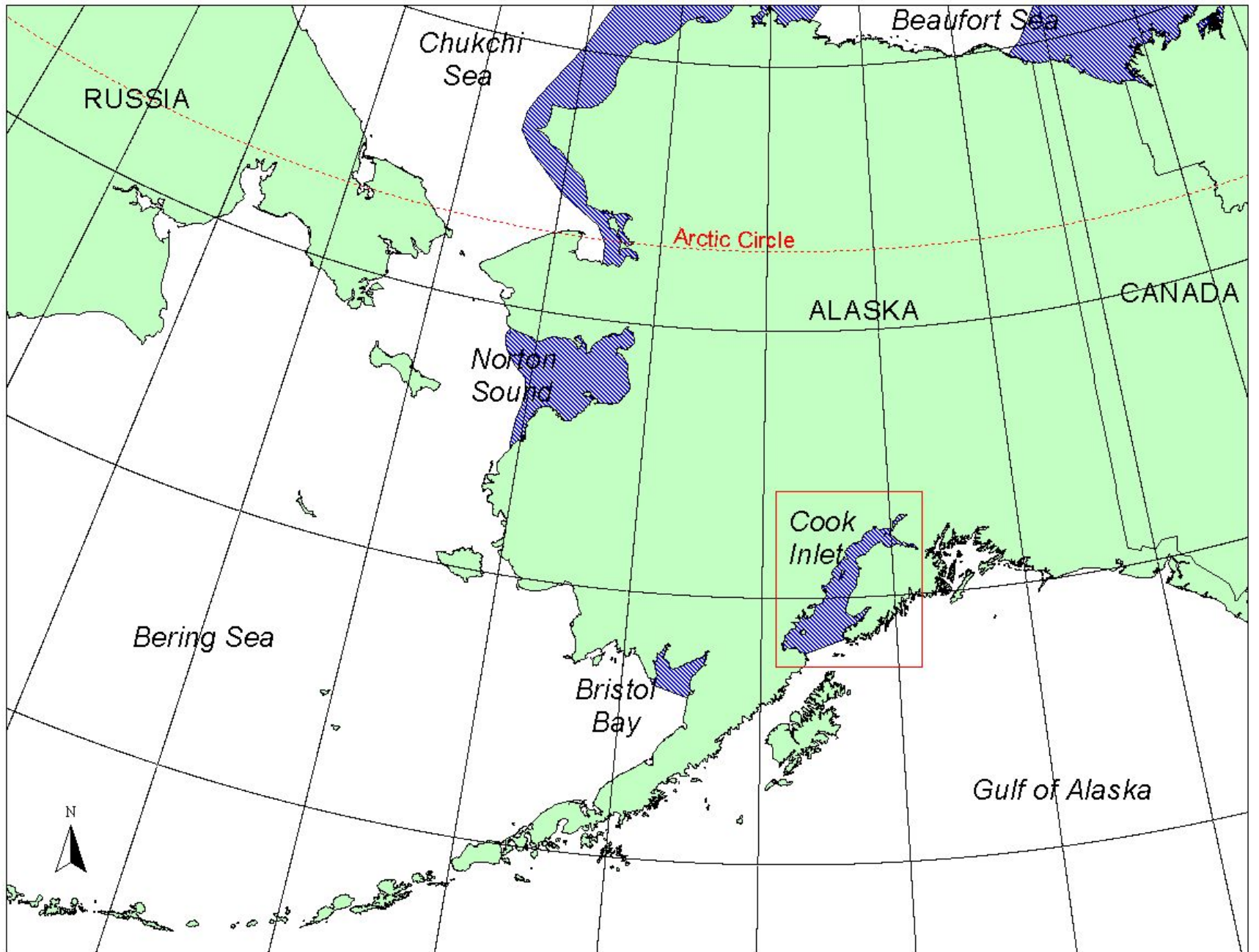


Cook Inlet Beluga

A photograph of two beluga whales swimming in the water. The whale in the foreground is white, and the one in the background is dark. The water is a light blue-green color.

