

Eastern North Pacific Gray Whales and Minke Whales from Aerial Surveys in the Alaskan Arctic, Summer and Fall 2011

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Abstract

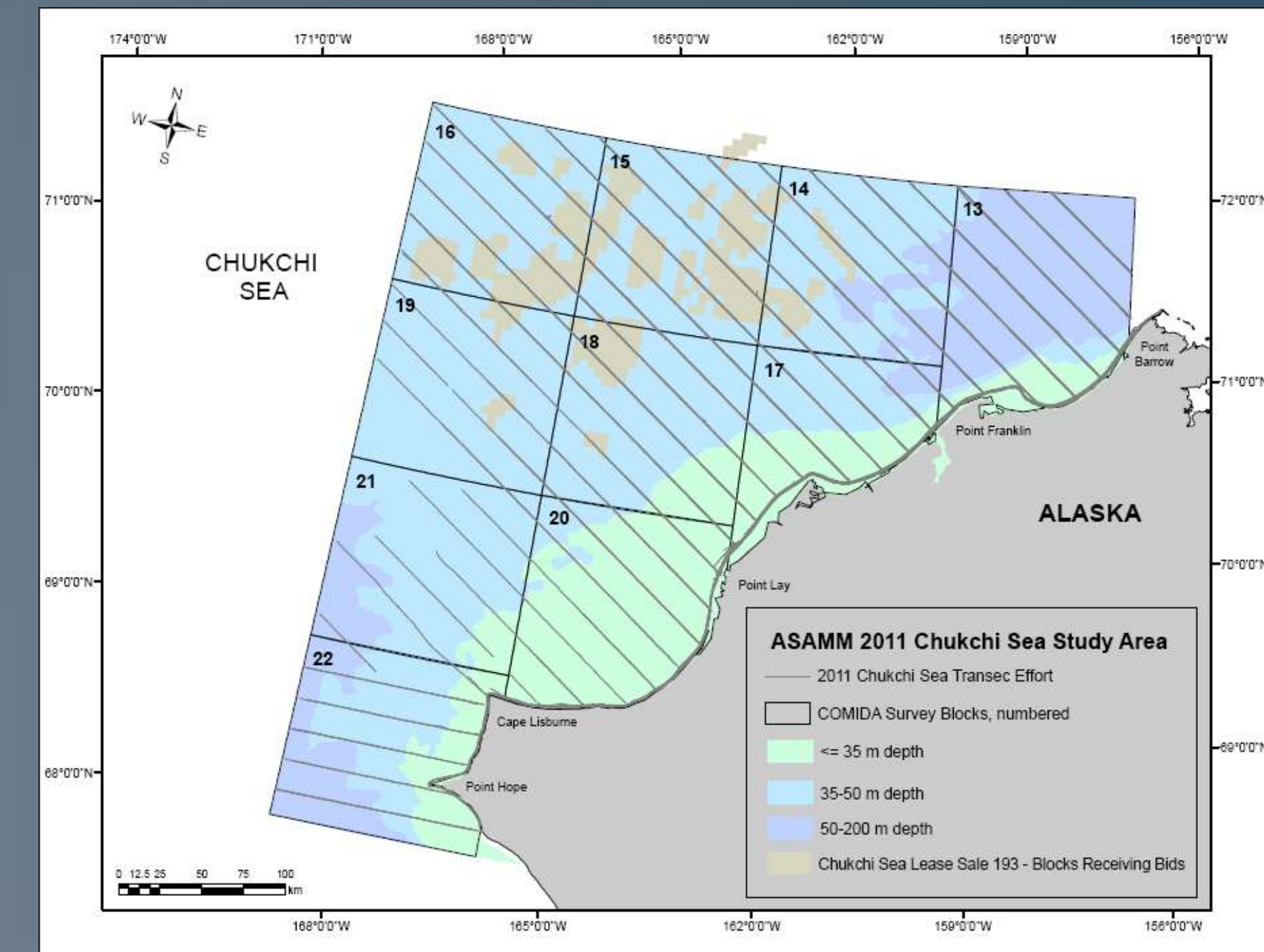
Aerial surveys were conducted in the northeastern Chukchi Sea from mid-June to late October, 2011, as part of the Aerial Surveys of Arctic Marine Mammals project funded by the Bureau of Ocean Energy Management. The study area covered 140°W to 169°W and 68°N to 72°N. Gray whales were sighted nearshore between Point Barrow and Point Lay, and offshore of Point Hope, both locations where gray whales have been observed in high densities historically (1982-1991) and in recent years (2008-2010). As in recent years, few gray whales were sighted near Hanna Shoal in 2011, an area of high densities in historical years. Gray whale calves, not observed in every year, were frequently sighted, particularly during the months of June and July. Several minke whales were sighted in both nearshore and offshore areas, including one sighting that may be the furthest north documented to date. Prior to 2011, minke whales had not been documented north of Point Hope by these aerial surveys, although they have been detected by passive acoustics and reported by industry-sponsored marine mammal observers, U.S. Fish and Wildlife Service and other sources in the Chukchi Sea. Results from these surveys indicate that the northeastern Chukchi Sea remains an important habitat and feeding ground for the Eastern North Pacific stock of gray whales; furthermore, there is increasing evidence that minke whales may be expanding their range north.

