

## **1: Can marine renewable energy technologies, and specifically tidal in-stream technologies, be developed in the Bay of Fundy without significant impacts on the marine ecosystem?**

If done properly, I believe that tidal in-stream technologies can be developed without having a significant impact on the marine ecosystem. I think it is important to note the drastic differences between the proposed technologies to be implemented in the Bay of Fundy and that of the older barrage style dams that have been used in Nova Scotia and France. Due to the minimal foot print, slow rotation speeds, and lack of blocking passageways, I believe the new generation of in-stream tidal devices will have little impact on the marine ecosystem in the Bay of Fundy.

The minimal foot print of these devices will prevent large tracks of marine life from being destroyed during installation. To put this in perspective a 300kW device that is currently installed off the coast of Devon, UK has a footprint of less than 50 square meters. This is very small in relation to the size of the ocean floor.

Due to the velocity and density of water the tidal in-stream technologies have a much slower rotation speed than that of wind turbines and hydro-electric dams. According to the Marine Current Turbines website (<http://www.marineturbines.com/technical.htm>) the rotation speed of their tidal in-stream devices are in the range of 10 to 20 revolutions per minute. I feel strongly that after more research it will be concluded that the spinning rotors will not cause physical damage to fish and other wildlife living in the ocean.

Using tidal in-stream technologies also eliminates the need to block off vast amounts of water in order to create large amounts of electricity. Since inception in 1985, those opposed to the Annapolis Royal tidal barrage have argued that a significant number of fish and other wildlife have been harmed while being forced through the turbine blades in the dam. I feel strongly that because of the minimal footprint of in-stream tidal devices in relation to the size of the passage way that almost all fish will avoid the turbines entirely, avoiding the destruction to fish that tidal barrages cause.

## **2: Can these technologies be developed without significant socio-economic impacts on fishers and the fisheries and on other marine and coastal resource users?**

I do not think that in-stream tidal energy devices will have significant socio-economic impacts on fishers and coastal resource users because of the relatively small overall footprint of such devices, and their minimal impact on the marine ecosystems. Many of the proposed designs do not protrude through the surface of the ocean and thus would not affect tourists who treasure the views of the ocean in Nova Scotia and New Brunswick. Fishers will only be affected in that they would not be able to fish in the immediate areas where the devices exist. I think that this area will be small enough that the overall catch rates for the fishers will not be impacted significantly.

### **3: What contribution can marine renewable energy technologies make to community and regional economic development in Nova Scotia?**

I feel strongly that the marine renewable energy technologies could have a significant positive effect on communities and economic development in Nova Scotia. I feel that if the Nova Scotia Government requires much of the development, construction, assembly and installation of such devices to take place in Nova Scotia that it will promote many high skill, and high paying, jobs in the region. My thoughts are that much economic development has already taken place before the devices have even been put in the water. Much of the environmental assessment work has been completed by Nova Scotia companies and colleges. The Centre of Geographical Sciences (COGS) and Jacques Whitford are two of many organizations that have already benefited from the preliminary work taking place.

### **4: Under what conditions should pilot projects be permitted?**

Pilot projects should take place as they are currently planned. I believe that in having one organization creating a 'Tidal Hub', where pilot projects can be tested, is an excellent way to ensure a level playing field and get a proper comparison of the devices used. These pilot projects should only get final approval after the "Strategic Environmental Assessment" that is currently taking place is completed. This is to ensure that the pilot projects will not have adverse effects on the surrounding marine ecosystems, local tide levels and fisheries.

### **5: What ongoing research and monitoring is required to gather the information needed to make decisions about commercial developments?**

Before commercial developments can take place, I feel it is necessary to choose the technology that has the best balance between environmental damage, obstruction of passage ways, and financial feasibility. In order for a commercial development to move forward the device/technology should be first tested at the 'Tidal Hub' to ensure minimal damage to the surrounding environment. This ensures that few unforeseen issues arise that haven't already been detected during the pilot stage.

Once a possible location has been chosen for a commercial tidal energy project, I think that there should be an Environmental Impact Assessment completed of the area to ensure there would be minimal effects in the area due to the devices. This would include documenting organisms and mammals in the area, ensuring little damage to the fisheries, and estimating the damage caused to the environment.

As commercial projects go forward I feel there should be long term monitoring of the wildlife surrounding the sites as well as constant monitoring of sediment buildup on the ocean floor. If any effects are thought to be too significant, solutions would have to be implemented on future projects. I believe that without constant monitoring long term damage could occur to the marine ecosystem and tide levels in the Bay of Fundy.