

Curriculum Vitae

Daniel S. Holland

Northwest Fishery Science Center
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Education:

1998, Ph.D., Environmental and Natural Resource Economics, University of Rhode Island
Dissertation: The Use of Year-round Closed Areas for the Management of New England Trawl Fisheries
Committee: Jon Sutinen, Jim Anderson, Jeremy Collie, Cathy Roheim and Richard Pollnac

1993, M.S., Agricultural Economics, University of Illinois
Thesis: Marine Reserves for Fisheries Management
Committee: Richard Brazee, John Braden and Bruce Hannon

1988, B.A., Economics, University of Utah

Professional History:

Current *Supervisory Economist: Northwest Fishery Science Center, NOAA Fisheries*
Adjunct Professor: University of Maine School of Marine Science
Affiliate Professor: University of Washington, School of Aquatic & Fishery Sciences
Affiliate Professor: Oregon State University, Department of Applied Economics

Manage Human Dimensions Team at NWFSC. Lead or manage research projects on a variety of marine resource management topics including fishery management strategy evaluation, quota markets, fishery diversification and bycatch management. Contract for and manage external research projects. Develop research partnerships with academic researchers and seek internal and external funding. Advise fishery managers and stakeholders on fishery management design and implementation issues. Advise graduate students and postdoctoral researchers.

2005-2010 *Research Scientist: Gulf of Maine Research Institute*
Adjunct Professor: University of Maine School of Marine Science
Adjunct Professor: University of Rhode Island

Lead investigator on over \$2 million in grants and contracts for research on New England fisheries including a grant for \$1.5 million from National Science foundation Couple Natural Human System program which brought together nine investigators from four institutions. Served on the groundfish plan development team and played key role in design of New England's sector management system. Founded an ongoing extension program that provides assistance to fishermen's groups in implementing and running sectors.

2003-2005 *Senior Economist: New Zealand Seafood Industry Council, Wellington, New Zealand*
Adjunct Professor: University of Rhode Island

Developed and communicated industry positions on various aspects of New Zealand's quota management system. Managed high level joint-industry working groups dealing with cost recovery and the deemed value system. Acquired funding for and carried out

research on fishery management issues of key interest to industry stakeholders including habitat management, operation of the deemed value system, introduction of new species into the quota management system, and implementation of management procedures in the largest lobster fishery.

*2000-2002 Assistant Professor: School for Marine Science and Technology (SMAST), University of Massachusetts Dartmouth. New Bedford, MA.
Adjunct Professor: University of Rhode Island*

Developed and taught new courses in fishery management and marine resource economics as a founding faculty member in the Intercampus Graduate School of Marine Science and Technology at the University of Massachusetts. Helped develop curriculum and the admissions process for the new degree program. Carried out and published independent research on fishery management.

1998-2000: Industry Economist: Alaska Fisheries Science Center, NMFS, Seattle, WA.

Co-led a project to acquire economic data from participants in federally managed groundfish fisheries off Alaska. Carried out and published research on management of Alaskan fisheries and on measurement and management of fishing capacity.

1994-1998: Graduate Research Assistant: Univ. of Rhode Island, Kingston, RI.

Carried out quantitative analysis and co-authored reports and papers on a wide variety of research projects, including stated preference surveys on seafood consumption and on placement of landfills. Helped research and draft an OECD report evaluating fishery management approaches in OECD fisheries. Wrote a successful Sea Grant proposal and carried out research for dissertation on closed area management in the New England groundfish fishery.

1994-1998: Fisheries Consultant: MARSEA Assoc., J.L. Anderson & Assoc., Kingston, RI.

Conducted research and helped draft reports on a variety of consulting projects for clients that included the World Wildlife Fund (evaluation of capacity reduction program), Environmental Defense (evaluation of New England groundfish management proposals) and Exxon (price effects of Valdez oil spill on Alaskan fisheries).

1993-1994 Environmental Policy Analyst: Plexus Engineering, Alexandria, VA.

Conducted research to support company principals in expert witness work related to PCB contamination and remediation for large industrial clients. Assisted with environmental audits at manufacturing facilities with PCB compliance issues.

1991-1993 Graduate Research Assistant: University of Illinois, Urbana, IL.

Carried out research, in support of department faculty, on management of fisheries in developing countries, on conservation of biodiversity, and on solid waste management.

1988-1990 Agricultural Education Program Coordinator: Peace Corps, Lome, Togo.

Coordinated national agricultural education program for the Togolese middle school system. Organized and facilitated in-service training for agriculture teachers. Coordinated activities of five other Peace Corps volunteers acting as regional teacher trainers. Trained new group of agriculture teacher trainers for program.

Research Interests:

- Ecosystem-Based Fishery Management
- Management and Governance of Common Pool Resources
- Spatial Management of Marine Resources
- Catch Share System Design
- Quota Markets
- Risk Management and Insurance
- Bioeconomic Modeling
- Managing Environmental Impacts of Fishing
- Behavioral Modeling

Recent and Ongoing Professional Activities and Service:

International Institute for Fisheries Economics and Trade (IIFET)

- President 2014-2016; President Elect 2012-2014
- Board Member 2010-2012
- Scientific Committee 2010 & 2012

North American Association of Fishery Economists (NAAFE)

- Treasurer 2011-2013
- Board Member 2009-2011
- Scientific Committee 2011 & 2013

Marine Resource Economics (Journal)

- Associate Editor 2001-present
- Contributing Editor 1998-2001

Marine Resource Economics Foundation: Vice President

Co-chair National NMFS Working Group on Collection and Use of Data from Catch Share Markets
2013-present

