

Continuation of Arctic Nearshore Impact Monitoring in the Development Area (cANIMIDA)

Summer 2006 Field Survey Report



Report to:

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Attachment 1: 2006 Station Logs

Section 1: Daily Operations Logs

Section 2: Sediment Collection Logs

Section 3: Water, Plankton, and Indigenous Biota Collection Logs

Section 4: Mussel Collection Logs

Section 5: Fish Collection Logs

Attachment 2: 2006 Collection Permit and Fish Transfer Permit

1.0 Introduction

As part of the Minerals Management Service (MMS) program entitled “Continuation of Arctic Nearshore Impact Monitoring in the Development Area” (cANIMIDA), the third and final summer field survey of this program (seventh survey overall) was conducted from July 24 to August 12, 2006.

The scientific crew collected water, sediment, and biota samples for physical and chemical analyses. Work was conducted from shore, inflatable boats, as well as using the MMS Vessel 1273. Sample collection activities included deployment and retrieval of mussel moorings, gravity cores, fish collection using fyke nets, towed benthic sled, small traps, and plankton tows. This report summarizes the field activities and samples collected during the 2006 summer field survey.



MMS Vessel 1273

The following bulleted items describe components successfully completed during the 2006 cANIMIDA summer sampling survey:

- Collected 34 surface sediment samples (0 to 1 cm) for hydrocarbon and metals chemistry from 34 offshore stations.

Area	Total Sediment Stations	Historical	New
BSMP	14	13	1
Northstar	8	6	2
McCovey	1	0	1
West Dock	1	0	1
Liberty	6	2	4
Endicott/SDI	3	2	1
Boulder Patch	1	1	0
Totals	34	24	10

- Collected 14 sediment gravity cores from seven locations.
- Collected five source/peat material samples.

- Collected seven CTD profiles from seven offshore stations.
- Collected 53 discrete water samples comprised of 23 surface samples and 30 subsurface samples from up to seven depth strata from 23 locations including 11 samples along a transect in the Sagavanirktok River and the Port Chatham Mussel Collection site.
- Deployed and retrieved eight moorings with mussels. Each mooring had two mussel cages with 20 mussels per cage. Moorings were deployed as follows:
 - Two near Northstar
 - Two in the Liberty area
 - One between Northstar and Liberty
 - One at West Dock
 - Two deployed adjacent to Endicott (one by Endicott, one by the SDI)
- A total of 34 indigenous tissue samples were collected from the following groups of organisms: amphipod (23); isopod (6); mysid (3); and bivalves (2). Amphipod samples were collected from the BSMP area (7 samples), the Northstar area (10), the Liberty Area (2), the Boulder Patch (2), and from West Dock (2 samples). Isopods were collected from the Northstar area (3 samples), the Liberty area (1), the BSMP area (1), and West Dock (1). Bivalves were collected in the Liberty area (2 samples).
- Collected fish with fyke nets from Stump Island (19 fish) and Point Brower (20 fish). Similar to 2005, we were unable to collect fish from the Boulder Patch area due to time constraints on the divers resulting from poor diving conditions prior to our arrival.
- Collected three kelp plants with the aid of Ken Dunton (University of Texas Marine Science Institute; cANIMIDA Task 6 PI) for metal analysis.
- Delivered all field samples to analytical laboratories for appropriate analyses.



Dr. J. Trefry collecting water sample

2.0 Schedule

Summer 2006 field sampling was conducted from July 24 to August 12, 2006. There was one travel day lost (11 August) at the end of the survey due to fog. Ice conditions during

the survey were favorable for field operations. Members of the field team arrived in Prudhoe Bay, Alaska, July 24-25. Initial “check-out” of MMS Vessel 1273 was performed on July 24 by ship captain Mark Mertz of TEG Oceanographic Services (TEG) and Dee Williams of MMS. Field sampling personnel consisted of five staff from three organizations: two staff from Battelle, two from the Florida Institute of Technology (FIT), and one from Kinnetic Laboratories Inc. (KLI). The scientific team and ship’s captain conducted the work on a 12 to 18 hours/day basis, depending on operating conditions and logistical considerations.

3.0 Cruise Operations and Samples Collected

The MMS Vessel 1273 served as the survey platform for the bulk of summer 2006 field work. The MMS Vessel 1273 was launched on 24 July after inspection by MMS representatives. The MMS Vessel 1273 was also used to retrieve and re-deploy current meters for the MMS University of Alaska Coastal Marine Institute (CMI) program at the end of the cANIMIDA survey using an alternate captain (Ken Kronschnabl) from KLI.

Table 1 provides information on station id, station type, location (latitude and longitude), depth, and date(s) the station was sampled. Table 2 provides a list of the sample stations (actual and target) and the types of samples collected. Figures 1 through 7 illustrate the locations of the 2006 sampling stations. Additional daily survey and sampling station information is included in the 2006 Station Logs (Attachment 1). Following Tables 1 and 2 is a narrative summarizing the field survey operations by day.



Juvenile arctic fox (*Alopex lagopus*)

Table 1. 2006 MMS cANIMIDA Station Locations, Water Depth, and Dates

Station ID	Station Type	Latitude (N; WGS84)		Longitude (W; WGS84)		Dept (ft)	Date(s)
4A	BSMP	70°	18.4578	147°	40.1781	14.7	28, 29 Jul
5(1)	BSMP	70°	24.9899	148°	03.4663	18.9	27 Jul
5(5)	BSMP	70°	26.0927	148°	18.1566	21.2	31 Jul
5A	BSMP	70°	29.6996	148°	46.1128	35.8	6, 7 Aug
6A	BSMP	70°	32.2000	149°	57.7200	9.1	3, 4 Aug
6B	BSMP	70°	33.3611	150°	24.6255	18.0	1, 2, 3 Aug
6D	BSMP	70°	44.9300	150°	28.5100	60.5	3 Aug
6F	BSMP	70°	40.1641	151°	12.1239	40.8	2, 3 Aug
6G	BSMP	70°	31.4000	149°	54.6000	6.3	3 Aug
6H	BSMP	70°	29.6753	150°	14.5986	5.5	1 Aug
7A	BSMP	70°	37.6525	152°	09.8789	7.0	2 Aug
7C	BSMP	70°	54.8501	152°	00.3010	45.2	2 Aug
7E	BSMP	70°	43.5819	152°	04.3662	8.7	2 Aug
7G	BSMP	70°	38.9050	151°	53.6441	6.5	2, 3 Aug
BP01	Boulder Patch	70°	20.7490	147°	32.9140	22.7	28, 29 Jul; 9 Aug
COL-03	Other	70°	23.9847	150°	28.9083	+2	3 Aug
E01	Other	70°	21.1034	147°	56.1035	11.2	27 Jul; 9 Aug
E02	Other	70°	21.0539	147°	58.2819	3.0	28 Jul
EI01	Other	70°	34.8687	151°	59.2539	+10	2 Aug
Kup	Other	70°	19.5355	149°	00.1299	+8	28 Jul
L03	Liberty	70°	17.3384	147°	33.2819	21.7	28, 29 Jul
L08	Liberty	70°	16.7030	147°	30.2990	20.5	28, 29 Jul; 9 Aug
L17	Liberty	70°	23.6088	147°	32.9282	22.8	29-Jul-06
L19	Liberty	70°	18.6216	147°	49.3156	7.1	27, 28 Jul
L20	Liberty	70°	15.4461	147°	43.9446	6.7	27 Jul
L21	Liberty	70°	13.7169	147°	38.2051	5.9	27 Jul
L22	Liberty	70°	29.2491	147°	16.4027	95.7	30 Jul
M01	McCovey	70°	30.7602	148°	27.3847	36.7	31-Jul-06
N01	Northstar	70°	31.6702	148°	41.4848	39.5	4 Aug
N03	Northstar	70°	30.0020	148°	41.5700	40.8	5, 6, 7 Aug
N05	Northstar	70°	29.6281	148°	44.8917	36.9	31 Jul; 6 Aug
N05N11	Northstar	70°	28.5194	148°	41.9535	28.1	10 Aug
N06	Northstar	70°	29.5360	148°	43.1940	36.7	05-Aug-06

