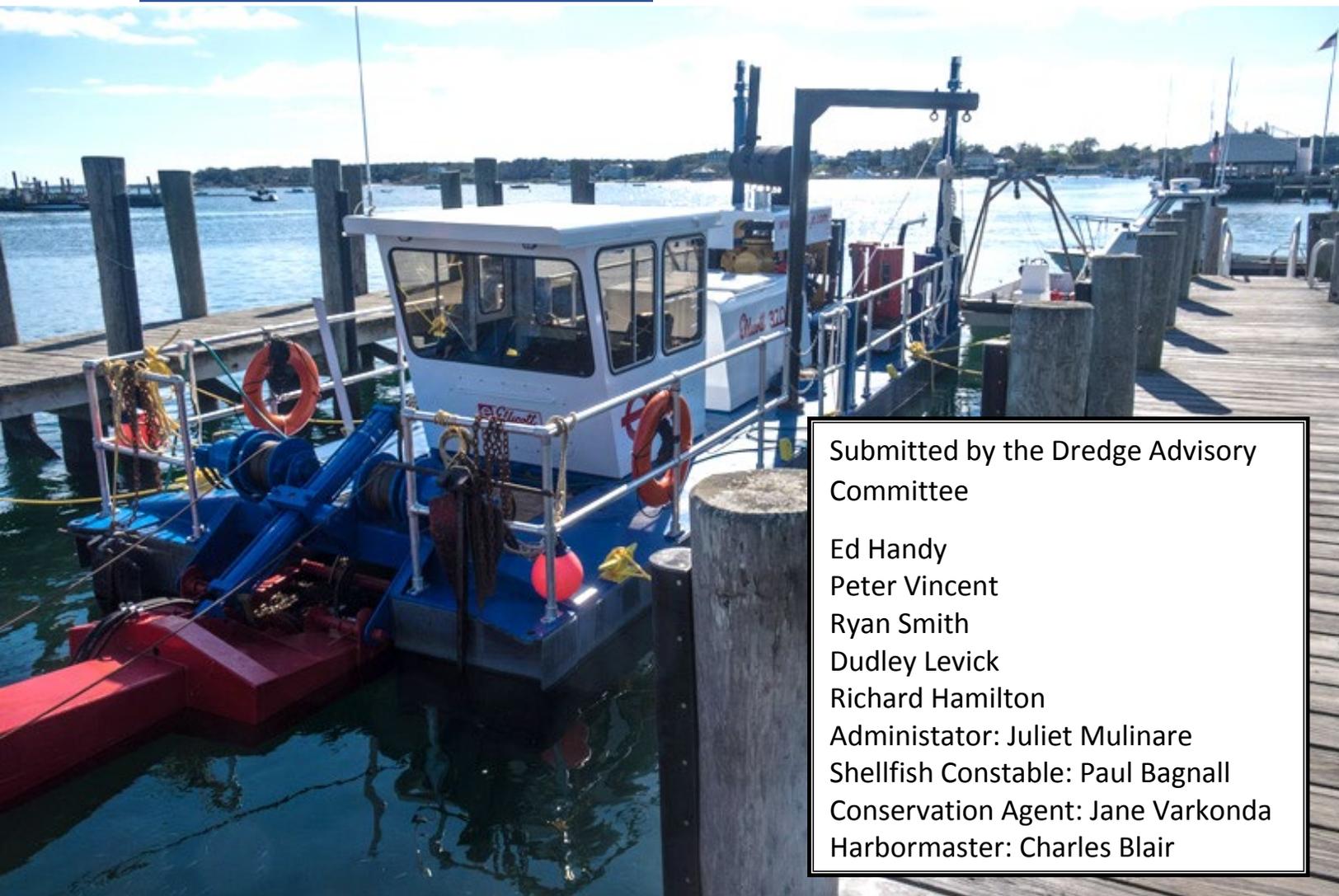




TOWN OF EDGARTOWN DREDGING MASTER PLAN UPDATE 2018



Submitted by the Dredge Advisory
Committee

Ed Handy

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Administrator: Juliet Mulinare

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Harbormaster: Charles Blair

EDGARTOWN DREDGE ADVISORY COMMITTEE

The goal of the Dredging Management Plan Committee, now the Edgartown Dredge Advisory Committee, has been to implement and develop a long range master plan for dredging and dredging management which qualifies for State and local funding. The Master Plan was first completed and adopted in March 27, 1996 and was updated in 2007 and again with this update in 2018. The Dredge Advisory Committee's function is to make recommendations to the Board of Selectmen, for their approval, on all matters concerning the sites, operation, and personnel associated with the dredge.

The Edgartown Dredge Advisory Committee, founded in 1995 under the authority of the Board of Selectmen, has experienced many transformations in the years since the most recent 2008 Dredge Master Plan Update. Significant progresses and changes have occurred both in the Edgartown Dredge Committee operation, and in the environment of dredging in Edgartown, which has incorporated cooperation with private sectors and other towns.

One of the most extensive projects the Edgartown Dredge Committee has completed in the past 10 years was the dredging of approximately 100,000 cubic yards of sand from Sengekontacket Pond throughout 2008 to 2010. There was unprecedented cooperation with, and funding from, the private Cow Bay Association to nourish the entire stretch of the western town beach through Bend in the Road Beach to Cow Bay Beach. Edgartown and Oak Bluffs mutually benefitted from the dredging of the Sengekontacket channel on the Oak Bluffs side. Inkwell and Pay Beaches received nourishment, and the pond as a whole experienced an increased flushing ability.

Following the events of 2012, the Dredge Advisory Committee was reselected and reformatted to consist of five Selectmen-appointed members: one from the Marine Advisory Board, one from the Shellfish Committee, one from the Conservation Commission, and two other at-large members. The current members of the Dredge Advisory Committee are: Ed Handy, Chair and Representative from the Marine Advisory Committee; Peter Vincent, Representative from the Conservation Commission; Ryan Smith, Representative from the Shellfish Committee; and Dudley Levick and Richard Hamilton, members at-large. Paul Bagnall, Shellfish Constable; Charles Blair, Harbormaster; and Jane Varkonda, Conservation Agent serve as non-voting advisory members. The primary projects the new committee undertook were the dredging of the Cape Pogue Narrows, assistance to the Great Pond Foundation with the Edgartown Great Pond delta, and the Fuller Street Beach nourishment with dredged sand from Eel Pond.

In addition to the success at Fuller Street Beach and the dredging of the Katama boat ramp and channel, the Committee purchased a new dredge in 2017. The accumulation of dredge repair and replacement costs for the old dredge, in its 21st season, began to exceed the service value of dredging. Ed Handy and Donald Benefit heard bidding presentations and conducted site visits to meet the vendors and see the dredges in person. An Elicott Dredge, Model 370 was ultimately chosen for purchase.

The extensive transformations and improvement the Edgartown Dredge Program has seen over the past 10 years has refocused the Committee on its essential mission statement, "improving waterways and navigation, maintaining shorelines, and protecting habitats."

The inception of the Dredge Program shows the Town's commitment to fishermen, to improving the storm damage and flood control functions of beaches, while also restoring recreational values and endangered species habitat (piping plover). This multiple benefit approach improves the economy by providing

opportunities, protecting the resources that are the basis of the existing economy, and restoring and enhancing natural heritage. This multiple benefit approach is typical of all the projects of the Dredge Program.

Miles of beach have been nourished. Navigation and mooring areas have been restored and need to be maintained. In addition, public access has been restored at three public boat ramps with one more scheduled for dredging. All of this is being done as the Town saves money (estimated to be a 71% savings over contractor costs) by using its own dredge and pursuing project grants.

The Committee has sought to carry out dredging in the most cost effective and efficient manner. To that end, the Committee has been successful in obtaining grants from the Massachusetts Department of Environmental Management Office of Waterways and some private funding for many projects. Additionally, the Town has provided dredging services to other Island Towns, funded by intergovernmental agreements to maintain regional and local resources, such as Tashmoo Pond in Tisbury. The Committee makes Edgartown dredge projects the top priority, and outside projects are only done secondarily when the dredge is available. The Town will continue to seek these types of partnerships in developing and implementing the Dredge Program.

The most conservative approach is taken in developing projects to protect natural habitats and the resources they produce, which are so valuable to the Town. It is believed that this conservative approach continues to be the most effective in restoring the navigable waterways, nourishing the barrier beaches and protecting habitat. The information contained in this plan will be a guide for the Town’s continuing efforts to maintain navigable waterways and the natural marine resources that are so important to the seasonal and year-round economies.

BUDGET HISTORY 2006-2018

Year	Operating and Maintenance Costs	Warrant Articles for Permitting Costs
2006	\$223,646.00	\$30,000.00
2007	\$221,488.00	\$15,000.00
2008	\$221,000.00	\$15,000.00
2009	\$236,000.00	--
2010	\$236,000.00	--
2011	\$236,000.00	--
2012	\$136,000.00	--
2013	\$236,000.00	--
2014	\$244,000.00	--
2015	\$244,000.00	--
2016	\$260,161.00	--
2017	\$259,766.20	\$50,000.00 from CPC funds
2018	\$260,847.40	--

In 2011, the Dredge Budget shifted to an “Unclassified” line item for department budgets.

In 2012, the Dredge was classified as a Town department, and the budget was voted as a line item in the Town Budget.

The Dredge Department will be asking for \$80,000.00 for permitting, and \$120,000.00 for permitting costs at the Katama boat ramp at the Annual Town Meeting of 2019.

MAJOR EVENTS, PROJECTS AND PERMITTING 2006-2018

Year	Major Events	Projects	Permitting
2006	<ul style="list-style-type: none"> • Dredge operating in its 12th year. • Extensive maintenance and repairs needed in early fall due to harsh salt environment. • Grant received from Seaport Advisory Council to examine Lighthouse Point area for build out choking harbor entrance. • Future plans: Inner Harbor maintenance, Lighthouse Pond, Cape Pogue opening. 	<ul style="list-style-type: none"> • Katama: maintenance dredging for boat ramp. • Eel Pond: nourishment of Sheriff’s Meadow, including a small island for rare birds and other species; improved navigation for mooring holders and improved circulation to avoid additional shellfish closures. 	<ul style="list-style-type: none"> • Permit renewals approved to dredge Eel Pond. • Town issued permits for the nourishment of Bend in the Road Beach. • Mattakesset: still waiting on permits. • Permit process becoming difficult and expensive, generally requiring 2-3 years.
2007	<ul style="list-style-type: none"> • Dredge hauled and stored at Town Barn for the summer. • New engine installed in early fall. 	<ul style="list-style-type: none"> • Cape Pogue narrows: improved circulation and shellfish habitat 	<ul style="list-style-type: none"> • Committee working with State officials to develop a comprehensive permit process to streamline the permitting process, • Sengekontacket: extensive permitting to improve navigation and nourish Bend in the Road and other southern beaches (80-100,000 yards³ of sand)
2008	<ul style="list-style-type: none"> • Cooperative project between Sengekontacket, Bend in the Road Beach, and Cow Bay Association homeowners to nourish popular dune system on Town beach, and prevent extreme storm wash overs onto Beach Road. • 180 ft of beachfront adjacent to eastern edge of Bend in the Road Beach was leased to the town for public enjoyment for \$1 per year. 	<ul style="list-style-type: none"> • The dune barrier system was rebuilt from the western border of Town beach all the way to the Strauch property. 	<ul style="list-style-type: none"> • Cow Bay paid for all of the permitting and dune restoration, including the portion owned by the Town. • Costs for the Bend in the Road Nourishment project covered by Cow Bay Association. • Woods Hole group helped in the permitting of this multi-faceted project.