Member: ICES Study Group on Integration of Economics, Stock Assessment and Fisheries Management
2012-present

National Science Foundation large grant review panel 2013

Member: Expert Review Panel of New England Swept Area Seabed Impact (SASI) Model 2011

Member: National Research Council Committee on the Development of an Integrated Science Strategy of
Ocean Acidification Monitoring, Research and Impacts Assessment 2010

New England Fishery Management Council Groundfish Plan Development Team 2000-2003
and 2005-1010

Joint Industry-Government Working Group of Reform of New Zealand Quota Management System
Deemed Value System 2003-2005

Joint Industry-Government Working Group of Reform of New Zealand Quota Management System Cost
Recovery System 2004-2005

Reviewer:

American Journal of Agricultural Economics

Bulletin of Marine Science

Canadian Journal of Agricultural Economics,

Canadian Journal of Fisheries and Aquatic Sciences

Conservation Biology

Ecological Applications
Ecological Economics
Environment and Development Economics
Fish and Fisheries
Fisheries Research
ICES Journal of Marine Science
International Bulletin of Marine Science
Journal of Applied Economics
Journal of Environmental Economics and Management
Journal of Global Environmental Issues
Land Economics
Marine Policy
Marine Resource Economics
Natural Resource Modeling,
Ocean and Coastal Management
Proceedings of the National Academy of Sciences

Awards

Honorable Mention: Outstanding Article Award - *Marine Resource Economics* 2013. Holland, D.S. 2013. Making Cents Out of Barter Data from the British Columbia Groundfish ITQ Market. *Marine Resource Economics* 28(4):311:330.

Best policy paper award, 16th Biennial Conference of the International Institute for Fisheries Economics and Trade, Dar es Salaam, Tanzania July 16-20 2012.

Graduate Fellowship, Department of Environmental and Natural Resource Economics, University of Rhode Island

Graduate Fellowship, Department of Agricultural Economics, University of Illinois

Undergraduate Scholar of the Year 1988, School of Business, University of Utah

Publications

Peer Reviewed Journal (chronologically from most recent):

1. Woods, P.J., D.S. Holland, A.E. Punt 2016. Evaluating the benefits and risks of species-transformation provisions in multispecies IFQ fisheries with joint production. Forthcoming in *ICES Journal of Marine Science*.
2. Holland, D.S. 2016. Development of the Pacific Groundfish Trawl IFQ Market. *Marine Resource Economics*. Forthcoming in *Marine Resource Economics*
3. Holland, D.S. and S. Kasperski 2016. The Impact of Access Restrictions on Fishery Income Diversification of US West Coast Fishermen. Forthcoming in *Coastal Management*.
4. Holland, D.S., P. Pinto da Silva, A.W. Kitts. 2015. Evolution of Social Capital and Economic Performance in New England in Harvest Cooperatives. *Marine Resource Economics* 30(4):371-92.
5. Anderson, J.L., C.M. Anderson, Jingjie Chu, Jennifer Meredith, Frank Asche, Gil Sylvania, Martin D. Smith, Dessy Anggraeni, Robert Arthur, Atle Guttormsen, Max Schmid, Wisdom Akpalu, Finnbogi Alfredsson, Hakan Eggert, Jimely Flores, Matthew A. Freeman, Daniel S. Holland, Gunnar Knapp, Mimi Kobayashi, Sherry Larkin, Kari MacLauchlin, Kurt Schnier, Mark Soboil, Sigbjorn Tveteras, Hirotugu Uchida, Diego Valderrama, Tim Ward. 2015. The Fishery Performance Indicators: A Management Tool for the Triple Bottom Line. *PLOS One*. DOI:10.1371/journal.pone.0122809

