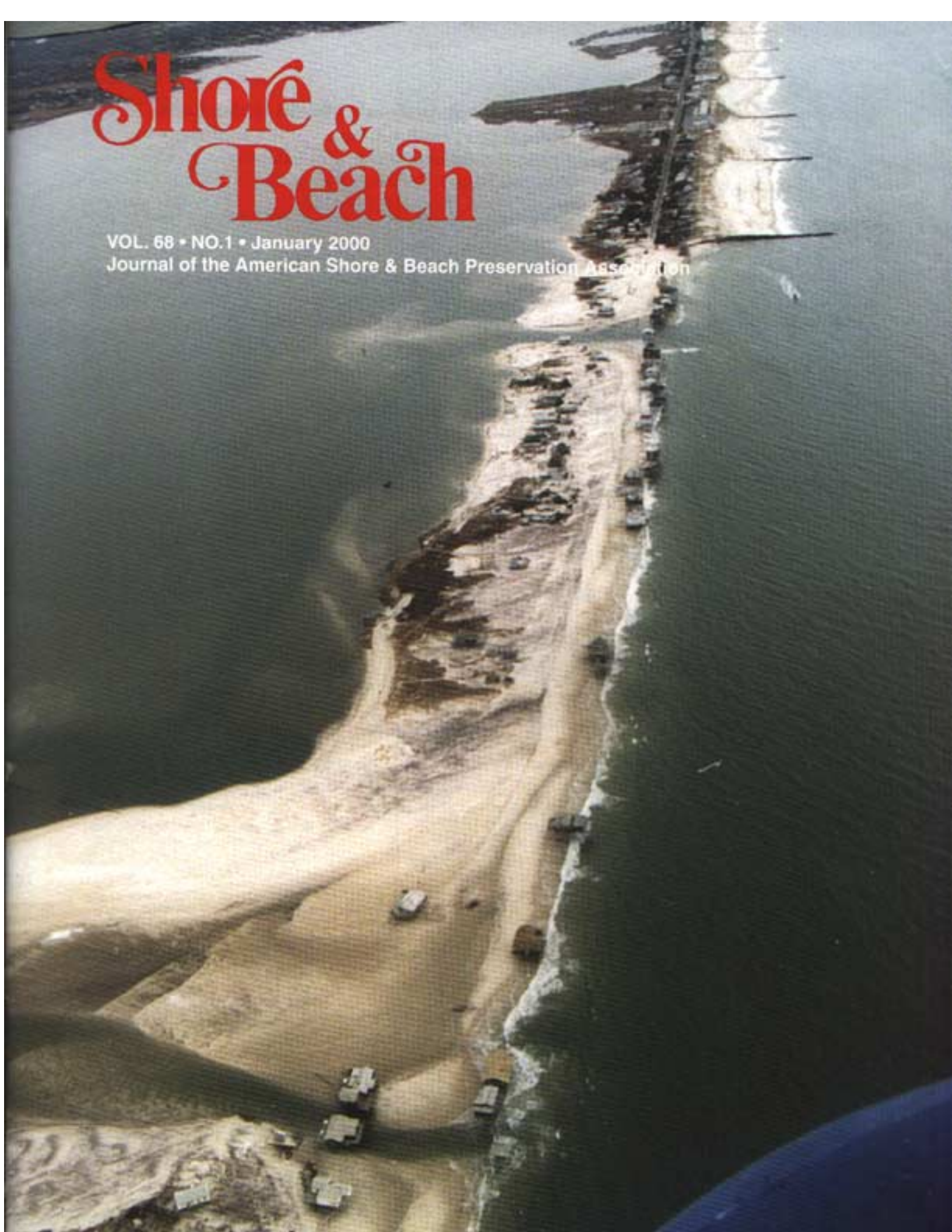


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# **The West Hampton Dunes Story A Blueprint for Coastal Management:**