	<ul style="list-style-type: none"> • \$150,000 donated to Town Dredge Program. • Dredge Committee began to function more as a Town Department. 		
2009	<ul style="list-style-type: none"> • New caterpillar engine and other replacement parts paid from Dredge Gift Account. • Dredge Administrator position eliminated, replaced by Clerk and Dredge Foreman; program runs more efficiently. • Cow Bay Association continues to buy sand for nourishment of the Town's and Cow Bay Beaches at \$11 per cubic yard. 	<ul style="list-style-type: none"> • Bend in the Road Beach: nourishment of 3,500 yards³ of sand using spoils from Sengekontacket borrow area just inside of the Big Bridge. 	<ul style="list-style-type: none"> • Oak Bluffs began to seek permitting for their portion of Sengekontacket: 57,000 yards³.
2010	<ul style="list-style-type: none"> • Dredge window extremely short due to many equipment breakdowns and failures. • Master Plan from Woods Hole Group completed, and funded privately. Project premise: to protect most susceptible beaches by nourishing the system as a whole, rather than individually. • Continued cooperation with Oak Bluffs to assist with Sengekontacket. • End of the three year public and private endeavor to dredge Sengekontacket, 100,000 yards³ total. 	<ul style="list-style-type: none"> • Small channel inside Cape Pogue Gut to increase access and flow to the largest and most productive shellfish habitat. • Cooperation with Oak Bluffs to assist with beach nourishment projects: 28,000 of the 57,000 cubic yard project completed in Sengekontacket. Inkwell and Pay Beaches received nourishment, as well as 9,000 yards³ to Bend in the Road and 8,000 yards³ to the Cow Bay Association. 	<ul style="list-style-type: none"> • Difficulty with and lack of cooperation from Division of Marine Fisheries and US Army Corps of Engineers.
2011	<ul style="list-style-type: none"> • One of the most productive and efficient dredging seasons. • Budget removed from warrant articles, and instead placed as an "Unclassified Line Item" in the Department Budgets. 	<ul style="list-style-type: none"> • Sengekontacket: completed navigational channel to clear area between the bridges (remaining 22,000 yards³). • Little bridge cleaning of delta on dogleg end of channel, westerly 	<ul style="list-style-type: none"> • Still working towards 10 year comprehensive permit for federal agencies; already secured on State level. • Funding costs removed from budget, no additional cost for tax payers.

		<p>groin fields of State Beach easily reached by pipe.</p> <ul style="list-style-type: none"> • 1,500 yards³ placed on easterly groin beaches of State Beach. 	<ul style="list-style-type: none"> • Requirements for the U.S. Army Corps of Engineers continually changing, difficult to complete tasks while minimizing large expenses.
2012	<ul style="list-style-type: none"> • Complete change in operation and management of dredge equipment, • June 2012: Dredge Advisory Committee reformatted and new committee selected by Edgartown Board of Selectmen. • Limitations to dredge activity: “seasonal designation” for dredge employees, Hurricane Sandy delay. 	<ul style="list-style-type: none"> • Edgartown Great Pond delta: EGP Foundation owns a smaller dredge, normally used to open the pond. Due to substantial growth in the delta, Town’s larger equipment was used. 	<ul style="list-style-type: none"> • Completed filing of comprehensive permit with US Army Corps of Engineers, allowing for maintenance dredging and nourishment of 36 sites; and more flexibility and efficient management of dredge operations. Approval pending.
2013	<ul style="list-style-type: none"> • Active and successful year for Town Dredge. • Significant repairs needed on dredge hull: after competitive bids, the entire hull sandblasted, the necessary steel replaced, metal barrier coated. Paid for by maintenance funds. 	<ul style="list-style-type: none"> • Edgartown Great Pond delta maintenance. • Beginning to add sand to Fuller Street Beach to account for damage done from winter storms. 	<ul style="list-style-type: none"> • Comprehensive permit: final application conditionally approved, and posted for public comments, hoping have permit in 2014.
2014	<ul style="list-style-type: none"> • Dredge operating in its 20th year, with equipment of same age. • Necessary repairs, replacement costs, and associated labor are starting to not make economic sense. • Discussion of dredge replacement and Capitol Programs begins. 	<ul style="list-style-type: none"> • Completion of Edgartown Great Pond delta. • 3,000 yards³ from Right Fork, South Beach storage to Fuller Street Beach • Eel pond: improve navigability and access to mooring field. • Lighthouse Point: 1,000 yards³ removed to increase tidal flow and added to Fuller Street Beach. 	<ul style="list-style-type: none"> • Official approval from ACOE for 10 year comprehensive permit for all Town’s dredging and beach nourishment sites, expires December 31, 2024.
2015	<ul style="list-style-type: none"> • \$62,250 grant received from Office of Coastal Zone 	<ul style="list-style-type: none"> • Fuller Street Beach receives the highest 	<ul style="list-style-type: none"> • Input from Shellfish Committee,

	<p>Management for engineering work on Lighthouse Beach and pond dredging. Further grants sought from Community Preservation Fund.</p> <ul style="list-style-type: none"> • Application to Capitol Programs Committee for a new dredge. • Existing dredge surveyed, determined to be usable for two seasons. 	<p>quality sand from Eel Pond.</p> <ul style="list-style-type: none"> • Eel Pond dredged for easier navigability and landing area. 	<p>Conservation Commission, and Marine Advisory Board become basis for sites for dredging and nourishment.</p>
2016	<ul style="list-style-type: none"> • Active and successful dredge season. • Long term goals: acquire State funding for State Beach engineering; CPC funds for improving Katama boat launch; hire coastal engineering firm to address accumulation of sand south of the Lighthouse, threatening the Harbor entrance. 	<ul style="list-style-type: none"> • Multiple Town beaches nourished with high quality sand. • Katama boat ramp and channel, Highway Department assisted with trucking the sand from Katama to State Beach. 	<ul style="list-style-type: none"> • New dredge planning expedited because equipment quickly approaching end of service life.
2017	<ul style="list-style-type: none"> • New dredge purchased. • \$50,000 in revenue was generated from the sale of leftover sand. 	<ul style="list-style-type: none"> • Katama channel approach to landing to clear access for larger vessels. Sand was trucked to Fuller Street, and the leftover 4,100 yards³ were sold. 	<ul style="list-style-type: none"> • CPC request for \$50,000 for engineering and capital improvements for the ongoing contract with the State to reconstruct the Katama boat landing.
2018	<ul style="list-style-type: none"> • Dredge Committee formed cooperative agreement with Tisbury, representing increased efforts to create an interconnected support network between towns. 	<ul style="list-style-type: none"> • Lake Tashmoo in Tisbury: channel had not been fully dredged in four years; shoaling was causing navigational issues. 	<ul style="list-style-type: none"> • Open contracts with FOTH Infrastructure (formerly CLE) for the dredging of Lighthouse Beach.

Existing Conditions

Dredging/Nourishment Locations

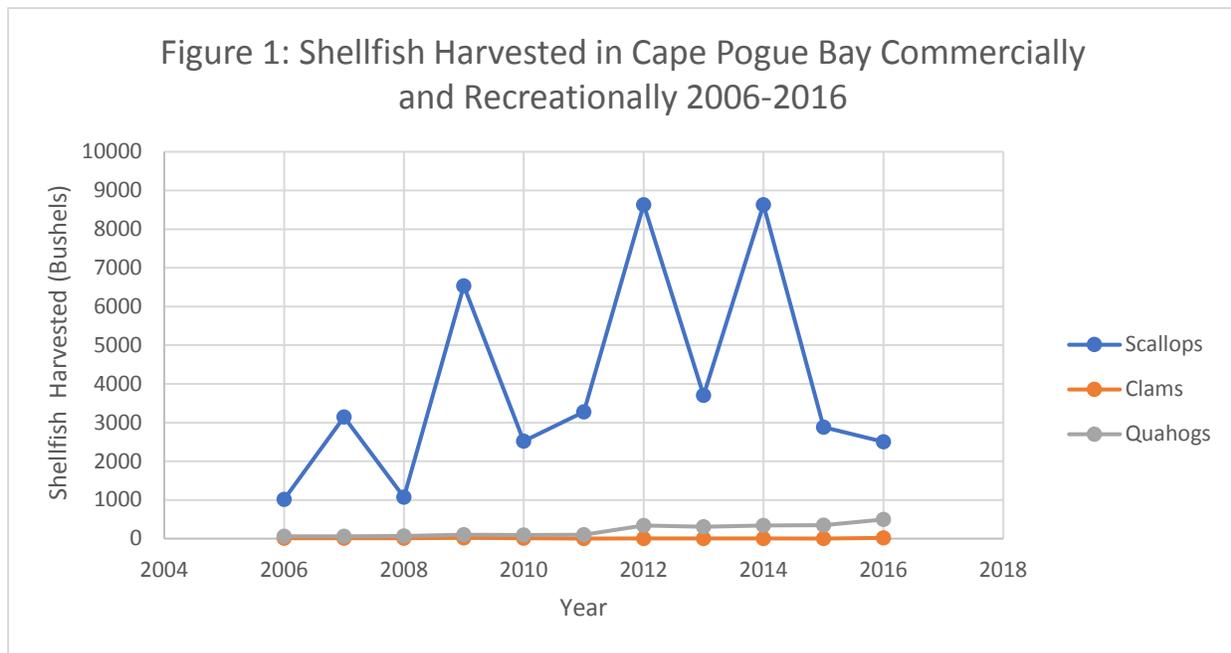
Cape Pogue



The 115-acre Cape Pogue Bay is located in Edgartown on the northeast corner of the island of Chappaquiddick. The northern portion of the bay is bounded by a thin peninsula that has been breached several times, but regularly possesses only one small opening at the end of the Cape Pogue Wildlife Refuge. Additionally, Cape Pogue Bay is connected to Poucha Pond on its southwest corner through the tight inlet of the Narrows and Dike Bridge approach. This bay is categorized by the Martha’s Vineyard Commission as Quality Waters with a substantial amount of eelgrass present.

Cape Pogue is also an essential habitat for shellfish, primarily bay scallop and quahogs. In 2016, the Cape Pogue bay scallop population made up a vast majority of the total \$364,000 worth of commercially caught bay scallops in Edgartown. For this reason, dredging in the pond has taken on a greater economic importance in improving tidal flushing that sustains shellfish habitat. In 2012, a total of 4,900 yd³ of the Cape Pogue Narrows and the Dike bridge approach were dredged, opening up the channel between Poucha Pond and Cape Pogue. The revival of this hydro-connection brought in nutrients from marshy Poucha Pond and increased the circulation throughout the system as a whole. Immediately following the dredging of this connection, the bay scallop population on the Eastern side of Cape Pogue Bay began to flourish.

Figure 1 below displays the commercially caught bushels of shellfish in Cape Pogue from 2006-2016, indicating trends in shellfish population throughout the years. Species in Cape Pogue that primarily serve as water quality indicators are bay scallops and quahogs.



Cape Pogue Shellfish Numbers (Bushels)				
Year	Scallops	Clams	Oysters	Quahogs
2006	1,016	12	0	61
2007	3,145	8	0	63
2008	1,073	13	0	71
2009	6,531	23	0	105
2010	2,516	12	0	91
2011	3,277	7	0	105
2012	8,633	6	0	343
2013	3,701	6	0	307
2014	8,628	6	0	343
2015	2,884	7	0	346
2016	2,505	18	0	495

As seen in Figure 1, the bay scallop population harvest reached peak numbers in the years 2012 and 2014 after dredging of the Narrows and Dike Bridge Approach. From lower yields of 2,512 bushels in 2010 and 3,277 bushels in 2011, the shellfish harvest rose to 8,633 bushels in 2012 and 8,628 bushels in 2014. Shellfish harvests have more than tripled from 2010-2012. Additionally, quahog harvests have flourished averaging approximately 366 bushels throughout 2012-2016, after only reaching peaks of 105 bushels in years previously. Clam harvests, however, have remained consistently low. Shellfish are considered indicators of the stress and ecological productivity of a pond, as seen in the Martha’s Vineyard Indicators Project. The definite increases in bay scallop and quahog harvests following the dredging in 2012 support the idea that dredging boosts circulation of nutrients, tidal flow of salt water, and the overall water quality of the pond.

The total maintenance dredging volume, primarily excavated in 2012 throughout three areas of Cape Pogue, was approximately 16,190 yd³ for navigation and beach nourishment. As seen in the chart below, the greatest volume of dredging, 9,900 yd³, was done in The Gut to ensure safe entrance into the bay from the Nantucket Sound. Dredging volumes for other locations were relatively low due to the fact that the Narrows and Dike Bridge Approach are small channels. In terms of species, there is no eelgrass within the project areas, but only in the vicinity of The Gut. Winter Flounder are not found in the Narrows and Dike Bridge region, nor are they able to spawn in the rapidly flowing water of The Gut. Although shellfish are not currently located within the actual dredging locations, the regions dredged are potential habitat for bay scallops, quahogs, and razor clams. The primary reasons for dredging throughout these sites include maintaining safety for the essential shell fishing economy in the area, increasing tidal pond flushing, and continuing connections within the system of water bodies.