6. Holland, D.S., E. Thunberg, J. Agar, S. Crosson, C. Demarest, S. Kasperski, L. Perruso, E. Steiner, J. Stephen, A. Strelcheck, and M. Travis. 2015. US Catch Share Markets: A Review of Data Availability and Impediments to Transparent Markets. *Marine Policy* 57(2015)103–110.
7. Woods, P.J., C. Bouchard, D.S. Holland, A.E. Punt, G. Marteinsdóttir 2015. Catch-quota balancing mechanisms in the Icelandic multi-species demersal fishery: are all species equal? *Marine Policy* 55:1-10.
8. Woods, P.J., D.S. Holland, G. Marteinsdóttir, and A.E. Punt 2015. How a catch-quota balancing system can go wrong: an evaluation of the species quota transformation provisions in the Icelandic multi-species demersal fishery. *ICES Journal of Marine Science*. Doi:10.1093/icesjms/fsv001.
9. Little, A.S., C. L. Needle, R. Hilborn, D.S. Holland, and C.T. Marshall 2015. Real-time spatial management approaches to reduce bycatch and discards: experiences from Europe and the United States. *Fish and Fisheries*. Early View: DOI: 10.1111/faf.12080
10. Ryan, R.W., D.S. Holland and G.E. Herrera 2014. Ecosystem Externalities in Fisheries. *Marine Resource Economics* 29(1):39-53.
11. Lehuta, S. D.S. Holland and A.J. Pershing 2014. Investigating interconnected fisheries: A coupled model of the lobster and herring fisheries in the Northeast US. *Canadian Journal of Fisheries and Aquatic Sciences* 71(2):272-289. dx.doi.org/10.1139/cjfas-2013-0185
12. Holland, D.S. 2013. Making Cents Out of Barter Data from the British Columbia Groundfish ITQ Market. *Marine Resource Economics* 28(4):311-30.
13. Ono, K. D.S. Holland and R. Hilborn 2013. How does species association affect mixed stock fisheries management? A comparative analysis of the effect of marine protected areas, discard bans, or individual fishing quotas. *Canadian Journal of Fisheries and Aquatic Sciences* 70(12): 1792-1804, 10.1139/cjfas-2013-0046.
14. K. Mills, Pershing, A.J., C. Brown, Y. Chen, F. Chiang, D.S. Holland, S. Lehuta, J. Nye, J.C. Sun, A. Thomas, and R. Wahle 2013. Fisheries management in a changing climate: lessons from the 2012 ocean heat wave in the Northwest Atlantic. *Oceanography* 26(2):191-5. <http://dx.doi.org/10.5670/oceanog.2013.27>.
15. Kaplan, I.C., D.S. Holland and E.A. Fulton 2013. Finding the gas pedal and brake in an individual quota fishery: Linking ecology, economics, and fleet dynamics to evaluate alternative management strategies for US West Coast trawl fisheries. *ICES Journal of Marine Science* 70(6), doi 10.1093/icesjms/fst114.
16. Jannot, J.E. and D.S. Holland 2013. Identifying ecological and fishing drivers of bycatch in a U.S. groundfish fishery. *Ecological Applications* 23(7):1645-58.
17. Kasperski, S. and D.S. Holland 2013. Income Diversification and Risk for Fishermen. *Proceedings of the National Academy of Science*. 100(6):2076-2081. doi: 10.1073/pnas.1212278110
18. Holland, D.S., A. Kitts, P. Pinto da Silva, J. Wiersma 2013. Capital and the Success of Harvest Cooperatives in the New England Groundfish Fishery. *Marine Resource Economics* 28(2):133-153.
19. Holland, D.S. and J.E. Jannot 2012. Bycatch Risk Pools for the US West Coast Groundfish Fishery. *Ecological Economics* 78:132-47.
20. Holland, D.S. and G.E. Herrera 2012. The Impact of Age, Structure, Uncertainty, and Asymmetric Spatial Dynamics on Regulatory Performance in Fishery Metapopulation. *Ecological Economics* 77:207-18.

21. Holland, D.S. 2011. Optimal Intra-annual Exploitation of the Maine Lobster Fishery. *Land Economics*, 87(4):699-711.
22. Holland, D.S. 2011. Planning for Changing Productivity and Catchability in the Maine Lobster Fishery. *Fisheries Research*, 110(1):47-58.
23. McConnell, W. J., J. D. Millington, N. J. Reo, L. A. Baker, N. Brozovic, L. E. Drinkwater, S. A. Drzyzga, J. Fragoso, D. S. Holland, T. A. Kohler, H. D. Maschner, M. Monticino, G. Podesta, R. G. Pontius, Jr., C. L. Redman, D. Sailor, G. Urquhart, J. Liu. 2011. Research on Coupled Human and Natural Systems (CHANS): Approach, Challenges and Strategies. *Bulletin of the Ecological Society of America* 92(2):218-228.
24. Holland, D.S. 2010. Markets, Pooling and Insurance for Managing Bycatch in Fisheries. *Ecological Economics*. 70(1):121-133.
25. Ryan, R.W., D.S. Holland, and G. Herrera 2010. Bioeconomic Equilibrium in a Bait-Constrained Fishery. *Marine Resource Economics*. 25(3):281-294.
26. Holland, D.S. and G.E. Herrera 2010. The Benefits and Risks of Increased Spatial Resolution in Management of Fishery Metapopulations Under Uncertainty. *Natural Resource Modeling* 23(4):494-520.
27. Pascoe, S., J. Innes, D. Holland, M. Fina, O. Thébaud, R. Townsend, J. Sanchirico, R. Arnason, C. Wilcox and T. Hutton 2010. Use of incentive based management systems to limit bycatch and discarding. *International Review of Environmental and Resource Economics*. Vol. 4:No 2, pp 123-161. <http://dx.doi.org/10.1561/101.00000032>
28. Jui-Han Chang, J., Y. Chen, D. Holland and J. Grabowski 2010. Estimating season-, size-, and sex-specific spatial distribution of American lobster (*Homarus americanus*) using habitat variables. *Marine Ecology Progress Series*. Forthcoming doi: 10.3354/meps08849
29. Holland, D.S. and J. Wiersma. 2010. Free form property rights for fisheries: The decentralized design of rights-based management through groundfish “sectors” in New England. *Marine Policy* 34(5):1076–1081.
30. Johnston, R.J., D.S. Holland and S. Tuler 2010. New England Fishing Communities: Prospects and Uncertainties. *Communities and Banking* 21(2):3-5.
31. Holland, D.S. and G.E. Herrera 2009. Uncertainty in the Management of Fisheries: Contradictory Implications and a New Approach. *Marine Resource Economics* 24(3): 24(3):289-299.
32. Holland, D.S. 2008. Are fishermen rational: a fishing expedition. *Marine Resource Economics* 23(3): 23(3):323-344.
33. Holland, D.S. 2008. An Economist’s Perspective on Cod: The Ecological History of the North Atlantic Fisheries. *International Journal of Maritime History*. June 2008.
34. Johnston, R. J., D.S. Holland, V. Maharaj, T. Warner Campson 2007. Fish harvest tags: An alternative management approach for recreational fisheries in the US Gulf of Mexico. *Marine Policy* 31(4):505-516.
35. Holland, D.S. 2007. Managing Environmental Impacts of Fishing: Input Controls versus Outcome Oriented Approaches. *International Journal of Global Environmental Issues* 7(2,3):255-272.
36. Hilborn, R, J. Annala and D.S. Holland 2006. The cost of overfishing and management strategies for new fisheries on slow-growing fish: orange roughy (*Hoplostethus atlanticus*) in New Zealand. *Canadian Journal of Fisheries and Aquatic Sciences*. 63:2149-2153.

