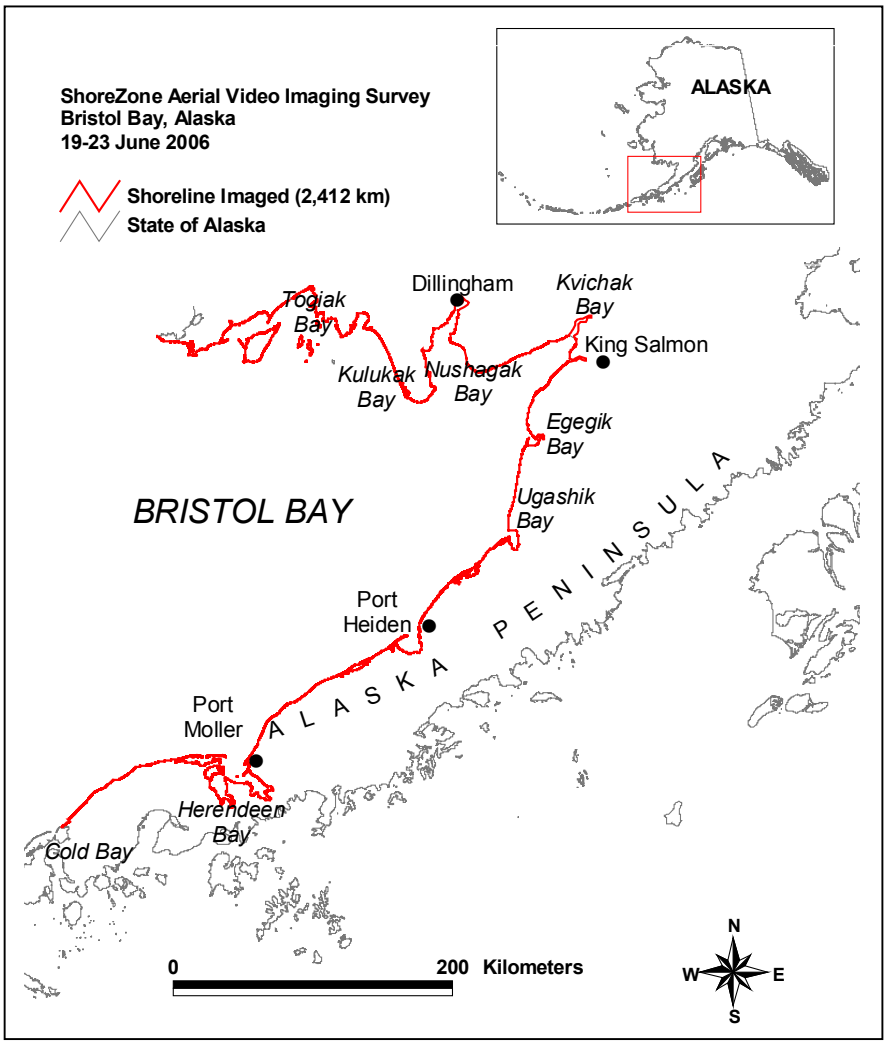
**CORI Project: 2006-17** **24 July 2006**

# FLIGHT REPORT
# ShoreZone Aerial Video Imaging (AVI) Survey
# Bristol Bay, Alaska, 19-23 June 2006



Prepared for
The Nature Conservancy
Juneau, Alaska
by

Coastal & Ocean Resources Inc.

ShoreZone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**ShoreZone** is a coastal habitat mapping and classification system in which georeferenced aerial imagery is collected specifically for the interpretation and integration of geological and biological features of the intertidal zone and nearshore environment. Oblique low-altitude aerial video and digital still imagery of the coastal zone is collected during summer low tides (zero tide level or lower), usually from a helicopter flying at <100 m altitude. The flight trackline is recorded at 1-second intervals using Fugawi electronic navigation software and is continuously monitored in-flight to ensure all shorelines have been imaged. Video and still imagery is georeferenced and time-synchronized. Video imagery is accompanied by continuous, simultaneous commentary by a geologist and a biologist aboard the aircraft. The imagery and commentary are later used in the definition of discrete along-shore coastal habitat units and the "mapping" of observed physical, geomorphic, sedimentary, and biological features in those units. Units are digitized as shoreline segments in ArcView or ArcGIS, then integrated with the along-shore and across-shore geological and biological data housed in a Microsoft Access database. Mapped habitat features include degree of wave exposure, substrate type, sediment texture, intertidal flora and fauna (abundance and community composition), subtidal algae, and some subtidal fauna.

The purpose of this flight report is to summarize the field activities of the ShoreZone aerial video imaging (AVI) survey conducted in **Bristol Bay, Alaska** during the low-tide window **19-23 June 2006**. The survey was conducted by **Coastal & Ocean Resources Inc.** (CORI, Sidney, British Columbia) under contract to The Nature Conservancy (TNC, Juneau, Alaska). A coastal ecologist from Archipelago Marine Research Ltd. (AMR, Victoria, British Columbia) was sub-contracted by CORI to provide biological expertise. **Table 1** provides a summary of crew affiliations and responsibilities. The survey was based in two principal field stations: King Salmon (in the northeast corner of Bristol Bay) and Cold Bay (near the southern end of the Alaska Peninsula). These locations were selected on the basis of availability of accommodations and fuel. The aircraft used in this survey was a fixed-wing Cessna 206 float-plane charted from Branch River Air (BRA) in King Salmon.

The length of shoreline imaged during the survey was **2,412 km** (from Point Moffet near the southern end of the Alaska Peninsula to Cape Newenham in the northwest corner of Bristol Bay). **Figure 1** summarizes the extent of aerial imagery collected by video tape number. Imagery was not collected at Round Island in Togiak Bay (~10 km of shoreline) because the island is a walrus preserve, and overflights are not permitted. Imagery was not collected south of Point Moffet because of poor flying visibility on both of the days that the crew was stationed in Cold Bay. The Izembeck Wilderness and Unimak Island lie outside (to the south) of the area imaged in this survey.

Particular attention was paid to the location and size of seabird colonies and walrus/seal haul-outs in the region, especially near the Togiak National Wildlife Refuge (TNWR) and the Walrus Islands State Game Sanctuary (WISGS). Branch River Air has permits to fly over these areas (except Round Island, which was avoided), and regulations were cleared pre-flight with representatives of both TNWR and WISGS.

The Bristol Bay AVI survey flight plan was constructed to take advantage of large-scale tidal delays in the bay, such that while flying northward (or westward), zero-tide windows continually opened up, enabling the continuous collection of data and imagery for 4-6 hours (400-600 km of shoreline) each day. This survey was also unique in that two geomorphologists shared the videography and navigation duties, switching seats and roles in-flight or during brief landings. This enabled the crew to capitalize on the long tide windows and compress the 2400-km survey into four days.

The tables and figures on the following pages summarize, by video tape number, the extent and location of the AVI data and imagery collected in Bristol Bay. Maps for each tape are annotated with representative geographic names, trackline times (in hh:mm:ss UTC), and photo numbers. UTC time is also imprinted on video imagery (provided on DVD with this report).

The final section of this report (beginning on page 39) contains daily updates with selected photos prepared while in the field. Because of the remote location and lack of internet access, these field updates were not able to be sent by the flight crew while in Bristol Bay and are thus included here.

**Table 1. Southeast Alaska AVI Flight Personnel and Responsibilities (Team Bristol)**

| Crew Member | Individual / Affiliation | Responsibilities |
|---|---|---|
| *Geomorphologist* | Jodi Harney<br>Neil Borecky<br>CORI, Sidney BC | survey coordination,<br>videography,<br>geologic commentary,<br>in-flight navigation,<br>post-flight data processing,<br>project reporting |
| *Coastal Ecologist* | Heather Anderson<br>AMR, Victoria BC | biologic commentary,<br>digital photography |
| *Pilot* | Marco Alletto<br>BRA, King Salmon AK | |

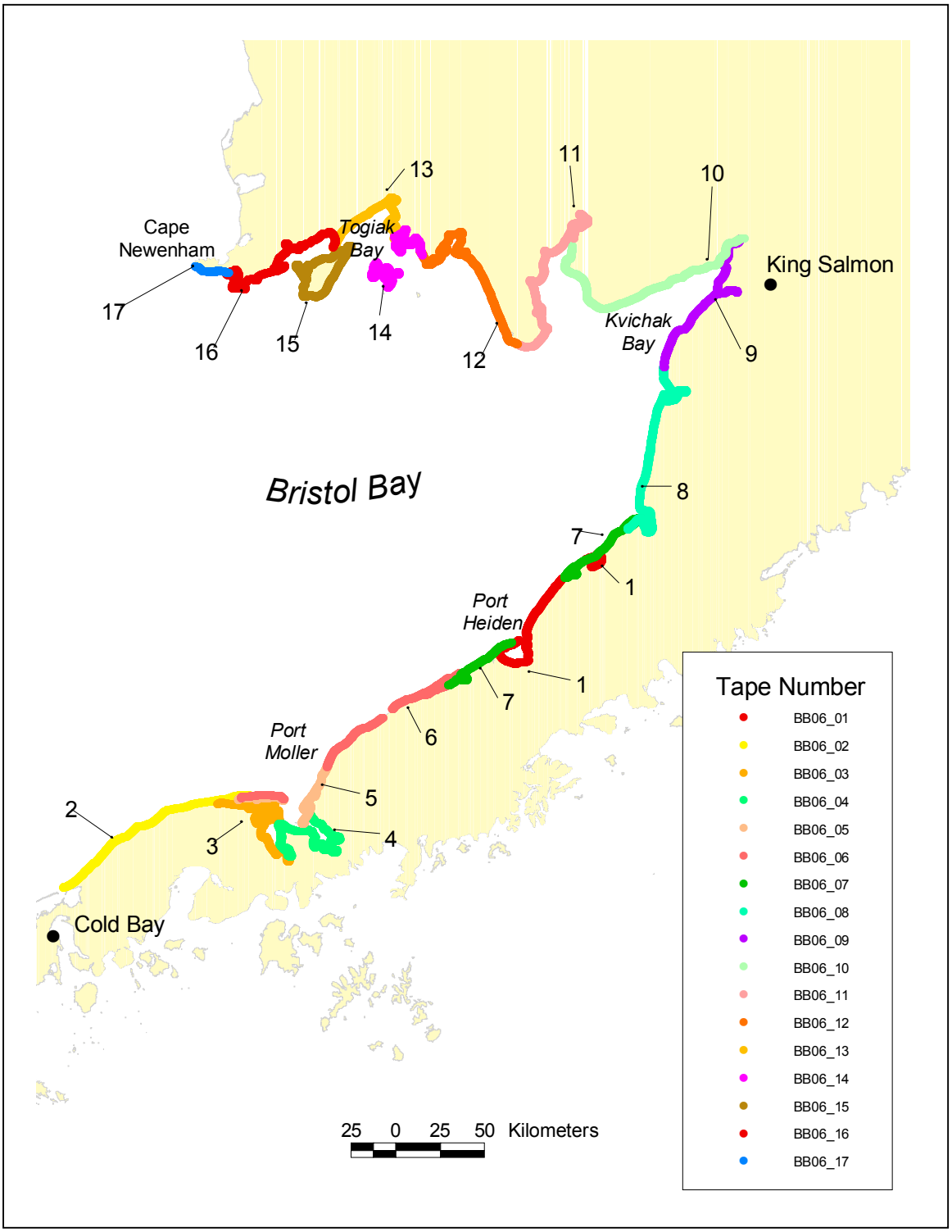



Figure 1. Summary of Bristol Bay AVI coverage (2,412 km shoreline), by tape number

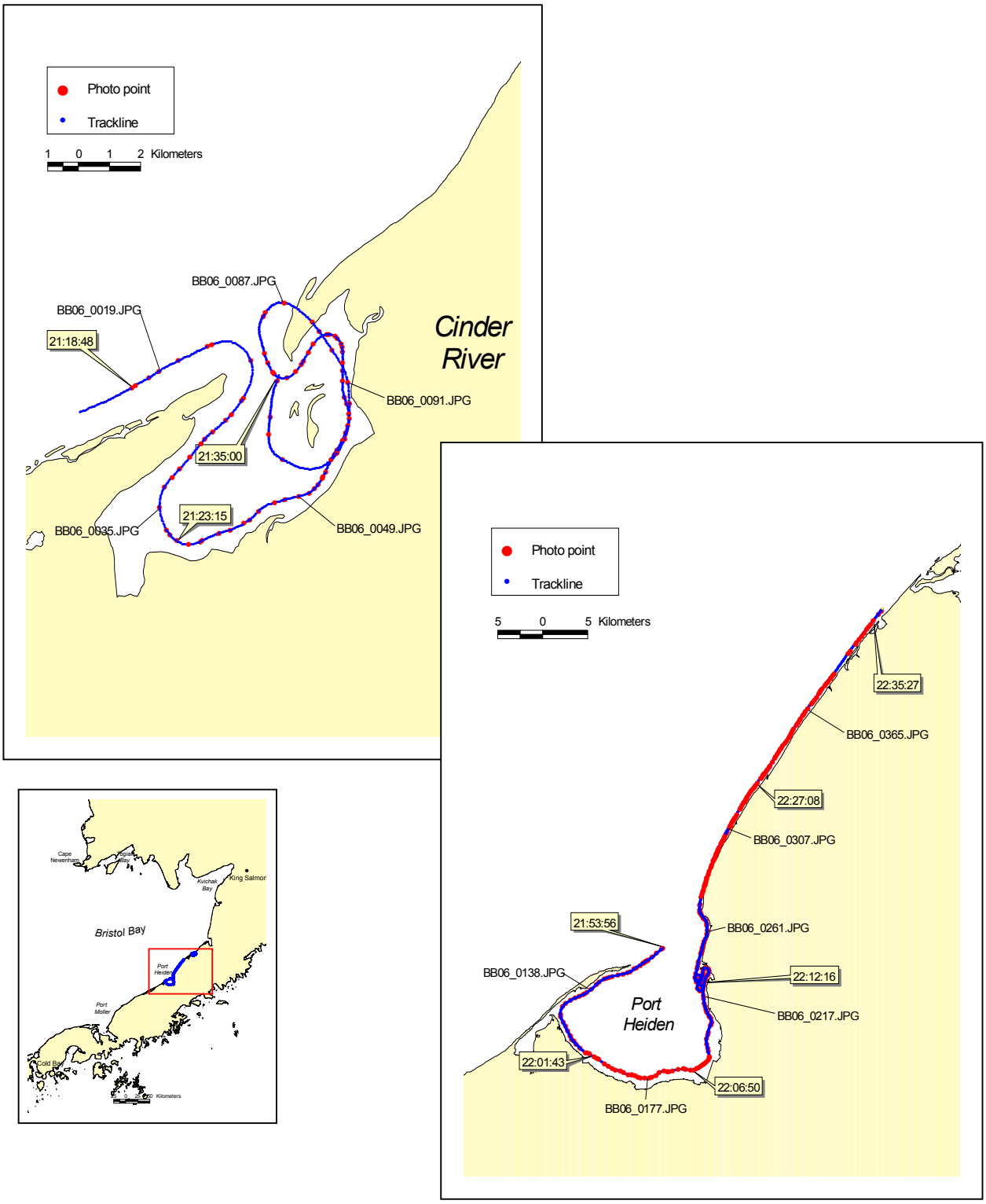



Figure 2. Location of Tape BB06_01, 19 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_01 **Date:** 19 June 06

