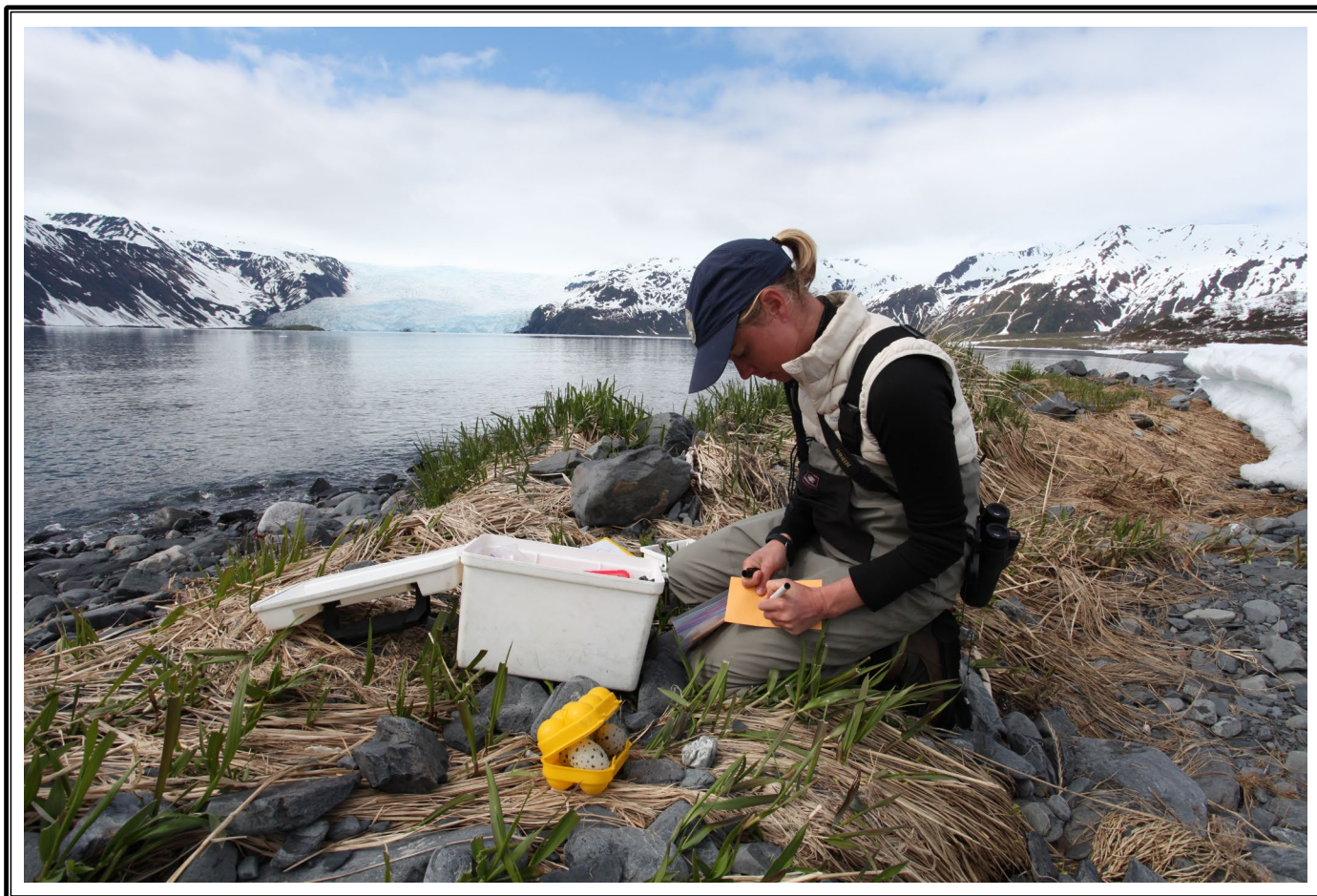




Marine and Coastal Science in Alaska's National Parks

A List of Published Research in 2018



**ON THIS PAGE**

Graduate student Brooke Carney prepares to take blood samples from black oystercatchers in Aialik Bay, Kenai Fjords National Park
NPS Photo/K. White

