

Sarah Gaichas

RESEARCH FISHERY BIOLOGIST ZP-IV

NOAA NMFS Northeast Fisheries Science Center 166 Water Street, Woods Hole, MA 02543

☎ +1 508 495 2016 | ✉ Sarah.Gaichas@noaa.gov | 📷 sgaichas

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

- End-year performance bonuses each year, 2006-2020.
- Individual cash award for State of the Ecosystem reporting, August 2020.
- Individual cash award for Acting Branch Chief performance, July 2017.
- ICES/MYFISH symposium Targets and Limits for Long Term Fisheries Management Most Inspiring Paper, October 2015.

- Department of Commerce “Cash-In-A-Flash” award, December 2011.
- Department of Commerce Special Act Award: Alaska Fisheries Science Center Employee of the Year, 2010.
- Department of Commerce Special Act Award for service on North Pacific Council Gulf of Alaska Plan Team and for ecosystem research contributions, July 2005.
- Department of Commerce Special Act Award for innovations in nontarget species management and ecosystem modeling, 2004.
- National Association of Environmental Professionals Award for Environmental Excellence in NEPA for assistance with the Steller Seal Lion Protection Measures SEIS, June 2003.
- Mote International Symposium on Confronting Trade-offs in the Ecosystem Approach to Fisheries Management Young Investigator Award, November 2002.
- Department of Commerce Special Act Award for service as the Nontarget and Prohibited Species Team Leader in the development of the Draft Programmatic SEIS for groundfish fisheries in Alaska, September 2000.
- Department of Commerce “Cash-In-A-Flash” awards, March and June 1998.
- College of William and Mary William J. Hargis Jr. Fellowship Award and Dean’s Fellowship. April, 1995.

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. Séférián, 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.2016.05.001.
- 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.
- Gaichas, S., K. Aydin, and R. C. Francis (2015). "Wasp waist or beer belly? Modeling food web structure and energetic control in Alaskan marine ecosystems, with implications for fishing and environmental forcing." In: *Progress in 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.

Gaichas, S. K., K. Y. Aydin, and R. C. Francis (2011). "What drives dynamics in the Gulf of Alaska? Integrating hypotheses of species, fishing, and climate relationships using ecosystem modeling." In: *Canadian Journal of Fisheries and Aquatic Sciences* 68, pp. 1553-1578.

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. Sjodin, 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.

Salomon, A. K., S. K. Gaichas, O. P. Jensen, V. N. Agostini, N. Sloan, J. Rice, T. R. McClanahan, M. H. Ruckelshaus, P. S. Levin, N. K. Dulvy, and E. A. Babcock (2011). "Bridging the Divide Between Fisheries and Marine Conservation Science." In: *Bulletin of Marine Science* 87.2, pp. 251-274. DOI: 10.5343/bms.2010.1089.

Gaichas, S. K., K. Y. Aydin, and R. C. Francis (2010). "Using food web model results to inform stock assessment estimates of mortality and production for ecosystem-based fisheries management." In: *Canadian Journal of Fisheries and Aquatic Sciences* 67, pp. 1493-1506.

Reuter, R. F., M. E. Conners, J. Dicosimo, S. Gaichas, O. Ormseth, and T. T. Tenbrink (2010). "Managing non-target, data-poor species using catch limits: lessons from the Alaskan groundfish fishery." In: *Fisheries Management and Ecology* 17.4, pp. 323-335. DOI: 10.1111/j.1365-2400.2009.00726.x.

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.

Gaichas, S., G. Skaret, J. Falk-Petersen, J. S. Link, W. Overholtz, B. A. Megrey, H. Gjøsæter, W. T. Stockhausen, A. Dommasnes, K. D. Friedland, and K. Aydin (2009). "A comparison of community and trophic structure in five marine ecosystems based on energy budgets and system metrics." In: *Progress in Oceanography* 81.1-4, pp. 47-62. DOI: 10.1016/j.pocean.2009.04.005.

Link, J. S., W. T. Stockhausen, G. Skaret, W. Overholtz, B. A. Megrey, H. Gjøsæter, S. Gaichas, A. Dommasnes, J. Falk-Petersen, J. Kane, F. J. Mueter, K. D. Friedland, and J. A. Hare (2009). "A comparison of biological trends from four marine ecosystems: Synchronies, differences, and commonalities." In: *Progress in Oceanography*. Comparative Marine Ecosystem Structure and Function: Descriptors and Characteristics 81.1, pp. 29-46. DOI: 10.1016/j.pocean.2009.04.004.

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.

Gaichas, S. K. and R. C. Francis (2008). "Network models for ecosystem-based fishery analysis: A review of concepts and application to the Gulf of Alaska marine food web." In: *Canadian Journal of Fisheries and Aquatic Sciences* 65, pp. 1965-1982.

Aydin, K. Y., 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. Department of Commerce, NOAA Tech. Memo. NMFS-AFSC-178, p. 298.

Gburski, C. M., S. K. Gaichas, and D. K. Kimura (2007). "Age and growth of big skate (*Raja binoculata*) and longnose skate (*R. rhina*) in the Gulf of Alaska." In: *Environmental Biology of Fishes* 80.2-3, pp. 337-349. DOI: 10.1007/s10641-007-9231-8.

