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National Marine Fisheries Service
Northwest Fisheries Science Center
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http://faculty.washington.edu/eeholmes

EDUCATION

Doctor of Philosophy, Zoology, University of Washington, June 1995
Title: "Spatial models in ecology: explorations into the impact of spatial behavior on population dynamics"
Committee: Peter Kareiva (chair), Robert T. Paine, Joel Kingsolver
Bachelor of Science, Biology, Stanford University, June 1988, with honors
Bachelor of Science, Mechanical Engineering, Stanford University, June 1988, cum laude

PROFESSIONAL POSITIONS

2005-present Affiliate faculty, School for Fisheries and Aquatic Sciences, Univ. of Washington
1999-present Research Scientist, Conservation Biology Division, Northwest Fisheries Science Center, Seattle WA
- Research focuses on population dynamics of endangered and threatened species and development of quantitative methods for risk assessment
- 2020-2023: Leading program to help agency transition to Open Science. NMFS OpenSci
- 2024: Detail with NMFS headquarters. Lead of NOAA Fisheries Open Science. NMFS representative on various policy subcommittees.

1998-99 National Research Council fellow, National Marine Mammal Lab., Seattle WA
- Project title: "Metapopulation dynamics of Steller sea lions", supervisors Anne York and Tom Loughlin

1995-97 National Science Foundation Post-doctoral fellow, Colorado State Univ., Biology Dept., Fort Collins, CO
- Project title: "An experimental study of the effect of metapopulation structure on parasite-host population dynamics", supervisor Janice Moore

PUBLICATIONS

Ford, M.J., Lindley, S.T., Barnas, K.A., Shelton, A.O., Spence, B.C., Weitkamp, L.A., Holzer, D.M., Boughton, D.A., **Holmes, E.E.,** Myers, J.M., Jordan, C.E., Fish, H., Liermann, M., O'Farrell, M.R., Mantua, N.J., Johnson, R.C., Satterthwaite, W.H. and Williams, T.H. (2025), Abundance Trends of Pacific Salmon During a Quarter Century of ESA Protection. Fish Fish, 26: 1087-1106. https://doi.org/10.1111/faf.70019

Martin, P.E., **E. Eli Holmes**, E. Mayorga, J.K. Ansong, U. Bhaskar, J. Cornejo-Donoso, D. Correa-Chilón, R. Damoah, D. Fierro-Arcos, L. Gómez-Navarro, N. Kumar, A. Lawal-Are, S. Maity, S. Majumder, D. Menemenlis, A. Modi, E. Nyadjro, O. Oghenechovwen, A. Oikonomou, M. Oladipo, M. Peña, D.T. Quaye, Y. Santana-Falcón, BR Smitha, C. Troupin, G. Vagenas, H. Villalobos, and G.L. Wagner. 2025. Harnessing marine open data science for ocean sustainability in Africa, South Asia, and Latin America. Oceanography 38(1):59–66, https://doi.org/10.5670/oceanog.2025.121

Lowndes, J. S., Holder, A. M., Markowitz, E. H., Clatterbuck, C., Bradford, A. L., Doering, K.,

Stevens, M. H., Butland, S., Burke, D., Kross, S., Hollister, J. W., Stawitz, C., Siple, M. C., Rios, A., Welch, J. N., Li, B., Nojavan, F., Davis, A., Steiner, E., London, J., Fenwick, I., Hunzinger, A., Verstaen, J., Barrett, A., **Holmes, E.**, Barrett, A., Robinson, E. (2024). Shifting institutional culture to develop climate solutions with Open Science. Ecology and Evolution, 14, e11341. https://doi.org/10.1002/ece3.11341

Brodie, S., Smith, J. A., Muhling, B. A., Barnett, L. A. K., Carroll, G., Fiedler, P., Bograd, S. J., Hazen, E. L., Jacox, M. F., Andrews, K. S., Barnes, C. L., Crozier, L. G., Fiechter, J., Fredston, A., Haltuch, M. A., Harvey, C. J., **Holmes, E. E.**, Karp, M. A., Liu, O. R., Malick, M. J., Buil, M. P., Richerson, K., Rooper, C. N., Samhouri, J., Seary, R., Selden, R. L., Thompson, A. R., Tommasi, D., Ward, E. J., Kaplan, I. C. 2022. Recommendations for quantifying and reducing uncertainty in climate projections of species distributions. Global Change Biology DOI:10.1111/gcb.16371

Nilsen I., C. Hansen, I. Kaplan, **E. Holmes** and Ø. Langangen. 2022. Exploring the role of Northeast Atlantic cod in the Barents Sea food web using a multi-model approach. Fish and Fisheries DOI: 10.1111/faf.12671.

