

How Close Is Too Close?

Acting on short-term disturbance to seals amidst uncertainty about long-term impacts and vessel compliance under the U.S. Marine Mammal Protection Act (MMPA)

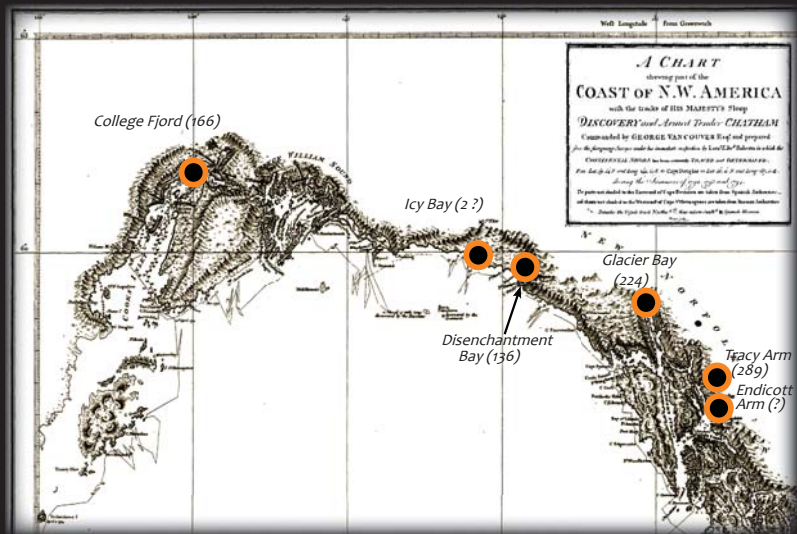
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1 The Problem

The largest aggregations of harbor seals in the world occur on floating ice calved from tidewater glaciers in Alaska, USA. Some populations are inexplicably declining (aerial photo of Icy Bay, Alaska; NMML/AFSC)



All cruise ships visiting Alaska stopover at one or more tidewater glacial fjords. Three of the 4 most visited sites – Tracy Arm, College Fjord, and Disenchantment Bay – are unregulated (map of fjords targeted by ships; apx. # of ship visits in 2009 is shown)

Alaska Natives have traditionally harvested seals on glacial ice, perhaps for 1000 years or more (Tlingit sealing camp in Yakutat Bay, Alaska, 1899)



Four vessels have been attracted to tidewater glacial fjords with seals for 100 years (steamship Queen in Glacier Bay, Alaska, early 1900's; inset from travel brochure)



Since the 1980s, cruise ship visits to tidewater glaciers have increased an order of magnitude to 150-300 per year; annual passengers now exceed 1 million (ship in Disenchantment Bay, Alaska; headline & chart from Seattle P.I., 2003)



Research aboard cruise ships shows that flushing seals into the water is common but often not apparent to vessel operators (mom and pup in Tracy Arm, Alaska; NMML/AFSC findings)

