2008 Shallow Hazards Survey Program in the Chukchi Sea

ConocoPhillips Alaska, Inc

Field Team

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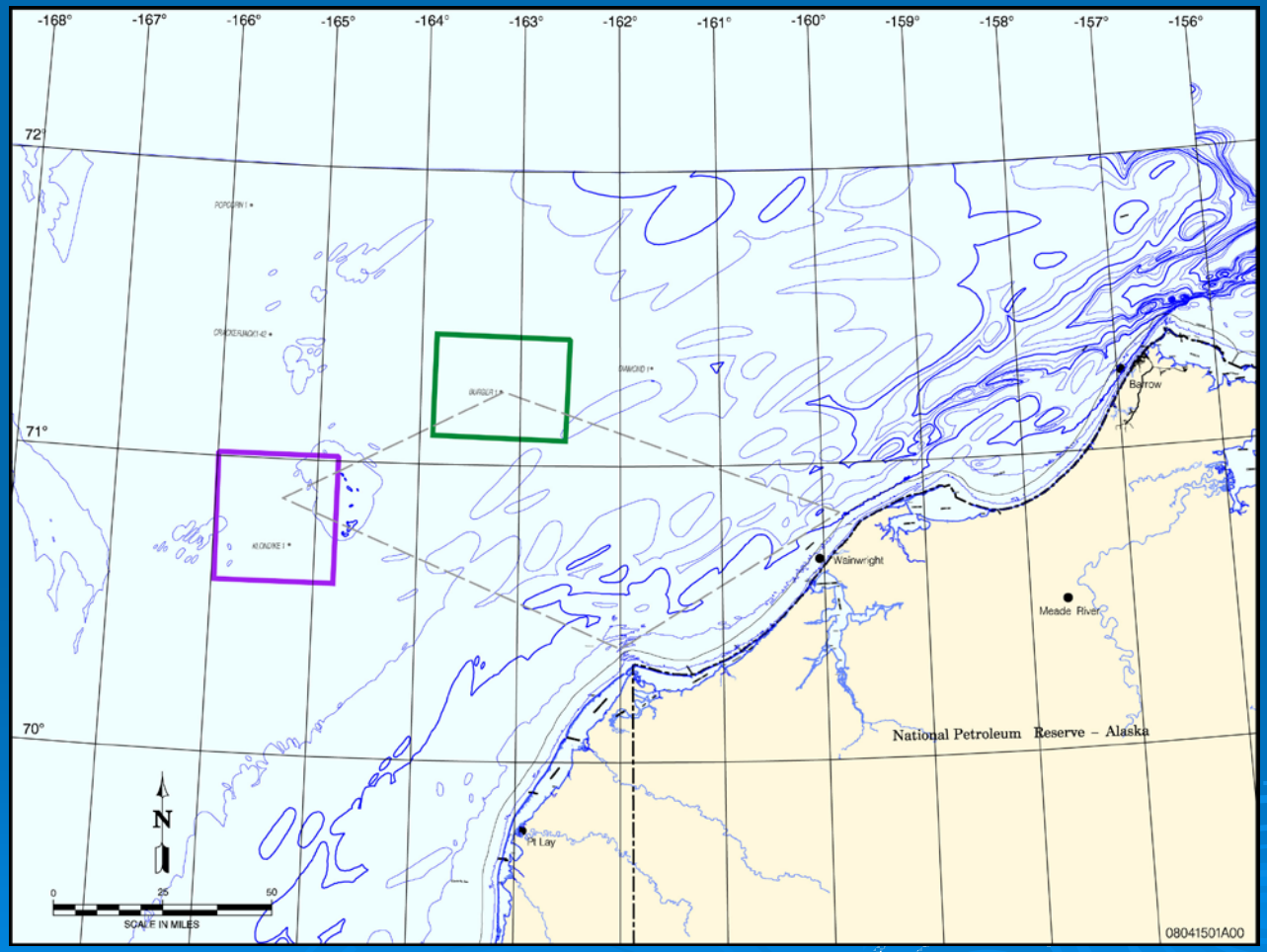
Purpose of Seismic Program

- Conduct shallow hazards survey at the Klondike Prospect for potential oil and gas drilling
- Collect core samples along two potential pipeline routes to define substrate characteristics
- Map bathymetry
- Map seafloor characteristics