Ford, M. J., editor. 2022. Biological Viability Assessment Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Pacific Northwest. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-171.

Holmes, E.E., BR, S., Nimit, K., Maity, S., Checkley, D.M., Jr., Wells, M.L. and Trainer, V.L. 2021. Improving landings forecasts using environmental covariates: A case study on the Indian oil sardine (Sardinella longiceps). Fisheries Oceanography https://doi.org/10.1111/fog.12541

Pendleton, D.E., **Holmes, E.E.**, Redfern, J., Zhang, J. 2020. Using modelled prey to predict the distribution of a highly mobile marine mammal. Diversity and Distributions 26: 1612–1626. https://doi.org/10.1111/ddi.13149

Holmes, E.E., M.D. Scheuerell, E.J. Ward. 2021. Applied Time Series Analysis for Fisheries and Environmental Science. Online book for UW course https://nwfsc-timeseries.github.io/atsa-labs/

Holmes, E.E. 2018. Fish Catch Forecasting with R. Online book for short course. https://fish-forecast.github.io/Fish-Forecast-Bookdown/

Ward, E.J., K. Oken, K.A. Rose, S. Sable, K. Watkins, **E.E. Holmes**, and M.D. Scheuerell. 2018. Applying spatiotemporal models to monitoring data to quantify fish responses to the Deepwater Horizon oil spill in the Gulf of Mexico. Environmental Monitoring and Assessment 190-530.

Tolimieri, N., **E. E. Holmes**, G. D. Williams, R. Pacunski, and D. Lowry. 2017. Population assessment using multivariate time-series analysis: A case study of rockfishes in Puget Sound. Ecology and Evolution, in press.

Keith, D.M., H.R. Akcakaya, S.H.M. Butchart, B. Collen, N. K. Dulvy, **E. E. Holmes**, J. A. Hutchings, D. Keinath, M. K. Schwartz, A. O. Shelton, and R. S. Waples. 2015. Temporal correlations in population trends: Conservation implications from time-series analysis of diverse animal taxa. Biological Conservation 192:247-257.

See, K. E. and **E. E. Holmes**. 2015. Reducing bias and improving precision in species extinction forecasts. Ecological Applications 25: 1157-1165.

Ruhí, A., **E. E. Holmes**, J. N. Rinne, and J. L. Sabo. 2015. Anomalous droughts, not invasion, decrease persistence of native fishes in a desert river. Global Change Biology 21:1482-1496.

Holmes, E. E. Computation of standardized residuals for MARSS models. Technical Report. arXiv:1411:0045 [stat.ME]

Francis, T. B., E. M. Wolkovich, M. D. Scheuerell, S. L. Katz, **E. E. Holmes**, and S. E. Hampton. 2014. Shifting Regimes and Changing Interactions in the Lake Washington, USA, Plankton Community from 1962-1994." PlosOne: e110363.

Ward, E.J., **E.E. Holmes**, J.T. Thorson, and B. Collen. 2014. Complexity is costly: comparing parametric and non-parametric methods for short-term population forecasting. Oikos

