



Marine and Coastal Science in Alaska's National Parks

A List of Published Research in 2017





ON THIS PAGE

Research vessel, *Serac*, in Aialik Bay, Kenai Fjords National Park
NPS Photo

ON THE COVER

Joy Erlenbach observes bears on the Katmai coast as part of the Changing Tides Project.
NPS Photo/Kaiti Chritz

2017 Annotated Peer Reviewed Literature

The following papers contain research relevant to the marine and coastal areas of Alaska's national park units. There may be additional papers not listed here. Some of them 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 authors. Some papers are included because of their relevancy to parks, but have no National Park Service authors and may not have been funded by the National Park Service. In a few cases, a paper may not be directly relevant to a national park, but was authored by a National Park Service researcher. We wish to laud such achievements as well.

Anderson, S.L., S. Tushingham, T.Y. Buonasera. 2017. Aquatic adaptations and the adoption of arctic pottery technology: Results of residue analysis. *American Antiquity* 82(3): 452-479
<https://doi.org/10.1017/aaq.2017.8>

Arctic pottery technologies present an excellent case study for examining possible correlations between hunter-gatherer pottery and aquatic resource use. This research is the first synthesis in over 30 years of early pottery in Alaska and is the first to include residue analysis of a small sample of pre-1500 B.P. pottery.

Bloom, C.K. 2017. Catastrophic landscape modification from massive landslide tsunamis: An example from Taan Fiord, Alaska. Thesis. Central Washington University, Ellensburg, Washington. (Embargoed) <https://digitalcommons.cwu.edu/etd/636/>

Bloom's study focuses on defining the characteristic geomorphic features of high run-up tsunamis expressed on low gradient fan deltas using observations made following the 2015 landslide and tsunami (192 m) in Taan Fiord.

Bodkin JL, **Coletti HA**, Ballachey BE, Monson DH, Esler D, Dean TA. In press. Variation in abundance of Pacific blue mussel (*Mytilus trossulus*) in the Northern Gulf of Alaska, 2006-2015. *Deep Sea Research II*. <https://doi.org/10.1016/j.dsr2.2017.04.008>

This study evaluates mussel (*Mytilus trossulus*) abundance data derived from monitoring conducted in the northern Gulf of Alaska between 2006 and 2015 and discusses potential implications to mussel predators.

Buma, B., S. Bisbing, J. Krapek, G. Wright. 2017. A foundation of ecology rediscovered: 100 years of succession on the William S. Cooper plots in Glacier Bay, Alaska. *Ecology* 98: 1513-1523. DOI:10.1002/ecy.1848

Understanding plant community succession is one of the original pursuits of Ecology. This work focused on rediscovering and studying Coopers' original plot locations established in Glacier Bay 100 years ago, and relating observed change to successional theory.

Buonasera, T. Y., **Tremayne, A. H.**, Darwent, C.M., Eerkens, J.W., Owen, K. Mason. 2015. Lipid biomarkers and compound specific d13C analysis indicate early development of a dual-economic system for the Arctic Small Tool tradition in northern Alaska. *Journal of Archaeological Science*. <https://www.sciencedirect.com/science/article/pii/S0305440315002046>

In this study researchers analyze preserved lipids from archaeological sites in Cape Espenberg Alaska, demonstrating a viable alternative for distinguishing between marine and terrestrial animal remains when bone preservation is poor. Results indicate that hunters bearing tools from the Arctic Small Tool tradition exploited marine animal resources as part of a dual economy as early as 4500 years ago.

Capps, D.M. 2017. The role of glaciers and glacier research in the development of U.S. National Parks. *Earth Sciences History* Vol. 36, No. 2:337-358. earthscienceshistory.org/doi/abs/10.17704/1944-6178-36.2.337

Capps' review highlights past contributions from glacier researchers in national parks and the manner in which glaciers have shaped the foundations of many such parks.

