

# Sarah Gaichas

RESEARCH FISHERY BIOLOGIST ZP-IV

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## Educational History

### University of Washington

PhD

Seattle, WA

2000 - 2006

### College of William and Mary, School of Marine Science

M.S.

Gloucester Point, VA

1994 - 1997

### Swarthmore College

B.A.

Swarthmore, PA

1986 - 1991

## Professional History

### Research Fishery Biologist NOAA/NMFS Northeast Fisheries Sci. Center, Woods Hole, MA

Ecosystem Assessment, MSE

September 2011 – present

Contribute to integrated ecosystem assessments and management strategy evaluations (MSEs) for the Northeast U.S. continental shelf by analyzing research survey, fishery, oceanographic, and economic data, and by developing and testing multispecies assessment models and ecosystem indicators. Conduct research on ecosystem based management reference points balancing multiple objectives. Chair National and Northeast MSE working groups to build capacity and coordinate work plans. Lead editor, State of the Ecosystem reports. Provide results in peer-reviewed literature and to the New England and Mid-Atlantic Fishery Management Councils.

### Research Fishery Biologist NOAA/NMFS Alaska Fisheries Science Center, Seattle, WA

Ecosystem Modeling

June 2006 – September 2011

Established an ecosystem context for fishery management through analysis of food web, fishery, and research survey data combined with ecosystem modeling. Evaluated the cumulative effects of fishing, climate change, and other factors on the marine ecosystem and species within it. Conducted independent research on ecosystem level indicators and thresholds and provided results in peer-reviewed literature and to the North Pacific Fishery Management Council. Participated in research surveys at sea.

Stock Assessment

November 1998 – June 2006

Assessed the condition of commercially exploited fish stocks through analysis of fishery and research survey data combined with population dynamics modeling. Evaluated the effects of fishing on non-target species and the marine ecosystem. Conducted Ph.D. research. Attended 2001 Complex Systems Summer School, Santa Fe Institute, Santa Fe NM. Participated in research surveys at sea.

Stock assessments: 1999 Gulf of Alaska (GOA) and 2000 – 2004 Bering Sea Aleutian Islands (BSAI) “Other species” (all species of skates, sharks, sculpins, octopi, and squids), 2000-2005 BSAI squids, 2005 BSAI skates, 2003-2005 GOA skates, 2000-2005 GOA Thornyheads, and 2006 GOA squids.

Observer Program

March 1997 – October 1999

Conducted statistical analyses of fishery observer data, evaluated present and proposed data collection methods through directed research, and examined uses of observer data in multiple applications.