Study Area


-168°
-167°
-166°
-165°
-164°
-163°
-162°
-161°
-160°
-159°
-158°
-157°
-156°
72°
71°
70°
Barrow
Wainwright
Meade River
Pt Lay
National Petroleum Reserve – Alaska
N
0
25
50
SCALE IN MILES
08041501A00

Seismic Program

- Time period: September 7 – October 31
- Vessel: Norseman 1
- Seismic source: 6 kilojoules sparker
- Coring equipment: drop core system
- Bathymetry equipment: echosounder
- Seafloor imagery: sidescan sonar

Marine Mammal Monitoring Program

- Determine species and number in safety zones (≥ 180 dB)
- Determine species and number in behavior disturbance zone (≥ 160 dB) to estimate take
- Determine number of seismic survey shutdowns
- Record behavior and natural history

Methods

- Two observers
- Four hour shifts
- All daylight hours, start ups
- Line-transect
- Standard data protocol for seismic and marine mammals

Total marine mammals

Species	Klondike		Total	
	Sightings	**Number**	**Sightings**	**Number**
Pinnipeds	48	79 (1)	214	267 (10)
Cetaceans	0	0	7	11(1)
Polar Bear	0	0	1	1
Total	**48**	**79 (1)**	**222**	**279 (11)**