Coletti, H.A., K. Kloecker, J.L. Bodkin, T.A. Dean. 2017. Gulf Watch Alaska nearshore component: Monitoring site locations from Prince William Sound, Katmai National Park and Preserve, and Kenai Fjords National Park. Dataset. <https://doi.org/10.5066/F78S4N3R>

These data describe site locations for rocky intertidal, mussel sampling, soft sediment bivalve sampling, and eelgrass bed sampling in the northern Gulf of Alaska within the Gulf Watch Alaska Program. They are available to the public.

Colligan, E.M. 2017. Thule iron use in the pre-contact Arctic. Dissertation. City University of New York, New York. http://academicworks.cuny.edu/gc_etds/2342?utm_source=academicworks.cuny.edu%2Fgc_etds%2F2342&utm_medium=PDF&utm_campaign=PDFCoverPages

An examination of the use of iron by the Thule people, a culture that lived in the North American Arctic between approximately 1000 AD and 1400–1500 AD.

Curran, J.H., **Loso, M.G.**, Williams, H.B. 2017. Glacial conditioning of stream position and flooding in the braid plain of the Exit Glacier foreland, Alaska. *Geomorphology*. www.sciencedirect.com/science/article/pii/S0169555X17302647

Increased spilling from the Exit Creek braid plain in Kenai Fjords National Park, Alaska, repeatedly overtopped the only access road to popular visitor facilities and trails. This study considers recent processes and the interplay between glacier and fluvial system dynamics since the maximum advance of the Little Ice Age to better understand causes of such flooding, with strong management implications for the park

Dufresne A, Geertsma M, Shugar DH, Koppes M, Higman B, Haeussler PJ, Stark C, Venditti JG, Bonno D, Larsen C, Gulick SP, McCall N, Walton MA, **Loso MG**. In press. *Sedimentology and*

geomorphology of a large tsunamigenic landslide, Taan Fiord, Alaska. Accepted in *Sedimentary Geology*. <https://doi.org/10.1016/j.sedgeo.2017.10.004>

In this study, researchers investigate the massive 17 October 2015 landslide in Taan Fiord, Alaska which offers a unique opportunity to study landslide behavior in different environments: supraglacial, on land, and subaqueous.

Frankel, A.S., **C.M. Gabriele**. 2017. Predicting the acoustic exposure of humpback whales from cruise and tour vessel noise in Glacier Bay, Alaska, under different management strategies. *Endangered Species Research* 34:397-415. <https://doi.org/10.3354/esr00857>

This study is the first attempt to quantify the effect of vessel speed limits and other factors on humpback whale noise exposure in Glacier Bay.

Gabriele, C.M., J.N. Neilson, J.M. Straley, C.S. Baker, J.A. Cedarleaf, J.F. Saracco. 2017. Natural history, population dynamics, and habitat use of humpback whales over 30 years on an Alaska feeding ground. *Ecosphere* 8(1):e01641. DOI:10.1002/ecs2.1641

This study characterizes the reproductive performance, habitat use patterns, and population dynamics of humpback whales across 30 years in and around Glacier Bay National Park and Preserve as the species recovers from intensive commercial exploitation.

George, D.L., R.M. Iverson, C.M. Cannon. 2017. New methodology for computing tsunami generation by subaerial landslides: Application to the 2015 Tyndall Glacier landslide, Alaska. *Geophysical Research Letters* 44(14): 7276-7284. DOI: 10.1002/2017GL074341

Landslide-generated tsunamis pose significant hazards and involve complex, multiphase physics that are challenging to model. This study presents a new methodology to seamlessly simulate all stages of landslide dynamics as well as tsunami generation, propagation, and inundation.

Haynes, T.B., M. Tibbles, K. Rodriguez, B. H. Perrault, M.D. Robards. 2017. Successful breeding of Caspian Terns *Hydropogone caspia* in the Arctic – part of the new normal? *Marine Ornithology* 45: 143-148. http://www.marineornithology.org/PDF/45_2/45_2_143-148.pdf

Caspian Terns have expanded their range in the Eastern Pacific, over the past several decades. This study observed a successful fledge in Cape Krusenstern National Monument, 653 km further north than previously reported. The authors propose that the terns' expansion into the Arctic is related to the changing Arctic conditions becoming more favorable to sub-Arctic species.

