Vita

Charles A. SIMENSTAD

Position-Affiliation Address

Research Professor
WETLAND ECOSYSTEM TEAM
School of Aquatic and Fishery Sciences, Box 355020
University of Washington
Seattle, Washington 98195-5020 USA
(206) 543-7185, -4650; FAX: (206) 685-7471
E-mail: *simenstd@u.washington.edu* or siwash@drizzle.com
Homepage: *http://www.fish.washington.edu/people/simenstd/*

Other Information

Birthdate; 22 February 1947
Birthplace; Yakima, Washington, USA

Education

B.S., 1969, Fisheries, University of Washington
M.S., 1971, Fisheries, University of Washington
Thesis title: The feeding ecology of the rock greenling, *Hexagrammos lagocephalus*, in the inshore waters of Amchitka Island, Alaska.

Positions Held

Research Professor Emeritus, School Aquatic & Fishery Sciences, University of Washington, 2019-present
Research Professor, School Aquatic & Fishery Sciences, University of Washington, 2006-2019
Research Associate Professor, School Aquatic & Fishery Sciences, University of Washington, 2001-2006
Fisheries Biologist II-Senior Fisheries Biologist, Fisheries Research Institute, University of Washington, 1971-2001; Coordinator, Wetland Ecosystem Team, August 1990-present

Honors and Positions

1993	University of Washington, PSO Award for Excellence
1994	Fellow, American Association for the Advancement of Science
1998-2013	Editorial Board--Associate Editor, Habitat Restoration and Wetlands, *Estuaries & Coasts*
2009	2009 NOAA-AFS Nancy Foster Award for Habitat Conservation
2013-2019	Washington Department of Natural Resources, Commissioner of Public Lands' *Expert Council on Climate & Environmental Change*
2013-2021	Co-Editor in Chief, *Estuaries & Coasts*
2008-present	Editorial Board, *San Francisco Estuary & Watershed Science*
2012-present	Editorial Board, *Encyclopedia of Puget Sound*

Professional Membership

American Association for the Advancement of Science (Fellow)
American Institute of Fisheries Research Biologists
Coastal and Estuarine Research Federation
Ecological Society of America
Estuarine and Coastal Sciences Association
Man and Water Network AB, International Network
Pacific Estuarine Research Society
Sigma Xi
Society for Ecological Restoration

Research Interests-Expertise

- Estuarine and nearshore marine ecosystem structure and dynamics, focusing on trophic interactions, especially those of detritus-based food webs; use of stable isotopes to trace trophic pathways
- Landscape ecology of coastal wetlands; influence of landscape structure on fish behavior and ecology
- Coastal wetland restoration ecology; planning and functional assessment of restored, created and enhanced coastal wetlands based on natural ecosystem processes
- Estuarine ecology and life history diversity of juvenile salmonids, and ecology of their prey
- Coastal ecosystem management, with emphasis on watershed influences on estuarine processes

- Community ecology of nearshore marine fish assemblages of the North Pacific, especially related to structuring influence of predators

Principal Current Research Activities

Ecological Responses to Russian River Estuary Entrance Alternatives; June 2009 – June 2021; Principal Investigator; Sonoma County Water Agency; develop and implement study to evaluate effects on juvenile salmonids and their prey resources under different conditions of Russian River estuary mouth channel open/closure; $251,763

Publications

Peer-Reviewed Journal articles published/in print/in press:

Isakson, J. S., C. A. Simenstad, and R. L. Burgner. 1971. Fish communities and food chains in the Amchitka area. *BioScience* **21**:666-670.

Simenstad, C. A., J. A. Estes, and K. W. Kenyon. 1978. Aleuts, sea otters, and alternate stable-state communities. *Science* **200**:403-411.

Volk, E. C., R. C. Wissmar, C. A. Simenstad, and D. M. Eggers. 1984. The relationship between otolith microstructure and the growth of juvenile chum salmon under different prey conditions. *Can. J. Fish. Aquat. Sci.* **41**:126-133.

Simenstad, C. A., and J. R. Cordell. 1985. Structural dynamics of epibenthic zooplankton in the Columbia River Delta. *Verh. Internat. Verein. Limnol.* **22**:2173-2182.

Simenstad, C. A., and R. C. Wissmar. 1985. $\delta^{13}C$ evidence of the origins and fates of organic carbon in estuarine and nearshore marine food webs. *Mar. Ecol.-Prog. Ser.* **22**:141-152.

Wissmar, R. C., and C. A. Simenstad. 1988. Energetic constraints of juvenile chum salmon (*Oncorhynchus keta*) migrating in estuaries. *Can. J. Fish. Aquat. Sci.* **45**:1555-1560.

Duggins, D. O., C. A. Simenstad, and J. A. Estes. 1989. Magnification of secondary production by kelp detritus in coastal marine ecosystems. *Science* **245**:170-174.

Shreffler, D. K., C. A. Simenstad, and R. M. Thom. 1990. Temporary residence by juvenile salmon of a restored estuarine wetland. *Can. J. Fish. Aquat. Sci.* **47**:2079-2084.

Jones, K. K., C. A. Simenstad, D. L. Higley, and D. L. Bottom. 1990. Structure, distribution, and standing crop of benthos, epibenthos, and plankton in the Columbia River estuary. *Prog. Oceanogr.* **25**:211-242.

Sherwood, C. R., D. A. Jay, R. B. Harvey, P. Hamilton, and C. A. Simenstad. 1990. Historical Changes in the Columbia River Estuary. *Prog. Oceanogr.* **25**:299-357.

Simenstad, C. A., C. D. McIntire, and L. F. Small. 1990. Consumption processes and food web structure in the Columbia River estuary. *Prog. Oceanogr.* **25**:271-298.

Simenstad, C. A., L. F. Small, C. D. McIntire, D. A. Jay, and C. R. Sherwood. 1990. An Introduction to the Columbia River Estuary: Brief History, Prior Studies, and the Role of the CREDDP Studies. *Prog. Oceanogr.* **25**:1-14.

Cordell, J. R., C. A. Simenstad, and C. A. Morgan. 1992. Establishment of the Asian calanoid copepod *Pseudodiaptomus inopinus* in the Columbia River estuary. *J. Crustacean Biol.* **12**:260-269.

Cordell, J. R., C. A. Simenstad, and C. A. Morgan. 1992. The Asian calanoid copepod *Pseudodiaptomus inopinus* in Pacific Northwest rivers—biology of an invasive zooplankter. *N.W. Environ. J.* **8**:164-165.

Shreffler, D. K., C. A. Simenstad, and R. M. Thom. 1992. Juvenile salmon foraging in a restored estuarine wetland. *Estuaries* **15**:204-213.

Simenstad, C. A., and J. R. Cordell. 1992. Species and assemblage diversity of nearshore epibenthic harpacticoid copepods--natural and human influences. *N.W. Environ. J.* **8**:154-155.

Weitkamp, L. A., R. C. Wissmar, C. A. Simenstad, K. L. Fresh, and J. G. Odell. 1992. Gray whales foraging on ghost shrimp (*Callianassa californiensis*) in littoral sand flats of Puget Sound, U.S.A. *Can. J. Zool.* **70**: 2275-2280.

LMER Coordinating Committee (Boynton, W., J. T. Hollibaugh, D. Jay, M. Kemp, J. Kremer, C. Simenstad, S. V. Smith, and I. Valiela). 1992. Understanding changes in coastal environments: the Land Margin Ecosystems Research Program. *EOS* **73**:481-485.

Simenstad, C. A., D. O. Duggins, and P. D. Quay. 1993. High turnover of inorganic carbon in kelp habitats as a cause of $\delta^{13}C$ variability in marine food webs. *Mar. Biol.* **116**: 147-160.

Hassett, R. P., D. O. Duggins, and C. A. Simenstad. 1993. Egg production rates of the neritic marine copepod *Acartia tumida* Willey in the Aleutian Archipelago. *Polar Biol.* **13**: 515-523.

Ruckelshaus, M. H., R. C. Wissmar, and C. A. Simenstad. 1994. Scale of habitat quality relevant to mussel growth in a well-mixed, temperate estuary. *Estuaries* **17**: 898-912.

Boesch, D. F., M. N. Josselyn, A. J. Mehta, J. T. Morris, W. K. Nuttle, C. A. Simenstad, and D. J. P. Swift. 1994. Scientific assessment of coastal wetland loss, restoration and management in Louisiana. *J. Coast. Res*., Spec. Issue **20**. 103 pp.

Simenstad, C.A., D.J. Reed, D.A. Jay, J.A. Baross, F.G. Prahl and L.F. Small. 1994a. Land-margin ecosystem research in the Columbia River estuary: investigations of the couplings between physical and ecological processes within estuarine turbidity maxima. Pp. 437-444 i*n* K. Dyer & B. Orth (eds.), *Changing Particle Flux in Estuaries: implications from science to management* (ECSA22/ERF Symposium, Plymouth, September 1992), Olsen & Olsen Press, Fredensborg.

Simenstad, C.A., C.A. Morgan, J.R. Cordell, and J.A. Baross. 1994b. Flux, passive retention, and active residence of zooplankton in Columbia River estuarine turbidity maxima. Pp. 473-482 i*n* K. Dyer & B. Orth (eds.), *Changing Particle Flux in Estuaries: implications from science to management* (ECSA22/ERF Symposium, Plymouth, September 1992), Olsen & Olsen Press, Fredensborg.

Baross, J. A., B. Crump and C. A. Simenstad. 1994. Elevated microbial loop activities in the Columbia River estuarine turbidity maxima. Pp. 459-464 *in* K. Dyer & B. Orth (eds.), *Changing Particle Flux in Estuaries: implications from science to management* (ECSA22/ERF Symposium, Plymouth, September 1992), Olsen & Olsen Press, Fredensborg.

Simenstad, C. A., and R. M. Thom. 1995. *Spartina alterniflora* as an invasive halophyte in Pacific Northwest estuaries. *Hortus Northwest* **6**:9-12,38-40.

Simenstad, C. A., and K. L. Fresh. 1995. Influence of intertidal aquaculture on benthic communities in Pacific Northwest estuaries: scales of disturbance. *Estuaries* **18**:43-70.

Jay, D. A., and C. A. Simenstad. 1996. Downstream effects of water withdrawal in a small, West Coast river basin: erosion and deposition on the Skokomish River delta. *Estuaries* **19**: 501-517.

