

ANNUAL REPORT FOR 2001



Deer Creek Mitigation Site
Carteret County
Project No. 6.16901T
TIP No. R-2105 WM



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DEER CREEK MITIGATION SITE

2001 REPORT – EXECUTIVE SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the Deer Creek Mitigation Site. This site was constructed in spring 2001. Monitoring activities in 2001 represent the first year of monitoring. The site must be monitored for five years after the construction of the site. Monitoring includes percent cover of herbaceous vegetation and hydrologic conditions at the site.

The site is monitored with thirty vegetation plots, three surface water gauges, and one rain gauge.

Data recorded by the rain gauge will be used for comparison to the daily surface water readings. Daily rainfall recorded at a Morehead City rain gauge, maintained by the NC State Climate Office was obtained to produce the 30-70 percentile graph.

The hydrologic results for this site are inconclusive due to an inconsistency between gauges for low tide and high tide. Field observations also contrast gauge data.

Vegetation monitoring was unsuccessful with 36.6% frequency of target species and 1.4% vegetative coverage. 70% is the required frequency of target species and 70% vegetative coverage is required for year five.

At this time NCDOT proposes to replace the present surface water gauges with Infinity gauges to continue monitoring, replant the site, and reevaluate the elevation issue. A meeting with the regulatory agencies should be held to discuss the problem areas of this site and possible options for improvement.

1.0 INTRODUCTION

1.1 Project Description

The Deer Creek Mitigation Site is located in Carteret County on the north side of NC 24 at the northeast quadrant of the crossing of Deer Creek. The mitigation site is approximately 4.25 ac in size. Approximately 1.5 ac of the site had previously been allocated to a stormwater detention facility designed for the NCDOT to treat runoff associated with the improvements associated with the widening of NC 24 (TIP No. R-2405AB). The existing Section 404 permit for widening NC 24 involves a commitment by NCDOT to better integrate the original 1.5 ac stormwater detention basin into the existing natural environment. To accommodate this, the NCDOT purchased the remaining 2.75 ac of land with the intent to utilize the area to provide compensatory mitigation for impacts to Section 404 wetlands associated with this TIP project.

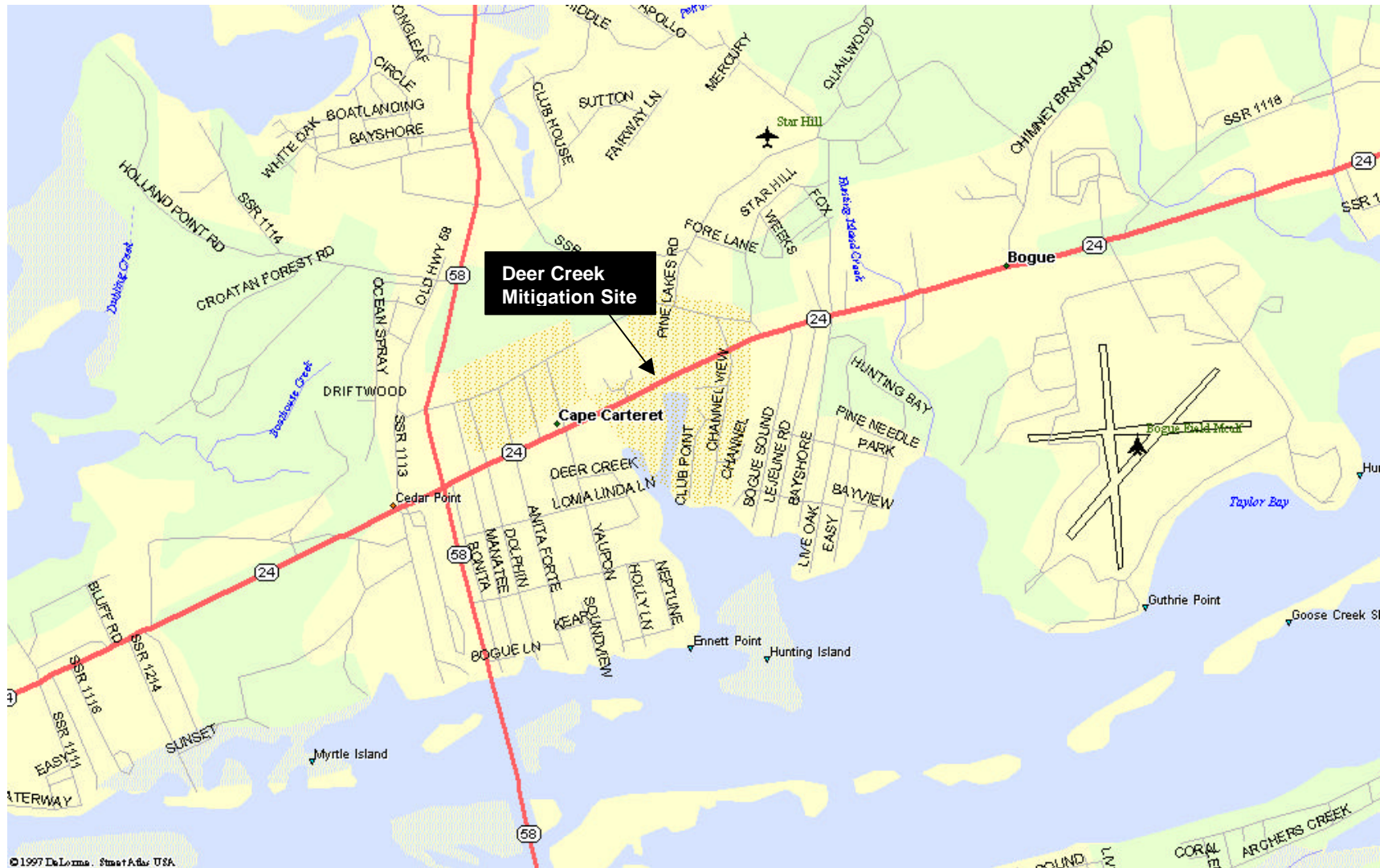
1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetative monitoring must be conducted. Vegetation will be monitored for five years following the completion of planting. The site will be considered hydrologically successful when the hydrology of the site is flooded twice daily. The vegetative marsh success of the wetland will be determined in accordance with NMFS Guidelines. The following report details the results of hydrologic and vegetative monitoring during 2001 at the Deer Creek Mitigation Site.