Helser, T., C. Kastle, A. Crowell, T. Ushikubo, I.J. Orland, R. Kozdon, J.W. Valler. In press. A 200-year archaeozoological record of Pacific cod (*Gadus microcephalus*) life history as revealed through ion microprobe oxygen isotope ratios in otoliths. *Journal of Archeological Science: Reports*. <https://doi.org/10.1016/j.jasrep.2017.06.037>

Using Pacific cod otoliths from middens in Kenai Fjords National Park, this research project reconstructs the nearshore temperature regime and ontogenetic Pacific cod habitat use in the Gulf

of Alaska since the late Little Ice Age. Implications for indigenous subsistence and coastal settlement patterns are discussed.

Hoover-Miller, A., **P. Armato**. In Press. Harbor seal use of glacier ice and terrestrial haulouts in the Kenai Fjords, Alaska. *Marine Mammal Science*.
onlinelibrary.wiley.com/doi/10.1111/mms.12470/full

This 10-year study in Kenai Fjords National Park assessed seasonal and interannual variation in harbor seal habitat use of tidewater glaciers and terrestrial haulouts to determine if such uses were equivalent, and whether haulouts can be classified with respect to population support function (e.g. pupping or molting).

Kenney, L.A., R.S.A. Kaler, M.L. Kissling, A.L. Bond, C.A. Eagles-Smith. In press. Mercury concentration in multiple tissues of Kittlitz's murrelets (*Brachramphus brevirostris*). *Marine Pollution Bulletin*. <https://www.ncbi.nlm.nih.gov/pubmed/29100636>

Mercury biomagnifies in food webs and can threaten the health of top predators such as seabirds. The primary purpose of this study was to quantify mercury concentrations in Kittlitz's murrelets and compare them to threshold levels developed for other marine birds.

Lewis, T.M., C. Behnke, **M. Moss**. 2017. Glaucous-winged gull *Larus glaucescens* monitoring in preparation for resuming native egg harvest in Glacier Bay National Park. *Marine Ornithology* 45: 165-174. www.marineornithology.org/PDF/45_2/45_2_165-174.pdf

In this study researchers monitored Glaucous-winged gull colonies in preparation for the Huna Tlingit people resuming traditional egg harvests.

Loso, M., B. Finney, R. Johnson, R. Sinnott. 2017. Evaluating evidence for historical anadromous salmon runs in Eklutna Lake, Alaska. *Arctic* 70(3): 259-272.
<http://dx.doi.org/arlis.idm.oclc.org/10.14430/arctic4665>

Researchers assess the historical presence of sockeye salmon in Eklutna Lake, Alaska, prior to construction of a diversion dam on the downstream Eklutna River in 1929.

Marcella, T.K., **Gende, S.M.**, Roby, D. and A. Allignol. In Press. Disturbance probability levels of a rare seabird by ship-based tourism in a marine protected area. *PLOS One*.
<https://doi.org/10.1371/journal.pone.0176176>

Managers of marine protected areas must often seek ways to allow for visitation while minimizing impacts to the resources they are intended to protect. Using shipboard observers, researchers quantified the “zone of disturbance” for Kittlitz's and marbled murrelets exposed to large cruise ships traveling through Glacier Bay National Park, one of the largest marine protected areas in North America.

Matthews, L.P. 2017. Harbor seal (*Phoca vitulina*) reproductive advertisement behavior and the effects of vessel noise. Dissertation. Syracuse University, Syracuse, New York.
<https://surface.syr.edu/etd/718/>

Harbor seals are a widely distributed pinniped species that mate underwater. This study investigates several variables and their effect on male vocalizations (which are used during the breeding season) including vessel noise, in a population of harbor seals in Glacier Bay National Park and Preserve, Alaska.

