Everyday Lives

An Interim Report on Archaeological and Environmental Investigations of Malaga Island, Phippsburg, Maine

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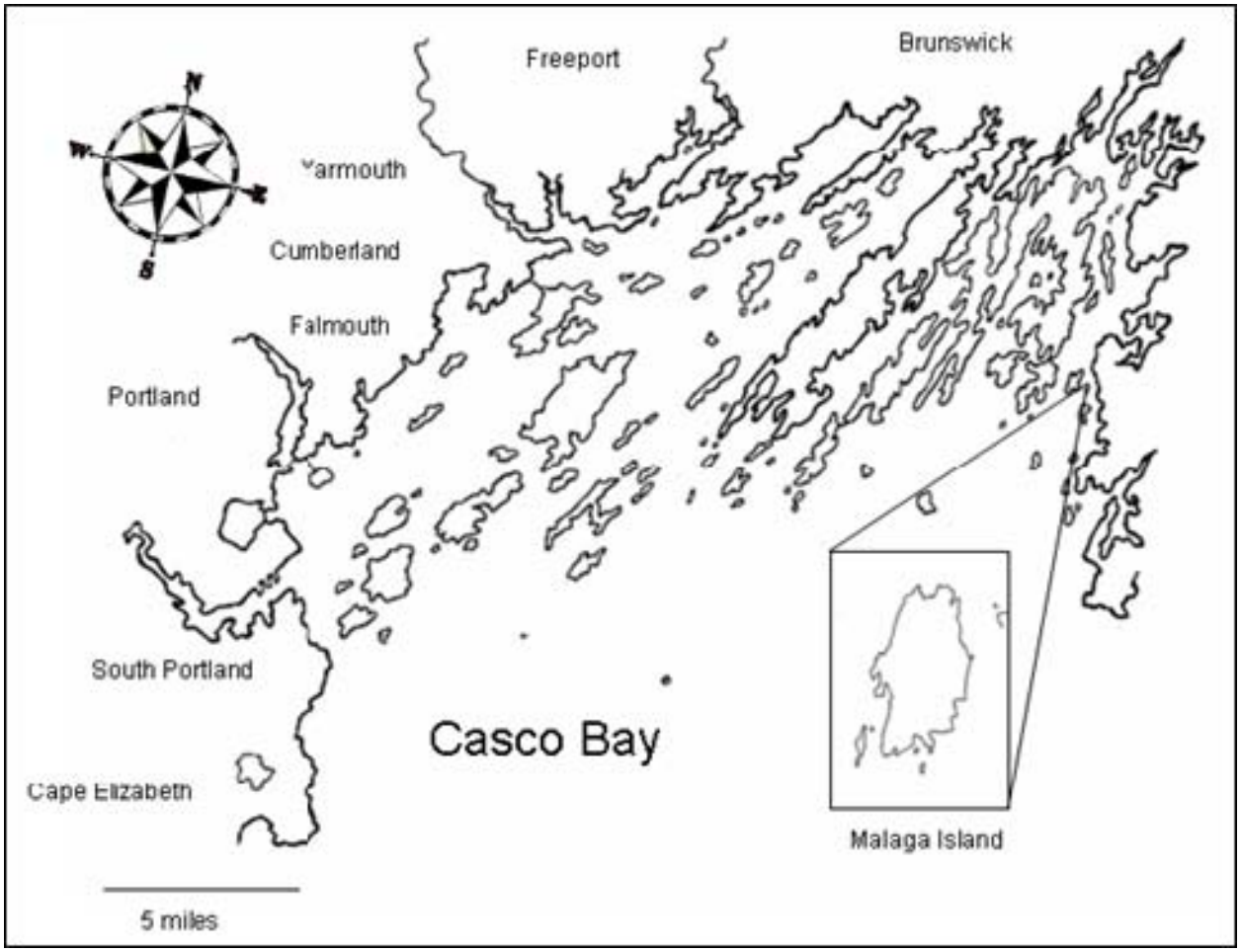


Figure 1 Malaga Island project location in northern Casco Bay

Abstract

This is a preliminary report on the archaeological work associated with Malaga Island, located in Casco Bay (town of Phippsburg), in mid-coastal Maine. Associated with this work were two formal field schools in the summers of 2006 and 2007 under the auspices of the University of Southern Maine. The field schools and subsequent explorations have resulted in over 56,000 artifacts and extensive laboratory work. The Malaga Island artifacts are now in the collection of the Maine State Museum and are accessible for research. Although the work continues, the occasion of the 100th anniversary of the eviction of the Malaga residents in 1912 and the important discussions engendered by Malaga Island have led to the issuance of this interim report on the archaeology. Due to its preliminary nature, the artifact collection is partial and the data analysis is on-going. Therefore, the information and analysis contained here is of a probationary nature. However, the multiple field schools and the extensive amount of artifacts, while only a small percentage of the potential data recovery the island could yield, provide a wealth of information. A significant number of tables and photographs are contained in this preliminary report as evidence of this information.

Dedication

This interim report is dedicated to the descendants of Malaga Island.

Table of Contents

I. Introduction 8

II. A Public Archaeology Approach 11

Black History in Maine 12

Stewardship of Archaeological Sites 13

Public Outreach, Civic Engagement and Education 14

III. Historical Research 17

Written Record 17

Oral History and 18

Genealogy 19

Photographic Documentation 19

Historical Cartography 19

IV. Environmental Investigation 22

Vegetation and Natural Resources Inventory 22

Natural Resource Inventory 23

Column Sampling, Tidal Sampling and Flotation Methods 30

Vibracoring Marsh and Inter-tidal Deposits 32

V. Archaeological Investigation 35
1988-2003 University of Southern Maine 44
2004-2007 University of Southern Maine and Maine Coast Heritage Trust 44
Maritime Lifeways of the Recent Historic Period 49
VI. Site Descriptions 50
Midden 1 (McKinney) 50
Site Description 50
Archaeological Investigation 53
Stratigraphy 55
Material Culture 57
Midden 2 (Marks) 60
Site Description 60
Archaeological Investigation 62
Stratigraphy 62
Material Culture 62
Midden 3 (Juniper Hill) 63
Site Description 63
Stratigraphy 64
Material Culture 65

Midden 4 (H. Griffin) 65
Site Description 65
Archaeological Investigations 68
Stratigraphy 68
Material Culture 72
Midden 5 (Griffin/Eason) 73
Site Description 73
Stratigraphy 74
Material Culture 78
VII. Historic Material Culture 80
Ceramic Remains 80
Glass Remains 88
Metal Remains 95
Bullets and Shell Casing 108
Smoking Pipes 114
VIII. Faunal Remains 121
Bone Fauna 121
Midden 1 (McKinney) 124
Midden 4 (H. Griffin) 126

Midden 5 (Griffin/Eason) ……. …… 128
Fishing at Malaga 130
Vertebra Faunal Conclusion 132
Bivalves Remains..... 133
Chondrophore Measurements..... 133
Marine Gastropods and Crustacean Ecology 134
Terrestrial Gastropods 140
IX. Floral Remains 143
X. Prehistoric Remains 143
XI. Project Summary 144
XII. Preliminary Recommendations 144
XIII. References 146
XIV. Acknowledgements ……...150

I. Introduction

Malaga Island is located at the northern end of Casco Bay, the first significant embayment moving north along the coast of Maine (Figures 1 and 2). This low-lying island of approximately 42 acres is near the eastern mouth of the New Meadows River in the town of Phippsburg, within hailing distance to the eastern mainland. A tombolo or sand bar at extreme low tide connects Malaga with Bear Island to the west (Figure 3). Extensive rocky tidal flats are to the south at low tide. Smaller clay and sandy flats extend to the north.

Figure 2 General view of the north end of Malaga Island, facing southwest. Bear Island is at right. (NDH MI 2007)

Figure 3 General view of vibracoring of sub tidal zone on the western shore between Bear Island and Malaga Island, Casco Bay, Maine, facing northwest. (NDH MI 2007)

Malaga Island was first occupied by Native Americans during the prehistoric period. At least one reported artifact suggests that a Late Archaic period occupation may have existed on the north end of the island. Archaeological survey identified indisputable prehistoric remains on Malaga Island, but failed to locate extensive aboriginal deposits including aboriginal shell middens, common along the shore of the Maine coast. However, the exploration for prehistoric remains has not been the main focus of archaeological

investigations on the island and a more intensive survey might reveal more information—the island is well-positioned for fishing forays down the river and out to the ocean.

At present (2012), no archaeological evidence of 17th or 18th century historic period occupations has been identified from walkover surveys and testing. However, an extensive historic habitation area with shell midden deposits dating from the mid 19th century to early 20th century, designated the Malaga Island Site (ME 348.8), has been identified on the north end of the island. Several other reported sites, including eroded shell middens and non-shell deposits have been identified on the other aspects of the present shore of the island (Table 1).

TABLE 1

Inventory of MHPC Reported Archaeological Sites and Characteristics
on Malaga Island, Casco Bay, Maine

MHPC NUMBER	NAME	PREHISTORIC/ HISTORIC	AREA ($M^{2)}$	DEPTH (CM)	EROSION
348.8	Malaga Island Site	P and H	1000+	90	Yes
348.	Malaga Island A	Historic	na	na	Yes
348.	Malaga Island B	Historic	na		Yes
348.	Malaga Island C	Historic	na	na	Yes
348.	Malaga Island D	Historic	na	na	Yes

The historic period occupation began around 1860 and continued until 1 July 1912 when the State of Maine ordered the final eviction of the fishing community. The initial dates of various household occupations remain only generally known and are based on deed research, cartography, photographic documentation and material culture. However, the terminal occupation of households and other structures was documented during the eviction period (Mitchell 1999). The eviction was required by the governor's council of the State of Maine, and the land was seized by the Cumberland County sheriff. Thus the Malaga Island community brackets an approximately 50 year historic period with a concentration of some 30-45 individuals at its peak from 1880-1912, and a clear designation of the end of occupation.

II. A Public Archaeology Approach

"Public archaeology" commonly refers to archaeological goals and research selected to have a public benefit, and to archaeology that involves the public, usually through education or participation. The public archaeology of Malaga Island incorporates both of these approaches. This is in keeping with the stewardship of Malaga Island under the ownership of Maine Coast Heritage Trust, with its civic, conservation mission, and its reputation as one of the largest, most effective land trusts in Maine. The archaeologists' investigation of Malaga has been designed in accordance with a "public archaeology" approach.

The immediate goal of our archaeological investigation is to determine what occurred on Malaga Island. We do this to increase our understanding of the inhabitants of Malaga Island during the principal occupation period. An increase of this understanding includes greater insight into how they lived, their economy, the environment, their cultural ecology, and how they interacted with other communities. Archaeology cannot provide the sum total of people's lives, but it can provide the artifacts (material culture) and their context (associations) for reconstruction of culture. The combined picture helps us to understand the past. Archaeology provides the physical evidence for social reconstruction of past ways of living. As a physical science in service to social science questions, it provides the means to "set the record straight." There are many different "records" and many different ways of establishing, sorting, and interpreting them. The archaeology becomes particularly important in dealing with issues of social justice that permeate to the

present from the past. A public archaeology approach is one means to increase the relevancy of the archaeology. This approach to understanding African-American history in Maine is outlined further in our summary of archaeological heritage stewardship, below.

Black History in Maine

The residents of Malaga Island have been maligned as among the historically most notorious on the southern Maine coast. A number of factors related to the media and political decision-making contributed to the visibility and notoriety of the community in the late 19th century. Caretakers and overseers of the poor were concerned about Malaga residents, some of who suffered from disease. But it cost money to sustain the poor. Further, the surrounding communities were also enticed by the notion of increased development to capitalize on tourism. Resorts for seasonal travelers in the area were becoming in vogue and economic opportunities were sensed. These factors and others caused the African-American settlement of Malaga Island, a settlement of "squatters," to be seen as a hindrance. However, like other islanders, the inhabitants were tied to people on the mainland and the greater Casco Bay region through kinship and economic linkages.

The archaeological investigations on Malaga Island have sought to show the details of the African American experience in this small fishing community in Maine by complementing the historic record with archaeological evidence. Malaga notoriety was a result of a highly diverse racial cluster of related people engaging in subsistence economies juxtaposed with grandiose regional plans for coastal development. The community is identified in historic records by state records, the Lanes (a missionary family), other missionaries, town representatives, post cards and news reporters. Malaga Island is one of the most well documented African American communities along the shore of the Gulf of Maine. This project gives insight to issues of social injustice, racial incrimination, civic engagement and appropriation and use of African American experience by revealing what lies beneath the archaeology: the every-day lives of the community.

One cannot think about Malaga Island and the State of Maine Legislative initiative to destroy the community without wanting to know more. The motive of the State in exhuming the burials of eight children and others who lived and perished on the island makes one wonder. The act was reminiscent of the Kit Carson "Scorched Earth Policy" of the early 19th century in the American Southwest. Dr. Kilgore of Bath, representing the state Coroner's office, attempted to eliminate the Malaga Island cemetery by

excavating the burials, placing the bodies in five lead lined coffins—thus mixing individual remains, and buried the caskets in Pineland Cemetery (at the time, part of the "Home for the Feeble Minded"). This makes one painfully aware of the Eugenics movement of the time.

The burials were of African-American extraction in the Darling genealogical legacy, a legacy extending back to the 18th century. The state mandated removal of houses by July 1st of 1912 or the state would commence burning the houses. They were all gone by that day 100 years ago but the trappings of their discarded lives remained. The shells that built the landscape, fish bones, pig bones, lobster, fish hooks, vanilla extract bottles, buttons, smoking pipes, and nails—all left behind. The State of Maine could erase this community, relocate the people, purchase and sell the island, but Malaga would not be forgotten in time.

The idea of engaging students about social injustice particularly at a local level is warranted with the quality of this case study. Rarely do we find 19th century archaeological sites in which individual African-American householders can be tied to specific structural foundations. Further, Malaga brings many different opportunities to engage people of all backgrounds. Our focus is on creating a dialog with community leaders, community members, tax payers, descendants, educators, children, and the clergy about the contribution of archaeology to matters of equity and social justice. A full partnership with the NAACP has been undertaken for public events such as Black History month in February. The research has been presented at a variety of academic meetings, in the college classroom, and at local venues. The idea of social justice forms the core of these programs and talks.

Stewardship of Archaeological Sites in the Gulf of Maine

Research at Malaga Island aims to build a connection between the cultural and environmental archaeological investigations and public education and stewardship. This project has focused on four basic approaches that encourage archaeological heritage stewardship and that reflect our notion of a "public archaeology":

- Personal conviction involving the creation of dialog between land owners and the local and regional archaeology community.

  Dialog should courage personal responsibility and appreciation of archaeological sites as sources of local cultural and natural history.

- ✳ Professional connection directing public involvement and linking professional academics, community managers and members of the public.
- ✳ Long-term public involvement at all levels of education in public and private schools, universities, and colleges about cultural resources. These efforts include educating the general public about conservation easements and the relation to taxes and long term municipal planning.
- ✳ A long-term approach to archaeology involves a commitment to permanent material culture and documentation, curation, and availability of collections and results. A project goal is to make national and local presentations at venues such as the Maine Archaeological Society events of "Maine Archaeology Awareness Month" in October each year.

Public Outreach and Education

Malaga Island has played a role in the education of students at the University of Southern Maine and through exhibits at The Salt Institute. Various teachers in area school systems have also presented Malaga Island as part of their curricula. Indeed, so many schools and teachers that we do not have an accurate compilation. However, as indicative of our own direct efforts, we provide the following partial listing of presentations, exhibits, and papers given in California, Maine, Minnesota, New Hampshire, New Mexico, and Virginia.

"The Malaga Island Project." Poster and artifact display for *The People's State of the State: What does Equity Look Like in Maine*, NAACP Portland Branch 31st Annual Martin Luther King, Jr. Breakfast Celebration, Portland, Maine, January 19, 2012.

"Archaeology of the Malaga Fishing Community." An interpretive field trip of the prehistoric and historic archaeology on Malaga Island for the Maine Coast Heritage Trust and Phippsburg Historical Society, Phippsburg, Maine, August, 2011.

Lecture and artifact display for *SAGE Program*, part of Osher Lifelong Learning Institute at the University of Southern Maine, Portland, Maine, May 17, 2011.

"The Malaga Island Project." Poster and artifact display for *From Civil Rights to Human Rights: Martin Luther King, Jr. and the Demand for Economic Justice*, NAACP Portland Branch 30th Annual Martin Luther King, Jr. Breakfast Celebration, Portland, Maine, January 17, 2011.

"Digital Microscope Applications for Archaeological Research, Instruction and Curation." As part of the Center for Technology, Enhanced Learning at the Annual Faculty Technology Showcase, University of Southern Maine, Portland, Maine, November 10, 2010.

"Cod Fish Lab Exercise in Introduction to Archaeology." Lecture for the Teaching for Sustainability: Maine Watershed Project, University of Southern Maine, Portland Maine, October 22, 2010.

"Archaeology Project on the Malaga Fishing Community." An interpretive field trip on the prehistoric and historic archaeology on Malaga Island for the Maine Coast Heritage Trust and Phippsburg Historical Society, Phippsburg, Maine, September 10, 2010.

"Fish and Isotope Study." Presentation at the annual meeting of the Isles of Shoals Historical Research Association at Sea Coast Science Center, Rye, New Hampshire, April 13, 2010.

"The Malaga Island Project." Poster and artifact display for *Stride toward Freedom: Why King Matters Now*, NAACP Portland Branch 29th Annual Martin Luther King, Jr. Breakfast Celebration, Portland, Maine, January 18, 2010.

"Public Archaeology: Preservation and Stewardship." Poster presented at Civic Matters, Symposium of Civic Community-Based Projects and Research, University of Southern Maine, Portland, Maine, November 20, 2009.

"Opening of the Malaga Island Trail and Installment of Maine Freedom Trail Marker." Field trip for Maine Coast Heritage Trust, Topsham and NAACP Portland Branch, Portland on Malaga Island, Phippsburg, Maine, August 17-18, 2009.

"Archaeology Project on the Malaga Fishing Community." An interpretive field trip of the prehistoric and historic archaeology on Malaga Island for the Maine Coast Heritage Trust and Phippsburg Historical Society, Phippsburg, Maine, July 17, 2009.

"Malaga Island History and Archaeology." Workshop for Maine Schools sponsored by Maine Civil Liberties and Maine Attorney General's Office at the Augusta Civic Center, Augusta, Maine, May 18, 2009.

Exhibit Nineteen: Maine, "Malaga Island: No Man's Land", March 31- April 18, 2009 as part of Americana 50 states, 50 months, 50 exhibits, September 5, 2007- May 31, 2012. Show curated by Jamie Austin in the Curatorial Practice Program, CCA Watts Institute for Contemporary Arts, San Francisco, California.

"Chemical and Sedimentological Analysis of Two Archaeological Sites in Casco Bay, Maine." By Jana Drury, undergraduate major in Geography-Anthropology (NDH, Mentor). Poster presented at the 9th annual *Thinking Matters Conference* at USM, Portland, Maine, April 17, 2009.

"An Analysis of Cod Remains from Archaeological Sites in the Gulf of Maine." By Erin A. Taylor, 2008 SURF recipient and undergraduate major in Geography-Anthropology (NDH, Mentor). Poster presented at the 9th annual *Thinking Matters Conference* at USM, Portland, Maine, April 17, 2009

"The Malaga Island Project." Poster and artifact display for *Closing the Gap: Investing in a Culture of Opportunity*, NAACP Portland Branch 27th Annual Martin Luther King, Jr. Breakfast Celebration, Portland, Maine, January 19, 2009.

"Historic Archaeology of Malaga Island." Lecture and artifact display presented at the annual meeting of the Phippsburg Historical Society, Phippsburg, Maine, August 26, 2008.

"Results of the 2007 Archaeology Project on the Malaga Fishing Community." An interpretive field trip of the prehistoric and historic archaeology on Malaga Island for the Maine Coast Heritage Trust and Phippsburg Historical Society, Phippsburg, Maine, June 7, 2008.

"The Malaga Island Project." Poster and artifact display for *Closing the Gap: Investing in a Culture of Opportunity*, NAACP Portland Branch 27th Annual Martin Luther King, Jr. Breakfast Celebration, Portland, Maine, January 19, 2008.

"Malaga Island, fishing and molusking on the edge: Coastal ecology and lifeways of a mixed race community in Maine." Presentation, Society for Historical Archaeology annual conference. Albuquerque, New Mexico, January 10, 2008.

"Civic engagement and the archaeology of Malaga Island." Presentation/poster, SENCER Summer Institute (International Conference on Science Education for New Civic Engagements and Responsibilities), Portland, Maine, August 3-6, 2007.

"The African-American Community on Malaga Island, expanding the African diaspora." Presentation, Society for Historical Archaeology, Williamsburg, Virginia, January 9-12, 2007.

"An African-American community on Malaga Island." Poster presentation at American Association for Environmental History and the Forest History Society joint annual conference, St. Paul, Minnesota, March 29-April 1, 2006.

III. Historical Research

Written Record

The written record is composed of a number of primary sources such as deeds, letters, town records, court records, correspondence and publication. The record has been extended by various articles published of first-hand observation of life ways and activities on the island. Holman Day published an article in Harpers Magazine in 1908 describing the habits of the people on Malaga Island, and their surroundings. With his well-illustrated accounts, this study selected details about Eliza Griffin, a laundress and fisher woman that he noted was one of the most economically successful of the Malaga Fishing Community. These details combined with the clearly identified location of her house provide the structure to examine the African American experience of this woman as an individual.

The written record of the early 20th century often demonstrates romanticization, disdain, and pity of the poor "Malagos." Advances in contemporary understanding and reflection were afforded by Bill Barry's 1984 piece in Down East Magazine. Barry's passionate history and proper documentation was apparent in the often cited work. In 1991 John Mosher presented his MA thesis: "No Greater Abomination: Class and Ethnicity of Malaga Island" to the faculty of American and New England Studies at the University of Southern Maine. This unpublished thesis drew together a variety of perspectives on the town of Phippsburg, the State of Maine, Missionaries and the people of the island. The research reflects the mentorship of Dr. Faith Harrington, archaeologist, and Dr. Ardis

Cameron, social historian.