Methods and Survey Effort

Transect flightlines for the northeastern Chukchi Sea portion of the study area (157°W to 169°W) lie perpendicular to the coastline, cutting across isobaths, prevailing currents, and expected gradients in marine mammal density. A coastal transect between Point Barrow and Point Hope was regularly flown 1 km offshore and parallel to the coast. Survey effort was designated as “on effort” (transect), “off effort” (search and circling) or deadhead. Gray whale sighting rates incorporate only transect effort sightings; search and transect effort sightings are included in the analyses of gray whale calves and minke whales.

Total distance (km) per survey block or depth zone for transect flightlines only was calculated by clipping transects to polygons defined by either survey block boundaries or isobaths. Sighting rates (whales per unit effort, WPUE) were calculated for gray whales as the number of whales per transect kilometer (Tr-km) surveyed for survey blocks and depth zones. Sighting rates were not corrected for availability or perception bias.

Surveys were conducted in a twin turbine Aero Commander at a targeted altitude of 1200 ft (366 m) and a speed of 110 kts (204 km/h). In the Chukchi Sea, 60 survey flights covering a total of ~27,000 km on transect were conducted from 16 June to 21 October.



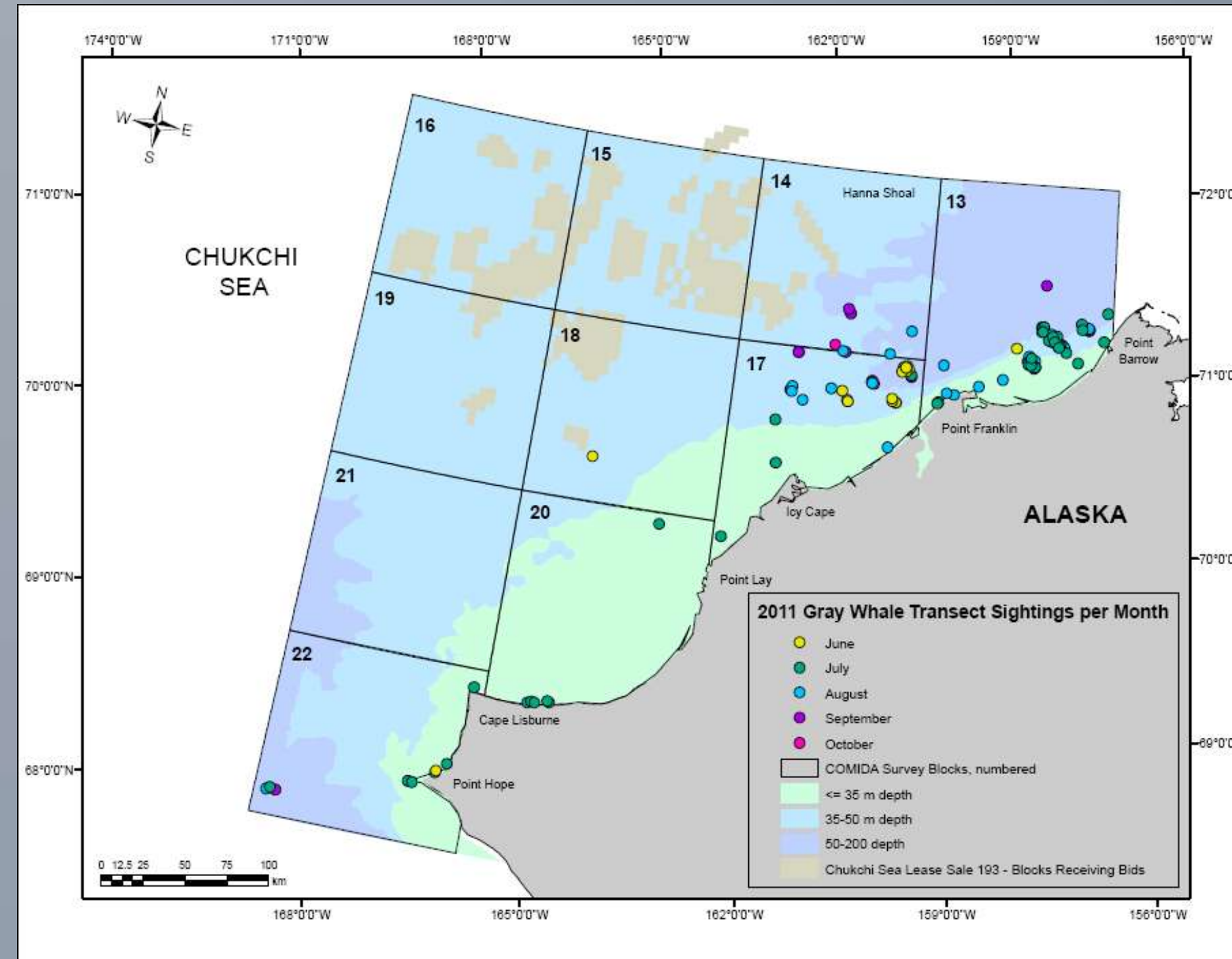
Gray Whales (*Eschrichtius robustus*)

Sighting Summary

There were 131 sightings of 180 gray whales on effort in the Chukchi Sea. When off effort sightings were included, this increased to 234 sightings of 330 animals. These sightings spanned all months surveyed; the highest sighting numbers were in July. Despite extensive survey effort in the Alaskan Beaufort Sea from mid-August through the end of October, no gray whales were sighted there.

Sighting Distribution