## Awards

AFSC Employee of the Year 2010

VIMS

## Publications

## PAPERS PUBLISHED IN PEER-REVIEWED JOURNALS

- Bastille, K., S. Hardison, L. deWitt, J. Brown, J. Samhour, S. Gaichas, S. Lucey, K. Kearney, B. Best, S. Cross, S. Large, and E. Spooner (2021). "Improving the IEA Approach Using Principles of Open Data Science." In: *Coastal Management* 49.1, pp. 72-89. DOI: 10.1080/08920753.2021.1846155.
- DePiper, G., S. Gaichas, B. Muffley, G. Ardini, J. Brust, J. Coakley, K. Dancy, G. W. Elliott, D. C. Leaning, D. Lipton, J. McNamee, C. Perretti, K. Rootes-Murdy, and M. J. Wilberg (2021). "Learning by doing: collaborative conceptual modelling as a path forward in ecosystem-based management." In: *ICES Journal of Marine Science*. DOI: 10.1093/icesjms/fsab054.
- Friedland, K. D., E. T. Methratta, A. B. Gill, S. K. Gaichas, T. H. Curtis, E. M. Adams, J. L. Morano, D. P. Crear, M. C. McManus, and D. C. Brady (2021). "Resource Occurrence and Productivity in Existing and Proposed Wind Energy Lease Areas on the Northeast US Shelf." In: *Frontiers in Marine Science* 8. DOI: 10.3389/fmars.2021.629230.
- Lucey, S. M., K. Y. Aydin, S. K. Gaichas, S. X. Cadrin, G. Fay, M. J. Fogarty, and A. Punt (2021). "Evaluating fishery management strategies using an ecosystem model as an operating model." In: *Fisheries Research* 234, p. 105780. DOI: 10.1016/j.fishres.2020.105780.
- Muffley, B., S. Gaichas, G. DePiper, R. Seagraves, and S. Lucey (2021). "There Is no I in EAFM Adapting Integrated Ecosystem Assessment for Mid-Atlantic Fisheries Management." In: *Coastal Management* 49.1, pp. 90-106. DOI: 10.1080/08920753.2021.1846156.
- Reum, J. C. P., H. Townsend, S. Gaichas, S. Sagarese, I. C. Kaplan, and A. Grüss (2021). "It's Not the Destination, It's the Journey: Multispecies Model Ensembles for Ecosystem Approaches to Fisheries Management." In: *Frontiers in Marine Science* 8. DOI: 10.3389/fmars.2021.631839.
- Link, J. S., G. Huse, S. Gaichas, and A. R. Marshak (2020). "Changing how we approach fisheries: A first attempt at an operational framework for ecosystem approaches to fisheries management." In: *Fish and Fisheries* 21.2, pp. 393-434. DOI: 10.1111/faf.12438.
- Lucey, S. M., S. K. Gaichas, and K. Y. Aydin (2020). "Conducting reproducible ecosystem modeling using the open source mass balance model Rpath." In: *Ecological Modelling* 427, p. 109057. DOI: 10.1016/j.ecolmodel.2020.109057.
- Weiskopf, S. R., M. A. Rubenstein, L. G. Crozier, S. Gaichas, R. Griffis, J. E. Halofsky, K. J. W. Hyde, T. L. Morelli, J. T. Morissette, R. C. Muñoz, A. J. Pershing, D. L. Peterson, R. Poudel, M. D. Staudinger, A. E. Sutton-Grier, L. Thompson, J. Vose, J. F. Weltzin, and K. P. Whyte (2020). "Climate change effects on biodiversity, ecosystems, ecosystem services, and natural resource management in the United States." In: *Science of The Total Environment*, p. 137782. DOI: 10.1016/j.scitotenv.2020.137782.
- Goethel, D. R., S. M. Lucey, A. M. Berger, S. K. Gaichas, M. A. Karp, P. D. Lynch, and J. F. Walter (2019). "Recent advances in management strategy evaluation: introduction to the special issue "Under pressure: addressing fisheries challenges with Management Strategy Evaluation"". In: *Canadian Journal of Fisheries and Aquatic Sciences* 76.10, pp. 1689-1696. DOI: 10.1139/cjfas-2019-0084.
- Karp, M. A., J. O. Peterson, P. D. Lynch, R. B. Griffis, C. F. Adams, W. S. Arnold, L. A. K. Barnett, Y. deReynier, J. DiCosimo, K. H. Fenske, S. K. Gaichas, A. Hollowed, K. Holsman, M. Karnauskas, D. Kobayashi, A. Leising, J. P. Manderson, M. McClure, W. E. Morrison, E. Schnettler, A. Thompson, J. T. Thorson, J. F. Walter, A. J. Yau, R. D. Methot, and J. S. Link (2019). "Accounting for shifting distributions and changing productivity in the development of scientific advice for fishery management." In: *ICES Journal of Marine Science* 76.5, pp. 1305-1315. DOI: 10.1093/icesjms/fsz048.
- Townsend, H., C. J. Harvey, Y. deReynier, D. Davis, S. G. Zador, S. Gaichas, M. Weijerman, E. L. Hazen, and I. C. Kaplan (2019). "Progress on Implementing Ecosystem-Based Fisheries Management in the United States Through the Use of Ecosystem Models and Analysis." In: *Frontiers in Marine Science* 6. DOI: 10.3389/fmars.2019.00641.
- Deroba, J. J., S. K. Gaichas, M. Lee, R. G. Feeney, D. V. Boelke, and B. J. Irwin (2018). "The dream and the reality: meeting decision-making time frames while incorporating ecosystem and economic models into management strategy evaluation." In: *Canadian Journal of Fisheries and Aquatic Sciences*. DOI: 10.1139/cjfas-2018-0128.
- Feeney, R. G., D. V. Boelke, J. J. Deroba, S. K. Gaichas, B. J. Irwin, and M. Lee (2018). "Integrating Management Strategy Evaluation into fisheries management: advancing best practices for stakeholder inclusion based on an MSE for Northeast U.S. Atlantic herring." In: *Canadian Journal of Fisheries and Aquatic Sciences*. DOI: 10.1139/cjfas-2018-0125.

Gaichas, S. K., G. S. DePiper, R. J. Seagraves, B. W. Muffley, M. Sabo, L. L. Colburn, and A. L. Loftus (2018). "Implementing Ecosystem Approaches to Fishery Management: Risk Assessment in the US Mid-Atlantic." In: *Frontiers in Marine Science* 5. DOI: 10.3389/fmars.2018.00442.

