

The Relationship of the Volcanic Landscape of Saint Michael Island with Erosion and Cemeteries

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Abstract

This report provides information that was gathered under the survey and recovery efforts detailed in a SCRIP (Appendix A). The main objectives were:

- Observe erosion around the entire Saint Michael peninsula.
- Observe the state of erosion at the Old Russian Cemetery.
- Survey and test a potential cemetery area.

Results of this work are:

- Erosion around the peninsula is not uniform due to the differences in substrate that are exposed along the coastline.
- The landform is volcanic.
- Erosion around the peninsula has occurred in different places during different storm events.
- There are at least three cemetery areas west of the village.
- These cemeteries are likely associated with a previously unrecorded village that may have been present from prior to the arrival of the Russians in 1833 and existed through the rest of the 19th century.
- These cemeteries present in a way that is notably unlike other cemeteries on the peninsula, except for one that I had visited in 2022 (SMI-76).

Comments include:

- Given the damage to the many (over 14) cemeteries on the peninsula from storm erosion and sinking from melting permafrost, the information gathered from the newly identified cemeteries along with the deeper understanding of the volcanic landscape, could be used for the creation of new cemeteries that are not subjected to the damages from storms and melting permafrost.
- Cracks in the landscape were created by erosion over the last century. These are clearly identifiable in aerial photographs. Any assessment of the distribution of erosion on the peninsula will benefit from observing and delineating the extent of the cracked topography. These cracked areas also correspond to places where previous ground disturbances took place (US Army activity, WAMCATS (US Signal Corps' Washington-Alaska Military Cable and Telegraph System) camp and cemetery, old Yupik Cemetery, industrial buildings and activity, the old Tachik village and other places).

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Glossary

A **clump** is a term for the masses of earth that I observed below the Old Russian Cemetery. These are most often between the size of a snow machine and a small sedan automobile. When these are pulled away from the cliff edges (by gravity as they hang out over the talus slope and beach) and dropped to the hillside or beach below, they often have some vegetation on them from the original ground surface. More vegetation grows on the clumps in the next years. A “vegetated clump” means that it has recent vegetal growth on it, indicating that it has slumped away from the cliff at least a year ago.

I observed different **types of lava rock**. They are: **waterworn**, **blocky**, and **cinders**. A fourth kind of lava is the **black sand**, which is ubiquitous throughout the Saint Michael peninsula coast.

Blocky lava rocks have jagged edges or sharp-angled edges. These were formed from breaking off from lava flows. They have not been subjected to the forces of water so they retain their jagged, angled forms.

Waterworn lava rocks have oval shapes with smooth sides all around. They used to be blocky rocks, but they have been shaped and polished smooth from tumbling in tidal or riverine situations, or moved about within or under glaciers.

Cinders are lava pieces that were formed when lava was forced from underground up into the air and cooled rapidly as it came back down to earth. Their porous bodies resemble steel wool or rocky sponge and they can crumble easily.

Black sand was created from the pounding of the ocean on the lava located along the shoreline.

Lava stratigraphy is the bedrock that outcrops in some places on the island that is visible in the cliffsides around the peninsula. There are of two types that were observed in this survey: **basalt with some porosity**, and **compressed cinders**.

The **Saint Michael peninsula** is the eastern triangular shaped land on the eastern edge of **Saint Michael Island**. The easternmost part of the peninsula has a shape much like that of a horse head profile.

Standard Oil Point is the easternmost tip is known as the Saint Michael peninsula. It is the nose of the horse head shape of the landform (as seen from space).

Tachek versus Tachik. I use “Tachik” for the bay following the Community Maps and “Tachik” for the archaeological site following the AHRS. “Tachek” shows up in various reports. I distinguish bay from village/site with supporting phrases.

Introduction

The proposed field work for the autumn of 2024 in Saint Michael was created as a direct result of the questions and insights that were generated during the emergency response work conducted there for nine days after the Merbok Typhoon scoured the western and southern edges of the Old Russian Cemetery in the autumn of 2022. Additional, and much more intensive response work, was conducted during six weeks in the autumn of 2023.

Background Research

A report on the results of the 2022 and 2023 work is currently approximately 80% complete (Wolforth n.d.). That report includes a lengthy appendix that inventories the 14 known cemeteries (at the time; additional cemeteries are reported in this report) on the island. A modified version of that appendix is included in this report (Appendix A). It is focused on the cemeteries that are relevant to this 2024 research design and work.

Information on the history, use, abandonment, erosion, religious affiliations and other factors of these cemeteries are provided in that appendix. An extensive and intensive discussion of the available archival documents is also featured in that report. In brief these selected documents below (plenty more are included in the preliminary report) provide these kinds of information germane to this work:

- Blomkvist (1972), Zagoskin (1967)
 - Information from Russians that spent time at the Mikhailovskii Redoubt in the early 1800s.
- Dall (1870), Nelson (1899), Wardman (1884), Whymper (1868)
 - Information from Americans that spent time at Saint Michael in the late 1800s.
- Crowell (1993), Higgs (2009), Hrdlička (1930), Koutsky (1982), Maxwell (1992), Shaw (2003), Wiersum (1985)
 - Information from anthropologists and archaeologists that worked in Saint Michael in the 1900s and 2000s.

Chronology of my work at Saint Michael from 2022 through 2024

My work began as an emergency response effort in 2022 (Table 1). I did not have any time to conduct any background work prior to rapidly deploying to Saint Michael to recover graves that had been pulled from their resting place by Merbok Typhoon. The research that I did subsequent to the field work generated plenty of insights and questions, especially when integrated with the results of the activities that I had conducted in 2022 and 2023.

For instance:

- The substantial quantity of *in situ* native materials that eroded out of the Old Russian Cemetery along with the historical graves represents a pre-contact site that was not previously mentioned in early chronicles or known or recorded in any subsequent investigations.

- There was unclear references to a native village contemporary with the early Russian occupation (in the middle 1800s) that existed to the west of the Mikhailovskii Redoubt. That village had not been physically located on the landscape, or been previously identified, or known about or recorded in archaeological investigations conducted on the island in the late 20th and early 21st centuries.
- How was it that one of the larger cemeteries on the island that was mentioned not too long ago (Maxwell 1992) was nearly entirely lacking in any evidence of its existence in the 2020s, a period of only circa 30 years?
- What would the current physical remains of a cemetery with graves that were created and used by native peoples in the traditional way of placing the deceased on the ground surface in wooden boxes, as indicated by early observers in Saint Michael (Dall 1870, Hrdlička 1930, Nelson 1899) look like on the landscape now?
- How has erosion altered and/or (counterintuitively) been influenced by the different kinds of cemeteries present at this village with an unusual quantity of cemeteries dating to a range of times and associated with different cultures?

Table 1. Investigations in 2022 and 2023.

Year	Major purpose	Other activities	Results
2022	Recover human skeletal remains that eroded out of Old Russian Cemetery.	Prepare remains for reburial. Observe other cemeteries and comment on erosion.	Success with recovery. Success with preparation for reburial. Identified potential unrecorded cemeteries. Observed the erosion would continue to impact the Old Russian Cemetery.
2023	Recover human skeletal remains at Old Russian Cemetery. Conduct actions in anticipation of additional erosion there.	Prepare remains for reburial. Observe other cemeteries and comment on erosion.	Success with recovery. Success with preparation for reburial.

Research Design

The observations and questions generated in the previous section above formed the research design rubric. The research design was created with the idea that two people would be working in Saint Michael for about two weeks (Appendix 1). This included a plan for a lot of work at a lot of places in a short period of time:

- Surface reconnaissance of shorelines around Saint Michael.
- Focused inspection and documentation of cemeteries SMI-47, SMI-74, SMI-75, SMI-77, SMI-92 to observe erosion and move graves in danger if present.
- Inspection of the old and historic native village SMI-44 (Tachik village).

- Work at the Old Russian Cemetery (SMI-73) that would include removal of graves in danger of eroding off the cliff if we saw that was necessary when we arrived there.

One of the team members, a student in Anthropology at the University of Alaska-Anchorage, had a change of plans that precluded his ability to participate in the proposed work at Saint Michael. As a result, the number of personnel, amount of time, and kinds of work that was conducted at Saint Michael under the auspices of this project was altered (reduced) notably.

In brief, I ended up spending a long weekend in Saint Michael and was able to:

- Conduct surface reconnaissance of shorelines around Saint Michael.
- Perform focused inspection of several cemeteries, including the Old Russian Cemetery, and the known historic native village (Tachik, SMI-44).
- Identify a previously unknown and undocumented settlement and cemeteries

The focus of the research turned to attempting to address these questions:

- Was there an old native village settlement in Gunner's Lake area?
- Was there an old native cemetery in the Gunner's Lake area?
- Is there some pattern and causality in the way that the different cemeteries in Saint Michael (which do exhibit a diversity of morphology) were created, are being used, are being subjected to melting permafrost and shoreline erosion?
- Could results of these investigations contribute to the ways of thinking about cemetery erosion and mitigation in the Arctic?

The landscape: volcanic

The landscape on Saint Michael island is dominated by 1) volcanic flows subjected up to hundreds of thousands of years of erosion, and 2) the development of the tundra and permafrost, while 3) alongside oceanic forces that contribute to shaping the shoreline of the Norton Sound of the Bering Sea in an arctic climate. All three of these physiological forces play a role in research conducted for this project. The discussion of the geological setting and figures used to illustrate them (Figure 1) are based on the work of Hoare and Condon (1971) and Patton and Moll-Stalcup (1996).

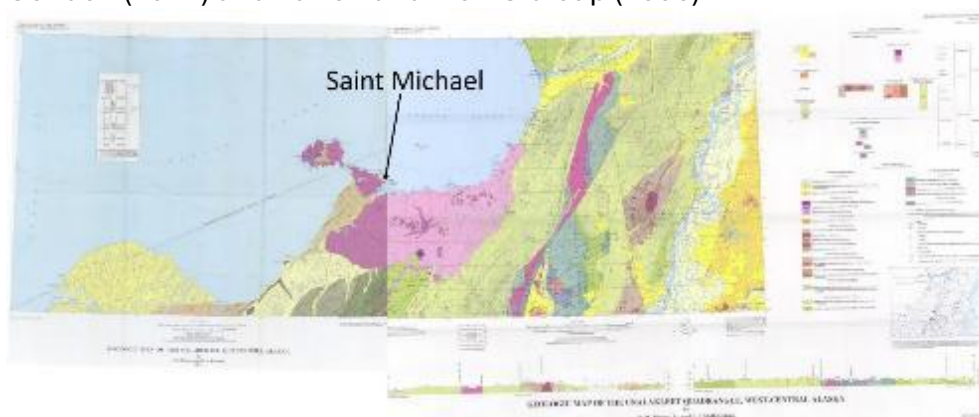


Figure 1. Composite of geological maps for Saint Michael and Unalakleet quadrangles.

The landscape of Saint Michael island and the nearby mainland to the east across Tachik Bay is composed of basalt flows and cinder cones that originated from volcanoes that were active in the late Pliocene (less than 3.25 million years ago), throughout the Pleistocene (2.6 million to 12,000 years ago) and into the Holocene (since 12,000 years ago), dating them to mostly within the Quaternary Period (up to 2.6 million years old). The basalt flows are recognized as relatively “older” and “younger” in the geological sequence based on their chemical configuration and the magnetic orientation of their structure¹ (Figure 2). The older flows are responsible for the creation and formation of Saint Michael Island. This broad volcanic landscape that encompasses Saint Michael Island, Stuart Island (to the west), and the coast of the mainland (to the east) is referred to as the “St. Michael² volcanic field” (Patton and Moll-Stalcup 1996:2). “In most areas the[se] rocks are concealed by silt which varies in thickness from a thin veneer to several feet. The silt contains a large amount of permafrost and is probably wind deposited” (Hoare and Condon 1971:2). Tundra vegetation covers the surface silts.

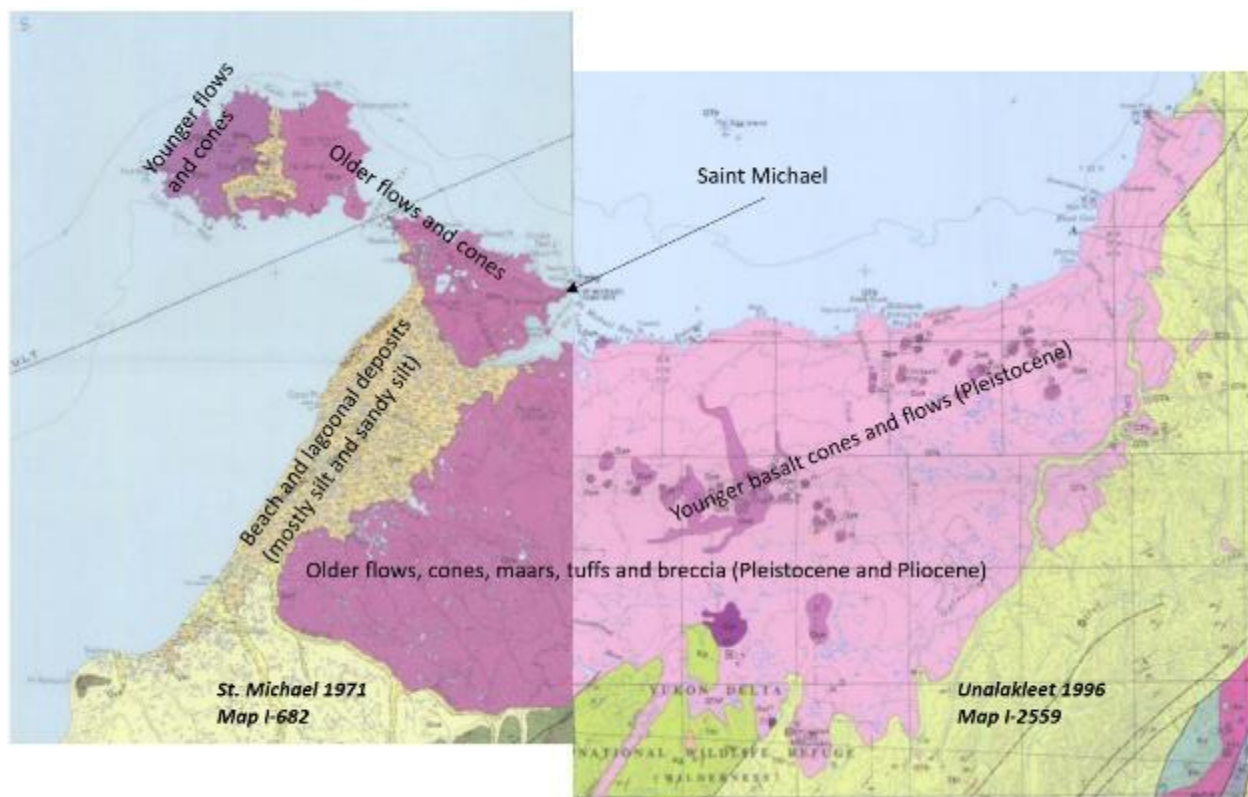


Figure 2. Volcanic topography in the region.

Saint Michael Mountain is the main volcanic peak near the center of the island, with several smaller cinder cones around the periphery of the island. There are also “six maar-type

¹ Unfortunately, the two map makers used different colors to represent older and younger flows. This confuses the matter when the two maps are placed side by side.

² Please note that the authors use the label “St. Michael” and not “Saint Michael” to refer to the volcanic field.)

craters” (Hoare and Condon 1971:2). These are a particular kind of landform that is created by volcanic processes that drop the ground surface into the water table, thus forming low-rimmed lakes (Figure 3).