Gray whale sightings in 2011 from Point Barrow to Point Franklin were primarily <50 km from shore. From Point Franklin to Point Lay, and west of Point Hope, sightings ranged up to 100 km from shore. Scattered sightings were nearshore around Cape Lisburne and Point Hope. This distribution of gray whales was similar to other recent (2008-2010) and historical (1982-1991) years, with a few notable differences. In historical years, gray whales were often documented feeding near Hanna Shoal, but they have not been sighted there since 2008. Prior to 2011, few gray whales had been sighted 50-100 km from shore between Point Franklin and Icy Cape.



Sighting Rate per Survey Block

Block	JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				TOTAL			
	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE
13	695	2	3	0.0043	1474	23	34	0.0231	1363	18	21	0.0154	2089	20	27	0.0129	1042	5	6	0.0058	6662	68	91	0.0137
14	590	0	0	0.0000	277	0	0	0.0000	630	3	5	0.0079	990	2	3	0.0030	318	1	2	0.0063	2804	6	10	0.0036
15	497	0	0	0.0000	311	0	0	0.0000	528	0	0	0.0000	923	0	0	0.0000	309	0	0	0.0000	2567	0	0	0.0000
16	315	0	0	0.0000	67	0	0	0.0000	226	0	0	0.0000	956	0	0	0.0000	109	0	0	0.0000	1672	0	0	0.0000
17	345	12	19	0.0550	927	6	9	0.0097	1663	12	14	0.0084	1290	9	14	0.0109	536	2	2	0.0037	4762	41	58	0.0122
18	317	1	1	0.0032	453	0	0	0.0000	520	0	0	0.0000	768	0	0	0.0000	197	0	0	0.0000	2254	1	1	0.0004
19	249	0	0	0.0000	31	0	0	0.0000	330	0	0	0.0000	208	0	0	0.0000	107	0	0	0.0000	924	0	0	0.0000
20	530	0	0	0.0000	793	6	7	0.0088	1075	0	0	0.0000	354	0	0	0.0000	284	0	0	0.0000	3036	6	7	0.0023
21	251	0	0	0.0000	196	0	0	0.0000	26	0	0	0.0000	0	0	0	0.0000	27	0	0	0.0000	500	0	0	0.0000
22	333	1	1	0.0030	450	6	10	0.0222	503	1	1	0.0020	541	1	1	0.0018	0	0	0	0.0000	1827	9	13	0.0071
Total	4121	16	24	0.0058	4979	41	60	0.0121	6864	34	41	0.0060	8117	32	45	0.0055	2927	8	10	0.0034	27008	131	180	0.0067