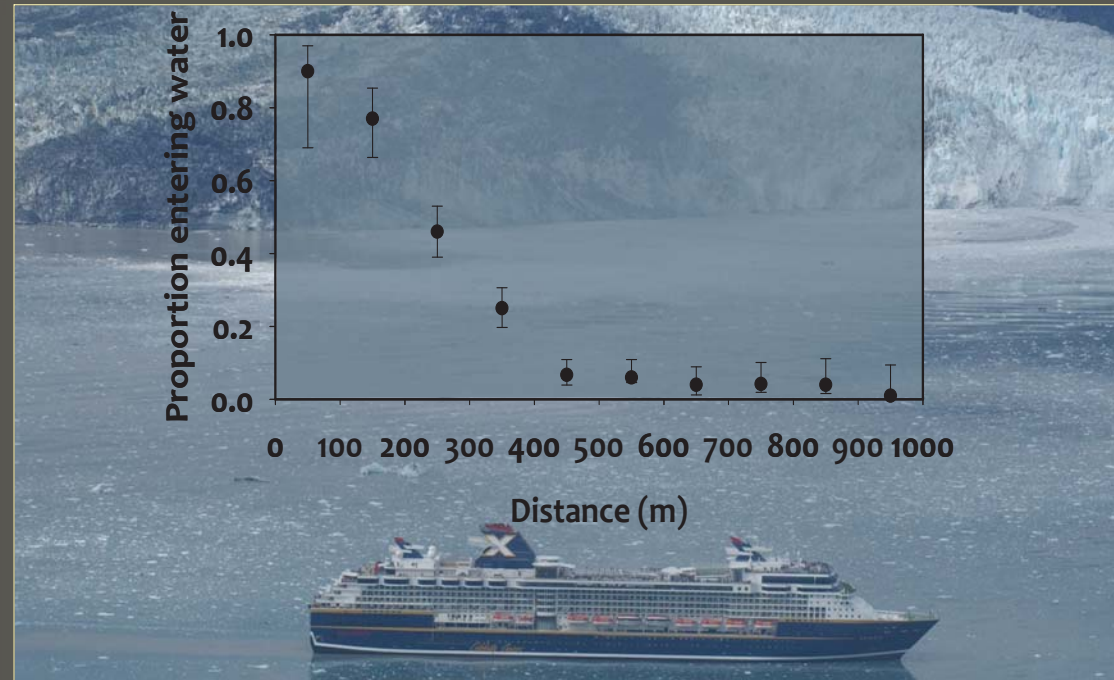


Current guidelines for approach distance to seals vary by region, are not binding or enforceable, and are not strictly adhered to by cruise and tour operators (ship near seals in Glacier Bay, Alaska)



2 The Evidence

Seals increasingly flush from the ice when cruise ships approach closer than 400 m, 90% flushing at 91 m (100 yds) – the current guideline for minimum approach distance.



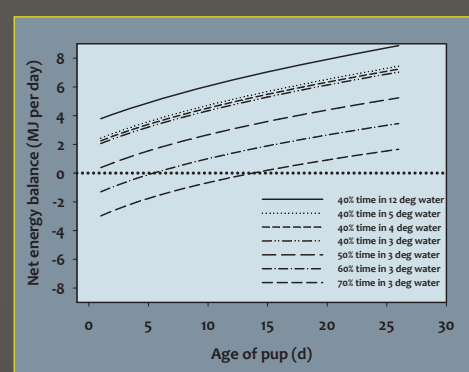
A significant number of seals are estimated to flush from the ice in response to a single ship passing through the haulout area (Disenchantment Bay shown).

(ship track shown by red line [inbound - thin, outbound - thick], 400 m disturbance zone shown in yellow; individual seals shown in orange; only seals sampled in photographs are shown; estimates of total disturbance include seals from interpolated density surface)

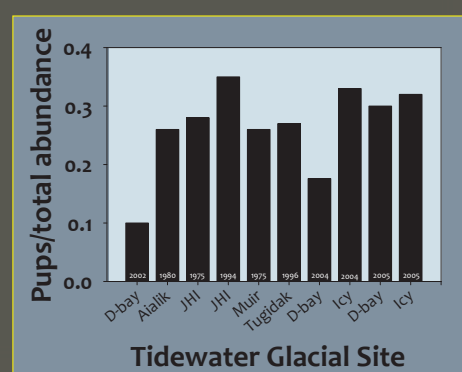


- An estimated 2% of the population (~24 seals, incl. 9 pups) were predicted to have flushed into the water on this outbound path
- 4% of the population (~62 seals, incl. 11 pups) were predicted to have flushed on the inbound path; 16% (~247 seals, incl. 12 pups) on the outbound path
- 1% of the population (~7 non-pups) were predicted to have flushed on the inbound path; none on the outbound

Pups are at risk from cold temperature stress with small increases in time submerged in water of 3-5 °C.



Pup productivity at a disturbed site, Disenchantment Bay (D-bay in figure), appears lower than other sites with little or no ship traffic.