**General Location:** Cinder River, Port Heiden

| | | | |
|---|---|---|---|
| **Time Start (UTC):** | 21:18:00 | **Geo:** | Borecky |
| **Filming Break:** | 21:35:05 to 21:53:56 | **Bio:** | Anderson |
| **Time End (UTC):** | 22:35:58 | **Nav:** | Harney |
| **Tape Length:** | 59:15 | **Pilot:** | Alletto |

**Weather:** Generally sunny; variable ceiling southward

| Time (UTC) | Location | Photo |
|---|---|---|
| 21:18:48 | Start, Cinder River | BB06_0016 |
| 21:23:15 | Head of Cinder River turning point | BB06_0038 |
| 21:24:53 | Mud Creek | BB06_0047 |
| 21:35:00 | Finish Cinder River | BB06_0099 |
| 21:35:05 to 21:53:56 | Transit to Port Heiden | |
| 21:53:56 | Start Port Heiden | BB06_0114 |
| 22:06:50 | Meshik River | BB06_0189 |
| 22:12:16 | Port Heiden town | BB06_0222 |
| 22:35:27 | Hook Lagoon area | BB06_0391 |

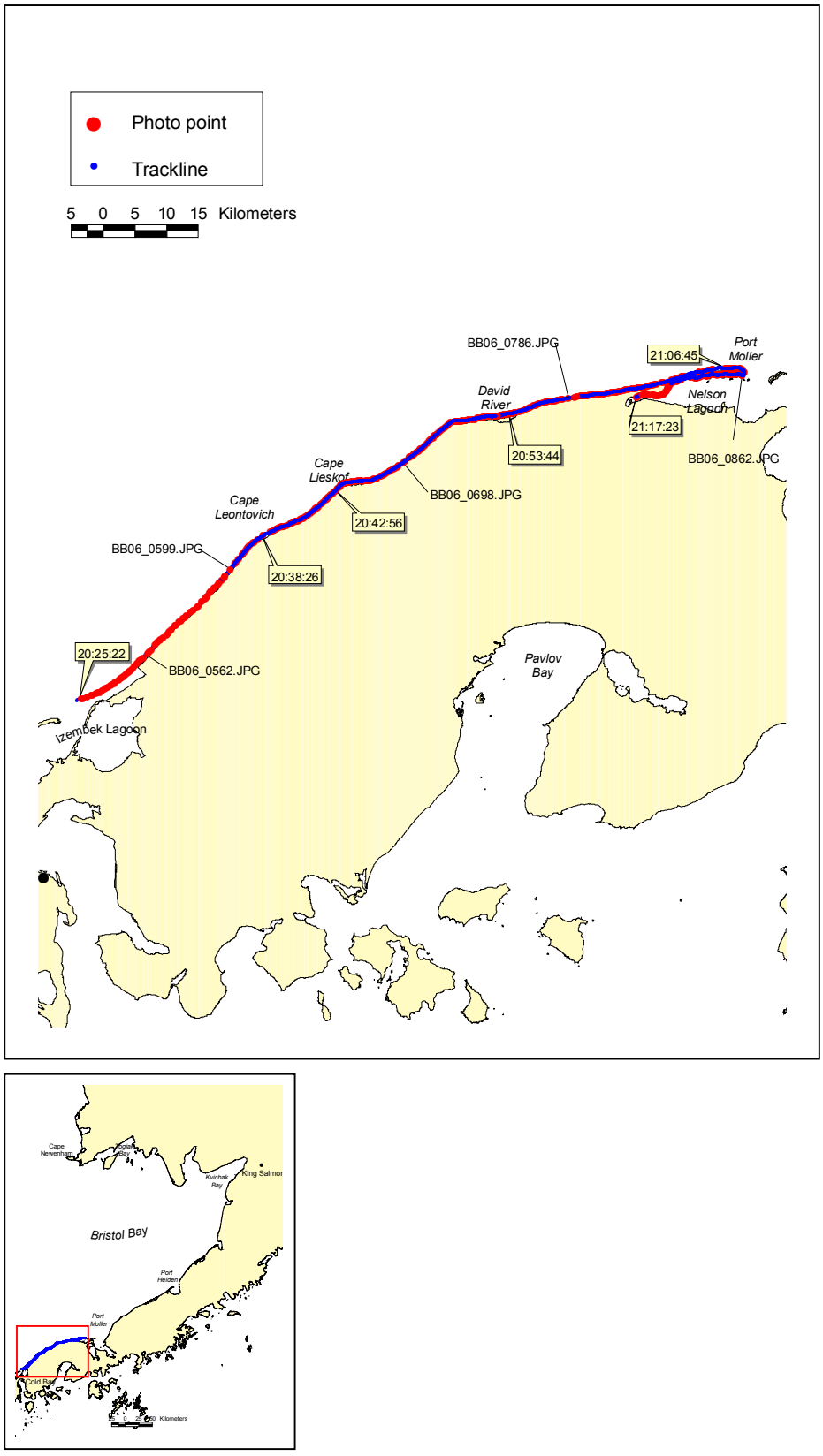






Figure 3. Location of Tape BB06_02, 20 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_02 **Date:** 20 June 06

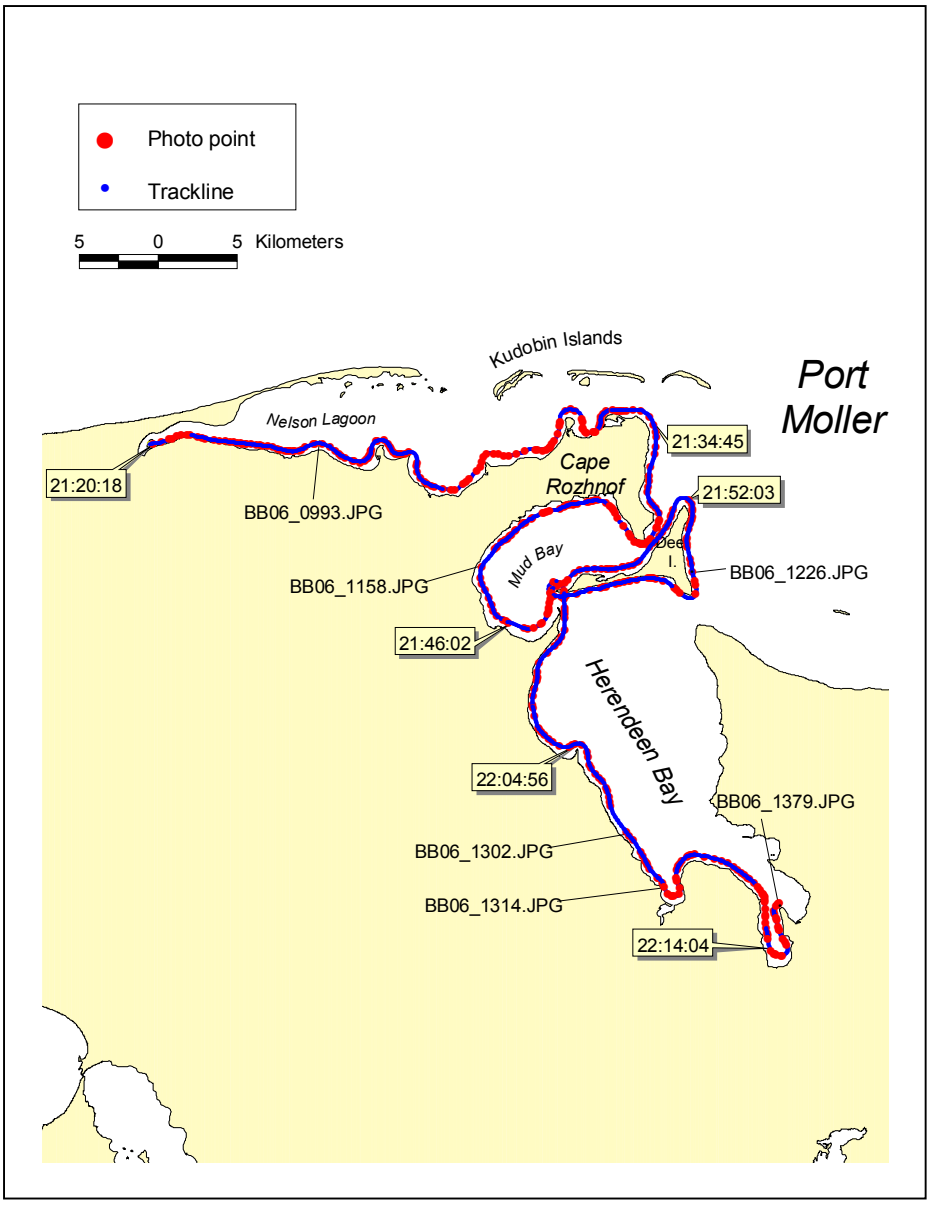
**General Location:** Moffet Point to Nelson Lagoon

**Time Start (UTC):** 20:25:08
**Time End (UTC):** 21:17:25
**Tape Length:** 52:18

**Geo:** Borecky
**Bio:** Anderson
**Nav:** Harney
**Pilot:** Alletto

**Weather:** Overcast, intermittent clouds, rain, and fog; variable ceiling; poor visibility (marginal flying conditions)

| Time (UTC) | Location | Photo |
|---|---|---|
| 20:25:22 | Moffet Point | BB06_0531 |
| 20:38:26 | Cape Leontovich | BB06_0613 |
| 20:42:56 | Cape Lieskof | BB06_0660 |
| 20:53:44 | David River | BB06_0755 |
| 21:06:45 | Lagoon Point | BB06_0847 |
| 21:17:23 | Nelson Lagoon | BB06_0949 |



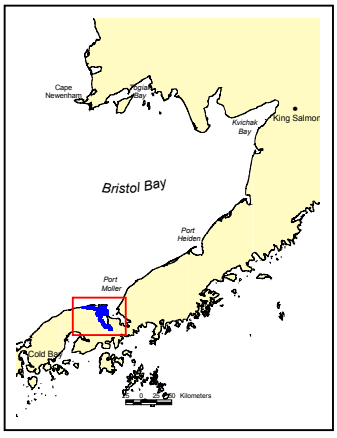




Figure 4. Location of Tape BB06_03, 20 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_03 **Date:** 20 June 06

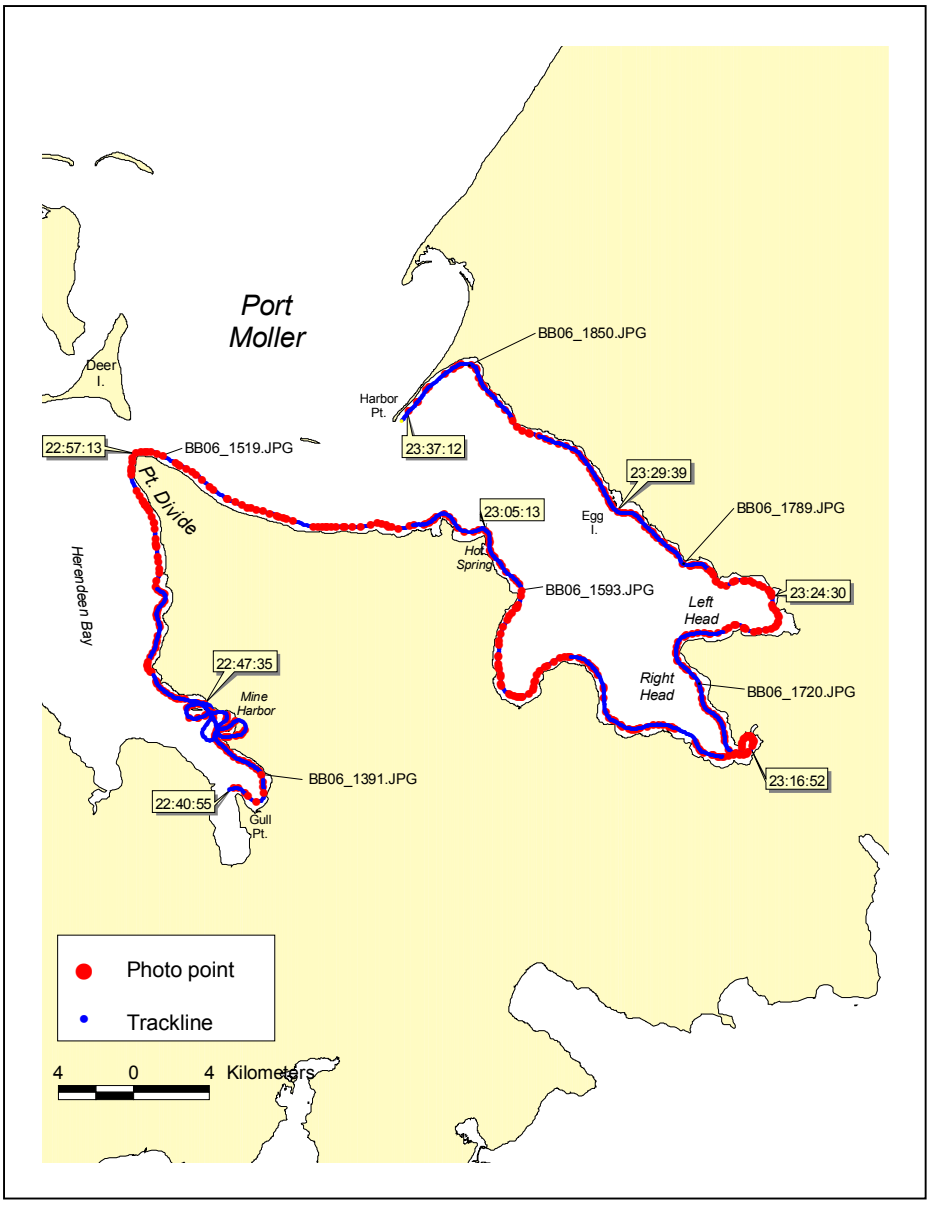
**General Location:** Western Port Moller: Nelson Lagoon, Cape Rozhnof, Deer Island, Herendeen Bay

