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# **BAR BEACH SALT MARSH RESTORATION HEMPSTEAD HARBOR, NEW YORK**

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## **SECOND YEAR MONITORING REPORT**

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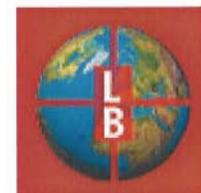
*Submitted to:*

**National Oceanic and Atmospheric Administration**  
New York, New York



*Prepared by:*

**The Louis Berger Group, Inc.**  
Florham Park, New Jersey



March 2006

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## EXECUTIVE SUMMARY

In 2003, The National Oceanic and Atmospheric Administration (NOAA), New York Department of Environmental Conservation, U.S. Fish and Wildlife Service, and the Town of North Hempstead restored the salt marsh in Bar Beach Lagoon, North Hempstead, New York, as part of a Superfund settlement addressing natural resource damages that had occurred as a result of the release of contaminants into Hempstead Harbor. Restoration activities included the removal of substantial volumes of fill consisting of sand, gravel, concrete, and solid waste debris from the site, as well as the physical removal of approximately 0.2 acres of common reed (*Phragmites australis*). Each of the fill removal areas was excavated to sub-grade, backfilled with clean soils, and planted with native wetland and coastal upland plant species.

The Louis Berger Group, Inc., conducted the second year monitoring of the five year monitoring program on September 13<sup>th</sup> and 14<sup>th</sup> of 2005. This event consisted of biological monitoring of vegetative cover and marsh elevation at the restoration site and at a nearby reference site. Avian monitoring was conducted by an experienced birder (volunteer) arranged by NOAA staff. The monitoring program was developed in collaboration with NOAA staff, and in accordance with the Final Restoration Plan (NOAA *et al.* 2002).

After the second year of monitoring, the restoration site has nearly met the 85 percent native species vegetative cover requirement and the re-establishment of *Phragmites* and other undesirable invasive species has been limited to 10 percent or less of the total restored area, as set forth in the restoration plan. Quadrat sampling revealed that an average of 84 percent of the restoration site was covered with native vegetation. Ground cover by *Phragmites* was limited to 0.4 percent of the restoration site.

The average height of *Spartina alterniflora* at the restoration site increased from 93 cm in 2004 to 103 in 2005. Plants had flowered and contained seedheads. Elevation monitoring results indicate that the restoration site has experienced no significant settlement or fill compaction between 2004 and 2005. Monitoring results suggest that the restoration site supports a more diverse avian community than the reference site. While avian abundance at the restoration site was lower than the reference site, this was largely due to the presence of non-native flocking species.

The second year monitoring results indicate that restoration efforts to date have been successful in establishing a diverse population of salt marsh plant and avian species. The planted salt marsh grasses are well established, however, the coastal zone still contains bare areas. Berger recommends planting shrubs and coastal grasses to increase vegetative cover of this zone. Berger also recommends that an osprey platform be established within Bar Beach lagoon, as the existing nest on pilings in the harbor is subjected to boating-related disturbances. Berger recommends that the herbivory fence in the peninsula area replanted in 2005 be left in place through the next growing season.

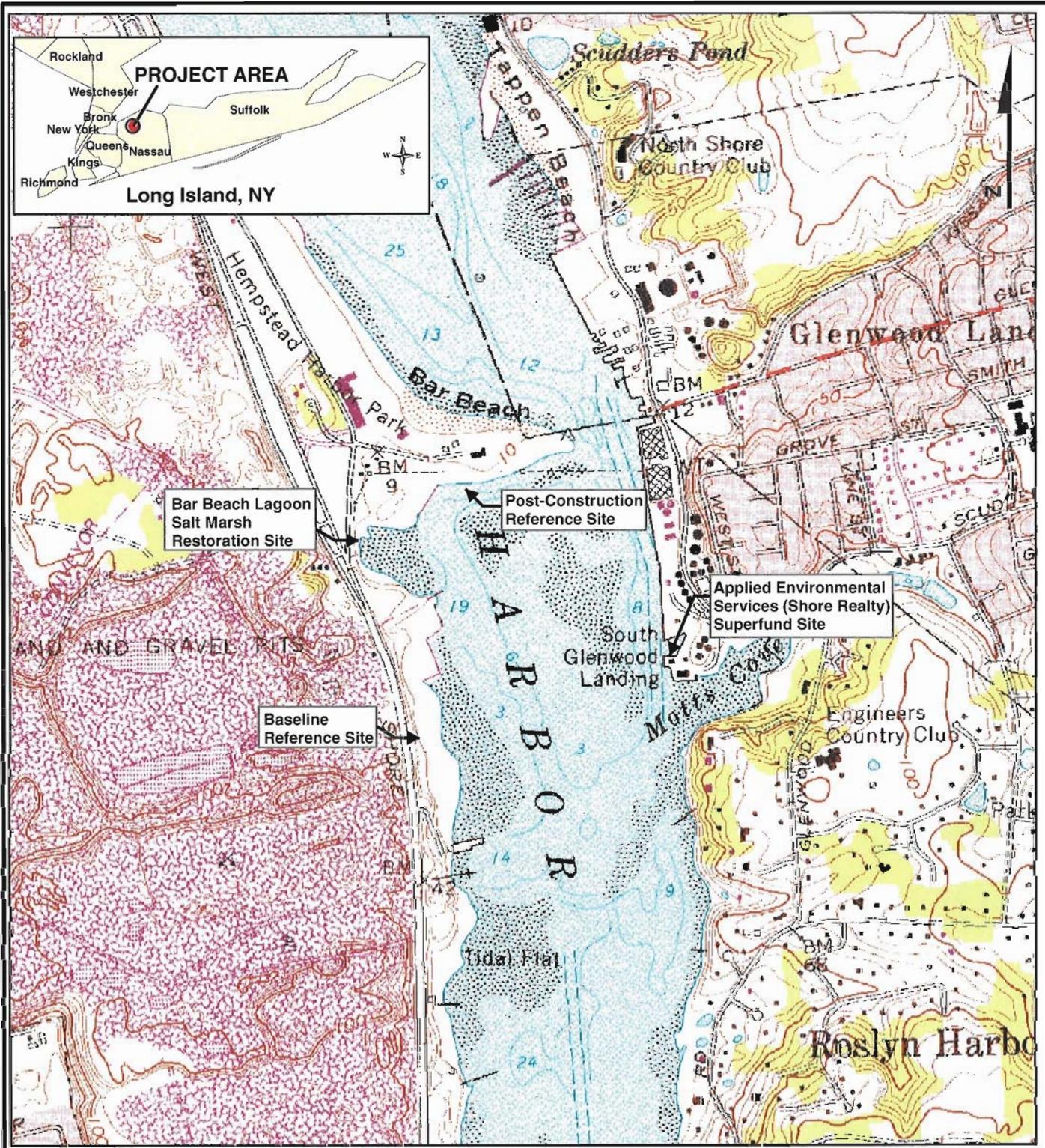
## 1.0 INTRODUCTION

In 2003, The National Oceanic and Atmospheric Administration (NOAA), New York Department of Environmental Conservation, U.S. Fish and Wildlife Service, and the Town of North Hempstead restored the salt marsh in Bar Beach Lagoon (also known as Hempstead Harbor Cove, see Figure 1), North Hempstead, New York, as part of a Superfund settlement addressing natural resource damages that had occurred as a result of the release of contaminants into Hempstead Harbor. Prior to restoration activities, Bar Beach Lagoon consisted of a mosaic of intertidal mudflat, sandflat, patchy low salt marsh, and shellfish beds. Restoration activities included the removal of substantial volumes of fill consisting of sand, gravel, concrete, and solid waste debris from the site. Removal of common reed (*Phragmites australis*) was also a component of the project, and involved physical removal of approximately 0.2 acres. Each of the fill removal areas was excavated to sub-grade, backfilled with clean soils, and planted with native wetland and coastal upland plant species.