ON THE COVER

Ph.D student Joy Erlenbach conducting brown bear research in Katmai Bay, Katmai National Park and Preserve
NPS Photo/J. Paluh

2018 Annotated Peer Reviewed Literature

The following papers contain research relevant to marine and coastal areas of Alaska's national park units. There may be additional papers not listed here. Some are still in press as of completion of this list, however all have completed the peer review process for publication. Names in bold print indicate National Park Service (NPS) authors. Some papers are included because of their relevancy to parks, but have no NPS authors and may not have been funded by the NPS. In a few cases, a paper may not be directly relevant to a national park, but was authored by an NPS researcher. We wish to laud such achievements as well.



Documenting marine life in Kamishak Bay, Katmai National Park and Preserve. NPS Photo/J. Pfeifferberger

Amundson C.L., C.M Handel, D.R. Ruthrauff, T.L. Tibbitts, R.E. Gill, Jr. 2018. Montane-breeding bird distribution and abundance across national parks of southwestern Alaska. *Journal of Fish and Wildlife Management* 9(1):180–207; e1944-687X. <https://doi.org/10.3996/062017-JFWM-050>.

Between 2004 and 2008, biologists conducted an inventory of breeding birds during May–June primarily in montane areas of Aniakchak National Monument and Preserve, Katmai National Park and Preserve, and Lake Clark National Park and Preserve in southwestern Alaska. Their results provide baseline estimates of relative abundance and models of abundance and species richness relative to land cover that can be used to assess future changes in avian distribution.

Anderson S., J. Jordan, **A. Freeburg**. In press. Human settlement and Mid-Late Holocene coastal environmental change at Cape Krusenstern, Northwest Alaska. *Quaternary International*. <https://doi.org/10.1016/j.quaint.2018.10.028>.

In this report, authors undertook an interdisciplinary study at Cape Krusenstern, a large coastal site complex in northwest Alaska, which was occupied over the last ca. 5000–6000 years. With the goals of refining local cultural and paleoenvironmental chronologies and to explore the question of how local environmental change may have influenced local settlement history.

Arimitsu, M.L., K.A. Hobson, D.A. Webber, J.F. Piatt, E.W. Hood, J.B. Fellman. 2017. Tracing biogeochemical subsidies from glacier runoff into Alaska's coastal marine food webs. *Global Change Biology* 24(1):387-378. <https://doi.org/10.1111/gcb.13875>.

The influence of the influx of riverine organic matter on the trophodynamics of coastal marine food webs is not well understood. This work demonstrates linkages between terrestrial and marine ecosystems, and

facilitates a greater understanding of how climate-driven changes in freshwater runoff have the potential to alter food web dynamics within coastal marine ecosystems in Alaska.

Barlow, D.R., M. Fournet, F. Sharpe. 2018. Incorporating tides into the acoustic ecology of humpback whales. *Marine Mammal Science*. <https://doi.org/10.1111/mms.12534>.

North Pacific humpback whales (*Megaptera novaeangliae*) migrate annually to foraging grounds in Southeast Alaska that are characterized by semidiurnal tidal cycles. Tidal activity is an important driver of marine mammal behavior on foraging grounds, but is often omitted in studies of acoustic ecology. To better understand the role of sound in this vocal species authors investigated the influence of tidal height and direction on humpback whale nonsong calling behavior in Frederick Sound and described new call types for this population.

Bessett-Kirton, E.K., J.A. Coe, W. Zhou. 2018. Using Stereo Satellite Imagery to Account for Ablation, Entrainment, and Compaction in Volume Calculations for Rock Avalanches on Glaciers: Application to the 2016 Lamplugh Rock Avalanche in Glacier Bay National Park, Alaska. *JGR Earth Surface* 123(4):622-641. <https://doi.org/10.1002/2017JF004512>.

The objective of this research is to use high-resolution preevent and postevent satellite stereo imagery to apply a newly developed model to calculate the thickness and volume of rock avalanches emplaced on glaciers.

Bill, N.S. H.T. Mix, P.U. Clark, S.P. Reilly, B.J.L. Jensen, J.A. Benowitz. 2018. A stable isotope record of late Cenozoic surface uplift of southern Alaska. *Earth and Planetary Science Letters* 482:300-311. <https://doi.org/10.1016/j.epsl.2017.11.029>.