Goethel, D. R., S. M. Lucey, A. M. Berger, S. K. Gaichas, M. A. Karp, P. D. Lynch, J. F. Walter III, J. J. Deroba, S. K. Miller, and M. J. Wilberg (2018). "Closing the Feedback Loop: On Stakeholder Participation in Management Strategy Evaluation." In: *Canadian Journal of Fisheries and Aquatic Sciences*. DOI: 10.1139/cjfas-2018-0162.

Lipton, D., M. A. Rubenstein, S. R. Weiskopf, S. L. Carter, J. Peterson, L. Crozier, M. Fogarty, S. Gaichas, K. J. W. Hyde, T. L. Morelli, J. Morissette, H. Moustahfid, R. Munoz, R. Poudel, M. D. Staudinger, C. Stock, L. Thompson, R. S. Waples, and J. F. Weltzin (2018). *Ecosystems, Ecosystem Services, and Biodiversity*. Other Government Series. U.S. Global Change Research Program, p. 268321. DOI: 10.7930/NCA4.2018.CH7.

Olsen, E., I. C. Kaplan, C. Ainsworth, G. Fay, S. Gaichas, R. Gamble, R. Girardin, C. H. Eide, T. F. Ihde, H. N. Morzaria-Luna, K. F. Johnson, M. Savina-Rolland, H. Townsend, M. Weijerman, E. A. Fulton, and J. S. Link (2018). "Ocean Futures Under Ocean Acidification, Marine Protection, and Changing Fishing Pressures Explored Using a Worldwide Suite of Ecosystem Models." In: *Frontiers in Marine Science* 5. DOI: 10.3389/fmars.2018.00064.

DePiper, G. S., S. K. Gaichas, S. M. Lucey, P. Pinto da Silva, M. R. Anderson, H. Breeze, A. Bundy, P. M. Clay, G. Fay, R. J. Gamble, R. S. Gregory, P. S. Fratantoni, C. L. Johnson, M. Koen-Alonso, K. M. Kleisner, J. Olson, C. T. Perretti, P. Pepin, F. Phelan, V. S. Saba, L. A. Smith, J. C. Tam, N. D. Templeman, and R. P. Wildermuth (2017). "Operationalizing integrated ecosystem assessments within a multidisciplinary team: lessons learned from a worked example." In: *ICES Journal of Marine Science* 74.8, pp. 2076-2086. DOI: 10.1093/icesjms/fsx038.

Gaichas, S. K., M. Fogarty, G. Fay, R. Gamble, S. Lucey, and L. Smith (2017). "Combining stock, multispecies, and ecosystem level fishery objectives within an operational management procedure: simulations to start the conversation." In: *ICES Journal of Marine Science* 74.2, pp. 552-565. DOI: 10.1093/icesjms/fsw119.

Holsman, K., J. Samhuri, G. Cook, E. Hazen, E. Olsen, M. Dillard, S. Kasperski, S. Gaichas, C. R. Kelble, M. Fogarty, and K. Andrews (2017). "An ecosystem-based approach to marine risk assessment." In: *Ecosystem Health and Sustainability* 3.1, p. e01256. DOI: 10.1002/ehs2.1256.

Tommasi, D., C. A. Stock, A. J. Hobday, R. Methot, I. C. Kaplan, J. P. Eveson, K. Holsman, T. J. Miller, S. Gaichas, M. Gehlen, A. Pershing, G. A. Vecchi, R. Msadek, T. Delworth, C. M. Eakin, M. A. Haltuch, R. Séférian, C. M. Spillman, J. R. Hartog, S. Siedlecki, J. F. Samhuri, B. Muhling, R. G. Asch, M. L. Pinsky, V. S. Saba, S. B. Kapnick, C. F. Gaitan, R. R. Rykaczewski, M. A. Alexander, Y. Xue, K. V. Pegion, P. Lynch, M. R. Payne, T. Kristiansen, P. Lehodey, and F. E. Werner (2017). "Managing living marine resources in a dynamic environment: The role of seasonal to decadal climate forecasts." In: *Progress in Oceanography* 152, pp. 15-49. DOI: 10.1016/j.pocean.2016.12.011.

Wildermuth, R. P., G. Fay, and S. Gaichas (2017). "Structural uncertainty in qualitative models for ecosystem-based management of Georges Bank." In: *Canadian Journal of Fisheries and Aquatic Sciences* 75.10, pp. 1635-1643. DOI: 10.1139/cjfas-2017-0149.