Smooth cordgrass (*Spartina alterniflora*) was planted in the intertidal zone at elevations from 2.5 to 4 feet National Geodetic Vertical Datum (NGVD). Salt marsh cordgrass (*Spartina patens*) and spikegrass (*Distichlis spicata*) were planted in the high marsh at elevations from 4 to 5 feet NGVD. Between the high marsh and the upland, a coastal shoreline community consisting of marsh elder (*Iva frutescens*), groundsel-bush (*Baccharis halimifolia*), perennial ryegrass (*Panicum amarum*), and seaside goldenrod (*Solidago sempervirens*) was planted. Upland areas adjacent to the restoration site were seeded with a native warm season grass mixture and various native shrubs were planted in the upland periphery. Additional plantings in 2004 augmented the 2003 plantings where mortality, erosion, and fill compaction occurred. Virginia creeper (*Parthenocissus virginiana*) was initially planted in the upland area, but because its survival was poor and the primary purpose was stabilization of soils, it was not replanted. In the spring of 2005, the Performing Parties Group replanted the center portion of the peninsula area of the restoration site with *Spartina alterniflora* and also erected herbivory fence and overhead string. Dead shrubs in the coastal shoreline zone were also replaced and *Spartina patens* was replanted at the eastern end of the site where ice damage had occurred.

As part of the Superfund settlement, a monitoring program was implemented to assess the extent of success of the restoration project. The performance criteria for the restoration project requires 85 percent vegetative cover of the restoration area (marsh and stabilized coastal shoreline) within 5 years of initial planting and minimal re-establishment of *Phragmites* and other undesirable invasive vegetation to 10 percent or less of the total restored area. Performance criteria also included 90 percent survival of *Spartina alterniflora* and shoreline vegetation after two full growing seasons, which was independently evaluated by NOAA and not discussed in this report. In addition, fish, benthic macroinvertebrate, and avian species abundance, richness, and composition must demonstrate a strong positive trend toward and not significantly differ from that of a reference marsh. The reference marsh, located 600 feet to the northeast of the restoration site, is also a fringing marsh and was selected to serve as the reference site for this monitoring program. The baseline reference marsh originally used by NOAA during pre-restoration monitoring, located approximately half a mile south of Bar Beach Lagoon, was not selected as the reference site for post-construction monitoring because of the ease of access to the closer site and because it was no more similar in habitat. The restoration and reference sites are similar in size, each consisting of approximately 0.75 acres.

On behalf of NOAA, The Louis Berger Group, Inc. conducted the second year of monitoring on September 13<sup>th</sup> and 14<sup>th</sup> of 2005. This event consisted of biological monitoring of vegetative cover and marsh elevation at the restoration site and at a nearby reference site. Avian monitoring was conducted by an experienced birder (volunteer) arranged by NOAA staff. The monitoring program was developed in collaboration with NOAA staff, and in accordance with the Final Restoration Plan (NOAA *et al.* 2002).



National Oceanic and Atmospheric Administration	
Bar Beach Salt Marsh Ecological Restoration Monitoring Site Location Map	
Location: Hempstead Harbor, Long Island, NY	
Date: DEC 2005 ID: JR 5110	
	The Louis Berger Group, Inc 30A Vreeland Road Florham Park, NJ 07932
Figure 1	

SOURCES:  
Base Mapping: USGS 7.5 Minute Topographic Map, Sea Cliff Quadrangle.

## 2.0 VEGETATION MONITORING

### 2.1 Methodology

Plant cover at the restoration site and reference site was measured within one-meter square quadrats placed along permanently established transects. The restoration site was sampled along seven transects composed of forty quadrats. Six of these transects were oriented from the upland to the lower edge of the marsh, while the seventh transected the peninsula area from southwest to northeast. The reference site was sampled along three transects composed of ten quadrats, also oriented from upland to the lower edge of the marsh. At NOAA's request, quadrats were arranged so that the first quadrat was positioned in the coastal shoreline zone (above 5 feet NGVD), the second quadrat was placed in the high marsh (4 to 5 feet NGVD), and subsequent quadrats were placed in the low marsh (2.5 to 4 feet NGVD). NOAA initially estimated the number of vegetation quadrats required to sample the restoration and reference sites at 20 and 10 respectively, but the number of quadrats at the restoration site was increased to 40 to accommodate the requested sampling in the coastal zone and high marsh and still adequately assess overall vegetative cover at this site.

The elevation of the center point of each quadrat was determined using a Leica Geosystems Rugby 100 laser level. The ends of each transect were marked in the field with PVC pipes driven into the substrate and were surveyed with a Trimble Pro XRS Global Positioning System (GPS) with Asset Surveyor. The distance of each quadrat along the transect was measured and recorded to ensure that the same quadrats will be sampled each year. The locations of the vegetation transects appear in Figure 2, and the positions of the transect ends and quadrats are presented in Appendix A.