Gaichas, S. (2006). "Development and application of ecosystem models to support fishery sustainability: A case study for the Gulf of Alaska - ProQuest." Seattle, WA.

Spies, I. B., S. Gaichas, D. E. Stevenson, J. W. Orr, and M. F. Canino (2006). "DNA-based identification of Alaska skates (*Amblyraja*, *Bathyraja* and *Raja*: Rajidae) using cytochrome c oxidase subunit I (col) variation." In: *Journal of Fish Biology* 69.sb, pp. 283-292. DOI: 10.1111/j.1095-8649.2006.01286.x.

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.

Dorn, M. W., S. K. Gaichas, S. M. Fitzgerald, and S. A. Bibb (1999). "Measuring Total Catch at Sea: Use of a Motion-Compensated Flow Scale to Evaluate Observer Volumetric Methods." In: *North American Journal of Fisheries Management* 19.4, pp. 999-1016. DOI: 10.1577/1548-8675(1999)019<0999:MTCASU>2.0.CO;2.

Gaichas, S. (1997). "Age And Growth Of Spanish Mackerel, *Scomberomorus Maculatus*, In The Chesapeake Bay Region." In: *Master's Thesis*. DOI: 10.25773/V5-TWBW-6T04.

PAPERS SUBMITTED TO PEER-REVIEWED JOURNALS

Staudinger, M., Lynch, A., Gaichas, S., Fox, M., Gibson-Reinemer, D., Langan, J., Teffer, A., Thackeray, S., and Winfield, I. Accepted April 2021. How does climate change affect emergent properties of aquatic ecosystems? *Fisheries*.

Kaplan, I.C., S.K. Gaichas, C.C. Stawitz, P.D. Lynch, K.N. Marshall, J.J. Deroba, M. Masi, J.K.T. Brodziak, K.Y. Aydin, K. Holsman, H. Townsend, D. Tommasi, J.A. Smith, S. Koenigstein, M. Weijerman and J. Link. Accepted May 2021. 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*.

OTHER PAPERS (BOOK CHAPTERS)

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.

REPORTS

Northeast Fisheries Science Center State of the Ecosystem Reports; lead editor for Mid-Atlantic 2017-2021, lead editor for New England 2017-2020, supporting editor for New England 2021

2021 State of the Ecosystem:

- Mid-Atlantic <https://apps-nefsc.fisheries.noaa.gov/rcb/publications/SOE-MAFMC-2021-508-Final.pdf>
- New England <https://apps-nefsc.fisheries.noaa.gov/rcb/publications/SOE-MAFMC-2021-508-Final.pdf>

2020 State of the Ecosystem:

- Mid-Atlantic <https://doi.org/10.25923/1f8j-d564>
- New England <https://doi.org/10.25923/4tdk-eg57>

2019 State of the Ecosystem:

- Mid-Atlantic https://www.mafmc.org/s/Tab09_State-of-the-Ecosystem-Report_2019-04.pdf
- New England https://s3.amazonaws.com/nefmc.org/11_SOE-NEFMC-2019.pdf

2018 State of the Ecosystem:

- Mid-Atlantic https://www.mafmc.org/s/Tab04_State-of-the-Ecosystem-Apr2018.pdf
- New England https://s3.amazonaws.com/nefmc.org/2_Ecosystem-Status-Report.pdf

2017 State of the Ecosystem:

- Mid-Atlantic https://www.mafmc.org/s/Tab02_2017-04_State-of-the-Ecosystem-and-EAFM.pdf
- New England: https://s3.amazonaws.com/nefmc.org/2_2016-State-of-the-Ecosystem-Report.pdf

Recent International Council for the Exploration of the Seas (ICES) Expert Group reports

ICES. 2021. Working Group on Multispecies Assessment Methods (WGSAM; outputs from 2020 meeting). ICES Scientific Reports. 3:10. 231 pp. <https://doi.org/10.17895/ices.pub.7695>

ICES. 2021. Workshop of Fisheries Management Reference Points in a Changing Environment (WKRChange, outputs from 2020 meeting). ICES Scientific Reports. 3:6. 39 pp. <https://doi.org/10.17895/ices.pub.7660>

ICES. 2019. Working Group on Multispecies Assessment Methods (WGSAM). ICES Scientific Reports.1:91. 320 pp. <http://doi.org/10.17895/ices.pub.5758>

ICES. 2018. Report of the Working Group on Multispecies Assessment Methods (WGSAM), 15–19 October 2018, Paris, France. ICES CM 2018/HAPISG:20. 89 pp.

Selected NOAA Technical Memoranda

Townsend, H., K. Aydin, K. Holsman, C. Harvey, I. Kaplan, E. Hazen, P. Woodworth-Jefcoats, M. Weijerman, T. Kel-lison, S. Gaichas, K. Osgood, J. Link (editors). 2017. Report of the 4th National Ecosystem Modeling Workshop (NEMoW 4): Using Ecosystem Models to Evaluate Inevitable Trade-offs. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-173, 77 p.

