

THE UNIVERSITY OF BRITISH COLUMBIA

CURRICULUM VITAE

FACULTY Graduate Studies/Science Date: Apr. 4, 2006

DEPARTMENT OR SCHOOL Fisheries Centre/Zoology _____
(C.J. Walters)

I. BIOGRAPHICAL DATA

Name: WALTERS, Carl John
Present Rank: Professor
Place of Birth: Albuquerque, NM, USA
Date of Birth: September 14, 1944
Citizenship: U.S.

II. EDUCATION

- a) **Undergraduate (where, dates, degree(s) received):**
Bakersfield College, Bakersfield, California 9/61 - 9/63, AA
Humboldt State College, Arcata, California 9/63 - 9/65, BS
- b) **Special Professional (e.g. Internships, Residencies, Specialty Boards):**
National Science Foundation, Graduate Fellow, 1966-1969
- c) **Graduate (where, dates, degree(s) received):**
Colorado State University, Fort Collins, Colorado 9/65 - 8/67, MS
Colorado State University, Fort Collins, Colorado 9/67 - 6/69, Ph.D.
- d) **Titles of theses written for graduate degrees (indicate the degree; name and title of main supervisor for each):**
Ms. - Distribution and production of midges in an alpine lake C.S.U., R.E. Vincent
Ph.D. - Effects of fish introduction on invertebrate fauna of an alpine lake C.S.U., R.E. Vincent
- e) **Academic awards and distinctions (prior to final degree):**
National Science Foundation Graduate Fellow, 1966-1969
American Fisheries Society, Best Student Paper, 1968
Various Scholastic Honors at Bakersfield and Humboldt State Colleges
Student Body vice-president, Bakersfield College, 1962

III. PROFESSIONAL EMPLOYMENT RECORD

- a) **Teaching, professional or research positions held prior to U.B.C. appointment (indicate rank or title, dates and name of institution for each position held):**
Seasonal Aide, June - Sept. 1963 and 1964, California Dept. of Fish & Game, Bishop, California.
Student Assistant, Sept. 1964 - June 1965, Humboldt State College, Arcata, California
4th yr. Fisheries Biology, Humboldt State, 1964-5 (labs, 1/2 lectures)
Temporary Aide, Jan. 1966 - Sept. 1967, Colorado Game, Fish & Parks Department, Fort Collins, Colorado
Graduate Fellow, Sept. 1967 - June 1969, Colorado State Univ., Fort Collins, Colorado

Consultant, Dec. 1968-1970, Colorado State Univ., Fort Collins, Colorado

Graduate Research Assistant, June 1966 - Sept. 1967, Colorado State Univ., Fort Collins, Colorado

- b) Date of first appointment at The University of British Columbia:**
July, 1969
- c) Rank at which first appointed:**
Assistant Professor
- d) Subsequent ranks including dates of promotion:**
Associate Professor, July 1977
Professor, June 1982
- e) Date of granting of Appointment without Term:**
July, 1974
- f) Principal University and Department teaching and service responsibilities over the last five years:**
Applied Ecology (Biol. 408), Population Dynamics (Zool. 527)
Fisheries population dynamics course (Fish. 505, Zool. 521)
(have bought out teaching for past two years using Pew Fellowship)

IV. PROFESSIONAL ACTIVITIES

- a) Membership in professional and learned societies (including any offices held, committee memberships, etc.)**

American Fisheries Society, AAS (not active)
Associate Editor, Journal of Applied Mathematics and Computation, 1982 - present
Associate Editor, Northwest Environmental Journal, 1985 - 1993
Associate Editor, Environmental Software, 1986 - present
Editorial Board, Canadian Journal of Fisheries and Aquatic Sciences
Associate Editor, Environmental Management, 1995 - present
Editorial Board, Conservation Ecology
Editorial Board, Ecosystems
- b) Academic or professional awards and distinctions:**

Wildlife Society award for best paper in fish ecology and management:
Walters, C.J. and R. Hilborn. 1976. Adaptive control of fishing systems, J. Fish. Res. Bd. Canada 33(1): 145-159.
Fellow of the Royal Society of Canada, Jan. 1998
Pew Fellow in Marine Conservation, 2001-2004
Mote Eminent Scholar, Florida State University and Mote Marine Laboratory, 2001-2002
Murray A. Newman Award for Marine Conservation (Vancouver Aquarium), 2005
- c) Professional service and experience (consultancies, professional committees, commissions, visiting professorships, invited lectureships, etc.):**

Member, National Research Council Grant Selection Committee for Population Biology, 1973-1976
Research Scholar, International Institute for Applied Systems Analysis, Vienna, 1974-75 (Deputy project leader for ecology project involving six scientists)
Adjunct Professor, Department of Zoology, University of Florida, 1989-1991
Consultant to Environment Canada on Policy Planning & Research, 1972 to present
Consultant to Government of US Fish & Wildlife Service, 1977-80
Investigator for the Pearse Commission on Pacific Fisheries Policy, 1981
Advisor on the Board of Technical Experts for the Great Lakes Fishery Commission 1980-82
Director of Environmental & Social Systems Analysts Ltd. 1980-82
Research Scholar & Project Leader for Adaptive Resource Policy Project, International Institute for Applied Systems Analysis, Vienna, 1982-83

NSERC Strategic Grants Committee, Open Area (1984-87, Chairman 1985)
NSERC Interdisciplinary Operating Grant Committee, 1992-1994
Council Member, Pacific Fisheries Resource Conservation Council, 2001-2004
Research Project Leader, stock assessment, Mote Marine Laboratory, 2004 to present
Adjunct Professor, Fisheries and Aquatic Sciences, University of Florida, 2005-present

d) Other public service:

Extensive fisheries advisory work for public agencies and industry groups.

V. RESEARCH AND PROFESSIONALLY RELATED SCHOLARLY AND CREATIVE ACTIVITIES

a) Areas of special interest and accomplishments in discipline:

I have been heavily involved in the development of rapid techniques for teaching systems analysis and mathematical modelling to biologists and resource managers, using problem-oriented workshops and seminars. I have conducted over two dozen three to ten day workshops in the past ten years, first for the International Canadian Fisheries Service, US Fish and Wildlife Service, and the International Institute for Applied Systems Analysis.

My main research work now is on the theory of harvesting in natural resource management. I have published on applications of stochastic optimal control theory to the analysis of populations in variable environments, and my chief interest is in the basic problem of how to behave adaptively in the face of extreme uncertainty.

