

Table 25 lists the marsh complexes that have exhibited the largest increases in marsh habitat area from 1974 through 2008 in Moriches and Shinnecock Bays. Oneck Drain (ID # 506) in Westhampton, a tributary to Moriches Bay, indicates both real and artifact gains in tidal wetlands (Figure 37). This complex shows intertidal and high marsh areas that have developed in former areas of *Phragmites australis* marsh and uplands as a result of natural or artificial widening, deepening, or stabilization of the channel mouth to Moriches Bay. However, it is also clear that there were areas of marsh present in 1974 that were missed during the original mapping effort.

Table 23: Complexes with Largest Tidal Wetland Loss within Moriches and Shinnecock Bays

Complex (ID #)	1974 IM + HM + FM (acres)	2008 IM + HM + FM (acres)	Δ IM + HM + FM (acres)	Δ IM + HM + FM (%)
Smith Point County Park West (476)	38.7	27.4	-11.3	-29.3
Dune Road Marsh East (529)	44.7	35.0	-9.6	-21.6
William Floyd Estate (471)	166.8	157.6	-9.2	-5.5
Ponquogue Islands (528)	11.5	3.2	-8.3	-72.2
Smith Point County Park East (478)	313.1	305.1	-7.9	-2.5

Table 24: Complexes with Largest Tidal Wetland Loss (%) within Moriches and Shinnecock Bays

Complex	1974 IM + HM + FM (acres)	2008 IM + HM + FM (acres)	Δ IM + HM + FM (%)	Δ IM + HM + FM (acres)
Ponquogue Islands (528)	11.5	3.2	-72.2	-8.3
Seatuck Creek (493)	12.5	7.8	-37.7	-4.7
Smith Point County Park West (476)	38.7	27.4	-29.3	-11.3
Dune Road Marsh East (529)	44.7	35.0	-21.6	-9.6
Cupsogue Swans Island (482)	16.2	13.6	-16.5	-2.7

Table 25: Complexes with Largest Tidal Wetland Increase within Moriches and Shinnecock Bays

Complex	1974 IM + HM + FM (acres)	2008 IM + HM + FM (acres)	Δ IM + HM + FM (acres)
Oneck Drain (506)	3.9	21.4	17.5
Havens Point (491)	5.7	22.4	16.7
Tuthill Creek (496)	5.2	21.0	15.8
Quogue Canal/Ogden Pond (515)	15.2	23.7	8.5
Mastic Beach (470)	16.1	22.7	6.6

Figure 33: Dune Road Marsh East (Complex ID #529)

[See Page E8, Appendix I for Locator Map]

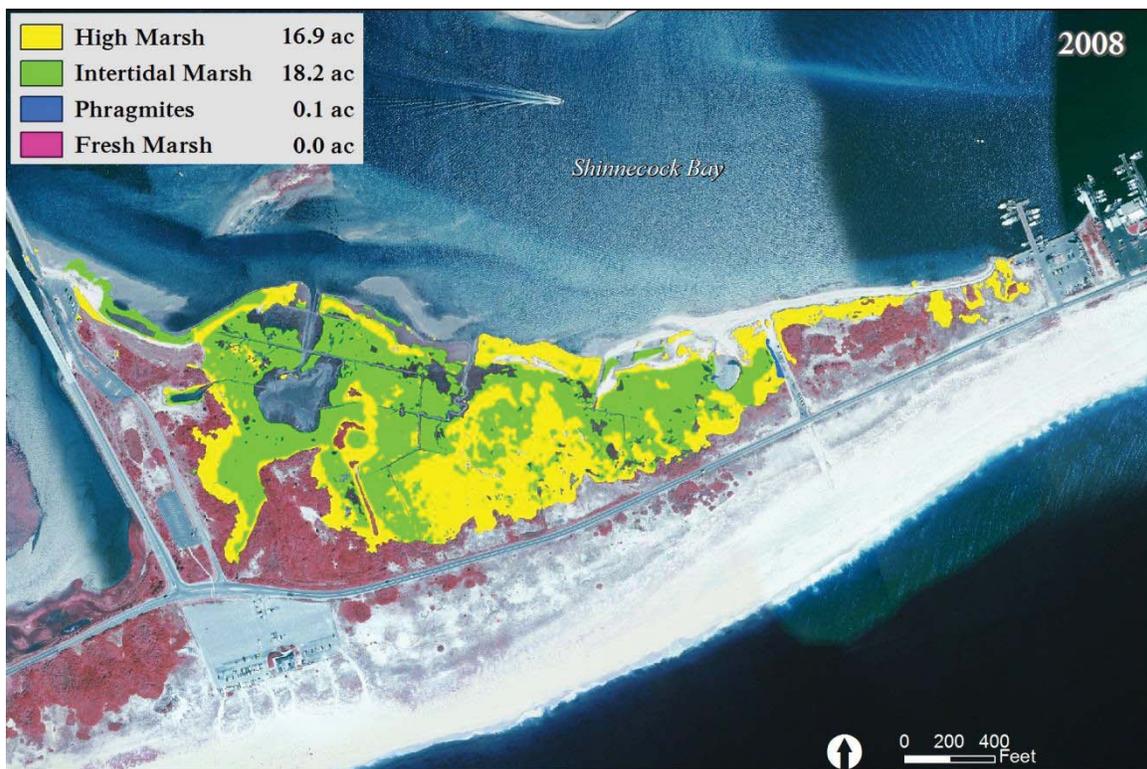
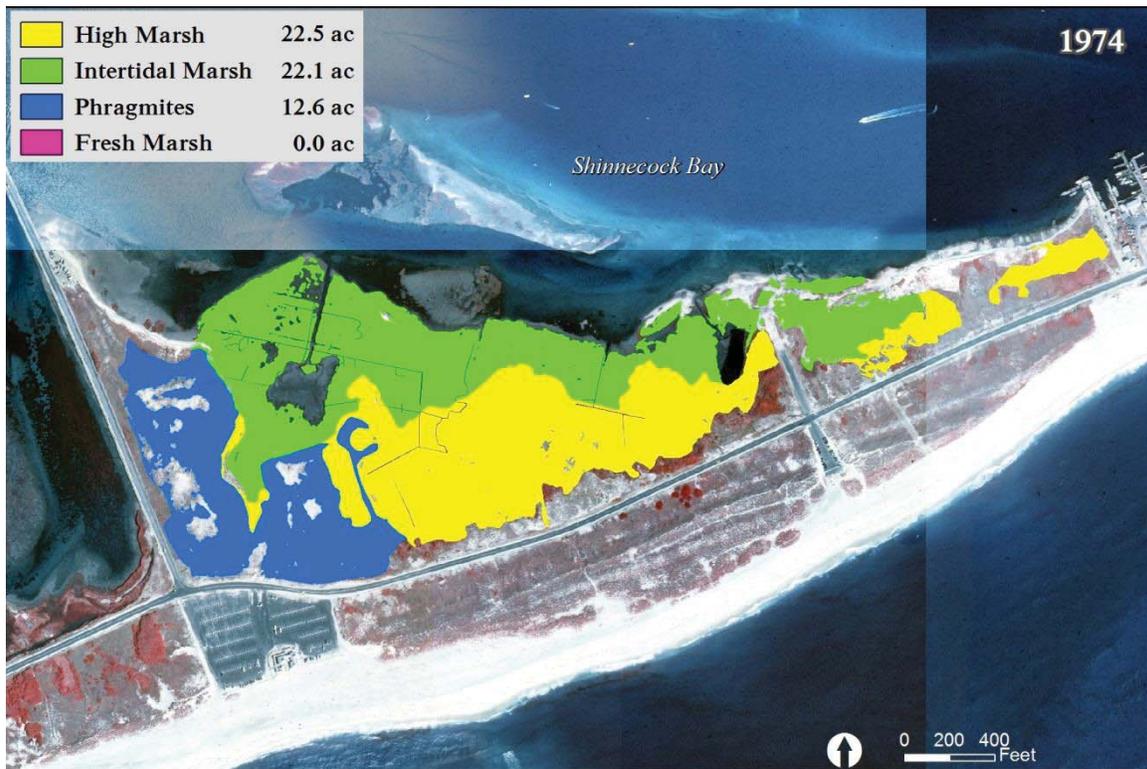


Figure 34: Smith Point County Park West (Complex ID #476)

[See Page E6, Appendix I for Locator Map]