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Station ID	Station Type	Latitude (N; WGS84)	Longitude (W; WGS84)	Dept (ft)	Date(s)
N08	Northstar	70° 29.4407	148° 38.2989	36.0	04-Aug-06
N11	Northstar	70° 28.4295	148° 41.9090	27.4	5, 6, 7 Aug
N11N08	Northstar	70° 29.4192	148° 38.3415	36	10 Aug
N11S	Northstar	70° 27.0240	148° 41.9833	15	10 Aug
N14	Northstar	70° 26.0060	148° 40.4290	9.2	4, 5, 6 Aug
N17	Northstar	70° 29.8717	148° 40.2850	38.9	31 Jul
N23	Northstar	70° 29.3732	148° 41.8366	36.3	4 Aug
N26	Northstar	70° 29.4989	148° 42.1752	36.1	7 Aug
N27	Northstar	70° 29.4133	148° 42.2011	36.9	5, 6 Aug
N28	Northstar	70° 29.5230	148° 41.5252	37.8	5, 6 Aug
PC	Port Chatham	59° 12.9200	151° 45.4050	~+2-+8	24, 26 Jul
PI01	Other (Pingok Island)	70° 33.3634	149° 28.2316	+6	4 Aug
Sag	Other (Sagavanirktok River)	70° 0.0748	148° 40.0873	+1, 2.0	28 Jul
Sag	Other (Sagavanirktok River)	70° 0.0748	148° 40.0873	2.0	28 Jul
SDI01	Other (SDI)	70° 19.586	147° 52.3960	7.3	27 Jul; 9 Aug
WD01	Other (West Dock)	70° 23.847	148° 31.4233	8.0	6, 8 Aug

Table 2. 2006 MMS cANIMIDA Station Sampling Summary

Station ID	Surficial Sediment	Sediment Core	Discrete Water	Plankton	Amphipod	Isopods	Bivalves	Mussels	Fish	Other Biota	Source / Peat	Comments
4A	1				1		0					
5(1)	1				0		0					
5(5)	1		5		0		0			0		
5A	1	0			0			2				
6A	1	0			1		0					
6B	1	22		0	2	1	0			0		
6D	1				0		0					
6F	1				1		0					
6G	1				0		0					
6H	1				0		0					
7A	1	9			0		0					
7C	1	18			0		0					
7E	1	16		0	1		0			0		
7G	1	0			1		0					
BP01	1			0	2			2				
COL-03			1								1	Coleville River
DS-11			0							0		
E01	1				0		0	2				
E02	1											
EI01											1	Eskimo Island
KUP-01			1								1	Kuparuk River
L03	1		0		0		1					
L08	1		5		1	1	1	2		0		
L17			5									Plankton attempted but unsuccessful.
L19	1				1							
L20	1				0					0		
L21	1				0							
L22	1	14	7									
M01	1	0	0									
N01			6	0								
N03	1		0		1		0	2		0		
N05	1	7			0							
N06	1				1		0					
N08			6									
N11	1				2		0	2				
N14	1		3		1		0					
N17	1	22										

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Station ID	Surficial Sediment	Sediment Core	Discrete Water	Plankton	Amphipod	Isopods	Bivalves	Mussels	Fish	Other Biota	Source / Peat	Comments
N23			1									
N25	0	0	0									
N26	0		0		2							
N27	1				1							
N28	1		0		1		0					
N05N11										2		1 Isopod; 1 Mysid sample
N08N02										0		
N11N08										3		1 Isopod; 1 Mysid; 1 Amphipod sample
N11S										2		1 Isopod; 1 Mysid sample
PBS									20			
PI01											1	Pingok Island, one of the Jones Islands
Sag			1								1	Sagavanirktok River
SAGE			11									
SDI-1	1		0					2				
SIS									19			
W-1			0									
WD01	1		0	0	2	1		2				West Dock
Port Chatham			1					3				QA/QC Zero Time samples
TOTAL No. Stations	34	7	13	0	17	3	2	9	2	3	5	
TOTAL No. Samples	34	108	53	0	22	3	2	19	39	7	5	Mussels include three zero time samples
TARGET No. Samples	32	28	19	5	26	0	12	8	30	6	4	
KEY												
1	Indicates number of samples collected at proposed location.											
0	Indicates proposed sample not collected.											
1	Indicates number of samples collected at alternative location.											
0	Indicates alternative sample attempted but unsuccessful.											

July 23 (Sunday)

Battelle field staff and vessel captain arrive at Anchorage, AK and meet for dinner with KLI staff (Mark Savoie).

July 24 (Monday)

Field team members John Hardin and Mike Walsh (Battelle); Gary Lawley (KLI); and Mark Mertz (TEG) travel to Prudhoe Bay. John Trefry and Bob Trocine (FIT) travel to Anchorage. The field team collects equipment and supplies from shipping agents and begins the mobilization process at the British Petroleum (BP) Seawater Treatment Plant (STP) Facility (laboratory and field storage) and Base Operations Center (BOC; housing). Begin mobilizing MMS Vessel 1273.

Mark Savoie (KLI) collects mussels from Port Chatham, AK. Collects zero time (reference) samples of mussels and water.

Dee Williams transfers MMS Vessel 1273 responsibility to Mark Mertz in the afternoon.

July 25 (Tuesday)

John Trefry and Bob Trocine travel to Prudhoe Bay.

Field team completes mobilization of equipment, supplies, vessels (1273 and two inflatable boats). Team deploys mussel moorings at 5(A), N03, and N11. Each mooring is comprised of two mussel cages, each containing 20 mussels, and an acoustic pinger (see Figure 8).

1273 overnights at West Dock.

July 26 (Wednesday)

Team deploys mussel moorings at West Dock (secured to the bow of the Crowley Barge), SDI, E01, L08, and BP01. Tow benthic dredge for clams at 4A without success.

Trefry and Trocine set up water processing laboratory at STP.

1273 overnights at Endicott.



Surficial sediment collected with Van-Veen sampler

July 27 (Thursday)

Hardin and Trefry meet with Ken Dunton and discuss coordination of field sampling.

The shore team deploys the fyke net at Point Brower and then performs a salinity gradient sampling transect along the Sagavanirktok River (includes 11 discrete samples). Water samples are processed at the STP.

The team on the 1273 collects sediment at 5(1), E01, SDI01, L19, L20, and L21. Amphipod traps are deployed at 5(1), E01 and L19. The clam dredge is towed at 5(1) and E01 (twice) without success.

The 1273 overnights at Endicott.

July 28 (Friday)

The 1273 team collects sediment from 4A, BP01, L03, L08, and E02. Amphipod traps are recovered at 5(1) (no sample), E01 (no sample), and L19. Amphipod traps are deployed at BP01 and L08. A CTD profile is performed and five discrete water samples are collected at L08. The clam dredge is towed twice at L08 without success.

The shore team tends the fyke net at Point Brower. High water fouled the net, no fish are collected. The net is cleaned and re-set. Water and peat samples are collected from the Sagavanirktok and Kuparuk rivers. Water samples are processed at the STP.

The cANIMIDA Contracting Officer's Technical Representative (COTR) Dr. Richard (Dick) Prentki travels to Prudhoe Bay from Anchorage.

The 1273 overnights at Endicott.

July 29 (Saturday)

The 1273 team retrieves amphipod traps from L08 (two samples), and BP01. *Astarte* clams are collected from L08 and L03. A CTD profile is performed and five discrete water samples are collected at L17. A double plankton tow with one meter diameter nets is performed at L17 for approximately one hour. The minimal sample mass recovered is not adequate for sample analysis. A highly stratified water column (salinity and temperature) suggests that upwelling of nutrients is minimal, phytoplankton productivity is low, and subsequent zooplankton populations are limited. The water mass remained stratified throughout the survey and no plankton blooms were observed. No further attempts at plankton collection were made.