We have drawn upon these resources and others to establish some of the context of the social experience and the sites occupied on the island. A more focused effort to document history and study is in progress by Allen Breed. His publication "No One From Malaga No More" as a chapter in *Maine's Visible Black History* presages his longer contribution. Allen has a broad understanding of Black History in North American and seeks to capture and understand details of the Town and State's involvement with the community. We do not seek to replicate these efforts; rather we plan to develop an understanding of the role of material culture to complement written history. As part of this record, we intend to delve further into the late 19th century and early 20th century records, examining food purchases, bills of lading, and other records that could give insight into the archaeological findings and the cultural reconstructions.

Oral History

Only two or three generations removed, the oral tradition is strong and frequently voiced. No one from the island remains alive. In February of 2002, Lottie Marks, the last member of the community with first-hand experience, passed away. With the assistance of her granddaughter, Lottie was videotaped in an interview with John Mosher of the Maine Historic Preservation Commission. She made brief anecdotal statements about the island and spoke more regarding her life after incarceration at Pineland. Lottie also contended that she was not Black, she was Native American. Jake Marks senior, Lottie's father, was identified as a Native American man who moved here from the Maritime Provinces. Besides Lottie, many descendants have information and stories passed down. Several hundred people can be documented in the various genealogies of the McKinneys, Griffins, Andersons, Darlings, Gomes, and others. The island has been continuously used as part of the local lobster fishing industry. The people using the island for storage of lobster traps, mooring boats, and other work purposes all had some connection by heritage, birth, or marriage to the people removed in 1912. Many of the people who have come back to tour the island are also related to the Malaga community.

Within Phippsburg and Harpswell, stories reflecting degrees of the "truth" are all well-known. In fact one can sort out the "locals" from the "summer tourists" or people from "away" by asking what they know about the island and how they came by the knowledge.

Oral history and local traditions are essential in much ethnographic research. They were particularly necessary in the era when basic schooling was important but literacy was not generally expected for one's life work. Local fishing communities required knowledge, skills and abilities outside of textbooks in the past as much as today. Many stories of the island are similar and even reflect sources in the news. Deeper consideration about family life is more revealing of the condition that led to Malaga's recognition and destruction. Further, one can understand the situation of local economy with regards to fishing, tourism and education. Our project has participated with Rob Rosenthal and Kate Philbrick (oral documentarian and photographer formerly of The Salt Institute, Portland, Maine) who have conducted radio interviews with descendants of the island community.

Genealogy

Our students and other researchers are working on a genealogical reconstruction of descendants. The Malaga genealogy has taken on a life of its own beyond that established as background for the archaeological research. A Facebook site on-line is helping descendants to collect and share information. It is creating a virtual Malaga community.

Photographic Documentation

Kate Philbrick and others have taken photographs of consenting of descendants and relatives. The Maine State Museum, NAACP Portland chapter, Phippsburg and other local historical societies, the University of Southern Maine, and the descendants' Facebook site are serving to collect photographic and other documentation. This has the added advantage of creating a virtual repository, sparking further submittals, and sharing the information among interested parties.

Historical Cartography

Our work entails examining all maps known to cover the area. Interesting patterns begin to emerge such as the steamer route that did not provide a view of the north end of Malaga, but raised local concerns about the visual quality of the area (Figure 4). The 1868 US coastal chart does not show structures on the island (Figure 5). This does not mean that they were not there. The 1868 map does document the location of Benjamin Darling Sr. and Jr. houses locations on Horse Island just south of Malaga. As with historical

photographs, we anticipate that the Facebook site and increased awareness among descendants, historians, and activists will lead to greater sharing and interpretation of cartographic information.

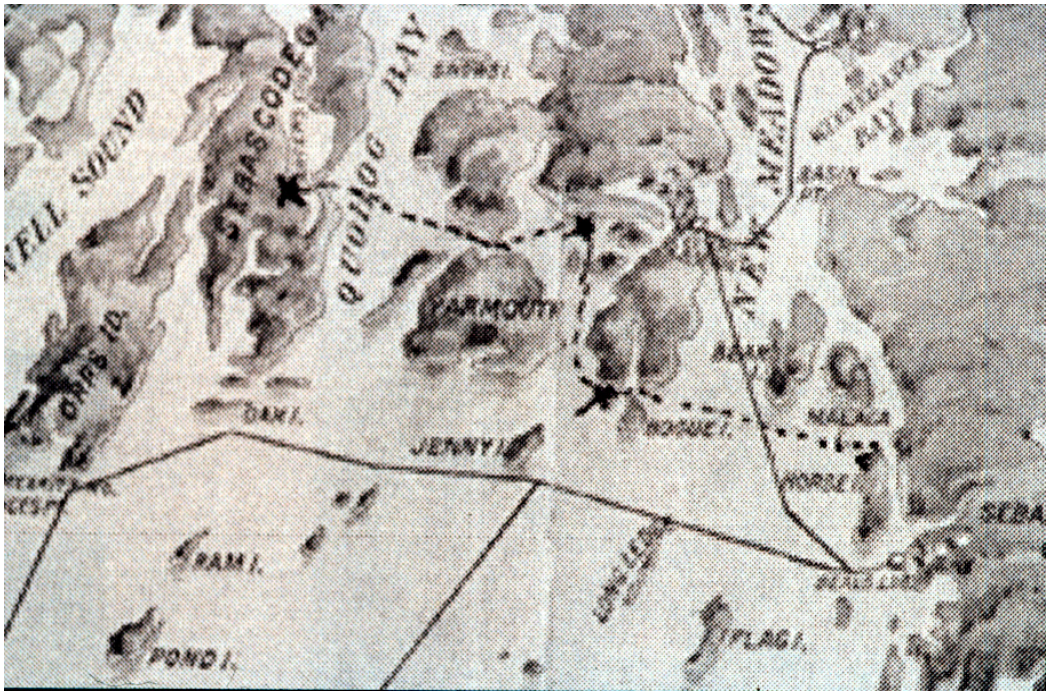


Figure 4 Steamship Routes for 1908 are just west of Malaga in Northern Casco Bay.

Figure 5 Casco Bay Coastal Chart of 1868 locating Bear, Malaga, and Horse Island at the mouth of the New Meadows River.

IV. Environmental Investigation

Overview

Malaga Island offers an excellent opportunity to study the prehistoric and historic changes in the land and coastal ecology within Casco Bay and along the southern Maine coast. The island was purchased in 2003 from Ricardo T. Quesada by the Maine Coast Heritage Trust and is presently protected as a conservation easement. The island has remained undeveloped since the 1912 eviction of its residents, but has been used for many decades by area lobstermen. Consequently, the archaeological resources and ecological communities are exceptionally well preserved.

A focal aspect of our archaeological investigations involved the documentation of historic fauna as a form of proxy evidence for historic marine environments and fishing and hunting strategies. This involved the recovery, identification and analysis of marine and terrestrial gastropods, bivalves, crustaceans, birds, fish, mammals and amphibians by screening excavated soils and column sampling. We also systematically recovered archaeo-botanical remains and sediment samples. The discussions below include vegetation and natural resources study, the goals and sampling strategies for flotation and fine screening as well as the examination of local tidal flats, marsh and sub-tidal marine zones by sub surface vibracoring.

Vegetation and Natural Resources Inventory

Malaga Island is situated in the south coastal Maine biotic provenance, a biologically productive ecotone including mixed coniferous and deciduous forests (Staples, 2008). The south end of the island is exposed to the open ocean. The dominant secondary growth on the island is red spruce. No cutting or burning has taken place on the island since the 1912 eviction of its residents. As a result over one hundred years of vegetation growth and development is extant.

The northern shore of the island in the vicinity of the archaeological site areas has been used for generations to store lobster traps in the winter. This area remains open with diverse ground vegetation of mostly grasses and shrubs. Goats have been intermittently kept on the island during the past 30 years and likely have contributed to vegetation clearance in this area. The goats would eat the pervasive poison ivy (which exists in three forms on the island—shrub, ground cover, and vine), which has rebounded in

their absence. The presence of extensive shell midden deposits in this area also influence soil conditions, and by extension vegetation communities, allowing grasses, shrubs, and deciduous trees to thrive in contrast with the coniferous forest communities and associated acidic soils found in the interior of the island.

Interrelated to the archaeological investigation are two separate studies undertaken in the summer of 2007. A natural resources inventory was completed by Dr. Joe Staples and three undergraduate students from the Department of Environmental Science at the University of Southern Maine (Staples 2008). This investigation focused on primary and secondary vegetation and insects, but included all fauna encountered during several days of inventory on the island. The bird species were previously inventoried in 2007.

Natural Resource Inventory

Malaga Island is 16.6 ha (41 acres) and measures 680 m from north to south and 379 m from east to west. An underlayment of metamorphic bedrock, part of the Cape Elizabeth Formation (Oce), consists of schist and gneiss with granite intrusions oriented along a north-south axis (Maine Geological Survey Bulletin 42, 2006). The highest elevation on the island is 12.5 m (41 ft) above mean sea level, on one of two main ridges that run longitudinally along the eastern and western sides of the island. Much of the soil is sandy loam, densely intermixed with shells, organic deposition from baitfish processing, and other cultural artifact deposition on the north.

Inland from the shore and northern edge are acidic soils. These soils are suitable for the red spruce, red maple, balsam fir (*Abdies balsamae*), huckleberry, blueberry (*Vaccinium sp.)* teaberry (*Gaultheria procumbens*) and various species of bryophyte characteristic of older spruce forests. The island contains natural sources of fresh water, and the perched nature of the water table helps ensure year-round availability for plant and animals.

Much of Malaga Island has re-vegetated after the settlement on the island was shut down. However, harsh climate conditions, exposed bedrock, poorly developed soils, extensive shell middens, and use by lobstermen all combined to reduce extensive reclamation on the northern end of the island. The 1868 U.S. Coast Guard Map of Casco Bay shows forest cover. A small, non-forested section is on the southwestern portion Malaga Island. Much of this area is now covered with red spruce (*Picea rubens*)—a dominant tree species on the island—and red maple (*Acer rubrum*). From the extent of red spruce dominance, Staples (2008)

postulates that the current canopy arose from a pre-existing conifer understory rather than open lands or cleared lands—these would have likely have led to greater species variation. Staples (2008) found five major natural community types (Table 2 and Figure 6).

TABLE 2
Community vegetation types identified on Malaga Island with global and state rarity ranks.[1]

COMMUNITY TYPE	**DOMINANT CHARACTERISTICS**	**ELCODE**	**GLOBAL RANK**	**STATE RANK**	**SIZE/LOCATION**
Maritime Spruce-Fir Forest	red spruce (*Picea rubens*)	CEGL006151	G4 G5	S4	32 acres (~12.9 hectares),
Spartina Saltmarsh	Cordgrasses (*Spartina patens* and *Spartina alterniflora*)	CEGL006006	G5	S3	Three small sections on south and west of island
Rose-Bayberry Maritime Shrubland	poison ivy, bayberry, juniper, raspberry, (*Rubus idaeus*), forbs, graminoids, quaking aspen, alder (*Alnus incana*), and balsam fir	CEGL006295	G4	S4	1.7 acres (~ 0.68 hectares).
Beach Strand	Rock, crushed shell, gravel and sand.		G4 G5	S4	10 to 30 meter sections
Intertidal Bedrock-Boulder Community	Various seaweeds, young crustaceans	CEGL006344	na	na	Most of the 3.8 km shoreline

[1] See Staples (2008) for rarity codes and ELCODE interpretation.

Figure 6 Photograph of the island's Maritime Spruce-Fir forest (From Staples, 2008, Page 19, Figure 10).

The edges of the island contain striped maple (*Acer pensylvanicum*), beech (*Fagus grandifolia*), quaking aspen (*Populus tremuloides*), pitch pine (*Pinus Rigida*) and white cedar (*Thuja occidentalis*). Shrubs include high bush blueberry, huckleberry, bayberry (*Morella pensylvanica*), poison ivy (*Toxicodendron radicans*), and juniper (*Juniperus communis*). Near McKinney are hops (*Humulus* lupulus). Hops are hardy non-natives likely brought over for making beer, then surviving on their own.[2] A lilac tree (*Syringa* sp.), also a common planting near houses, is near this site.

Staples (2008) identified and mapped two forested wetlands on the northern portion of the island (Figure 7). Both contain a sphagnum substrate with a few emergent plants, and are saturated throughout the year. The larger eastern wetland runs north (43°46'59.24"N 69°52'33.9"W) to south (43°46'55.39"N 69°52'3.3"W), measuring approximately 120 m in length and up to 25 m

[2] The archaeologists successfully tested the viability of the hop plants in 2008 by using flower buds from them to brew a small batch of beer.

wide, and drains north into a meadow of ferns. A narrow section of open water in the wetland may support amphibians and other aquatic and semi-aquatic species. The smaller western wetland extends from north (43°46’58.00”N 69°52’35.0”W) to south (43°46’57.32”N 69°52’35.1”W) measuring approximately 19 meters by 5 meters. The small wetland has no obvious outlet. Staples observed the general relief patterns in the area and concluded that outflow from the western wetland also occurs to the north where it likely combines with outflow from the eastern wetland.

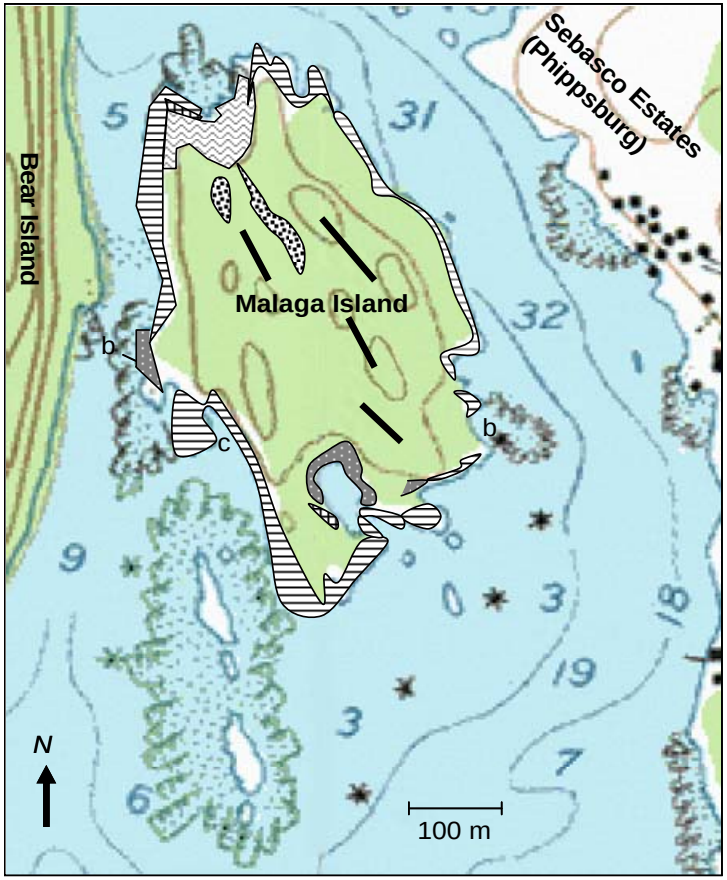


Figure 7 Topographical Map of Malaga Island showing locations of community types and transects where trees were sampled. (From Staples, 2008, Page 24, Figure 12).

A small meadow of hay-scented fern (*Dennstaedtia punctilobula*) is located in the central northern section of the island. Plants along the beach include beach pea (*Lathyrus japonicas*), night shade (*Solanum dulcamara*), sea rocket (*Cakile edentula*), and various forbs. Common seaweeds are found in the water, notably bladder wrack (*Fucus vesiculosus*) and knotted wrack (*Ascophyllum nodosum*). These provide good habitat for crustaceans and other resources valuable to the Malaga inhabitants

Some of the animal species found by Staples (2008) and the archaeological investigators are indicated below in Table 3.

TABLE 3

Mammals, amphibians, and reptiles observed on Malaga during the natural resource inventory

COMMON NAME	**SPECIES**
red squirrel	*Tamiasciurus hudsonicus*
New England cottontail	*Sylvilagus transitionalis*
raccoon	*Procyon lotor*
whitetail deer[3]	*Odocoileus virginianus*
snowshoe hare	*Lepus americanus*
Eastern red-backed newt	*Plethodon cinereus*
common garter snake	*Thamnophis sirtalis*
Northern Ringneck snake	*Diadophis punctatus edwardsii*

[3] The archaeological team found a partially consumed deer carcass in the center of the island in 2007.

Malaga Island first came to the attention of MCHT due to its reputation for bird habitat. Wing Goodale of the BioDiversity Research Institute in Gorham, Maine, noted 20 bird species on Malaga Island (2007). Staples augmented this list by adding the common eider, *Somateria mollissima*, lesser yellow legs, *Tringa flavipes,* and bald eagle, *Haliaeetus leucocephalu.*

Staples (2008, 34) found a single specimen of the Giant Resin Bee, *Megachile sculpturalis*, at the north end of the island in late summer of 2007. This is the first known Maine island instance of this invasive insect from Japan (perhaps Malaga has climate change value as an indicator site for early arrival of invasive species). The most common group of insects found on the island is the ant. Staples identified *M. minimum* scavenging in grass or tending milkweed aphids, colonies of the New York carpenter ant, *Camponotus novaboracensis*, and numerous arachnids including spiders and wood ticks (*Dermacentor variabilis*). A complete list of insects found by Staples is in his report (2008).

In the shallow waters around Malaga are healthy populations of soft-shell clam (*Mya arenaria*), blue mussel, (*Mytilus edulis*), the common periwinkle (*Littorina littorea*—another invasive), rock barnacle (*Balanus balanoides*), and the common mummichog (*Fundulus heteroclitus*) found in the tidal pools on the southern end of the island), hermit crab (*Pagurus sp.*), the European Green Crab (*Carcinus maenas*—an invasive with significant ecological effects), and beach fleas (*Orchestia sp.*). Numerous shell fragments of razor clam (*Ensis direcw*) and quahog (*Mercenaria mercenaria*) were found around the island indicating that these species are also present.

Staples (2008, 36) reports that one rare plant, the spotted wintergreen (*Chimaphila maculate*) was observed on Oct 4, 2006 near the shore on the west side of the island by MCHT staff. The southwestern section of the island is within the protected area of a bald eagle nest located on the southern end of Bear Island. No other rare, threatened, or endangered plant species were found on Malaga.

Column Sampling, Topsoil Sampling and Flotation Methods

Column sampling of the site matrix was conducted in all three areas of test excavation, including Midden 1 (James and Salome McKinney household), Midden 4 (Henry Griffin household), and Midden 5 (Eliza Griffin/ John and Rosilla Eason household). Column sampling is a standard technique used for investigations of shell middens in the Gulf of Maine and elsewhere. This technique has been used in Casco Bay to characterize changes in frequency of species over time, to distinguish between living floors, activity areas and refuse areas, and to aid in the definition of cultural affiliation and artifact assemblages.

Following years of sporadic preliminary research, archaeological field schools at the University of Southern Maine have recovered and processed systematic column samples at eight prehistoric sites in Casco Bay, including two sites local to Malaga Island: the prehistoric and historic Long Island North (15.95) and Basin (15.20) sites located on the New Meadows River. These samples provide a data set for future comparative analyses between prehistoric and historic components within the New Meadows River embayment.

Constant volume samples (CVS) were taken in most one meter test units excavated in 2006-2008 (see Table 4). Samples were taken in either 5 or 10 cm increments for different levels of analysis. Processing of 2006 samples utilized one liter CVS samples taken in five centimeter increments. Processing involved soil flotation in conjunction with fine-screening and hand-sorting. Materials recovered from the floated fraction of the sample, including carbonized floral samples and lighter terrestrial gastropod shells, have the potential to document local environmental conditions and trends over the past 150-200 years or longer. The remaining non-floating heavy fraction was water-screened in a series 6.3 mm (1/4"), 3.2 mm (1/8"), and 1 mm (0.04”) mesh size screens. After drying, cultural and faunal remains were sorted, counted, weighed, then separated into those that require additional treatment and stabilization prior to being curated.

TABLE 4

Inventory of Excavated Column and Flotation Samples Collected
in the Malaga Island Site, Casco Bay, Maine.

LOCATION	TU/ STP	YEAR	DEPTH (cm)	LITERS	PROCESSED
Midden 1 (McKinney)	TU-2	2006	70	14	Yes
	TU-3	2006	60	12	Yes
	TU-5	2006	55	11	Yes
Midden 3 (Juniper Hill)	STP-1	2006	25	5	-
Midden 4 (Griffin)	TU-1	2006	70	14	Yes
	TU-2	2006	70	14	Yes
Midden 5 (Griffin/Eason)	TU-1	2006	35	7	Yes
	TU-2	2006	20	4	Yes
	TU-3	2006	55	11	Yes
	STP-1	2006	35	7	-
	STP-2	2006	80	16	-
	TU-7	2008	90	18	Yes

Quantifications of fine screened samples from Malaga Island provide counts and densities of historic artifacts and fauna species, which document trends in natural and cultural resources presence, use and disposal. Five select column samples from the 2006 excavations were analyzed in the winter of 2006-2007. Other samples were processed as a lab exercise in ANT 308: *Environmental Archaeology*, during the 2008 spring semester at the University of Southern Maine.

A quantitative study was completed of size measurements of Soft-shell Clam (*Mya arenaria*) from column samples. This is the most frequent marine bivalve species in the midden assemblages, comprising an estimated 85% of bivalve shells in the midden. Measurements were taken of whole shell and chondrophore (shell hinge) to test for changes in shell size over time. A regression analysis of the chondrophore width and total shell length was also conducted. This is useful to archaeological research of shell size over time in excavation units where only crushed shell is available, as chondrophores frequently survive fragmentation. Measurements were taken on the maximum width of the whole shell, and maximum width of the chondrophore (shell hinge). The minimum number of individuals (MNI) of soft-shell clam was also calculated for each level.