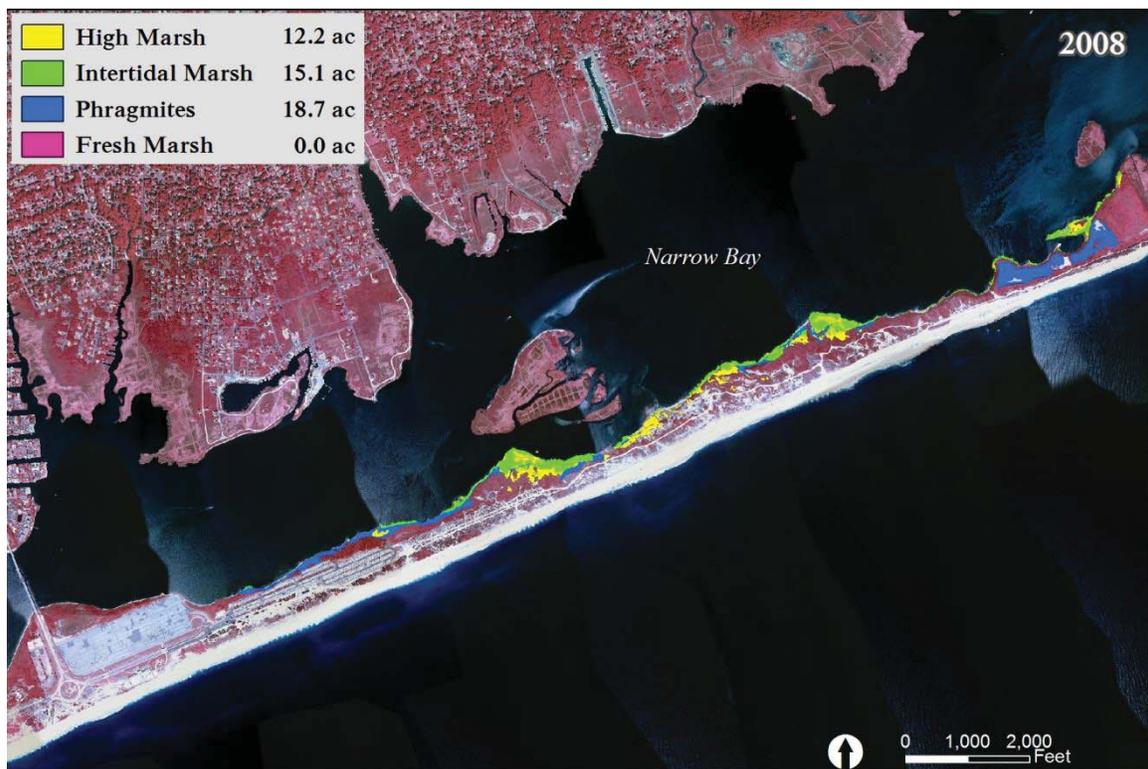
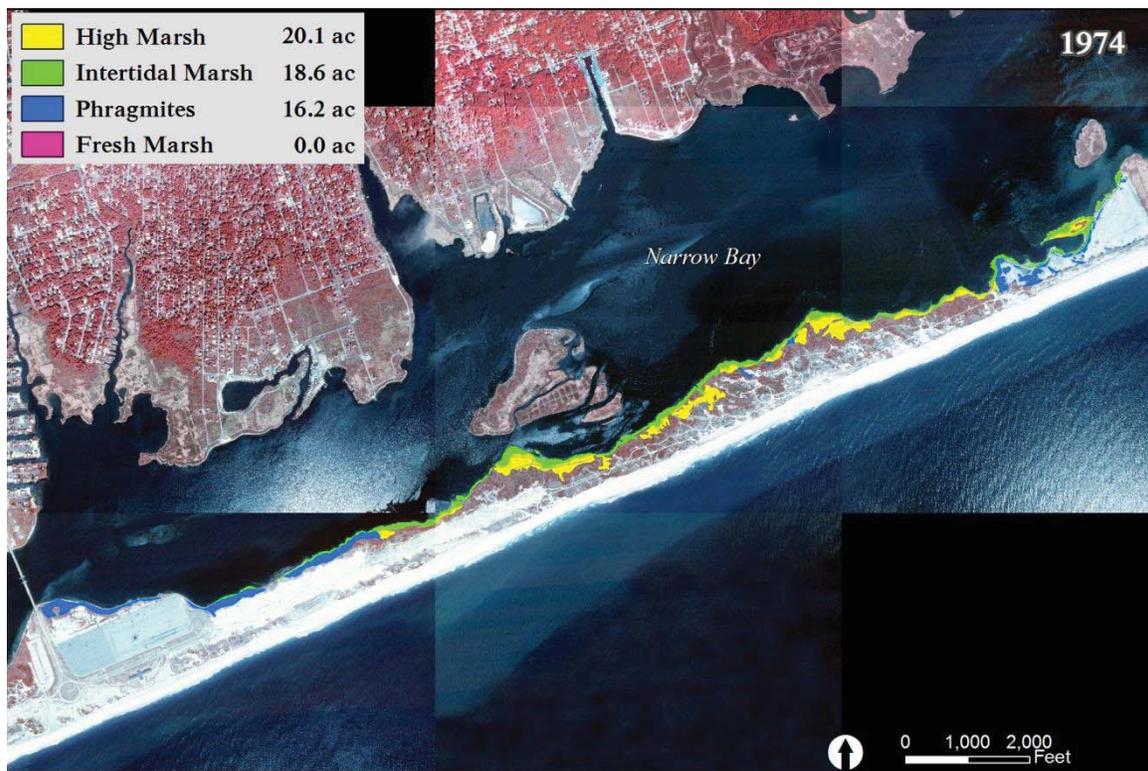


Figure 35: William Floyd Estate (Complex ID #471)

[See Page E6, Appendix I for Locator Map]

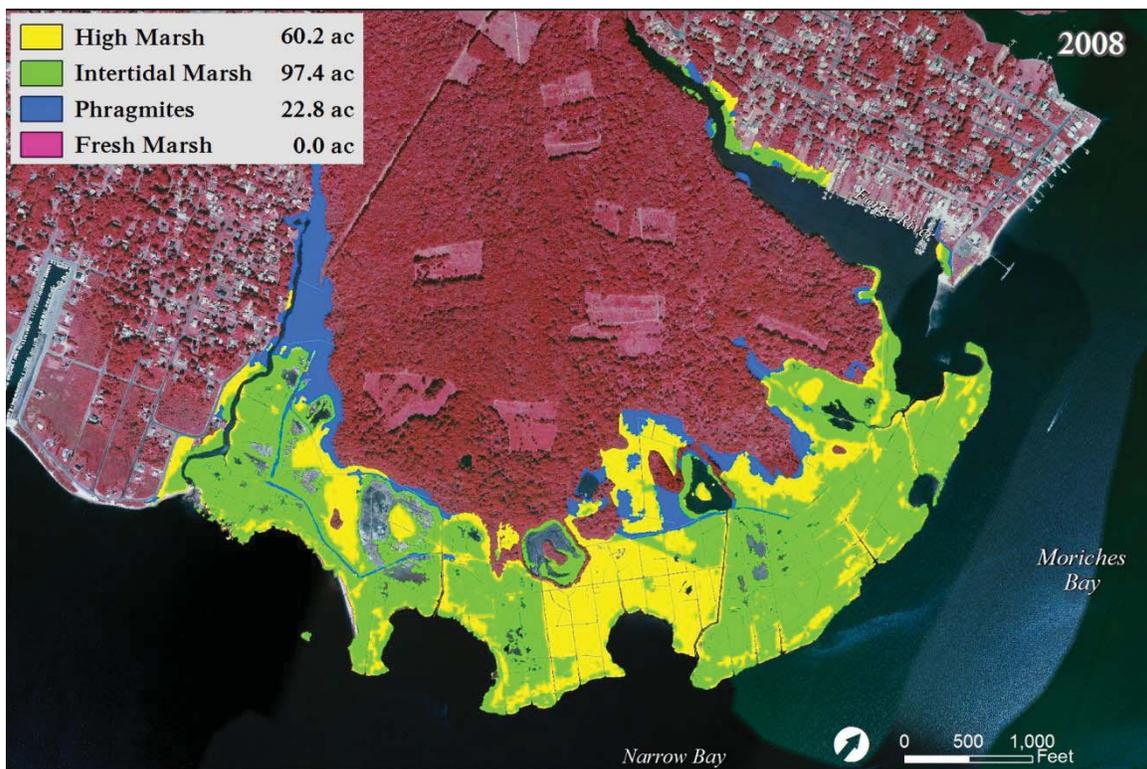
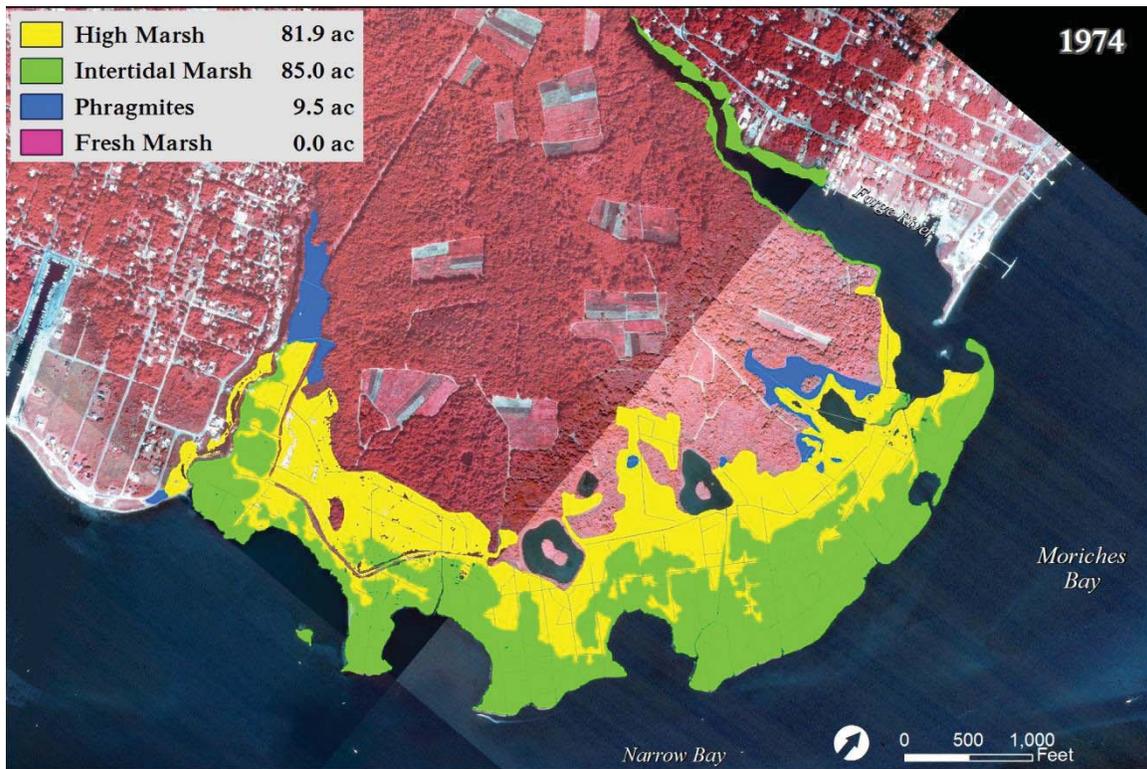


Figure 36: Ponquogue Islands (Complex ID #528)

[See Page E8, Appendix I for Locator Map]