Although the timing of an acceleration in late-Cenozoic exhumation of southern Alaska is reasonably well constrained, the surface uplift history of this region remains poorly understood. To assess the extent of surface uplift relative to rapid exhumation, the authors developed a stable isotope record using the hydrogen isotope composition of paleo-meteoric water from interior basins of Alaska and Yukon Territory.

Boes, E., M. Van Daele, J. Moernaut, S. Schmidt, B.J.L. Jensen, N. Praet, D. Kaufman, P. Haeussler, **M.G. Loso**, M. De Batist. 2017. Varve formation during the past three centuries in three large proglacial lakes in south-central Alaska. *GSA Bulletin* (2017) 130 (5-6): 757-774. <https://doi.org/10.1130/B31792.1>.

The sediments stored in the large, deep proglacial lakes of south-central Alaska are largely unstudied. Authors in this study analyzed sediments in 20 cores from Eklutna, Kenai, and Skilak Lakes, using a combination of repeated lamination counting, radionuclide dating, event stratigraphy, and tephrochronology.

Bowen, L., A.K. Miles, S. Waters, **D. Gustine, K. Joly**, G. Hilderbrand. 2017. Using Gene Transcription to Assess Ecological and Anthropological Stressors in Brown Bears. *EcoHealth* (2018) 15:121. <https://doi.org/10.1007/s10393-017-1287-0>.

Advances in molecular technology enable the identification of synergistic effects of multiple stressors on the individual physiology of different species. Brown bears (*Ursus arctos*) are an apex predator; thus, they are ideal candidates for detecting potentially ecosystem-level systemic perturbations using molecular-based tools. Authors in this study used gene transcription to analyze 130 brown bear samples from three National Parks and Preserves in Alaska.



A peregrine falcon research team heads into Aialik Bay, Kenai Fjords National Park. NPS Photo/J. Pfeiffenberger

northwest Bristol Bay. Prior to this research, no analysis of the Summit Island collection had been conducted.

Casperson, M. 2018. Walrus, Seal, and Seabird Faunal Remains from Summit Island in Bristol Bay, Alaska: The Subsistence Practices of Norton Peoples in an Island Environment (2740–980 Cal B.P.). Thesis. University of Oregon. <http://hdl.handle.net/1794/23116>.

In an effort to directly document Norton subsistence practices, the author procured a sizeable faunal assemblage that Robert Shaw excavated in 1985 from 49-XHI-043 and 49-XHI-044. These sites are located on Summit Island, a nearshore island 6 km from the shoreline of

Coe, JA, E.K. Bessette-Kirton, M. Geertsema. 2017. Increasing rock-avalanche size and mobility in Glacier Bay National Park and Preserve, Alaska detected from 1984 to 2016 Landsat imagery. *Landslides* (2018) 15:393. <https://doi.org/10.1007/s10346-017-0879-7>.

Glacier Bay National Park and Preserve in southeast Alaska has attracted the attention of landslide researchers in the last few years because of several large rock avalanches. Authors of this paper analyze and assess the park's rock-avalanche inventory for changes in frequency, magnitude and mobility over a 33-year period.

Curl, J. 2018. Estimating Seabird Abundance: A Case Study in Kenai Fjords National Park, Alaska. Thesis. University of Alaska Fairbanks, Fairbanks, Alaska. <https://search.proquest.com/openview/>.

Estimation of breeding seabird population size and trends is integral to understanding how seabird populations respond to changes in marine or coastal environments, to identifying threatened or declining species, and to informing management actions and decisions. In this study the author introduces multiple methods to collect and analyze seabird data, and identifies the most effective methods to estimate breeding abundance of glaucous-winged gulls in Kenai Fjords National Park, Alaska.

Farquharson, L.M., D.H. Mann, **D.K. Swanson**, B.M. Jones, R.M. Buzard, J.W. Jordan. 2018. Temporal and spatial variability in coastline response to declining sea-ice in northwest Alaska. *Marine Geology* 404:71-83. <https://doi.org/10.1016/j.margeo.2018.07.007>.

