

United States Department of the Interior
National Park Service

National Register of Historic Places Multiple Property Documentation Form



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This form is for use in documenting multiple property groups relating to one or several historic contexts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. For additional space use continuation sheets (Form 10-900a). Type all entries.

☒ New Submission ☐ Amended Submission

A. Name of Multiple Property Listing

Granite Vessel Shipwrecks in the Stellwagen Bank National Marine Sanctuary

B. Associated Historic Contexts

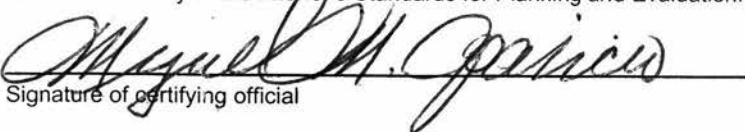
(Name each associated historic context, identifying them, geographical area, and chronological period for each.)

C. Form Prepared by

name/title Deborah Marx and Matthew Lawrence, Maritime Archaeologists
organization NOAA/Stellwagen Bank National Marine Sanctuary date 2 January 2012
street & number 175 Edward Foster Road telephone 781-545-8026
city or town Scituate state MA zip code 02066

D. Certification

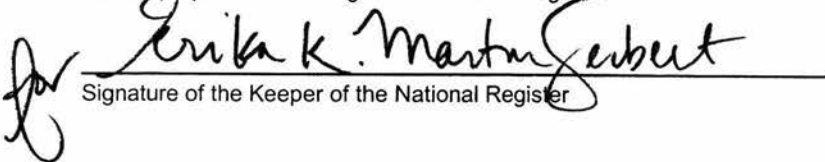
As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR Part 60 and the Secretary of the Interior's Standards for Planning and Evaluation.


Signature of certifying official

1/12/2012 See continuation sheet
Date

NOAA/National Oceanic and Atmospheric Administration
State or Federal agency and bureau

I, hereby, certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.


Signature of the Keeper of the National Register

3/7/12
Date

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Provide the following information on continuation sheets. Cite the letter and the title before each section of the narrative. Assign page numbers according to the instructions for continuation sheets in How to Complete the Multiple Property Documentation Form (National Register Bulletin 16B). Fill in page numbers for each section in the space below.

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Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

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E. STATEMENT OF HISTORIC CONTEXTS

New England's topography and geology made it ideally suited for granite quarrying. The area's intense and relatively recent glaciation caused the granite bedrock to be exposed or very close to the surface making it easy to locate and extract at coastal locations from Maine to Massachusetts. Few other places in the United States have such a variety of readily available granitic rock. Prior to the development of land based transportation network, the proximity of New England's granite to tidewater made the industry an economic possibility. During the nineteenth century, the area's leading quarries were all located along the coastline providing water access to Atlantic Seaboard markets a great distance away. Rich (1892:744) said, "This proximity to the coast has done two things for the quarry-owners of eastern New England. It has made granite a possibility as a building stone. This it has done by affording cheap transportation to the leading building centers. Then, having made a market for the stone, it has given these owners the permanent advantage over many of their rivals of water shipping rates." Granite quarrying efforts in New England can be grouped into three localities. The first includes coastal Gulf of Maine quarries from Eastport, Maine to Quincy, Massachusetts with concentrations of effort near Penobscot Bay, Cape Ann, and Quincy. The second locality includes quarries in Rhode Island and along Long Island Sound. The third locality includes quarries in central Maine, New Hampshire, Vermont, and western Connecticut.

Generally, quarries produced five classes of granite products: 1) constructional or cut stone used for bridges, docks, retaining walls, buildings, or monument bases; 2) statuary stone used for statues and delicate monument or ornamental work; 3) inscriptional stone used for inscribed dies and tablets; 4) curbing stone used for curbstones, sidewalks, and cross walks; 5) paving stone used for exclusively for paving blocks. Many quarries specialized in a particular granite product based on a particular quarry's location, size, complexity, stone color, or labor force. For example, not all quarry operations could cut and finish material for monumental work or handle the volume of material needed to fill large or complex contracts. All of the different granite product classes were produced by Gulf of Maine coastal quarries and moved by water to its destination.

This National Register of Historic Places Multiple Property Submission for granite vessel shipwrecks in the Stellwagen Bank National Marine Sanctuary will concentrate on the coastal Gulf of Maine quarries. These quarries used waterborne transportation as the primary method of moving granite from the quarries. Vessels carrying granite from Gulf of Maine quarries are most likely those now represented by shipwrecks on the seafloor of the Stellwagen Bank National Marine Sanctuary.

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Granite's Early Use in New England (1630-1750)

When the first colonists arrived in Boston, Massachusetts in 1630 they found a large supply of granite boulders lying exposed on the surface. These early colonists recognized granite's strength, durability, and availability and set about using the stone for building foundations. Conveniently located boulders were used whole or broken into the desired shapes and size as needed. Boston's citizens gradually increased their use of brick and granite in building construction the 1600s. Large fires, in particular the 1679 blaze on Boston's waterfront that destroyed many wooden clapboard structures and caused a million dollars of damage, emphasized the need for stone construction amongst closely spaced building. Just south of Boston in Braintree, Massachusetts, the residents also began to scavenge surficial boulders at such a rate that town officials feared that there would not be enough available stone in the surrounding community to build a common stone wall. Laws passed in 1715 and again in 1730 outlawed the removal of stone from common or undivided land without permission from the town's officials (Brayley 1913:13). The need for commercial quarrying was evident to supply materials for the area's growing towns.

First Commercial Quarries in Quincy, Braintree, and Lowell (1750-1840)

The origins of New England's granite quarrying industry can be traced to Quincy, Massachusetts, a suburb 10 miles south of Boston. In the mid-eighteenth century, German immigrants who had settled in Quincy introduced better methods to hammer and work granite. Prior to this time, granite boulders were simply dug out of the ground, heated, and then split by smashing them with an iron ball. The fragments were then hammered into the desired shape. Another early method was to dig out an area under a large boulder and light a fire under it until it was fragile enough to be broken apart with sledge hammers. Both of these methods were very labor intensive and yielded inconsistent results. Stones were rarely moved far from their original location. These were the methods used to obtain granite for the construction of Kings Chapel in Boston, the first large building constructed of Quincy granite and one of the first examples of granite being transported from its original location to a work site. Construction on the chapel began in 1749 and was completed in 1754. Visitors flocked to see the granite chapel and were convinced that more granite buildings should be built. Rather than using the somewhat random heating and smashing process on boulders, the German immigrants focused their attention on the area's exposed granite ledges. Using gunpowder, the early quarry men broke off large segments of the ledge and then reduced it into angular chunks by carving a groove along a desired axis of fragmentation. The stone was then struck on either side of this groove with heavy hammers, with the intent of breaking the granite along the groove. This technique yielded straighter and smoother pieces, but was still very labor intensive. Granite quarrying techniques were vastly improved at the end of the eighteenth century with the adoption of a new technique to split granite. Conflicting accounts attribute the

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development of the feather and wedge splitting technique to different individuals; however, Quincy was again at the forefront. Quarrymen using this technique carved short narrow slots along their desired cutting access. Steel wedges were driven into the slot between thin iron shims or feathers. Following the turn of the century, Quincy stone cutters greatly increased their output and lowered their rates by drilling a series of round holes (as opposed to thin slots) six inches apart in a piece of granite ledge and then using a series of wedges and feathers to split the rock along the drill holes. Remarkably angular and uniform pieces were produced with this method (Brayley 1913: 17-19; Granite Railway Co. 1913:10).

In 1800, several businessmen opened quarries in Braintree, West Quincy, Quincy Adams, and Quincy and established the first stone business in the region. At first, demand for large building stones was low due the high labor cost and difficulty in delivering the stone to the work site so the quarries concentrated on small underpinnings and doorsteps. As more laborers became skilled stone cutters, the output increased and price dropped dramatically. Local and federal government contracts for more buildings in Boston drove demand for quarried granite. Ox and horse carts carried the granite from Quincy limiting its range. In addition to Quincy, towns near the Boston suburb of Lowell (Tyngsborough, Westford, and Chelmsford) supplied cut granite. Where Quincy granite was dark colored and cut from loose boulders and ledges, the granite from Lowell was whiter and taken entirely from loose boulders. Lowell granite was used extensively in Boston's buildings during the early nineteenth century largely due to the Middlesex Canal. Completed in 1803, the 27.25 mile long Middlesex Canal connected Boston and Chelmsford facilitating transport of the heavy commodity. Draft animals pulled granite loaded canal boats downstream from the quarries to Boston. Once unloaded at Boston's wharves, draft animals moved the granite to the construction site via wagons and drag skids. Initially the canal structures were made from timber, but significant updates to the canal's locks and infrastructure in the 1820's incorporated the local granite. Significant portions of the Middlesex Canal are listed on the National Register of Historic Places (Public Archaeology Lab, 1998).

Massachusetts' granite is chiefly coarse grained and grey in color with some having a pink tint. More specifically the popular Quincy granite comes from stone located on the low hills south of Boston called the Blue Hills near Quincy and Milton. The main uses for the Quincy granite were for either for monumental or ordinary building purposes. The monumental granite was able to be highly polished and came in various shades known commercially as medium, dark, and extra dark. It is this type of granite which caught the attention of builders and architects. By beginning of the 19th century a number of large granite buildings were erected in Boston such as the Post Office, Customs House, Courthouse, Fanueil Hall marketplace, Charlestown Navy Yard, and Merchant's Exchange. A boom in the industry occurred around 1827 when construction began on a monument to commemorate the Battle of Bunker Hill in Charlestown, MA. A 221-ft high granite obelisk was chosen for the design with little known at that time about

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quarrying or using large size granite blocks for building purposes. Solomon Willard oversaw the project and found a quarry suitable to produce enough stone for the massive project. Instead of purchasing granite from an existing quarry Willard bought 4 acres of property in Quincy, known as the Bunker Hill quarry, and cut his own granite. He also invented the machinery to cut, handle, and move the slabs of stone including a granite railway (Holly 1998).

Granite quarried at Quincy could follow two paths to the sea. In 1826, the Quincy Canal Corporation extended the navigable head of the Town River to within a mile of the North Common quarries enabling sloops to load granite cargos brought down from the quarries by wagon. Sailing vessels ranging in size from 60 to 100 tons made three trips a week out of Quincy (Crane 1910:174). On the quarry area's west side that same year, the Granite Railway Company built a rail line from its quarry to tidewater. The Granite Railway was an ingenious system that was the first commercial railway in the United States (Granite Railway Co. 1913:8). It carried the larger cut slabs for the Bunker Hill Monument. Chains and counterbalanced weights lowered loaded stone cars and returned empty cars to the quarry face. When the stone cars were not descending a steep incline, ox or horse power moved the stone from the quarry to the Company's wharf in Milton on the Neponset River near Gulliver's Creek, a distance of 2 $\frac{3}{4}$ miles. At the wharf, the granite was loaded onto flat bottom barges, towed to Deven's wharf in Charlestown with the steam tug *Robin Hood* or other tow boats, and moved to the monument site with ox/horse teams (Brayley 1913:45). The Granite Railway Company wharf was 1,280 feet long by 40 feet wide and cost \$30,000 to build. It incorporated a platform and turntable for unloading, but often times the movement of large blocks was done only in the winter when the ground was hard enough to support the tremendous load. The operations at the Bunker Hill quarry stimulated the development of the New England granite industry and highlighted the use of granite as a building material for both public and private uses. The Bunker Hill Monument was completed in 1842 and put Quincy on the map as an important place in the granite industry. The Granite Railway Company continued to operate the railway and quarry granite for building materials until 1870 when it switched to polishing work as monumental work emerged as Quincy's forte. After the completion of the Bunker Hill Monument, the Granite Railway Company and Quincy Canal Corporation wharf continued to be one of the main shipment points for granite quarried out of Quincy. Other wharves for shipping granite were located at Quincy Point and the Town River Bay. No known historical documents survived from the Quincy granite quarry companies to provide more details on the shipment via water out of Quincy.

