St. Lawrence Island, Alaska

Gambell Sites

GIS-BASED HISTORICAL TIME SEQUENCE ANALYSIS
(HISTORICAL PHOTOGRAPHIC ANALYSIS)

PRODUCED BY THE
USACE ENGINEER RESEARCH AND DEVELOPMENT CENTER
TOPOGRAPHIC ENGINEERING CENTER
September 2000

Final
Gambell, AK - Site Locations

St. Lawrence Island

Army Activity

Air Force Activity
Gambell, AK

1955 AERIAL OBLIQUE PHOTOGRAPH

3-D PERSPECTIVE VIEW

VILLAGE OF GAMBELL
Gambell, AK - General Study Area

1984 Image Mosaic

Gambell
Sevuokuk Mtn.
Troutman Lake
Nayvaghaq Lake

US Army Corps of Engineers
OBJECTIVES:

• Analyze a series of historic aerial photographs, historical maps, and ancillary data/documents for the 2,542 acre area we shall refer to as the Gambell Sites.

• Determine if there are features on these photos that could be indicative of possible burial and/or areas of general ground disturbance and/or possible historical, cultural features. These features may be potential areas of interest for possible HTRW disposal and/or conventional ordnance disposal, requiring further site investigation.

• Map the location of historical features of interest onto a current aerial photo base produced for the site.

BACKGROUND:

• Some of the features identified represent new or refined data found during the Topographic Engineering Center’s (TEC’s) analysis of historical aerial photography and therefore are meant to be used in addition to the data found in previous investigations and the Archive Search Report. Some information used in this report was provided by USACE Huntsville and USACE Alaska District.

• Data is presented in Geographic Information System (GIS) form and additional information for features is provided on the CDROM. ArcView is the common GIS display mechanism, though .dx files are provided in addition to the arc coverages.
INTRODUCTION

This report presents the results of a historical aerial photographic analysis (GIS-based historical time-sequence analysis) for an area known as the Gambell Sites located on Saint Lawrence Island in the state of Alaska. This study was compiled for the U.S. Army Engineering & Support Center, Huntsville, Alabama by the United States Army Engineer Research and Development Center (ERDC), Topographic Engineering Center’s (TEC) Operations Division (CEERD-TO), located in Alexandria, Virginia.

The Terrain Analysis Branch (TAB) of the Operations Division was tasked to search for and collect historical photographic records and map data relevant to the Gambell area. The objective of this study was to locate any sites that may be of interest for further investigation. These sites may be linked to buried waste or equipment and/or ordnance and explosives (OE) activities. OD was asked to map any such sites identified on the historical aerial photography (AP). For the purposes of this study, the entire Northwest Cape peninsula was examined south to a line where the sand spit terminates on the western coast.

SITE LOCATION and HISTORY

The study area for the Gambell Sites is located on Northwest Cape, St. Lawrence Island, in the Bering Sea. It is 36 miles from the Chukotsk Peninsula, Siberia, and 200 miles southwest of Nome, Alaska.

The Gambell Sites were established in the 1950s as part of the surveillance and intelligence-gathering network of the military. Seven individual leases were initiated by the DoD in this area. The first lease agreement was implemented in September 1950, and the final lease was terminated in September 1973. Various units of the U.S. Army and the U.S. Air Force utilized the area. Prior to lease terminations, all DoD-owned material was demolished and/or buried on site.

The Air Force established an installation in September 1950 with a lease consisting of 1,580 acres. A base camp was built on the western base of Sevuokuk Mountain and a radar site was built directly above this camp on the mountain top. The Air Force abandoned this site in 1956, though the lease ran until September of 1962. The Army occupied several sites from 1954 through 1963, with a main base camp located just north of Troutman Lake. The Navy laid communication cables from the village of Gambell up Sevuokuk Mountain and across to Dovelawik Bay and then south to Brunnell Cape. A final lease by the Gambell National Guard was terminated in September of 1973. The military presence was essentially gone by the late 1970s.

METHODOLOGY

In preparation for this report, research was conducted for historical aerial photography (AP), maps and some textual information. Information and photography were gathered from the National Archives and Records Administration (NARA) in College Park, Maryland and other sources. The analysis was primarily based upon the interpretation of black and white AP over the project area, spanning the years 1948 through 1994. Stereo-paired aerial photographs were analyzed for 1948, 1955, 1972, 1973, 1980, 1984, 1985, and 1994. Orthophoto base maps was produced using 1984 color infrared AP and 1994 true-color AP.