Arctic sea-ice is declining in extent, leaving coastlines exposed to more storm-wave events. Here authors describe spatial and temporal patterns of shoreline changes along two geomorphologically distinct, storm-wave dominated reaches of the Chukchi Sea coastline over the last 64 years.

Fiorillo, A.R., P.J. McCarthy, Y. Kobayashi, T. Tanaka. 2018. Duck-billed Dinosaurs (Hadrosauridae), Ancient Environments, and Cretaceous Beringia in Alaska's National Parks. *Alaska Park Science* 17(1).

Researchers present new information from Aniakchak National Monument and Preserve on the Alaska Peninsula, that, when compared to time-equivalent rock units elsewhere in Alaska, sheds light on the likely ancient environment that allowed the migration of one group of dinosaurs, the hadrosaurs (duck-billed dinosaurs), across Beringia during the Cretaceous.

Fournet, Michelle E.H., C.M. Gabriele, D.C. Culp, F. Sharpe, D.K. Mellinger, H. Klinck. 2018. Some things never change: multi-decadal stability in humpback whale calling repertoire on Southeast Alaskan foraging grounds. *Scientific Reports* 8(13186).

By comparing the earliest known acoustic recordings of humpback whales in Southeast Alaska (from the 1970's) with recordings collected in the 1990's, 2000's, and 2010's, the authors investigated the long-term repertoire stability of calls on Southeast Alaskan foraging grounds.

Fournet, Michelle E.H., **C.M. Gabriele**, F. Sharpe, J.M. Straley, A. Szabo. 2018. Feeding calls produced by solitary humpback whales. *Marine Mammal Science* 34(3):851-865. <https://doi.org/10.1111/mms.12485>.

Humpback whales produce a wide range of low- to mid-frequency vocalizations throughout their migratory range. In this research paper the source levels of 426 humpback whale calls in four vocal classes were estimated using a four-element planar array deployed in Glacier Bay National Park and Preserve, Southeast Alaska.

Fournet, Michelle E.H., L. Jacobsen, **C.M. Gabriele**, D.K. Mellinger, H. Klinck. 2018. More of the same: allopatric humpback whale populations share acoustic repertoire. *PeerJ* 2018 Jul 30;6e5365. <https://doi.org/10.7717/peerj.5365>.

For this study authors looked for evidence that temporally stable call types are shared by two allopatric humpback whale populations while on their northern hemisphere foraging grounds in order to test the hypothesis that some calls, in strong contrast to song, are innate within the humpback whale acoustic repertoire.



National Park Service Marine Biologists monitor whales in Glacier Bay National Park and Preserve. NPS Photo

Fournet, Michelle E.H., L.P. Matthews, **C.M. Gabriele**, D.K. Mellinger, H. Klinck. 2018. Source levels of foraging humpback whale calls. *The Journal of the Acoustical Society of America* 143(2). <https://doi.org/10.1121/1.5023599>.

Humpback whales produce a wide range of low- to mid-frequency vocalizations throughout their migratory range. Non-song “calls” dominate this species' vocal repertoire while on high-latitude foraging grounds. In this study the source levels of 426 humpback whale calls in four vocal classes were estimated using a four-element planar array deployed in Glacier Bay National Park and Preserve, Southeast Alaska.

Gabriele, C.M., D.W. Ponirakis, C.W. Clark, **J.N. Womble**, **P.B.S. Vanselow**. 2018. Underwater Acoustic Ecology Metrics in an Alaska Marine Protected Area Reveal Marine Mammal Communication Masking and Management Alternatives. *Frontiers in Marine Science*. <https://doi.org/10.3389/fmars.2018.00270>.

In this study, the authors incorporated empirical data from acoustic monitoring in GBNP and applied the Clark et al. (2009, 2016) approach to quantify the degree to which vessel noise can compromise the ability of vocalizing humpback whales and harbor seals to communicate with conspecifics.

Gende, S., A.N. Hendrix, **J. Schmidt**. 2018. Somewhere between acceptable and sustainable: When do impacts to resources become too large in protected areas? *Biological Conservation* 223:138-146. <https://doi.org/10.1016/j.biocon.2018.04.038>.