Matthews, L.P., **C.M. Gabriele**, S.E. Parks. 2017. The role of season, tide, and diel period in the presence of harbor seal (*Phoca vitulina*) breeding vocalizations in Glacier Bay National Park and Preserve, Alaska. *Aquatic Mammals* 43(5): 537-546.
http://www.aquaticmammalsjournal.org/index.php?option=com_content&view=article&id=1705&catid=162&Itemid=326

In this study, long term data from an established passive acoustic monitoring system were used to assess the seasonal, diel, and tidal variation in male harbor seal roar production to gain insight into their underwater behavior and compare acoustic activity with previously studied populations.

Matthews, L.P., Parks, S.E., Fournet, M.E.H., **Gabriele, C.M.**, **Womble, J.N.**, Klinck, H. 2017. Source levels and call parameters of harbor seal breeding vocalizations near a terrestrial haulout site in Glacier Bay National Park & Preserve. *Journal of Acoustical Society of America, Express Letters* 141(3): 274-280 <http://dx.doi.org/10.1121/1.4978299>

Harbor seals (*Phoca vitulina*) are the most widely distributed pinniped in the northern hemisphere and occupy a variety of habitats including rocky reefs, islands, and glacier ice. This research paper presents results of a study that measured the frequency characteristics and source levels of harbor seal roars in a wild population.

McKenna, M.F., **C.M. Gabriele**, B. Kipple. 2017. Effects of marine vessel management on the underwater acoustic environment of Glacier Bay National Park, AK. *Ocean and Coastal Management* 139: 102-112. DOI: [10.1016/j.ocecoaman.2017.01.015](https://doi.org/10.1016/j.ocecoaman.2017.01.015)

To protect the underwater acoustic environment and the marine mammals that depend upon it, Glacier Bay National Park implements marine vessel quotas, speed regulations, and routing restrictions in biologically important areas. This study characterizes the underwater acoustic environment to quantify changes in conditions related to vessel management actions.

Molnia, B.F. 2017. Keeping the bay in Glacier Bay National Park: Introducing glacier science to the United States Supreme Court. *Earth Science History* 36(2): 359-384.
<https://doi.org/10.17704/1944-6178-36.2.359>

Molnia's narrative presents a summary of how glacier science became an integral part of the argument prepared and presented by the US Government to the U.S. Supreme Court in response

to the State of Alaska's complaint related to the ownership of 'certain marine submerged lands in southeast Alaska'.

Polasek , L., J. Bering , **H. Kim, P. Neitlich, B. Pister, M. Terwilliger, K. Nicolato, C. Turner and T. Jones.** 2017. Marine Debris in five national parks in Alaska. *Marine Pollution Bulletin* 117(1-2):371-379. [doi: 10.1016/j.marpolbul.2017.01.085](https://doi.org/10.1016/j.marpolbul.2017.01.085).

Marine debris is a management issue with ecological and recreational impacts for agencies, especially on remote beaches not accessible by road. This project was implemented to remove and document marine debris from five coastal National Park Service units in Alaska.

Praet N, Moernaut J, Van Daele M, Boes E, Haeussler P, Strupler M, Schmidt S, **Loso M.G.,** DeBatist M. 2016 Paleoseismic potential of sublacustrine landslide records in a high seismicity setting (south-central Alaska). *Marine Geology*, 384: 103-119.
<https://www.sciencedirect.com/science/article/pii/S0025322716300767>

This study investigates the distribution of landslide deposits and megaturbidites attributed to the historic 1964 megathrust earthquake in Eklutna Lake, Skilak Lake and Kenai Lake and compares their distribution to prehistoric landslide events using seismic stratigraphy analysis in an attempt to enhance the resolution of the paleoseismic record.

