

# 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

2001-present	Richard C. and Lois M. Worthington Professor of Fisheries Management
1987-present	Professor, School of Aquatic and Fishery Sciences, University of Washington.
1996-1998	Director, Fisheries Research Institute, 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

2002 - present	Member Editorial Board, Canadian Journal of Fisheries and Aquatic Sciences
2003 – present	Member Editorial Board, New Zealand Journal of Marine and Freshwater Research
1999-present	Member Editorial Board, Fish and Fisheries.
1993-present	Member Editorial Board, Reviews in Fish Biology and Fisheries
1993-present	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.
1997-1999	Member NMFS panel to review fisheries closures to protect Steller's Sea Lions
1996-1997	Member National Academy of Sciences Panel on Fisheries Stock Assessment Methods
1989-1994	American co-chairman: Pacific Salmon Commission working group on mark-recovery statistics.
1988-1990	Editor for Fisheries, Marine Policy Reports.

### **Honors and Awards**

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
2001-2006	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**

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**

- Hobbs, N.T. and R. Hilborn. 2006. Alternatives to statistical hypothesis testing in ecology: a guide to self teaching. *Ecological Applications* 16: 5-19.
- Hilborn, R. Micheli, F. and DeLeo, G. 2006. Integrating Marine Protected Areas with catch regulation. *Canadian Journal of Fisheries and Aquatic Sciences*. 63: 642-649.
- Grafton, R.Q., Arnason, R., Bjørndal, T., Campbell, D., Campbell, H.F., Clark, C.W., Connor, R., Dupont, D.P., Hannesson, R., Hilborn, R., Kirkley, J.E., Kompas, T., Lane, D.E., Munro, G.R., Pascoe, S., Squires, D., Steinshamn, S.I., Turriss, B.R., Weninger, Q. 2006. Incentive-based approaches to sustainable fisheries. *Canadian Journal of Fisheries and Aquatic Sciences*. 63: 699-710.
- 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.
- Hilborn, R., J. K. Parrish, K. Litle 2005. Fishing Rights or Fishing Wrongs? *Reviews in Fish Biology and Fisheries* 15, 191-198.
- Walters, C. J., and Hilborn, R. 2005. Exploratory assessment of historical recruitment patterns using relative abundance and catch data. *Canadian Journal of Fisheries and Aquatic Sciences* 62: 1985-1990.
- de Valpine, P. and R. Hilborn. 2005. State-space likelihoods for nonlinear fisheries time-series. *Canadian Journal of Fisheries and Aquatic Sciences* 62: 1937-1952.
- Hyun, S-Y, Hilborn, R. Anderson J. and Ernst, B. 2005. A statistical model for in-season forecasts of sockeye salmon (*Oncorhynchus nerka*) returns to the Bristol Bay districts of Alaska. *Canadian Journal of Fisheries and Aquatic Sciences* 62: 1665-1680.
- Branch, T. A., Hilborn, R., and Bogazzi, E. 2005. Escaping the tyranny of the grid: a more realistic way of defining fishing opportunities. *Canadian Journal of Fisheries and Aquatic Sciences* 62: 631-642.

