

# Summer in the Western Beaufort Sea:

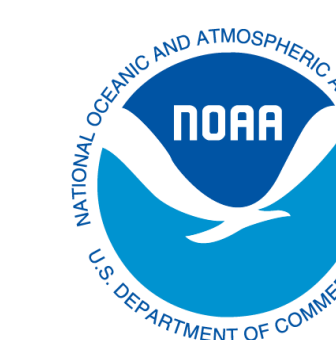
## Results from Aerial Surveys of Arctic Marine Mammals, July and August, 2012

Megan Ferguson<sup>1\*</sup>, Janet Clarke<sup>2</sup>, Rebecca Shea<sup>1</sup>, Amelia Brower<sup>1</sup>, and Cynthia Christman<sup>1</sup>

<sup>1</sup> National Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS, NOAA, Seattle, WA, USA

<sup>2</sup> Ocean Sciences Division, SAIC, Buckley, WA, USA

\* Megan.Ferguson@noaa.gov



NOAA  
FISHERIES

BOEM  
BUREAU OF OCEAN ENERGY MANAGEMENT

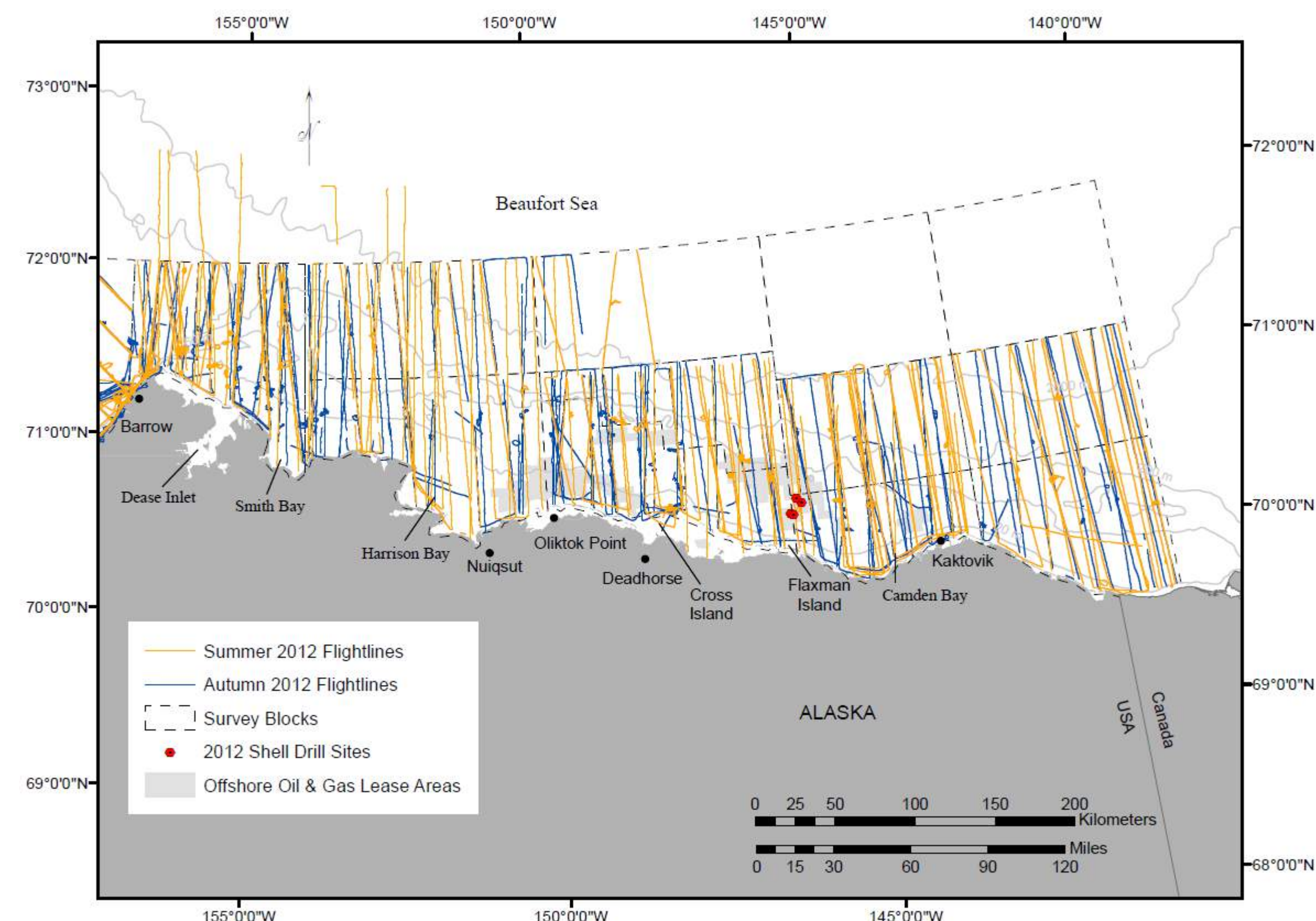
### Abstract

The lengthened open water season and reduced sea ice coverage in the Arctic foretell increased human activities in this region, including shipping, fishing, recreation, and oil and gas exploration, development, and production. In order to minimize and mitigate the effects of anthropogenic activities on arctic marine mammals, information on marine mammal ecology is needed for all seasons in which activities could occur. Aerial surveys have proven effective for studying the distribution and behavior, and inferring the density, of arctic marine mammals within large study areas. Since 1987, broad-scale aerial survey coverage in the western Beaufort Sea has been mainly limited to the months of September and October. Between 8 July and 22 October, 2012, the Aerial Surveys of Arctic Marine Mammals (ASAMM) project, funded by BOEM and conducted by NOAA, conducted line-transect surveys for marine mammals over a vast (~107,600 km<sup>2</sup>) study area in the western Beaufort Sea (140°W to 157°W, from the coast to 72°N). In summer (July and August) 2012, ASAMM flew 26

surveys in this region, including over 14,000 km on transect, with total summer flight effort amounting to over 28,500 km. Bowhead whales were found on 13 days, distributed primarily along the outer continental shelf, in 61 sightings totaling 118 whales, including 11 calves. Belugas were found on 22 days, distributed primarily over the continental slope, in 395 sightings totaling 2253 individuals. Gray whales (29 sightings, 60 