37. Holland, D.S. and G.E. Herrera 2006. Flexible catch-balancing policies for multispecies individual fishery quotas. *Canadian Journal of Fisheries and Aquatic Sciences* 63(8):1669-1684.
38. Anderson, C.M. and D.S. Holland 2006. Auctions for initial sale of annual catch entitlement. *Land Economics* 82(3):333-352.
39. Sanchirico, J., D.S. Holland, K. Quigley and M. Fina 2006. Catch-Quota Balancing in Multispecies Individual Fishing Quotas. *Marine Policy* 30(6):767-785.
40. Holland, D.S. and K.E. Schnier 2006. Protecting Marine Biodiversity: A Comparison of Individual Habitat Quotas (IHQs) and Marine Protected Areas. *Canadian Journal of Fisheries and Aquatic Sciences*. 63(7):1481-1495.
41. Holland, D.S. and K.E. Schnier 2006. Modeling a Rights-Based Approach to Management of Habitat Impacts of Fisheries. *Natural Resource Modeling*. 19(3):405-435.
42. Holland, D.S. and K.E. Schnier 2006. Individual Habitat Quotas for Fisheries. *Journal of Environmental Economics and Management*. 51:72-92.
43. Holland, D.S. and K. Stokes 2006. Comment: Fishing and the impact of marine reserves in a variable environment. *Canadian Journal of Fisheries and Aquatic Sciences* 63(5):1183-1185.
44. Stokes, K., N. Gibbs and D.S. Holland 2006. New Zealand's cost recovery regime for fisheries research services: an industry perspective. *Bulletin of Marine Science* 78(3):467-485.
45. Holland, D.S., N. Bentley and P. Lallemand 2005. A Bioeconomic Analysis of Management Strategies for Rebuilding and Maintenance of the NSS Rock Lobster Stock in Southern New Zealand. *Canadian Journal of Fisheries and Aquatic Sciences*. 62(7):1553-1569.
46. Holland, D.S. 2004. Spatial Fishery Rights and Marine Zoning: A Discussion with Reference to Management of Marine Resources in New England. *Marine Resource Economics*. 19(1):21-40.
47. Holland, D.S., J.N. Sanchirico, R.E. Curtis and R.L. Hicks. 2004. An introduction to spatial modeling in fisheries economics. *Marine Resource Economics*. 19(1):1-6.
48. Holland, D.S. 2003. Integrating Spatial Management Measures into Traditional Fishery Management Systems: The Case of the Georges Bank Multispecies Fishery. *ICES Journal of Marine Science* 60:915-929.
49. Holland, D.S. and J.J. Maguire. 2003. Optimal Effort Controls for the Multispecies Groundfish Complex in New England. *Canadian Journal of Fisheries and Aquatic Sciences*, 62(2):159-170.
50. Holland, D.S. 2002. Integrating Marine Protected Areas into Dynamic Spatial Models of Fish and Fishermen. *Natural Resource Modeling*. 15(3) Fall.
51. Holland, D.S. and S.T. Lee. 2002. Impacts of noise and specification on estimates of capacity derived from data envelopment analysis. *European Journal of Operations Research* 137(1):10-21.
52. Holland, D.S. and J.J.C. Ginter. 2001. Common Property Institutions in the Alaskan Groundfish Fisheries. *Marine Policy* 25:33-42.
53. Holland, D.S. 2000. A bioeconomic model of marine sanctuaries on Georges Bank. *Canadian Journal of Fisheries and Aquatic Sciences* 57:1307-1319
54. Holland, D.S. and J.G. Sutinen. 2000. Location Choice in New England Trawl Fisheries: Old Habits Die Hard. *Land Economics* 76(1):133-149.
55. Holland, D.S. 2000. Fencing the Fisheries Commons: Regulatory Barbed Wire in the Alaskan Groundfish Fisheries. *Marine Resource Economics*. 15(2):141-149.

56. Holland, D.S. and J.G. Sutinen 1999. An Empirical Model of Fleet Dynamics in New England Trawl Fisheries. *Canadian Journal of Fisheries and Aquatic Sciences* 56:253-264.
57. Holland, D.S, E. Gudmundsson and J. Gates, 1999. Do fishing vessel buyback programs work: A survey of the evidence. *Marine Policy* 23(1):47-69.
58. Holland, D.S. 1999. On Direct and Indirect Management of Fishing Capacity. *Marine Resource Economics* 14(3):263-267.
59. Holland, D.S and C.R. Wessells, 1998. Predicting Consumer Preferences for Fresh Salmon: The Influence of Safety and Production Method Attributes? *Agricultural and Resource Economics Review* 27(1):1-14.
60. Wessells, C.R. and D.S. Holland, 1998. Predicting Consumer Choices for Farmed and Wild Salmon. *Aquaculture Economics & Management* 2:49-59.
61. Holland, D.S and R. Brazee 1996. Marine Reserves for Fisheries Management. *Marine Resource Economics* 11(3):157-171

Publications in Review or Preparation

Steiner, E. and D.S. Holland. The Dynamic Role of Sablefish in a Multispecies, Multigear IFQ Fishery. *Ecological Economics* (in review).