123:652-661.
Hampton, S.E., **E.E. Holmes**, D.E. Pendleton, L.P. Scheef, M.D. Scheuerell, and E.J. Ward. 2013. Quantifying effects of abiotic and biotic drivers on community dynamics with multivariate autoregressive (MAR) models. Ecology 94:2663-2669
Holmes, E. E. 2013. Derivation of the EM algorithm for constrained and unconstrained multivariate autoregressive state-space (MARSS) models. Technical Report. arXiv:1302.3919 [stat.ME]
Mongillo, T. M., **E. E. Holmes**, D. P. Noren, G. R. VanBlaricom, A. E. Punt, S. M. O'Neill, G. M. Ylitalo, M. B. Hanson, P. S. Ross. 2012. Predicted polybrominated diphenyl ether (PBDE) and polychlorinated biphenyl (PCB) accumulation in southern resident killer whales. Marine Ecology Progress Series 453:263-277.
Holmes, E. E., E. J. Ward and K. Wills. 2012. MARSS: Multivariate autoregressive state-space models for analyzing time-series data. R Journal 4: 11-19.
Scheef, L. P., D. E. Pendleton, S. E. Hampton, S. L. Katz, **E. E. Holmes**, M. D. Scheuerell, and D.G. Johns. 2012. Assessing marine plankton community structure from long-term monitoring data with multivariate autoregressive (MAR) models: a comparison of fixed station vs. spatially distributed sampling data. Limnology & Oceanography: Methods 10: 54-64.
Ward, E., B. Semmens, **E. Holmes**, and K. Balcomb. 2010. Effects of multiple levels of social organization on survival and abundance. Conservation Biology 25:350-355.
Holmes, E. E. and E. J. Ward. 2010. Analysis of multivariate time series using the MARSS package. (http://cran.r-project.org/web/packages/MARSS/index.html)
Viscido, S. V. and **E. E. Holmes.** 2010. Statistical modeling of communities and ecosystems using the LAMBDA software tool. Environmental Modeling and Software 25(12): 1905-1908
Ward, E. J., Chirakkal, H., González-Suárez, M., Aurioles-Gamboa, D., **Holmes, E. E.** and Gerber, L. 2009. Inferring spatial structure from time-series data: using multivariate state-space models to detect metapopulation structure of California sea lions in the Gulf of California, Mexico. Journal of Applied Ecology 47:47-56
Ward, E., K. Parsons, **E. Holmes**, K. Balcomb, and J. Ford. 2009. The role of menopause and reproductive senescence in a long-lived social mammal. Frontiers in Zoology 6:4
Hinrichsen, R. A. and **E. E. Holmes**. 2009. Using multivariate state-space models to study spatial structure and dynamics. In *Spatial Ecology* (editors Robert Stephen Cantrell, Chris Cosner, Shigui Ruan). CRC/Chapman Hall
Ward, E. J., **E. E. Holmes**, and K. C. Balcomb. 2009. Quantifying the effects of prey abundance on killer whale reproduction. Journal of Applied Ecology 46:632-640
Ellner, S. P. and **E. E. Holmes**. 2008. Resolving the debate on when extinction risk is predictable. Ecology Letters 11: E1–E5
Hauser, D. D. W., M. G. Logsdon, **E. E. Holmes**, G. R. VanBlaricom, R. W. Osborne. 2007. Summer distribution patterns of Southern Resident killer whales (Orcinus orca): core areas and spatial segregation of social groups. Marine Ecology Progress Series 351: 301-310.
Holmes, E. E., J. Sabo, S. V. Viscido, and W. F. Fagan. 2007. A statistical approach to quasi-extinction forecasting. Ecology Letters 10:1182–1198.
Holmes, E.E., L. W. Fritz, A. E. York and K. Sweeney. 2007. Age-structured modeling reveals long-term declines in the natality of western Steller sea lions. Ecological Applications 17: 2214–2232.
Hauser, D. D. W., M. G. Logsdon, **E. E. Holmes**, G. R. VanBlaricom, R. W. Osborne. 2007. Summer distribution patterns of Southern Resident killer whales (Orcinus orca): core areas and spatial segregation of social groups. Marine Ecology Progress Series 351: 301-310.

Hauser, D., G. VanBlaricom, **E. Holmes**, R. Osbourne. 2006. Evaluating the use of whalewatch data in determining killer whale (Orcinus orca) distribution patterns. Journal of Cetacean Research and Management 8: 273-281.

Levin, P., **E. E. Holmes**, K. Piner and C. Harvey. 2006. Shifts in a Pacific Ocean fish assemblage: the potential influence of exploitation. Conservation Biology 20: 1181-1190.

Fagan, W. F and **E. E. Holmes**. 2006. Quantifying the extinction vortex. Ecology Letters 9: 51-60.

Holmes, E. E., W. F. Fagan, J.J. Rango, A. Folarin, J.A., Sorensen, J.E. Lippe, and N.E. McIntyre. 2005. Cross validation of quasi-extinction risks from real time series: an examination of diffusion approximation methods. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-67, 37 p.

Holmes, E. E. 2004. Beyond theory to application and evaluation: diffusion approximations for population viability analysis. Ecological Applications 14: 1272-1293.

Holmes, E. E. and B. Semmens. 2004. Population viability analysis for metapopulations: a diffusion approximation approach. Pp. 565-598 in Ecology, Genetics, and Evolution of Metapopulations, editors Illka Hanski and Oscar E. Gaggiotti. Elsevier Press.