Cruise ships in Glacier Bay National Park have been involved in several lethal collisions with humpback whales. Park managers must make a recurring decision regarding the number of cruise ships that are allowed to enter the park each year. Using an individual-based simulation model, the authors of this study demonstrate that increasing the annual ship volume from current to maximum allowable levels would have negligible impacts on population growth of whales.

Haeussler, P.J., S. P. S. Gulick, N. McCall, M. Walton, R. Reece, C. Larsen, D. H. Shugar, M. Geertsema, J. G. Venditti, K. Labay. 2018. Submarine Deposition of a Subaerial Landslide in Taan Fiord, Alaska. *JGR Earth Surface* 123(10):2443-2463. <https://doi.org/10.1029/2018JF004608>.

A large subaerial landslide entered Taan Fiord, Alaska, on 17 October 2015 producing a tsunami with runup to 193 m. In this study, researchers used LiDAR data to show the slide volume and mapped the fjord with multibeam bathymetry and high-resolution seismic data.



Mapping landslide beneath Taan Fiord, in Wrangell-St. Elias National Park and Preserve. Photo: Ground Truth Trekking.

Hauser, Donna D.W. 2018. Seasonal sea ice and arctic migrations of the beluga whale. University of Washington and University of Alaska Fairbanks. Alaska Park Science 17(1).

This paper examines the relationship between the loss of arctic sea ice and the movement of beluga and bowhead whales in the Chukchi and Beaufort seas.

Hessing-Lewis, M., E.U. Rechsteiner, B.B. Hughes, M.T. Tinker, Z.L. Monteith, A.M. Olson, M.M. Henderson, J.C. Watson. 2018. Ecosystem features determine seagrass community response to sea otter foraging. Marine Pollution Bulletin 134:134-144. <https://doi.org/10.1016/j.marpolbul.2017.09.047>.

Comparing sea otter recovery in California and British Columbia reveals key ecosystem properties that shape top-down effects in seagrass communities. Here authors review potential ecosystem drivers of sea otter foraging in CA and BC seagrass beds, including the role of coastline complexity and environmental stress on sea otter effects.

Higman, B., D.H. Shugar, [...] **M. Loso**. 2018. The 2015 landslide and tsunami in Taan Fiord, Alaska. Scientific Reports 8 (12993). <https://doi.org/10.1038/s41598-018-30475-w>.

Glacial retreat in recent decades has exposed unstable slopes and allowed deep water to extend beneath some of those slopes. This study provides a benchmark for modeling landslide and tsunami hazards and calls attention to an indirect effect of climate change that is increasing the frequency and magnitude of natural hazards near glaciated mountains.

Hilderbrand, G.V., **D.D. Gustine, B.A. Mangipane, K. Joly**, W. Leacock, L.S. Mangipane, J. Erlenbach, **M.S. Sorum, M.D. Cameron**, J.L. Belant, T. Cambier. 2018. Body size and lean mass of brown bears across and within four diverse ecosystems. Journal of Zoology 305(1):53-62. <https://doi.org/10.1111/jzo.12536>.

For this study researchers assessed skull size, body length, and lean mass of adult female and male brown bears in four Alaskan study areas that differed in climate, primary food resources, population density, and harvest regime.

Hilderbrand, G.V., **D.D. Gustine, B.A. Mangipane, K. Joly**, W. Leacock, L.S. Mangipane, J. Erlenbach, **M.S. Sorum, M.D. Cameron**, J.L. Belant, T. Cambier. 2018. Plasticity in physiological condition of female brown bears across diverse ecosystems. Polar Biol (2018) 41: 773. <https://doi.org/10.1007/s00300-017-2238-5>.

Variation in life history strategies facilitates the near global distribution of mammals by expanding realized niche width. In this research paper, authors investigated physiological plasticity in the spring body composition of adult female brown bears (*Ursus arctos*) across 4 diverse Alaskan ecosystems.

Helm, J.E. 2018. Confronting the challenges of whale avoidance by large vessels to reduce collision risk: A quantitative approach. Thesis. University of Montana, Missoula, Montana. <https://scholarworks.umt.edu/etd/11163>.