individuals, including 4 calves) were sighted on five days, near Barrow Canyon. Walrus (28 sightings, 923 individuals) were sighted on four days, near Barrow Canyon and over the continental slope in the western half of the region. Polar bears (11 sightings, 28 individuals, including 4 cubs or yearlings) were sighted on four days: 20 bears were found on Cross Island, 4 were located on barrier islands east of Kaktovik, and 4 were sighted swimming between 10 to 85 km offshore. One sighting of 13 killer whales (including 2 calves) was found near Barrow. These data help fill an important information gap into marine mammal ecology during the summer in the western Beaufort Sea.

### Study Area and Survey Methods

- Survey Dates:** One survey team was stationed at Barrow, AK, from 30 June to 28 October 2012. A second team was stationed at Deadhorse, AK, from 18 July to 19 October 2012.



ASAMM 2012 summer (July – August) and autumn (September – October) transect, search, and circling effort in the western Beaufort Sea.

- Survey Team:** Two primary marine mammal observers, and one data recorder and two pilots who also served as secondary observers.
- Aircraft:** Two twin turbine Aero Commander 690A aircraft, with bubble windows for primary observers.
- Survey Altitude and Speed:** 305-457 m (1000-1500 ft); 204 km/hr (110 kts).
- Survey Protocol:** Observers collected standard line-transect data on all marine mammals sighted and environmental data during transect, search, and circling survey modes. Data collected included: species identification; group size; number of calves or cubs present; angle of declination to sighting; side of plane; Beaufort sea state; visibility range (distance); impediments to visibility; percent sea ice cover; and sea ice type.

### Summer 2012 Results

- The aircraft diverted from transect for most cetacean sightings to confirm species identification, estimate group size, and determine whether calves were present. Without circling, 90.9% of bowhead whale, 5.7% of beluga, 25% of gray whale, and 100% of killer whale calves would not have been sighted during the summer surveys (Table 1).