Abundance and
Distribution

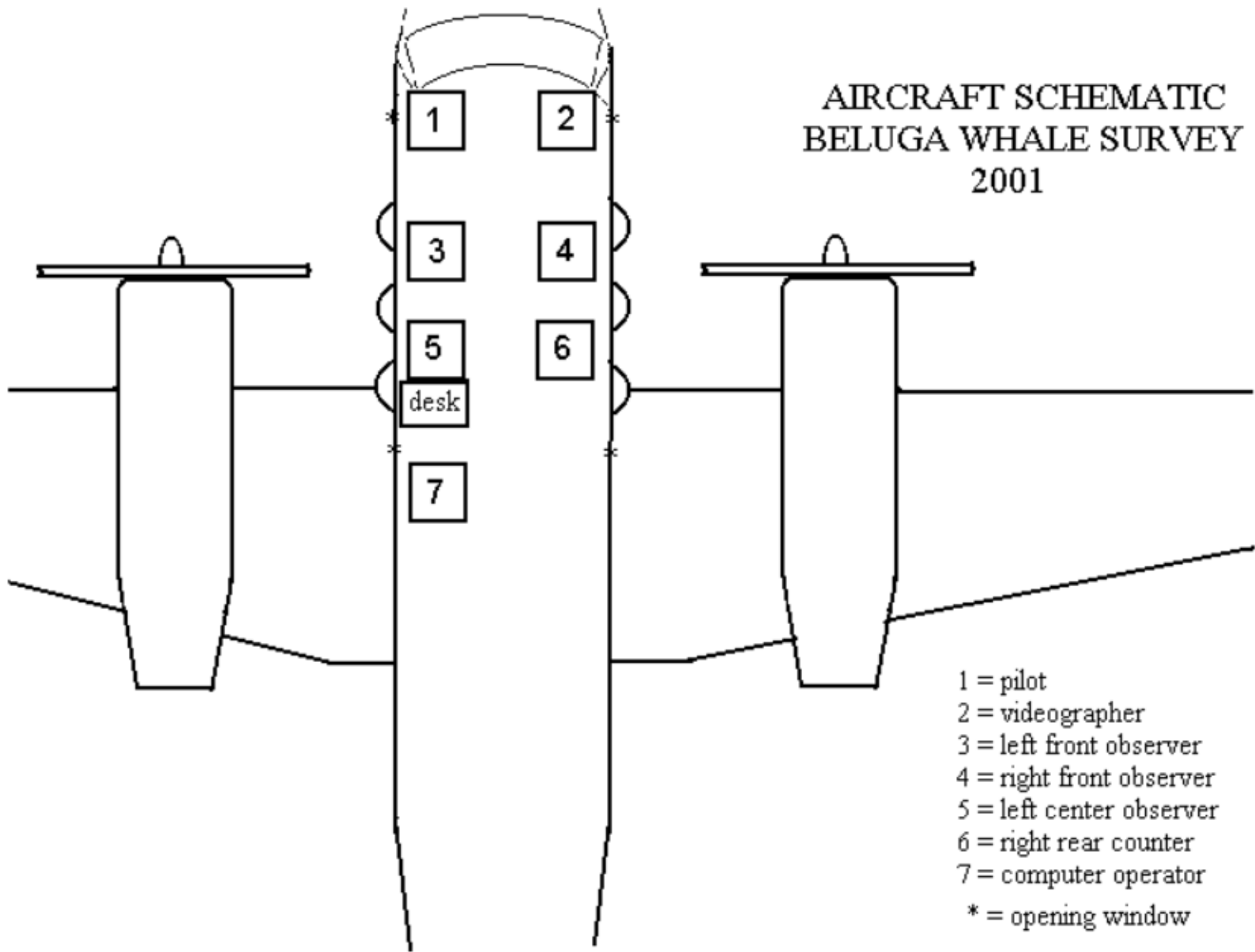


Summer distribution of beluga whale stocks in Alaska

June Aerial Survey

- 4-6 surveys of upper inlet, 1 survey of lower inlet (where few beluga are found).
- Alongshore strip survey and offshore line transect survey.
- 4 person team 2 independent observers on shoreward side of plane, one observer on offshore side and a recorder.

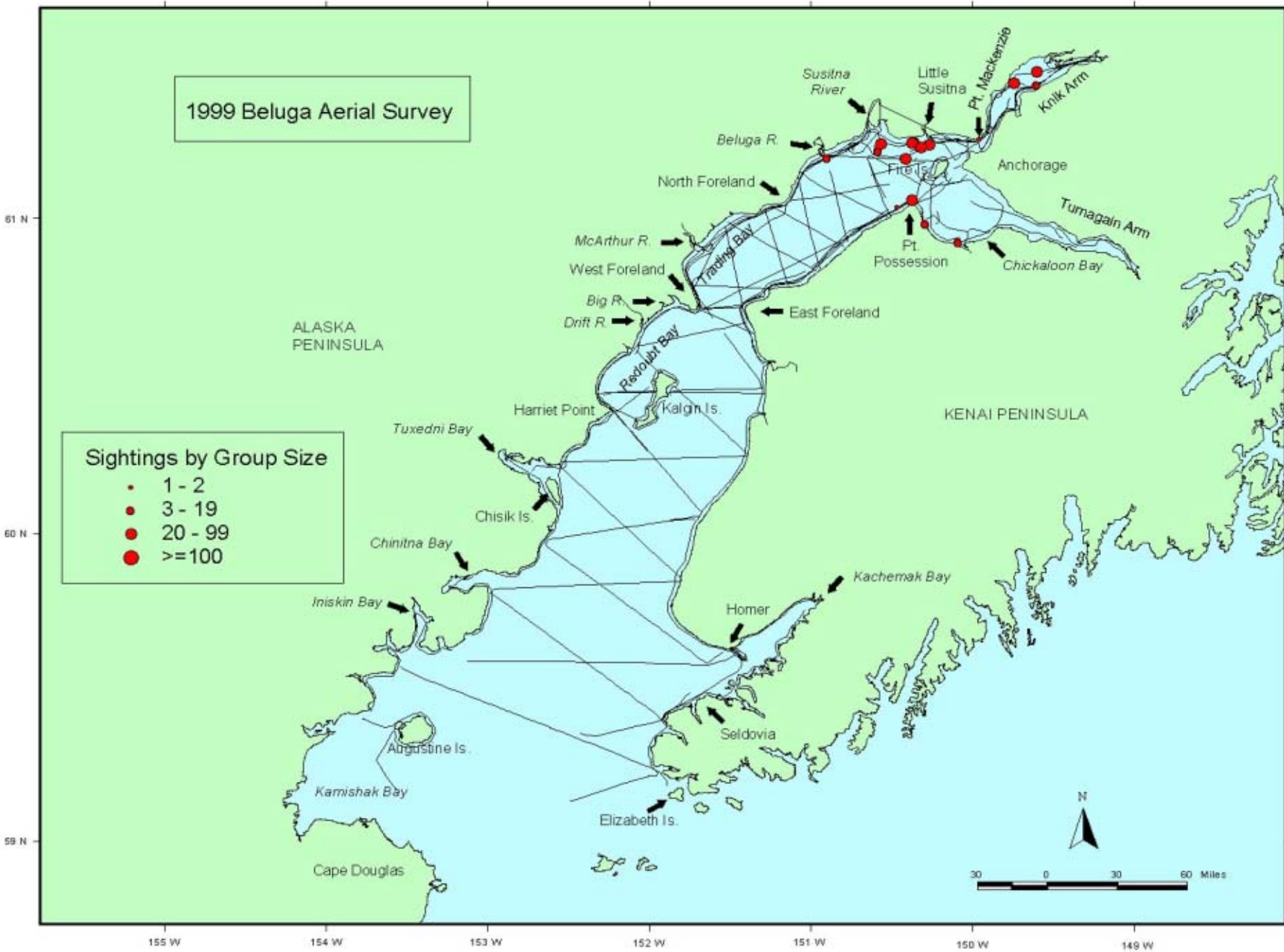
AIRCRAFT SCHEMATIC
BELUGA WHALE SURVEY
2001



1999 Beluga Aerial Survey

Sightings by Group Size

- 1 - 2
- 3 - 19
- 20 - 99
- ≥ 100



Abundance Estimation

- Estimate average of 2-4 useable surveys in one season (first 2 weeks in June).
- Group counts corrected for beluga missed at the surface (video analysis).
- Group counts corrected for beluga missed under the surface (dive data).
- Survey corrected for beluga in missed groups (independent observer data).