**Time Start (UTC):** 21:20:12
**Time End (UTC):** 22:16:21
**Tape Length:** 56:06

**Geo:** Borecky
**Bio:** Anderson
**Nav:** Harney
**Pilot:** Alletto

**Weather:** Overcast, intermittent clouds, rain, and fog; variable ceiling; poor visibility (marginal flying conditions)

| Time (UTC) | Location | Photo |
|---|---|---|
| 21:21:18 | Nelson Lagoon | BB06_0953 |
| 21:34:45 | Cape Rozhnof | BB06_1088 |
| 21:46:02 | Head of Mud Bay | BB06_1169 |
| 21:52:03 | NE point of Deer Island | BB06_1212 |
| 22:04:56 | Village spit, Herendeen Bay | BB06_1289 |
| 22:14:04 | Head of Herendeen Bay, near old cannery | BB06_1360 |



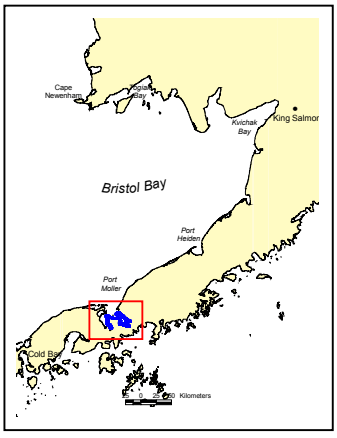




Figure 5. Location of Tape BB06_04, 20 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_04 **Date:** 20 June 06

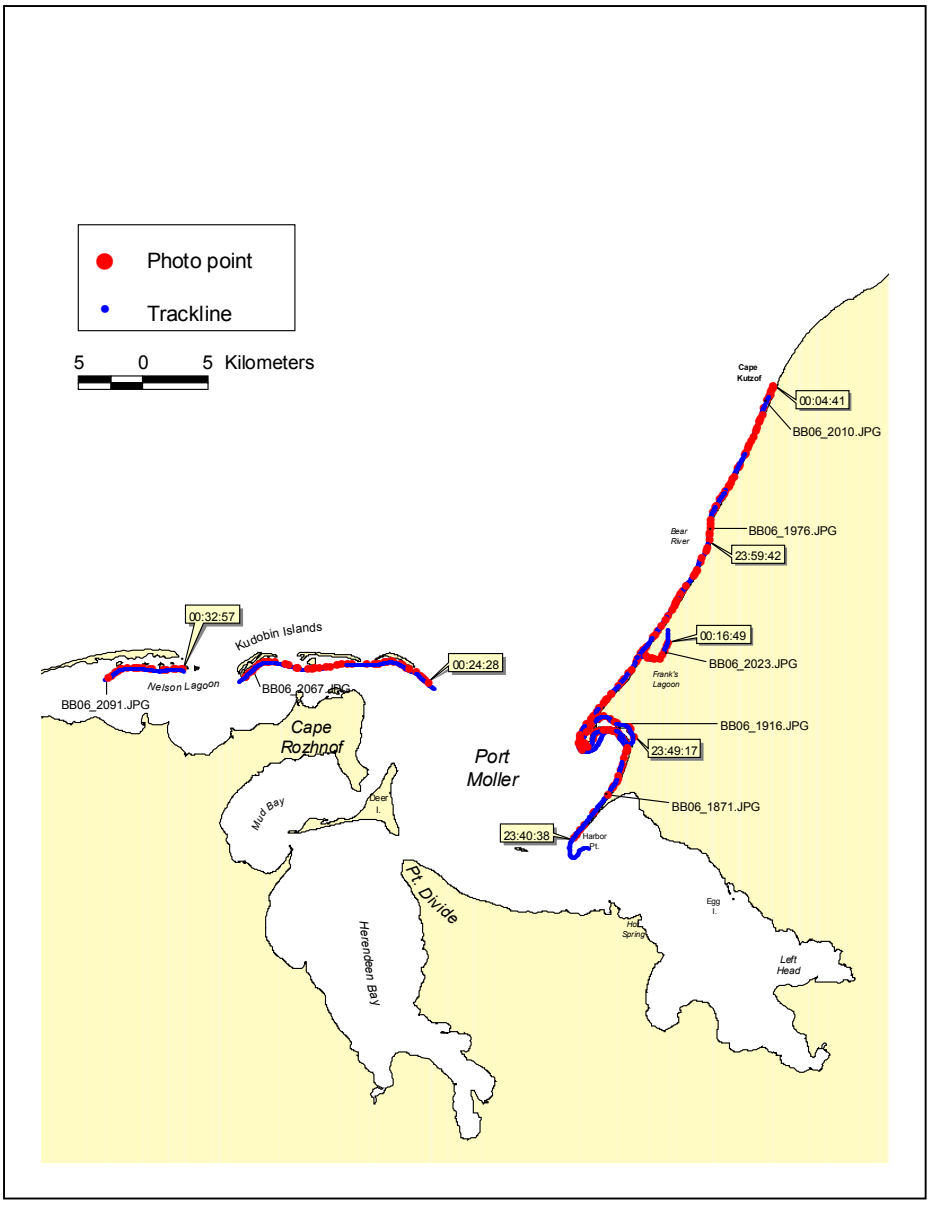
**General Location:** Port Moller

**Time Start (UTC):** 22:40:48
**Time End (UTC):** 23:37:29
**Tape Length:** 56:41

**Geo:** Harney
**Bio:** Anderson
**Nav:** Borecky
**Pilot:** Alletto

**Weather:** Overcast, intermittent clouds, rain, and fog; variable ceiling; poor visibility (marginal flying conditions)

| Time (UTC) | Location | Photo |
|---|---|---|
| 22:40:55 | Gull Pt. | BB06_1383 |
| 22:47:35 | Mine Harbor | BB06_1437 |
| 22:57:13 | Pt. Divide | BB06_1513 |
| 23:05:13 | Hot Spring | BB06_1578 |
| 23:16:52 | Right Head | BB06_1687 |
| 23:24:30 | Left Head | BB06_1760 |
| 23:29:39 | Egg Island | BB06_1808 |
| 23:37:12 | Harbor Pt. | BB06_1860 |



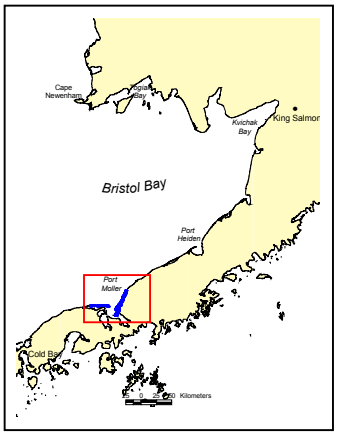




Figure 6. Location of Tape BB06_05, 20 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_05 **Date:** 20 June 06

**General Location:** Port Moller, Harbor Point to Cape Kutuzof, Kudobin Islands, Nelson Lagoon

| | | | |
|---|---|---|---|
| **Time Start (UTC):** | 23:39:13 | **Geo:** | Harney |
| Transit to Frank Lagoon | 00:04:44 to 00:16:20 | **Bio:** | Anderson |
| Transit to Kudobin Islands | 00:18:00 to 00:24:14 | **Nav:** | Borecky |
| Transit to inner Nelson Lagoon | 00:30:26 to 00:32:51 | **Pilot:** | Alletto |
| **Time End (UTC):** | 00:35:21 | | |
| **Tape Length:** | 56:07 | | |

**Weather:** Overcast, intermittent clouds, rain, and fog; variable ceiling; poor visibility (marginal flying conditions)

| Time (UTC) | Location | Photo |
|---|---|---|
| 23:40:38 | Harbor Point, Port Moller | BB06_1865 |
| 23:49:17 | Town of Port Moller | BB06_1919 |
| 23:59:42 | Bear River | BB06_1973 |
| 00:04:41 | Cape Kutuzof | BB06_2016 |
| 00:04:44 to 00:16:20 | Transit to Frank Lagoon | |
| 00:16:49 | Frank's Lagoon | BB06_2021 |
| 00:18:00 to 00:24:14 | Transit to Kudobin Islands | |
| 00:24:28 | Kudobin Islands | BB06_2030 |
| 00:30:26 to 00:32:51 | Transit to inner Nelson Lagoon | |
| 00:32:57 | Nelson Lagoon | BB06_2072 |

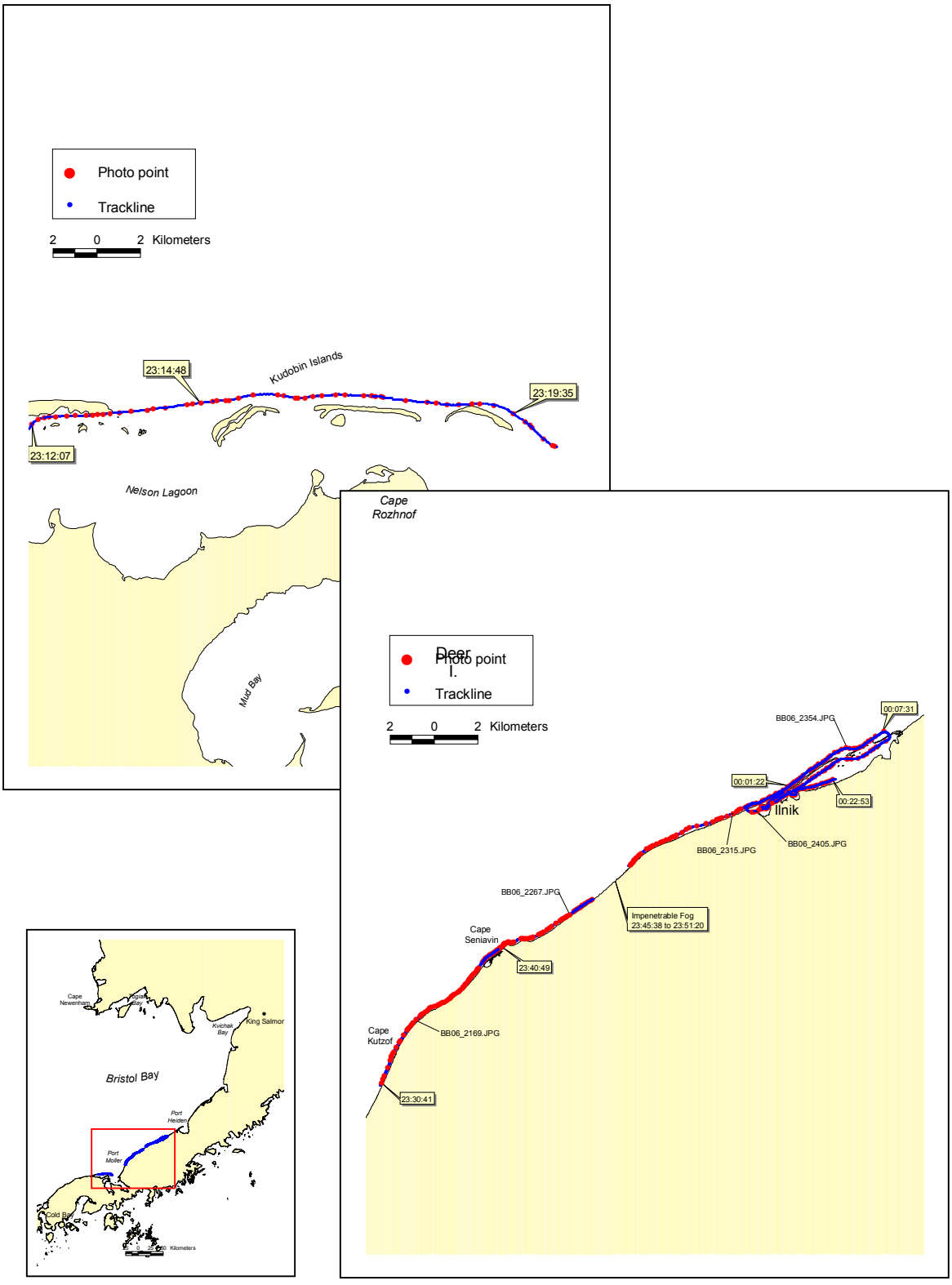



Figure 7. Location of Tape BB06_06, 21 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_06 **Date:** 21 June 06

**General Location:** Cape Kutuzof to Ilnik, Kudobin Islands

| | | | |
|---|---|---|---|
| **Time Start (UTC):** | 23:12:40 | **Geo:** | Borecky |
| Transit Kudobin Isls to Cape Kutuzof | 23:20:28 to 23:30:29 | **Bio:** | Anderson |
| Fog break | 23:45:38 to 23:51:20 | **Nav:** | Harney |
| **Time End (UTC):** | 00:23:06 | **Pilot:** | Alletto |
| **Tape Length:** | 54:43 | | |

**Weather:** Overcast, intermittent clouds, rain, and fog; variable ceiling; heavy fog on portion of Ugashik coast (4 km break)

| Time (UTC) | Location | Photo |
|---|---|---|
| 23:12:07 | Nelson Lagoon, near Kudobin Islands | BB06_2095 |
| 23:19:35 | Eastern Kudobin Islands | BB06_2143 |
| 23:20:28 to 23:30:29 | Transit to Cape Kutuzof | |
| | Cape Kutuzof | BB06_2150 |
| | Cape Seniavin | BB06_2226 |
| 23:45:38 to 23:51:20 | Fog break | |
| 00:01:22 | Start of spit outside Ilnik | BB06_2333 |
| 00:07:31 | NE entrance to Ilnik Lagoon | BB06_2367 |
| 00:22:53 | Inside Ilnik Lagoon | BB06_2452 |