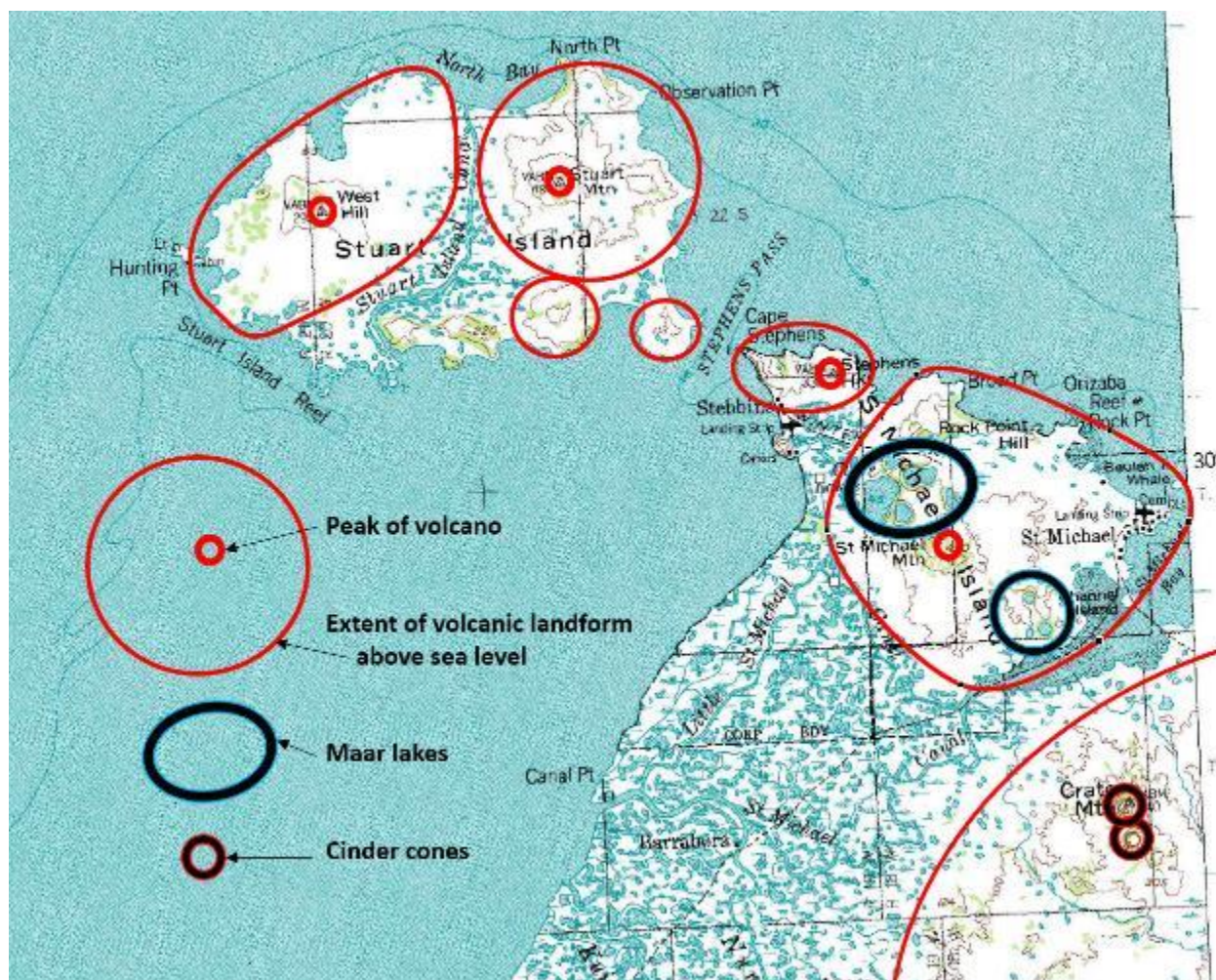


Figure 3. Volcanic topography around Saint Michael.

“Thin- to thick-bedded, fine-grained volcanic ash, lapilli-tuff, and breccia constitute many of the sea cliffs (that) crop out...on St. Micheal Island...They are generally overlain by a thick layer of wind-deposited silt” (Hoare and Condon 1971:3). Being so close to the mouth of the mighty Yukon River there are also floodplain and beach and lagoonal deposits around and beyond the island. Lagoonal deposits, made up of silt and sand, hug the southern and western border of the island.

The cinder cones scattered along the St. Michael volcanic field on the mainland east of and across the Tachik Bay from Saint Michael island are visible from the southern and eastern portion of the island (Figure 4). Their classic shape seen in profile reflects their relatively recent age (not having been eroded away). Indeed, these formations are “compositionally similar to magmas erupted on oceanic islands like the Hawaiian Islands” (Patton and Moll-

Stalcup 1996:13). Consequently, the ubiquitous black sand on the beaches of Saint Michael island and the cinder cones nearby and across the bay seem comfortably familiar to any that have observed them in Hawai'i.



Figure 4. View from the Old Russian Cemetery across Tachik Bay showing some of the cinder cones of the volcanic landscape. View to the southeast.

I had not sought out these geological maps and reports prior to the work that I conducted in 2022 and 2023 in Saint Michael. Without having consulted these maps I thought that those light gray, highly homogenous, very fine-grained and compact sediments that underly the Old Russian Cemetery were clays that were set down in a low energy aquatic setting, in something like a lagoon or bay or floodplain setting. There are some, but very few, lenses in the 20 foot thick exposure of that sediment that exists below the Old Russian Cemetery tundra. I had thought that simply indicated a lengthy depositional era of shoreline clays up against the nearby volcanoes.

Hoare and Condon (1971) identifies and demarcates floodplain and lagoon/bay sediments around the western and southern portions of Saint Michael Island but not in the eastern peninsula portion of the island. Based on my observations, it appears to me that lagoonal sediments are present in the eastern peninsula. It may be that the scale of the maps are such that the small amount of sediment-based surfaces is just too small to present on the map. Or, as will be shown below, that the checkered sediment/volcanic outcrop peninsula surface was just easier to label and show as a volcanic surface at the scales used by the mappers.

The excellent maps from Hoare and Condon (1971) and Patton and Moll-Stalcup (1996) are of such a scale that they cannot show all of the distinctions and delineations of geological phenomena that are present in this landscape. My walk along the shoreline of the Saint Michael peninsula provides an opportunity to report on the fine-grained interrelationship of the bedrock, eroded surfaces, sediments and tundra development, supplementing the broader strokes presented by the U.S. Geological Survey.

One thing that I noticed from walking over much of the peninsula as well as from looking at the cliff edges was that there appears to be a clear demarcation between the “island” and the “peninsula of the island.” The island can be characterized by the dominant feature near

the center of the island, the volcano known as St. Michael Mountain. The terrain from that tallest peak at 450 above sea level slopes down in all directions to and down into the Bering Sea. The ground surface of the higher portions of the island are covered in tundra with eroding basalt lava in big rocks to very large boulders comprising a large percentage of the surface. These basalt pieces probably tumbled down from the mountain over the millennia and have been covered somewhat by the tundra.

Around the edges of the island where the land is less than somewhere around 25 to 40 feet above sea level, the terrain is swampier. The basalt boulders are not present. The tundra vegetation and surface has a different look to it. And as one can see when they spend some time looking closely at the shoreline cliff exposures, the landform is made up of thick grey sediments (that could be ash or could be lagoon-laden clays).

The distinction between the basalt-filled tundra on the Saint Michael mountain side (to the west of the village) contrasts sharply with the low-lying, swampy sediments of the peninsula in a Google Earth© aerial photograph from June 2019 (Figure 5). It is this clear delineation (yellow line on Figure 5) that I use in this report as the western boundary of the “Saint Michael peninsula.”



Figure 5. The Saint Michael peninsula to the east of higher and drier terrain.

Field investigations: Shoreline survey in 2024

I had walked much of the shoreline of the eastern part of the Saint Michael peninsula in a cursory, exploratory way during my previous visits in 2022 and 2023. In 2024 I set out to observe the entire shoreline in a systematic way. Observations from the previous two years helped to identify where and when erosion had taken place over this span of three observation cycles. That covered the time immediately following Typhoon Merbok, soon after Typhoon Amphil, and the higher than normal summer rains in the YK Delta in 2023 and 2024, with storms in August being particularly hard on the west coast of Alaska in 2023 (pers. comm. Michelle Snowball 2023).

Shoreline survey methods

I walked nearly the entire shoreline of Saint Michael peninsula in three different events over a period of three days. That information was compiled to present results as if I had started near the western end of the northern shoreline and ended in the western end of the southern shoreline (Figure 6).



Figure 6. Location of observations along the shoreline of Saint Michael peninsula.

To be able to comment on where, when and maybe why erosion has taken place along the peninsula, I made note to observe these things:

- Height of land above the beach.

- Presence/absence of cracked land at the top edge of the cliff.
- Presence/absence of clumps of earth on the beach.
- Identification of type of earth exposed in the cliff side (sediment or bedrock).
- Presence/absence of volcanic rocks on the beach.

I also spent some time at the two locations where the staff at the for State of Alaska Department of Natural Resources Division of Geological & Geophysical Survey had created erosion measuring stake stations (Buzard *et al.* 2021). There are two of these (each with two pairs of stakes) along the western half of the northern shore of the peninsula.

Shoreline survey results

The peninsula is not uniformly low and level. There are hills over 50 feet high above sea level in some places (Figure 7). Some of the higher ground are volcanic remnants with basalt bedrock outcropping on the ground surface, but the vast majority of the peninsula shoreline reveals silt and clay sediments (Table 2). Photos of the shoreline are provided in Appendix 4.

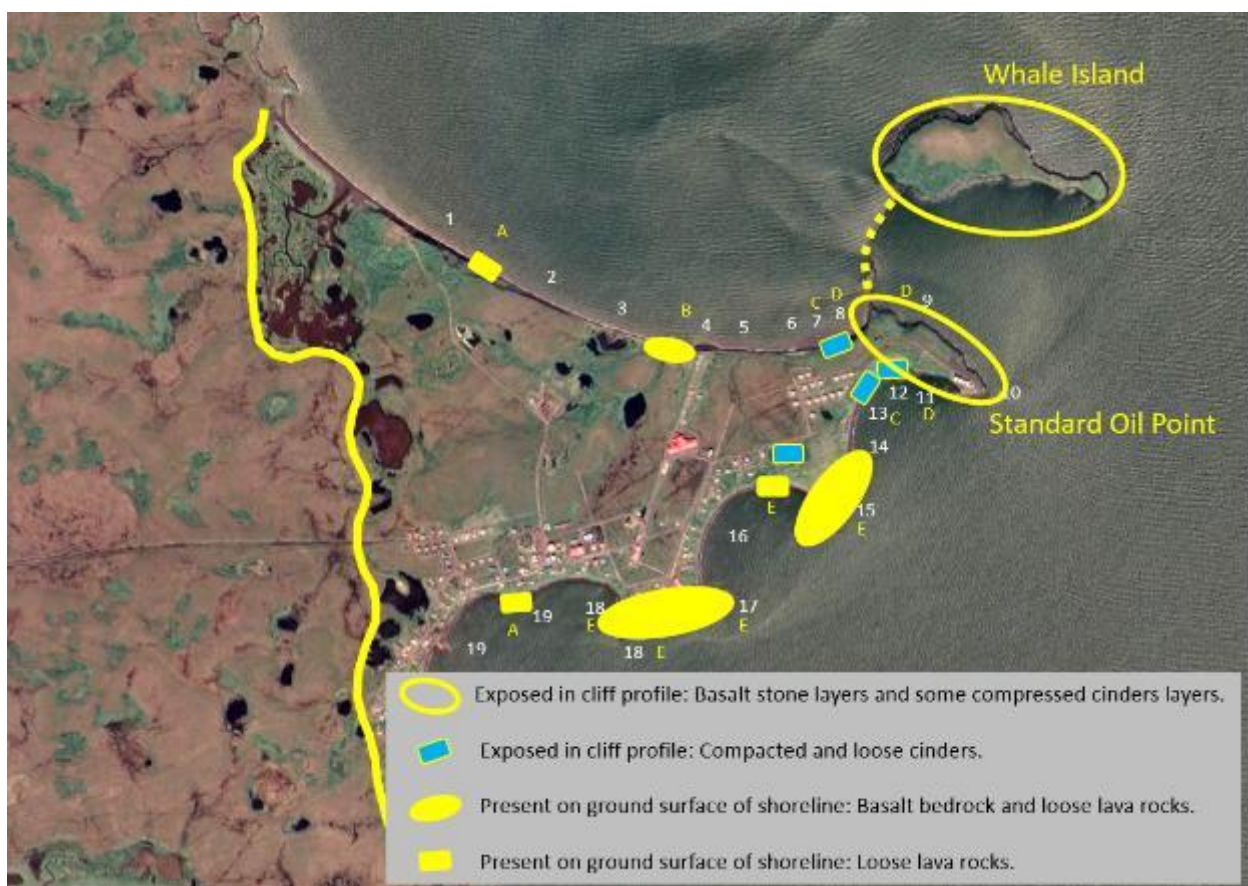


Figure 7. Sediment and volcanic landforms around the peninsula.

Table 2. Observations along the peninsula shoreline.

Spot	Landscape	Height from top of land to top of beach (feet)	Lava visible?	Lava described	Status of erosion in 2024
1	High ground at Russian Gardens.	40 to 60	Yes, on the beach not in cliffside stratigraphy.	Large, angular blocks on beach. A	Erosion cracks on surface, sediments washing down slope, clumps on beach indicating recent erosion.
2	West of small lake.	20 to 40	No.	None.	Erosion cracks on surface. Some clumps on beach indicating recent erosion.
3	Lowlands at small lake.	1 to 4	No.	None.	None.
4	North end of old airstrip.	10 to 15	Yes, in stratigraphy not on beach.	Blocky, few waterworn, <5 feet from surface in landscape. B	Erosion cracks present on surface. Some clumps on beach indicating recent erosion.
5	East of north end of old airstrip.	5 to 15	No.	None.	Vegetation covers cracks on surface indicating older erosion.
6	West of Old Yupik Cemetery	15 to 40	No.	None.	Vegetation covers cracks indicating older erosion.
7	Old Yupik Cemetery	40	Yes.	Compacted cinders in landscape. C	Vegetation covers cracks indicating older erosion.
8	West side of peninsula/isthmus to nearby island.	40	Yes.	Soil and lava stratigraphy in exposed landscape. Large lava boulders on beach. D	Boulders on beach probably from older erosion. Smaller rocks may be recent. Some scars in stratigraphy appear recent.
9	East side of peninsula/isthmus to nearby island.	50	Yes.	Soil and lava stratigraphy in exposed landscape. Lava in cinders and basalt stone. D	No obvious recent erosion.
10	Standard Oil point.	50	No, but that is because I could not get to it. I assume lava is present there.	Could not see it. I assume that it is same as 10. D	Could not see it. I assume that this steep cliff is similar to Spots 9 and 11.
11	South edge of Standard Oil point.	50	Yes.	Cinder and basalt strata in landscape. Large boulders on beach. D	Recent erosion from 2022 and 2024.
12	East of eastern neighborhood.	50	No.	None.	Many deep cracks indicate much past and recent erosion.

Table 2. Observations along the peninsula shoreline (continued).

Spot	Landscape	Height from top of land to top of beach (feet)	Lava visible?	Lava described	Status of erosion in 2024
13	East of eastern neighborhood.	35	Yes.	Compacted cinders in landscape. C	Friable hillside. Recent erosion.
14	East of old Tachik Village site.	20	No.	None.	Clumps on beach indicating recent erosion.
15	Southeast of old Tachik Village site.	20	Yes.	Shoreline is exposed lava bedrock with broken up basalt boulders. E	Vegetated clumps from 2022 but not 2024 storm.
16	West of old Tachik Village	50	Yes, on the beach not in cliffside.	Shoreline is exposed lava bedrock in one small area with broken up basalt boulders. E	Vegetated clumps from 2022 but not 2024 storm.
17	Near AC store.	15	Yes.	Shoreline is exposed lava bedrock with broken up basalt boulders. E	Vegetated clumps from 2022 but not 2024 storm.
18	At Old Russian Cemetery.	30	Yes.	Shoreline is exposed lava bedrock with broken up basalt boulders. E	Vegetated clumps from 2022 but not 2024 storm.
19	Near main village.	10	Yes, some.	Lava blocks on beach in one small area but not in landscape. A	Vegetated clumps from 2022 but not 2024 storm.

Where the volcanoes and cinder cones are

The volcanic landform of the Saint Michael peninsula does not have the same kind of tundra-over-large-basalt-boulder formation that the surface does to the west of the village and over the center of the island. Instead, there are three kinds of volcanic phenomena present in the peninsula: 1) volcanic vent; 2) cinder cone; and 3) lava bed bedrock.

Some kind of volcanic vent existed in the eastern edge of the Saint Michael peninsula, a place referred to locally as Standard Oil Point. Layers of black basalt lava are present here from the ocean up to 50 feet above sea level. Erosion has altered the vent over the millennia, so it is difficult to identify the original shape of that vent. The line of basalt rocks that connect the peninsula to nearby Whale Island, which from the peninsula appears to also be composed of black basalt lava, may together be remnants of a volcanic vent in this location.

Loosely consolidated black cinder spills out of the shoreline in several locations around the peninsula. The exposures of cinder do not continue very far along the exposed shoreline. This is probably indicative of the way that cinders are distributed during cinder

cone formation. The cinder is thrown into the air and blown slightly away from the spewing center to form an arc around that center. Cinders accumulate to build up arced ridges that often circle the center entirely. Examples of large cinders are plentiful across Tachik Bay to the south, but small cones can also be created.

Some of the places where cinder is present along the peninsula could all be part of one cinder cone. The presence of cinders that outcrop along the low cliff to the north of the Tachik Village Site (SMI-44) (Figure 8) and at the north side of the 1918 influenza gravesite (SMI-74) (Figure 9) could be connected and associated with a low, caldera kind of topography that spans this portion of the peninsula (Figure 10).