Group Counts

- Groups counted on multiple passes by two pairs of observers (10-16 counts per group).
- Video recording on each pass.
- Video counted each half second (15 frames).
- Zoomed video compared to counting video to estimate probability that beluga is missed because its image size was too small.

Zoomed Video



Standard Video used for counting



20:41:12

Beluga group is
collection of small
dots in counting video

9 13:06

All dots are
counted then the
area that
corresponds to
the zoomed
video is
compared and
the missed
beluga are noted



9 12:58

Zoomed Video

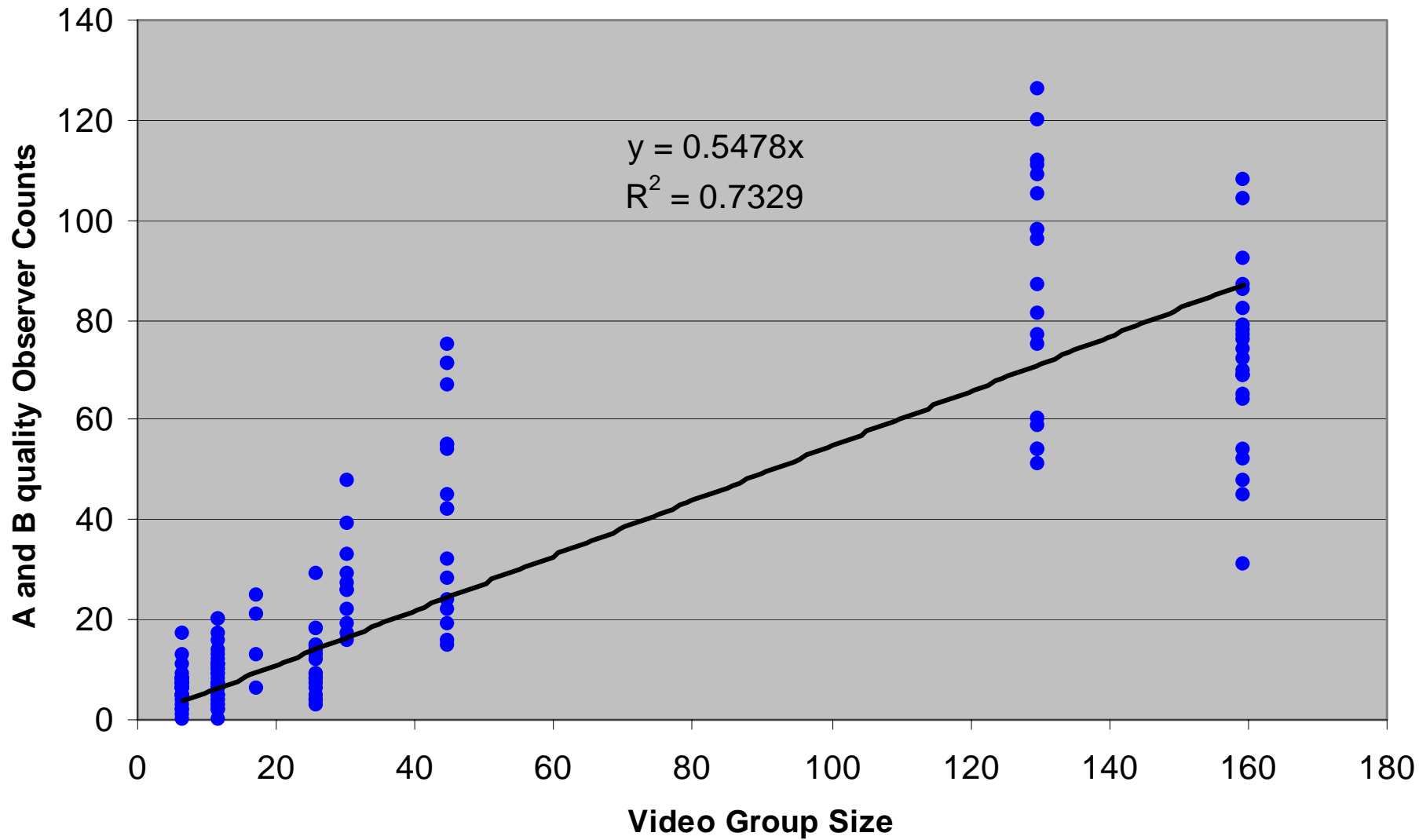
Smaller beluga may
not appear in counting
video