I also maintain an active field research program on the responses of aquatic communities to disturbances such as removal of selective species by introduced fish populations and enhancement of productivity through fertilization.

b) Research or equivalent grants received as principal investigator over the past five years (indicate date, source, and subject):

Current Grants Only:

- | | | |
|----|--|-----------|
| 1. | NSERC Operating: | 40,000/yr |
| 2. | Pew Fellowship in Marine Conservation: | 73,500/yr |

CURRICULUM VITAE - Walters, Carl John

- PUBLICATIONS RECORD -

NAME IN FULL: WALTERS, Carl John
DEPARTMENT OR SCHOOL: Fisheries Centre
FACULTY: Science/Graduate Studies

a) Publications or original works (including books, performances, films, exhibitions, etc.). List in proper bibliographical form according to the discipline including title and pagination, and indicate with an asterisk those you consider of primary importance. Include only those published or in press.

1. Walters, C.J. 1969. "A generalized computer simulation model for fish population studies", *Trans. Am. Fish. Soc.*, 98: 505-512.
2. Walters, C.J. 1970. "Resource management decision making for the next 50 years: roles of the biologist and the computer", *Proc. West. Assn. St. Fish Game Comm.*, 50: 1-7.
3. Walters, C.J. 1971. "The systems approach: mathematical models in ecology", Chap. 10. In: Odum, E.P., *Fundamentals of Ecology*, 3rd edition. W.B. Saunders, New York.
4. Walters, C.J. 1971. "Manipulation of fish populations with respect to food production: a cautionary note", *Trans. Am. Fish. Soc.*, 100: 365-366.
- *5. Walters, C.J., F. Bunnell. 1971. "A computer management game of land use in eastern British Columbia. *Journal of Wildlife Management*, 35: 644-657.
- *6. Walters, C.J., P.J. Bandy. 1972. "Periodic harvest as a means to increase long-term yields from big-game populations", *Journal of Wildlife Management*, 36(1): 128-134.
7. Walters, C.J., J.E. Gross. 1972. "Development of big game management plans through simulation modelling", *Journal of Wildlife Management* 36(1): 129-128.
- *8. Walters, C.J. 1972. "Systems analysis in the Marion Lake IBP program", *Oecologia* 11: 33-44.
9. Walters, C.J. 1973. "Potential productivity of an alpine lake as indicated by removal and reintroduction of fish". *Trans. Am. Fish. Soc.*, 102:675-697.
10. Walters, C.J. 1974. "An interdisciplinary approach to the development of watershed simulation models". *Technological Forecasting and Social Change* 6:299-323.
11. Walters, C.J., R. Peterman. 1974. "Modelling spruce budworm and balsam fir forests in New Brunswick". *Quaestiones Entomologicae* 10:177-186.
12. Walters, C.J. 1974. Dynamic models and evolutionary strategies. *Proc. SIAM-SIMS Conference on Ecosystems*, Alta., Utah, pp. 68-82

13. Walters, C.J. 1974. "Oberurgl: a microcosm of economic growth in relation to limited ecological resources". *Nature and Resources* 2:10-21.
14. Walters, C.J., R. Hilborn, E. Oguss, J. Stander. 1974. "Development of a simulation model of Mallard Duck populations", *Canadian Wildlife Service, Occ. Papers Series, #20*, 35 pp.
15. Walters, C.J., Hilborn, R., Peterman, R. 1975. "Simulation of barren ground Caribou population dynamics", *Ecological Modelling* 1:303-315.
- *16. Walters, C.J. 1975. "Optimal harvest strategies for salmon in relation to environmental variability and uncertain production parameters", *J. Fish. Res. Bd. Canada*, 32:1777-1784.
17. Buckingham, S., Walters, C.J., Klieber, P. 1975. "A procedure for estimating gross production, net production, and algal carbon content using ¹⁴C", *Verh. Internat. Verein. Limnol.* 19:32-38.
- *18. Walters, C.J. 1975. Foreclosure of options in sequential resource development decisions. *Int. Inst. for Applied Systems Analysis, Res. Rept. Series, RR-75-12*, 31 pp.
19. Walters, C.J. (Ed.). 1975. Hierarchic decision problems in the management of pacific salmon: proceedings of a workshop. *Intl. Inst. of Appl. Systems Analysis, CP-75-2*. (Contains 3 mimeo papers by author that do not appear elsewhere in this list.)
- *20. Walters, C.J., Hilborn, R. 1976. "Adaptive control of fishing systems", *J. Fish. Res. Bd. Canada*, 33:145-159.
21. Walters, C.J. 1976. Fishermen as switching predators in multispecies fisheries. Presented at USNMFS Colloquium on Multispecies Fisheries, Triburon, California, June 1976. 15 pp.
22. Gatto, M., Rinaldi, S., Walters, C.J. 1976. "A predator-prey model for discrete-time commercial fisheries". *Applied Mathematical Modelling* 1:67-76.
23. Jones, D., Walters, C.J. 1976. "Catastrophe theory and fisheries regulation". *J. Fish. Res. Bd. Canada*, 33(12):2829-2833.
24. Hilborn, R., Walters, C.J. 1977. Differing goals of salmon management on the Skeena River. *J. Fish. Res. Bd. Canada*, 34(1):64-72.
25. Walters, C.J. 1977. Design of experimental salmon enhancement policies. Chapter 10 in D. Ellis (Ed.), *Pacific Salmon: Management for People*. University of Victoria Press, Western Geographical Series, Vol. 13, 36 pp.
26. Holling, C.S., Walters, C.J. 1977. Fenitrothion or not fenitrothion: that is not the question. In: *Fenitrothion: Long-term Effects on Forest Ecosystems*. Nat. Res. Council of Canada Publ. No. NRCC 15329.
27. Haber, G., Walters, C.J., Cowan, I. 1977. Stability properties of a wolf-ungulate system in Alaska, with management implications. 56 pp. mimeo.
28. Walters, C.J. 1977. Management under uncertainty. Chapter 10 in: *Pacific Salmon: Management for People*, D. Ellis, Ed., University of Victoria Press, Western Geographical Series, Vol. 13, pp. 261-297.
29. Hilborn, R., Holling, C.S., Walters, C.J. 1978. Managing the unknown: approaches to ecological policy design. In: J.J. Reisa (Ed.), *Biological Analysis of Environmental Impacts*. President's Council on Environmental Quality, pp. 276-287.

