

Matthew R. Baker, Ph.D.

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Education

Ph.D. Fisheries, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA
M.S. International & Public Affairs, Environmental Science & Policy, Columbia University, NY
B.A. English & Biology, Middlebury College, VT

Professional Experience

North Pacific Research Board, Anchorage, Alaska

Science Director [04/15/2014-present]

- Developed strategy and approach to NPRB Science Plan revision (lead author)
- Developed annual research priorities and request for proposals 2014-2017
- Developed request for proposals, research plan, implementation plan and actively participated in steering committee for multi-million, multi-institutional integrated ecosystem research program in the Arctic (Northern Bering and Chukchi seas)
- Developed request for proposals, research plan, implementation plan and participate in steering committee for multi-million, multi-institutional integrated ecosystem research program in the Gulf of Alaska Program and Gulf of Alaska Synthesis
- Managed staff responsible for program management of the core research program and research programs in the Gulf of Alaska, Bering Sea, Aleutian Islands and Arctic
- Managed staff responsible for data management and system operations and restructured internal operations related to staff responsibilities, data and metadata management and storage, information technology support systems and systems to facilitate proposal submission and review
- Managed and coordinated interactions with board, science panel, advisory panel, and external partner organizations including international institutions, government agencies, academic departments and industry and community
- Represented organization at international, national, and regional scientific conferences

Alaska Pacific University, Anchorage AK

Affiliate Faculty [2016-present]

- Research collaboration, Fisheries Aquatic Science and Technology (FAST) Laboratory
- Committee member, Anita Kroska, MSES Graduate Student (Stress physiology in Pacific halibut)

Friday Harbor Laboratories, University of Washington, San Juan Islands, WA

Visiting Faculty [2012-present]

- Developed Pelagic Ecosystem Research Apprenticeship course
- Mentored undergraduate and post-graduate research apprentices in analyzing physical/biological oceanographic data, forage fish distribution and abundance, mark-recapture and statistical analyses, benthic habitat characterization, diet analysis and physiology, and fisheries acoustics.
- Taught fisheries oceanography, marine ecology, fish biology, quantitative analysis, survey design, and fisheries management.
- Coordinated curriculum and on-vessel and shore-based field research and laboratory analyses.
- Developed and maintained time series on physical oceanography and pelagic fish
- Published research, presented at conferences, and collaborated with state and federal agencies

Resource Assessment and Conservation Engineering Division, Alaska Fisheries Science Center, NOAA Fisheries & Ocean Associates: Contract Research Scientist [2013-2014]

- Developed analytic approach to characterize benthic habitat to inform survey design and resource assessment, improve habitat assessments, and inform effective management.
- Integrated National Ocean Service bathymetry data to develop high resolution spatial maps of benthic habitat (depth, slope, curvature, rugosity, vector ruggedness, sediment type, grain size)
- Developed random forest models, generalized additive models, regressions, and statistical analyses to identify and predict trawlable/untrawlable habitat on the basis of habitat attributes
- Processed survey data and documented results of survey-related research
- Developed spatial analyses of groundfish surveys in the Gulf of Alaska and Aleutian Islands
- Produced analyses to inform the design of resource assessment surveys, determine availability of particular habitats and associated species to survey, and improve stock assessments

Resource Ecology & Fisheries Management Division, Alaska Fisheries Science Center, NOAA Fisheries & Joint Institute for the Study of the Atmosphere and Ocean Contract Research Scientist [2010-2013]

- Published research in peer-reviewed journals, presented at international conferences, and informed planning related to federal fisheries management strategies and assessments
- Coordinated with stock assessment and ecosystem modeling teams to inform stock analysis
- Analyzed time series data of trawl surveys and environmental indices and applied multivariate methods to analyze shifts in species distributions and quantify threshold responses of species in the Bering Sea, Gulf of Alaska, Aleutian Islands and California Current
- Applied multivariate autoregressive models to evaluate the relative influence of competition, climate, and harvest as drivers of abundance
- Applied dynamic factor analysis to identify underlying trends in species patterns over time.
- Integrated research into planning related to spatial and multispecies management via NOAA integrated ecosystem assessments, plan team meetings, and ecosystem models