1.3 Project History

March 2001	Construction completed
May 2001	Site Planted
June 2001	Gauges Installed
June –November 2001	Hydrologic Monitoring (1 yr.)
August 2001	Vegetation Monitoring (1 yr.)

Figure 1. Site Location Map



2.0 HYDROLOGY

2.1 Success Criteria

The success of this site will be primarily based on planting elevations and the success of plantings. If plantings are successful, then the grading will have been correctly correlated to the tidal fluctuations. The hydrologic monitoring aspect will involve the use of surface water monitoring gauges. Because this is a tidal system, groundwater monitoring is not required at this site. The site will be considered hydrologically successful when the hydrology of the site is flooded twice daily. Success will be determined from data taken from the three surface water gauges located in the site. Only gauge 1 will illustrate twice daily flooding, as the other gauges will be used for comparison of tide elevations. It is expected that the surface water flooding will be the same as that measured for the biological benchmarks for *Spartina alterniflora*, since the grading was done to an elevation that is known to be periodically flooded. Table 1 describes each gauge and the hydrologic expectations of each. See Figure 2 for precise location of each gauge.

Table 1. Gauge Description and Expectations

Gauge	Elevation	Location	Hydrologic Expectation
SG-1	1.20 ft	low marsh between channel and high marsh	Flood twice daily
SG-2	-0.64 ft	within constructed channel of site	Remain flooded, daily fluctuations
SG-3	-0.54 ft	in Deer Creek adjacent to site	Remain flooded, daily fluctuations

The site will be monitored during the growing season. The growing season in Carteret County begins February 27 and ends November 29 and is 274 days long. The dates correspond to a 50% probability that temperatures will drop to 28° F or lower after February 27 and before November 29.

2.2 Hydrologic Description

Three surface water monitoring gauges and one rain gauge were installed on site in June 2001 (Figure 2). The surface water gauges record surface water readings every hour to determine if the site is being flooded twice daily. The infinity rain gauge records rainfall data once per day.

Appendix A contains a plot of the surface water's elevation based on the elevation of the gauge for each monitoring gauge. Elevation was used rather than depth so that