During the 2007 archaeology field school, soil samples were excavated from standard intervals on the surface of Midden 5 (Griffin/Eason) for flotation. The topsoil of this area was chosen after processing of 2006 column samples revealed the potential abundance of micro terrestrial gastropods in the upper ten centimeters of this area. Two liter samples were taken at five meter intervals for a total of twelve samples from the central portion of Midden 5 (Griffin/Eason). A contrast in the distribution of identified terrestrial gastropod species between the McKinney, Griffin and Griffin/Eason middens analyzed in 2006 suggested different site ecologies or historic activities. The specific habitat characteristics of one or more species suggest the possible definition of a historic garden in the southern area of Midden 5, clearly situated between the John and Rosilla Eason House and the salvaged ship wheel house, home to Eliza Griffin (see Chapter VII). Archaeological testing may be able to confirm the existence and dimensions of the garden.

Vibracoring Marsh and Intertidal Deposits: Objectives and Methods

Vibracoring was conducted in 2007 in three select intertidal areas of Malaga Island for reconstruction and dating of late

Holocene sea-level rise, and investigations of the evolution of local near shore coastal biotic communities. Vibracoring can provide detailed illustrations of the development of marine habitats by documenting sedimentological and marine species changes. Dating sedimentary and biogenic sequences contributes to the establishment of the long term chronology of changes in coastal habitats.

Vibracoring has been conducted in a number of marine and near shore settings within Casco Bay and the mouth of the Morse and Kennebec River (Kelly et al., Neotectonics). Research conducted by the University of Maine at Orono utilized radiocarbon dates on shell and organic samples for reconstruction sea level over in the past 14,000 years before present.

Extensive vibracoring of Quahog Bay some five kilometers to the west was conducted by Bowdoin College. These investigations documented the evolution of the small bay as well as benthic communities (Weddle, T.K. & Retelle, M.J. [eds], Deglacial history and relative sea-level changes, Late Wisconsinan glacial deposits in the Portland - Sebago Lake - Ossipee Valley Region, south-western Maine, Pergamon *Press*, 1-21.) Radiocarbon dates on marine shell and organic gytta from subtidal sediment cores in the Basin embayment document ecological and sea level changes during the Holocene in this land form located one mile north of Malaga Island (Rettell and Weddle 2001). USM has conducted marsh and intertidal vibracoring at six locations in Casco Bay, including the Long Island North site (15.95) and the Basin site (15.20).

In June 2007, nine cores were taken from three distinct intertidal areas located in the northwest part of the island. The first area cored was the intertidal mud flats on the north shore of the island. The north shore has many small coves separated by bedrock outcrops of the Cape Elizabeth Formation, a quartz, plagioclase, and mica schist, which locally is oriented on a primarily north-south axis. The coves on the north shore are low energy environments, characterized by very poorly sorted clasts with an abundance of shell debris in the lower inter-tidal areas, and small marsh grass communities and detritus zones in the upper inter-tidal areas. The intertidal zone on the Island supports spiral wrack (*Fucus spiralis*) in the upper intertidal, knotted wrack (*Ascophyllum nodosum*) in the mid intertidal, and bladderwrack (*Fucus vesiculosis*) in the lower intertidal. Mature blue mussel (*Mytelus edulis*) communities are present in the lower intertidal below the *Ascophylum nodosum* zone. Three cores (VC-1, 2, and 3) were obtained (Figure 8; Table 5) in the designated Tidal Area 3 (two cores) and Tidal Area 4 (one core). These cores were situated around the low tide line and revealed shallow sediments (30-50 cm) above bedrock.

TABLE 5

Inventory of Vibracores Taken in 2007 at Malaga Island, Casco Bay, Maine.

CORE	LOCATION	LENGTH (CM)	DATE	LOGGED
VC-1	North end tidal flat, Beach Area 2	58	June	I. B. Brack
VC-2	North end tidal flat. Beach Area 2	66	June	I. B. Brack
VC-3	North end tidal flat, Beach Area 4	136	June	I. B. Brack
VC-4	West side marsh	110	June	I. B. Brack
VC-5	West side marsh	120	June	I. B. Brack
VC-6	West side marsh	156	June	I. B. Brack
VC-7	Intertidal thoroughfare	430	June	I. B. Brack
VC-8	Intertidal thoroughfare	375	June	I. B. Brack
VC-9	Intertidal thoroughfare	232	June	I. B. Brack

All cores logged and bagged by I. B. Brack (see Brack 2008).

Figure 8 General view of vibracoring of intertidal Area 3 on the north end of Malaga Island, Casco Bay, Maine, facing north. (NDH MI 2007)

A second area cored was the marsh on the west side of Malaga Island just south of the tombolo and tidal flats toward Bear Island. The marsh area is south west of Midden 1 (Eason) and extends over 90-120 meters along the shore. It exhibits a surface fresh water pond at its highest point, and gravely sand beach at the southern end. Three cores (VC-4, 5, and 6) were obtained from grass covered areas of this marsh (Figure 9) and represent two different marsh grass zones. The cores were situated between folds in the bedrock that indicated the greatest depth of sediment accumulation. Each core reached about one meter below surface before hitting bedrock (see Table 3). A visually distinct sequence from basal Presumpscot Formation clay to silty marsh deposits was documented. The cores exhibited a coarse sand and granule layer 1 to 4 cm thick interrupting the middle portion of the marsh sediments. This unit is interpreted as either a storm surge deposit or anthropogenic pavement.

Figure 9 General view of vibracoring of near shore marsh on the west shore of Malaga Island, Casco Bay, Maine, facing south (NDH MI 2007).

The third area cored came from an east-west bearing transect through the tombolo between Malaga Island and Bear Island (see Figure 3 and Table 5). These cores were collected to document changing marine conditions and to obtain radiometric dates on coastal evolution and the geographic separation of Bear and Malaga Islands. The channel floor consists of granule and abundant shell debris from intertidal mollusks including blue mussel (*Mytilus edulus*), quahog (*Merceneria merceneria*), and common periwinkle (*Littorina littorea*). Smaller numbers of shell fragments from farm raised oyster, smooth periwinkle (*Littorina obtusata*), and mud dog whelk (*Illyanassa obsoletus*) are also present. The shores of the tidal channel are low (1 to 10 meter high) bedrock ledges, which are too steep to support extensive seaweed in most areas. Blue mussel, various species of barnacles and common periwinkle thrive in the lower intertidal zone here.

Three cores (VC-7, 8, and 9) were placed in the center of the marine thoroughfare upon a crown of reworked shell and fine sediment. The sampled area is exposed during mean low tide. Coring was conducted during a negative 1.5 foot neap tide. The cores here ranged from 2.2 to 2.9 meters depth, below mean low tide. None of the cores hit refusal so deeper samples may be obtained in the future. Clearly stratified marine deposits to a depth of 1.5 meters were documented. A biostratigraphic layer dominated by large Northern Quahog (*Mercenaria mercenaria*) shells was represented in all three cores at 130 to 140 centimeters below the surface. While this species is present in smaller numbers in the living assemblage of species in this area today, its dominance at this depth suggests a different intertidal ecology, including the possibility of warmer water conditions. Particle size analysis shows sandier sediments, ideal habitat for Quahog, just below the Quahog layer.

VC-7 was chosen for detailed particle size analysis. The core contains predominantly crushed shell ranging from whole shell to coarse sand size fragments from 0-39 cm depth. Particle size analysis was not conducted on this portion of the core. A dark olive grey silt layer interrupts the shell layer at 24-32 cm. The area from 39 to 149 cm contains dark olive grey sandy silt with variable amounts of shell fragments. This portion of the core (samples from 115-195 cm) is consistently composed of very poorly sorted silt. This indicates that stable riverine conditions occurred during the deposition of these sediments. From 149 to 160 cm, sediments include more sand, which indicates a slightly higher energy regime. Lower strata contain sandy silt with charcoal and wood inclusions, and very little shell. Charcoal and wood concentrations are found at 113-129 cm and at 150-154 cm, and are ubiquitous but less abundant throughout the entire core below 133 cm. The lowest stratum (231-259 cm) is gleyed. The lack of shell and abundance of charcoal

may signal more acidic conditions, or rapid deposition (Brack 2008).

All cores were hand drawn, illustrated with Strater (Golden Software) and photographed. One half of the tube was bagged for sedimentological analysis and mollusk species identification. The other half is curated at the University of Southern Maine Archaeology Laboratory as a visual record for instructional purposes. We aim to core at least four additional land forms in future fieldwork. In particular, more exclusive sampling will be conducted in the thoroughfare relative to the Late Archaic shell midden on Bear Island.

V. Archaeological Investigation

The north end of Malaga Island contains at least six discreet patches of culturally constructed shell midden deposits that form a nearly contiguous occupation surface (see Figure 10). Three of these shell midden areas are clearly associated with the 19th and 20th century habitation structures, identified in historic photographs (Figure 11). The shell middens seem to be intentional constructions of elevated, flat, well drained living surfaces. The midden and habitation area deposits are relatively deep in places (up to 70-100 cm deep), built above surfaces of exposed bedrock, glacial till, glacio-fluvial deposits, and Presumpscot Formation marine clay deposits. The irregular folded metamorphic Cape Elizabeth Formation bedrock is generally oriented north-south along the long axis resulted in irregular deposits of surface sediments. The introduced shell matrix had the effect of elevating dwelling and activity area surfaces above the bedrock and other poorly drained sediments.

Figure 10 General view of the 1988 eroded margin of Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing east. The stratigraphy revealed deep stratified soft-shell clam above blue mussel directly on bedrock. (NDH MI 1988)

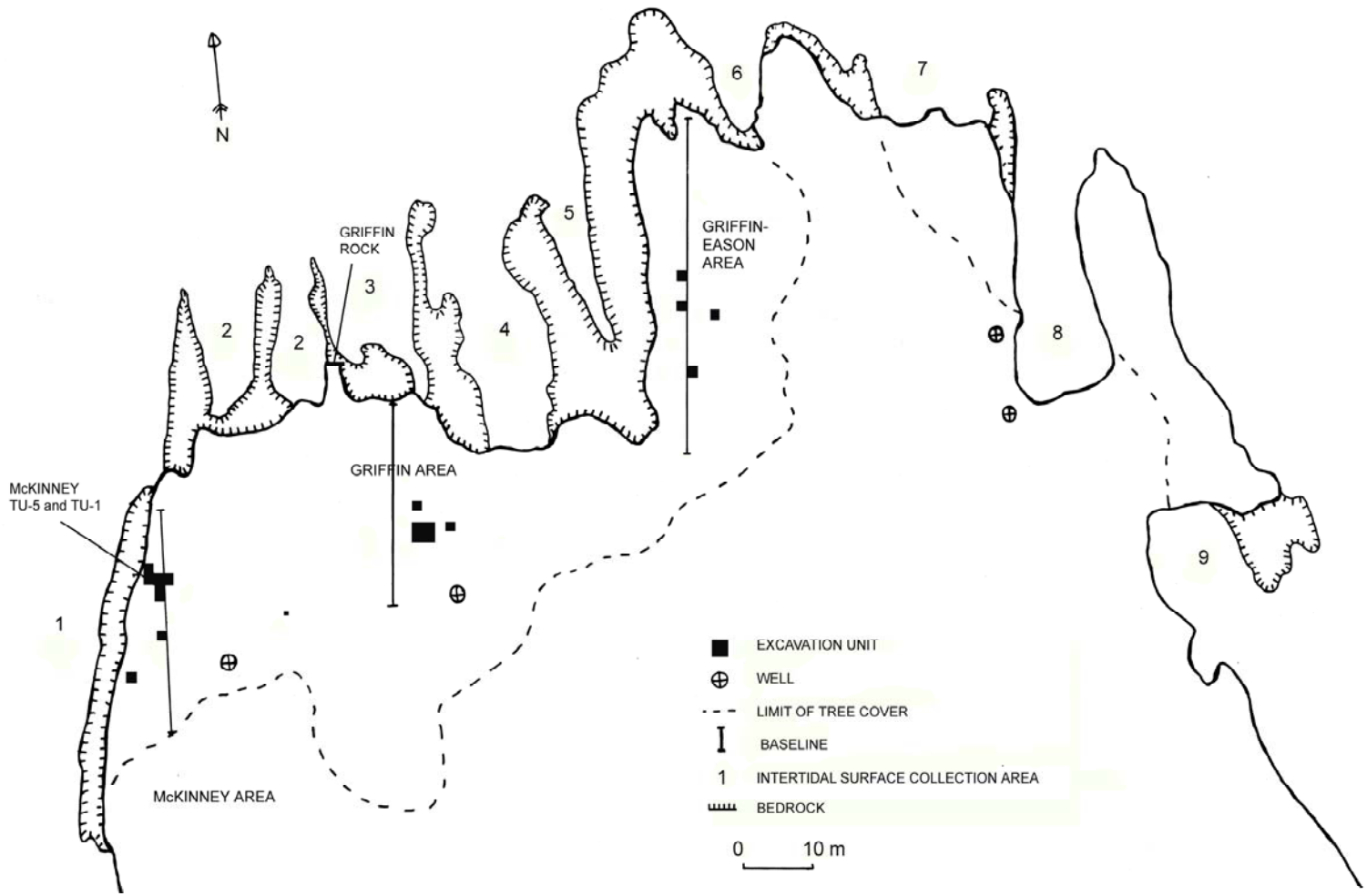


Figure 11 Plan view of the excavation areas on the north end of Malaga Island.

The majority of shell used is Soft-shell Clam (*Mya arenaria*) with minor but significant secondary deposits of Blue Mussel (*Mytelus edulius*), found in Midden 1 (McKinney). The shell refuse and diverse minority mollusk species reflects the historical preference of species and ecological configuration of nearby tidal flat over the past 150 years. The various midden formations involved "local" procurement and direct disposal patterns over about a 40-50 year maximum period and perhaps as short as 10 years in several deposits. Depositional characteristics of the shells can be useful indicators of the past, including whether or not a surface was exposed and walked on or worked on a great deal (highly crushed) or rapidly deposited and built up (as in processing of bait).

In Midden 4 (Griffin), fine-grained silt sand deposits were deep enough to allow hand excavation and construction of a shallow (*circa* one meter deep) house foundation. All other structures on the north end of the island were apparently above ground set on rock and wood structures or supported by piles of shell. This would have provided good air circulation for ventilation, and reduced the intrusion of pests into the homes.

There appears to be a high perched ground water table and flow of ground water grades to the north end of the island. Two hand dug and rock lined wells (Figures 12 and 13) are readily identifiable adjacent to two middens, both are shallow *ca.* 1 to 1.5 m below ground surface. Over the past 18 years observations of the wells on eight different occasions during the summer and fall seasons, both of the wells were charged with water. Additional wells have been identified on the northeast side of the island.

Figure 12 General view of the hand-dug and stone-lined well on the eastern portion of Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing east. Brick at lower left shows the proportion, which is similar for all wells on Malaga. The presence of standing water shows the continued viability of these slow-yielding but dependable sources. (NDH MI 2006)

Figure 13 General view of the presumed H. Griffin hand-dug and stone-lined well on the eastern side of Midden 4 (Griffin) at the Malaga Island Site, facing east. Even in mid-summer, this well continues to provide small amounts of water. (NDH MI 2006)

The tidal range is *ca.* 9.6 feet (2.96 meters) with a maximum range of 13.1 feet (3.99 meters) during fortnightly spring tides. There is a significant north-south push-pull of the tidal flow from the outer portion of Casco Bay into the New Meadows River to the north (Figure 2). Prehistoric and historic people fishing from the island could afford easy maneuver by boat to open ocean and into the deep water (*ca.* 60-120 feet) portion of the estuary by utilizing the ebb and flow movements of the tidal cycle.

Although sea-level rise and storm surge have eroded portions of the prehistoric site as well as some historic midden

accumulation, it is quite likely that some of the historic refuse disposal was directly on to the tidal flats or in the ocean. We systematically collected eroded cultural material from the northern tidal flat for three seasons from 2004 to 2007. By July 1, 2007, we had 2052 artifacts, which were spatially isolated into six discreet intertidal areas defined and constrained by bedrock outcrops on the tidal flats. These six areas are identified as being in direct association with eroding aspects of the historic shell-midden deposits on land.

1988-2003 University of Southern Maine

In 1988 the University of Southern Maine conducted an archaeological survey of the eroded shore of the island. Exposed and eroded midden profiles were cleaned, drawn, and photographed as well as surface collected. This work was completed as part of the archaeological survey of prehistoric sites funded in part by University of Southern Maine Summer Session and the Maine Historic Preservation Commission (Hamilton *et al.*1992). At the time, the Phase I testing of extensive historic period archaeological deposits of the fishing community was beyond the scope of our survey. During the survey, four shell midden deposits -- possibly prehistoric, historic, or of unclear cultural affiliation -- were documented (see Table 1) and reported to MHPC. Site numbers were assigned and much of the interrelated historic northern end of the island received a single site designation.

During the period after 1988 and up to 2003, background research was conducted, and occasional island visits occurred. Essentially, the island was monitored as part of an apparent archaeological district while plans were underway for specific field schools.

2004-2007 University of Southern Maine and Maine Coast Heritage Trust

Several surface collections of the eroded matrix and tidal flats were made by USM in 2002, 2004, 2005 (Table 6), along with

global positioning system (GPS) and photo documentation. These survey efforts sought a better understanding of the spatial extent of the shell deposits and spatial definition of the discontinuous shell midden. In the summer of 2005, a GPS walk was supported by the Geographic Information Systems (GIS) lab at the University of Southern Maine (USM), and included use of a Tremble 2606 hand held unit and the download of data into ArcView format for visualization (Adamak, 2005).

In 2006, permission was granted for archaeological investigation by the Maine Coast Heritage Trust (MCHT). As a focus of the USM archaeology field school, test excavations were conducted in the three largest middens and two smaller deposits all at the north end of the island. The field objectives were to determine the location of structural features, identify the cultural context of the middens and their extent and characteristics, train archaeological students in Phase I Archaeological Assessment, and assess the capability and stability of the island as a cultural resource. Part of our strategy was to recover artifacts that would enable us to determine activity areas, diet, and cultural practices.

In all, 19 test units (TU's) or standard test pits (STP's) were hand excavated to culturally sterile deposits. The depths of cultural deposits ranged from 20 to 100 cm below present ground surface. Some 85-95% of the historic matrix is composed of marine shell in the three large midden areas (1, 4 and 5) tested. Stratigraphic profiles were drawn for all test units (TU’s) and all standard test pits (STP’s).

As part of the 2006 field school, ten two-liter column samples were taken in 5 cm increments in the deepest units of the midden deposits for flotation, fine screening, and artifact, faunal and floral identification (see Table 2). A constant volume sample (CVS) of one liter from all of the column levels, totaling 115 samples, was processed and sorted in the USM archaeology laboratory (this data will be presented in Appendix of final report). Our investigations focused both on artifactual and ecofactual recovery, so a significant investment processing time was taken with floral and faunal sample recovery from column samples.

TABLE 6

Summary of Fauna and Artifacts Recovered from 2005-2007 USM Inter-tidal Surface Collection at Malaga Island Site, Phippsburg, Maine.

INTER-TIDAL AREA	YEAR	BONE	UNIVALVE	BRICK	METAL	GLASS	CERAMIC	COAL	BUTTONS	PIPE STEM	PIPE BOWL
1 (McKinney)	2006	-	-	-	-	-	-	-	-	-	-
	2007	-	1	-	-	52	15	-	1	-	-
2 (Marks)	2006	-	-	-	-	-	-	-	-	-	-
	2007	4	1	8	24	73	21	-	-	3	1
3 (Marks)	2006	-	-	-	-	-	-	-	-	-	-
	2007	5	2	1	238	165	96	-	2	2	-
4 (Unknown)	2006	-	-	--	-	-	-	-	-	-	-
	2007	8	1	-	105	80	94	-	3	1	1
5 (Griffin)	2006	-	-	-	-	-	-	-	-	-	-
	2007	4	7	-	3	626	510		12	8	10
6 (Griffin)	2006	-	-	-	-	-	-	-	-	-	-
7 (Murphy)	2007	1	11	-	9	80	42	-	-	-	-
8 (Unknown)	2007	-	6	7	13	288	92	-	1	1	-
TOTAL		**22**	**29**	**16**	**392**	**1364**	**870**	**-**	**19**	**15**	**12**

All of the TU and STP excavations were processed using 6.3 mm (1/4") mesh screens. Materials recovered (Table 7) were sorted into major artifactual groups, bone, univalve, brick, metal, glass, ceramic, stoneware/red ware, coal, buttons, pipe fragments, coins, and prehistoric flakes (*lithic)* and miscellaneous. A variety of geological samples and more modern artifacts from continued use of the island by local lobster men were also bagged, cataloged, and listed separately from the late 19th and early 20th century historic occupation.

In 2007 a second archaeology field school was completed at Malaga Island. The objectives for 2007 were to recover a larger faunal sample from the Griffin area, to collect vegetation samples for evaluation of human influence, to match historic photos with current conditions and locate their viewsheds on the island, to further survey the extensive Griffin-Eason area with STP transects and surface soil sampling for the recovery of terrestrial gastropods, and to investigate the stratigraphy and artifact distribution of the Eason area by excavating Test Units contiguous with 2006 excavations. A 2 by 2 meter excavation area was opened in the Griffin Area. Samples from three STP transects were excavated in the Griffin - Eason area and additional test units were excavated in the Eason area.

TABLE 7

Summary of Distribution Artifact and Faunal Remains Recovered from
2006-2008 USM Testing of the Malaga Island Site, Casco Bay, Maine.