Relevant Publications

- Sisson, N., **Baker, M.R.** (In Review) Feeding ecology of Pacific sand lance (*Ammodytes personatus*) in the San Juan Archipelago. Marine and Coastal Fisheries
- Baker, M.R.**, Palsson, W., Zimmermann, M., Rooper, C.N., Somerton, D. (In Prep). Determining trawlable habitat in the Gulf of Alaska – thresholds for oceanographic features and benthic terrain.
- Dickson, D., **Baker, M.R.**, 2016. The North Pacific Research Board Gulf of Alaska Integrated Ecosystem Research Program. Deep Sea Research II.
- Baker, M.R.**, Hollowed, A.B. (2014). Delineating ecological regions in marine systems: synthesis of physical structure and community composition to inform spatial management. Deep Sea Research II.
- Nye, J.A., **Baker, M.R.**, Bell, R., Kenny, A., Kilbourne, K.H., Martino, E., Stachura, M.M., Van Houtan, K.S. (2014). Ecosystem effects of the Atlantic Multidecadal Oscillation. Journal of Marine Systems.
- Baker, M.R.**, Schindler, D.E., Essington, T.E., Hilborn, R. (2014). Accounting for non-retention mortality in gillnet fisheries: Discounting escapement estimates as a function of fishing effort. Ecological Applications. DOI 10.1890/12-1871.1.
- Baker, M.R.**, Gobush, K.S., Vynne, C.H. (2013). Stress physiology in wildlife: meta-analysis of disturbance and physiological correlates. Journal for Conservation of Nature 21:309-318.
- Baker, M.R.**, Swanson, P., Young, G. (2013) Inhibited maturation in spawning salmon due non-retention in commercial fisheries: cortisol and gonadotrophins. PLoS One. 8 e69615.
- Baker, M.R.**, Kendall, N. W., Branch, T.A., Schindler, D.E., Quinn, T.P. (2011) Selection due to non-retention mortality in gillnet fisheries for salmon. Evolutionary Applications 4:429-443.
- Baker, M.R.**, Schindler, D.E. (2009) Unaccounted mortality in salmon fisheries: non-retention in gillnets and effects on estimates of spawners. Journal of Applied Ecology 46:752–761.

- Baker, M.R.**, Schindler, D.E., Holtgrieve, G.W., St. Louis, V.L. (2009) Bioaccumulation and transport of contaminants: salmon as vectors of mercury. *Environmental Science and Technology* 43:8840-6.
- Vynne, C.H., **Baker, M.R.** (2009) Missing the Point. *Frontiers in ecology and the environment*. 7:128-9.

Relevant Presentations

- Workshop Lead**, Understanding the Changing Coastal Ocean: Advances and Challenges in Multi-parameter Observations. PICES Annual Science Meeting, San Diego, CA.
- Workshop Lead**, North Pacific Ecosystem Status Report Working Group. The role of the northern Bering Sea in modulating Arctic environments: towards international interdisciplinary efforts. PICES Annual Science Meeting, San Diego, CA.
- Baker, M.R.**, Eisner, L. 2016. Opportunities for data sharing in the northern Bering Sea – Research and data to support international and interdisciplinary analyses. PICES Annual Science Meeting, San Diego.
- Baker, M.R.**, Hollowed A.B., Holsman, K., Hermann, A. 2016. Integrating species environmental thresholds to explore species interactions and parameterize multi-species models. PICES Annual Science Meeting, San Diego, CA.
- Baker, M.R.**, Pacific sand lance in the San Juan Islands: synthesis of research 2010-2016. . PICES Annual Science Meeting, San Diego, CA.
- Baker, M.R.**, Palsson, W., Zimmermann, M., Rooper, C.N., Somerton, D. 2016. Using bathymetric features to quantify trawlable habitat and implications for understanding marine ecosystems. Friday Harbor Laboratories Lecture Series, San Juan Island, WA.
- Workshop Lead and Facilitator for Discussion Session**, Fisheries Research and Science, Community and Industry Interactions and Synergies in the Aleutian Islands. Aleutian Life Forum, 2016.
- Baker, M.R.** 2016. Aleutians Research. Aleutians Life Forum. Unalaska, AK.
- Baker, M.R.**, Palsson, W., Zimmermann, M., Rooper, C.N., Somerton, D. 2016. Quantifying and evaluating implications for trawlable and untrawlable habitat. Aleutians Life Forum. Unalaska, AK.
- Baker, M.R.** 2016. Addressing gaps in integrating Arctic Research. Arctic Integrated Ecosystem Research Program Annual PI Meeting. Anchorage, AK.
- Lloyd, D., **Baker, M.R.** 2016. North Pacific Research Board – setting research priorities for investment. North Pacific Fishery Management Council, Anchorage, AK.
- Workshop Participant**, North Pacific Ecosystem Status Report Working Group, Siney, BC 2016.
- Baker, M.R.** 2016. Forage Fish Management and Conservation Session. Salish Sea Ecosystem Conference. Vancouver, BC.
- Baker, M.R.** 2016. Research in the northern Bering and Chukchi Seas. Arctic Science Summit, Fairbanks, AK.
- Baker, M.R.** 2016. Understanding mechanisms underlying the persistence of North Pacific Anomalous Warming and consequences for ecological interactions in the Gulf of Alaska. Pacific Anomalies Conference, Seattle, WA.
- Baker, M.R.** 2015 Longterm monitoring in the North Pacific. PICES Monitor Committee. PICES Annual Science Conference, Qingdao, China.
- Baker, M.R.** 2015 Integrated Ecosystem Research Programs. PICES Annual Science Conference, Qingdao, China.
- Baker, M.R.** 2015. Influence of climate on species distribution and interaction in the eastern Bering Sea Pacific Marine Environmental Laboratory and Fisheries-Oceanography Coordinated Investigations Seminar, Alaska Fisheries Science Center, NOAA, Seattle WA.
- Lloyd, D and **Baker, M.R.** 2015 North Pacific Research Board: A decade of funding marine research in Alaska. ComFish Alaska Trade Show, Kodiak, AK
- Baker, M.R.** 2015. Identifying suitable habitat for bottom trawl surveys: thresholds for benthic terrain and oceanographic variables, Alaska Fisheries Science Center, NOAA Fisheries, Seattle, WA
- Lloyd, D., **Baker, MR**, Eischens C.E. 2014. North Pacific Research Board: Investments in marine science. North Pacific Fishery Management Council, Anchorage, AK