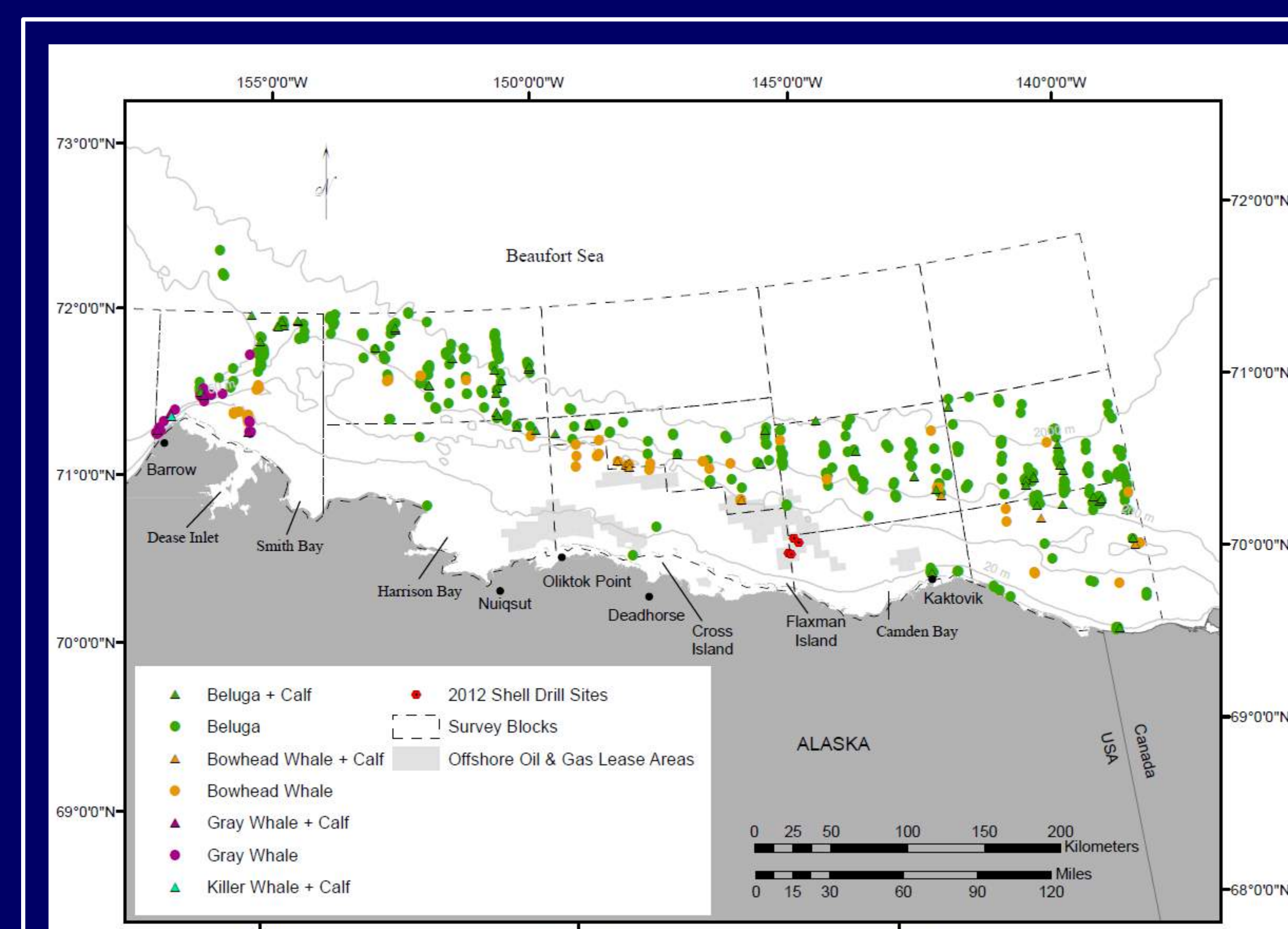
Table 1. ASAMM marine mammal sightings made during transect, search, and circling effort in the western Beaufort Sea during the summer (July and August) of 2012.