*By*

William Daley

*NYS Department of Environmental Conservation  
50 Wolf Road  
Albany NY 12233*

Thackoor Mootoo  
Aram V. Terchunian

*First Coastal Corporation  
P.O. Box 1212  
Westhampton Beach NY 11978*

Clifford Jones

*U.S. Army Corps of Engineers  
26 Federal Plaza  
New York NY 10278*

Gary Vegliante  
*Mayor*

*Inc. Village of West Hampton Dunes  
P.O. Box 728  
Westhampton Beach NY 11978*

## **ABSTRACT**

West Hampton Dunes represents a blueprint for coastal hazard management and habitat enrichment. At one time, West Hampton Dunes was the poster child of what could go wrong with a project. Today, it is a lesson in successful partnership and coastal management. The shoreline of what is now the Incorporated Village of West Hampton Dunes has experienced increased erosion since the construction of a groin field to the east of the Village boundary. The erosion eventually led to a breach in the barrier island in 1992, and in loss of private property. Legal action by the residents against the Federal, State and local governments led to a stipulated settlement that allowed redevelopment of the Village, improved public access, endangered habitat enrichment and vital coastal flood and erosion protection. The beach and dune restoration project has performed above expectations and the redevelopment of the Village has proceeded in concert with endangered species rejuvenation and public access.

## **INTRODUCTION**

West Hampton Dunes is a small village on the south shore of Long Island, New York, located entirely along the barrier island separating the Atlantic Ocean and Moriches Bay. The Village comprises 342 properties bordering Dune Road, and three miles of roadway that transverses the barrier. The Village extends approximately two miles eastwards from the Cupsogue County Park facility on the east side of Moriches inlet (Figure 1).

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The Village was incorporated in November 1993 after more than 20 years of sporadic legal action to have severe erosion problems addressed. The erosion problem was originally addressed by a Federal authorization in 1960, which provided for an erosion control project from Fire Island Inlet to Montauk Point. Recognized as one of the most vulnerable areas along the authorized project area, a field of 15 rock groins was constructed in the late 1960s on the Atlantic shore of the Westhampton barrier. For political reasons, (Nersesian et.al. 1992 and Heikoff, 1975) the groins were constructed in reverse order (from east to west) to the way originally proposed by the U.S. Army Corps of Engineers (Corps). The beach compartments between the original eleven groins were not artificially filled, and the authorized extension of the groin field, extending to Moriches Inlet, along the shore of what is now the Village of West Hampton Dunes, was also not completed. As a result of these factors, the erosion of the coast downdrift of the groins was exacerbated (Figure 2).

In December 1992, the barrier island was breached just downdrift of the last groin during a severe northeaster. Compounded by a subsequent northeaster in March 1993, the breach grew to over 3,000 ft in width and about 20 ft in depth (Terchunian & Merkert 1995). The breach caused the loss of more than 190 homes as well as approximately 60 undeveloped properties (Figure 3(a) and (b)). The Corps, with state and county support, undertook a project in late 1993 to close the breach through the installation of 1,800 linear ft of buried steel sheet pile and the pumping of 1.5 million cu yd of sand.

The breaching of the barrier also spurred a consolidated legal action and the incorporation of the Village of West Hampton Dunes. As a result of civil litigation by the property owners against Suffolk County and the State and Federal Governments, a stipulated settlement in the Federal Court prompted the federal, state and local governments to rebuild two miles of beach and dune in accordance with the goals of the originally authorized project. The intent of this interim project was to provide a limited degree of protection until a comprehensive reformulation study was completed. The project included the tapering of the existing groins, pre-filling of remaining unfilled groin compartments and beach replenishment, using 4.5 million cu yd of sand. The project was constructed between 1995 and 1997 and provides for periodic renourishment for 30 years after completion.

