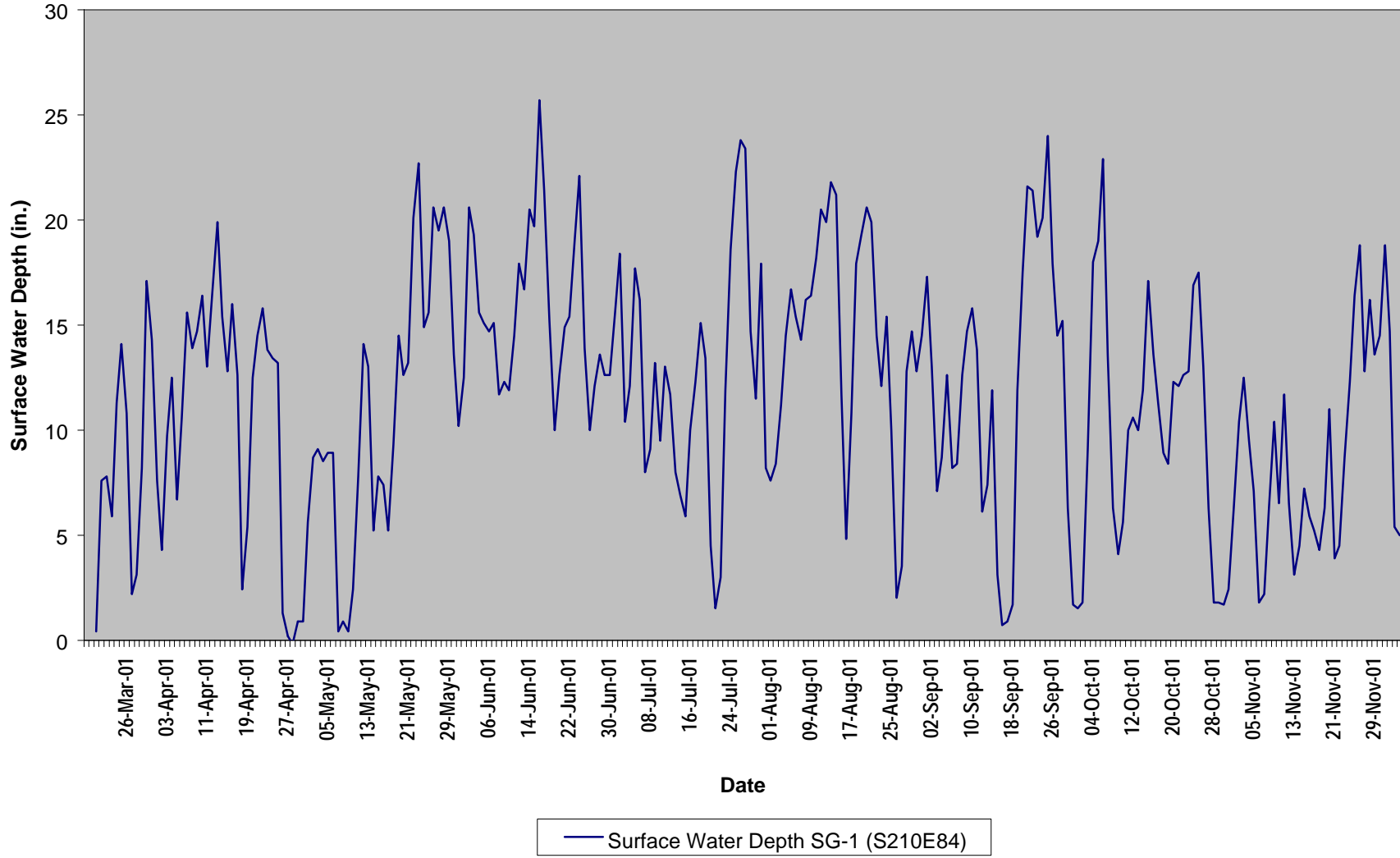
### Casey Tract Monitoring Gauge MG-5



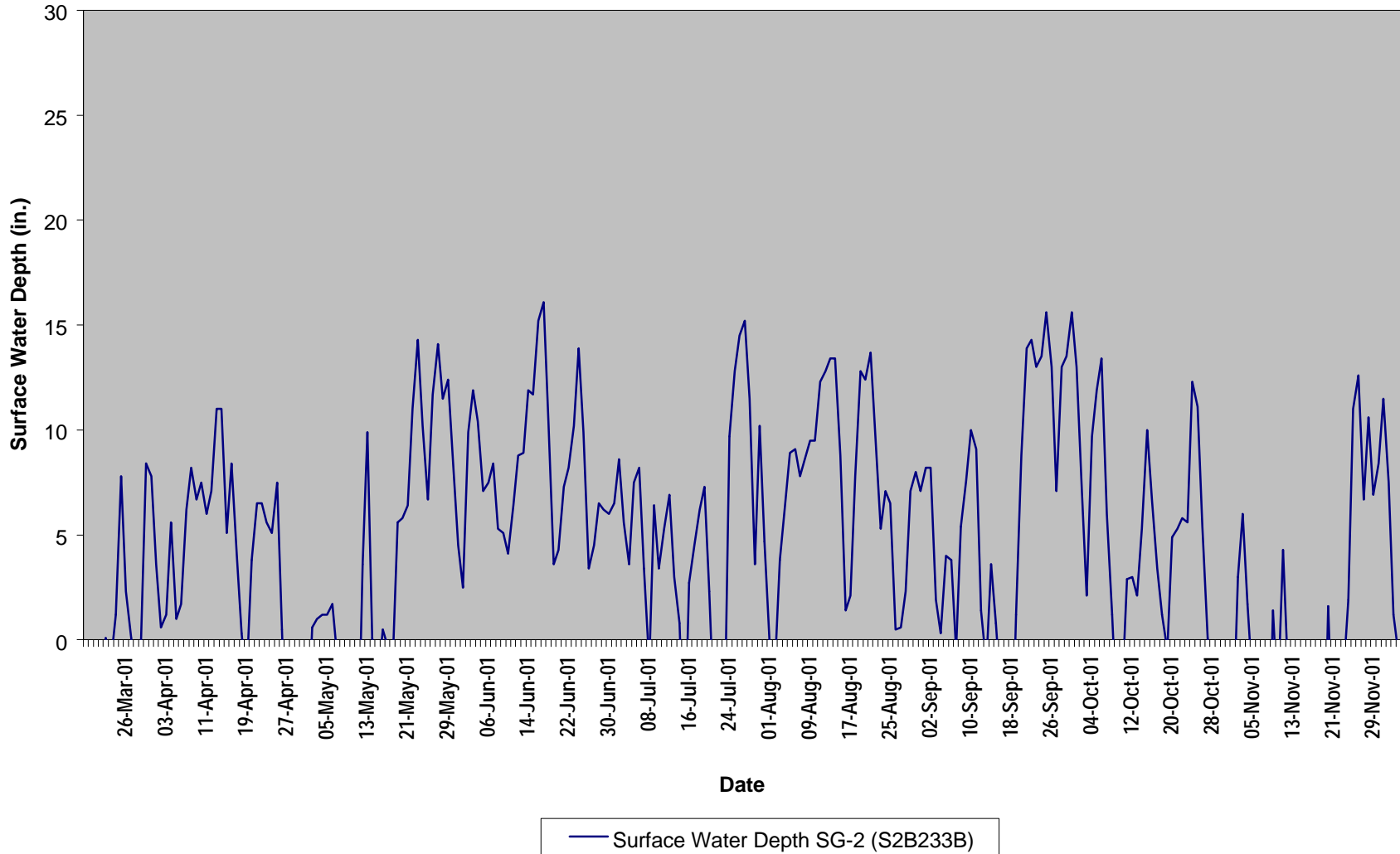