Species	Number Sightings	Number Individuals	Number Calves or Cubs	Number Calves or Cubs First Sighted on Circling	Number of Days Sighted	Sighting Date Range
Bowhead Whale	61	118	11	10	13	8 Jul to 26 Aug 2012
Beluga	395	2253	69	4	22	8 Jul to 29 Aug 2012
Gray Whale	29	60	4	1	5	10 Jul to 20 Aug 2012
Killer Whale	1	13	2	2	1	20 Aug 2012
Walrus	28	923	0	NA	4	23 Jul to 20 Aug 2012
Polar Bear	11	28	4	0	4	5 to 25 Aug 2012



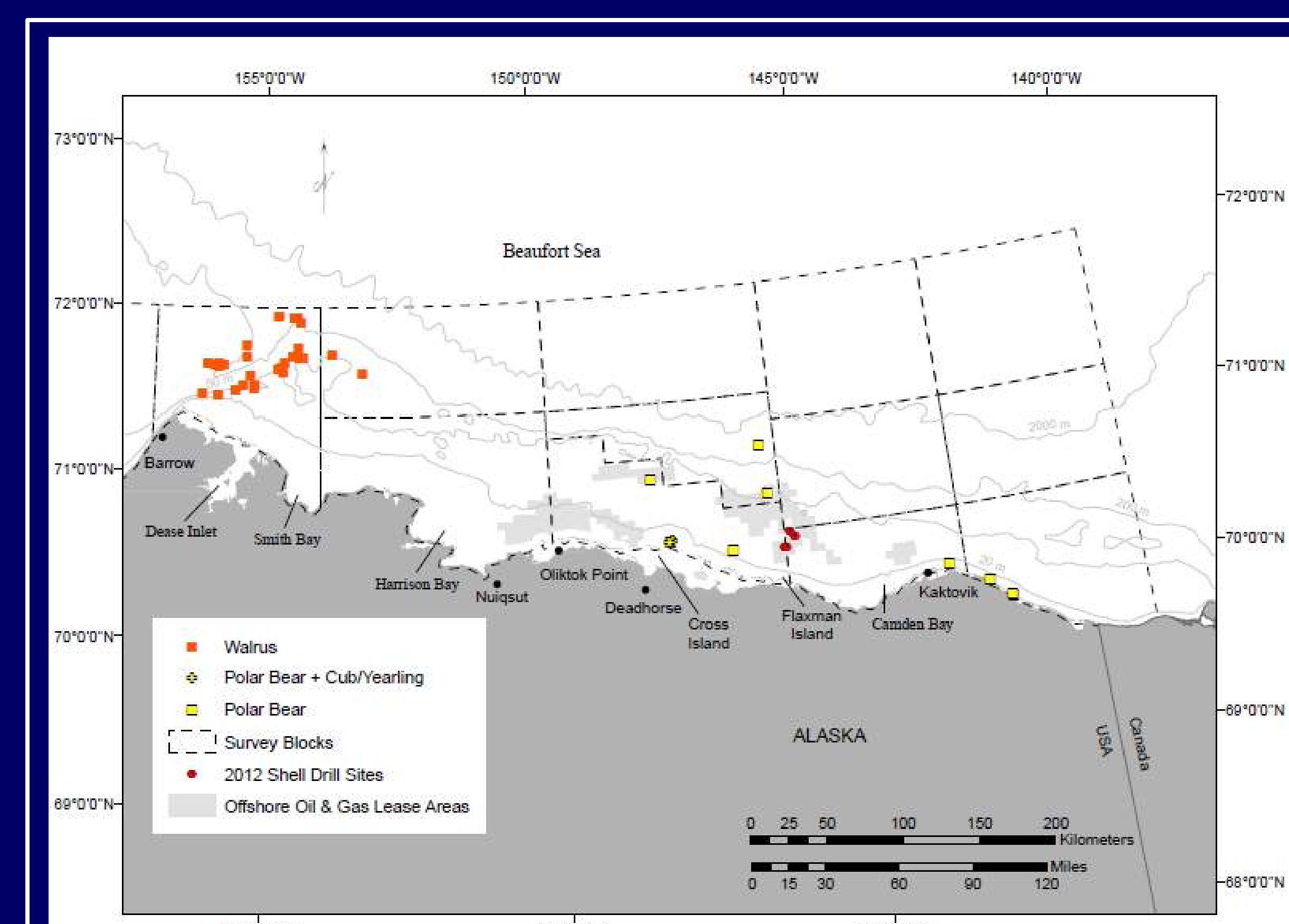
Photos by Cynthia Christman, NMFS permit NA12AP

### More Summer 2012 Results



ASAMM 2012 summer sightings of cetaceans from transect, search, and circling effort.