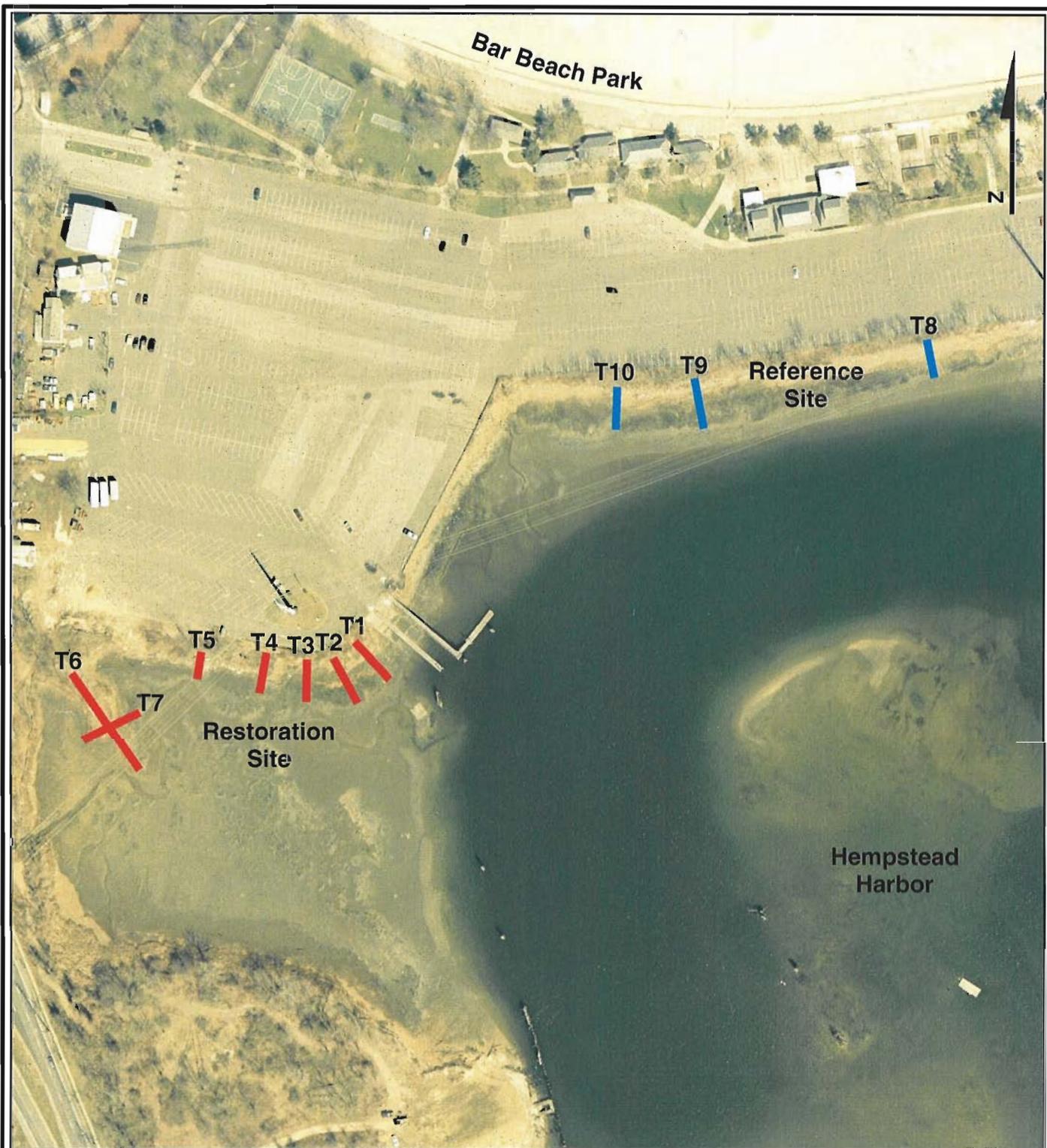
### 2.2 Results

A summary of vegetation observed in quadrats at the restoration and reference sites is presented in Table 1. A total of 11 species were present within the sampled quadrats at the restoration site, seven of which were planted and four which volunteered, including *Phragmites*. This is one less species than was observed at the restoration site in 2004. The coastal shoreline zone at the restoration site was dominated by the planted species *Iva frutescens*, *Panicum amarum*, *Solidago sempervirens*, and *Spartina patens*, while the marsh vegetation consisted almost entirely of *Spartina alterniflora*, *Spartina patens*, and *Distichlis spicata*.

**Table 1. Vegetative Species Observed.**

Common Name	Scientific Name	Restoration Site	Reference Site
groundsel tree*	<i>Baccharis halimifolia</i>	✓	
spike grass*	<i>Distichlis spicata</i>	✓	
high tide bush*	<i>Iva frutescens</i>	✓	✓
perennial ryegrass*	<i>Panicum amarum</i>	✓	
Virginia creeper*	<i>Parthenocissus quinquefolia</i>		✓
common reed	<i>Phragmites australis</i>	✓	✓
pearlwort	<i>Sagina procumbens</i>	✓	
glasswort	<i>Salicornia europa</i>	✓	
seaside goldenrod*	<i>Solidago sempervirens</i>	✓	
smooth cordgrass*	<i>Spartina alterniflora</i>	✓	✓
salt meadow grass*	<i>Spartina patens</i>	✓	
sea blite	<i>Sueda linearis</i>	✓	

\*Species planted or seeded at the restoration site



**Legend**

- Vegetation Transects
- █ Restoration Site
- █ Reference Site



National Oceanic  
and Atmospheric Administration

Bar Beach Salt Marsh  
Ecological Restoration Monitoring  
Transect Location Map

Location: Hempstead Harbor, Long Island, NY

Date: DEC 2005 ID: JR 5110

SOURCES:  
Base Mapping: New York State DOQQs,  
Nassau County, 2000.

 The Louis Berger Group, Inc.  
30A Vreeland Road  
Florham Park, NJ 07932

Figure 2

Only four species were present within the sampled quadrats at the reference site, representing one less species than observed in 2004. Vegetation in the coastal shoreline zone of the reference site was dominated by *Phragmites*, *Spartina alterniflora*, *Parthenocissus cinquefolia*, and *Iva frutescens*, while marsh vegetation consisted exclusively of *Spartina alterniflora* and *Phragmites*.

**Figure 3. Overview of the Restoration Site, September 2005.**



Table 2 presents a summary of vegetative ground cover, including cover by *Phragmites*, for each transect in the restoration and reference sites, as well as the mean value for these parameters across all transects at each site. Quadrat sampling indicates that total vegetative cover of the restoration site was 84.4 percent, representing a slight increase over the 2004 observation of 83.9 percent total cover. *Phragmites* accounted for 0.4 percent of cover, representing a very slight decrease from the 2004 observation of 0.5% *Phragmites* cover. Total vegetative cover of quadrats at the reference site was 83 percent, with *Phragmites* covering 19 percent of ground. Total vegetative cover of the reference site in 2004 was also 83 percent, but *Phragmites* cover was 11.5 percent. Plant field data documenting the ground cover estimates for the restoration and reference sites, as well as *Spartina alterniflora* height measurements, are presented in Appendix B. Photographs taken along each transect at the restoration site appear in Appendix C.

Prior to restoration activities, the upper elevations of the restoration site were dominated by *Phragmites*, while lower elevations were either unvegetated, or contained some *Spartina alterniflora*. Sampling conducted by NOAA in 2002 before the restoration indicated that total plant cover of the restoration site was approximately 47 percent, with *Spartina alterniflora* covering 22.5 percent of sampled quadrats and *Phragmites* covering 14.5 percent of quadrats sampled. High tide bush, spikegrass, poison ivy (*Toxicodendron radicans*), mugwort (*Artemisia vulgaris*) sea lavender (*Limonium* sp.), and glasswort were also present, but accounted for relatively little cover. Appendix E contains NOAA pre-restoration monitoring of percent plant cover by species at the restoration site.

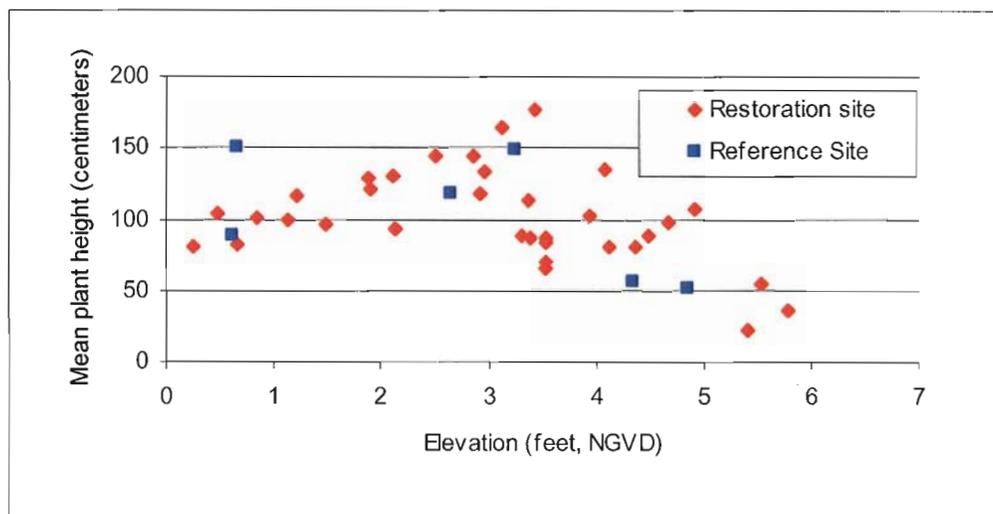
Table 2. Summary of Vegetative Ground Cover

Transect	Number of Quadrats	Mean Percent Vegetative Ground Cover for All Species Excluding <i>Phragmites</i>	Mean Percent Vegetative Ground Cover of <i>Phragmites</i>	Mean Total Percent Cover
Restoration Site				
1	5	71	0	71
2	5	92	1	93
3	5	96	0	96
4	5	69	0	69
5	5	85	2	87
6	10	83	0	83
7	5	94	0	94
Mean (all quadrats)		84.0	0.4	84.4
Reference Site				
8	3	72	7	79
9	4	46	43	89
10	3	80	0	80
Mean (all quadrats)		64	19	83

### Plant Height

Vegetation quadrat elevation data are presented in Appendix D. *Spartina alterniflora* height was closely tied to elevation at both the restoration and reference sites. Figure 4 presents mean plant height by elevation for both sites. Plant height was greatest at elevations of approximately two to three feet NGVD, decreasing both above and below this range. Mean *Spartina alterniflora* height within quadrats at the restoration site was 103 cm, a 10.7% increase over the 93 cm average height in 2004. The mean height of plants in quadrats at the reference site was 110 cm, representing a 6.3% decrease from the 117 cm average height in 2004. At both sites, *Spartina alterniflora* had flowered and contained seedheads. In 2002, prior to the restoration, NOAA staff measured *Spartina alterniflora* height at the restoration site and reference site, finding the mean height of the remnant plants in the lower tidal elevations of the restoration site to be 116 cm, while mean plant height at the original reference site was 136 cm. Pre-restoration plant height measurements were taken from different locations than those sampled for this monitoring report.