Between 1803 and 1847, 28 firms engaged in the Quincy granite business with hundreds of men per year employed in the trade. During the 1830s and 1840s the majority of the Quincy granite was used for rough work in constructing buildings. Quincy's nickname is "Granite City" due to the impressive granite landmarks that originated in its quarries. Notable buildings include the United States Custom Houses in Boston, Savannah, New Orleans, and Galveston

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all of which are listed on the National Register of Historic Places. To facilitate the land based movement of granite, the Quincy Railroad Company opened up service for 25 to 30 quarries with 6 miles of track. In 1870, it merged into the Old Colony Railroad Line and later the New York, New Haven, and Hartford Railroad Line that allowed the stone to be rail shipped long distances (Brayley 1913:93). The Quincy Railway Quarry produced large blocks of dark blue granite, known as "railway stock," which was shipped to the Mid-west and West for finishing.

Quincy's focus shifted to cutting and dressing granite for monumental and ornamental work in the late nineteenth and early twentieth century. Large turning mills produced columns and air-powered tools were used to fashion ornate pieces of art as the granite industry mechanized. Quincy quarries first developed the mechanical process to polish granite with machinery in 1869 (Brayley 1913:84). Eventually, 54 quarries were operating around the city producing grey, green, and pink colored granite that could be highly polished as it had a very low to no mica content. Scottish, Swedish, Finnish, and Italian immigrants followed the Germans and settled in and near Quincy making them the primary population in the town. Rapid urbanization and growth in Quincy occurred as a result of the influx of people and increasing industry; however, the change in transportation from water to rail and decreased demand for granite spelled the end of the areas' quarry operations. The last of the quarries in Quincy closed in 1963 ending an over 100 year industry that helped build this nation.

Cape Ann Quarries Expand the Granite Trade (1850-1930)

Quincy's rapidly developing granite industry supported by the advances in quarrying technique led to expansion of the industry. Quarries sprang up in other Massachusetts areas, particularly at Cape Ann, a rocky island promontory north of Boston. Like Quincy, Cape Ann was well suited for quarrying stone. Its exposed granite outcrops, almost inexhaustible uniform granite, and proximity of the stone to water made Cape Ann an ideal quarry location. The Cape Ann quarries formed an almost continuous line along the coast from Rockport to Bay View. The area is bounded in the northwest by Ipswich Bay, on the east by the Atlantic Ocean, on the west by the city of Gloucester, and to the south by Massachusetts Bay. Rockport granite was particularly suitable for structural purposes and paving. The stone was divided into two commercial varieties: grey stone known as Rockport grey and grey stone tinted with green known as Rockport green. The Rockport grey originated in quarries close to the town of Rockport while Rockport green stone came from areas near Gloucester.

Until 1800, Cape Ann granite was only used locally for millstones, street markers, and well curbing. Mooring stones were a particularly ingenious use of the stone during this early period. A fishermen seeking to construct a mooring drilled a fifteen inch hole in a flat piece of granite ledge approximately six feet square and from eight to sixteen inches thick. The fishermen then cut off the top of an oak tree, such that twenty feet of straight trunk projected from the ground.

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The oak tree was then hauled out of the ground, roots and all, and inserted it through the hole in the stone. Dropped in water of an appropriate depth, the stone secured the oak trunk to the seafloor and left a few feet projecting into the air for a vessel's mooring lines. Enterprising early quarry man Joshua Norwood of Rockport made several dozen mooring stones for his Rockport neighbors at the beginning of the eighteenth century. His son carried on the tradition, quarrying stones for many other Cape Ann fishermen (Erkkila 1987:12).

Solomon Willard visited Cape Ann during his scouting trips to find material for the Bunker Hill monument. He thought the quarries were located too far for his project, but found the granite to be of very high quality. Cape Ann quarries supplied government contracts for forts on the Boston Harbor Islands along with the Salem jail, Charlestown and Portsmouth Naval Shipyards, and Newburyport Custom House during the 1840s and 1850s (all are listed on the National Register of Historic Places). Aside from these local monumental building projects, Cape Ann granite began to be shipped more widely reaching cities like San Francisco, New Orleans and Valparaiso, Chile (Brayley 1913:113). Increasing orders led to larger and larger quarries with greater capital investment. Until the end of the Civil War, individually-owned operations supplied most of the Cape Ann granite used in government contracts. Individuals such as Colonel Thayer, William Torrey, Ezra Eames, Amos Sanborn, and Beniah Colburn pioneered commercial quarrying on Cape Ann and profited from the increasing demand for their stone. Eventually individuals combined their holdings and formed larger companies such as the Bay State Granite Company, Gloucester and Boston Granite Company, and Eames, Stimson, and Company. Stone was shipped from small harbors surrounding Cape Ann such as Pigeon Cove, Bay View, Folly Cove, Lanesville, Rockport, and Halibut Point. The quarrymen initially came from Maine, New Hampshire, and Vermont, but immigrants from Ireland, Russia, and Finland arriving from the 1830s through 1870s dominated the trade and were preferred for their lower labor rates.

In 1823, Mr. Nehemiah Knowlton cut five hundred tons of stone from cobble near Pigeon Cove and advertised its sale in Boston newspapers. He brought the stone into Boston on the sloop *Fox*, the first time stone was shipped to that city from Cape Ann (Pitsee 1945; Pitsee 1949). The advertisement caught the attention of Major Bates and William Torrey of Quincy who traveled to Cape Ann to try their hand at quarrying. Their combined efforts proved unsuccessful, but the knowledge they gained in the process allowed Major Bates to connect with Colonel Thayer, the U. S. Engineer in charge of the construction of Fort Warren near the mouth of Boston Harbor. Colonel Thayer employed Major Bates as an assistant and turned to William Torrey to supply the stone. Much of the stone used in the government fortification work on the Boston Harbor Islands and Charlestown and Portsmouth Naval Shipyards came from Torrey's quarries until 1842. During the 1830s and 1840s, William Torrey held a business interest in six sloops that constantly hauled granite from his quarry, but were insufficient to handle his entire

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production. Vessels from Quincy and Maine were also contracted to carry his stone (Hurd 1888:1380).

Cape Ann granite's coarse nature made it ideally suited for making paving blocks. The first paving blocks were cut from the Flat Ledge quarry by John Stimson during the 1830s. Cut square and flat, the stones were used at Fort Warren (a National Historic Landmark) and shipped there by the small 30 to 40 ton sloop *Fox* (Hurd 1888:1381). Cape Ann stone was used extensively in the streets of Boston, New York, and Philadelphia. Large Belgium blocks, New York blocks, and smaller Boston blocks paved streets while other pieces lined cross walks, gutters, and sewer systems. Cape Ann quarries pioneered new varieties of paving blocks, in particular the New York block, which was the first variety to be laid on its edge (Hurd 1888: 1381). Cape Ann promotional material claimed that nearly every city in the United States had granite paving from Cape Ann and that the block varieties produced were almost as great as the number of places the stone was shipped. The demand for pavers and other blocks was so high that groups of businessmen and quarry operations came together to form larger companies between 1864 and 1873. The larger companies possess enough capital to invest in larger operations with more advanced infrastructure needed to quarry, finish, and ship large amounts of material. Consolidated quarry operations included: the Rockport Granite Company formed in 1864, the Cape Ann Granite Company formed in 1869, the Pigeon Hill Granite Company formed in 1870, and the Lanesville Granite Company formed in 1873. The consolidated quarries were capable of producing tremendous quantities of paving blocks. In 1874, the Cape Ann Granite Company took on a contract for 5.5 million blocks for Boston's streets. Similar large paving contracts were shipped out on three-masted schooners averaging 200-tons burden. A particular group of three-masters, known as the "Philadelphia" schooners loaded paving for that city, Washington, D. C. and Baltimore. Insufficient water at the quarry docks forced these schooners to complete loading offshore, where there was enough water to accommodate the deeply laden vessels (Erkkila 1987:18).

The Rockport Granite Company was the best known and most successful of the Cape Ann quarries. Incorporated in 1864, it began with the assets from the Eames, Stimson Company and soon acquired other granite properties in the region including the Cape Ann Granite Company in 1893, the Pigeon Hill Granite Company in 1914, and numerous smaller operations. At the height of the company's operations around 1900, it employed a thousand people with a payroll of \$20,000 a week covering granite cutters, paving cutters, other quarrymen, engineers, carpenters, and laborers. Company officers were located not only in Gloucester and Rockport on Cape Ann but also in Boston, New York, Philadelphia, and Chicago. It owned 1,000 acres of land and quarries in Bay View, Rockport, Pigeon Cove, and Halibut Point as well as a large quarry in Jonesport, Maine. Additional assets included a general store, 70 tenements, 8 miles of railroad, 3 locomotives, several 30-ton rail cars, wharves and a dock capable of securing a vessel with a 20-foot draft. It also owned a tug,

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steam lighter, schooners, and sloops. After a strike in 1922 weakened the Rockport Granite Company, it closed its doors in 1927 and liquidated its assets in 1930.

Cape Ann quarries used a system of mechanical conveyances to move the recently cut stone from the quarry face to the loading wharves. Once free from the rock face two holes, known as dog holes, were cut into each side of the granite block. Large iron hooks, known as dogs, were inserted into the holes and hooked to cables and chairs suspended from a wooden derrick. Derricks were fixed in place, but could be pivoted around a central point and used block and tackle to lift the stone. Prior to the 1860s and the introduction of steam winches, teams of men or oxen lifted the stone limiting the size of individual quarried blocks. Steam engines made it possible to lift and move larger blocks weighing 40 tons. In the larger and deeper quarries, several derricks would be used in a series of lifts to move the stone from the quarry face to ground level and the quarry's exit. During the height of Cape Ann quarrying around 1910, one quarry alone had four derricks with masts over 90 ft high and booms over 80 ft in length.

At first, cut blocks were placed onto carts pulled by oxen or horses down to the water or finishing facilities. Larger quarries quickly found greater efficiency by installing a network of railways. Eventually these railways became complex enough to support small steam locomotives capable of pushing several rail cars. The Cape Ann Granite Company introduced the first steam locomotive to the area's quarries in September 1870 (Erkkila 1987:47). By the 1890s, quarry companies had a sophisticated railway system allowing granite to be moved from finishing areas to either wharves for shipment via water or railroad hubs to be moved via rail.

Only a small amount of stone was shipped in its rough form taken directly out of the quarry. Prior to being loaded for shipment, the material was moved to a cutting area or shed. Most of the material was cut to the desired dimensions and then finished or polished depending on the order specifications. Very large blocks that did not need fine finishing were worked out in the open but most pieces were taken to cutting sheds where they were cut to their final shape. Sheds could be anything from simple coverings to larger more sophisticated buildings with specialized machines. Prior to the 1870s, finishing work was done entirely by hand with drills, hammers, chisels, and points. Technological advances during that decade saw the introduction of machines such as the gang saw and stone lathes that allowed larger pieces to be produced with less labor (Erkkila 1987:86).

Development and Use of the Stone Sloop (1850-1910)

Rockport had no natural harbors so a relatively small indentation on the north side of Cape Ann known as Sandy Bay became one of the main shipping points for Cape Ann granite.

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Development of that port first began in 1743, when timber wharves were built creating a protected basin. By 1811, the timber wharves were replaced by a more substantial stone wharf. Four years later a second stone wharf was built creating a relatively protected harbor. The Sandy Bay Pier Company and Pigeon Cove Harbor Company built additional wharves and small breakwaters in Sandy Bay during the 1820s and 1830s to facilitate the shipment of granite, lumber, and fish. Seeking to improve the Sandy Bay anchorage, the U. S. Army Corps of Engineers developed a plan for a large, 1.5 mile long granite breakwater in 1883. Located one mile outside the harbor, the project's intention was to create a massive place of refuge on the north side of Cape Ann for sailing ships. The first load of stone was dropped into the water by the stone sloop *Screamer* in 1885 (Hurd 1888:1357). Ultimately, work on the breakwater ceased in 1902 due to the lack of funding and declines in the use of sailing ships. The breakwater provided shelter for many of the granite wharves in Rockport's vicinity that relied heavily on sailing vessel transportation. In addition to the breakwater, many of the impressive granite wharves are still visible today.