This project, which has become known as the Westhampton Interim Project, incorporates many components of sound coastal management principles arising from the various agreements reached between the parties. Here, four main achievements will be discussed:

- Barrier Island/mainland flood and erosion protection
- Nurturing and enhancement of endangered species
- Improving and expanding public access
- Restoration of private property

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## **FLOOD AND EROSION PROTECTION**

### **Emergency Breach Closure**

To close the breach in the barrier island, and to restore properties lost to the erosion, 1.5 million cu yd of sand were pumped from an offshore site. A double row of 30-ft steel sheathing, 1,800 ft long was installed across the breach incrementally to reduce sand losses during the pumping operation. One row of sheeting was retained at the completion of the project to protect against future breaching at this location. The integrity of the island was restored, but the flood and erosion protection of the barrier was minimal (1:5 year storm protection).

### **Beach-Dune Restoration**

The Westhampton Interim Project restored property lost to some two decades of accelerated erosion culminating in the 1992 northeaster. A typical restored profile is shown in Figure 4. From Dune Road, the beach was restored approximately 500 ft to the south to the mean high water (MHW) line. A dune was created 130 ft from the centerline of the road, and the beach berm extended a further 90 ft seaward of the dune. The back of the dune was vegetated using American beach grass, and sand fences were installed along the seaward toe.

To promote arrival of littoral drift to the newly formed Village of West Hampton Dunes (west of the groin field), the project included tapering of the existing two westernmost groins with an additional groin inserted between them to complete the taper. The project also provided for additional beachfill in the groin field as needed, to further increase sediment transport to the west.

Part of the court settlement required that restored private property would extend to the seaward toe of the dune, a distance of 187.5 ft from the southern edge of the Dune Road right-of-way. Thus the beach, (from the seaward toe of the dune to the MHW line of the Atlantic Ocean) became public property through a Boundary Line Agreement, at no public cost of condemnation. The dune was established as a Conservation Easement, and protected from pedestrian traffic by elevated access walkways from each property.

The federal, state and county project participants have committed to maintaining this protection for 30 years from 1996. The project was designed to withstand a 1 in 44 year storm with renourishment on an anticipated three year cycle. Figures 5(a) and (b) show the restoration project under construction and on completion respectively

After completion in 1997, the project was monitored to confirm the validity of the coastal hydrodynamic predictive models, observe project performance, and plan for future renourishments. Since the beachfill placement was completed in the spring of 1996, the first of the scheduled renourishments was expected to be in 1999.

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However, analysis of recent beach profile surveys for the Corps indicate that the project area has performed better than expected.. It seems very clear that, the combination of increasing the probability of longshore sediment transport past the groin field by filling the groin compartments and tapering the downdrift end, together with extensive nourishment of the beach/dune section is functioning far better than anticipated. In additional to the Corps' work, the Village of West Hampton Dunes undertook local protective actions, including erecting sand fence along the seaward toe and face of the dune. The accumulated sand has increased the height and breath of the dune to levels beyond the original design and created important dune and transitional habitat. As a consequence, renourishment, which was anticipated in 1999, is now planned for late in the year 2000. Coastal monitoring, including beach profile surveys and aerial photography is expected to continue over the project life.

## **PUBLIC ACCESS**

Although as a Public Trust Doctrine State, New York's beaches are almost entirely publicly owned, public access to those beaches is highly variable. One of the problems is getting to the beach! Historically, development along the coast made no provision for public access between individual properties. Parking restrictions at coastal locations (either no parking, or restricted to residents) also limit access to the beach.

### **Beach Parking and Pedestrian Access**

The public can get access to the beach at State, County, and municipal parks for a daily fee. Municipal facilities generally allow low cost access (parking permit and/or beach pass) to residents only, although it is possible for a non-resident or day visitor to get access to the facility, at a higher cost. The Town of Southampton has one facility at Pikes Beach within the Village of West Hampton Dunes, designed for 200 cars, and Suffolk County owns and operates Cupsogue County Park at the western boundary of the Village, which can accommodate 800 cars (Figure 1).

The settlement agreement provided for seven new public access points along Dune Road within the Village. Elevated walkways over the dunes have been provided at easements, for cyclists and pedestrians, and for passengers dropped off at the access points. Drop-off lanes are planned for each of the access points. Vehicular parking is provided at the two public parks.