- Baker, M.R.** 2014. North Pacific Research Board: Research and development of an Arctic Program, Alaska Beluga Whale Committee, Anchorage, AK
- Baker, M.R.,** Hollowed A.B., Holsman, K., Hermann, A. 2014. Climate impacts on the distribution and volume of marine ecoregions and implications for species interactions. PICES Annual Science Conference, Yeosu, Korea.
- Baker, M.R.** 2014. North Pacific Research Board: Investments in marine science. PICES Fisheries Committee. PICES Annual Science Conference, Yeosu, Korea.
- Baker, M.R.** 2014. Longterm monitoring – the Seward Line, continuous plankton recorder program and fixed moorings. PICES Monitor Committee. PICES Annual Science Conference, Yeosu, Korea.
- Baker, M.R.** 2014. Development of an Arctic Integrated Ecosystem Research Program, Northwest Borough 2014 Kotzebue, AK.
- Baker, M.R.,** Hollowed A.B. 2014. Patterns in species dynamics and interactions in the Northeast Pacific. Alaska Marine Science Symposium Anchorage, AK
- Baker, M.R.,** Hollowed A.B. 2013. Influence of climate and environmental forcing on ecosystem structure in northeast Pacific systems. ICES Annual Science Conference, Reykjavik, Iceland
- Baker, M.R.,** Hollowed A.B. 2013. Multivariate models of species interactions using times series data in North Pacific. ICES Annual Science Conference, Reykjavik, Iceland
- Baker, M.R.,** Hollowed A.B. 2013. Synthesis of physical structure and community composition to inform spatial management. Resource Assessment Seminar Series, Alaska Fisheries Science Center, NOAA, Seattle, WA
- Baker, M.R.** 2012. Quantitative Approaches to Spatial Management: Delineating ecological regions and identifying biophysical drivers of community composition. Friday Harbor Laboratories Lecture Series
- Baker, M.R.** and Hollowed, A. 2012. Habitat & Climate: Species distribution and interaction in Arctic and Subarctic systems. ICES Annual Science Conference, Bergen, Norway
- Baker, M.R.,** Hollowed, A. and Hilborn R. 2012. Spatial considerations for analyses of trophic stability in marine ecosystems ICES/PICES Conference for Early Career Scientists “Oceans of Change”, Palma de Mallorca, Spain
- Baker, M.R.,** Hollowed, A. and Hilborn R. 2012. Spatial considerations for analyses of trophic stability in marine ecosystems. Alaska Marine Science Symposium Anchorage, AK
- Baker, M.R.,** Hollowed, A., Clarke, M.E. and Hilborn R. 2011. Spatial considerations for analyses of trophic stability in marine ecosystems. American Fisheries Society Annual Meeting, Seattle, WA
- Baker, M.R.** 2010. Fisheries Management. Friday Harbor Laboratories, San Juan Island, WA.
- Baker, M.R.,** Swanson, P. and Young, G. 2010. Non-retention and physiology: Suppressed reproductive maturation and non-retention in commercial fisheries. Northwest Fisheries Science Center, NOAA, Seattle, WA.
- Baker, M.R.** 2010. Analyses of non-retention mortality and density dependence in salmon recruitment dynamics. Alaska Fisheries Science Center, NOAA, Seattle, WA.
- Baker, M.R.** 2010. Unaccounted mortality in fisheries: non-retention and impacts on population estimates and management. Society of Conservation Biology, Edmonton, BC
- Baker, M.R.,** Schindler, D.E., Holtgrieve, G.W. and St Louis, V.L. 2009. Salmon as contaminant vectors: mercury transport in Alaskan watersheds. 2009. American Fisheries Society, Shelton, WA
- Baker, M.R.,** Schindler, D.E., Holtgrieve, G.W. and St Louis, V.L. 2009. Salmon as contaminant vectors: mercury transport in Alaskan watersheds. Pacific Ecology and Evolution Conference, Bamfield Marine Station, BC
- Baker, M.R.** and Schindler, D.E. 2008. Fishery-induced delayed mortality in sockeye salmon: effects of gillnet injury on spawning populations. Ecological Society of America Conference, Milwaukee, WI
- Baker, M.R.** and Schindler, D.E. 2008. Non-Retention Mortality in Salmon Fisheries and Consequences for Spawning Success. Ecological and Evolutionary Ethology of Fishes Conference, Boston, MA
- Baker, M.R.,** K. Evans, K. Holsman, C. Young, J. Parrish, T. Klinger, J. Ruesink. 2005. Elements of ecosystem based management: estuarine case study of Willapa Bay. Puget Sound Georgia Basin Research Conference, Seattle, WA.

