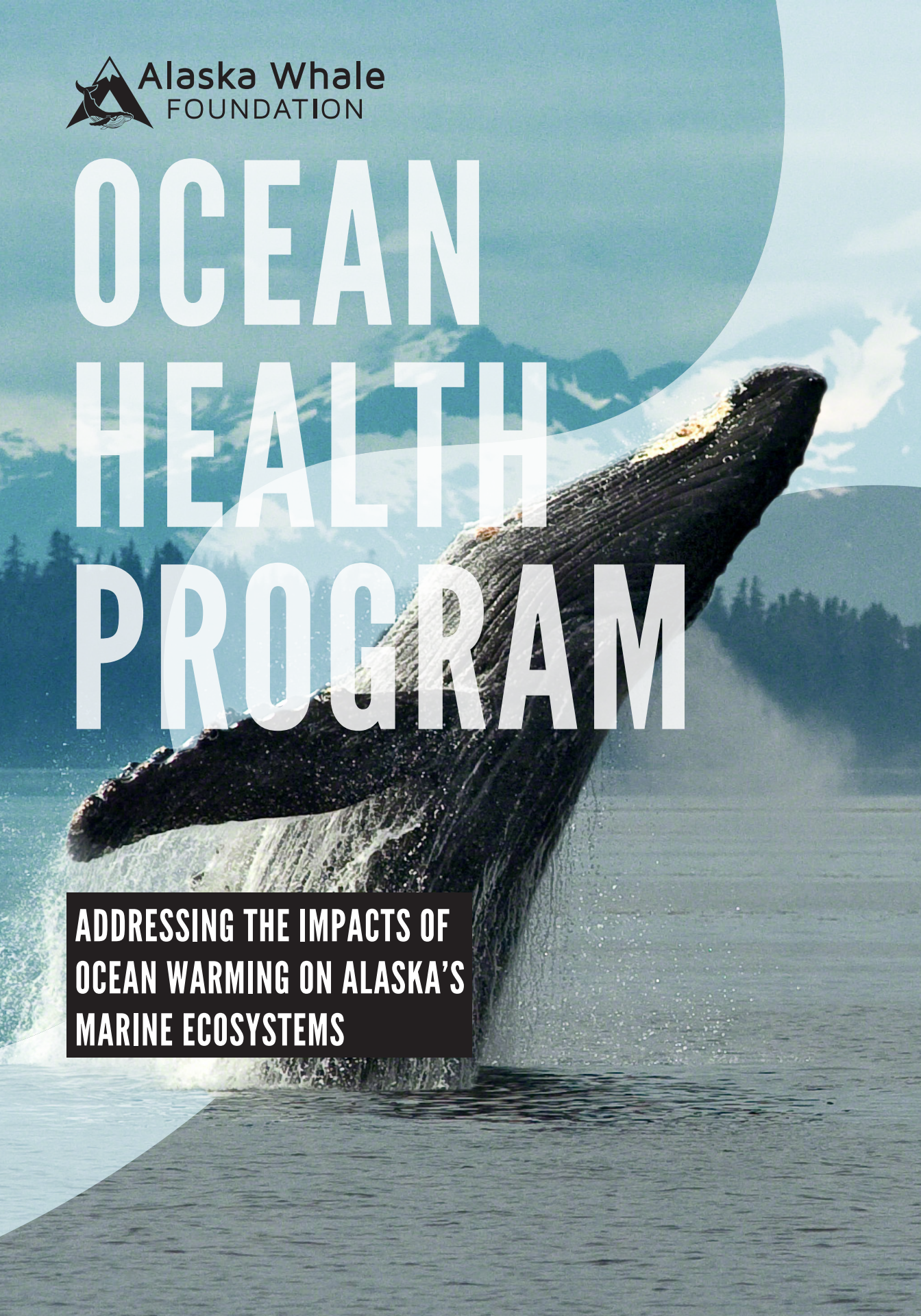
Alaska Whale FOUNDATION

OCEAN HEALTH PROGRAM

ADDRESSING THE IMPACTS OF OCEAN WARMING ON ALASKA'S MARINE ECOSYSTEMS



WE NEED YOUR SUPPORT IN OCEAN CONSERVATION

In 2013, researchers working throughout the North Pacific began detecting abnormally warm waters.