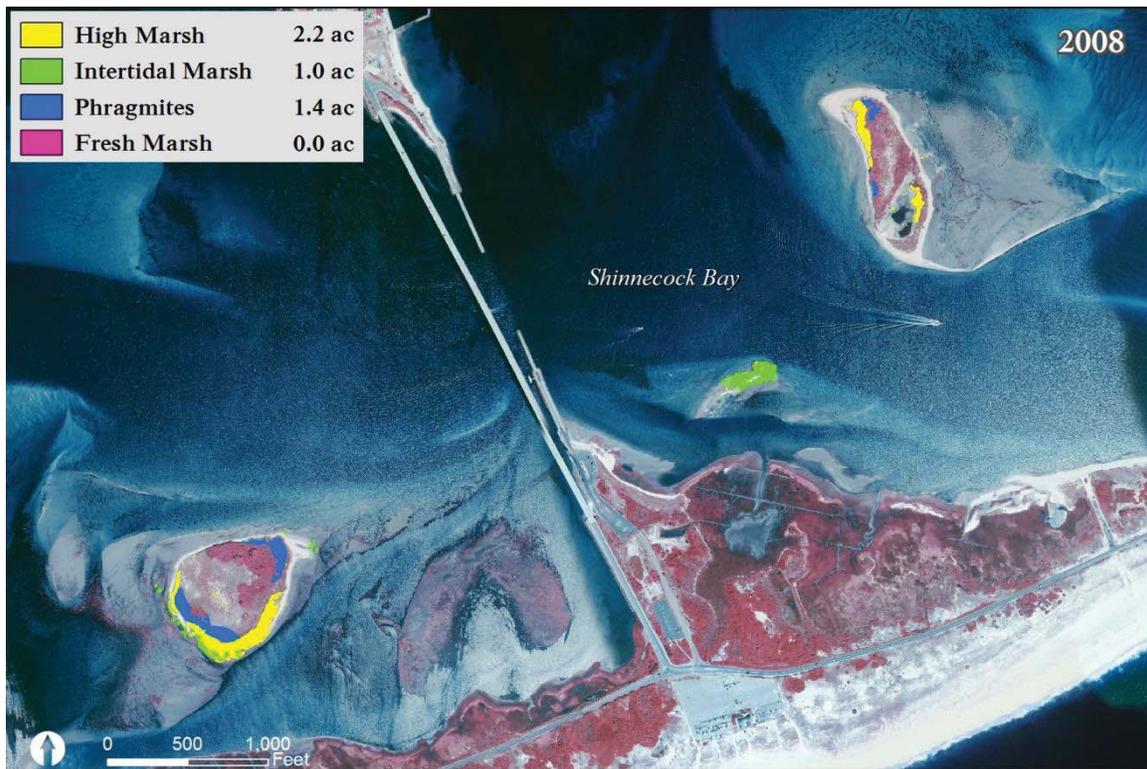
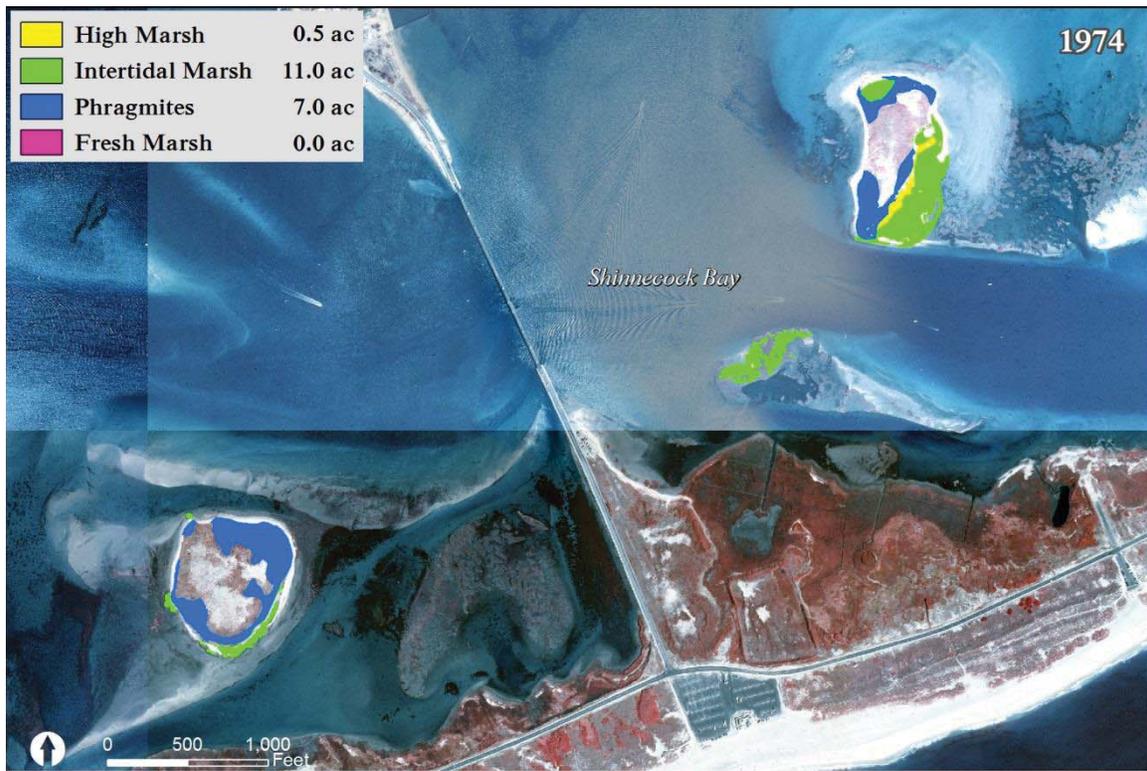
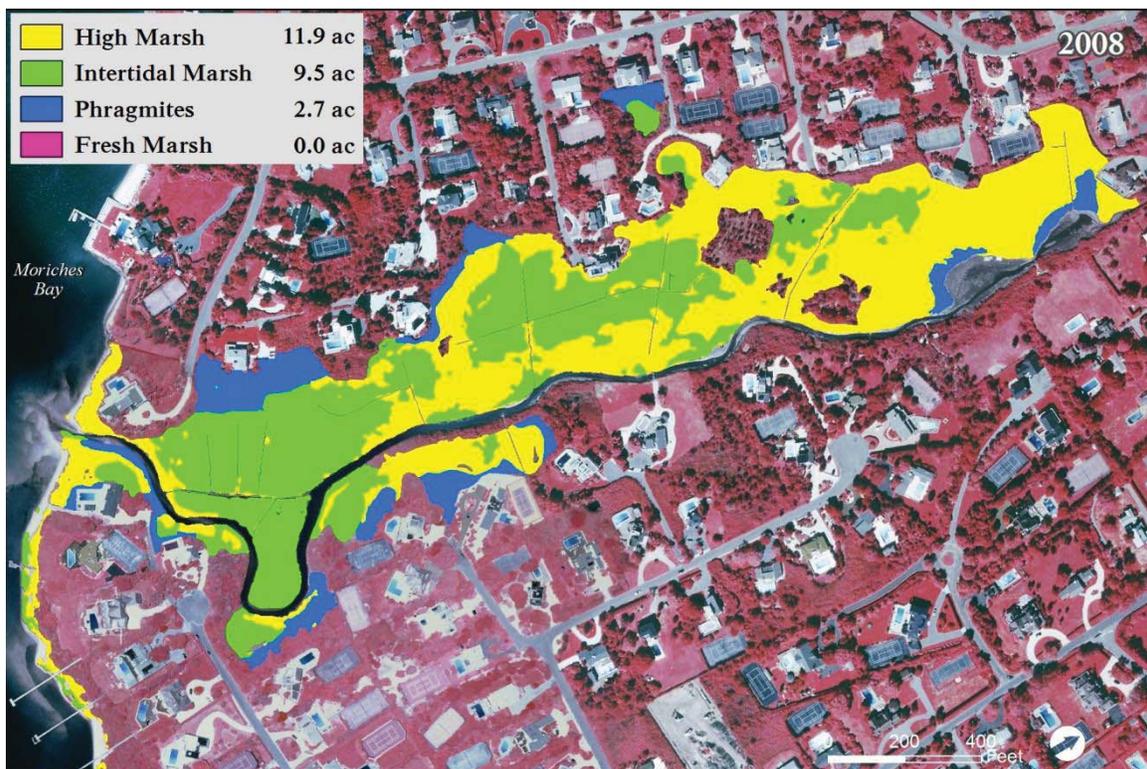
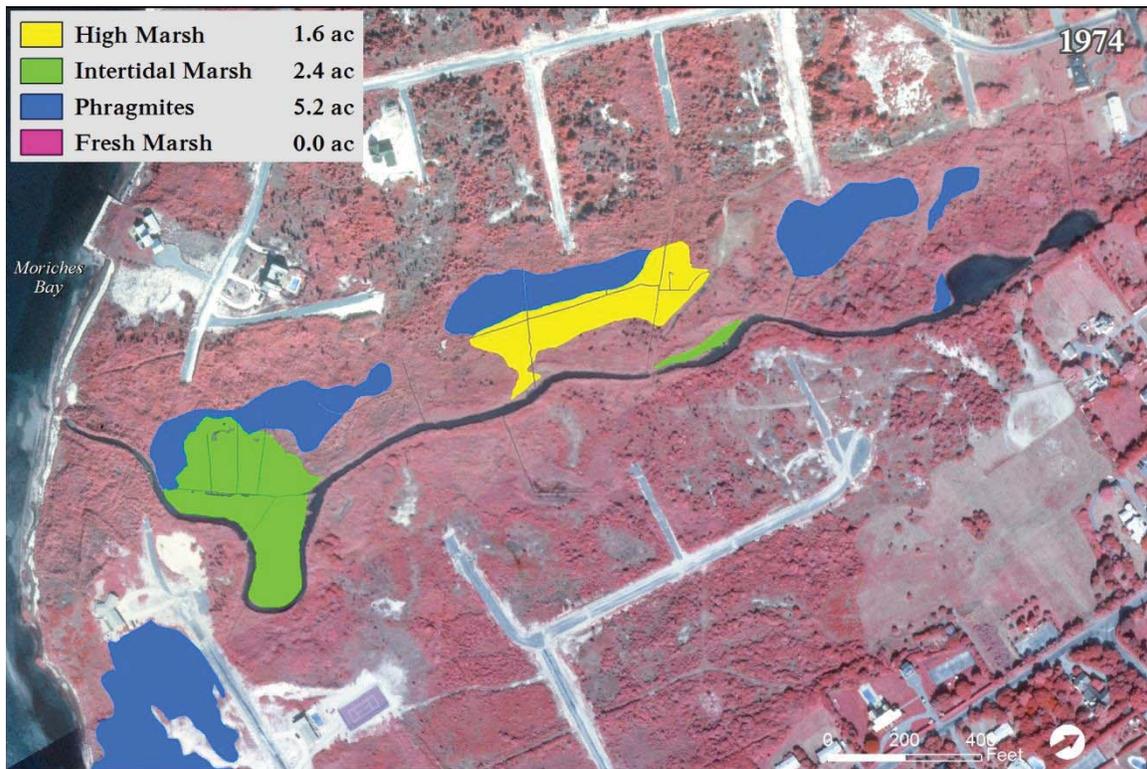


Figure 37: Oneck Drain (Complex ID #506)

[See Page E7, Appendix I for Locator Map]



At-Risk Marsh Complexes

The number of „At-Risk“ marsh complexes and proportion of marsh complexes identified as „At-Risk“ declined eastward within the South Shore Estuary (Table 26). An „At-Risk“ marsh was defined as one in which the loss of vegetated marsh area exceeded 10% from 1974 to 2008. The trends analysis identified 117 „At-Risk“ marshes complexes – out of a total of 215 – in the South Shore Estuary. The western Towns typically have more than 70% of wetlands complexes identified as At-Risk compared to the Town of Southampton with only 20.4% of complexes identified as At-Risk. In addition, the „At-Risk“ marshes that have sustained greater than 30% loss in vegetated marsh area tend to be located in the western reaches of the South Shore Estuary with 20 such complexes located in the East Rockaway to Fire Island Inlet Reach, 13 complexes located between Fire Island Inlet and Smith County Park, and only 6 complexes in Moriches and Shinnecock Bays. „At-Risk“ marshes for East Rockaway Inlet to Fire Island Inlet, Fire Island Inlet to Smith Point County Park, and Moriches Bay and Shinnecock Bay are presented in Table 26-Table 29.