PM 2:21

9 12:48

Video Group Size vs. observer counts



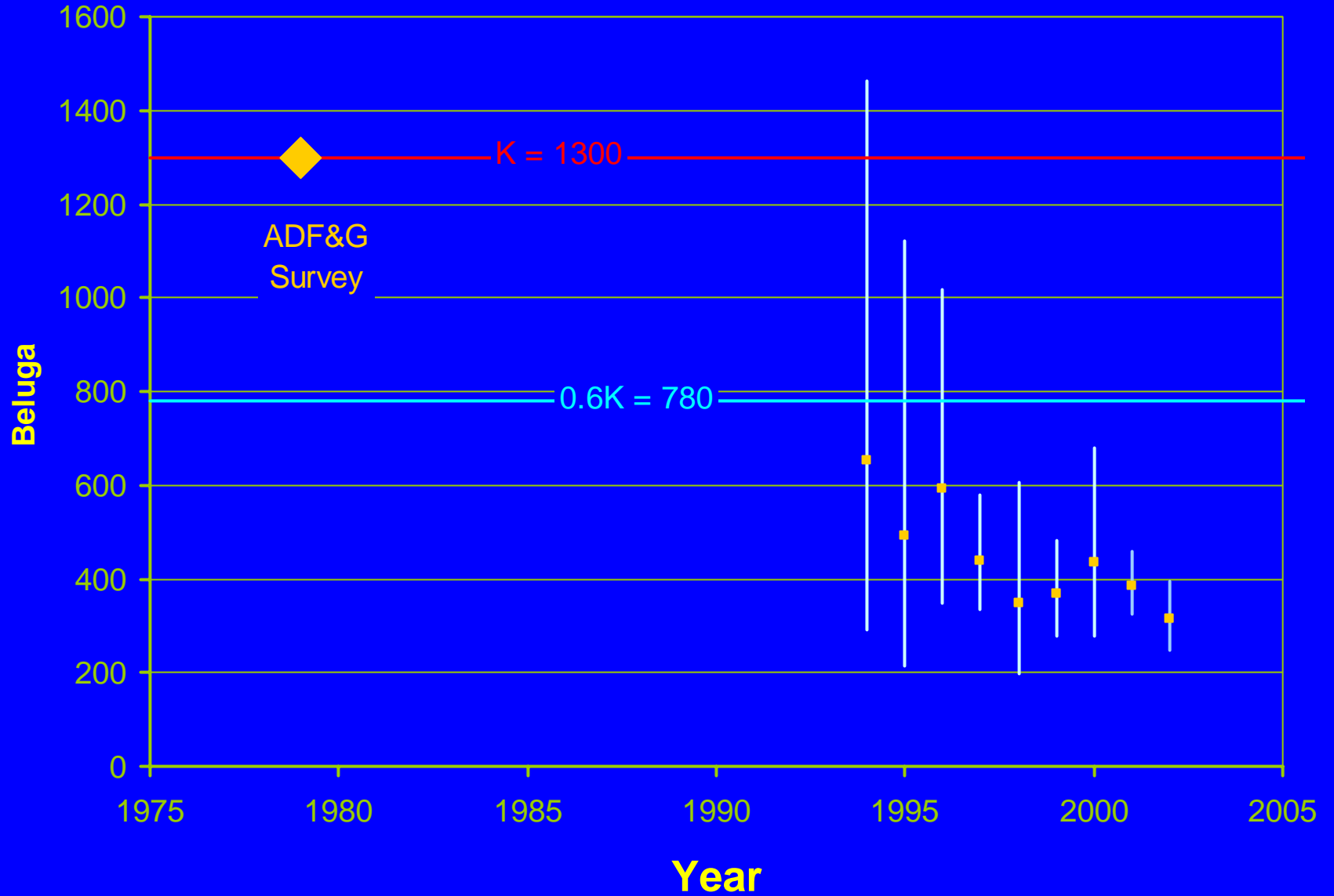
Corrections for Observer counts from Video Group Size Estimates

	Obs1		Obs2		Obs3		Obs4	
	parameter	SE	parameter	SE	parameter	SE	parameter	SE
count w/o time	1.382	0.083	1.829	0.135	1.652	0.12	1.632	0.083
count w/ time	1.877	0.202	1.829	0.119	3.073	0.294	2.398	0.219
count ² /t	-0.416	0.158	0	0	-1.699	0.327	-0.737	0.198
covar		-0.03		0		-0.09		-0.041

Estimation

- Corrected group sizes are summed up by survey day for each section (Susitna-Knik, Turnagain and south inlet).
- Totals for survey days are averaged to estimate abundance in each section.
- Section abundance is summed to estimate annual population abundance.

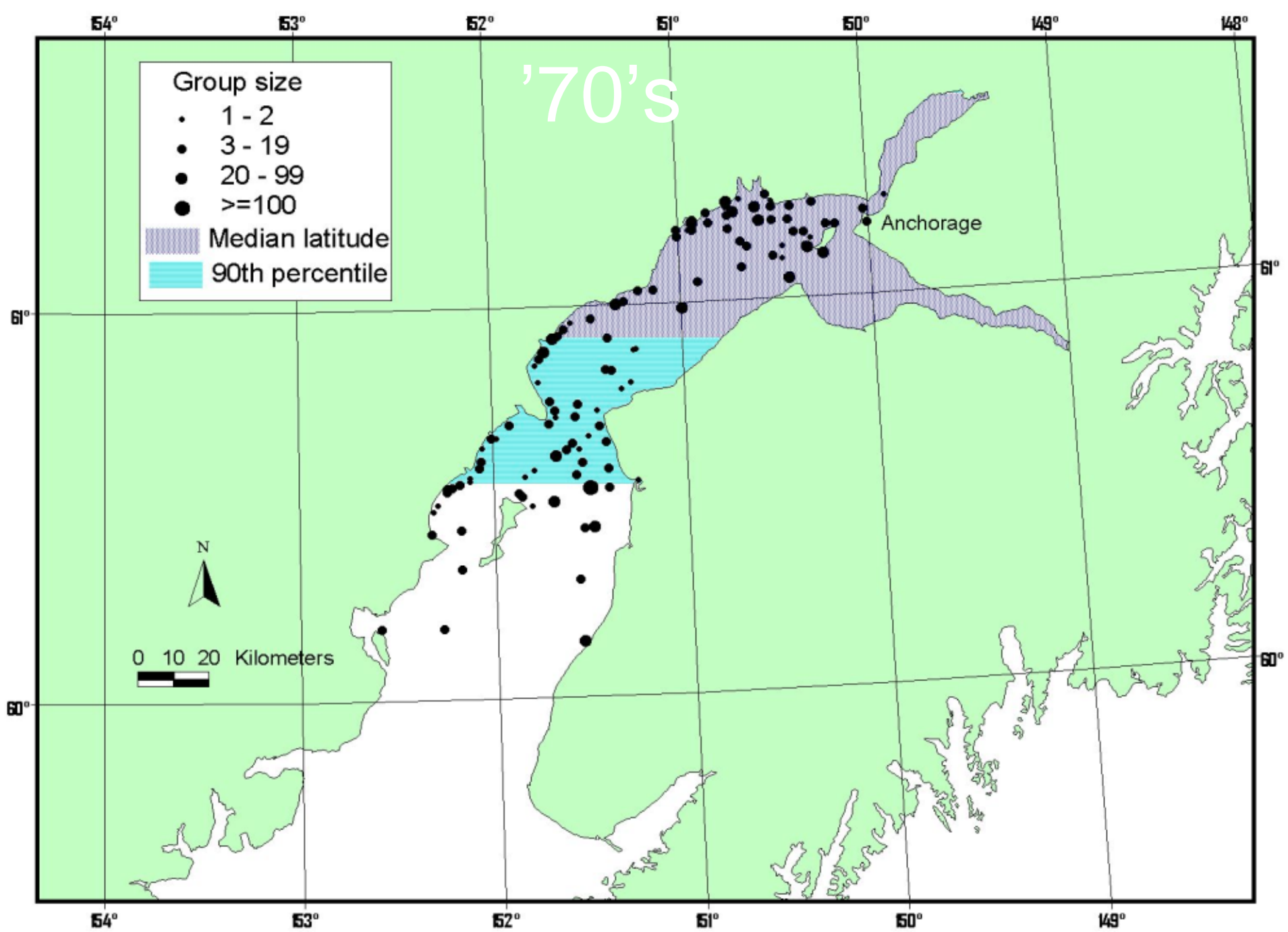
Estimated Abundance of Cook Inlet Beluga