Simenstad, C. A., and R. M. Thom. 1996. Assessing functional equivalency of habitat and food web support in a restored estuarine wetland. *Ecol. Appl.* **6**:38-56.

Paveglio, F. L., K. M. Kilbride, C. E. Grue, C. A. Simenstad, and K. L. Fresh. 1996. Use of Rodeo® and X-77® Spreader to control smooth cordgrass (*Spartina alterniflora*) in a southwestern Washington estuary: I. Environmental fate. *Environ. Toxicol. Chem.* **15**: 961-968.

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Crump, B. C., J. A. Baross and C. A. Simenstad. 1997. Dominance of particle-attached bacteria in the Columbia River estuary, USA. *Aquat. Microb. Ecol.* **14**: 7-18.

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Miller, J. A., and C. A. Simenstad. 1997. A comparative assessment of a natural and created estuarine slough as rearing habitat for juvenile chinook and coho salmon. *Estuaries* **20**:792-806.

Prahl, F. P., L. F. Small, B. Sullivan, J. Cordell, C. A. Simenstad, B. C. Crump, and J. A. Baross. 1998. Biogeochemical gradients in the lower Columbia River. *Hydrobiologia* **361**:37-52.

Feist, B. E., and C. A. Simenstad. 2000. Expansion rates and recruitment frequency of exotic smooth cordgrass, *Spartina alterniflora* (Loisel) colonizing unvegetated littoral flats in Willapa Bay, Washington. *Estuaries* **23**:267-274.

Simenstad, C. A., and J. R. Cordell. 2000. Ecological assessment criteria for restoring anadromous salmonid habitat in Pacific Northwest estuaries. *Ecol. Engineering* **15**:283-302.

Simenstad, C. A., and R. S. Warren. 2002. Introduction to the special issue on dike/levee breach restoration of coastal marshes. *Restoration Ecology* **10**: i.

Gray, A., C. A. Simenstad, D. L. Bottom and T. J. Cornwell. 2002. Contrasting functional performance of juvenile salmon in recovering wetlands of the Salmon River estuary, Oregon USA. *Restor. Ecol.* **10**: 514-526.

Toft, J. D., C. A. Simenstad, J. R. Cordell, and L. F. Grimaldo. 2003. The effects of introduced water hyacinth on habitat structure, invertebrate assemblages, and fish diets. *Estuaries* 26: 746-758.

Garono, R. J., C. A. Simenstad, R. Robinson and H. Ripley. 2004. Using high spatial resolution hyperspectral imagery to map intertidal habitat structure in Hood Canal, WA (USA). *Can. J. Remote. Sensing* **30**:54-63.

Lubetkin, S. C., and C. A. Simenstad. 2004. Two multi-source mixing models using conservative tracers to estimate food web sources and pathways. *J. Appl. Ecol.* **41**: 996-1008.

Bottom, D. L., K. K. Jones, T. J. Cornwell, A. Gray, and C. A. Simenstad. 2005. Patterns of Chinook salmon migration and residency in the Salmon River Estuary (Oregon). *Est. Coastal Shelf Sci.* **1**:79-93.

Dean, A. F., S. M. Bollens, C. A. Simenstad and J. R. Cordell. 2005. Marshes as sources or sinks of an estuarine mysid: demographic patterns and tidal flux of *Neomysis kadiakensis* at China Camp marsh, San Francisco estuary. *Est., Coast. Shelf Sci.* **63**: 1-11.

Orth, K., J.W. Day, D.F. Boesch, E.J. Clairain, W.J. Mitsch, L. Shabman, C. Simenstad, B. Streever, C. Watson, J. Wells and D. Whigham. 2005. Lessons learned: An assessment of the effectiveness of a National Technical Review Committee for oversight of the plan for the restoration of the Mississippi Delta. *Ecol. Engineer.* **25**:153-167.

Simenstad, C. A., C. Tanner, J. Cordell, C. Crandell and J. White. 2005. Challenges of habitat restoration in a heavily urbanized estuary: Evaluating the investment. *J. Coast. Res.***40**: 6-23.

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Koehler, M. E., K. L. Fresh, D. A. Beauchamp, J. R. Cordell, C. A. Simenstad and D. Siler. 2006. Diet and bioenergetics of lake-rearing juvenile Chinook salmon in Lake Washington. *N. Am. J. Fish Mgmt.* **135**: 1580-1591.

Reisewitz, S. E., J. A. Estes, and C. A. Simenstad. 2006. Indirect food web interactions: sea otters and kelp forest fishes in the Aleutian archipelago. *Oecologia* **146**:623-631.

Simenstad, C. A., D. Reed, and M. Ford. 2006. When is restoration not? Incorporating landscape-scale processes to restore self-sustaining ecosystems in coastal wetland restoration. *Ecol. Engineer.* **26**: 27-39.

Van Cleve, F. B., T. Leschine, T. Klinger, and C. A. Simenstad. 2006. An evaluation of the influence of natural science in regional-scale restoration projects. *Environ. Mgmt.* **37**: 367-379.

Visintainer, T. A., S. M. Bollens, and C. A. Simenstad. 2006. Community composition and diet of fishes as a function of tidal channel order: A field study in China Camp Marsh, San Francisco Estuary. *Mar. Ecol. Prog. Ser.* **321**: 227-243.

Day, J. W., Jr., D. F. Boesch, E. J. Clairain, G. P. Kemp, S. Laska, W. J. Mitsch, K. Orth, H. Mashriqui, D. R. Reed, L. Shabman, C. A. Simenstad, B. J. Streever, and R. R. Twilley. 2007. Restoration of the Mississippi Delta: lessons learned from Hurricanes Katrina and Rita. *Science* 315: 1679-1684. [DOI 10.1126/science.1137030]

Howe, E.R., and C. A. Simenstad. 2007. Characterizing restoration trajectories through food web linkages in San Francisco Bay's estuarine marshes: A manipulative translocation experiment. *Mar. Ecol. Prog. Ser.* **351**:65-76. [DOI 10.3354/meps07120]

Toft, J., J. Cordell, L. Stamatiou and C. A. Simenstad. 2007. Fish distribution, abundance, and behavior along city shoreline types in Puget Sound. *N. Am. J. Fish. Mgmt.* **27**: 465–480. [DOI 10.1577/M05-158.1]

Peterson, C.H., K. W. Able, C. F. DeJong, M.F. Piehler, C. A. Simenstad, and J. B. Zedler. 2008. Practical proxies for tidal marsh ecosystem services: Application to injury and restoration. *Adv. Mar. Biol.* 54:221-266. [DOI 10.1016/S0065-2881(08)00004-7]

Bottom, D. L., K. K. Jones, C. A. Simenstad, and C. L. Smith. 2009. Reconnecting social and ecological resilience in salmon ecosystems. *Ecol. Society* **14**: 5. [online] URL: http://www.ecologyandsociety.org/vol14/iss1/art5/

Gardner, R. C., J. Zedler, A. Redmond, R. E. Turner, C. A. Johnston, V. R. Alvarez, C. A. Simenstad, K. L. Prestegaard, and W. J. Mitsch. 2009a. Compensating for wetland losses under the Clean Water Act (Redux): Evaluating the Federal Compensatory Mitigation Regulation. *Stetson Law Rev.* **38**:213-249.

Gardner, R. C., J. Zedler, A. Redmond, R. E. Turner, C. A. Johnston, V. R. Alvarez, C. A. Simenstad, K. L. Prestegaard, and W. J. Mitsch. 2009b. Compensating for wetland losses under the Clean Water Act (Redux): Evaluating the Federal Compensatory Mitigation Regulation. *Natl. Wetl. Newsletter* **31**:1, 3-7,20. [synopsis of Gardner *et al.* 2009a]

Jackson, E. L., and C. A. Simenstad. 2009. Introduction to the special issue on seagrass landscapes. *Est. Coast. Shelf Sci.* **68**: 379.

Maier, G. O., and C. A. Simenstad. 2009. The role of marsh-derived macrodetritus to the food webs of juvenile Chinook salmon in a large altered estuary. *Estuaries Coasts* **32**: 984-998. [DOI 10.1007/s12237-009-9197-1]

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Sobocinski, K. L., J. R. Cordell, and C. A. Simenstad. 2010. Effects of shoreline modifications on supratidal macroinvertebrate fauna on Puget Sound, Washington beaches. *Estuaries Coasts* **33**:699-711 [DOI 10.1007/s12237-009-9262-9]

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Boström, C., S. Pittman, C. A. Simenstad, and R. T. Kneib. 2011. Seascape ecology of coastal biogenic habitats: advances, gaps and challenges. *Mar. Ecol. Prog. Ser.* **427**:191-217.

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Thom, R. M., C. A. Simenstad, J. R. Cordell, and E. O. Salo. 1989. Fish and their epibenthic prey in a marina and adjacent mudflats and eelgrass meadow in a small estuarine bay. FRI-UW-8901, Rep. for The Port of Bellingham, Fish. Res. Inst., Univ. Wash., Seattle, WA. 27 pp.

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Thom, R. M., C. A. Simenstad, J. R. Cordell, D. K. Shreffler, and L. Hamilton. 1990. The Lincoln Avenue wetland system in the Puyallup River estuary, Washington: Phase IV report; year four monitoring, January-December 1989. FRI-UW-9004, Rep. to Port of Tacoma, Fish. Res. Inst., Univ. Wash., Seattle, WA. 44 pp.

Thom, R. M., C. A. Simenstad, J. R. Cordell, and L. Hamilton. 1991. The Gog-Li-Hi-Te wetland system in the Puyallup River estuary, Washington; Phase V Report, Year five monitoring, January-December 1990. FRI-UW-9108. Fish. Res. Inst., Univ. Wash., Seattle, WA. 44 pp.

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Simenstad, C. A., R. M. Thom, and A. M. Olson (eds.). 1997. Mitigation between regional transportation needs and preservation of eelgrass beds. Final Report WA-RD 421.1, Res. Proj. T9903, Task 51, Washington State Department of Transportation, Olympia, WA. Appendices I (143 pp.) and II.

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Garono, R. J., R. Robinson, and C. Simenstad. 2002. Assessment of estuarine and nearshore habitats for threatened salmon stocks in the Hood Canal and eastern Strait of Juan de Fuca, Washington State: Focal Areas 1-4. Rept. submitted to Point No Point Treaty Council, Earth Design Consultants, Inc., Wetland & Watershed Assessment Group, Corvallis, OR. 27 pp + figs.