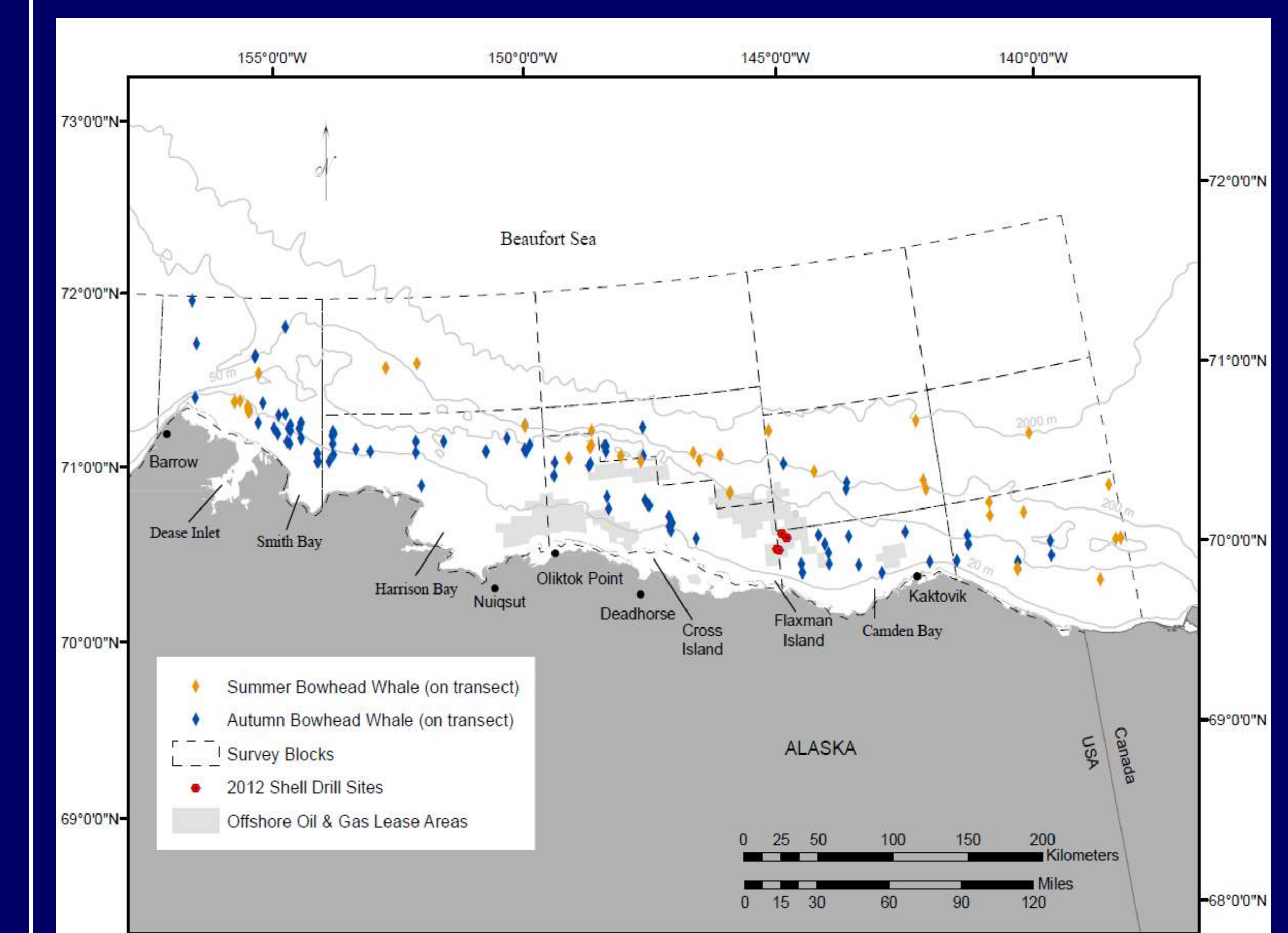
- Bowhead whales and belugas were sighted across the continental slope (~200-2000 m).
- Bowhead, gray, and killer whales and belugas were found near Barrow Canyon.
- 11 bowhead whale, 4 gray whale, 2 killer whale, and 4 beluga calves were sighted (see also Table 1).