Locations within Cape Pogue	Volume Dredged	Depth Dredged (below MLW)	Area over which Dredged	Reason for Dredging (Navigational Importance)	Species within Dredging Location	Specific Precautions for Dredging
The Gut	9,900 yd ³	2.5 ft	135,000 ft ²	-Shell fishing navigational safety -Tidal pond flushing	-Eelgrass in vicinity of Gut -Unlikely for winter flounder to spawn due to high velocity in entrance channel -Within bay scallop and quahog suitability area	-High velocity in gut monitored -No project areas within eelgrass beds
The Narrows	3,100 yd ³	3 ft	48,500 ft ²	Hydro-connection between Poucha Pond and Cape Pogue	-Initial Permitting: winter flounder not impacted -Within razor clam suitability area	No project areas within eelgrass or shellfish beds

Dike Bridge Approach	1,390 yd ³	3 ft	21,000 ft ²	Hydro-connection between Poucha Pond and Cape Pogue	-Initial permitting: winter flounder not impacted	No project areas within eelgrass or shellfish beds
Outer Channel	1,390 yd ³	6 ft	20,000 ft ²	Shell fishing navigational safety	Within bay scallop suitability area	

The Cape Pogue nourishment area for all three nourishment locations is a total of 147,000 ft². Beach nourishment is only permitted to occur between November 1st and March 15th to minimize adverse effects on piping plovers and other endangered bird species. Deposition of sand in these locations is essential to replenish beach sand washed away by storm erosion, to restore dune habitat for endangered species, and to protect coastal homes and roadways from destruction. Cape Pogue nourishment locations, in particular, were provided with sand in 2012 immediately following severe storm damage from Hurricane Sandy.

Particular species that reside in the nourishment locations have been the piping plover, American oystercatcher, and willets. The Narrows and Dike Bridge Approach are not as commonly known to house piping plovers, but are a transitional area for their movements around Cape Pogue. Additionally, sea-beach knotweed is a special concern, it is an endangered, low-growing vegetation species that inhabits the shores annually in Cape Pogue.

The Trustees of Reservations have declared that, for all Cape Pogue nourishment sites, beach nourishment material should be placed above the mean high water line. Silt barriers, required by the Conservation Commission Order of Conditions, were placed in order to protect salt marsh and removed by April 15th. The vegetation which was minimally disturbed by pipe placement, was replanted in coordination with the Conservation Commission.

Location within Cape Pogue	Area Nourished over which Tide Line	Bird/Vegetation Species within Nesting Area	Time of Year Restrictions for Species	Specific Precautions to Protect Species
Cape Pogue Elbow (NSELB) and North Gut (NSNG)	101,000 ft ² above HTL	-Piping plover and American oystercatchers partially for nesting and foraging habitat ₁	November 1 st to March 15 th	-Nesting sites demarcated for laying of pipe ₁ -No nourishment material within 150 ft of nests, within 100 ft of chicks -Work overseen by Trustees qualified monitor
The Narrows (NSN)	25,000 ft ² above MHTL	-Piping plover area to bring chicks to bayside and back ₁	November 1 st to March 15 th	-No nourishment material within 150 ft of

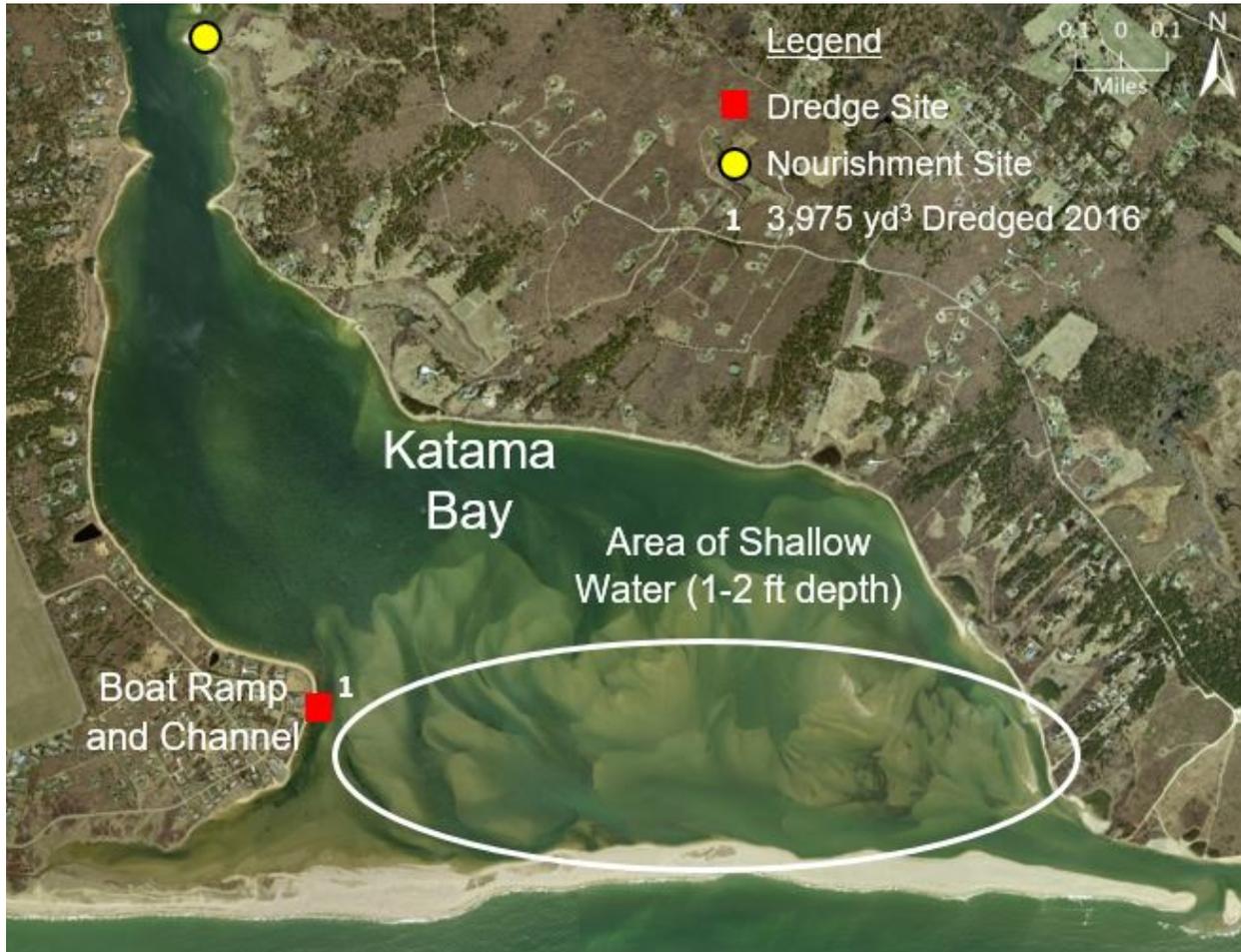
		-American oystercatcher habitat ₁ -Sea beach knotweed in late Summer/early Fall ₁		nests, within 100 ft of chicks -45,000 ft ² of nourishment area at 10:1 slope -Work overseen by qualified Trustees monitor
Dike Bridge (NSDB)	21,000 ft ² above MHTL	-American oystercatcher foraging and chicks ₁ -Willetts chicks -Pair of piping plovers possibly in danger laying of pipe ₁	November 1 st to March 15 th	-No nourishment within 150 ft of nests, within 100 ft of chicks -Efforts not to disturb marsh vegetation

₁Text: Source of Caitlin Borck, Mass Trustees

Edgartown Harbor Region

The Edgartown Harbor region contains three primary water bodies: Katama Bay, Edgartown Harbor and Eel Pond, all of which are contained within the 3,068 acre Katama watershed. These interconnected bodies contain the vast majority of all boat traffic in Edgartown.

Katama Bay



Katama Bay, a 1,695 acre bay, is located on the southern shore of Edgartown bounded to the west by the island of Chappaquiddick and to the south by a barrier beach to the Atlantic Ocean. The northern, well-sheltered region of Katama Bay leads into Edgartown Harbor connecting it to Nantucket sound. Shoaling from tides that run from Edgartown Harbor cause a buildup of sand in the southern region of Katama Bay, a large part of it is now only one to two feet deep. Katama Bay is categorized as Compromised in water quality by the Martha's Vineyard Commission with limited eelgrass, but good circulation and dissolved oxygen levels.

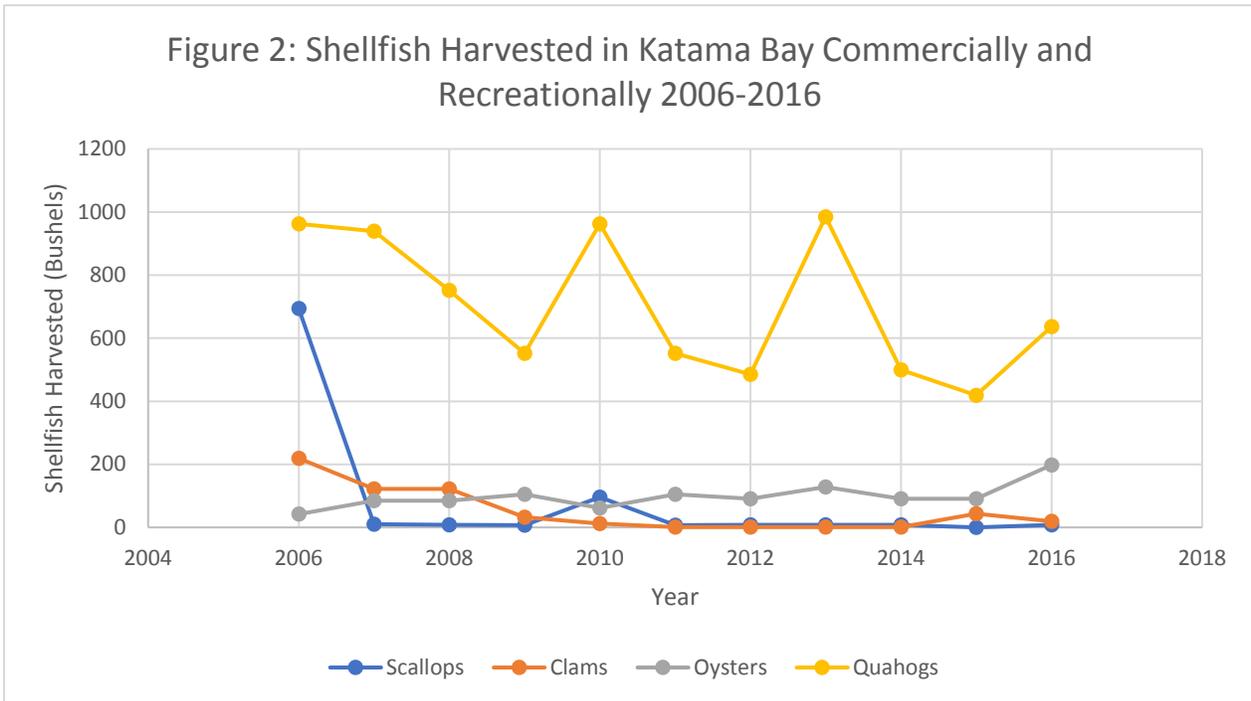
In April of 2007, extreme storm conditions caused a breach in Katama Bay's southern barrier beach, Norton Point, disconnecting Chappaquiddick from the rest of the island. The result was an immediate cleansing of silt and grass buildup, as well as salt water and nutrient circulation for shellfish populations.

The beach was part of a natural cycle and it moved eastward towards Wasque point, ocean water eroding the coast and threatening houses.

The natural breach of Norton Point improved tidal flushing conditions in Katama Bay which are essential to the Bay’s shellfish population. Oyster, Scallops, and Clams experienced a return to water quality equilibrium and harvest numbers flourished. There are over 12 aquaculture farms in Katama, and the worth of Oysters harvested in Katama in 2014 was estimated at \$1.4 million. The shallow waters in the Southern part of the Bay, and the strong tidal flow create a perfect environment for shellfish.