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Clancy, M., I. Logan, J. Lowe, J. Johannessen, A. MacLennan, F.B. Van Cleve, J. Dillon, B. Lyons, R. Carmen, P. Cereghino, B. Barnard, C. Tanner, D. Myers, R. Clark, J. White, C. Simenstad, M. Gilmer, and N. Chin. 2009. Management measures for protecting and restoring the Puget Sound nearshore. Tech. Rep. 2009-01, Puget Sound Nearshore Ecosystem Restoration Project, Washington, Department of Fish and Wildlife, Olympia, WA. 295 pp.

Ono, K., C.A. Simenstad, J.D. Toft, S.L. Southard, K.L. Sobocinski, and A. Borde. 2010. Assessing and Mitigating Dock Shading Impacts on the Behavior of Juvenile Pacific Salmon (Oncorhynchus spp.): Can Artificial Light Mitigate the Effects? Wash. State Transport, Center, Res. Rept. WA-RD-755.1, prep. for Wash. State Dept. Transport., Olympia, WA. 74 pp + appendices.

Toft, J.D., J.R. Cordell, S.M. Heerhartz, E.A. Armbrust and C.A. Simenstad. 2010. Fish and invertebrate response to shoreline armoring and restoration in Puget Sound. Pp. 161-170 *in* H. Shipman, M.N. Dethier, G. Gelfenbaum, K.L. Fresh, and R.S. Dinicola (eds.),Puget Sound Shorelines and the Impacts of Armoring—Proceedings of a State of the Science Workshop, May 2009: U.S. Geological Survey Scientific Investigations Report 2010–5254.

Dethier, M. N., G. Gelfenbaum and C.A. Simenstad. 2010. Summary of discussion from breakout groups. Pp. 221-228 *in* H. Shipman, M.N. Dethier, G. Gelfenbaum, K.L. Fresh, and R.S. Dinicola (eds.),Puget Sound Shorelines and the Impacts of Armoring—Proceedings of a State of the Science Workshop, May 2009: U.S. Geological Survey Scientific Investigations Report 2010–5254.

Simenstad, C.A., M. Ramirez, J. Burke, M. Logsdon, H. Shipman, C. Tanner, J. Toft, B. Craig, C. Davis, J. Fung, P. Bloch, K. Fresh, S. Campbell, D. Myers, E. Iverson, A. Bailey, P. Schlenger, C. Kiblinger, P. Myre, W. Gerstel, and A. MacLennan. 2011. Historical Change and Impairment of Puget Sound Shorelines: Atlas and Interpretation of Puget Sound Nearshore Ecosystem Restoration Project Change Analysis. Puget Sound Nearshore Ecosystem Restoration Project Report No. 2011-01. Published by Washington Department of Fish and Wildlife, Olympia, Washington, and U.S. Army Corps of Engineers, Seattle, Washington. [http://www.pugetsoundnearshore.org/technical_papers/change_analysis.pdf]

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Cereghino, P., J. Toft, C. Simenstad, E. Iverson, S. Campbell, C. Behrens, J. Burke. 2012. Strategies for nearshore protection and restoration in Puget Sound. Puget Sound Nearshore Report No. 2012-01. Published by Washington Department of Fish and Wildlife, Olympia, Washington, and the U.S. Army Corps of Engineers, Seattle, Washington. [http://www.pugetsoundnearshore.org/technical_papers/PSNERP_Strategies_NoMaps.pdf]

Brandon, T., N. Gleason, C. Simenstad, and C. Tanner. 2013. Puget Sound Nearshore Ecosystem Restoration Project Monitoring Framework. Prepared for the Puget Sound Nearshore Ecosystem Restoration Project. Published by Washington Department of Fish and Wildlife, Olympia, Washington, and U.S. Army Corps of Engineers, Seattle, Washington. 73 pp.

Walker, C. M., C. A. Simenstad, T. H. Neher, S. J. Barid, J. Maurer, and E. Sosik. 2013. Identifying key habitats for juvenile salmon in the Fox River flats estuary State Wildlife Grant Project T-10-3 P17, Kachemak Bay Research Reserve, Homer, Alaska. 98 pp.

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Direct Involvement in Committees, Symposia and Meetings

Current Membership:

- Member, Research Advisory Committee, Padilla Bay National Estuarine Research Reserve, 1989-present
- Member, Scientific Advisory Group (SAG), Interagency Ecological Program (IEP), San Francisco Bay; December 1998-present
- Member, Padilla Bay Foundation, 2019-present

Past Membership/Involvement, and Invited Presentations:

- Co-chairman, 1976 and 1978 Fish Food Habits workshops (GUTSHOP 1976 and 1978) at Astoria, Oregon, October 1976, and Lake Wilderness, WA, October 1978, respectively
- Convener, Ecological Implications of Enhancement session, 1979 Annual Meeting, Pacific N.W. Chapter, American Fisheries Society, February 1979, Bellingham, WA
- Chairman, Estuarine, and Nearshore Influences upon Pink and Chum Salmon Run Variability session, 1980 NE Pac. Pink and Chum Salmon Workshop, Sitka, AK. February 1980
- Co-Chairman, GUTSHOP '81 Fish Food Habits Studies Workshop, 6-9 December 1982, Pacific Grove, CA.
- Chairman, Mini-symposium on Fish Stomach Contents Analyses. Oct. 20, 1982. Inst. Freshwat. Res., Drottningholm, Sweden
- Co-Chairman, 1982-1983 N.E. Pac. Pink and Chum Salmon Workshop, Rosario, Orcas Island, WA. January, 1983
- Delegate, Estuarine Research Federation Delegation on Estuarine Research to People's Republic of China, March 24-April 9, 1983
- Panel Member, Marine and Aquatic Ecosystems Panel; First Glacier Bay Science Symposium, Glacier Bay Lodge, AK. September 23-26, 1983.
- Co-Chairman, Working Group on Estuaries and Inlets. Salmonid Oceanography Workshop, 8-10 November 1983, Oregon State Univ., Mar. Sci. Center, Newport, OR
- Co-Chairman, Gutshop '84 Fish Food Habits Workshop, 2-6 December 1984, Pacific Grove, CA.

- Member, Technical Advisory Committee, "Wetland Functions, Rehabilitation, and Creation in the Pacific Northwest: The State of Our Understanding," April-May 1986 Workshop, Port Townsend, WA. Wash. State Dept. Ecology
- Member, Ad-hoc Committee on Mitigation Strategies in Urbanized Estuaries of the Pacific Northwest, April 1986-1991
- Resource Expert, Ocean Use Planning for the Exclusive Economic Zone, invitation-only workshop, January 1986
- Member, Habitat Monitoring Subcommittee, Puget Sound Water Quality Authority, March-May 1987
- Resource Expert, "Saving Our Bays, Sounds, and Great Lakes: An Activists' Agenda", Save the Bay Conference, 19-23 October 1987, Warwick, RI
- Session Leader, Habitat Modification Session, First Symposium on Puget Sound Research, Puget Sound Water Quality Authority, March 1988
- Participant, Freshwater Inflow/San Francisco Bay Workshop, Interagency Ecological Study Program, 12-14 July, 1988, Sausalito, CA
- Convener, Effects of Dredging Upon Anadromous Fishes on the Pacific Coast, workshop, 8-9 September 1988, Seattle, WA
- Organizer, Estuarine Wetland Mitigation Protocol Development Workshop, 16-19 April 1989, Port Townsend, WA
- Co-Convener, "Wetlands and Seagrass Beds as Critical Habitats" session, Tenth Biennial International Estuarine Research Conference, 8-12 October 1989, Baltimore, MY
- Member, Technical Subcommittee, Pacific Northwest OCS Task Force, 1989-1991
- Expert Witness, US-NOAA, Office of General Counsel, GCNW, US vs. City of Seattle and METRO, March 1990-September 1991
- Member, Scientific Resource Panel, Lower Columbia River Bi-State Water Quality Program, November 1990-December 1996
- Member, Washington Department of Ecology, Oil Spill Compensation Schedule Scientific Advisory Committee; Marine Habitats and Salmon Subcommittees; 1991-1992
- Participant, Entrapment Zone Workshop, Interagency Food Chain Working Group, 16 December 1991, Concord, CA
- Member, W. Alton Jones Panel on Coastal Marsh Loss and Restoration in Louisiana, September 1993-March 1994
- Member, Technical Resource Panel, An Ecosystem Approach to Understanding Coastal Resources Workshop, Research and Education for Managing the Coastal Resources of the Olympic Peninsula, November 16-17, 1993
- Technical Program Co-chair, Society of Wetland Scientists, 15th National Meeting, May 30-June 3, 1994
- Session Chair, The Terrestrial/Marine Interface, Conference on the Environment and People of the Coastal Temperate Rainforest, Whistler, BC, Canada, August 29-31, 1994
- Panelist, Workshop on Ecological Carrying Capacity for Columbia Basin Salmon Habitats, Portland, OR, September 6-7, 1995
- Panelist, 1st Workshop on Restoration of the San Francisco Bay-Delta-River: Choosing Indicators of Ecological Integrity, October 28, 1995
- Co-chair, Land Margin Ecosystem Research session, Estuarine Research Federation 13th International Conference, Corpus Christi, Texas, November 12-16, 1995
- Co-Chair, Biological Importance of Flocculation/Aggregation session, ECSA27/ERF'96, Middleburg, NL, September 16-20, 1996
- Member, Technical Team, Chinook River Basin Restoration Plan, August-December 1996