Granite was moved most economically by water to the developing cities along the Eastern Seaboard. Cape Ann granite companies embraced the use of vessels of all sizes from small sloops to multi-masted schooners. The size and type of vessel chosen was based on the variety and quantity of stone to be carried and final destination. Small sloops carried loads of dimension stone to closer ports such as Boston while large three-masted schooners were need to carry large orders of paving to distant ports like New Orleans and Miami. Nearly the entire production from the Rockport Granite Company was shipped by vessel from one of the company's three private docks, which could each move 1,200 tons a day. At one point the company owned ten vessels and often chartered others to meet orders (Mine and Quarry 1908:219).

The Cape Ann quarries pioneered the use of small sloops specifically designed for carrying granite. Known as "stone sloops" they were ideally suited to shipping cargoes of random granite, cellar stone, or paving blocks because of their heavy construction, lifting derrick and good sailing qualities with a heavy load. Early stone sloops shared similarities with the sloops used on New York's Hudson River. These vessels, though operated in a more confined environment that necessitated a loftier rig, carried heavy loads with a shallow draft. Hudson River ship masters, like their Cape Ann counterparts, appreciated the unobstructed deck space created by the sloop rig. Shipbuilders undoubtedly refined the Cape Ann sloop to match its environment with an eye also directed towards the vernacular techniques used by shipbuilders further south (Smith c.1925). Historical records indicate that at least 90 sloops engaged in the granite trade were built between 1805 and 1890 ranging from 45 to 100 feet in length and 44 to 125 gross tons. Both keel and centerboard vessels were used (Erkkila 1987:27). Maine and Massachusetts shipyards were the most prolific builders of stone sloops with the towns of Freeport, Harpswell, and Yarmouth, ME turning out a majority of the fleet.

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Little archival information on Cape Ann's stone vessels prior to the 1850s has been found. Published sources attributed the first purpose-built stone sloop to the Pigeon Hill Granite Company's, *Ann Parker* launched in 1850. In 1853, the Pigeon Hill Granite Co. built the sloop *Daniel Webster* (46 tons), while the Rockport Granite Co. built the *Cock of the Walk* (55 tons), and the *New Era* (62 tons). A succession of vessels followed over the following decades each generally growing in size. Notable vessels included: the Lanesville Granite Co.'s *Hard Chance* (64 tons) launched in Gloucester in 1859 and the Rockport Granite Co.' *Belle of Cape Ann* (78 tons) launched in Chatham, Connecticut in 1860. All of the previously mentioned vessels were keel vessels. Centerboard sloops first appeared with *C. E. Trumbull* (99 tons) built at East Boston in 1870 and remained a popular option exemplified by the *Mary A. White*, built in Boston in 1893. Other stone sloops operating out of Cape Ann included *Acadia*, *Casket*, *Daniel Warren*, *Jennie Preston*, *Nellie C. Noble*, and *America* (Smith c.1925; Rogers 1872).

Cape Ann's stone sloops were rigged with a single fore and aft rigged mast and topmast rising as much as 110 feet above deck. A sloop's sail plan included a main sail, jumbo or forestay sail, one or two jibs, and a gaff topsail. The sloops were heavily timbered (especially the deck and deck beams) with a broader beam as compared to other contemporary sloops. Stone sloops often had sharp lines with clipper type bows and a raised quarter deck that housed the captain and crew. Some sloops were designed more like a scow, a design popular with the Quincy quarries. The crew consisted on a captain, cook, and three or four deck hands that helped with loading, sailing, and unloading. Cape Ann stone sloops were primarily manned by sailors out of Rockport, Massachusetts.

The Rockport Granite Company owned a succession of stone sloops including one of the most famous vessels, the *Albert Baldwin*. The Tarr and James shipyard at Essex, MA built the sloop in 1890 using the lines of an earlier sloop, the *William P. Hunt*. The *Albert Baldwin* was the last and largest of all the Cape Ann stone sloops. Due to the sloop's survival into the twentieth century, it was well documented in comparison to most other granite trade vessels. The centerboard sloop *Albert Baldwin* measured 86 ft in length, 27.2 ft in breadth, 7.3 ft in depth, 123 gross tons, and 117 net tons. It's keel was 12 in. square, knees 6 in. sided, deck beams were 32.5 in. on center, with all planking 3 in. thick. It's framing timbers were 7 in. by 5 in. on 2-foot 2 in. centers. The *Baldwin*'s hold had heavy bilge ceiling and a flat floor laid on top of the keelsons. In general, stone sloops were heavily constructed particularly the planking, deck, and deck beams to support the weight of the granite. The *Albert Baldwin* carried a sail area of over 3,000 square yards with the main sail consisting of 1,100 square yards, the largest ever made in the lofts of Gloucester. It's main mast measured 90 ft in length with a top mast extending an additional 43 ft. The boom and gaff were 82 ft. and 45 ft. respectively. The *Albert Baldwin*'s captain, William Poland, helped design the sloop and command it for its entire 30 year career. In addition to the *Baldwin*'s usual trips to Salem and

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Boston, Poland took the sloop to New York, Providence, Jonesport, Maine, and to St. John, New Brunswick. The stone sloop was distinctly identified with the Cape Ann granite trade and was often referred to as floating ledges because their decks would nearly be awash due to the enormous weight of their loads and how low in the water they sat. The *Albert Baldwin* served the Rockport Granite Company until October 1920 when it was abandoned near Annisquam. A restaurateur purchased the vessel and towed it to Smith Cove in Gloucester, but the floating restaurant never materialized. A Works Progress Administration (WPA) crew broke up the sloop in the 1930s (Walen and Chapelle 1931; Erkkila 1987:38).

Stone sloops used a removable derrick to lift the granite on and off the vessel. When needed, the derrick was stepped just aft of the main mast into a large pillow block, otherwise it was stowed flat on deck. The derrick was outfitted with block and tackle and heavy chains with iron hooks to move the granite around the main deck and into the hold. A hoisting winch located forward and separate from the anchor windlass facilitated lifting and lowering the cargo. The sloop *John Brooks* was the first vessel equipped with a steam hoisting engine for sails and cargo in 1851 followed by the sloops *New Era* and *Hard Chance* in 1858 and 1859 respectively. Prior to the installation of steam engines, sailors lifted the granite aboard with the sloop's windlass operated by pump brakes of hand spikes (Pittee 1949). The donkey boiler and engine that powered both the windlass and hoisting winch was typically located below decks. The *Albert Baldwin* was also equipped with a hand winch near the main mast for hoisting sails when steam power was not available. All of this equipment made it possible for vessel to load and offload their cargo even if the port they were docked at did not have adequate facilities. Often a narrow gauge track was installed in the granite sloops hold to help with moving the cargo once onboard. A great deal of care was taken when loading and unloading a vessel to make sure the cargo was balanced and secure (Walen and Chapelle 1931).

Granite was stowed on board a vessel in its hold, on deck, or a combination of both locations depending on the cargo composition. Stowage of large granite pieces in a vessel's hold was limited by the ability to move the granite without mechanical assistance once it was away from the hatch. Therefore, large dimension stone was frequently secured on deck once sufficient granite was stowed below to ballast the vessel. Historic photographs show granite sloops with decks full of cut granite slabs positioned like a jig saw puzzle surrounding the cargo hatch. In certain circumstances, granite slabs were shipped roughly cut and not finished to their final size until reaching their final destination. This prevented a finely carved piece from being damaged. Smaller granite pieces like street pavers were always carried below decks as the potential for these pieces to shift was high. Paving blocks were loaded in mass into a granite carrier's hull using a variety of techniques to get the stone aboard.

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The mode of loading the blocks on board was over a run or platform 16 to 18 feet long, one end resting upon the wharf, the other supported by rigging attached to the vessel's throat halyard. This end extended to the forward hatch, and was elevated about seven feet above the deck. The paving blocks were placed in a car, and pushed over rails upon this run or platform, and dumped into the hold of the vessel (Atlantic Reporter 1897).

Once onboard, the pavers were stacked carefully into all corners of the vessel's hull to ensure maximum carrying capacity and prevent shifting cargo. In certain situations, the granite pavers were tossed individually from man to man along a human chain from the wharf to the hold (Erkkila 1955). Forty thousand blocks (a common load for a three masted schooner) could typically be loaded in 24 hour's time. In 1893, the price paid for Maine pavers ranged from \$60 to \$65 per thousand with an additional \$18 per thousand added for shipment. The cost to municipalities of laying a square yard of paving for a city street with a sand base was \$2.25 or on a concrete base from \$4 to \$4.25 (Municipal Engineering Company 1893).

Maine Quarries Become Industry Leaders (1877-1945)

In addition to Massachusetts, Maine became a center of the granite industry in New England after the American Civil War. Intense glaciation exposed much of the state's granite underpinnings and its granite headlands and islands offered easy access to both the stone and the sea. Maine's competitive advantage lay with its access to tidewater and the ability to quarry exposed granite without needing to excavate large pits as was done at the Cape Ann and Quincy quarries. At many places vessels of over 150 tons could dock a few hundred feet from where the stone was quarried. Maine granite was shipped to at least twenty-three states, mostly in the eastern half of the United States and was used in hundreds of famous buildings, monuments, as well as streets (Gratwick 2007:27).

Maine's granite can be classified into fourteen groups based on its color: 1) reddish (divided in to light, bright, and dark); 2) pinkish-buff; 3) light lavender; 4) gray (black and white with white dominant); 5) gray, porphyritic; 6) buff; 7) greenish grey; 8) black and white (black dominant); 9) grey, weak contrasts; 10) muscorite; 11) fine textured; 12) paving; 14) black (divided into black, greenish black, and medium grey). The granite's color can roughly link a piece back to a particular area or quarry.

Maine's granite industry came under considerable duress following the financial Panic of 1873, which greatly reduced building projects. Against the background of decreasing job availability granite cutters established their first union, the Granite Cutters' International Association

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(GCIA), in January 1877. After decades of uncompensated injuries resulting from a very dangerous work place, stone cutters were in dire need of an organization to represent their interests. The GCIA and other labor unions provided a voice for quarry workers ultimately establishing uniform labor rates, monthly pay days, and a prescribed work week. Quarry owners experienced further difficulties later in 1877, when the U. S. Attorney General ended the Federal contracting practice that guaranteed a 15% profit for Federal granite contracts (Deer Isle Granite Museum 1997:28). While these events likely cost quarry owners considerable consternation, national economic reinvigoration brought increasing orders for building stone. Consolidation of independent quarries into large nationally owned operations provided the working capital to meet the demands of unionized labor and infrastructure development needed to meet ever larger orders. By 1890, Maine led the nation in granite production with receipts totaling over \$2,500,000. Quarrying took place in almost every county in Maine with the production focusing on building stone and pavers. Granite quarrying was Maine's leading industry at the turn of the twentieth century.

With the exception of a few quarries located in Oxford, Cumberland, Somerset, Waldo, and Hancock Counties, all of Maine's granite quarries were located directly adjacent to navigable tidewater or within 4 miles of such. The center of the industry was in Penobscot and Blue Hill bays and their surround islands totaling 1,200 square miles. The four places in Maine best known for quarrying granite was Jonesboro, Vinalhaven (part of the Fox Islands), Mount Desert Island, and Deer Isle/Stonington.

In the 1880s, the largest operations were on Dix, Hurricane, Fox, and Crotch Island. Dix Island is part of the Muscle Ridge Islands located southeast of Thomaston, Maine. Quarry operations were so active on Dix Island that by 1892, "nearly the whole of the island had been quarried over." Stone for the New York Custom House, New York Post Office, and Philadelphia Post Office came from Dix Island (Rich 1892: 748).