**Figure 4. Mean *Spartina alterniflora* Height by Ground Elevation.**



### 3.0 ELEVATION MONITORING

Elevations of the vegetation sampling quadrats taken in 2004 were compared with elevations taken in 2005, and these results appear in Table 3. No elevation data were taken for transect 8, due to rain which developed during the final afternoon of sampling. The mean difference in elevation of each transect at the restoration and reference sites between 2004 and 2005 was less than 0.2 feet, and generally much less than that. The differences between elevations in 2004 and 2005 at the restoration site and reference site are of the same range of magnitude, and overall, the elevation differences between the sites are extremely small. The observed differences are likely due to the lack of a permanent marker within the 50 quadrats, making it impossible to take measurements in the exact same location as the previous year. The data do not indicate that the restoration site has experienced significant settlement or fill compaction between 2004 and 2005.

**Table 3. Elevation Differences Between 2004 and 2005**

Restoration Site		Reference Site	
Transect	Mean Difference	Transect	Mean Difference
1	-0.19	8	NA
2	-0.02	9	0.11
3	-0.05	10	-0.15
4	0.01		
5	-0.06		
6	-0.07		
7	-0.04		
Overall Mean Difference	-0.062		-0.001

### 4.0 AVIAN

# MONITORING

## 4.1 Methodology

Avian monitoring was conducted by Mary Normandia, an ornithologist from the North Shore Audubon Society arranged by NOAA. During 2005, monitoring was conducted on forty occasions, generally on a weekly basis. The ornithologist spent 30 minutes at the restoration and reference sites, and noted the bird species present within each site, their numbers and activity, as well as the weather and tide conditions. Birds within 100 yards of the restoration and reference sites were also noted, but not included in the analysis, as they were generally flying through the area, or were between the sites in the parking lot or on the power lines or towers.

## 4.2 Results

Table 4 presents avian species abundance, richness, composition, and diversity for the restoration and reference sites.

**Table 4. Summary of Avian Monitoring Results.**

Species		Restoration Site		Reference Site	
Common Name	Scientific Name	Number of Individuals	Mean Abundance	Number of Individuals	Mean Abundance
Song Sparrow	<i>Melospiza melodia</i>	20	0.50	1	0.03
House Sparrow	<i>Passer domesticus</i>	1	0.03		
Swamp Sparrow	<i>Melospiza georgiana</i>	2	0.05	2	0.05
Double-crested Cormorant	<i>Phalacrocorax auritus</i>			1	0.03
Mallard	<i>Anas platyrhynchos</i>	2	0.05	5	0.13
Mute Swan	<i>Cygnus olor</i>	18	0.45	8	0.20
Canada Goose	<i>Branta canadensis</i>	13	0.33	9	0.23
Ring-billed Gull	<i>Larus delawarensis</i>	2	0.05	96	2.40
Herring Gull	<i>Larus argentatus</i>	1	0.03	7	0.18
Foster's Tern	<i>Sterna forsteri</i>	3	0.08	1	0.03
Great Blue Heron	<i>Ardea herodias</i>	1	0.03		
Great Egret	<i>Ardea alba</i>	1	0.03	4	0.10
Snowy Egret	<i>Egretta thula</i>			1	0.03
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	3	0.08		
Osprey	<i>Pandion haliaetus</i>	2	0.05		
Spotted Sandpiper	<i>Actitis macularia</i>	1	0.03		
Barn Swallow	<i>Hirundo rustica</i>	9	0.23	1	0.03
Mourning Dove	<i>Zenaidura macroura</i>	3	0.08		
Rock Dove	<i>Columba livia</i>			78	1.95
European Starling	<i>Sturnus vulgaris</i>	4	0.10	98	2.45
Killdeer	<i>Charadrius vociferus</i>	3	0.08		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	13	0.33		
Grackle	<i>Quiscalus quiscula</i>	12	0.30		
Willow Flycatcher	<i>Empidonax traillii</i>	1	0.03		
Goldfinch	<i>Carduelis tristis</i>	1	0.03		
Yellow-rumped Warbler	<i>Dendroica coronata</i>	2	0.05		
All Species		118	2.95	312	7.80
Species Richness		23		14	
Diversity Index		1.137		0.695	

Avian monitoring data are provided in Appendix F. Twenty-three avian species were observed at the restoration site, while fourteen were observed at the reference site. Mean avian abundance per observation at the restoration site was 3, which was lower than the mean of nearly 8 birds per observation at the reference site. However, this reflects the different makeup of the avian assemblage at the reference site, where 87 percent of individuals consisted of the flocking species Ring-billed Gull, Rock Dove, and European Starling. It should be noted that the Rock Dove and European Starling are not native species. Avian abundance at the restoration site was higher in 2004 than in 2005, however the first year monitoring consisted of a small number of observations in the fall, and was not representative of year-round conditions.

Avian diversity, as measured by the Shannon-Weaver Diversity Index, was 1.137 at the restoration site, which was significantly higher than the reference site diversity index of 0.695. Both songbirds and waterbirds were well represented at the restoration site, while most species observed at the reference site were waterbirds. The greater avian species richness and diversity of the restoration site as compared to the reference site and the difference in species composition are likely due to habitat differences. The waters adjacent to the restoration site are less exposed to wind and waves than the reference site and the restoration site is nearly surrounded by densely forested habitat providing a close source of food and shelter for songbirds.

## 5.0 SUMMARY

After the second year of monitoring, the restoration site has nearly met the 85 percent native species vegetative cover requirement and re-establishment of *Phragmites* and other undesirable invasive species has been limited to 10 percent or less of the total restored area, as set forth in the restoration plan. Quadrat sampling revealed that an average of 84 percent of the restoration site was covered with native vegetation. Ground cover by *Phragmites* was limited to 0.4 percent of the restoration site. Comparisons with NOAA pre-restoration monitoring indicate substantially greater coverage of the restoration site with native wetland vegetation, and the near-total eradication of *Phragmites*. In 2002, prior to the restoration, only 47 percent of the site had vegetative cover, nearly a third of which consisted of *Phragmites*. Table 5 summarizes the monitoring results for all parameters investigated at the restoration and reference sites in 2005.

**Table 5. Summary of Monitoring Results**

Resource	Monitoring Result	2004	2005	Direction of Change
Vegetation	Percent Ground Cover (excluding <i>Phragmites</i> )	83	84	+
	Percent Cover by <i>Phragmites</i>	0.5	0.4	+
	Species Richness	12	11	-
	Mean <i>Spartina alterniflora</i> height	93	103	+
Marsh Elevation	--	--	--	=
Avian	Mean Abundance	4.9	3	-
	Species Richness	8	23	+
	Diversity Index	0.771	1.137	+

Comparisons of the elevations of the vegetation monitoring quadrats do not indicate that the restoration site has experienced significant fill compaction between 2004 and 2005. Monitoring results indicate that the restoration site supports a more diverse avian community than the reference site. Although birds were more abundant at the reference site, this was largely due to flocks of the non-native Rock Dove and European Starling. Differences in the composition of the avian communities at the restoration and reference sites are probably due to differences in the surrounding habitats of each site.

## **Management Recommendations**

The second year monitoring results indicate that restoration efforts to date have been successful in establishing a diverse population of salt marsh plant and avian species. The planted salt marsh grasses are well established, however, bare ground continues to be present in some areas of the coastal shoreline zone, and some of the shrubs planted in this zone are dead. Berger recommends replanting these shrubs, as well as coastal grasses, preferably with plugs, which would be more effective at vegetating larger areas. Berger recommends that the goose exclusion fence around the area on the peninsula which was replanted by the Town of North Hempstead in 2005 be left in place for another growing season.