30. Northcote, T.G., Walters, C.J., Hume, J.M.B. 1978. Initial impacts of experimental fish introductions on the macrozooplankton of small oligotrophic lakes. *Verh. Internat. Verein. Limnol.* 20:2003-2012.
31. Peterman, R.M., Walters, C.J., Hilborn, R. 1978. Systems analysis of pacific salmon management problems. In: E.S. Quade, Ed., *Handbook of Applied Systems Analysis, II.* John Wiley & Sons, NY, pp. 183-214.
32. Walters, C.J., with Bazykin, Alexander; Bunnell, Pille; Clark, W.C.; Gallopin, Gilberto C.; Gross, Jack; Hilborn, R.; Holling, C.S.; Jones, Dixon D.; Peterman, Randall P.; Rabinovich, Jorge E.; Steele, John H. 1978. *Adaptive Environmental Assessment and Management.* John Wiley & Sons, London, England. 377 pp.
- *33. Walters, C.J., Hilborn, R. 1978. Ecological Optimization and Adaptive Management. *Annual Review of Ecology and Systematics* 9:157-188.
34. Walters, C.J., Hilborn, R., Peterman, R.M., Staley, M.J. 1978. Model for examining early ocean limitation of Pacific salmon production *J. Fish. Res. Bd. Canada*, 35(10):1303-1315.
35. Walters, C.J. 1979. Some dynamic programming applications in fisheries management:. In: *Dynamic Programming and its Applications*, M. Peterman, Ed., pp. 233-246, Academic Press.
36. Walters, C.J. 1979. Systems principles in fisheries management. pp. 167-183. In: R.T. Lackey and R Nielsen, Eds., *Fisheries Management*, pp. 168-183. Blackwell Press.
37. Haber, G. and C. Walters. 1979. Dynamics of the Alaska-Yukon caribou herds, and management implications. *Proc. 2nd International Caribou Conference, Norway*, pp. 645-663.
- *38. Walters, C.J., R.A. Park, J.F. Koonce. 1980. Dynamic models of lake ecosystems. pp. 455-479, in E.D. LeCren and M. Lowe-McConnell (Eds.), *the functions of freshwater ecosystems.* Cambridge University Press.
- *39. Walters, C.J., G. Steer, G. Spangler. 1980. Responses of lake trout (*Salvelinus namaycush*) to harvesting, stocking, and lamprey control. *Can. J. Fish. Aquat. Sci.*, 37(11):2133-2145.
40. Walters, C.J., G. Spangler, W. Christie, P. Manion, and J. Kitchell. 1980. A synthesis of knowns, unknowns, and policy recommendations from the Sea Lamprey International Symposium. *Can. J. Fish. Aq. Sci.*, 37(11):2202-2208.
- *41. Walters, C.J. and C.S. Holling. 1981. Resilience and adaptability in ecological management systems: why do policy models fail? In: G. Conway (Ed.), *Proc. IIASA Conference Pest Management*, pp. 470-479.
42. Walters, C.J., M. Stocker, G. Haber. 1981. Simulation and optimization models for a wolf-ungulate system. In: 1978 Large Mammal Symposium, Logan, Utah, G. Fowler [ed.]. John Wiley and Sons, NY. pp. 317-338.
43. Walters, C.J. and D. Ludwig. 1981. Effects of measurement errors on the assessment of stock-recruitment relationships. *Can. J. Fish. Aq. Sci.*, 38(6):704-710.
44. Ludwig, D. and C.J. Walters. 1981. Measurement errors and uncertainty in parameter estimates for stock and recruitment. *Can. J. Fish. Aq. Sci.*, 38(6):711-720
45. Smith, A.D.M., C.J. Walters. 1981. Adaptive management of stock-recruitment systems. *Can. J. Fish. Aq. Sci.*, 38(6):690-703.

46. Argue, A.W., R. Hilborn, R.M. Peterman, M.J. Staley, C.J. Walters. 1981. The Strait of Georgia chinook and coho fisheries. *Can. Bull. Fish. Aq. Sci.* #211, 91 pp.
- *47. Walters, C.J. 1981. Optimum escapements in the face of alternative recruitment hypotheses. *Can. J. Fish. Aq. Sci.*, 38(6):678-689.
48. Walters, C.J. 1982. New trends in complex ecosystem management. *Proc. IFIP Conf. Environmental Systems Analysis and Management.* pp. 445-450.
49. Ludwig, D., C.J. Walters. 1982. Optimal harvesting with imprecise parameter estimates. *Ecological Modelling*, 14:273-292.
50. Huang, B. and C.J. Walters. 1983. Cohort analysis and population dynamics of large yellow croaker in the China Sea in the China Sea. *N. Amer. J. of Fish. Management*, 3(3):295-305.
51. Hilborn, R. C.J. Walters, R.M. Peterman, and M.J. Staley. 1984. Models and fisheries: a case study in implementation. *N. Amer. J. of Fish. Management*, 4:9-14.
52. Ludwig, D. and C.J. Walters. 1985. Are age-structured models appropriate for catch-effort data? *Can. J. Fish. Aquat. Sci.*, 42(6): 1066-1072.
53. Walters, C.J. and P. Cahoon. 1985. Evidence of decreasing spatial diversity in British Columbia salmon stocks. *Can. J. Fish. Aquat. Sci.*, 42(5):1033-1037.
- *54. Walters, C.J. 1985. Bias in the estimation of functional relationships from time series data. *Can. J. Fish. Aquat. Sci.*, 42(1):147-149.
55. Stockner, M. and C.J. Walters. 1985. Dynamics of a vegetation-ungulate system and its optimal exploitation. *Ecological Modelling*, 25:151-165.
56. Walters, C.J. 1986. Pathological behaviour of managed populations when production relationships are assessed from natural experiments. *Proceedings of the 2nd Ralph Yorque Conference*, Springer-Verlag, Berlin, lecture notes in Biomathematics #61, pp. 89-104.
57. Walters, C.J., M. Stocker, A.V. Tyler, S.J. Westrheim. 1986. Interaction between Pacific Cod (*Gadus macrocephalus*) and Herring (*Clupea harengus pallasii*) in the Hecate Strait, British Columbia. *Can. J. Fish. Aquat. Sci.*, 43(3):830-837.
58. Walters, C.J. and B. Riddell. 1986. Multiple objectives in salmon management: the chinook sport fishery in the Strait of Georgia, British Columbia. *Northwest Environmental Journal*. Vol. 2(1):1-15.
- *59. Hilborn, R. and C.J. Walters. 1986. Microcomputer fisheries simulations as training and teaching tools. *Env. Software*, 1(3):156-163.
60. Walters, C.J. 1987. Nonstationarity of production relationships in exploited populations. *Can. J. Fish Aquat. Sci.*, 44(Suppl.2):156-165.
61. Walters, C.J. 1987. Approaches to adaptive policy design for harvest management. Springer-Verlag, Berlin, Lecture Notes in Biomathematics No. 72.:114-124.
- *62. Walters, C. J. and D. Ludwig. 1987 . Adaptive management of harvest rates in the presence of a risk averse utility function. *Nat. Res. Modelling*, 1: 32 1-337 .