- Member, Corresponding Scientific Committee, 3rd International Congress Limnology-Oceanography, "Interfaces: Oceans, Rivers and Lakes--energy and substance transfers at Interfaces session, Nante, France, October 7-9, 1996; Co-Chair, Interface Between Nutrients and Physical Medium session
- Member, Tillamook Bay National Estuary Project Scientific/Technical Advisory Committee, March 1994-June 1996
- Member, Fish and Wildlife Work Group, Lower Columbia River Bi-Sate Water Quality Program, 1993-1996
- Committee of Science Advisors (CSA), San Francisco Estuary Institute; May 1996-December 1997
- Invited speaker; "Ecological Assessment Criteria for Restoring Anadromous Salmonid Habitat in Pacific Northwest Estuaries," w/ JR Cordell, Goal Setting and Success Criteria for Coastal Habitat Restoration conference, 12-15 January 1998, Charleston, SC.
- Plenary speaker; "Evaluating Coastal Wetland Restoration: Structure, Process or Function," Recent Research in Coastal Louisiana: Natural System Function and Response to Human Influences, 3-5 February 1998, Lafayette, LA.
- Review Panel, San Francisco Estuary-River-Ecosystem Restoration Project; October 1995-October 1998
- ISRP Peer Review Group, Columbia River Basin Fish and Wildlife Plan, Bonneville Power Authority; November 1998-April 1999
- Representative, Coastal Environment Science and Technology (CEST) Panel meeting, US-Japan Agreement on Natural Resources (UNJR), 17-20 March 1998, Yokosuka, Japan
- Long-term Monitoring Subcommittee, Lower Columbia River Estuary Program, May 1997-March 1999
- Science Review Group, San Francisco Bay Area Wetlands Ecosystem Goals Project, December 1996-May 1999
- University of Washington Professional Staff Organization, Board, June 1995-June 1999
- *Ex officio*, University of Washington Faculty Council on Research, November 1995-June 1999
- Nearshore Technical Committee, Central Puget Sound Watershed Forum; January 2000-December 2000
- Member, Winchester Tidelands Restoration Advisory Group, South Slough National Estuarine Research Reserve, June 1993-2000
- Participant, Environmental Windows for Dredging Workshop, National Academy of Sciences (NAS), National Research Council (NRC); March 2001
- Committee on Mitigating Wetland Losses, National Academy of Sciences (NAS), National Research Council (NRC); January 2000-October 2001
- Citizens Advisory Committee for Central Waterfront Master Plan, City of Seattle; October 2000-February 2002
- CALFED Scientific Peer-Review; February 2002
- Participant, Environmental Windows Workshop: Achieving Dredging Decisions That Balance Economic and Environmental Concerns, U.S. Section 100th Anniversary Conf. International Navigation Association, Vicksburg, MI; April 2002
- Chair, Scientific Review Panel, USGS San Francisco Place-Based Program, Salt Pond Studies, September 2002
- Coastal Environment Science and Technology (CEST) Panel, US-Japan Agreement on Natural Resources (UNJR); January 1998-December 2002
- Scientific Program Co-Chair (w/ S. Bollens), Estuarine Research Federation Biennial Meeting, September 2003, Seattle, Washington; September 2000-2003
- Member, Louisiana Coastal Area (LCA), National Technical Review Committee (NTRC), US Army Corps of Engineers and State of Louisiana; 2001-2003
- Participant, "The Science of Eelgrass Forum," Port Townsend Marine Science Center, Port Townsend, Washington; April 2004

- Session Chair, "Estuarine and Tidal Wetlands" session, and panel member, "The Next 25 Years: Your Future Career in Wetland Science" symposium; Society of Wetland Scientists, 25th Anniversary Meeting, July 2004, Seattle, Washington
- Plenary Speaker and session co-chair, "Towards an Integrated Knowledge and Management of Estuarine Systems," ECSA Local Meeting Symposium; September 2004, Lisbon, Portugal
- Session Chair, "Re-Emergence of Shallow Water Ecosystems across the Bay and Delta" session, and presenter; 3rd Biennial CALFED Bay-Delta Program Science Conference; October 2004, Sacramento, California
- Testimony, "Intertidal Distribution and Ecological Function of Eelgrass (*Zostera marina*) in Hood Canal, Washington;" Washington State House of Representatives, Select Committee on Hood Canal, 24 February 2005, Olympia, WA
- Science Advisor Panel, Environmental Law Institute project on wetland mitigation performance standards, September 2003 – December 2004
- Pacific Estuarine Ecosystem Indicator Research Consortium (PEEIR), Science Advisory Committee; May 2002 - December 2004
- Scientific Peer Review Panel for Tidal Wetlands Restoration Handbook project, California State Coastal Conservancy, August 2002-October 2004
- Scientific Working Group, Toward a New Framework for Planning the Future of Coastal Louisiana after the Hurricanes of 2005, November 2005-December 2005
- Scientific Advisory Committee, Sea Resources; September 2001-December 2006
- Executive Steering Committee, University of Washington Earth Initiative, May 2004-January 2007
- National Scientific Advisory Panel, San Francisco Bay Salt Pond Project, California Coastal Conservancy, March 2003-April 2007
- ESA Compliance Science Panel, Washington Department of Natural Resources, June-December 2006
- Fireside Chat speaker, 53rd annual Eastern Pacific Ocean Conference, Timberline Lodge, Oregon; 29 September 2006
- Program Committee, Steering Committee, 2nd National Conference on Ecosystem Restoration (April 2007), May 2006-April 2007
- Review Panel, Mid-Term Review of Plum Island Ecosystem Long-Term Ecological Research (PIE-LTER) program; National Science Foundation, October 2007
- Contributing author, Synthesis and Assessment Product (SAP 4.4), Strategic Plan of the U.S. Climate Change Science Program, September 2006-May 2008
- Core Working Group member, Puget Sound Partnership, Biodiversity/Species/Food Web Topic Forum, February-April 2008
- Session co-chair, "Medium and Long-Term Recovery of Marine and Estuarine Ecosystems—A Guide to Providing Useful Information in New Scenarios to Restore Ecological Integrity", ASLO 2009, Nice, FR, January 2008
- Louisiana Coastal Protection and Restoration Authority Integrated Planning Team (IPT), Science and Engineering Review Team (SERT), August 2006-December 2008
- Board of Advisors, University of Washington Educational Outreach Program in Environmental Regulation; April 2001-April 2008
- Member, USACE Engineer Research and Development Center, Environmental Benefits Assessment program review panel, March-April 2009
- Member, USACE Engineer Research and Development Center, Environmental Program, recruitment review panel, July-August 2009
- Member, CALFED Science Program Independent Review Panel, 2-Gates Fish Protection Demonstration Project, August 2009

- Program Committee, Plenary Committee, Steering Committee, 3nd National Conference on Ecosystem Restoration (July 2009), August 2007-July 2009
- Member, USACE Engineer Research and Development Center, Ecosystem Restoration Recruitment review panel, March-August 2009
- University of Washington, Restoration Ecology Network (UW-REN) faculty steering committee, March 2008-2010
- Member, National Program Committee, 5th National Conference on Coastal and Estuarine Habitat Restoration (Restore America's Estuaries), November 2010; September 2009-November 2010
- Member, Estuarine Coastal Sciences Association Council, 2005-2010
- Member, Scientific Advisory Board, Port Townsend Marine Science Center, April 1986-December 2010
- Northwest Estuary Science Committee, The Nature Conservancy, April 2005-December 2010
- Member, Board of Advisors, University of Washington Educational Outreach Certificate Program in Wetland Science and Management; April 1994-December 2010
- Chair, Puget Sound Nearshore Ecosystem Restoration Project, Nearshore Science Team; January 2002-June 2011
- Member, Steering Committee, Puget Sound Institute, Comprehensive Ecosystem Recovery Workshop, May 2013; January-May 2013
- Member, Program Committee, 4th National Conference on Ecosystem Restoration, August 1-5, 2011; December 2009-August 2011
- Science Work Group, Lower Columbia River Estuary Program; April 2000-November 2011
- Member, Review Panel, NSF Long-Term Ecological Research, Palmer (Antarctica) LTER review; December 2011
- Plenary Speaker, WISER Final Conference, Tallinn, Estonia; January 2012
- Member, External Review Panel, Pacific Northwest National Laboratory Marine Science Laboratory, Seattle and Sequim, Washington; March 2012
- Member, Louisiana Technical Advisory Committee on Predictive Models, June 2010-August 2012
- Member, Committee on the Evaluation of the Drakes Bay Oyster Company Special Use Permit DEIS and Peer Review, National Academy of Sciences, National Research Council; June-August 2012
- Member, National Program Committee, 6th National Conference on Coastal and Estuarine Habitat Restoration (Restore America's Estuaries), October 2012; September 2011-October 2012
- Invited speaker, State of the Gulf of Mexico Summit 2014, The Importance of Restoration Metrics and Outcomes to Guide Restoration Programs panel; March 24-27, 2014
- Volume Co-Editor, "Treatise on Estuarine and Coastal Science", Elsevier, April 2008-present

Reviewer

Manuscripts:

American Naturalist
American Zoologist
Aquatic Conservation: Marine and Freshwater Ecosystems
Biological Conservation
BioScience
Bulletin of Marine Science
Canadian Journal of Fisheries and Aquatic Sciences
Canadian Journal of Zoology
Chinese Journal of Oceanology and Limnology
Coastal Management Journal
Marine Ecology-Progress Series
Coastal Shelf Research
Copeia
Ecological Applications
Ecological Engineering
Ecological Monographs
Ecology
Ecosphere
Ecosystems
Environmental Biology of Fishes
Environmental Conservation
Environmental Management

Estuaries & Coasts
Estuarine, Coastal and Shelf Science
Fishery Bulletin
Frontiers in Marine Ecology
Hydrobiologia
ICES Journal of Marine Science
Journal of Animal Ecology
Journal of Applied Ecology
Journal of Experimental Marine Biology and Ecology
Limnology and Oceanography
Marine Biology
Northwest Environmental Journal
Northwest Science
Oecologia
Oikos
Restoration Ecology
Science
Southeastern Naturalist
Sustainability Science, Practice and Policy
Transactions of the American Fisheries Society
Vegetatio
Wetland Ecology and Management

Proposals & Other Documents:

Alaska Sea Grant Program
CALFED/Bay-Delta Science Program
California Coastal Commission
California Sea Grant Program
Canadian Foundation for Climate and Atmospheric Sciences
Coastal Restoration and Enhancement through Science and Technology (CREST)
Connecticut Sea Grant Program
Fonds Wetenschappelijk Onderzoek – Vlaanderen (Research Foundation-Flanders)
Georgia Sea Grant Program
Hudson River Foundation
Maryland Sea Grant Program
Mississippi-Alabama Sea Grant Program
National Science Foundation
National Estuarine Research Reserve Program
National Fish and Wildlife Federation
National Marine Fisheries Service-National Science Foundation (US GLOBEC)
National Sea Grant Program
Natural Environment Research Council (UK)
Natural Sciences and Engineering Research Council of Canada
NOAA-West Coast National Undersea Research Center
New Hampshire Sea Grant Program
New Jersey Sea Grant Program
North Carolina Sea Grant Program
North Pacific Research Board
Olympic Natural Resource Center
Oregon Sea Grant Program
People for Puget Sound
Research Foundation Flanders
Science Council of British Columbia
Texas Sea Grant Program
Tillamook Bay National Estuary Program
University of Washington-Royalty Research Fund
USGS National Climate Change and Wildlife Service Center
Virginia Sea Grant Program
Washington Sea Grant Program
Western Regional Center, National Institute for Global Environmental Change
William H. Donner Foundation
Woods Hole Oceanographic Institution Sea Grant Program