The ornithologist conducting the avian monitoring has noted that fishermen sometimes tie their boats to the pilings located just to the south of Bar Beach lagoon. As osprey nest on one of these pilings, this disturbance has been observed to severely agitate the adults, leaving the young unprotected. While this is not within the project site, NOAA might consider posting warning signs to the pilings to prohibit boats from approaching. Berger recommends that an osprey platform be established in the lagoon itself where boat traffic would not disrupt nesting activities.

## **6.0 REFERENCES**

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## APPENDICES

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**APPENDIX A**  
**VEGETATION MONITORING QUADRAT LOCATIONS**

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## Bar Beach Vegetation Monitoring Quadrat Locations

Reference Site									
Transect and Quadrat position (transect lengths and quadrat locations as measured along a tape measure laid between the PVC end pipes)									
End	northing	easting	Quadrat	Distance from lower pipe (m)	End	northing	easting	Quadrat	Distance from lower pipe (m)
T1up	240496.692	1079543.771	1	21.0	T8up	240917.997	1080339.707	1	14
T1low	240443.858	1079592.021	2	18.3	T8low	240865.224	1080350.428	2	6.1
T1 total length 22.07 m			3	13.8	T8 total length 16.0 m			3	0.7
			4	7.7				T9up	240863.950
			5	0.9	T9low	240794.065	1080028.913	2	14.8
T2up	240473.546	1079513.559	1	21.0	T9 total length 21.6 m			3	6.7
T2low	240411.422	1079547.602	2	18.4				4	0.5
T2 total length 21.95 m			3	15.8	T10up	240851.720	1079907.820	1	12.3
			4	7.7	T10low	240792.253	1079905.867	2	5.6
			5	0.5	T10 total length 19.0 m			3	0.6
T3up	240471.818	1079476.992	1	17.6					
T3low	240413.046	1079475.841	2	15.2	T3 total length 17.95 m			3	9.8
T3 total length 17.95 m			4	4.9					
			5	0.6					
			T4up	240481.267	1079420.387	1	15.1		
T4low	240425.061	1079411.027	2	12.6	T4 total length 17.50 m			3	7.8
T4 total length 17.50 m			4	5.4					
			5	0.5					
			T5up	240482.271	1079329.557	1	9.9		
T5low	240444.181	1079324.130	2	7.7	T5 total length 12.1 m			3	5.3
T5 total length 12.1 m			4	2.9					
			5	0.7					
			T6up	240451.950	1079149.276	1	47.4		
T6low	240317.391	1079242.701	2	46.8	T6 total length 50.1 m			3	42.4
T6 total length 50.1 m			4	37.8					
			5	30.8					
			6	23.4					
			7	17.4					
			8	11.5					
			9	5.8					
			10	0.7					
			T7west	240359.023	1079164.397	1	26.7		
T7east	240397.675	1079243.907	2	21.9	T7 total length 27.3 m			3	11.8
T7 total length 27.3 m			4	6.7					
			5	0.7					

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**APPENDIX B**  
**VEGETATIVE COVER DATA**

---

## 2005 Bar Beach Vegetative Cover Data

Restoration Site	Transect 1					Transect 2					Transect 3					Transect 4					Transect 5					Transect 6					Transect 7														
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5					
Quadrat	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
<i>Spartina alterniflora</i>	5	95	100	30	5	+	95	100	85	5	20	100	100	100	95	0	0	70	100	25	+	5	90	90	75	0	0	90	90	75	0	0	90	90	75	0	0	90	100	85	90	100	85	95	100
<i>Spartina patens</i>	10	90	0	0	0	10	0	0	0	40	10	0	0	0	0	35	20	0	0	0	0	0	0	0	0	0	0	0	0	0	10	35	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Distichlis spicata</i>	15	5	0	0	0	65	95	0	0	0	10	70	0	0	0	0	80	0	0	0	40	95	0	0	0	15	10	0	0	0	0	15	10	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salicornia europaea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex patula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Suaeda linearis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Baccharis halimifolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Iva frutescens</i>	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phragmites australis</i>	0	+	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Panicum amarum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Solidago semipervirens</i>	0	0	0	0	0	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sagina procumbens</i>	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Parthenocissus cinquefolia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% dead vegetation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% open/mud/water	70	0	5	0	70	15	0	5	0	15	0	0	0	0	5	50	0	30	0	75	20	0	10	10	25	15	5	10	10	50	10	10	10	50	25	5	35	5	15	10	0	15	0	15	5
% vegetative ground cover	30	100	95	100	30	85	100	95	100	85	100	100	100	100	95	50	100	70	100	25	80	100	90	90	75	85	95	90	90	50	75	95	95	65	85	90	100	85	95	100					

Reference Site	Transect 8				Transect 9				Transect 10		
	1	2	3	4	1	2	3	4	1	2	3
Quadrat	1	2	3	4	1	2	3	4	1	2	3
<i>Spartina alterniflora</i>	0	100	80	0	10	95	70	65	90	85	85
<i>Spartina patens</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Distichlis spicata</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Salicornia europaea</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Atriplex patula</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Suaeda linearis</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Baccharis halimifolia</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Iva frutescens</i>	30	0	0	0	0	0	0	0	0	0	0
<i>Phragmites australis</i>	20	0	0	0	90	80	0	0	0	0	0
<i>Panicum amarum</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Solidago semipervirens</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Sagina procumbens</i>	0	0	0	0	0	0	0	0	0	0	0
<i>Parthenocissus cinquefolia</i>	5	0	0	10	0	0	0	0	0	0	0
% dead vegetation	0	0	0	0	0	0	0	0	0	0	0
% open/mud/water	45	0	20	0	10	5	30	35	10	15	15
% vegetative ground cover	55	100	80	100	90	90	95	70	65	90	85

+ = present, but covers less than 1 percent of quadrat

---

**APPENDIX C**  
***Spartina alterniflora* HEIGHT DATA**

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**APPENDIX D  
ELEVATION DATA**

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## 2005 Bar Beach Elevation Data

Restoration Site				
Transect	Quadrat	2004 Elevation	2005 Elevation	Difference
1	1	5.76	5.4	-0.36
	2	5.05	4.9	-0.15
	3	4.15	4.1	-0.05
	4	3.29	3.1	-0.19
	5	0.44	0.25	-0.19
2	1	5.81	5.76	-0.05
	2	4.84	4.74	-0.1
	3	4.41	4.48	0.07
	4	1.89	1.88	-0.01
	5	0.51	0.48	-0.03
3	1	5.56	5.52	-0.04
	2	4.75	4.65	-0.1
	3	4.11	4.07	-0.04
	4	2.2	2.1	-0.1
	5	0.8	0.84	0.04
4	1	5.86	5.79	-0.07
	2	4.76	4.7	-0.06
	3	3.3	3.28	-0.02
	4	2.5	2.83	0.33
	5	0.8	0.66	-0.14
5	1	5.57	5.58	0.01
	2	4.39	4.35	-0.04
	3	3.41	3.37	-0.04
	4	2.2	2.12	-0.08
	5	1.28	1.13	-0.15
6	1	5.39	5.35	-0.04
	2	4.62	4.85	0.23
	3	3.98	3.93	-0.05
	4	3.65	3.5	-0.15
	5	3.61	3.52	-0.09
	6	3.53	3.5	-0.03
	7	3.38	3.35	-0.03
	8	3.28	2.94	-0.34
	9	2.55	2.48	-0.07
	10	1.6	1.48	-0.12
7	1	1.24	1.22	-0.02
	2	2.97	2.9	-0.07
	3	3.53	3.5	-0.03
	4	3.55	3.41	-0.14
	5	1.83	1.87	0.04