Nearby, Hurricane Island had its peak quarry years between 1870 and 1900. The first quarry operations on that island were owned by David Tilson who formed the Hurricane Island Granite Company with William C. Kingsley in 1870. The Hurricane Island Granite Company supplied the stone for the St. Louis Post Office and Custom House, one of America's iconic granite buildings and a National Historic Landmark. The 70-ft tall, three-story walls of the 234-ft by 179-ft monumental building were 3 to 4-ft thick Hurricane Island granite. Built between 1873 and 1884 at a cost of \$5.69 million, the stone cutting alone cost the U. S. Government \$1.47 million. The Hurricane Island Granite Company shipped the stone via water to Baltimore, Maryland where it was loaded onto railcars bound for St. Louis. Two voyages that went awry shed light on granite transportation. In November 1877, the schooner *Joseph Farwell* sailed from Rockland, ME with a cargo of Hurricane Island granite valued at \$23,681.87. The rough stone was valued at \$2,206.11 and the value of the cutting was \$21,475.76. It collided with the

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steamer *John H. Starin* in Long Island Sound and sank in deep water. Wreckers salvaged the granite and it continued on to Baltimore in the schooner *Luella A. Snow* in January 1878. That same month, the schooner *Catawamteak* wrecked in the Chesapeake Bay en-route to Baltimore. It was carrying finished stone valued at \$51,961.00. In its raw state the stone was only valued at \$2,662.25. Ultimately, the wreckers arrived and saved the grounded schooner and its cargo. Subsequent legal disputes revealed that insurance underwriters considered deck shipped granite to be more likely damaged or lost as compared to hold shipped granite. Deck-shipped granite had an insurance rate equivalent to 4.66% of the cutting cost, while hold-shipped granite had a 1.5% insurance premium. The increased premiums accounted for the greater likelihood of damage or loss of the deck cargo during transit. If the vessel encountered a problem it could jettison some of the pieces from its deck to increase stability. Often times the deck load shifted during a storm causing the entire vessel to be lost. Legal documentation also revealed that the stone was extensively packaged in wood with iron strapping to protect the stone's polished faces and fine edges. Surprisingly the Hurricane Island Granite Company did not pay freight on the packaging, but only on the actual weight of the stone itself as computed from its cubic-foot volume. (Snell 1970; Court Case Tillson vs U.S. 1888).

In 1890, Tilson and Kingsley joined their operations with the Booth Brothers of New York to formed the Booth Brothers and Hurricane Island Granite Company. Booth Brothers was formed in 1870 and had quarries in Maine and Connecticut and offices in New York, New London, Philadelphia, and Rockland (Rich 1892: 748). It specialized in supplying stone for buildings and pavers. In 1910, Hurricane Isle Quarries subsumed the Booth Brothers and Hurricane Island Granite Company's properties (totally approximately 100 acres). The last granite shipment departed the island in 1914 for finishing work in Rockport, Massachusetts. Ultimately, the company ceased operations and abandoned the island in 1916.

Lying east of Dix Island at the mouth of West Penobscot Bay, the Fox Islands played an important role in Maine's granite industry. Vinalhaven Island, the largest island in the group, had its quarry operations concentrated around the town of Vinalhaven and adjacent Carver's Harbor. Both towns had protected harbor with good water access to load granite cargos. Vinalhaven Island granite was best known for its gray and bluish gray stone. Granite quarrying on Vinalhaven Island likely started in the 1820s with the first cargo of granite shipped by a Mr. Tuck from Arey's Harbor in the late 1820s. The schooner *Plymouth Rock* carried the stone to Boston for the Massachusetts State Prison in Charlestown (Rich 1892:749; Winslow 1989:21). Until 1846, quarrying was done mainly for local use until small operations opened such as the East Boston Quarry and Diamond Rock Quarry.

In 1853, the firm of Bodwell, Webster, and Company changed the face of the granite business at Vinalhaven. Mr. Webster bought into the East Boston Quarry in the early 1850s and was soon joined by Mr. Joseph Bodwell. Together, the company's principals started securing large

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government contracts for supplying granite for breakwaters, lighthouses, and fortifications. By 1871, the incorporated Bodwell Granite Company had secured contracts for the Executive Office Building in Washington, D.C., Chicago Board of Trade, Pennsylvania Railroad Station, and Brooklyn Bridge. The Bodwell Granite Company became the largest economic force on the island, employing over 1,200 men, where other firms typically employed only 25 to 50 men. These men quarried and cut truly monumental pieces of stone. One such piece was a monument to Major General John E. Wool to be erected at Oakwood Cemetery in Troy, New York. Shipped from Vinalhaven in August 1879 on the barge *Jemima Leonard*, the 75-ft obelisk and base weighed 650 tons. The obelisk was believed to be the largest granite shaft quarried in the United States up to that time (Winslow 1989:28)

Monumental building contracts flowed to the firm between 1880 and 1910, with interruptions of work caused by national economic slumps in the early 1890s. The firm supplied stone for big government construction projects including the U. S. Customs House in New York, and post offices in Washington, Pittsburg, Cincinnati, and Kansas City. The Bodwell Granite Co. quarried much of the stone used in the Brooklyn Bridge, including all the stone for the Brooklyn-side pier and the New York-side pier up to the arches (Winslow 1989:28). Adoption of mechanical quarrying techniques shrunk the workforce to between 800 and 900 men in the 1890s. Mr. Bodwell's success in the granite industry led to his election as Maine's 40th governor in 1886. His untimely death the following year did little to slow the company. By 1905, nine quarries were cutting stone on the island with the Bodwell Granite Company operating four quarries and Booth Brothers and Hurricane Island Granite Company operating two quarries. All of the granite quarried near Vinalhaven was shipped out via water. The Bodwell Company owned a fleet of schooners for this purpose rather than contracting vessels for shipment (Rich 1892:751). The company's quarries were ideally located for ease of transportation, distances from quarry to the harbor was anywhere from 200 to 1000 feet. Moving the stone from the quarry to the harbor required a system of graded tracks used with specialized railroad cars (Dale 1907). In 1919, the Bodwell Granite Company closed and sold off all its assets. Quarrying continued on Vinalhaven Island by smaller companies until 1939 with a focus on paving blocks.

The southern tip of Deer Isle and in particular the town of Stonington was a nexus for Maine's granite industry. In 1860, Job Goss discovered a rich area of granite at Green's Landing on the southern end of Deer Isle. His son, John L. Goss, expanded quarrying operations onto two small islands just offshore of Green's Landing (incorporated as Stonington in 1897), Crotch Island and Moose Island. John L. Goss bought Crotch Island in 1887 and began operating on Moose Island in the late 1890's under the auspices of the John L. Goss Corporation. Due to Crotch Island's easily accessible granite and surrounding deep water, it hosted three active quarries (the Goss Quarry opened in 1872, the Ryan-Parker Quarry opened in 1880, and Sherwood Quarry opened in 1889) by 1905. Crotch Island granite was used extensively in the

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construction of bridges and buildings in New York City and New London. All of the granite quarried at Crotch Island was shipped out via water. The distance from quarry face to the loading wharves was no more than 500 feet. Stone cutters moved the quarried material with a gravity track rail system. The John L. Goss Corporation supplied granite from Crotch Island for the Pilgrim Monument in Provincetown, MA, Portsmouth's U. S. Navy dry-dock, the Cape Cod Canal, Boston's Museum of Fine Arts, the approaches to the Brooklyn Bridge from the Manhattan side, and a large fountain at John D. Rockefeller's estate in Tarrytown, NY. The period around 1900 was the most lucrative for the Stonington granite industry and the John L. Goss Corporation. The Corporation's last major contract provided stone for the expansion of a dry-dock in East Boston in 1918. By the 1930s, the Goss works closed due to low demand for granite. In 1933, the Deer Isle Granite Corporation purchased the Goss property on Crotch Island and continued operations until the end of World War II. Crotch Island reopened in 1966 to supply stone for the John F. Kennedy Memorial at Arlington Cemetery. The New England Stone Company continues to quarry Crotch Island granite on a limited basis for decorative granite items.

While not a quarry location, Chebeague Island in Casco Bay played an important role in granite transportation. Located 10 miles from Portland in Casco Bay, the island is only 5 miles long and 3 miles wide with a long maritime tradition focused on stone sloops. Z. William Hauk identified 59 sloops associated with Chebeague Island in his book *The Stone Sloops of Chebeague Island*. Hauk wrote that, "everyone on Chebeague took a crack at stone slooping in his day" (Hauk 1991:61). At least 32 Chebeague Island families comprised of over 180 individuals engaged in the stone hauling business. The Hamilton family provided an example of Chebeague Island's generational involvement in granite shipment. Ambrose Hamilton, the family's founding father, moved to the island in 1761 with his wife Deborah (Hauk 1991:112). The couple became the island's third permanent Euro-American settlers. Over the following 175 years, seventy-three Hamilton family members were associated with the trade. Many of the most well known stone sloops were named after Hamiltons (Hauk 1991). Chebeague Island sloops usually had a crew complement of between three and five sailors including the captain. Many times this consisted of a father as captain with four sons or possibly cousins or nephews. The youngest son usually served as the vessel's cook, going to sea at age twelve (Hauk 1991:13). Like the Cape Ann stone sloops, Maine's stone sloops were specifically built to carry stone cargos.

Chebeague Island sloops were first employed as early as the 1760s to carry quarried ballast stone to the shipyards around Casco Bay (Hauk 1991:14). By the 1790s, increased shipbuilding in the bay following the Revolutionary War spurred on the trade. Stone sloops started off small, but soon grew in size as new markets for bigger cargoes developed. By the 1830's the vessels' were engaged in moving granite for harbor work projects all over New England (Hauk 1991:12). Much in the way U. S. Government infrastructure project spurred

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development of the Cape Ann quarries, more stone sloops were needed to move the stone for the lighthouses, wharves, breakwaters, military structures, and other fortifications under construction. Specifically, Chebeague stone sloops carried cut stone and grout (the oddly shaped pieces of granite created during quarrying that were not further finished, equivalent to rubble) for breakwaters and/or wharves at the Maine ports of Eastport, Rockland, Bar Harbor, Portland, and Saco. Stone sloops delivered granite for Massachusetts breakwaters at Newburyport, Rockport, and Hyannis and wharves in Boston and Fall River. Further afield, stone sloops carried stone for Jersey City, New Jersey and New London, Connecticut wharves (Hauk 1991:14). Stone sloops were ideally suited to breakwater work. Not only could stone sloops carry the granite from the quarry to the worksite, but the vessel could unload the stone into the water using its derrick. During this process, the stone was gripped with dogs (iron hooks) and chain suspended from its derrick. Once the stone was raised from the sloop's deck and swung abeam of the vessel, the dogs were tripped causing the granite to drop into the water. Stones weighing between six and ten tons caused the sloop to wildly roll once released creating havoc on deck (Hauk 1991:59).

An account book from the Chebeague stone sloop *Pigeon Hill* excerpted in *The Stone Sloops of Chebeague Island* documented the vessel's activity in 1839. The sloop made 35 granite carrying trips totaling 3,051.5 tons quarried out of Cape Ann and loaded at Sandy Bay or Pigeon Cove. The breakdown of its cargoes is as follows: 1,297.5 tons from Sandy Bay to Haverhill, 1,098 tons from Pigeon Cove to Georges Island, 185 tons from Pigeon Cove to Castle Island, and 132 tons from Pigeon Cove to the Sandy Bay breakwater. The sloop also carried 339 tons of stone to Portsmouth, New Hampshire, Lowell, Massachusetts and other unrecorded destinations. The sloop was active carrying granite March through November (Hauk 1991:165-168). The granite for Georges Island was likely used in the construction of Fort Warren which was started in 1833 and finished in 1861. The granite for Castle Island could have been used in Fort Independence which was repaired and improved between 1834 and 1851. The 63-ft. long *Pigeon Hill* was built in Falmouth, Maine in 1836. In 1839, its captain and four-man crew all resided in Chebeague Island. The last report of the vessel had it ashore at Eastern Point near Gloucester, Massachusetts on 24 June 1857.