Table 26: Frequency of ‘At-Risk’ in the South Shore Estuary (SSE) by Town

SSE Reach	TOWN	# of At-Risk Marshes	% of At-Risk Marshes
East Rockaway Inlet to Fire Island Inlet	Hempstead	57	91.9
	Oyster Bay	7	77.8
	Babylon	7	33.0
	Islip	3	75.0
	<i>Total</i>	<i>74</i>	<i>77.1</i>
Fire Island Inlet to Smith Point County Park	Brookhaven	14	60.9
	Islip	14	56.0
	<i>Total</i>	<i>28</i>	<i>57.1</i>
Moriches and Shinnecock Bays	Brookhaven	7	28.0
	Southampton	10	20.4
	<i>Total</i>	<i>17</i>	<i>23.0</i>
TOTAL		117	54.4

**Table 27: At-Risk Marshes in the East Rockaway to Fire Island
Inlet Reach of the South Shore Estuary by Town**

ID #	Wetland Complex	Town	1974 IM+HM+FM (Acres)	2008 IM+HM+FM (Acres)	Change in IM+HM+FM (Acres)	Change in IM+HM+FM (%)
403	Ketcham (Woods) Creek	Babylon	1.3	0.5	-0.7	-59.2%
409	Oak Beach Missing TWL	Babylon	11.9	5.9	-6.0	-50.5%
407	Grass Island	Babylon	5.8	3.8	-2.0	-34.5%
414	Neguntatogue Creek	Babylon	0.3	0.3	0.0	-12.5%
415	Santapogue Creek	Babylon	1.9	1.6	-0.2	-12.4%
397	Elder Island	Babylon	87.1	77.6	-9.5	-10.9%
396	Little Island	Babylon	13.9	12.5	-1.4	-10.1%
	<i>Subtotal</i>		<i>122.1</i>	<i>102.2</i>	<i>-19.9</i>	<i>-16.3%</i>
329	Auerbach Canal	Hempstead	0.4	0.0	-0.4	-88.7%
330	Thixton Creek	Hempstead	1.9	0.5	-1.4	-72.2%
332	East Rockaway Channel	Hempstead	6.4	2.4	-4.1	-63.3%
375	Cedar Swamp Creek & Newbridge Creek	Hempstead	3.2	1.4	-1.8	-55.2%
331	Bay County Park	Hempstead	0.9	0.4	-0.5	-52.6%
320	Reynolds Channel	Hempstead	6.8	3.4	-3.4	-50.1%
324	Woodmere Channel & Golf Course	Hempstead	5.0	2.8	-2.2	-44.3%
374	Bellmore Creek	Hempstead	2.4	1.4	-1.0	-41.8%
348	Parsonage Cove	Hempstead	3.2	1.9	-1.3	-40.2%
359	Mill Creek Islands	Hempstead	10.4	6.2	-4.1	-40.0%
340	Island Park East Shoreline	Hempstead	0.9	0.5	-0.4	-39.6%
328	Hewlett Hassock & Nums Marsh	Hempstead	76.1	49.5	-26.6	-34.9%
373	Olivers Island	Hempstead	39.4	25.8	-13.6	-34.5%
334	West Meadow Island	Hempstead	19.2	13.2	-6.1	-31.5%
371	Jones Beach West Tip	Hempstead	29.9	20.5	-9.4	-31.3%
346	Long Meadow & Middle Islands	Hempstead	72.4	50.3	-22.1	-30.6%
345	Ingraham Hassock	Hempstead	41.8	30.0	-11.8	-28.2%
341	East Channel Islands	Hempstead	130.4	93.8	-36.6	-28.1%
351	Seadog Island	Hempstead	136.3	99.2	-37.1	-27.2%
344	Cinder & North Cinder Islands	Hempstead	139.0	101.4	-37.6	-27.0%
367	Cuba, Middle & East Islands	Hempstead	238.5	176.2	-62.3	-26.1%
349	Baldwin Park	Hempstead	22.3	17.0	-5.3	-23.7%
335	North & East Meadow Islands	Hempstead	123.0	95.6	-27.3	-22.2%
352	High Meadow Island	Hempstead	163.3	127.0	-36.3	-22.2%
319	Bannister Creek	Hempstead	93.5	72.8	-20.7	-22.1%
353	Smith Meadow Island	Hempstead	181.6	145.1	-36.5	-20.1%
356	Pine Marsh	Hempstead	204.2	163.7	-40.5	-19.8%
366	Deep Creek Meadow & Snipe Island	Hempstead	194.7	157.2	-37.6	-19.3%
368	Green Island	Hempstead	21.5	17.5	-4.0	-18.8%
363	Big Cow Island	Hempstead	308.4	253.4	-55.0	-17.8%

Methodology and Data

ID #	Wetland Complex	Town	1974 IM+HM+FM (Acres)	2008 IM+HM+FM (Acres)	Change in IM+HM+FM (Acres)	Change in IM+HM+FM (%)
350	Alder Island/Loop Parkway	Hempstead	210.9	173.8	-37.0	-17.6%
323	Brosware Bay Marsh Islands	Hempstead	116.8	96.3	-20.4	-17.5%
321	Lawrence Upland Fringe Marshes	Hempstead	188.8	157.1	-31.7	-16.8%
343	Parsonage Islands	Hempstead	161.1	135.3	-25.8	-16.0%
339	Garrett Marsh	Hempstead	162.9	137.6	-25.3	-15.5%
362	False Channel Meadow & Neds Meadow	Hempstead	175.2	148.4	-26.8	-15.3%
365	East Cow Island	Hempstead	160.4	136.1	-24.2	-15.1%
364	Jones, Middle & West Cow Islands	Hempstead	374.0	318.8	-55.2	-14.8%
342	Bedell Creek	Hempstead	39.1	33.6	-5.4	-13.9%
383	South Line Island	Hempstead	362.4	312.3	-50.2	-13.8%
357	Petit Marsh	Hempstead	170.6	147.1	-23.5	-13.8%
383	Zachs Bay	Hempstead	148.3	129.3	-19.1	-12.8%
322	Lawrence Marsh	Hempstead	610.8	538.5	-72.3	-11.8%
372	Great Island West	Hempstead	73.7	65.2	-8.5	-11.5%
333	Pearsalis Hassock	Hempstead	56.0	49.6	-6.4	-11.4%
355	Meadow Island	Hempstead	149.7	133.1	-16.6	-11.1%
	Subtotal		5437.7	4442.8	-994.9	-18.3%
380	North Line Island	Hempstead / Oyster Bay	180.1	152.6	-27.5	-15.3%
381	Goose Island	Hempstead / Oyster Bay	63.6	47.5	-16.1	-25.4%
	Subtotal		243.7	200.0	-43.6	-17.9%
411	Sand Island	Islip	0.0	0.0	0.0	-32.9%
424	East Fire Island	Islip	129.2	99.2	-30.0	-23.2%
412	Saxton Island	Islip	26.3	21.5	-4.8	-18.1%
	Subtotal		155.5	120.7	-34.8	-22.4%
390	Carmans River	Oyster Bay	0.2	0.0	-0.2	-95.3%
389	Jones Creek	Oyster Bay	1.0	0.1	-0.8	-85.7%
391	Narrasketuck Creek	Oyster Bay	0.1	0.0	-0.1	-82.1%
388	West, Townsend, Hen, Wanser & Squaw Islands	Oyster Bay	156.4	123.1	-33.3	-21.3%
386	Marsh Islands North of State Boat Channel	Oyster Bay	607.9	504.6	-103.3	-17.0%
	Subtotal		765.5	627.8	-137.7	-18.0%

**Table 28: At-Risk Marshes in the Fire Island
Inlet to Smith Point Reach of the South Shore Estuary by Town**

ID #	Wetland Complex	Town	1974 IM+HM+FM (Acres)	2008 IM+HM+FM (Acres)	Change in IM+HM+FM (Acres)	Change in IM+HM+FM (%)
443	Davis Park	Brookhaven	1.3	0.1	-1.3	-94.0%
451	Tuthill Creek	Brookhaven	4.5	0.3	-4.2	-92.5%
444	Watch Hill West	Brookhaven	4.9	0.5	-4.3	-89.2%
442	Barrett Beach to Davis Park	Brookhaven	3.1	0.6	-2.5	-79.9%
453	Swan River	Brookhaven	29.2	14.0	-15.2	-52.1%
454	Mud Creek	Brookhaven	35.6	18.5	-17.1	-48.0%
463	Carmans River Upstream FM	Brookhaven	97.1	61.6	-35.5	-36.6%
456	Hedges Creek	Brookhaven	19.7	14.3	-5.4	-27.4%
450	Corey Creek	Brookhaven	1.2	0.9	-0.3	-26.4%
459	Motts Creek	Brookhaven	15.8	11.7	-4.1	-25.9%
462	Carmans River East	Brookhaven	303.1	251.9	-51.2	-16.9%
461	Fireplace Neck & Carmans River West	Brookhaven	279.5	235.6	-43.9	-15.7%
439	Point O' Woods	Brookhaven	3.6	3.1	-0.6	-15.6%
446	Ridge Island	Brookhaven	34.3	30.3	-4.0	-11.5%
	Subtotal		832.8	643.4	-189.4	-22.7%
427	Champlins Creek	Islip	0.8	0.0	-0.8	-95.3%
421	Robert Moses State Park	Islip	23.2	1.6	-21.6	-93.1%
433	Connetquot River	Islip	2.2	0.5	-1.7	-77.6%
438	Brown's River North	Islip	14.9	5.0	-9.8	-66.1%
417	Conklin Point	Islip	0.6	0.4	-0.3	-44.1%
432	Grand Canal & Pickman Wetlands	Islip	29.7	19.9	-9.7	-32.8%
426	Seatuck NWR	Islip	43.3	31.6	-11.6	-26.9%
412	Saxton Island	Islip	31.2	22.9	-8.3	-26.5%
425	Lawrence Creek	Islip	0.1	0.1	0.0	-25.3%
431	Timber Point	Islip	61.3	47.6	-13.7	-22.4%
424	East Fire Island	Islip	130.3	101.5	-38.8	-22.1%
434	Pepperidge State Tidal Wetlands	Islip	96.4	76.0	-20.4	-21.2%
435	Indian Creek	Islip	96.6	79.6	-17.0	-17.6%
437	Brown's River South	Islip	1.4	1.2	-0.2	-13.8%
	Subtotal		532.0	387.9	-153.9	-28.9%

Table 29: At-Risk Marshes in the Moriches Bay and Shinnecock Bay Reach of the South Shore Estuary by Town