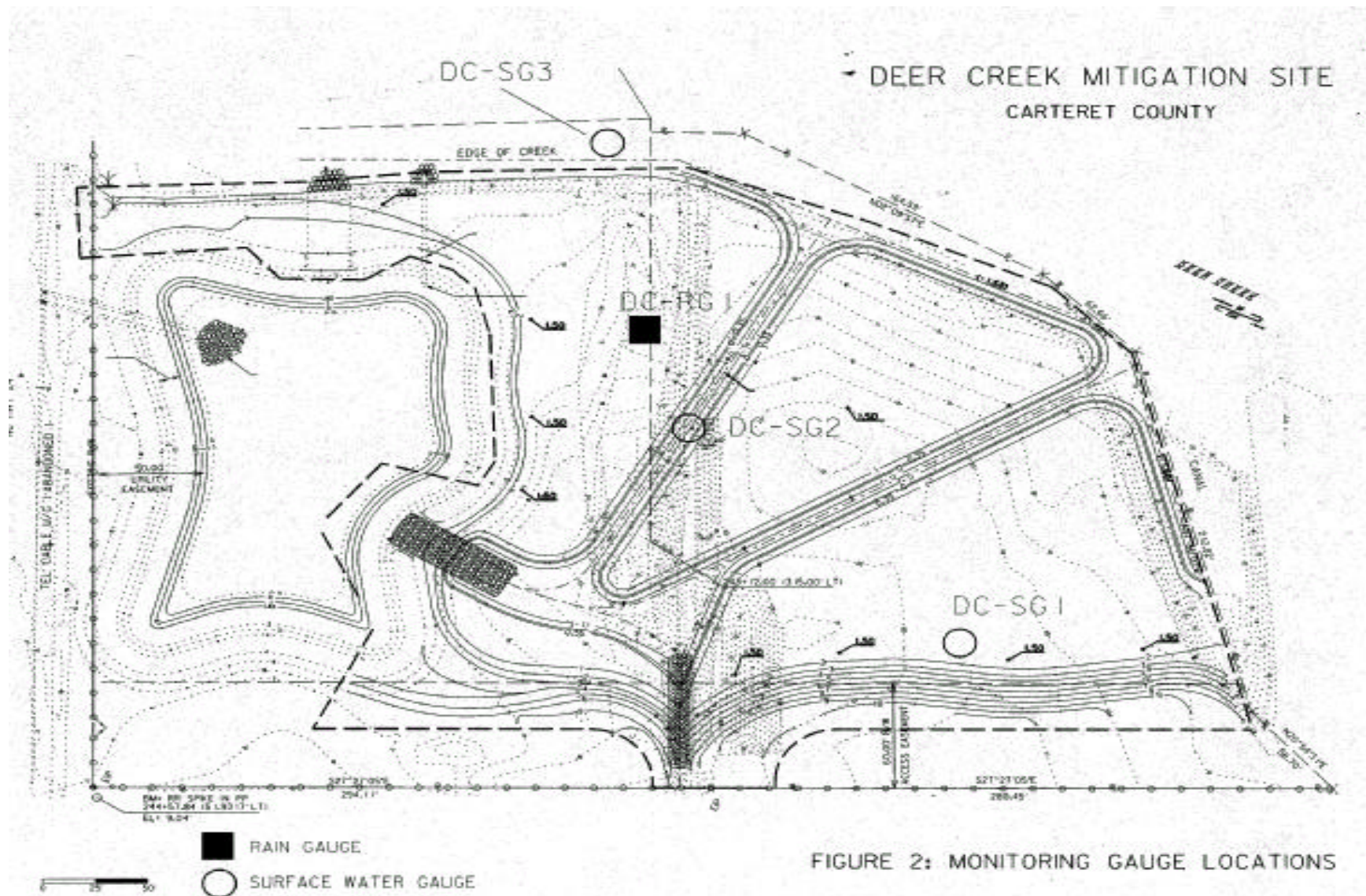


Figure 2. Gauge Location Map

sites could more easily be compared. Two weeks, chosen based on their average conditions for the growing season, were individually plotted so that Gauge 1 data could be more closely compared with Gauge 2 and 3 data. Precipitation events are included on each graph as bars. The rainfall plotted was obtained from the on-site infinity rain gauge.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

Gauge 1 was evaluated to determine if the site was being flooded twice daily. Tide data from Gauges 2 and 3 were evaluated for comparison.

There are missing gaps of data from August 7, 2001 to August 30, 2001 and from September 22, 2001 to October 8, 2001 for all three surface water gauges. Only a limited amount of data can be stored on each gauge before older data is recorded over. Due to the large amount of data being recorded (once per hour), some of the data was lost due to the length of time between visits due to personnel issues.

Gauge 1 data shows that area to be inundated all the time with sporadic fluctuations. The water level never dropped below the ground elevation of 1.2 ft. During field visits, the site was observed flooded most of the time, however, in contrast to the gauge data, the site was observed with no surface water on at least one occasion.

Because the site is so small, low tide and high tide elevations should be consistent between the three gauges. Gauge 2 shows that the water was fluctuating between elevations of 1.3 ft and 2.5 ft (extremes excluded). Gauge 2 shows that the water was fluctuating between elevations of 0.8 ft and 2.4 ft (extremes excluded). Gauge 3 shows that the water was fluctuating between elevations of 0.2 ft and 2.6 ft (extremes excluded). All three gauges are producing data that is inconsistent with one another. Refer to the graphs in Appendix A that contain individual sample weeks of data for gauge comparison.

2.3.2 Climatic Data

Figure 4 is a comparison of 2000 and 2001 monthly rainfall to historical precipitation for the area. The two lines represent the 30th and 70th percentiles of monthly precipitation for Morehead City, NC. These percentiles represent monthly rainfall data collected between 1948 and 2001 that was provided by the State Climate Office of North Carolina at NC State University. Because of data availability, the 2001 rainfall encompasses precipitation through August 2001. The 2002 annual report will include a 30-70 percentile graph with the monthly rainfall from September through December of 2001.