In this study the author investigates the ability of ship operators to detect and actively avoid whales by quantifying two processes: the ability of vessel operators to ascertain the direction of travel of whales and the varying detection challenges faced by vessel operators as whales move through the “strike zone”.

Kenney, L.A, R.S.A. Kaler, M.L. Kissling, A.L. Bond, C.A. Eagles-Smith. 2018. Mercury concentrations in multiple tissues of Kittlitz's murrelets (*Brachyramphus brevirostris*). *Marine Pollution Bulletin* 129(2):675. <https://doi.org/10.1016/j.marpolbul.2017.10.055>.

The Kittlitz's murrelet (*Brachyramphus brevirostris*) is a seabird endemic to Alaska and the Russian Far East and is a species of conservation concern in the region. In this study researchers determined Hg concentrations in eggshells, guano, blood, and feathers of Kittlitz's murrelets sampled from four locations in Alaska.

Lindeberg, M.R., J. Maselko, R.A. Heintz, C.J. Fugate, L. Holland. 2018. Conditions of persistent oil on beaches in Prince William Sound 26 years after the Exxon Valdez spill. *Deep Sea Research Part II: Topical Studies in Oceanography* 147:9-19. <https://doi.org/10.1016/j.dsr2.2017.07.011>.

In this study authors present findings from a lingering oil survey conducted during the summer of 2015 at a small set of beaches in Prince William Sound known to have persistent subsurface Exxon Valdez oil. The objectives of the survey were to estimate how much oil remains at these sites, the oil composition, and oil retention rates compared to previous studies.

Matthews, L.P., B. Blades, S.E. Parks. 2018. Female harbor seal (*Phoca vitulina*) behavioral response to playbacks of underwater male acoustic advertisement displays. *PeerJ* 6:e4547. <https://doi.org/10.7717/peerj.4547>.



Harbor seals hauled out on rocks. NPS Photo/K. Chritz

This study consisted of a series of playback experiments in which captive female harbor seals were exposed to recordings of male roars to determine if females respond to recordings of male vocalizations and whether or not they respond differently to roars from categories with different acoustic characteristics.

McCune, B., U. Arup, O. Breuss, E. DiMeglio, J. DiMeglio, T.L. Esslinger, N. Magain, J. Miadlikowska, **A.E. Miller**, L. Muggia, P.R. Nelson, R. Rosentreter, M. Schultz, J.W. Sheard, T. Tonsberg, **J. Walton**. 2018. Biodiversity and ecology of lichens of Katmai and Lake Clark National Parks and Preserves, Alaska. *Mycosphere* 9(4):859–930, <http://hdl.handle.net/2268/228102>.

In this study the authors inventoried lichens in Lake Clark and Katmai national parks and preserves. They assembled the known information on lichens in these parks by combining field, herbarium, and literature studies. Their results provide baseline data on lichen occurrence that may

be used in resource condition assessments, vulnerability assessments, long-term ecological monitoring, and resource management.

Milner, A.M., J.L. Picken, M.J. Klaar, A.L. Robertson, L.R. Clitherow, L. Eagle, L.E. Brown. 2018. River ecosystem resilience to extreme flood events. *Ecology and Evolution* 8(16):8354-8363.
<https://doi.org/10.1002/ece3.4300>.

Floods have a major influence in structuring river ecosystems. However, there is uncertainty about the effect of different flooding regimes in structuring riverine habitats and their associated biotic communities. Here authors show that in a river ecosystem studied for 30 years, a major winter flood reset the invertebrate community to a community similar to one that existed 15 years earlier.

Naves, L.C. 2018. Geographic and seasonal patterns of seabird subsistence harvest in Alaska. *Polar Biology* 41:1217. <https://doi.org/10.1007/s00300-018-2279-4>.

This study quantified seasonal harvest of seabirds and their eggs in all Alaska regions, addressed management and conservation questions, and identified topics where collaboration among stakeholders can support sustainable harvest opportunities and promote seabird conservation.