The shore team collects fish from the fyke net at Point Brower and processes them at the STP.

The 1273 overnights at Endicott.



R. Trocine with dual gravity core samples

July 30 (Sunday)

The 1273 team transits ~16 NM Northeast from Endicott into thick flow ice to a water depth of 95.7 feet and collects surface sediment and two gravity core samples from L22.

A CTD profile is performed and seven discrete water samples are also collected at L22. Amphipod traps are deployed at 5(5).

The 1273 overnights at West Dock.

July 31 (Monday)

The 1273 team collects surface sediment and gravity cores from N05 and N17. Surface sediment is collected from M01 (McCovey exploration well area) but multiple gravity core attempts are unsuccessful at M01 and 5(A) due to stiff sediments limiting penetration. Amphipod traps are retrieved from 5(5), but no sample is collected.

The shore team prepares samples for shipment and processes water samples.

During the evening, the 1273 is re-fueled, water and provisions added in preparation for traveling west to Harrison Bay.

The 1273 overnights at West Dock.

August 1 (Tuesday)

Mobilization of the 1273 for the transit to Harrison Bay is conducted in the morning. Sediment and tissue samples are shipped to Duxbury, MA. The 1273 team transits to Oligtok Point on the eastern side of Harrison Bay during the afternoon and evening.

Surface sediment samples are collected from 6B and 6H. Gravity core samples are collected from 6B. Amphipod traps are deployed at 6B and 6H.



J. Hardin collecting amphipods

The shore team processes water samples and delivers delayed food shipment to Harrison Bay.

Richard Prentki returns to Anchorage.

1273 overnights at Oligtok Point.

August 2 (Wednesday)

The 1273 team collects surface sediment samples from 6F, 7A, 7C, 7E, and 7G. Collect gravity cores from 7A, 7C, and 7E. Gravity core attempt at 7G is unsuccessful due to stiff sediment. Collect amphipod traps from 6B, 6H (no sample), 7A (no sample) and 7E. Attempt clam collection at all sediment stations (6F, 7A, 7C, 7E, and 7G) without success. Collect peat sample from Eskimo Island.

The shore team processes water samples at STP and attends to errands/logistics in Prudhoe Bay.

The 1273 overnights at Eskimo Island.

August 3 (Thursday)

The 1273 team collects sediment samples from 6A, 6D, and 6G. Clam collections are attempted at 6A, 6D, and 6G without success. Amphipods traps are collected from 6B, 6F and 7G. All three have amphipod samples and one isopod sample is collected from 6B.

The shore team travels up the Colville River in the inflatable boat as far as fuel allows and collects peat and water samples at COL-03.

The 1273 overnights at Spy Island.

August 4 (Friday)

In the morning, the 1273 team collects amphipod traps from 6A and 6G (no sample was collected from 6G). The 1273 transits east toward Prudhoe Bay, stopping at Pingok Island to collect a peat sample. The 1273 arrives back at West Dock at 1310.

In the afternoon, the 1273 team collects surface water samples from N01 and N23. CTD casts, surface and subsurface water samples are collected at N08 (six discrete samples) and N14 (three discrete samples).



Flock of geese over Pingok Island

The 1273 overnights at West Dock.

August 5 (Saturday)

The 1273 team collects sediment samples at N03, N05, N06, N11, N14, N27, and N28. Amphipod traps are also deployed at N03, N05, N06, N11, N14, N27, and N28.

The shore team processes water samples.

The 1273 overnights at West Dock.

August 6 (Sunday)

The 1273 team collects sediment samples from West Dock, and 5A. Amphipod traps are collected with adequate mass for analysis at N03, N06, N11 (2 samples), N14, N27, and N28. The trap at N27 was drug by flow ice and strong winds to near N06 where it was recovered and a sample was collected. The traps at N05 were also drug by flow ice and winds and were not recovered, no sample was collected. Field equipment blank sample is collected at West Dock.

The shore team deploys the fyke net at Stump Island, deploys amphipod traps at West Dock, and completes water sample processing. FIT packs equipment and supplies.

The 1273 overnights at West Dock.

August 7 (Monday)

The 1273 team recovers mussel moorings from 5A, N03, and N11, with excellent recovery in all six samples. Amphipod traps are collected at N26 (2 samples). A field blank for amphipod collection equipment is collected at N26.

Shore team collects five fish from the fyke net at Stump Island, the net is re-set.

FIT completes shipment of equipment and supplies and departs Prudhoe Bay.

1273 overnights at West Dock.

August 8 (Tuesday)

Winds are too high to transit to Endicott and recover mussel moorings. Shore team collects fish from the Stump Island fyke net, remove the net, and process samples at STP. The shore team collects mussels and amphipods from West Dock (2 amphipod and 1 isopod samples).

Demobilize some equipment and supplies from the 1273. Pack samples for shipping to Duxbury laboratory.

The 1273 overnights at West Dock.

August 9 (Wednesday)

Battelle staff ship samples in the morning.

The 1273 team retrieves moorings from BP01, L08, SDI01, and E01. The mussels have excellent survival at all four locations. Deploy and retrieve amphipod traps at BP01. QA/QC sample for airborne contamination collected at SDI01.

The 1273 overnights at West Dock.

August 10 (Thursday)

The 1273 team performs four epibenthic tows in the Northstar area, collecting small volumes in seven samples. Tow N11-N08 provides amphipod, mysids, and isopod samples; tow N05-N11 collects mysids and isopods; and tow N11S collects mysids and isopods. The tow in deeper water, N08-N02, is not successful.

The 1273 is demobilized in the afternoon; samples and equipment are packed for transit in the evening.

The 1273 overnights at West Dock.



Benthic sled on loan from Dr. Ken Dunton

August 11 (Friday)

Battelle and KLI staff ship equipment and supplies. Departure flights are canceled due to fog.

Seth Danielson and the UAF team arrive at Prudhoe Bay. However, their gear is delayed.

The UAF team spends the night on the 1273 at West Dock due to housing shortages on the North Slope.

August 12 (Saturday)

Poor visibility continues in the afternoon but the flight is moved from Deadhorse to the Kuparuk gravel airstrip and departs in the evening.

Mark Mertz meets with UAF team again and makes some minor repairs on the 1273.

The 1273 overnights at West Dock.

August 13 (Sunday)

The UAF team and Mark Mertz continue to organize and prepare for mooring recovery. Some UAF gear fails to arrive on time.

The 1273 overnights at West Dock

August 14 (Monday)

Captain Mertz takes UAF team to recover Dinkum Sands area mooring (offshore of Prudhoe Bay). The mooring is recovered using divers due to acoustic release failure. The team attempts to recover the Reindeer Island mooring, but the release does not work.

The 1273 overnights at West Dock.



M. Walsh and G. Lawley collect fish at Stump Island

August 15 (Tuesday)

The 1273 team returns to Reindeer Island and use an alternate set of coordinates that prove more accurate. The acoustic release functions when the 1273 gets within ~25 meters and the mooring is recovered intact.

Ken Kronschnabl (KLI, 1273 Captain) arrives in Prudhoe Bay in the evening. Mark Mertz and Ken Kronschnabl meet to discuss the 1273 status and transfer project information.

The 1273 overnights at West Dock.

August 16 (Wednesday)

Mertz transfers responsibility for the 1273 to Kronschnabl. UAF and Kronschnabl prepare the 1273 and service mooring for trip to Camden Bay.

The 1273 overnights at West Dock.

August 17 (Thursday)

The 1273 team transits toward Camden Bay.

August 18 (Friday)

Retrieve Camden mooring, replace with serviced mooring.

August 19 (Saturday)

Transit back to Prudhoe Bay.

August 20 (Sunday)

The UAF team services the moorings.
1273 overnights at West Dock.

August 21 (Monday)

The 1273 team deploys one mooring at Dinkum Island and one mooring offshore of Dinkum Island in 55 feet of water.