- Sharma, R., Cooper, A. and R. Hilborn. 2005. A quantitative framework for the analysis of habitat and hatchery practices on Pacific salmon. *Ecological Modelling*. 183: 231-250.
- Hilborn, R., J. M. Orensanz, and A. M. Parma. 2005. Institutions, incentives and the future of fisheries. *Philosophical Transactions of the Royal Society of London Series B-Biological Sciences*, 360:47-57.
- Hilborn, R. 2005. Fisheries management. *Issues in Science and Technology*, 21:10-11.
- Packer, C., Hilborn, R., Mosser, A., Kissui, B., Borner, M., Hopcraft, G., Wilmshurst, J., Mduma, S. and Sinclair, A R E. 2005. Ecological Change, Group Territoriality, and Population Dynamics in Serengeti Lions. *Science* 307: 390-393
- Valero, J., C. Hand, J.M. Orensanz, A. M. Parma, D.Armstrong, R. Hilborn. 2004. Geoduck (*Panopea abrupta*) recruitment trends in the Pacific northwest: long-term changes in relation to climate. *California Cooperative Oceanic Fisheries Investigations Report* 45: 80-86.
- Boatright, C., T. Quinn, and R. Hilborn. 2004. Timing of adult migration and stock structure for sockeye salmon in Bear Lake, Alaska. *Transactions of the American Fisheries Society*, 133:911-921.
- Orensanz, J. M., C. M. Hand, A. M. Parma, J. Valero, and R. Hilborn. 2004. Precaution in the harvest of Methuselah's clams — the difficulty of getting timely feedback from slowpaced dynamics. *Can. J. Fish. Aquat. Sci.* 61: 1355-1372.
- Hilborn, R., Punt, A.E., Orensanz, J. 2004. Beyond band-aids in fisheries management: fixing world fisheries. *Bulletin of Marine Science* 74(3): 493-507.
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- Hilborn, R. 2004. Ecosystem-based fisheries management: the carrot or the stick? *Marine Ecology-Progress Series*, 274:275-278.
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- Norse, E. A., C. B. Grimes, S. Ralston, R. Hilborn, J. C. Castilla, S. R. Palumbi, D. Fraser, and P. Kareiva. 2003. Marine reserves: the best option for our oceans? *Frontiers in Ecology and Environment*. 1: 495-502.
- Hilborn, R., T.A. Branch, B. Ernst, A Magnusson, C.V. Minte-Vera, M.D. Scheuerell, and J.L. Valero. 2003. State of the world's fisheries. *Annual Review of Environment and Resources* 28: 359-399.

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- Punt, A.E. and R. Hilborn. 1997. Fisheries stock assessment and decision analysis: the Bayesian approach. *Reviews in Fish Biology and Fisheries*. 7: 35-63.
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- Pascual, M. A., and R. Hilborn. 1995. Conservation of harvested populations in fluctuating environments: the case of the Serengeti wildebeest. *Journal of Applied Ecology* 32: 468-480.
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### **National Research Council Reports**

- National Research Council. 2003. Cooperative Research with the National Marine Fisheries Service. NRC Press. 131 pps. Chairman of committee.
- National Research Council. 1998. Improving fish stock assessment. NRC Press. 188 pps. Member of Committee.
- National Research Council. 1998. Review of Northeast fishery stock assessments. NRC press. 136 pps. Member of committee.

### **Book Chapters**

- Hilborn, R. 2005. Are sustainable fisheries achievable? Pps 247-259 in Norse, E.A. and Crowder, L.B. (eds.) *Marine Conservation Biology*. Island Press, 575 p.
- Hilborn, R. 2004. Population management in stock enhancement and sea ranching. In *Stock enhancement and sea ranching: developments, pitfalls and opportunities*. Edited by K. M. Leber, S. Kitada, H. L. Blankenship and T. Svasand. Blackwell, Oxford, U.K. pp. 201-209.
- Anderson, JL, RW Hilborn, RT Lackey, D Ludwig. 2003. Watershed restoration--adaptive decision making in the face of uncertainty. Pages 203-232 in RC Wissmar, PA Bisson (eds), *Strategies for Restoring River Ecosystems: Sources of Variability and Uncertainty in Natural and Managed Systems*. Am. Fish. Soc., Bethesda.

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- Hilborn, Ray. 1998. Challenges and progress in sustainable fisheries .pps 82-88. In The Brundtland Commission's Report – 10 Years. Edited by Guri Bang Sjøfting, George Benneh, Kjetil Hindar, Lars Walløe and Anders Wijkman. Scandinavian University Press, Oslo, Norway. 234 p.
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## Reviews

- Hilborn, R. 2005. Review of "Namibia's fisheries: economic, economic and social aspects". *Fish and Fisheries* 6: 88.
- Hilborn, R. 2003. Review of "Conservation of exploited species." By Reynolds, J.D., G.M. Mace, K.H. Redford and J.G. Robinson. *Conservation Biology* 17: 340-341.
- Hilborn, R. 2000. Review of "Dynamics of pelagic fish distribution and behaviour: effects on fisheries and stock assessment." By P. Freon and O. A. Misund. *Transactions of the American Fisheries Society* 129: 887-887.
- Hilborn, R. 1999. Review of "Stocking and introductions of fish." Edited by I.G. Cowx. *Reviews in Fish Biology and Fisheries* 9: 121-122.

