Alright, so you’re ready for your dream cruise to Alaska. Who hasn’t dreamed about that? But wait just a minute…

You will be sharing the waters with many other marine animals. Harbor seals (Phoca vitulina) live in Alaska too and haul-out every summer to breed and molt. This haul-out coincides with peak tourist season in Alaska, especially in Glacier Bay. Vessel traffic can disturb haul-out seals that frequent the area either visually or by noise disturbance.

Larger ships such as cruise ships, and really small ships like kayaks (often deployed by cruise ships for excursions) cause the most harm. The presence of these ships within 500 meters of hauled-out seals causes them to flush or escape into the water. Flushing into the water can create energy deficits and stress, especially for the pups, causing a depletion in metabolism.

Currently, regulations mandate that ships do not get within 90 meters of hauled-out seals, but ships at that distance have already disturbed 70% of the hauled-out seals. The purpose of my analysis was to determine the best path for cruise ships through Glacier Bay without disturbing harbor seals.

**Cruising for Harbor Seals:**

**Rerouting conflict between vessel traffic and harbor seals**

**Final best fit path for cruise ships traveling through Glacier Bay.**

Criteria are as follows:
- Bathymetry: greater than 15m
- Glacial distance: 1500-4500m
- Distance to haul-out locations: greater than 400m
- Harbor seal haul-out density: low

This positive marketing may make the public more aware of such problems and create more support for harbor seals and other marine mammals.

**CONCLUSION**

Breeding harbor seals hauled out on ice are vulnerable to passing cruise ships and other vessels. If we can make vessel traffic less intrusive, they will likely have less stress transferred to their offspring. Adjusting shipping patterns may also benefit other marine mammals that frequent the area such as humpback and killer whales. If redirection of cruise ships costs more for cruise companies, tours can be advertised as eco-friendly and the increased cost for tickets is benefiting the environment. Below is a mock flyer for a cruise ship company that decided to put seals first. This positive marketing may make the public more aware of such problems and create more support for harbor seals and other marine mammals.

**METHODS**

Cruise ship vessel traffic has been increasing for over a decade causing disturbance to wildlife. Each layer was weighted with raster calculation for the generation of a best path—least cost using the following weights:
- Bathymetry: 20%
- Glacial Distance: 10%
- Distance to haul-out locations: 35%
- Harbor seal haul-out density: 35%

**WELCOME TO THE 2018-2019 Eco-Cruise!**

Dedicated to saving the planet one cruise vacation at a time.

Enjoy your vacation with the knowledge that you are on an environmentally conscious cruise. Travel through Glacier Bay, Alaska, Known for its icy blue glaciers and never-ending mountains. Each passing cruise vessel is watched by harbor and humpback whale populations, and many marine mammals choose paths through the bay that do not disturb harbor seals during that critical time while still allowing them to take photos of the SecondGlacier Bay National Park is one of the most preserved parks on Earth.

The whole family will enjoy live performances by the cruise岸ent team, a group of engaging storytellers that combine stories, storytelling, and tour guides to deliver a unique experience. Each tour takes place on either an easy or a more challenging sailing schedule, allowing for a longer full of activities, each one of our many marine mammals (including icebergs).

 strapped in adventure mode and take the family on a journey of a life time, in each cruise we go to Glacier Bay.

Wildlife biologists and harbor seals take the family on a journey of a life time, in each cruise we go to Glacier Bay.

Thank you Carolyn for everything!