Stereoscopic viewing was performed on the collection of historical photos. Film and paper based aerial photo material were used in the analysis. Features assessed as possible sites of interest were identified and labeled. Photos with these features of concern were scanned on a high-resolution scanner at 200 to 600 DPI resolution in TIF format. The historical aerial photos were rectified to the 1984 digital orthophoto.

All of the identified historical features were digitized on their respective rectified image. These features could then be placed onto the current 1984 and 1994 orthophotos as vector overlays.

The image rectification was accomplished using ERDAS IMAGINE 8.3 software. Vector layers were generated using ArcView 3.2 software. Shape files were created. The digital data was transferred to a CD-ROM. The digital orthophoto and rectified aerial photos are in tagged image file format (TIF) with an associated “world file” or .tfw file. The .tfw file contains the pixel size, and upper left geographic coordinate for the image file.

The orthophoto, rectified photos and corresponding vector layers are georeferenced to the Alaska State Plane (Zone 9), NAD83 (datum), and GRS 1980 (spheroid) Zone #6301. Units are in feet.

SUMMARY OF FINDINGS

The review of maps and photos for the site reveal numerous changes in the area over time. Features mapped for the area include pits, disturbed ground, possible trenches, and some possible mounded material. Many of the features occur in burial areas identified in previous studies.

A digital version of this report is on CD-ROM media. The CD-ROM also contains the historical features in vector layers (for use in a GIS system).
Documents Reviewed


Alaska Historical Commission studies in history, Anchorage; no. 174, Notes to the historical photographs of Saint Lawrence Island, June 1985.


USGS, St. Lawrence, Alaska, Map, Scale 1:250,000. 1948.
## Gambell, AK - Aerial Photography

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Gambell, AK - Aerial Photography

Aerial Photographic Coverage Extent by Year

- 1948
- 1955
- 1958
- 1972
- 1973
- 1980
- 1984
- 1985
- 1994
Gambell, AK - Span of Analysis

Captured Features:
- Disturbed Ground
- Trenches
- Pits
- Mounded Material
- Depressions
- Buildings of Interest
- Cultural Features of Interest

Change Detection Through Time

1948 Aerial Photo

1984 Aerial Photo
Gambell, AK - Archeological Sites

Locations Approximate

SEKLOWGYAGET SITE
IEVOGHIYOQ SITE
MIYOWAGH SITE
AND
HILLSIDE SITE
MERUWTU POINT
Gambell, AK - Pre-DOD Features

1948 AERIAL PHOTOGRAPH

Building Footprints of former structures

Cleared area for runway

1994 AERIAL PHOTO WITH 1948 FEATURES

Features of Interest
Gambell, AK - Features of Interest

Sep 1953 North Beach, Gambell

1953 Army Site from Mtn.

1959 North Beach and Sevuokuk Mtn.

Village of Gambell

1953 View of North Beach from Mtn.

Ancient Village Site
# Gambell, AK - DOD Leased Timeline

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<td>Gambell Communications Annex</td>
<td>Jun 1960 - Sep 1962</td>
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Gambell, AK - DOD Leased Areas

Archives Search Report 1998

Plate 2

Plate 3
Gambell Sites, AK    STUDY AREAS

STUDY AREA 1
Gambell, AK - STUDY AREA 1

DOD Leased Property

1984 Orthophoto Base Map

Army 1953 - 1962

Air Force 1950 - 1962

Army 1958 - 1963

Army 1963 - 1963

Air Force 1960 - 1962
Gambell, AK  Installations in Northern Area

General Locations in Northern Area

Army and Air Force Installations in 1955

1955 Oblique Aerial Photo
Gambell Sites, AK - STUDY AREA 1

Features Identified from 1955 Aerial Photos

1955 Aerial Photo and Features
Gambell Sites, AK - STUDY AREA 1

Features Identified from 1973 Aerial Photos
Gambell Sites, AK - STUDY AREA 1

1980 Aerial Photo

Troutman Lake

1994 Aerial Photo

Note: the 1973 Depression no longer apparent in 1980 and 1994 aerial photos

1955 and 1973 Identified Features on more current Aerial Photos
Gambell Sites, AK - STUDY AREA 1