Polashenski, D.J., E.C. Osterberg, B.G. Koffman, D. Winski, K. Stamieszkin, K.J. Kreutz, C.P. Wake, D.G. Ferris, D. Introne, S. Campbell, G.M. Lewis. 2018. Denali Ice Core Methanesulfonic Acid Records North Pacific Marine Primary Production. *Journal of Geophysical Research* 123(9):4642-4653.
<https://doi.org/10.1029/2017JD028123>.

In this paper, the authors establish methanesulfonic acid (MSA) concentrations in the Denali ice core as a proxy for marine primary production in the NE Pacific. Using Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT; Stein et al., 2015, <https://doi.org/10.1178/BAMS-D-14-00110.1>) modeling, they identify moisture source regions for the core site and correlate Sea-Viewing Wide Field-of-View Sensor-derived chlorophyll a concentrations with ice core MSA.

Prejean, S.G., D.P. Hill. 2018. The influence of tectonic environment on dynamic earthquake triggering: A review and case study on Alaskan volcanoes. *Tectonophysics* 745:293-304.
<https://doi.org/10.1016/j.tecto.2018.08.007>.

In this study, researchers review evidence for tectonic regime dependence of dynamic triggering susceptibility in the shallow brittle crust, and explore triggering susceptibility at Alaskan volcanoes.

Rehberg, M., L. Jemison, **J.N. Womble**, G. O’Corry-Crowe. 2018. Winter movements and long-term dispersal of Steller sea lions in the Glacier Bay region of Southeast Alaska. *Endang Species Res* 37:11-24. <https://doi.org/10.3354/esr00909>.

Steller sea lions *Eumetopias jubatus* in the Glacier Bay region of northern Southeast Alaska experience greater survival and more rapid population growth than sea lions elsewhere in this region. To better understand demographics of sea lions in the region, and to describe the origins and behavior of sea lions and relate these descriptions to previous studies, the authors studied genetic origins, residency, foraging range, diving behavior, and dispersal of immature sea lions captured in Glacier Bay.

Rode, K.D., J.K. Fortin-Noreus, D. Garshelis, M. Dyck, V. Sahanatien, T. Atwood, S. Belikov, K.L. Laidre, S. Miller, M.E. Obbard, D. Vongraven, J. Ware, J. Wilder. 2018. Survey-based assessment of the frequency and potential impacts of recreation on polar bears. *Biological Conservation* 227:121-132. <https://doi.org/10.1016/j.biocon.2018.09.008>.

Authors of this study conducted a Delphi survey among experts who live and work in polar bear habitats, followed by an internet-based survey to which 47 managers, tour operators, community members, and scientists contributed.

Roffler, G.H., D.P. Gregovich, K.R. Larson. 2017. Resource selection by coastal wolves reveals the seasonal importance of seral forest and suitable prey habitat. *Forest Ecology and Management* 409:90-201. <https://doi.org/10.1016/j.foreco.2017.11.025>.

This study reveals the potential of coastal wolves to seasonally target prey habitat and adjust to altered landscapes, but successional forests had a limited period of use (<30 years), thus forestry practices could reduce availability of wolves' preferred habitat.

Sparks, M.M., J.A. Falke, T.P. Quinn, M.D. Adkison, D.E. Schindler, K. Bartz, D. Young, P.A.H. Westleya. 2018. Influences of spawning timing, water temperature, and climatic warming on early life history phenology in western Alaska sockeye salmon. *Canadian Journal of Fisheries and Aquatic Sciences*, Published on the web 25 April 2018. <https://doi.org/10.1139/cjfas-2017-0468>.

In this study, researchers applied an empirical model to predict hatching and emergence timing for 25 western Alaska sockeye salmon (*Oncorhynchus nerka*) populations in four lake-nursery systems to explore current patterns and potential responses of early life history phenology to warming water temperatures.

Szpak, P., M. Buckley, C.M. Darwent, M.P. Richards. 2017. Long-term ecological changes in marine mammals driven by recent warming in northwestern Alaska. *Global Change Biology* 24(1):490-503, January 2018. <https://doi.org/10.1111/gcb.13880>.