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 Tech-nical Memorandum NMFS-F/SPO-153, 31 p.

Link, J. S., T.F. Ihde, H. Townsend, K. Osgood, M. Schirripa, D. Kobayashi, S. Gaichas, J. Field, P. Levin, K. Aydin, G. Watters, and C. Harvey (editors). 2010. Report of the 2nd National Ecosystem Modeling Workshop (NEMoW II): Bridging The Credibility Gap – Dealing With Uncertainty In Ecosystem Models. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-102, 72 p.

Connors, 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 2020-2021: Lead author, State of the Ecosystem Request tracking memo for the Mid-Atlantic and New England Fishery Management Councils. https://www.mafmc.org/s/Tab01_2020-SOE-Report_2020-04.pdf (2020; pp 33-49 of combined pdf), https://www.mafmc.org/s/Tab06_SOE-Mid-Atlantic-Risk-Assessment__2021-04.pdf (2021; pp 44-60 of combined pdf)

October 2017-2021: Lead author, Mid-Atlantic Fishery Management Council Ecosystem Approach to Fisheries Man-agement Risk Assessments. https://www.mafmc.org/s/Tab08_EAFM-Risk-Assessment.pdf (2017), https://www.mafmc.org/s/MAB_RiskAssess_08_18.pdf (2018), https://www.mafmc.org/s/Tab10_EAFM_Updates_2019-04.pdf (2019), https://www.mafmc.org/s/Tab01_2020-SOE-Report_2020-04.pdf (2020; pp 50-62 of combined pdf), https://www.mafmc.org/s/Tab06_SOE-Mid-Atlantic-Risk-Assessment__2021-04.pdf (2021; pp 61-81 of combined pdf)

December 2019: Mid-Atlantic Fishery Management Council Ecosystem Approach to Fisheries Management Concep-tual models and visualizations. https://nefsc.github.io/READ-SSB-DePiper_Summer_Flounder_Conceptual_Models/sfconsmod_riskfactors_subplots.html https://nefsc.github.io/READ-SSB-DePiper_Summer_Flounder_Conceptual_Models/sfconsmod_final_2col.html

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

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

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

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

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/GOAcraab.pdf

September 2010: Ecosystem Considerations SAFE editor (while S. Zador was on leave): 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

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

1999-2006: Stock assessment reports (see above under Professional History) contributed to North Pacific Fishery Management Council Stock Assessment and Fishery Evaluation Reports: https://archive.fisheries.noaa.gov/afsc/REFM/stocks/Historic_Assess.htm

Presentations

Summary: Speaker, moderator, and symposium organizer at regional to international professional meetings (American Fisheries Society, ASLO, Conservation Biology, Ecological Society of America, GLOBEC, IMCC, World Fisheries Congress, ICES Annual Science Conference) 1995-present.

TALKS PRESENTED AT PROFESSIONAL MEETINGS

Upcoming invited presentations

Invited keynote speaker on best practices in multispecies modeling, Multispecies modeling applications workshop, June 2021.

Invited keynote speaker on ecosystem indicators contextualizing stock assessments, U.S. Fishery Management Council 7th Scientific Coordination Subcommittee (formerly National SSC), August 2020 (meeting postponed to 2022)

Invited speaker for two American Fisheries Society (AFS) Annual meeting symposia, November 2021. Submitted abstracts:

- Gaichas, S., B. Muffley, G. DePiper. Climate news you can use: risk assessment and ecosystem reporting in the US Mid-Atlantic. (Connecting the dots, management approaches for climate-ready fisheries symposium)
- Gaichas, S., V. Saba, S. Lucey. Integrated Ecosystem Assessment and Ecological Forecasting: Let's Do This. (Ecological Forecasting: Bridging fish, ecosystems, weather, water, climate and communities symposium)

Selected presentations

Gaichas, S.K., G. DePiper, R. Seagraves, B. Muffley, S. Lucey. There is no I in EAFM: adapting Integrated Ecosystem Assessment for Mid-Atlantic Fisheries Management. 2019 Coastal and Estuarine Research Foundation Biennial Conference, Mobile AL. (Presented by Sean Lucey due to conflict with review panel)

Gaichas, S.K., J. Deroba, M-Y. Lee. Are any herring harvest control rules good for both fisheries and predators? 2018 ICES Annual Science Conference, Hamburg, Germany.

Deroba J.J., S.K. Gaichas (speaker), M-Y. Lee, R.G. Feeney, D. Boelke, B. Irwin. Getting on the same page, or at least in the same library: lessons in communication from a stakeholder-driven MSE for Northeast US Atlantic herring. 2017 IMBER IMBIZO, Woods Hole MA.

Gaichas, S.K., R. Seagraves, J. Coakley, G. DePiper, V.G. Guida, J. Hare, P. Rago and M. Wilberg. The Mid-Atlantic Fishery Management Council's Framework for Incorporating Species, Fleet, Habitat, and Climate Interactions into Fishery Management: Initial Risk Assessment. 2017 AFS Annual Meeting, Tampa FL.