AREA	BONE	UNIVALVE	BRICK	METAL	GLASS	CERAMIC	COAL	BUTTON	PIPE	FLAKE	COIN

Midden 1 (McKenney)											
2006	1283	802	128	6016	787	209	151	22	36	2	-
2007	4933	1257	854	7562	1177	490	8	43	43	-	-
Sub-total	6216	2059	982	13578	1964	699	159	65	79	2	-
Midden 2 (Marks)											
Midden 3 (Juniper)	4	-	14	18	17	1	-	-	-	-	-
Midden 4 (Griffin)											
2006	2272	110	317	2618	150	94	2	13	19	-	-
2007	4582	305	590	6371	1153	422	-	62	43	1	2
2008	58	?	6	900	64	18	-	9	1	-	-
Sub-total	6912	415	1013	9889	1367	534	2	84	63	1	2
Midden 5 (Griffin/Eason)											
2006	1277	176	538	2854	757	283	101	28	13	1	-
2007	455	44	73	597	313	259	-	19	13	-	-
2008	419	655	23	639	337	319	127		5	-	-
Sub-total	2151	875	634	4090	1407	861	228	47	31	1	-
Surface Collection											
2006	11	4	42	557	794	573	37	17	13	-	4
2007	28	39	18	415	1400	889	-	20	29	-	-
Sub-total	39	43	60	972	2194	1462	37	37	42	-	4
TOTAL	**15318**	**3392**	**2689**	**28529**	**6932**	**3556**	**426**	**233**	**215**	**4**	**6**

Maritime Lifeways of the Recent Historic Period

In the Gulf of Maine and along the Maine coast a majority of the archaeological research of historic period fishing communities or stations has focused on 17th and 18th century occupations. Some of the best known 17th century fishing operations includes the Isle of Shoals with a focus on William Pepperell (Faith Harrington's work), the well-documented Richmond Island operation initiated by Baxter (1880), and Churchill and Damriscove Island operations (Faulkner). Several fortifications on the Maine Coast including Pemaquid and Pentagoet were foci of extensive archaeological excavation; the close proximity of these sites to the ocean produced archaeological evidence of fishing technology as well as substantial faunal samples. The excavation of colonial Pemaquid, among the earliest systematic historic period excavations in Maine revealed abundant structures, artifacts, fishing technology, and a small faunal sample (Camp 1978, Bradley and Camp 2000). The most well reported historic fortification, Pentagoet discusses the role of fishing technology and reports a small selective faunal sample. Historical archaeology of coastal occupations on the Maine coast dating after these notable 17th and 18th centuries examples are minimal in the published literature. Thus far, the 19th and 20th century excavations remain under-reported.

In contrast to these studies which emphasize large scale fish harvesting and export economies in their faunal records, Malaga Island documents diverse resource use of locals present year round. The faunal record at Malaga Island documents diverse resource use of local people present year round with limited use of domestic animal. As a result the faunal record affords the opportunity to portray historic period opportunistic hunting-fishing-gathering economies among people living on the margins of the socio economic system. The Malaga Island Site complex represented here is interesting from a cultural or behavioral perspective. General aspects of the lifestyle of local fishing communities or "gangs" are historically documented. An anthropological perspective of fishing gangs has been developed (e.g., Achenson, 1988, *The Lobster Gangs of Maine*).

An opportunity to examine a community archaeologically and anthropologically is afforded with the excavation of the historically documented, household-specific midden loci within the Malaga Island Site. Because few rich, well-developed late historic shell-midden deposits have been documented, analyzed, and interpreted in detail, and many such sites are at risk for looting, this

opportunity for research becomes an important part of public archaeology. Reconstruction of activities associated with individual households of a diverse ethnic community will broaden our understanding of race, ethnicity and maritime life ways on the Maine coast. With our focus on midden formation, species representation and maritime activities, the Malaga Island Site provides an unusually strong opportunity.

VI. Site Descriptions

This section provides an overview of several defined cultural areas, recently mapped. tested and documented. Each area is described, along with the nature of Phase I testing, the stratigraphy, artifacts recovered and column sample processed from select units.

Midden 1 (McKinney)

Site Description

The Midden 1 area is tentatively identified as the home of James and Salome McKinney. This is the third largest shell midden in aerial extent. It measures 28 meters along the north-south axis by 8-15 meters on the east-west axis (see Figure 11). The total area is circa 300 m^2 in extent. The midden is generally flat with a south and west margin sloping down to match the configuration of the bedrock (Figure 14). The entire west margin of the midden drops off steeply to the water and offers one of the best strategic locations on the island to pull up a small fishing boat and tie off (Figure 15). The McKinney midden exhibits moderate erosion with some general upper depositional disturbance from recent lobstering activities at the south end. A stone lined hand dug well is located at the eastern margin of the midden in a bedrock seam (see Figure 8).

Figure 14 General view of the 2007 excavation of TU-8-12 in Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing west toward Bear Island. (NDH MI 2007)

Figure 15 General view of Midden 1 (McKinney) at the Malaga Island site, Casco Bay, Maine, facing south. Raymond Gilliam is picking up lobster traps with the *Michela Alice*. Bear Island is at right. (NDH MI 2007)

Archaeological Investigations

The McKinney area was tested in 2006 with six one-meter test units, two of which, TU-1 and TU-5 were connected as a 1 by 2 meter unit (Figures 16 and 17). In 2007, five additional units were excavated in the northern portion of the midden contiguous with 2006 units (see Figure 14).

Figure 16 General view of the 2006 excavation of test units 1 & 5 in Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing north. These units have been excavated down to the original bedrock surface. (NDH MI 2006)

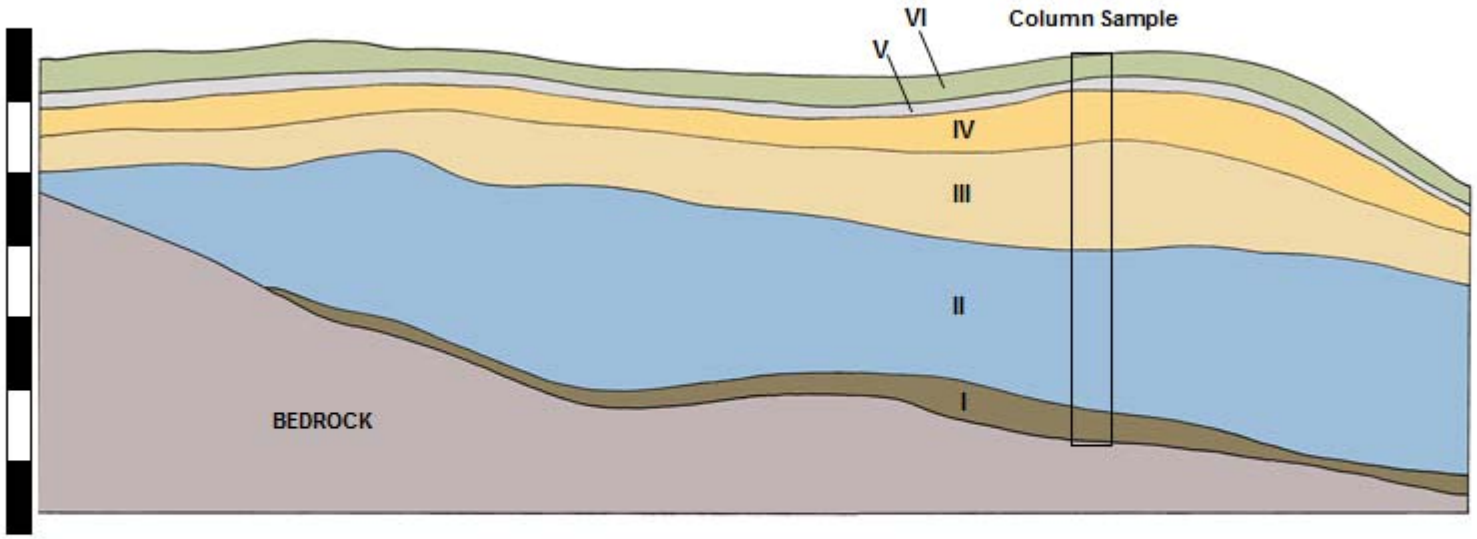


Figure 17 Stratigraphic view of the 2006 excavation of test units 1 & 5 in Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing south.

Stratigraphy

The depth of the midden varies from 20 cm to 75 cm in depth below the present surface. In five of the six units the shell is situated directly on bedrock (Figure 18). The stratigraphy (Figure 19) reveals a midden deposit of differentialized bivalve species. Clearly stratified deposits of blue mussel (lower) and soft-shelled clam (upper) are evident on the northeast portion of the midden. A thick (*ca*. 5-7 cm) moss and grass turf caps the deposit and protects the matrix. Three column samples taken from the site were in test units 2, 3, and 5. A total of 37 individual samples were brought back to the laboratory for curation.

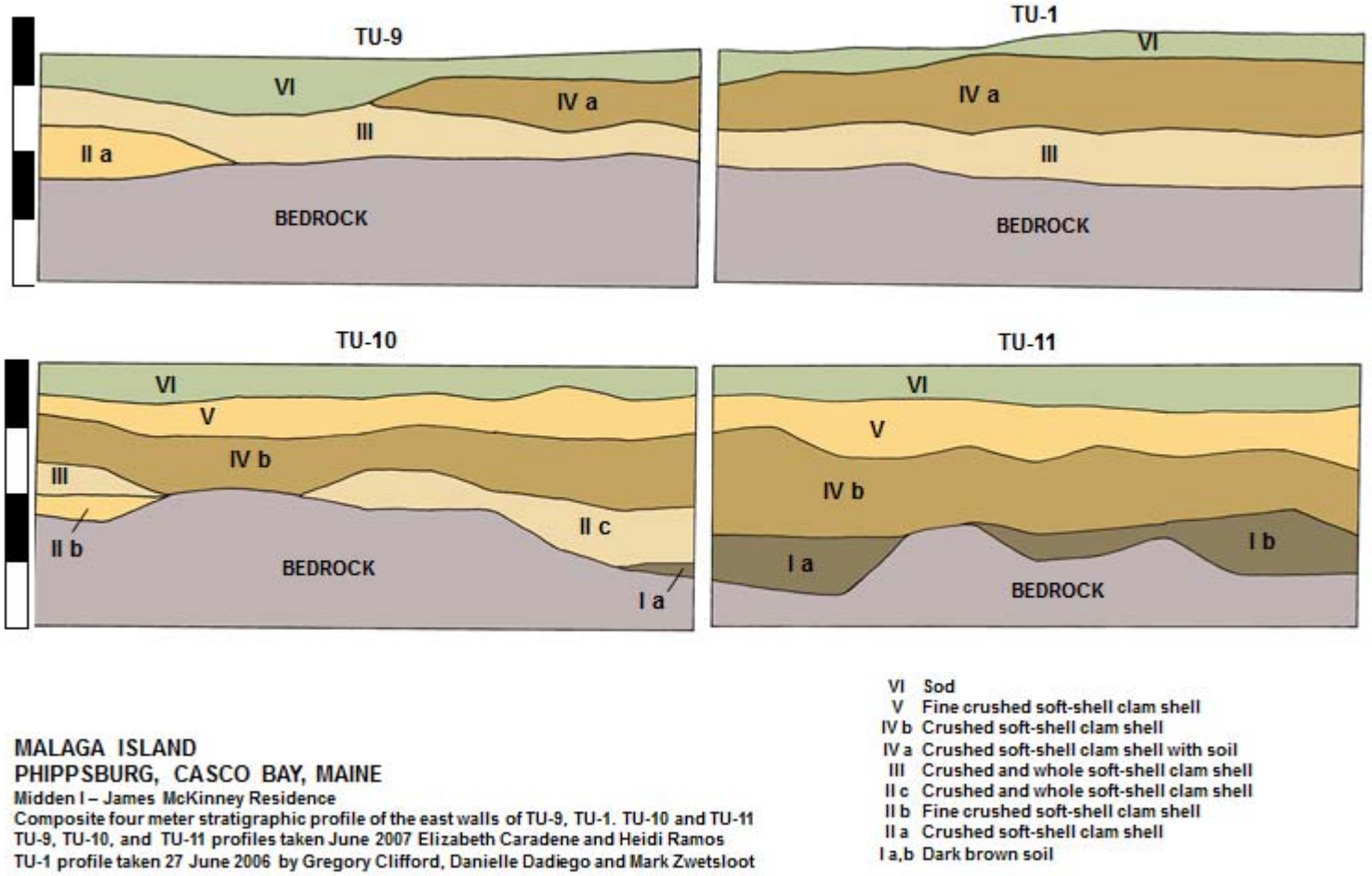


Figure 18 Stratigraphic view of the 2006 and 2007 excavation of four units in Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing east.

Figure 19 Stratigraphic profile of TU-1 and TU-5 Midden 1 (McKinney) at the Malaga Island Site, Casco Bay, Maine, facing south. The relatively uncrushed lower level of shells is the results of a rapid deposition. (NDH MI 2006)

Material Culture

A substantial sample of cultural remains (see Table 8) from the 12 units was recovered. This area produced the largest sample from the areas tested in 2006. Metal fragments (n= 13,578) constitute 62% of the total sample and are dominated by nails and fish hook fragments. Nails are more abundant in the upper strata, and are believed to be related to the dismantling of the McKinney House. A substantial sample of faunal remains including bone (n= 6216) and univalve (n= 2059) reveal high diversity in the excavation block, deposited in a similar pattern to the metal specimens. A moderate sample of glass (n= 1964) and ceramics (n= 699) document a different pattern of disposal from the metal and fauna. Among the glass and ceramic are a number of diagnostic forms

some with makers marks (Figure 20). Moderate but significant samples of buttons (n= 65), pipe stem and pipe bowl fragments (n= 79) were recovered. Overall, brick and coal samples are small but concentrated in several units (a not unexpected result for this type of site). Select specimens were photo-documented and are described below by artifact category.

TABLE 8
Summary of Fauna and Artifacts Recovered from the 2006-2007 USM Test Unit Excavation of Midden 1 (McKinney) and Midden 2 (Marks) at Malaga Island Site, Phippsburg, Maine.

TEST UNIT	DEPTH (CM)	BONE	UNIVALVE	BRICK	METAL	GLASS	CERAMIC	COAL	BUTTONS	PIPE STEM	PIPE BOWL
Midden 1 (McKinney)											
1	50	333	135	1	1359	126	28	11	7	3	1
2	75	54	6	98	778	68	21	0	3	6	3
3	70	85	6	11	789	170	11	-	4	7	5
4	20	36	7	5	78	32	22	-	4	0	-
5	60	551	554	4	2335	129	23	108	4	9	-
6	30	101	11	0	463	219	90	-	-	1	-
8	50	662	235	15	1261	301	136	6	10	7	3
9	70	1162	108	12	1584	299	24	-	11	7	-
10	50	679	348	2	1116	113	92	2	7	2	-
11	40	579	281	129	1295	255	169	-	12	6	1
12	35	851	285	15	2306	209	69	-	8	9	8
Midden 2 (Marks)											
7	60	123	83	9	214	43	14	32	-	1	-
TOTAL	**610**	**6216**	**2059**	**301**	**13578**	**1964**	**699**	**159**	**65**	**58**	**21**

Figure 20 Ceramic (ironstone) with Makers Mark (348.08/01.002), (348.08/01.003), (348.08/01.004), Malaga Island, Casco Bay, Maine.

Midden 2 (Marks)

Site Description

The Midden 2 area includes the shell beach to the east of Midden 1, and the unsurveyed area located directly uphill (south) from the beach. Midden 2 measures 14 meters along the north-south axis by19 meters along the east-west axis (see Figure 21). The total site area is 266 m^2. The southern portion is exclusively covered by poison ivy and has not been surveyed or excavated. The remainder of the site is currently used for storage of lobster traps by Jim McKinney[4] and his son's fishing operation.

Figure 21 General view of Midden 2 (Marks) at the Malaga Island Site, Casco Bay, Maine, facing south. Poison ivy extensively covers the site. (NDH MI 2006)

[4] Interviews with area fishermen who used Malaga Island revealed almost no-one was allergic to poison ivy.

A small cove contains a beach of finely crushed and intensively reworked Soft-shell clam (*Mya areneria*) fragments. This beach appears to be re-deposited landward: a minimal amount of eroded shell fragments were visible on the inter-tidal flats in 2006. This cove is an ideal place to land smaller boats, as is seen in a historic photograph (Figure 22). The site would have been useful in prehistoric times as well. One informant attending an archaeology awareness presentation at Bowdoin College (Oct. 2004) stated that an aboriginal grooved axe was surface-collected on the north end beach of Malaga. However, the dynamic location means that the beach does not have long-term stability.

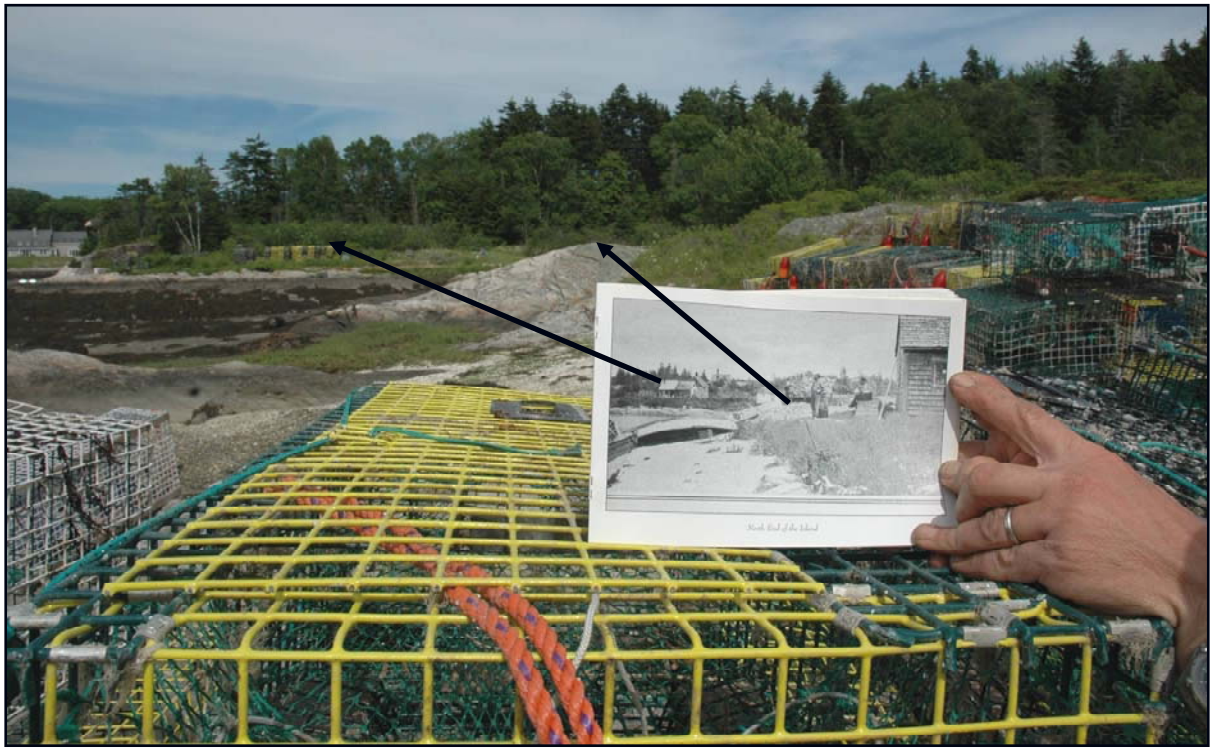


Figure 22 General view of Midden 2 (Marks) at the Malaga Island Site, Casco Bay, Maine, facing east. (NDH MI 2007)

Archaeological Investigation

Our objectives were to determine the depth of deposit, the nature of underlying material, and the dynamics of the depositional layers. We excavated a single one-meter square (TU-7) in the beach deposit.

Stratigraphy

The stratigraphy reveals undifferentiated beach deposits of mixed shell and sand over a medium to fine sand deposit that appears rich in organics. The shell deposit extends to 60 cm below the present surface. No column sample was taken in the beach deposit.

Material Culture

The cultural remains (see Table 9) from TU-7 are moderate in number, totaling 580 items. The sample is dominated by metal items (n=214). A moderate sample of bone (n=123) and univalve (n= 83) related to fishing and processing activities document aspects of the marine focus. Smaller samples of household items including glass (n=43), ceramics (n=14) and a single pipe stem were recovered. Some coal and brick were recovered as small fragments.

TABLE 9

Distribution of Fauna and Artifacts Recovered from 2006 USM Testing of Midden 2 Beach (Marks), Test Unit-1 (Field Designation TU-7) at Malaga Island Site, Phippsburg, Maine.

LEVEL (CM)	BONE	UNIVALVE	BRICK	METAL	GLASS	CERAMIC	PIPE STEM	COAL	SLAG
0-10	2	8	1	14	15	7	0	0	0
10-20	32	43	3	98	25	7	1	24	7
20-30	10	15	4	47	2	0	0	8	1
30-40	29	10	0	41	1	0	0	0	0
40-50	48	7	0	8	0	0	0	0	0
50-60	2	0	1	6	0	0	0	0	0
TOTAL	**123**	**83**	**9**	**214**	**43**	**14**	**1**	**32**	**8**

Level 0-10 contains plastic and one stone flake
Level 10-20 contains plastic

Midden 3 (Juniper Hill)

Site Description

The Midden 3 area, named Juniper Hill, is a small, thin, isolated shell midden deposit, situated east of Midden 1 and southwest of Midden 4 (Figure 23). It is the highest elevated midden area at approximately 3.5 meters above sea level. It measures 11

meters along the north-south axis and nine meters along the east-west axis. The entire patch of *ca*. 100 m^2 is well-vegetated by juniper bushes and at present is not associated with any specific historic structure, although there is evidence of remnant paths through the juniper.

Figure 23 General view of Midden 3 (Juniper Hill) at the Malaga Island site, Casco Bay, Maine, facing north. (NDH MI 2006)

Stratigraphy

A single 50 cm^2 STP was excavated in the deposit. The stratigraphy (see Appendix of final report) reveals a shallow

deposit of an A horizon with shell over a silt-clay deposit. The shell and cultural remains extend to a depth of 25 cm below surface. A single column of five samples was taken in the south wall of the STP.

Material Culture

The cultural remains from STP-1 are small in number, totaling 55. The sample is dominated by glass (n= 17), metal (n= 18) and brick fragments (n= 14) and small amounts of bone (n= 4). One ceramic fragment and one univalve round out the total.

MIDDEN 4 (H. Griffin Area)

Site Description

The Midden 4 area, tentatively identified as belonging to the household of Henry Griffin is the third largest patch in aerial extent and measures *ca.* 40 meters along the north-south axis by *ca.* 20 meters on its east-west axis (Figure 24). The site area is *ca.* 800 m^2.Evidence of an intact stone lined house foundation occurs at the northern margin adjacent to the ocean. The foundation along the long axis is generally north-south in orientation and measures 3.2 meters by 2.9 meters. Photo documentation of the foundation was made as part of our goal of preserving the foundation intact and unexcavated. Southeast of the midden in a small fern meadow is the location of the identified stone-lined hand-dug well (see Figure 13). This well, although small in diameter, is typical of rural wells serving single structures, and still contains a shallow amount of fresh water due to the perched water table on the island.