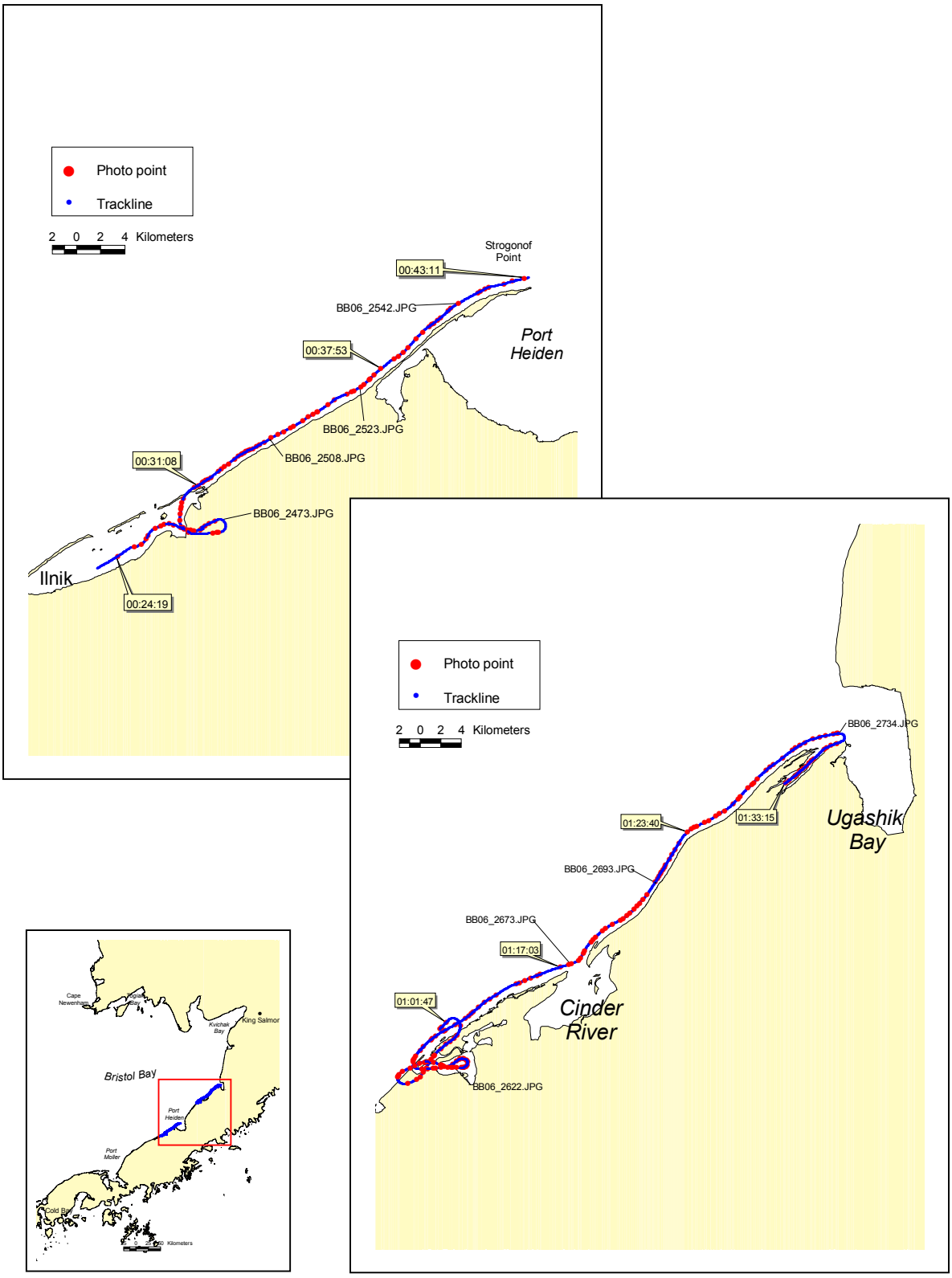



Figure 8. Location of Tape BB06_07, 21 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_07 **Date:** 21 June 06

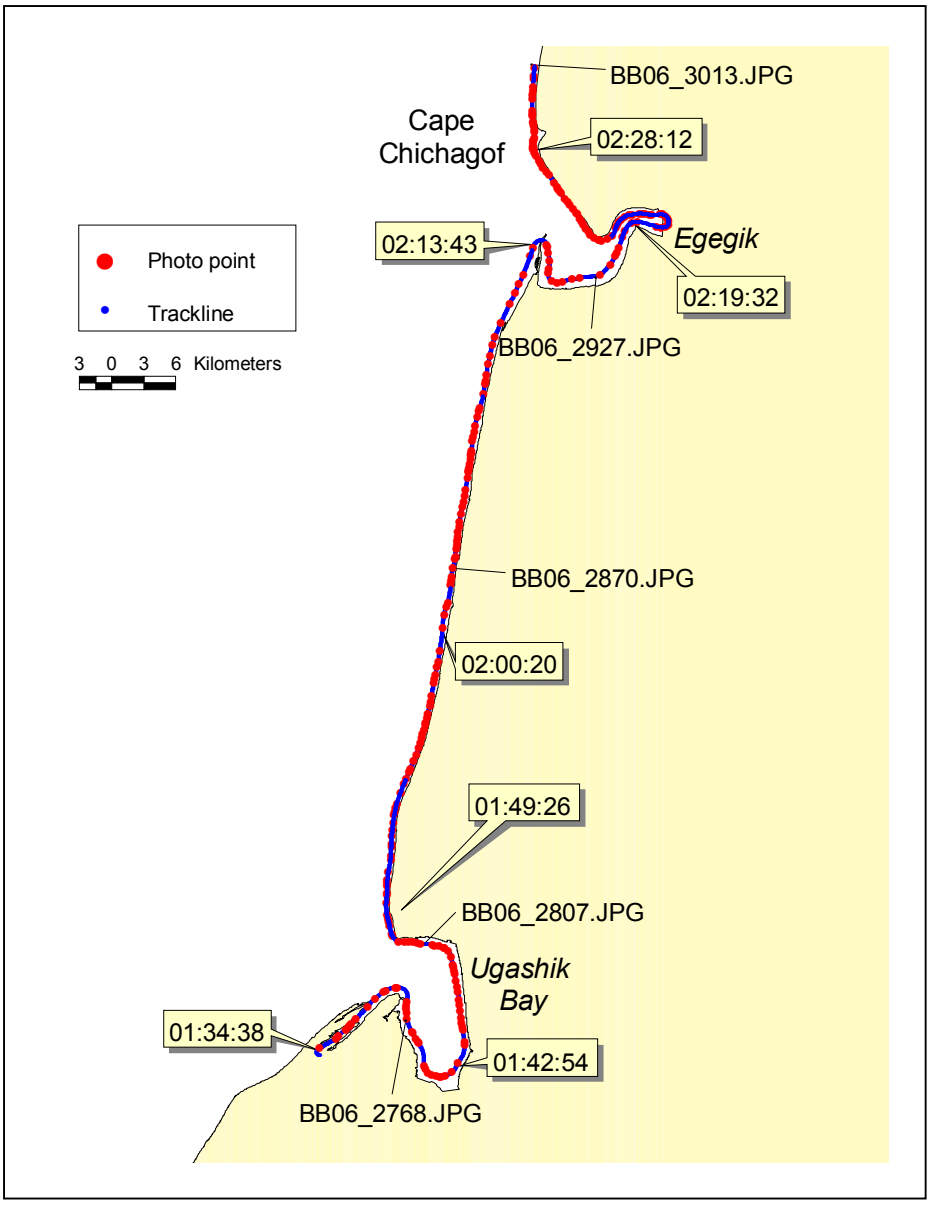
**General Location:** Ilnik to Port Heiden, Cinder River, Ugashik Bay

| | | | |
|---|---|---|---|
| **Time Start (UTC):** | 00:23:29 | **Geo:** | Borecky/Harney |
| Transit between Port Heiden's Stroganof Point and Cinder River | 00:43:20 to 01:01:26 | **Bio:** | Anderson |
| **Time End (UTC):** | 01:33:18 | **Nav:** | Harney/Borecky |
| **Tape Length:** | 51:43 | **Pilot:** | Alletto |

**Weather:** Overcast with sunny periods; intermittent clouds and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 00:24:19 | Ilnik | BB06_2454 |
| 00:37:53 | Start of Strogonof Spit (view of inner Port Heiden Lagoon) | BB06_2528 |
| 00:43:11 | End of Strogonof Spit | BB06_2549 |
| 00:43:20 to 01:01:26 | Transit between Port Heiden and Cinder River (switch geo/nav) | |
| 01:01:47 | Cinder River Lagoon Resume | BB06_2590 |
| 01:17:03 | Mouth of Cinder River | BB06_2671 |
| 01:23:40 | Halfway between Cinder and Ugashik Bay | BB06_2705 |
| 01:33:15 | Ugashik Bay | BB06_2748 |

*Note portions of this trackline must be rebuilt in the transit



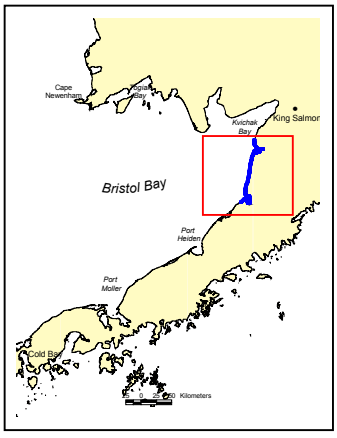




Figure 9. Location of Tape BB06_08, 21 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_08 **Date:** 21 June 06

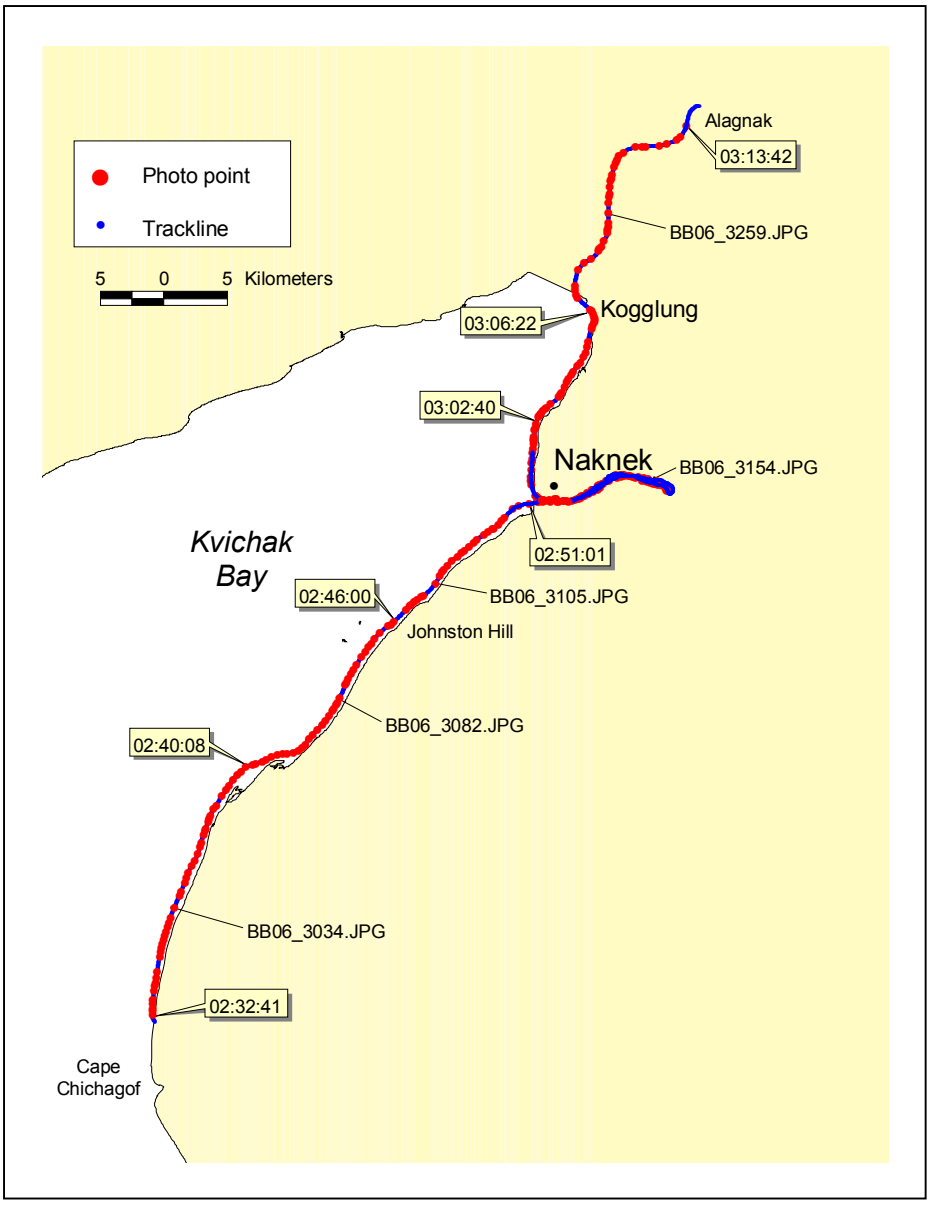
**General Location:** Ugashik Bay to Egegik

**Time Start (UTC):** 01:34:12
**Time End (UTC):** 02:30:57
**Tape Length:** 56:46

**Geo:** Harney
**Bio:** Anderson
**Nav:** Borecky
**Pilot:** Alletto

**Weather:** Overcast with sunny periods; intermittent clouds and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 01:34:38 | Start, western lagoon of Ugashik Bay | BB06_2750 |
| 01:42:54 | Mouth of Ugashik River | BB06_2783 |
| 01:49:26 | Smokey Point, Ugashik Bay | BB06_2813 |
| 02:00:20 | Halfway between Ugashik and Egegik | BB06_2863 |
| 02:13:43 | Mouth of Egegik Bay | BB06_2915 |
| 02:19:32 | Confluence of King Salmon an d Egegik Rivers | BB06_2941 |
| 02:28:12 | Cape Chichagof | BB06_2994 |



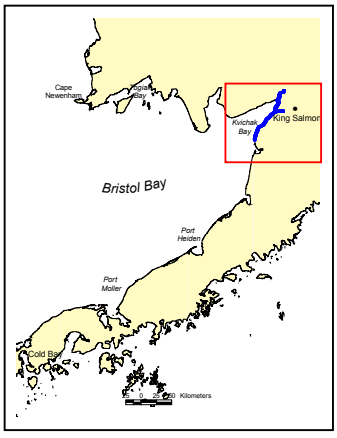




Figure 10. Location of Tape BB06_09, 21 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_09 **Date:** 21 June 06