Zador, S. G., S. K. Gaichas, S. Kasperski, C. L. Ward, R. E. Blake, N. C. Ban, A. Himes-Cornell, and J. Z. Koehn (2017). "Linking ecosystem processes to communities of practice through commercially fished species in the Gulf of Alaska." In: *ICES Journal of Marine Science* 74.7, pp. 2024-2033. DOI: 10.1093/icesjms/fsx054.

Gaichas, S. K., R. J. Seagraves, J. M. Coakley, G. S. DePiper, V. G. Guida, J. A. Hare, P. J. Rago, and M. J. Wilberg (2016). "A Framework for Incorporating Species, Fleet, Habitat, and Climate Interactions into Fishery Management." In: *Frontiers in Marine Science* 3. DOI: 10.3389/fmars.2016.00105.

Olsen, E., G. Fay, S. Gaichas, R. Gamble, S. Lucey, and J. S. Link (2016). "Ecosystem Model Skill Assessment. Yes We Can!" In: *PLOS ONE* 11.1. Ed. by C. N. Bianchi, p. e0146467. DOI: 10.1371/journal.pone.0146467.

Weijerman, M., J. Link, E. Fulton, E. Olsen, H. Townsend, S. Gaichas, C. Hansen, M. Skern-Mauritzen, I. Kaplan, R. Gamble, G. Fay, M. Savina, C. Ainsworth, I. van Putten, R. Gorton, R. Brainard, K. Larsen, and T. Hutton (2016). "Atlantis Ecosystem Model Summit: Report from a workshop." In: *Ecological Modelling* 335, pp. 35-38. DOI: 10.1016/j.ecolmodel.2016.07.011.

Zador, S. G., K. K. Holsman, K. Y. Aydin, and S. K. Gaichas (2016). "Ecosystem considerations in Alaska: the value of qualitative assessments." In: *ICES Journal of Marine Science: Journal du Conseil*, p. fsw144. DOI: 10.1093/icesjms/fsw144.

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*Oceanography* 138, Part A, pp. 1-17. DOI: 10.1016/j.pocean.2015.09.010.

Smith, L., R. Gamble, S. Gaichas, and J. Link (2015). "Simulations to evaluate management trade-offs among marine mammal consumption needs, commercial fishing fleets and finfish biomass." In: *Marine Ecology Progress Series* 523, pp. 215-232. DOI: 10.3354/meps11129.

Gaichas, S. K., J. S. Link, and J. A. Hare (2014). "A risk-based approach to evaluating northeast US fish community vulnerability to climate change." In: *ICES Journal of Marine Science* 71.8, pp. 2323-2342. DOI: 10.1093/icesjms/fsu048.

Ruzicka, J. J., J. H. Steele, T. Ballerini, S. K. Gaichas, and D. G. Ainley (2013). "Dividing up the pie: Whales, fish, and humans as competitors." In: *Progress in Oceanography* 116, pp. 207-219. DOI: 10.1016/j.pocean.2013.07.009.

Ruzicka, J., J. Steele, S. Gaichas, T. Ballerini, D. Gifford, R. Brodeur, and E. Hofmann (2013). "Analysis of Energy Flow in US GLOBEC Ecosystems Using End-to-End Models." In: *Oceanography* 26.4, pp. 82-97. DOI: 10.5670/oceanog.2013.77.

Fu, C., S. Gaichas, J. Link, A. Bundy, J. Boldt, A. Cook, R. Gamble, K. Rong Utne, H. Liu, and K. Friedland (2012). "Relative importance of fisheries, trophodynamic and environmental drivers in a series of marine ecosystems." In: *Marine Ecology Progress Series* 459, pp. 169-184. DOI: 10.3354/meps09805.

Gaichas, S. K., G. Odell, K. Y. Aydin, and R. C. Francis (2012). "Beyond the defaults: functional response parameter space and ecosystem-level fishing thresholds in dynamic food web model simulations." In: *Canadian Journal of Fisheries and Aquatic Sciences* 69, pp. 2077-2094. DOI: 10.1139/F2012-099.

Gaichas, S., A. Bundy, T. Miller, E. Moksness, and K. Stergiou (2012). "What drives marine fisheries production?" In: *Marine Ecology Progress Series* 459, pp. 159-163. DOI: 10.3354/meps09841.

