

# CURRICULUM VITAE

## Ray William Hilborn

### Date of Birth

December 31, 1947

### Education

B.A. (Biology) Grinnell College, Grinnell, Iowa (1969)

Ph.D. Department of Zoology, University of British Columbia (1974)

### Employment History

1987-present	Professor, School of Aquatic and Fishery Sciences, University of Washington.
1985-1987	Senior Fisheries Scientist, Tuna and Billfish Program, South Pacific Commission, Noumea, New Caledonia
1980-1985	Adjunct Associate Professor, Institute of Animal Resource Ecology, University of British Columbia.
1975-1980	Policy Analyst, Departments of Environment and Fisheries, Government of Canada. Concurrently Honorary Lecturer, Institute of Animal Resource Ecology, University of British Columbia.
1974-1975	Research Scholar. International Institute for Applied Systems Analysis, Laxenburg, Austria.

### Major Professional Activities

2006 – present	Member Board of Reviewing Editors, Science Magazine
2002 - present	Associate Editor, Canadian Journal of Fisheries and Aquatic Sciences
1999-present	Member Editorial Board, Fish and Fisheries.
1993-present	Member Editorial Board, Reviews in Fish Biology and Fisheries
2007-present	Member Senior Advisory Council, Natural Resource Modeling.
2008-present	Member Editorial Board, The Open Fish Science Journal
2003 – 2010	Member Editorial Board, New Zealand Journal of Marine and Freshwater Research
1993-2007	Member Editorial Board, Natural Resource Modeling.
1999-present	Independent Science Advisor, Commission for Conservation of Southern Bluefin Tuna

2002 – 2003	Chair, National Academy of Sciences/National Research Council Committee on Cooperative Research in the National Marine Fisheries Service
2002 - 2004	Member Scientific Advisory Board for Presidents Commission on Ocean Policy
1999-2001	Member Ocean Studies Board, National Research Council
1996-2000	Member International Committee for recovery of the vaquita ( <i>Phocoena sinus</i> )
1997-1998	Member National Academy of Sciences Panel on status of New England groundfish stocks.
1996-1997	Member National Academy of Sciences Panel on Fisheries Stock Assessment Methods

### **Honors and Awards**

2010	Elected Fellow of American Academy of Arts and Sciences
2010	Elected Member of Washington State Academy of Sciences
2009	American Institute of Fisheries Research Biologists Outstanding Achievement Award
2006	Volvo Environmental Prize (shared with Carl Walters and Daniel Pauly)
2005	Elected Fellow of Royal Society of Canada
2005	Recipient of American Fisheries Society 2005 National Award of Excellence
2005	Recipient of Western Division, American Fisheries Society, Award of Excellence
2001-2008	Richard C. and Lois M. Worthington Professor of Fisheries Management
1997	College of Ocean and Fisheries Sciences Distinguished Research Award
1988-1991	H. Mason Keeler Professor of Recreational Fisheries Management.
1985	Stevenson Memorial Lecture, Canadian Conference for Fisheries Research.
1976	Wildlife Society award for best paper in fisheries science. (Adaptive management of renewable resources with C. Walters).
1972-1974	National Research Council Canada. Graduate Fellowship.

### **Books and Monographs**

Grafton, R. Q., Hilborn, R., Squires, D., Tait, M., and Williams, M. (eds.). 2010. Handbook of marine fisheries conservation and management. Oxford University Press, Oxford. p. 770.

- Punt, A. and R. Hilborn. 2002. Bayesian stock assessment methods in fisheries. FAO Computerized Information Series (Fisheries) No. 12. 56 p.
- Hilborn, R. and M. Mangel. 1997. *The Ecological Detective: confronting models with data.* Princeton University Press, Princeton, N.J. 315 pps.
- Punt, A.E. and R. Hilborn. 1996. Biomass dynamics models. FAO Computerized Information Series (Fisheries). No. 10. Rome, FAO. 62p.
- Hilborn, R. and C. J. Walters. 1992. *Quantitative Fisheries Stock Assessment: Choice, Dynamics and Uncertainty.* Chapman and Hall, New York. 570 p. Also available in Russian.
- Bazykin, A., P. Bunnell, W.C. Clark, G.C. Gallopin, J. Gross, R. Hilborn, C.S. Holling, D.D. Jones, R.M. Peterman, J.E. Rabinovich, J.H. Steele, and C.J. Walters. 1978. *Adaptive Environmental Assessment and Management.* John Wiley and Sons, New York. 375 pps.