The 1273 overnights at West Dock.

August 22 (Tuesday)

The 1273 is pulled from the water and winterized.
Ken Kronschnabl transfers responsibility of the vessel to Dee Williams of MMS.

August 23 (Wednesday)

Ken Kronschnabl leaves Prudhoe Bay.



1273 Captain M. Mertz

4.0 Sampling Procedures

Sampling procedures followed at each station were consistent with those performed during the ANIMIDA Summer 2002 program (MMS, 2002), 2004 and 2005 cANIMIDA summer surveys, and are described in the Summer 2006 Field Logistics and Sampling Plan for the Minerals Management Service ANIMIDA Program (MMS, 2006). Typical sampling procedures included:

- Conductivity, temperature, and depth (CTD) measurements
- Water sample collection via pump system from offshore suspended sediment stations, and by hand at shoreline river stations

- Surface sediment grab sample collection using a modified Van-Veen grab (for sediments and bivalves – as appropriate)
- Core sampling with a gravity coring device equipped with twin four inch diameter barrels.
- Deployment and retrieval of amphipod traps
- Deployment of mussel cages at eight fixed moorings; seven recovered
- Collection of fish samples by fyke net at two locations
- Collection of epibenthic fauna with a benthic sled provided by Dr. Ken Dunton.

Photo documentation, station logs, and field notes were recorded during the field survey. The station logs for each sampling station are included in Attachment 1. Each station log includes a description of the sampling location, observations, number and type(s) of samples collected, and comments.

5.0 Technical Issues

There were no significant technical difficulties during this survey. Due to the patchy nature of amphipod and clam populations, as encountered in previous studies, the exact target types and numbers of samples were not collected. When multiple attempts at a station occurred, the mass of amphipods recovered was similar between attempts. This pattern was also observed in 2005 and indicates that resident populations are relatively stable over the short sampling time frame. This indicates that additional effort(s) yield minimal additional return. Sampling went smoothly, with only one weather day occurring on the final travel day of the cANIMIDA portion of the survey. There were no significant administrative or local logistic problems. British Petroleum did an outstanding job of supporting the field staff and providing room and board during an unusually busy summer season.

6.0 References

Minerals Management Service. 2002. Summer 2002 Field Sampling and Logistics Plan. July 2002.

Minerals Management Service. 2006. Summer 2006 Field Sampling and Logistics Plan. July 22, 2006.

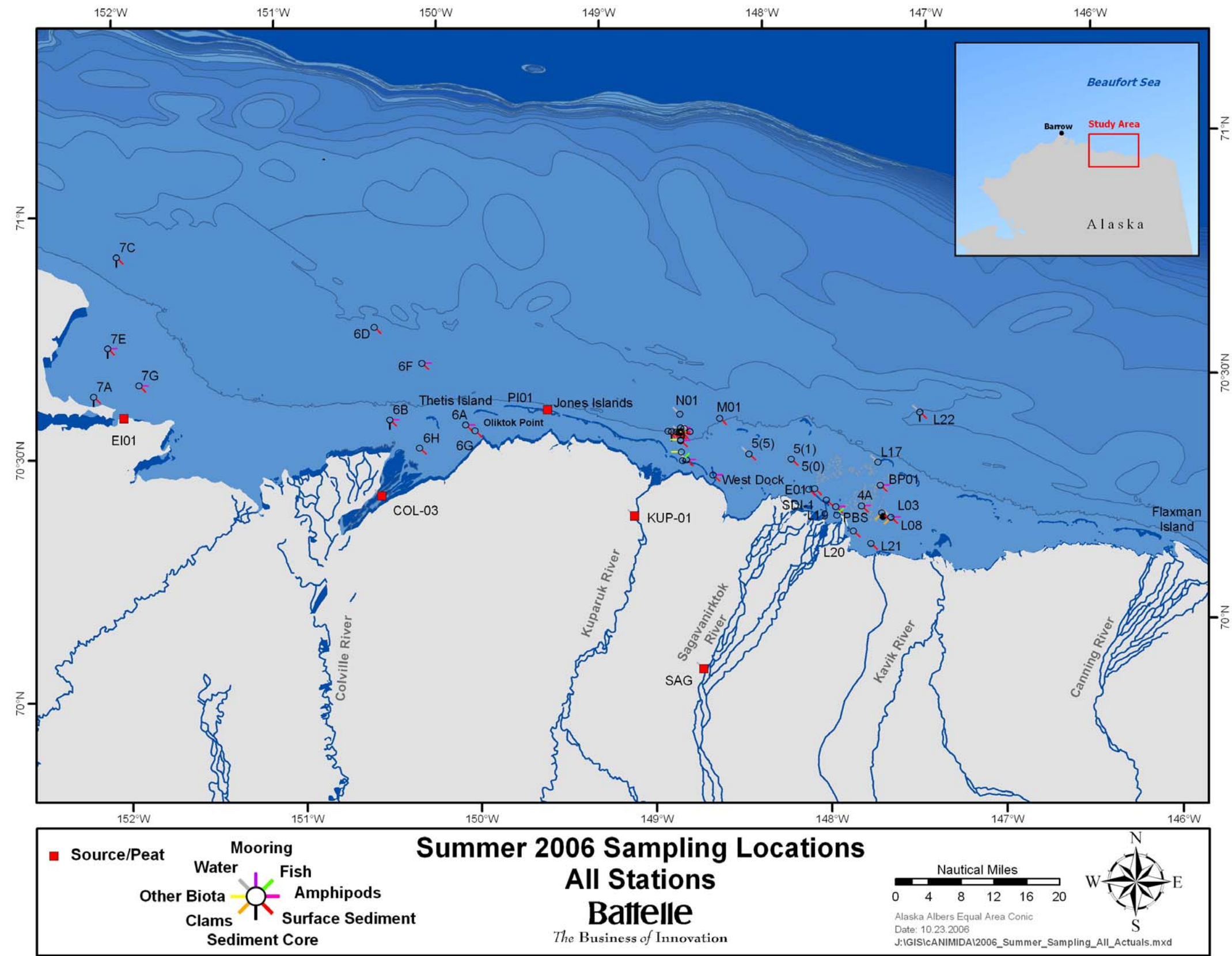


Figure 1. Summer 2006 cANIMIDA Sampling Locations.