Gaichas, S., R. Gamble, M. J. Fogarty, H. Benoit, T. Essington, C. Fu, M. Koen-Alonso, and J. Link (2012). "Assembly Rules for Aggregate-Species Production Models: Simulations in Support of Management Strategy Evaluation." In: *Marine Ecology Progress Series* 459, pp. 275-292.

Link, J., S. Gaichas, T. Miller, T. Essington, A. Bundy, J. Boldt, K. Drinkwater, and E. Moksness (2012). "Synthesizing Lessons Learned from Comparing Fisheries Production in 13 Northern Hemisphere Ecosystems: Emergent Fundamental Features." In: *Marine Ecology Progress Series* 459, pp. 293-302.

Link, J., T. Ihde, C. Harvey, S. Gaichas, J. Field, J. Brodziak, H. Townsend, and R. Peterman (2012). "Dealing with uncertainty in ecosystem models: The paradox of use for living marine resource management." In: *Progress in Oceanography* 102, pp. 102-114. DOI: 10.1016/j.pocean.2012.03.008.

Moksness, E., J. Link, K. Drinkwater, and S. Gaichas (2012). "Bernard Megrey: pioneer of Comparative Marine Ecosystem analyses." In: *Marine Ecology Progress Series* 459, pp. 165-167. DOI: 10.3354/meps09582.

Pranovi, F., J. Link, C. Fu, A. Cook, H. Liu, S. Gaichas, K. Friedland, K. Rong Utne, and H. Benoît (2012). "Trophic-level determinants of biomass accumulation in marine ecosystems." In: *Marine Ecology Progress Series* 459, pp. 185-201. DOI: 10.3354/meps09738.

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Hunsicker, M. E., L. Ciannelli, K. M. Bailey, J. A. Buckel, J. W. White, J. S. Link, T. E. Essington, S. Gaichas, T. W. Anderson, R. D. Brodeur, K. Chan, K. Chen, G. Englund, K. T. Frank, V. Freitas, M. A. Hixon, T. Hurst, D. W. Johnson, J. F. Kitchell, D. Reese, G. A. Rose, H. Sjödin, W. J. Sydeman, H. W. v. d. Veer, K. Vollset, and S. Zador (2011). "Functional responses and scaling in predator-prey interactions of marine fishes: contemporary issues and emerging concepts." In: *Ecology Letters* 14.12, pp. 1288-1299. DOI: 10.1111/j.1461-0248.2011.01696.x@10.1111/(ISSN)1461-0248.anthropogenic-change.

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Salomon, A. K., S. K. Gaichas, N. T. Shears, J. E. Smith, E. M. P. Madin, and S. D. Gaines (2010). "Key Features and Context-Dependence of Fishery-Induced Trophic Cascades." In: *Conservation Biology* 24.2, pp. 382-394. DOI: 10.1111/j.1523-1739.2009.01436.x.

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Megrey, B. A., J. A. Hare, W. T. Stockhausen, A. Dommasnes, H. Gjøsæter, W. Overholtz, S. Gaichas, G. Skaret, J. Falk-Petersen, J. S. Link, and K. D. Friedland (2009). "A cross-ecosystem comparison of spatial and temporal patterns of covariation in the recruitment of functionally analogous fish stocks." In: *Progress in Oceanography. Comparative Marine Ecosystem Structure and Function: Descriptors and Characteristics* 81.1, pp. 63-92. DOI: 10.1016/j.pocean.2009.04.006.

Gaichas, S. (2008). "A context for ecosystem-based fishery management: Developing concepts of ecosystems and sustainability." In: *Marine Policy* 32, pp. 393-401.

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Barbeaux, S. J., S. Gaichas, J. N. Ianelli, and M. W. Dorn (2005). "Evaluation of Biological Sampling Protocols for At-Sea Groundfish Observers in Alaska." In: *Alaska Fishery Research Bulletin* 11.2, p. 25.

Karp, W. A., C. S. Rose, J. R. Gauvin, S. K. Gaichas, M. W. Dorn, and G. D. Stauffer (2001). "Government-Industry Cooperative Fisheries Research in the North Pacific under the MSFCMA." In: *Marine Fisheries Review* 63.1, pp. 40-46.