Katama Bay has been dredged around its heavily used town boat ramp and channel in 2006 and again in 2016. Because of the shallow depths in the southern portion of Katama Bay, it has become difficult and dangerous for boats to exit the boat ramp and travel up through Edgartown Harbor or into Katama for shell fishing. Excavating the area around the ramp has improved navigability. Dredging in Katama has also opened up shallower areas, increasing circulation for shellfish.

Figure 2 below displays the commercially and recreationally caught bushels of Katama Bay shellfish from 2006-2016, indicating trends in shellfish population throughout the years. Bay scallops and quahogs are the species in Katama that are of greatest economic importance.



As seen in Figure 2, the Quahog population in Katama Bay has the highest harvests reaching peaks of 900 bushels per year, followed by Oyster harvests reaching almost 200 bushels per year at points. However, scallop harvests, especially after 2006, and clam harvests have not been as successful within Katama Bay.

After dredging the Katama boat ramp and channel in the winter of 2016, the summer shellfish harvest saw a slight upturn in quahogs and oysters. From approximately 90 bushels of oysters caught from 2014-2015, there was an increase to 198 bushels in 2016. Quahog numbers from approximately 450 bushels in 2014-2015 rose to about 630 bushels in 2016. The rise in shellfish harvest can be associated with water quality and circulation benefits that dredging brings about in a water body.

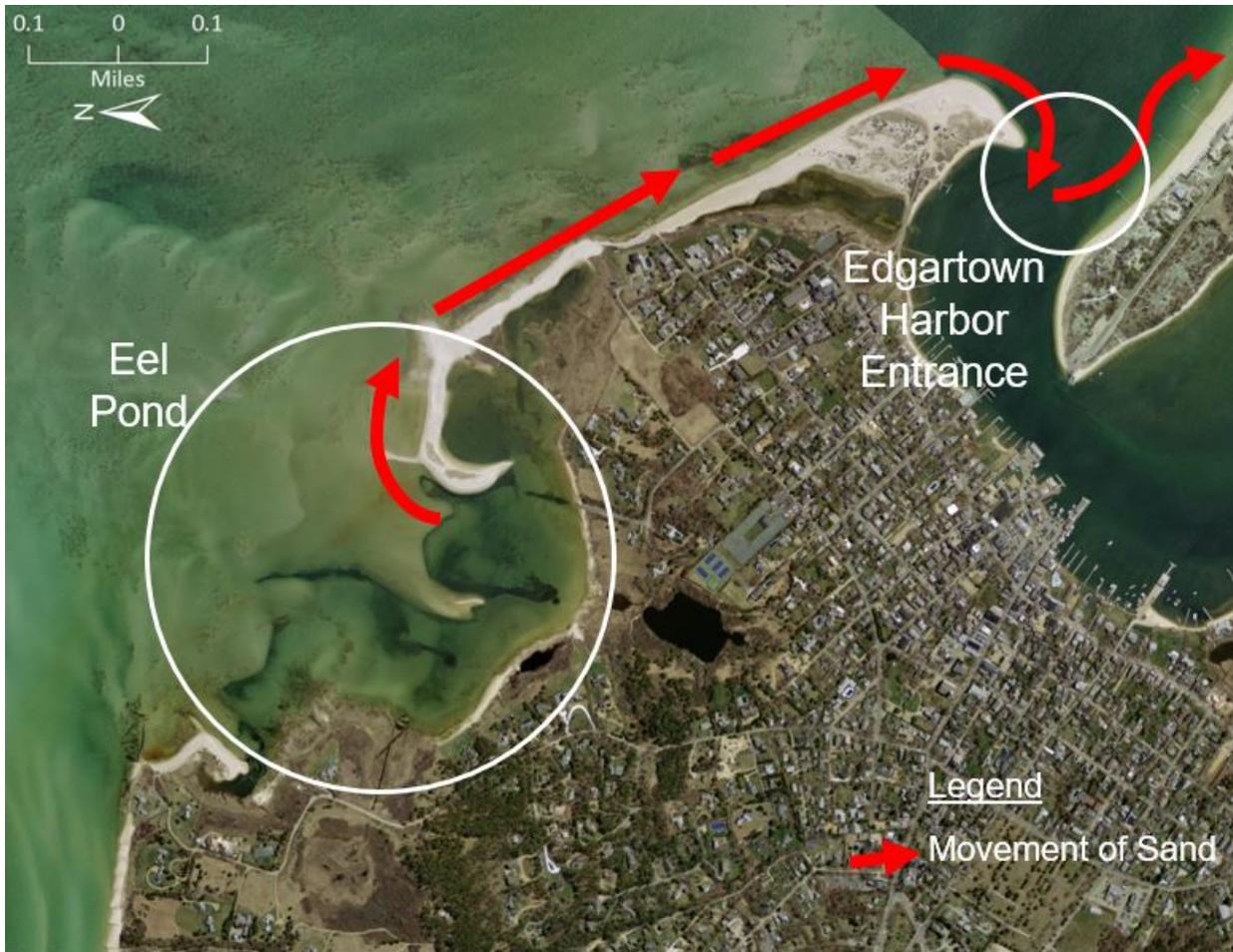
Katama Shellfish Numbers (Bushels)				
Year	Scallops	Clams	Oysters	Quahogs
2006	694	219	42	962
2007	10	122	85	939
2008	8	122	85	752
2009	7	32	105	552
2010	96	12	62	962
2011	7	1	105	552
2012	8	1	91	485
2013	8	1	128	985
2014	8	1	91	499
2015	0	43	91	419
2016	8	19	198	637

Eel Pond/ Edgartown Harbor



Edgartown Harbor is the oldest harbor on the island and experiences the most boat traffic in Edgartown with approximately 1,000 vessels coming in on an average summer day. The Harbormaster manages around 50 transient moorings that handle ships up to 65 feet tall. The Harbor, with its mooring and docking fees, contribute to the economic stability of Edgartown. The scenic and historic nature of the Harbor gives it the name of “village waterfront” within the Edgartown Harbor Plan. Maintaining safe navigability and access to the Harbor is essential to the natural heritage of the Town.

Throughout the past few years, shoaling and the transport of sand around the Edgartown Lighthouse peninsula has caused a depth change from approximately 31 to 17 feet in the entrance channel to Edgartown Harbor, with some areas reaching as low as 15 feet. This has prevented larger boats, including luxury yachts, from entering the harbor. In 2014, the Edgartown dredge excavated 8,400 yd³ from the entrance in an effort to amend the situation. In 2017, the Dredge Advisory Committee began the process of integrating an additional permitted dredging amount for the entrance channel into the 10-year Comprehensive Permit working with CLE Engineering. Surveys and assessment of impact for eelgrass, shellfish, and nesting shorebirds are underway and the Committee anticipates dredging to occur in the next couple of years.

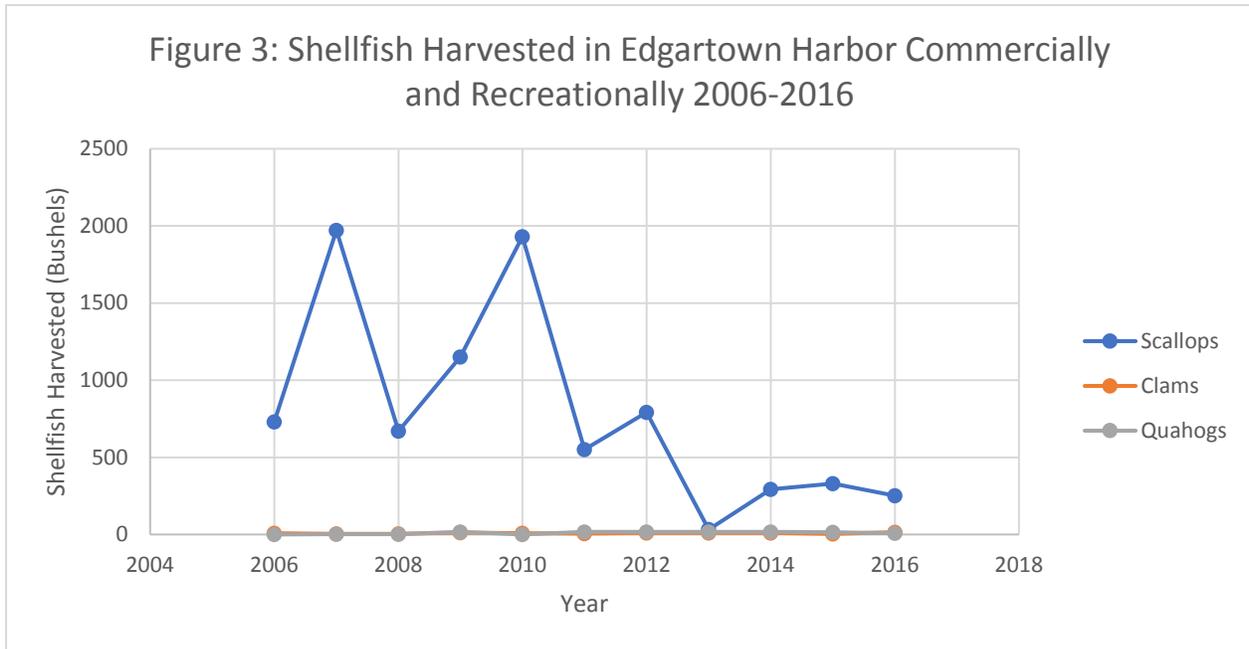


Another embayment within the Edgartown Harbor region is Eel Pond, a small pond with a large opening to the Nantucket Sound, but somewhat sheltered by a thin arm extending from the Edgartown Lighthouse peninsula. This pond has experienced a large buildup of silt, sand, and grasses on the eastern side of the pond, blocking access to many moorings. Sand from the buildup is carried from eastern Eel Pond, around the Edgartown Lighthouse peninsula, and then accumulates in the entrance to Edgartown Harbor. This process of sand movement is illustrated in the map above.

Eel Pond is in close proximity to a location that is in great need of nourishment, Fuller Street Beach. Fuller Street Beach, a target of severe winter storms, is being eroded back to the line between the public and private beach. Failure to restore sand to this beach will result in a priceless loss of Town property and popular public beach. Therefore, approximately 8,400 yd³ were excavated from Lighthouse Point and brought to Fuller Street beach in 2014. In 2016, approximately 4,000 yd³ were pumped through 3,500 feet of pipe to Fuller Street beach. Material has also been brought from Edgartown Great Pond for nourishment, and Fuller Street Beach will continue to erode and require nourishment every couple of years.

Eel Pond has not historically been a location with substantial shellfish populations. However, in 2014, two farming operations set up oyster populations in the middle flats, a quarter of a mile from the interior. The expansion of shellfish operations may be viable in the near future for Eel Pond, especially as a refuge from

Vibrio infections that have occurred in Katama in recent years. Edgartown Harbor, on the other hand, has historically housed large bay scallop populations. Figure 3 below illustrates the trends of the bay scallop harvest in Edgartown Harbor from 2006-2016.



Edgartown Harbor Shellfish Numbers (Bushels)				
Year	Scallops	Clams	Oysters	Quahogs
2006	731	9	0	0
2007	1,972	5	0	2
2008	671	5	0	2
2009	1,150	12	0	17
2010	1,931	9	0	0
2011	550	6	0	17
2012	792	11	0	17
2013	32	11	0	17
2014	292	11	0	17
2015	329	4	0	14
2016	252	15	0	8

As seen in Figure 3, the shellfish in Edgartown Harbor were flourishing in years prior to 2013, averaging harvests at approximately 1,110 bushels and peaking at almost 2,000 bushels. Diminished water quality and decreased salt water flow from the Edgartown Harbor entrance have caused a rapid decline in bay scallop harvests from 2013 to the present.

The total maintenance dredging volume for seven areas of Edgartown Harbor is 44,015 yd³. The primary reason for dredging in these areas is for navigational safety for commercial and recreational boats, especially for shell fishing. The most critical areas that have restrained access are the Katama boat ramp, the Harbor entrance area around Lighthouse Point, and Eel Pond boat ramp. Dredging in these regions

also allows greater access to emergency boats that may often have to respond to a boat fire or injury in this heavily populated area.

Species of shellfish that inhabit or contain potential habitats in these regions are commonly bay scallop, quahogs, and soft-shelled clams. Quahog populations are particularly essential within Katama Bay where peak numbers of approximately 900 bushels have been harvested. Within Edgartown Harbor, profitable bay scallop populations have previously existed in large numbers and populations could potentially rebound. Especially within these locations, precautions are taken not to dredge within shellfish beds and the relocation of beds is a viable option. Eelgrass is present within Eel Pond and sporadically throughout Katama Bay, but no dredging work is done within eelgrass beds.