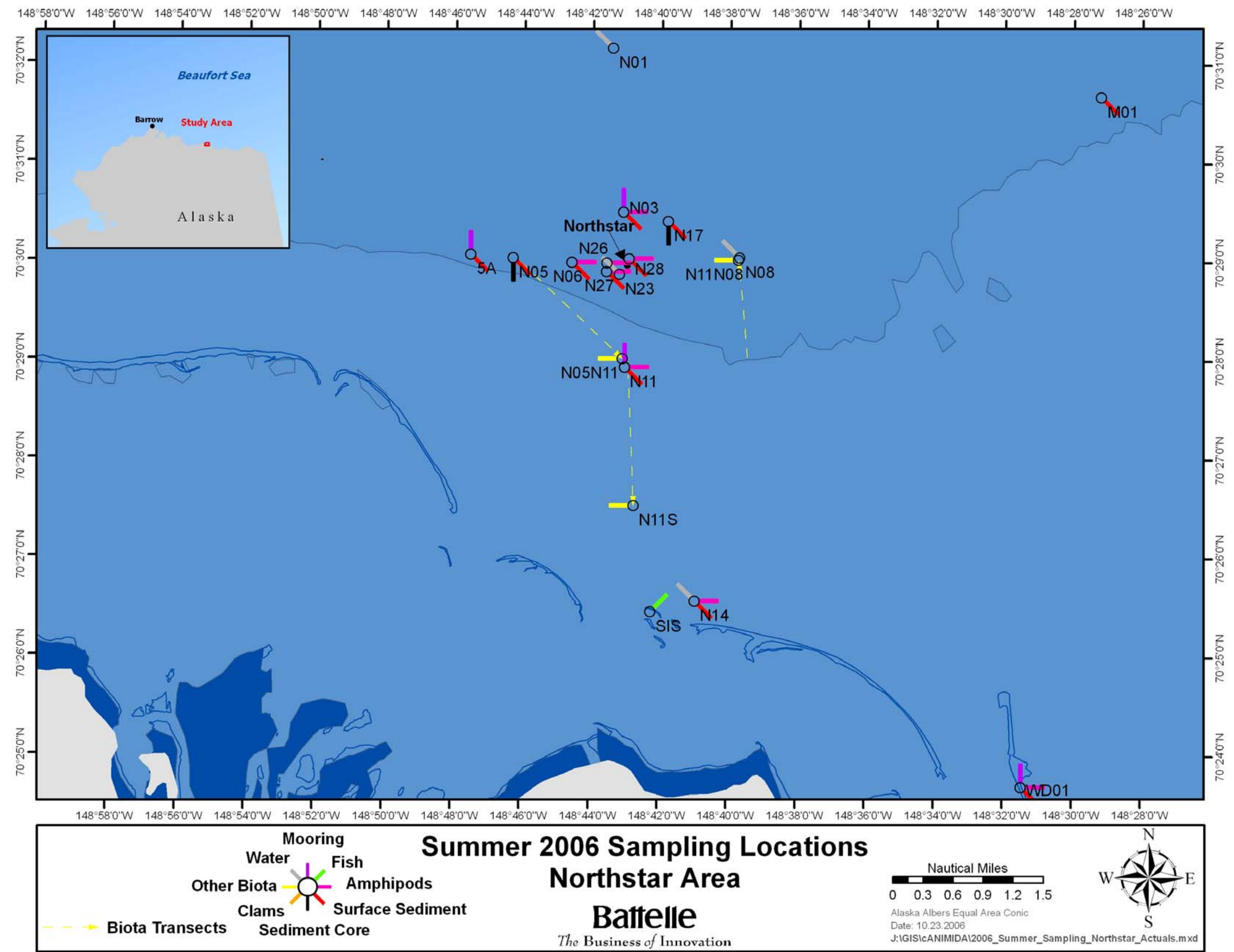


Figure 2. Northstar Area Sampling Locations, Summer 2006.

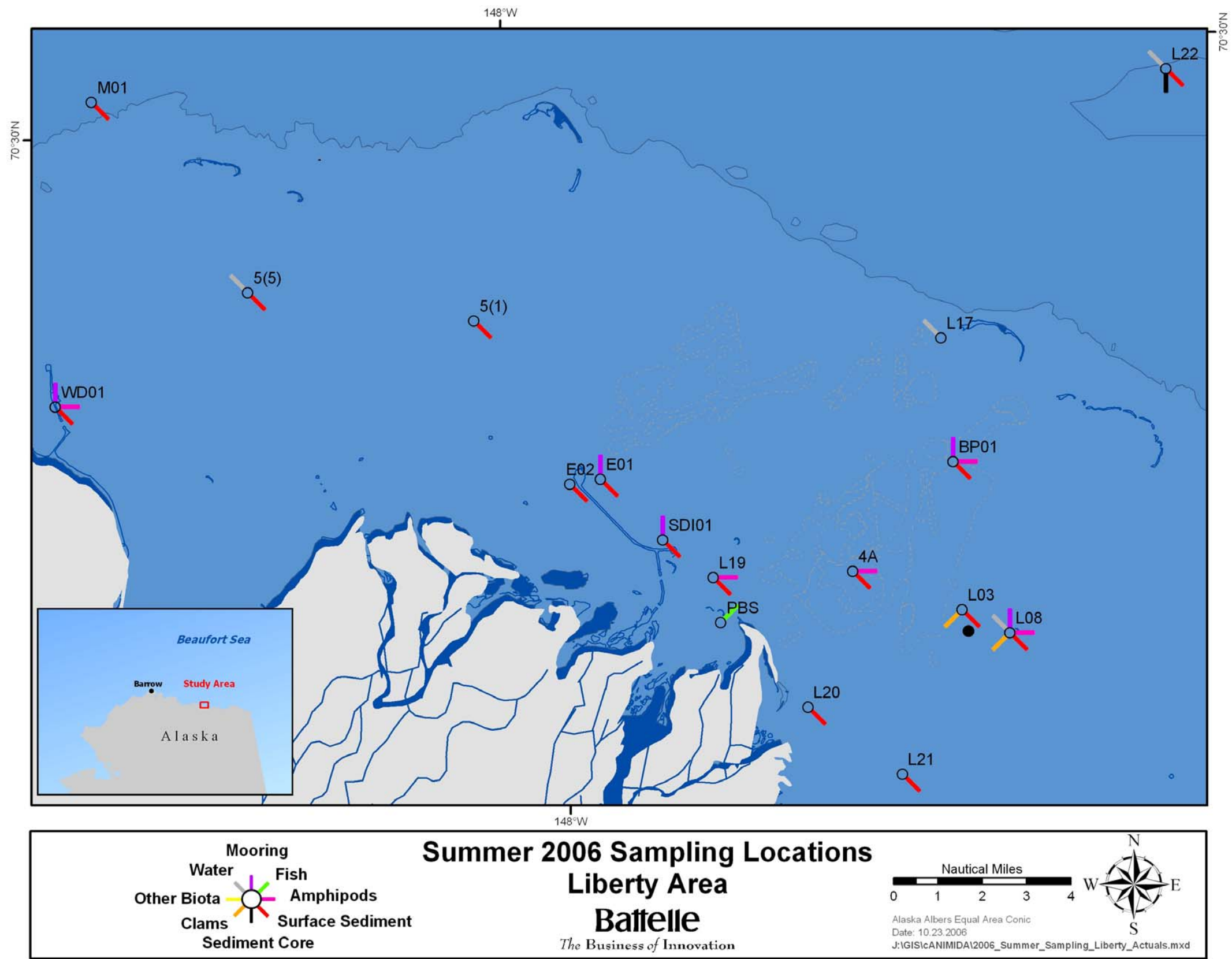


Figure 3. Liberty Area Sampling Locations, Summer 2006.