Books

Holland, D.S., J. Sanchirico, R.J. Johnston and D. Joglekar. 2009. *Economic Analysis for Ecosystem Based Management: Applications to Marine and Coastal Environments*. Washington, DC: RFF Press.

National Research Council 2010. *Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean*. National Academies Press, Washington D.C.

Book Chapters and other Non-Journal Publications

1. Holland, D.S. and K. Norman. 2015. The Anatomy of a Multispecies Individual Fishing Quota (IFQ) “Market” in Development. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-F/SPO-158.
2. Holland, D., E. Thunberg, J. Agar, S. Crosson, C. Demarest, S. Kasperski, L. Perruso, E. Steiner, J. Stephen, A. Strelcheck, and M. Travis. 2014. U.S. Catch Share Markets: A Review of Characteristics and Data Availability. U.S. Dept. of Commer., NOAA Technical Memorandum NMFS-F/SPO-145, 67 p.
3. Johnston, R.J., J. Sanchirico, and D.S. Holland. 2014. Measuring Social Value and Human Well-Being. in Bowen, R.E., M.H. Depledge, C.P. Carlane and L.E. Fleming (eds.) *Oceans and Human Health: Implications for Society and Well-Being*. pp 113-140. John Wiley & Sons, Ltd., New York.
4. Holland, Daniel S. 2014 (in press). Structuring Rights and Privileges in Catch Share Systems. Handbook on the Economics of Natural Resources. D. Layton and R. Halvorsen (eds.). Edward Elgar Publishing.
5. Gray, I.A., I.C. Kaplan, I.G. Taylor, D.S. Holland, and J. Leonard 2012. Biological and Economic Effects of Catch Changes Due to the Pacific Coast Groundfish Trawl Rationalization. In 2012 NOAA California Current Integrated Ecosystem Assessment, P.S. Levin and B. Wells, eds.
6. Abbott, J.K. and Holland, D.S. 2013. Protecting Marine Ecosystems in Fishery Regulation. *Encyclopedia of Energy, Natural Resources and Environmental Economics* 2:206-214. Elsevier, London, UK. <http://dx.doi.org/10.1016/B978-0-12-375067-9.00049-8>

7. Guerry, A.D., Plummer, M., Ruckelshaus and D.S. Holland 2013. Modeling Marine Ecosystem Services. *Encyclopedia of Biodiversity 2nd Edition, Volume 5*. Academic Press, Waltham, MA.
8. Holland, D.S., Pinto da Silva P., Wiersma J. 2010. A survey of social capital and attitudes toward management in the New England groundfish fishery. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 10-12; 13 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at <http://www.nefsc.noaa.gov/nefsc/publications/>
9. Holland, D.S. 2010. Management Strategy Evaluation and Management Procedures: Tools for Rebuilding and Sustaining Fisheries, *OECD Food, Agriculture and Fisheries Working Papers*, No. 25, OECD, Paris, France. Dx.doi.org/10.1787/978926075429-6-en
10. Holland, D.S. 2010. Economic Considerations and Methods for Evaluating Fishery Rebuilding Strategies. In OECD, *The Economics of Rebuilding Fisheries: Workshop Proceedings*, OECD Publishing, Paris, France.
11. Holland, D.S. 2008. Governance of Fisheries in the US. In Grafton, R.Q., R. Hilborn, D. Squires, M. Tait, and M. Williams (eds.) *Handbook of Marine Fisheries Conservation and Management*. Oxford University Press, Oxford, UK.
12. Johnston, R. J., D.S. Holland, V. Maharaj and T.W. Campson 2008. Fish Harvest Tags: An Attenuated Rights Based Management Approach For Recreational Fisheries. in Leal, D.R. and V. Maharaj. *Evolving Approaches to Managing Marine Recreational Fisheries*. Rowman & Littlefield Press.
13. Holland, D.S. 2005. Economic Analysis of Protection of Essential Fish Habitat in Alaskan Fisheries: An Analysis of Research Needs. NOAA Technical Memorandum NMFS-AFSC-154. August.

Selected Invited Paper and Keynotes:

- Holland, D.S. and J. Jannot 2011. Bycatch Risk Pools for the West Coast Groundfish Fishery. PERC Workshop: Lessons Learned in Rights-Based Fisheries Management. Bozeman, MT July 26-29, 2011.
- Holland, D.S. and J. Wiersma 2009. Free Form Property Rights for Fisheries: The Decentralized Design of Rights-Based Management Through Groundfish “Sectors” in New England. PERC Workshop: Innovations in Property Rights for Fisheries Management, UC Santa Barbara, Oct. 19-21, 2009.
- Holland, D.S. 2009. Economic Considerations and Methods for Evaluating Fishery Rebuilding Strategies. Invited Paper. OECD Workshop on the Economics of Rebuilding Fisheries. Newport, RI May 21-22, 2009.
- New York Times Institute on the Environment, Punta Cana, Dominican Republic, March 30-April 4, 2008. An Economic Perspective on Fisheries and Oceans.
- Johnston, R. J., D.S. Holland, V. Maharaj and T.W. Campson 2008. Fish Harvest Tags: An Attenuated Rights Based Management Approach For Recreational Fisheries. PERC Workshop on Evolving Approaches to Managing Marine Recreational Fisheries. Big Sky, MT October 5-8, 2006.
- Holland, D.S. 2001. Are Marine Reserves Part of an Optimal Fishery Management System: The Case of the Georges Bank Groundfish Fishery. Invited Paper. Marine Protected Areas: Design and Implementation for Conservation and Fisheries Restoration. Woods Hole Oceanographic Institute, August 27-29, 2001.
- Holland, D.S. 2000. Integrating Marine Protected Areas into Dynamic Spatial Models of Fish and Fishermen. Invited key note presentation. International Conference on the Economics of Marine Protected Areas. University of British Columbia, Vancouver, Canada, July 6-7, 2000.