ID #	Wetland Complex	Town	1974 IM+HM+FM (Acres)	2008 IM+HM+FM (Acres)	Change in IM+HM+FM (Acres)	Change in IM+HM+FM (%)
489	US Coast Guard Station-Moriches	Brookhaven	0.9	0.2	-0.6	-76.1%
487	Radio Point	Brookhaven	1.7	1.0	-0.7	-42.0%
492	Heils Creek	Brookhaven	6.3	4.2	-2.1	-33.4%
476	Smith Point County Park West	Brookhaven	38.7	27.4	-11.3	-29.3%
474	Areskonk Creek	Brookhaven	2.3	1.8	-0.5	-20.4%
479	Made Islands	Brookhaven	6.1	5.1	-1.0	-17.0%
477	Pattersquash Island	Brookhaven	40.2	35.8	-4.4	-11.0%
	<i>Subtotal</i>		96.1	75.3	-20.7	-21.6%
528	Ponquogue Islands	Southampton	11.5	3.2	-8.3	-72.2%
520	Davies Creek	Southampton	6.1	3.9	-2.2	-36.0%
539	Halsey Neck Pond	Southampton	6.6	4.3	-2.3	-34.7%
499	Speonk River North	Southampton	9.1	6.5	-2.7	-29.1%
497	Dug Canal	Southampton	0.1	0.1	0.0	-23.8%
495	Fish Creek	Southampton	3.4	2.6	-0.8	-23.4%
529	Dune Road Marsh East	Southampton	44.7	35.0	-9.6	-21.6%
482	Cupsogue Swans Island	Southampton	16.2	13.5	-2.7	-16.5%
486	Terrell River	Southampton	16.1	13.5	-2.6	-16.3%
484	Westhampton Dunes West	Southampton	16.8	14.5	-2.3	-13.6%
	<i>Subtotal</i>		130.6	97.1	-33.5	-25.6%

Long Island Sound Estuary

The portions of the Long Island Sound Estuary in the study area were divided into 152 marsh complexes varying in vegetated area from 0.1 to 235 acres. Intertidal and high marsh habitat decreased by 24.4% and 17.3%, respectively, from 1974 to 2005 (see Table 30). In total, marsh habitat decreased by an estimated 654.3 acres (see Table 31). *Phragmites australis* increased by 33.6%, or 106.6 acres. *Phragmites australis* displaced a portion of the former high marsh habitat such that there was only a 17.1% reduction in overall vegetated area despite the loss of 22.6% of native intertidal, high, and coastal fresh marsh habitat.

Table 30: Tidal Wetland Area Change (1974-2005) in Long Island Sound by Class

Wetland Type	1974 Wetland Area (acres)	2005 Wetland Area (acres)	Change (%)
Intertidal Marsh	1,920.6	1,451.7	-24.4
High Marsh	950.2	785.9	-17.3
Fresh Marsh	21.0	0.0	-100.0
Marsh Subtotal	2,891.8	2,237.6	-22.6
<i>Phragmites australis</i>	317.1	423.7	+33.6
Vegetated Area Total	3,209.0	2,661.2	-17.1

Table 31: Tidal Wetland Area Change in Long Island Sound by Town/County

Municipality	1974 IM + HM + FM (acres)	2005 IM + HM + FM (acres)	Δ IM + HM + FM (acres)	Δ IM + HM + FM (%)
Bronx (Bx)	272.0	194.1	-77.8	-28.6
Brookhaven (Bk)	403.1	336.1	-67.0	-16.6
Huntington (Hu)	683.9	520.3	-163.6	-23.9
North Hempstead (NH)	145.0	100.5	-44.5	-30.7
Oyster Bay (OB)	369.1	310.7	-58.4	-15.8
Queens (Qu)	80.7	68.8	-11.9	-14.8
Riverhead (Ri)	162.7	126.3	-36.4	-22.4
Smithtown (Sm)	506.7	373.9	-132.8	-26.2
Southold (So)	79.0	85.9	+7.0	+8.8
Westchester (We)	189.6	120.9	-68.7	-36.2
Total	2,891.8	2,237.6	-654.3	-22.6

Table 32: Complexes with Largest Tidal Wetland Area Loss in Long Island Sound

Complex (ID #)	1974 IM + HM + FM (acres)	2005 IM + HM + FM (acres)	Δ IM + HM + FM (acres)
Porpoise Channel Islands (105)	106.8	49.2	-57.6
Hutchinson River (550)	122.4	76.1	-46.4
Crab Meadow (222)	242.0	208.3	-33.7
Mount Sinai Harbor Islands (90)	69.8	38.0	-31.8
Marshland Conservancy & Blind Brook (313)	72.8	47.4	-25.4
Lloyd Harbor (234)	123.6	103.0	-20.6
Lloyd Point Wetlands (236)	96.2	76.0	-20.3
Inner Hempstead Harbor West (267)	50.5	28.8	-22.2
Wading River Marsh (87)	145.6	126.3	-19.3
Baiting Hollow Marsh (85)	17.2	0.0	-17.2

Portions of the Long Island Sound Estuary included in this study were the Bronx and Queens in New York City; New Rochelle, Mamaroneck, and Rye in Westchester County; and several Towns in Nassau and Suffolk Counties. A large majority, i.e., about 82%, of the marsh habitat is located in Nassau and Suffolk Counties. Approximately 12% of the marshes are situated in New York City, with the remainder (6%) located in Westchester County, primarily in the Town and City of Rye.

Table 33: Complexes with Highest Percent Loss of Tidal Wetlands in Long Island Sound

Complex (ID #)	1974 IM + HM + FM (acres)	2005 IM + HM + FM (acres)	Δ IM + HM + FM (%)
Baiting Hollow Marsh (85)	17.2	0.0	-100.0
Sheets Creek Channel (275)	9.8	1.1	-88.7
Northport Harbor- Bird Island (225)	16.8	3.5	-79.3
LIS- Milton Point to Rye Beach (314)	14.4	3.6	-85.1
Northport Harbor (226)	19.3	5.4	-71.9
West Pond (261)	20.8	8.5	-59.0
Cold Spring Harbor- East Shoreline (240)	11.1	4.7	-57.6
Porpoise Channel Islands (105)	106.7	49.2	-53.9
Huntington Harbor (233)	22.3	10.4	-53.4
Mitchell Creek (282)	13.3	6.7	-49.2

The largest losses in marsh area from 1974 to 2005 occurred in the Towns of Huntington (163.6 acres lost), Smithtown (132.8 acres lost), Brookhaven (67.0 acres lost), and North Hempstead (44.5 acres lost); in addition, the Bronx lost an estimated 77.8 acres of marsh. There is a general trend towards western municipalities exhibiting greater losses of native tidal wetlands communities (Table 31). However, there was no statistically significant relationship between percent loss of native tidal wetlands and longitude position within the Long Island Sound estuary ($R^2 = 0.02$), as many complexes in the eastern portion of the estuary also exhibited high rates of tidal wetlands loss and vice versa.

Cumulatively, the north shore of Long Island and portions of Queens, the Bronx, and Westchester included in this study lost 654.3 acres of native tidal wetlands (22.6% of total marsh area) between 1974 and 2005 averaging 21.1 acres of marsh loss annually.

Table 33 provide summaries of the marsh complexes that incurred the largest losses in marsh area. The ten wetland complexes listed in Table 32 account for almost 45% of the marsh habitat lost in the estuary from 1974 to 2005. In addition, approximately 75% of the marsh loss occurred in only 27 out of the 152 marsh complexes. Approximately 40% of these 30 complexes were more than 40 acres in area, while the remainder were typically greater than 25 acres in area. Small marsh complexes can also exhibit high rates of marsh loss. However, due to their small size, large percentages of area loss (or gain) in small complexes have much less influence on estuary-wide trends in tidal wetland area and, accordingly, estuary or regional trends in marsh area change are determined by trends in the larger wetland complexes. The spatial distribution of the variation in marsh change percentages between 1974 and 2005 is shown in Figure 38.

Figure 38: Long Island Sound Wetland Complexes by Percent Change in Vegetated Marsh Area (1974-2005)

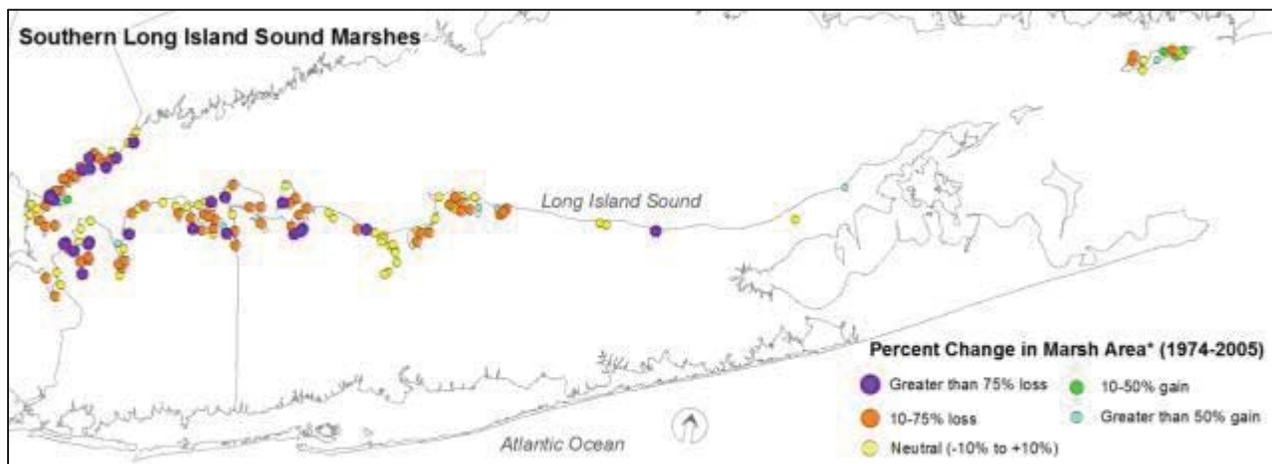


Figure 39 through Figure 44 depict the native marsh and *Phragmites* areas for six of the complexes identified in Table 32 as having the greatest marsh loss by area: Stony Brook Harbor (ID # 105), Crab Meadow (ID # 222), Mount Sinai Harbor Islands (ID # 90), Lloyd Point Wetlands (ID # 236), Inner Hempstead Harbor West (ID # 267) and Baiting Hollow Marsh (ID #

85) complexes. Figure 44 through Figure 46 depict the marsh and *Phragmites australis* areas for the three marsh complexes with the greatest percentage of marsh loss: Baiting Hollow Marsh (ID # 85), Sheets Creek Channel (ID # 275), and the Long Island Sound shoreline between Milton Point and Rye Beach (ID # 314). The wetland complexes listed in Table 32 and shown in Figure 39 through Figure 46 exhibit many of the characteristic biological and geomorphological associated with marsh loss described for the South Shore Estuary.