Teaching

A Landscape Understanding of Wetland Processes, Stresses and Preservation; University of Washington, Certificate Program in Wetland Science and Management; Winter Quarters 1995-1999 (co-taught with J. Karr, G. Hood or M. Logsdon), 2000-2014

Puget Sound Nearshore: *Understanding the Past and Assessing the Future*; University of Washington, School of Marine Affairs, SMA550b, Fall Quarter 2006 (co-taught with T. Leschine, M. Logsdon and J. Burke)

Nearshore Habitats and Food Webs; Port Townsend Marine Science Center and Washington Sea Grant Workshop Series; 10 April 2004

Watershed to Estuary: *The Restoration Continuum*; University of Washington, School of Aquatic and Fishery Sciences; FISH513, Fall Quarter 2001 (co-taught with R. Wissmar),

Applied Ecology and Management of Wetlands; University of Washington, Extension; Fish507U, Winter Quarter 1993 (co-taught K. Kunz)

Seminar Series: How Can We Better Integrate Behavior and Ecology into Fisheries Management; School of Fisheries, Fish507S, Winter Quarter 1992 (co-taught with D. Stouder)

Applied Ecology and Management of Wetlands; University of Washington, Extension; Fish507TA, Winter Quarter 1992 (co-taught with F. Weinmann and K. Kunz)

Wetlands: Function, Mitigation and Restoration; 2-day short course, NOAA Coastal Resource Coordinators, Seattle, Washington , May 1991 (co-taught with R. M. Thom)

Applied Ecology of Wetlands; School of Fisheries, University of Washington; Fish507C, Summer Quarter 1990 (co-taught with R. M. Thom)

Estuarine Fishes of the Pacific Northwest: Love, Life and Death on the Flats; Western Washington University Continuing Education 478E-850, Spring 1989, Padilla Bay National Estuarine Research Reserve (short course)

Estuaries of the Pacific Northwest; School of Fisheries, University of Washington; Fish 522C Seminar Series, Winter Quarter 1985 (co-taught with R. C. Wissmar)

Estuarine Dynamics of the Pacific Northwest; School of Fisheries, University of Washington; Fish 499E/507E Estuaries Select Program, Spring Quarter 1985 (co-taught with R. C. Wissmar)

Wetlands Restoration Training Course; 3-day short course, NOAA Restoration Center, Silver Spring, Maryland, (co-taught with R. Thom and C. Hackney)

Chair/Member-Graduate Student Committees

Current:

Joshua Kubo, Ph.D., Environmental and Forest Sciences (**Co-Chair**; on-leave)
Robert Oxborrow, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**)
Jon Wittouck, M.S., Aquatic and Fishery Sciences, Univ. Washington (on-leave)

Completed:

Greer (Anderson) Maier, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2006)
Alisa Bieber, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2005)
Justin Boevers, M.S., Marine Affairs, Univ. Washington (2008)
Troy W. Buckley, M.S., Fisheries, Univ. Washington (1995)
Sahrye Cohen, M.S., Romberg Tiburon Center for Environmental Studies, San Francisco State Univ. (2006)
Bethany Craig, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2010)
Caren Crandell, M.S., Urban Horticulture—Forest Resources, Univ. Washington (1999)
Caren Crandell, Ph.D., Forest Resources, Univ. Washington (2018)
Byron Crump, Ph. D., Oceanography, Univ. Washington (1999)
Molly Cobliegh, M.S., Aquatic and Fishery Sciences, Univ. Washington (2003)
Jeffery R. Cordell, M.S., Fisheries, Univ. Washington (1986)
Aaron David, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2014)
Emily Davis, M.S., Aquatic and Fishery Sciences, Univ. Washington (2015)
Elizabeth Duffy, M.S., Aquatic and Fishery Sciences, Univ. Washington (2003)
Eva Dusek Jennings, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2012)
Christopher Eaton, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2012)
Crystal Elliot, M.S., Urban Horticulture—Forest Resources, Univ. Washington (2004)
Amy Federline, M.S., Romberg Tiburon Center for Environmental Studies, San Francisco State Univ. (2004)
Blake E. Feist, Ph.D., Fisheries, Univ. Washington (1999)
David Finlayson, Ph.D., Oceanography, Univ. Washington (2006)
Halley Froehlich, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (2015)
Aaron Gallaway, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (2013)
Pascale Goertler, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2014)
Maureen Goff, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2010)
Molly Good, M.S., Marine and Environmental Affairs, Univ. Washington (2013)
Deborah Goodwin, M.S., Biology for Teachers, Univ. Washington (2004)
Ayesha L. Gray, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (**Co-Chair**; 2005)
Melora Haas, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2002)
Danelle Heatwole, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2004)
Sarah Heerhartz, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair;** 2010)

Sarah Heerhartz, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2013)
Noble Hendrix, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (2003)
William G. Hood, Ph.D., Fisheries, Univ. Washington (2000)
Emily Howe, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2006)
Emily Howe, Ph.D., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2012)
Laura Johnson, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2010)
Brittany Jones, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2015)
Michele Koehler, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Co-chair**; 2002)
Errin Kramer-Wilt, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2010)
Ilon Logan, M.S., Marine Affairs, Univ. Washington (2011)
Mary-Austill Lott, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**, 2004)
Susan Lubetkin, M.S., QUERM, Univ. Washington (1997)
Chris M. Luecke, Ph.D., Zoology, Univ. Washington (1986)
Robert M. Mayer, M.S., Fisheries, Univ. Washington (1980)
Jessica A. Miller, M.S., Fisheries, Univ. Washington (1993)
Cheryl A. Morgan, M.S., Fisheries, Univ. Washington (1993)
Stuart Munsch, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2016)
Barbara Nightengale, M.S., Marine Affairs, Univ. Washington (2002)
Kotaro Ono, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2010)
Mary Ramirez, M.S., Aquatic and Fishery Science, Univ. Washington (**Chair**; 2008)
Stephen Ratchford, M.S., Fisheries, Univ. Washington (1995)
Shauna Reisewitz, M.S., Univ. California-Santa Cruz (2002)
Casey Rice, Ph.D., Fisheries, Univ. Washington (2007)
Lauren E. Rich, M.F.R., Urban Horticulture, Univ. Washington (1993)
Mary H. Ruckleshaus, M.S., Fisheries, Univ. Washington (1988)
Lisbeth Seebacher, M.S., Urban Horticulture, Univ. Washington (1997)
Erin Seghesio, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2011)
David K. Shreffler, M.S., Fisheries, Univ. Washington (1989)
Kathryn Sobocinski, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2003)
Elizabeth Sosik, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2012)
Sarah Spilseth; M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2008)
Curtis D. Tanner, M.M.A., School for Marine Affairs, Univ. Washington (1990)
Lucinda Tear, M.S., Fisheries, Univ. Washington (1995)
Jason Toft, M.S., Aquatic and Fishery Sciences, University of Washington (2000)
Daniel M. Tonnes, M.M.A, Marine Affairs, Univ. Washington (2008)
Frances Van Cleve, M.A.A., Marine Affairs, Univ. Washington (2004)
Stacey M. Wenger, M.S., Urban Horticulture, Univ. Washington (1995)
Alicia Wick, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2002)
Victoria Zipperer, M.S., Fisheries, Univ. Washington (1996)
Tammie A. Visintainer, M.S., San Francisco State Univ. (2003)
Kristen Lee Webster, Ph.D., Oceanography, Univ. Washington (Graduate School Representative, 2013)
Carl Young, M.S., Aquatic and Fishery Sciences, Univ. Washington (**Chair**; 2009)

Advising and Consulting, Expert Witness

With Renumeration:

AECOM
Battelle Northwest Laboratories, Marine Sciences Laboratory
CALFED
Cascade Land Conservancy
CH2M-Hill
City of Tacoma, Dept. of Public Works
Columbia River Estuary Study Taskforce
Dames and Moore
Day Island Club, Shoreline Committee

Envirosphere Co.
Gahagan & Bryant Associates, Inc.
Mathematical Sciences Northwest
Native American Rights Fund (Evergreen Legal Services)-Muckleshoot Indian Tribe, Skokomish Indian Tribe
Northwest Power Planning Council
Philip Williams & Associates, LTD (PWA)
Rust, Assoc. Engineers
Suquamish Indian Tribe
Tetra Tech
U. S. Army Corps of Engineers-Waterways Experiment Station
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Damage Assessment Center
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Coastal Sciences Center
U. S. Department of Justice-Environmental Enforcement Section
U. S. Fish and Wildlife Service-Coastal Ecosystems Team
Washington State Department of Fish and Wildlife
Washington Department of Ecology
Woodward-Clyde Consulting, Inc.