Holland, D.S. 2000. Incorporating Spatial Dynamics of Fish and Fishermen in Models of Marine Exclusion Zones. Invited key note presentation. Marine Exclusion Zones in Europe: A Facilitated, Multidisciplinary Conference With Research Funding in Mind. Southampton, UK, April 26-28, 2000.

Gates, J., D.S. Holland and E. Gudmundsson 1997. Theory and Practice of Fishing Vessel Buyback Programs. Invited Paper. UNEP/WWF Natural Resource Management Workshop on the Role of Trade Policies in the Fishing Sector, Geneva, Switzerland, June 2-3, 1997.

Conference Papers and Presentations:

8th Biennial Conference of the North American Association of Fishery Economists. Ketchikan, AK May 2015

- The Impact of Catch Shares on Fishing Income Diversification and Fleet Diversity
- The Anatomy of a Multispecies Individual Fishing Quota (IFQ) “Market” in Development.
- Varying Profitability across Gear Types in a Multi-Gear, Multispecies IFQ Fishery (presented by Erin Steiner).

Mark L. Plummer Memorial Symposium, Seattle, WA June 3, 2015.4.

- Fishery Diversification Along the US Pacific Coast.

ICES Annual Science Conference, Copenhagen, Denmark Sept. 21-25, 2015.

- Can species transformation provisions help multi-species fisheries management systems adapt to an uncertain future? (presented by Pamela Woods)
- Evaluation of Integrated Ecological-Economic Models – Review and Challenges for Implementation (presented by Rasmus Nielsen)

17th Biennial Conference of the International Institute for Fisheries Economics and Trade, Brisbane, Australia July 2014.

- The Dynamic Role of Sablefish in a Multispecies, Multigear IFQ Fishery

88th Annual Conference of the Western Economic Association International. Seattle, WA 2013

- Location Choice and Bycatch Avoidance in the Pacific Groundfish Trawl Fishery Under ITQs
- Making Cents Out of Barter Data from the British Columbia Groundfish ITQ Market
- Can Species Diversity Improve the Resiliency of Fishing Communities?

7th Biennial Conference of the North American Association of Fishery Economists. St. Petersburg, FL, 2013

- Making Cents Out of Barter Data from the British Columbia Groundfish ITQ Market
- Network Analysis of the Quota Pounds Market for the Pacific Groundfish ITQ
- Co-organizer of Special Session on Quota Markets in US Catch Share Systems
- Catch-quota balancing regulations in the Icelandic multi-species demersal fishery: are they useful for advancing the ecosystem approach to fisheries?

2012 West Coast Fisheries Forum. Monterey, CA, Sept. 2012:

- Managing Constraining Species in Multispecies Fisheries

16th Biennial Conference of the International Institute for Fisheries Economics and Trade, Dar es Salaam, Tanzania July 2012.

- Bycatch Risk Pools for the West Coast Groundfish Fishery
- Fishery Income Diversification and Risk for West Coast Fishermen and Fishing Communities
- A coupled model of the Gulf of Maine lobster, herring and groundfish fisheries

141st Annual Meeting of the North American Fisheries Society, Seattle, WA, Sept. 2011.

- Jointly Modeling Fish and Fishing in the Maine Lobster Fishery
- Bycatch Risk Pools for the West Coast Groundfish Fishery

6th Biennial Conference of the North American Association of Fishery Economists. Honolulu, HI , May, 2011

- An Introduction to Modeling Participation and Location Choice Decisions in Fisheries
- Management of Fishery Metapopulations Under Uncertainty: The Role of Age Structure and Asymmetry in Migration

Pacific Catch Share Workshop, Honolulu, HI May 2010.

- Assigning Rights and Responsibilities in Fishery Catch Share Systems: Individual Quotas vs. Harvest Cooperatives

15th Biennial Conference of the International Institute for Fisheries Economics and Trade, Montpellier, France, July 2010.

- Markets, Pooling and Insurance for Managing Bycatch in Fisheries
- Optimizing Intra-annual Harvest in the Maine Lobster Fishery
- Management Strategy Evaluation and Management Procedures: Tools for Rebuilding and Sustaining Fisheries

5th Biennial Conference of the North American Association of Fishery Economists. Newport, RI, May, 2009

- The Benefits and Risks of Increased Spatial Resolution in Management of Fishery Metapopulations Under Uncertainty
- Economic Considerations and Methods for Evaluating Fishery Rebuilding Strategies.

US-International Association of Landscape Ecologists Symposium. Snowbird, Utah, April 12-16, 2009.

- Managing Coupled Fishery Systems: The Case of a Bait-Dependent Fishery

14th Conference of the International Institute for Fisheries Economics and Trade, Nha Trang, Vietnam, July 2008.

- Dealing with Uncertainty in Management of Fisheries: Contradictory Advice and a New Approach
- Linking ecology, economics, and fleet dynamics to evaluate alternative management strategies for US West Coast trawl fisheries

4th Biennial Conference of the North American Association of Fishery Economists. Merida, Mexico March, 2007.