This 'marine heatwave' continued for several years and was unprecedented in both its magnitude and persistence. At the same time, Alaska Whale Foundation began documenting declines in several critical whale health metrics, including their abundance, their calving rates, and their overall body condition. This, together with alarming declines in key forage species, such as krill and herring, and commercially important fish stocks, as well as widespread seabird and marine mammal mortality, was clear evidence that North Pacific marine ecosystems were being negatively impacted.

Although the North Pacific eventually cooled, without major curbs on planetary warming marine heatwaves will become increasingly common. Warm waters are typically nutrient and oxygen poor. As a result, they support fewer phytoplankton - the microscopic 'plants' at the base of marine food webs – and thus fewer zooplankton, fish, seabirds and marine mammals. As well, phytoplankton are major drivers of carbon dioxide (CO_2) removal from the atmosphere, so declines in their abundance can lead to higher atmospheric CO_2 levels, which will further exacerbate the warming trend.

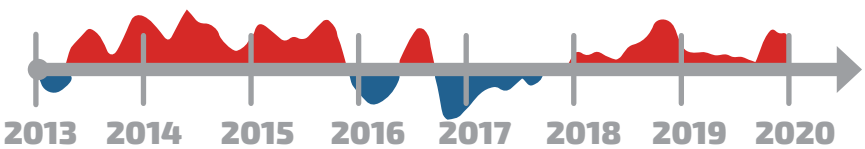
It will also directly impact humans. The United Nations Food and Agricultural Organization estimates that fisheries and aquaculture provide over 4 billion people with ~15% of their animal protein and are a source of income for millions of people worldwide. By altering distributions of fish stocks and increasing the vulnerability of fish species to diseases, ocean warming is a serious risk to food security and people's livelihoods globally.

So, what can be done?

Unfortunately, there is no single solution to curbing planetary warming. It will require policy makers and resource managers to make difficult and unpopular decisions. This, in turn, will require support from the public whose actions as both voters and consumers directly and indirectly impact planetary warming.

Collectively, these rely on scientific data upon which managers and policy makers can base their decisions and persuasive evidence-based examples of the impacts of planetary warming that can help win public support.

These are the challenges that AWF's Ocean Health Program (OHP) is addressing by researching how changing oceans are impacting marine ecosystems, providing data for guiding management decisions, eliciting broad support for ocean conservation initiatives, and ensuring enduring research capacity.



A temperature timeline for the Gulf of Alaska. In 2013, researchers working throughout the North Pacific began detecting warmer than average waters.

WHY WHALES?

AWF has been studying whales since 1996. Today, they play an outsized role in our conservation efforts.

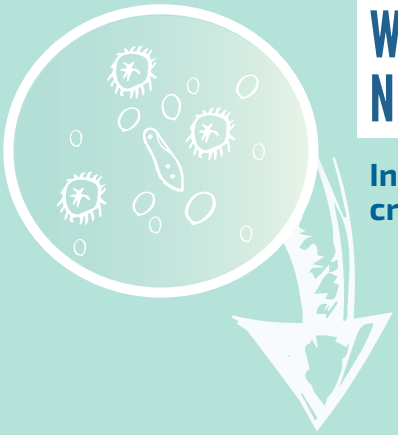
They are **INDICATOR SPECIES** — changes in their health and abundance can signal changes in the underlying ecosystem.

They are **UMBRELLA SPECIES** — management strategies protecting them protect other species that share their habitat.

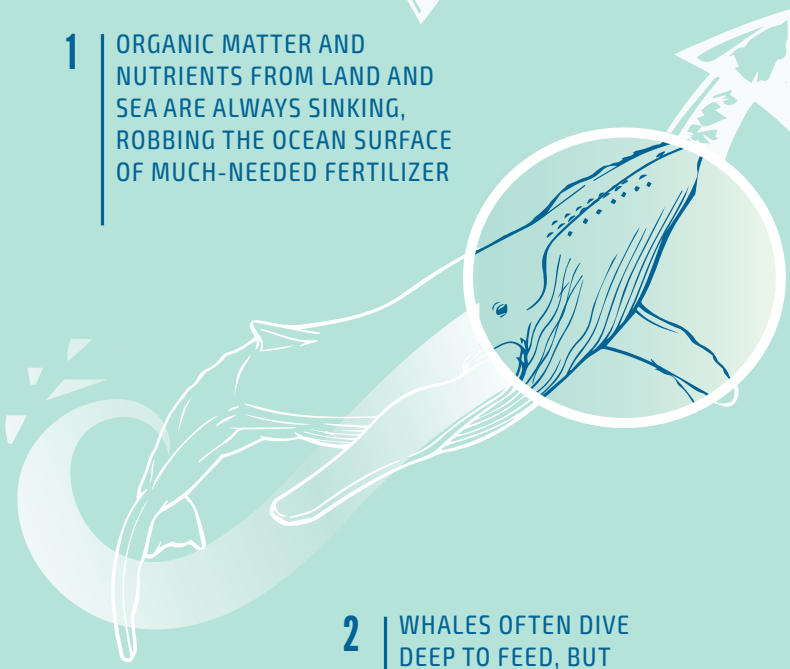
They are **FLAGSHIP SPECIES** — as charismatic animals, they can elicit support from the public for broad conservation initiatives.