ASAMM 2012 summer sightings of polar bears and walrus from transect, search, and circling effort.

- Walrus sightings were limited to the waters over Barrow Canyon.
- Polar bears were found on Cross Island (20 bears), the barrier islands east of Kaktovik (four bears), and swimming between 10 and 85 km offshore (four bears).
- Four polar bear cubs or yearlings were sighted.

### Bowhead Whales in Summer vs. Autumn 2012



ASAMM 2012 summer and autumn bowhead whale sightings from transect effort.

- During the summer in the eastern portion (140°W to 154°W) of the Beaufort Sea study area, bowhead whales were encountered most frequently over the outer continental shelf (51-200 m) (Table 2).
- During the summer in the western portion (154°W to 157°W) of the Beaufort Sea study area, bowhead whales were encountered most frequently in shallow waters (0-20 m) (Table 2).
- During the autumn, bowhead whales were encountered most frequently over the inner continental shelf (21-50 m) across the Beaufort Sea study area (Table 2).

Table 2. Summary of summer (July - August) and autumn (September - October) bowhead whale sightings by depth zone in the Beaufort Sea during 2012.

Region	Summer				Autumn			
	TOTAL Transect Km	Transect Sightings	Transect Whales	WPUE (whales/km)	TOTAL Transect Km	Transect Sightings	Transect Whales	WPUE (whales/km)
<b>154W-157W</b>								
0-20 m	472	8	25	0.0529	424	14	17	0.0401
21-50 m	503	0	0	0.0000	484	5	6	0.0124
51-200 m	1412	1	1	0.0007	1018	4	4	0.0039
201-2000 m	301	0	0	0.0000	232	1	1	0.0043
<b>140W-154W</b>								
0-20 m	1431	0	0	0.0000	1290	9	11	0.0085
21-50 m	3569	13	18	0.0050	3578	46	56	0.0157
51-200 m	2199	8	16	0.0073	1809	4	5	0.0028
201-2000 m	3468	9	11	0.0032	2215	3	3	0.0014
>2000 m	1480	0	0	0.0000	784	0	0	0.0000
<b>Total Beaufort Sea</b>	<b>14836</b>	<b>39</b>	<b>71</b>	<b>0.0048</b>	<b>11834</b>	<b>86</b>	<b>103</b>	<b>0.0087</b>

### Acknowledgements

This study was funded by BOEM through inter-agency agreement M11PG00033 with the Alaska Fisheries Science Center, NOAA, Department of Commerce. Jeffrey Denton at BOEM provided valuable oversight and logistical help. The Alaska Beluga Whale Committee provided the ASAMM team with additional financial support for surveys designed specifically to study the Eastern Chukchi Sea beluga stock from 30 June to 12 July, 2012. At NMML, additional support was provided by Robyn Angliss, Phil Clapham, Stefan Ball, and administrative and travel personnel. In addition to the authors, our 2012 team leaders included Amy Kennedy, Brenda Rone, and Christy Sims. Thanks to our 2012 field observers Corey Accardo, Lisa Barry, Vicki Beaver, Jessica Crance, Pete Duley, Heather Foley, Jennifer Gatzke, Stephanie Grassia, Allison Henry, Jessica Thompson, Dan Twyman, Karen Vale, and Linda Vate Bratstrom. Thanks to Clearwater Air, Inc., especially Andy Harcombe, Stan Churches, Jim Kopezynski, Alex Shibakov, and Jake Turner for keeping ASAMM in the air. Real-time flight following via satellite link was provided by Department of Interior personnel Jan Bennett and Lark Wuerth. Programming support was provided by Mike Hay (Xera GIS).