- Are Fishermen Rational? A Fishing Expedition

ICES Symposium: Fishing Technology in the 21st Century: Integrating Fishing and Ecosystem Conservation. Boston, MA, Nov. 2006

- Managing Environmental Impacts of Fishing: Input Controls vs. Outcome Oriented Approaches

13th Conference of the International Institute for Fisheries Economics and Trade, Portsmouth, UK, July 2006.

- Balancing Efficiency and Risk with Flexible Catch Balancing Policies for Multispecies ITQ Fisheries

3rd World Congress of Environmental and Resource Economists. Kyoto, Japan July 2006.

- Balancing Efficiency and Risk with Flexible Catch Balancing Policies for Multispecies ITQ Fisheries

3rd Biennial Conference of the North American Association of Fishery Economists. Vancouver, Canada May, 2005.

- Protecting Marine Biodiversity with Individual Habitat Quotas

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5th William R. and Lenore Mote International Symposium. Sarasota, Florida, November 2004.

- Protecting marine biodiversity: a comparison of individual habitat quotas and marine protected areas.
- Incentives in research planning and procurement: an industry perspective on New Zealand's cost recovery regime

12th Biennial Conference of the International Institute for Fisheries Economics and Trade, Tokyo, Japan, July 2004.

- Individual Habitat Quotas for Fisheries
- Auctions for Initial Sale of Annual Catch Entitlement

12th Conference of Annual Conference of the New Zealand Association of Economists, Wellington, New Zealand. June 2004.

- A Laboratory Assessment of Sealed-bid Auction Mechanisms for Initial Sale of Annual Catch Entitlements

11th Biennial Conference of the International Institute for Fisheries Economics and Trade, Wellington, New Zealand, July 2002.

- Optimal Effort Controls for the Multispecies Groundfish Complex in New England

1st Biennial Conference of the North American Association of Fishery Economists. New Orleans, LA April 1-4, 2001.

- A Retrospective Look at the Feasibility of Predicting Response of Fishermen to Regulatory Change in the New England Groundfish Fishery

2nd World Congress of Environmental and Resource Economists. Monterey, CA June 24-27 2002

- Balancing Biological and Financial Risks for the New England Groundfish Complex

2001 ICES Annual Science Conference, September, 2001.

- Integrating Spatial Controls into Fishery Management Systems: The Case for the Georges Bank Multispecies Groundfish Fishery

10th Conference of the International Institute for Fisheries Economics and Trade, Corvallis, Oregon, July 2000.

- The Impact of Noisy Catch Data on Estimates of Efficient Output Derived From DEA and Stochastic Frontier Models: A Monte Carlo Comparison

8th Biennial Conference of the International Association for the Study of Common Property (IASCP).
Bloomington, IN 2000.

- Common Property Institutions in the Alaskan Groundfish Fisheries

17th Lowell Wakefield Symposium. Spatial Processes and Management of Fish Populations. Anchorage,
Alaska, October 1999.

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8th Biennial Conference of the International Institute for Fisheries Economics and Trade, Marrakech,
Morocco, July 1996.

- Marine Reserves for Fishery Management

World Aquaculture Society annual meetings, Las Vegas, Feb, 1998.

- Predicting Consumer Preferences for Seafood: What's in a Label?

Grants and Research Contracts Awarded:

2013; Pershing, A.J., K. Mills, C. Y. Chen, F. Chiang, T. Farmer, D.S. Holland, J. Nye, J.C. Sun, A. Thomas, and R. Wahle. National Science Foundation, Coastal SEES. Collaborate Research: Resilience and Adaptation of a Coastal Ecological-Economic System in Response to Increasing Temperature. \$372,055 (part of \$1.9 million collaborative proposal).

2012; Holland, D.S., Hicks, R.L. and Schnier, K.E. Risk Aversion and Bycatch Avoidance in the West Coast Groundfish Trawl Fishery. Pacific States Marine Fisher Commission. \$40,000.

2011-2013; Holland, D.S., Anderson, C.M., Uchida, H. An Experimental Evaluation of Individual Quota and Pooling Approaches for Managing Incidental Catch of “Choke Species” in Catch Share Systems. NOAA, NMFS Science and Technology. \$50,100.

2010-2012; Holland, D.S. Saltonstall-Kennedy Grant Program. Understanding Opportunities and Barriers to Increased Profitability for the Gulf of Maine Lobster Industry. \$165,658.

2007-2012; Holland (lead PI), D.S., J. Grabowski, A. Lishness, and G. Sherwood, GMRI, G. Herrera, Bowdoin, A. Pershing, J. Runge, Y. Chen, U. Maine, L. Incze, USM.) National Science Foundation, Dynamics of Couple Natural Human Systems Program (Award #0709527); Collaborative Research: Direct and Indirect coupling of fisheries through economic, regulatory, environmental and ecological linkages \$872,023 (part of \$1.5 million collaborative proposal).

2009-2010; Holland, D.S. (the NMFS collaborators Patricia Pinto da Silva and Andrew Kitts); Understanding Determinants of Success of New England Groundfish Sectors. Cooperative Institute for the North Atlantic Region (CINAR). \$89,015.

2008-2010; Holland, D.S., G. Herrera, Bowdoin College: Maine Sea Grant, “The Benefits and Risks of Increased Spatial Resolution in Management of New England Groundfish Stocks,” \$99,350.

2008-2010; Holland, D.S., T. Lee. NMFS, Northwest Fishery Science Center. “Modeling the British Columbia Groundfish ITQ Market,” \$US40,805.