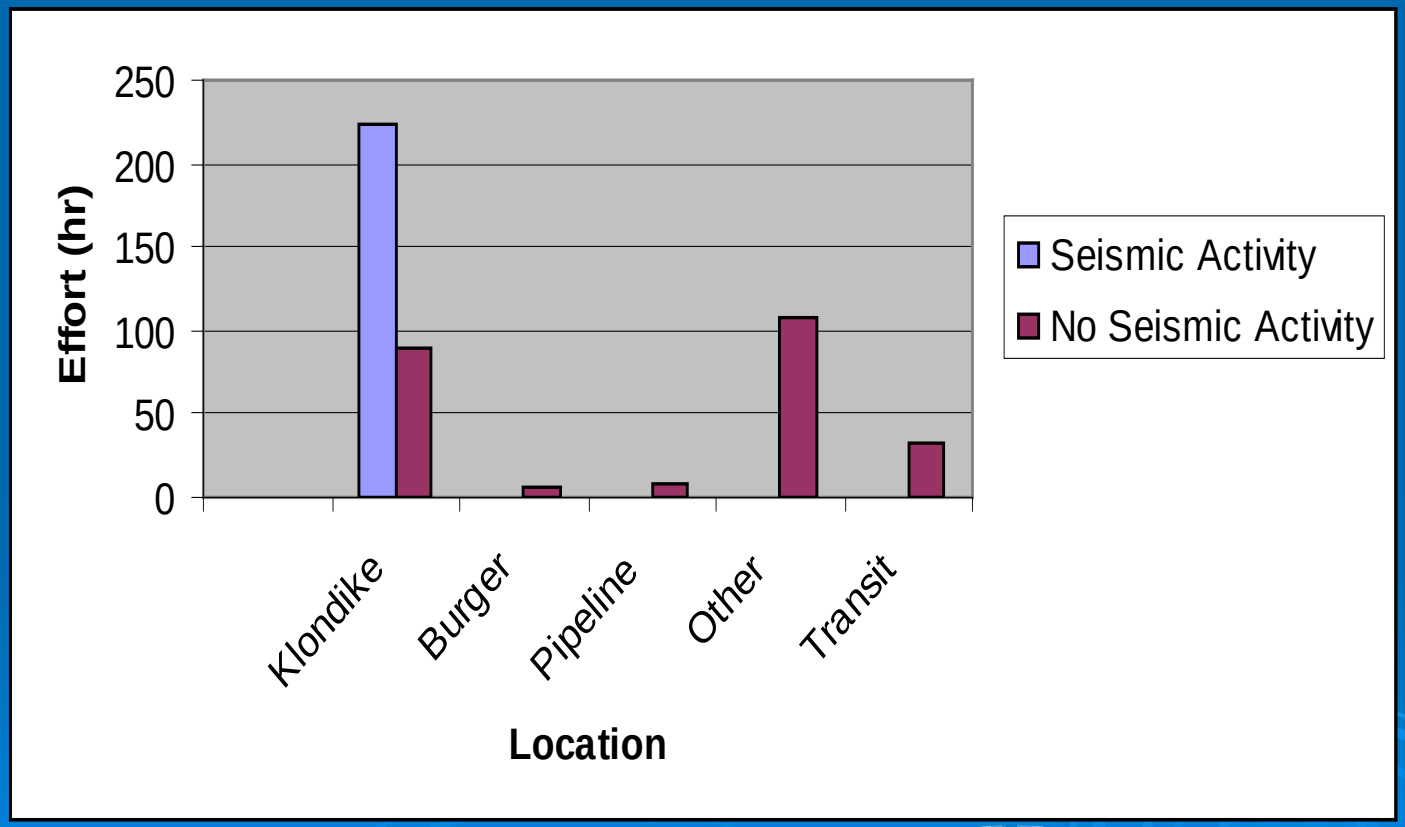
Species composition/number

Species	Klondike		Total	
	Sightings	Number	Sightings	Number
Ringed/Spotted	7	7	48	53
Ringed Seal	1	1	6	6
Spotted Seal	10	12	27	31
Bearded Seal	6	6	35	39
Ribbon Seal	0	0	1	1
Pacific Walrus	14	43	16	50
Unident Seal	10	10	78	84
Unident Pinniped	0	0	3	3
Subtotal	48	79	214	267