Average Difference      -0.062

Reference Site				
Transect	Quadrat	2004 Elevation	2005 Elevation	Difference
8	1	5.89	NA	NA
	2	3.23	NA	NA
	3	1.07	NA	NA
9	1	6.08	6.28	0.2
	2	4.74	4.84	0.1
	3	2.74	2.63	-0.11
10	1	4.25	4.33	0.08
	2	3.27	3.23	-0.04
	3	1.14	0.65	-0.49

Average Difference      -0.001

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**APPENDIX E**  
**SITE PHOTOGRAPHS**

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**Restoration site-view of transect 1 from upland end.**



**Restoration site-view of transect 2 from upland end.**



**Restoration site-view of transect 3 from upland end.**



**Restoration site-view of transect 4 from upland end.**



**Restoration site-view of transect 5 from upland end.**



**Restoration site-view of transect 6 from upland end.**



**Restoration site-view of transect 7 from west end.**



**Restoration site-view from boat ramp.**



**Reference site, view from boat ramp.**



**Reference site-view of transect 10.**



**Reference site-view of transect 9.**



**Reference site-view of transect 8.**

---

**APPENDIX F**  
**AVIAN MONITORING DATA**

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MONITORING INFORMATION

Date of Monitoring 12/9/04

Time of Monitoring Began: 10: AM  
Concluded: 10: 30

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather 46° @ 5mph / cloudy / North  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. NORMANDIA, AUDUBON

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



**MONITORING INFORMATION**

**Date of Monitoring** 12/16/09

---

**Time of Monitoring** Began: 3 pm  
Concluded: 330 pm

---

**Tide** High Tide Ebbing / Low Tide /  
(please circle one) Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

---

**Weather** 38° SW @ 10 mph Clear  
(temperature, wind, precipitation)

---

**Monitor(s)** M. Normandia, NSAS  
(name, affiliation)

---

**Type of Monitoring** Pre-Construction  
(please circle one) As-built (4-5 weeks)

Annual Post-Construction: Year 1 2 / 3 /  
4 / 5

---

**Parameters Measured** Vegetation  
(please circle all that apply) Sediment

Benthic Invertebrates

Birds

Other (please describe):

---



**MONITORING INFORMATION**

**Date of Monitoring** 12/23/04

---

**Time of Monitoring** Began: 10:AM  
Concluded: 10:30 A.M.

---

**Tide**  High Tide  Ebbing /  Low Tide /  
(please circle one)  Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

**Weather** 55°/SSE/25mph/overcast  
(temperature, wind, precipitation)

---

**Monitor(s)** M. NORMANDIA, NSAS  
(name, affiliation)

---

**Type of Monitoring**  Pre-Construction  
(please circle one)  As-built (4-5 weeks)  
 Annual Post-Construction: Year 1  2 / 3 /  
4 / 5

---

**Parameters Measured**  Vegetation  
(please circle all that apply)  Sediment  
 Benthic Invertebrates  
 Birds  
 Other (please describe):

---

**MONITORING PARAMETERS: BIRD OBSERVATION** 12/23/04

Site:

Species	Abundance	Location	Activity	Duration of Stay
Mute Swan	5	water	sleeping	15 minutes
Song Sparrow	1	grass	Flying	10 minutes

Ref:

Double Crest Cormorant	1	water	feeding	10 minutes

Note:

Pecoy duck	← duck hunters in area			

**Notes: Others**

20 Rock Pigeon  
 54 Ring billed Gull  
 2 Great BK. Backbill  
 2 Herring Gull  
 20 House Sparrow

} Parking lot

1 Kingfisher - west bank of lagoon  
 1 Peregrine - L.I.P.A plant  
 200 Canada geese - Fly by

MONITORING INFORMATION

Date of Monitoring 1/7/05

Time of Monitoring Began: 9:30 AM  
Concluded: 10: AM

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather (temperature, wind, precipitation) 39° / 10-20 mph / W.N.W. Cloudy

Monitor(s) (name, affiliation) M. Normandia, NSAS

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Does this change in 05?

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds

Other (please describe):



**MONITORING INFORMATION**

**Date of Monitoring** 1/9/05

---

**Time of Monitoring** Began: 11 AM  
Concluded: 12 pm

---

**Tide** (please circle one) High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

**Weather** (temperature, wind, precipitation) 40°/5-10 mph/direction unknown/sunny

---

**Monitor(s)** (name, affiliation) M. NORMANDIA, NSAS

---

**Type of Monitoring** (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

---

**Parameters Measured** (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

---



## MONITORING INFORMATION

Date of Monitoring

1/16/05

Time of Monitoring

Began: 9 AM

Concluded: 9:30 AM

Tide

(please circle one)

High Tide / Ebbing / Low Tide /

Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather

(temperature, wind,  
precipitation)

32°/NE @ 5-10 mph - cloudy

Monitor(s)

(name, affiliation)

M. NORMANDIA

Type of Monitoring

(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / 3 /  
4 / 5

Parameters Measured

(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):



**MONITORING INFORMATION**

**Date of Monitoring** 2-16-05

---

**Time of Monitoring** Began: 11:00  
Concluded: 12:00

---

**Tide** High Tide / Ebbing / Low Tide /  
(please circle one) Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

---

**Weather** 39° / WSW / 15 mph / cloudy  
(temperature, wind, precipitation)

---

**Monitor(s)** M. NORMANDIA NSAS  
(name, affiliation)

---

**Type of Monitoring** Pre-Construction  
(please circle one) As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

---

**Parameters Measured** Vegetation  
(please circle all that apply) Sediment

Benthic Invertebrates

Birds

Other (please describe):

---



MONITORING INFORMATION

Date of Monitoring 3/14/05

Time of Monitoring Began: 10 AM  
Concluded: 10:30 AM

Tide (please circle one) High Tide / Ebbing  Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather (temperature, wind, precipitation) 38° / WNW-12 / SUNNY

Monitor(s) (name, affiliation) M. NORMANDIA, NSAS

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year  1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
 Birds  
Other (please describe):



**MONITORING INFORMATION**

**Date of Monitoring** 3/22/05

---

**Time of Monitoring** Began: 10:30  
Concluded: 11:00 AM

---

**Tide** High Tide / Ebbing / Low Tide /  
(please circle one) Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

---

**Weather** 46°/5-10 mph/North/Sunny  
(temperature, wind, (46) degree precipitation)

---

**Monitor(s)** M. NORMANDIA, NSA S  
(name, affiliation)

---

**Type of Monitoring** Pre-Construction  
(please circle one) As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / 3 /  
4 / 5

---

**Parameters Measured** Vegetation  
(please circle all that apply) Sediment

Benthic Invertebrates

Birds

Other (please describe):

---



**MONITORING INFORMATION**

**Date of Monitoring** 3/31/05

---

**Time of Monitoring** Began: 3:pm  
Concluded: 3:30pm

---

**Tide** (please circle one) High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

**Weather** (temperature, wind, precipitation) 43°/5-12 mph / ESE / cloudy

---

**Monitor(s)** (name, affiliation) NORMANDIA

---

**Type of Monitoring** (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

---

**Parameters Measured** (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

---



MONITORING INFORMATION

Date of Monitoring 4/7/05

Time of Monitoring Began: 3 pm  
Concluded: 3:30 pm

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 60° / SSW @ 21 / pt. cloudy

Monitor(s) (name, affiliation) M. Normandia, North Shore Clubbon

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 4/16/05

Time of Monitoring Began: 3pm  
Concluded: 3:30

Tide (please circle one) High Tide / Ebbing / Low Tide  
Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather 50°/E@10-15/SUNNY  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 4/24/05

Time of Monitoring Began: 9pm  
Concluded: 4:30pm

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 50°/SW @ 10-15 / cloudy-sprinkles