Figure 24 General close-up view of presumed Henry Griffin house foundation at the northern end of Midden 4 (Griffin) at the Malaga Island Site, facing north. The foundation dimensions are small and typical of the 19th century lower socioeconomic bracket. (NDH MI 2006)

The midden associated with this site is extensively exposed at the northern tip and along the eastern margin. The northern tip was significantly eroded apparently from the 2007 “Patriots Day” nor’easter storm. The midden exhibits minimal erosion of sub-soil at the northern margin of the bedrock platform. A memorial sign was placed on the upper elevation portion of the site (in the

background of Figure 25) in the late 1990's by the late Steve Mitchell, a concerned local resident who has published a small booklet of photographs about Malaga Island (Mitchell 1999). The sign was subsequently removed some time after Malaga was acquired by Maine Coast Heritage Trust.

Figure 25 General view of eroded rock point at the northern end of Midden 4 (Griffin) at the Malaga Island Site, Casco Bay, Maine, facing southeast. One storm can make a big difference in the depositions on top of the rock. (NDH MI 2007)

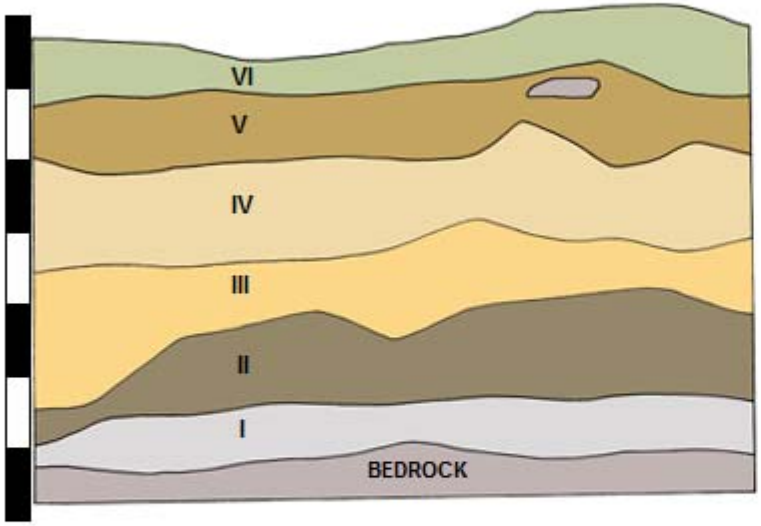
Archaeological Investigations

Our objective was to determine the physical parameters of artifactual and stratigraphic deposition. Midden 4 was tested in 2006 with one 50 cm^2 STP, later expanded into a one-meter test unit (TU-1). A second test unit (TU-2) was placed just south of the foundation. In 2007, a two-by-two meter block with four test units (TU-3 to TU-6) was excavated in the deepest portion of the site.

Stratigraphy

The stratigraphy reveals a thick, deep culturally constructed shell matrix (see Figure 26-29). All of the 2006 test units sit on top of glacial deposits and rocks at the base of TU-1 (Figure 26) may be structural in origin. The units varied between 60 cm and 110 cm in depth. Much of the matrix is unconsolidated soft-shelled clams, with large fragments of nearly complete shells. A substantial sample of whole shells with chondrophores was secured from all levels in five units. A column sample or two was taken from each unit and five and 10 cm increment samples were collected from each unit.

Figure 26 Stratigraphic profile Test Unit 1 in Midden 4 (Griffin) at the Malaga Island Site, Casco Bay, Maine, facing west. (NDH MI 2006)



MALAGA ISLAND
PHIPPSBURG, CASCO BAY, MAINE
Midden IV- Henry Griffin Residence
One meter stratigraphic profile of the south wall of TU-1
Profile taken 27 June 2006 by Maxamillian Branzenburg, Danielle Dadiego, and Thomas Edwards

VI Grass sod
V Crushed soft-shell clam shell with soil
IV Coarse crushed soft-shell clam shell
III Crushed soft-shell clam shell
II Black clayey loam
I Gray sand

Figure 27 Stratigraphic profile Test Unit 1 in Midden 4 (Griffin) at the Malaga Island Site, Casco Bay, Maine, facing south.

Figure 28 Stratigraphic profile Test Units 5 and 6 in Midden 4 (Griffin) at the Malaga Island Site, Casco Bay, Maine, facing north. The profile reveals distinct stratigraphic levels.

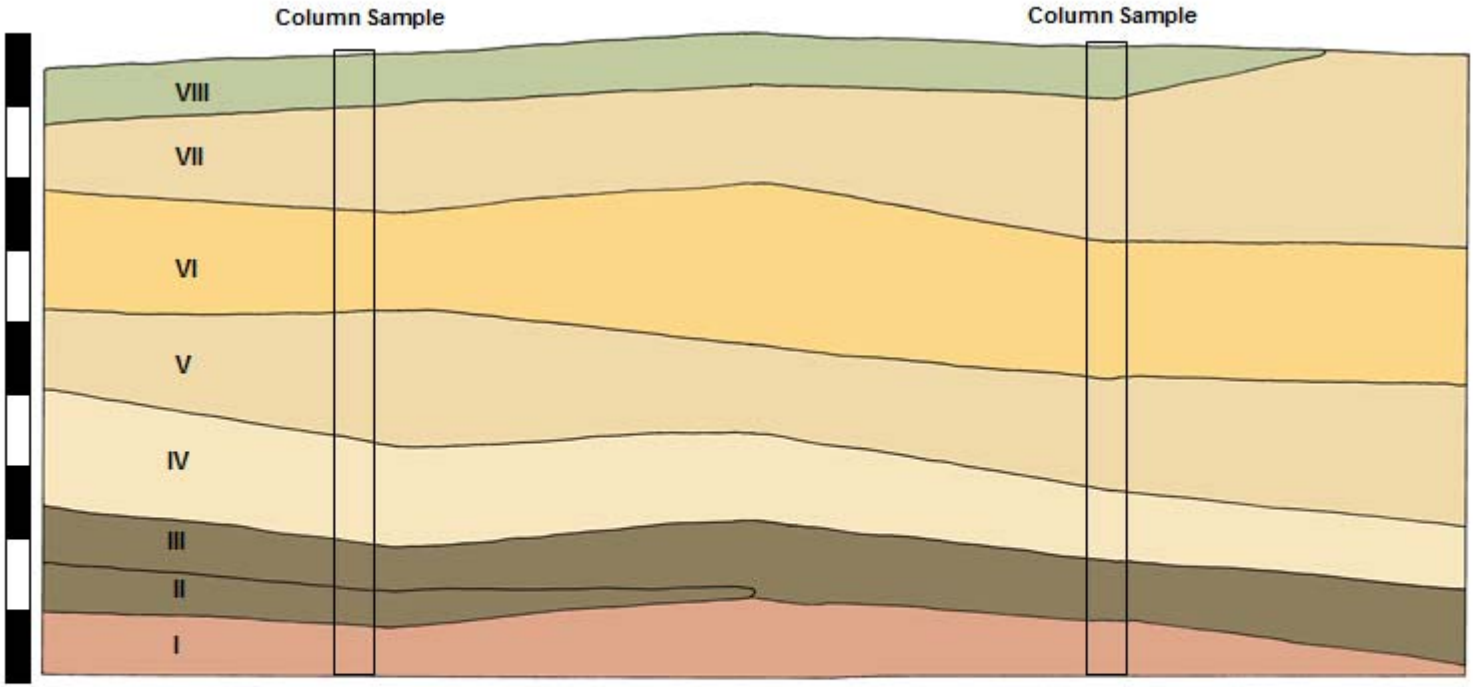


Figure 29 Stratigraphic profile Test Units 5 and 6 in Midden 4 (Griffin) at the Malaga Island Site, Casco Bay, Maine, facing north.

Material Culture

The highest average counts of cultural remains per square meter occurs in Midden 4 with an overall total of 19,041 specimens in the six square meters excavated (see Table 10). 89% of the count is attributed to the combined categories of metal (n= 8989) and bone fauna (n= 6752). Test Unit-2 produced the highest count of bone fauna (n= 1828) of any unit excavated in the 2006-07 field seasons. Smaller samples of household cultural remains include glass (n=1303), ceramics (n= 516), buttons (n= 75) and smoking pipe fragments (n= 62). A moderate amount of brick fragments (n= 907) suggests the foundation and former structure had a brick chimney. A moderate sample of gastropod shells (n= 435) was recovered throughout the six units and on the rock.

TABLE 10
Summary of Fauna and Artifacts Recovered from 2006-2007 USM Test Unit Excavation of Midden 4 (Griffin) at Malaga Island Site, Phippsburg, Maine.

TEST UNIT	DEPTH (CM)	BONE	UNIVALVE	BRICK	METAL	GLASS	CERAMIC	COAL	BUTTONS	PIPE STEM	PIPE BOWL
1	60	444	38	80	1041	65	23	2	8	6	5
2	110	1828	72	237	1577	85	71	-	5	5	3
3	90	1047	19	131	907	184	152	-	13	9	3
4	90	1233	41	75	854	156	33	-	15	7	-
5	90	588	60	218	607	184	70	-	9	5	1
6	90	1102	65	139	635	188	105	-	4	10	2
7 (Rock)	*60*	*513*	*120*	*27*	*3368*	*441*	*62*	-	*21*	*4*	*2*
TOTAL	**280**	**6752**	**435**	**907**	**8989**	**1303**	**516**	**2**	**75**	**46**	**16**

MIDDEN 5 (E. Griffin/J. Eason Area)

Site Description

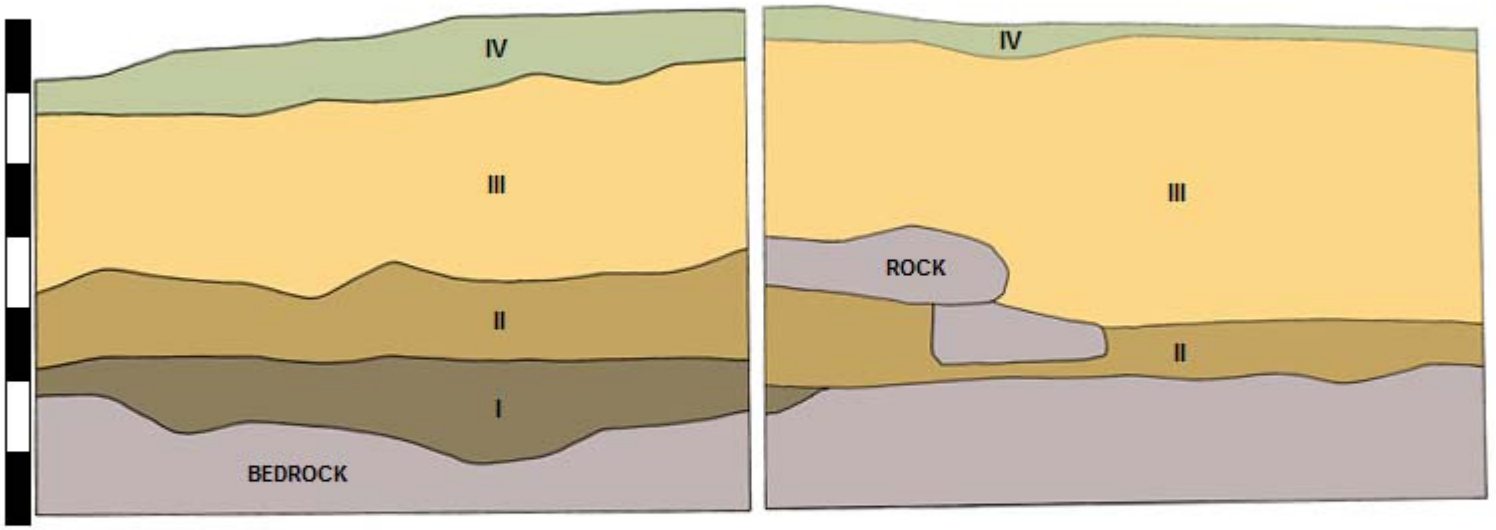
Midden 5 identified as belonging to the households of Eliza Griffin and John Eason is the largest in aerial extent. It measures *ca.* 50 meters on its north-south axis by 15-20 meters on its east-west axis (Figure 30). At least three separate structures are documented from historic photographs, one a cape style house with an ell, and the other a salvaged ship wheelhouse. The midden exhibits minimal erosion, around the bedrock platform. The area was tested in 2006 with six one-meter squares and three 50 cm ^{2} STPs that were placed in central areas of the deposit.

Figure 30 General view of the Eliza Griffin and John Eason Site (Midden 5) at the Malaga Island Site, Casco Bay, Maine, facing north. The oldest types of lobster traps were found on this site. (NDH MI 2007)

Stratigraphy

The stratigraphy reveals a dense cultural construction of the matrix (See Figure 31). Much of the shell in the deposit is highly fragmented soft-shelled clam. The midden varies from 20 to 90 cm in depth below the surface. The buried subsurface at 90 cm depth would have been in direct association with the cape style house documented in the photos. Several test units terminate directly on bedrock and others on a silty-clay deposit that appears related to the Presumpscot Formation deposits.

Figure 31 Stratigraphic profile Test Unit 3 in Midden 5 (E. Griffin/J. Eason) at the Malaga Island Site, Casco Bay, Maine, facing east. (NDH MI 2006)



MALAGA ISLAND
PHIPPSBURG, CASCO BAY, MAINE
Midden V- Eliza Griffin and John and Rosella Eason Residences
Composite two meter stratigraphic profile of the north and east walls of TU-3
Profile taken 27 June 2006 by Ingrid Brack and Casey Tatangelo

IV Grass and wildflower sod
III Crushed and whole soft-shell clam shell with black soil
II Crushed and whole soft-shell clam shell with black soil
I Black clayey loam grading to gray sand

Figure 32 Stratigraphic profile Test Unit 3 in Midden 5 (E. Griffin/J. Eason) at the Malaga Island Site, Casco Bay, Maine, facing north and east.

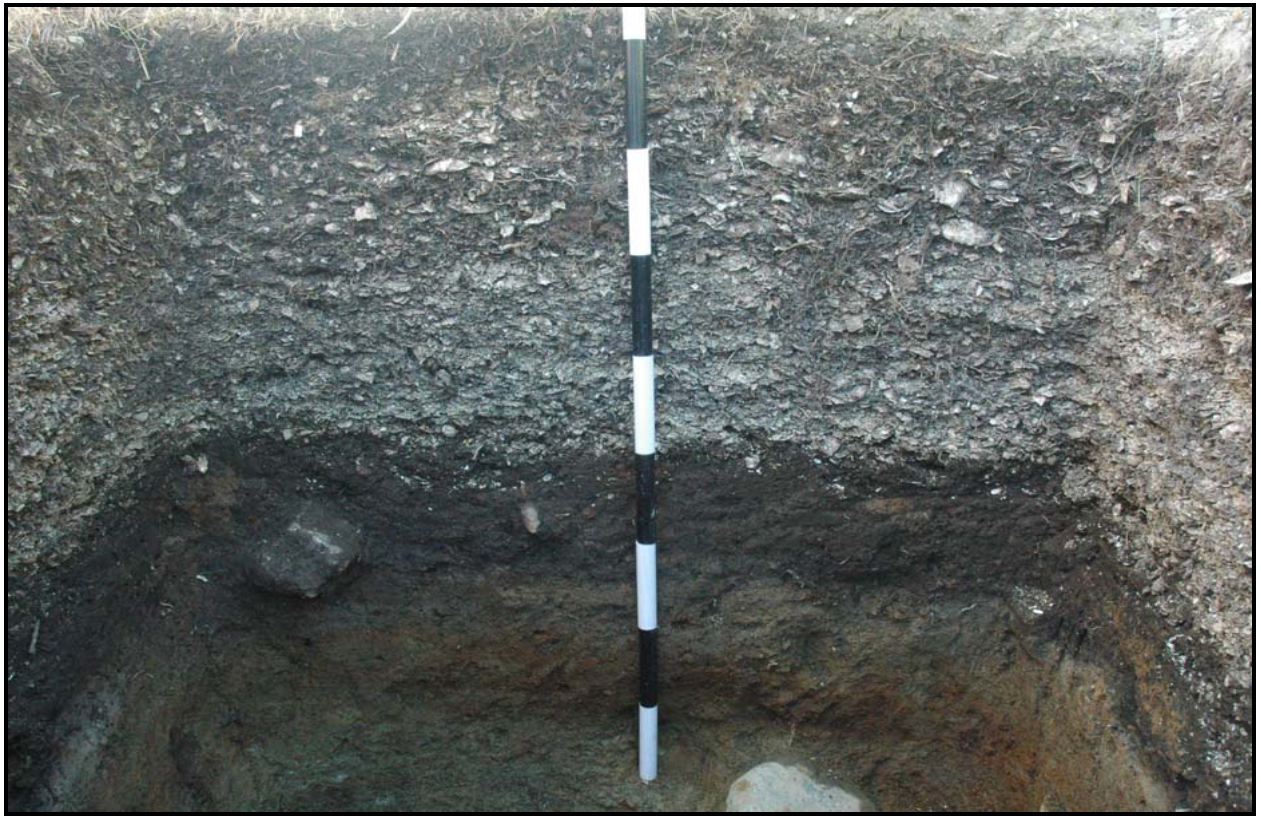


Figure 33 Stratigraphic profile Test Unit 7 in Midden 5 (E. Griffin/J. Eason) at the Malaga Island Site, Casco Bay, Maine, facing north.

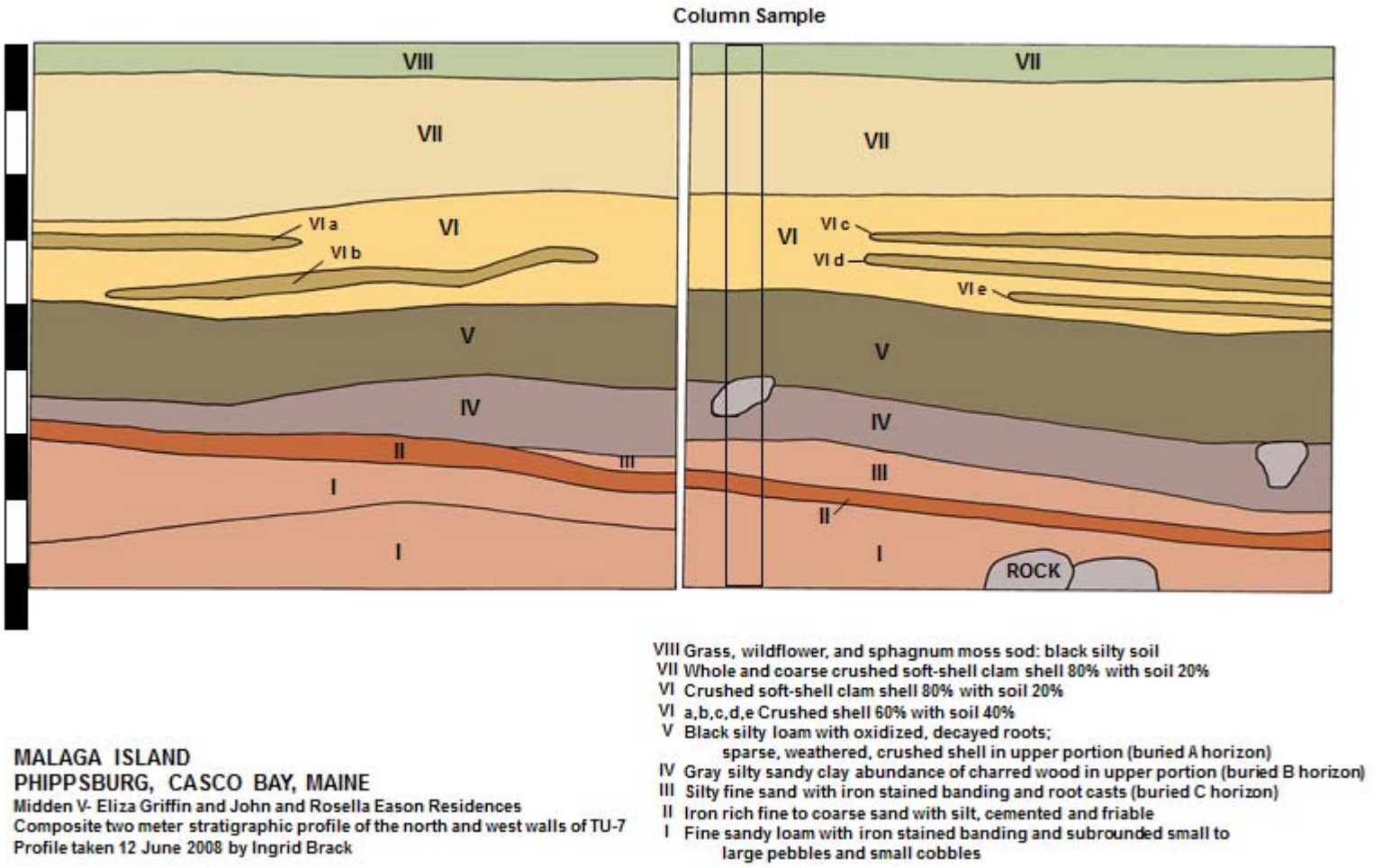


Figure 34 Stratigraphic profile Test Unit 7 in Midden 5 (E. Griffin/J. Eason) at the Malaga Island Site, Casco Bay, Maine, facing north and east.

Material Culture

A significant sample of cultural remains from the three test pits and seven test units and 11 STPs were recovered in midden 5 in 2006 (See Table 11). Like the other areas with habitation structures, metal (n= 2854) dominates the sample. The faunal sample includes a significant bone sample (n= 1696).

TABLE 11

Summary of Fauna and Artifacts Recovered from 2006-2008 USM Testing of Midden 5 (Griffin/Eason) at Malaga Island Site, Phippsburg, Maine.