### **Publications in refereed journals**

- Krkošek, M., and Hilborn, R. 2011. Sea lice (*Lepeophtheirus salmonis*) infestations and the productivity of pink salmon (*Oncorhynchus gorbuscha*) in the Broughton Archipelago, British Columbia, Canada. *Can. J. Fish. Aquat. Sci.* 68: 17-29.
- McGilliard, C. R., Hilborn, R., MacCall, A., Punt, A. E., and Field, J. C. 2011. Can information from marine protected areas be used to inform control-rule based management of small-scale, data-poor stocks? *ICES J. Mar. Sci.* 68: 201-211.
- Hilborn, R., and Cowan, J. H. 2010. Marine stewardship: high bar for seafood. *Nature.* 467: 531-531.
- Metzger, K. L., Sinclair, A. R. E., Hilborn, R., Hopcraft, J. G. C., and Mduma Simon, A. R. 2010. Evaluating the protection of wildlife in parks: the case of African buffalo in Serengeti. *Biodiversity and Conservation.* 19: 3431-3444.
- Dobson, A., Borner, M., Sinclair, A.R.E. 24 others including Hilborn. R. 2010. Road will ruin Serengeti. *Nature* 467: 272-273.
- Courtenay, W. R., Collette, B. B., Essington, T. E., Hilborn, R., Orr, J. W., Pauly, D., Randall, J. E., and Vaniz, W. F. S. 2010. North Atlantic Fisheries: A Response to Criticism of the Proactive Proposal Reply. *Fisheries.* 35: 298-298.
- Harwell, M. A., Gentile, J. H., Cummins, K. W., Highsmith, R. C., Hilborn, R., McRoy, C. P., Parrish, J., and Weingartner, T. 2010. A conceptual model of natural and anthropogenic drivers and their influence on the Prince William Sound, Alaska, ecosystem. *Human and Ecological Risk Assessment.* 16: 672-726.
- Grafton, R. Q., Kompas, T., and Hilborn, R. 2010. Limits to the Privatization of Fishery Resources: Comment. *Land Economics.* 86: 609-613.
- Holdo, R. M., Galvin, K. A., Knapp, E., Polasky, S., Hilborn, R., and Holt, R. D. 2010. Responses to alternative rainfall regimes and antipoaching in a migratory system. *Ecological Applications.* 20: 381-397.

- Westley, P. A. H., Schindler, D. E., Quinn, T. P., Ruggerone, G. T., and Hilborn, R. 2010. Natural habitat change, commercial fishing, climate, and dispersal interact to restructure an Alaskan fish metacommunity. *Oecologia*. 163: 471-484.
- Schindler, D. E., Hilborn, R., Chasco, B., Boatright, C. B., Quinn, T. P., Rogers, L. A., and Webster, M. S. 2010. Population diversity and the portfolio effect in an exploited species. *Nature*. 465: 609-613.
- Branch, T. A., and Hilborn, R. 2010. A general model for reconstructing salmon runs. *Canadian Journal of Fisheries and Aquatic Sciences*. 67: 886-904.
- Cowan, J. H. J., Grimes, C. B., Patterson, W. F. I., Walters, C. J., Jones, A. C., Lindberg, W. J., Sheehy, D. J., Pine, W. E. I., Powers, J. E., Campbell, M. D., Lindeman, K. C., Diamond, S. L., Hilborn, R., Gibson, H. T., and Rose, K. A. 2010. Red snapper management in the Gulf of Mexico: science- or faith-based. *Reviews in Fish Biology and Fisheries*. DOI 10.1007/s11160-010-9165-7.
- Hilborn, R., and Stokes, K. 2010. Defining overfished stocks: have we lost the plot? *Fisheries*. 35: 113-120.
- Goñi, R., Hilborn, R., Díaz, D., Mallol, S., and Adlerstein, S. 2010. Net contribution of spillover from a marine reserve to fishery catches. *Marine Ecology Progress Series*. 400: 233-243.
- Doctor, K. K., Hilborn, R., and T., Q. 2010. Spatial and temporal patterns of upriver migration by sockeye salmon populations in the Wood River system, Bristol Bay, Alaska. *Transactions of the American Fisheries Society*. 139: 80-91.
- Hilborn, R. 2010. Pretty Good Yield and exploited fishes. *Marine Policy*, 34:193-196
- Schroeter SC, Gutiérrez NL, Robinson M, Hilborn R and Halmay P. 2009. Moving from data poor to data rich: a case study of community-based data collection for the San Diego red sea urchin (*Strongylocentrotus franciscanus*) fishery. *Mar. Coast. Fish*. 1:230–243
- Worm, B., Hilborn, R., Baum, J. K., Branch, T. A., Collie, J. S., Costello, C., Fogarty, M. J., Fulton, E. A., Hutchings, J. A., Jennings, S., Jensen, O. P., Lotze, H. K., Mace, P. M., McClanahan, T. R., Minto, C., Palumbi, S. R., Parma, A., Ricard, D., Rosenberg, A. A., Watson, R., and Zeller, D. 2009. Rebuilding Global Fisheries. *Science*. 325: 578-585.
- Grafton, R. Q., Campbell, D., Costello, C., Hilborn, R., and Kompas, T. 2009. Comment on "Abdicating Responsibility: The Deceits of Fisheries Policy". *Fisheries*. 34: 291-294.
- Courtenay, W. R. Jr., Collette, B. B., Essington, T. E., Hilborn, R., Orr, J. W., Pauly, D., Randall, J. E., and Smith-Vaniz, W. F. 2009. Risks of Introductions of Marine Fishes: Reply to Briggs. *Fisheries*. 34: 181-186.
- Honea, J.M., Jorgensen, J.C., McClure, M.M., Cooney, T.D., Engie, K., Holzer, D., and Hilborn, R. 2009 Evaluating habitat effects on population status: influence of habitat restoration on spring-run Chinook salmon. *Freshwater Biology*, 54: 1576-1592
- Hilborn, R., and Litsinger, E. 2009. Cause of Decline and Potential for Recovery of Atlantic Cod Populations. *The Open Fish Science Journal*. 2: 32-38.