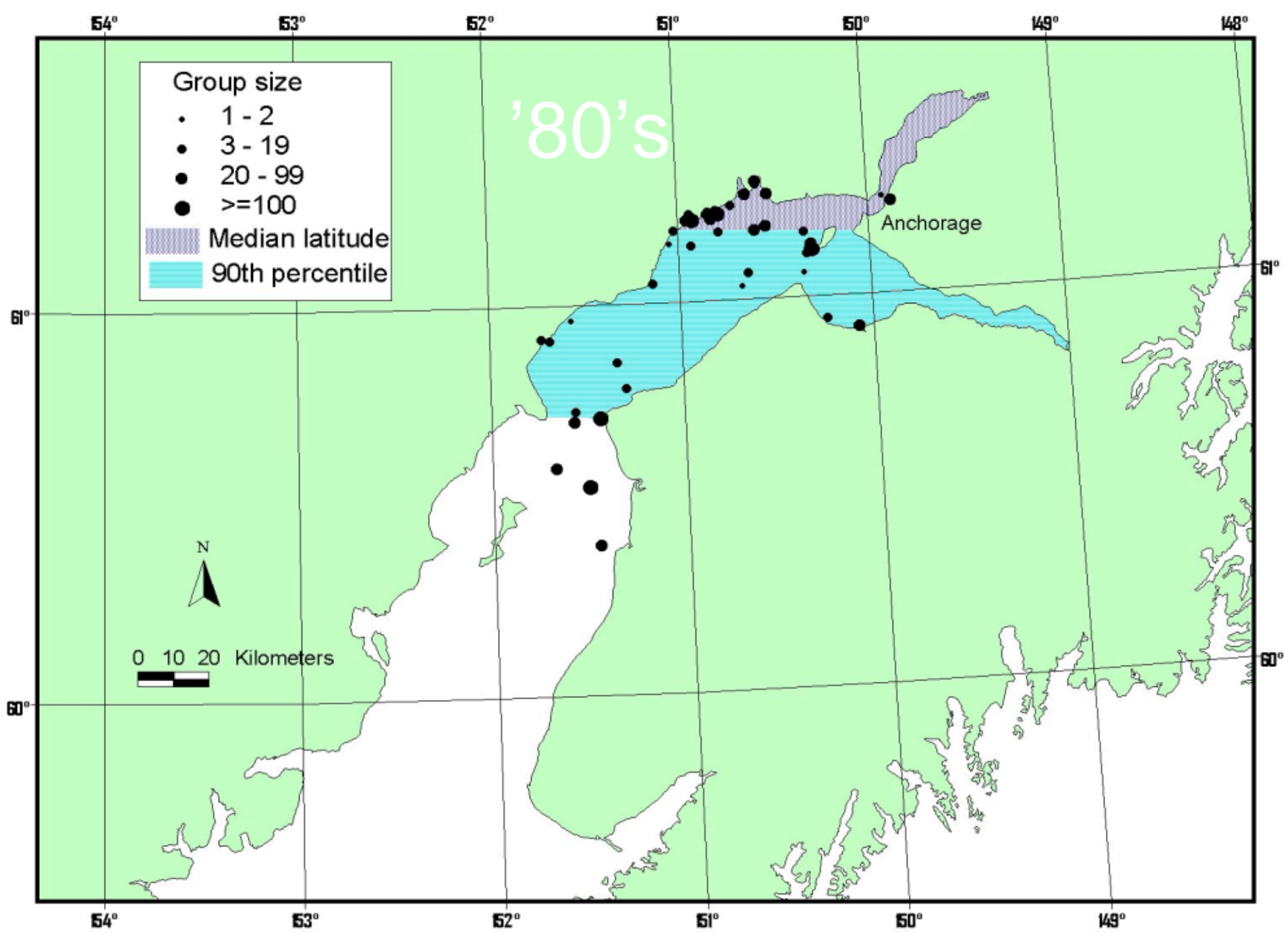


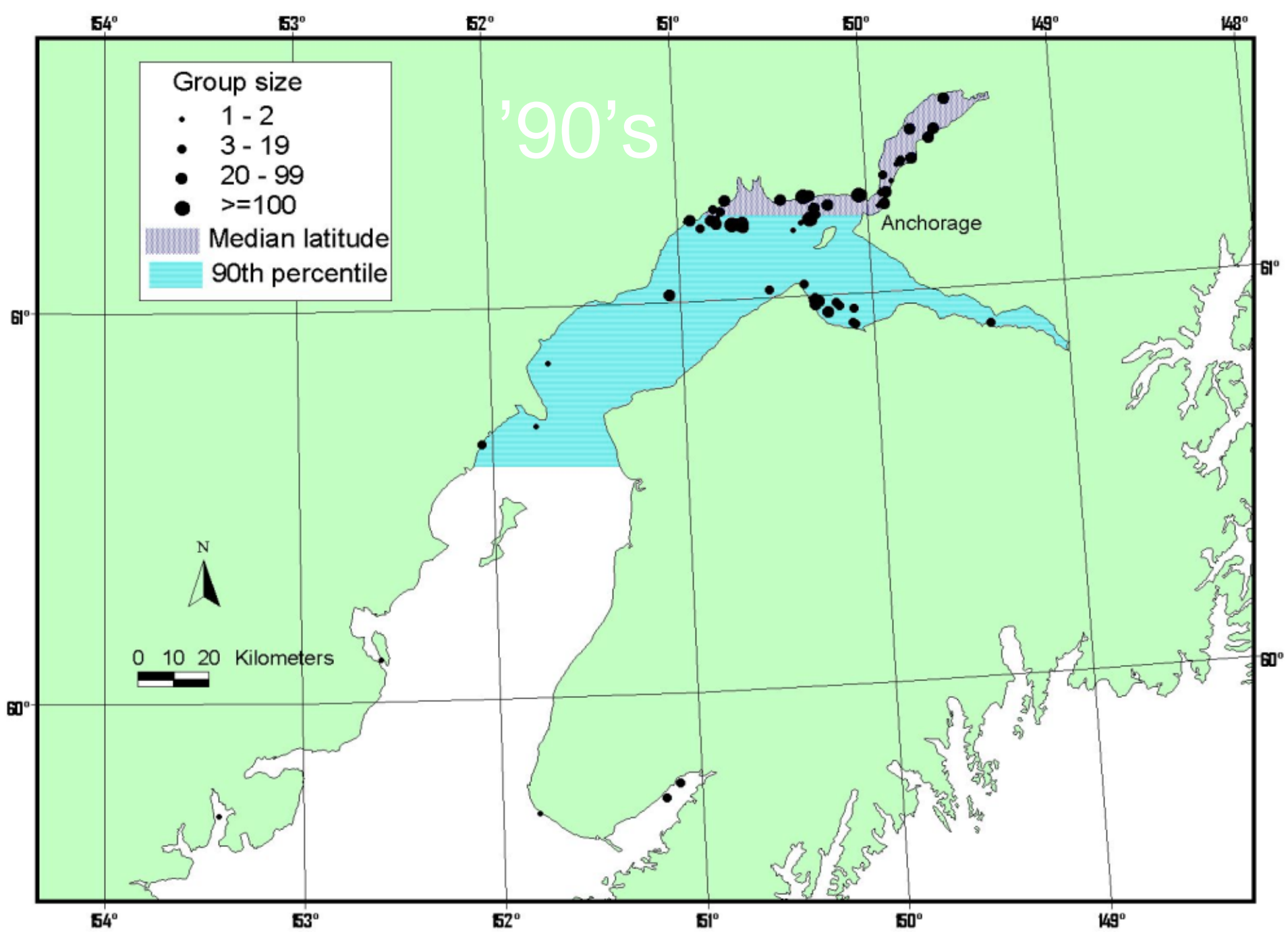
Life History Parameter	Scenario							
	1	2	3	4	5	6	7	8
Age at sexual maturity	4	4	4	4	4	4	4	4
Age at senescence	30	30	30	30	30	20	20	20
Adult annual survival	0.97	0.97	0.94	0.97	0.94	0.97	0.97	0.94
Immature annual survival	0.97	0.94	0.94	0.9	0.9	0.97	0.94	0.94
Reproductive rate	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
fraction of cohort reaching maturity	0.89	0.78	0.78	0.66	0.66	0.89	0.78	0.78
fraction of cohort reaching senescence	0.40	0.35	0.16	0.30	0.13	0.54	0.48	0.29
Fraction adults	0.63	0.64	0.62	0.65	0.63	0.62	0.63	0.62
Average age at death	22.7	20.3	15.5	17.5	13.4	18.7	16.7	13.9
Lambda	1.06	1.05	1.03	1.04	1.02	1.05	1.04	1.02