TEST UNIT	DEPTH (CM)	BONE	UNIVALVE	BRICK	METAL	GLASS	CERAMIC	COAL	BUTTONS	PIPE STEM	PIPE BOWL
1	40	45	12	5	153	67	25	0	4	1	0
2	20	25	24	3	133	83	12	0	1	0	0
3	50	271	26	57	345	184	55	55	3	1	0
4	90	529	40	4	1130	108	69	1	12	4	4
5	20	0	0	0	21	4	10	0	0	0	0
6	60	175	41	270	528	140	23	23	4	2	0
7	60	419	651	23	639	337	319	127	?	5	-
TEST UNIT TOTAL	**340**	**1464**	**794**	**362**	**2949**	**923**	**513**	**196**	**24**	**13**	**4**

STP 06-1	50	23	13	155	164	25	8	22	0	0	0
STP 06-2	80	193	4	0	198	106	47	0	4	1	0
STP 06-3	60	16	16	44	173	40	34	0	0	0	0
STP 1.1	-	12	3	-	-	-	-	-	-	-	-
STP 1.2	-	12	-	-	-	-	-	-	-	-	-
STP 2.2	-	339	26	-	-	-	-	-	-	-	-
STP 2.3	-	12	1	-	-	-	-	-	-	-	-
STP 3.1	-	32	-	-	-	-	-	-	-	-	-
STP 3.2	-	28	6	-	-	-	-	-	-	-	-
STP 4.1	-	1	-	-	-	-	-	-	-	-	-
STP 5.3	-	17	8	-	-	-	-	-	-	-	-
TEST PIT TOTAL	**190**	**232**	**33**	**199**	**535**	**171**	**89**	**22**	**4**	**1**	**0**

Also Included: TU-2: string, TU-4: string, quartz flake, TU-6: leather, plastic, TU-7: fabric, hammer stone, STP-1: cement, STP-2: wetstone, quartz flakes

VII. Historic Material Culture

Ceramic Remains

A more detailed ceramic analysis is underway by Edna Feighner (New Hampshire Historic Preservation Commission). It will be interesting to compare this collection with those of the mainland.

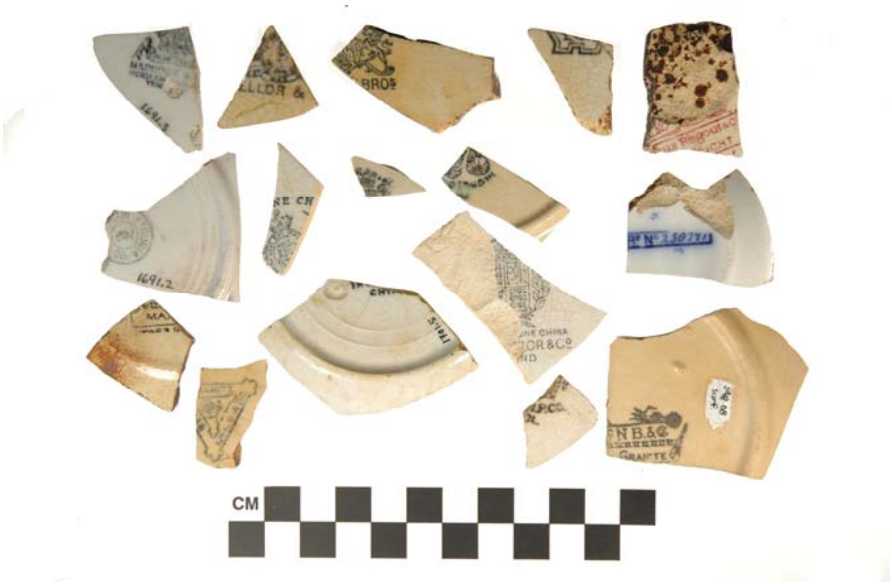


Figure 35 (1691.3), surface collection, area 2, 2006; (1673.2), surface collection, area 1, 2006; (348.9/289.3); (1723.5), surface collection, area 5, 2006; (1691.2), surface collection, area 2, 2006; (1723.4), surface collection, area 5, 2006; (348.8/289.5); (348.8/289.4); (1714.9), surface collection, area 4, 2006; (1723.3), surface collection, area 5, 2006; (1735.5), surface collection, area 6, 2006; (1701.5), surface collection, area 3, 2006; (1699.1), surface collection, area 3, 2006; (348.8/289.6); (348.8), surface collection, 1988, Malaga Island, Casco Bay, Maine.

Figure 36 Ceramic (1587.5), (1587.6), (1587.7), (1587.9), Eason and E Griffin house, STP-3, 10-20 centimeters, Malaga Island, Casco Bay, Maine.

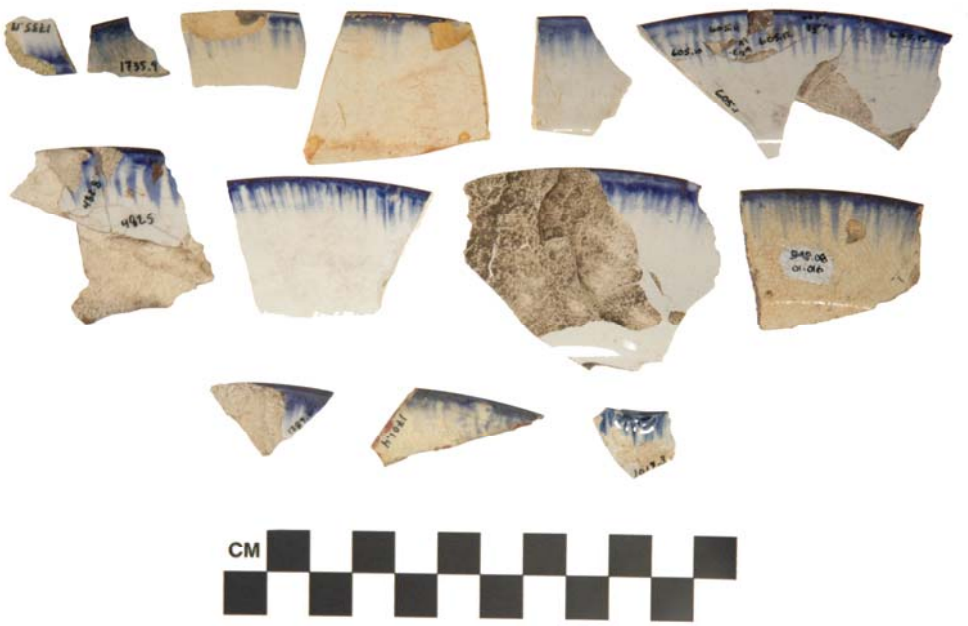


Figure 37 Ceramic (1735.13), surface collection, area 6, 2006; (1735.9), surface collection, area 6, 2006; (1691.1), surface collection, area 2, 2006; (1714.1), surface collection, area 4, 2006; (1673.1), surface collection, area 1, 2006; (605.1), (605.3), (605.10), (605.11), (605.12), (605.13), (605.15), (605.16) McKinney house, TU-4, 10-20 centimeters; (482.5), TU-2, 0-10 centimeters;(999.1), H. Griffin house, TU-2, 60-70 centimeters; (1298.5), Eason and E. Griffin house, TU-4, 10-20 centimeters; (348.08/01.016), 1988; (1289.6), Eason and E. Griffin house, TU-4, 0-10 centimeters; (1701.4), surface collection, area 3, 2006; (1019.3), H. Griffin house, TU-2, 80-90 centimeters, Malaga Island, Casco Bay, Maine.

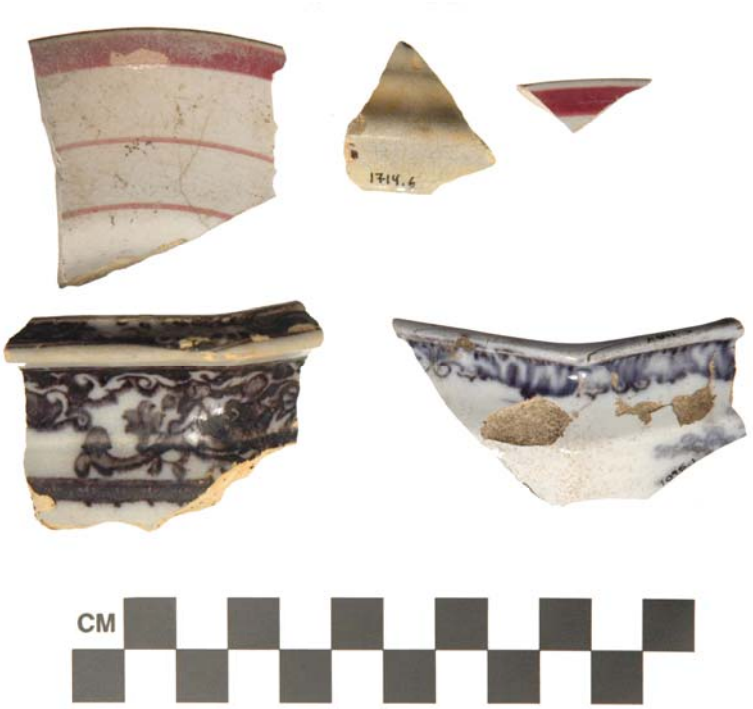


Figure 38 Ceramic (1318.4), Eason and E. Griffin house, TU-4, 30-40 centimeters; (1714.6), surface collection, area 4, 2006; (1318.6); (1723.6), surface collection, area 5, 2006; (1095.1), H. Griffin house, STP-1, 10-20 centimeters, (1104), H. Griffin house, STP-1, 20-30 centimeters, Malaga Island, Casco Bay, Maine.

Figure 39 Ceramic (1263.5), (1263.4), (1263.3), Eason/E.Griffin house, TU-3, 30-40 centimeters, Malaga Island, Casco Bay, Maine.

Figure 40 Ceramic (532.2), (532.1), McKinney house, TU-2, 50-60 centimeters, Malaga Island, Casco Bay, Maine.

Figure 41 Crock (1359), Eason/E.Griffin house, TU-4, 70-80 centimeters, Malaga Island, Casco Bay, Maine.

Figure 42 Ceramic (1358.4), (1358.2), (1358.3), Eason/E.Griffin house, TU-4, 70-80 centimeters, Malaga Island, Casco Bay, Maine.

Glass Remains

Many of the glass bottles and other glass materials show a connection to the area. Bottles from Bath and Portland are in this collection, reflecting common patent medicines, flavorings, and other household materials.

Figure 43 Glass (481.3), McKinney house, TU-2, 0-10 centimeters; (348.8/292.5), surface collection, 2002; (348.8/292.4), surface collection, 2002; (411.4), McKinney house, TU-1, 10-20 centimeters; (481.1), McKinney house, TU-2, 0-10 centimeters; (686.2), McKinney house, TU-5, 50-60 centimeters, Malaga Island, Casco Bay, Maine.

Figure 44 Glass (539.1), (539), McKinney house, TU-3, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 45 Glass cup handle (1595), Malaga Island, Casco Bay, Maine.

Figure 46 Glass (411.12), McKinney house, TU-1, 10-20 centimeters; (86.1); (1418.1), Eason/E.Griffin house, TU-18, 20-30 centimeters; (401.5), McKinney house, TU-1, 0-10 centimeters; (431.35), McKinney house, TU-1, 20-30 centimeters; (1467.16); (401.10), McKinney house, TU-1, 0-10 centimeters; (539.25), McKinney house, TU-3, 0-10 centimeters; (481.4), McKinney house, TU-2, 0-10 centimeters; (626.36), (626.12), McKinney house, TU-5, 10-20 centimeters; (1233.10), Eason/E.Griffin house, TU-3, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 47 Glass bottle tops (715.1), McKinney house, TU-6, 0-10 centimeters; (207.3), surface collection, locus 7, 2002; (1253.14), Eason/E.Griffin house, TU-3, 20-30 centimeters; (305), Malaga Island, Casco Bay, Maine.

Figure 48 Glass (1438.1), Eason/E.Griffin house, TU-6, 40-50 centimeters, Malaga Island, Casco Bay, Maine.

Figure 49 Glass (293.3/348.8), surface collection, 2002; (348.8)/293.2), surface collection, 2002; (348.8/01.005), surface collection, 1988, Malaga Island, Casco Bay, Maine.

Metal Remains

The seacoast is hard on metal, plus the residents would have had the opportunity to remove usable metals even as the island was forcibly abandoned. Accordingly, the metals encountered may not represent a rich array. However, the packed, isolated stratigraphic layers helped preserve pins, fish hooks and other small items in some portions of the excavated areas. Through the Maine State Museum, these materials are being stabilized and will soon be available for analysis.

Figure 50 Stove fragment (1401), E. Griffin house, TU-6, 10-20 centimeters, Malaga Island, Casco Bay, Maine.

Figure 51 Stove cover (1508), E. Griffin house, Malaga Island, Casco Bay, Maine.

Figure 52 Fishing hook (883.1); pin (883.2), M^{c}Kinney house, TU-1, 30-40 centimeters, Malaga Island, Casco Bay, Maine.

Figure 53 Fishing hooks (1316.1), (1316.2), brass nails (1316.3-1316.6), E. Griffin house, TU-4, 30-40 centimeters, Malaga Island, Casco Bay, Maine.

Figure 54 Pocket knife (1316.1), Eason/E Griffin house, TU-4, 30-40 centimeters, Malaga Island, Casco Bay, Maine.

Figure 55 Spoon (1136), Eason and E.Griffin house, TU-4, 50-60 centimeters, Malaga Island, Casco Bay, Maine.

Figure 56 Lamp part (549.1), McKinney house, TU-3, 10-20 centimeters, Malaga Island, Casco Bay, Maine.

Figure 57 Belt buckle (480), McKinney house, TU-2, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 58 Key (883.7), H. Griffin house, TU-1, 30-40 centimeters, Malaga Island, Casco Bay, Maine.

Figure 59 Lock (1287), Eason and E. Griffin house, Malaga Island, Casco Bay, Maine.

Figure 60 Razor blade (933), H. Griffin house, TU-2, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 61 Small hatchet (578), McKinney house, TU-3, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 62 Hinge (538), McKinney house, TU-3, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Bullets and Shell Casing

Two 10 gauge brass shot shells were recovered (Cat. No. 437). These were too corroded to allow for a definitive analysis but appear to be manufactured by the Union Metallic Cartridge Company. These shot shells were manufactured between 1837 and 1912 (Ohio U.) (Remington). The UMC head stamp was not used after 1912 when this company and Remington Arms merged. These shells may have been used in a market gun.

One .22 short brass rim fire cartridge was recovered (Cat. No. 538.2). The cartridge was manufactured by the Peters Cartridge Company. It was loaded with a 28 grain lead bullet and was primed with fulminate of mercury. The Peters Cartridge Company was founded shortly before 1900 in Kings Mills, Ohio (Peters, Wikipedia). The Peters head stamp continued in production until the 1930's when Remington Arms purchased Peters. The .22 short cartridge was first introduced in 1857 (Hawks 2005).

Two .22 short brass rim fire cartridges manufactured by the Union Metallic Cartridge Company were recovered (Cat. No. 400.1 and 400.2). These cartridges were loaded with 28 grain lead bullets and were primed with fulminate of mercury. The Union Metallic Cartridge Company was founded in 1867 in Bridgeport, Conn. (Ohio U) and the U or UMC head stamp was in use until 1912 when the company merged with Remington Arms.

One .22 long brass rim fire cartridge manufactured by the Peters Cartridge Company was recovered (Cat No. 613.1). This cartridge was loaded with a 28 grain bullet and used a fulminate of mercury primer. The .22 long cartridge was first introduced in 1871 (Hawks 2005). The head stamp was in use until the 1930's. See Cat. No. 538.2 for company particulars.

One 32-20 brass center fire cartridge (Cat. No. 625.1) manufactured by the Winchester Repeating Arms Company was recovered. This cartridge was introduced in 1882 by Winchester specifically for its model 1873 lever action rifle and was later used for the very popular Model 1892 (Winchester, Wikipedia). There were many different loads for this cartridge using bullet weights

ranging from 85 to 115 grains and fulminate of mercury primers. Other arms manufacturers quickly recognized the popularity of this cartridge. Among these were Colt, Smith and Wesson, Remington, and one obscure manufacturer named Bayard. In 1888, Colt chambered its venerable Colt Lightning for this cartridge. Both rifles and handguns were chambered for the 32-20. The 32-20 nearly faded into obscurity in the 1930's and 40's but resurgence in popularity in the 1950's, fueled mainly by the arms reproduction market, saved it from extinction and it is still in production today.

One .44 or .45 caliber lead conical bullet was recovered (Cat. No. 731). This specimen is badly deformed and oxidized, ruling out a definitive analysis. However, it appears to be a hand-cast bullet with one lubrication groove near the base. This type of bullet was popular for cap and ball handguns but certainly was used in other firearms. Molten lead was poured into the mold and allowed to round up on top of the mold and left to partially cool. This aided in the heating of the mold to the proper temperature for molding. The base appears deformed, likely due to the casting procedures used.

One brass base for a 10 gauge waxed fiber shot shell was recovered (Cat. No. 933.1). This item was manufactured by the Union Metallic Cartridge Company under the head stamp of New Club, both the UMC 10 gauge brass and waxed fiber shot shells were produced between 1867 and 1912. UMC and Remington merged in 1912 and the UMC head stamp was no longer used.

Figure 63 Cap (933.2), H Griffin house, TU-2, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 64 Shotgun shell (933.1), H Griffin house, TU-2, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 65 22 short brass shells (400.1), (400.2), McKinney house, TU-1, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Figure 66 Shell case (613), McKinney house, TU-5, 0-10 centimeters, Malaga Island, Casco Bay, Maine.

Smoking Pipes

Smoking pipes or "ball clay" pipes were recovered from the excavations at Malaga Island in Midden 1 (McKinney), Midden 4 (Griffin), and Midden 5 (Griffin/Eason), , and provide useful information about the chronology of occupation of the site, relative habits of a "low-income" fishing community, and insight into local offshore trading. Pipe fragments were also surface-collected from much of the beach and surface rock portions of the habitation area and shore.

No complete smoking pipes were recovered. However, numerous stem bowl, and base fragments were found (approximately 200 fragments). A complete attribute analysis of the pipe fragments was conducted on the provenience of the artifact, description, length (mm), bore diameter (64^{th} of an inch) of the stems, weight (g), and identification of any maker's marks. The average size of all stem fragments is about two to three centimeters in length, and the bowl pieces were usually fragmentary with the exception of a few intact bowls. About 40% of the assemblage came from Midden 1(McKinney), 30% from Midden 4 (Griffin), 15% from Midden 5 (Griffin/Eason), and another 15% from combined surface collections. Pipe fragments occurred in all levels of Midden 1 (McKinney) area (0-70 cm), but were concentrated in the first forty centimeters of shell midden. Most of the pipe fragments recovered from Midden 5 (Griffin/Eason) area were concentrated in the first thirty centimeters. In comparison, the Midden 4 (Griffin) area had the highest concentration of pipe fragments in the deeper levels (40-80 cm).

Approximately 20% of the total assemblage of smoking pipe fragments recovered from Malaga Island exhibit distinguishable maker's marks and proofs (10% from the Midden 1 (McKinney) area, 5% from the Midden 4 (Griffin) area, and 5% from the Midden 5 (Griffin/Eason) area). Four named primary makers are present in the pipe assemblage: W. White, McDougall, Davidson, and Bannerman. W. White, McDougall, and Davidson pipes all had proof marks from Glasgow, Scotland, or just Scotland, and the Bannerman pipes were proof marked Montreal, Quebec. All are commonly found at historic sites in New England (indeed, through the 1950s it was not uncommon to see an old-time farmer smoking a clay pipe). The 12 variations on smoking pipe stems found on

Malaga Island are listed below.

BANNERMAN GLASGOW
BANNERMAN MONTREAL
MONTREAL R. BANNERMAN
DAVIDSON GLASGOW
GLASGOW DAVIDSON
McDOUGALL SCOTLAND
328 McDOUGALL GLASGOW
GLASGOW SCOTLAND McDOUGALL
W. WHITE GLASGOW
78 W. WHITE & SON GLASGOW
78 8 W. WHITE GLASGOW
SCOTLAND W.W. WHITE

The W. White pipes occurred in the first 60 cm of stratigraphic levels, but were concentrated in levels 20 to 40 cm in particular, especially in the Midden 1 (Eason) area. Interestingly, the McDougall pipes only occurred in only one level in all areas (10-20 cm) with the exception of Test Unit 1. Davidson pipes occur in the Midden 1 (Eason) and Midden 4 (McKinney) areas (20-30 cm), but not in Midden 5 (Griffin). The Bannerman pipes occur in Midden 5 (Griffin) and Midden 4 (McKinney) areas, but not in Midden 1 (Eason). The Bannerman pipes were found mostly in deeper levels, especially in McKinney Test Unit 3 (70-80 cm). Overall, it seems the W. White pipes were used throughout the entirety of the historic occupation of the island, but the use of the McDougall, Davidson, and Bannerman pipes were limited to more specific temporal and spatial ranges.

Normal wear marks and evidence of burning appear on the smoking pipe assemblage, but some pieces showed some excessive wear. A pipe stem piece near the mouth end showed clear signs of being chewed (Midden 1, Eason, TU-2) and another mouth segment looked as though it had been carved or chiseled (Midden 4, TU-3). Sometimes, when a pipe would break, the user would

simply chisel or grind down the broken end to make it less sharp, but still useable. The chewing marks could be a sign of extended use or a nervous habit of chewing away while working. Reusing broken pipes and/or extended use of this generally abundant commodity may reflect its availability to the island community and the community's temporal contact with the mainland, though it was a common New England tradition of frugality.

Few fragments display decoration, although there is one intact bowl with a face carved on it (Midden 1, TU-2) suggesting that the community would have been able to acquire some of the nicer smoking pipe styles at times. Little is known about red clay pipes but several such fragments were recovered from the site suggesting that the community's trading network could have been quite extensive.

A specific date using the pipe fragments cannot be determined without using a pipe stem or pipe bore dating formula (e.g. Binford's pipe stem dating formula), but the relative dates of the maker's marks plus the average bore diameter of the assemblage can help reaffirm the dates for the island's occupation gathered from historic documents and other archaeological investigations. W. White pies were most commonly used after 1892, and the McDougall pipes were exported in greatest quantities to the Unites States in the 1880s and 1890s. Robert Bannerman started producing pipes in 1858, and the Bannerman line kept making pipes until 1907. About 95% of the assemblage has a bore diameter of either a 4/64 or 5/64, placing them near the end of clay smoking pipe manufacture and popular use.