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



## MONITORING INFORMATION

Date of Monitoring 4/29/05

Time of Monitoring Began: 3:30  
Concluded: 4:15

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 55°/SSW@12/cloudy

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 5/5/05

Time of Monitoring Began: 9:30 A.M.  
Concluded: 10 AM

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding  
~~Predicted low and high tides:~~  
~~Time of tidal measurements:~~  
~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 55°/ENE @ 5-10 mph / SUNNY

Monitor(s) (name, affiliation) M. Normandie, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



## MONITORING INFORMATION

<b>Date of Monitoring</b>	5/8/05
<b>Time of Monitoring</b>	Began: 9:30 A.M. Concluded: 10: AM
<b>Tide</b> (please circle one)	<input checked="" type="radio"/> High Tide / Ebbing / Low Tide / Flooding
	<del>Predicted low and high tides:</del>
	<del>Time of tidal measurements:</del>
	<del>Nearest tidal station:</del>
<b>Weather</b> (temperature, wind, precipitation)	55°/N@20-30/Cloudy
<b>Monitor(s)</b> (name, affiliation)	M. Normandia, North Shore Audubon Soc.
<b>Type of Monitoring</b> (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year <input checked="" type="radio"/> 1 / 2 / 3 / 4 / 5
<b>Parameters Measured</b> (please circle all that apply)	Vegetation Sediment Benthic Invertebrates <input checked="" type="radio"/> Birds Other (please describe):



MONITORING INFORMATION

Date of Monitoring 5/21/05

Time of Monitoring Began: 1 pm  
Concluded: 1:45 pm

Tide (please circle one) High Tide Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather 62°/10mph/EAST/CLOUDY-50%  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 5/29/05

Time of Monitoring Began: 10:30AM  
Concluded: 11:10AM

Tide High Tide / Ebbing / Low Tide  
(please circle one) Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather 64°/NNW @ 5-7 mph / clear  
(temperature, wind, precipitation)

Monitor(s) M. Normandia, North Shore Audubon Soc.  
(name, affiliation)

Type of Monitoring Pre-Construction  
(please circle one) As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured Vegetation  
(please circle all that apply) Sediment  
Benthic Invertebrates  
Birds

Other (please describe):

Note: Memorial Day Fireworks display closed off entire area for night of 5/28/05



MONITORING INFORMATION

Date of Monitoring 6/8/05

Time of Monitoring Began: 9:30 AM  
Concluded: 10:15 AM

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather 80° clear / N@5 / SUNNY  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 6/18/05

Time of Monitoring Began: 9AM  
Concluded: 10AM

Tide (please circle one) High Tide Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather 72°/CALM/SUNNY  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 6/23/05

Time of Monitoring Began: 9 AM  
Concluded: 9:45 AM

Tide (please circle one) High Tide / Ebbing Low Tide / Flooding  
~~Predicted low and high tides:~~  
~~Time of tidal measurements:~~  
~~Nearest tidal station:~~

Weather 76°/South Calm/clear  
(temperature, wind, precipitation)

Monitor(s) M. Normandia, North Shore Audubon Soc.  
(name, affiliation)

Type of Monitoring Pre-Construction  
(please circle one) As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured Vegetation  
(please circle all that apply) Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 6/27/05

Time of Monitoring Began: 9AM  
Concluded: 930 AM

Tide (please circle one) High Tide / Ebbing / Low Tide  
Flooding  
~~Predicted low and high tides:~~  
~~Time of tidal measurements:~~  
~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 73°/ESE/CLOUDY - FOG

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 7/7/05

Time of Monitoring Began: 11 AM  
Concluded: 1:30 A.M.

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

\*Weather 70° / SE / CLOUDY  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

\*Beach closed due to heavy rains day before.



## MONITORING INFORMATION

**Date of Monitoring**

7/14/05

**Time of Monitoring**

Began: 9:15 AM  
Concluded: 9:45 AM

**Tide**  
(please circle one)

High Tide / Ebbing / Low Tide /  
Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

**Weather**  
(temperature, wind,  
precipitation)

76° / SSE 10 / cloudy

**Monitor(s)**  
(name, affiliation)

M. Normandia, North Shore Audubon Soc.

**Type of Monitoring**  
(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / 3 /  
4 / 5

**Parameters Measured**  
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):



MONITORING INFORMATION

Date of Monitoring

7/20/05

Time of Monitoring

Began: 9 AM  
Concluded: 9:30 AM

Tide  
(please circle one)

High Tide Ebbing / Low Tide /  
Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather  
(temperature, wind,  
precipitation)

80°S / Sunny

Monitor(s)  
(name, affiliation)

M. Normandia, North Shore Audubon Soc.

Type of Monitoring  
(please circle one)

Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 /  
4 / 5

Parameters Measured  
(please circle all that apply)

Vegetation  
Sediment  
Benthic Invertebrates  
Birds

Other (please describe):



MONITORING INFORMATION

Date of Monitoring 7/25/05

Time of Monitoring Began: 9:30 AM  
Concluded: 10:15 AM

Tide (please circle one) High Tide / Ebbing Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 80° SW 10-15 Cloudy, drizzle

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



## MONITORING INFORMATION

<b>Date of Monitoring</b>	8/1/05
<b>Time of Monitoring</b>	Began: 9 AM Concluded: 9:30 AM
<b>Tide</b> (please circle one)	High Tide / Ebbing / Low Tide / Flooding
	<del>Predicted low and high tides:</del>
	<del>Time of tidal measurements:</del>
	<del>Nearest tidal station:</del>
<b>Weather</b> (temperature, wind, precipitation)	75°N / Hazy Sun
<b>Monitor(s)</b> (name, affiliation)	M. Normandia, North Shore Audubon Soc.
<b>Type of Monitoring</b> (please circle one)	Pre-Construction As-built (4-5 weeks) Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5
<b>Parameters Measured</b> (please circle all that apply)	Vegetation Sediment Benthic Invertebrates Birds Other (please describe):



MONITORING INFORMATION

Date of Monitoring

8/8/05

Time of Monitoring

Began: 4:45 PM  
Concluded: 5:15 PM

Tide  
(please circle one)

High Tide / Ebbing / Low Tide /  
Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather  
(temperature, wind,  
precipitation)

82°/SW@9 - cloudy-drizzle

Monitor(s)  
(name, affiliation)

M. Normandia, North Shore Audubon Soc.

Type of Monitoring  
(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 / 2 / 3 /  
4 / 5

Parameters Measured  
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):



**MONITORING INFORMATION**

**Date of Monitoring** 8/17/05

**Time of Monitoring** Began: 9:45  
Concluded: 10:15 AM

**Tide** High Tide / Ebbing / Low Tide /  
(please circle one) Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

**Weather** 78° / NW @ 9 / SUNNY  
(temperature, wind, precipitation)

**Monitor(s)** M. Normandia  
(name, affiliation)

**Type of Monitoring** Pre-Construction  
(please circle one) As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 /  
4 / 5

**Parameters Measured** Vegetation  
(please circle all that apply) Sediment  
Benthic Invertebrates  
Birds ✓  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 8/23/05

Time of Monitoring Began: 9 AM  
Concluded: 10 AM

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather 75°/NW@5/Sunny  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 8/29/05

Time of Monitoring Began: 4:30 pm  
Concluded: 5:00 pm

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

Weather (temperature, wind, precipitation) 83°/South/hazy sun

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



# MONITORING INFORMATION

**Date of Monitoring** 9/7/05

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**Time of Monitoring** Began: 9:15 AM  
Concluded: 9:45 AM

---

**Tide** High Tide / Ebbing / Low Tide /  
(please circle one) Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:~~

---

**Weather** 70°/ENE/SUNNY  
(temperature, wind, precipitation)

---

**Monitor(s)** M. Normandia, North Shore Audubon Soc.  
(name, affiliation)

---

**Type of Monitoring** Pre-Construction  
(please circle one) As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

---

**Parameters Measured** Vegetation  
(please circle all that apply) Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

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MONITORING INFORMATION

Date of Monitoring 9/20/05

Time of Monitoring Began: 9:15 AM  
Concluded: 10:00 AM

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:-~~

Weather (temperature, wind, precipitation) 77° SSW HAZE CLOUDY

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 9/30/05

Time of Monitoring Began: 11 AM  
Concluded: 12 pm

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding

~~Predicted low and high tides:~~

~~Time of tidal measurements:~~

~~Nearest tidal station:-~~

Weather 70 S @ 25 - drizzle  
(temperature, wind, precipitation)

Monitor(s) (name, affiliation) M. Normandia, North Shore Audubon Soc.