Sabo, J. L., **E. E. Holmes**, and P. Kareiva. 2004. The efficacy of simple viability models in ecological risk assessment: Does density dependence matter? Ecology 85: 328-341.

Holmes, E. E. and A. E. York. 2003. Using age structure to detect impacts on threatened populations: a case study using Steller Sea Lions. Conservation Biology 17:1794-1806.

McClure, M. M., **E. E. Holmes**, B. L. Sanderson, and C. E. Jordan. 2003. A large-scale, multi-species risk assessment: anadromous salmonids in the Columbia River Basin. Ecological Applications 13(4):964-989.

Holmes, E. E. and W. F. Fagan. 2002. Validating population viability analysis for corrupted data sets. Ecology 83: 2379-2386.

Holmes, E. E. 2002. Compute and Conserve, Book review of "Quantitative methods for Conservation Biology" Conservation Biology 16(1): 275-276.

Holmes, E. E. 2001. Estimating risks in declining populations with poor data. Proceedings of the National Academy of Science 98: 5072-5077.

Holmes, E. E. and P. M. Kareiva. 2000. Using single-species measurements to anticipate community level effects of environmental contaminants. In Environmental Contaminants and Terrestrial Vertebrates: Effects on Populations, Communities, and Ecosystems, P.H. Albers, G.H. Heinz, and H.M. Ohlendorf, editors. Published by the Society of Environmental Toxicology and Chemistry (SETAC), 315 pp.

Holmes, E. E. 1999. Book review of "Quantitative Analysis of Movement" Bulletin of Mathematical Biology

Holmes, E. E. and H. B. Wilson. 1998. Running from trouble: long distance dispersal and the competitive coexistence of inferior species. American Naturalist 151: 578-586.

Holmes, E. E. 1997. Basic epidemiological concepts in a spatial context. In Spatial Ecology (editors, D. Tilman and P. Kareiva). Princeton University Press.

Holmes, E. E. 1995. Spatial models in ecology: explorations into the impact of spatial behavior on population dynamics. Dissertation. University of Washington.

Holmes, E. E., M. A. Lewis, J. Banks, and R. Veit. 1994. Partial differential equation models in ecology. Ecology 75: 17-29.

Holmes, E. E. 1993. Is diffusion too simple? Comparisons with a telegraph model of dispersal. American Naturalist 142: 779-796.

CODE PACKAGES

Holmes, E., Boettiger, C., Panda, Y., & López, L. (2025, April 28). nmfs-opensci/py-rocket-base: py-rocket-base v3.0.7 [Software]. Zenodo. https://doi.org/10.5281/zenodo.15293190 A containerized base environment providing Python, R, and geospatial tooling for reproducible scientific computing in Jupyter, RStudio, and VS Code.

Holmes, E., Ward, E., and Wills, K. 2013. MARSS: Multivariate Autoregressive State-Space Modeling. R package version 3.5. Currently one of the top 10% of downloaded R packages. http://cran.r-project.org/web/packages/MARSS

Holmes, E., 2013. fbRanks: Association Football (Soccer) Ranking via Poisson Regression. R package version 2.0. http://cran.r-project.org/web/packages/fbRanks/

Holmes, E., 2022. quarto_titlepages. https://nmfs-opensci.github.io/quarto_titlepages/

Many more on my GitHub repositories. Largely having to do with time-series analysis and risk-assessment for federally managed populations https://github.com/eeholmes

REPORTS

Holmes, E. E. 2003. "Review of methods, progress and cross-validation studies pertaining to population trend and risk assessment for Columbia River salmonids" in Final Report on the Technical Workshop on Population Trends and Extinction Metrics Workshop held December 5, 2003, NWFSC, Seattle, WA.

Richard G. Gustafson, Jonathan Drake, Michael J. Ford, James M. Myers, **Elizabeth E. Holmes**, and Robin S. Waples. Status Review of Cherry Point Pacific Herring (Clupea pallasii) and Update of the Status Review of the Georgia Basin Distinct Population Segment of Pacific Herring Under the U.S. Endangered Species Act. June 2005 Draft

Drake, J., E. A. Berntson, J. M. Cope, R. G. Gustafson, **E. E. Holmes**, P. S. Levin, N. Tolimieri, R. S. Waples, S. Sogard, G. D. Williams. 2010. Status review of five rockfish species in Puget Sound, Washington: Bocaccio (Sebastes paucispinis), canary rockfish (S. pinniger), yelloweye rockfish (S. ruberrimus), greenstriped rockfish (S. elongatus), and redstripe rockfish (S. proriger). U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-NWFSC-108.