63. Walters, C.J. and M. Staley. 1987. Evidence against the existence of cyclic dominance in Fraser River sockeye salmon (Oncorhynchus nerka). Can. Sp. Publ. Fish. Aquat. Sci. 96:375-384.
- *64. Pearse, P.H., and C.J. Walters. 1987. Perspectives on the application of economic-ecological models . Chap. 15 . In Van Lierop, W., and L. Brant [eds.] Economic-ecological Modelling. Springer-Verlag, Berlin, pp 269-281 .
- *65. Walters, C.J., T.G. Northcote, W.E. Neill, E. Krause. 1987. Equilibrium models for seasonal dynamics of plankton biomass in four oligotrophic lakes. Can. J. Fish. Aquat. Sci. 43:1002-1017.
- *66. Milliman, S., A.P. Grima, C.J. Walters. 1987. Policy making within an adaptive management framework, with an application to Lake Trout. Can. J. Fish. Aquat. Sci. 44:425-430.
- *67. Walters, C.J. 1987. Adaptive policy design for fisheries management: active versus passive policies. In L.W. Botsford [Ed.], Perspectives on Applied Ecology. U. Calif. Press, Davis. (In press).
- *68. Walters, C.J. 1987. Mixed stock fisheries and the sustainability of enhancement production for chinook and coho. In W. McNeil [Ed.], Proc. First World Salmonid Conf. Oregon State Univ. Press. pp 109-116.
69. Trostel, K., A.R.E. Sinclair, C.J. Walters, and C.J. Krebs.) 1987. Can predation cause the 10 year hare cycle? Oecologia, 74:185-192.
- *70. Hilborn, R. and C.J. Walters. 1987. A general model for simulation of stock and fleet dynamics in spatially heterogeneous environments. Can. J. Fish. Aquat. Sci. 44: 1366-1369
71. Collie, J., and C.J. Walters. 1987. Alternative recruitment models of Adams River sockeye salmon. (Oncorhynchus nerka). Can. J. Fish Aquat. Sci. 44: 1551-1561.
- *72. Zheng, J. and C.J. Walters. 1987. Population dynamics and stock assessment of Wanshan spring, Decapterus maruadsi, (T. & S.) in South China Sea. Fish. Res. 6:217-231.
- *73. Walters, C.J. 1987. Development of microcomputer use in fisheries research and management. Am. Fish. Soc. Symp. 6: 3-6.
74. Ludwig, D., C.J. Walters, and J. Cooke. 1987. Comparison of two models and two estimation methods for catch and effort data. Nat. Res. Modelling 2 : 457-498 .
- *75. Hall, D.L., R. Hilborn, M. Stocker, and C.J. Walters. 1988. Alternative management strategies for Pacific herring. Can. J. Fish. Aquat. Sci. 45:888-897.
- *76. Walters, C.J. and J. Collie. 1988. Experimental designs for estimating transient responses to management disturbances. Can J. Fish. Aquat. Sci., 45:530-538.
- *77. Walters, C.J. and J.S. Collie. 1988. Is research on environmental effects on recruitment worthwhile? Can. J. Fish. Aquat. Sci., 45:1848-1854.
- *78. Walters, C.J., J.S. Collie, and T. Webb. 1988. Experimental designs for estimating transient responses to habitat alterations: is it practical to control for environmental changes? Can. Sp. Pub. Fish. Aquat. Sci., Habitat Symposium, 105:13-20.
- *79. Walters, C.J. and J.S. Collie. 1989. An experimental management strategy for groundfish in the face of large uncertainty about stock size and production. Can. J. Fish. Aqua. Sci., 108:13-25.

80. Ludwig, D., and C.J. Walters. 1989. A robust method for parameter estimation from catch and effort data. *Can. J. Fish. Aquat. Sci.*, 46:137-144.
81. Walters, C.J. 1989. Value of short term recruitment forecasts for harvest management. *Can. J. Fish. Aquat. Sci.*, 46:1969-76.
82. Collie, J.S., R.M. Peterman, C.J. Walters. 1989. Experimental harvest policies for a mixed-stock fishery: Fraser River Sockeye salmon. *Can. J. Fish. Aquat. Sci.*, 47:145-155.
83. Johnson, B.L., and C.J. Walters. 1989. Estimation of abundance and survey catchability from catch-at-age and survey data. *Can. J. Fish. Aquat. Sci.* (accepted subject to revision).
84. Walters, C.J., T.G. Northcote, D.R. Robinson. 1990. Comparative dynamics of Daphnia and Holopedium in four oligotrophic lakes. *Can. J. Fish. Aquat. Sci.*, 47:401-409.
85. Walters, C.J. 1990. A partial bias correction factor for stock-recruitment estimation in the presence of autocorrelated environmental effects. *Can. J. Fish. Aquat. Sci.*, 47:516-519.
86. Walters, C.J., and C.S. Holling. 1990. Large scale management experiments and learning by doing. *Ecology*, 71:2060-2068.
87. Walters, C.J. 1990. A partial bias correction factor for stock-recruitment estimation. *Can. J. Fish. Aquat. Sci.*, 47:516-519.
88. Collie, J.S., C.J. Walters. 1991. Adaptive management of spatially replicated groundfish populations. *Can. J. Fish. Aquat. Sci.* 48:1273-1284.
89. Woody, J.C., C.J. Walters. 1992. Genetic models for cyclic dominance in Sockeye salmon. *Can. J. Fish. Aquat. Sci.* 49:281-292.
90. Walters, C.J., C.S. Holling, Lance Gunderson. 1992. Experimental water management policies for the Florida Everglades. *Ecological Applications* 2:189-202.
91. Walters, C.J., L. Gunderson. 1993. Comparison of alternative scenarios for water restoration in the Florida Everglades. *Proc. Everglades. Symp.* (U.S. Nat. Park Service, In press).
92. Walters, C.J. 1992. Trends in applied ecological modelling. *Wildlife 2001: Populations* (Wildlife Society), 117-122.
93. Walters, C.J., C.G. Hannah, K. Thomson. 1991. A microcomputer program for simulating effects of physical transport processes on fish larvae. *Fisheries Oceanography* 1 (1) :11-19.
94. Walters, C.J., R. Goruk, D. Radford. 1993. Rivers Inlet Sockeye salmon; an experiment in adaptive management. *North Am. J. Fish. Mgmt.* 13:253-262.
95. Pearse, P. and C.J. Walters. 1992. Harvest regulation under quota management systems for ocean fisheries. *Marine Policy* (May 1992): 167-182.
96. Walters, C.J. and J. Post. 1993. Density dependent growth and competitive asymmetry in size-structured fish populations: a theoretical model and recommended field experiments. *Trans. Am. Fish. Soc.* 122:34-45.
97. Walters, C.J. 1992. Dynamic model and large scale field experiments in environmental assessment and management. *Australian J. Ecology* 18:53-61.