Figure 8. Recently eroded volcanic cinders north of Tachik Site. Compacted cinders are present in the exposed profile. Crumbled cinders are on the low talus towards the beach on the right. Viewer looking northwest.



Figure 9. SMI-74, the Pandemic Cemetery. Viewer facing west.

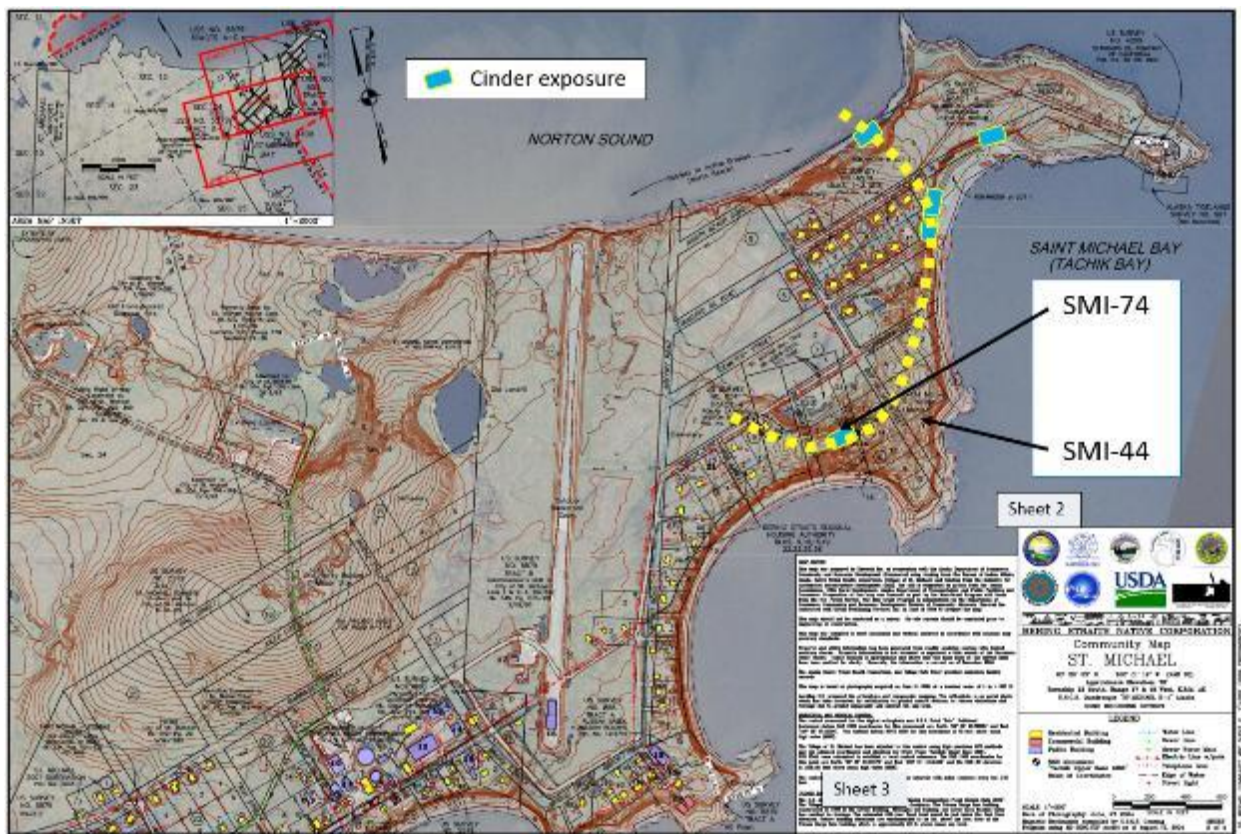


Figure 10. Possible cinder cone on the peninsula.

This is entirely speculative. The shoreline exposure provides only a small window into the surface composition of the peninsula. Much more investigation is needed throughout this landform to be able to confidently demarcate the distribution of lava bedrock and lava cinders. The complicated undulating topography created by volcanic vents, cinder cones and maars that has been subjected to millennia of erosion is not easily “read” with the evidence that is available on the thin veil of the ground surface in the 21st century.

The lava bedrock in two locations along the southern shoreline (Spots 15, 17, 18) is probably the place on the peninsula that is most like that on the gentle slopes of St. Michael Mountain to the west of the peninsula. The top of the bedrock happens to coincide with sea level in areas between the Old Russian Cemetery and further east near SMI-44. Lava rocks have broken off the bedrock over the years. Many of those rocks are relatively blocky, and some are somewhat waterworn and smooth. They are of a similar size and shape to the rocks and boulders that are common throughout the volcanic landscape west of the Saint Michael peninsula.

Significance of the volcanic landscape

Mapping these variations in the surficial landform does provide information that is helpful for thinking about the way erosion takes place in and around the village of Saint Michael. It has implications on the distribution of permafrost and where that may be melting faster than in some other locations. My knowledge of these processes is limited. The information that I have provided from the observations along the shoreline is limited. A thorough investigation of the topography with attention to the distribution of the sediments, cinders and lava would be beneficial for the community, providing information that should be incorporated into decisions about where and where not to build infrastructure to avoid the worst of the erosion that is yet to come.

Where the erosion is

Fresh erosion, presumed to have been created by the rain and storms of 2024 (Figure 11), was evident by the occurrence of:

- Clumps of earth on the beach that have vegetation on one surface (that was once the ground surface) but has raw exposure of sediment all around it (no new vegetation has yet grown on this recently-exposed sediment clump).
- Washes of sediment that cover the talus slopes of the cliffsides that have not yet been covered in vegetation.
- Sharp cuts in the cliffside that have not yet been smoothed out by weathering.

Evidence of erosion from the Merbok Typhoon of early autumn 2022 was similar to that above except that:

- Clumps of the earth on the beach have vegetation on all surfaces that are exposed to the air (the vegetation having had two years to grow on the clumps).
- Cliffsides have some vegetative growth.
- Cuts in the cliffside are somewhat smooth.

Evidence of places that have not had major erosion recently (between 2022 and 2024) appeared as:

- Lacking clumps of earth on the beach. Those have washed away in higher tides or other storms.

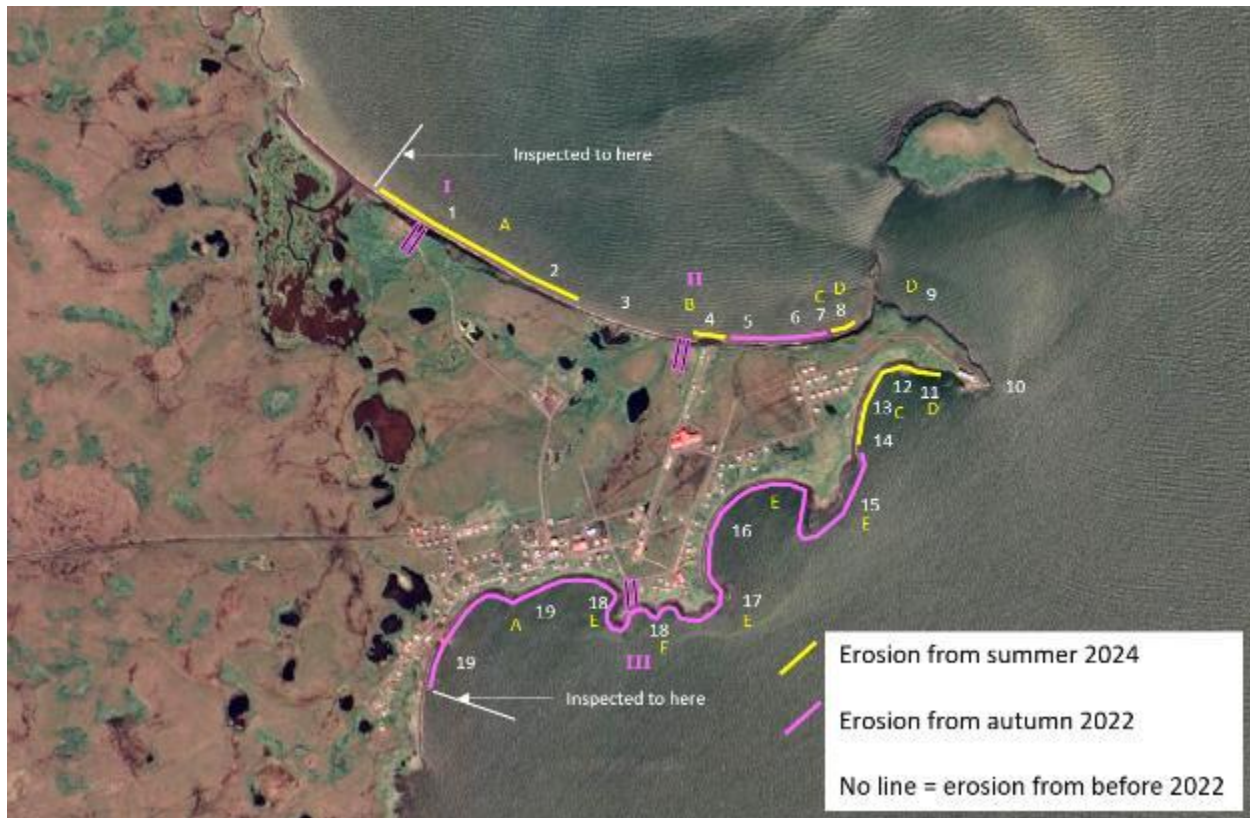


Figure 11. Recent erosion episodes on Saint Michael peninsula.

These criteria are very impressionistic. Fortunately, there is some quantitative data that can be added to this investigation. Several years ago geologists from the Department of Natural Resources Division of Geological & Geophysical Surveys placed sets of stakes in two locations along the northern cliffs of the Saint Michael peninsula. Inspired by that activity, I placed some stakes in the Old Russian Cemetery in October, 2023.

Erosion measuring stakes

There are two sets of stakes associated with the Department of Natural Resources Division of Geological & Geophysical Surveys (Figure 12). One set is on the high elevations at the west end of the northern portion of the peninsula, a place locally known as Russian Gardens. Another set is just to the west of the place where the old airstrip meets the northern shore of the peninsula. I have labelled the former (I) and the latter (II) on the figures and tables in this report.

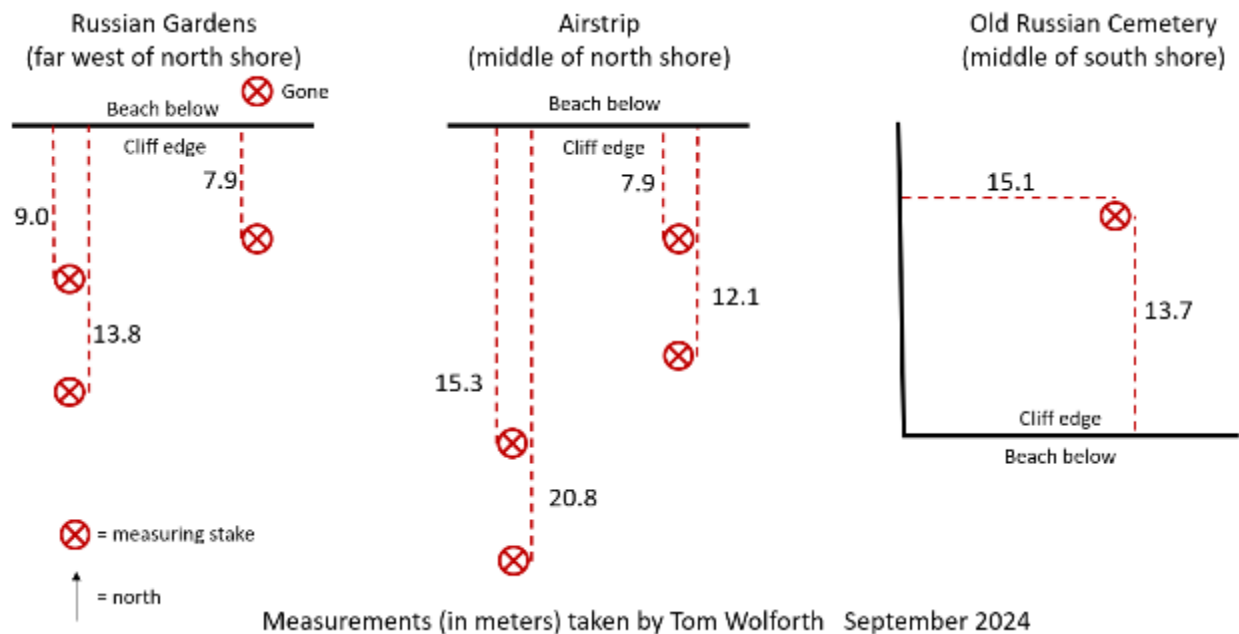


Figure 12. Erosion measurement stakes.

Each set of stakes along the northern cliffs has two lines of two stakes. Both lines are perpendicular to the shoreline and parallel to one another. For purposes of this report, I label one line the “east line” and the other the “west line.” Each line has a stake that is closer to the shore and a stake that is farther from the shore. I label the former the “shoreside stake” and the latter the “inland stake.”

There is only one stake in the Old Russian Cemetery (III). Measurements were made from this stake to the edge of erosion to the south and the west.

Measurements were made at the airstrip and Old Russian Cemetery stakes in October 2023. Our team did not make it out to the Russian Gardens location in 2023. Measurements were made again in September 2024 during work conducted for this project (Table 3).

The erosion that I witnessed at the Russians Gardens in the summer of 2024 was substantial. Environmental staff members of the Native Village of Saint Michael tribe Darlene Chiskok and Michelle Snowball pointed out that one of the erosion measuring stakes at the Russian Gardens had eroded away from the cliff side there in the summer of 2024. It is unclear how much of the cliffside was lost. My estimate above (Figure 12) is pure guesswork.

Based on these observations several statements can be advanced:

- The Merbok Typhoon of 2022 did a lot of erosional damage to the southern peninsula shoreline, but not so much on the north side of the peninsula.

- The storms of 2024 created erosional damage to the northern and eastern peninsula shoreline, but not so much on the southern peninsula shoreline.
- The volcanic vent at the eastern point of the peninsula is least likely to suffer from erosional damage.

Table 3. Measurement of erosion at three locations.

	July 2022		October 2023		September 2024		2022 to 2024	
	Distance to cliff edge		Distance to cliff edge		Distance to cliff edge		Lost to erosion	
	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)
Russian Gardens (I)								
Site 1 seaward stake A	9.0	29'0"	No visit	No visit	9.0	29'0"	0	0
Site 1 landward stake B	13.7	45'0"	No visit	No visit	13.7	45'0"	0	0
Site 2 seaward stake A	13.1	43'0"	No visit	No visit	Gone	Gone	?	?
Site 2 landward stake B	18.0	59'0"	No visit	No visit	7.9	26'0"	10.1	33'0"
North Beach (II)								
Site 3 seaward stake A	15.8	52'0"	15.8	52'0"	15.3	50'3"	0.5	1'9"
Site 3 landward stake B			21.3	70'0"	20.8	68'3"	0.5	1'9"
Site 4 seaward stake A		35'6"	7.9	26'0"	7.9	26'0"	0	0
Site 4 landward stake B			12.1	39'10"	12.1	39'10"	0	0
Old Russian Cem (III)								
To the south	No visit	No visit	13.7	45'0"	13.7	45'0"	0	0
To the west	No visit	No visit	15.1	49'8"	15.1	49'8"	0	0

Cracks in the landscape: evidence of erosion over the last century

Cracks in the earth provide a very clear indication of where erosion is happening on the peninsula. As the permafrost melts, the ground loosens. As the ground loosens it falls away from itself along hillsides; gravity pulls it downwards. The phenomenon is something like slices of bread falling away from the loaf.

There are several major regions of cracked landscape on the peninsula. You can see them from aerial photographs. I have walked in several of them. It is difficult to walk in these landscapes. Indeed, I have had to crawl over some of them. The cracks are from four feet to eight feet deep and up to four feet wide. Many are smaller.

The cracked landscape occur in places where the land has been occupied and built over, then the buildings were removed. The buildings compromised the permafrost and it facilitated the sloughing away of the earth creating the cracks there. It is here that it is

important to remember that there used to be up to possibly 10,000 people in Saint Michael with the Russian fort, the US Army fort, the telegraph camp, the churches that have come and gone, and several industrial and port facilities that all operated up until circa 1930s. Cemeteries, too, have comprised the land and began the cracking. There are many aerial photographs available, but the best one that shows the cracking landscapes is from Google Earth in June 2021 (June 2023 is also good) (Figures 13, 14, 15 and 16).



Figure 13. Cracked landscapes in tan color on the peninsula, June 2021.



Figure 14. Correlation of historical activity with cracked landscape. June 2021.



Figure 15. Cracks at cemetery, Russian fort and commercial area, June 2023.



Figure 16. Cracks at commercial and port and Tachik village, June 2023.



Figure 17. Cracks at Old Yupik Cemetery (center of image), June 2023.