Without Renumeration

American Oceans Campaign
Earthjustice
Friends of the Earth
Friends of Gray Harbor
Mary E. Theler Community Wetland Committee
Mendocino County (CA) Resource Conservation District
National Academy of Sciences-National Research Council
Natural Resources Defense Council
Port Townsend Marine Science Center
Save the Resources Committee
Sea Resources
Seattle Audubon Society-WETNET
The Nature Conservancy
U.S. Army Corps of Engineers-Seattle District
U.S. Fish and Wildlife Service-Nisqually Refuge
Washington Department of Fish and Wildlife
Washington State House of Representatives (Select Committee on Hood Canal)

Supplement

Work Experience, Grants, and Contracts

(descending chronology)

Ecological Responses to Russian River Estuary Entrance Alternatives; June 2009 – June 2016; Principal Investigator; Sonoma County Water Agency; develop and implement study to evaluate effects on juvenile salmonids and their prey resources under different conditions of Russian River estuary mouth channel open/closure; $251,763

Comprehensive Salmon Habitat Restoration Planning of the Columbia River Estuary: Phase III; December 2008 – September 2021; Principal Investigator; PC Trask & Assoc., developing a framework for strategic restoration and preservation of juvenile salmon habitat in the Columbia River estuary; $130,000 (to date)

Development and Testing of a Comprehensive Research Plan to Assess Juvenile Salmon Life History and Ecology in the Fox River Estuary; October 2008 – June 2013; Principal Investigator; Alaska Department of Fish and Game; design sampling plan and conduct preliminary studies to assess juvenile salmon utilization of the Fox River delta; $60,500

BREACH III: Evaluating and Predicting 'Restoration Thresholds' in Evolving Freshwater-Tidal Marshes: University of Washington Tasks; December 2009 – June 2013; Principal Investigator; CALFED (through US Fish and Wildlife Service); evaluating trajectories and predicting landscape endpoints of passive restoration at Liberty Island, Sacramento River delta; $530,000

Variation in Food Web Connectivity across Intertidal Gradients in Embayment and Fluvially-Dominated Estuaries; May 2008 – March 2013; Principal Investigator; National Science Foundation; evaluate the length and strength of intertidal food webs under differing estuarine-fluvial forcing; $460,000

Puget Sound Nearshore Ecosystem Restoration Program; October 2004 – March 2013; Principal Investigator; US Army Corps of Engineers and Washington State Department of Fish and Wildlife; participate in and serve as Co-Chair of PSNERP Nearshore Science Team; $749,276.

*Shellfish Kinetics (*sub-project of larger Pacific Northwest Center for Human Health & Ocean Studies [H2O Center]); July 2004 – July 2012; Principal Investigator; National Science Foundation/National Institute of Environmental Health; assess intertidal macroinvertebrate assemblage filtration on phytoplankton that can produce toxin (domoic acid); ~$120,000

Developing a Nearshore Assessment Tool for Hood Canal; September 2011-June 2012; Principal Investigator; AECOM/US Navy; provide expert advice to AECOM and the US Navy-NAVFAC to develop a Nearshore Assessment Tool to accurately and precisely estimate the functions and values of the estuarine environment that could be affected by nearshore projects for application in Hood Canal of Puget Sound, WA, as well as provide a science-based screening process to aid in the selection of appropriate mitigation for NAVFAC projects; $15,000.

Olympic Sculpture Park: Construction Monitoring Plan 2007; September 2006 – present; Co-Principal Investigator (with J. Cordell, J. Toft and A. Ogsdon); City of Seattle; monitoring changes in beach substrate and geomorphology and intertidal/shallow subtidal organisms at newly created beach at Olympic Sculpture Park, Elliott Bay; $179,441

What Is Natural in the Puget Sound Ecosystem? *Establishing Baseline Conditions and Identifying Ecological Indicators (Phase I)*; March 2007 – February 2008; Co-Principal Investigator (with T. Essington); Sea-Doc Society; assess historic fisheries and associated environmental data for scientific fisheries collections in Puget Sound; $34,786

San Francisco Integrated Wetland Monitoring Program (IRWM); September 2002 – present; Principal Investigator; CALFED, as subcontract through San Francisco State University; conduct interdisciplinary research to evaluate indicators of ecosystem performance of restoring estuarine wetlands in San Francisco Bay; $478,750

Salmonid Use of Restored Estuarine Wetlands: Regional Applications of the Salmon River Estuary Study; March 2003 – present; Principal Investigator; Oregon Sea Grant, as subcontract through Oregon Department of Fish and Wildlife; determine the relative effects of wetland habitat condition and landscape position on marsh

habitat use and performance by juvenile salmon in diverse estuarine environments undergoing wetland restoration; $116,562 total.

December 2000 – September 2005; Principal Investigator; **Assessment of Estuarine and Nearshore Habitats for Threatened Salmon Stocks in the Hood Canal and Eastern Strait of Juan de Fuca, Washington State: Phase 2;** Point-No-Point Treaty Council; conduct research on intertidal eelgrass landscape structure of juvenile chum salmon in Hood Canal and the eastern Strait of Juan de Fuca, Washington; $85,778

September 2003 – present; Principal Investigator; **Science Advisement for Pond 4A Tidal Wetland Restoration Project**; CH2M-Hill; participate in an independent review of the science involved in the Pond4A salt pond restoration in South San Francisco Bay; $8,250

September 2003 – present; Principal Investigator; **Historic Habitat Opportunities and Food Web Linkages of Juvenile Salmon in the Columbia River Estuary and Their Implication for Managing River Flows and Restoring Estuarine Habitat**; NOAA-Northwest Fisheries Science Center/Bonneville Power Authority; evaluate the effects of habitat change and flow regulations on historic and current estuarine food webs that support diverse juvenile salmon estuarine life histories; $29,393

March 2003 – present; Principal Investigator; **Salmonid Use of Restored Estuarine Wetlands: Regional Applications of the Salmon River Estuary Study**; Oregon Sea Grant; determine the relative effects of wetland habitat condition and landscape position on marsh habitat use and performance by juvenile salmon in diverse estuarine environments undergoing wetland restoration; $70,663

May 2002– present; Principal Investigator; **FY2002 Development of the Puget Sound Nearshore Conceptual Model**; US Army Corps of Engineers-Seattle Dist.; provide a team of scientists composed of a fisheries researcher, geospatial modeler and benthic ecologist to develop a conceptual model of Puget Sound nearshore ecosystem processes; $17,500

May 2002 – present; Principal Investigator (with J. Cordell); **Juvenile Salmon Diet Analysis for Dyes Inlet Estuary Study**; Suquamish Tribe; perform quantitative diet analyses of representative subsamples of juvenile salmon captured by the Tribe in the Inlet between April and June 2002 in order to compare between habitat conditions and prey utilization at each estuary; $15,000

May 2002 – present; Principal Investigator (with J. Cordell); **Dietary Analysis of Juvenile Salmonids Collected from Nearshore Marine Waters of Central Puget Sound**; Metro King County; analyze the stomach contents of juvenile salmonids that have been captured in beach seines deployed in nearshore marine waters of central Puget Sound; $45,155

May 2002 – present; Principal Investigator (with J. Cordell and J. Toft); **Analysis of Methods for Estimating Juvenile Salmon Presence and Behavior on City of Seattle Shorelines**; City of Seattle; develop and test a variety of sampling methods that will be appropriate in designing statistically-based studies to compare abundance, residence time and behavior of juvenile salmon along City of Seattle shorelines; $40,000

May 2002 – present; Principal Investigator (with J. Cordell and J. Toft); **Inventory and Mapping of City of Seattle Shoreline in Lakes Washington and Union, the Ship Canal and Shilshole Bay**; City of Seattle; field inventory of shoreline habitat important to juvenile salmon within the City of Seattle limits; $65,000

May 2002 – present; Principal Investigator (with J. Cordell); **Sinclair Inlet Juvenile Salmon Diet Analyses**; Washington Department of Fish and Wildlife; laboratory processing and data analyses of the diet of juvenile salmon captured in Sinclair Inlet, Puget Sound; $41,685

pril 2002 – present; Principal Investigator; **Life History, Residence Time, and Growth of Juvenile Salmon in the Salmon River Estuary: 2002 Investigations**; Oregon Dept. Fish and Wildlife; evaluate the contribution of fish diet and prey availability to the variability in juvenile chinook performance in different restoring marshes and the estuary overall in the Salmon River estuary, coastal Oregon; $48,923

February 2002 – present; Principal Investigator (with Susan Bell, Jeff Cordell, Kurt Fresh, Julia Parrish and Chris Weller); **Juvenile Salmon Response to Intertidal Eelgrass (*Zostera marina*) Landscape Structure**; Washington Sea Grant; test responses of migrating juvenile chum salmon to contrasting intertidal eelgrass landscape structures in Puget Sound, WA; $191,000

June 2001 – December 2004; Principal Investigator (with Philip Williams & Assoc.); **Crescent Bay Salt Marsh and Salmon Habitat Restoration**; Island County; design and implement actions to restore full tidal action to

the Crescent Bay Marsh, on northeastern Whidbey Island, and conduct environmental studies to aid in project design and initial assessment of changes in the marsh, its wetland functions and performance in supporting fish and wildlife; $225,483

February 2001– December 2004; Principal Investigator (with Allan Devol and Miles Logsdon, UW-Oceanography; Marc Hershman, UW-SMA; Hugh Shipman, WDOE; and Kurt Fresh, WDFW); **Development of a Spatially-Explicit Biophysical Model of Puget Sound Nearshore Processes**; Washington Sea Grant Program; design and implement general, spatially-explicit, dynamic biophysical model of sediment transport and structure for Puget Sound shoreline ecosystem; $197,368

January 2000 – August 2005; Principal Investigator (collaborating with Ralph Garono, Earth Designs Consultants); **High-Resolution Remote Sensing of Habitat Structure in the Lower Columbia River and Estuary: Phase I—Imagery and Data Acquisition**; Columbia River Foundation; conduct initial data acquisition, using satellite and air-borne hyperspectral sensors, of landscape structure of Columbia River estuary; $75,000

March 2000 – December 2001; Principal Investigator (with J. Cordell); **Impacts of Ferry Terminals on Migrating Juvenile Salmon, Phase III: Field Assessment of Epibenthic Prey Impacts**; Washington State Department of Transportation, through Washington State Transportation Center (TRAC), in collaboration with Battelle Marine Science Laboratory (R. Thom); Assess impacts of WSDOT ferry terminals and ferry operations on prominent epibenthic crustacean prey resources of juvenile salmon. $99,560

January 2001 – March 2001; Principal Investigator; **Chinook Salmon Investigations in Shilshole Bay: I. Development of Scientific Scope of Work**; City of Seattle; design integrated scientific investigations to evaluate the effect of the Lake Washington Ship Canal, the Hiram M. Chittenden Locks, and Shilshole Bay on endangered chinook salmon; $15,005

September 1999 – December 2000; Principal Investigator (with J. Cordell); **Grays Harbor Fish Mitigation Monitoring: Monitoring of Created and Natural Sloughs Ten Years Post-Construction**; U.S. Army Corps of Engineers (through Jones & Stokes Task Order Agreement), in collaboration with Battelle Marine Science Laboratory (R. Thom); Determine ecological status of created estuarine slough ten years after construction. $106,000

September 1999-September 2000; Principal Investigator; **Essential Ecological Indicator for Marsh Health**; Environmental Defense Fund; Investigate comprehensive metrics of marsh structure as indicators of ecological health; $9,127.