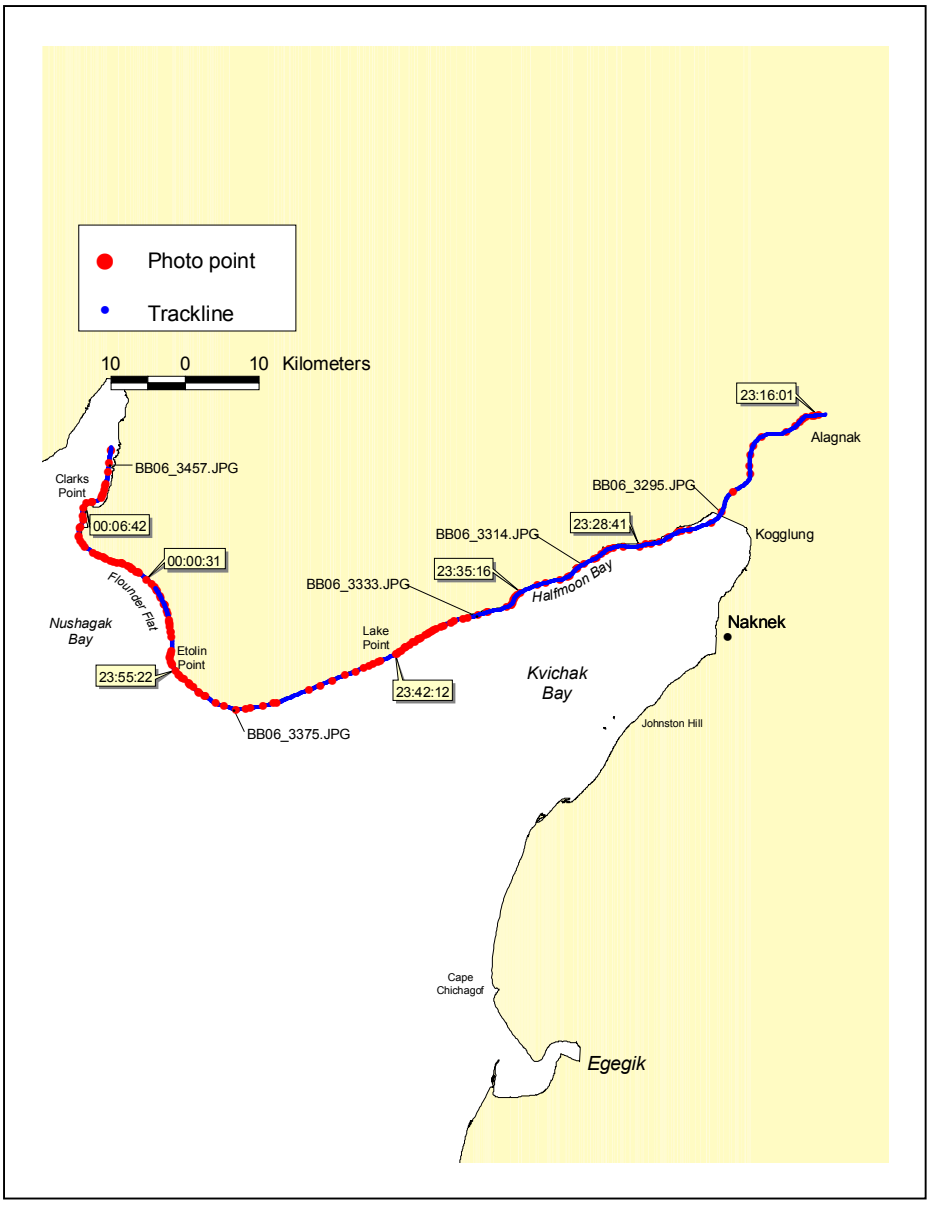
**General Location:** Cape Chichagof to Kvichak River, including Naknek

**Time Start (UTC):** 02:32:28
**Time End (UTC):** 03:14:29
**Tape Length:** 42:02

**Geo:** Harney
**Bio:** Anderson
**Nav:** Borecky
**Pilot:** Alletto

**Weather:** Overcast, intermittent clouds, rain, and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 02:32:41 | North of Cape Chichagof (4 km) | BB06_3014 |
| 02:40:08 | Start of wide mud flats in Kvichak Bay | BB06_3059 |
| 02:46:00 | Johnston Hill area | BB06_3097 |
| 05:51:01 | Mouth of Naknek River (south Naknek) | BB06_3126 |
| 03:02:40 | Libbyville | BB06_3212 |
| 03:06:22 | Graveyard Point, Koggiung | BB06_3243 |
| 03:13:42 | Confluence of Kvichak and Alagnak Rivers | BB06_3279 |



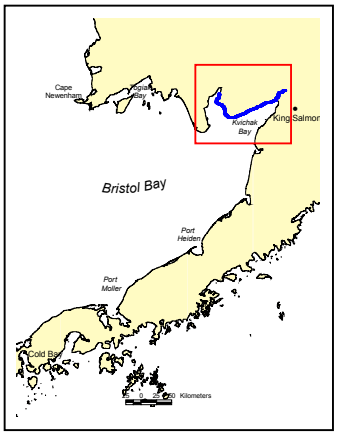




Figure 11. Location of Tape BB06_10, 22 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_10 **Date:** 22 June 06

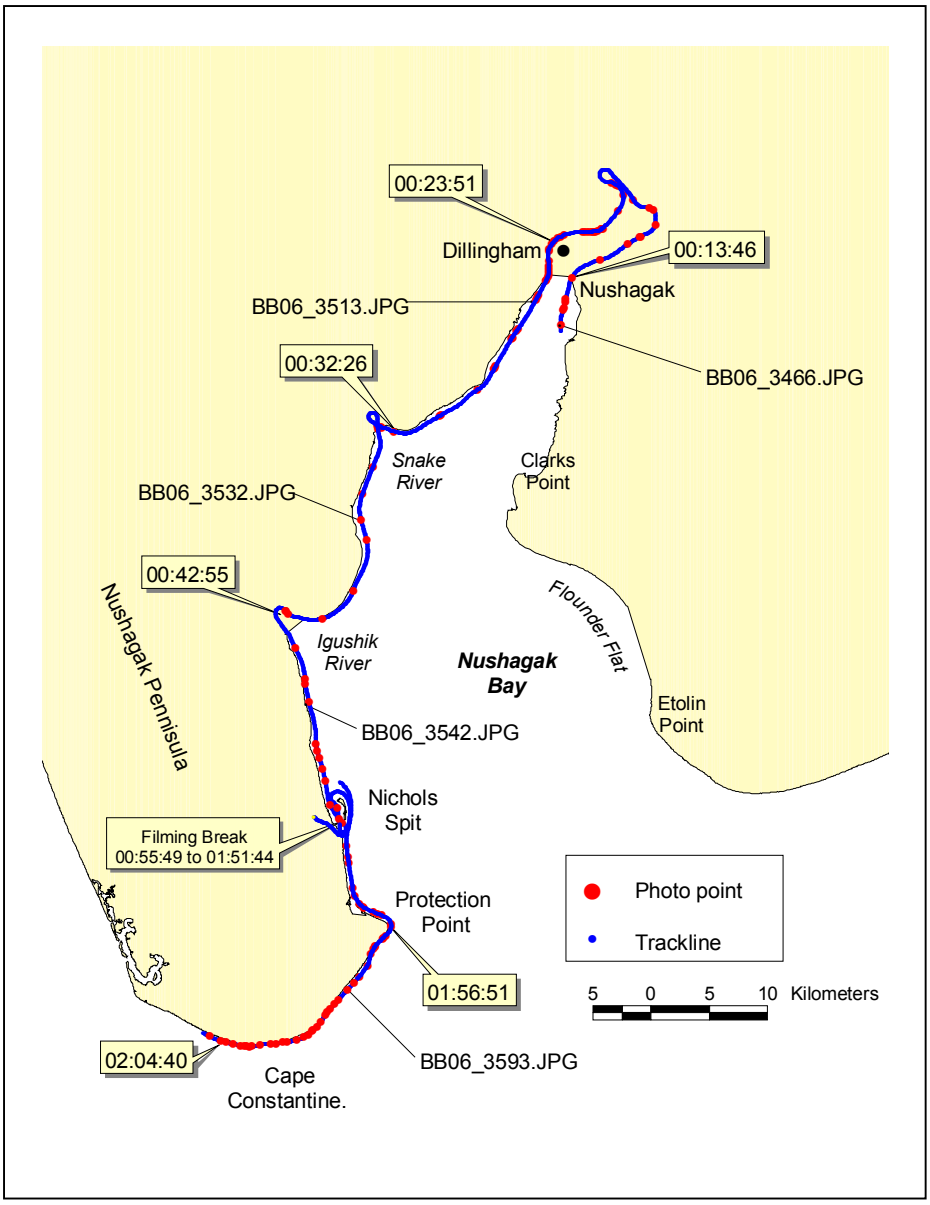
**General Location:** Kvichak Bay to Nushagak Bay

**Time Start (UTC):** 23:15:43
**Time End (UTC):** 00:10:15
**Tape Length:** 54:33

**Geo:** Borecky
**Bio:** Anderson
**Nav:** Harney
**Pilot:** Alletto

**Weather:** Overcast with sunny periods; intermittent clouds and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 23:16:01 | Alagnak | BB06_3281 |
| 23:28:41 | Start Halfmoon Bay | BB06_3305 |
| 23:35:16 | End Halfmoon Bay | BB06_3322 |
| 23:42:12 | Lake Point | BB06_3358 |
| 23:55:22 | Etolin Point | BB06_3390 |
| 00:00:31 | Middle of Flounder Flats | BB06_3417 |
| 00:06:42 | Clarks Point | BB06_3447 |



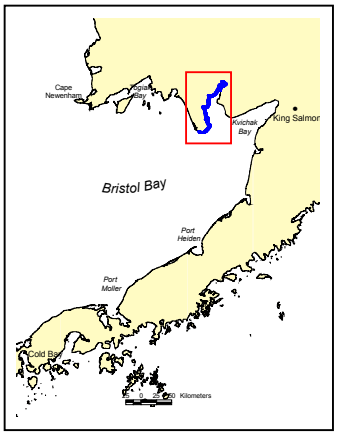




Figure 12. Location of Tape BB06_11, 22 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

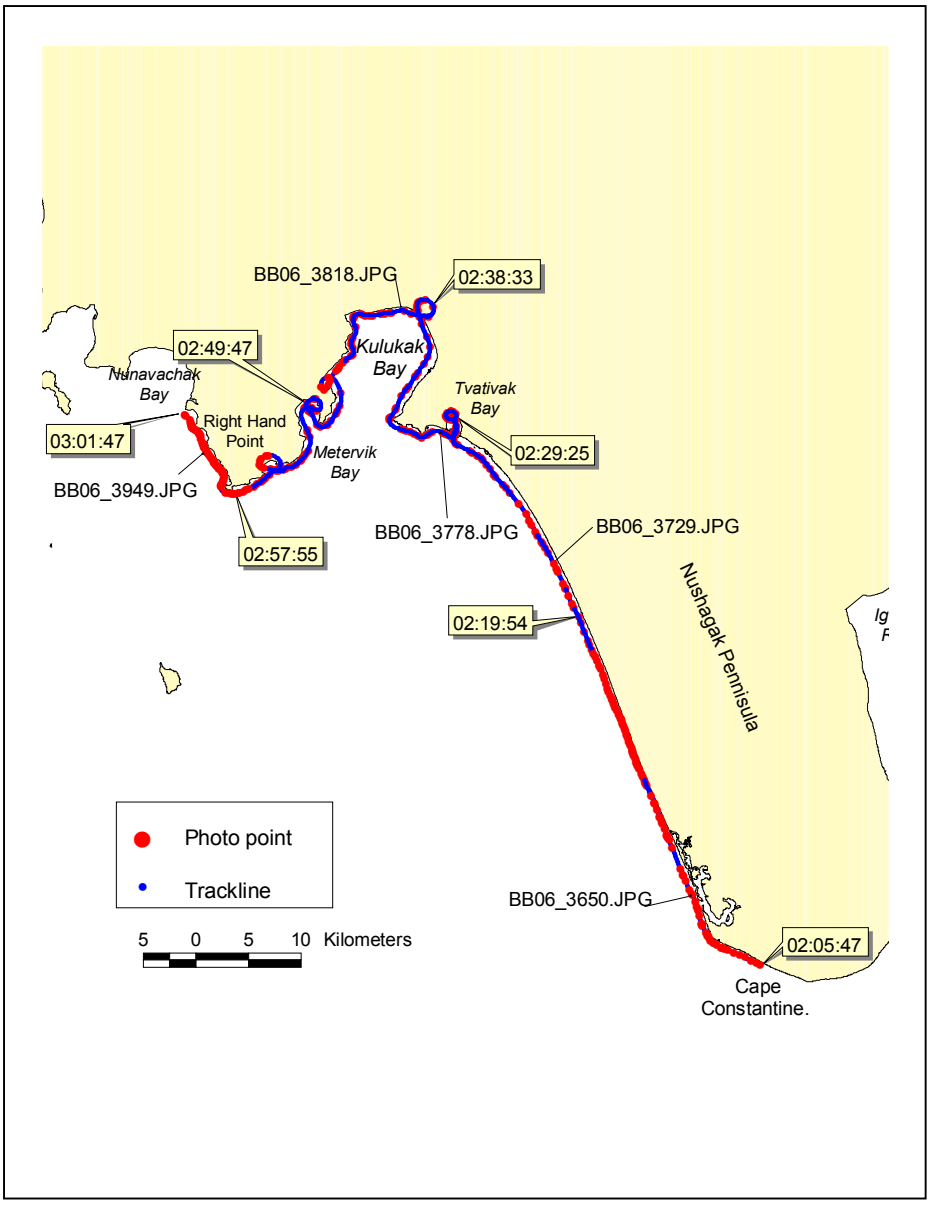
**Tape:** BB06_11 **Date:** 22 June 06

**General Location:** Nushagak Bay, Dillingham, Nushagak Peninsula

| | | | |
|---|---|---|---|
| **Time Start (UTC):** | 00:11:59 | **Geo:** | Borecky/Harney |
| Filming break | 00:55:49 to 01:51:44 | **Bio:** | Anderson |
| **Time End (UTC):** | 02:05:20 | **Nav:** | Harney/Borecky |
| **Tape Length:** | 57:26 | **Pilot:** | Alletto |

**Weather:** Overcast with sunny periods; intermittent clouds and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 00:13:46 | northern Nushagak Bay, near Dillingham | BB06_3471 |
| 00:23:51 | Dillingham | BB06_3499 |
| 00:32:26 | Snake River | BB06_3525 |
| 00:42:55 | Igushik River | BB06_3537 |
| 00:55:49 to 01:51:44 | Filming break near Nichols Spit (rough conditions) | |
| 01:56:51 | Protection Point | BB06_3581 |
| 02:04:40 | Cape Constantine | BB06_3618 |



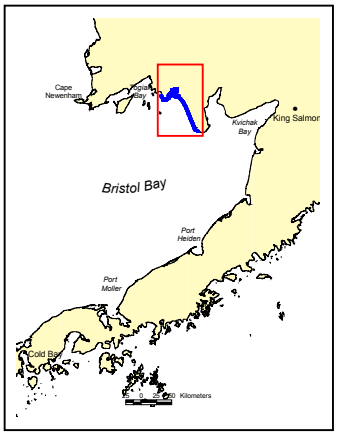




Figure 13. Location of Tape BB06_12, 22 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_12 **Date:** 22 June 06

**General Location:** Nushagak Penninsula (west side) , Kulukak Bay, Metervik Bay, Right Hand Point

**Time Start (UTC):** 02:05:46
**Time End (UTC):** 03:01:48
**Tape Length:** 56:03

**Geo:** Harney
**Bio:** Anderson
**Nav:** Borecky
**Pilot:** Alletto

**Weather:** Overcast with sunny periods; intermittent clouds and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 02:05:47 | Cape Constantine | BB06_3623 |
| 02:19:54 | Halfway between Cape Constantine and Tvativak Bay, Nushagak Peninsula | BB06_3720 |
| 02:29:25 | Head of Tvativak Bay | BB06_3770 |
| 02:38:33 | Head of Kulukak Bay | BB06_3814 |
| 02:49:47 | Head of Metervik Bay | BB06_3864 |
| 02:57:55 | Right Hand Point | BB06_3911 |
| 03:01:47 | Mouth of Nunavachak Bay | BB06_3982 |