USGS geologists work on repeat photography of Holgate Glacier in Kenai Fjords National Park. NPS Photo/J. Pfeifferberger

Carbon and nitrogen isotopes analyses were performed on marine mammal bone collagen from three archaeological sites (ad 1170–1813) on Cape Espenberg (Kotzebue Sound, northwestern Alaska) as well as modern animals harvested from the same area to examine long-term trends in foraging ecology and sea ice productivity.

Straley, J.M., J.R. Moran, K.M. Boswell, J.J. Vollenweider, R.A. Heintz, T.J. Quinn II, B.H. Witteveen, S.D. Rice. 2018. Seasonal presence and potential influence of humpback whales on wintering Pacific herring populations in the Gulf of Alaska. *Deep Sea Research Part II: Tropical Studies in Oceanography* 147:173-186. <https://doi.org/10.1016/j.dsr2.2017.08.008>.

This study addresses the lack of recovery of Pacific herring (*Clupea pallasii*) in Prince William Sound, Alaska, in relation to humpback whale (*Megaptera novaeangliae*) predation. The authors compare the potential influence of foraging humpback whales on three herring populations in the coastal Gulf of Alaska: Prince William Sound, Lynn Canal, and Sitka Sound from 2007 to 2009.

Tremayne, A.H. 2018. A Survey of Human Migration in Alaska's National Parks through Time. *Alaska Park Science* 17(1).

This article describes human migrations into and through Alaska over the past 14,000 years to provide a better understanding of who created the archaeological sites found within Alaska's national parklands.

Valentin, M.M., R.J. Viger, A.E. Van Beusekom, L.E. Hay, T.S. Hogue, N.L. Foks. 2018. Enhancement of a Parsimonious Water Balance Model to Simulate Surface Hydrology in a Glacierized Watershed. *JGR Earth Surface* 123(5):1116-1132. <https://doi.org/10.1029/2017JF004482>.

Streamflow in cold regions can experience large and rapid changes in response to changes in temperature and precipitation. Computer simulation models that are relatively easy to set up, use, and interpret are important tools for understanding these responses and managing water resources to maximize societal and environmental benefit. This paper describes such a model, the U.S. Geological Survey monthly water balance model, which was enhanced for cold regions by adding simulations of glaciers and glacier contributions to streamflow.

Weiser, E.L., et al. 2017. Effects of environmental conditions on reproductive effort and nest success of Arctic-breeding shorebirds. *Ibis* 160(3):608-623. <https://doi.org/10.1111/ibi.12571>.

The Arctic is experiencing rapidly warming conditions, increasing predator abundance, and diminishing population cycles of keystone species such as lemmings. However, it is still not known how many Arctic animals will respond to a changing climate with altered trophic interactions. Here authors studied clutch size, incubation duration and nest survival of 17 taxa of Arctic-breeding shorebirds at 16 field sites over 7 years.

Williams, P.J., M.B. Hooten, **J.N. Womble**, G.G. Esslinger, **M.R. Bower**. 2018. Monitoring dynamic spatio-temporal ecological processes optimally. *Ecology* 99(3):524-535. <https://doi.org/10.1002/ecy.2120>.

Researchers in this study describe a cohesive framework for monitoring a spreading population that explicitly links animal movement models with survey design and monitoring objectives. They then apply the framework to develop an optimal survey design for sea otters in Glacier Bay.

Wooller, M.J., E. Saulnier-Talbot, B.A. Potter, S. Belmecheri, N. Bigelow, K. Choy, L.C. Cwynar, K. Davies, R.W. Graham, J. Kurek, P. Langdon, A. Medeiros, R. Rawcliffe, Y. Wang, J.W. Williams. 2018.

A new terrestrial palaeoenvironmental record from the Bering Land Bridge and context for human dispersal. Royal Society Open Science 5(6):180145. <https://doi.org/10.1098/rsos.180145>.

Palaeoenvironmental records from the now-submerged Bering Land Bridge (BLB) covering the Last Glacial Maximum (LGM) to the present are needed to document changing environments and connections with the dispersal of humans into North America. This study presents the first terrestrial temperature and hydrologic reconstructions from the LGM to the present from the BLB's south-central margin.



Brown bear research team in Katmai Bay, Katmai National Park and Preserve. NPS Photo/J. Paluh

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