The Old Yupik Cemetery is of particular interest to eroding cemeteries. Archaeologists visiting there circa 35 years ago wrote that they observed

numerous historic graves... Most of the graves in this area date to the first decade of the 20th Century. Most of the grave sites consist of wooden fenced-in burials with wooden “headstones” as markers. Some of the inscriptions can be made out, others have worn off and are not longer discernable. Many of the graves are collapsing over the heavily eroding north bluff. The graves are concentrated in two areas, although some graves were identified in between the two concentrations (Maxwell 1992:15).

No graves or grave markers are clearly visible in this rather large area now. I did encounter one grave site in this area in 2023 after crawling on my hands and knees through the cracks and low brush for some time. I found some wood slats lying half in the dirt, half in the brush. One piece of wood had a metal plate screwed to it that read “Mason Otten Rest in Peace.” Michelle Snowball and Darlene Chiskok recognized that name as belonging to a Saint Michael resident from some time ago.

Status of the Tachik Site (SMI-44)

The Tachik Site (SMI-44) is the remains an Alaska Native settlement. Information that has been passed down from comments made in the 19th century provide little about the place (Nelson 1899; Zagoskin 1967). Archaeological work in the subsequent centuries there has been limited to observations of the surface and brief mention of the materials eroding out of the shoreline profile (Maxwell 1992), and that information has been repeated in cultural resource management reports (Crowell 1993, Higgs 2009, Shaw 2003, Wolforth n.d.). Consequently, not much is known about the extent of the settlement, dates of occupation, degree of erosion, or the ways that the people that lived there interacted with the Russian and American traders, military, mining, religious, and other cultural and historical developments on the peninsula. Piecing together the bits one can say that the settlement

was occupied when the Russians arrived there in 1830s and was abandoned probably sometime between 1890s and 1930s.

I made short visits to the Tachik Site in 2022 and 2023. During my 2024 visit Michelle Snowball and Darlene Chiskok mentioned that some “cultural guys” had visited the Tachik Site that summer. I do not know who they were or what institution that they might have represented. I did spend a few moments at the Tachik Site in 2024 during my shoreline inspection.

It was clear that someone had taken a shovel to the site. Material remains were strewn about (Figure 18). Some material remains were thrown over the low cliffside. I did not see any sifted backdirt piles, so it was apparent that screens were not used in this “excavation.” The digging took place on the little cliff edge, and not within any of the house pits at the site. It is not possible to know what was taken, but the presence of plenty of material remains tossed about and laid neatly on the ground indicates that many things were dug up but not carried away. No human skeletal remains were observed, although there are plenty of marine mammal bones.



Figure 18. Diggings at Tachik Site. Viewer facing west.

Although I cannot say for certain, the whole scene looks like looters spent a day or two at the place poking about. The removal of earth at this particular spot (Figure 19) will speed up erosion of the site here. Much of the Tachik Site is still intact further inland and parallel

to the shoreline cliff. No human remains were observed at the Tachik Site of the nearby highly eroded shoreline to the west.

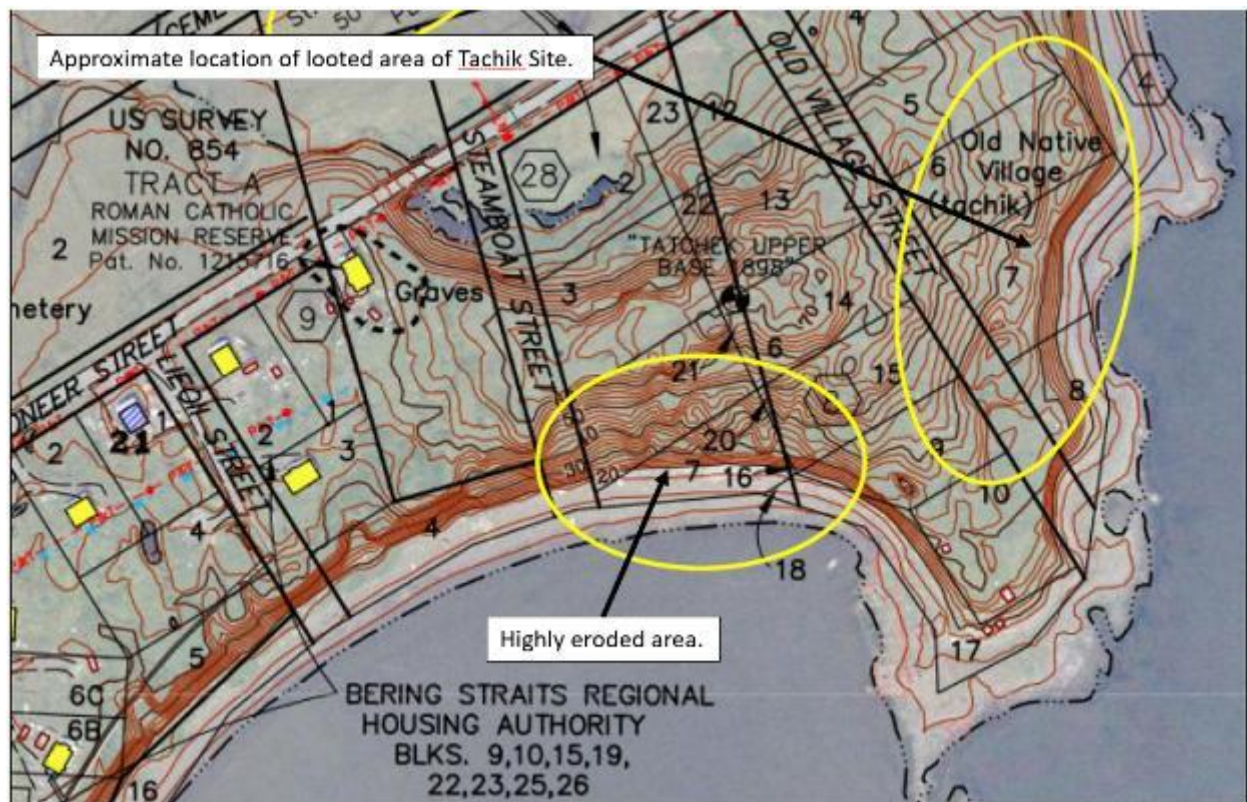


Figure 19. Tachik Site and highly eroded area along shoreline to the west.

Status of the Old Yupik Cemetery (SMI-47)

The Old Yupik cemetery has suffered a great deal from erosion. As recently as 1907 this cemetery still had above ground graves with wooden boxes (Figure 20).



Figure 20. 1907 photograph from Old Yupik Cemetery by Dobbs. Viewer facing west.

I visited this area in 2022 and 2023. Obvious evidence of wooden box graves is lacking. I did see a few wood slats that look identical to the slats used in grave fences elsewhere on the island. These few bits of wood were deeply imbedded in

the dense interlaced network of branches from bushes and the thick lichen and mosses. There may be more of those fragments of graves present, but it will take a great deal of work to find them.

There are 13 very recent graves at the western end of SMI-47. The grass here is relatively low, so one can clearly see around the area. The graves are modern, with fresh paint and lettering. The oldest date of death is 2001. These graves are in and around a depression that is filled with water. This moat around these graves is the result of melting permafrost.

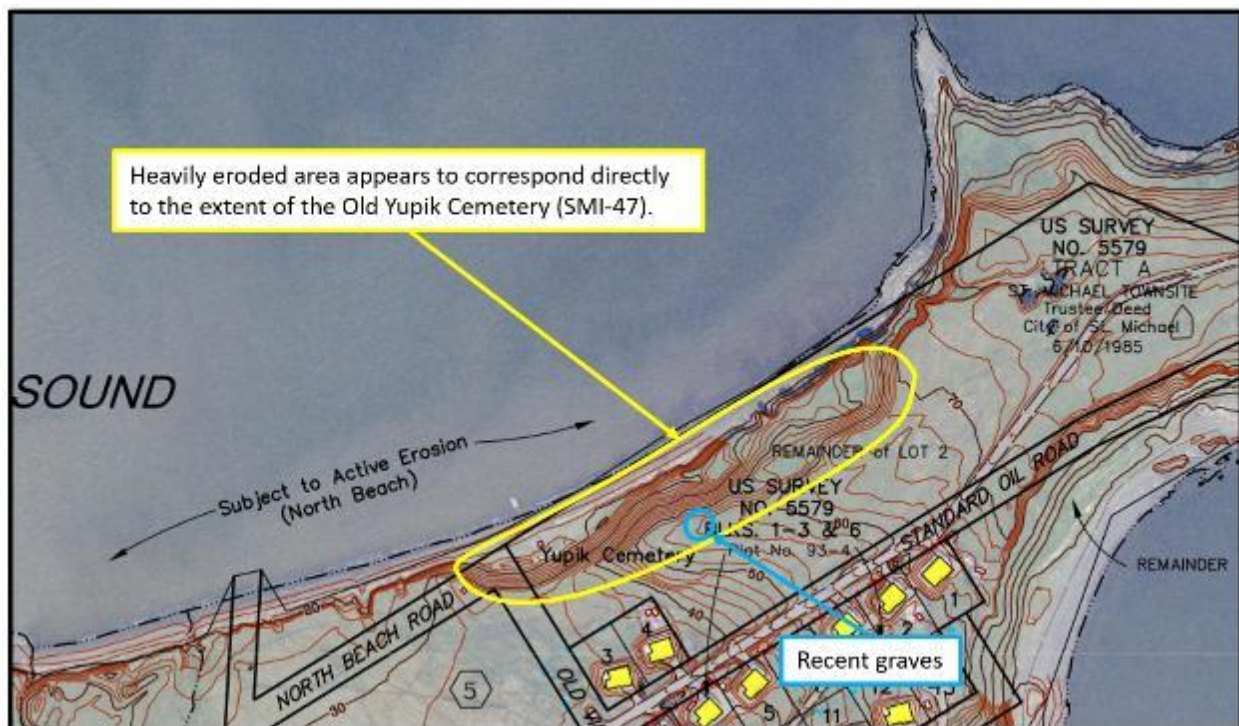


Figure 21. Recent graves on Old Yupik Cemetery (SMI-47).

Erosion at this site is notable with acres of cracked ground surface resulting from the way the earth tears away and slumps downhill (Figure 22)l. It is my proposition that the sloping, more hillside-like topography here that stands in contrast to the nearby more steeply sloping, cliff-like terrain is the result of a century of erosion that has been created and expedited by the many graves placed on and into the ground here, thus compromising the earth and permafrost and contributing to erosional forces here. None of the work proposed in the Research Design as Submitted for SCRIP plan (Appendix 1) was conducted in the short visit to Saint Michael in 2024.



Figure 22. High density of deep cracks resulting from earth pulling away to the ocean.

Field investigations in 2024: Inspections at Gunner's Lake

Field inspection was conducted in the area just to the west of Gunner's Lake.

In brief:

- I revisited both of the small groups of stones that appeared to be cemetery areas that I had seen in 2022 and 2023.
- I encountered material remains that appear to indicate that these are cemetery areas.
- I encountered another group of similar stones, and this one is certainly associated with a cemetery.
- I moved some of the stones in one group expecting to encounter human remains. Instead, I encountered the water table.

The results of this work provide:

- Insights into the nature of this volcanic landform.
- Information on a different style of cemetery in Saint Michael (previously undocumented).
- Evidence for a settlement and cemetery complex (previously undocumented in the AHRS) that likely predates the arrival of the Russians to Saint Michael in the 1830s.

My interest in this area was created after a short visit south of but not at Gunner's Lake in 2022. Documentation of the field work and analysis of that is currently in Appendix A of my currently unfinished report (Wolforth n.d.). During 2022 I encountered a cemetery area (shown as "Old Cemetery" on the 1980, 1994, 1996 and 2004 Community Maps) that was

- There might be a habitation area directly associated with these cemeteries just to the south of these two little cemeteries.

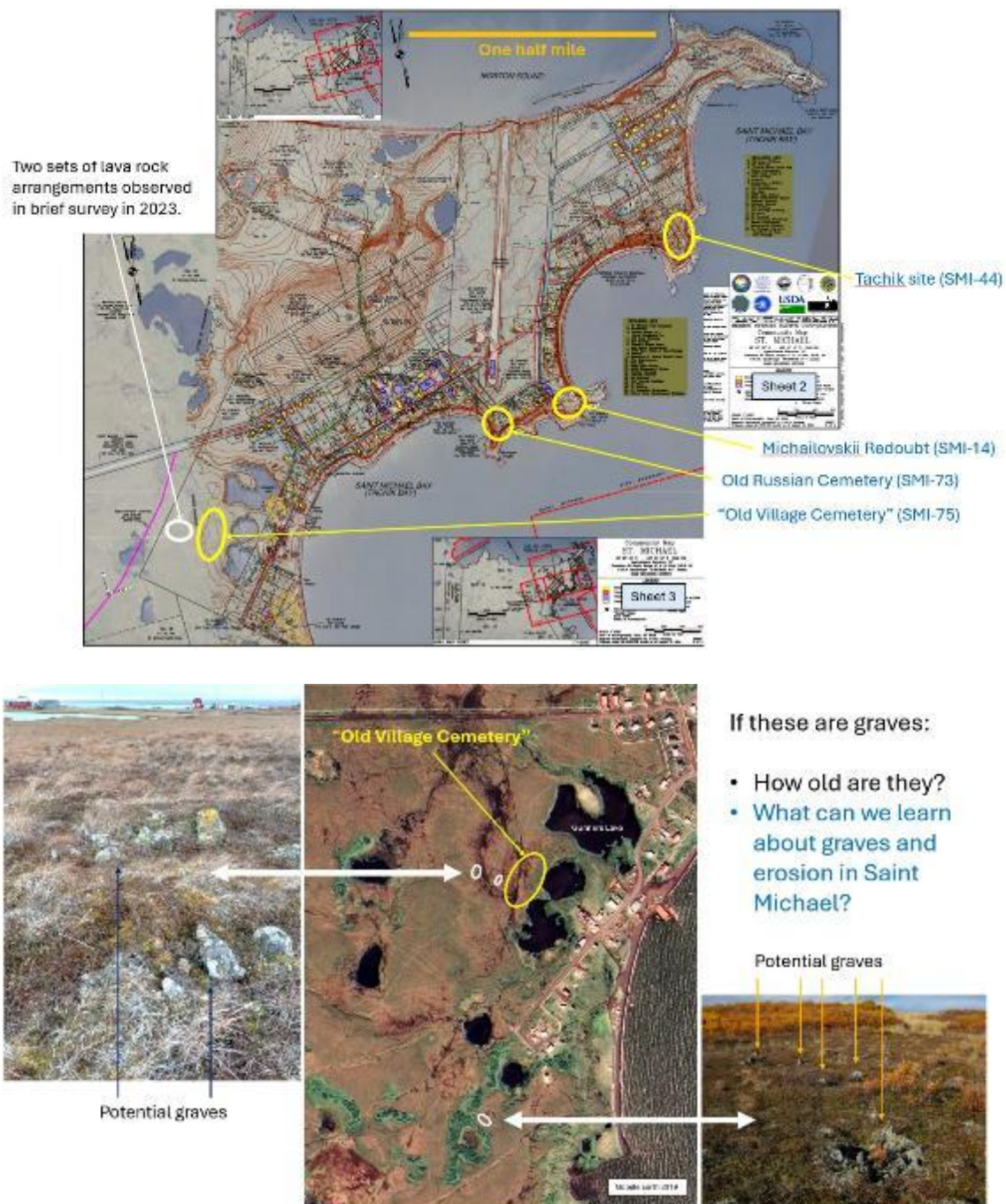


Figure 23. The white circles show the two new cemeteries.

The other native villages in and around Saint Michael

Saint Michael was and still is situated near the intersection of Inupiat, Yupik and Athabaskan cultures. Centuries ago this frontier region was a kind of liminal space that was the stage for trade and warfare (Burch 1974). The arrival of the Russians and their redoubt in 1833 coincided with and played some kind of part in the lessening of the violent interactions between these native groups (Fienup-Riordan 1990). Further influx of strangers in this place facilitated new modes of trading interactions between native groups from around the western parts of Alaska. Koutsky (1982:12-13) synthesizes this phenomenon succinctly.

In the early nineteenth century the boundaries between different groups were jealously guarded and only allied groups or individuals could travel in another's region. During the mid-nineteenth century, however, when the new population of northern Malemiut people began settling in the area and trade increased, group boundaries became more flexible and Native traders could move freely into other group areas (Nelson 1899:229).

Where did these Malemiut people live on the Saint Michael peninsula. Many chroniclers mention the Tachik village to east of the redoubt. On the other side (west coast) of Saint Michael island the island that is now known as Stebbins is also noted. But the mention of other villages between those two (and only a little west of the redoubt) are fewer and less clear. As Ray (1975:163) says: “(i)information about villages (around Saint Michael) is varied.” The fleeting references to a village on the Saint Michael peninsula west of the Michaelovskii Redboud do not paint a cohesive picture of when and where such a village may have existed in that area (Table 4).

