Nova Scotia Energy Research and Development Forum 2012

Graham Daborn

Biography

Dr. Daborn is Professor Emeritus at Acadia University. He was a graduate of the University of Alberta and taught Biology at Acadia University from 1973 to 2004. He was the founding Director of the Acadia Centre for Estuarine Research (ACER), which was established in 1985 to focus attention on estuarine environments, such as the Bay of Fundy. ACER research studies have covered the full range of topics in estuarine research, from the ecology of plants, to the population dynamics, growth rates and feeding relationships of crustaceans, fish and birds, and have been carried out in the Canadian Arctic, Europe, South America and New Zealand. A lot of the research has dealt with the effects of human modifications of estuaries and coastal waters, such as the construction of causeways, the dredging of harbours, the addition of nutrients or contaminants, and tidal power. From 2004 to 2007 he was first Director of the Academy for the Environment at Acadia University. From 1996-2004 he chaired the Bay of Fundy Ecosystem Partnership, a virtual institute concerned with increasing cooperation between governments, communities, resource users and industries in development of sustainable futures for the communities and resources of the Bay of Fundy. His current activities relate mostly to the environmental implications of generating renewable energy from the marine environment, especially from tidal currents in the Bay of Fundy. He is a member of the Board of the Ocean Renewable Energy Group (OREG), and serves as a volunteer on the Research Advisory Committee and the Tidal Area Sub-committee for the Offshore Energy Environmental Research Association (OEER).

Presentation Abstract: Evaluating the Environmental Effects of Tidal Energy Conversion

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The environmental effects of in-stream tidal power have been reviewed several times over the last few years, both in Europe and Canada, and there is growing consensus about the high priority ecosystem components: marine mammals and fish, for example. However, because there have been very few long-term, well-monitored deployments of TISEC devices – and so far only one with multiple devices in array form – the assessment of environmental risk remains difficult. Principal areas of uncertainty include the following:

1. **Technology-specific effects:** Considerable variation in design, size and operational characteristics of different TISEC devices makes it difficult to forecast many environmental effects, especially where these involve behavioural responses of organisms. How can we determine whether a given fish or mammal can detect a TISEC device and avoid it?
2. **Scale effects:** How far is 'far-field'? Can one distinguish the environmental effects of TISEC from the effects of natural variation in environmental conditions?

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3. **Assessing significance:** In the highly dynamic ecosystem that TISECs will be placed, how does one assess the risks to valued ecosystem components? What should be the triggers for cessation or mitigation?

Recognizing the limitations of existing knowledge and experience (in spite of the 100 year history of Bay of Fundy tidal electricity generation proposals!), an adaptive management approach has been adopted in which regulatory approval can be adjusted as knowledge is increased through environmental monitoring. The presentation will address some of these issues, and outline the Pathways of Effects logic model that is being used by federal regulators regarding marine renewable energy.