## Estuaries

Estuaries are diverse and dynamic habitats formed at the meeting place of terrestrial, freshwater and marine ecosystems; commonly, these are areas where rivers meet the sea. They are among the world's most biologically productive ecosystems. Estuaries make up less than three percent of the BC coast, but are used by 80 percent of coastal wildlife.[1,2]

Estuary functions include the following:

- Physical processes such as water filtration, circulation of freshwater and sea water, nutrient enrichment and cycling and processing of detritus;[2,3]
- Provision of energy for nearshore food webs;[2]
- Spawning and foraging habitat for invertebrates, including juvenile prawns, shrimp and crab;[4]
- Habitat for larval, juvenile and adult fish, including foraging, refuge and physiological transition sites for anadromous salmonids, and spawning areas for eulachon and herring;[5]
- Human uses such as sport fishing;[5]
- Wintering, moulting and breeding habitat for waterfowl; habitat for species at risk, red- and blue-listed bird species and birds of prey; and staging areas along the migratory corridor for millions of birds;[5] and
- Rich feeding areas for aquatic and terrestrial mammals including harbour seal, river otter, mink, grey wolf, Sitka deer, black bear and grizzly bear.[5]

### Relative Importance of Estuaries

In BC, the Pacific Estuary Conservation Program (PECP) is responsible for securing and enhancing estuary habitats of conservation importance. The accompanying map presents estuaries ranked by PECP partners for their biological importance to waterbirds (ducks, geese, swans, loons and grebes). Ranking of each estuary was carried out relative to other estuaries, based on their cumulative score with respect to five variables: size, habitat rarity, species rarity, waterbird density, and herring spawn. The ranking was used to calculate a biological importance score for each estuary.[2]

**Estuaries are among the world's most biologically productive ecosystems**

The estuaries that ranked high tended to be larger than 356 hectares, and had large intertidal delta or adjacent saltmarsh areas. Common vegetation included seaweeds such as *Ulva* and kelp, eelgrass (*Zostera*), and succulent plants such as *Salicornia*. Many high ranking estuaries were also characterized by abundant mussels, large and frequent herring spawn events, and high densities of wintering waterbirds.[2]

The estuaries identified as having the highest biological importance score in PNCIMA are on the north coast at Big Bay (Georgetown Creek), Kitimat River and the Skeena-Ecstall-McNeil River Complex.[2]

It should be noted that the relative importance of estuaries depends on priorities, e.g. birds, fish, productivity, rarity. All estuaries may be considered equally important for vascular plants.[6]

Material presented is drawn from the following, including literature reviews which contain primary references:
1 Lucas, B.G., Johannessen, D. and Lindstrom, S. 2007. Appendix E: Marine plants. In Ecosystem overview: Pacific North Coast Integrated Management Area (PNCIMA). Edited by Lucas, B.G., Verrin, S. and Brown, R. Can. Tech. Rep. Fish. Aquat. Sci. 2667: iv + 23 p.
2 Ryder, J.L., Kenyon, J.K., Buffett, D., Moore, K., Ceh, M. and Stipec, K. 2007. An integrated biophysical assessment of estuarine habitats in British Columbia to assist regional conservation planning. Technical Report Series No. 476. Canadian Wildlife Service, Pacific and Yukon Region, British Columbia, 151 pp.
3 Crawford, W., Johannessen, D., Whitney, F., Birch, R., Borg, K., Fissel, D. and Vagle, S. 2007. Appendix C: Physical and chemical oceanography. In Ecosystem overview: Pacific North Coast Integrated Management Area (PNCIMA). Edited by Lucas, B.G., Verrin, S., and Brown, R. Can. Tech. Rep. Fish. Aquat. Sci. 2667: vii + 77 p.
4 Lucas, B.G., Verrin, S. and Brown, R. (Editors). 2007. Ecosystem overview: Pacific North Coast Integrated Management Area (PNCIMA). Can. Tech. Rep. Fish. Aquat. Sci. 2667: xiii + 104p.
5 MacKenzie, W., Remington, D. and Shaw, J. 2000. Estuaries of the North Coast of British Columbia: a reconaissance survey of selected sites, May 1, 2000. A Cooperative Project of the Ministry of Environment, Lands and Parks and the Ministry of Forests, Research Branch. Province of British Columbia, 98p.
6 British Columbia Marine Conservation Analysis Project Team. 2011. Marine atlas of Pacific Canada: a product of the British Columbia Marine Conservation Analysis. Available from www.bcmca.ca (Accessed March 2011).

*Photo: Steve Diggon*



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