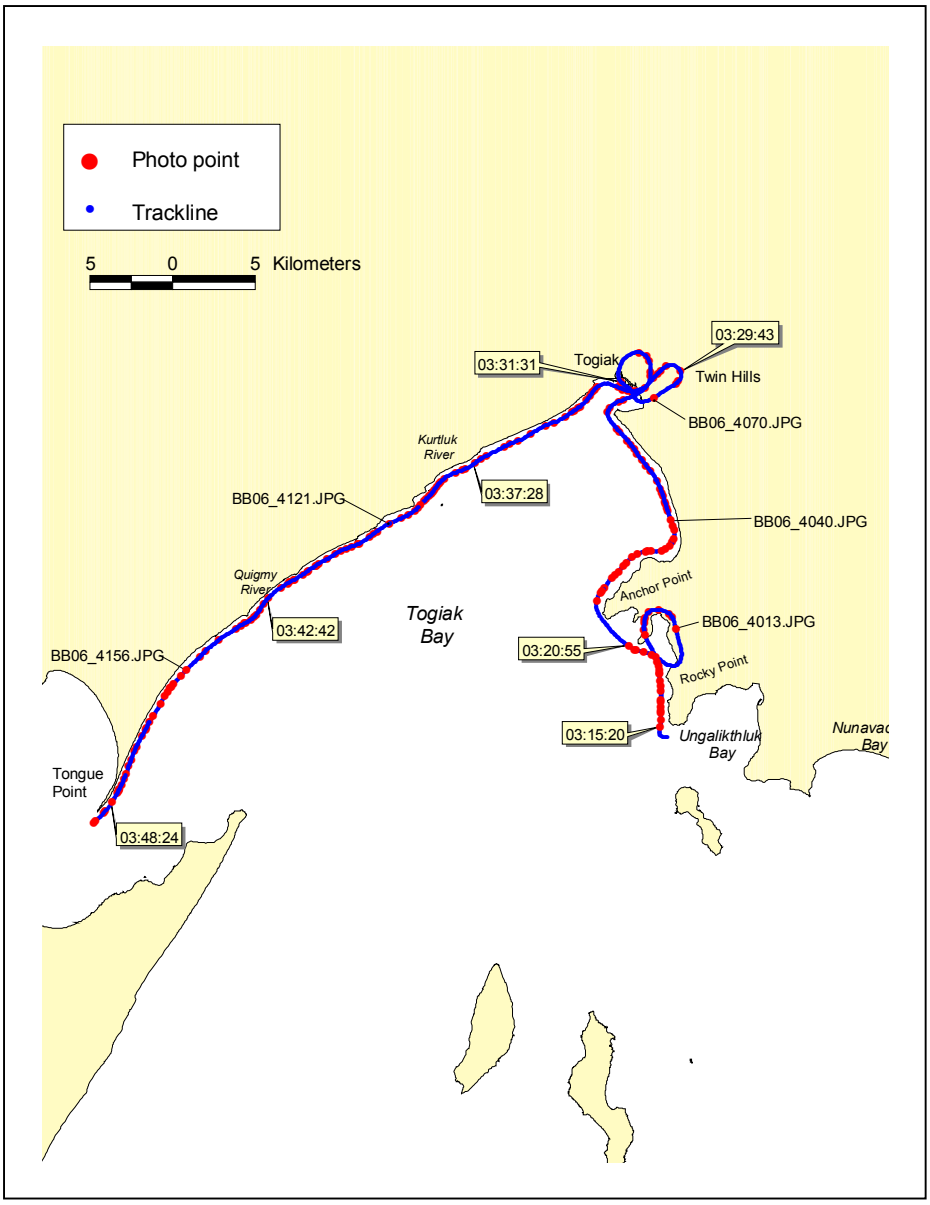



Figure 14. Location of Tape BB06_13, 22 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_13 **Date:** 22 June 06

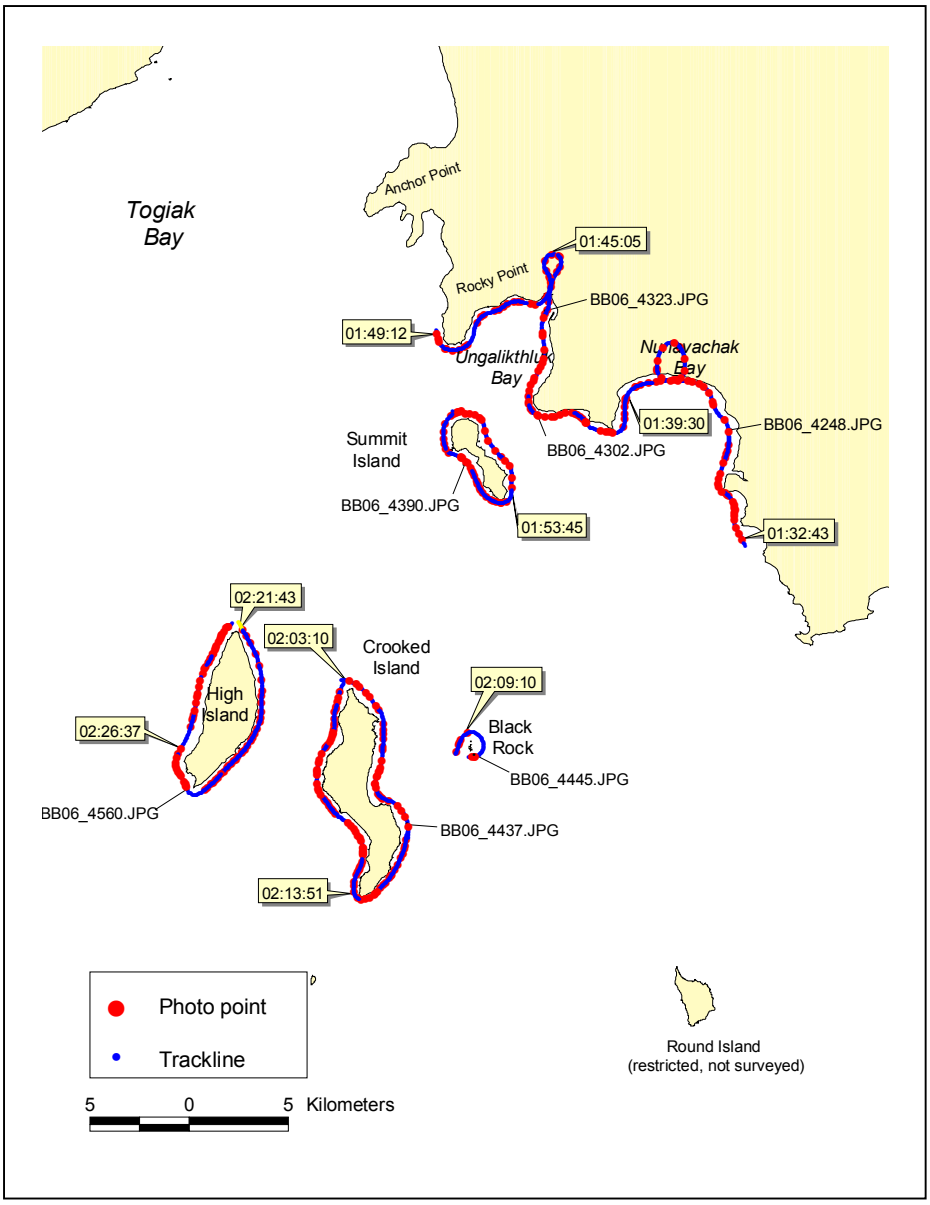
**General Location:** Togiak Bay

**Time Start (UTC):** 03:14:56
**Time End (UTC):** 03:48:54
**Tape Length:** 33:58

**Geo:** Borecky
**Bio:** Anderson
**Nav:** Harney
**Pilot:** Alletto

**Weather:** Overcast with sunny periods; intermittent clouds and fog; variable ceiling

| Time (UTC) | Location | Photo |
|---|---|---|
| 03:15:20 | Rocky Point | BB06_3988 |
| 03:20:55 | Anchor Point | BB06_4018 |
| 03:31:31 | Togiak | BB06_4074 |
| 03:37:28 | Kurtluk River | BB06_4102 |
| 03:42:42 | Quigmy River | BB06_4143 |
| 03:48:24 | Tongue Point | BB06_4180 |



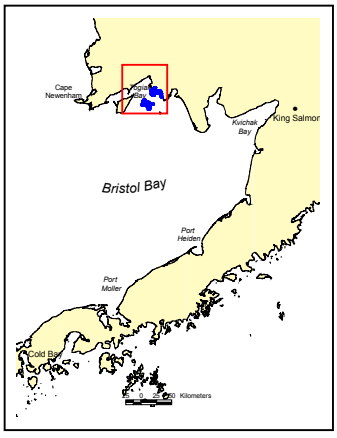




Figure 15. Location of Tape BB06_14, 23 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

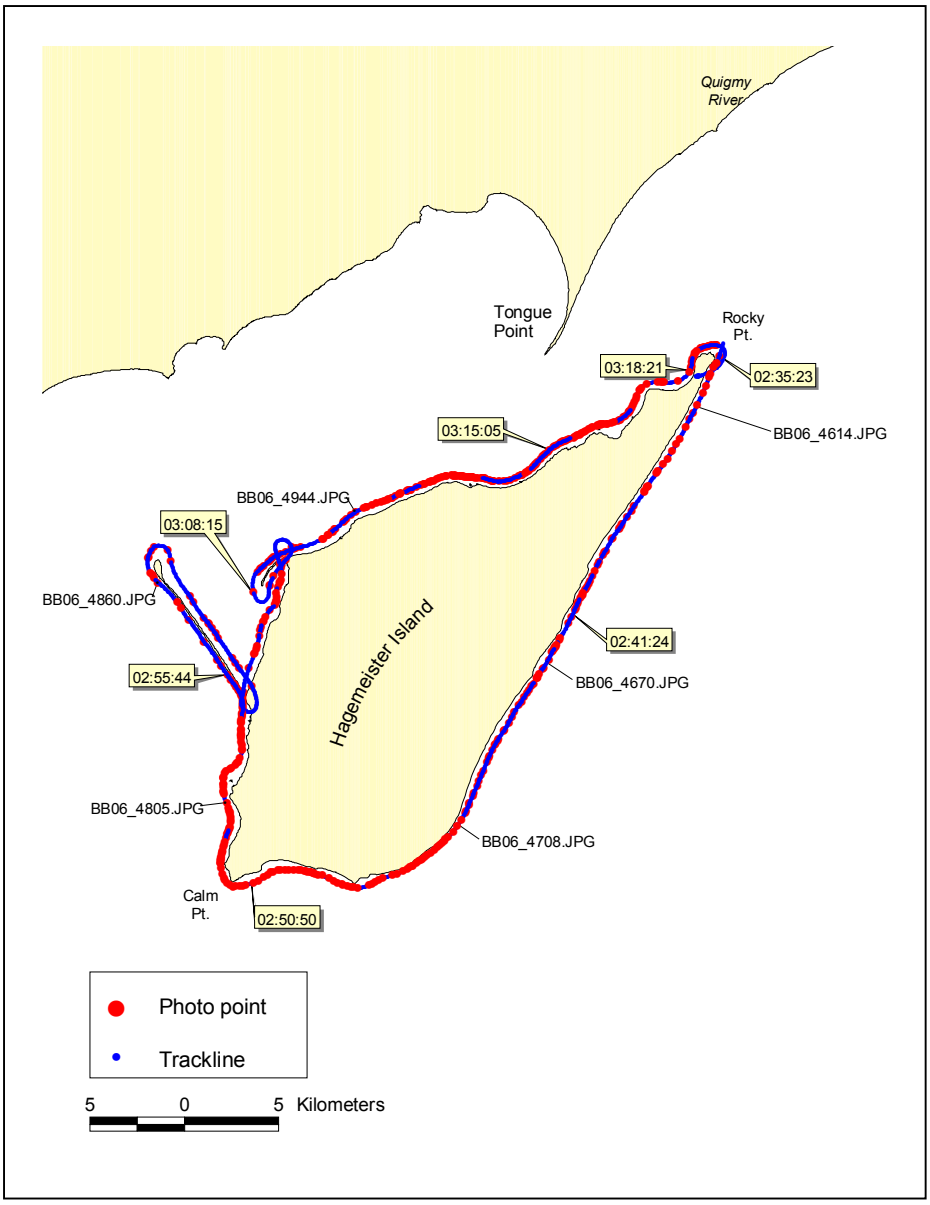
**Tape:** BB06_14 **Date:** 23 June 06

**General Location:** Togiak National Wildlife Refuge, Walrus Islands

| | | | |
|---|---|---|---|
| **Time Start (UTC):** | 01:32:37 | **Geo:** | Borecky |
| Transit to Summit Island | 01:49:17 to 01:51:40 | **Bio:** | Anderson |
| Transit to Crooked Island | 01:56:34 to 02:03:00 | **Nav:** | Harney |
| Transit to Black Rock from Crooked Island | 02:06:54 to 02:08:43 | **Pilot:** | Alletto |
| Transit to back to Black Rock | 02:10:11 to 02:11:49 | | |
| Transit to High Island | 02:18:19 to 02:21:32 | | |
| **Time End (UTC):** | 02:28:55 | | |
| **Tape Length:** | 40:37 | | |

**Weather:** Overcast, variable ceiling; intermittent storm clouds and rain; low, heavy fog in some areas

| Time (UTC) | Location | Photo |
|---|---|---|
| 01:32:43 | North of Right Hand Point | BB06_4225 |
| 01:39:30 | Nunavachak Bay | BB06_4278 |
| 01:45:05 | Ungalikthluk Bay | BB06_4331 |
| 01:53:45 | Summit Island | BB06_4372 |
| 02:03:10 | Crooked Island (north tip start) | BB06_4407 |
| 02:09:10 | Black Rock | BB06_4443 |
| 02:21:43 | High Island (north tip start) | BB06_4526 |



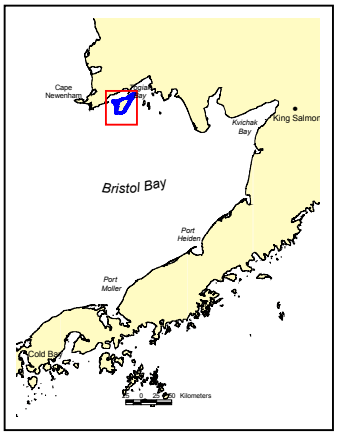




Figure 16. Location of Tape BB06_15, 23 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_15 **Date:** 23 June 06