The wetland complexes of the Long Island Sound exhibit a substantial loss of intertidal marsh habitats. Losses are observed in complexes both with large intertidal marsh islands, such as Stony Brook Harbor (Figure 39) and Mount Sinai Harbor (Figure 41), and marshes along embayment shorelines, such as Hempstead Harbor (Figure 43). As shown in (Table 33) there are many large complexes (greater than 10 acres in 1974) that have lost more than 50% of their marsh area in the short period between 1974 and 2005 with some complexes exhibiting more 80% to 100% loss of intertidal marsh habitat. Table 10 indicates that eleven of the fifteen wetland complexes with the greatest percentage loss of intertidal marshes are located within the Long Island Sound estuary. Similar to the western portion of the South Shore estuary, the Long Island Sound estuary had a lower ratio of high marsh vegetation (32.8%) to total native marsh area in 1974 compared to the Peconic Estuary (49.8%) and central and eastern portions of the South Shore estuary (41.2-53.3%) (Table 5). Thus, in the Long Island Sound conversion of intertidal marsh to panne and mudflat (often due the recession of the seaward edge of the intertidal marsh) was not offset by conversions of high marsh habitats into intertidal marsh. Further investigation is necessary to determine which of the interacting causes of marsh loss related the nutrient loading, sea level rise, sediment budget perturbations, and recreational uses contribute most to the rapid loss of intertidal marsh habitats in the Long Island Sound. In addition, pilot projects to restore lost marshes, decrease the deterioration rates in remaining marshes, or establish new marsh areas should be undertaken in these embayments.

The limited complexes in the Long Island Sound with large high marsh components, such as Crab Meadow (ID # 222), Wading River Marsh (ID # 87), Lloyd Harbor (ID # 234), Hutchinson River (ID # 549 and 550), and West Meadow Creek (ID # 104) exhibit marsh drowning and conversion to intertidal marsh similar to the central portions of the South Shore Estuary and the Peconic Estuary. The high marsh to intertidal marsh conversion in Crab Meadow (ID # 222) and Lloyd Point (ID # 236) is shown in Figure 40 and Figure 42, respectively. These wetland complexes comprised approximately 50% of the high marshes present in the Long Island Sound in 1974 (487.1 of 950.2 acres) and lost collectively 75.4% of high marsh between 1974 and 2005.

Phragmites australis expansion has contributed to the decline in high marsh and total native marsh area in the Long Island Sound. At Baiting Hollow marsh (ID # 85, Figure 44), the complete loss of native marsh habitat is due entirely to *Phragmites australis* expansion and significant *Phragmites australis* expansion has occurred in many of the complexes with large

high marsh components, including Crab Meadow and Wading River marshes, and complexes with freshwater inputs, such as the Nissequogue River (ID # 207-220). Table 34 lists the ten Long Island Sound marsh complexes that have sustained the greatest amount of *Phragmites australis* expansion. Collectively, *Phragmites australis* in these complexes accounts for over half (or 59%) of the 155.0 acres of *Phragmites australis* expansion in the southern portion of the Long Island Sound Estuary.

Table 34: Complexes with Largest *Phragmites australis* Expansion in Long Island Sound

Complex (ID #)	1974 <i>Phragmites</i> (acres)	2005 <i>Phragmites</i> (acres)	Δ <i>Phragmites</i> (acres)
Wading River Marsh (87)	7.7	25.6	17.9
Crab Meadow (222)	6.2	19.9	13.7
Nissequogue Downstream Coastal FM (216)	16.2	29.0	12.8
Hutchinson River (550)	5.3	16.6	11.3
Baiting Hollow Marsh (85)	7.1	16.0	8.9
Conscience Bay (101)	0	6	6.0
Stony Brook Harbor South (108)	0.5	6.3	5.8
Crab Meadow Coastal FM (221)	0	5.6	5.6
Marshland Conservancy & Blind Brook (313)	6.5	12.1	5.6
Inner Hempstead Harbor West (267)	5.5	10.7	5.2

Review of the patterns of marsh gain and loss in the Long Island Sound suggests the importance of long-term changes in inlet morphology, and resulting perturbations to amplitude of the tidal prism and the duration of ebb and flood tides, may be responsible for changes in marsh composition in some complexes. For example, the inlet for the Baiting Hollow Marsh (ID # 85) has completely shoaled between 1974 and 2005, preventing ebb tides, inundating the former marsh area leading to formation of a large marsh pond, and presumably decreasing salinity within the marsh contributing to the expansion of *Phragmites australis*. In contrast, the inlet for East Creek in Sands Point (ID # 303) appears to have remained relatively open between 1974 and 2005 and *Spartina alterniflora* has expanded into mudflat areas since 1974 (Figure 47). The role of inlet dynamics in maintaining tidal wetlands in the smaller embayments on the North Shore of Long Island has obvious management implications for several complexes experiencing moderate or large marsh loss rates such as Flax Pond (ID # 103), West Pond (ID # 261), and Lloyd Point Marsh (ID # 236).

Table 35: Complexes with Largest Gain in Tidal Wetland Area in Long Island Sound

Complex (ID #)	1974 IM + HM + FM (acres)	2005 IM + HM + FM (acres)	Δ IM + HM + FM (acres)
Prospect Point/East Creek (272)	21.9	31.6	+9.7
Centre Island Marsh (251)	32.5	34.5	+2.1
Sagamore Hill Marsh (243)	3.7	5.7	+2.0
Goldsmith Inlet (83)	2.9	4.8	+1.9

Four of the wetland complexes that have gained marsh habitat from 1975 through 2005 are listed in Table 35. These include Prospect Point/East Creek and Sagamore Hill Marsh which are shown in Figure 47 and Figure 48. Marsh area gains accounted for 33.7 acres of new habitat, but these are minimal gains compared with the net loss 654.5 acres of native marshes from 1974 to 2005. The calculated 9.7 acres of native marsh gained at Prospect Point may overestimate the positive trend in marsh area as 1) native high marsh (and *Phragmites australis*) has colonized an area in the southeast corner of the marsh that was cleared and filled in the 1974 imagery and 2) the 1974 imagery appears to show standing water above some areas of intertidal marsh in 1974 and extensive waterlogging. Despite these difficulties with comparison of the 1974 and 2005 images, the Prospect Point/East Creek Marsh also exhibits actual evidence of natural marsh gain and improved marsh health including 1) conversion of intertidal marsh to high marsh, 2) decrease in abundance of stressed intertidal marsh vegetation, 3) dense intertidal marsh development in sparsely vegetated areas, and 4) apparent narrowing of marsh channels. Favorable inlet geomorphology and tidal exchange are likely responsible for the gains in marsh area and health at Prospect Point or certainly the absence of marsh loss typically observed in Long Island Sound wetland complexes. At Sagamore Hill, high marsh vegetation appears to have migrated landward and colonized sandy, open beach areas that were sparsely vegetated in 1974.

Table 36 summarizes the At-Risk marshes in Long Island Sound Estuary by town. An „At-Risk“ marsh was defined as one for which the loss of vegetated marsh area exceeded 10% from 1974 to 2005. The trends analysis identified 100 „At-Risk“ marsh complexes – out of a total of 152 – in the Long Island Sound Estuary.

Table 36: At-Risk Marshes in the Long Island Sound Estuary by Town

ID #	Wetland Complex	Town	1974 IM+HM +FM (Acres)	2005 IM + HM + FM (Acres)	Change in IM+HM+FM (Acres)	Change in IM+HM+FM (%)
553	Hart Island	Bronx	4.5	1.8	-2.8	-61.4
552	City Island	Bronx	5.4	2.3	-3.1	-57.0
550	Hutchinson River	Bronx	122.4	76.1	-46.4	-37.9
551	Pelham Bay East Shore	Bronx	9.3	5.8	-3.4	-36.9
547	Hunter Island	Bronx	37.2	25.2	-12.1	-32.4
546	Pelham Bay Park	Bronx	31.7	26.5	-5.3	-16.6
	Subtotal		210.7	137.6	-73.0	-34.7
90	Mount Sinai Harbor Islands	Brookhaven	69.8	38.0	-31.8	-45.5
89	Mount Sinai Harbor North	Brookhaven	20.3	13.8	-6.5	-32.2
91	Mount Sinai Harbor South	Brookhaven	48.4	32.9	-15.6	-32.1
99	The Narrows	Brookhaven	6.3	4.5	-1.8	-28.0
95	Port Jefferson Harbor Poquott	Brookhaven	2.9	2.1	-0.8	-27.0
96	Setauket Harbor	Brookhaven	19.7	17.4	-2.3	-11.7
	Subtotal		228.8	165.2	-63.6	-27.8
231	Price Bend & Shoreline IM	Huntington	0.9	0.0	-0.9	-100.0
238	Whitewood Point	Huntington	0.2	0.0	-0.2	-100.0
228	Centerport Mill Pond	Huntington	1.7	0.1	-1.6	-94.7
221	Crab Meadow Coastal FM	Huntington	6.4	0.5	-5.9	-92.2
225	Northport Harbor Bird Island	Huntington	16.8	3.5	-13.3	-79.3
226	Northport Harbor	Huntington	19.3	5.4	-13.9	-71.9
223	Northport Bay Shoreline	Huntington	8.6	3.0	-5.5	-64.3
224	Asharoken Marsh	Huntington	1.7	0.6	-1.1	-63.0
240	Cold Spring Harbor East Shoreline	Huntington	11.1	4.7	-6.4	-57.6
235	Huntington Bay East Beach	Huntington	4.0	1.8	-2.3	-56.2
233	Huntington Harbor	Huntington	22.3	10.4	-11.9	-53.4
230	Winkle Point	Huntington	5.2	3.1	-2.1	-41.2
227	Centerport Harbor	Huntington	11.2	6.8	-4.3	-38.8
236	Lloyd Point Wetlands	Huntington	96.2	76.0	-20.3	-21.1
229	Duck Island Harbor	Huntington	54.3	44.3	-10.0	-18.4
234	Lloyd Harbor	Huntington	123.6	103.0	-20.6	-16.7
239	Lloyd Harbor Park	Huntington	7.3	6.1	-1.2	-15.9
222	Crab Meadow	Huntington	242.0	208.3	-33.7	-13.9
237	Spring Bay Wetlands	Huntington	11.3	10.1	-1.1	-10.0
	Subtotal		644.0	487.7	-156.2	-24.3
241	Cold Spring Harbor Inner Harbor	Huntington/Oyster Bay	15.2	9.3	-5.9	-38.6
298	Premium Point	Larchmont	0.7	0.5	-0.2	-31.0
301	LI Sound Preyer Ln to Umbrella Pt	Larchmont	1.9	1.5	-0.5	-23.4
300	Premium River	Larchmont	9.9	8.1	-1.8	-18.4
	Subtotal		12.5	10.1	-2.4	-19.2