The highest sighting rates were in Blocks 13 (0.0137 WPUE), 17 (0.0122 WPUE), and 22 (0.0071 WPUE). These results are similar to 2008-2010, although sighting rate was highest in Block 17 from 2008-2010. In historical years, Block 14 (containing the Hanna Shoal area) had a moderately high sighting rate (0.0048 WPUE), which has not been reproduced in recent years. Historically, Block 22 had a much higher sighting rate (0.0313) than any other block. The survey block with the highest sighting rate in each time period is represented in bold and italics.

Sighting Rate per Depth Stratum

Depth Stratum (m)	JUNE				JULY				AUGUST				SEPTEMBER				OCTOBER				TOTAL			
	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE	Tr-km	Sightings	Whales	WPUE
0-35	950	1	1	0.0011	2412	22	33	0.0137	3339	10	13	0.0039	2403	2	6	0.0025	992	1	1	0.0010	10096	36	54	0.0053
36-50	2327	8	14	0.0060	1562	10	13	0.0083	2647	11	12	0.0045	4188	21	28	0.0067	1172	2	4	0.0034	11895	52	71	0.0060
51-200	796	7	9	0.0113	963	9	14	0.0145	803	13	16	0.0199	1447	9	11	0.0076	760	5	5	0.0066	4770	43	55	0.0115
Total	4073	16	24	0.0059	4937	41	60	0.0122	6789	34	41	0.0060	8038	32	45	0.0056	2924	8	10	0.0034	26761	131	180	0.0067

The depth stratum with the highest sighting rate was the 51-200 m stratum (0.0115 WPUE), similar to 2008-2010 (0.0086 WPUE). This differs from historical years in which the highest sighting rate was in the ≤35 m stratum (0.0075 WPUE). The survey block with the highest sighting rate in each time period is represented in bold and italics.

Habitat

Gray whales (including feeding whales and cow/calf pairs) were observed on- and off-effort in up to 70% sea ice cover in the month of June, suggesting that sea ice does not impede gray whale occurrence. However, 65% of sightings occurred in 0% sea ice after the beginning of July when the ice had disappeared from the area.