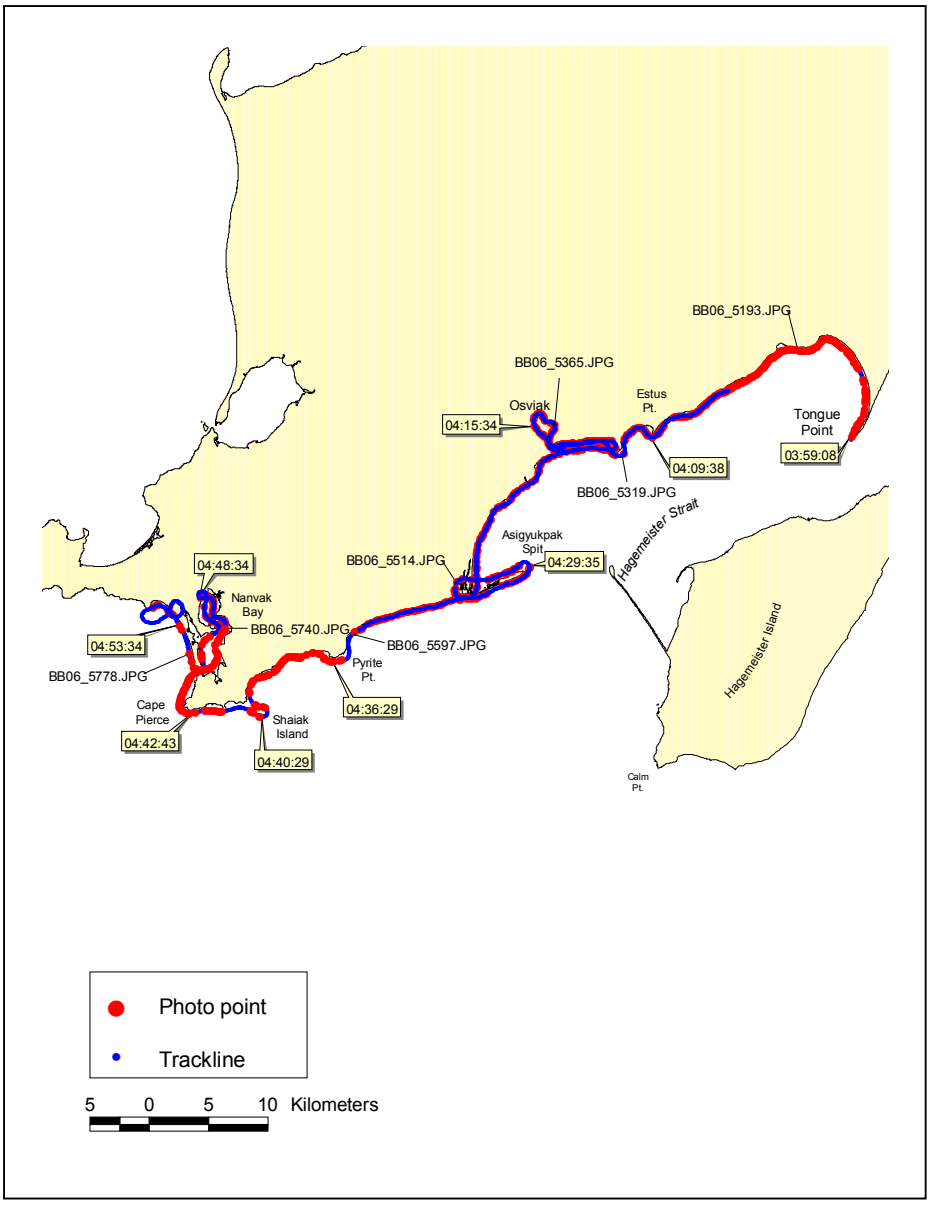
**General Location:** Hagemeister Island

**Time Start (UTC):** 02:35:07
**Time End (UTC):** 03:20:24
**Tape Length:** 45:18

**Geo:** Borecky
**Bio:** Anderson
**Nav:** Harney
**Pilot:** Alletto

**Weather:** Overcast, variable ceiling; intermittent storm clouds and rain; low, heavy fog in some areas

| Time (UTC) | Location | Photo |
|---|---|---|
| 02:35:23 | Rocky Point (start) | BB06_4606 |
| 02:41:24 | East side of Hagemeister (near relic beach ridges) | BB06_4660 |
| 02:50:50 | Calm Point | BB06_4767 |
| 02:55:44 | SW side of long spit | BB06_4853 |
| 03:08:15 | Mudflats inside of spit | BB06_4916 |
| 03:15:05 | NW shoreline opposite of Tongue Point | BB06_5034 |
| 03:18:21 | Rocky Point (near ending) | BB06_5090 |



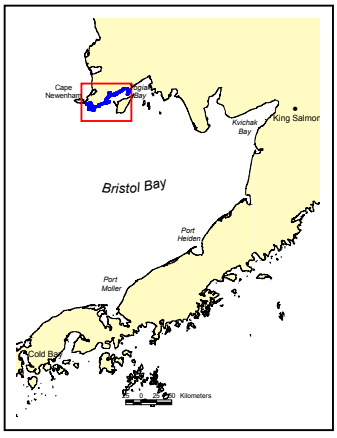




Figure 17. Location of Tape BB06_16, 23 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_16 **Date:** 23 June 06

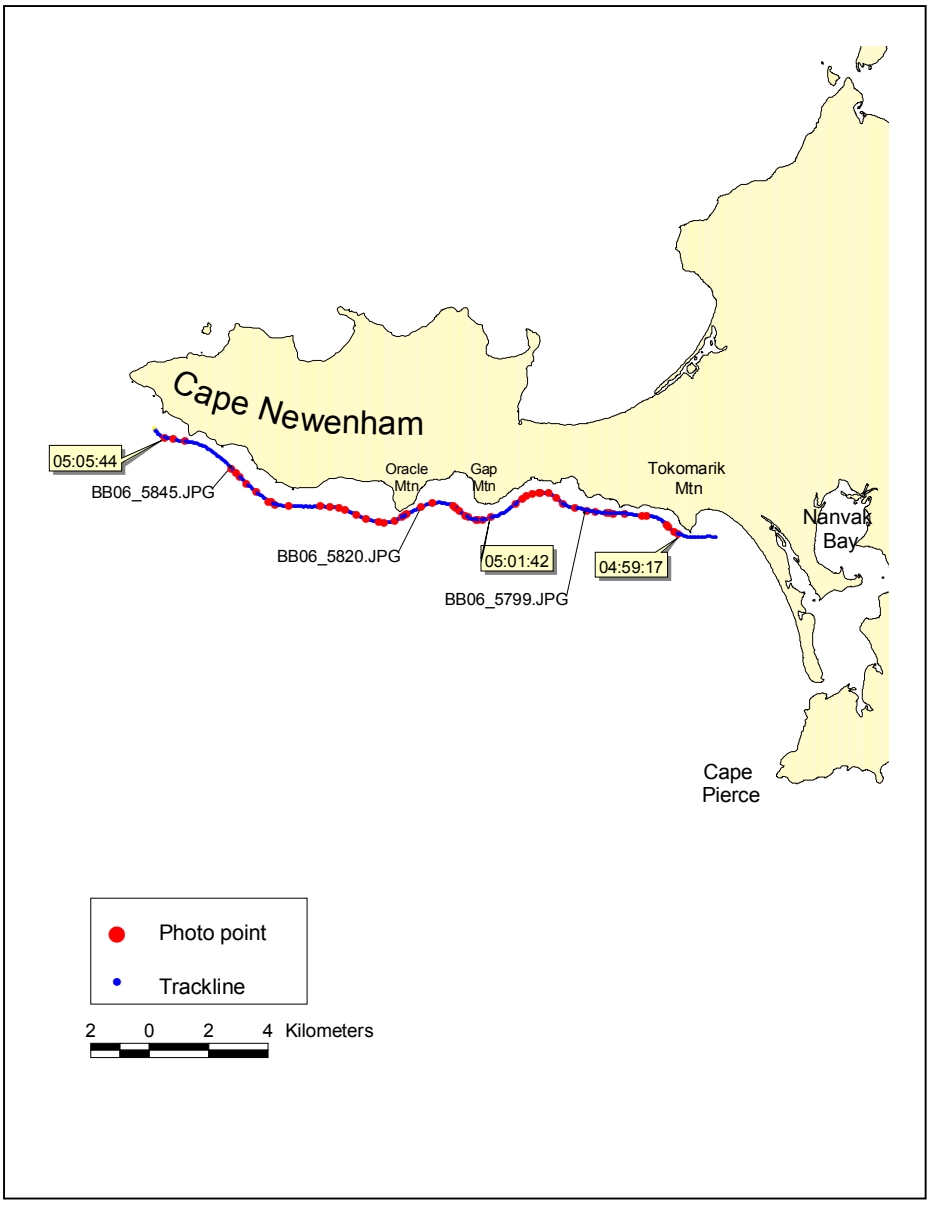
**General Location:** Hagemeister Strait, Osviak, Asigyukpak Spit, Cape Peirce, Nanvak Bay

**Time Start (UTC):** 03:59:02
**Time End (UTC):** 04:56:56
**Tape Length:** 57:54

**Geo:** Harney
**Bio:** Anderson
**Nav:** Borecky
**Pilot:** Alletto

**Weather:** Overcast, variable ceiling; intermittent storm clouds and rain; low, heavy fog in some areas; windy and turbulent approaching Capes Peirce and Newenham

| Time (UTC) | Location | Photo |
|---|---|---|
| 03:59:08 | Tongue Point | BB06_5133 |
| 04:09:38 | Estus Point | BB06_5294 |
| 04:15:34 | Osviak | BB06_5381 |
| 04:29:35 | Asigyukpak Spit | BB06_5337 |
| 04:36:29 | Pyrite Point | BB06_5600 |
| 04:42:43 | Cape Peirce | BB06_5672 |
| 04:48:34 | Nanvak Bay | BB06_5756 |



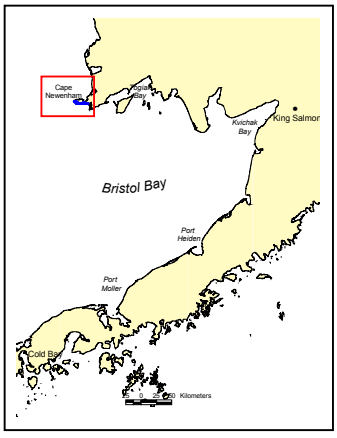




Figure 18. Location of Tape BB06_17, 23 June 2006

# 2006 Bristol Bay Aerial Video Imaging Survey
# Tape Log

**Tape:** BB06_17 **Date:** 23 June 06

**General Location:** Cape Newenham

**Time Start (UTC):** 04:58:56

**Time End (UTC):** 05:05:55

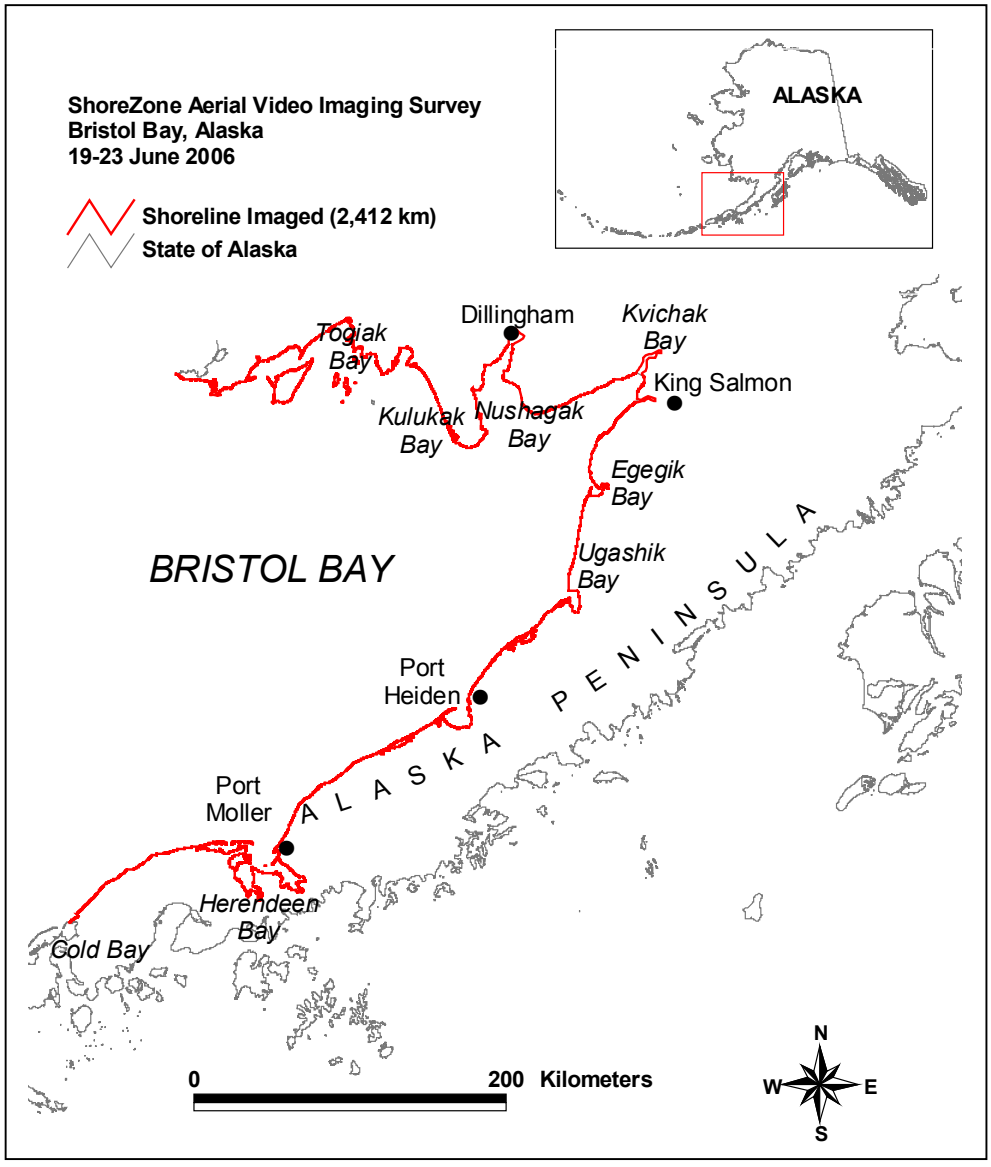
**Tape Length:** 07:00

**Geo:** Harney
**Bio:** Anderson
**Nav:** Borecky
**Pilot:** Alletto

**Weather:** Overcast, variable ceiling; intermittent storm clouds and rain, low, heavy fog in some areas; windy and turbulent approaching Capes Peirce and Newenham

| Time (UTC) | Location | Photo |
|---|---|---|
| 04:59:17 | Tokomarik Mountain… above Nanvak Bay | BB06_5788 |
| 05:01:42 | Gap Mountain | BB06_5810 |
| 05:05:44 | Cape Newenham | BB06_5848 |

# DAILY FIELD SUMMARIES
# ShoreZone Aerial Video Imaging (AVI) Survey
# Bristol Bay, Alaska, 19-23 June 2006




Prepared for
The Nature Conservancy
Juneau, Alaska
by

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**ShoreZone Bristol Bay AVI Survey: June 2006**
Fixed wing Cessna 206, Branch River Air
Home base: King Salmon
Field base: Cold Bay

**ShoreZone Bristol Bay AVI Survey**
**19 June 2006**
Transit to Cold Bay, southern Alaska Peninsula; imaging in southern Ugashik Bay and Port Heiden

**Tide window (ADT): 1318 – 1432 (Heiden)**
Liftoff (ADT): 1230 (King Salmon)
Setdown: 1640 (Cold Bay)
Cessna time: 4.1 hours
Fuel: Branch River Air

**Flown = 145 km:**
Southern Ugashik Bay, Cinder River, Port Heiden to Hook Lagoon

**Imagery collected: 1.0 hours**
Tapes: BB06_01

**Conditions:**
Generally sunny; variable ceiling southward

**Highlights and interesting features:**
- 7 km mud flats at Ugashik
- seals on sand bars offshore of Port Heiden
- Cinder and Meshik Rivers

**Comments**
Decided to transit south to work the area while the weather is “good.” Set up and loaded the Cessna at Branch River Air; took off at 11:30 for Cold Bay (timed to arrive at Port Heiden for the low tide window). Imaged Port Heiden and a small bay in southern Ugashik on the way down (75 km) because the area was clear of fog, which our pilot said was uncommon.
Landed on Blinn Lake under clear (even sunny!) skies. Flight Services let Mary Martin of Cold Bay Lodge know we were on the lake, and she retrieved us within an hour while we broke down the electronics and hardware in the Cessna. Cold Bay is a few buildings on a narrow strip of land between the Bering Sea and Pacific Ocean... not a tree in sight and very windy.