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- Branch, T.A. and R. Hilborn. 2008. Matching catches to quotas in a multispecies trawl fishery: targeting and avoidance behavior under individual transferable quotas. *Canadian Journal of Fisheries and Aquatic Sciences* 68: 1435-1446.
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- Martell, S. J. D., Walters, C. J., and Hilborn, R. 2008. Retrospective analysis of harvest management performance for Bristol Bay and Fraser River sockeye salmon (*Oncorhynchus nerka*). *Canadian Journal of Fisheries and Aquatic Sciences*. 65: 409-424.
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- Carlson, S. M., Hilborn, R., Hendry, A. P., and Quinn, T. P. 2007. Predation by Bears Drives Senescence in Natural Populations of Salmon. *PLOS One*. 2: e1286. doi:10.1371/journal.pone.0001286.
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- Hilborn, R. 2007. Reinterpreting the state of fisheries and their management. *Ecosystems*. DOI: 10.1007/s10021-007-9100-5.
- Hilborn, R. 2007. Managing fisheries is managing people: what has been learned? *Fish and Fisheries*. 6: 285-296.
- Magnusson, A., and Hilborn, R. 2007. What makes fisheries data informative? *Fish and Fisheries*. 8: 337-358.
- Metzger, K. L., Sinclair, A. R. E., Campbell, K. L. I., Hilborn, R., Hopcraft, J. G. C., Mduma, S. A. R. & Reich, R. M. 2007. Using historical data to establish baselines for conservation: The black rhinoceros (*Diceros bicornis*) of the Serengeti as a case study. *Biological Conservation*. 139:358-374.
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- Walters, C. J., R. Hilborn, and R. H. Parrish. 2007. An equilibrium model for predicting the efficacy of marine protected areas in coastal environments. *Canadian Journal of Fisheries and Aquatic Sciences* 64:1009-1018.
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- Hilborn, R. 2007. Moving to Sustainability by Learning from Successful Fisheries. *Ambio*. 36: 296-303.
- Hilborn, R. 2007. Biodiversity loss in the oceans: how bad is it? *Science* 316: 1281-1282.
- Sinclair, A. R. E., A. R. Mduma Simon, J. G. C. Hopcraft, J. M. Fryxell, R. Hilborn, and S. Thirgood. 2007. Long-Term ecosystem dynamics in the Serengeti: lessons for conservation. *Conservation Biology* 21:580-590.