- 98 Walters, C.J., Norm Hall, Rhys Brown, Chris Chubb. 1993. A spatial model for the dynamics of the Western Australian rock lobster fishery. *Can. J. Fish. Aquat. Sci.* 50:1650-1662.
99. Labelle, M. B. Riddell, C. Walters. 1993. Ocean survival and exploitation patterns of hatchery and wild coho salmon. *Can. Sp. Pub. Fish. Aquat. Sci.* 94 (In press, 40 p. typed).
100. Ludwig, D., R. Hilborn, C. Walters 1993. Uncertainty, resource exploitation, and conservation: lessons from history. *Science* 260: 17 & 36.
- *101 .Walters, C.J., F. Juanes. 1993. Recruitment limitation as a consequence of optimal risk-taking behaviour by juvenile fish. *Can. J. Fish. Aquat. Sci.* 50:2058-2070.
102. Peterman, R.M., S.G. Marione, K.A. Thomson, I.D. Jardine, R.N. Crittenden, P.H. Leblond, and C.J. Walters. 1994. Simulation of juvenile sockeye salmon (*Oncorhynchus nerka*) migrations in the Strait of Georgia, British Columbia. *Fisheries Oceanography*, (In press).
103. Walters, C.J., and A. Punt. 1994. Placing odds on sustainable catch using virtual population analysis and survey data. *Can. J. Fish. Aquat. Sci.* 51:946-958.
104. Collie, J. and C. Walters. 1993. Models that “learn” to distinguish among alternative recruitment hypotheses. *Fisheries Research* 18:259-273.
105. Walters, C.J., and D. Ludwig. 1994. Calculation of Bayes posterior probability distributions for key population parameters. *Can. J. Fish. Aquat. Sci.* 51:713-722.
106. Walters, C.J. 1995. Computers in policy design and fisheries regulation. B. Megrey (Ed.) *Future of Computers in Fisheries*. Am. Fish. Soc. Sp. Pub.
107. Walters, C.J. 1995. Estimation of historical stock sizes and recruitment anomalies from relative abundance data. *Can. J. Fish. Aquat. Sci.* 52:1523-1534.
108. Walters, C.J. 1995. Use of gaming procedures in adaptive policy design. *Can. J. Fish. Aquat. Sci.* 51:2705-2714.
109. Hilborn, R., C.J. Walters, D. Ludwig. 1995. Sustainable exploitation of renewable resources. *Ann. Rev. Ecol. Syst.* 26:45-67.
110. LeBlond, P., C. Dat, K. Thomson, M. Healey and C. J. Walters. 1995. Modeling Fish Migration in Variable Currents, pp. 323-33 In: H.R. Skjoldal, C. Hopkins, K. Erikstad and H. Leinas (ed.) *Ecology of Fjords and Coastal Waters*, Elsevier, London.
- 111 . Walters, C.J., A. Parma. 1996. Fixed exploitation policies for dealing with effects of large-scale climate change. *Can. J. Fish. Aquat. Sci.* 53:148-158.
112. Walters, C.J. and P.H. Pearse. 1996. Stock information requirements for quota management systems in commercial fisheries. *Rev. Fish. Biol. Fisheries* 6:21-42.
113. Walters, C.J. and J.J. McGuire. 1996. Lessons for stock assessment from the northern cod collapse. *Rev. Fish. Biol. Fisheries*. 6:125-137.
114. Korman, J., R.M. Peterman, C.J. Walters. 1995. Empirical and theoretical analyses of correction of time-series bias in stock recruitment relationships of sockeye salmon (*Oncorhynchus nerka*). *Can. J. Fish. Aquat. Sci.* 52:2174-2189.