Reviewer for Publications & Grant Awards

Fisheries Research, Science, Ecology, Evolutionary Applications, Canadian Journal of Fisheries and Aquatic Sciences, Transactions of the American Fisheries Society, Environmental Engineering Science, Natural Sciences and Engineering Research Council of Canada (NSERC)

Honors, Grants, and Fellowships

- Gold Medal Award, NOAA, 2015
- Faculty Merit Award for Outstanding Academic Achievement, University of Washington, 2011
- Honors Fellowship, School of International and Public Affairs, Columbia University, 2002
- Habitat Assessment Improvement Plan Grant, Office of Science and Technology (NOAA), 2014
- North Pacific Research Board, Annual Program, 2014
- Stock Assessment Improvement Plan Grant, Office of Science and Technology (NOAA), 2012
- Habitat Assessment Improvement Plan Grant, Office of Science and Technology (NOAA), 2012
- Comparative Analysis of Marine Ecosystem Organization (NSF/NOAA), 2010
- Environmental Protection Agency STAR Fellowship, 2007-2010
- School of Aquatic and Fishery Sciences Honors Fellowship, 2005-2008
- Anchor Environmental Scholarship, 2007
- Presidential Management Fellowship 2004

Skills

Programming & Computing: R, ArcGIS, SigmaPlot, SQL/Oracle, Microsoft Office

Skills-based Training: Media Relations and Communication, Navigation, Safety at Sea, SCUBA

Course-based Training:

- Ecology of Marine Fish
- Ecological Modeling
- Quantitative Fishery Science
- Fisheries Stock Assessment
- Advanced Analytic Fisheries Stock Assessment
- Estimation of Population Parameters
- Statistical Inference in Applied Research
- Biostatistics
- Database Management
- Statistical Programming and Data Management in R
- Statistics and Quantitative Analysis
- Geographical Information Systems (ArcGIS)
- Conservation Biology
- International Environmental Politics
- Environmental Policy
- Microeconomics
- Macroeconomics
- Environmental Economics
- Natural Resource Economics
- Economics of Living Marine Resources
- Fisheries Management and Conservation
- Marine Resource Management and Planning
- International Organizations and Ocean Management
- Commercial Fisheries Management and Modeling
- Graduate Seminar in Sustainable Fisheries