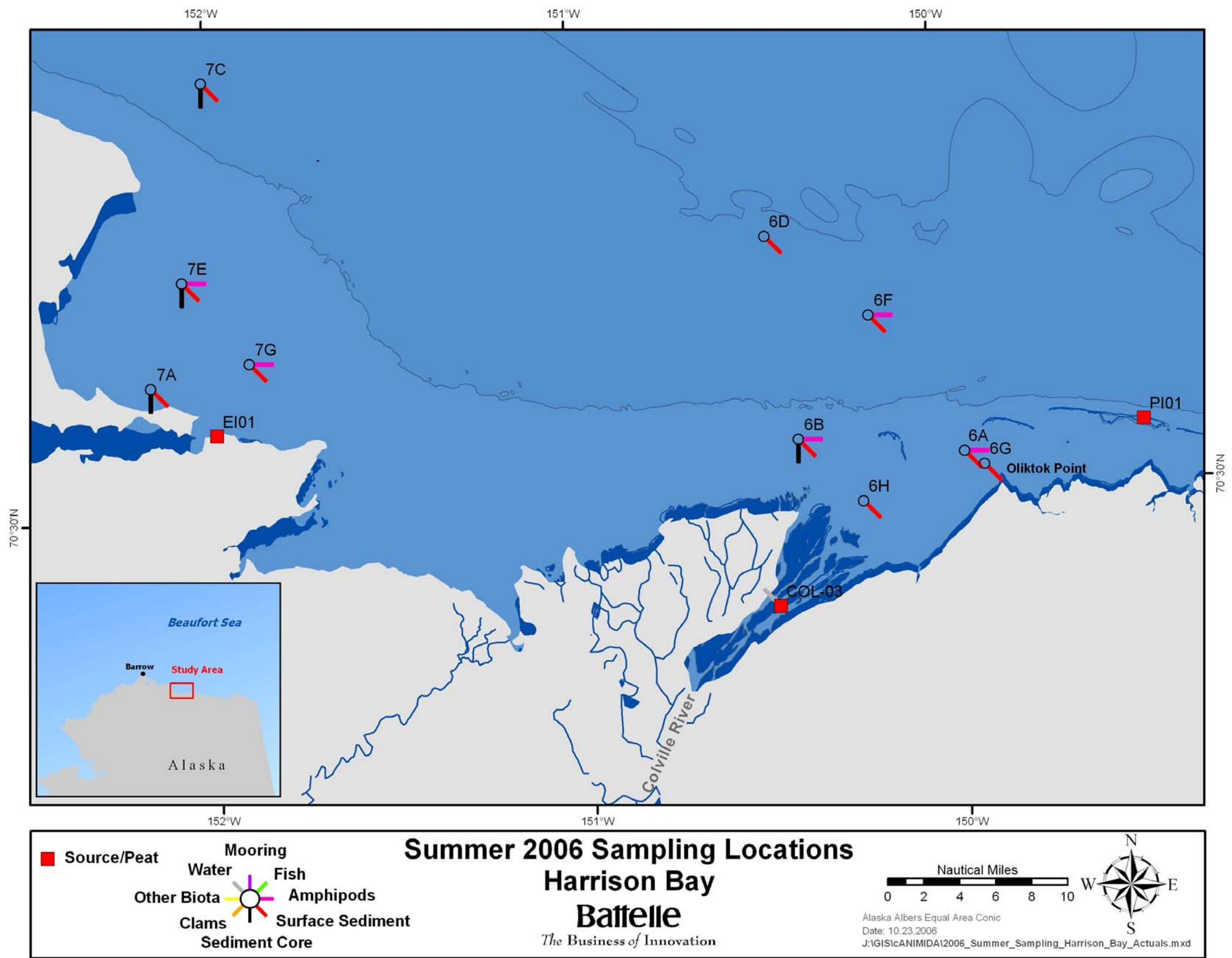


Figure 4. Harrison Bay Sampling Locations, Summer 2006.

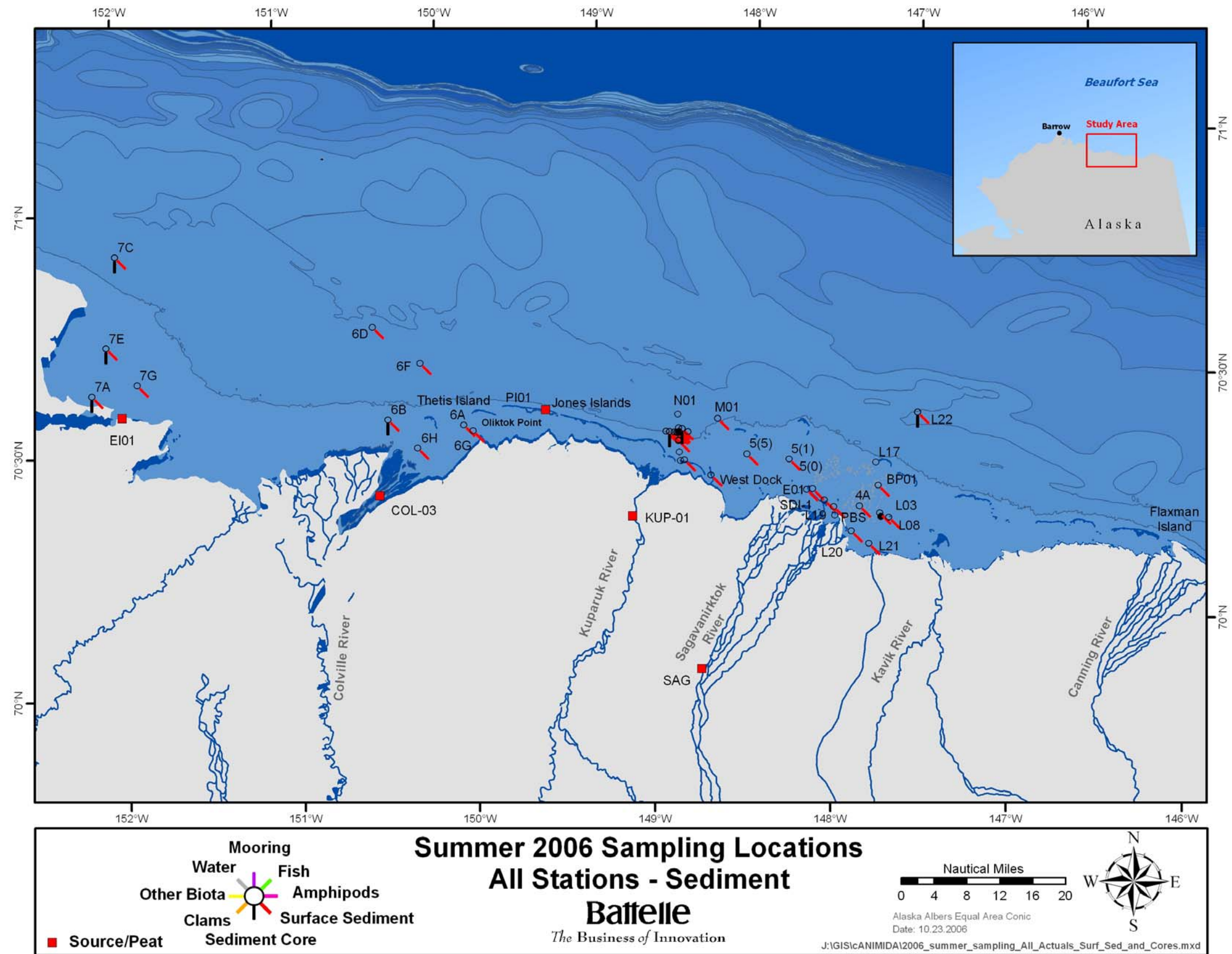


Figure 5. Sediment and Core Sampling Locations, Summer 2006.