Ford, M. J., K. Barnas, T. Cooney, L. G. Crozier, M. Diaz, J. J. Hard, **E. E. Holmes**, D. M. Holzer, R. G. Kope, P. W. Lawson, M. Liermann, J. M. Myers, M. Rowse, D. J. Teel, D. M. Van Doornik, T. C. Wainwright, L. A. Weitkamp, M. Williams. 2015. Status Review Update for Pacific Salmon and Steelhead Listed under the Endangered Species Act: Pacific Northwest. National Marine Fisheries Service, Northwest Fisheries Science Center.

TEACHING

Graduate, Post-Graduate and Professional

2025 NASA PACE HackWeek, UMD (organizer team); OceanHackWeek, UW (organizer team and project lead), NMFS HackHours, virtual (organizer and instructor), Fish-PACE, virtual (organizer).

2024 NASA PACE HackWeek, UMD (organizer team); NASA EarthScience HackWeek, UW (project lead); OceanHackWeek, Maine (organizer team and project lead), NMFS HackHours, virtual (organizer and instructor).

2023 ITCOocean Hack2Week, Hyderabad, India (lead); OceanHackWeek, (project lead).

2022 GitHub workshops for scientists. PSAW 2022, Women in Statistics and Data Science, SnowEx Hackweek

2020, 2021, 2022 RWorkflow for Scientists. R, RStudio and GitHub workflow workshops for federal agency scientists. Fridays in spring. 2020 2021 2022

2013, 2015, 2017, 2019, 2022 Fish 507/550, Time-series analysis for environmental and fisheries data at the University of Washington with Eric Ward and Mark Scheuerell.

2018 Fish catch forecasting with R. Week-long short course at the Indian National Centre for

Ocean Information Services, Hyderabad, India.

2015 Multivariate linear modeling for fisheries data. Weeklong workshop the Earth System Science Organization, Indian National Center for Ocean Information Services (ESSO INCOIS), Hyderabad, India.

2014 Multivariate Time-Analysis with MARSS. Weeklong workshop at Stockholm University, Sweden.

2010, 2011, 2012 1-day workshops on multivariate time series analysis, Ecological Society Meetings. Online versions available on my website.

2009 1-day workshop on analysis of population monitoring data, Biennial Conference of the Marine Mammal Society, Quebec City, Quebec.

2008 1-day workshop on multivariate state-space models for analyzing ecological data. Ecological Society Meetings, Milwaukee, WI, August 2008 (short version repeated at University of Chicago, Oct 2008).

2007 1-day workshop on multi-variate autoregressive models for analysis of community time series data. Ecological Society Meetings, San Jose, CA, August 2007. (repeated at the National Center for Ecological Synthesis and Analysis, Sept 2007).

2005 1-day workshop on state-space modeling for Population Viability Analysis at the Ecological Society Meetings, Montreal, Canada, August 2005.

2001/2002 Graduate course on ecosystem management, Zoology Dept., Univ. of Wash.

- Review of the concept of ecosystem management versus its application in actual Ecosystem Management plans and projects
- Co-organized and co-lectured with D. Boersma, M. McClure, P. Kareiva

2000 Spatial Ecology, graduate course, Zoology Dept, University of Washington

- Course on the effect of spatial structure on population and community dynamics
- Lecture style course based on a course reader that I developed

1998 10 wk graduate seminar on Metapopulation models, University of Washington

- Course on the population, community and genetic consequences of metapopulation structure

1996 6 wk graduate seminar on Cellular Automata models, Imperial College, UK,

SUPERVISION

Post-docs

Dr. John Sabo, Professor Arizona State University
Dr. Steven Viscido, Associate professor at Winston-Salem University (NC State)
Dr. Kim Parsons, Federal research scientist at NWFSC
Dr. Brice Semmens, Director CalCOFI, Associate professor at UCSD
Dr. Eric Ward, Federal research scientist at NWFSC
Dr. Yasmin Lucero, independent statistical contractor
Dr. Dan Pendelton, senior research scientist at New England Aquarium
Dr. James Thorson, Federal research scientist at AFSC
Dr. Guillaume Bal, research scientist at Marine Institute, Ireland.