2007-2010; L Singer and Holland, D.S. The Gordon and Betty Moore Foundation. Technical and Scientific Expertise to Fishing Sectors. \$1,065,058

2007 Holland, D.S., Johnston, R, Sanchirico, J.. Massachusetts Ocean Partnership. “Economic frameworks and data needs to support integrated multiple use ocean management in Massachusetts.” \$59,333.

2006-2007; Holland, D.S. National Marine Fisheries Service, Office of Science and Technology “A Feasibility Study of Community Based Groundfish Sectors,” \$38,000.

2006-2008; T. Lee, D.S. Holland, E.A. Fulton I. Kaplan,; NMFS, Northwest Fishery Science Center; “Linking ecology, economics, and fleet dynamics to evaluate alternative management strategies for US West Coast trawl fisheries” US\$60,500.

2005-2006; Holland, D.S. National Marine Fisheries Service, Office of Science and Technology “New approaches to understanding fishing decisions under uncertainty,” US\$24,865.

2005-2006; Singer, L.T. and Holland, D.S. A Socioeconomic Study of the Gulf of Maine Lobster Industry. National Marine Fisheries Service, Northeast Regional Office, Cooperative Research Partners Program. \$128,492.

2004-2005; Holland, D.S.; New Zealand Ministry of Fisheries; “A Bioeconomic Modeling Analysis of the Economic Efficiency and Biological Risk Associated with Alternative Catch Balancing Regimes for Multispecies Fisheries in the New Zealand QMS,” \$98,000.

2003-2005; Holland, D.S.; NMFS, Alaska Fishery Science Center; “Economics of essential fish habitat,” \$60,000.

2001-2003; Rothschild, B. and D.S. Holland; Massachusetts Office of Business Development through Massachusetts Fisheries Recovery Commission. “Improving assessment and management of the Northeast multispecies fishery,” \$200,000 .

2002-2003; Holland, D.S. NMFS, Office of Statistics and Economics; “Spatial fishery rights and marine zoning,” US\$10,000.

1997; Sutinen, J.G., J. Anderson and D.S. Holland; Rhode Island Sea Grant. “The Use of Closed Areas as a Fisheries Management Tool for the New England Groundfish Fishery: A Bioeconomic Analysis,” \$29,415.

1997; Sutinen, J. and D.S. Holland. Medical Science Foundation. “The Use of Marine Sanctuaries for Fisheries Management and Protection of the Environment: A Bioeconomic Analysis,” \$10,500.

Courses Taught:

Marine Resource Economics: This course was developed for non-economics graduate students in a multidisciplinary marine science program and for upper level undergraduates in economics. Students learn to apply economic reasoning to understand the causes and potential solutions of problems facing policy makers responsible for managing the marine environment. The first half of the course focuses on the theory and practice of managing marine fisheries with particular attention to how fishers respond to the economic incentives created by different methods of regulation. In the second half of the course students learn how economists attempt to determine the value of environmental goods and services, and how incentives can be altered to address problems such as marine pollution, destruction of marine habitat and other threats to marine plant and animal communities. The course was taught at University of Massachusetts, Dartmouth and at Oregon State University.

Aquaculture Economics: This course was developed for non-economics graduate students in an aquaculture M.S. program and for upper level undergraduates in economics. The course introduces basic concepts of production economics and applies them to real-world aquaculture data. Students learn how to use net present value, internal rate of return and break-even analysis to evaluate aquaculture investments. They learn how to account for risk and uncertainty in evaluating project investments. Students learn about seafood and aquaculture markets and how market considerations affect aquaculture investments. Course was taught at University of the Algarve, Portugal.

The Science and Economics of Fisheries Management: This course was developed and taught jointly with a marine biologist. The course was designed for non-economics graduate students in a multidisciplinary marine science program. The course provides a broad overview of the theory, science and methods of fisheries management. The first third of the course covers key aspects of population dynamics, fish biology and stock assessment. In the second part of the course students are introduced to the economic theory that supports the need for and informs the design of regulatory tools for marine fisheries. The last

third of the course surveys a variety of topical fisheries management issues. The course was taught at University of Massachusetts, Dartmouth.

Regulation of Marine Fisheries: This course was developed for 2nd and 3rd year law students. It provides an introduction to regulatory methods for fishery management, the structure of responsibilities of fishery management institutions in the US, and the legal requirements for managing US fisheries. The course was taught at the University of Maine School of Law.

Postdoctoral Advising :

Pamela Woods, Postdoctoral researcher with Nordic Centre for Research on Marine Ecosystems and Resources under Climate Change (NorMER). *Catch-quota balancing regulations in the Icelandic multi-species demersal fishery: are they useful for advancing the ecosystem approach to fisheries?*

Sigrid Lehuta, Postdoctoral researcher at Gulf of Maine Research Institute. *Couple Modeling of Gulf of Maine Lobster and Herring Fisheries.*

Graduate Committee Membership:

Timothy Cline, University of Washington, Ph.D. candidate.

Kotaro Ono, University of Washington, Ph.D. candidate. *Weak stock management.*

Peter Kuriyama, University of Washington, M.S. candidate. *Effects of Pacific Groundfish IFQ on Fish and Fishermen*

Jui-Han Chang, University of Maine, Ph.D. candidate. *Gulf of Maine Lobster Management.*

Dominic Fitzpatrick – University of Maine, M.S. Student. *Coupled Fishery System Modeling*

Richard Ryan (MS awarded University of Rhode Island 2009). *Essays in Fishery Policy.*

Mark Soboil (PhD awarded University of Rhode Island 2005). *Transboundary Impacts of Fishing Activities Along the Continental Shelf.*