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- Hilborn, R. 1994. Review of "On the Dynamics of Exploited Populations [reprint]" by R.J.H. Beverton and S.J. Holt. *Reviews in Fish Biology and Fisheries* 4: 259-260.
- Hilborn, R. 1992. Review of "Catch effort sampling strategies" edited by I.G. Cowx, in *Reviews in Fish Biology and Fisheries* 2: 273-275.
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- Hilborn, R. 1990. Review of "Salmon production, management and allocation" edited by W. J. McNeil" in *Transactions of the American Fisheries Society*.
- Hilborn, R. 1981. Review of "Management and analysis of biological populations by B. Goh". *Quarterly Review of Biology* 56:357.

### **Papers in Peer Reviewed Conference Proceedings and Peer Reviewed Reports**

- Hilborn, R. 2004. Incentives, the key to solving fisheries problems. Chapter 26 in *World Summit on Salmon*. Edited by P. Gallagher and L. Wood. Simon Fraser University, Burnaby, B.C. Canada.
- Orensanz, J.M., R. Hilborn and A.M. Parma. 2000. Harvesting Methuselah's clams – is the geoduck fishery sustainable, or just apparently so. *Canadian Stock Assessment Secretariat Research Document 2000/175*. ISN 1480-4883. 68 pps.
- Hilborn, R. 1997. The frequency and severity of fish stock declines and increases. Pps 36-38 in Hancock, D.A., Smith, D.C. Grant, A. and J.P. Beumer, eds. *Developing and sustaining world fisheries resources. Proceedings of the 2<sup>nd</sup> World Fisheries Congress*, CSIRO Publishing PO Box 1139 Collingwood, Victoria, Australia.
- Hilborn, R. and R.M. Peterman. 1996. The development of scientific advice with incomplete information in the context of the precautionary approach. Pps 77-101 in *FAO Fisheries Technical Paper. No. 350. Part 2*. Rome, FAO. 210 p.
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- Hilborn, R. 1979. Troubled waters over Pacific Salmon. pps 49-52 in F.J. Convery and B.R. Strain (eds). U.S. dependency on Canadian natural resources: extent and significance. Center for Resource and Environmental Policy Research, Canadian Studies Center, Duke University.

## Popular Articles

- Halmay, P. and R. Hilborn. 2005. Community co-ops: the solution to small-scale U.S. fisheries? National Fisherman. March 2005. p 8.
- Hilborn, R. 2001. Comments on marine reserves. Western Outdoor News, June 29, 2001.
- Hilborn, R. 2000. Why fishermen oppose stock rebuilding plans. National Fisherman May 2000 p 7.
- Hilborn, R. 1999. Statistical issues in ecological risk assessment. Newsletter of the Section on Statistics & the Environment of American Statistical Association. 3 (1): 1/5
- Hilborn, R. 1995. Taking precautions: the implications of the precautionary approach for commercial fisheries. Seafood New Zealand Vol 3 No 11 pps 12-13.
- Hilborn, R. 1995. Fish stock collapses: lessons for New Zealand. Seafood New Zealand:9.
- Hilborn, R. 1995. How many spawners is enough? Seafood New Zealand:16.
- Hilborn, R. 1995. Is it dangerous to harvest spawning fish? Seafood New Zealand:21.
- Hilborn, R. 1993. Controlling Johnny Salmonseed. The Osprey 17: 2/18.
- Hilborn, R. Key to saving B.C. fishery is to reduce the costs of fishing. Vancouver Sun. March 9, 1984.

Hilborn, R. and C.J. Walters. Truth about wolves is lost in the howl. Vancouver Province Sunday Supplement. Jan. 29, 1984.

Hilborn, R. 1973. Climbing in the Adamants. Canadian Alpine Journal 57: 75-77.

## Research Funding

2005-2006	NOAA funding for development of SHIRAZ model to evaluate habitat impacts on salmon \$100k
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.
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-present	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.