1980 Aerial Photo

Panning to the East
from the previous slide area

Navy Station
(Vacant in 1980)

as per Dept. of Highways Map

High School

Troutman Lake

1980 Aerial Photo
Gambell Sites, AK - Army Installation 1955

Features of Possible Concern

1955 Oblique Aerial Photo

Army Facility

Possible Ammo Facility

Trench

Stacks of drums

Outdoor Storage

Possible Pit

Identified as Military Landfill in Site Investigation Report
Gambell Sites, AK - Army Installation 1955

- Army Facility
- Outdoor Storage
- Stacks of drums
- Possible Ammo Facility/Quonset Hut
- Note: Trench

Identified as Military Landfill in Site Investigation Report

Possible Pit
Gambell Sites, AK - Army Installation 1955

Army Facility North of Troutman Lake with Detail of Possible Ammo Facility
Gambell Sites, AK - STUDY AREA 1

Army Facility in 1953
Looking to the Southeast

September 1953
Oblique Aerial Photo

Rows of Drums

Troutman Lake

Lumber Stacks

September 1953
Gambell Sites, AK - Army Installation 1955

1955 Aerial Oblique

1955 Building Footprints

Note: Quonset Hut Building/ Berm

Note: Trench

Stacks of Drums

1955 Features on 1994 Aerial Photo
Gambell Sites, AK - STUDY AREA 1

Features Identified from 1955 Aerial Photography

1954 Aerial Photo

1955 Building Footprints

1955 Building Footprints of Army Facility

1994 Aerial Photo

Drums

Disturbed Ground

Trenches
Gambell Sites, AK - STUDY AREA 1

1953 Oblique Photo

Army Installation 1953 - North of Troutman Lake

Possible Debris Burial Site/Disturbed Ground

Drums Marking Pathway
Gambell Sites, AK - STUDY AREA 1

1994 Aerial Photo With 1955 Identified Features

Possible Debris Burial Feature found only on 1953 Oblique Photo

Approximate Location on 1994 Aerial Photo

1953 Oblique Photo

Note: ASR Army Site #1 1954 - 1962
Gambell Sites, AK - STUDY AREA 1

Possible Pit Feature

1955 Aerial Oblique Photo
Gambell Sites, AK - STUDY AREA 1

1973 Aerial Photo

Pit Feature Location

1973 Trench and Pits

1980 Aerial Photo

1973 Trench and Pits

1994 Aerial Photo

1973 Trench and Pits

1973 Trench and Pits
Gambell Sites, AK - STUDY AREA 1

1955 Disturbed Ground

North Beach

1955 Aerial Photo

1955 Feature on 1994 Aerial Photo

Disturbed Ground

North Beach
Gambell Sites, AK - STUDY AREA 1

1980 Identified Features

1980 Aerial Photo

1980 Features on 1994 Aerial Photo
Gambell Sites, AK - RUNWAY AREA

1994 Aerial Photo with Mounded Material Identified from 1972 Aerial Photo

Mounded Material and Leaking Drum Stack Found near Runway Evident in 1972 Aerial Photos
Gambell Sites, AK - July 1960 Ground Photos

- Note Drums near Village of Gambell
- Possible Photo Location
- Note Drums near Village of Gambell
Gambell Sites, AK - STUDY AREA 2
Gambell Sites, AK  1953 - Ground Photos

1953 North Beach

Handling of Drums 1953 - North Beach

Stacked Drums

Disposal Site?

Army Landing Area - Supply Ship
Gambell Sites, AK - STUDY AREA 2

U.S. Air Force Installation “Camp” - July 1952
Gambell Sites, AK - STUDY AREA 2

Air Force Installation Area

Note: Yellow Rectangle indicates approximate location of Air Force Installation (Military Housing/Operations)

1980 Aerial Photo

Depressions

Disturbed Ground
Gambell Sites, AK - STUDY AREA 2

Depressions and Disturbed ground from 1980 Aerial Photos

Disturbed Ground

Depressions

Disturbed Ground

Figure 2-2 of SI Report

Identified as Burial Areas on Fig. 2-2 of Site Investigation Report

July 1952

Former Communications Facility Burial Area

Former Military (AF) Housing/Operations Burial Area

Ordnance Burial Site
Gambell Sites, AK - STUDY AREA 2

Disturbed Ground
Identified from
1980 Aerial
Photography

Details from Figure 2-2 of Site Investigation Report
Gambell Sites, AK - STUDY AREA 2