(Invited) Gaichas, S., M. Fogarty, G. DePiper, G. Fay, R. Gamble, S. Lucey, and L. Smith. Combining stock, multi-species, and ecosystem level status determination criteria: what tradeoffs can we expect? 2015 ICES symposium "Targets and limits for long term fisheries management," Athens, Greece.

Gaichas, S.K., M. Fogarty, R.J. Gamble, S.M. Lucey, L. Smith, C. Perretti, G. Fay. Multispecies stock assessment for Georges Bank: model development, performance testing, and multimodel inference. 2015 AFS Annual Meeting, Portland, OR.

(Invited) Gaichas, S., J. Link. Incorporating Climate into Ecosystem Based Fisheries Management. 2015 NOAA GFDL Application of Seasonal to Decadal Climate Predictions for Marine Resource Management Workshop, Princeton, NJ.

Gaichas, S., J. Link, J. Hare, M. Fogarty, P. Pinto da Silva, G. DePiper, J. Cournane, J. Manderson, S. Lucey, M. Lowe, S. Large, and G. Fay. Towards operational assessments: selection, vetting, and standardized analysis of ecosystem indicators for the Northeast US Large Marine Ecosystem. 2014 ICES Annual Science Conference, A Coruña, Spain.

• 2012 World Fisheries Congress, May (CAMEO Production modeling synthesis paper) • 2012 AIFRB Symposium, June (Alaska "beer belly" paper) • 2012 Ecological Society of America Annual meeting, Portland OR August (Multispecies size structured spatial assessment model development)

(Invited) Gaichas, S. Uncertainty in ecosystem indicators: known knowns, known unknowns, and unknown unknowns. 2011 PICES FUTURE workshop on Ecosystem Indicators, Honolulu HI.

2011 AFS Seattle CAMEO? other stuff?

Assembly Rules for Aggregate-Species Production Models: Simulations in Support of Management Strategy Evaluation, Michael Fogarty , Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA Sarah K. Gaichas (presenter) , Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA Hugues Benoit , Gulf Fisheries Centre, Fisheries and Oceans Canada, Moncton, NB, Canada Tim Essington , School of Aquatic and Fisheries Sciences, University of Washington, Seattle, WA Caihong Fu , Pacific Biological Station, Fisheries and Oceans Canada, Nanaimo, BC, Canada Robert J. Gamble , Northeast Fisheries Science Center, National Marine Fisheries Service, Woods Hole, MA Mariano Koen-Alonso , Fisheries and Oceans Canada, Northwest Atlantic Fisheries Centre, St. John's, NF, Canada Jason S. Link ,

Gaichas, S., What Drives Dynamics in the Gulf of Alaska? Integrating Hypotheses of Species, Fishing, and Climate Relationships Using Ecosystem Modeling. 2010 Lowell Wakefield Ecosystems Symposium, Anchorage AK.

2010 AFS - Presented "From the Aleutians to the Arctic: integrating ecosystem approaches within the Alaska fishery management process" at the AFS meeting in Pittsburgh, PA, 12-16 September within the Ecosystem Approach to Fishery Management symposium organized by Mike Fogarty et al. (NEFSC). - Presented (for K. Aydin) "The use of models in ecosystem assessment processes in Alaska (experiences from the Alaskan Fisheries Council Process)" at the AFS meeting in Pittsburgh, PA, 12-16 September within the Ecosystem Approach to Fishery Management symposium organized by Mike Fogarty et al. (NEFSC).

- Presented "Complex systems models of trophic and fishing interactions with implications for research and management" at GLOBEC Open Science Meeting in Victoria BC, June 2009
- PICES Annual meeting, Victoria, B.C., October 30, 2007; presented my own paper on ecosystem level thresholds as well as Ivonne Ortiz's paper on Aleutian Islands spatial food web modeling. - UW Career Week panelist for marine science careers January 29, 2008
- Advances in Marine Ecosystem Modelling Research (AMEMR) symposium in Plymouth, UK June 22-26, 2008; presented "Identifying critical interactions and thresholds in eastern north Pacific ecosystems through model simulations."
- 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.

-PICES meeting Yokohama Japan October 13-19, 2006. Presented ecosystem network comparison methods for EBS, GOA, and California Current during CFAME workshop. -Society for Conservation Biology meeting invited symposium

speaker July 1-5, 2007 in South Africa. -AFS: presented a talk and a poster (for Grant Thompson) in the symposium “Ecosystem modeling applications in fishery management” for September 2-6, 2007 meeting in San Francisco

POSTERS PRESENTED AT PROFESSIONAL MEETINGS

Gaichas, S., G. DePiper, R. Seagraves, L. Colburn, A. Loftus, M. Sabo, B. Muffley. Which MSE should you do first? Prioritizing MSE investments using risk assessment under an Ecosystem Approach to Fishery Management. National SSC meeting in San Diego, January 2018

Deroba, J., S. Gaichas, Lee M-Y., Feeney R.G., Boelke D., Irwin B. “Getting on the same page, or at least in the same library: lessons in communication from a stakeholder-driven management strategy evaluation for northeast US Atlantic herring. National SSC meeting in San Diego, January 2018

OTHER SEMINARS/PRESENTATIONS

Summary: Regular presentations to managers and stakeholders at Fishery Management Council meetings and management strategy evaluation stakeholder workshops. Presenter for the Marine Resource Education Program and at the Maine Fishermen’s Forum. Presenter in multiple agency and academic seminar series including OneNOAA, Alaska and Northeast Fishery Science Center, University of Washington, University of Massachusetts, Rutgers University. Invited speaker for public lecture series, teacher workshops, and university courses and departmental seminars.