May 1998-September 2000; Principal Investigator; **Hood Canal and Eastern Strait of Juan de Fuca, Summer Chum Estuarine Investigation**; Point-No-Point Treaty Council; Evaluate limiting factors for summer chum salmon, *Oncorhynchus keta*, during early estuarine and marine life history, with emphasis on landscape-scale limitations; $34,382

February 1998 – present; Principal Investigator; **Nearshore Effects of Ferry Terminals on Migrating Juvenile Salmon**; Washington State Department of Transportation, through Washington State Transportation Center (TRAC), in collaboration with UW School for Marine Affairs (A. Olson) and Battelle Marine Science Laboratory (R. Thom); Establish the scientific evidence regarding the impacts of ferry terminal structure on the behavior and ecology of juvenile salmon migrating along Puget Sound shorelines. $102,000.

February 1998 – present; Principal Investigator; **Juvenile Salmon Rearing in Restoring Wetlands of the Salmon River Estuary: Functional Development with Marsh Age**; Washington and Oregon Sea Grant Programs; in collaboration with Oregon Department of Fish and Wildlife (D. Bottom); Evaluate the response of juvenile Pacific salmon rearing in restoring, previously-diked wetlands of different ages (22-, 13- and 4-yr) in the Salmon River estuary, coastal Oregon. $341,123

June 1997 – present; Principal Investigator; **Predicting the Evolution of Ecological Functions of Restored Diked Wetlands in the San Francisco Bay-Sacramento River Delta**; CALFED/Metropolitan Water District of Southern California; in collaboration with Louisiana Universities Marine Consortium (D. Reed, B. McKee), Phil Williams & Assoc. (P. Williams), and California Department of Water Resources (IEP). Apply the ecological concept of space-for-time substitution to test whether breached-dike wetlands in the Sacramento-San Joaquin rivers delta follow predictable trajectories toward restoration of function. $175,000

July 1996 – May 1997; Principal Investigator, **Remote Investigations and Sampling of Epibenthic Particle Accumulation in the Columbia River Estuary Turbidity Maxima**; NOAA-West Coast National Undersea Research Center; during July 1996 cruise, test feasibility of utilizing a remote-operated vehicle (ROV) for investigating and sampling epibenthic particle accumulations associated with estuarine turbidity maxima; $6,365.

July 1996 – present; Co-Principal Investigator, EPA-ERC **Pacific Northwest Ecosystem Research Consortium**; US Environmental Protection Agency-PNW; Co-Principal Investigator (with R. Edwards, D. Montgomery, L. Conquest, and P. Bisson in Univ. Washington segment of Consortium); Principal Investigator on two UW Consortium projects: (1) Development of Pacific Northwest Watershed-Estuary Landscape Typology (with D. Montgomery and D. Jay), $92,962; and, (2) Estuarine Landscape Structure Interaction with Ecosystem Processes (with D. Armstrong and L. Conquest), $189,977

September 1994 – present (August 2000); Principal Investigator, **LMER Research in the Columbia River Estuary: The Role of Estuarine Turbidity Maxima (ETM) Processes Coupling Watershed, Estuary and Ocean**; National Science Foundation-Land-Margin Ecosystem Research Program; with D. Jay, D. Reed, J. Baross, L. Small, F. Prahl, L. Bledsoe, and A. Baptista; $3,000,000.

February 1994 – present; Co-Principal Investigator, **Response of Critical Puget Sound Deltaic Habitats to Riverflow Cycle Alteration**; systematically compare sub-basins of the Puget Sound/Hood Canal drainage basin in order to determine the response of three critical deltaic habitats (emergent tidal salt marsh, mudflat, and eelgrass) to: (a) hydrologic changes in tributary watersheds, including consumptive water use, riverflow cycle manipulation, and timber harvest; and (b) alteration of the immediate deltaic environment through dredging, diking and filling; Washington Sea Grant Program; with D. Jay, R. Sternberg, D. Montgomery, and R. Thom; $173,975.

June 1992 - present; Principal Investigator, **Wetland Ecology Studies Coordination**; coordination of University of Washington-US Environmental Protection Agency, Region 10 cooperative agreement for interdisciplinary studies on wetland ecology conducted by faculty, staff and students at the School of Fisheries and other cooperating UW schools and departments; US Environmental Protection Agency-Region 10; $272,000 (as of 12/94), of which $184,855 involves WET studies.

April 1994 – March 1997; Principal Investigator, **Ecological Effects of Marsh Progradation by Native and Non-Native Species in Two Pacific Northwest Estuaries**; evaluate historical and recent progradation of emergent coastal marshes over unvegetated habitats, the associated sedimentation processes and implications for estuarine food webs; NOAA Coastal Ocean Program-Estuarine Habitat Program; with D. Reed (LUMCON) and R. Emmett (NOAA); $214,449.

June 1994 – December 1994; Principal Investigator, **Neuston Production and Retention in a Created Brackish Tidal Slough, Chehalis River Estuary, WA: Development of Protocols**; investigate the composition, retention and source of insects in the neuston community of a constructed slough, and one or more comparable, adjacent sloughs in the Chehalis River estuary; U.S. Army Corps of Engineer, Seattle Dist.; $5,000.

April 1994 – March 1997; Principal Investigator, **Ecological Effects of Marsh Progradation by Native and Non-Native Species in Two Pacific Northwest Estuaries**; evaluate historical and recent progradation of emergent marshes over unvegetated littoral habitats and the respective contributions of organic matter and epibenthic invertebrates by the marsh and unvegetated habitats, and differences between indigenous and exotic marsh vegetation; NOAA-Coastal Ocean Program; with D. Reed, B. McKee, R. Emmett, and B. Atwater; $214,449.

June 1994 – December 1994; Principal Investigator, **Comprehensive Assessment of Restored Wetland Function: Equivalency of the Gog-Le-Hi-Te Wetland System, Commencement Bay, WA, after six-years--Phase II**; assess indicators of functional equivalence between a six-yr old constructed wetland and a reference natural wetland; with R. Thom; US Army Corps of Engineers, Waterways Experiment Station; $24,950.

May 1993 – March 1997; Principal Investigator**, Mitigation Between Regional Transportation Needs and Preservation of Eelgrass Beds**; develop quantitative understanding of how ferry docks affect eelgrass habitats and how to minimize deleterious effects; Washington Department of Transportation; with R. Thom, A. Olson and J. Cordell; $166,125.

February 1993 – December 1996; Principal Investigator, **Effects Upon Littoral Mudflat Community Functions by Emergent Vegetation Invasion: *Spartina alterniflora* in Willapa Bay, Washington**; assess the ecological effects of invasion by emergent salt marsh on unvegetated littoral flats by studying colonization of mudflats by the smooth cordgrass, *Spartina alterniflora*, in Willapa Bay, Washington; Washington Sea Grant Program; with K. Fresh, J. Cordell, D. Stouder, and R. Thom; $260,606.

September 1992 – August 1993; **Status and Development of Restored Estuarine Wetlands: Functional Equivalency of the Gog-Le-Hi-Te Wetland System, Puyallup River Estuary, Washington after Six Years**; assess ecological functions of a created wetland compared to natural wetlands, as a case study of the efficacy of restoring tidal inundation by removing dikes and excavating fill matrial, and of evaluating their ecological function by comparison with natural wetlands; with R. Thom; U. S. Army Corps of Engineers, Waterways Experiment Station; $62,250.

October 1990 – September 1991; Principal Investigator, **Effects of Estuarine Habitat Modifications on Anadromous Salmonids**; field manipulation experiment to test hypothesis that utilization of restored or created estuarine sloughs by juvenile salmon is equivalent to natural slough utilization; U.S. Army Corps Engineers, Waterways Experiment Station; $100,000.

May 1990 – August 1994: Co-Principal Investigator, **Estuary Turbidity Maxima (ETM) in Land-Margin Ecosystems: ETM Dynamics and the Impact of Anthropogenic Change**; multi-disciplinary, intensive study of role of estuarine turbidity maxima in structuring food web of Columbia River estuary; with eight other investigators; National Science Foundation-Biological Oceanography/Division of Environmental Biology; $1,950,000.

March 1990 – present: Principal Investigator, **Estuarine Slough Function and Restoration for Juvenile Salmon Residence and Foraging**; several grants/contracts covering on-going assessment of juvenile salmon ecology of created estuarine slough in Grays Harbor, Washington, as compared to adjacent natural slough; U.S. Army Corps of Engineer., Seattle Dist.; $170,000.

December 1989 – December 1991: Principal Investigator, **Ecological Effects of Ghost Shrimp Harvesting: Evaluation of Impacts on Epibenthic Prey Resources of Juvenile Fishes Rearing in Littoral Flat Habitats**; experimental manipulation study of effects of sediment disturbance from harvesting *Callianassa californiensis* on the composition, standing stock, and distribution of epibenthic meiofauna and small macrofauna that are important prey items for juvenile fishes; Washington Department of Fisheries; $33,000.

April 1989 – March 1990: Co-Principal Investigator, **Trophic Links From Epibenthic Crustaceans in Littoral Flat Habitats: Seasonal and Regional Comparisons**; basic ecological investigators of the temporal and spatial variability in food web linkages between epibenthic meiofauna (prey) and fishes (predators) in three National Estuarine Research Reserves and comparable estuaries on the Pacific Northwest coast; with R. C. Wissmar; NOAA-OCRM; $37,797.

January 1989 – December 1989: Co-Principal Investigator, **Effects of Beach Graveling on Juvenile Salmon Prey: Phase I-III**; sampling intertidal sites which have been artificially graveled for the enhancement of clam and oyster populations, and comparable control habitats, to determine the effects upon salmon prey organisms; with R. C. Francis; Wash. Dept. Fisheries; $78,520.

August 1988 – July 1989: Principal Investigator, **Workshop on the Effects of Dredging upon the Physiology and Behavior of Anadromous Fishes of the Pacific Coast**; conducting a workshop and literature assessment to determine the state of the knowledge about the impacts of dredging and related estuarine habitat changes on anadromous fishes in the Pacific Northwest region; U.S. Army Corps of Engineers, Waterways Experiment Station; $52,877.

August 1988 – December 1988: Co-Principal Investigator, **Pacific Northwest Wetland Mitigation Information Base: Intern Advisement and Data Base Development**; providing U.S. Environmental Agency, Region 10 with technical advise in a student intern project in further evaluating the status of wetland mitigation projects in this region, and development of a comprehensive computer data base in which this information and subsequent wetland mitigation data can be stored, retrieved, and analyzed; with R. C. Francis; US EPA; $29,000.