- Hilborn, R. 2007. Faith, evolution, and the burden of proof - The author responds. *Fisheries* 32:91-93.
- Hilborn, R., Hopcraft, G., and Arcese, P. 2007. Wildlife population increases in Serengeti National Park - Response. *Science*. 315: 1790-1791.
- Quinn, T.P., Hodgson, S., Flynn, L., Hilborn, R. and Rogers, D.E. 2007. Directional selection by fisheries and the timing of sockeye salmon migrations. *Ecological Applications* 17: 731-739
- Hilborn, R. 2007. Defining success in fisheries and conflicts in objectives. *Marine Policy* 31: 153-158.
- Hilborn, R., Arcese, P., Borner, M., Hando, J., Hopcraft, G., Loibooki, M., Mduma, S., and Sinclair, A. R. E. 2006. Effective enforcement in a conservation area. *Science*. 314: 1266-1266.
- Hilborn, R. 2006. Faith-based fisheries. *Fisheries*. 31: 554-555.
- Hilborn, R. 2006. Salmon-farming impacts on wild salmon. *Proceedings of the National Academy of Sciences*. 103: 15277.
- Hilborn, R., Annala, J., and Holland, D. S. 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.
- Branch, T. A., Hilborn, R., Haynie, A. C., Fay, G., Flynn, L., Griffiths, J., Marshall, K. N., Randall, J. K., Scheuerell, J. M., Ward, E. J., and Young, M. 2006. Fleet dynamics and fishermen behavior: lessons for fisheries managers. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 1647-1668.
- Flynn, L., Punt, A. E., and Hilborn, R. 2006. A hierarchical model for salmon run reconstruction and application to the Bristol Bay sockeye (*Oncorhynchus nerka*) fishery. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 1564-1577.
- Hilborn, R. 2006. Fisheries success and failure: the case of the Bristol Bay salmon fishery. *Bulletin of Marine Science* 78: 487-498.
- Parma, A. M., Hilborn, R., and Orensanz, J. M. 2006. The good, the bad and the ugly: learning from experience to achieve sustainable fisheries. *Bulletin of Marine Science* 78: 411-428.
- Scheuerell, M. D., Hilborn, R., Ruckelshaus, M. H., Bartz, K. K., Langueux, K. M., Haas, A. D., and Rawson, K. 2006. The Shiraz model: a tool for incorporating anthropogenic effects and fish-habitat relationships in conservation planning. *Canadian Journal of Fisheries and Aquatic Sciences* 63: 1596-1607.
- Hobbs, N.T. and R. Hilborn. 2006. Alternatives to statistical hypothesis testing in ecology: a guide to self teaching. *Ecological Applications* 16: 5-19.
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- Branch, T. A., Rutherford, K., and Hilborn, R. 2006. Replacing trip limits with individual transferable quotas: implications for discarding. *Marine Policy*. 30: 281-292.
- Hodgson, S., Quinn, T.P. Hilborn, R., Francis, R.C. and D.E. Rogers. 2006. Marine and freshwater climatic factors affecting interannual variation in the timing of return migration to fresh water of sockeye salmon (*Oncorhynchus nerka*). *Fisheries Oceanography* 14:4 1-24.
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## Major Research Funding

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| 2010-2012 | Funding from Moore Foundation for analysis of portfolio effect and salmon productivity across a range of watersheds 596,876. (D. Schindler lead P.I.) |
| 2010-2012 | NOAA/CAMEO Post doc funding \$166,909   |
| 2009-2011 | Funding from Bristol Bay Regional Seafood development agency for analysis of foregone harvest \$61,485  |
| 2011      | Walton Family Foundation funding for Impacts of Fishing. \$100,000  |
| 2010-2012 | NSF funding \$496,569 for Comparative Analysis of Marine Ecosystems.  |
| 2009-2010 | Funding from Pacific Salmon Commission \$117,757 for evaluation of statistical model of Pacific coast Chinook stocks.                                 |

2008-2011	Funding from Moore Foundation for salmon research. \$3.6 million over 3 years. (with D. Schindler and T. Quinn)
1999-present	Funding from Bristol Bay Salmon Processors for salmon research in Bristol Bay, Alaska. Average \$130k per year.
2005-2007	NOAA funding for development of SHIRAZ model to evaluate habitat impacts on salmon \$200k
2005-2007	Funding from Pew Institute for Ocean Sciences for research on dynamics of small populations. \$250k over 2 years.
2005-2008	Funding from Moore Foundation for salmon research. \$2.3 million over 3 years. (With D. Schindler and T. Quinn)
2002-2006	NOAA funding for graduate student support in marine fish population dynamics \$255,000
2004-2009	NSF funding for “Biocomplexity and fisheries sustainability” \$2.0 Million. I am the lead P.I.
2004-2006	SeaGrant funding for spatial dynamics of geoducks in Puget Sound. With David Armstrong. \$150k over 3 years.
2003-2007	NSF Biocomplexity funding Award 0308440 for study of spatial structure in fish recruitment. Dave Siegel U.C. Santa Barbara lead P.I. my portion \$315,607
1996-present	New Zealand Seafood Industry Council funding of stock assessment in New Zealand Fisheries \$67,000-\$125,000 per year.
2003-2006	NOAA/SeaGrant funding for graduate fellowship for Eric Ward in fisheries stock assessment. \$37k per year for 3 years.
2002	NMFS funding for post-doc on salmon habitat modelling. \$50k
2002-2003	Alaska Department of Fish and Game funding for grad student support on prediction of salmon run timing. \$30k
2002-2004	NMFS Stock Assessment Improvement Program funding for grad student support. \$70k per year
2002-2005	NSF LTREB funding for Alaska Salmon studies. \$35k per year. Jointly with Tom Quinn and Daniel Schindler.
2001-2003	NSF funding for field station infrastructure, \$200k for new laboratory and classroom at Porcupine Island Alaska field station. Tom Quinn lead P.I.
2002-2005	NOAA/SeaGrant funding for graduate fellowship for Melissa Haltuch in fisheries stock assessment. \$37k per year for 3 years.
2001-2003	Institute of Marine Research, Iceland funding for research on Icelandic cod and age structured models \$16k per year.
2001-2004	NOAA/SeaGrant funding for graduate fellowship for Ian Stewart in fisheries stock assessment. \$37k per year for 3 years.