Table 4. References to a village nearby and west of the redoubt.

Reference/author	Time that the author was in Saint Michael	Mention of Tachik	Mention of village west of redoubt	Village name west of redoubt
Koutsky 1982/elders	Generational Memory	Yes	Yes	Nuthlutagmiut, Agasliuk
Ray 1971/elders	Generational Memory: 1890	Yes	Yes	Nuthlutagmiut, Agashlikuk
Wardman 1884/Wardman	1879	Unclear	Unclear	None
Ray 1975/Adams	1865-1867	Unclear	Unclear	None
Dall 1870/Dall	1865-1868	Yes	Yes	T'stasúmi
Zagoskin 1967/Zagoskin	1842-1844	Yes	No	No but mentions Agakhkhlyak

That lack of notice of a native village nearby to the west of the redoubt by Zagoskin, who was an astute chronicler of the goings on of the Russians and their neighbors there between 1844 and 1846, may be a fair indication that there was no Alaska native village in the “lakes region” of the Saint Michael peninsula. Afterall, he does record a village at what is now known as Stebbins, providing some indication that he paid attention to who was living on other parts of the island.

By the 1860s it seems that there certainly was one west of the redoubt, as indicated by Dall who spent his first trip in Alaska at Saint Michael from 1865 to 1868. “The name of the tribe is *Únaleet*, and their name for the village, half a mile west of the Redoubt on the island of St. Michael, is *T’stasúmi*” (Dall 1870:13). I added the underline in the previous sentence. Although the west side of Gunner’s Lake is 0.70 miles west of the “Redoubt” (which at that time was still in Russian hands), his estimate of that village being 0.50 miles west of there is not so far off as to preclude that he was referring to the west side of the lake.

George Russell Adams was a member of the crew that set up telegraph poles across the northwest of Alaska in an attempt to connect the east and west hemisphere with communication lines (Taggart 1956). He worked in the Norton Sound region from 1865 through 1867, staying in Saint Michael often, around the time that Dall was in Saint Michael. Adams’ diary mentions that in September 1865 that “the Eskimo village near Saint Michael contained twelve houses” (Ray 1975:163). This contrasts with Dall who states, only 13 months after Adams’ observations, that “there were ‘some thirty or more houses in it now’ and a large dance house” (Ray 1975:163). This could indicate that a single village doubled in size between September 1865 and October 1866. Or perhaps it could indicate that these two men were talking about two different villages. After all, when Dall talks about the village of *T’stasúmi* (the one to the west of the redoubt) he says that there it “comprises a half a dozen houses and a dance house” (Dall 1870:13). Yes, this is varied information, and perhaps it is too much to nit pick it to try to establish what native village of what size was where at what time around Saint Michael in the 19th century.

George Wardman was a United States Treasury Agent when he was sent out to Alaska in the summer of 1879. He cruised about with Captain Bailey on the United States Revenue steamer the *Richard Rush*. Wardman’s chronicles provide a personal perspective on the physical, cultural, and potentially economical resources that he experienced from the boat and during its brief stays at ports. His observations of the situation at Saint Michael are most notable for a description of the taking of a beluga whale just off shore. His brief comments on the location of any local settlement is confusing. “On the same side with the redoubt, about half a mile away, is the Mahlemute village, consisting of thirty or forty log huts and a “kashima,” or club-house” (Wardman 1884:157).

The most tantalizing information regarding a village west of Saint Micheal’s redoubt area comes from work by Ray (1971) on place names for the region, shared by Koutsky (1982). The elders familiar with Nuthlutalik shared this story with Ray (1971:26).

nuthlotaligmiut (“floating bottoms up”), an old village near the gold rush boat works of St. Michael. It is said to come from the following folktale: “Once when high water came, long before you or I were born, and all the people went to the hills, one man [apparently the chief] had left his knife in the house and said to the young men, ‘I’ll give you a wolf skin or a daughter if you’ll get my knife.’ One of them volunteered, and got to the house just as the wave receded. He mase it, and got the knife, but was caught by another wave on the way back, and he was floating face down with his bottoms up when the people returned, and this is what the word *nuthlotaligmiut* means.”

Here the village is clearly located “near the gold rush boat works of St. Michael.” That could be the boat works just over a half mile west of the redoubt area of Saint Michael. In addition, based on interviews with elders, Koutsky (1982:21) conflates *nuthlotaligmiut* with Gunners Lake.

Nuthlotaligmiut, “floating bottoms up,” was a settlement near the boat works in St. Michael (Ray 1971:26), on Nuthulatlik or Gunners Lake. It was also recalled as an overnight camp used when caribou hunting. The settlement is associated with a story about a tidal wave³.

In addition, there is this information which establishes the presence of two separate native villages “very near present St. Michael” (Ray 1971:20).

agashlikuk (said to mean “point where people lived”) was remembered as a place very near St. Michael where Yukon people and Malemiut lived together when they stayed during the winter. Zagoskin said that Agakhkhlyak, meaning a place suitable for a settlement, was called Tachik. This has already been discussed under the name *tachek*, which is St. Michael’s Eskimo name today. I was told that by 1890 there were two different villages, *tachek* and *agashliuk*, but that *agashliuk* was the older (Ray 1971:26).

There is a lot information packed in that paragraph. First, this presentation of *tachek* as being different from *agashliuk* contrasts with Zagoskin’s statement based on his observations in 1842 through 1844.

³ Another recollection of high waters along this southern coast of the peninsula was shared with Zagoskin when he was there from 1842 to 1844: “it is related that when the fort was founded one of the natives in the adjacent village advised against the present location, saying that twice with her memory it had been flooded” (Zagoskin 1967:98). Her advice was not heeded and the Michaelovskii Redoubt was erected where we know of it today.

The (native village “near the fort”) was first populous before the smallpox epidemic but now consists of only 19 person of both sexes. It is called Tachik or Agakhkhlyak, that is “a place suitable for settlement” (Michael 1967:100).

Here we have the venerable Zagoskin saying that there was only one fort near the redoubt and it had two names: Tachik and Agakhkhlyak. In contrast, Ray says here informants say that there were two different villages with two different names. And they were populated by two different cultural groups: Yukon and Malemiut (from north of Saint Michael) at Agashliuk and the local population at Tachik.

This seems to be referring to Tachik (which was on the same side with the redoubt compared to the headquarters of the Western Fur and Trading Company that was recently built to the west of the redoubt area after the Russians left and the Americans moved in). Yet Wardman clearly put Mahlemute residents in that village. Ray (1967:50) points out that by “1867 a few northern Eskimos were living permanently in the vicinity of St. Michael.” These were traders from the Malemiut region of the Seward Peninsula.

Regarding the location, Ray and Koutsy put the village “on” Gunners Lake. They don’t specify which shore of that lake they are referring to. They do include reference to the nearby boat works. There were two “boat works” near Gunner’s Lake. One is just east of the lake and the other is a little further away to the south of the lake. The southern of these two was the large “shipyard” created and used by the US Army during their tenure in the area from 1897 to 1922 (Shaw 2003). The closer docking area was built and used by the North American Trade and Transportation Company sometime before the US Army arrived but was abandoned before the US Army left the island. Between the two rather decent indications where the village was, it is fair to say that the village was somewhere near Gunners’ Lake.

These chronicles are indeed varied. And confusing. But there does appear to be plenty of reason to state that the body of written records indicates that there was some village not far to the west of the redoubt at Saint Michael with these potential (liberally defined) characteristics:

Name: T’stasúmi or Agasliuk, colloquially referred to as Nuthlutagmiut (those that live at Nuthlatalik).

Location: adjacent to Gunner’s Lake (a.k.a. Nuthlatalik).

Occupied by: Yupik and Inupiat (specifically Malemiut people).

Functions: changed over time including cross-cultural trading, winter residence, hunting, camping.

Chronology of occupation: Prior to Tachik (known to exist there in 1833), through the 19th century.

And where there were inhabitants, there were cemeteries. None of the chroniclers mention any cemetery⁴ west of the redoubt⁵. The one (set of) “written” documentation of a cemetery near Gunner’s Lake comes from the Community Maps of Saint Michael that were constructed in part from information gathered from community members in Saint Michael. The cemetery at the west side of Gunner’s Lake is referred to as “Old Village Cemetery” (1980, 1994, 1996), but is oddly not represented on the Community Map from 2004.

Field work at Gunner’s Lake

There is plenty of information in books and maps that there was a village and cemetery near Gunner’s Lake. During my very short visit there in 2023 I saw strange arrays of lava rock that looked identical to a strange array of rocks that were likely the graves at a cemetery not too far away to the southwest that I had seen in 2022. The work planned for 2024 at Gunners’ Lake was designed to spend more time on the landscape in that area, and included a test excavation at one of the lava rock clusters to see if it was a burial.

Surface survey

There are four clusters of lava rock in this area (Table 5). These clusters contrast with the surrounding landscape’s mushy, slightly undulating tundra that has no rock outcrops to the surface. The lava rock clusters are loosely bunched together. Some of them have rocks that appear to be positioned to be upright, or perpendicular to the ground surface. One can see through the cracks in to the ground below where more loosely packed lava rocks are present. The average size of the blocky (none are waterworn) rocks is approximately 0.25 by 0.25 by 0.25 meters. Larger stones are around 0.50 meters, and the largest slab in this group is 1.30 by 0.60 by 0.30 (thick) meters.

Table 5. The lava rock clusters.

Burial Cluster	N	W	Areal extent (meters)	Approx # rock loci	Notes
1	63.47576	-162.05594	30 x 15	25	2 wooden posts
2	63.47528	-162.05494	15 x 8	15	
3	63.47445	-162.05571	15 x 8	10	
4	63.47225	-162,05571	30 x 15	20	2 wooden crosses
SMI-76	63.47179	-162.05469	50 x 15	9	

One rock cluster had a shaped piece of wood sticking out of the ground at one end of the cluster (Figure 24). This piece was about 0.75 meters long and had an octagonal cross section approximately 7.5 cm. This shape may have been created by planing, but not turning on a lathe. Another shaped piece of wood of similar length and shape was seen in the tundra nearly prone to the ground surface (Figure 25). I pulled this one out and

⁴ This includes any lack of written record by anyone regarding the Old Russian Cemetery up until when that place was surveyed by the US Army in the early 1900s.

⁵ Nelson (1899) talks about burials to the east of the redoubt.

observed that one end (above ground) was broken and the other (in the ground) was tapered (Figure 26).



Figure 24. Rock cluster with worked wood.

This prone piece of worked wood was near a rock cluster. I chose this rock cluster to conduct an excavation of sorts. I had surmised that these pieces of wood were could be posts for crosses, or were posts for elevated box burials, or were posts for hanging items associated with the departed. Such things would be expected in an old village cemetery.

Excavation work at a rock cluster

The excavation consisted of carefully removing rocks (Figure 27, 28 and 29). In the beginning there was no soil associated with the rocks. There was only roots from the tundra vegetation, gaps of air and then water.



Figure 25. Similar worked wood near another rock cluster.



Figure 26. Worked wood with tapered end.



Figure 27. Pre-excavation. Viewer facing North.



Figure 28. Excavation unit when water table was reached. Viewer facing North.



Figure 29. Excavation unit. Viewer facing West.

I continued to remove rocks from below the water line (which was encountered at approximately 30 centimeters below ground surface). As best as I could tell the loosely packed rocks continued into the earth for another 30 centimeters. I could not see into the murky water, but could feel soil there beginning at about 60 centimeters below ground surface. I had reached my arm's length for digging, but could slip my trowel another 10 centimeters into the soil. That trowel probing did not encounter rocks and, notably, it did not encounter permafrost (Figure 30).

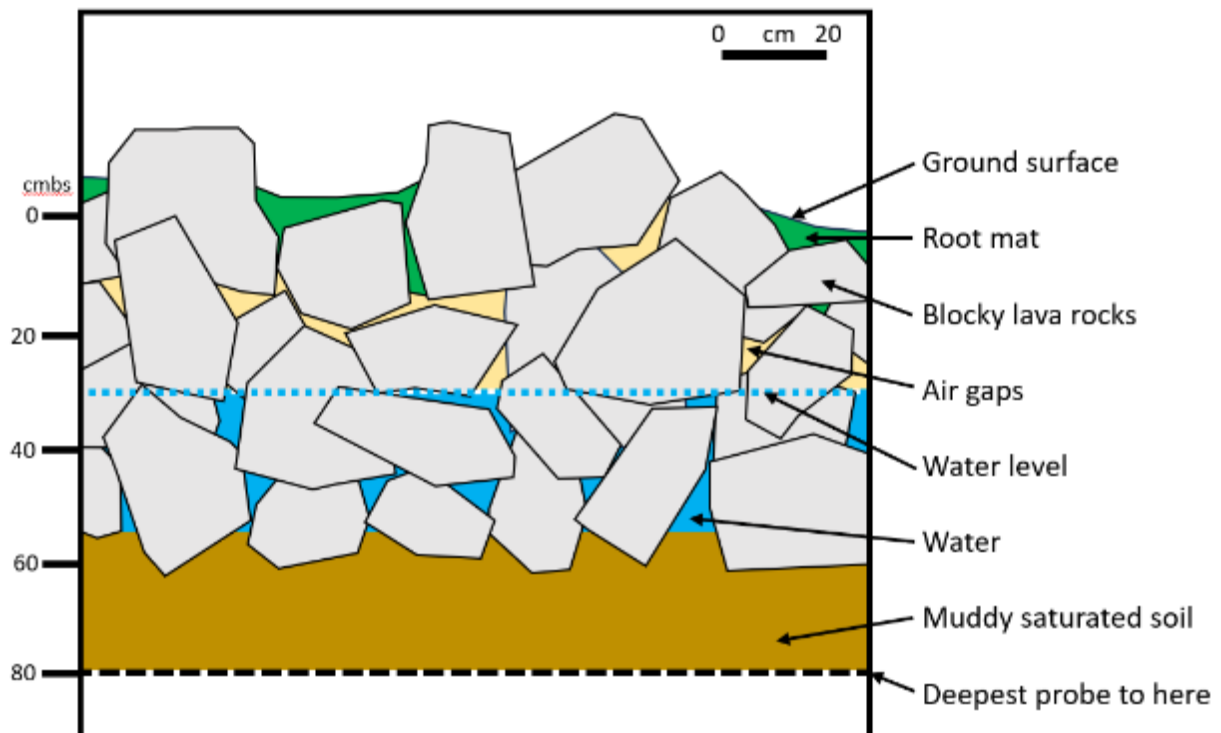


Figure 30. Excavation unit profile. Viewer facing West.

Where ever there was blocky lava rock there was plenty of gaps between the rocks. In others words, they were not stacked or packed tightly. Instead they were jumbled, appearing to indicate that they were hastily or haphazardly put there.

The way that the rocks appear on the ground surface and the way that they are present below the ground surface appears to me to indicate that:

- Someone dug a whole into the tundra.
- To a depth of about two feet below the ground surface.
- Blocky lava rocks that are present in this portion of the Saint Michael peninsula associated with the volcano to the west of this location were collected.
- Those blocky lava rocks were brought to these spots to fill the holes.
- I assume that other things were in those holes, and that the rocks covered those things.
- I propose that what was buried by those rocks were human burials.

This proposition is supported by the presence of worked pieces of wood that appear to be posts. Those posts could be solitary posts that marked the place. Those posts could represent what was left of a group of posts that supported something at or above these locations. Something like the box burials that were ubiquitous at villages in this region from the time the Russians and Americans arrived until well into the 20th century.

While working in the Old Russian Cemetery in 2023 I encountered several burials that had waterworn lava rocks (of the same size as those in this test excavation discussed here) placed on top of the wooden, subterranean coffins. Those coffins were placed in holes that were dug to the permafrost, which is two feet below the ground surface in that cemetery.

It is conceivable that placing rocks on burials is custom directly associated with the interment of loved ones in shallow graves in this village (and perhaps others).

Does the presence of water in this location discussed here indicate that the permafrost is melting here? Maybe.

Much of this is speculation. No human skeletal remains were found in this small test excavation. No wooden materials or cultural accoutrement were found, either. Nevertheless, the accumulation of the other evidence suggests to me that this area is a cemetery area:

- It is noted as a cemetery on Community Maps that gathered that information from knowledgeable local elders.
- There is some indication in some written documentation that there was a village in this location, and villages are often associated with cemeteries.
- The blocky lava rocks were brought to this place and placed in holes that were dug for some reason.

- Some blocky lava rocks are erect in the ground, like markers, and others appear to have once been erect.
- Wooden post-like pieces are directly associated with these rock clusters.
- There are crosses in association with this kind of rock cluster just to the south of this location (Figure 31).



Figure 31. Wooden cross in southern most burial cluster (#4). Viewer facing West.