115. Abrams, P. and C. Walters. 1996. Invulnerable prey and the paradox of enrichment. *Ecology* 77:1125-1133.
116. Walters, C.J. 1997. Information requirements for salmon management. In (ed) Pacific salmon and their ecosystems. Chapman-Hall.
117. Walters, C. 1997. Challenges in adaptive management of riparian and coastal ecosystems. *Conservation Ecology* [online]1(2):1. Available from the Internet. URL: <http://www.consecol.org/vol1/iss2/art1>.
117. Hutchings, J.A., C. Walters, R.L. Haedrich. 1996. Government-Administered fisheries science: a critical review and proposed solution. *Can. J. Fish. Aquat. Sci.* 54:1198-1210.
118. Walters, C.J., V. Christensen, D. Pauly. 1997. Structuring dynamic models from trophic mass-balance assessments of exploited ecosystems. *Rev. Fish. Biol. Fisheries* 17:139-172.
119. Walters, C.J. and R. Green. 1997. Valuing large scale management experiments for natural resources. *J. Wildl. Mgmt.* 61:987-1006.
120. Walters, C.J. 1998. Designing fisheries management systems that do not depend on accurate stock assessment. IN: Pitcher, T.J., P.J. Hart and D. Pauly (eds.), *Reinventing Fisheries Management*. Chapman & Hall, London, p. 279-288.
121. Walters, C.J., J. Prescott, R. McGarvey, J. Prince. 1998. Management options for the South Australia Rock lobster fishery: a case study of cooperative assessment and policy design by fishers and biologists. *Can. Sp. Pub. Fish. Aquat. Sci.* 125:377-383.
122. Walters, C.J. and B. Ward. 1998. Is solar radiation responsible for declines in marine survival rates of anadromous salmonids that rear in small streams. *Can. J. Fish. Aquat. Sci.* 55:2533-2538.
123. Peterman, R., B. Pyper, M. Lapointe, M. Adkinson, and C. J. Walters. 1998. Patterns of covariation in survival rates of British Columbia and Alaska sockeye salmon. *Can. J. Fish. Aquat. Sci.* 55:2503-2517.
124. Walters, C.J. 1998. Evaluation of quota management policies for developing fisheries. *Can. J. Fish. Aquat. Sci.* 55:2691-2705.
125. Walters, C.J. 1998. Improving links between ecosystem scientists and managers. M. Pace and P. Groffman (eds.), *Successes, limitations, and frontiers in ecosystem science*. Springer Verlag, Berlin.
126. Kitchell, J.F., C. Boggs, Xi He, C.J. Walters. 1998. Keystone predators in the central Pacific. *Proc. Wakefield Symposium on forage fishes in marine ecosystems, Anchorage Alaska, in press.*
127. Mackinson, S., M. Vasconcellos, T.J. Pitcher, C.J. Walters. 1998. Ecosystem impacts of harvesting small pelagic fish in upwelling systems: using a dynamic mass balance model. *Proc. Wakefield Symposium on forage fishes in marine ecosystems, Anchorage Alaska, in press.*
128. Walters, C.J. and J. Korman. 1999. Analysis of stock and recruitment data for deriving reference levels: fitting, precision, diagnostics, pitfalls. In G.R. Chaput and E. Prevost, eds., *management strategies for Atlantic salmon*. Springer-Verlag, Berlin.
129. Perry, Ian, C.J. Walters and J. Boutillier. 1999. A framework for providing scientific advice for the management of new and developing fisheries. *Rev. Fish Biol. Fisheries* 9:1-26.
130. Walters, C.J., R. Bonfil. 1999. Multispecies spatial assessment models for the B.C. groundfish trawl fishery. *Can. J. Fish. Aquat. Sci.* 56: 601-628.

131. Peterman, R., B. Pyper, M. Lapointe, M. Adkinson, and C.J. Walters. 1999. Patterns of covariation in body size and growth of British Columbia and Alaska sockeye salmon. *Can. J. Fish. Aquat. Sci.* 55:2503-2517.
132. Walters, C.J. 2000. Impacts of dispersal, ecological interactions, and fishing effort dynamics on efficacy of marine protected areas: how large should protected areas be? *Bull. Mar. Sci.* 66:745-757.
133. Walters, C.J., and J. Korman. 1999. Cross-scale modelling of riparian ecosystem responses to hydrologic management. *Ecosystems* 2:411-421.
134. Walters, C.J., J. Scandol, J.D. Cave, and M.F. LaPointe. 1999. Inseason stock assessment and tactics for reducing overfishing risk in gauntlet fisheries for Pacific salmon. *Can. J. Fish. Aquat. Sci.* (in press).
135. Cappel, M., C.J. Walters and R.C.J. Lenanton. 1999. Estimation of migration, exploitation, and survival using tag recovery data for Western Australian "salmon" *Arripis truttaceus*. *Fisheries Research* 44:207-217.
136. Guenette, S., T. Pitcher and C.J. Walters. 1999. The potential of marine reserves for management of cod in Newfoundland. *Bull. Marine* 66:758-769.
- *137. Walters, C.J. and J. Korman. 1999. Revisiting the Beverton-Holt recruitment model from a life history and multispecies perspective. *Rev. Fish Biol. Fisheries* 9:187-202.
138. Walters, C.J., V. Christensen and D. Pauly. 1999. ECOSPACE: prediction of mesoscale spatial patterns in trophic relationships of exploited ecosystems. *Ecosystems* 2:539-544.
139. Walters, C.J., V. Christensen, D. Pauly and J. Kitchell. 1999. ECOSIM II: representation of trophic interaction effects in a population dynamics model. *Ecosystems* 3:70-83.
140. Walters, C.J. and J. Korman. 1999. Ecosystem modeling for evaluation of adaptive management policies in the Grand Canyon. *Conservation Ecology* (www.consecol.org, online).
141. Pyper, B.J., R.M. Peterman, M.F. Lapointe and C. J. Walters. 1999. Patterns of covariation in length and age at maturity of sockeye salmon. *Can. J. Fish. Aquat. Sci.* 55:2503-2517.
143. Watson, R., Alder, J., C. Walters. 2000. A dynamic mass balance model for marine protected areas. *Fish and Fisheries* 1:94-98.
144. Pauly, D., Christensen, V., C. Walters. 2000. Ecopath, ecosim, and ecospace as tools for evaluating ecosystem impact of fisheries. *ICES J. Mar. Sci.* 57:697-706.
145. Kitchell, J. Cox, S.P., Harvey, C.J., Johnson, T.B., Mason, D.M., Schoen, K.K., Aydin, K., Bronte, C., Ebener, M., Hanson, M., Hoff, M., Schram, S., Schreiner, D., and C. Walters. 2000. Sustainability of the Lake Superior fish community: interactions in a food web context. *Ecosystems*, 3:545-560.
146. Gunderson, L., and Walters, C. 2001. Florida Bay: Alternating or Alternative Stable States? *Conservation Ecology* (www.consecol.org, online).
147. Walters, C. and J. Kitchell. 2001. Cultivation/depensation Effects on Juvenile Survival and Recruitment: Implications for the Theory of Fishing. *Can. J. Fish. Aquat. Sci.* 58:39-50.
148. Walters, C. 2001. Implications for marine population and community dynamics of natural selection for predation avoidance tactics. *Marine Ecology Progress series* 208:309-313.