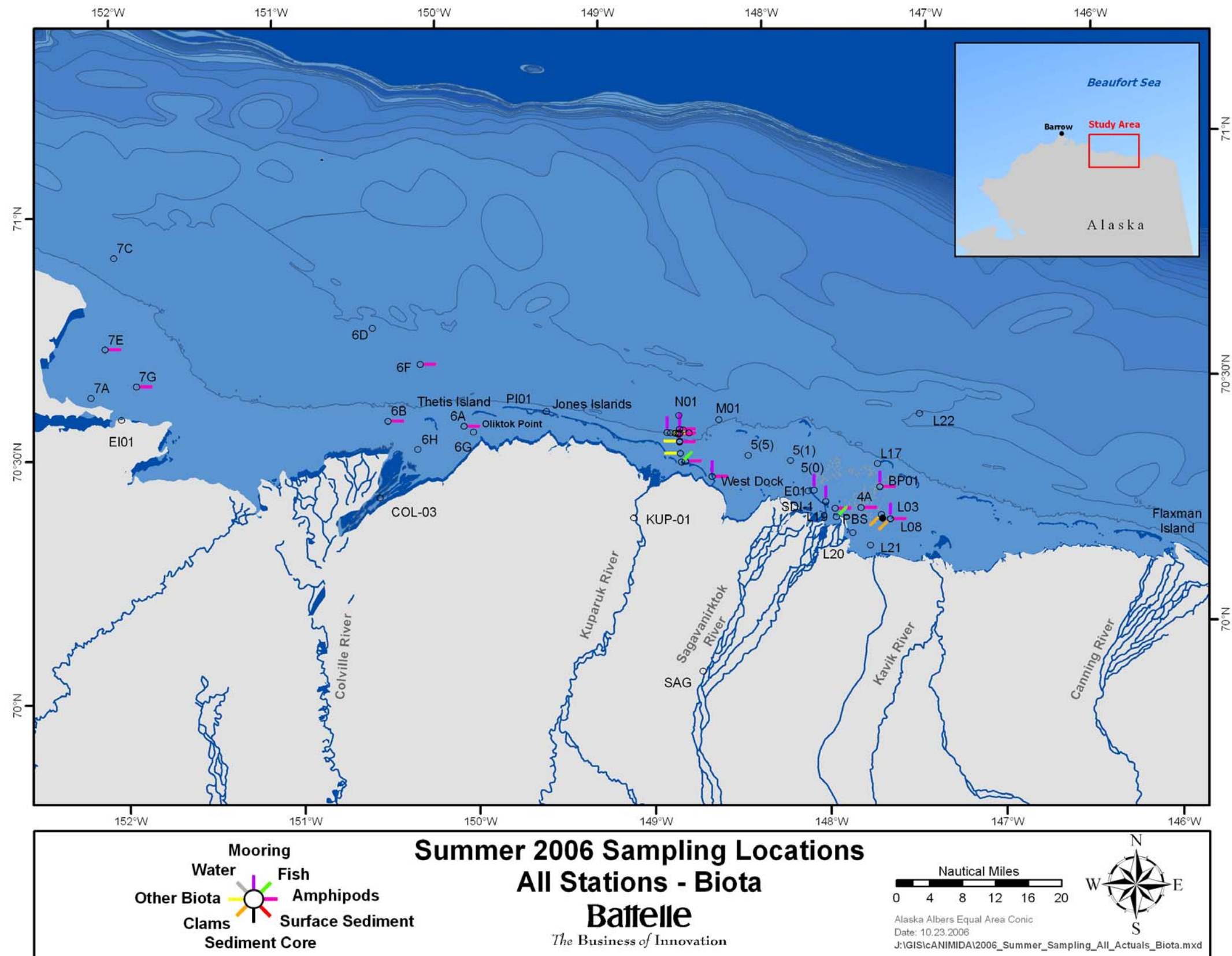


Figure 6. Mussel Moorings and Indigenous Biota Sampling Locations, Summer 2006.

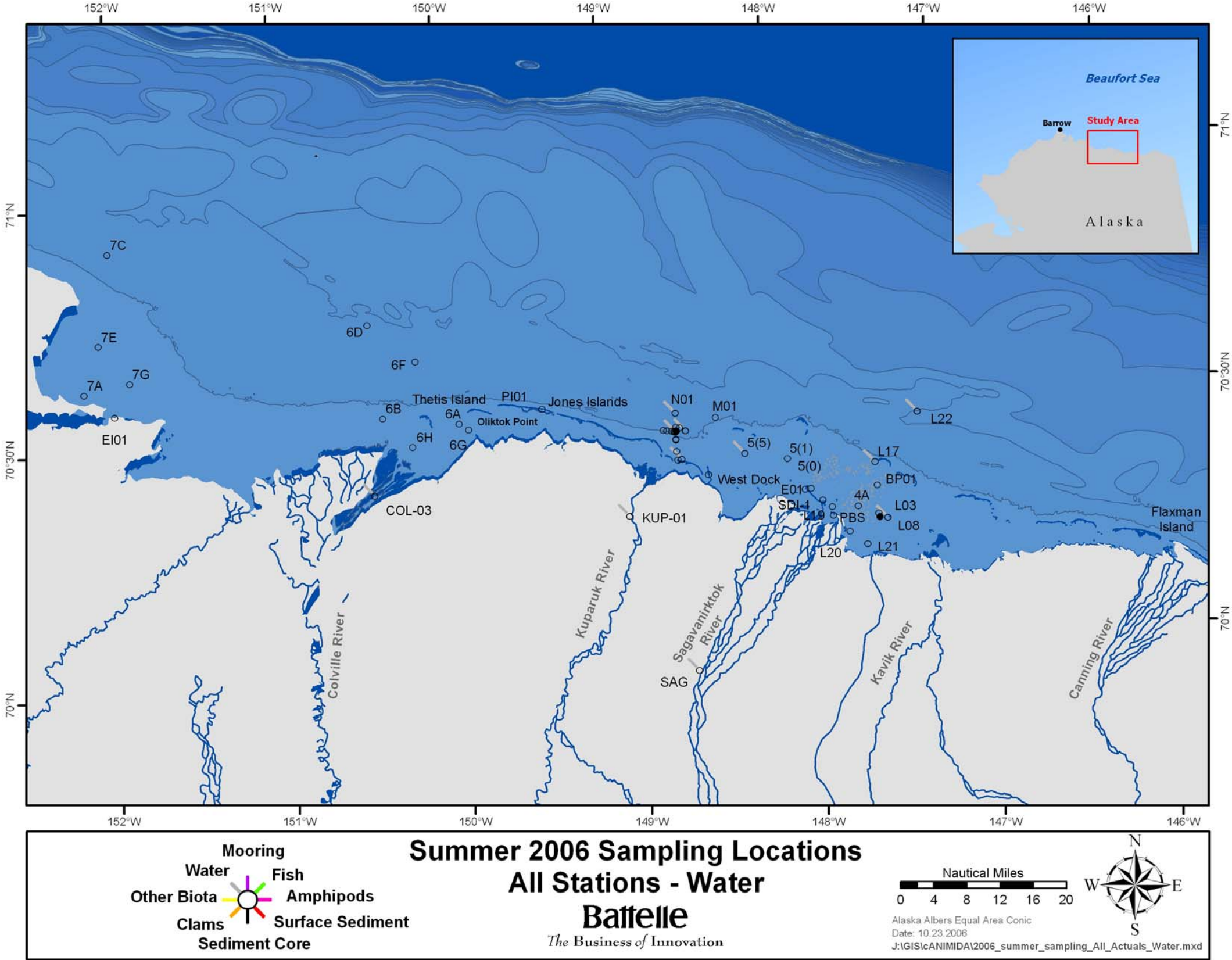


Figure 7. Water Sampling Locations, Summer 2006.