Figure 67 Pipe stems, Eason house, Malaga Island, Casco Bay, Maine.

Figure 68 Pipe stems and bowls, Eason house, Malaga Island, Casco Bay, Maine.

Figure 69 Pipe stems and bowls, McKinney house, Malaga Island, Casco Bay, Maine.

Figure 70 Pipe stems and bowls, Griffin house, Malaga Island, Casco Bay, Maine.

VIII. Faunal Remains

Bone Fauna

The 2006 excavations of three shell middens 1, 4 and 5, produced a sample of 5005 well-preserved animal bones consisting of 565 (11.3%) mammal, 428 (8.6%) bird, and 4012 (80.2%) fish bones. The three areas of excavation were designated McKinney (Midden 1), Griffin (Midden 4), and Griffin/Eason (Midden 5), after families that occupied the space prior to 1912. The Griffin area contained the largest faunal sample, producing 2361 bones from two one-by-one meter test units and was by far the deepest of the middens extending to a 110 cm depth. Most of the tested area consisted of a matrix of whole *Mya arenaria* shells (clams). Griffin/Eason and McKinney both produced a similar sized sample of 1282 and 1352 specimens respectively, and were shallower middens than the Griffin area.

Analysis of these faunal remains revealed differences in use areas (activity areas). Two different horizons were evident within the middens. The remains from the Griffin area provided strong evidence of commercial fish processing, while the Griffin/Eason and McKinney remains are more consistent with household refuse. Frequencies of mammal remains and a broadening of exploited species help to define the horizons within the midden, and suggest a lighter residential use in the lower midden compared to an increased residential use in the upper layers of the middens. Earlier commercial fishing activities can also be seen in the midden remains.

The collection contains a large variety of fish and bird species, but is far more limited in mammal remains. Mammal remains are dominated by domestic pigs (*Sus scrofa*) and contain a large proportion of teeth and cranial remains suggesting that the Malaga people kept pigs out on the island. The presence of several immature pigs, including at least one newborn, further supports this theory. The other large portion of the mammal remains are from domestic cattle (*Bos taurus*) and consist mainly of shoulders and shanks; pieces which would be consistent with the poorer economic conditions that the Malaga people lived under. The remainder of

the mammals consists of domestic dog (*Canis familiaris*) representing three individuals, two mostly complete muskrat (*Ondatra zibethicus*), one red squirrel (*Tamiasciurus hudsonicus*) and one rabbit (*Lepus townsendii*).

Fish species are consistent with a broad based fishing settlement on the coast of Maine. The remains are dominated by commercially important cod (*Gaddus morhua*) and haddock (*Melanogrammus aeglefinus*), and also contains a large portion of pollock (*Pollachius virens*). Additionally, there are many remains from small fish such as mackerel (*Scomber scombrus*) and menhaden (*Brevoortia tyranus*) that have been used as bait or as a commercial commodity. At least 10 other species of fish are represented in the collection, including some notables such as sturgeon (*Acipenser oxyrhynchus*), salmon (*Salmo salar*), spiny dogfish (*Squalus acanthias*), and striped bass (*Morone saxatiles*).

Bird remains suggest a broad based hunting strategy dominated by medium ducks and seabirds, most of which are indeterminate to species. Both the common loon (*Gavin immer*) and the red-throated loon (*Gavim stellita*) are present, as is cormorant (*Phalacrocorax auritus*). Such birds were known to be eaten in many parts of the country; their consumption is not peculiar to Malaga.

Domestic chickens (*Gallus gallus*) are represented and at least one Falconiform (raptor) is present in the collection and is heavily butchered with many cuts and chops. Many of the bird remains are heavily butchered, which could be the result of adding them to the diet or exploiting them for their feathers, which were an important commodity at the time (Spiess, Pers. Comm. to Rowe 5-1-07).

The presence of several turtle remains within the collection should also be noted. They are very limited in quantity, represented by six bones with no carapace or plastron remains. Five of the bones belong to a single tiny individual that may have been an invasive or natural addition to the midden or could have been found and kept as a pet by one of the children living on Malaga. The remaining bone is a small vertebra from a slightly larger individual. The size and limited representation of the turtles found in this

collection do not suggest that they were important as a food source—turtles were eaten by rural peoples in Maine—but instead were a curiosity for the children or a natural addition to the midden.

Butchery marks are abundant on the mammal and bird remains leaving little doubt that they were being processed as a food source. Many of the bones show heavy chopping and shearing with multiple blows and deep markings. Most of the mammal remains are fragmented or have butchery marks ranging from cuts, chops, shearing and sawing. Most of the bird remains have finer cut marks that may have been the result of field dressing or carving at the table. In addition to the cuts, many of the bird bones have spiral fractures or crunched, chewed ends that were likely acquired at the table. The limited nature of the crunching and the absence of sharp punctures or conical depressions, and the similarity of the crunching pattern suggest that this was not a post-deposition carnivore gnawing; rather it was a consistent human pattern.

Fish remains present less clear evidence for butchery and use patterns. Most of the remains are spines and vertebrae, which are expected due to the anatomy of bony fish. There are a large number of cranial bones and bone fragments as well, which may be consistent with removing the head as part of the processing. It is interesting to note that several articulated tail sections from small fish were recovered out of Midden 4 (Griffin) as well as many cranial remains from similar sized individuals. This pattern suggests the removal of both head and tail from smaller fish, which seems more consistent with the production of a salted or pickled commodity rather than as a result of bait processing. Another explanation is that they were using the whole fish as bait and what is represented in the Griffin midden is an unintentional deposition due to loss or scattering of a few individuals through processing. It is notable that the larger cod and haddock remains are mostly found in the Midden 1 (McKinney) and Midden 5 (Griffin/Eason) while the smaller fish species are more common in Midden 4 (Griffin).

The Number of Individual Specimens (NISP) is used to estimate the number of individuals; in concert with the Minimum Number of Individuals (NMI), a reasonable estimate can be achieved (Marshall & Pilgrim, 1943; Klein and Cruz-Uribei, 1984). Table

35 is a listing of the NISP and MNI of the identifiable specimens from the 2006 Malaga collection. 1555 (31%) specimens were identified to species or in the case of some of the bird fragments to class, demonstrating the excellent preservation of bone within the midden. 31 species are represented in the collection with three more fish species that could not be identified with the resources at hand.

Some 28 of these species are represented in the upper 40 cm of the site including 15 species exclusive to the upper layers, demonstrating a broad-based exploitation of the wild fauna, and the introduction of the domestic dog and domestic sheep/goat. This represents a major shift in exploitation strategies and most likely represents the 19th century establishment of the Malaga settlement. This is supported by the wider variety of wild fauna which may be due to diverse economic endeavors such as bait for lobstermen, commercial fishing, and wild bird plumage, or it could reflect economic conditions that encouraged a broad foraging strategy and subsistence conditions. Either way, the distribution represents a major change in exploitation patterns that is preserved within the midden.

Midden 1 (McKinney)

The McKinney midden extends along the shoreline facing Bear Island and is lying directly on top of bedrock overlooking a fast-moving channel. Seven units were excavated. TU-2 was the deepest, extending to 80 cm in depth. 1352 faunal specimens were recovered from these units, consisting of 115 (8.5%) mammal, 123 (9.1%) bird, and 1114 (84.1%) fish bones (Table 36).

Mammal remains in this midden are limited to the upper 50 cm of the midden and consist of mainly three species: *Bos taurus, Sus scrofa,* and *Canis familiaris*. It should be noted that both the domestic dog and the domestic cattle remains are limited to the upper 30 cm of the midden while pigs show a little earlier. There is also evidence of growing importance of pigs in the upper 30 cm

of the midden, demonstrated by a NISP of 29 and an MNI of six compared to a NISP of three and an MNI of two in the 30-50 cm layers. The presence of one *Lepus americanus* in the 10-20 cm strata also reflects the broadening exploitation of small game as seen in the Midden 5 (Griffin/Eason).

Midden 1 (McKinney) also demonstrates distinct differences in frequencies that suggest a signature of the Malaga people in the archaeological record. Fish remains are present throughout the midden and demonstrate a spike in the 40-50 cm layer and in the 10-20 cm layer, NISP of 422 (37.9% of McKinney fish) and NISP 322 (28.9% of McKinney fish) respectively. There is a division between the 20-30 cm and 30-40 cm layers above which 104 (90.4%) mammal specimens by NISP and 101 (82.1%) bird specimens by NISP were recovered. The combination of the increased frequencies and the presence of numerous butchered remains suggest that this is evidence of more intense residential use brought about by the movement of the Malaga people to the island.

Fish remains at the Eason midden are extremely diverse representing nine different species and are dominated by cod, haddock, longhorned sculpin and pollock. Cod remains extend into the 60-70 cm strata and are represented by a NISP of 284 and an MNI of 18. Haddock remains are found as deep as 70-80 cm, but are only represented by a NISP of 23 and an MNI of seven. Pollock is only found in the upper 40 cm of the midden and are represented by a NISP of 17 and an MNI of four while longhorned sculpin are found in the top 70 cm of the midden and are represented by a NISP of 28 and an MNI of six. By these numbers it can be seen that cod were clearly the most important fish species at the McKinney midden and while the majority of these individuals are relatively small, most of the larger individuals are found in this midden.

Bird remains are limited to the top 40 cm of this midden and include common loon, red-throated loon, chicken and medium ducks. This concentration of remains in the upper 40 cm coincides with a diversification of species and an increased signature in terms of NISP and MNI. It is likely that these remains represent a post 1890 Malaga population increase and an intensified residential use of the area. This is further supported by the distribution of mammal remains and the introduction of different fish species into the

collection.

This pattern directly reflects the Griffin/Eason remains in that 18 species are represented above the 40 cm layer while only seven species are represented below this layer. Of those seven species, cod dominates the collection, while the other species are limited to single individuals and trace remains. This suggests that a commercial fishing activity was taking place on or near the Midden 1 (McKinney) area before the 1890's, and that the deposits above the 40 cm layer can be related to the increased residential use after the 1890's Malaga population moved to the island. This is correlated with the Griffin/Eason midden and begins to give a solid picture of the subsistence strategies employed by the 1890's Malaga population; broad based foraging and exploitation of wild fauna, increased presence of domestic animals and a fishing strategy that brings wider variety of species onto the island.

Midden 4 (H. Griffin)

Midden 4 (H. Griffin) midden is the deepest of middens on the island with TU-2 extending 110 cm in depth, mostly through a whole shell matrix. The whole shell matrix itself suggests that the area was used more for a commercial processing area, shucking clams for food or bait than as a permanent residence. This is further supported by the collection of fauna found in this area particularly the high concentration of fish remains.

The two test units in this area are located approximately two meters from a field stone foundation and were among the most productive units in terms of faunal remains. A total of 2361 bones were recovered from the midden of which fish were the predominant class. The collection from the Griffin midden consists of 178 (7.5%) mammal, 188 (8.0%) bird and 1995 (84.5%) fish bones. The fish bone NISP is inflated due to the approximately 324 fin spines and ribs, which were recovered. Refiguring the frequencies in the midden without the fins and spines results in a distribution of 8.7% mammal, 9.2% bird and 82.2% fish, doing little

to diminish the predominance of fish in this midden.

Mammal remains in the Griffin area are limited to cow and pig. The only evidence of domestic cows is a single bone in the 20-30 cm layer. Pigs, however, are represented in two groupings. There is a small grouping of pigs in the 70-90 cm layers represented by six bones from two individuals. The second grouping is in the 0-50 cm layers and consists of 27 bones from eight individuals, several of which are juveniles represented by two unfused fibulas.

Fish remains from the Griffin midden are the most diverse on the island, representing many smaller fish as well as important commercial species such as cod and haddock. There is a noticeable spike in fish remains beginning in the 70-80 cm layer and continuing through to the 20-30 cm layer above which they taper off rapidly. It should also be noted that a sturgeon scute (bony exterior plate or scale) was found in the 0-10 cm layer, suggesting the Malaga people had limited access to these large fish.

Many smaller fish are present in this midden and are not well represented in the other two middens. 284 vertebrae were measured from this midden producing a mean of 5.2 mm and a range of 2.1 mm to 18.1 mm with a standard deviation of 1.69 mm and a mode of 4.5 mm. These measurements demonstrate the predominance of smaller fish vertebrae in the collection. Between the 30-40 cm layer and the 70-80 cm layer there are the remains of six menhaden/pogies, which were used as lobster bait. There are only four other individuals of this species in the collection and they are found in the Eason midden between the 10-20 cm layer and the 30-40 cm layer. This, along with historic photographs, suggests that the Griffin area was actually a processing area as opposed to a residential use area. The limited amount of ceramics found in this midden and the select nature of the mammal remains help to support this as well.

Bird remains at the Griffin midden are concentrated in the 30-50 cm layers and are dominated by Anseriformes. In addition to this concentration of bird remains, there was one humerus belonging to a Falconiforme in the 70-80 cm layer. This is an interesting specimen in that it has seven cut marks on a roughly three cm proximal fragment. Many of the bird remains in the Griffin midden

show evidence of butchery.

The faunal collection from the Griffin midden demonstrates the most intensive use from the 20-30 cm layer to the 60-70 cm layer and is the least diverse of the middens. The combination of the collection of fish species, limited mammal remains and concentrated bird helps to support the theory that the Griffin area was being used as a processing area.

Midden 5 (Griffin/Eason)

A total of 1282 bones were recovered from the Griffin/Eason midden consisting of 270 mammal, 111 bird and 901 fish bones from six one m^2 test units and three 50 cm^2 STP's (Table 38). The deepest of the units was TU-4, which reached a depth of 80 cm. Fish remains are slightly more frequent in the lower portion of the midden, but remains fairly frequent throughout. There are mammal remains throughout the midden, but are much more frequent in the upper 30 cm of the midden, while bird remains consistent throughout with a spike at the 20-30 cm layer related to a fairly complete individual in TU-1.

Mammal frequencies are consistent with the artifacts found in the Griffin midden which also suggest an earlier habitation than that of the 1890 population. A distinct break in frequencies occurs between the 30-40 cm layer and the 40-50 cm layer. Mammal bones in the upper 40 cm of the Griffin/Eason midden represent 30.4 % of the bones by NISP while in the lower 40 cm are only 11.2 % of the bones. These frequencies are altered slightly by the presence of the two mostly complete muskrat that account for 64 of the mammal bones in the 0-10 cm layer, but even after removing these from the count, mammal bones are still almost twice as frequent in the upper three layers (20.7 %) than in the lower five (11.2 %).

MNI numbers represent a fairly consistent importance of pigs throughout the midden as well as a limited use of cows. There are at least four individuals represented in the upper 40 cm while there are at least five individuals represented in the lower 40 cm. It

is interesting to note that cows are represented by at least four individuals in the lower 40 cm while there are only two represented in the upper portion. This may indicate a lowering of economic status on the island that may also be supported by the wider range of wild fauna represented in the upper layers of the midden. Additionally, the upper portion of the midden demonstrates the introduction of dogs to the island as well as domestic sheep/goats.

Bird remains at the Griffin/Eason midden continue to support the residential use and broader exploitation patterns demonstrated by the mammal and fish remains. Below the 40 cm layer, there are four individuals from four different species represented. Above the 40 cm layer there are ten individuals representing five species, which include the introduction of Charadriformes (shore birds) and cormorants.

Fish remains in the Griffin/Eason midden also support the residential nature of this area both in size of the individual fish that are found there and in the diversity of species represented in the midden. The Griffin fish collection is limited to nine different species of fish and is lacking the menhaden/pogies that are present in the Griffin midden. The smaller fish species represented are mackerel and the alewife/mackerel classes, which are readily taken with a hook and line or a mackerel jig and which are quite tasty when fresh. Additionally, both haddock and sculpin become less important in the upper portion of the midden while cod becomes more important, suggesting a more selective approach to fish species.

The high level of mammal in comparison to fish at the Griffin/Eason midden helps to define this area as a residential midden. Fish species at the Griffin/Eason midden tend to be larger individuals, with cod, haddock and sculpin being the most numerous. Additionally, the wide variety of species in the upper levels of the midden may indicate the presence of hunting and trapping as demonstrated by the three muskrat and the squirrel found near the top of the midden.

Fishing at Malaga Island

1256 (31.30%) of the 4012 fish bones were identified to species, mainly through direct comparison with prepared specimens housed at the University of Southern Maine. 14 species were positively identified from this group of bones. An additional 143 specimens appear to be identifiable to species, but were unable to be positively identified with the resources at hand. This group consists mainly of small herring sized species represented by vertebrae and cranial pieces and one large fish species with a very aggressive single tooth row, which may be a small tuna. The 1256 identifiable bones consist of 598 (63) cod, 206 (35) long-horned sculpin, 192 (39) haddock, 109 (22) pollock, 52 (11) mackerel, 31 (11) menhaden/pogie, 26 (3) ocean perch, 21 (6) cunner, 7 (4) striped bass, 7 (4) salmon, 3 (3) winter flounder, 2 (1) plaice, and 1 (1) spiny dogfish, 1 (1) sturgeon specimens.

Cod remains dominate the fish portion representing 47.6 % of all the identifiable fish bone at Malaga and 63 of 204 identified individuals or 30.9 % of the total fish MNI. Young cod dominates the population distribution, most of which are under four years as determined by caudal vertebrae diameter measuring greater than 1.1 cm (Carlson 1986, Hamilton 1985, Spiess and Lewis 2001). Only four specimens representing three individuals from the collection are greater or near 1.1 cm which may demonstrate a selection process that could be related to fishing strategies, economic or technological features of the Malaga population.

Tables 30 breaks the measured codfish vertebrae into three different size classes for atlases, cervical, precaudal and caudal vertebrae. This is a somewhat troubling method in that there is a natural reduction in vertebrae size from the atlas to the terminal caudal vertebrae. Some variation can be accounted for in a single individual creating the possibility that a single individual could contribute elements to all three size classes, particularly in the caudal vertebrae.

With this in mind, the distribution of measurements at Malaga suggest a concentration of juvenile individuals and the top end of the range precludes the possibility of large numbers of adult cod (over four years) entering into the midden. This suggests that a controlled selection process occurs, limiting the population before remains are introduced into the midden.

There are at least two explanations for the age distribution in the population; that fishing methods being used focused on shallower waters and thus only had access to the large fish in the winter months when water temperatures cooled, or that economic or market conditions selected for larger fish and left the smaller catch for personal consumption which then entered the midden.

Following a discussion by Spiess and Lewis (2001), young cod are available year-round in all but the shallowest of waters due to their greater tolerance for warmer waters. They can be found in depth of fewer than two fathoms. Long horned sculpin that make up a significant portion of the collection (206 bones and 35 individuals) can also be taken with a baited hook and line in similar depths. This suggests that the Malaga people employed a baited hook and line technique in shallower waters where they could take the small cod and sculpin year round. Many of these fish could have been taken in the lobster traps.

However, also found is haddock, NISP 192 (MNI 39), which prefers deeper cooler water (Spiess and Lewis 2001). This indicates that deeper water fishing techniques were being used by the Malaga people. The numbers and ratios support an economic explanation for the young cod population represented at Malaga. In this case, the larger cod found in deeper waters with the haddock, are sold on the market, while smaller fish are kept for personal consumption on the island.

There was not a single approach to fishing on the island. The presence of large numbers of small schooling fish helps to suggest that these fish were being scooped or netted for use as bait, perhaps as part of a lobstering operation, or processed as a pickled or salted fish. Some of these smaller fish, such as the mackerel, are readily available by jigging in shallower waters. Other remains are from fish that would be most profitably caught in netting.

The distribution of species continues to demonstrate different subsistence approaches between the lower midden and the upper midden. Only six species of fish are found below the 50 cm layer, two of which, dogfish and cunner, are represented by scant remains and single individuals. The other four are cod, haddock, long-horned sculpin and pollock. Above the 50 cm layer the species diversify with the introduction of at least seven different species.

These statistics help to illustrate the size differences between each area of excavation, demonstrating a smaller average size and less variable population at McKinney and a larger average size with more variability at Griffin and Eason. These numbers along with the species diversity and distribution help to support the pattern of residential (McKinney and Griffin/Eason) vs. commercial (Griffin) on the island. Additionally, they begin to define different selection processes at each site which result in the overall size difference and the reduced variability in the Griffin midden.

Vertebrate Faunal Conclusion

The Malaga island excavation produced a well-preserved bone faunal collection and with further analysis has demonstrated some interesting patterns of exploitation and deposition. There is a clear difference between the upper portions and the lower portions of the three middens represented by an intensification of use demonstrated by both NISP and MNI and a broadening of species being taken. Subsistence patterns shifted from the lower portions and the upper portions as demonstrated by the increased diversity of species and the presence of more domestic animal remains. From this information, we are able to determine that there was a presence on the island pre-1890's, focused on commercial fishing with a light residential population that was most likely absorbed in 1890's by the Malaga population. Procurement patterns practiced by the 1890's population were widely varied and were influenced by availability and economic conditions. The increased residential pressure on the island and the economic conditions that the 1890's Malaga population lived under, encouraged a broad based foraging strategy in which many fish species were taken, most bird species were open game, domestic animals contributed to the economy and wild mammals were trapped or shot for food or furs.

Bivalve Remains

The bivalve shells recovered during excavation consist predominantly of Soft-shell Clam (*Mya arenaria*). Smaller numbers of blue mussel (*Mytilus edulus*) are present in discreet patches. Today, blue mussels are abundant on Malaga Island, and may have been gathered directly from the shores of the island in the past. Soft-shell clam, razor clam and quahog are found today in the tombolo area between Bear and Malaga Islands. The north mudflats have not been surveyed.

During the period that Malaga Island was inhabited, the extensive clam flats to the north around Bath were mostly privately owned, so they were likely not used by the residents of Malaga Island. According to a census of shell fish species by the Maine Department of Marine Resources (MEDMR 1970), smaller but productive soft shelled clam mud flats are present all along the shores of the New Meadows River. These are near Harbor Island, in various coves of Cundy's Harbor, and in the long stretch of shallow river that runs between the mainland and Dingley and Long Island. Figure__ shows a composite aerial photo with this data overlain.