149. Walters, C. and S. Martell. 2002. Stock assessment needs for sustainable fisheries. *Bull. Marine Science* 70: 629-638.
150. Martell, S. and C. Walters. 2002. Implementing harvest rate strategies by directly monitoring exploitation rates and estimating catchability changes. *Bull. Marine Sci.* 70: 695-713.
151. Martell, S., and C. Walters. 2000. Use of marine protected areas for conservation of ling cod (*Ophiodon elongatus*). *Bull. Mar. Sci.* 66:729-743.
152. Essington, T.E., Kitchell, J.F., and C. Walters. 2001. The von Bertalanffy growth function, bioenergetics, and the consumption rates of fish. *Can. J. Fish. Aquat. Sci.* 11:2129-2138.
153. Cox, S.P., Beard, T., and C. Walters. 2002. Harvest control in open-access sport fisheries: hot rod or asleep at the wheel? *Bull. Mar. Sci.* 70:749-761.
154. Cox, S.P., C. Walters. 2002. Modeling exploitation in recreational fisheries and implications for effort management on British Columbia rainbow trout lakes. *North Am. J. Fish. Mgmt.* 22:21-34.
155. Salomon, A.K., Waller, N.P., McIlhagga, C., Yung, R.L., C. Walters. 2002. Modeling the trophic effects of marine protected area zoning policies: a case study. *Aquat. Ecol.* 36:85-97.
156. Korman, J., Ahrens, R.N.M., Higgins, P.S., C. Walters. 2002. Effects of observer efficiency, arrival timing, and survey life on estimates of escapements for steelhead trout (*Oncorhynchus mykiss*) derived from repeat mark-recapture experiments. *Can. J. Fish. Aquat. Sci.* 59:1116-1131.
157. Cox, S.P., Martell, S.J.D., Walters, C., Essington, T.E., Kitchell, J. F., Boggs, C. Kaplan, I. 2002. Reconstructing ecosystem dynamics in the central Pacific Ocean, 1952-1998. 1. Estimating population biomass and recruitment of tunas and billfishes. *Can. J. Fish. Aquat. Sci.* 59:1724-1735.
158. Cox, S.P., Martell, S.J.D., Walters, C., Essington, T.E., Kitchell, J. F., Boggs, C. Kaplan, I. 2002. Reconstructing ecosystem dynamics in the central Pacific Ocean, 1952-1998. 2. A preliminary assessment of the trophic impacts of fishing and effects on tuna dynamics. *Can. J. Fish. Aquat. Sci.* 59:1736-1747.
159. Pauly, D., V. Christensen, S. Guenette, T.J. Pitcher, U.R. Sumaila, C.J. Walters, R. Watson, and D. Zeller. 2002. Towards sustainability in world fisheries. *Nature* 418 (6898): 659-695.
160. Kitchell, J.F., T.E. Essington, C.J. Boggs, D.E. Schindler, and C.J. Walters. 2002. The role of sharks and longline fisheries in a pelagic ecosystem of the Central Pacific. *Ecosystems* 5(2): 202-216.
161. Post, J.R., M. Sullivan, S. Cox, N.P. Lester, C.J. Walters, E.A. Parkinson, A.J. Paul, L. Jackson and B.J. Shuter. 2002. Canada's recreational fisheries: The invisible collapse? *Fisheries* 27(1): 6-17.
162. Dill, L.M., M.R. Heithaus and C.J. Walters. 2003. Behaviourally mediated indirect interactions in marine communities and their conservation. *Ecology* 84(5):1151-1157.
163. Watters, G.M. R.J. Olson, R.C. Francis, P.C. Fiedler, J.J. Polovina, S.B. Reilly, K.Y. Aydin, C.H. Boggs, T.E. Essington, C.J. Walters, and J.F. Kitchell. 2003. Physical forcing and the dynamics of the pelagic ecosystem in the eastern tropical Pacific: simulations with ENSO-scale and global warming climate drivers. *C.J. Fish. Aquat. Sci.* 60(9):1161-1175.

164. Cox, S.P., C.J. Walters, and J.R. Post. 2003. A model-based evaluation of active management of recreational fishing effort. *N.Amer.J.Fish.Man* 23(4): 1294-1302.
165. Christensen, V., S. Guenette, J.J. Heymans, C.J. Walters, R. Watson, D. Zeller, and D. Pauly. 2004. Hundred year decline of North American predatory fishes. *Fish and Fisheries*. 4(1):1-24.
166. Walters, C. 2003. Folly and fantasy in the analysis of spatial catch rate data. *C.J. Fish. Aquat. Sci.* (60):1433-1436.
167. Christensen, V. and Walters, C.J. 2004. Ecopath with Ecosim: methods, capabilities and limitations. *Ecol. Model.* 172(2-4): 109-139.
168. Christensen, V., and Walters, C.J. 2004. Trade-offs in ecosystem-scale optimization of fisheries management policies. *Bull. Mar. Sci.* 74: 549-562.
169. Kitchell, J.F., I.C. Kaplan, S.P. Cox, S.J.D. Martell, T.E. Essington, C.H. Boggs, and C. Walters. 2004. Ecological and economic components of alternative fishing methods to reduce by-catch of marlin in a tropical pelagic ecosystem. *Bull. Mar. Sci.* 74: 607-619.
170. Walters, C. 2004. Simple representation of the dynamics of biomass error propagation for stock assessment models. *Can. J. Fish. Aquat. Sci.* 61: 1061-1065.
171. Martell, S.J.D., T. Essington, R. Lessard, J.F. Kitchell, C. Walters, and C.H. Boggs. 2004. Interactions of productivity, predation risk, and fishing effort in the efficacy of marine protected areas for the central Pacific. *Can. J. Fish. Aquat. Sci.* (In press).
172. Taylor, N., S.J.D. Martell, and C. Walters. 2004. A new likelihood for simultaneously estimating von Bertalanffy growth parameters, gear selectivity, natural and fishing mortality. *Can. J. Fish Aquat. Sci.* 61 (In press).
173. Walters, C., Christensen, V., Martell, S., Kitchell, J. 2005. Possible ecosystem impacts of applying MSY policies from single species assessment. *ICES J. Mar. Sci.* 62:558-568.
174. Walters, C., Hilborn, R. 2005. Exploratory analysis of recruitment trends using relative abundance and catch data. *Can. J. Fish. Aquat. Sci.* 62:1985-1990.
175. Lessard, R. B., S. J. D. Martell, C. J. Walters, T. E. Essington and J. F. Kitchell 2005. Should Ecosystem Management Involve Active Control of Species Abundances?. *Ecology and Society* 10 (2): 1. [online] URL: <http://www.ecologyandsociety.org/vol10/iss2/art1/>
176. Walters, C., Korman, J., and McAdam, S. 2005. An assessment of white sturgeon status and trends in the lower Fraser River. *Can. Science Advisory Secretariat (CSAS) Res. Doc.* 2005/066, 60 p. [Online] URL: http://www.dfo-mpo.gc.ca/csas/Csas/Publications/ResDocs-DocRech/2005/2005_066_e.htm.
177. Coggins, L.G., Jr, W. E. Pine, III, C. J. Walters, D. R. Van Haverbeke, D. Ward, and H. C. Johnstone. 2006. Abundance Trends and Status of the Little Colorado River Population of Humpback Chub. *North Am. J. Fish. Man.* 26:76-88.
178. Coggins, L. G., Jr., W. E. Pine, III, C. J. Walters, and S. J. D. Martell. 2006. Age Structured Mark Recapture Analysis (ASMR): A VPA Based Model for Analyzing Age Structured Capture-Recapture Data. *North Am. J. Fish. Man.* 26:89-93.