Increased public access for bicycle and pedestrians is being planned via a dedicated bike and pedestrian path from the mainland along Dune Road to the Public Access points and the parks in the Village.

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## **Public Beach Ownership**

It is common for the seaward property boundary of coastal parcels to be defined by the location of the MHW line. The long-term erosion and the breach re-defined the location of the MHW line for many properties. Beach nourishment could have further re-defined this line to the benefit of the property owners. New York State law, however, requires that state funded beach nourishment be placed on municipally owned lands.

As described earlier, another stipulation of the settlement created a Boundary Line Agreement that established the seaward property boundary at the seaward toe of the restored dune. All lands seaward of this boundary were dedicated to Suffolk County for public beach use. Other agreements (e.g. building setbacks from dunes) were made with regard to the locations of buildings on the properties to protect the dunes, as well as dedicated beach access from each property.

## **Conservation Area**

The settlement also included concessions by the property owners to protect the reconstructed dune and to provide the public crossover routes. The entirety of the reconstructed dune, from its seaward toe to a point 25 ft landward of its landward toe (Figure 4), is subject to a permanent easement as a Conservation Area. No construction or any other activities may take place within the Conservation Area, except for maintenance and repair of the dune and associated features such as sand fencing and public crossover structures. Additionally, each lot is allowed a single crossover structure, not to exceed four feet in width, for non-commercial access to the beach.

## **Public Walkovers**

In so far as possible the public crossovers were placed on previously existing rights-of-way, which provided beach access for bay-side properties. However, in a few cases there were no conveniently located, previously existing rights-of-way, and permanent easements were fashioned by taking equal portions along the boundary of two adjoining lots. In all cases of the public walkovers, the settlement required transfer of the property rights to the County at no cost.

## **NURTURING AND ENHANCEMENT OF ENDANGERED SPECIES**

### **Piping Plovers**

Since the early 1980s, and at the time of the breach, there were no documented sightings of piping plovers in the West Hampton Dunes area. The combination of beach/dune restoration and careful management of the foreshore have enticed a significant plover population with stunning reproduction (Table I). This successful plover population has blossomed in concert with the beach and dune restoration project and the construction boom that is taking place in the Village.

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The local plover population is now one of the most treasured in the State, with over 33 pairs along two miles of beach and the fledging of 204 chicks in the last five years (Figure 6). The significance of the plover population in the West Hampton Dunes area is demonstrated by the data shown in Table 2. For example, over the five year period from 1995 to 1999, 12% of the state breeding pairs were located in West Hampton Dunes and these produced 16% of the total statewide plover fledging.

The unqualified success in plover population increase is remarkable because the breeding area in West Hampton Dunes (2 miles) is small compared to the Long Island total covering over 250 miles of coast (i.e. less than 1%). Also in 1999, the state average of chicks fledged/pair was 1.36. At West Hampton Dunes this average was 2.19. Since the Village assumed control of predators within the breeding area in 1996, the productivity rate (chicks fledged/breeding pair) averaged 1.58 for West Hampton Dunes, or 35% higher than the 1.17 for the entire state. The data are based on monitoring carried out by the Corps in consultation with the U.S. Fish and Wildlife Service, the State of New York, and the Village of West Hampton Dunes.

### **Seabeach Amaranth**

Seabeach amaranth (a federally endangered plant) has also become established within the Village boundaries. There was no evidence of this plant in the area in the recent past. Its appearance may be owed to the dredging and nourishment activities during the restoration project.

## **PRIVATE PROPERTY**

Construction of the groin field, without artificial filling of the groin compartments to assure continued long-shore sediment transport, eroded the West Hampton Dunes area since the mid 1960s. Although the barrier island between Shinnecock and Moriches Inlets was historically prone to breakthroughs and inlet formation, the extreme blockage of the normal east-west flow of sand past the groins destabilized the area to the west of the groins. The weakened barrier island segment then became increasingly susceptible to erosion, flooding, and breaches; and the mainland bordering Moriches Bay more vulnerable to flood and erosion damage.