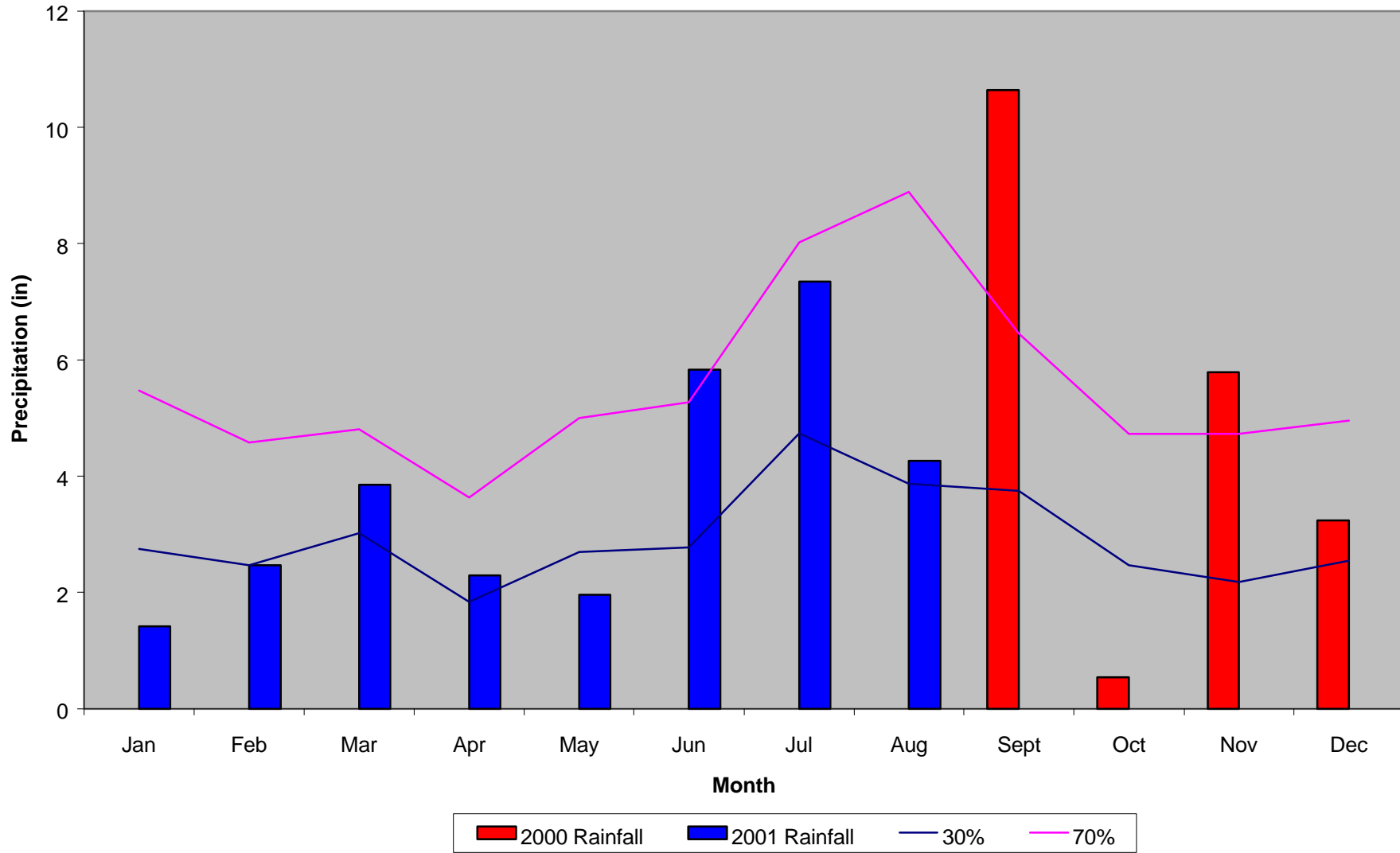
Rainfall for the Morehead City vicinity in the past two years ranges from below average to above average.

2.4 Conclusions

Based on the data obtained from the surface water gauges, the inconsistencies between the gauges and between data and field observations show that some of the data is inaccurate. Therefore, conclusions concerning the success of the hydrology of the site can not be drawn for the 2001 growing season.

Due to the gauge malfunctions shown at this site and other NCDOT mitigation sites, all surface water gauges will be replaced with more reliable Infinity brand gauges for the 2002 growing season.

Figure 3. Deer Creek 30-70 Percentile Graph



3.0 VEGETATION: DEER CREEK MITIGATION SITE (YEAR 1)

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 patens, Saltmeadow Cordgrass

Spartina alterniflora, Smooth Cordgrass

3.4 Conclusions

Percent Frequency of Target Species 36.6% (Frequency of 70% required)

Vegetative Cover Percentage 1.4% (Vegetative Cover Percentage of 70% required for year 5)

NCDOT feels that the portion of the site that is not exhibiting successful plant growth was graded too low. These portions of the site will be replanted Spring 2002. These plantings, however, may not survive either. A meeting with the regulatory agencies should be held to discuss possible “fixes” or other options available for the site.