Similarly excerpted in *The Stone Sloops of Chebeague Island*, the account book for the sloop *Yankee Girl* for the years between 1867 and 1906 indicated that the vessel either stayed near Rockland, Maine for the season or went down to Boston and Cape Ann for anywhere from a few months to the whole season. *Yankee Girl* carried granite cargoes consisting of grout, cellar stone, foundation stone, cut stone, wall stone, culvert stone, random stone, and dimensional stone. It also carried other heavy cargoes like iron, a locomotive, helped lay stone at the Kittery Naval Yard, and swept the ocean bottom with a chain for a lost schooner. More specifically, in 1893 the *Pigeon Hill* carried 51 cargoes of grout to the Rockland breakwater, 30 cargoes of grout to the Bar Harbor breakwater, 5 cargoes to Isle Au Haut, and 11 miscellaneous cargoes.

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The sloop averaged an income of \$150 per cargo for that year with an average load of 87 tons. The 80-ft long *Pigeon Hill* was built in 1866 in Harspswell, Maine and was last recorded as abandoned in 1921. During the sloop's entire career, its captain and crew were associated with Chebeague Island (Hauk 1991:171-176).

Increased Use of Schooners to Reach New Ports (1865-1930)

Based on economic importance, Maine and Massachusetts led the granite industry in New England by 1879. Massachusetts remained on top with 148 firms, 151 quarries, 3,333 employed, and production valued at \$2,503,503. Maine was second with 133 firms, 153 quarries, 3,737 employed, and production valued at \$2,225,839. A 1905 granite industry report counted 108 open quarries in Maine within Hancock County (encompassing Mount Desert, Crotch Island, Deer Isle) containing the most quarries at 44. The report dated the earliest quarry opening in Maine to 1826 with the 1880s being the time period with the most new openings at 15. Fifty-seven of the 108 quarries only shipped granite out by water, 18 of the 108 only shipped by railroad, and 5 of the 108 shipped by both water and railroad (Dale 1907). With over 50% of the quarries in Maine only shipping their product out by water, the schooner, with its larger size and greater carrying capacity as opposed to the sloop, better answered the needs of granite shippers. Granite building projects had increased in scale to such an extent that shippers sought economies of scale to make a profit.

Larger two and three-masted schooners began to replace the stone sloops as the primary carrier of granite in New England on voyages beyond the Gulf of Maine. The sloop rig had initially predominated in the granite trade because its single mast allowed for ease of loading and unloading. Ultimately the schooner's larger size and cargo carrying capacity won out. Author John F. Leavitt writing about the transition to schooners explained, "The schooners, with the exception of the *George R. Bradford* and *Anna Sophia*, began life as general traders. When rebuilt for the stone trade, the mainmast was stepped as far aft as it could go with the result that enough room was left between the masts to allow a derrick boom to be rigged and swing clear." At sea, the derrick boom was stored on deck but once in port it was rigged and fitted to a steam powered hoisting engine and winch for loading and offloading. Changing the mast's position made the schooners fast sailers when the wind blew from dead aft. Now equipped with a foresail equivalent in area or bigger than its mainsail, two-masted granite schooners set their foresail on one side and mainsail on the other to catch a breeze from astern (Leavitt 1984:151).

The success of the New England granite industry would not have happened if it was not for the influx of coastal shipping beginning after the end of the Civil War. Shipyards turned out hundreds of schooners which profited from the demand for bulk cargo. Granite was needed to build government buildings, factories, public spaces, and infrastructure such as roads and

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sewers. Additionally granite saw a new market with the increased demand for monuments to commemorate heroes and historic battles from the Civil War. The use of two and three-masted schooners by the 1870s indicated that granite cargoes were being shipped farther and in greater quantities. Sloops were appropriate for carrying large dimension pieces, but schooners were able to transport larger loads greater distances which in turn was more profitable. Rockport Granite Company records detailing the activities of that company's vessels provided a glimpse into the granite trade including the typical cargoes and vessel varieties employed to transport stone. The city of New Orleans contracted the Rockport Granite Company to ship paving blocks to New Orleans at \$2.50 per ton 1867-1869. Schooners, barks, and brigs were used to fill this order. Once the granite was offloaded, the vessels returned north with cargos of cotton. In 1877, the company recorded 249 trips leaving Cape Ann in 28 vessels (comprised of 20 schooners and 8 sloops). In 1878 there were 182 trips in 25 vessels (comprised of 19 schooners and 6 sloops). The Rockport Granite Company shipped the following granite varieties via water in 1877 and 1878: ballast stone, dimension stone, edge stones, foundation stone, bulk block, cap stone, cellar stone, chunk stone, cut pieces, paving block, pinnars, chip stone, random stone, square blocks, square paving blocks, street crossings, and wharf stone.

Ledger books from the John L. Goss operations also chronicled the movement of granite from that company's Stonington, Maine area quarries. Granite cargos were shipped mostly on the decks and in the holds of schooners with a few sloops used for smaller trips closer to home. During March and April of 1893, schooners made 14 trips to ports such as Boston, Lowell, Cambridge, and New York City. The smallest cargo consisted of 100 tons and the largest was 428 tons; on average most loads were around 150 tons. Between April and December of 1895 the Goss quarries shipped stone cargos on 11 schooners and out on 14 trips (3 sloops and eleven schooners). The sloops carried loads of 100 or 130 tons while the larger schooners carried 160 or 195 tons. Throughout the 1890s and 1900s the shipment of granite down the Eastern Seaboard returned good profits, paralleling the development of other coasting trades, such as coal. Schooners left Maine for more southerly ports, offloaded their cargo, and then picked up a return cargo. Rarely did a schooner engaged in hauling stone return immediately in ballast to the quarry for another load. One common route documented in the marine listing of many newspapers had schooners during the 1880s-1890s hauling granite from Maine to New Orleans, then moving in ballast to Pensacola, Florida to load pine. Many other schooners hauling granite from Maine to Baltimore or Philadelphia then loaded coal before returning to Maine. Common cargoes of schooners in addition to granite included lime, coal, salt, pig iron, phosphate, plaster, brick, cement, dye wood, sand, hard pine, ice, corn, oats, wheat, railroad iron, copper ore, bananas/coconuts, sugar, cooperage, guano, brimstone, lumber, molasses, clay, lathes, and fire brick. The Rockland (Maine) Daily Star newspaper noted the activities of vessels in the area including those in the granite trade. In 1900, the newspaper reported 66 trips by 57 vessels with a granite cargo. The two most common departure ports were in

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Stonington and Long Cove at Vinalhaven with Hurricane Island and Somes Sound at Mt. Desert Island the second most numerous. The most frequently mentioned destination was New York City, accounting for 45 of the trips and Philadelphia, a distant second with eight trips. Newspaper reports of these voyages rarely specified what variety of granite was being shipped, an occasional mention specified pavers as the cargo.

Schooners, like the two-masted 122-foot long *Annie and Reuben*, were often so fully loaded that they were just shy of sinking. Author John F. Leavitt described the results of this practice in his book *Wake of the Coasters*. "I have seen the *Annie and Reuben* with something over 200 tons of stone aboard, lying at Crotch Island wharf with the water flowing through the scuppers to the height of an inch or more on the main hatch coaming over the deck. This is in a flat calm. Loaded in such a fashion, the schooners resembled half-tide ledges when at sea, and it is sure the hatches were well battened down and pumps going steadily the entire trip." The *Annie and Reuben* was built in Bath, ME in 1891 for the general coasting trade, but was later refitted for the stone trade by Goss and Company of Deer Isle, ME. The primary modification was to re-step the mainmast aft, opening up a larger space for swinging the schooner's derrick. At the start of World War II, the schooner was sold into the Cuban sugar trade before finally running ashore in New Jersey in 1943.

Unlike the *Annie and Reuben*, the Tarr and James shipyard built the 96-foot long two-masted schooner *George R. Bradford* specifically for the stone trade in 1895. Modeled after the stone sloop *Albert Baldwin*, Tarr and James revised their design by lengthening its hull and adding a mast. While it spent some time working out of Cape Ann with the Rockport Granite Company and Pigeon Hill Granite Company it eventually was moved to the run between the Maine quarries of John L. Goss and Company and Boston.

By the beginning of the twentieth century granite shipments were reaching record numbers. In 1904 the Rockport Granite Company shipped 104,233 tons of granite in 502 trips by water from its Sandy Bay wharves between 1 March and 1 December. The vessels carried 100 to 1,500 tons per trip with an average of 200 tons. The stone cost \$0.25 to \$1.25 per ton to freight. The vessels' destinations included Portsmouth, Boston, Gloucester, New York City, Jersey City, Philadelphia, Baltimore, and Havana. During that time period the company owned 2 steamers, 5 sailing vessels, 1 tug, and 2 un-rigged barges. The Census of Transportation data also provides information on the use of schooners and sloops by the Pigeon Hill Granite Company and Rockport Granite Company. Schooner *George R. Bradford* transported 7,654 tons of granite in 1906 from Rockport, MA (5,267 tons to Boston and 2,387 tons to Bradford, Rhode Island). Schooner *Erwin J. Luce*, sloop *Albert Baldwin*, schooner *William H. Bradford*, and sloop *Mary A. White* combined shipped 33,254 tons in 1916 (with 11,868 tons coming out of Gloucester and 21,568 out of Rockport). The final destination for the granite was Boston

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(22,460 tons), Hull (5,387 tons), Quincy (2,259 tons), Salem (1,713 tons), and Lynn (1,435 tons).

By 1928 the Rockport Granite Company produced cut granite for buildings and memorials, rough stock for sea walls, paving blocks, and crushed as well as rubble for breakwaters. Fifty percent of their business went just into making pavers and the rest of the products making up the remaining 50%. The paving block business first started to boom after the Civil War ended and cities started to rebuild and invest in their infrastructure. In addition to larger more established companies, smaller one or two man quarries, called motions, entered the granite business to supply the world with material to pave their streets. Wagons transported the blocks down to the wharfs where derricks lifted the carts onto the vessels for loading. Men then fed the pavers onto wooden chutes that directed them into the hold. By 1899 most of the larger cities were using granite pavers in their streets. The places with the largest amount of square yards paved were New York with 8,201,600, Philadelphia 5,760,509, and Boston with 1,859,248. Over a twelve year period between 1918 and 1929 the company produced 33,240,947 paving blocks with its most productive year in 1919 where it made 3,664,527. The number of pavers does not correlate to a very high monetary value when you think about how much work went into shaping each block. In 1929 the Rockport Granite Company cut 1,204,305 pavers valued at \$53,352 compared to \$736,028 worth of granite cut for buildings and bridges. The total value of granite produced in that year was \$882,574. Overall the granite was mainly shipped out from the company's own dock in small vessels they owned or in larger schooners which regularly shipped coal but were specifically chartered for granite trips when needed (Hoyt 1899:542).

During the early 1910s, Maine quarries began to shift their transportation mode to towed barges for large stone orders. The barges were capable of carrying 1,300 tons of stone, double the quantity carried by even 3-masted schooners. Most importantly, the barges were easier to load. The barge's top deck could be largely removed allowing the quarry's loading derrick to evenly place large dimension stone throughout the barge's hold. When transporting stone to established cargo terminals with shore-based derricks, the barges greatly decreased stone handling costs (Granite Cutters Journal 1911).