179. Walters, C.J., Korman, J., and Martell, S.J. 2006. A stochastic approach to stock reduction analysis. Can. J. Fish. Aquat. Sci. 63:212-223.

Books

*Adaptive Management of Renewable Resources. 1986. MacMillan Pub. Co., Inc. N.Y. 374 pp.

*Quantitative Fisheries Stock Assessment and Management. 1991. Chapman-Hall, Pub. Co., New York (Ray Hilborn, Carl Walters), 580 pp.

*Fisheries Ecology and Management. 2004. Walters, C. and S. Martell. Princeton University Press, Princeton, 399p.

(b) Completed and unpublished material including Commission Reports, Discussion Papers or similar material (include only those of significant: if paper read at a conference, indicate date and nature of conference as well as status of other material).

1. Walters, C.J. Summary report on initial small-herbivorous-mammal modelling efforts, pawnee site, grasslands biome. U.S. International Biological Program, Grasslands Biome Technical Report No. 7,9 pp. (1970).
2. Walters, C.J. The development of an aquatic ecosystem model for the CCIPB. IIPS study report No. 4, University of British Columbia, 36 pp.
3. Walters, C.J. Workshops on systems modelling at the University of British Columbia, Ford Foundation Workshop on Workshops, Parksville, B.C., September 1971, 13 pp.
4. Walters, C.J. Simulation of wildlife populations along Arctic rivers. Report to the Canadian Wildlife Service, 100 pp. mimeo. (1972).
5. Walters, C.J., R. Reed, and J. Ward. Factors determining duck hunter success in southern British Columbia. C.W.S. Progress Notes series, 36:1-6 (1973).
6. Walters, C.J., R. Hilborn, M. Stanley, and F. Wong. 1982. Status and potential yields of fish stocks on pacific coast of Canada. Rept. to Pearse Commission on Pacific fisheries policy. 133 pp.
- *7. Walters, C.J. 1984. Managing fisheries under biological uncertainty. Dahlem Konferenze on Exploitation of Marine Communities, Berlin, R.M. May (Ed.), pp. 263-274.
8. Walters, C.J. 1984. Design of indexing systems for assessment of escapements in B.C. Salmon. Can. Tech. Rept. Fish. Aquat. Sci. (In press, 59 pp.)
9. Tyler, A.V., L.J. Richards, and C.J. Walters. 1986. Hecate Strait project report on the Hecate Strait ecosystems modelling workshop. Canadian Manuscript Report of fisheries and Aquatic Sciences, No. 1879.
- *10. Walters, C.J. and R. Hilborn. 1986. A syllabus for tropical fish stock assessment. South Pacific Commission, 167 pp.
- *11. Walters, C.J. 1987. Catch at age analysis using microcomputers. Published by FAO, Rome, 130 pp.
- *12. Walters, C.J. 1987. Fisheries stock assessment with Deriso model. Published by FAO, Rome, 130 pp.
13. Walters, C.J. 1987. Approaches to adaptive policy design for harvest management. In T.L. Vincent et al. (Eds). Modelling and management of resources under uncertainty. Springer-Verlag lecture notes in Biomathematics #72 (refereed). pp. 114-134.

14. Walters, C.J. 1992. Perspectives on adaptive policy design in fisheries management. pp. 242-262, In: S.K. Jain and L.W. Botsford (Eds.). Applied Population Biology. Klumer Academic Publications, Amsterdam.
15. Walters, C.J., K. Sainsbury. 1990. Design of a large-scale experiment to measure effects of fishing on the Great Barrier Reef. Great Barrier Reef Marine Park Authority, Townsville. 131p.
16. Walters, C.J., J. Post, J. Degisi, J. Sawada. 1991. Kootenay Lake fertilization response model. B.C. Ministry of Environment. 108 pp.
17. Walters, C.J. 1991. An outsider's look at the future of recreational fishing in Western Australia. pp. 24-29, In P. Rogers (Ed), The future for recreational fishing: Forum proceedings. Australian Dept. Fisheries, Fisheries Mgmt. Paper No. 40.
18. Walters, C.J. 1993. Where have all the coho gone? Proc. AFS/Association of Professional Biologists Workshop on coho salmon, Nanaimo, B.C. July 1992 (In press, 10 pp).
19. Walters, C.J. 1995. Fish on the line: the future of the Pacific fisheries. Suzuki Foundation, Vancouver 100p.
20. Walters, C.J. 1997. Adaptive management in Australia: a review and critique. Bureau of Resource Sciences, Canberra. 63pp.
21. Walters, C.J. 1998. Ecospace: prediction of mesoscale spatial patterns in trophic relationships of exploited ecosystems, with emphasis on impacts of marine protected areas. Int. Council Explor. of the Sea, ICES Conference Proceedings, CM1998/S:4.
22. Walters, C.J. 1998. The crisis in Canadian fisheries. Vancouver Institute Lecture Series. UBC Press.
23. Walters C.J. and S. Cox. 1999. Maintaining quality in recreational fisheries: how success breed failure in management of open access sport fisheries. RECFISH Conf. Proc., Fisheries Centre, UBC, Vancouver.
24. Walters, C.J. and J. Korman. 1999. Salmon Stocks. Pacific Fisheries Resource Conservation Council, Background Paper 1999/Ib, pp. 95-133.