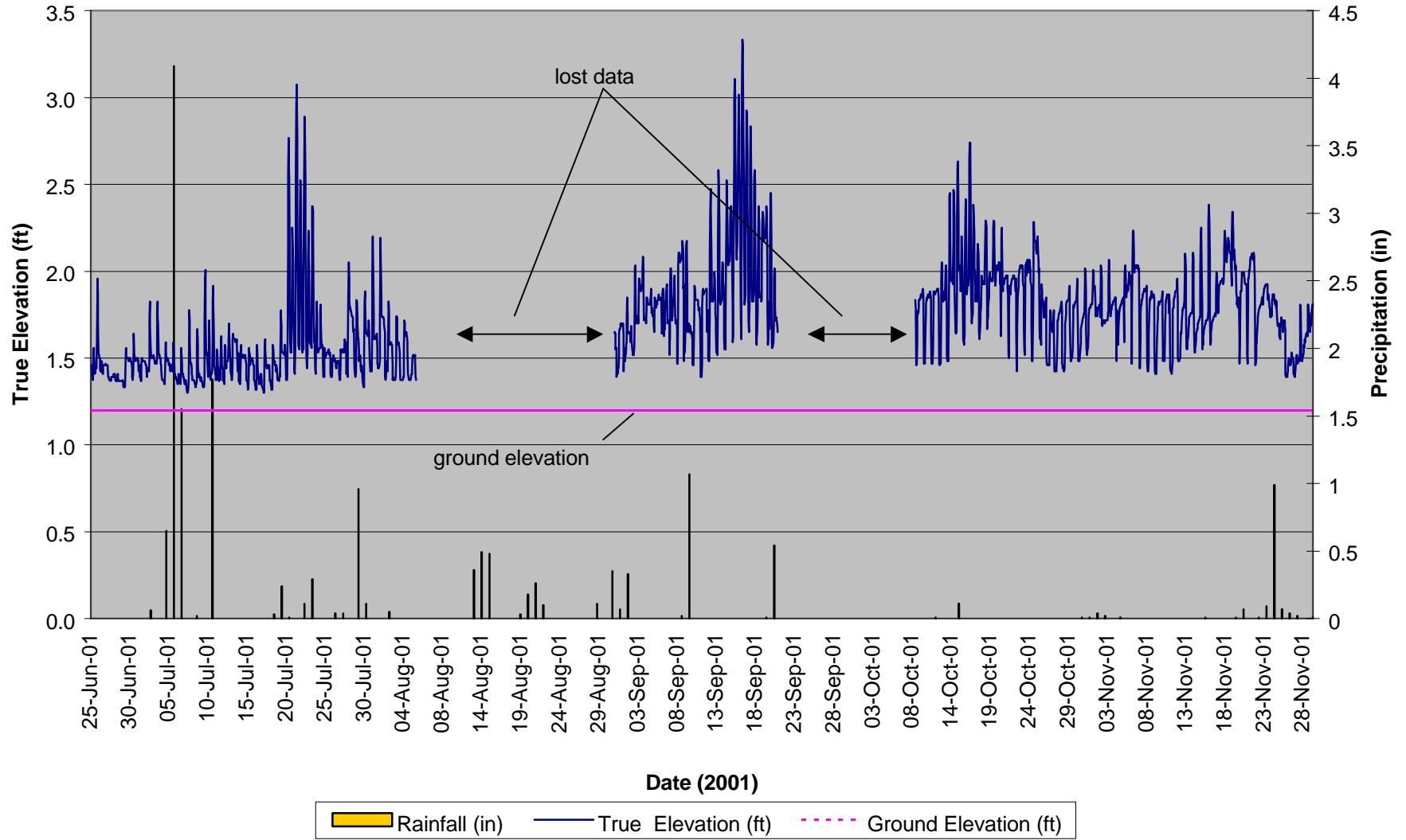
4.0 OVERALL CONCLUSIONS/ RECOMMENDATIONS

Hydrologic monitoring indicated that the site was being flooded daily. However, the inconsistency between gauge data indicates that the gauges may have malfunctioned. Vegetation monitoring yielded an unsuccessful 36.6% frequency of target species and 1.4% vegetative coverage. Field observations have shown that the site is being flooded. Based on the poor survival of vegetation, it is possible that the site may have been graded too low.