Granite Shipwrecks

Shipping granite by water was a hazardous proposition. The cargo's sheer weight meant that a leak or a shift in cargo during a storm could easily cause the vessel's loss. The United States Life Saving Service reported that there were a total of 592 disasters between 1876 and 1913 on the Atlantic and Gulf coasts for vessels carrying a cargo of stone or brick (reports from six years during that time frame were unavailable for analysis, the total number of disasters in that time frame was likely higher). The average number of disasters was 19 per year with the

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1894 having the highest number of disasters at 37. The years between 1876 and 1899 had a higher than average number of disasters (23 per year) as compared with the time period between 1900 and 1913 (9 per year). A thorough, but not exhaustive search of historic newspapers uncovered at least 110 vessels that sank with a granite cargo off New England's shores between 1812 and 1928 (Marx 2011). The most common vessel lost was a wooden-hulled 2 or 3-masted schooner ranging from 70 to 130 feet. A majority of the vessel losses resulted from either a dramatic cargo shift causing the vessel to capsize or the development of a bad leak causing the vessel to founder. Often vessels carrying granite would develop a leak, start their pumps, and quickly alter course for the nearest port for repairs. Once fixed, the vessel continued its voyage. If the weather was unfavorable or an incident happened too fast the vessel would be lost. Vessels that went ashore or rested in shallow water were often salvaged; those that sank in deeper water became a total loss.

George Wasson described the seaworthiness of stone carriers with the following quote from his book *Sailing Days on the Penobscot*, "It was a common remark that when a vessel got too old for even lumber coasting out of Bangor, or carrying wood for the Rockland lime kilns, she was considered none too ripe for the stone business and was often loaded to the scuppers with paving or huge blocks of granite."

An example of just such a lifecycle was noted in the trade publication *Granite* in July 1903. A sixty year old vessel had recently loaded a granite cargo bound from Freeport, ME to New York. The vessel's owner believed that it had been built as a slaver. Hard usage over many years undoubtedly took its toll on granite vessels; however, the value of many stone cargos used in monumental works suggested that quarry operators did not load their finest product into any old hull. Records indicate that some vessels, the so-called stone sloops of Cape Ann or Chebeague Island among them, repeatedly carried stone cargos throughout a long work life, not just at its end. Quarry operators were even confident enough in well-built, serviceable vessels that they self-insured the risk of transport. These were still wooden vessels; however and subject to the mercies of the elements.

The story of the three-masted schooner *Belle Wooster* provided a well documented example of the events surrounding the loss of a granite laden vessel. The 129-foot long, 475-ton *Belle Wooster* was bound from Stonington, Maine to New York in December 1902. Built in 1878 in Franklin, Maine, it measured 129.2 ft long by 32.8 ft in breadth. The *Belle Wooster* was carrying 720 tons of dressed granite for the East River Bridge valued at \$20,000. A sudden southwest blizzard caught the vessel. Winds of nearly hurricane force blew away many of the schooner's sails. Heavy seas caused the cargo to shift, opening a bad leak. Crewmembers attempted to keep the vessel afloat with its pumps, but could not stem the flow of water. As the schooner sank 60 miles east of Cape Ann, the 8-man crew abandoned ship into their long boat. The fishing schooner *Patriot* rescued the sailors a day later as the battled the sea,

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frostbite, and hunger (*Gloucester Daily Times* 1902; *Brooklyn Eagle* 1902; *Lewiston Daily Sun* 1902).

Decline of the Granite Industry (1930-1945)

The last schooner to be built specifically for the granite trade was the 2-masted, 102-ft long, 146-ton *Anna Sophia* in 1923. It was launched at Dennysville, Maine by Lyman Pushee. The two-masted schooner *M. M. Hamilton* carried granite to Boston on the last trip made by a Chebeague Island vessel in October 1930 (Hauk 1991:4). By 1930, New England's granite industry was in severe decline brought about by the use of cheaper construction materials for buildings and streets. Where granite once dominated, it was now relegated to use as veneer for concrete and steel buildings. Likewise, asphalt and concrete supplanted granite in road construction. The Island Institute publication *Island Journal* succinctly summarized why the granite industry met its end in the 20th century.

Changes in architectural styles and new and lighter construction materials (structural steel and concrete) were appearing at the beginning of the 20th century. Builders were now using limestone, which was cheaper and easier to work with. Granite had its limitations as a building material. Because of its weight, it was impracticable to use for buildings that were more than 5 or 6 stories tall. Ironically, transporting granite by sea had become more expensive (Gratwick 2007:30).

The preeminent historian of Maine's granite industry, Roger Grindle wrote:

The demise of the industry in the State [Maine], and other parts of the country as well, has been variously attributed to changing architectural styles; alternate building, monument, and paving materials; rising labor costs, transportation and technological changes; the no-cemetery movement; cut-throat competition among manufacturers; or, simple lack of foresight. . . . The history of the Maine granite industry from 1910 to World War II is punctuated with the demise of old established firms, a struggle to maintain the paving industry, brief spurts of activity at individual quarries to fulfill special contracts, and the nostalgic reminiscences of the ever-diminishing number of men who actually worked in and about the Maine Quarries (Grindle 1997:184)

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During the Great Depression, the quarries did not benefit from government spending. A 1935 study by the John L. Goss Co. revealed that only 18 of 234 government building contracts (with appropriations totaling \$178 million) included granite as one of the materials and the 18 projects only included granite valued at \$25,000. A Bureau of Labor and Statistics report published the same year indicated that employment in the granite industry was only 29% of its 1923-1925 average (Deer Isle Granite Museum 1997:54). The late 1930s saw a small uptick in business relating to bridge and building expansion but, World War II depressed the industry to its lowest levels as it severely restricted government building projects and monopolized labor and coal. In the following years after the war, the economic advantage held by Massachusetts and Maine's quarries ended when strikes, lockouts, and poor labor relations allowed the limestone industry to gain political power and lobbying power. Politicians secured government contracts for limestone producing states, such as Indiana, as new bids came due, shutting out the granite industry. Maine's quarries also found one of their previously great assets, easy tidewater access, became a hindrance as transportation by rail and truck was cheaper than by water. Landlocked quarries in places such as Barre, Vermont prospered as they were closer to rail lines and transportation hubs. Even island quarries, like those offshore of Stonington switched to truck transport over new bridges, but the cost of shipping the stone the short distance to Deer Isle made the quarries less competitive and ended the shipment of granite via water (Deer Isle Granite Museum 1997:55).

America's distinctive architecture from the nineteenth and early twentieth century was based upon granite. The illustrated magazine *Stone* opined in 1894 that,

"Men have not built granite edifices because of a preference for other kinds of stone so much as because granite has been more costly than most any other kind of stone. If it were merely a question of architectural taste, all other things being equal, we would find more granite and fewer structures of the softer stones in our stately buildings. Granite is pre-eminently the finest building material in existence." (Stone 1894:171)

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F. ASSOCIATED PROPERTY TYPES

Name of Property Type

Granite vessel shipwrecks in the Stellwagen Bank National Marine Sanctuary

Description

Granite vessel shipwrecks in the Stellwagen Bank National Marine Sanctuary (SBNMS) are categorized as shipwrecks of wooden-hulled sailing vessels that sank while carrying a granite cargo. The shipwreck must lie within the Stellwagen Bank National Marine Sanctuary. Vessels engaged in the granite trade were primarily sloops and schooners that operated along the Eastern Seaboard of the United States transporting granite from the quarries of Maine and Massachusetts to cities such as Boston, New York, and as far away as Miami and New Orleans. Some vessels engaged in the granite trade were purpose-built, while others carried occasional granite cargos in between loads of coal or other bulk commodities. Purpose-built "stone sloops" were heavily-built and specially rigged for granite transportation. Adaptation of a typical coasting schooner to carry granite is expected, but historical information does not contain specifics. The vessel must have been constructed and lost prior to 1961 to qualify as a historical property as defined by the National Register of Historic Places.

To date, three granite vessel shipwrecks have been located and investigated in the Stellwagen Bank National Marine Sanctuary. All sites have been imaged with side scan sonar and video documented with vary degrees of completeness with a remotely operated vehicle (ROV). Each shipwreck site consisted of a granite cargo capping the remains of a wooden hull partially buried in the sediment. At some sites portions of the frames and hull planking protrude up from the sediment. Vessel fittings and cultural artifacts were found around the sites' periphery. Site preservation varies between sites; some have greater quantities of hull projecting above the sediment, others have greater quantities of extant vessel fittings, or more cultural artifacts located on the site. The average size of the shipwreck sites is 55 feet long and 25 feet wide.

Review of historically reported vessel losses based on primary and secondary sources of information such as newspapers, granite company records, and popular shipwreck books yielded the following list of six vessels carrying a cargo of granite that are possibly sunk within the boundaries of the Stellwagen Bank National Marine Sanctuary.

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Historically Reported Granite Loses in Stellwagen Bank NMS

Name	Year_Built	Length_ft	Breadth_ft	Year_Lost	Cargo_Type
<i>Addie E. Snow</i>	1876	95.8	26.4	1898	Pavers
<i>Belle Wooster</i>	1878	129.2	32.8	1902	Granite (dressed)
<i>Lamartine</i>	1848	79	22	1893	Granite (cut)
<i>Lucy D.</i>	1866	110	29	1886	Pavers (blocks)
<i>Screamer</i>	1872	68	26	1904	Granite
<i>William C. Tanner</i>	1890	191.4	38.3	1909	Granite (rubble)

Significance

The granite vessel shipwrecks in the Stellwagen Bank National Marine Sanctuary are significant to American history and are eligible at the state level for the National Register of Historic Places based upon Criteria D; the shipwreck sites are likely to yield information important to history. The shipwrecks are significant specifically to the New England states of Maine and Massachusetts based upon archaeological information that can be collected about the overall granite trade, the vessels, and the people who built, used, and in some cases perished when these vessels sank.

The level of structural integrity of an individual site will dictate the overall research goals and expected outcomes. Some shipwrecks are more intact while others only consist of a lower hull and a piled granite cargo. In general, granite vessel shipwrecks provide a physical record of the development and expansion of the New England granite trade between 1830 and 1930. Investigation of the archaeological sites will likely yield information on purpose-built granite vessels as well as vessel adaptations to meet the needs of a changing and expanding granite industry. Most importantly, archaeological site investigations will shed light on representatives of a vanished vessel and cargo type that contributed to the United States' economic, industrial, and infrastructure growth during the 19th and 20th century.

Current and future research programs will develop information important to history through linking archaeological investigated granite shipwrecks to their historical context. Research themes that will yield this information include shipboard life, vessel design, use, and adaptation, granite quarrying, finishing, and use, cargo stowage, and the wrecking event.

Shipboard life

Future site investigations can provide information about the lives of crewmen who operated granite vessels. Little documentation of the crew's day to day life onboard exists in the historical record, making archaeological investigation a significant way to yield insight into

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coastal freighting as a livelihood. Archaeological information derived from a single shipwreck might show differences and/or similarities in the crew's background, ideology, economic status, and life-ways through documentation of personal items and family mementos. Artifacts found on shipwrecks may yield information that illuminates differences and/or similarities between geographic locales based on the vessel's home port or the crew's cultural affiliation. In many cases, several generations of a single family were engaged in the coasting trade resulting in strong ties to the sea and to particular vessels or ports such as Chebeague Island, Maine or Rockport, Massachusetts.

Vessel Design, Use, and Adaptation

Like many types of watercraft, little information exists in archival collections that document granite vessel design, use, and adaptation. Purpose-built "stone sloops" were designed and constructed for the trade; however, the exact aspects that went into building this variety of vessel have not been determined. Similarly, archaeological research is expected to elucidate the modification of 2 to 5-masted coasting schooners to become part time or full time granite carriers. Sloops and schooners in the granite trade were built mainly in Massachusetts and Maine. Sloops in particular were not built in established yards and as a result, no known information is present today about their building techniques and construction details.

Granite Quarrying, Finishing, and Use

Granite quarrying was an industry vital to New England's economic development in the 19th and early 20th century. The products ranging from the humble paving block to meticulously finished statutory and cemetery work were shipped all over the globe. The quarries and quarrymen supplied hundreds of types of products, many of which are not documented in written records. Archaeological research on shipwrecks with granite cargoes will provide data on the breadth of granite products shipped from quarries. Sampling of granite cargoes will likely lead to identifying the area of origin as subtle differences in the stone marked each regions output. Some stone can be directly identified with a particular quarry.