Scribner, K.T., **Soiseth, C.,** J. McGuire, G.K. Sage, L. Thorsteinson, J.L. Nielson, E. Knudsen. 2017. Genetic assessment of the effects of streamscape succession on coho salmon *Oncorhynchus kisutch* colonization in recently deglaciated streams. *Journal of Fish Biology* 91(1): 195-218.
[DOI: 10.1111/jfb.13337](https://doi.org/10.1111/jfb.13337)

Measures of genetic diversity from populations and geomorphological data on stream landscapes were used to examine hypotheses of the relative importance of stream features associated with colonization events and gene flow for coho salmon breeding in recently deglaciated streams in Glacier Bay National Park and Preserve.

Sergeant, C.J., J.R. Bellmore, C. McConnell, J.W. Moore. 2017. High salmon density and low discharge create periodic hypoxia in coastal rivers. *Ecosphere* 8(6): 01846. [DOI: 10.1002/ecs2.1846](https://doi.org/10.1002/ecs2.1846)

Dissolved oxygen (DO) is essential to the survival of almost all aquatic organisms. This study examines the possibility that abundant Pacific salmon (*Oncorhynchus* spp.) and low streamflow combine to create hypoxic events in coastal rivers.

Sergeant, C. J., and W. F. Johnson. 2017. Monitoring Kittlitz's and marbled murrelets in Glacier Bay National Park and Preserve: 2017 annual report. Natural Resource Report NPS/SEAN/NRR— 2017/1538. National Park Service, Fort Collins, Colorado
<https://irma.nps.gov/DataStore/DownloadFile/587259>

This is an annual report by the National Park Service's Southeast Alaska Inventory and Monitoring Network, of population abundance and spatial distribution of Kittlitz's and marbled murrelets in Glacier Bay National Park and Preserve.

Sigler, M.F., **S.M. Gende**, and D.J. Csepp. 2017. The association of foraging Steller sea lions with persistent prey hot spots in southeast Alaska. *Marine Ecology Progress Series* 571: 233-243.
<https://doi.org/10.3354/meps12145>

This study seeks to gain insight into the foraging mechanisms and population productivity and trends of Steller sea lions by studying concentrations and distributions of forage fish.

Sill, L.A., J.T. Ream, M. Cunningham. 2017. Harvest and use of wild resources in Yakutat, Alaska, 2015. Alaska Department of Fish and Game Division of Subsistence, Anchorage, Alaska. https://www.doi.gov/sites/doi.gov/files/uploads/4_nps_community_harvest_survey_w_a_dfg_summary_0.pdf

The goal of this TEK-oriented report was to document and understand the use of wild foods in Yakutat as well as to document community responses to contemporary resource challenges arising from climate change, existing resource management systems and transportation.

Stanek, A.E., N. Wolf, **G.V. Hildenbrand**, **B. Mangipane**, D. Causey, J.M. Welker. 2017. Seasonal foraging strategies of Alaskan gray wolves (*Canis lupus*) in an ecosystem subsidized by Pacific salmon (*Oncorhynchus* spp.). *Canadian Journal of Zoology* 95(8): 555-563.
<http://dx.doi.org/10.1139/cjz-2016-0203>

Despite frequent observations of gray wolves using non-ungulate prey, variation in the use of alternative prey sources has not been studied at the individual scale. In this study researchers used stable isotope analysis of gray wolf guard hair and blood components to examine the Pacific salmon as a food resource in Lake Clark National Park and Preserve.

Talbot, S.L., G.K. Sage, S.A. Sonsthagen, M.C. Gravley, T. Swem, J.C. Williams, J.L. Longmire, S. Ambrose, **M.J. Flamme**, S.B. Lewis, **L. Phillips**, C. Anderson, C.M. White. 2017. Intraspecific evolutionary relationships among peregrine falcons in western North American high latitudes. *Plos One* 12(11): e0188185.
<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188185>

This study focuses on current subspecies taxonomy of Alaska peregrine falcons, and the relationships among populations within named subspecies in western high latitude North America.