WHALES ALSO CONTRIBUTE IMPORTANT NUTRIENTS TO MARINE ECOSYSTEMS

In this way, healthy whale populations are critical to healthy oceans.



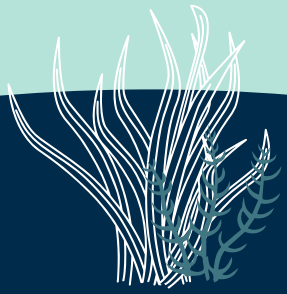
1 ORGANIC MATTER AND NUTRIENTS FROM LAND AND SEA ARE ALWAYS SINKING, ROBBING THE OCEAN SURFACE OF MUCH-NEEDED FERTILIZER

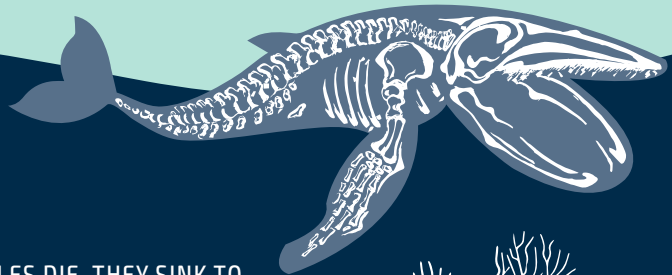


2 WHALES OFTEN DIVE DEEP TO FEED, BUT EVENTUALLY THEY MUST RETURN TO THE SURFACE TO BREATHE

3 ONCE BACK AT THE SURFACE THEY DEFECATE, PROVIDING AN IRON AND NITROGEN RICH FERTILIZER TO THE PLANKTON THAT GROW IN THE SUNLIT WATERS

4 THE ABUNDANT PLANKTON IN TURN SUPPORTS ABUNDANT KRILL, THE KEYSTONE SPECIES THAT VIRTUALLY EVERYTHING IN THE OCEAN, INCLUDING FISH, MARINE MAMMALS AND BIRDS, DEPENDS ON





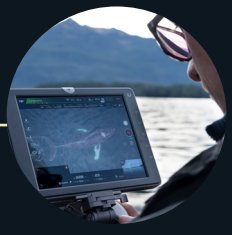
5 EVENTUALLY WHEN WHALES DIE, THEY SINK TO THE OCEAN FLOOR AND PROVIDE MONTHS OF NUTRITION TO BOTTOM COMMUNITIES OF FISH AND INVERTEBRATES

THE OCEAN HEALTH PROGRAM IS GUIDED BY

5 PRINCIPLES

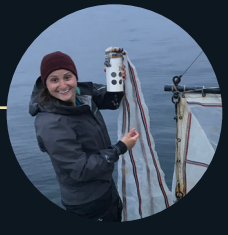
#1: Comprehensive:

The OHP focuses on all aspects of the marine ecosystem, from the physical and chemical properties of the water upon which everything depends to the 'apex' predators that sit at the top of the food web.



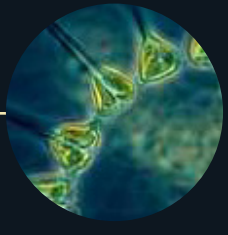
Whales

With their contribution to ocean health and the critical role they play as environmental indicators, whales have always been a focus of AWF's research program. Now, with new tools and techniques, we're able to study the health of whale populations in ways that were never before possible.



Zooplankton

Despite their tiny size, zooplankton are the critical link between phytoplankton and virtually every other ocean consumer, from the smallest fish to the largest whales.



Phytoplankton

As the "plants of the sea", changes in the abundance and species composition of phytoplankton can have cascading effects throughout the entire ecosystem.