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#### PAPERS SUBMITTED TO PEER-REVIEWED JOURNALS

Isaac C. Kaplan, Sarah K Gaichas, Christine C Stawitz, Patrick D. Lynch, Kristin N Marshall, Jonathan J. Deroba, Michelle Masi, Jon KT Brodziak, Kerim Y. Aydin, Kirstin Holsman, Howard Townsend, Desiree Tommasi, James A. Smith, Stefan Koenigstein, Mariska Weijerman and Jason Link. Management Strategy Evaluation: Allowing the Light

on the Hill to Illuminate More than One Species. Original Research, Front. Mar. Sci. - Marine Fisheries, Aquaculture and Living Resources. Received on: 31 Oct 2020, Edited by: Athanassios C. Tsikliras. Manuscript ID: 624355

#### **OTHER PAPERS (NON PEER-REVIEWED JOURNALS, BOOK CHAPTERS, SYMPOSIUM VOLUMES)**

Gaichas, S.K., C. Reiss, and M. Koen-Alonso. 2014. Ecosystem Based Management in high latitude ecosystems. Chapter 10, p. 277-324 in The Sea, Volume 16: Marine Ecosystem Based Management. Harvard U. Press.

#### **BOOKS**

#### **REPORTS**

State of the Ecosystem

Risk assessments

ICES WGSAM

ICES WGNARS

Link, J.S., D. Mason, T. Lederhouse, S. Gaichas, T. Hartley, J. Ianelli, R. Methot, C. Stock, C. Stow, and H. Townsend. 2015. Report from the Joint OAR-NMFS Modeling Uncertainty Workshop. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-F/SPO-153, 31 p.

Lucey, S. and S. Gaichas. 2015. Fish Communities. Section in Fogarty, M. (ed.), Ecosystem Status Report for the Northeast Large Marine Ecosystem <http://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/fish-communities.html>

Northeast Fisheries Science Center 2015. Figures for Ecosystem Status Report (Executive Summary). <http://www.nefsc.noaa.gov/ecosys/ecosystem-status-report/>

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Conners, M.E., J. Cahalan, S. Gaichas, W.A. Karp, T. Loomis, and J. Watson. 2009. Sampling for estimation of catch composition in Bering Sea trawl fisheries. NOAA Tech. Memo. NMFS-AFSC-199, 42 p.

Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298 p.

Gaichas, S.K., and J.C. Field, 2003. Comparative modeling approaches for exploited marine ecosystems in the North Pacific: what are these models good for? In Mace, P.M. (ed.), Proceedings of the seventh NMFS National Stock Assessment Workshop, (Re)building Sustainable Fisheries and Marine Ecosystems. NOAA Tech. Memo NMFS-F/SPO-62.

#### **OTHERS (FISHERY MANAGEMENT COUNCIL DOCUMENTS)**

April 2016: Contributor to Mid-Atlantic Fishery Management Council Ecosystem Approach to Fisheries Management Guidance Document (1st Draft). [http://www.mafmc.org/s/Tab05\\_EAFM.pdf](http://www.mafmc.org/s/Tab05_EAFM.pdf)

February 2016: Lead author for A Framework for Incorporating Species, Fleet, Habitat, and Climate Interactions into Fishery Management: A DRAFT White Paper to Inform the Mid-Atlantic Fishery Management Council. [http://www.mafmc.org/s/02\\_DRAFTInteractionsWhitePaper\\_bbdraft.pdf](http://www.mafmc.org/s/02_DRAFTInteractionsWhitePaper_bbdraft.pdf)

April 2015: Contributor/Editor for Climate Change and Variability: A White Paper to Inform the Mid-Atlantic Fishery Management Council on the Impact of Climate Change on Fishery Science and Management. [http://www.mafmc.org/s/Climate-Change-and-VariabilityWhite-Paper\\_BBook\\_second\\_draft\\_final.pdf](http://www.mafmc.org/s/Climate-Change-and-VariabilityWhite-Paper_BBook_second_draft_final.pdf)

December 2014: Contributor to Managing Forage Fishes in the Mid-Atlantic Region: A White Paper to Inform the Mid-Atlantic Fishery Management Council. [http://www.mafmc.org/s/3\\_ForageWhitePaper\\_Nov2014\\_draft3-2.pdf](http://www.mafmc.org/s/3_ForageWhitePaper_Nov2014_draft3-2.pdf)

November 2010: Lead author, Bering Sea Ecosystem Assessment, and Ecosystem Considerations SAFE co-editor: <http://access.afsc.noaa.gov/reem/ecoweb/Eco2010.pdf>

October 2010: GOA Crab Protection Closures Environmental Assessment, contributed ecosystem effects analysis in section 4: [http://www.fakr.noaa.gov/npfmc/current\\_issues/bycatch/G0Acrab.pdf](http://www.fakr.noaa.gov/npfmc/current_issues/bycatch/G0Acrab.pdf)