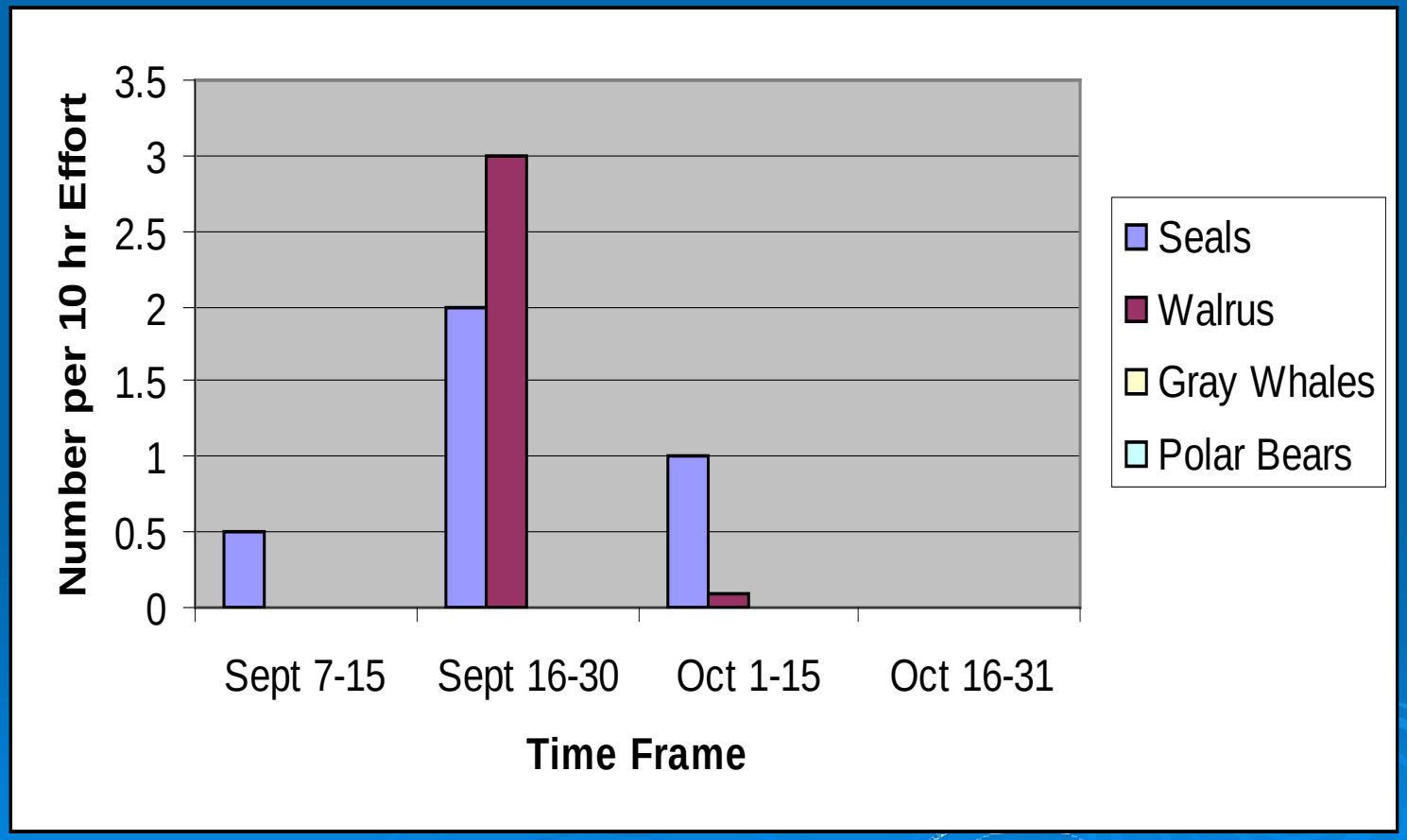
Species composition/number

Species	Klondike		Total	
	Sightings	Number	Sightings	Number
Gray Whale	0	0	5	9
Minke Whale	0	0	1	1
Unident Whale	0	0	1	1
Subtotal	0	0	7	11
Polar Bear	0	0	1	1
Total	**48**	**79**	**222**	**279**