**ShoreZone Bristol Bay AVI Survey**
**19 June 2006 – Photo Picks**

| | |
|---|---|
| | |
| Port Heiden<br>Hundreds of seals hauled out on sand bars offshore<br>BB06_0121.jpg | Port Heiden<br>Ponds, stream channels, and wide mud flats<br>BB06_0155.jpg |
| | |
| Port Heiden<br>Meandering streams, marsh grasses, wide mud flats<br>BB06_0159.jpg | Port Heiden<br><br>BB06_0165.jpg |
| | |
| North of Port Heiden<br>Sand-pebble beach, cliff of peat and ash<br>BB06_0324.jpg | North of Port Heiden<br>Meandering stream, beach, and sand islets offshore<br>BB06_0338.jpg |

**ShoreZone Bristol Bay AVI Survey**
**20 June 2006**
Moffet Point to Port Moller

**Tide window (ADT): 1118 – 1418 (Moller), 1314 – 1612 (Heiden)**
Liftoff (ADT): 1100
Setdown: 1700
Cessna time: 5.1 hours
Fuel: Frosty Fuels with fuel truck in morning, left at Blinn Lake, refueled evening

**Flown = 590 km:**
Moffet Point, Nelson Lagoon, Port Herendeen, Port Moller

**Imagery collected: 3.7 hours**
Tapes: SE06_BB02 – BB05

**Conditions:**
Overcast, intermittent clouds, rain, and fog; variable ceiling; poor visibility (marginal flying conditions)

**Highlights and interesting features:**
- Wide sand and mud flats with eelgrass in Herendeen and Moller
- Lagoons that are filled in with mudflats
- Sandy spits, bars, and islets alongshore
- Wide marshes
- Steep eroding cliffs near Moller
- Dead walrus on the beach; dead whale being eaten by a bear
- Stream fans with coarser material

**ShoreZone Bristol Bay AVI Survey**
**20 June 2006 – Photo Picks**

Cape Leontovich
Cathedral River carving through a high-energy beach
BB06_0647.jpg

Port Moller (northwest side)
Meandering channels and ponds in dune grass
BB06_1072.jpg

Herendeen Bay
Patchy *Fucus* (rockweed) on upper rock platforms; continuous *Zostera* (eelgrass) on lower sand flats.
BB06_1311.jpg

Herendeen Bay
Dark patches are the blue mussel bioband, common in this bay
BB06_1346.jpg

Herendeen Bay
Dense stands of dune grass in the backshore, bears on the sand-pebble beach, and continuous beds of eelgrass near shore
BB06_1522.jpg

Port Moller (southwest side)
Estuary with distinct wetland biobands: tall, blue-green dune grasses (upper) and marsh herbs and grasses (lower).
BB06_1608.jpg

**ShoreZone Bristol Bay AVI Survey**
**20 June 2006 – Photo Picks (cont)**

| | |
|---|---|
| | |
| Left Head, Port Moller<br>*Verrucaria* (black lichen) on steep cliff with *Fucus* below; mud flats extend offshore several km<br>BB06_1763.jpg | Left Head, Port Moller<br>Extensive beds of *Zostera* eelgrass<br><br>BB06_1803.jpg |
| | |
| Egg Island, northeastern Port Moller<br>Steep cliff with dark *Verrucaria* (black lichen) band; *Zostera* eelgrass in the subtidal on the back side of the islet.<br>BB06_1808.jpg | Harbor Point, Port Moller<br>Eagles nesting in navigation marker at the end of a sandy spit at the entrance of Port Moller<br><br>BB06_1866.jpg |

**ShoreZone Bristol Bay AVI Survey**
**21 June 2006**
Filling in Port Moller, Heiden; Ugashik to Kvichak Bay

**Tide windows (ADT):** Moller = 1145 – 1532, Heiden = 1340 – 1725, Nushugak (PP) = 1634 – 1946, Kvichak = 2000  2200

| | |
|---|---|
| Fuel truck: | 0830 |
| Patch ruptured float: | 0900 - 1400 |
| Liftoff: | 1445 |
| Setdown: | 20:15 |
| Cessna time: | 5.3 hours |
| Fuel: | Frosty Fuels with fuel truck in morning, King Salmon in evening |

**Flown = 615 km:**
Filling in Port Moller, Port Heiden, and Ugashik to Kvichak Bay (up to Alagnak River)

**Imagery collected: 3.7 hours**
Tapes: BB06 – BB09

**Conditions:**
Overcast, intermittent clouds, rain, and fog; variable ceiling; heavy fog on portion of Ugashik coast (4 km gap in imagery)

**Highlights and interesting features:**
- repairing the hole torn in one of the floats using aluminum, roofing screws, and epoxy (all before the tide window ran out)
- Walrus haul-out at Cape Seniavin
- mud cutbanks in Kvichak Bay at Naknek and Alagnak Rivers
- extensive sand bars and barrier islands

**ShoreZone Bristol Bay AVI Survey**
**21 June 2006 – Photo Picks**

Nelson Lagoon
Sandy barrier islands just south of Port Moller
BB06_2114.jpg

Nelson Lagoon
Sandy barrier islands just south of Port Moller
BB06_2142.jpg

Cape Kutuzof, north of Port Moller
Coarse-grained lag deposit on sand beach
BB06_2169.jpg

Cape Seniavin
Enormous walrus haul-out
BB06_2230.jpg

South of Port Heiden
Wide sand-pebble beaches and steep, eroding cliffs
BB06_2500.jpg

Stroganof Point
Sandy spits and barrier islands, entrance Port Heiden
BB06_2548.jpg

**ShoreZone Bristol Bay AVI Survey**
**21 June 2006 – Photo Picks (cont)**

| | |
|---|---|
| | |
| Hook Lagoon, south of Cinder River<br>Common shoreline is sand with continuous dune grass in the supratidal<br>BB06_2605.jpg | Cinder River State Critical Habitat Area<br>Tidal flats and sand bars extending far offshore<br><br>BB06_2671.jpg |
| | |
| Cape Greig, north of Ugashik Bay<br>Steep, high cliffs with coarse talus base, sand-pebble beach, and wide sand flats.<br>BB06_2832.jpg | Egegik River<br>Wide estuary and extensive marsh<br><br>BB06_2945.jpg |

**ShoreZone Bristol Bay AVI Survey**
**22 June 2006**
Kvichak Bay (at Alagnak River) to Togiak

**Tide windows (ADT): Moller = 1145 – 1532, Heiden = 1340 – 1725, Nushugak (PP) = 1714 - 2047**
Liftoff: 1500
Setdown: 2100
Cessna time: 5.2 hours
Fuel: King Salmon

**Flown = 550 km:**
Kvichak Bay (at Alagnak River) to Togiak

**Imagery collected: 3.7 hours**
Tapes: BB10 – BB13

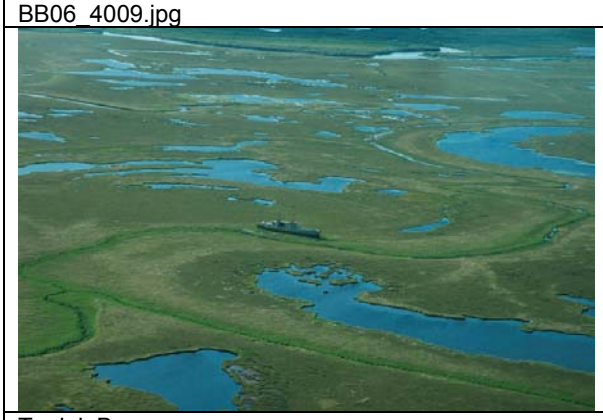
**Conditions:**
Overcast with sunny periods; intermittent clouds and fog; variable ceiling

**Highlights and interesting features:**
- rock platforms and steep eroding cliffs of sediment and organic material
- sand dunes of Nushagak Peninsula
- extensive sand and mud flats
- steep, eroding cliffs of peat, soil, and ash at Etolin Point and Ekuk Bluff, near Nushagak
- wide marsh and mud flats at mouth of Togiak River

**ShoreZone Bristol Bay AVI Survey**
**22 June 2006 – Photo Picks**

| | |
|---|---|
| | |
| Etolin Point<br>Steep, eroding cliffs of peat, soil, and ash between Nushagak and Kvichak Bays<br>BB06_3385.jpg | Ekuk Bluff, northern Nushagak Bay<br>Fine ash eroding from cliff, forming cross-shore patterns on the beach face<br>BB06_3432.jpg |
| | |
| Nushagak Peninsula (east of Cape Constantine)<br>Extensive dunes (both active and vegetated with dune grass) grading to wide sand flats offshore<br><br>BB06_3636.jpg | Tvativak Bay (northern Kulukak Bay)<br>Marsh grasses and herbs in lower estuary and continuous stands of dune grasses and herbs in the supratidal<br>BB06_3764.jpg |
| | |
| Kulukak Point<br>Talus at the base of mountains on the northwest Nushgak Peninsula grade into wide sand flats extending far offshore<br>BB06_3794.jpg | Kulukak Point<br>Rock platform with a mixture of green algae and red turf algae<br><br>BB06_3967.jpg |

**ShoreZone Bristol Bay AVI Survey**
**22 June 2006 – Photo Picks (cont)**

| | |
|---|---|
| | |
| Togiak Bay<br>Pocket beach inside Anchor Point with continuous eelgrass in the nearshore<br><br>BB06_4009.jpg | Togiak Bay<br>Distinct biobanding on boulder beach just east of Anchor Point: dark *Verrucaria* band in the splash zone above a red algae band<br>BB06_4016.jpg |
|  | |
| Togiak Bay<br>Ship stranded high in the wetland suggests a former waterline position<br>BB06_4078.jpg | Togiak River<br>Exensive estuary and tidal flats in northern Togiak Bay<br><br>BB06_4081.jpg |

**ShoreZone Bristol Bay AVI Survey**
**23 June 06**
Walrus Islands to Cape Newenham

**Tide window (ADT): Walrus = 1800 - 2215**
Liftoff: 1630
Setdown: 2230
Cessna time: 5.7 hours
Fuel: King Salmon

**Flown = 405 km:**
Walrus Islands, Hagemeister Island, Cape Pierce, Cape Newenham
(did not fly Round Islands or The Twins due to flight restrictions; Twins can be mapped like Black Rock)

**Imagery collected: 3.0 hours**
Tapes: BB14 – BB17

**Conditions:**
Overcast, variable ceiling; intermittent storm clouds and rain, low, heavy fog in some areas; windy and turbulent approaching Capes Pierce and Newenham

**Highlights and interesting features:**
- long sand spits at Tongue Point and on Hagemeister
- beautiful Walrus Islands but not many mammals observed
- enormous nesting seabird colonies on Black Rock and Cape Newenham
- extensive dunes of Nanvak Bay
- incredible steep, craggy Cape Newenham

**ShoreZone Bristol Bay AVI Survey**
**23 June 2006 – Photo Picks**

| | |
|---|---|
| | |
| Ungalikthluk Bay<br>Lower rock platforms covered in a continuous band of red algae; some ice remains on the cliff face<br>BB06_4229.jpg | Nunavachak Bay<br>Wide delta and marsh at the mouth of Nunavachak Lake drainage<br>BB06_4270.jpg |
| | |
| Togiak Bay<br>Steep cliff and linear beach between Ungalikthluk and Nunavachak Bays<br>BB06_4295.jpg | Black Rock, Togiak Bay<br>Enormous colonies of nesting seabirds in the Walrus Islands State Game Sanctuary<br>BB06_4446.jpg |
| | |
| Hagemeister Island, Togiak Bay<br>Beautiful setting: waterfalls pouring over high cliffs onto wide, sandy beaches.<br>BB06_4666.jpg | Hagemeister Island, Togiak Bay<br>A part of the Togiak National Wildlife Refuge<br><br>BB06_4749.jpg |

**ShoreZone Bristol Bay AVI Survey**
**23 June 2006 – Photo Picks (cont)**

| | |
|---|---|
| | |
| Asigyukpak Spit<br>Bright green eelgrass formed a continuous, dense bed in the nearshore subtidal along this narrow sand spit at the western edge of Hagemeister Strait<br>BB06_5518.jpg | Cape Peirce<br>High wave exposure indicated by the presence of a dark red algae band at the waterline; near northwest corner of Bristol Bay<br>BB06_5679.jpg |
| | |
| Nanvak Bay<br>Active and vegetated sand dunes outside Nanvak Bay, north of Cape Peirce<br>BB06_5770.jpg | Nanvak Bay<br>Active and vegetated sand dunes outside Nanvak Bay, north of Cape Peirce<br>BB06_5710.jpg |
| | |
| Cape Newenham<br>Northwest corner of Bristol Bay<br><br>BB06_5856.jpg | Cape Newenham<br>Sea arches, sea caves, and sea stacks of the spectacular northwest edge of Bristol Bay<br>BB06_5845.jpg |