During the second phase of construction, which included the four most westerly groins, the inter-groin compartments were pre-filled, but once again the compartments between the original eleven groins were not filled, allowing the updrift portion of the groin field to continue capturing most of the long-shore drift. Between 1962-1991 the captured littoral material amounted to 1.8 million cu yd (Nersesian et. al. 1992). This material, if not prevented from continuing westward, would have naturally nourished the barrier beaches lying downdrift of the groin field and would, most probably, have prevented the 1992 breach and the loss of more than 150 homes.

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Following the restoration project, which included the creation of the Conservation Area to protect the integrity of the reconstructed primary dune, the building envelope on the south side of Dune Road was very limited. Reconstructed homes on this side of Dune Road are limited to a depth of 75 feet from the southerly right-of-way to the northerly edge of the Conservation Area. A front-yard setback of 25 feet, rigorously enforced by the Village of West Hampton Dunes, must be accommodated within that 75 ft, effectively limiting a building envelope to a depth of 50 ft. The setback area can be used for off-street parking, as there is no on-street parking within the Village, and for sanitary disposal facilities.

Despite these space limitations and strict environmental (endangered species) regulations, there is a tremendous amount of building activity on these lots as houses and construction activities have been designed and timed to overcome these restrictions. Approximately 40 homes were built in 1998, an increase from 25 homes in 1997 and 20 in 1996.

## CONCLUSION

The described components of this project represent a blueprint for successful coastal management of all levels of government and owners of private property, working together to accomplish meaningful consensus and partnership. The details of this project clearly underscore that the benefit derived from an honest exchange of ideas and a genuine application of scientific and engineering can overcome decades of political maneuvering and intentional polarization. The outstanding performance of the beach and dune restoration project also demonstrates how both people and endangered species thrive when proven engineering and scientific methods are used in a coordinated and complimentary manner.

The West Hampton Dunes project is an example of how the diverse aspects of coastal management (hazards, endangered species, public access, & private property) can mutually thrive in a critical coastal area through partnership, mutual respect and understanding. The resort to legal action is clearly a last resort, and should be reserved for those situations where the blueprint of the West Hampton Dunes story has been lost on the participants. However, legal action is an effective way to force polarized participants to recognize the rights of other coastal users and to craft a mutually beneficial program.