September 2010: Ecosystem Considerations SAFE editor (while S. Zador was on leave): [ftp://ftp.afsc.noaa.gov/afsc/public/Plan\\_Team/ecosystem.pdf](ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/ecosystem.pdf)

November 2009: Ecosystem Assessment coauthor: <http://www.afsc.noaa.gov/refm/docs/2009/ecosystem.pdf>

September 2008: Arctic Fishery Management Plan Environmental Analysis; contributed Arctic Ecosystem Description, Chapter 8, Section 1: [http://www.fakr.noaa.gov/analyses/arctic/ArcticFMP\\_EA1108.pdf](http://www.fakr.noaa.gov/analyses/arctic/ArcticFMP_EA1108.pdf)

December 2007: Aleutian Islands Fishery Ecosystem Plan; Ecosystem Plan Team member, contributed food web analyses: [http://www.fakr.noaa.gov/npfmc/current\\_issues/ecosystem/AIFEPbrochure1207.pdf](http://www.fakr.noaa.gov/npfmc/current_issues/ecosystem/AIFEPbrochure1207.pdf)

1999-2006: Stock assessment reports (see below) contributed to North Pacific Fishery Management Council Stock Assessment and Fishery Evaluation Report [https://archive.fisheries.noaa.gov/afsc/REFM/stocks/Historic\\_Assess.htm](https://archive.fisheries.noaa.gov/afsc/REFM/stocks/Historic_Assess.htm)

## **Presentations**

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Speaker, moderator, and symposium organizer at regional to international professional meetings (AFS, ASLO, Conservation Biology, ESA, GLOBEC, IMCC, World Fisheries Congress) 1995-present. Invited speaker for public lecture series, teacher workshops, and university courses and departmental seminars.

### **TALKS PRESENTED AT PROFESSIONAL MEETINGS**

Invited: \* 2021 AFS - connecting the dots climate informed management symposium - ecological forecasting symposium

OMG too many

### **POSTERS PRESENTED AT PROFESSIONAL MEETINGS**

Fewer

### **OTHER SEMINARS/PRESENTATIONS**

Fishery Management Councils: SOE

Fishery Management Councils Management strategy evaluation stakeholder workshops

Marine Resource Education Program

OneNOAA EBFM series

AFSC Groundfish series

NEFSC seminar series

UMass seminar series

IMR/NOAA bilateral meetings

Invited \* Using ecosystem info in management for DFO Ecosystem WG \* MSE and DMDU for Ecosystem WG NOAA SAB

## **Funded research**

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Internal grants International fellowship COCA

## **Professional Affiliations/Activities/Service**

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- Mid-Atlantic FMC Scientific and Statistical Committee, (2014-present); determining Allowable Biological Catch (ABC) advice for fishery management and other scientific support.
- Member and past co-chair of the ICES Working Group on North Atlantic Regional Seas; developing ecosystem indicators and integrated ecosystem assessments for Canadian and U.S. waters.