Methodology and Data

ID #	Wetland Complex	Town	1974 IM+HM+ FM (Acres)	2005 IM + HM + FM (Acres)	Change in IM+HM + FM (Acres)	Change in IM+HM+FM (%)
302	Larchmont Harbor	Larchmont/Mamaroneck	7.2	1.3	-5.8	-81.5
303	East Creek	Larchmont/Mamaroneck	5.6	4.8	-0.8	-14.8
	<i>Subtotal</i>		12.8	6.1	-6.7	-52.3
305	LI Sound Edgewater Pt to Orient Pt	Mamaroneck	4.2	0.0	-4.2	-99.3
306	Mamaroneck Harbor East & West Basins	Mamaroneck/Rye	3.4	0.8	-2.6	-77.6
293	Lower New Rochelle Harbor	New Rochelle	0.2	0.0	-0.2	-87.5
291	Goose Island	New Rochelle	0.6	0.1	-0.5	-82.1
294	Inner Neptune Island	New Rochelle	0.8	0.1	-0.7	-79.1
295	New Rochelle Harbor & Titus Mill Pond	New Rochelle	4.4	1.3	-3.1	-70.2
296	Davenport Island Shoreline	New Rochelle	2.5	1.2	-1.3	-50.3
297	Echo Bay	New Rochelle	1.7	0.9	-0.8	-46.6
292	Glen Island	New Rochelle	0.6	0.4	-0.2	-34.8
	<i>Subtotal</i>		10.7	4.1	-6.5	-61.2
284	Gatsby Lane FC Wetland	North Hempstead	0.4	0.0	-0.4	-100.0
276	Toms Point	North Hempstead	2.0	0.1	-2.0	-97.2
283	Manhasset Bay NW Shoreline	North Hempstead	1.5	0.1	-1.4	-91.8
279	Inner Manhasset Harbor	North Hempstead	3.8	0.3	-3.4	-91.0
275	Sheets Creek Channel	North Hempstead	9.8	1.1	-8.7	-88.3
281	Kings Point Lagoon & Twin Ponds	North Hempstead	0.5	0.1	-0.4	-87.4
277	Manhasset Bay East Shoreline	North Hempstead	8.1	3.6	-4.5	-55.8
282	Mitchell Creek	North Hempstead	13.3	6.7	-6.5	-49.2
278	Leeds Pond	North Hempstead	6.2	3.3	-2.9	-47.5
280	Manhasset Bay West Shoreline	North Hempstead	6.6	3.5	-3.0	-46.9
267	Inner Hempstead Harbor West	North Hempstead	48.4	28.6	-19.8	-40.9
274	Plum Point	North Hempstead	5.8	4.9	-1.0	-16.5
	<i>Subtotal</i>		106.4	52.2	-54.2	-50.9
285	Little Neck Bay West Shoreline	Queens	6.3	2.0	-4.3	-67.8
287	Alley Pond	Queens	44.2	39.5	-4.7	-10.7
286	Udalls Cove	Queens	30.2	27.2	-2.9	-9.7
	<i>Subtotal</i>		80.7	68.7	-12.0	-14.9
85	Baiting Hollow Marsh	Riverhead	17.2	0.0	-17.2	-100.0
87	Wading River Marsh	Riverhead	145.6	126.3	-19.3	-13.2
	<i>Subtotal</i>		162.8	126.3	-36.5	-22.4
248	Mill Creek	Oyster Bay	0.1	0.0	-0.1	-100.0
252	Centre Island NE Shoreline	Oyster Bay	2.4	0.0	-2.4	-98.4
242	Cold Spring Harbor Wst. Shoreline	Oyster Bay	3.9	0.9	-3.0	-76.4
264	Glen Cove Creek	Oyster Bay	2.4	0.6	-1.9	-75.8
270	Motts Creek	Oyster Bay	2.3	0.8	-1.5	-64.2
261	West Pond	Oyster Bay	20.8	8.5	-12.3	-59.0
262	Cobble Court Marsh	Oyster Bay	2.8	1.3	-1.5	-52.3
269	Inner Hempstead Harbor East	Oyster Bay	12.7	7.8	-4.9	-38.7
260	Desoris Pond	Oyster Bay	2.1	1.3	-0.8	-36.6

Methodology and Data

ID #	Wetland Complex	Town	1974 IM+HM+FM (Acres)	2005 IM + HM+FM (Acres)	Change in IM+HM+FM (Acres)	Change in IM+HM+FM (%)
249	Mill Neck East Shoreline	Oyster Bay	15.7	10.3	-5.4	-34.4
250	Centre Island East Shoreline	Oyster Bay	13.0	8.7	-4.3	-33.1
253	Centre Island West Shoreline	Oyster Bay	12.3	9.6	-2.7	-21.9
245	Cove Neck West Shoreline	Oyster Bay	6.8	5.6	-1.2	-18.2
259	Frost Creek	Oyster Bay	56.2	46.1	-10.1	-18.0
257	Beaver Creek	Oyster Bay	29.1	24.3	-4.7	-16.3
247	Oyster Bay South Shoreline	Oyster Bay	7.6	6.4	-1.1	-14.8
	<i>Subtotal</i>		190.1	132.4	-57.7	-30.4
311	Scotch Cap Islands	Rye	1.5	0.2	-1.3	-85.3
314	LI Sound Milton Pt to Rye Beach	Rye	14.4	3.6	-10.8	-75.1
317	Manursing Island Shoreline	Rye	2.6	0.7	-1.9	-73.6
312	Milton Harbor	Rye	2.6	0.9	-1.5	-62.9
310	Hen Island	Rye	19.5	12.5	-7.0	-35.8
313	Marshland Conservancy & Blind Brook	Rye	72.3	47.4	-25.4	-34.9
307	East Basin Creek	Rye	3.9	3.3	-0.6	-15.5
	<i>Subtotal</i>		144.9	98.1	-46.9	-32.3
219	Nissequogue Sunken Meadow Moat	Smithtown	2.8	0.0	-2.8	-100.0
220	Nissequogue Upper Sunken Meadow Creek	Smithtown	8.7	1.7	-7.0	-80.8
105	Porpoise Channel Islands	Smithtown	106.7	49.2	-57.5	-53.9
107	Stony Brook Creek	Smithtown	5.6	2.8	-2.9	-49.5
108	Stony Brook Harbor South	Smithtown	52.1	37.7	-14.4	-27.7
214	Nissequogue Smithtown Landing Golf Course	Smithtown	4.1	3.0	-1.1	-27.3
207	Nissequogue Mouth of Sunken Meadow Creek	Smithtown	60.7	44.5	-16.2	-26.6
209	Short Beach	Smithtown	22.6	18.3	-4.3	-19.1
212	Nissequogue Landing County Park	Smithtown	15.4	12.5	-2.9	-18.8
215	Nissequogue East	Smithtown	86.5	71.2	-15.3	-17.7
216	Nissequogue Downstream Coastal FM	Smithtown	9.3	7.6	-1.6	-17.6
210	Nissequogue IM Island	Smithtown	20.3	16.8	-3.5	-17.3
211	Nissequogue Riveria Drive Shoreline	Smithtown	15.3	12.8	-2.5	-16.1
	<i>Subtotal</i>		410.2	278.2	-132.0	-32.2
20	Fisher's Island Hungry Pt to Brooks Pt	Southold	1.1	0.8	-0.4	-31.4
26	Fisher's Island Hay Harbor	Southold	2.2	1.6	-0.6	-27.7
24	Fisher's Island Crescent Ave	Southold	0.9	0.8	-0.1	-11.6
	<i>Subtotal</i>		4.2	3.2	-1.1	-26.2

Figure 39: Porpoise Channel Islands & Stony Brook Harbor South (Complex ID #105 and ID #108)
[See Page D4, Appendix I for Locator Map]

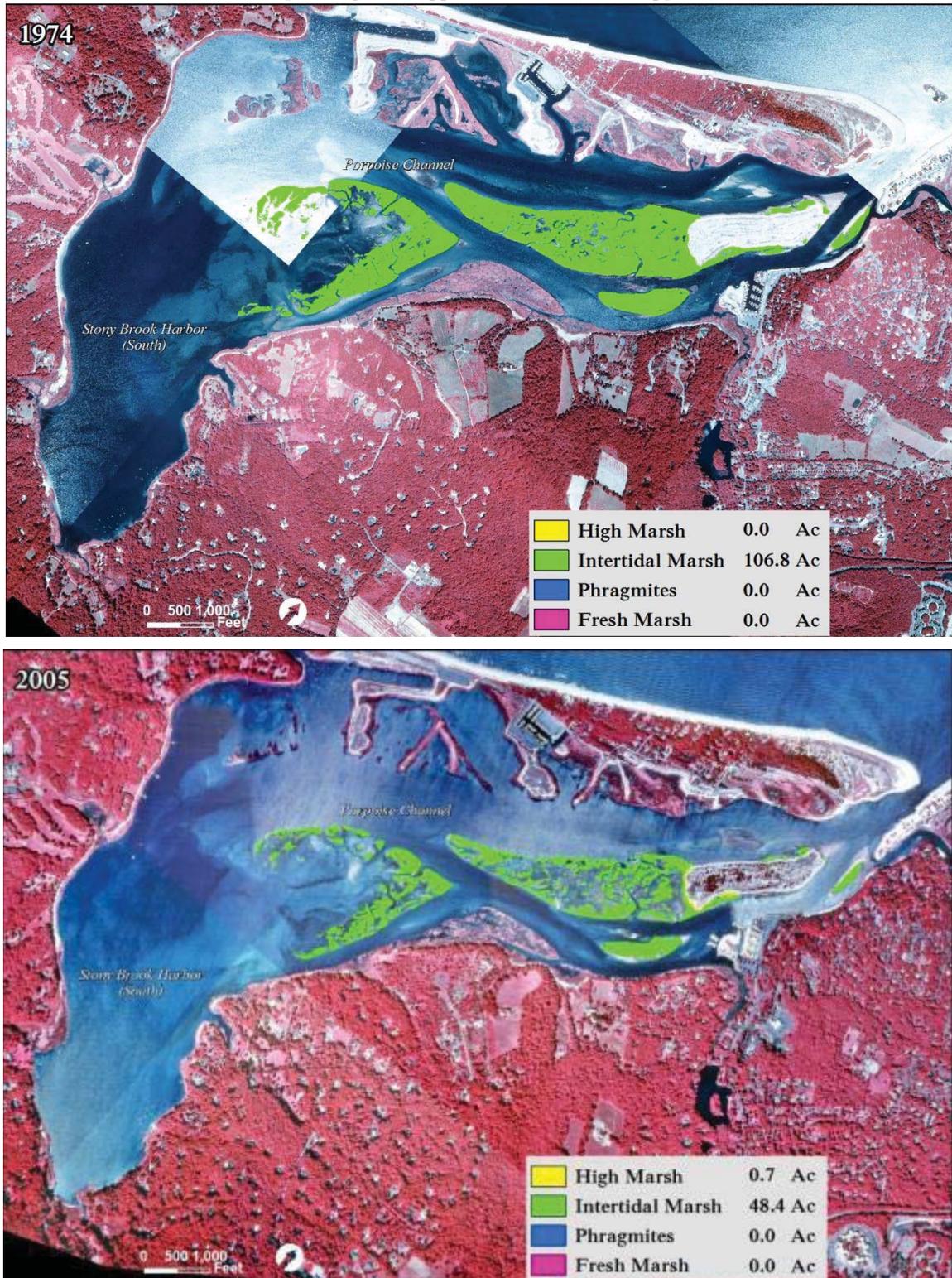


Figure 40: Crab Meadow (Complex ID #222)
[See Page D3, Appendix I for Locator Map]