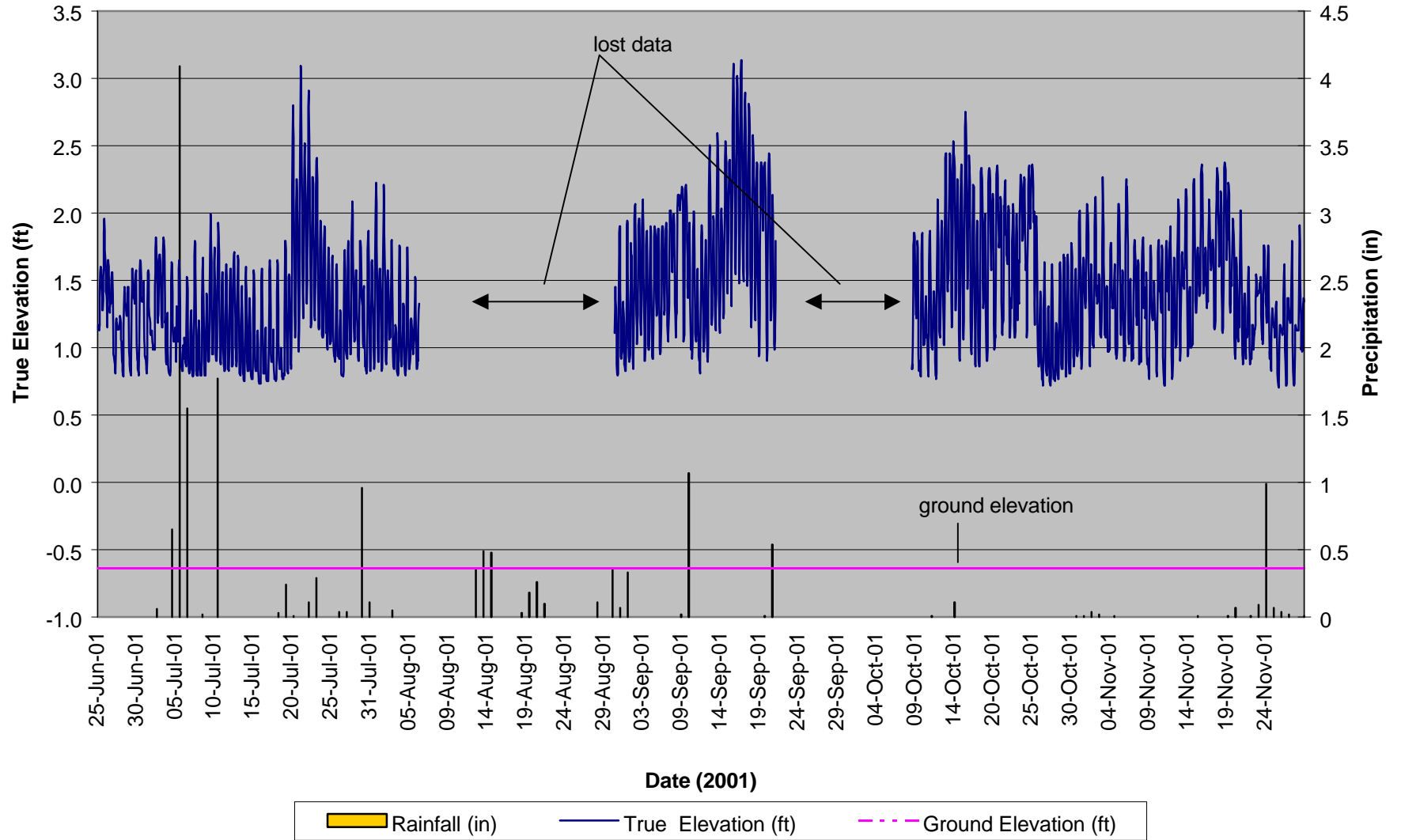
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APPENDIX A. ELEVATION OF SURFACE WATER GRAPHS