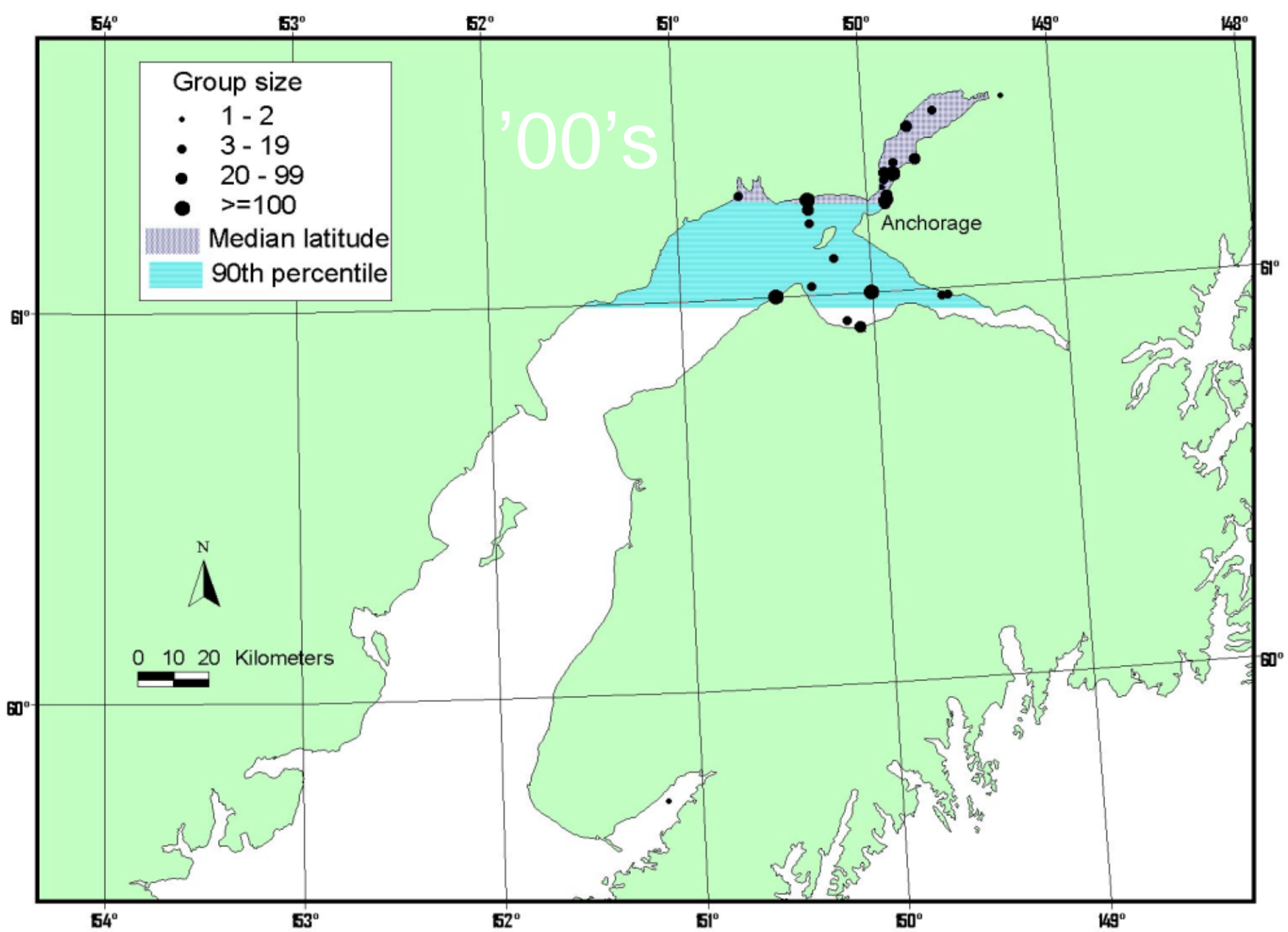
Change in Distribution

- During 1970's beluga were distributed widely throughout the inlet, the population was thought to be near carrying capacity, K.
- With each decade the median and southern extent of sightings has moved northward.
- In 2000's beluga rarely seen south of McArthur River in June and July.