Invited * Keynote on multispecies modeling best practices for Multispecies Modeling Applications Workshop, June 2021 * IEA and SOE for MACO Ocean forum May 2021 * Using ecosystem info in management for DFO Ecosystem WG February 2021 * ICES WKRPchange US reference points and herring HCR (2 presentations) Sept 2020 * MSE and DMDU for Ecosystem WG NOAA SAB July 2020 * IMR departmental and institute seminars 2019 * Fisheries Forum April 2017

US Reference Points Introduction, September 21, 2020, ICES Workshop on Reference Point Changes

Herring HCR accounting for its role as forage, September 23, 2020, ICES Workshop on Reference Point Changes

Species Interactions in Multispecies models, October 8 2020, NOAA Fisheries Integrated Toolbox Technical meeting

Multispecies models: US update, October 12, 2020, ICES Working Group on Multispecies Assessments

Integrating Climate into SOE and Model Skill Assessment, November 17, 2020, Northeast Fisheries-Climate PI workshop

“State of the Ecosystem 2020” for ICES WGNARS, May 8 (pre-recorded in April): https://noaa-edab.github.io/presentations/20200508_US_SOEUpdate_Gaichas.html

“US Council update (EAFM/EBFM): for ICES WGNARS, May 8 (pre-recorded in April): https://noaa-edab.github.io/presentations/20200508_USCouncilUpdate_Gaichas.htm

“Deep Uncertainty and MSE” for NOAA Science Advisory Board’s Ecosystem Sciences and Management Working Group, July 16, 2020: https://noaa-edab.github.io/presentations/20200716_MSEUncertainty_Gaichas.html

“Climate and Fisheries” for National Academy of Sciences Ocean Studies Board panel, May 22, 2020: https://noaa-edab.github.io/presentations/20200522_NASOSB_Gaichas.html

MREP EBFM section February 2020

- ICES WGNARS, March 2018 (“US Risk Assessment and Ecosystem Reporting Update”)
- International TAC workshop in Xiamen China, April 2018: “Can we integrate ecosystem and multispecies interactions into TACs and other fishery management?”
- Invited presenter, workshop co-organized by European pelagics industry and MAFMC, May 2018. Many US fishing industry participants attended. Presented “Implications of Ecosystem Approaches to Fisheries Management (EAFM) for Pelagic Fisheries”
- Organizing committee member, invited speaker and participant in Marine Resources Education Program 200 course on EBFM, presented “Analytical approaches for Ecosystem Based Fishery Management: Models and Indicators” Feb 2018 (Invited to West Coast MREP but unable to attend)

- 2017

- ICES WGNARS, March 2017 (“US IEA Update”) • ICES WGSAM, October 2017 (“Update on US modeling activities,” “Indicator based risk assessment,” “Herring MSE update,” “Linking mass balance models” for Sean Lucey, “GB multispecies management procedure” for Mike Fogarty, “Model structural comparisons” for Robert Wildermuth, “ICES update” for Amanda Hart, “Multiple models for sardine” for Isaac Kaplan, “ACLIM project” for Kirstin Holsman) • NSF Wind Energy Workshop, November 2017 (“IEAs”) • QUEST webinar, December 2017 (“The Dream and the Reality: Meeting decision-making times frames while incorporating ecosystem and economic models into management strategy evaluation”)

- 2016

- ICES WGSAM, October 2016 (“Update on US MSE activities and Atlantis Poseidon Adventure project,” “The state of ecosystem indicator reference points for fishery management” for Jamie Tam, “Tradeoffs between commercial fishing fleets, marine mammals and finfish biomass” for Laurel Smith, and “Mid-Atlantic Ecosystem Approach to Fisheries Management”)

- Council presentations on herring MSE and EAFM reported under elements 3 and 4

- 2015

- Presenter in American Meteorological Society Capitol Hill Policy Briefing on Applications of Seasonal Forecasting, September 2015: “Seasonal forecasting and ecosystem based fishery management.”