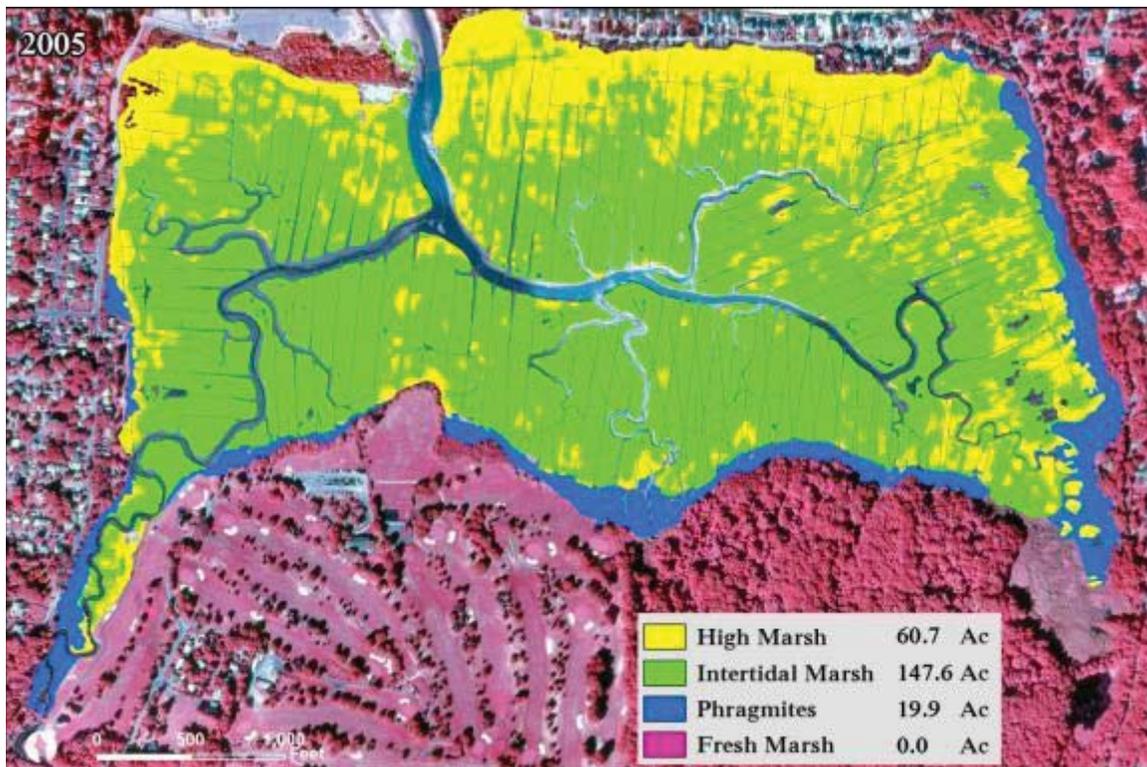
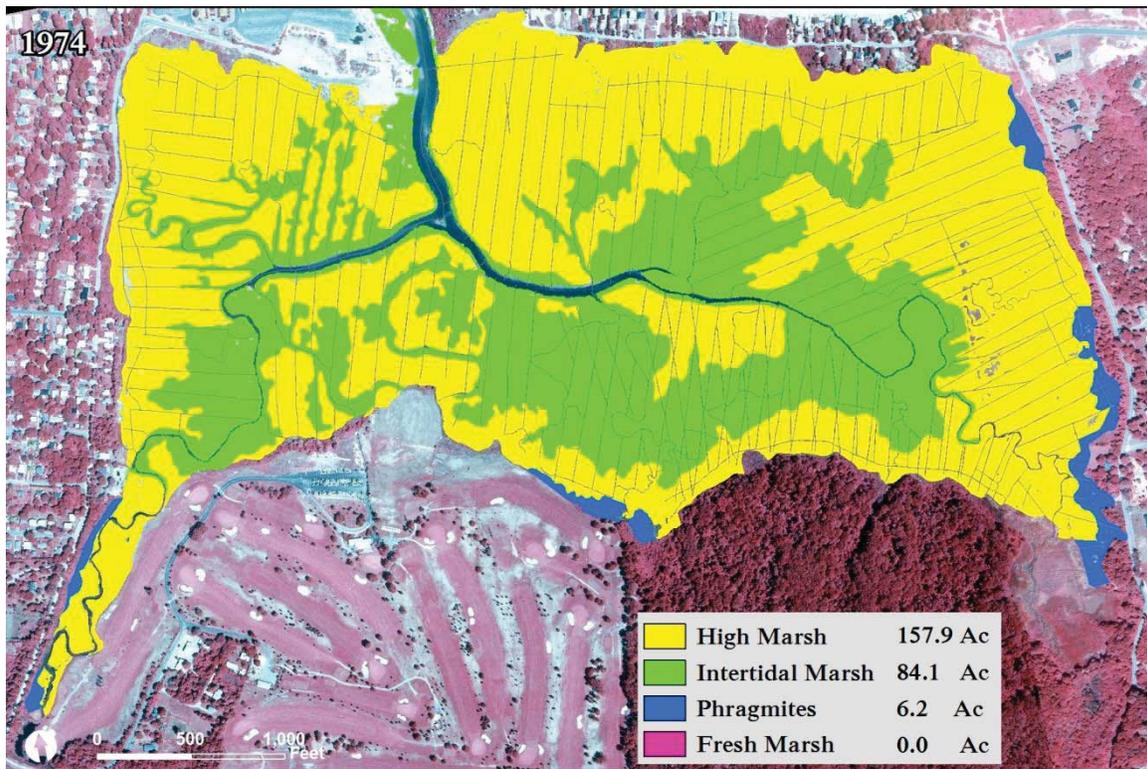


Figure 41: Mount Sinai Harbor Islands (Complex ID #90)
[See Page D5, Appendix I for Locator Map]

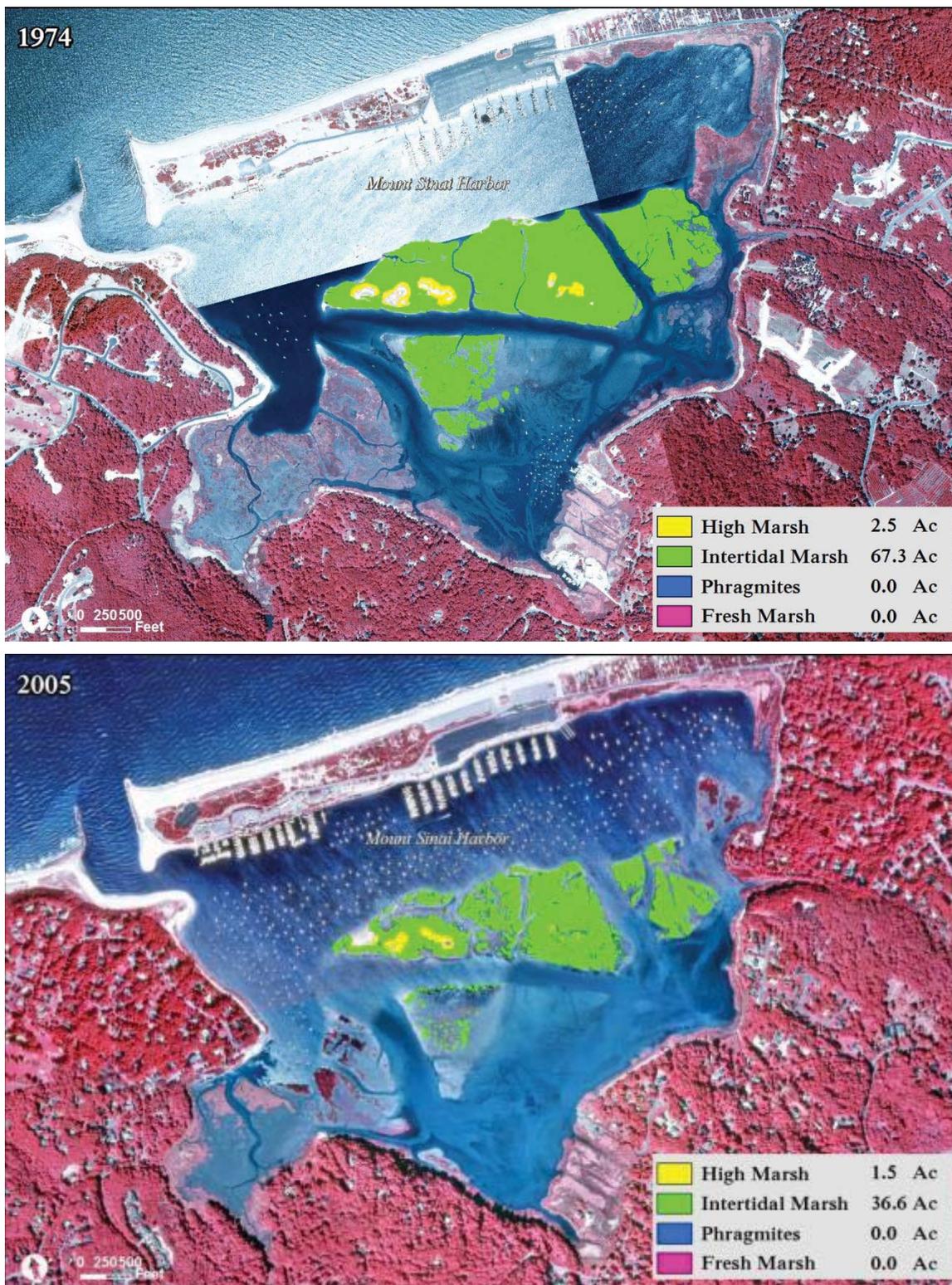


Figure 42: Lloyd Point Wetlands (Complex ID #236)

[See Page D2, Appendix I for Locator Map]