Cargo Stowage

The tremendous weight of the granite cargos loaded upon relatively small sloops and coasting schooners, lent the vessels the moniker of "floating ledge." The process of stowing a granite cargo was an art practiced by ship captains and quarrymen that was not recorded in the historical record. Loads were meticulously placed either in the hold, on deck, or a combination of both depending on the vessel size and cargo characteristics. Archaeological investigation can yield information on cargo stowage by examining the granite cargos that still show evidence of careful stacking by skilled laborers.

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Wrecking Event

Events surrounding the sinking of a granite vessel, in many cases, can only be examined through an analysis of its archaeological remains. Information extracted through the archaeological investigation of the shipwreck site can identify the cause of the vessel's demise and the crew's activities onboard just prior to and during the sinking event. In general, little or no detailed information exists in the historical record about the wrecking event. Local newspaper articles covering a granite vessel sinking focused on who was onboard and the physical condition of the crew as a result of their traumatic ordeal. Analysis of the wrecking event may yield information about deficiencies in the design and operation of granite vessels that may have contributed to the vessel's demise. There is also the role of economic pressure to send vessels out overladen to maximize profit, or to sail at a less than optimal time to complete an order. Variables such as a vessel's design or age, position and type of cargo, and the amount of knowledge crew members had in sailing granite laden vessels can lend greater depth to the story of the New England granite trade.

Contemporary accounts of the granite trade describe it as a dangerous undertaking. The unyielding, tremendously heavy nature of the cargo made crewmen especially wary of a coasting voyage carrying granite. Analysis of the archaeological remains of several granite shipwrecks may shed light on specific factors that led sailors to consider granite cargos as "tombstones."

The authors believe that no granite laden vessels, which sank within the territorial waters of the United States, New England, or along the Atlantic Coast, have been listed on the National Register of Historic Places. The only known vessels with ties to the stone industry that have been listed on the National Register of Historic Places are three shipwrecks associated with the Bullhead Point Historical and Archaeological District in Lake Michigan, off Sturgeon Bay, Wisconsin. The vessels are the barge *Empire*, schooner barge *Ida Corning*, and barge *Oak Leaf*. The vessels were listed in 2001 and are connected to the Sturgeon Bay Stone Company and overall Great Lakes limestone trade between the 1860s and turn of the century. All three were abandoned at the Bullhead Point site in the 1920s and subsequently burned in the 1930s. They lie in very shallow water and are now part of the Bullhead Point City Park and Wisconsin Maritime Trail (Rodgers and Green 2003).

Nine granite laden vessels have been located by recreational sport divers in Massachusetts' waters outside the Stellwagen Bank National Marine Sanctuary based on a search of local shipwreck books and websites. None of these sites have been the subject of archaeological investigation to record the site or assess its potential eligibility for the National Register of Historic Places. The only site in Massachusetts water's examined by Massachusetts Board of

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Underwater Archaeological Resources archaeologists is the three-masted schooner *Jennie M. Carter* that sank with a cargo of paving stone in 1894 off Salisbury Beach. Only a limited visual inspection of the remains was completed, which did not result in a report, analysis of significance, or determination of eligibility (Victor Mastone 2011, pers. comm). Historically reported vessel losses indicate that an additional 87 schooners and sloops may have been lost in Massachusetts state waters with a cargo of granite or stone (Marx 2011). There are no purpose-built granite carrying vessels being preserved or held in a museum collection. A number of museums house wooden schooners that may have carried a cargo of granite during their career; however, no museum interprets their historic vessel as a component of the New England granite trade.

Registration Requirements

In order for a shipwreck to be eligible for listing as part of this multiple property submission under criteria D at the state level, there must be physical evidence that the shipwreck was a vessel carrying a granite cargo when it sank and now is located within the boundaries of the Stellwagen Bank National Marine Sanctuary. The property must potentially yield information on the history of the New England granite trade as well as granite vessel construction and use. Archaeological study would be expected to yield information about the diverse varieties of granite used throughout society as building material or for ornamental purposes. Key registration requirements are that the property must have sufficient structural integrity to visually convey the historic function and design of a granite carrying vessel, whether it be purpose-built or modified for the granite trade. The property must also clearly demonstrate that granite was its primary cargo at the time of its loss. Site integrity must be sufficient for archaeological investigation to yield information about shipboard life, vessel design, use and adaptation, as well as the wrecking event.

Evidence of its location should consist of a side scan sonar image at minimum. To be considered eligible for individual listing, the archaeological site must have sufficient integrity for archaeologists to determine that the shipwreck is a vessel with a cargo of granite through visual documentation of diagnostic features that indicate its function and cargo contents. Historically reported vessel losses may be used in tandem with archaeological information to ascertain the site's age. Sites may be eligible even if disturbed by natural forces or human interactions as long as enough archaeological integrity remains to have the potential to yield useful information.

Artifacts will not be considered individually eligible or as contributing to the significance of a multiple property submission unless they can be associated with a specific shipwreck. If such artifacts have the potential to yield information because of their own characteristics apart from

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any associated with a wreck, they may be considered as significant objects, as opposed to a site.

Threats

Granite shipwrecks have been located in depths ranging from 200 feet to 500 feet. The character of the physical remains present at a shipwreck sites results from the wrecking process and subsequent effects of natural and anthropogenic forces. The wrecking process for granite laden vessels lost in the sanctuary includes two separate causal factors that influence site preservation. Foundering was a leading cause of vessel destruction. Foundering may have resulted from a storm event causing a cargo shift or structural failure of a vessel's hull. Vessel foundering also occurred through structural failure resulting from deterioration of a vessel's hull. Due to the various causes that might lead to foundering, the amount of structure entering the archaeological record differs from case to case. Some granite vessels with a strongly-built wooden hull will have its remains largely intact and therefore its structure will withstand post-depositional forces to a greater degree. Other granite vessels with an older or a more lightly built hull might enter the archaeological record with less material remains and are therefore more readily impacted by environmental and anthropogenic forces. Other granite vessels sank due to collision with another vessel or an unknown object. Collision may fragment the vessel, compromising its structural rigidity and therefore increasing the effects of post-depositional forces.

All materials submerged in the marine environment undergo degradation based upon environmental factors and the material's composition. Oceanographic forces such as currents and waves physically break down the shipwreck's fabric. Largely constructed of wood, granite vessels are digested slowly by marine organisms and bacterial decomposition. Iron fastening and machinery corrode and loose tensile strength. In both cases the archaeological site's degradation reaches a plateau where the degradation process slows. In many instances little of the wooden hull remains above the sediment, but the granite cargo is perfectly intact due to the stone's durable nature. Material buried in the sediment is the best preserved as it is surrounded in an anoxic environment that greatly reduces bacterial decomposition of both organic and inorganic material. The sanctuary's cold water and depth blunt both the effects of the natural forces as compared to warm tropical seas. Natural degradation is a slow, inexorable threat, but one that does not diminish the site's archaeological integrity.

The biggest threat to SBNMS's historic shipwrecks is from fishing activities. Negative impacts to site's can be directly correlated with their location in areas subject to gillnet fishing, bottom trawling, and hook and line bottom fishing. Bottom trawling has the greatest negative impact potential. Single impacts from trawl gear may crush or disarticulate wooden structure and remove artifacts from the site. Repeated trawl gear impacts can completely destroy the fragile

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wooden structure of a shipwreck. Trawl nets may also become entangled in the wreck structure, impeding public access and archaeological research. Gillnet fishing also negatively impacts shipwreck structure through the deployment and recovery of the net. Gillnet fishermen intentionally set their gear on shipwreck structure. While the net itself weighs very little, weighted lines and anchors destroy artifacts and structure. Gillnetting's greatest negative impact results when the fishermen recovers the gear and finds it snagged on the wreck. Gillnetters can exert tremendous pull on their gear in an attempt to break the snag free, leading to destruction of shipwreck structure. Oftentimes gillnet fishermen cannot recover their net; it remains entangled in the wreck continuing to fish and impeding access. Hook and line fishing as practiced in the sanctuary often utilizes a hook weighted with up to 24 ounces of lead. Hook and line fishermen target shipwrecks as quantities of fish are found inhabiting these sites. The fisherman repeatedly raises and lowers the weighted hook often contacting the bottom with the weight. Fragile artifacts may be crushed in the process or the hook may snag on shipwreck structure, disarticulating it, and even pulling it to the surface.

Current Protection

The sanctuary's mandate to protect and manage historical resources arises from various federal regulations and laws as follows:

- Antiquities Act of 1906
- Historic Sites Act of 1935
- Archaeological and Historic Preservation Act of 1960
- National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. § 470 et seq.)
- Department of Transportation Act of 1966 (section 4(f))
- Presidential Order 11593 of 1971
- National Environmental Policy Act (NEPA) (Section 101(b)(4))
- National Marine Sanctuaries Act (NMSA) of 1972 (16 U.S.C. § 1432 et seq.)
- Archaeological Resource Protection Act of 1979 (ARPA) (16 U.S.C. § 470aa et seq.)
- Stellwagen Bank National Marine Sanctuary Regulations of 1992 (15 C.F.R § Subpart N)

The NMSA mandates that all National Marines Sanctuaries manage historical resources in a fashion that protects the resources while facilitating uses compatible with resource protection. Office of National Marine Sanctuaries regulations require the sanctuary to comply with all laws and regulations of the Federal Archaeology Program, such as the National Historic Preservation Act (NHPA) and Archaeological Resource Protection Act (ARPA). These regulations require the sanctuary to develop a heritage resource inventory and management program, oversee federal activities that may affect historic and cultural resources, and nominate potentially eligible sites to the National Register of Historic Places.

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Stellwagen Bank National Marine Sanctuary seeks to comply with Section 110 of the National Historic Preservation Act by nominating archaeological sites to the National Register of Historic Places. Currently, five shipwreck sites within the sanctuary are listed on the National Register of Historic Places. Although the National Register of Historic Places was originally designed to recognize historic properties on State-held lands, the Keeper of the Register has determined that NOAA's Office of National Marine Sanctuaries may participate in the program because the sanctuary has jurisdiction and control over historic properties on the sanctuary's seafloor as set forth by Congress during the sanctuary's designation. In addition to complying with Section 110 of the NHPA, the sanctuary is required by Section 106 of the same act to take into account the effects of sanctuary undertaking on historic properties and to allow the Advisory Council on Historic Preservation an opportunity to comment on sanctuary actions that negatively affect historic properties.

Current Stellwagen Bank National Marine Sanctuary regulations prohibit moving, removing or injuring, or attempting to move, remove or injure a sanctuary historical resource except as an incidental result of traditional fishing operations. These regulations also prohibit drilling into, dredging or otherwise altering the seabed of the sanctuary; or constructing, placing or abandoning any structure, material or other matter on the seabed of the sanctuary, except as an incidental result of an anchoring vessel, traditional fishing operations; or the installation of navigational aids. Lastly sanctuary regulations prohibit possessing within the sanctuary (regardless of where taken, moved or removed from), except as necessary for valid law enforcement purposes, any historic resource.

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G. GEOGRAPHICAL DATA

Stellwagen Bank National Marine Sanctuary

Stellwagen Bank National Marine Sanctuary (SBNMS), managed by NOAA's Office of National Marine Sanctuaries, is located at the mouth of Massachusetts Bay, 25 miles east of Boston, 3 nautical miles southeast of Cape Ann, and 3 nautical miles north of Cape Cod, Massachusetts. Congress designated the 842-square mile (638 square nautical miles) area encompassing Stellwagen Bank and Basin, Tillies Bank and Basin, and the southern portion of Jeffreys Ledge a National Marine Sanctuary in 1992. The sanctuary lies wholly in federal waters and does not overlap with the state waters of the commonwealth of Massachusetts. The sanctuary's most prominent feature is Stellwagen Bank, a glacially deposited sandbank created by the retreating Laurentide Ice Sheet that covered much of New England during the last period of glaciation. SBNMS lies astride the maritime routes connecting the historic ports of Provincetown, Plymouth, Boston, Salem, and Gloucester to the Atlantic Ocean. Given the nearly four centuries of European and Euro-American waterborne transportation across sanctuary waters, archaeologists have found a rich collection of maritime heritage resources resting on the sanctuary's seafloor in the form of historic shipwrecks. To date, 40 historic and 5 modern shipwrecks have been located in SBNMS. Five of those sites, comprised of six vessels, are listed on the National Register of Historic Places. The most well known National Register sites are those of the steamship *Portland* lost with all hands in 1898, the collided coal schooners *Frank A. Palmer* and *Louise B. Crary*, and the coal schooner *Paul Palmer*. Additional National Register sites are the eastern rig draggers *Joffre* and *Edna G*.