Scallops are noted in the MEDMR survey as abundant in patched near the island today, but are not found in the archaeological assemblage. The absence of scallops in suggests the exclusion of subtidal shell fishing among fishing methods used at Malaga Island. No scallop shells have been found along the shores of Malaga Island during tidal area surveys, which indicates that the shells of these subtidal species were not incorporated during storm events.

Chondrophore Measurements

A regression analysis of the measurement of hinge size to shell width on all whole shells recovered from column samples showed a positive correlation where hinge width = 0.1228 x shell width + 2.3038 with an R squared value of 0.6481 and a correlation coefficient of 0.805051. This experimental measurement showed that shell hinges of *Mya arenaria* from this population can be

measured as a proxy of whole shell size, but the accuracy of this method is limited. Chondrophores have been used as proxies of shell size and meat weight at several archaeological sites in the Gulf of Maine and are ideal for this purpose as whole chondrophores survive more readily than whole shell. Chondrophores also provide useful evidence of the number of shell fish gathered.

A regression analysis of whole shell width to burial depth showed a gradual but not statistically significant decline in whole shell width over the sequence of deposition where Y = 0.1343 x shell width + 54.456, R squared value: 0.0645. A closer analysis of the relationship of shell width to context age is needed to make statements about changes in shellfish size over time.

The final report will contain the whole shell measurement averages, though we now note the relatively large size. Barber, in his study of fauna from the prehistoric Wheeler's Site in New Hampshire notes that larger shellfish indicate selective gathering because only about 8% of a population will be larger than 7.5 cm in environments conducive for growth (Barber, 1982; see Newcomb, 1936).

Marine Gastropod and Crustacean Ecology (2006 and 2007 excavations)

The marine gastropod assemblage recovered from excavations conducted in 2006 and 2007 is dominated by upper intertidal species. *Littorina littorea* (common periwinkle), *Littorina obtusata* (smooth periwinkle), *Illyanassa obsoletus* (mud dogwhelk), and *Nucella lapillus* (dogwinkle) are the most frequent species. Other species present are *Lunatia heros* (Northern moonsnail) *Illyanassa trivitattus* (New England dogwhelk), *Littorina saxatilis* (rough periwinkle), *Buccinum undatum* (waved whelk), and *Epitonium novangliae* (New England wentletrap).

Small numbers of crab and lobster shell fragments have also been recovered. Crustacean shells are not frequently preserved in shell middens due to their fragility and composition. Fragments recovered from the 2006 and 2007 excavations are mostly composed

of claw fragments which are more durable.

Littorina species including *L. Littorea* and *L. Obtusata* were a focus of the investigations of the invertebrate assemblage. These species are related to recent historic invasive ecologies and provide useful marine ecological data. *Littorina littorea* (common periwinkle) are an invasive species from Europe that arrived in Maine around 1880 during the peak of the shipping era and now found throughout the coastal region. This species is generally found in upper excavation levels at Malaga and being absent in lower units. These specimens of *Littorina littorea* may thus represent some of the earliest populations of the species locally. Gastropod distributions from the McKinney area show *Littorina littorea* in lower strata as well as upper strata indicating either a later date of deposition or stratigraphic disturbance in this area. Column samples from the Griffin and Griffin-Eason areas show *Littorina littorea* confined to the upper strata.

In addition to the research potential of tracking the movement of this invasive species, questions about diet can be addressed. The common periwinkle is edible. It is known as a food source in Italian fish markets (Gosner, 1979), so an interesting question is whether it was eaten by the Malaga residents as part their strategy to exploit the environment.

Shell morphology of the smooth periwinkle (*Littorina obtusata*) has been investigated as proxies for charting the presence of the invasive green crab (*Carcinus maenas*) (Seeley 1986). The smooth periwinkle in a range of shell forms from high spired with thin shell walls and rounded whorls to low spired with thick shell walls with whorls that have almost no indentation at the sutures. Gracile shell morphology is thought to be selected against in environments where the green crabs are active predators. The green crab was introduced from Europe, and is thought to have been present in Maine only after 1900 (Scattergood, 1952), during the period of occupation at Malaga Island. One of the crustacean shell fragments recovered in 2006 (out of a sample of 36 total fragments recovered in 2006) may be green crab. The crustacean remains from the 2007 excavation have not been fully identified yet. Rock crab (*Cancer irroratus*) and lobster (*Homarus americanus*) are included as other crustacean species present in the archaeological assemblage.

Gastropod shell specimens from Eason TU-5 (excavated in 2006) and all units excavated in 2007 were examined for evidence markings left by the boring sponge (*Cliona* spp.)—a native species. The boring sponge uses bivalve and gastropod shells as a substrate. *Cliona* growth is visible on shell as carved 'bored' squiggly lines in the shell, or alternately, as very small, porous dots. Boring is accompanied by regrowth on the interior of the shell. Sometimes a thick deposition of chalky material on the exterior of the shell is present.

Sponge growth has multiple physiological effects on gastropods. When the shell is weakened, the animal becomes more vulnerable to predation by crabs that break the shell to eat the snail. Sponge growth was noted frequently on gastropods that dwell in the lower intertidal, notably on larger *Littorina littorea*. At a nearby prehistoric (2500 BP to 500 BP) archaeological site on Long Island North (15-95), the most frequent species to exhibit sponge borings was *Crepidula fornicata* (the slipper shell). Sponge boring was also noted sporadically on other species examined from archaeological assemblages from Long Island North and the Basin site (15-20) on Brightwater. Of these three sites, sponge boring was noted most frequently at Malaga Island. Today, on the low tide line of the shores around Sebasco one can find many large *L. littorea* with various types of algae and sponges growing on them.

In contrast to two prehistoric sites in the New Meadows River, *Lunatia heros* was not abundant in the archaeological assemblage. When present, it was generally found in a group of several shells. It is likely that this species was used as bait or for food. It is also likely that moon snails were incorporated into the midden as an accidental by-product of gathering clams. Moon snails are a predator of bivalves, especially soft shelled clams. Soft shelled clams with evidence of predation by gastropods (probably *L. heros*) have been recovered, though not systematically. Predation marks are visible as drilled holes in shell, with either broken or smoothed edges. Drilled gastropods also have been recovered.

Dogwinkles are another predatory gastropod. They are found more often in the lower intertidal among blue mussel and barnacles. Drill markings would be expected on blue mussels but blue mussel specimens from the archaeological contexts at Malaga

are very fragmented due to the delicate nature of the shell.

The three most abundant species at Malaga Island (2006 assemblage) are *Littorina littorea* (786, 71%), *Illyanassa obsoletus* (106, 10%), and *Littorina obtusata* (106, 10%). The Eason area 2006 univalve assemblage consisted of 78 % *Littorina littorea* (n=667), 3% *Illyanassa obsoletus* (n=26), and 7 % *Littorina obtusata* (n=62). The Griffin area consisted of 21% *Littorina littorea* (n=26), 34% *Illyanassa obsoletus* (n=53), and 16% *Littorina obtusata* (n=19). The Griffin/Eason area 2006 consisted of 46% *Littorina littorea* (n=93), 14% *Illyanassa obsoletus* (n=27), and 13 % *Littorina obtusata* (n=25).

The McKinney gastropod assemblage is anomalous in that it contains so many Common Periwinkle and indicates the occurrence of storm surge deposits. 86% of the gastropods recovered from the Eason Area in 2006 are from the one by two meter excavation unit (TU-1 and TU-5), which is the closest to the shore. These two units reveal a peak number of common periwinkle in levels 10-20 and 40-50 centimeter depth, many of which are broken or exhibit sponge damage.

Many of the *L. littorea* from the Malaga Island archaeological sample are very large (around 22 mm high) adults with sponge boring. Adult *Littorina lilttorea* are known to migrate from the upper intertidal as juveniles to the lower intertidal as adults, and are generally found in larger numbers in the lower intertidal. The higher percent of adult shells with excessive sponge boring and breakage in the death assemblage at Malaga Island may represent a depositional event, most likely related to a storm surge or over wash of shells from the lower intertidal rather than intentional harvesting for food or bait.

Other upper littoral species: smooth periwinkle and dogwinkle, are very few or absent where there are not large concentrations of common periwinkle. Lower littoral and mud-dwelling species: waved whelk (*Buccinum undatum*), mud dog whelk (*Illyanassa obsolete*), and moon snail (*Lunatia heros*) are more numerous in levels 20-30 and 30-40, where there are fewer upper littoral species.

Like the archaeological sites at Long Island North and the Basin, gastropods recovered from Malaga Island are found in higher

frequency in excavation units close to the shore. At Malaga Island the density of gastropods occurs independently of the density of artifacts. This phenomenon has been documented at three archaeological sites with different cultural affiliations, indicating that tidal action may be responsible for the incorporation of a substantial number of marine gastropods into the shore edges of archaeological deposits.

The lower levels of TU-1 and 5 contain blue mussel, whereas the upper levels predominantly contain soft shelled clam. In a column sample taken from the south wall of Eason TU-1, blue mussel are present from 30-50 cm, with a homogenous concentration at 45-50 cm. Column samples were taken in 5 cm levels, in contrast with the 10 cm levels employed during standard test excavation. Above and below the mussel shell stratum, all other bivalve remains consist of soft shelled clam.

The mussel shell stratum contains one of the two concentrations of upper littoral gastropods, but extends beyond this concentration. Mussels are absent from the stratum with the second concentration of upper littoral gastropods. In these two units, the bivalve assemblage exists independently of the gastropod assemblage.

The distribution in the midden of gastropod assemblages unique to tidal elevations may represent storm or flood events. The presence of sponge markings on large shells suggests the origin of shells is the lower intertidal zone. The bimodal distribution of the shell numbers suggests the occurrence of two storm events where waves lifted material from the lower intertidal to about 3.5 meters horizontally onto the shore in this particular location.

Crab (n= 23) and lobster (n= 9) remains were found Eason area. This constitutes 89 % of all of the crustacean remains recovered in 2006. The crustacean shell fragments that were recovered were always very small (1 to 3 cm). Most were difficult to identify to species because of their fragmentary condition. Most of the fragments were of claws. No whole crustacean shells were recovered.

Two of the three waved whelk (*Buccinum undatum*) shells recovered also were from the Eason area. Waved whelk are

scavengers, and often are found in baited traps. The fact that this species co-occurs with a higher frequency of lobster and crab remains indicates that the Eason household utilized baited traps. The single Epodonitidae (wentletrap family) shell, probably New England wentletrap (*Epitonium novangliae*), was recovered from the Eason area. This species lives in deeper water environments.

Mud dog whelk (*Illyanassa obsoletus*) are uniquely abundant in the Griffin area, representing 34% of the 2006 Griffin area sample. The units excavated in the Griffin area are directly facing one of the many small coves on the north end of the island. The coves present probably the most suitable habitat for this species on the north end of the island. Mud dog whelks live as scavengers in muddy, sheltered conditions, around the low tide line (Morris).

In the Griffin assemblage, there are almost as many smooth periwinkle (n= 19, 21%) as common periwinkle (n= 26, 16%). Smooth periwinkle often are found grazing on the intertidal algae knotted wrack (*Ascophyllum nodosum*). This seaweed is currently abundant on the shores of the island, especially the north end where the linear bedrock outcrops provide a suitable substrate, although, *A. nodosum* is most abundant on the shore of the Griffin-Eason area.

The bivalves recovered from the Griffin area are limited to soft-shell clam. Lobster remains are absent, and there is only one fragment of a crab shell. One waved whelk shell was recovered. These remains indicate lobstering activities in the Griffin household.

The Griffin-Eason area sample contains 46% *Littorina littorea*, 15% *Nucella lapillus*, 14% *Ilyanassa obsoletus*, and 13% *Littorina obtusata*. All other species each represent a significantly smaller percent of the assemblage.

60% of the *Nucella lapillus* recovered in 2006 were from the Griffin-Eason area, although this species constitutes only 15% of the number of shells recovered from the Griffin-Eason area. Blue mussel (*Mytilus edulis*) and barnacles are the preferred foods of dogwinkles. Blue mussels and barnacles are abundant in the lower intertidal around the Griffin-Eason area today, and may have been as abundant in the past. The high number of dogwinkles from Griffin-Eason area suggests that barnacles or mussels were endemic to

the shores near this area. Today mussels and barnacles are more abundant here (tidal area 5) than other tidal areas of Malaga Island.

Each excavation area yielded gastropod assemblages that were different in terms of the proportion of each gastropod species present. The assemblages may represent slight differences in tidal environments between these areas. The gastropod assemblage of the McKinney area suggests deposition and possible reworking by tidal action in two levels where concentrations of large, sponge bored, broken and eroded *Littorina littorea* shells were deposited. This may represent two events where the tidal channel that faces the McKinney area flooded. The Griffin area assemblage reveals a more sheltered environment, with seaweed abundant in the past, like it is today. The Griffin-Eason area assemblage suggests a varied tidal ecology, with more mussels or barnacles present in the tidal areas 5 and 6 compared to other areas.

Terrestrial Gastropods

Smaller terrestrial gastropods (generally measuring between 1 mm and 6.2 mm in maximum dimension) were recovered by hand-sorting the screened floated fraction of one liter soil samples. The floated fraction also included other lightweight materials, primarily botanical remains. Moss, wood fragments and roots (especially those belonging to grasses) are abundant, and assumed to represent the immediate habitats of the snails. One species of insect was also present. Large snails (at least 6.2 mm in any dimension) were recovered either *in situ*, or from the 6.2 mm (1/4 inch) screen used during excavation. A small number of unidentified shell fragments (equaling about one or two individuals) were also present from all areas.

Plant remains (except charcoal from fireplace discard) and terrestrial gastropods are not abundant in strata below 20 cm. Presumably the shell midden was constructed relatively rapidly during the period of occupation, and underwent trampling when deposition was not active. Stable soil surfaces which support vegetation and terrestrial gastropods would develop near the household midden areas in only small and thin patches during the occupation period. In contrast, the largest diversity and highest count of gastropods recovered from flotation samples is from the Griffin area, which shows extensive grass cover in historic photographs and

today remains as an extensive grass and shrub lawn.

Relatively larger numbers of Vallonia *puchella* at the Midden 5 (Griffin/Eason) area may indicate the presence of a garden. *Vallonia puchella* are commonly found in small-scale cultivated areas (lawns or gardens) where there are abundant shady niches, and seem to be absent in areas not cultivated by humans (Pilsbry, 1948). After it rains, they emerge in large numbers and crawl on the wet rocks (Pilsbry, 1948). This species cannot survive in coniferous forests, so their range on Malaga Island is probably limited to the northern part where shell neutralizes the soil and coniferous trees are absent. *V. Puchella* can survive in newly burnt areas because they can tolerate ashy soil which is desiccating to most snails (Barber, 1985). Thus they may tolerate ash deposited from the cleaning of wood stoves and fire places. *Vallonia puchella* is far less abundant in the Griffin area samples, where there are more *Triodopsis albolabris.*

Discus cronkheiti and *Pupilla badia* are both present at the Midden 5 (Griffin/Eason) area. These species both thrive in grassy habitats. The areas surveyed contain mixed vegetation dominated by open grass. Historic photographs show a similar vegetation pattern, with grassy areas around the house. *Discus cronkhitei* is common in temperate transition forests; they live in moist environments, and are often found among decaying wood or leaves, or in grass (Pilsbry, 1948). *D. cronkhitei* are said to thrive under dead wood (Barber, 1985). *Pupilla badia* is common in coastal areas of north eastern North America. They live in open grass, and under rocks, and by paved ocean roads (PSNH, 1864).

Caepea hortensis from the Midden 4 (Griffin) area sample are larger in size and fewer in number compared to the Midden 5 (Griffin/Eason) sample. This could indicate a recent spawning of this species at the Midden 5 (Griffin/Eason) area, or, it could indicate that the habitat around the Midden 4 (Griffin) area is more conducive to the survival of this species to adulthood. *Cepaea hortensis* are common in islands and costal areas. This species requires alkaline soil (Pilsbry 1948) and cannot survive in coniferous forests. The unbanded form of this species is found in open land (Barber 1985). Identification of this species is tentative.

Anguspira alternata and *Triodopsis albolabris*, the two larger species which are recovered during standard excavation, are much more abundant from the Midden 4 (Griffin) area. *Anguspira alternata* are found in forests and fields. They require a lot of moisture (more than most species of land snail) and will burrow if it is too dry (Morse, 1985). This species "reaches its greatest population density in open land without trees" (Barber, 1985, p. 472).

Triodopsis albolabris are often found in gardens feeding on young plants, or in forests of oak, maple and beech. They are common on islands (Morse 1865). In 2007 two living *Triodopsis albolabris* were observed on the house foundation near the excavation units. The house foundation extends below ground and is made of glacial cobbles. It is open and exposed on three sides and shaded by sumac and vine to the north. The house foundation would be an ideal habitat for many species of terrestrial gastropods because the stones provide a cool and damp refuge. A field of milkweed, grasses, and other weedy plants is adjacent to the house foundation.

Cionella lubrica are also present in the assemblage. This land snail lives in shaded, damp places, especially on land cleared by humans (Barber 1985). They are often found under leaves in shaded woods, under rocks, and under rotting wood. They are active and come out to the open six to eight hours before it rains (Pilsbry 1948). This species identification is tentative.

Terrestrial gastropods at Malaga Island represent primarily an open landscape assemblage with a few species preferring shady niches. As over 95% of specimens recovered were from the upper 10 cm of soil, they are assumed to be of recent age. Many probably post date the period of occupation. However, the number of species unable to tolerate coniferous forests indicates transport of snails to the island after the establishment of alkaline soils on the north end as a result of the addition of shell midden deposits to the soil. Thus the modern assemblage of terrestrial gastropod species may represent an ecology that was established during historic occupations.

IX. Floral Remains

The floral (and other natural resources) inventory of Malaga Island is contained Joseph K. Staples' Natural Resources Inventory of Malaga Island, Phippsburg, Maine (2008), a report filed with Maine Coast heritage Trust. The archaeologists and their students collaborated with Dr. Staples in the preparation of this report. Additionally, the archaeological sampling strategy included the collection and curation of column samples from all excavated squares. These samples, excavated and labeled in 10 cm units, are available for future research via flotation, microscopic analysis, XRF, and other techniques.

X. Prehistoric Remains

The archaeological goals for Malaga Island research focused on the historic community. The island has not been surveyed for resources not associated with the historic occupation of *circa* 1860 to 1912. However, three of the historic habitation sites occupied by the Malaga residents also yielded prehistoric flakes for a total of four (Table 12). Given this yield from a very tiny sampling of the original surface below the layers built up by the historic settlement of Malaga, and despite the existence of the settlement—with attendant likelihood of its residents finding and picking up stone tools left by native Americans, it is highly likely that more prehistoric resources exist on Malaga. Prehistoric sites—and stone tools—have been found on other islands and shorelines in the New Meadows River. Some of these other sites are associated with other shell middens known to be prehistoric.

Further research may be necessary to determine whether or not any of the middens on Malaga do in fact have an underlying prehistoric component. However, the investigations thus far have allowed squares on the middens to be excavated to bedrock, establishing the relatively recent historic nature of these particular shell midden components. Further exhaustive excavation of the middens is not within our current research plan, nor is further prehistoric resource investigation of the island.

TABLE 12
Prehistoric material recovered at Malaga as of 2009.

MIDDEN-ASSOCIATION	TEST UNIT	TYPE	SOURCE MATERIAL
1-McKinney	TU-5	Flake	Chert
1-McKinney	TU-7	Flake	Rhyolite
5-Griffin/Eason	TU-4	Flake	Quartz
4-Henry Griffin	TU-2	Flake	Rhyolite

XI. Project Summary

The archaeological investigations of this project have largely shifted to laboratory curation, analysis, and reporting. New and modified goals and objectives may arise out of this analysis and associated process. If they arise, they will be in conjunction with the public archaeological focus of the researchers, and with the interests of MCHT, Maine State Museum, NAACP and other stakeholders. Meanwhile, this preliminary report serves as an attempt to make some of the results of the Malaga investigations available to a wider audience. As a result of our research and analysis thus far, a series of preliminary recommendations have been developed and are presented below.

XII. Preliminary Recommendations

A full set of recommendations will be developed upon issuance of the final Malaga report. These interim recommendations include items suggested prior to the final report, and the recommendations we thus far anticipate will arise in the final report. The recommendations pertain to our own actions as archaeologists and educators associated with Malaga Island.

1. Artifacts and collections
   - Stabilize and conserve artifacts with long-term curation in mind, preferably Maine State Museum.
   - Work with current and former students for analytical research on subsets of Malaga artifact collection – e.g., ceramics, metals, bottles/glassware, fishhooks, nail distribution & activity areas, bullets, sea shells.

2. Further archaeological investigations
   - Historical pressures and response by Malaga residents to regional tourism and economic patterns.
   - Pre-contact & colonial Native American use of Malaga Island
   - Artifactual context with Phippsburg and other coastal areas – ceramics, metals, glass, tools, fishing.
   - Other settlement and development on Malaga Island. Can other house sites be located?
   - Food productivity, fish size (correlation with fish hooks), subsistence patterns.
   - Cultigens and cultivars in a relatively undisturbed setting.
   - Further hypothesize about location of cemetery using non-destructive methods.
   - Reconstruct and match up historic photo views with contemporary photographic views and angles. Create a viewshed and photographic angle map.
   - Hold off on planning another field school until specific research questions emerge that merit investigation and then only if further work is in the best interest of the resource base.

3. Site management and public archaeology
   - Continue or advance collaborations with NAACP, Maine State Museum, MHPC, USM Library Special Collections, Phippsburg and other town historical societies, Maine Coast Heritage Trust.
   - Encourage site protection via trail development and maintenance and by use of traditional lobster trap storage sites by area lobstermen.
   - Encourage and participate in heritage tourism about Malaga Island, including literature, signage, exhibits, and tours.
   - Encourage local school education programs about Malaga Island.
   - Continue to mentor USM student research pertaining to Malaga Island.
   - Participate in Malaga descendent events to which we are invited.

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