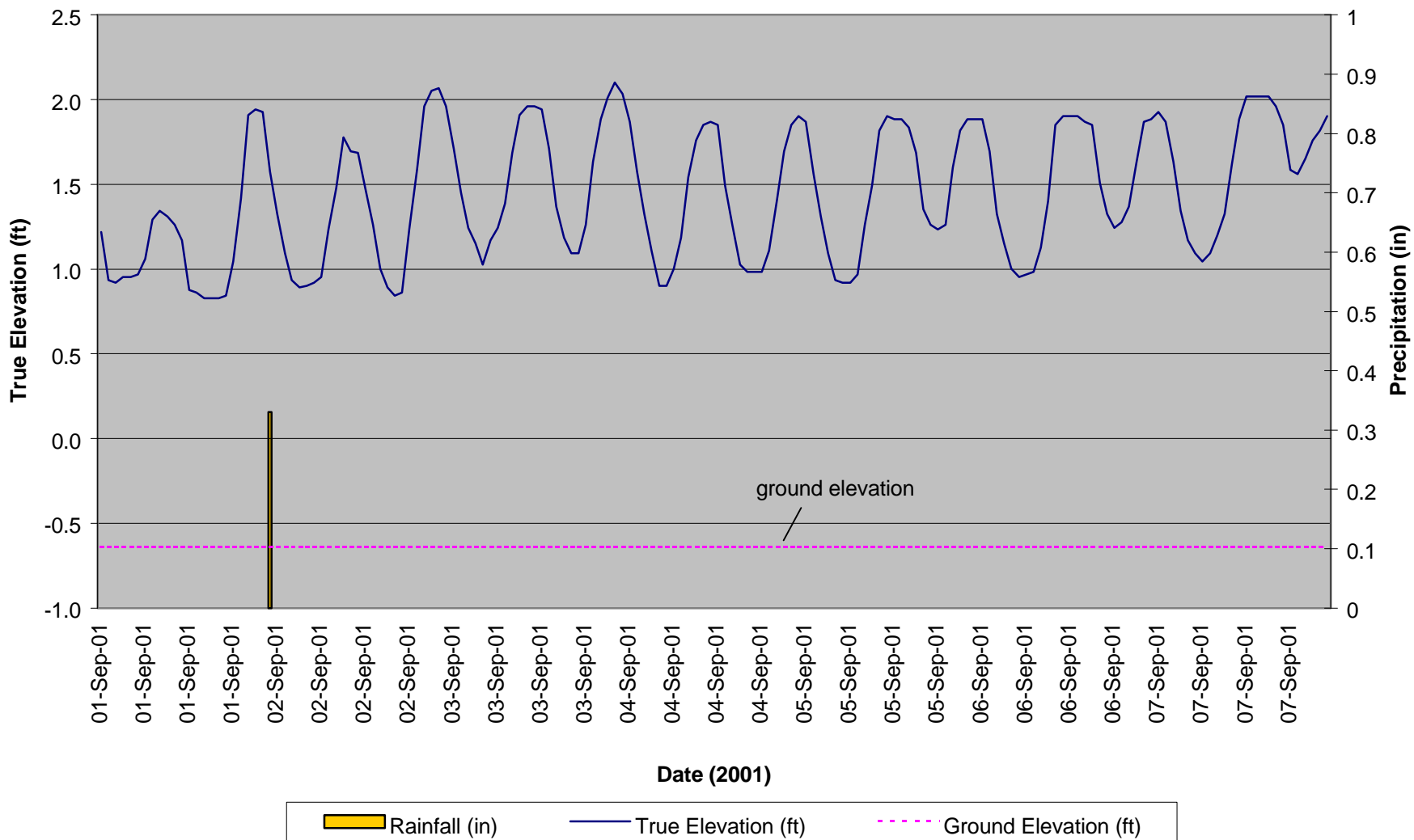
Deer Creek - SG1 Based on Elevation



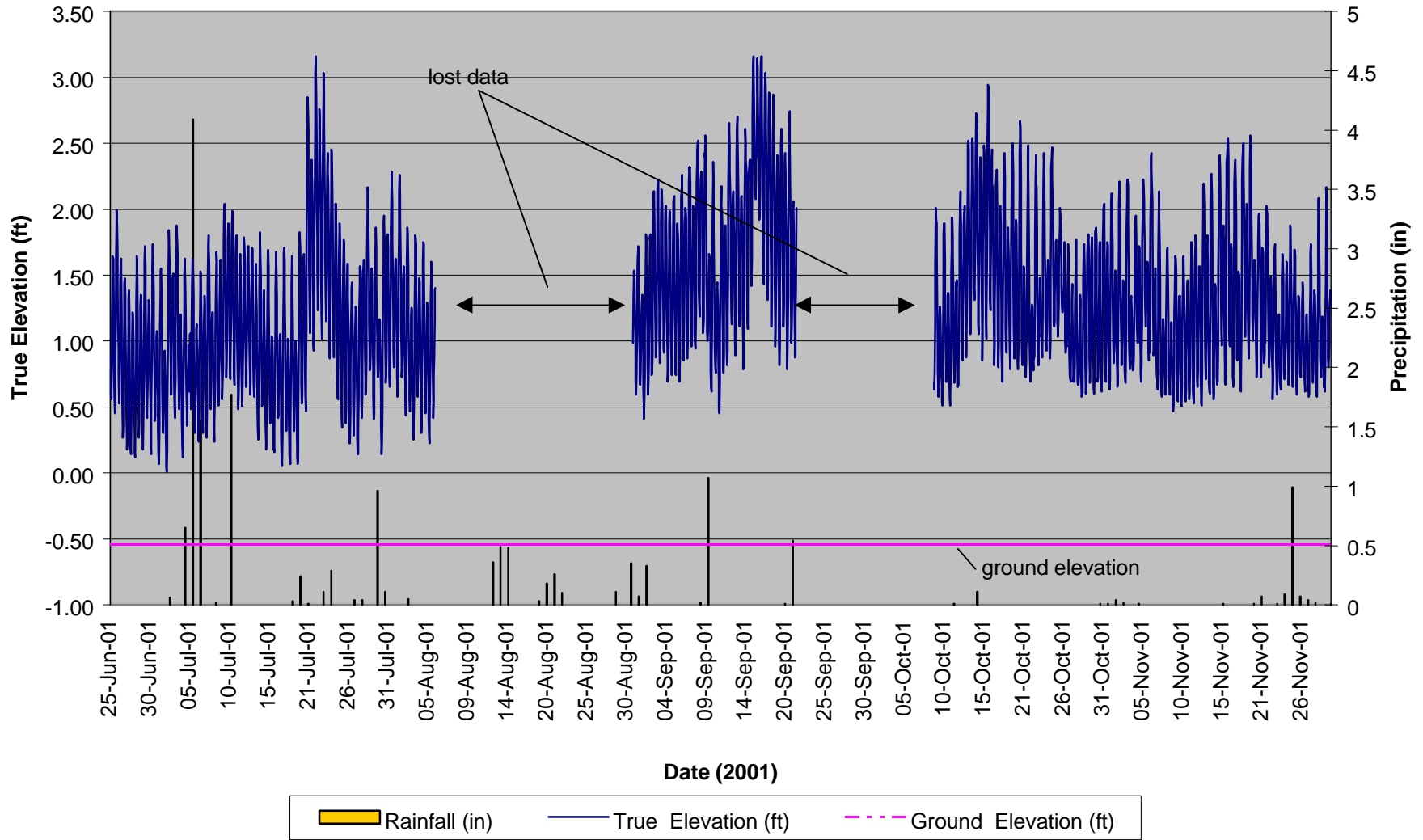
Deer Creek SG-2 Based on Elevation



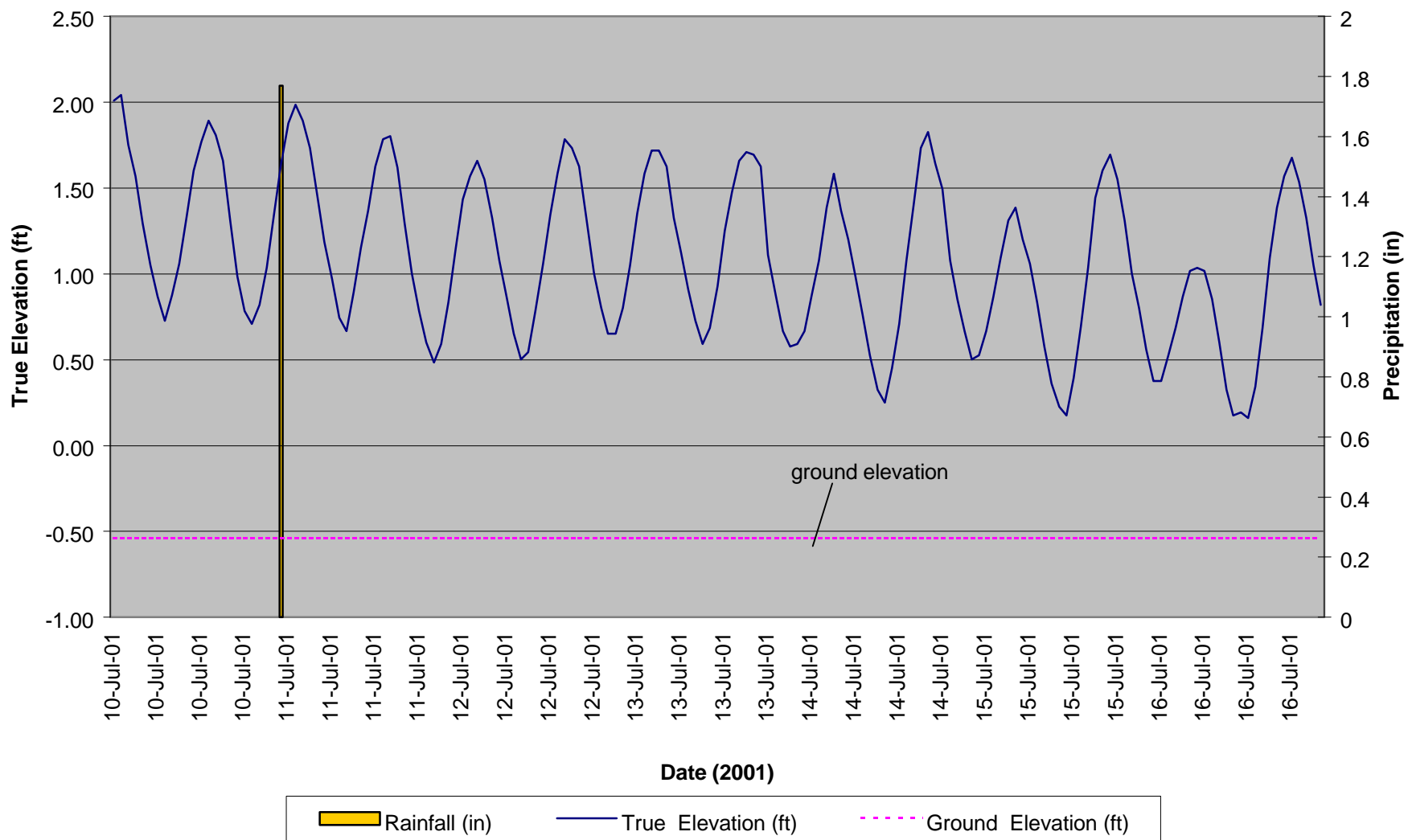
Deer Creek SG-2 (Sample week 2)



Deer Creek SG-3 Based on Elevation



Deer Creek SG-3 (Sample week 1)



APPENDIX B. SITE PHOTOS

Deer Creek



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

Deer Creek



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11

APPENDIX C. VEGETATION PLANTING PLAN