### Casey Tract Monitoring Gauge MG-6



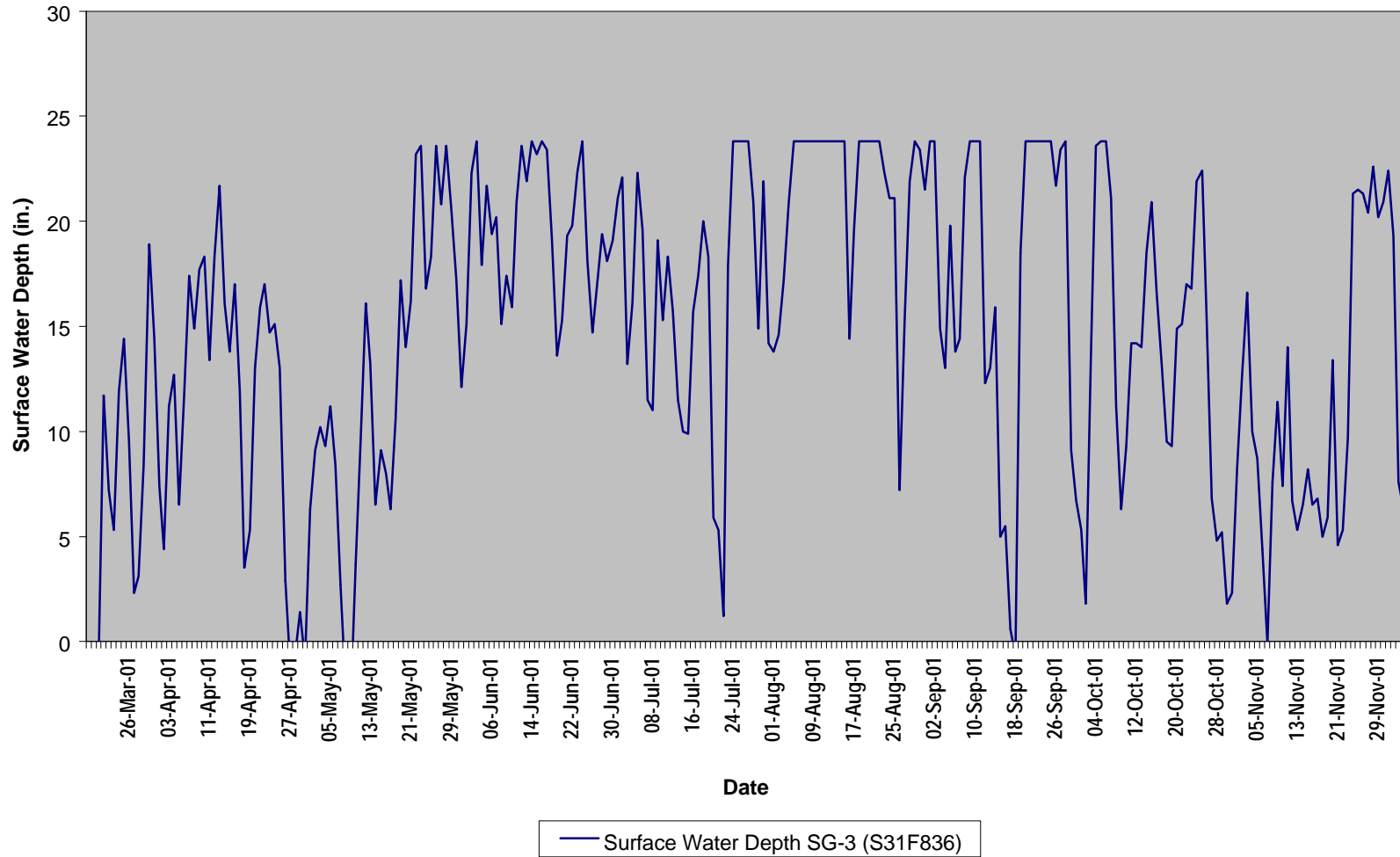
### Casey Tract Surface