The significance of the information gathered in this short (in duration) and small (in size) probing is unclear. There is nothing in the ground that securely indicates that this (and all of the other lava rock clusters) is a burial location. Yet the information provided in the historical records, the Community Maps, and comparison with another location said to be a cemetery that looks just like this area seems to be to be compelling evidence for a cemetery here. The presence of two worked pieces of wood projecting from the ground lends a little more credence to that notion.

The occurrence of two modern crosses in the southernmost rock cluster indicates that current residents are comfortable with using this area as a small cemetery. Perhaps that notion has been passed down for generations for these rocky lava burial areas.

Much more work needs to be done in this location. There are plenty of lava rock mounds, erect stones, and depressions in the landscape at the western end of the paved portion of Saint Michael. It is possible that these represent the remains of a native village in this area (Figure 32).



Figure 32. Burial clusters and possible settlement near Gunner's Lake.

Field investigations in 2024: Old Russian Cemetery

I looked over the tundra top, slopes, and shoreline bottom of the Old Russian Cemetery (Figures 33 and 34). There appeared to be no new movement of earth since I last saw and documented it in 2023. There were no new exposures of coffins or any other material in, on, or below the cemetery. There are some vertical spots and even some overhanging matrix, but those areas are beyond the limits of the Old Russian Cemetery.

Vegetation is growing on the earth that slumped down off the cliff top. This newly formed slope is less vertical, and consequently, with the connecting forces of the vegetative root system, should evolve into a gently sloping hill side that will no longer actively erode away from the Old Russian Cemetery. That is, until the next big storm scours away this location.



Figure 33. Slope from Old Russian Cemetery (to the left) to the beach. Viewer to East.



Figure 34. Vegetated clumps at Old Russian Cemetery. Viewer facing Northeast.

Summary and Recommendations

I spent three days in late September 2024 making observations and conducting one excavation test unit. I was not able to fulfill the planned research outlined in the SCRIP. I was able to discern a few things.

Erosion

- Spent some time observing the nuances of the volcanic landscape.
- Noticed differential erosion based on changes in the substrate across the peninsula.
- Observed that different storms at different times impact the shoreline and erosion in different ways.
- Pointed out the phenomenon of cracks across the peninsula ground surface, and their relationship to erosion.
- Documented the correlation of historical land use practices with cracked landscapes.

The Gunner's Lake region history

- Identified several cemetery areas in the area just to the west of Gunner's Lake.
- These cemeteries are are notably different than other cemeteries, in that they are comprised of blocky lava rock graves in clusters from 10 to 25 graves.
- They are on a different substrate: in the eastern edge of the slope of Saint Michael Mountain.
- These cemeteries are likely associated with a village that was present prior to the arrival of Russians in 1830s.
- That village might have been called Nuthlutagmiut or Agasliuk or T'stasúmi.

The Old Russian Cemetery

- The response work that was conducted for six weeks in 2023 was successful in altering the eroding landscape here to the extent that no further erosion was observed in 2024.
- No additional coffins were observed in 2024.
- Vegetation is growing on the hillside, stabilizing that surface.

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Saint Michael Community Map 1980, 1994, 1996, 2004

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Appendix 1: Research Design as Submitted for SCRIP

Research Design for Proposed Work to be Conducted in Saint Michael in Summer 2024

Work to be conducted on State of Alaska Lands:

Possible, but not certain, collection of human remains that have eroded out of known burial areas onto the sandy shoreline (State controlled lands).

Thomas R. Wolforth July 16, 2024

The only state land in the proposed work at Saint Michael in 2024 is along the beach. Shorelines are considered under state of Alaska control. The other activities will take place on land owned by the City of Saint Michael, the Saint Michael Native Corporation, and the Russian Orthodox Church of Alaska. The proposed research and activities have been designed in consultation with those entities. Please see attached maps for entirety of proposed field work for this project.

Human remains may be encountered on the beach and on the cliff sides. The proposed activities include removing human remains from those locations, wrapping pursuant to the local community's desires, and placing them in the village morgue until members of the local community rebury them at a currently undefined time.

Permits are currently being procured with the State of Alaska Department of Health Division of Health Analytics and Vital Records to move human remains, and the Bureau of Indian Affairs to conduct reconnaissance and mapping on non-state lands involved.

Activities associated with this SCRIP

Thomas Wolforth and Nicholas Leonovicz will conduct the activities described below on lands controlled by the State of Alaska.

- These activities are being conducted in support and the request of the local community to address the damage caused by the Merbok Typhoon to their deceased ancestors.
- This work is not designed to fulfill any National Historic Preservation Act undertaking.
- Portions of this work will be used in partial fulfillment of graduate student work of Nicholas Leonovicz.

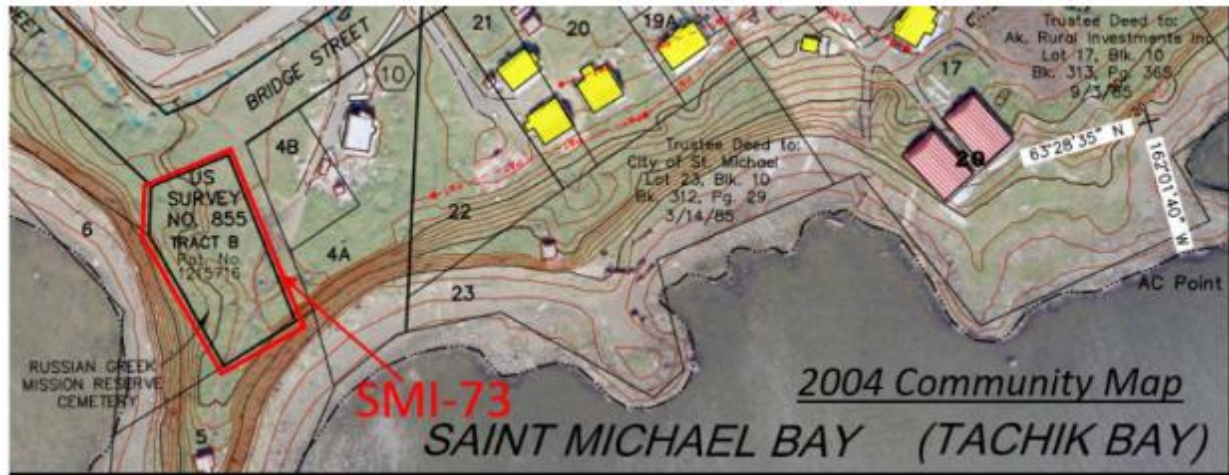
Section 1 (A). Research Design

Walkover (reconnaissance) inspections will take place on some state-controlled shorelines in Saint Michael. See the set of maps at the end of this submittal for locations.

For general background information please see the attached draft report on relevant work conducted in the recent past by Tom Wolforth in Saint Michael.

A list of all known AHRS sites in the project area is provided in the attached draft report on relevant work. Cemeteries that have eroded and may have deposited human remains on the shoreline are:

- SMI-44 Tachik Village (Old Native Village – with human remains)
- SMI-47 Old Yupik Cemetery
- SMI-73 Old Russian Cemetery



The estimated acreage to be surveyed along the state-controlled shoreline is two acres.

The proposed fieldwork methodology on state-controlled shoreline is to walk along the shoreline on multiple occasions. No excavations will be conducted on state-controlled lands.

A 1:63,360 USGS map of that depicts the areas of the proposed work is attached.

Section 1 (B). Professional Qualifications

Thomas R Wolforth is the field supervisor (and the permittee), and he meets the qualification standards.

Section 1 (C). Land Management

The State of Alaska Department of Natural Resources Division of Mining, Land and Water controls the shoreline.

Section 1 (D). Time

Section 2 (A). Permittee Responsibility

The one permittee is Thomas R Wolforth.

Section 3 (A). Survey Methodology

The survey methodology for the actions to be conducted on state controlled lands is surface survey. The explicit areas to surface survey are based on having spent time in Saint Michael in the past two years and having digested the reports conducted by others to date (synthesized in draft report attached). This is also informed by local residents that have encountered human remains on the beaches that are to be looked at in this SCRIP research. Survey transects will be much tighter than 10m apart. Survey will be conducted over the same areas on multiple occasions to account for changing dynamics along the shoreline including storms and tides. Last year human remains

were encountered on random days along the shoreline at the base of the Old Russian Cemetery. These were washed up with the ocean and not brought down from the cliffs.

Section 3 (B). Field Supervisor Qualifications

The permittee is serving as field supervisor.

Section 3 (E). Subsurface Testing

No subsurface testing will be conducted. Human remains resting on the surface may be picked up. If so, those will be wrapped and placed in the village morgue to be reburied by village residents sometime unknown time.

Section 3 (F). Curation Agreement

No artifacts or human remains or cultural items of any kind will be taken away from the island.

Section 3 (G). Human remains

Human remains are expected to be encountered. Indeed, that is the principal goal in this endeavor: find and retrieve human remains that have been eroded out of their primary context and moved by natural forces to the cliff edge and beach (state-controlled land). The permittee has consulted with the local tribal government and city government for two years on this issue and is implementing methods to satisfy their concerns and approaches to this problem. A permit from the Alaska Department of Health Division of Public Health, Health Analytics and Vital Records (previously known as the State of Alaska Bureau of Vital Statistics) to move human remains from the beach is being procured (as it was last year for this same activity). This is being done so this work can proceed without having to halt when human remains are (inevitably) encountered during this work.

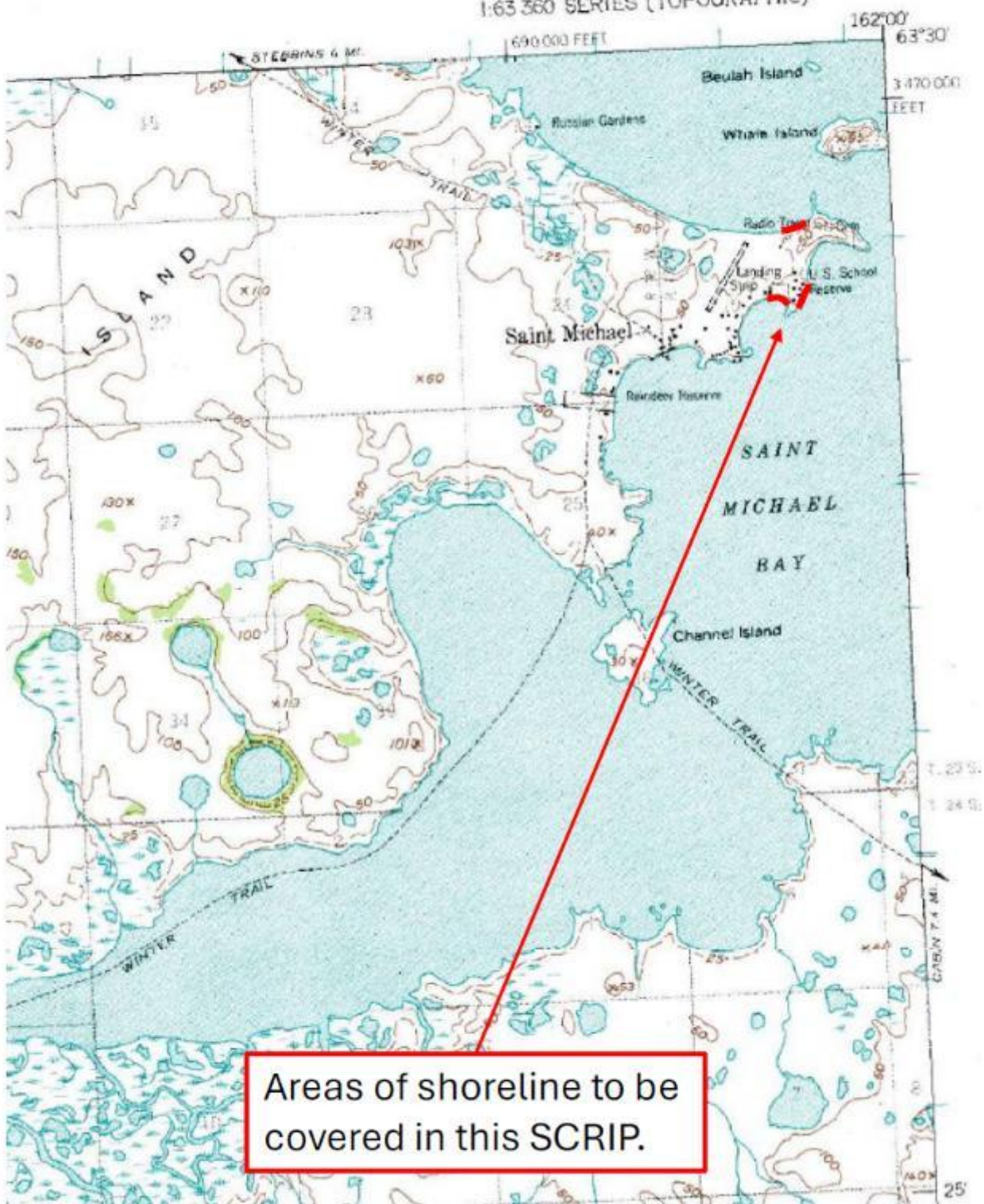
Section 3 (H). Other Laws

The permittee is coordinating with the Bureau of Land Management for Archaeological Resource Protection Act concerns and the departments mentioned above.

Section 4 (B). Report Timeline

A report on the work conducted in 2023 under a SCRIP was not provided to OHA. A lengthy draft report was provided on work conducted there in 2022. This permittee would like to submit that this 2024 is a continuation of a multi-year activity. This permittee is offering to provide a brief interim report on the 2023 if requested. An interim report on the combined work of the 2022, 2023 and planned 2024 seasons will be submitted to OHA within three months of returning from the field (September 8, 2024). That would be December 8, 2024.

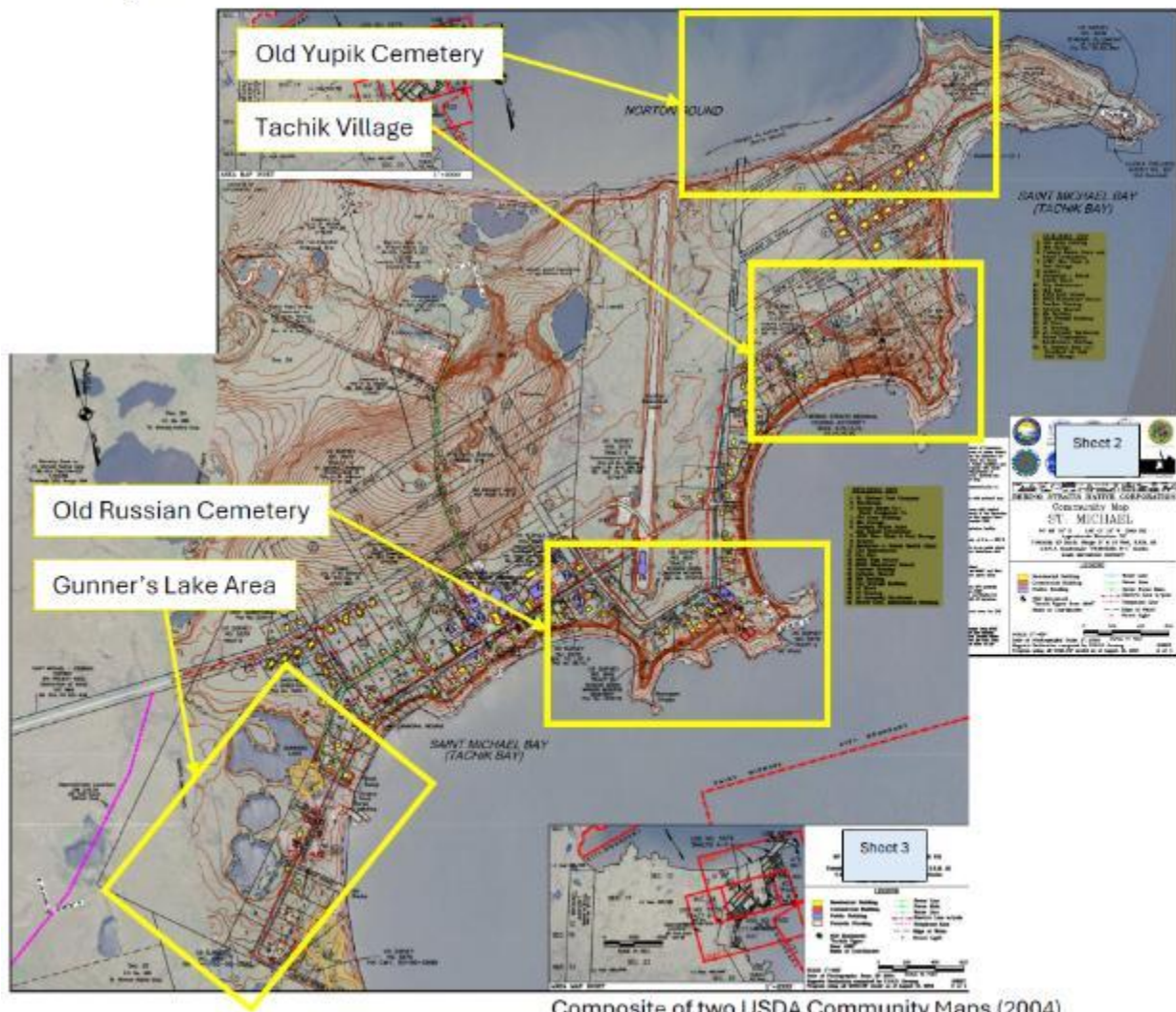
SAINT MICHAEL (B-1) QUADRANGLE
ALASKA
1:63 360 SERIES (TOPOGRAPHIC)



Introduction and orientation to maps locating and describing the proposed investigations at Saint Michael in 2024

All of the procedures that are proposed for the 2024 work have been discussed with officials with the city of Saint Michael and the tribal government Native Village of Saint Michael. I have worked at the Old Russian Cemetery and have surveyed the island over the past two years in response to the erosion caused by the Merbok Typhoon. The information presented within is based on these consultations, field experiences, and associated research.