Ocean Conditions

It is the physical and chemical properties of the ocean that are directly impacted by climate change and that, in turn, drive the biological processes we observe in the marine ecosystem.

#2: Enduring

Planetary warming and ocean health are concerns that will persist beyond the lifespan of typical research projects. The OHP is not a typical project - it is a long-term research and monitoring initiative that reflects AWF's refocused mission towards ocean conservation.

#3: Outreaching

Through a dedicated communication and outreach strategy, AWF is ensuring that information is available where it is needed: in the hands of researchers, resource managers, and, perhaps most importantly, the public whose support is critical to conservation.

#4: Collaborative

Research benefits from collaboration. This is especially true for multifaceted programs like the OHP. AWF has developed key partnerships with researchers who bring a diversity of experience, expertise and resources to help ensure the program's success.

#5: Educational

Today's students are tomorrow's marine stewards. The OHP continues AWF's longstanding tradition of providing opportunities for graduate and undergraduate student mentorship, training and participation in field work to prepare those students for future careers in marine conservation.

CONTRIBUTE TO SUPPORT OCEAN CONSERVATION

HOW YOU CAN HELP

Three reasons to support the Ocean Health Program:

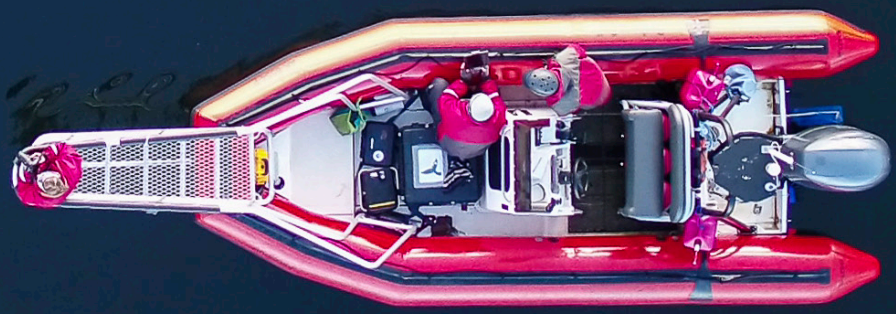
1) You're supporting both whale conservation and long-term ocean health.

Alaska Whale Foundation has been studying whales for over two decades. With each passing year, it becomes clearer that, to protect whales, we must protect their underlying ocean ecosystem. Our Ocean Health Program aims to better understand how our changing planet is impacting not only whales but their entire ecosystem. Your donation will ensure the long-term success of this program and its ocean conservation initiatives.

2) You're supporting the next generation of ocean scientists & stewards.

Every year, AWF invites graduate and undergraduate students from around the world to participate in our research and monitoring programs. We offer them the training and experience they will need to be successful in their future careers as marine scientists. Your donation directly supports these students.

Alaska Whale Foundation is able to achieve its ocean health research and conservation goals in the remote wilderness of Southeast Alaska because of individual donors who are as passionate about our mission as we are.



3) You're helping us create one of the world's longest, largest, and deepest data sets on whale health and behavior.

Over the past decade, AWF's humpback whale health initiative has matured into a comprehensive program that tracks annual whale abundance and habitat use patterns, reproductive rates, stress hormone levels, dietary shifts, and body condition in all months of the year and at both ends of the whales' trans-oceanic migration. It is yielding an unprecedented volume of data - together with our Hawaiian research partners we have collected health metrics from approximately one third of the entire Central North Pacific humpback whale population. This establishes it as one of the largest whale health research programs on the planet. And, because it is a long-term program, we can identify whale health trends linked to multi-year changes in the ecosystem that would not be evident in a short-term study. Your contribution will help us continue to grow and sustain this critical effort.

View from above AWF's field station in Warm Springs Bay.

Alaska Whale Foundation has been committed to conserving marine mammals and coastal ecosystems since 1996.

Our team of scientists, students, and staff work to understand, protect, and inspire appreciation for whales and their habitat through rigorous research, long-term ecological monitoring, and outreach from our field station in Baranof Warm Springs in the panhandle of Southeast Alaska.

As our planet continues to warm, we need your help more than ever to ensure the long-term health of whales and ocean ecosystems.

Learn more about AWF's Ocean Health Program, and how you can support it, at alaskawhalefoundation.org

PLEASE CONSIDER BECOMING A SUPPORTER TODAY

All donations are tax-deductible within the US

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