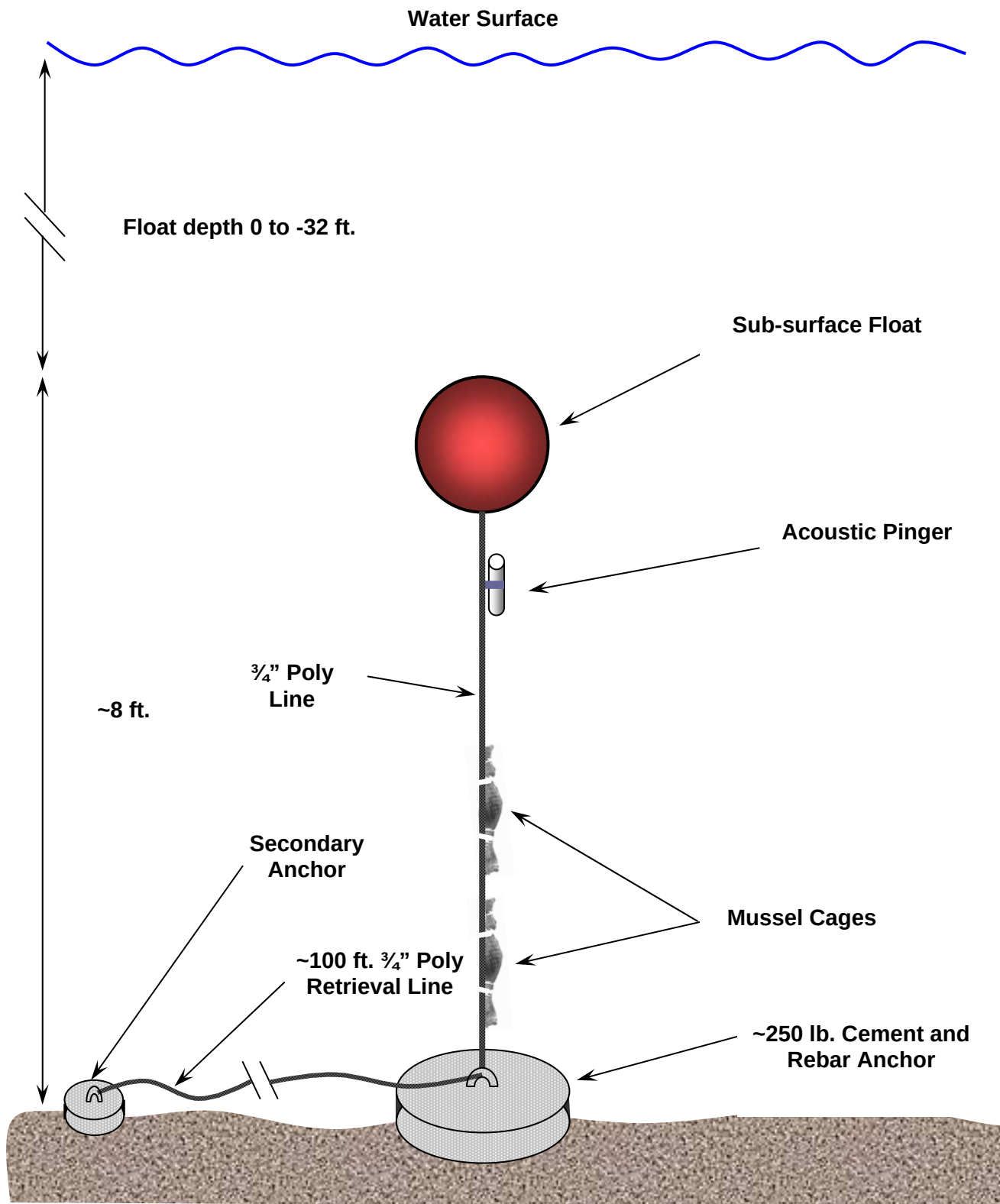


Figure 8. Schematic of the Mussel Cage and Mooring String

Attachment 1: 2006 Station Logs

Section 1: Daily Operations Logs

Section 2: Sediment Collection Logs

Section 3: Water, Plankton, and Indigenous Biota Collection Logs

Section 4: Mussel Collection Logs

Section 5: Fish Collection Logs

Attachment 2: 2006 Collection Permit and Fish Transfer Permit



STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
P.O. Box 25526
JUNEAU, ALASKA 99802-5526

Permit No. CF-06-074

Expires 08/31/2006

FISH RESOURCE PERMIT
(For Scientific/Educational Purposes)

This permit authorizes John Hardin (whose signature is required on page 2 for permit validation)
person
of Battelle Memorial Institute at 703 Palomar Airport Rd, Suite 350, Carlsbad, CA 92009
agency or organization address

to conduct the following activities from July 1, 2006 to August 31, 2006 in accordance with AS 16.05.930 and AS 16.05.340(b).

Purpose: To collect target species of shellfish and amphipods for tissue analysis of petroleum hydrocarbons and trace metals in order to evaluate concentration levels of hydrocarbons in the near-shore biota of the Beaufort Sea; to examine the potential bioaccumulation of organic compounds in the water column by deploying caged mussels and analyzing them for organics and metals, and to collect target species of fish for tissue analysis of petroleum hydrocarbons, trace metals, biomarker CYP1A, and biomarker bile FAC in order to evaluate contaminant exposure of fish in the near-shore Beaufort Sea.

Location: Nearshore Beaufort Sea, 12-20 stations from Bulletin Point to Western Harrison Bay, concentrating around the Northstar Production Island and Liberty Development Area.

Species Collected: **Collect & Sacrifice:** 300 astarte clams, 600 cyrtodaria clams, 600 mysids, 5000 amphipods, 10 Dolly Varden, 20 Arctic cisco, 10 broad whitefish, 20 least cisco, 10 humpback whitefish, 40 four horn sculpin, 10 Arctic cod, 10 Arctic flounder, 20 snailfish.
Collect, transport, caged release & sacrifice: 380 blue mussels (see Contingencies).

REPORT DUE September 30, 2006. The report shall include species, numbers, dates, and locations of collection and disposition, and if applicable, sex, age, and breeding condition, and lengths and weights of fish. The report shall also include other information as may be required under the contingencies section.

GENERAL CONDITIONS, EXCEPTIONS AND RESTRICTIONS

1. This permit must be carried by person(s) specified during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable and will be revoked or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No redelegation of authority may be allowed under this permit unless specifically noted.
2. No specimens taken under authority hereof may be sold or bartered. All specimens must be deposited in a public museum or a public scientific or educational institution unless otherwise stated herein. Subpermittees shall not retain possession of live animals or other specimens.
3. The permittee shall keep records of all activities conducted under authority of this permit, available for inspection at all reasonable hours upon request of any authorized state enforcement officer.
4. Permits will not be renewed until detailed reports, as specified above, have been received by the department.
5. **UNLESS SPECIFICALLY STATED HEREIN, THIS PERMIT DOES NOT AUTHORIZE the exportation of specimens or the taking of specimens in areas otherwise closed to hunting and fishing; without appropriate licenses required by state regulations; during closed seasons; or in any manner, by any means, at any time not permitted by those regulations.**


Division of Commercial Fisheries


Deputy Director
Division of Commercial Fisheries
Alaska Department of Fish and Game

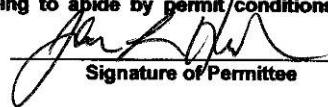
CF-06-074 continued (page 2 of 2)

Authorized Personnel: The following personnel may participate in collecting activities under terms of this permit:

John Hardin, Dick Prentki, John Trefry, Mark Savioe, Bob Trocine, Gary Lawley, Rob Rember, Mike Walsh, Carrie Semmler, Mark Mertz, Matt Alkire, Other KLI field personnel (TBA).

Contingencies:

- 1) **Fred Bue** (Division of Commercial Fisheries, Fairbanks, 907-459-7217) must be contacted **prior** to you engaging in collecting activities. Division of Commercial Fish Area Management Biologists have the right to specify methods for collecting, as well as limiting the collections of any species, and the number of specimens collected by time and area.
- 2) All unattended collecting gear must be labeled with the permittee's name, telephone number, and permit number.
- 3) Invertebrates, especially sessile invertebrates, should be collected over a broad geographical area to avoid local depletion and disruption of local ecosystems.
- 4) Permits will indicate the number of specimens that may be taken, by species and life stage. Sampling or collecting activities must stop when the maximum allowable number of specimens is obtained. All live fish, shellfish, and aquatic plants collected in excess of the number specified on the permit must be released immediately and unharmed at the capture location, unless otherwise specified in the permit.
- 5) All bycatch incidentally captured during sampling will be identified, recorded and released unharmed if possible. Bycatch data should be included in the collection report.
- 6) This permit will fulfill the requirements of 5AAC 41.005 – 41.060 pertaining to fish transport permits (FTP's), with the condition that the transported species **BE DESTROYED AND NOT BE RELEASED**.
- 7) *A copy of this permit, including any amendments, must be made available at all field collection sites and project sites for inspection upon request by a representative of the department or a law enforcement officer.*
- 8) Issuance of this permit does not absolve the permittee from compliance in full with any and all other applicable federal, state, or local laws regulations, or ordinances.
- 9) **A report of activities, referenced to this fish resource permit number, must be submitted to the Alaska Department of Fish and Game, Division of Commercial Fish, PO Box 115526, Juneau, AK 99811-5526, attention Sara Larsen (465-4724; sara_larsen@fishgame.state.ak.us), within 30 days after the expiration of this permit.** This report must summarize the number of fish captured by location and by species, and the fate of those fish. A report is required whether or not collecting activities were undertaken. A report must also be sent to the Biologist(s) listed under number 1 in this Contingencies section.
- 10) **PERMIT VALIDATION requires permittee's signature agreeing to abide by permit/conditions before beginning collecting activities:**


Signature of Permittee

cc: Bonnie Borba
Fred Bue
Ted Meyers
Gene Sandone
CF Division Files
Alaska Bureau of Wildlife Enforcement-Coldfoot