Tom Wolforth
July 2024



Composite of two USDA Community Maps (2004)

Old Yupik Cemetery

Also known as:

- Yupik Cemetery
- Old Yupik Cemetery
- AHRS SMI-47

Landowner: City of Saint Michael.

This is a highly eroded landscape, clearly indicated by scalloped cliff edge in this topographic map. Reports written over the past century include photographs of graves, comments that there were many graves there, and that graves were and are eroding away. Currently the area has low brush covering the area and no obvious graves are apparent. A close inspection of a limited portion of the cemetery by me in 2023 revealed that there are still some highly-decomposed grave structural elements present hidden in the underbrush.



Plan for 2024:

- Identify and map the extent of erosion and any grave remains present,
- Identify how this erosion is manifest: cracks, permafrost melt, remains on beach, etc?

Old Russian Cemetery

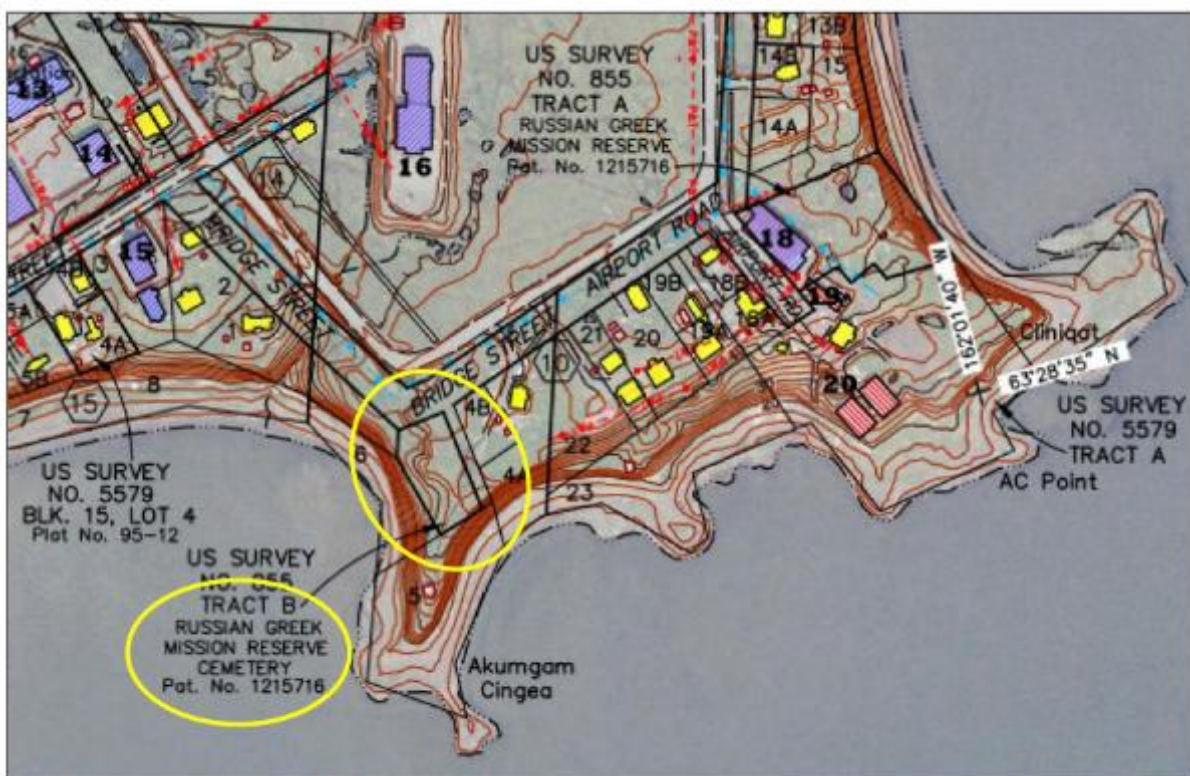
Also known as:

- Old Russian Cemetery
- AHRs SMI-73

Landowner: Russian Orthodox Church.

Shoreline controlled by State of Alaska

This cemetery has been eroding slowly but continuously on the south and west sides over the century since the Russian Orthodox Church abandoned the cemetery and interments were stopped there. The Merbok Typhoon in 2022 scoured the south and west cliff sides and removed an unknown number of graves. Erosion that continued more vigorously since the storm removed 10 more graves. Erosion continues.



Plan for 2024:

- Examine and map the extent of erosion since last visit in October 2023.
- Use electronic resistivity across the cemetery to examine extent of permafrost.
- Retrieve any newly eroded graves (if any) since 2023 and prepare them for reburial (in the same ways that was performed there in 2022 and 2023) by the community at a later date.

Tachik Village

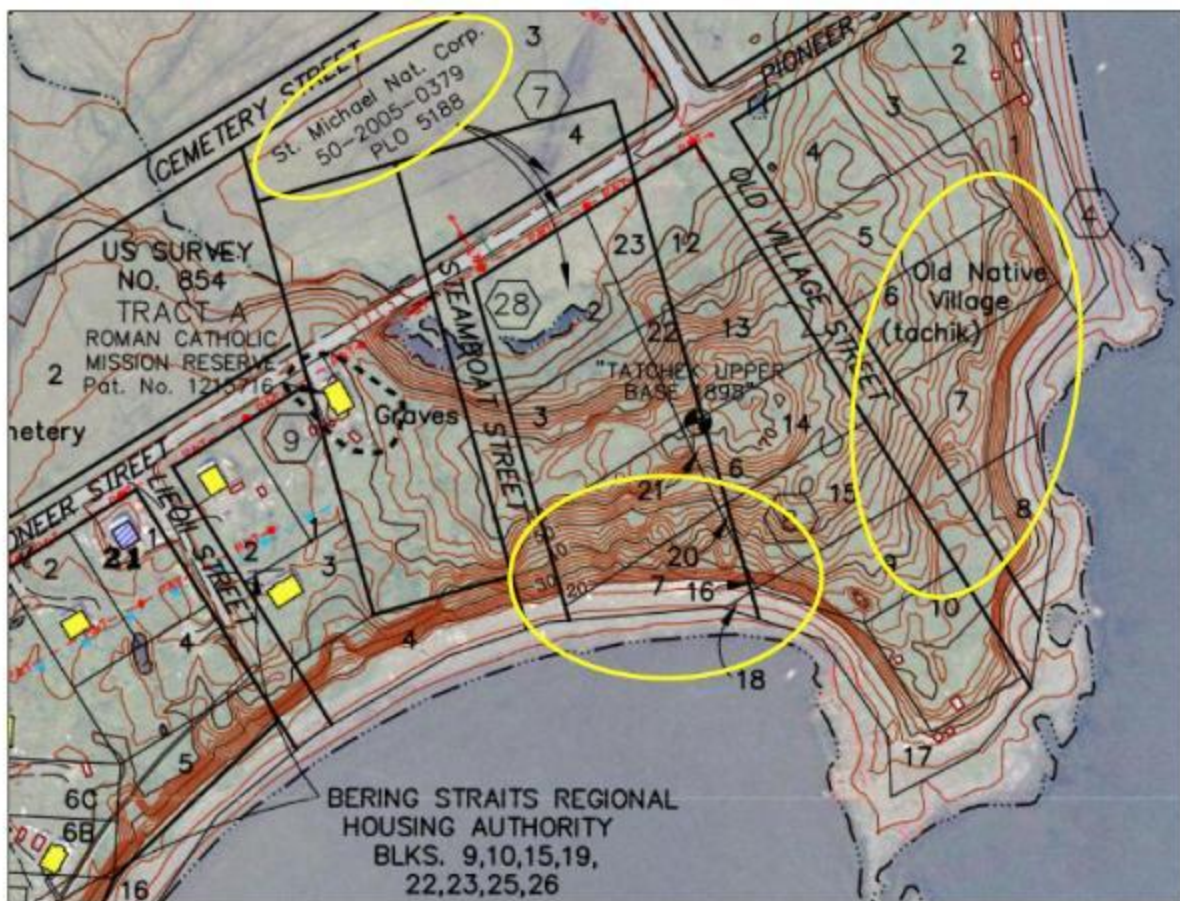
Also known as:

- Old Native Village
- AHRs SMI-44

Landowner: Saint Michael Native Corporation.

Shoreline controlled by State of Alaska.

A native village was occupied in this location (on the right in this image) during the 1800s. Artifacts erode on to the beach continuously. Recently Saint Michael residents have indicated that human remains have eroded on to the beach to the southwest of the old native village (known as Tachik). One can see in this topographic map how the slope there has been compromised by erosion. Walking there is difficult due to the large cracks the size of a person in that hillside.



Plan for 2024:

- Examine the cliff edges and beaches in these two areas.
- Recover any eroded human remains and prepare them for reburial (in the same ways that was performed there in 2022 and 2023) by the community at a later date.

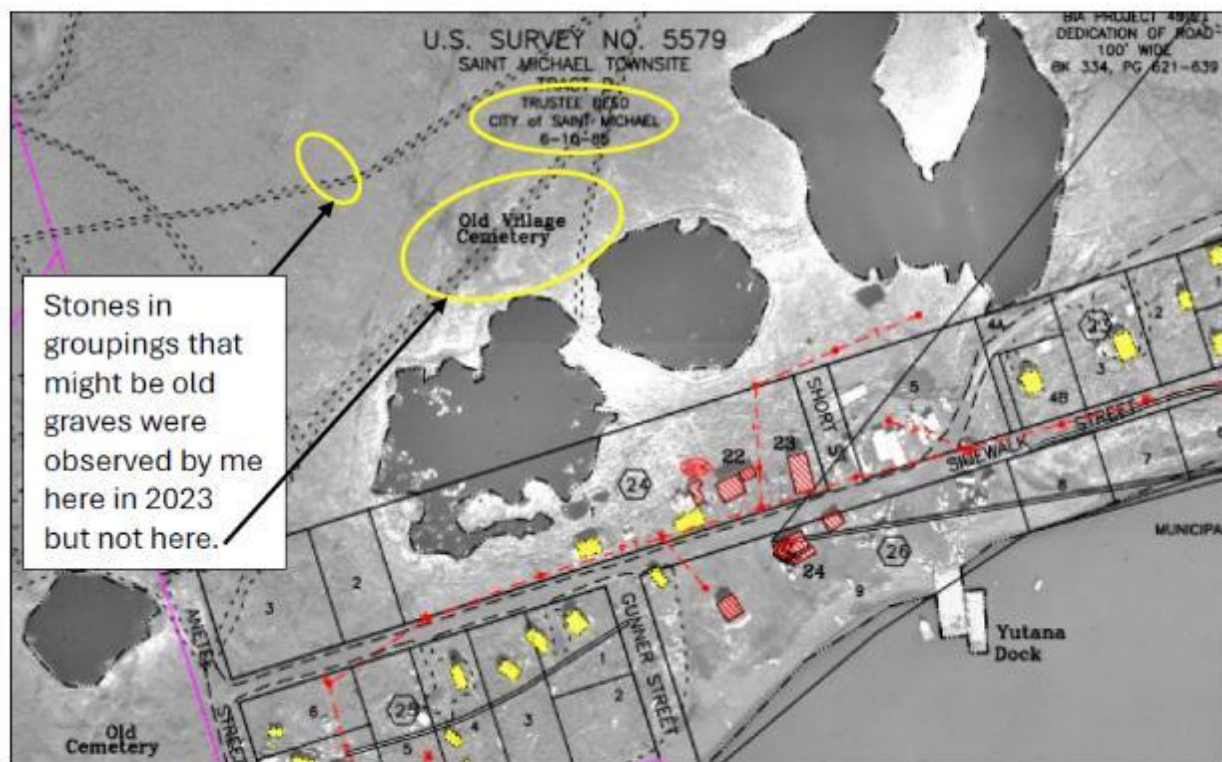
Gunner's Lake Area

Also known as:

- Old Village Cemetery
- AHRs SMI-75

Landowner: City of Saint Michael.

An "Old Village Cemetery" is indicated on 1980 and 1996 Community Maps (but not on the 2004 map) in this location. Local residents have knowledge of an old cemetery there. Yet there are no physical indications of a cemetery at that location. Nearby to the west there are a couple dozen stone features imbedded in the ground that could be the remnants of old burials. The AHRs SMI-75 was defined strictly on the basis of the "cemetery" being noted on the maps; none the authors of that site documentation had gone there to examine that area.



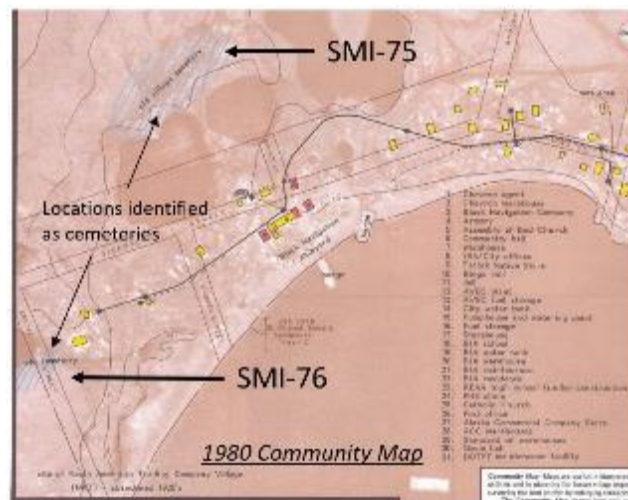
Plan for 2024:

- Examine and map the stone features.
- Move the minimum amount of stones possible to be able to determine if these are graves or not.
- Replace the stones and do not disturb the human remains.

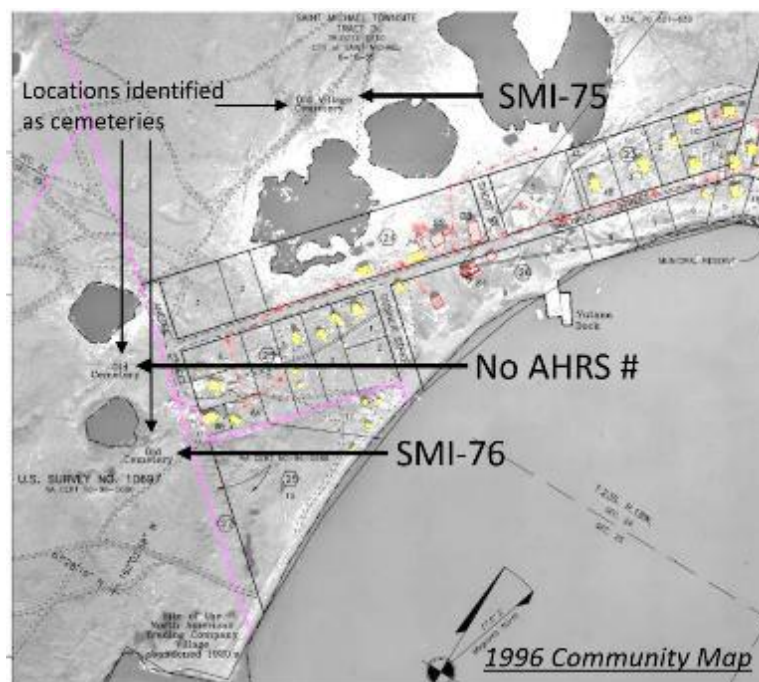
Appendix 2: Cemeteries discussed in this report

SMI-76 Old Cemetery

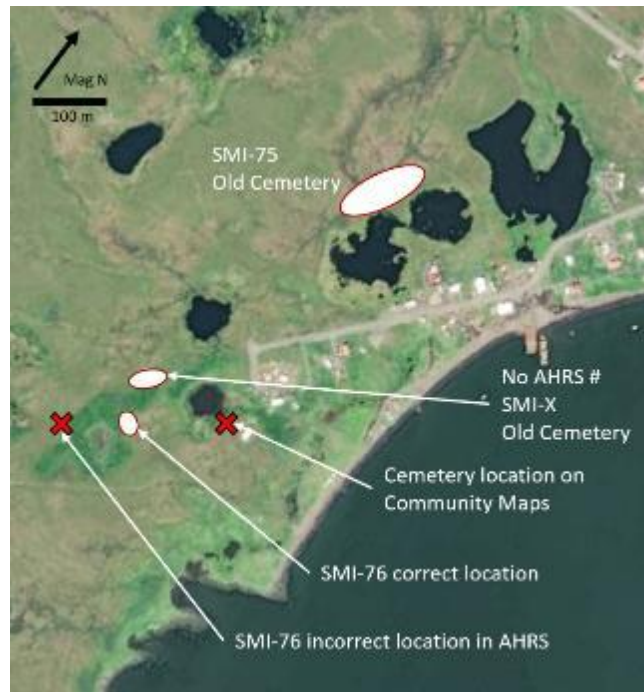
This cemetery shows up on all four of the 1980 (Figure 2), 1994, 1996, and 2004 Saint Michael Community Maps. In each one the cemetery is portrayed as along the southeast edge of a small pond at the west end of the village. In contrast, the AHRs location for this cemetery is situated approximately 720 feet (220 meters) to the west of that small pond. Shaw (2003) shows a large blue rectangle that provides a generic location for cemeteries in this area.