2000-2001	NOAA funding for study of salmon run timing. \$70k.
2000	NMFS funding for Research Faculty position in groundfish assessment. \$120k
1999-present	Funding from Bristol Bay Salmon Processors for salmon research in Bristol Bay, Alaska. Average \$200k per year.
1998-2009	NOAA funding for salmon research at Chignik Lakes, Alaska \$30k per year.
1998-2002	Funding of PNCRS research on salmon survival (Sea Grant and NOAA joint funding) Multi PI program, my portion \$35,000 per year.
1998-present	Chignik Regional Aquaculture Association funding for salmon research at Chignik Lakes, Alaska. \$45k-\$10k per year.
1998-2003	Alaska Department of Fish and Game funding for operation of Pt. Moller test fishery. \$30k per year.
1996-1997	National Marine Fisheries Service funding for analysis of interaction between habitat, ocean conditions and harvest in chinook salmon. \$49,000
1997-1998	Washington Sea Grant: modeling the interaction between habitat, harvest, ocean conditions and hatcheries. \$32,000
1995	Gift of \$100,000 as part of Consent Decree between Reynolds Aluminum and Washington Public Interest Research Group for research on Columbia River Chinook Salmon.
1990-1996	New Zealand Fishing Industry Board. with Prof. Ellen Pikitch "Analysis of New Zealand TAC setting policies." \$100,000-\$150,000 per year.
1993-1995	Washington Sea Grant. "Hatcheries: what works and what doesn't." \$100,800
1993-1994	National Marine Fisheries Service funding for Bayesian risk analysis of Snake River Fall Chinook. \$35,000
1989-1993	Bonneville Power Administration. "Analysis of historical patterns of survival among Columbia River salmonids". \$450,000.
1991-1993	Washington Sea Grant. "Salmon management using coded-wire-tags." \$96,000
1990	International Pacific Halibut Commission. "Analysis of IPHC transboundary tagging experiments, part II." \$54,105. With J.R. Skalski.
1990	Provosts fund for Interdisciplinary research. "In search of sustainable development." \$15,000. With Kai Lee and Gardner Brown.
1988	International Pacific Halibut Commission. "Analysis of IPHC transboundary tagging experiments". \$40,315. With J.R. Skalski.
1988	Bonneville Power Administration. "Flow requirements for the Hanford reach, relative to the number of chinook salmon spawners". \$23,357. With D. E. Rogers.

- 1988 Northwest Indian Fisheries Commission. Statistical procedures for comparing results of coded wire tag releases. \$10,000.
- 1989-1991 Washington Sea Grant. Managing Adaptively: early experience in Western North America. \$144,000. With Kai N. Lee and Janice E. Carpenter.
- 1987-1990 Vice Provost for Computing University of Washington. \$177,731 for microcomputer teaching lab for Colleges of Forest Resources and College of Fisheries and Ocean Sciences. Proposal written by Dr. Gordon Swartzman and myself.
- 1975-1985 National Sciences and Engineering Research Council of Canada operating grants in Population Biology (\$6000-\$12,000 per year).
- 1980-1985 Department of Fisheries and Oceans. Contract support for Cooperative Fisheries Research Unit (\$60,000-\$110,000 per year). With C.J. Walters.
- 1985-1987 3 year Strategic Grant from National Sciences and Engineering Research Council (\$90,000 per year) for "Adaptive management of fisheries resources." With C.J. Walters and D. Ludwig.
- 1978 B.C. Science Council. (\$24,000). Behavior of B.C. purse seine fleet.
- 1978 Canadian National Sportsman's Fund (\$12,000). A study of B.C. salmon purse seine vessels.