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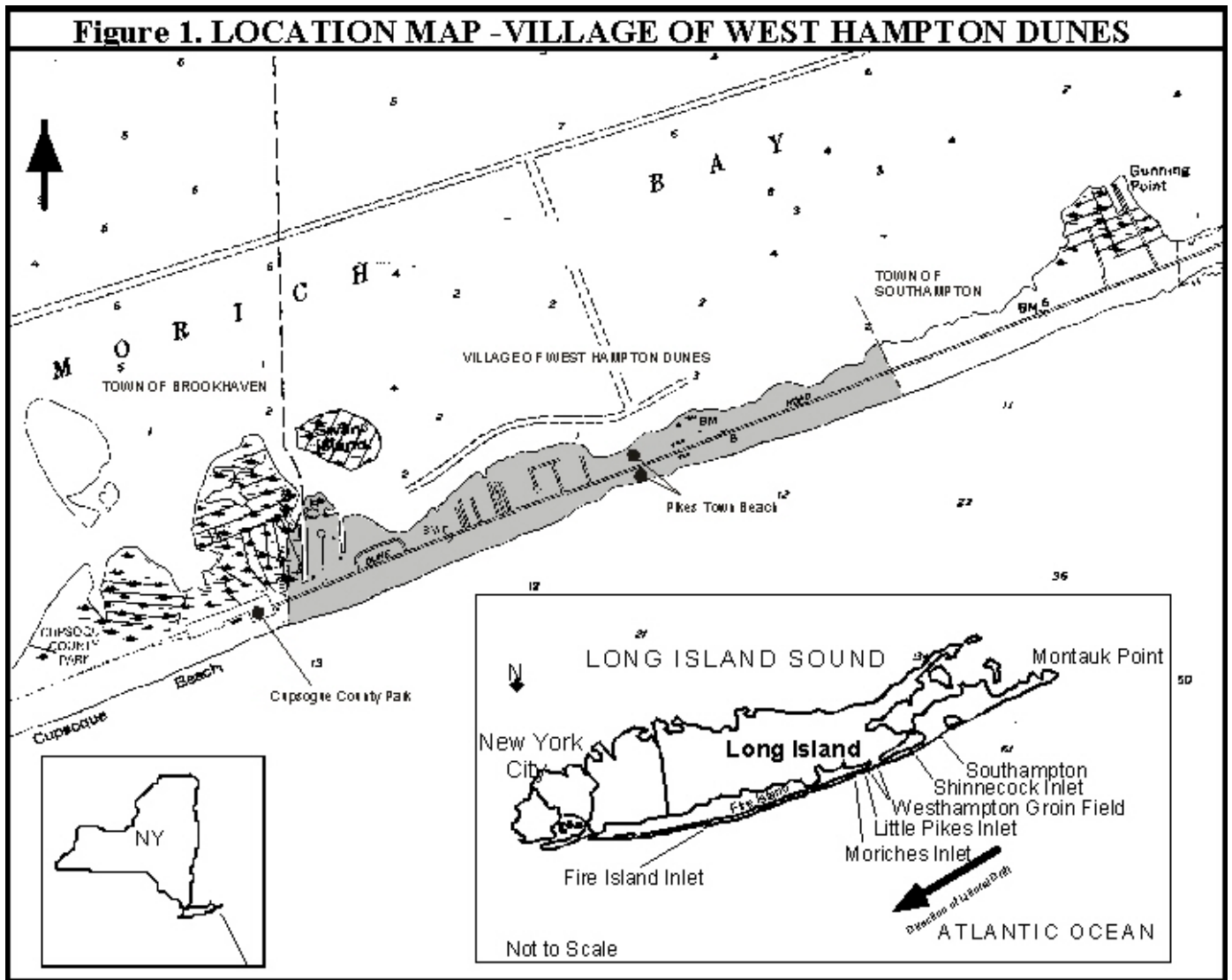
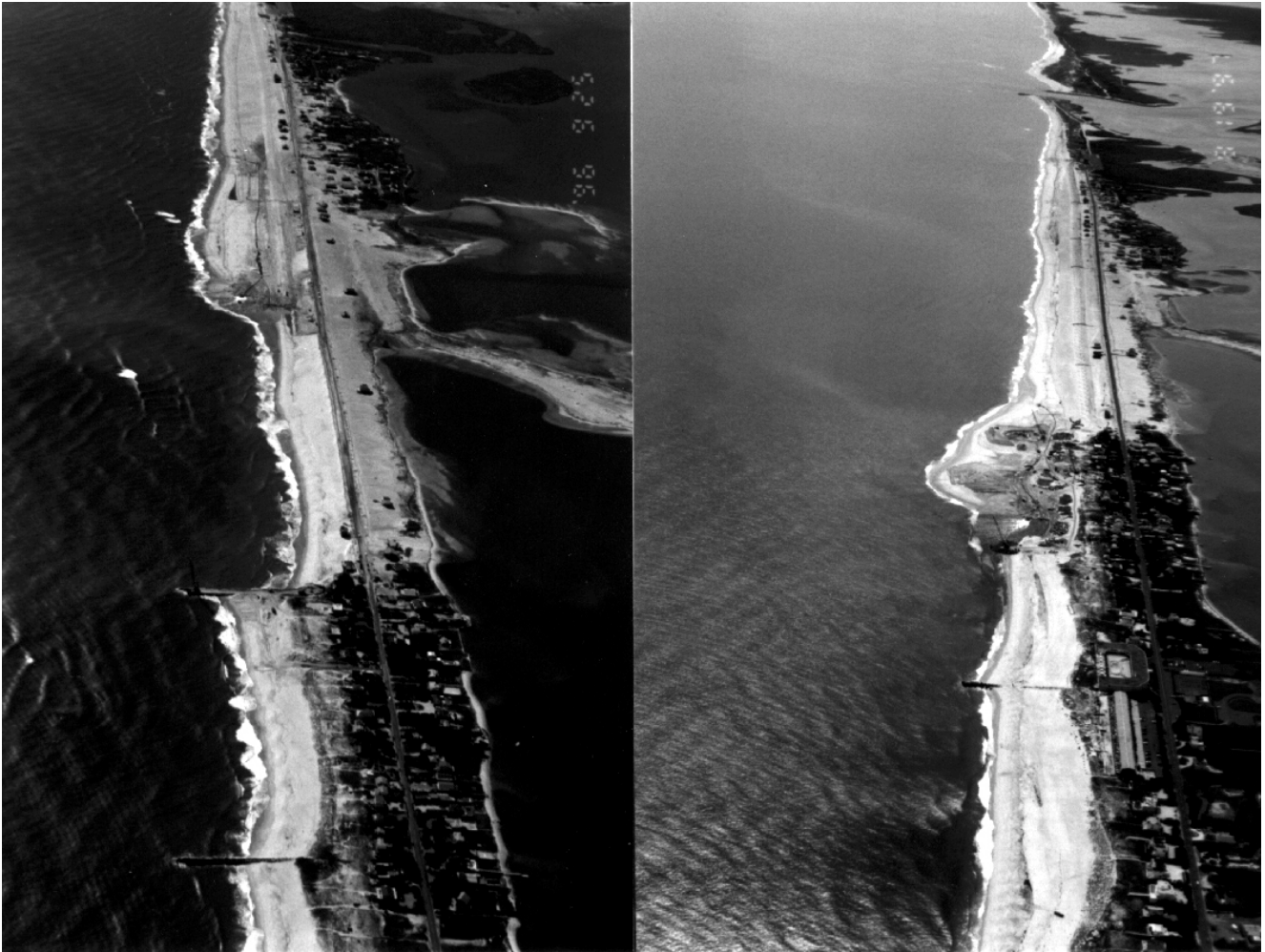