The sanctuary has diverse bottom topography and composition. Its most prominent submerged feature is the kidney-shaped plateau, Stellwagen Bank. Stellwagen Bank is a shallow, sand and gravel covered geologic feature curving in a southeast to northwest direction for 19 miles. It is roughly 6 miles across at its widest point at the southern end. The surface of Stellwagen Bank, which is the shallowest portion of the sanctuary at 65 feet, is mostly sand and gravel while coarser sand and gravel flank the eastern edge of the bank. The sanctuary also includes all of Tillies Bank (situated to the northeast of Stellwagen Bank) and southern portions of Jeffreys Ledge (situated to the north). Directly north of Stellwagen Bank is Gloucester Basin where the seafloor consists of fine mud and the depths drops to over 500 feet.

The Sanctuary boundary is marked by the following coordinates, which indicate the northeast, southeast, southwest, west-northwest, and north-northwest points: 42 45'59.83" N x 70 13'01.77" W (NE); 42 05'35.51" N x 70 02'08.14" W (SE); 42 07'44.89" N x 70 28'15.44" W (SW); 42 32'53.52" N x 70 35'52.38" W (WNW); and 42 39'04.08" N x 70 30'11.29" W (NNW).

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H. SUMMARY OF IDENTIFICATION AND EVALUATION METHODS

The multiple property listing has been developed based upon historical and archaeological research on granite vessels in the Stellwagen Bank National Marine Sanctuary between 2003 and 2011. The shipwrecks were discovered through multibeam, side scan, and synthetic aperture sonar surveys. Sanctuary maritime archaeologists used an EdgeTech DF-1000 dual frequency side scan sonar as their primary search tool. The digital DF-1000 operates simultaneously at both low (100 kHz) and high (384 kHz) frequencies. Sonar data was displayed and recorded using Triton Imaging's Isis sonar acquisition software. Geographic positioning for the surveys was accomplished utilizing a differential global positioning system (DGPS).

Survey locations were chosen based upon the location of reported vessel losses, fishing hangs, and multibeam anomalies. Reported vessel losses were locations where a vessel was reported as sunk. These locations were identified with specific geographic coordinates in the form of Latitude/Longitude, LORAN TD's, or descriptive ranges and bearings. Primary and secondary source material compiled from newspapers, archives, and books were entered into the sanctuary's historic vessel loss database, which was then queried to extract the records of reported vessel loss. Most of the reported vessel losses in Massachusetts Bay provide imprecise positions. A common reported vessel loss may reference a very rough bearing and a distance (for example, 10 miles southeast of Gloucester, Massachusetts). This variety of reported loss was less useful for informing the survey area selection process, but it was valuable for determining the possible identity of a located shipwreck.

Fishing hangs were locations identified by fishermen where fishing gear (primarily trawl gear) became entangled with an object on the seafloor. The source of the entanglement may be a geologic formation or cultural in origin. Oftentimes, a fishing hang had the name of a shipwreck associated with it; fishermen often attributed hangs to fishing vessels that had sunk in the vicinity. Multibeam anomalies were features on the USGS Sun-illuminated Sea Floor Topographic Map of Stellwagen Bank National Marine Sanctuary that were visually identified on the map by sanctuary staff. Previous remote sensing surveys of these multibeam anomalies revealed the anomalies to be shipwrecks, geologic features, or false anomalies created by multibeam data errors.

Subsequent remotely operated vehicle (ROV) investigations of granite vessel shipwrecks, conducted in partnership with the Northeast Underwater Research Technology and Education Center at the University of Connecticut (NURTEC), yielded still and video imagery used to document the shipwreck sites. NURTEC supported ROV investigations utilized the NURTEC science-class ROVs *Hela* in 2003 through 2006 and *Kraken 2* in 2009 and 2010. Operations were conducted from the University of Connecticut's (UConn) Research Vessel *Connecticut*.

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Both ROVs were heavily modified off-the-shelf models adapted to meet the needs of scientific based missions.

The ROVs' main imaging tool was either a forward facing Triton Aries 3-CCD video camera, Kongsberg High Definition (HD) video camera, or Insite Pacific Zeus HD video camera. Both the *Hela* and *Kraken 2* carried a low light color pilot camera and scaling lasers mounted twenty centimeters apart that bracketed the pilot camera. The parallel lasers allowed archaeologists to measure artifacts and structures. The vehicles also carried an Insite Pacific Scorpio 3-megapixel digital still camera facing forward or downward and 2 strobes. Each of the ROV's video cameras recorded its digital data onto Sony HDCAM or DVCAM tapes as well as onto DVDs. The ROV's complement of positioning sensors consisted of a depth sensor, compass, sector scanning sonar, and ultrashort baseline tracking system.

In addition to the NURTEC supported ROV investigations, SBNMS archaeologists utilized a Seabotix LBV 150 ROV to investigate a granite vessel shipwreck in 2011. Carrying a low-light color standard definition video camera, LED lighting, and a sector scanning sonar, the Seabotix ROV provided sufficient capability to characterize a granite vessel shipwreck. Archaeologists conducted field operations from the NOAA research vessel *Auk*. Site investigation video was recorded on mini-DV video cassettes.

ROV investigations focused on the exploration, comprehensive documentation, and characterization of the granite shipwrecks with the following objectives in mind:

- 1) Vessel construction and design
 - Project data was used to determine how the ship's hull was built, its overall shape, and the location/design of its deck structures and machinery to determine the vessel's age and identity.
- 2) Cargo Type
 - The dimensions and shape of the cargo to identify its origin, destination, and function.
 - The location and condition of the cargo (stowed, or displaced) was recorded to determine the vessel's condition at the time of its loss
- 3) Wrecking event
 - Information about the condition of the ship's hull, cargo position, and artifactual material was recorded to illuminate the wrecking event. Information about the wrecking event can indicate the vessel's identity.
- 4) Material culture
 - The presence, location, and type of artifacts were documented to answer questions about the vessel's identity, when it sank, and life onboard

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An additional objective was the documentation of anthropogenic impacts to the sites from activities such as commercial and recreational fishing. The information was used to determine which activities have damaged the site as well as which activities possess the greatest future threat to the site. Identified threats will inform the creation of management strategies to best protect the historic resources.

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United States Department of the Interior
National Park Service

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Granite Vessel Shipwrecks in The Stellwagen Bank
National Marine Sanctuary MPS

Essex County, MA

Name of multiple property listing (if applicable)
N/A

Section number

Page

SUPPLEMENTARY LISTING RECORD

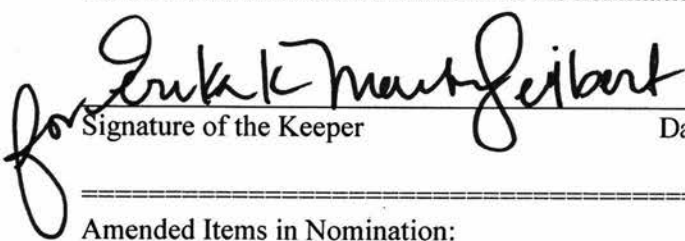
NRIS Reference Number: 64501135

Property Name: Granite Vessel Shipwrecks in The Stellwagen Bank National Marine Sanctuary MPS (Cover)

County: Essex State: MA

Multiple Name: N/A

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

 Signature of the Keeper

3/7/12
Date of Action

Amended Items in Nomination:

The documentation is amended to remove the sentence: If such artifacts have the potential to yield information because of their own characteristics apart from any associated with a wreck, they may be considered as significant objects, as opposed to a site.

Artifacts are not considered objects (or sites) and should not be nominated as such.

The ____ State Historic Preservation Office was notified of this amendment.

DISTRIBUTION:

National Register property file

Nominating Authority (without nomination attachment)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: COVER DOCUMENTATION

MULTIPLE NAME: Granite Vessel Shipwrecks in The Stellwagen Bank
National Marine Sanctuary MPS

STATE & COUNTY: MAINE, Essex County

DATE RECEIVED: 01/20/12 DATE OF PENDING LIST:
DATE OF 16TH DAY: DATE OF 45TH DAY: 03/07/12
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 64501135

REASONS FOR REVIEW:

APPEAL: N DATA PROBLEM: N LANDSCAPE: N LESS THAN 50 YEARS: N
OTHER: N PDIL: N PERIOD: N PROGRAM UNAPPROVED: N
REQUEST: Y SAMPLE: N SLR DRAFT: N NATIONAL: N
NEW MPS: Y

COMMENT WAIVER: N

☒ ACCEPT ☐ RETURN ☐ REJECT ☐ DATE

ABSTRACT/SUMMARY COMMENTS:

RECOM./CRITERIA _____

REVIEWER Seibert DISCIPLINE Archaeology
Phone _____ Date 3/7/12

DOCUMENTATION see attached comments Y/N see attached SLR Y/N

If a nomination is returned to the nominating authority, the nomination is no longer under consideration by the National Park Service.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Sanctuary System
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Rd.
Scituate, MA 02066
(781) 545-8026 FAX: (781) 545-8036



National Register of Historic Places
National Park Service
1201 Eye St., NW 8th Floor (MS 2280)
Washington, DC 20005

To Whom It May Concern,

2 January 2012

Please find enclosed the multiple property National Register of Historic Places nomination for granite shipwrecks in the Stellwagen Bank National Marine Sanctuary and an individual site nomination for the shipwreck and remains of the schooner *Lamartine*. The *Lamartine* and future site nominations related to this multiple property nomination reside solely in federal waters off the coast of Massachusetts in a National Marine Sanctuary managed by the National Oceanic and Atmospheric Administration (NOAA). The historic shipwreck sites are under the jurisdiction of NOAA and are protected by regulations which prohibit the disturbance, salvage, or removal of historical resources. In addition to the nomination package, NOAA is providing you with information clarifying the agency's authority to nominate properties in the Stellwagen Bank National Marine Sanctuary.

The National Historic Preservation Act mandated that federal agencies establish programs to ensure that "properties under the jurisdiction or control of [such] agenc[ies] are identified, evaluated, and nominated to the National Register," as appropriate. 16 U.S.C. § 470h-2 (a)(2)(A). The National Marine Sanctuaries Act (NMSA) gives NOAA jurisdiction and management responsibility and authority over "discrete area[s] of the marine environment" designated as national marine sanctuaries. 16 U.S.C. § 1433 (a). The duties placed on NOAA by the NMSA include the protection and management of submerged cultural and historical resources. 16 U.S.C. § 1431 *et seq.* The authority of NOAA to nominate sites in the Stellwagen Bank National Marine Sanctuary to the National Register is further affirmed by the successful listing of the steamship *Portland*, schooners *Frank A. Palmer* and *Louise B. Crary*, schooner *Paul Palmer*, and eastern rig draggers *Joffre* and *Edna G.* to the National Register of Historic Places in 2005-2011.

Therefore, we ask that you include the multiple property nomination for eastern rig dragger fishing vessels of the Stellwagen Bank National Marine Sanctuary and the shipwreck and remains of the *Lamartine* to the National Register in recognition of its importance to the history of this nation. We believe that it is NOAA's duty to put forth nominations for properties under our jurisdiction and hope that you recognize this nomination as an attempt to meet our own mandate under the NHPA. 16 U.S.C. § 470h-2 (a)(2)(A). Thank you for your attention to this important issue. Please do not hesitate to contact me at 781-545-8026 if you have any questions.

Sincerely,

Craig MacDonald, Ph.D
Superintendent