Graduate and undergraduate students

Summer internship mentor for Yifei Hang and Shridhar Sinha, Varanasi Internship. Project on gap-filling remote-sensing data with CNNs

Summer internship mentor for Jairui Yu and Minh Phan, Varanasi Internship. Project on predicting upwelling with CNNs

Summer internship mentor for Anthony Xiu, Varanasi Internship. Project on wavelet analysis of coastal upwelling temporal changes

Summer internship mentor for William Chen, Varanasi Internship. Project on wavelet analysis of coastal upwelling temporal changes. Current computer science masters student a U Mich.

Summer internship mentor for Howard Baek, Varanasi Internship. Project on time-series

analysis of coastal upwelling temporal changes. Biostatistics masters student a Univ of Wash.

Co-chair for Donna Hauser, graduated, M.S. student, School of Aquatic & Fisheries Sciences, Univ. of Wash., Seattle, WA. "Summer habitat use by Southern Resident Killer Whales"

Co-chair for Teresa Mongillo, graduated, M.S. student, School of Aquatic & Fisheries Sciences, Univ. of Wash., Seattle, WA. "Effects of contaminants on Southern Resident Killer Whale Population Dynamics"

Co-chair for Kevin See, Ph.D. student, School of Aquatic & Fisheries Sciences, Univ. of Wash., Seattle, WA. "Multivariate autoregressive modeling of spatial community data"

SCIENCE ADVISORY WORK (a subset of it)

1999-2005 Development of trend estimation methods for noisy salmonid data in support of the Biological Recovery Teams for listed salmonids in the Columbia River basin. See section on Methods in Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-66, 598 p.

2005 Cherry Point Pacific Herring Biological Recovery Team, team member, analyst on the risk assessment for 2005 status review

2005-2007 Steller Sea Lion Biological Recovery Team, advisor

2005-2007 Southern Resident Killer Whale Biological Recovery Team, advisor, mainly in reviewer capacity

2007 Marine Stewardship Council certification of the Alaska pollock fisheries, marine mammal assessment scientist, advisor

2007 Review panel member, 5-year laboratory peer review for the Atlantic Division NHERL laboratory, Environmental Protection Agency

2008-2009 Puget Sound Rockfish Biological Review Team, team member

2008-2012 NWFSC Internal Grants Program, proposal review panel member

2009-2012 Science Advisory Board for the National Center for Ecological Analysis and Synthesis (NCEAS), Santa Barbara, CA

2009 CAMEO-NSF proposal review panel member

2009-2011 Secretary, statistical ecology section of the Ecological Society of America

2011-2015 4-year NASA funded grant on 'Forecasting Changes in Habitat Use by Bowhead Whales in Response to Arctic Climate Change: Integration of Physical-Biological Models with Satellite, Biological Survey and Oceanographic Data' PIs: E. E. Holmes and D. Pendleton. This is a collaborative project with M. Ferguson (National Marine Mammal Lab) and J. Zhang (Applied Physics Lab, UW).

2012-2021 Subject editor, Ecological Applications, Ecological Monographs

2012-2019 Co-lead for the Population Assessment group in the NOAA-wide Protected Species Toolbox project. This is a $600,000 per year, 3 year, project to develop quantitative tools for protected species.

2014-2015 5-year Status Review of listed Pacific NW Salmonids, advisor/trend analysis

2014-2019 Development of Predictive Capabilities on Marine Fisheries and Harmful Algal Blooms in Indian Seas, MoES (India)-NOAA Technical Cooperation. Joint workshops with US and Indian fisheries biologists and oceanographers in Cochi and Hyderabad, India.

2015 Statistical contributor for the 2015 IUCN Red List assessment for polar bears. http://www.iucnredlist.org/details/22823/0

2016-2017 Working group member Sacramento River Winter-Run Chinook control evaluation.

2019-2020 NOAA International fellowship with Ministry of Earth Sciences (India). Working with Indian fisheries biologists and oceanographers in Cochi and Hyderabad, India on effects of ocean climate change in the Indian Ocean.

2019-2021 Another 5-year Viability Report in support of the Status Review of listed Pacific NW Salmonids, advisor/trend analysis.

2022-2024 Oregon coast steelhead Biological Review Team, team member
2023-2025 NMFS representative on the Public Access to Research Results working group, NMFS rep on the Open Source Software working group, NOAA rep on the Whitehouse OSTP Open Science subcommittee.