



## Columbia River Estuary

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### Web-site:

<http://depts.washington.edu/cretmweb/CRETM.html>

### Books:

Pruter, A. T., and D. L. Alverson. 1972. The Columbia River Estuary and Adjacent Ocean Waters. Univ. Washington Press, Seattle. 868 pp.

### Summary/Overview Journal Articles:

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., D. A. Jay and C. R. Sherwood. 1992. Impacts of watershed management on land-margin ecosystems: The Columbia River estuary as a case study. Pp. 266-306 In R. J. Naiman (ed.), New Perspective in Watershed Management, Springer-Verlag, New York. 543 pp.

### Classic Journal Articles:

Haertel, L. S., L. C. Osterberg, H. Curl, and P. K. Park. 1969. Nutrient and plankton ecology of the Columbia River estuary. *Ecology* 50: 962-978.

Haertel, L. S., and L. C. Osterberg. 1967. Ecology of zooplankton, benthos, and fishes in the Columbia River estuary. *Ecology* 48: 459-472.

McCabe, G. T., Jr., W. D. Muir, R. L. Emmett, and T. J. Durkin. 1983. Interrelationships between juvenile salmonids and nonsalmonid fish in the Columbia River estuary. *Fish. Bull.*, US 81: 815-826.

Misitano, D. A. 1977. Species composition and relative abundance of larval and post-larval fishes in the Columbia River estuary. *Fish. Bull.*, US 75: 218-222.

### Biological/Ecological Processes:

Baross, J. A., B. Crump, and C. A. Simenstad. 1994. Elevated 'microbial loop' activities in the Columbia River estuary turbidity maximum. Pp. 459-464 In K. Dyer and R. Orth (ed.), Changing Particle Fluxes in Estuaries: Implications from Science to Management, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.

- Bottom, D. L., and K. K. Jones. 1990. Species composition, distribution and invertebrate prey of fish assemblages in the Columbia River estuary. *Prog. Oceanogr.* 25:243-270.
- Bottom, D. L., C. A. Simenstad, A. M. Baptista, D. A. Jay, J. Burke, K. K. Jones, E. Casillas, and M. H. Schiewe, 2001. Salmon at river's end: The role of the estuary in the decline and recovery of Columbia River salmon, Natl. Ocean. Atmosp. Admin, Northwest Fish. Sci. Center,, Seattle, Wash.
- Cordell, J. R., C. A. Simenstad, and C. A. Morgan. 1992. Occurrence of the Asian calanoid copepod *Pseudodiaptomus inopinus* in the Columbia River estuary. *J. Crustacean Biol.* 12:260-269.
- Crump, B., and J. A. Baross. 1996. Particle-attached bacteria and heterotrophic plankton associated with the Columbia River estuarine turbidity maxima. *Mar. Ecol. Prog. Ser.* 138: 265-273.
- Crump, B.C. E.V. Armbrust, and J.A. Baross. 1999. Phylogenetic analysis of particle-attached and free-living bacterial communities in the Columbia River, estuary, and adjacent coastal ocean. *Applied Environ. Microbiol.* 65: 3192-3204.
- Crump, B. C., J. A. Baross and C. A. Simenstad. 1997. Dominance of particle-attached bacteria in the Columbia River estuary. *Aquat. Microb. Ecol.* 14:7-18.
- 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.
- Morgan, C. A., J. R. Cordell, and C. A. Simenstad. 1997. Sink or swim? Copepod population maintenance in the Columbia River estuarine turbidity maxima region. *Mar. Biol.* 129:309-317.
- 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., 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 In K. Dyer and R. Orth (ed.), *Changing Particle Fluxes in Estuaries: Implications from Science to Management*, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.
- Simenstad, C. A., D. J. Reed, D. A. Jay, J. A. Baross, F. G. Prahl and L. F. Small. 1994a. Landmargin ecosystem research in the Columbia River estuary: investigations of the couplings between physical and ecological processes within estuarine turbidity maxima. Pp. 437-444 In K. Dyer and R. Orth (ed.), *Changing Particle Fluxes in Estuaries: Implications from Science to Management*, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.