- Co-Chair of the ICES Working Group on Multispecies Assessment Methods: reviewing and contributing to multispecies and ecosystem modeling progress across ICES regions.
- Advisory partner in the European Commission's PANDORA project (2018-2022), which is designing toolsets for new dynamic ocean resource assessments and exploitation.
- Advisory partner in the European Commission's MYFISH project (2012-2015), which defined alternative approaches to Maximum Sustainable Yield including ecological, social, and economic dimensions.
- External reviewer for the Canada Maritimes Region Ecosystem Research Initiative (March 2012).
- Guest lecturer: Woods Hole Partnership in Education Program (PEP), June 2015; Worcester Polytechnic Institute Research Experience for Undergraduates in Applied Mathematics, June 2014; WHOI Fisheries Oceanography Course, April 2014, Rutgers Ecology and Evolution Dept. Seminar, March 2013, SMAST Fisheries Oceanography Dept. Seminar, February 2012.
- Member of the Aleutian Islands Fishery Ecosystem Plan Team (2007-2011) and the Gulf of Alaska Fishery Management Plan Team (2000-2011) for North Pacific Fishery Management Council. Co-authored the Aleutian Islands Fishery Ecosystem Plan (2007) and regularly co-authored the Stock Assessment and Fishery Evaluation introduction and summary for the Gulf of Alaska. Authored Ecosystem Description and contributed analyses for management alternatives for the Arctic Fishery Management Plan (2009).
- Co-organizer of the Bering Sea Ecosystem Synthesis Team (2010), a multi-disciplinary group charged with identifying important ecosystem indicators for fishery management and writing an eastern Bering Sea ecosystem assessment for the North Pacific Fishery Management Council.
- Invited participant in PICES FUTURE workshop on Ecosystem Indicators, April 2011 in Honolulu, HI.
- Co-organizer of the Comparative Analysis of Marine Ecosystem Organization (CAMEO) Stock Production Modeling Workshop II in Woods Hole, MA, May 2011. Presented results at the International Marine Conservation Congress in Victoria BC (May 15, 2011) at the Ecosystem Studies of Subarctic Seas Open Science Meeting (May 24, 2011), and at the World Fisheries Congress in Edinburgh, Scotland (May 2012).
- Participant in three CAMEO workshops in 2010: Role of predator-prey interactions in marine ecosystem organization in Corvallis, OR, March 2010; End to end modeling workshop in Woods Hole, MA, April 2010; and Stock production model fitting workshop in Woods Hole MA, May 2010.
- Co-PI on modeling portion of the North Pacific Research Board's GOA Integrated Ecosystem Research Plan.
- Investigator with 22 others on the interdisciplinary "Collaborative Research: GLOBEC Pan-Regional Synthesis: End-to-end Energy Budgets in US-GLOBEC Regions" project comparing four marine ecosystems in the Southern Ocean, in the Pacific off Alaska and the U.S. West Coast, and in the Atlantic off the U.S East Coast (2008-2011).
- Invited participant in Asia-Pacific Economic Cooperation International workshop on developing a network for deep sea research in Lima, Peru (2007). Presented information on North Pacific ecosystems, fisheries, and management, and helped develop a preliminary framework for an information-sharing network.
- Invited participant in Society for Conservation Biology symposium on ecosystem consequences of fishing in Port Elizabeth, South Africa (2007) and coauthor on a related review publication.
- Participant in the Marine Ecosystems of Norway and the U.S. (MENU) workshop in Bergen, Norway (2007). Compared energy budget models and trophic network attributes for five high-latitude marine ecosystems, presented results at 2007 ICES and PICES meetings, and collaborated on three publications.
- Regular participant in Alaska Fisheries Science Center scientific education and outreach activities, including Pacific Science Center programs, Minorities in Marine Science Undergraduate Program presentations, elementary, secondary, and college educator workshops, internship application review and placement.

## PROFESSIONAL SOCIETIES

AFS AIFRB

## EDITORIAL POSITIONS

## MEMBERSHIP ON PANELS

## ADVISORY SERVICES

All the Council stuff

ICES Wks

## WORKSHOPS ORGANIZED/CHAired; SESSIONS ORGANIZED/CHAired AT PROFESSIONAL MEETINGS



ICES/PICES 2022 Small Pelagics

WFC 2021 Climate and Ecosystem section of Horn of Plenty

AFS 2018 ecosystem emergent properties Atlantic City

AFS 2017 MSE Tampa

- Symposium Co-organizer: “Multispecies models (including humans!)—where have we been and where do we need to go?” 2015 American Fisheries Society annual meeting.

“What Influences Fisheries Production? Comparing the Effects of Environmental, Fishing, and Food Web Forcing Across Large Marine Ecosystems” 2011 American Fisheries Society annual meeting.

“Bridging the gap between fisheries and marine conservation to advance ecosystem-based management,” Society for Conservation Biology’s International Marine Conservation Conference (IMCC) 2009.

“Ecosystem modeling applications in fishery management” 2007 American Fisheries Society annual meeting.

## TEACHING AND MENTORING

**Adjunct professor** *University of Massachusetts, Dartmouth*

One current College of William and Mary (Virginia Institute of Marine Science) PhD student committee

One current UNH PhD student committee

2021 (Exam) PhD student committee at the University of Massachusetts, Dartmouth

2020 External examiner for a PhD student at University of Iceland

2019 (Exam) PhD student committee at the University of Massachusetts, Dartmouth

2019 External examiner for a PhD student at Dalhousie University

2016 External examiner for a PhD student at the University of Cape Town

2016 (Exam) PhD student committee at the University of Washington

2015 (Exam) PhD student committee at Oregon State University

WPI REU program Invited speaker for college courses

## Agency Service

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### COMMITTEES

National MSE WG Chair

MAFMC SSC (here or advisory?)

### OTHER

## Other relevant information

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March 2020 - present: considerable time was needed for dependent care (elementary age kids and elder care). I often used the excused absence for dependent care.

## References

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