June 1988 – October 1988: Co-Principal Investigator, **Evaluation of Existing Literature and Data on the Functional Performance of Estuarine Wetlands to Fish and Wildlife Guilds in the Pacific Northwest**;

direct graduate student project to gather and evaluate existing literature and unpublished data and other quantiative information on methods of assessing biological function of estuarine wetlands; with R. C. Francis; US EPA; $10,000.

June 1988 – December 1988: Co-Principal Investigator, **Evaluation of the Effects of Sevin Application on Littoral Flat Meiofauna**; determining the short-term effects of applying the insecticide Sevin on littoral flat meiofauna, particularly the documented prey of juvenile fishes; with D. A. Armstrong; Bay Center Mariculture; $7,049.

October 1987 – December 1988: Co-Principal Investigator, **Evaluation of Intertidal Benches in Stablized Shorelines for Enhancement of Juvenile Salmonid Prey Resources**; assessing the effectiveness of installing terraces in rip-rap stabilized estuarine shorelines to trap fine sediment and attrach salmon prey organisms; with R. C. Francis; Port of Seattle; $15,400.

May 1986 – March 1988: Co-Principal Investigator, **Assemblage Structure, Microhabitat Distribution, and Food Web Linkages of Epibenthic Crustaceans in Padilla Bay, Washington**; defining epibenthic crustacean distribution and standing stock and food web linkages to important fish and macroinvertebrate consumers across an estuarine habitat gradient; with R. C. Wissmar; NOAA-National Estuarine Research Reserve grant; $10,000.

March 1987 – December 1988; Collaborator, **Blaine Marina Ecology**; assessment of community structure (benthic and epibenthic flora and fauna, demersal fish) of intertidal habitats inside Blaine Marina as compared to natural equivalent habitats in adjacent Drayton Harbor; with R. M. Thom and E. O. Salo; Port of Bellingham; $50,000.

March 1987 – July 1987: Co-Principal Investigator, **Benthic/Epibenthic Assemblages of Puget Sound Bivalve Beaches**; evaluation of benthic infauna and epibenthic meiofauna inhabiting intertidal beaches in Puget Sound proposed for graveling to enhance harvestable bivalve populations; with R. C. Francis; Washington State Department of Fisheries; $16,174.

April 1986 – September 1988; Co-Principal Investigator, **Nearshore Macrophyte Community Functions**; estimate the functional role of marine macrophyte (eelgrass, kelp) communities as habitat for economically- and ecologically-important fishes and macroinvertebrates in Neah Bay, Washington; with R. C. Francis; Washington Sea Grant-U.S. Army Corps of Engineers; $93,000.

January 1986 – May 1988: Co-Principal Investigator, **The Importance of Primary Producer Habitats to Estuarine Food Webs**; experimental studies of sources and pathways of organic carbon originating from discrete estuarine habitats characterized by different autotrophs; with R. C. Wissmar; NOAA-Washington Sea Grant Program; $70,000.

May 1985 – November 1988: Co-Principal Investigator, **Sea Otters, Alternative Communities, and the Role of Kelp-derived Carbon in Nearshore Food Webs**; sampling and experiments of sea otter-kelp and sea urchin dominated island ecosystems in the Aleutian Islands (Alaska) to assess the sources and effects of kelp-derived organic carbon on food web structure and production; National Science Foundation; with D. Duggins, J. Estes, and R. Burgner; $235,347.

April 1985 – February 1986: Co-Principal Investigator, **Feeding Dependencies of Juvenile Salmon and Non-salmonid Fishes in the Yukon River Delta**; food habits studies of juvenile salmonids and other fishes collected during OCSEAP studies of Yukon River delta and adjacent nearshore estuarine waters; with R. Nakatani; NOAA-OCSEAP/Envirosphere Co.; $27,000.

March – April 1985: Co-Principal Investigator, **Nisqually Estuary Study Design**; design baseline study plan, a study of the juvenile salmonid utilization, and a long-term environmental monitoring program of the Nisqually River estuary; with R. Thom and E. Salo; Nisqually Tribe; $19,500.

February 1985 – January 1986: Collaborator, **Wetland Planting and Monitoring in Commencement Bay**; design, establishment, and monitoring of a wetland restoration project in the Puyallup River estuary, Commencement Bay, Washington; with R. M. Thom and E. O. Salo; Port of Tacoma; $325,000.

July 1983 – July 1985: Participant, **Estuaries Select Program**; design and assist in teaching of seminar, survey and field courses on estuaries and coordinate estuarine research; with R. Wissmar; College of Ocean and Fishery Sciences; $134,000.

January 1983 – December 1984: Co-Principal Investigator, **Estuarine Carrying Capacity for Juvenile Chum and Pink Salmon**; mesocosm experiments of density-dependent effects on growth of juvenile chum and pink salmon and on composition and standing stock of prey resource; with R. Wissmar, Washington Sea Grant; $93,000.

November 1982 – June 1984: Co-principal Investigator, **CREDDP Summary of Epibenthic Organisms in Columbia River Estuary**; synthesis of community structure, distribution, standing stock, and trophic ecology of epibenthic zooplankton in Columbia River estuary; with R. Nakatani, NOAA/CREST; $40,000.

December 1982 – June 1984: Co-principal Investigator, **CREDDP Integration of higher Trophic Level Processes in the Columbia River Estuary**; integration of role of zooplankton, fish, birds, and marine mammals in estuarine ecosystem; with R. Nakatani, NOAA/CREST; $20,000.

July 1981 – March 1982: Co-principal Investigator, **Streamer Bay Epibenthos Study**; quantitively analyzing fish stomach contents and epibenthic organism samples from NMFS collections in SE Alaska; with R. Nakatani, NOAA-NMFS; $75,000.

January 1981 – December 1982: Co-principal Investigator, **Sea Grant Detritus Project**; defining origins and pathways of detritus in estuarine food webs of Hood Canal using stable carbon isotopes; with R. Wissmar; Sea Grant; $75,000.

September 1981 – March 1982: Co-principal Investigator, **Pollock Stomachs Project**; quantitatively analyzing walleye pollock stomach samples from NMFS collections in North Pacific; with R. Nakatani; NOAA-NMFS; $10,000.

February 1981 – June 1981: Co-principal Investigator, **NMFS Trophic Analyses Study**; quantitatively analyzing fish stomach samples from NMFS collections in North Pacific; with R. Nakatani; NOAA-NMFS; $3,000.

September 1980 – March 1983: Co-principal Investigator, **Chum Carrying Capacity Project**; experimentally evaluating estuarine and nearshore carrying capacity for juvenile chum salmon; R. Wissmar and D. Eggers; National Science Foundation; $115,000.

March 1980 – April 1981: Co-principal Investigator, **Grays Harbor Salmonids Study**; documenting distribution, abundance, and food habits of juvenile salmon, English sole, and baitfish and their prey resources in Grays Harbor estuary; with D. Eggers; Seattle District, U.S. Army Corps of Engineers; $190,500.

February 1980 – August 1980: Co-principal Investigator, **MESA Synthesis-Nearshore Fish and Food Web Relationships**; contribute to synthesis volume on MESA biological studies in northern Puget Sound and the Strait of Juan de Fuca; with R. Nakatani; NOAA-MESA; $12,000.

September 1979 – September 1981: Co-principal Investigator, **CREDDP Epifauna Study**; examination of structure and dynamics of epifauna community as part of comprehensive ecosystem study of Columbia River estuary; with D. Eggers; Dames and Moore; $107,500.

June 1978 – May 1979: Project Leader and Co-Principal Investigator, **Epibenthic Zooplankton Assemblages at Selected Sites Along the Strait of Juan de Fuca**; quantitatively describing summer composition, density, and standing crop of epibenthic zooplankton; with B. Miller; NOAA-MESA.

October 1978 – September 1982: Co-principal Investigator, **Trophic Interactions Between Baitfish and Pacific Salmon Population**; documenting predation and potential trophic interactions between Puget Sound baitfish and salmon populations; cooperatively with Washington State Department of Fisheries; with R. Nakatani; WDF; $104,000.

June 1976 – December 1979: Project Leader and Co-principal Investigator, **Aleutian Nearshore Community Ecology Studies**; documenting changes in nearshore community structure associated with return of sea otters to Attu Island; U.S. Fish and Wildlife Service; $22,000.

March 1977 – May 1979: Project Leader, **Northern Puget Sound Food Web Pathways**; synthesizing data and literature describing nearshore food web structures of northern Puget Sound; NOAA-MESA Program; with B. S. Miller;

1976 – 1980: Project Leader and Co-principal Investigator, **Trophic Relationships of Juvenile Chum Salmon in Hood Canal, WA**; describing prey organisms and prey community composition of epibenthic fauna consumed by outmigrating juvenile chum salmon; U.S. Navy;

April 1978 – December 1978: Project Leader and Co-principal Investigator, **Trophic Relationships of Fish in Puget Sound Marinas**; describing prey organisms of juvenile salmon and associated fishes inhabiting Puget Sound marinas; Wash. Dept. Fish;

July 1974 – September 1979: Project Leader, **Nearshore Fish Survey, and Fish Communities** studies; sampling and evaluating the occurrence, distribution, abundance, and food web relationships of nearshore fishes in northern Puget Sound and the Strait of Juan de Fuca; Wash. Dept. Ecology; with B. S. Miller

November 1972 – June 1974: Project Leader, **Amchitka Nearshore Marine Ecology Project**, FRI project evaluating long-term effects of underground nuclear tests on marine ecosystem of Amchitka Island, Alaska; additional research on studies on effects of aquaculture on water quality, effects of pump-storage system on the ecology of Banks Lake, Washington, and development of a study plan for the North Puget Sound Biological Baseline Study (WnDOE). $125,000 yr^{-1}.

September 1971 – July 1972: Fisheries Biologist II, continued studies of Amchitka Island, Alaska nearshore fishes with emphasis on studies and experiments designed to evaluate the effects of the Cannikin underground nuclear test (7 November 1971); conducted post-event surveys and sampling and documented effects of the test on adjacent marine fish communities.

June 1969 – September 1971: Research Assistant, graduate studies on Amchitka Project, responsible for nearshore fish studies and concentrating on thesis work on food habits of the major nearshore marine fish, the rock greenling (*Hexagrammos lagocephalus*).