- 1948 Aerial Photo
- Quonset Hut Detail: July 1960
- Tramway Detail: December 5, 1953
- Top of Sevoukuk Mountain
Gambell Sites, AK - STUDY AREA 2

1980 Aerial Photo

Disturbed Ground and Quonset “Footprints”

Building Footprint Remnants Found on 1980 Aerial Photography

July 1960 Photo
Gambell Sites, AK - STUDY AREA 2

Disturbed Ground found at possible site of Upper Tramway Station

1980 Aerial Photo

December 5, 1953

1980 Aerial Photo
Gambell Sites, AK - STUDY AREA 3

South of Troutman Lake
Gambell Sites, AK - STUDY AREA 3

1955 Aerial Photo

1955 Features on 1994 Aerial Photo

Troutman Lake

Identified as Former Radar Power Station area in Table 2-1 of SI Report

Buildings and Pit
As per Plate 2 of Archives Search Report, Leased by Army Jan '55 to May '58

Disturbed Ground and Possible Stacked Outdoor Storage of some kind

1955 Aerial Photo

1955 Aerial Photo

Disturbed Ground and Possible Stacked Outdoor Storage of some kind

1955 Features on 1994 Aerial Photo

Gambell Sites, AK - STUDY AREA 3
Gambell Sites, AK - STUDY AREA 3

As per Plate 2 of Archives Search Report, Leased by Army Jan '55 to May '58

Troutman Lake

1972 Aerial Photo

Ground Disturbance Not Identified until 1972 Timeframe with Aerial Photos

Troutman Lake

1972 Ground Disturbance on 1994 Aerial Photo
Gambell Sites, AK - STUDY AREA 3

1980 Disturbed Ground features overlaid upon SI Report Figure 2-2
Note: # 12 = Lake Disposal Site (SI Report)

1980 Disturbed Ground on 1984 Air Photo Base Map

As per Plate 2 of Archives Search Report, Leased by Army Jan ‘55 to May ‘58
Gambell Sites, AK

Gambell Sites, Alaska
Summary of Findings
Gambell Sites, AK - Study Area 1

As per Site Investigation Report - Previously identified Military Landfills

Possible Disturbed Ground Identified on 1955 Aerial Photos

Possible Depressions and Pits identified on 1980 Aerial Photos

Possible 1953/55/73 Trenches, Disturbed Ground, and Depressions (approximate)

1994 Aerial Photography

Additional Quonset Hut and Berm identified from 1955 Aerial Obliques

US Army Corps of Engineers
Gambell Sites, AK - STUDY AREA 1

Historic Features on 1994 Aerial Photo Base Map

1994 Aerial Photo
Gambell Sites, AK - STUDY AREA 1

Historic features on 1994 Aerial Photo Base Map
Gambell Sites, AK - STUDY AREA 2

Previous Location of Air Force Radar Facility
Previous Location of Air Force Camp Facility
Previous Location of Quonset Hut Facility
Previous Location of Top of Tramway

1980 Aerial Photo

Seyuokuk Mtn.
Gambell Sites, AK - STUDY AREA 2

Base of Sevuokuk Mountain

- Depressions and Disturbed ground

1980 Aerial Photo

Approximate Location of Former Air Force Facility

Top of Sevuokuk Mountain

- Disturbed Ground

1980 Aerial Photo

- Previous Location of Air Force Radar Facility

- Previous Location of Air Force Quonset Hut Facility

Building footprints found on 1980 Aerial Photos
Disturbed Ground and Outdoor Storage were ID’d from 1955 Aerial Photos

Buildings and Pit were ID’d from 1955 Aerial Photos

1994 Aerial Photo

Troutman Lake

Nayvaghaq Lake
Gambell Sites, AK - STUDY AREA 3

Disturbed Ground and Stacked Storage found on 1955 Aerial Photography

Buildings found on 1955 Aerial Photography

Disturbed Ground found on 1972 Aerial Photography

1994 Aerial Photo
Gambell Sites, AK

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