Behavior

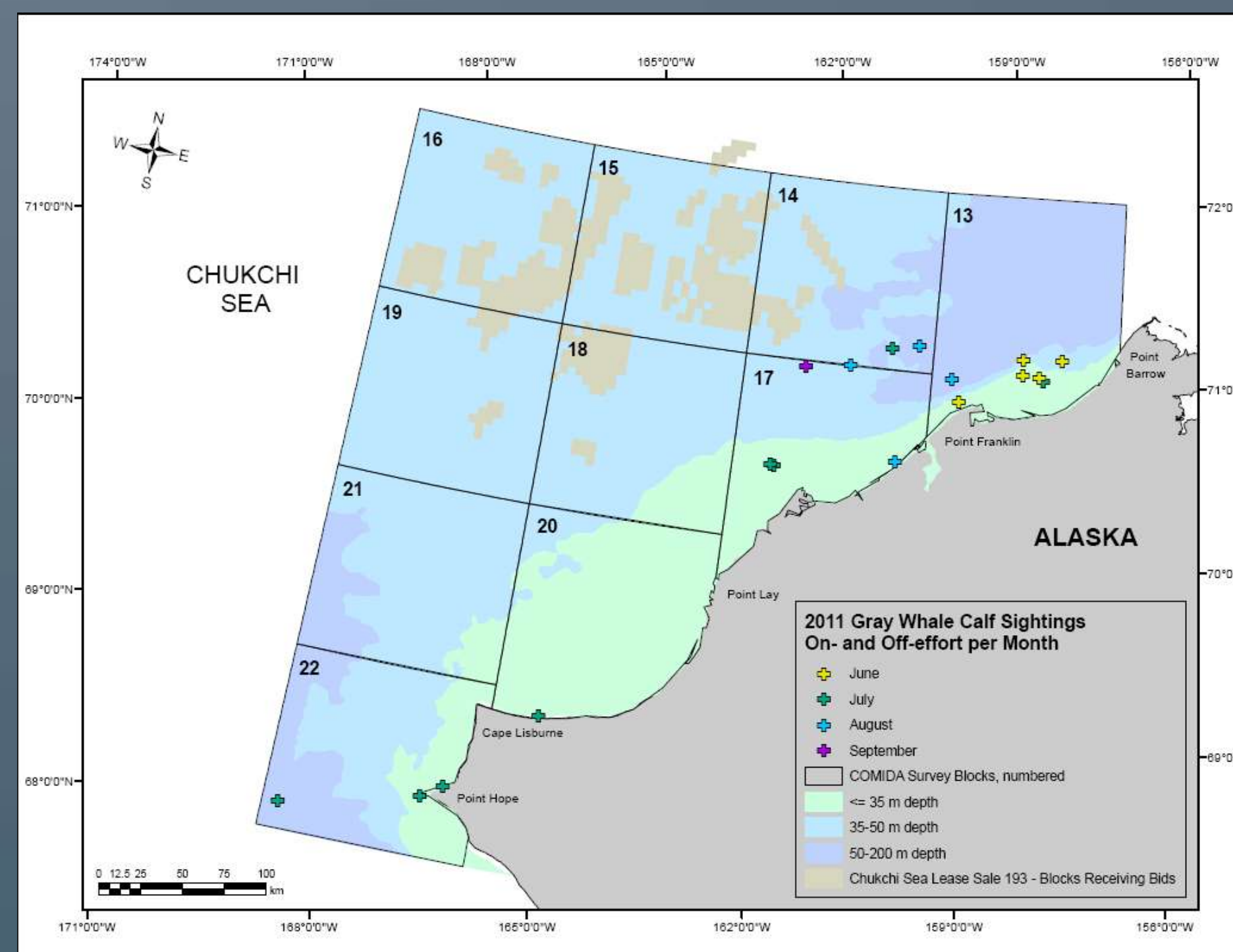
Gray whale behavior on- and off-effort included feeding (62%), swimming (27%), resting (7%), and milling (2%). The percentage of feeding gray whales is similar to 2008-2010 (63%) and less than historical years (80%). The portion of gray whales feeding in the northeastern Chukchi Sea provides further evidence that this area remains an important habitat for gray whales.

Calves

A relatively high number of calves were sighted in 2011, with 18 calves sighted on- and off-effort, although some of the calves may have been sighted on more than one day. Five were sighted in June, 8 in July, 4 in August, and 1 in September. The calves were mostly distributed along the coast, although 5 calves were farther offshore.



Photo by Cynthia Christman
NOAA AFSC NMML
Permit No. 782-1719



Minke Whales (*Balaenoptera acutorostrata*)