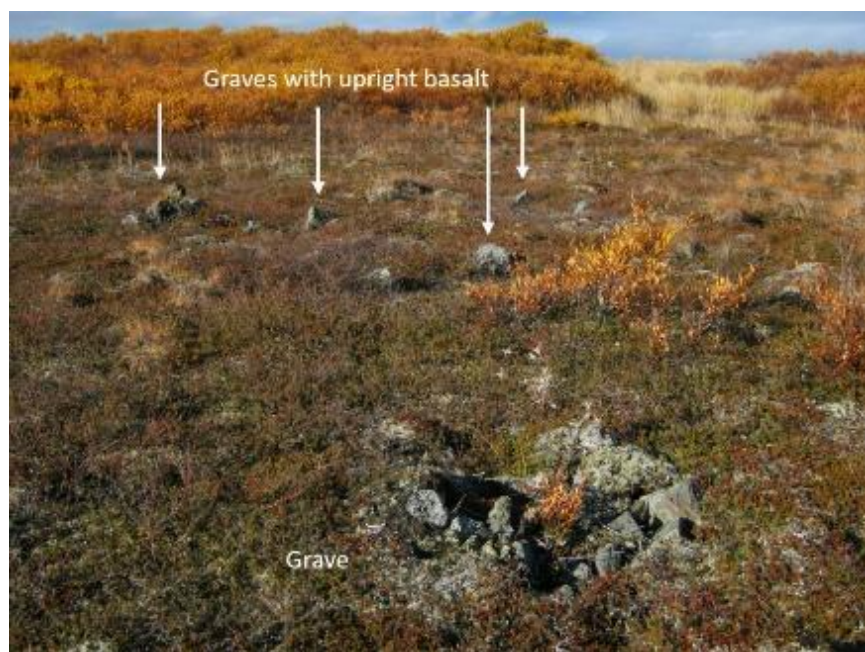
SMI-75 and SMI-76 on portion of 1980 Community Map.



SMI-75, SMI-76 and SMI-X on portion of 1996 Community Map.
I visited the cemetery on October 1, 2022 spending about a half hour searching at the location indicated by the Community Maps. There is no indication of grave sites in or around those areas. There are no crosses, or pieces of wood, or landscape/ vegetation anomalies that might suggest something subterranean there.



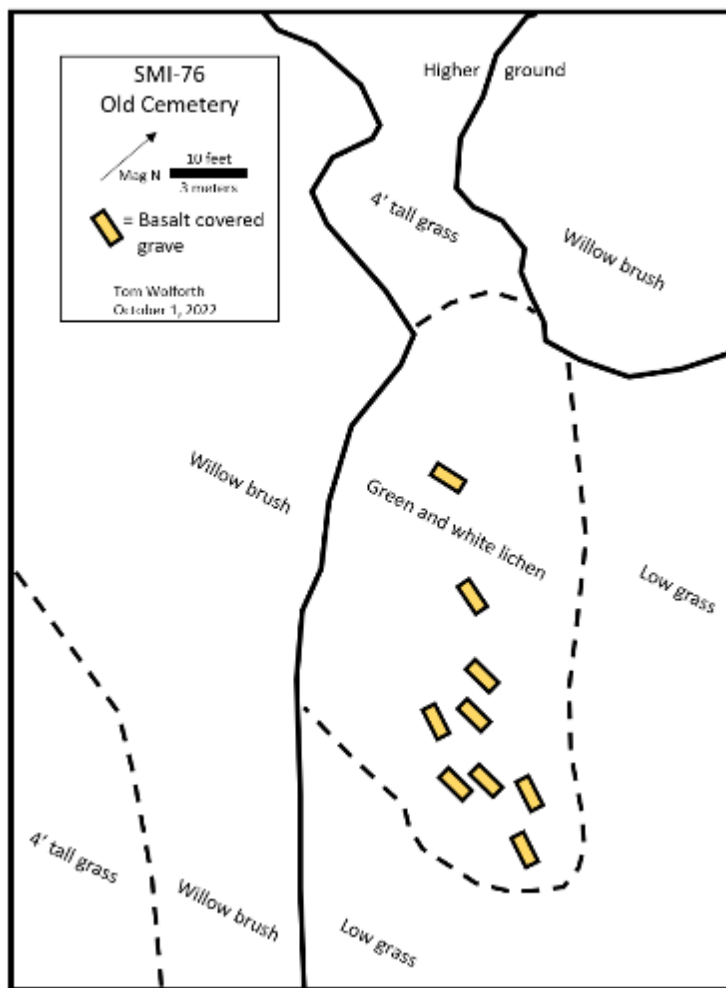
SMI-76 previously reported locations versus observed in 2022.



SMI-76. Viewer facing northwest.

I counted nine rocky rectangles. There are other areas with basalt that may be graves that require more investigation. This set of graves is distinctly different from any other group of graves (cemetery) in the Saint Michael environs. There is a piece of milled wood lying on the surface, but no crosses or fences. There are no names associated with these graves. Indeed, this cemetery stands in stark contrast to the cemetery that is located just uphill and less than 40 meters to the northeast. That cemetery (lacking any AHRS #) does include the usual crosses, fences and painted names (see discussion below for SMI-X). It also appears that it is currently being used (visited and added to).

The notably different arrangement of this SMI-76 cemetery does lend credence to the notion that, as portrayed by the AHRS file for SMI-76, that this is a cemetery possibly

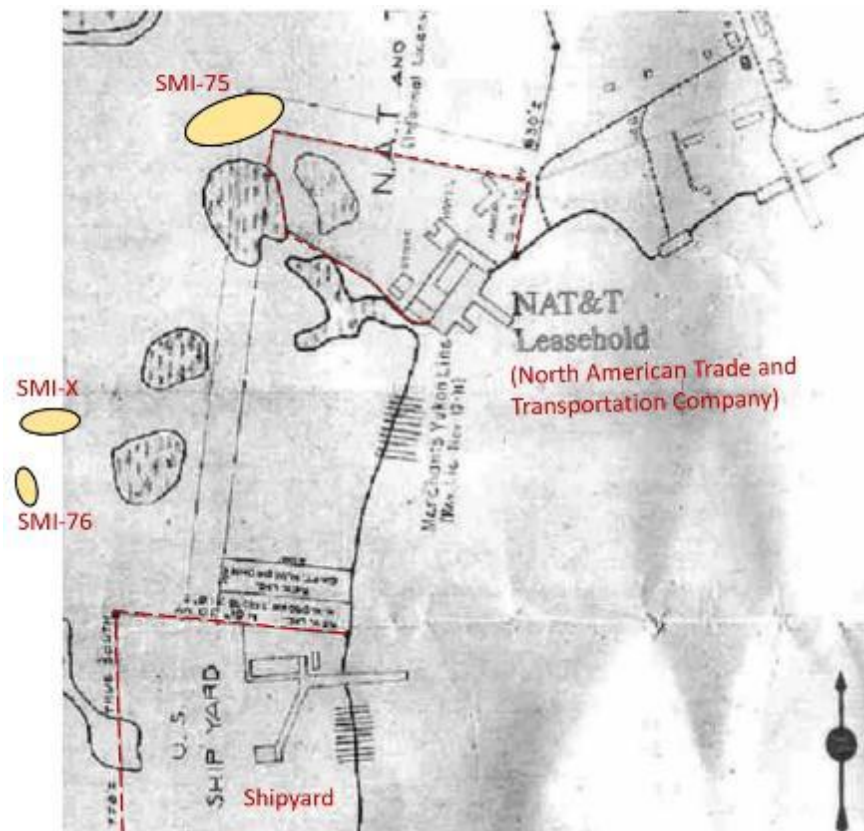


associated with an old village or the North American Trade and Transportation Company, or Fort St. Michael. Located just S of the former U.S. Ship Yard. The area has not been archaeologically investigated (AHRS file for SMI-76).

The cemetery is located near the old headquarters, referred to as Fort Get There (Shaw 2003:31) of that trade company. The company buildings, which included a large hotel, were built perhaps as early as 1894. The last store for the North American Trade and Transportation Company was sold in 1912. The U.S. ship yard is also near SMI-76. The U.S. Army arrived in Saint Michael after the North American Trade and Transportation Company. The Army started building Fort St. Michael, including (probably) the shipyard in late 1897. The Army relinquished its boats and closed its posts in the Yukon, including this one

discussed here, in 1922.

SMI-76 sketch map.



Cemeteries near historical developments. Modified from Shaw (2003:33).

The basalt rock rectangles visible on the ground surface do not look like other Alaska native gravesites in Saint Michael. However, it is possible that they were created by Alaska natives that lived and died prior to the creation of local graves that use wooden crosses and fences. Descriptions and images of Alaska native cemeteries that existed in the villages around Saint Michael in the early 1800s focus on the wood box on posts above ground with accoutrements attached (Zagoskin 1967 ; Blomkvist 1972; Dall 1870; Whympers 1868; Nelson 1899). There is, however, one mention of rocks being used at grave sites in Alaska.

Dall observed and commented on a large cemetery at a village in the lower Yukon River with graves that “were filled with earth over the body, and then carefully covered with pieces of birch bark, held own by heavy stones” (Dall 1870:225). These were also adorned with the usual company of grave goods and imagery. If all of these wooden and perishable items decayed, and, as Hrdklicka later observed to bury themselves into the ground over time, then perhaps what would remain on the ground is something like that observed at this cemetery area in SMI-76.

One native cemetery that Dall observed at Plover Bay in Russia includes the use of rocks (Dall 1870:382). Dead were interred in a shallow oval grave with stones at the perimeter. Perhaps the stones used at SMI-76 reflects a “foreign” style of burial at this location at the periphery of Saint Michael. Natives from eastern Russia were a significant part of the early

settlers at Miklailovskii Redoubt (Zagoskin 1967; Dall 1870). Maybe they were buried in a way that they were familiar with, and in a place that segregated or even marginalized them from others on the peninsula.

Alternatively, the proximity of this cemetery to the U.S. Army shipyard suggests that it could have served as a resting place for U.S. soldiers from 1897 to 1922 (25 years). While this is possible, the Army is known to have had a cemetery at the far other end of Saint Michael (see discussion for SMI-78 below). The proximity of cemetery SMI-76 to the North American Trade and Transportation Company headquarters suggests that it may have served civilians that worked there from 1894 to 1912 (18 years). For an association with either the Army or the trade company, one would expect some things that are not present at SMI-76 such as some kind of headstone or cross or even some cement. Lacking any diagnostic feature like that, it is currently not possible to confidently state who used this cemetery, and when that took place.

One thing to consider is that this cemetery may be the resting place of those that did not fit with the norms of those that lived there at the time. They may have been outsiders. Or they could have been unknowns. For instance, itinerant miner cemeteries are known from other areas. Many workers and miners came through this location at Saint Michael on their way to and from the mining areas in the interior of Alaska and Canada. These people may have been unidentified, or have had no one to care for their burial. They may have believed in religions other than those prevalent in Saint Michael at the time. They may have been so different culturally and ethnically that they were not allowed to be buried with the citizens of Saint Michael. The location at the periphery of the village lends some credence to this notion that those buried here were peripheral to social norms of this place.

Erosion status

The cemetery is on flat, level ground. Consequently, there is no slumping of terrain. It also appears that there is no permafrost melting taking place at this location. There is no indication of ponding or pooling of water anywhere.

SMI-75 Old Village Cemetery

This cemetery shows on three Saint Michael Community Maps: 1980, 1994, and 1996. It is not on any of the 2004 overview or close up Community Maps. It is also not on the Shaw (2003) map.

I did not visit this cemetery during my stay in Saint Michael, so I have no first-hand information to contribute. It is interesting to note that this one is named “Old *Village* Cemetery” as opposed to the two nearby cemeteries that are named “Old Cemetery.” The meaning of the inclusion of “village” in the name is unclear.

Appendix 3: Moving permit



Alaska Bureau of Vital Statistics
PO Box 110675
Juneau, Alaska 99811-0675



DISINTERMENT PERMIT

Family Member/ Guardian Requestor	Name of Person Requesting Disinterment (First, Middle, Last) Thomas R Wolforth		Phone Number 907.428.7184
	Mailing Address (Street or PO Box, City, State, Zip Code) P.O. Box 5169, JBER, AK 99505		
	Legal Relationship to the Decedent: <input type="checkbox"/> The decedent's spouse (at the time of death). <input type="checkbox"/> An adult son or daughter of the decedent. <input type="checkbox"/> Either parent of the decedent. <input type="checkbox"/> An adult brother or sister of the decedent. <input type="checkbox"/> A guardian of the person of the decedent at the time of death. <input checked="" type="checkbox"/> Any other person authorized or obligated to dispose of the remains.		
Decedent Information	Name of Decedent (First, Middle, Last) Unknown		Date of Death More than 100 years ago
	Place of Death (City, Town, Village) Saint Michael, Alaska	Name of Cemetery or Location Where Decedent is Buried Old Russian Cemetery	
Post-Disinterment Information	Post-Disinterment Disposition: Check one box that applies. If "Cremation" is checked, information on the new burial/entombment site is not required. <input type="checkbox"/> Reburial/Entombment in the same cemetery (only the new lot number/entombment information needs to be completed). <input checked="" type="checkbox"/> Reburial/Entombment elsewhere (complete below). <input type="checkbox"/> Cremation		
	State or Country if not in U.S. Alaska, USA		City, Town, or Village Saint Michael, Alaska
	Name of Cemetery or Mausoleum Local cemetery with no name		Lot Number/Entombment Location (if known) No lot numbers available
Funeral Director Archaeologist	Name of Funeral Home None		Mailing Address of Funeral Home None
	Name of Funeral Director None		
	Signature of Funeral Director <i>Thomas R. Wolforth</i>		Date Signed July 16, 2024
	Expected Date of Disinterment Late August 2024		Expected Date of Reinterment Unknown
State Registrar	Name of State Registrar Abigail Newby-Kew		Signature of State Registrar <i>Abigail Newby-Kew</i>
	Date Signed 07/17/2024	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied	

Appendix 4: Photographs of the shoreline



Spot 1. Crack in foreground ready to fall to beach. Looking the East.



Spot 1 with Stakes at Russian Gardens (I). Looking West.



Spot 1. Looking South.



Spot 1. Looking Southeast.



Spot 2. Looking South.



Spot 3. Looking West.



Between Spots 3 and 4. Looking South. Partially waterworn blocky lava exposed.



Just west of Spot 4. Looking East.



Spot 4. Riprap at end of old airstrip. Looking East.



Spot 5. Looking East.



Spot 6. Looking East.



Spot 7 with vegetated clumps from previous year's erosion. Looking East.



Between Spots 7 and 8 with loose cinders exposed. Looking Southeast.



Spot 8 with blocky lava eroded off cliffside to the beach. Looking Northeast.



Spot 8. Looking Southeast.



Between Spots 8 and 9 at isthmus with Whale Island at low tide. Looking North.



At isthmus looking Southwest.



At isthmus looking Southeast.



Spot 9. Looking Southeast.



Spot 10 with abandoned Standard Oil tank above. Looking Northwest.



Spot 11. Looking East.



Spot 12. Looking Northeast.



Spot 13 with loose cinders exposed. Looking South.



Spot 14 at Tachik village site. Looking West.



Spot 15. Looking Northwest.



Spot 16. Looking West.



Spot 17 with lava bedrock outcrop at sea level. Looking East.



Spot 17. Looking West towards Old Russian Cemetery.



Spot 19. Looking Northeast.



Spot 19. Looking Northeast.



Spot 19 with vegetated clumps from probably 2022. Looking Northeast.



Spot 19. Looking East.