- NMFS-OAR Uncertainty Workshop, April 2015 (“Uncertainty in Ecosystem Models: Taxonomy and Treatment”)

- 2014

- ICES WGSAM, October 2014 (“Mixed fisheries in multispecies and ecosystem models” presented remotely) • Chesapeake Bay Forage Workshop, Nov 2014 (“Ecosystem metrics for fisheries management: examples and suggestions”) • ICES WKRISCO, Nov 2014 (“WGNARS: IEA progress, opportunities, and challenges”)

- Data Visualization Workshop, Portland ME, February 2013 (Visualizing complexity; invited)

- Presented “Diet data products for stock assessment” and co-organized the Stock-specific ecosystem indicators workshop hosted by AFSC, April 7, 2011

- Presented Central GOA dynamic model simulations of whale restoration, jellyfish fluctuations, and no fishing at GLOBEC Pan-Regional Synthesis PI meeting, Feb 28-March 4, 2011

- Presented “Fishing policy simulations in end-to-end models” at CAMEO end to end modeling workshop, Woods Hole MA, April 18-22 2010. Also, summarized discussions for two breakout groups and contributed meeting notes. - Presented GOA ecosystem overview and data summary, and examples of fitting our models to time series data at CAMEO stock production modeling workshop, Woods Hole MA, May 10-14

- Participated in CAMEO Predator-Prey Interactions workshop in Corvallis, OR, March 16-18, 2010: presented three slide “lightning talk” on GOA food web modeling and management applications. - Presented “Ecosystem Considerations in the North Pacific: Groundfish SAFE & Aleutian Islands FEP” at the Ecosystem Science and Management workshop in Silver Spring, MD March 24-25, 2010.

- Presented “Marine ecosystems science and management from Alaska to Puget Sound” with Chris Harvey (NWFSC) at the Science Cafe, an informal public lecture series in Seattle sponsored by Pacific Science Center, December 7, 2010

- Presented “Arctic ecosystem knowledge, where do we stand and where do we go from here?” in the AFSC seminar series, 19 May 2010.

- Organized Alaska group analyses and presented work completed to date for ecosystem comparisons for the GLOBEC Pan-Regional Synthesis PI meeting in Seattle, May 25-27, 2010

- Presented Ecosystem Considerations SAFE to the joint Groundfish Plan Teams, 22 September 2010.

- Co-led UW-NMFS Fisheries Think Tank on Dec 8, 2009: “Combining single species and ecosystem modeling results in ecosystem assessments” with Kerim Aydin and Isaac Kaplan (NWFSC)

-Invited presenter at UW SAFS “Young Investigator” departmental seminar on Dec 3, 2009: “Where does ecosystem modeling fit into fisheries management? Examples from the North Pacific”

- Presented “Gulf of Alaska food web modeling and predation mortality estimates: information for single-species M” at the national workshop on Natural Mortality, August 2009
- Presented analysis of comparisons of single species and ecosystem model results across NMFS Science Centers at NEMoW II meeting in Annapolis, August 2009
- Presented work completed to date for ecosystem comparisons for the GLOBEC Pan-Regional Synthesis PI meeting in Seattle, September 2009

FY08: - Invited expert at Asia-Pacific Economic Cooperation (APEC) workshop on developing a network on deep sea resources and fisheries, October 3-5 2007 in Lima, Peru; presented talk on Alaskan fisheries and deep-sea resources including slope surveys in all three ecosystems. - Presented results of ecosystem threshold modeling at UW mini-workshop October 24, 2007 - Presented ecosystem modeling talk at Pacific Science Center Teacher workshop October 26, 2007

- Science on Tap May 6, 2008; informal evening outreach presentation on ecosystem modeling and fishery management, sponsored by Pacific Science Center
- Marine Science Weekend at Pacific Science Center May 15-18, 2008; collaborated to develop and present a food-web/ecology related demonstration (did first presentation, May 15)
- Presented ecosystem modeling results to Ray Hilborn’s UW class, May 19, 2008

FY07:

-MENU workshop, Bergen Norway, March 6-9 presented GOA ecosystem description, demonstrated comparison methods used in Alaska. -Co-leader of UW Mini-workshop on fitting ecosystem models to data, February 20 2007. -NEMoW workshop, Santa Cruz CA August 29-31, 2007, gave presentation on Ecosim and contributed to presentation on Ecopath, co-leader of breakout group 1, and rapporteur. -Presented research on computation involved in ecosystem modeling to a group of visiting junior college teachers from Fresno City College and other schools touring the NOAA facility August 9, 2007. -Presenter at AFSC fish booth at the Seattle Fall Fisherman’s Festival, September 22, 2007.

Funded research

Internal grants (multispecies modeling, MSE support, fish energy content indicator, squid fishery indicators, Atlantis) International fellowship 2019 COCA • COCA proposal with GMRI/SMASST on MSE for groundfish under climate change funded, August 2017 o Postdoc hiring committee member: reviewed resumes, participated in interviews, selected candidates o Facilitating collaboration between COCA postdocs and NEFSC scientists (meeting April 2018), snared Min-Yang Lee (SSB) and Anna Birkenbach (U. Delaware) so far.

- 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).

Professional Affiliations/Activities/Service

PROFESSIONAL SOCIETIES

Current member: American Fisheries Society (AFS), American Institute of Fishery Research Biologists (AIFRB)

Past member: Ecological Society of America, The Society for Conservation Biology, American Society of Ichthyologists and Herpetologists

EDITORIAL POSITIONS

Guest editor, 2018-2019. Canadian Journal of Fisheries and Aquatic Sciences virtual special issue “Under pressure: addressing fisheries challenges with management strategy evaluation.”