Locations within Edgartown Harbor	Volume Dredged	Depth Dredged (below MLW)	Area over which Dredged	Reason for dredging (Navigational importance)	Species within Dredging Location	Specific Precautions for Dredging
Eel Pond Channel and Ramp	3,200 yd ³ 800 yd ³	4 feet 2.5 feet	59,000 yd ² 10,000 ft ²	Maintenance	Within quahog and American oyster suitability area	No eelgrass beds in project areas
Lighthouse Point	8,400 yd ³	7 feet	50,990 ft ²	Navigational safety entering Edgartown Harbor	Within bay scallop and quahog suitability areas	No shellfish within project areas
Inner Harbor	8,500 yd ³	6 feet	113,000 ft ²	Navigation in mooring area off Chappaquiddick Point	Within bay scallop and quahog suitability Areas	No shellfish within project areas
Collin's Beach	2,150 yd ³	6 feet		Navigation for commercial and recreational vessels		
Caleb's Pond	8,400 yd ³	4 feet	92,000 ft ²	Navigation for commercial and recreational shellfish	Within bay scallop, quahog, and soft shelled clams suitability areas	No shellfish within project areas
Katama Boat Ramp	9,390 yd ³	5 feet		Maintain area around boat ramp and navigation	Within bay scallop, quahog, and soft shelled clams suitability areas	No shellfish within project areas
Katama Channel	3,975 yd ³	5 feet	50,094 ft ²	Shoaling causes shallow area of 1-2ft depth throughout southern part of Bay	Within bay scallop and quahog suitability areas	No shellfish within projects areas

The total nourishment area for all four nourishment areas in Edgartown Harbor is 320,700 ft². Sand may be placed on beaches for nourishment only between the dates of November 1st and April 1st to maintain compliance with Town of Edgartown restrictions. Deposits of sand from dredging will be used to replenish beaches damaged by storm erosion and will restore habitats for endangered shorebirds.

Endangered avian species most commonly found in these locations are the piping plover, least terns, and common terns as listed species; and the American Oystercatcher as non-listed species. The Eel Pond location and the Norton Point locations have migratory bird species that stop-over for a few months, including the semi-palmated plovers, greater yellow legs, dunlin black-bellied plovers, semi-palmated sandpipers, and various other species. These and the more permanent shorebird species both rely on the undisturbed dune areas for survival.

Various precautionary techniques are utilized in order to ensure that endangered shorebird species are not being negatively impacted. As required by the Conservation Commission Order of Conditions, silt barriers are put up to protect salt marsh habitat from destruction. Specifically on Norton Point beach, Fuller Street beach, and Eel Pond, nourishment material is deposited at a specific 10:1 slope in order to ensure that the dunes are adequate for bird nests. Coordination with the Conservation Commission is also necessary to ensure that pipe placement on the beach does not disturb essential dune vegetation. Dune nourishment, however, in the long-term benefits shorebirds that may otherwise have their nesting areas eroded by storms.

Location within Edgartown Harbor	Volume Nourished	Area Nourished over which Tide Line	Bird/Vegetation Species within Nesting Area	Time of Year Restrictions for Species	Specific Precautions to Protect Species
Eel Pond	1)1,800 yd ³ 2)1,400 yd ³	1) 19,500 ft ² above HTL 2) 9,700 ft ² above HTL	-Sheriff's Meadow within piping plover, least terns, common and roseate terns, black skimmer, and willet habitat ₂ -Migratory birds ₂	November 1 st to April 1 st	-Sheriff's Meadow Beach: 10:1 slope ₂ -Minimize impact of pipes on beach vegetation ₂
Fuller Street (Lighthouse) Beach		1) 74,580 ft ² above MHW 2) 7,420 ft ² below MHW	Within habitat of Piping Plover and American Oystercatcher ₂	November 1 st to April 1 st	-Nourishment above MHW: 10:1 slope
A-D, F (NSA-D,F) (NSE) Within Edgartown Inner Harbor		1) 27,375 ft ² above HTL 2) 8,575 ft ² from MHW-HTL 3) 20,300 ft ² from MLW-MHW	-Sites B-D possible American Oystercatcher ₂ -Sites D, F Osprey ₂	November 1 st to April 1 st	-Nourishment placed landward of MHW of nourishment sites

NSNB Norton Point Beach		153,500 ft ² above HTL	-Piping plovers, least terns, common terns, roseate terns, black skimmers, saltmarsh sparrows ₂ -Migratory species ₂ -Sea-beach knotweed ₂	November 1 st to April 1 st	-Beach slope: 10:1 for shorebird habitat -Minimize impact of pipes on beach vegetation
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Text₂: Information Sourced from MV Biodiversity works Liz Baldwin

Sengekontacket:



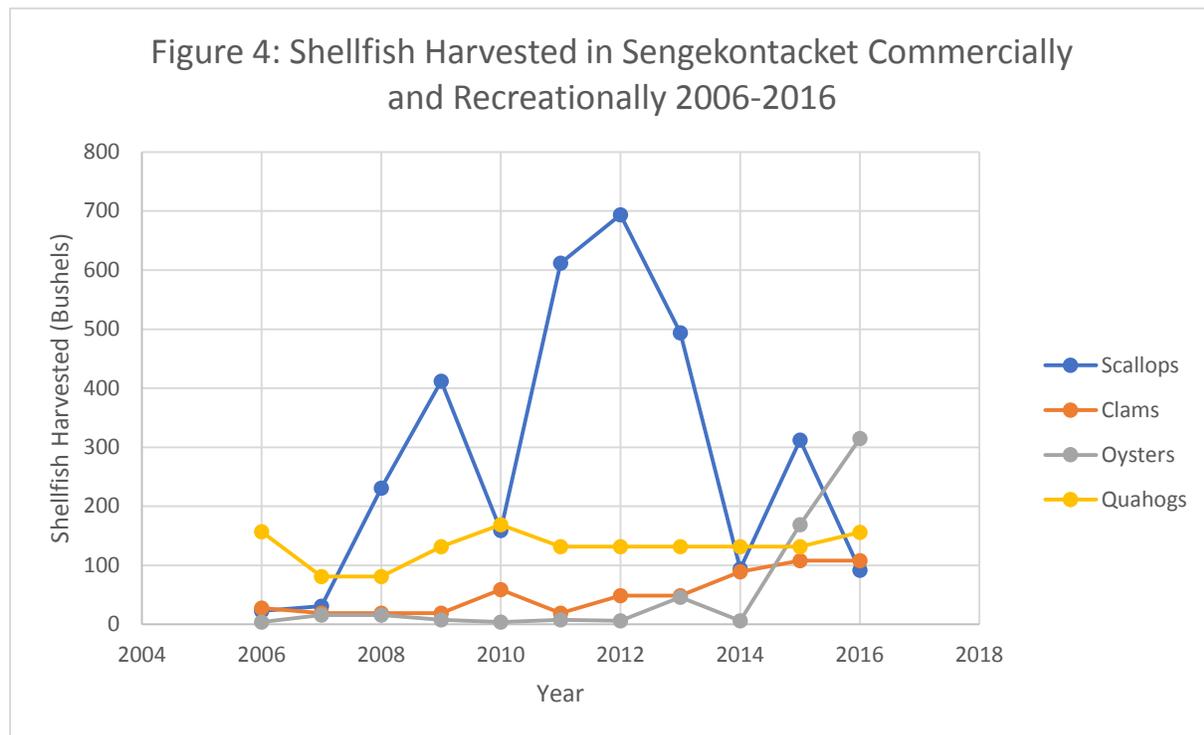
Sengekontacket is a 726-acre pond located directly landward of Joseph Silvia State Beach and Bend in the Road Beach, separated by State Beach Road by an extensive salt marsh and dune system. The eastern side of Sengekontacket belongs to Edgartown while the western side belongs to Oak Bluffs with a small section of its watershed in West Tisbury. The pond contains two inlets to Nantucket Sound, under the first and second bridge, that allow tidal flushing twice per day.

Sengekontacket, with its ideal flats and mean depth of only 3 feet, is ideal for shell fishing and other recreational activities. The Martha’s Vineyard Commission categorizes Sengekontacket Pond as Impaired Water Quality, with declining eelgrass and an expansion of wrack algae. Nitrogen levels are also very high in the inner areas of the pond, primarily in Major’s Cove and Trapp’s Pond.

In 1988, the entirety of Sengekontacket Pond was closed to shell fishing by the Massachusetts Division of Marine Fisheries for high coliform levels within the pond. A multitude of possible reasons for this closure were proposed, but a study in 1989 done by the Woods Hole Oceanographic Institute showed that failed septic systems in coastal homes, fertilizer runoff, and waste from the multitude of birds in the pond together overcame the pond’s ability to flush out contaminants.

Towards the beginning of the Edgartown Dredge Program in 1996, a dredging solution was formulated for Sengekontacket, recognizing that a buildup of sand in Borrow Area 1 and around first bridge (Big Bridge) was inhibiting the flushing ability of the pond. Excavating sand from those areas almost immediately improved circulation in the pond and decreased bacteria counts. To prevent this dangerous accumulation of bacteria and stagnation of the pond from reoccurring, Sengekontacket has become a dredging priority, especially in the project from 2008-2011.

Figure 4 below shows the shellfish caught recreationally and commercially in Sengekontacket from 2006 to 2016. Like Katama Bay, Sengekontacket Pond is one of the only water bodies in Edgartown that is home to bay scallops, soft shelled clams, oysters and quahogs.



As shown in Figure 4, the bay scallop population peaked in 2012, coming in at a whopping 694 bushels, a noteworthy increase from 159 bushels in 2010 and 31 bushels in 2007. This peak was followed by a gradual decline, to 494 bushels in 2013 and 94 bushels in 2014. The oyster harvests are significantly on the rise in recent years, multiplying their numbers nearly seven-fold from 2013 to 2016, from 46 bushels to 315

bushels. Soft shelled clam harvests are also slightly on the rise, but not as sharply as the oyster catches. The average harvest for clams in Sengekontacket averaged about 21 bushels from 2006 to 2009, which increased to an average of about 80 bushels from 2012 to 2016, topping out at 108 bushels in 2015 and 2016. The quahog harvests have maintained steadily, averaging 130 bushels per year for the entire time period.

Sengekontacket Shellfish Numbers (Bushels)				
Year	Scallops	Clams	Oysters	Quahogs
2006	23	28	4	157
2007	31	19	16	81
2008	231	19	16	81
2009	412	19	8	132
2010	159	59	4	169
2011	612	19	8	132
2012	694	49	6	132
2013	494	49	46	132
2014	94	89	6	132
2015	312	108	169	132
2016	92	108	315	156

Throughout the three-year extensive process of dredging Sengekontacket Pond, 67,000 yd³ were dredged from the Borrow Area 1 by second bridge; 57,000 yd³ were dredged from the inside channel on the Oak Bluffs side; and an additional 6,500 yd³ were dredged in the Borrow Area 2 and Little Bridge Outside Channel combined. Oak Bluffs and Edgartown formed their first dredging partnership working towards a goal of improving tidal flow through Sengekontacket’s two openings for the greater health of the pond. Oak Bluffs was singularly responsible for funding the permitting cost for dredging, but received the work itself from the Edgartown dredge pro-bono.

Sand from the dredged areas served a dual purpose of nourishment for the delicate and storm-eroded beaches across from Sengekontacket. Between Silvia State Beach, Cow Bay Beach, and Bend in the Road Beach, a total area of 1.01 million ft² was nourished. Private dunes such as Cow Bay for two reasons, the significant funding of permitting and dredging costs from the Cow Bay Association and the adjacent dune support for Bend in the Road Beach. A shaping idea behind beach nourishment was that the Town beaches could not singularly be nourished and have long term stability without bolstering support from the whole system of beaches.

The total dredging volume of all four areas within Sengekontacket Pond, broken down in the chart below, is 130,500 yd³, the greatest amounts being within Borrow Area #1 and Sengekontacket Channel. Navigational safety for shell fishing access, and the immense number of recreational boaters influence the importance for dredging in Sengekontacket Channel. The dredging of Borrow Area #1 and Little Bridge Outside Channel were the most significant in improving tidal flushing. The high dredging volume in these areas was tied to the great need for nourishment material on the lengthy eroded barrier beaches on the other side of Beach Road.