Figure 1: Location Map of West Hampton Dunes



Figure 2: View to the east of the two barrier island breaches caused by the diminished sand supply and the December 11-14 Nor'Easter. Littoral drift is from east (top) to west (bottom). Photograph by Dan Covello & Aram Terchunian.



**Figure 3 A (left) and B (right) of the breach fill, beach and dune restoration, and the tapering of the westernmost portion of the groin field, Photographs looking to the west, taken by Dan Covello & Aram Terchunian.**

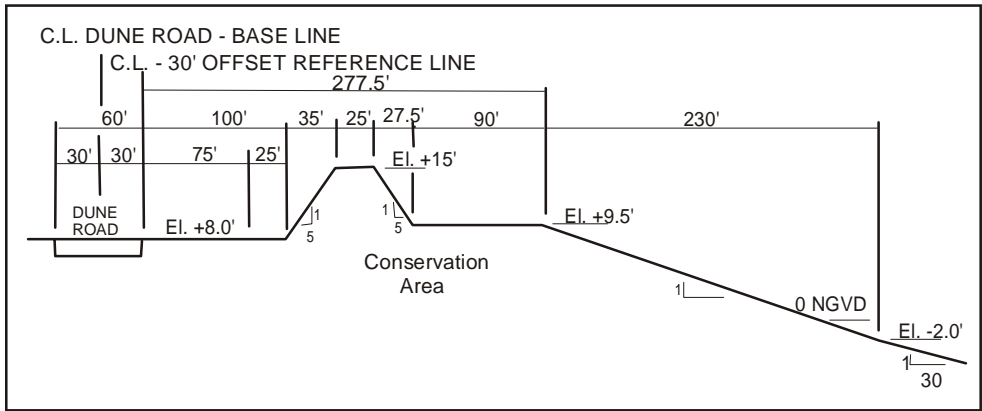


Figure 4. Typical beach & dune restoration profile

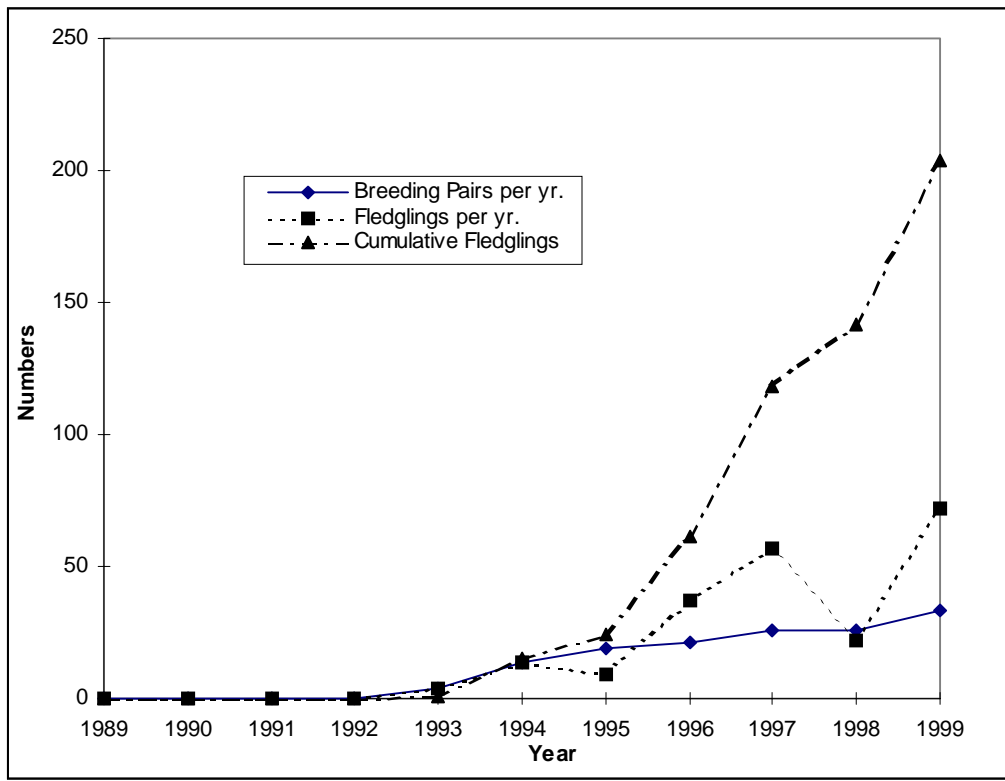


Figure 5. Breeding Pairs and Fledging 1989-1999

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<b>Table 1. Breeding pairs and fledglings at West Hampton Dunes</b>			
<b>Year</b>	<b>No of breeding pairs</b>	<b>No. of fledglings</b>	<b>Cumulative no. of fledglings</b>
1983-92	0	0	0
1993	4	4	1
1994	14	14	15
1995	19	9	24
1996	21	37	61
1997	26	57	118
1998	26	24	142
1999	33	72	204

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<b>Table 2. Comparison of plover population at WHD and NYS (72 sites)</b>												
	<b>1995</b>		<b>1996</b>		<b>1997</b>		<b>1998</b>		<b>1999</b>		<b>95-99 avg.</b>	
	<b>WHD</b>	<b>NYS</b>	<b>WHD</b>	<b>NYS</b>	<b>WHD</b>	<b>NYS</b>	<b>WHD</b>	<b>NYS</b>	<b>WHD</b>	<b>NYS</b>	<b>WHD</b>	<b>NYS</b>
Chicks Fledged	9	182	37	165	57	286	22	245	72	344	39.4 16.1%	244.4
Breeding pairs	19	188	21	145	26	210	26	245	33	254	25 12.0%	208.4
Prod. rate	.50	0.97	1.76	1.14	2.19	1.36	0.79	1.00	2.18	1.36	1.49	1.17