Tremayne, Andrew H., 2017 Marine resource intensification and the reorganization of lithic technologies during the middle-late Holocene in Northwest Alaska. *Journal of Island and Coastal Archaeology*. In press. www.tandfonline.com/doi/full/10.1080/15564894.2017.1278730

This study uses lithic technological organization from two successive Middle–Late Holocene archaeological cultures in northwest Alaska to test hypotheses about marine resource intensification through time.

Tremayne, A.H., B. Winterhalder. 2017. Large mammal biomass predicts the changing distribution of hunter-gatherer settlements in mid-late Holocene Alaska. *Journal of Anthropological Archaeology* 45: 81-97. <http://dx.doi.org/10.1016/j.jaa.2016.11.006>

This study provides an ecological explanation for the distribution of Arctic Small Tool tradition settlements in Alaska and the origin of their arctic maritime adaptation.

Weiser, E.L., R.B. Lanctot, S.C. Brown, H.R. Gates, R.L. Bentzen, J. Bêty, M.L. Boldenow, W.B. English, S.E. Franks, L. Koloski, E. Kwon, J. Lamarre, D.B. Lank, J.R. Liebezeit, L. McKinnon, E. Nol, J. Rausch, S.T. Saalfeld, N.R. Senner, S.H. Ward, P.F. Woodard, B.K. Sandercock. 2018. Environmental and ecological conditions at Arctic breeding sites have limited effects on true survival rates of adult shorebirds. *The Auk: Ornithological Advances* 135: 29-43. <https://doi.org/10.1642/AUK-17-107.1>

Many Arctic shorebird populations are declining. Researchers in this study obtained broad-scale estimates of true annual survival rates for six species of shorebirds at nine breeding sites across the North American Arctic in 2010–2014 to better understand population dynamics.

Williams, P.J., M.B. Hooten, **J.M. Womble, M.R. Bower.** 2017. Estimating occupancy and abundance using aerial images with imperfect detection. *Methods in Ecology and Evolution* 8(12): 1679-1689. DOI: [10.1111/2041-210X.12815](https://doi.org/10.1111/2041-210X.12815)

Under-counting animals from aircraft surveys presents a major problem for estimating abundance and distribution of vertebrate populations. For this study, the authors developed an approach for fitting point process models using an N-mixture model framework to estimate detection probability for aerial occupancy and abundance surveys. They tested their approach using sea otter data from Glacier Bay National Park and Preserve.

Williams, P.J., M.B. Hooten, **J.N. Womble, G.G. Esslinger, M.R. Bower, T.J. Hefley.** 2017. An integrated data model to estimate spatiotemporal occupancy, abundance, and colonization dynamics. *Ecology* 98(2): 328-336. DOI: [10.1002/ecy.1643](https://doi.org/10.1002/ecy.1643)

This study describes a statistical framework for simultaneously estimating spatiotemporal occupancy and abundance dynamics of a colonizing species. The model is then used to estimate the colonization dynamics of sea otters in Glacier Bay, Alaska.

Williams, S.H. 2017. Quantifying the ecological processes underlying collisions between large baleen whales and large ships to evaluate risk. Dissertation. University of Montana, Missoula, Montana. <https://scholarworks.umt.edu/etd/10985>

The marine environment is a major interface for human and wildlife conflict. Humans use the world's oceans for activities ranging from military operations, tourism and recreation,

commercial shipping and transport, and resource extraction. In her dissertation, Williams

Wilson, T.L., L.M. Phillips, B.A. Mangipane. 2017. Improving bald eagle nest monitoring with a second spring survey. *Journal of Wildlife Management* 81(3): 545-551.
DOI: 10.1002/jwmg.21219

This study demonstrates that imperfect observation of bald eagle nesting activity using standard methods results in estimator bias and reduced precision if not corrected.

National Park Service
U.S. Department of the Interior



Natural Resource Stewardship and Science

1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525

www.nature.nps.gov