Guest editor, 2011-2012. Marine Ecology Progress Series Theme Section “Comparative analysis of marine fisheries production.”

MEMBERSHIP ON PANELS

Chaired multispecies model key run reviews for ICES WGSAM, October 2020 (North Sea), October 2019 (Baltic Sea).
Participant in WGSAM model key run reviews 2015-2018.

Invited review panelist:

- Atlantic States Marine Fisheries Commission Atlantic Menhaden stock assessment and ecological reference points, November 2019.
- South African Assessment review, November 2018. MSE-based management procedures for 4 species were reviewed over the course of a week by an international panel. (Also invited for 2019 panel, but declined due to conflicts).
- International Whaling Commission, JARPN II February 2016 (Tokyo, Japan), NEWREP-NP February 2017 (by correspondence)
- NOAA NMFS Ecosystem Science Program reviews:
 - Alaska Program (Juneau, May 2016)
 - Northwest Program (Seattle, July 2016)
- Woods Hole Oceanographic Institution CINAR Fellows review panel, December 2012
- Invited external reviewer for the Canada Maritimes Region Ecosystem Research Initiative (March 2012)

ADVISORY SERVICES

Active

- Mid-Atlantic Fishery Management Council Scientific and Statistical Committee, (2014-present); determining Allowable Biological Catch (ABC) advice for fishery management and other scientific support.
- Mid-Atlantic Fishery Management Council Ecosystem Approach to Fisheries Management work group (2013-present); scientific support for ongoing EAFM efforts.
- ICES Working Group on North Atlantic Regional Seas (WGNARS), 2012-present, co-chair 2013-2016: developing ecosystem indicators and integrated ecosystem assessments for Canadian and U.S. waters. Co-chaired working group meetings in January 2013, February 2014 (also local host), and February 2015:
 - Developed agendas, 3 year Terms of Reference for 2014-2016, co-authored and submitted reports
 - Organized working sessions - 2013: ecosystem indicator thresholds/performance testing and ecological risk assessment, led section on risk assessment - 2014: reviewing, selecting and operationalizing management objectives and large scale ecosystem drivers - 2015: conceptual model development for Gulf of Maine/Georges Bank connecting large scale ecosystem and social drivers, focal ecosystem components, human activities, and human social system components as well as selected management objectives drawn from US law and published work
- ICES Working Group on Multispecies Assessment Methods (WGSAM), 2013-present, co-chair 2017-present: reviewing and contributing to multispecies and ecosystem modeling progress across ICES regions. Co-chaired working group meetings in October 2017, October 2018, October 2019, October 2020:
 - Developed agendas, 3 year Terms of Reference for 2019-2021, co-authored and submitted reports
 - Developed review criteria and organized working sessions on multispecies model key-run reviews
 - Currently leading intersessional work on multispecies model skill assessment
- Advisory partner in the European Commission's PANDORA project (2018-2022), which is designing toolsets for new dynamic ocean resource assessments and exploitation.

Completed

All the Council stuff

- Atlantic herring benchmark stock assessment working group 2018
- Member of the Ecosystem Based Fishery Management Plan Development Team for the New England Fishery Management Council (2012-2016), and Herring MSE steering committee (2016).

Invited speaker/participant, Multispecies Fisheries Management Workshop, Fujian, China 2018 • National Climate Assessment (NCA4) Ecosystem Chapter contributor—climate effects on trophic interactions • National Integrating Climate Effects into Fisheries Management (ICE-FM) working group member ICES WGs WKPchange 2020

facilitated a Stellwagen Bank NMS conceptual modeling workshop (March 2017) WKRISCO 2014

- 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.
- NEFSC Stock Assessment Program Review steering committee member. Participated in planning meetings in Dec 2013, Jan, Feb, March, April (including Directorate briefing) and full review meeting 19-23 May 2014. Developed background materials and presentation with Mike Fogarty and Jon Hare for TOR 6 on how well NEFSC integrates ecosystem and climate considerations into stock assessments. Contribute to follow up and Center response June-August. • Participant in National Stock Assessment Improvement Plan (SAIP) writing team for NEFSC; contributing to chapters on incorporating ecosystem effects into stock assessments and future of stock assessment (including IEAs, multimodel inference, etc.). Participated remotely in writing team meeting 21-23 January 2014. Developed outline for the "Why include ecosystem interactions" chapter with Michael Schirripa. Submitted first draft chapter August 2014. Met with SAIP leads and authors at ICES ASC to clarify further edits.

CB Forage Fish 2014

- 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 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.