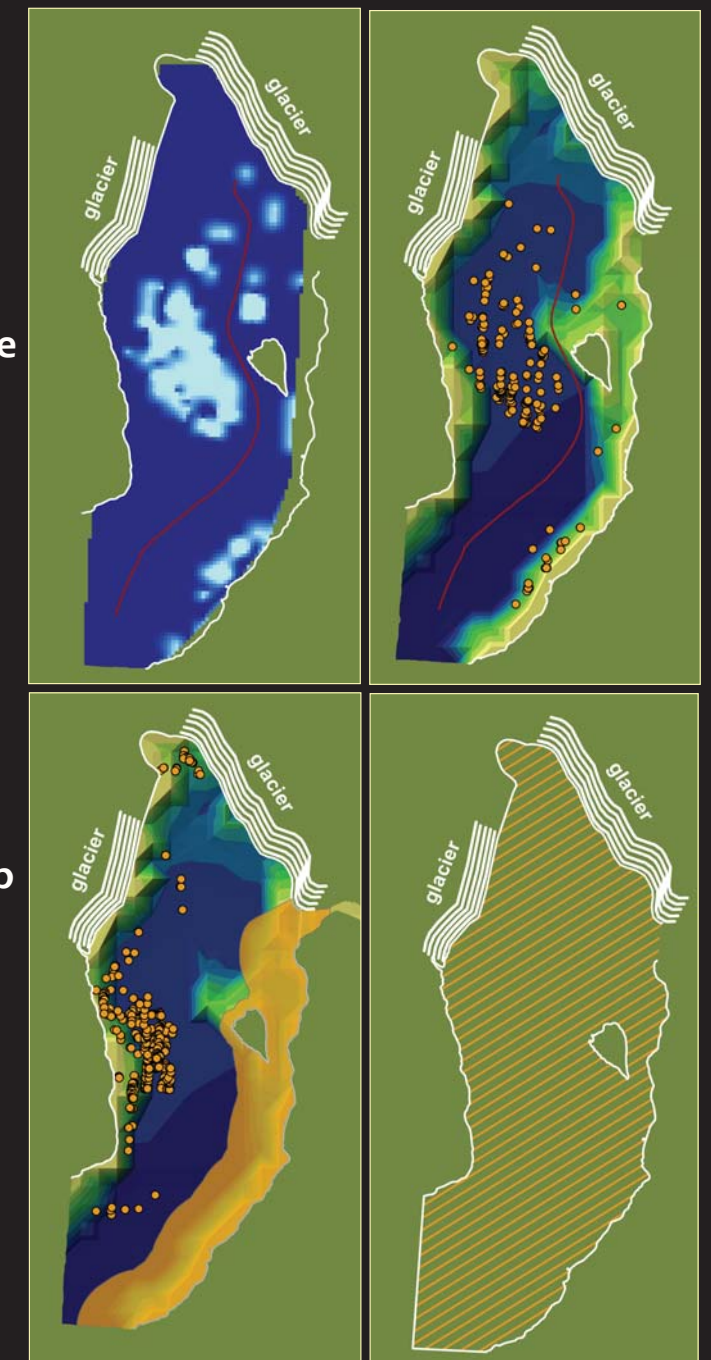
3 The Solution

The U.S. MMPA prohibits the “taking” of marine mammals, which is defined to include disturbance, but currently there are no binding or enforceable limits on approaches to seals in Alaska State waters. Despite the short-term nature of individual disturbance events, the likelihood of long-term impacts points to the need for management action.

	VCA's (Voluntary Conservation Agreements)	OR	Regs (Codified Regulations)
Pros	<ul style="list-style-type: none"> Less confrontational Require less time Less costly to implement More flexibility in designing and implementing policies Use traditional/local knowledge Highlight gov't-industry cooperation 		<ul style="list-style-type: none"> Code of conduct is specific Compliance is mandatory and enforceable Universal awareness of expectations Conservation goals are clearly testable and more likely to be achieved Use traditional/local knowledge Legal penalties for non-compliance
Cons	<ul style="list-style-type: none"> Compliance is voluntary May not be universally accepted (Industry coalition?) Past efficacy has been equivocal (e.g., whale watching) Pressure to meet business goals may cause operators to ignore VCAs No penalties for non-compliance 		<ul style="list-style-type: none"> Could involve costly litigation and delays Less flexibility in tailoring solutions across diverse glacial sites Less industry commitment to shared conservation goals Industry likely to be more resistant; less cooperation

Potential Conservation Measures

- Restrict ship movement relative to ice
- Restrict ship movement to a static corridor (shown in orange)
- Use observers to keep ship to seal separation greater than 400 m
- Exclude ships during pupping and molting (e.g., Glacier Bay NP)



Conclusions

Behaviors and physiological measures altered on short time scales are readily discernable, but long-term impacts are not. Documented and suspected declines in glacial-fjord seal populations visited by cruise ships — as well as frequent flushing of seals (with energetic consequences) — point to the need for precautionary conservation measures. VCAs, regulations, or a combination of the two, will be required to reduce disturbance to levels that minimize the chance of long-term impacts.

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