Gauge SG-1



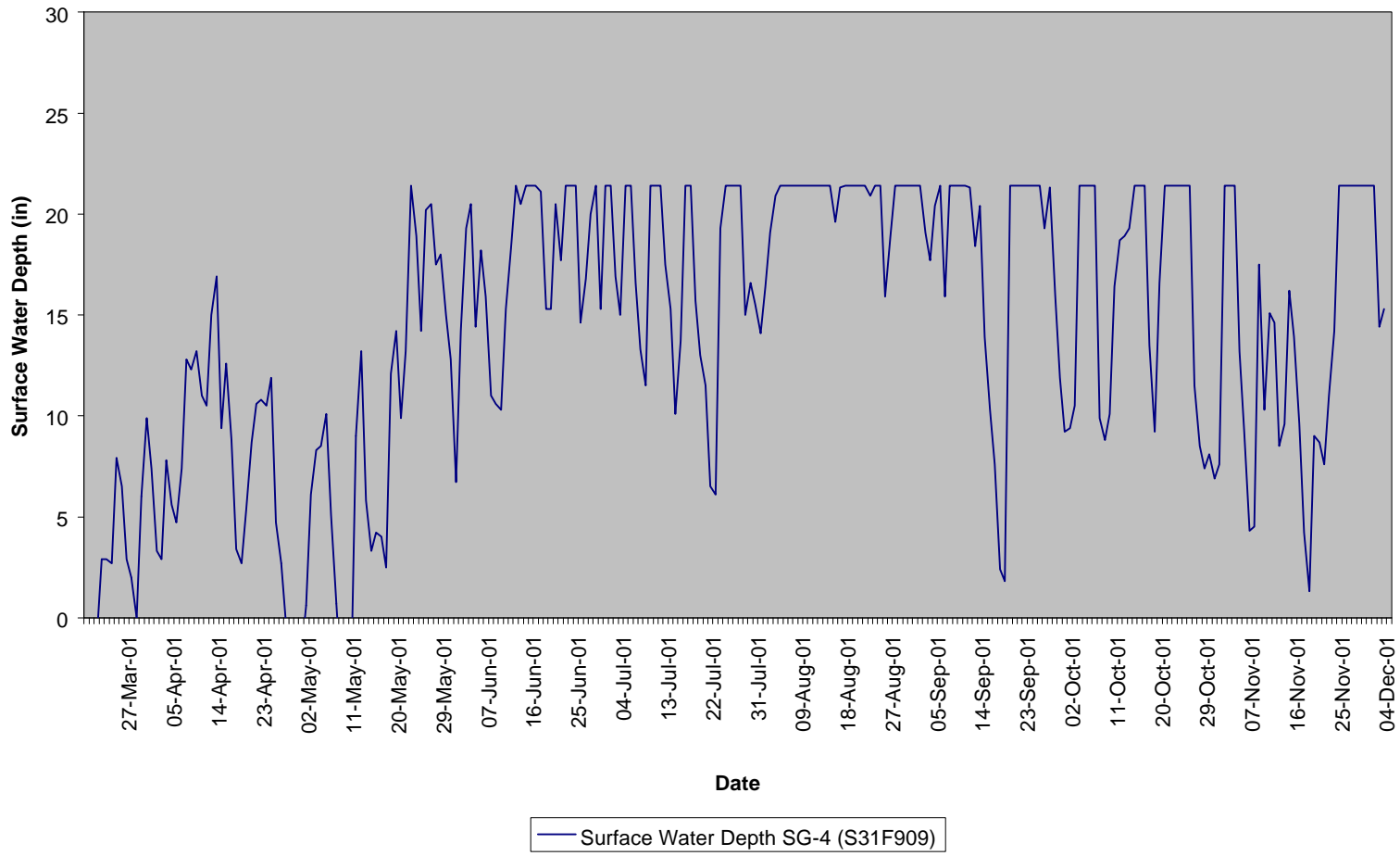
### Casey Tract Surface Gauge SG-2



### Casey Tract Surface