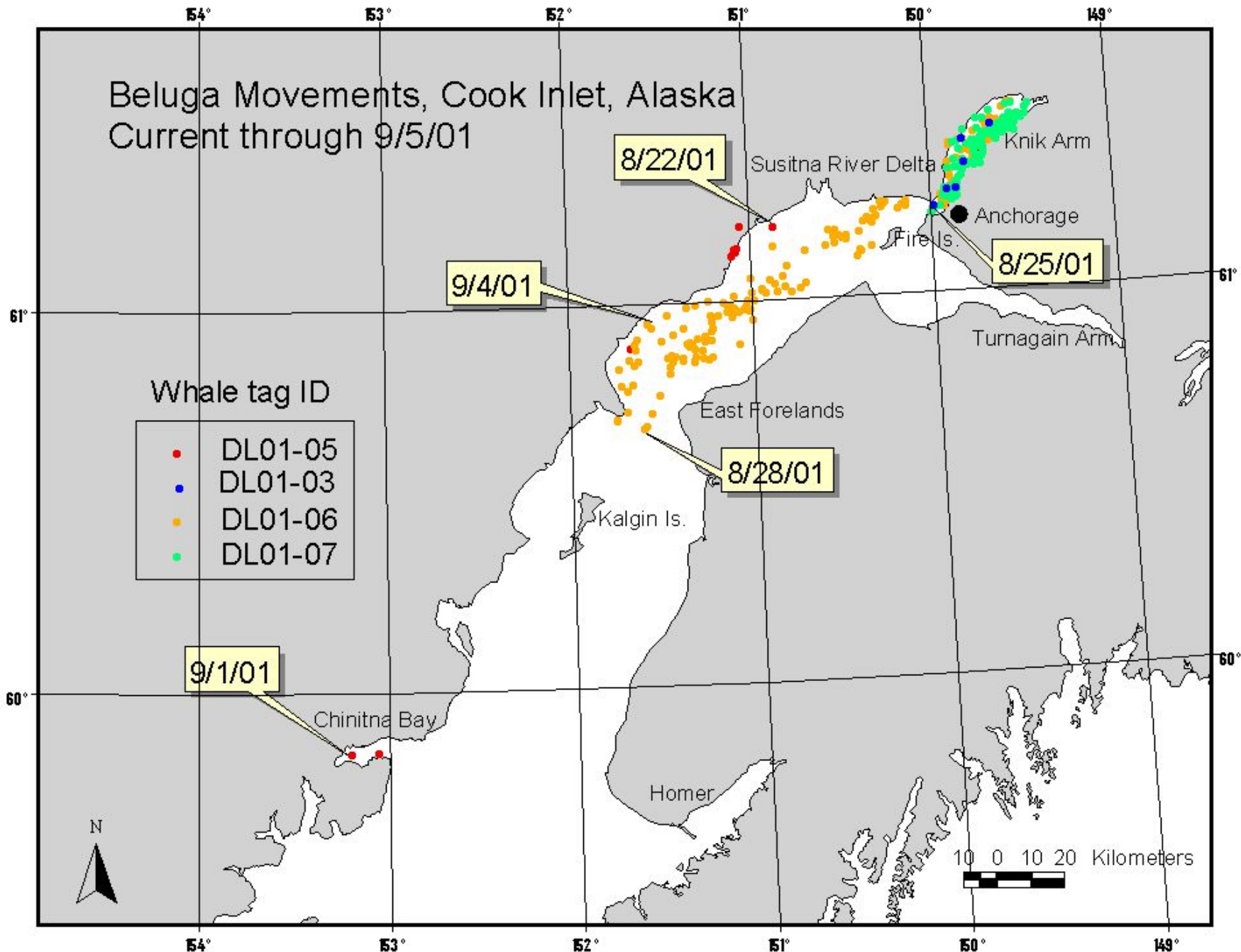




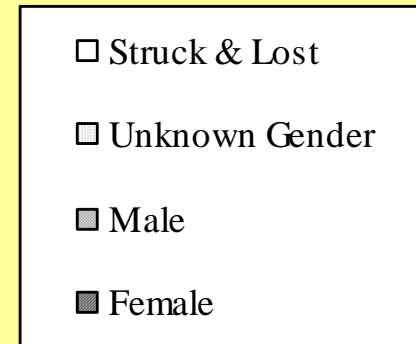
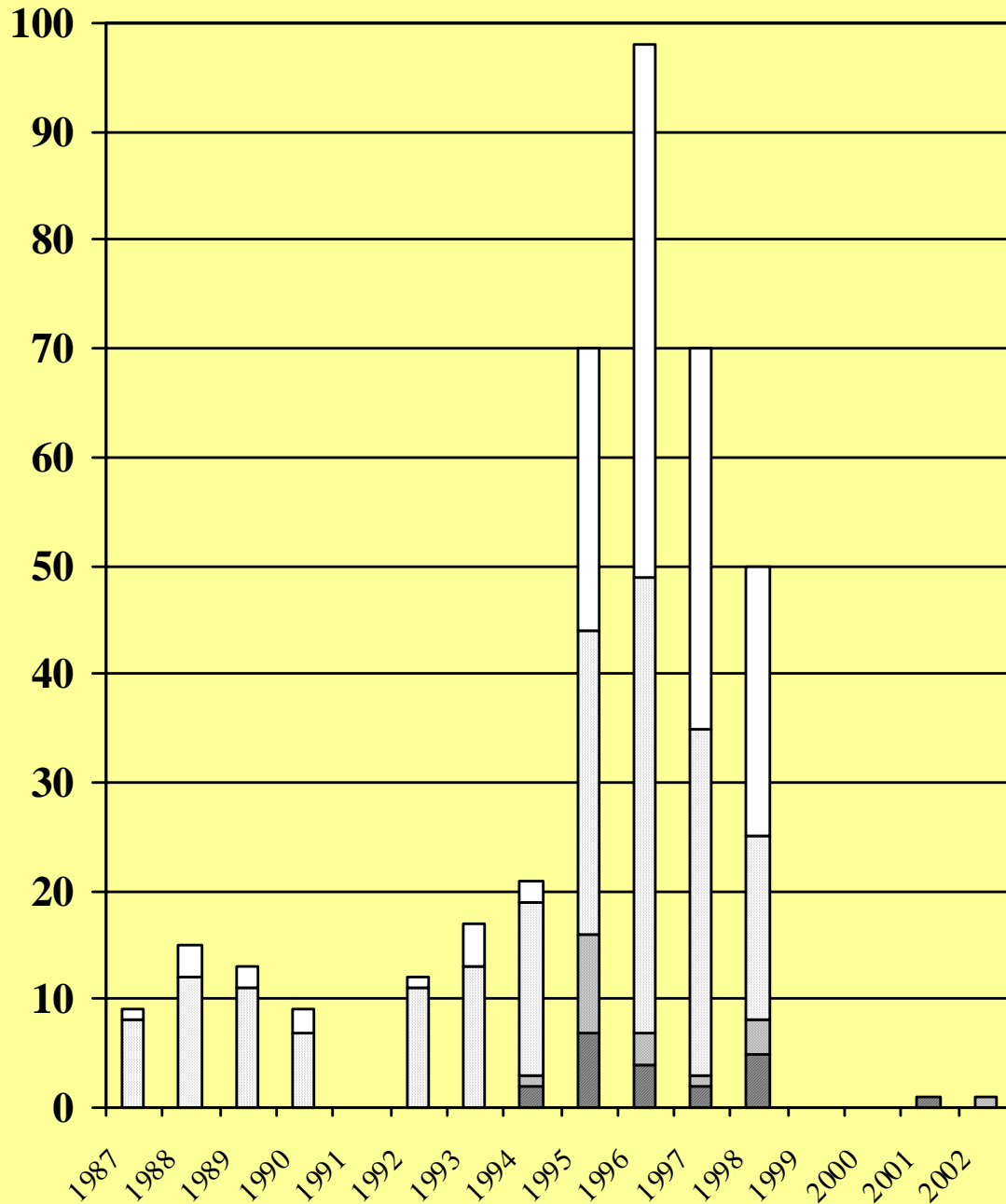
Satellite Tags

- Satellite transmitters are attached to captured beluga and allow scientists to track whales for 3-10 months.
- Results show that beluga continue to utilize southern part of range observed in 1970's during fall, winter and spring.

Beluga Movements, Cook Inlet, Alaska Current through 9/5/01



Known Harvest



Observed non-harvest mortalities of CIB

		natural or unknown cause	human caused
	total dead		
2003	17	17	
2002	13	13	
2001	10	10	
2000	13	13	
1999	13	13	
1998	13	7	6
1997	3	3	
1996	11	11	
1995	1	1	
1994	7	7	