Location within Sengekontacket	Volume Dredged	Depth Dredged	Area over which Dredged	Reason for Dredging (Navigational Significance)	Species Within Dredging Location	Specific Precautions for Dredging
Borrow Area #1	67,000 yd ³	3 feet	720,000 ft ²	-Nourishment of Cow Bay and Bend in the Road Beach -Horseshoe crab breeding area	-Within bay scallop, quahog, and soft-shelled clam suitability areas	-No dredging within shellfish or eel grass beds -No dredging in horseshoe crab breeding season
Borrow Area #2	2,500 yd ³	3 feet	147,814 ft ²	-Nourishment of Cow Bay and Bend in the Road Beach		
Little Bridge Outside Channel	4,000 yd ³	5 feet	12,000 ft ²	-Increased pond tidal flushing -Beach nourishment	-Within bay scallop and quahog suitability areas	-No dredging within shellfish or eel grass beds, relocation -Silt barrier to protect salt marsh
Sengekontacket Inside Channel	57,000 yd ³	5 feet	832,000 ft ²	-Navigational safety shell fishing -Beach Nourishment -Horseshoe crab breeding area	-Within bay scallop and quahog suitability areas	-No Dredging within shellfish or Eel Grass beds/ Shellfish relocation -No dredging in horseshoe crab breeding season

Potential habitat in many regions of Sengekontacket Pond are primarily well suited to scallops, quahogs, and soft-shelled clams. Horseshoe crabs are also a listed species of concern along the coastline of Sengekontacket Pond, but primarily breed in the months of May and June. The seasonal restriction for Sengekontacket from November 1st-April 1st for endangered shorebirds also avoids disrupting shellfish breeding season.

The total nourishment area for all three locations within the Sengekontacket Pond region, broken down in the chart below, is approximately 728,000 ft². Nourishment slope and design remains consistent throughout all three locations to ensure entire system support. Species within the dune habitats that are nourished include primarily piping plovers, least tern, common tern, and American oystercatchers. Many of these species' habitats have been disrupted by storm surges that wash over the dunes and onto

Beach Road. Therefore, deposition of material in these locations will ensure that species' habitats will remain intact.

Locations within Sengekontacket	Area Nourished over which Tide Line	Bird/Vegetation Species within Nesting Area		Time of Year Restrictions for Species	Specific Precautions to Protect Species
Silvia State Beach (SBNS)	1) 464,749 ft ² above HTL 2) 19,278 ft ² below MTL	-Piping plover, Least tern, common tern, American oystercatcher nesting and foraging areas ₃		November 1 st -April 1 st	-Maintenance of temporary groins placed in 1997 for storm protection -Consistent nourishment design with Bend in the Road beach for longevity -Piping plover nesting sites demarcated
Bend in the Road Beach (BITRNS)	1) 23,957 ft ² above HTL 2) 47,917 ft ² below MHW	-Piping plovers, common tern, least tern nest adjacent to beach ₃ -Potential for future nesting in the area ₃ -American oystercatchers ₃		November 1 st -April 1 st	-Consistent nourishment design with Silvia State for longevity
Cow Bay Dunes (CBNS)	175,113 ft ² above MHW	-Piping plover, least tern, common tern ₃ -Trapp's Pond habitat protected by Cow Bay Dunes ₃	November 1 st -April 1 st	-Consistent nourishment design with Silvia State for longevity -Piping plover nesting sites demarcated	

Text₃: Information sourced from Suzan Belencampi from Felix Neck Reserve

Edgartown Great Pond



Edgartown Great Pond is a 544 to 840-acre embayment on the southern side of the island with a barrier beach separating it from the Atlantic Ocean and many long fingers extending inland. The pond is bordered by many residences, and the Great Pond Foundation was founded in 1998 partnering with the Town of Edgartown to perform water quality monitoring and dredging within the pond. Water quality has fluctuated with the duration of openings in the barrier beach, but the Martha's Vineyard Commission categorizes this pond as impaired water quality with small amounts of eel grass present.

Of Edgartown's major waterways, Edgartown Great Pond is unique in that it is three feet higher than sea level, supplied from an underground reservoir of fresh groundwater. This adds extra considerations for dredging and the opening of the pond. A long pond opening depletes the reservoir of groundwater, which must refill itself before the pond can rise high enough to be opened again. There is a trade-off between the duration of the pond openings and their frequency, there is not enough groundwater to have long pond openings multiple times per year.

Since 2008, the Great Pond Foundation's dredge has done maintenance work within regions like Herring Creek. However, in 2012, after Hurricane Sandy, forceful tides washed over the pond's southern barrier beach and created a tidal delta. The Great Pond Foundation's dredge has a much smaller capacity for dredging volumes, so it was necessary for the Edgartown Town Dredge to remove material built up by the

hurricane. As seen in the map above, a majority of the dredging was done in the Sluiceway approach and the Great Pond Delta and Channel, about 9,800 yd³ in each location, with dredging also in Wilson’s Landing and Herring Creek.

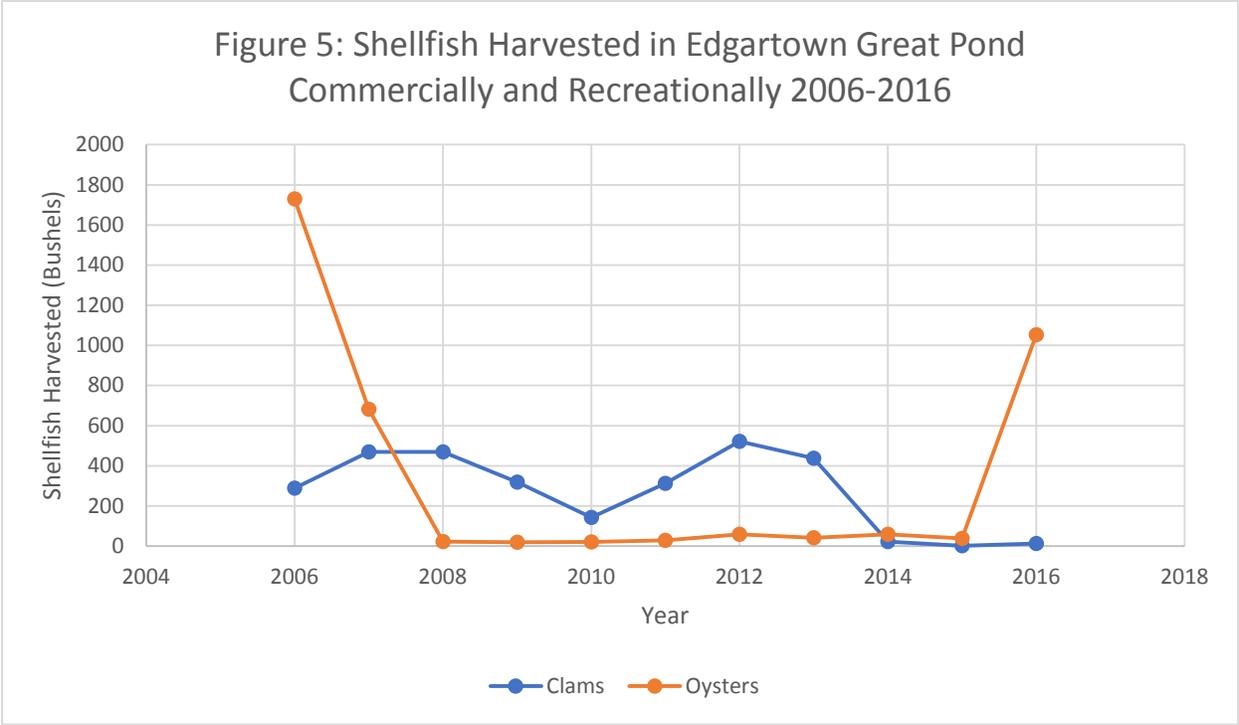
As seen in the chart below, a total volume of 25,900 yd³ of material was excavated from the four areas of Edgartown Great Pond dredged. The dredged material was used for beach nourishment. One of the more essential areas for dredging was the Great Pond Channel, which allowed ocean water to flow into the pond, flushing out silt buildup and increasing the circulation in the pond. The Sluiceway Approach and Herring Creek are fish runs with great historical successes, but have been clogged by vegetation and silt build up throughout past years.

Location Within Edgartown Great Pond	Volume Dredged	Reason for Dredging (Navigational Importance)	Species within Dredging Location	Specific Precautions for Dredging
Great Pond Ramp	500 yd ³	Maintain town owned boat ramp, Wilson’s Landing	Within American oyster and soft shelled clam suitability area	Work done April 1 st -July 31 st with monitoring of shorebirds and consultation with the Conservation Commission
Great Pond Channel	9,800 yd ³	-Create outlet to Atlantic Ocean -Enhance marine fisheries and tidal flushing	Within American oyster and soft shelled clam suitability area	Work done April 1 st -July 31 st with monitoring of shorebirds and consultation with the Conservation Commission
Sluiceway Approach	9,800 yd ³	-Maintain approach to Herring Creek	Within American oyster suitability area	Work done April 1 st -July 31 st with monitoring of shorebirds and consultation with the Conservation Commission
Herring Creek Restoration	5,800 yd ³	-Maintain restored historic anadromous fish way	-Native species: Anadromous fish - Within American oyster and soft shelled clam suitability area	-Nuisance species removed (by hand) -Native species replanted

The total nourishment area for the two locations in Edgartown Great Pond is 223,900 ft². A great majority of nourishment material is placed on South Beach, approximately 212,000 ft². Material placed on South Beach must be compatible with the sand type and can only be taken from certain locations, such as the Sluiceway Approach and Great Pond Channel. Nourishment work can only be done between the months of September 1st and February 28th so as to not disturb endangered shore bird species.

Location within Edgartown Great Pond	Area Nourished over which Tide Line	Bird/Vegetation Species within Nesting Area	Time of Year Restrictions for Species	Specific Precautions to Protect Species
South Beach (SBNS)	1) 85,640 ft ² above HTL 2) 72,143 ft ² from MHW to HTL 3) 55,847 ft ² from MLW to MHW	-Within actual habitat of endangered shorebirds -Nuisance vegetation problematic	September 1 st -February 28 th	-Only permitted compatible material from Sluiceway Approach, Great Pond Channel, and Herring Creek Restoration -Invasive vegetation disposed of upland -Beach slope: 10:1 and no vegetation planting
Great Pond Boat Ramp (Wilson's Landing)	10,270 ft ² above HTL	-Within actual habitat of endangered shorebirds	September 1 st -February 28 th	-Disposal only permitted when pond is low -Beach slope: 10:1

Figure 5 below shows the trends in soft shelled clam and oyster harvests in Edgartown Great Pond from 2006 to 2016. Due to the brackish water, Edgartown Great Pond is not a suitable habitat for saltwater organisms like bay scallops and quahogs.



The oyster population severely declined from 2007 to 2008, with a harvest of 1,729 bushels in 2006 dropping to 681 bushels in 2007 and only 22 in 2008. These numbers remained low from 2009 to 2015, with a slight increase in 2016.

averaging about 37 bushels per year during that time. The oyster harvests in 2016 indicate that the numbers may be reaching their old glory, with a harvest of 1,052 bushels. The clam harvests fluctuated slightly from 2006 to 2013, averaging 370 bushels per year with a significant drop in 2014, of only 22 bushels and an all-time low of two bushels in 2015.

Edgartown Great Pond Shellfish Numbers (Bushels)				
Year	Scallops	Clams	Oysters	Quahogs
2006	0	289	1,729	0
2007	0	470	681	0
2008	0	470	22	0
2009	0	318	19	0
2010	0	143	20	0
2011	0	313	29	0
2012	0	522	59	0
2013	0	438	41	0
2014	0	22	59	0
2015	0	2	38	0
2016	0	12	1,052	0

Permitting

Dredging is one of the most highly regulated activities in Massachusetts. The removal and placement of materials in nearshore and offshore are intensely supervised. There continues to be numerous agencies at all levels of government who have some responsibility for permitting, funding and implementing these projects. Each of the agencies involved have different jurisdictions, both in terms of political boundaries and separate focuses on protecting natural resources that can be impacted by dredging. The permitting process could include the following agencies: Edgartown Conservation Commission, Massachusetts Environmental Policy Act (MEPA), the Massachusetts Department of Environmental Protection (DEP), and its Divisions of Water Pollution Control (WPC), and Wetlands and Waterways (DWW), Massachusetts Coastal Zone Management (MCZM), the U.S. Army Corps of Engineers (COE), the U.S. Environmental Protection Agency (EPA), and a number of other agencies by an advisory role to these agencies. Since the original Dredge Plan was approved by the State, the Martha's Vineyard Commission no longer reviews projects that are part of the accepted municipal plan. Water is subject to a myriad of regulations.