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):



MONITORING INFORMATION

Date of Monitoring 10/6/05

Time of Monitoring Began: 10  
Concluded: 10:30 AM

Tide (please circle one) very High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather (temperature, wind, precipitation) 80°/SW/cloudy

Monitor(s) (name, affiliation) MARY NORMANDIA, NSAS

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 (2) 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates

(Birds)

Other (please describe):

Photo Monitoring Conducted? (please indicate station codes) Yes / (No)

Video Monitoring Conducted? (please provide brief description) Yes / (No)



**FIELD NOTES**

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10/17/05

No coverage week ending 10/15/05

Rain all week

MONITORING INFORMATION

Date of Monitoring 10/17/05

Time of Monitoring Began: 12:30 pm  
Concluded: 1: pm

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding  
Predicted low and high tides:  
Time of tidal measurements:  
Nearest tidal station:

Weather (temperature, wind, precipitation) 63, WNW @ 20mph / Sunny

Monitor(s) (name, affiliation) MARY NORMANDIA, NSAS

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 (2) / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

Photo Monitoring Conducted? (please indicate station codes) Yes / No

Video Monitoring Conducted? (please provide brief description) Yes / No

MONITORING PARAMETERS: BIRD OBSERVATION

10/17/05

Site:

Species	Abundance	Location	Activity	Duration of Stay
Foster's Tern	3	hunting over marsh	diving for small fish	15 minutes
House Sparrow	1	grasses	feeding	10 minutes
Swamp Sparrow	2	spartina	eating seeds	15 minutes
Mute Swan	2	between grasses	foraging	15 minutes
Great Egret	1	" "	hunting	10 minutes
Yellow-rumped Warbler	2	spartina	hunting	10 minutes

Ref:

Foster's Tern	1	above ref. site.	diving for fish	5 minutes
Swamp Sparrow	2	at fence line	feeding	10 minutes

bird Notes: 2 Mute Swan } South Cove  
2 Foster's Tern }

8 Swamp Sp }  
White Crowned Sp. }  
Song Sp. }  
Coopers Hawk }  
Osprey }  
1 Eastern Phoebe }  
1 Mourning Dove } Parking Lot  
8 Rock Pigeon }

Great Black Backed Gull on Pier

9 Double Crested Cormorant }  
25 Foster's Tern } Harbor  
5 Canada Geese }  
1 Laughing Gull } BAR  
3 Herring Gull }

MONITORING INFORMATION

Date of Monitoring

10/27/05

Time of Monitoring

Began: 12 PM

Concluded: 12:30 PM

Tide

(please circle one)

High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather

(temperature, wind, precipitation)

~~48°/10 mph~~  
48°/10 mph / cloudy NNW

Monitor(s)

(name, affiliation)

M. NORMANDIA, NSAS

Type of Monitoring

(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 (2) 3 / 4 / 5

Parameters Measured

(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?

(please indicate station codes)

Yes No

Video Monitoring Conducted?

(please provide brief description)

Yes No

MONITORING PARAMETERS: BIRD OBSERVATION

10/27/05

Site:

Species	Abundance	Location	Activity	Duration of Stay
Ringbilled Gull	1	mud	picking seaweed	5 minutes
Swamp Sparrow	2	grass island	eating seeds	15 minutes
Gr. Blue Heron	1	mud	hunting	15 minutes
Belted Kingfisher	2	above tidal stream	hovering	5 minutes
Mallard	2	tidal stream	swimming	10 minutes

Ref:

Herring Gull	1	mud	standing	15 minutes
Double Cr. Cormorant	1	water	hunting	10 minutes
Belted Kingfisher	2	above water	hovering	5 minutes

Other bird notes: 1 Peregrine Falcon - LI-PA

30 Juncos  
 2 Blue Jays  
 5 White Throated Sparrows  
 2 Ruby Crowned Kinglet  
 4 Palm Warblers  
 60 Canada Geese

} Grass around parking lot

1 Song Sparrow  
 13 Rock Pigeon  
 8 Eu. Starling  
 2 Double Cr. Cormorant  
 22 Ringbilled Gulls  
 7 Herring Gull  
 2 Mute Swan

} Parking Lot  
 } Harbor  
 } Bar

MONITORING INFORMATION

Date of Monitoring

11/1/05

Time of Monitoring

Began: 1 PM

Concluded: 1:30 PM

Tide  
(please circle one)

High Tide  Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather

(temperature, wind, precipitation)

68°/SW/SUNNY - 10 to 20 mph

Monitor(s)

(name, affiliation)

M. NORMANDIA, NSAS

Type of Monitoring

(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1  2 / 3 / 4 / 5

Parameters Measured

(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?

(please indicate station codes)

Yes /  No

Video Monitoring Conducted?

(please provide brief description)

Yes /  No



MONITORING INFORMATION

Date of Monitoring 11/8/05

Time of Monitoring Began: 9:30 AM  
Concluded: 10 AM

Tide (please circle one) High Tide / Ebbing / Low Tide / Flooding  
Predicted low and high tides:  
Time of tidal measurements:  
Nearest tidal station:

Weather (temperature, wind, precipitation) 60°W cloudy

Monitor(s) (name, affiliation) M. NORMANDIA, NSAS

Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 / 2 / 3 / 4 / 5

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

Photo Monitoring Conducted? (please indicate station codes) Yes No

Video Monitoring Conducted? (please provide brief description) Yes No



(NO COVERAGE  
W/E 11/19

### MONITORING INFORMATION

Date of Monitoring

11/21/05

Time of Monitoring

Began: 9:15 AM  
Concluded: 9:45 AM

Tide  
(please circle one)

High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

Weather  
(temperature, wind, precipitation)

50°/SW@8/cloudy

Monitor(s)  
(name, affiliation)

M. NORMANDIA NSAS

Type of Monitoring  
(please circle one)

Pre-Construction

As-built (4-5 weeks)

Annual Post-Construction: Year 1 (2) 3 / 4 / 5

Parameters Measured  
(please circle all that apply)

Vegetation

Sediment

Benthic Invertebrates

Birds

Other (please describe):

Photo Monitoring Conducted?  
(please indicate station codes)

Yes / No

Video Monitoring Conducted?  
(please provide brief description)

Yes / No



MONITORING INFORMATION

Date of Monitoring 11/29/05

---

Time of Monitoring Began: 9:30 AM  
Concluded: 10: AM

---

Tide (please circle one) Very High Tide / Ebbing / Low Tide / Flooding

Predicted low and high tides:

Time of tidal measurements:

Nearest tidal station:

---

Weather (temperature, wind, precipitation) 62°, SE @ 15, cloudy

---

Monitor(s) (name, affiliation) M. NORMANDIA, NSAS

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Type of Monitoring (please circle one) Pre-Construction  
As-built (4-5 weeks)  
Annual Post-Construction: Year 1 (2) / 3 / 4 / 5

---

Parameters Measured (please circle all that apply) Vegetation  
Sediment  
Benthic Invertebrates  
Birds  
Other (please describe):

---

Photo Monitoring Conducted? (please indicate station codes) Yes (No)

---

Video Monitoring Conducted? (please provide brief description) Yes (No)

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