Small, L. F., and S. R. Morgan. 1994. Phytoplankton attributes in the turbidity maximum of the Columbia River Estuary, USA. Pp. 465-472 *In* K. Dyer and R. Orth (ed.), Changing Particle Fluxes in Estuaries: Implications from Science to Management, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.

Small, L. F., C. D. McIntire, K. B. Macdonald, J. R. Lara-Lara, B. E. Frey, M. C. Amspoker, and T. Winfield. 1990. Primary production, plant and detrital biomass, and particle transport in the Columbia River estuary. *Prog. Oceanogr.* 25: 175-210.

Zwart, G., B. C. Crump, M. P. Kamst-van Agterveld, F. Hagen, and S-K Han. 2002. Typical freshwater bacteria: an analysis of available 16S rRNA gene sequences from plankton of lakes and rivers. *Aquat. Microb. Ecol.* 28: 141-155.

### **Biogeochemical Processes:**

Prahl, F. G. and Coble P. G. 1994. Input and behavior of dissolved organic carbon in the Columbia River Estuary. Pp. 451-457 *In* K. Dyer and R. Orth (ed.), Changing Particle Fluxes in Estuaries: Implications from Science to Management, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.

Prahl, F. G., L. F. Small, and B. Eversmeyer. 1997. Biogeochemical characterization of suspended particulate matter in the Columbia River estuary. *Mar. Ecol. Prog. Ser.* 160:173-184.

### **Physical Processes:**

Giese, B. S., and D. A. Jay, 1989. Modeling the tidal energetics of the Columbia River Estuary, *Estuarine Coastal Shelf Sci.*, 29, 549–571.

Jay, D. A. 1994. Residence time, box models and shear fluxes in tidal channel flows. Pp. 3-12 *In* K. Dyer and R. Orth (ed.), Changing Particle Fluxes in Estuaries: Implications from Science to Management, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.

Jay, D. A. and J. D. Musiak. 1994. Particle trapping in estuarine turbidity maxima. *J. Geophys. Res.* 99: 20,446-461.

Jay, D. A., and J. D. Smith. 1990. Circulation, density distribution and neap-spring transitions in the Columbia River estuary. *Prog. Oceanogr.* 25:81-112.

Jay, D. A., B. S. Giese, and C. R. Sherwood. 1990. Energetics and sedimentary processes in the Columbia River estuary. *Prog. Oceanogr.* 25:157-174.

Kukulka, T., and D. A. Jay. 2003. Impacts of Columbia River discharge on salmonid habitat: 1. A nonstationary fluvial tide model, *J. Geophys. Res.*, 108, doi:10.1029/2002JC001382.

Kukulka, T., and D. A. Jay, Impacts of Columbia River discharge on salmonid habitat: 2. Changes in shallow-water habitat, *J. Geophys. Res.*, 108(C9), 3294, doi:10.1029/2003JC001829, 2003.

Naik, P., and D. A. Jay. 2002. Estimation of the Columbia River virgin flow, in Southwest Washington Coastal Erosion Workshop Report 2000, edited by G. Gelfenbaum and G. Kaminsky, U.S. Geol. Surv. Open File Rep., 02-229, 68–73.

Oliveira, A., and A. M. Baptista. 1997. Diagnostic modeling of residence times in estuaries. *Wat. Resources Res.* 33:1935-1946.

Reed, D. J. and J. Donovan. 1994. The character and composition of the Columbia River estuarine turbidity maximum. Pp. 445-450 In K. Dyer and R. Orth (ed.), *Changing Particle Fluxes in Estuaries: Implications from Science to Management*, ECSAERF22 Symposium, Olsen & Olsen Press, Friedensborg.

Sherwood, C. R., and J. R. Creager. 1990. Sedimentary geology of the Columbia River estuary. *Prog. Oceanogr.* 25:15-79.

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