WORKSHOPS ORGANIZED/CHAIRING; SESSIONS ORGANIZED/CHAIRING AT PROFESSIONAL MEETINGS

In Progress

ICES/PICES Symposium Small Pelagic Fish: New Frontiers in Science and Sustainable Management (planned for Lisbon, Portugal November 2022); S6 Reconciling Ecological Roles and Harvest Goals: Development and Testing Management Strategies to Enhance Marine Ecosystem Services. <https://meetings.pices.int/meetings/international/2022/pelagic/program#S6> Convenors: Sarah Gaichas, Cecilie Hansen, Isaac Kaplan, Richard Nash

World Fisheries Congress (planned for Adelaide, Australia/Virtual September 2021); The land of plenty: Advances and future directions in population dynamics modeling to support fishery management. Six consecutive, non-overlapping sub-sessions are planned, including (conveners in parentheses): general stock assessment methodology and statistics (André Punt, James Thorson); spatial models (Daniel Goethel, Aaron Berger); ecosystem dynamics and climate change (Éva Plagányi, Caleb Gardner, Sarah Gaichas); data-limited methods (Kristen Omori, Jason Cope, Natalie Dowling); management strategy evaluation and biological reference points (Carryn de Moor, Richard McGarvey, Ann Preece); and a summary discussion (Mark Maunder, Patrick Lynch).

Completed

National Ecosystem Modeling Workshop (NEMoW) 2019 St Petersburg; Steering committee member and workshop planner – Developed NEFSC overview presentation (presented by Scott Large) – Developed atlantisom tool demonstration (presented by Christine Stawitz)

American Fisheries Society annual meeting (AFS) 2018 Atlantic City; Emergent Properties of Aquatic and Marine Ecosystems Due to Climate Change: An Overview of the Current State of Knowledge. Organizers: Michelle D. Staudinger, Abigail J. Lynch, and Sarah K. Gaichas

AFS 2017 Tampa; Closing the Loop: Stakeholder Involvement in the Management Strategy Evaluation (MSE) Process—Advancing Management Strategy Evaluation. Organizers: Sean M. Lucey, Sarah K. Gaichas, John F. Walter III, Daniel Goethel, Aaron Berger, and Patrick Lynch

AFS 2017 Tampa; Under Pressure: Defining Harvest Strategies that Account for Biological, Environmental or Anthropogenic Spatiotemporal Complexity—Advancing Management Strategy Evaluation. Organizers: Daniel Goethel, Aaron Berger, Patrick Lynch, Sarah K. Gaichas, John F. Walter III, and Sean M. Lucey

AFS 2015 Portland, OR; Multispecies models (including humans!)—where have we been and where do we need to go? Organizers: Sarah K. Gaichas, Kirstin Holsman, Alan Haynie and Geret DePiper

AFS 2011 Seattle; What Influences Fisheries Production? Comparing the Effects of Environmental, Fishing, and Food Web Forcing Across Large Marine Ecosystems. Organizers: Sarah Gaichas, William Stockhausen, Thomas J. Miller, Jason S. Link, Tim Essington, R. Ian Perry and Alida Bundy

AFS 2011 Seattle; Ecosystem Modeling: Joint Modeling of Human Behavior and Fish Populations; Ecosystem Models to Address Fishery Management Needs. Organizers: Eli Fenichel, Joshua Abbott, Thomas F. Ihde, Sarah K. Gaichas, Isaac C. Kaplan, Derek M. Orner, Yvonne L. deReynier and Howard M. Townsend

Comparative Analysis of Marine Ecosystem Organization (CAMEO) Stock Production Modeling Workshop II Woods Hole, 2011. Organizers: Alida Bundy, Ken Drinkwater, Tim Essington, Jason Link, Sarah Gaichas, Tom Miller, Erlend Moksness, and Ian Perry

Society for Conservation Biology's International Marine Conservation Conference (IMCC) 2009 Washington DC; Bridging the gap between fisheries and marine conservation to advance ecosystem-based management. Organizers: Anne Salomon, Olaf Jensen, Vera Agostini, Sarah Gaichas, and Norm Sloan

AFS 2007 San Francisco; Ecosystem modeling applications in fishery management. Organizers: Sarah Gaichas, John Field, Howard Townsend, Megan Tyrell, and Jason Link

TEACHING AND MENTORING

Graduate-level

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

Undergraduate-level

IN FISH program 2021 Internship mentor: diet data analysis and development of ecosystem indicators

Shoals Marine Lab summer course and lab guest lecturer 2021, 2019

WPI REU program (twice), organized lab visits and provided guidance, background, and data for student projects

Invited course and lab guest lecturer for Rutgers 2020 summer course (postponed due to COVID)

- 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.
- 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.

Agency Service

COMMITTEES

National Management Strategy Evaluation Working Group co-Chair (2016-present)

National EBFM workshop participant, July 2020 * Contributed NEFSC info to ESR presentation * Represented NEFSC in ESR and other discussions

IMR/NOAA bilateral meetings 2019, 2017

Regional IEA Working Group

OTHER

Other relevant information

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

Vera Agostini FAO Deputy Director Fisheries and Aquaculture Policy and Resources Division Food and Agriculture Organization of the United Nations Viale delle Terme di Caracalla 00153 Rome, Italy. Vera.Agostini@fao.org P. +39 06570 50183 ; F. +39 06570 53020 Skype vera.agostini

Jane DiCosimo Retired, formerly 13411 Norden Dr, Silver Spring, MD 20906 Or if it would help more 34198 Eaglet Way Soldotna AK 99669

Daniel Howell Institute of Marine Research P.O. Box 1870 Nordnes NO-5817 Bergen, Norway daniel.howell@hi.no +47 92063885

Jason Link