One of the larger issues with the dredge program has been finding permissible dredge sediment disposal areas. This has been a problem particularly from the downtown area out to Katama Bay. Cooperation between Town boards and Commissions is essential to an efficient and effective dredge program.

In general, many of the environmental agencies may be reviewing a project simultaneously. As a general rule, the permitting issuance sequence will start at the local level and proceed through regional, state and federal agencies. Review documents, such as the Notice of Intent, may be submitted simultaneously to several agencies, although the issuance of the permits must be in a specific order (see MCZM Project Review Chart).

A project would require a State permit through the Massachusetts Environmental Policy Act, for instance, if the project would impact ½ acre or more of any wetlands. The Notice of Intent (NOI) would be filed with the local Conservation Commission, who would issue an Order of Conditions. The Martha's Vineyard Commission does not automatically review these projects as a Development of Regional Impact (DRI) because it is a part of the approved Dredge Plan.

No State or local permits or licenses can be issued before the MEPA process is complete. The MEPA process is only an information gathering process that determines the adequacy of information for agencies to evaluate the environmental impacts. When the MEPA certificate declares that the information is complete, then State agencies can begin their review. The Department of Environmental Protection (DEP), Division of Watershed Management Water Quality Certificate (WQC) is the next permit in sequence with the DEP, Wetlands and Waterways Program (WWP). The Ch. 91 Waterways permit follows. It should be noted that the Waterways permit requires notification and response from the local Planning Board, Town Clerk, and Harbormaster. The last approval is the Massachusetts Coastal Zone Management (MCZM) Federal Consistency Review (FCR). This review cannot be completed until all other State approvals have been acquired.

Once the State approvals are in place, the Federal permits can be issued. The United States Army Corps of Engineers (COE), is the primary agency with Section 10, Section 404, and Section 103 permits. The COE regulates projects in Massachusetts under a Programmatic General Permit and an Individual Permit process. The COE reviews projects jointly with the U.S. Environmental Protection Agency (EPA), the U.S.

Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS). The EPA has veto power over Section 103 permits.

Timeframes for permitting are subject to changes based on the complexity of the project and conditions discovered during the assessment and review process. With a straight-forward project, the local process is estimated to take 45 days, the State process approximately six to eight months, and the Federal process two months. These periods do not include time for preparing submittals. And while the MCZM estimates six to eight months for a non-controversial project, one to two years is a more realistic period for town planning purposes for any project of magnitude.

LIST OF REQUIRED PERMITS

- A. Local
 - a. Conservation Commission (Includes local Wetlands By-Law)
 - i. Application Form: Notice of Intent
 - ii. Permit: Order of Conditions, valid for 3 years can be extended to 5. If requested for maintenance dredging, can be valid for 10 years.
 - iii. Statute: M.G.L. C.131 S.40
 - iv. Regulation: 310 CMR 10
- B. Regional
 - a. Martha's Vineyard Commission - possible
 - i. Application Form: Notice of Intent
 - ii. Permit: Development of Regional Impact
 - iii. Statute: Enabling Legislation Ch.831
- C. State
 - 1. Massachusetts Department of Environmental Protection
 - a. Division of Water Pollution Control, WQC (maintenance and new)
 - i. Application Form: Standard Application
 - ii. Permit: Water Quality Certificate
 - iii. Statute: M.G.L. Ch.21 S.26-53
 - iv. Regulations: 314 CMR 9.00; 33 United States Codes 1341 S.401
 - b. Waterways Regulation Project, Ch.91 permit (maintenance for 10 years)
 - i. Application Form: Standard Application
 - ii. Permit: Chapter 91 Waterways Permit
 - iii. Statute: M.G.L. Ch.91
 - iv. Regulations: 310 CMR 9.00
 - 2. Mass Environmental Policy Act (MEPA)
 - a. Thresholds: if greater than 10,000 cubic yards of dredged material, requires an Environmental Notification Form (ENF); if greater than 10 acres of resource area impacted, requires an Environmental Impact Statement.
 - i. Application Form: Environmental Notification Form; Environmental Impact Statement
 - ii. Permit: Certificate of the Secretary of the Executive Office of Environmental Affairs
 - iii. Statute: M.G.L. Ch.30 S.61-62H
 - iv. Regulations: 301 CMR 11.00

3. Mass Coastal Zone Management (MCZM), Federal Consistency Review (FCR)
 - a. Regulatory policies impacted; non-regulatory policies
 - i. Application Form: Consistency Certificate and Federal Permit Application
 - ii. Permit: Federal Consistency Concurrence
 - iii. Statute: CZMA, 1972 76, 90; MCZMA, 1978
 - iv. Regulations: 301 CMR 21.00; 301 CMR 20.00; 15 CFR Part 930
4. Natural Heritage and Endangered Species Program (as part of WPA process)
5. Mass Historical Commission (as part of WPA process)

D. Federal

- a. U.S. Army Corps of Engineers (COE)
 - i. Application Form: Notice of Intent (same as Wetlands Protection Act), or standard application
 - ii. Permit: Section 10; Section 404 fill; Section 103 transport; Programmatic General Permit Process (PGP)

Under the PGP, the project is classified as: non-reporting, screening or individual permit. If the project requires an individual permit, a joint review will be conducted by the ACOE, USEPA, NMFS, and USF&W. The Corps considers the other agencies' comments in its decision.

- iii. Statute: Rivers and Harbors Act; Clean Water Act of 1977; Marine Sanctuaries Act
- iv. Regulations: 33 CFR Parts 320-330

Testing (Sampling) Requirements

State

- a. Agency: DEP, Division of Water Pollution Control (Classification of Materials and approvable dredging, handling and disposal options are contained in 314 CMR 9.03. See attachments)
 - i. Grain Size Analysis: A complete grain size analysis of the dredge material is required. A single pooled representative analysis will be analyzed initially. Based on project specifics, further sampling may be required.
 - ii. Chemical Analysis of Sediment: A complete bulk analysis of the dredge material is required. A singled pooled representative sample will be analyzed initially. Based on the specifics of the project, more samples and analysis may be required.
 - iii. Supplemental Information may be required, including additional chemical sampling and clinical analysis.
 - iv. Special Requirements for Dredge Material to be Reused or Disposed at Landfills (see Interim Policy #Comm-94-007)
 1. Sampling analysis and frequency include: 1 core sample for each 1,000 cubic yards; minimum of 2 cores in all cases; up to 3 cores may be composited for analysis, but a minimum of two analytical data sets must be presented representing the sediment volume to be dredged.

2. Sediment analysis for reuse or disposal at landfills: sediment conductivity test for reuse at unlined landfills (ATSM g-57, see attachment).

Federal

Borings and sediment sampling and testing must be consistent with ACOE/EPA February 1991 publication, Evaluation of Dredged Material Proposed for Ocean Disposal, and the ACOE/EPA Regional Protocols for Performing Tests on Dredged Material to be Disposed of in Open Waters, effective May 15, 1989.

3. Three Tier evaluation System
 - a. Tier I is to review historical data and determine if there are likely contaminants of concern.
 - b. Tier II is chemical evaluation. Tier II evaluation is often used to determine the necessity of Tier III evaluations.
 - c. Tier III evaluation is biological evaluation. Many projects are now being required to do a Tier III evaluation, particularly for ocean disposal.

New Dredge Purchased and In Use

The maintenance costs for the old dredge, compounded with the operating and permitting costs, were becoming too exorbitant to be considered the best use of taxpayer money. The old dredge was needing so many repairs that it began to limit the productivity of the already restricted dredge season. The Committee also concluded that a new dredge would be more environmentally friendly and safer for the crew to use.

Specific equipment failures were limiting the use of the old dredge. The sand and water that go through the dredge were corroding the pipe, which generally needs to be replaced every three to five years, based on the volume dredged. The pipe has a 12-inch diameter and costs about \$12 to 15 per foot to replace. The pipe is thousands of feet long, and those costs add up. The replacement costs needed to be staggered year by year to not take on the full cost all at once. There are no year-round employees on island able to perform the necessary maintenance work during the dredging off-season, which forced the Committee to fit the dredging repairs into the end of September. This timing is not ideal, because it lies during the first part of the dredge season, but allowed the Committee to be able to have the dredge ready for the bulk of the work that could be performed later during the narrow dredge window.

In 2007, the engine in the dredge itself was submerged under saltwater, and needed to be replaced. The dredge itself could not stay afloat, which was a huge issue.

In 2010, there were many equipment delays and the required repairs shortened the season significantly. The gear box seized, and caused a back-up of several weeks.

In 2013, significant repairs were needed on the dredge hull. The entire hull was sandblasted, the steel was replaced, and the metal barrier was painted. The work on the hull was approximately a two week delay, but was able to be completed on island by Ralph Packer.

In 2014, when the dredge was operating for its 20th season, the equipment was evaluated and the necessary repairs were beginning to not make economic sense. With a 10-year permit in place, the budget did not need to account for permitting costs, which freed up money to purchase a new dredge. The Dredge Committee began to work with Capital Programs to begin the process of purchasing a new dredge, and completed a preliminary application in 2015.

In 2016, serious planning work began for a new dredge by the 2018-2019 dredging season. It was officially determined that the cost to repair the old dredge were greater in value than purchasing a new one, and the Dredge Committee began to look into sellers.

In April 2017, at the Edgartown Annual Town Meeting, a vote was placed to allocate \$600,000 of the Town budget for the purchase of a new dredge.

The Dredge Committee decided on a process of selecting a bidder and the model of the new dredge. The most important criteria for selecting a new dredge were its approximate size of 12 feet long by 36 feet wide; a dredging depth capacity of 20 feet; a minimum suction inlet diameter of 12-inches, and a minimum discharge diameter of 10-inches. Members of the Dredge Committee heard bidding presentations from each bidder, conducted site visits to see the dredges in person (both before purchase and before delivery). Any variations from the dredging specifications were met with an explanation with specific reasoning.

There were three primary vendors for the bid: Ellicott Dredge with a Model Ellicott 370, DSC Dredge with a refurbished Shark Class Dredge, and Custom Dredgeworks.

After deliberations, it was decided that the Ellicott Series 370 Dredge was the best fit for Edgartown because of the small, portable cutter head; the dredge is easily portable by truck; and the maintenance and training of operations are simple. It was also the most suitable for small navigational projects, like canals and inland waterways. The final specifications are shown below.