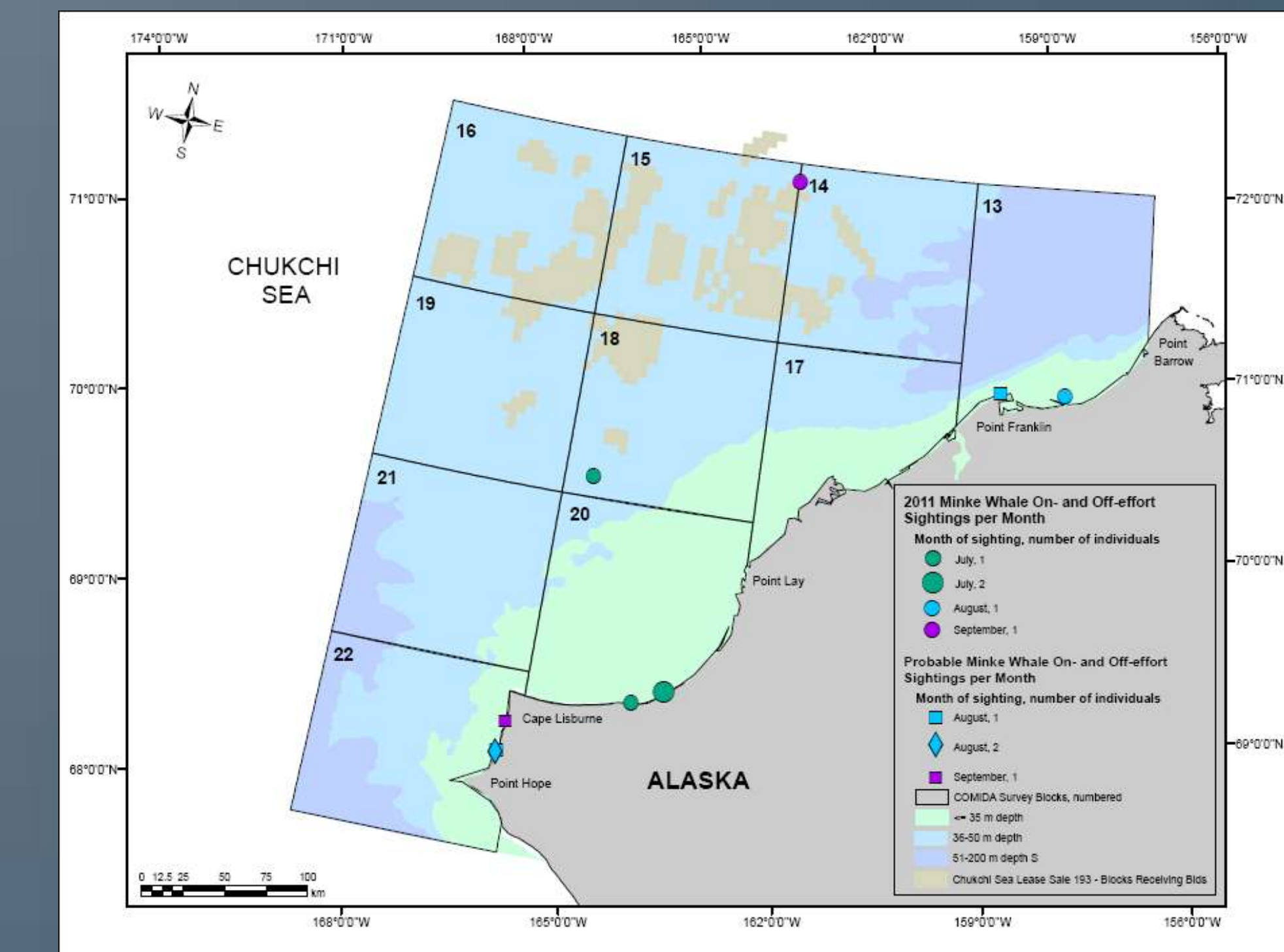
Photo by Brenda Rone
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Sighting Summary

Minke whales were documented in 5 sightings of 6 whales during all types of effort. Sightings occurred from mid-August to the beginning September. Four sightings of 5 unidentified cetaceans in August and September were documented as probable or possible minke whales but could not be resighted to confirm the species. Minke whales were difficult to sight and photograph and did not stay at the surface very long. Despite extensive survey effort in the Beaufort Sea from mid-August through the end of October, no minke whales were sighted there.

Sighting Distribution

Four minke whales and all 5 of the probable/possible minke whales were sighted along the coast. Two minke whales were sighted offshore; 1 was sighted in the southwest corner of Block 18, and 1 was sighted far offshore at 71.89°N, 163°W, in the northwest corner of Block 14. This may be the farthest north documented minke whale in the eastern Chukchi Sea.



Habitat

All minke whales were seen in open water (0% ice cover).

Behavior

All minke whales were recorded as either swimming or milling. Two sightings of 3 minke whales were associated with mud.

Acknowledgments

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