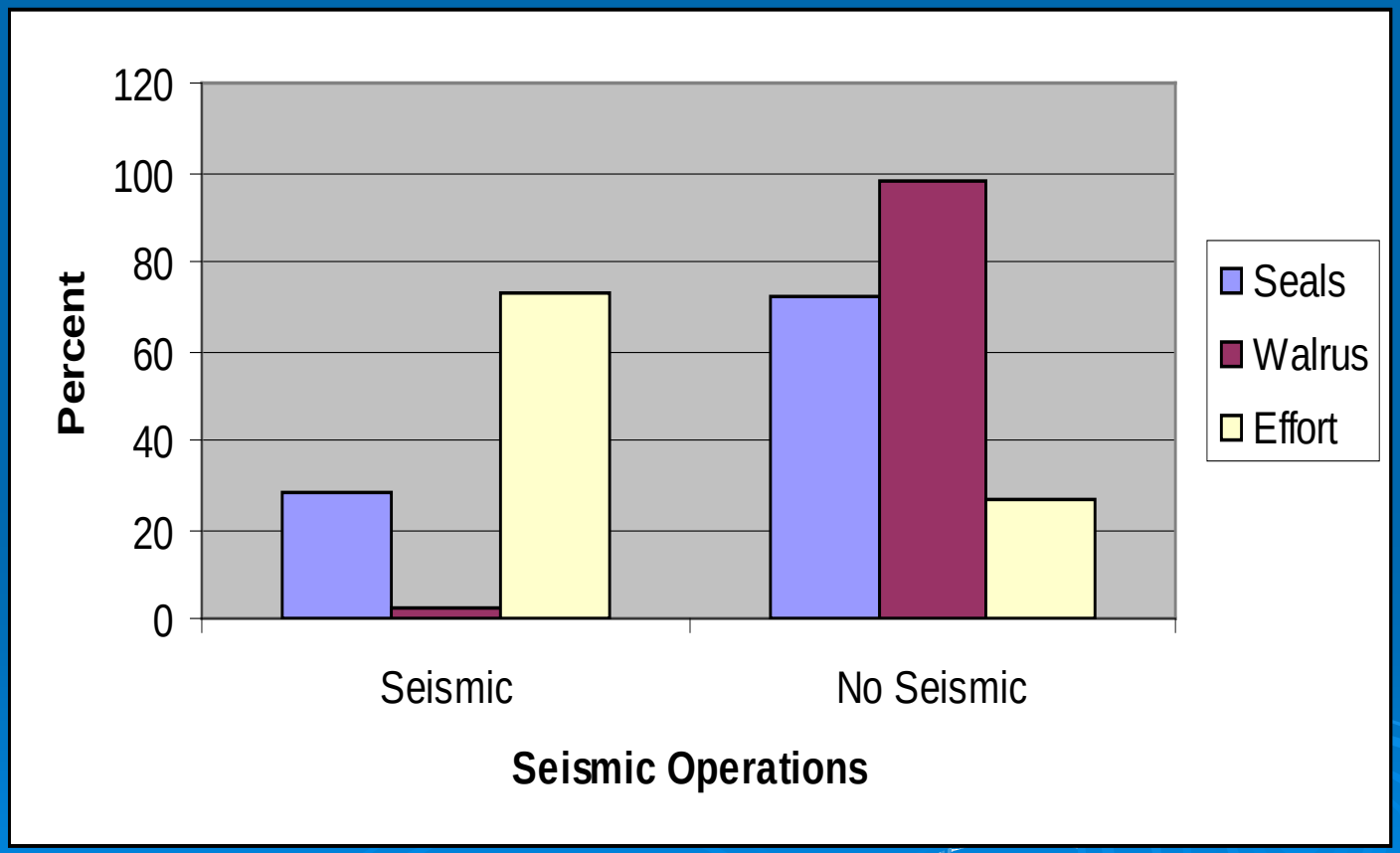
Monitoring effort



Temporal distribution at Klondike



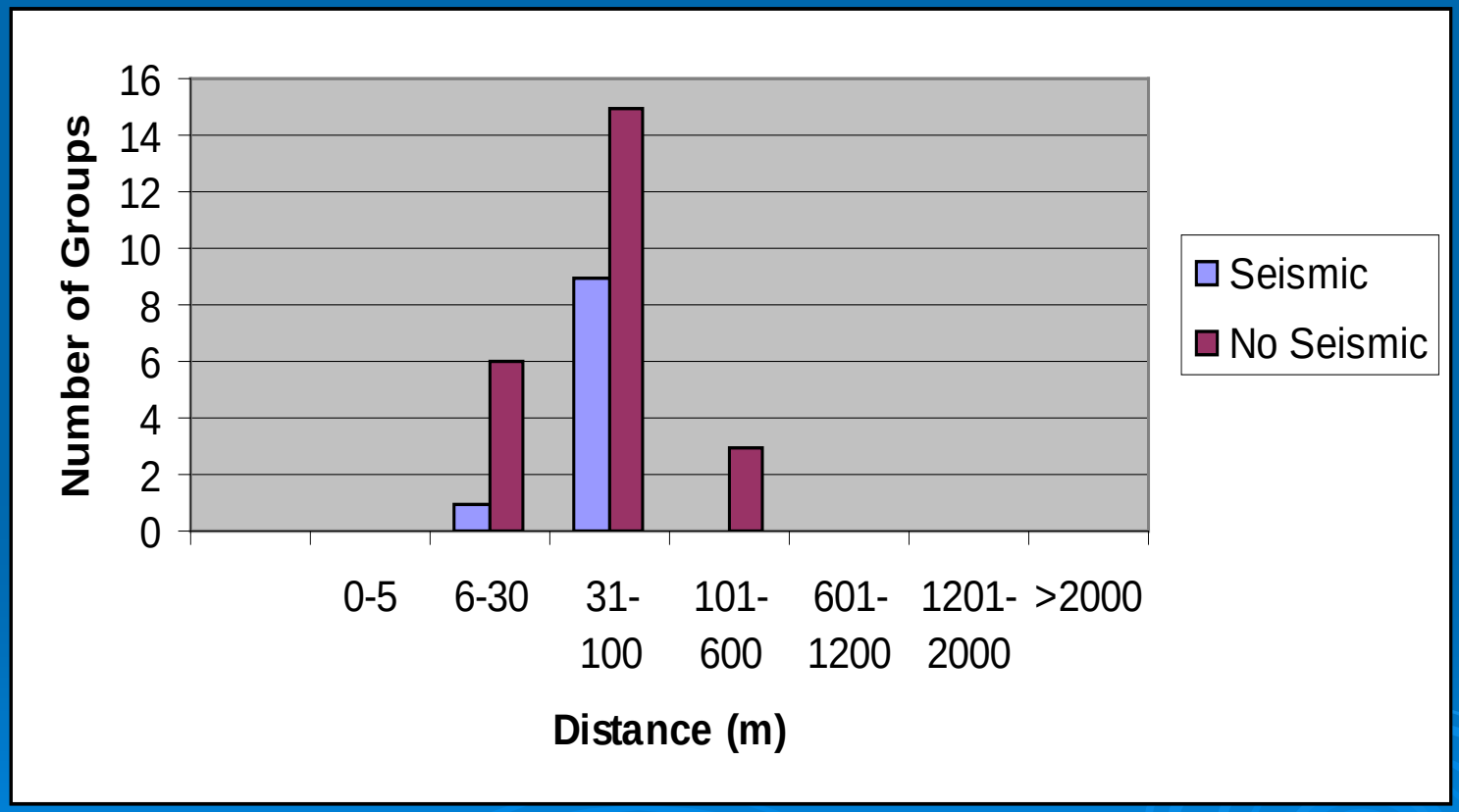
Percent of sightings at Klondike



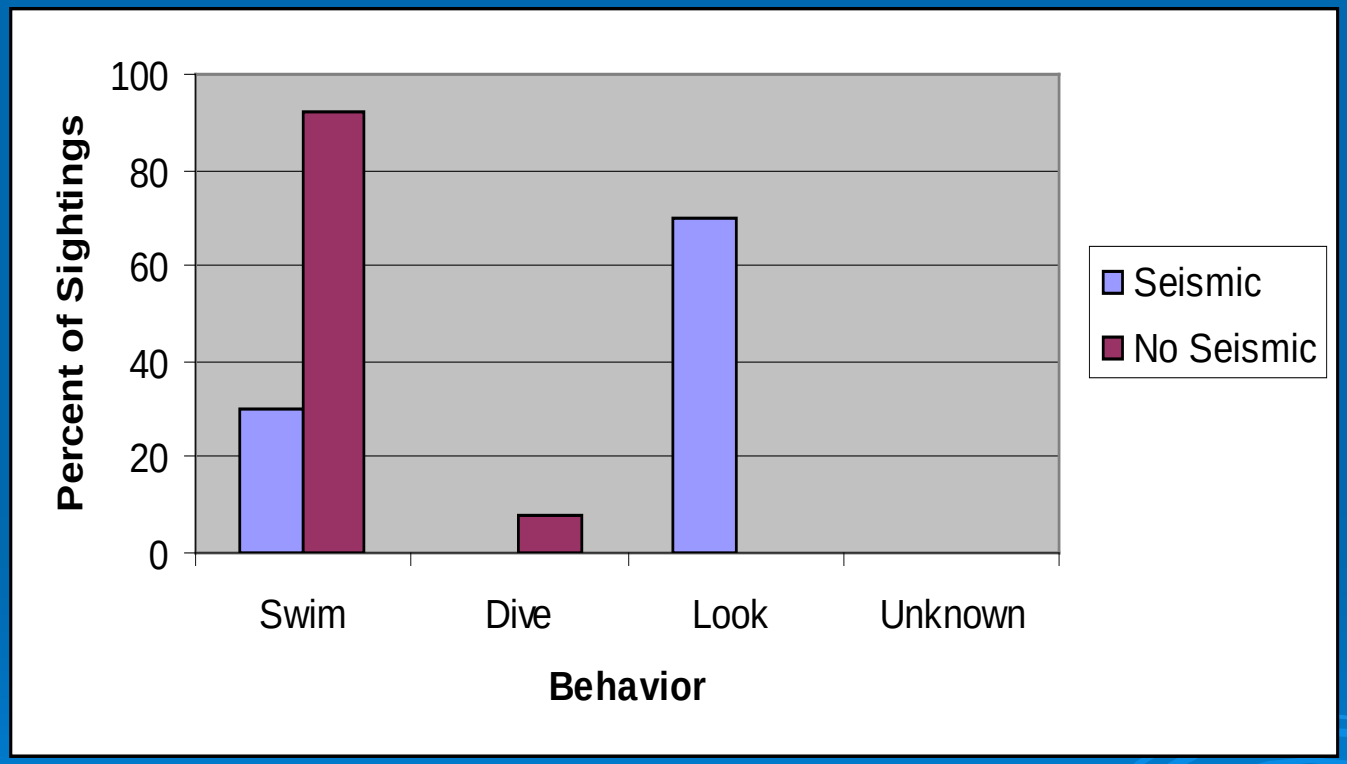
Seal density

Location	Activity	No Sightings	F(0)	G(0)	Density (no./ km²)
Klondike	Seismic	10	11.45	1	0.038
Klondike	No seismic	24	11.45	1	0.284
Other	No seismic	152	11.45	1	0.920

Seal distances from vessel at Klondike



Seal behavior at Klondike



Take estimates

Safety radii	Distance (m) from source	Seals	Whales	Walrus	Bears
≥190 dB	13	0	0	0	0
≥180 dB	41	0	0	1	0
≥160 dB	368	10-42	0-10	0-50	0-1

Conclusions

- Life history
  - Species composition typical for the region
  - Most belugas and bowheads passed through the region before and after program
  - Most bowheads appear to migrate north of the program area in the fall
- Seismic effects
  - Considerably fewer seals observed during seismic vs no-seismic activity and within Klondike than other survey areas suggesting possible localized effects
  - Seismic effects not corroborated by behavior/distance
  - Other factors could have caused difference between seismic and no-seismic activity on marine mammals
- Shallow hazards survey had no more than a negligible effect on individual marine mammals and no population level effects