Gauge SG-3



### Casey Tract Surface Gauge SG-4



**APPENDIX B**  
**SITE PHOTOS**



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



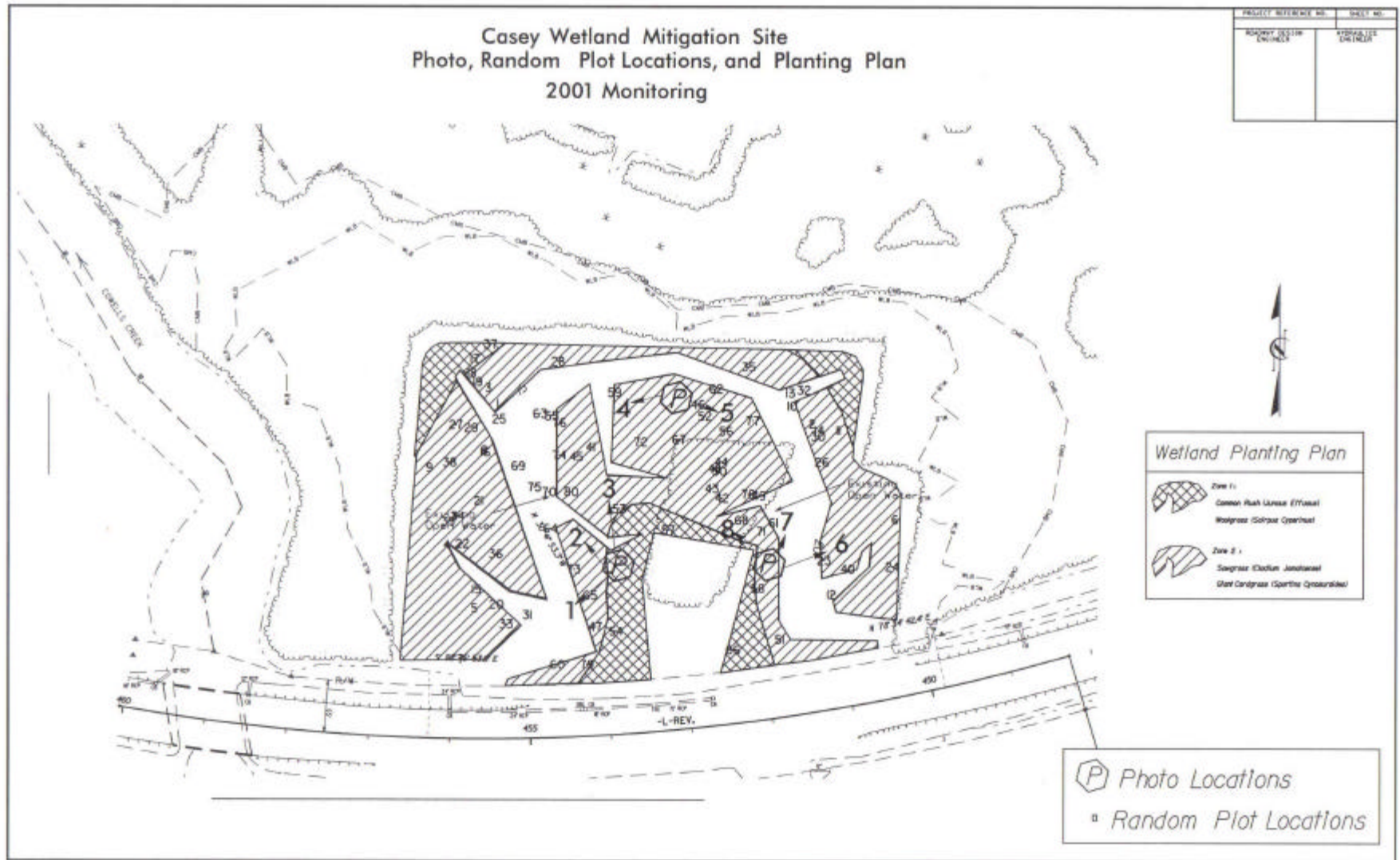
Photo 6



Photo 7



Photo 8



**Figure 5**