Specifications for Dredge versus Ellicott Series 370 Dredge

Aspect of Dredge	Committee Specification	Ellicott Series 370 Dredge	Approximate Cost
Pumping System Range		-Up to 225 yd ³ /hr. -Rate per 500M of pipeline: 175 m ³ /hr	
Length Overall		57.5'	
Hull Sections	One center tank, Two side tanks	Two side tanks	
Hull Length	36'	36'	
Hull Width	12'	12'	
Maximum Dredge Depth	20'	20' at 60 degree inclination 15' at 40 degree inclination	
Minimum Dredge Depth		3'	
Channel Width with maximum 40 degree swing		Min digging depth: 73' Max digging depth: 60'	
Main Hull end, bottom, sides, deck plates thickness	¼"	¼"	
Hull Material		-One-piece welded steel, ABS River Standards -Built in fuel oil and ballast tanks	Hull Zinc installation: \$1,667
Height Overall		10' 7"	
Dry Weight		28 U.S. tons	
Draft		To spud point: 3.58 ft Molded (max): 2.67 ft	
Fuel Tanks	800 gal. capacity	800 gal. capacity	
Anodes	Zinc with bolt-on connections		
Rope Cleats	16"		
Cab Size	7' X 5' X6'6"		

Lever Room	Welded with 4 sides/lockable doors, Air conditioned	Removable welded steel room Plexi glass windows and lockable door Control Panel with fingertip levers for operations, Air conditioned	Air condition-er: \$10,000
Water pump	Centrifugal driven off main pump engine		
Main Engine	Caterpillar Marine with -24 volt electric starters -105 amp alternator -220 amp-hr batteries	Caterpillar C-15 440 HP -24 volt D.C. electric starter -60 amp alternator -220 am-hr batteries -Throttle control lever room -Marine Power Display (MPD) engine operating data	
Dredge Pump	Suction 12", Discharge 10"	-Ellicott Series 400 Pump -Suction 12", Discharge 10" -500 BHN Alloy Cast Iron chrome alloy -Steel Side Heads -V-belt driven, anti-friction bearings	10" flap valve assembly: \$7,667 10" discharge hose assembly: \$5,833
Production Equipment	-Flow Meter in lever room monitoring dredged material	Lever room contains dredge pump vacuum and discharge gauge	
Swing Winches	-Two independent, reversible, hydraulically driven -Two 200' X 1/2" swing wires	-Two independent, reversible -8,000 lb line pull, 75 ft/min -Two 200' X 1/2" swing wires -Drum capacity: 200 ft -Gear type hydraulic motor -Enclosed planetary gearing with anti-friction bearings	Outfitting kit swing wires: \$667
Dredge Ladder	-Structural steel -Abrasion resistant pipe	-Structural steel, bolted on suction pipe -Mounted to eliminate dragging -23 ft. long from trunnion pin to cutter end -Heavy duty trunnions with removable pins in hull ladder -Spline connected to planetary reduction gear	
Anchors	Two 150 lb. Danforth type or equal	150 lb. anchors	Anchor: \$500, \$1000 ext.

Cutter Head	-Submerged Hydraulic with variable speed 0-35RPM and 40 HP by engine -Toothed with replaceable teeth	-Hydraulic with variable 0-39 RPM and 40 HP -Diameter 31.5 in and force: 4000lbs -6 blade cast steel plain edge cutter with keyed and tapered shaft connection -Alloy steel, watertight cutter shaft -Sheave blocks for ½ in diameter rope	31.5 Six blade cutters: -plain edge: \$5,833 -Pin tooth: \$4,500
Ladder Hoist	-Double Acting Hydraulic cylinder -Single lever control and independent winch operating system	-Double acting hydraulic cylinder; Ram cylinder for crowding action -Single lever control	
Spuds	-Two, tubular steel capped with lifting eye -Length 10' greater than digging depth: 30'	-Two Tubular steel, mounted in stern, cap with lifting lug on upper end -Length: 29 ft 1 ½ in -12 ¾ in O.D. X 0.562 in minimum -Cross tubes for stowage of cross pins -Stowage saddles on spuds for main deck	
Spud gates and hoist	-Hinged for easy spud removal -Two spud collars for hoist slings	-Spud mounted in spud keepers at stern -Vertical hydraulic cylinder and choker slings for hoisting - ½ in. Wire rope and lubricated sheaves	
Hydraulic System	-Biodegradable hydraulic fluid for running -Functions for cutter head motor, ladder hoist, swing winches, spud carriage, spud hoist: single-lever	-Triple Section Hydraulic Gear Pump -Three independent operating circuits: swing winch, cutter, spud, ladder hoist -Relief valves for protection -230 gal reservoir with level and temperature gauge	
Dredge Piping	-Suction side 14 in ID X 3/8in wall ANSI 150lb flange at discharge -Corrosion resistant: all water piping	-Suction side 12 in ID X 3/16 in wall abrasion resistant suction pipe bolted in ladder -Flanged rubber suction hose for full vacuum service -Flanged suction cleanout trap	
Dredge Lifting Rig			\$5,667
Lighting	-LED Powered lights -Diesel engine batteries (min 1000 lumens)	-24 Volt D.C. internal/electrical lighting -Powered by main engine	

		-Floodlights for forward and aft end, Dome light in lever room	
Safety Equipment	-Deck handrail - 2000 gal bilge pumps for dredge pump room	-Deck handrail -Life vests (3) -Life rings -A.B.C. fire extinguishers -Automatic bilge pump system (24 V.D.C)	Portable bilge and fire pump with hoses: \$2,362
Spare Parts List	-Main pump casing -Main pump impeller -Front head liner -Back head liner -Main pump shaft wearing sleeve -Lantern ring -Service water pump assembly -Spare cutter head work ready	-Pump Alloy Cast iron parts: case, impeller, and head liners -Replaceable 316 stainless steel shaft sleeve for fresh/sea water service	
Auxiliary Equipment	Deck crane for pump parts and assembly Impellor lifting hook		



New Dredge on launch day

Dredging For and In Other Towns

The Dredge Committee also researched other island town Dredge Programs. Chilmark had issues with J-Way Dredging in 2016. They were hired to dredge an 8-foot deep, 80 foot wide channel from the Harbor entrance jetties past the west basin, and Red Nun past Picnic Point to Menemsha Pond. Menemsha Pond was designated a “Harbor Refuge” in 1945 for boats during storms, but was not safe to navigate at the time. In 2016, the \$2.2 million project came to a halt for the second time in two years. J-Way had failed to meet the permitting deadline and the U.S. Army Corps shut down the project. The DMF claimed disruption to the winter flounder species. The contract was terminated in 2016 and renewed for 2017. After two years of dredging, only 16,000 cubic yards were dredged out of the 45,000 cubic yards that were needed for maintenance. There were also other issues with the project. The 1.5-mile pipeline running through Lobsterville Road was obstructing traffic and causing damage to the parking areas, and sand was accumulating in the Bay during the nine-month delay. J-Way received allowances to park heavy machinery on the beach and in the parking lots, but that allowance expired in September of 2016, and the equipment needed to be removed before the project was finished.

In Tisbury, Barnstable Dredge was hired to dredge the entrance to Tashmoo, where sand was pumped from the far end of the jetty up to the Chop to improve pond flushing and resolve circulation issues. The distance needed to transport the dredge and associated equipment was expensive. This year, the Tisbury Board of Selectmen asked to hire Edgartown to perform the dredging work. Over a 10-year span, the proposal includes dredging 25,000 cubic yards of material over 5.1 acres for maintenance. 3,120 cubic yards will be transported to an up-island location for disposal. Tisbury will also need 500 cubic yards of material at the town landing.

In Oak Bluffs, the Edgartown town dredge was selected as the final bidder for dredging Sengekontacket Pond. The other bids were substantially more expensive. There was the same per-cubic yard price, but much higher up-front costs for dredge delivery. There were other benefits for this inter-Town partnership, where Oak Bluffs only had to pay for the permitting of the project. The work to be done was paid for by the Cow Bay Neighborhood Association, which allowed Edgartown to refund the cost to Oak Bluffs; and was able to provide the sand for the Inkwel Beach nourishment project at no cost.

The conclusions determined by the Edgartown Dredge Committee were that off-island companies out to bid are known to have delays in completing the work. Dredging in-house allows for more control over the timeline of work, and awareness of building in weather delays, and less costs for transport. It is also much more cost effective to foster these inter-town partnerships and allows for more continuous long-term dredging.

Which locations were most heavily dredged since the 2007 plan update

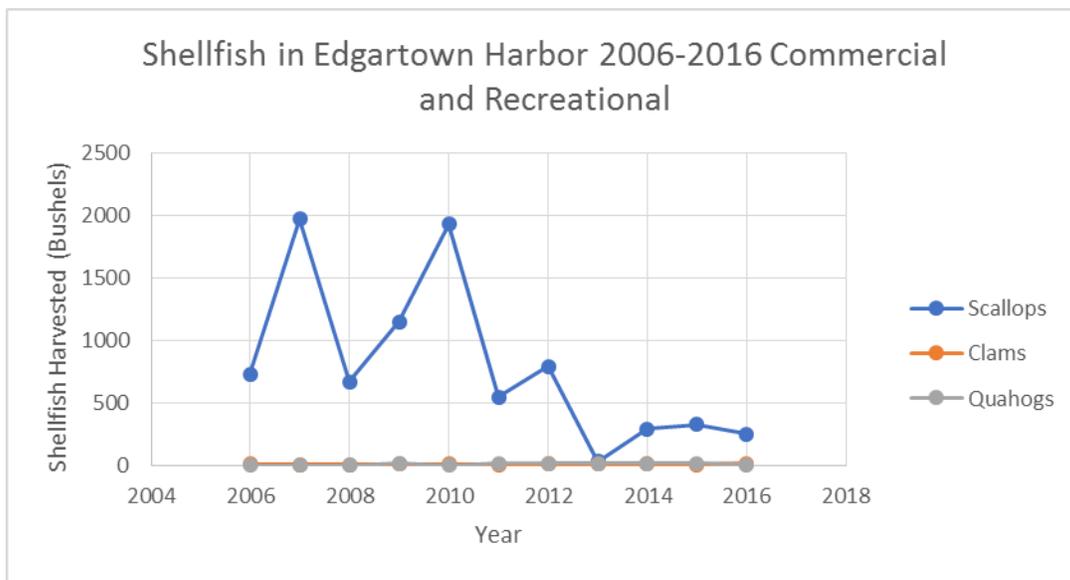
The Dredge Committee ordinarily tries to achieve two locations per year. Eel pond (dredging in 2013, 2014 and 2015) was dredged the most heavily during those three years. Its proximity to Fuller Street beach is helpful because the crew can pump the dredged material

Katama Pond (2016) has seen most of the dredging. Dredged material trucked from there to Bend in the Road beach addresses problems with too much sand buildup in Katama beaches, and the selling of the sand assuaged issue. Sengekontacket Pond has also been heavily dredged in recent years. The dredging in both Katama and Sengekontacket have had real benefits to the shellfish population.

Future Issues

Dredging in Edgartown Harbor

There has been attention given to increased dredging in Edgartown Harbor. The entrance to the Harbor has gone from 31 to 17 feet deep in the past few years. This prevents the entrance of larger boats. In addition, many citizens want their private docks dredged. There is an issue of scale in Edgartown Harbor, with the current dredge viewed as too large to fit in the Harbor, so the smaller dredge owned by the Edgartown Great Pond Foundation would need to be borrowed. The possible dredging of the Harbor entrance has potential to increase circulation in the harbor and increase the bay scallop population. The Edgartown Harbor contained an average bay scallop harvest of 1,291 bushels per year in years 2006 to 2010. In 2011, average bay scallop harvests fell to about a quarter or the previous harvests with averages totaling 374 bushels per year.



There were formally a series of groins that controlled the flow of sand through the harbor entrances. This should be completed again.

Addition of Borrow Areas

There has been discussion of permitting additional areas for the mining of sand for beach nourishment. These may be harder to permit, as the State does not currently permit dredging for the sole reason of beach nourishment, only for navigation. However, there are growing calls for such a nourishment practice. There are locations desired in Katama and Edgartown Great Pond for borrowing.

The Town should Continue to Focus on Nourishment of Silvia State Beach, Bend in the Road Beach, Cow Bay Beach and Fuller Street Beach

The Town should focus on the coastlines. The worst of the winter storm erosion in Edgartown is experienced on State Beach and Lighthouse Beach. Rising sea levels will only exacerbate the problem. The Town should also concentrate of Silvia State Beach, Bend in the Road Beach, and Cow Bay Beach because they are all part of the same system. This is an all-encompassing approach. Support for the beach is only effective on the entire coast, not just one area.

The loss of Fuller Street Beach would be incalculable. Erosion pushes the beach back to the public/private line.

(Map of public/private line to come)

Revise Regulatory Restrictions on Dredging

There has been commentary that the current regulatory time frame for dredging has become outdated. For example, Winter Flounder and Herring no longer nest in Eel Pond because the water has become too warm, yet restrictions remain in place. The regulations are too general, not based on specific species in each pond, but rather based on a cumulative region.

The regulations and dredging time frame should be established by location and not one Town standard. Some locations may be able to be dredged for longer into the season than others.

Develop Regular Procedures and Process for Working with Other Towns

With the purchase and operation of a new dredge, the Town has the ability to complete projects for other towns on the island. Goals and procedures should be developed so that each project proceeds through a defined process. This process should include the development of a policy on the logistics of moving sand, specifically trucking to where it will be stored, as spoil is not allowed to sit on most beaches for extended periods of time. Attention should also be paid to the development of qualified crew members. The need for personnel who are licensed to operate the dredge safely, and who can work when needed is paramount to a successful operation.