

A Modern Approach to a Modern Industry

a role for real-time data in aquaculture success

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Aquaculture is a science-based industry and to be successful requires an understanding of the dynamic biophysical conditions influencing a farm site. This includes long-term information about all aspects of the ocean environment, such as water currents and temperatures, tidal and wave patterns, weather conditions and seabed information and their potential impact on farm success. These dynamic day to day conditions may only be ‘hiccups’ in the big picture but can dramatically influence the success or failure of an aquaculture operation. Applied ocean observation, that is, the collection and application of relevant data and the processing of that data to generate value-added information data products, can be a major piece of the aquaculture puzzle to ensure environmentally safe, efficient and ultimately successful operations.

Aquaculture operations generally share the surrounding waters with other users such as



Harbour Breton fish farm.

fishers, the marine transportation industry and recreational users as well as the residents of any number of communities on surrounding shores. The introduction of ocean observation instrumentation in support of the aquaculture sector can provide direct benefit on both a regional and site-specific scale. As a starting point, each aquaculture operator as well as the general marine community would benefit significantly from real-time weather and seastate data as well as weather forecasts customized to the area and supported by real time site-specific observations. Incorporate additional layers of real-time water quality data or fish behaviour data (video feeds) for individual cage sites and the potential is immediately obvious.

By its very nature aquaculture production is risk-based; to help reduce that risk it is never too early or too late to initiate what could be referred to as ‘smart aquaculture.’ At a minimum, instruments providing critical parameters; for example, site-specific temperature and dissolved oxygen levels



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can be acquired in real time by deploying off-the-shelf sensors combined with proven communications technology and a little deployment innovation to provide existing site operators with real time data at their kitchen table. Recent advancements in ‘smart ocean sensor’ technology that accommodates direct communication with sensors over the web will further simplify cage to shore data transfer. As the level of aquaculture development becomes more extensive in an area it may be prudent to also incorporate a regionalized component whereby water quality data, in conjunction with water column current and circulation data, is acquired for the general area. This data could then feed dynamic current trajectory models that would also incorporate relevant site specific data from individual sites. Along with the day to day benefit to operators to take early action to avoid the implications of conditions – ‘super chill,’ for example, which can result in large scale fish kill or better time feeding based on currents – this information would also assist managers and regulators to optimize development by being better able to assess the

influence that other farms or facilities (e.g. processing plants) might have on existing or planned sites.

From the big picture perspective, better information leads to improved planning, further enhancing the effectiveness of initiatives such as regional area management plans. The promotion of a region as ‘aquaculture friendly’ combined with the availability of supporting infrastructure and regional environmental, oceanographic and meteorological data can be a key element to attracting new industry players. New players are beneficial to the industry as a whole as they help increase scientific knowledge, introduce new aquaculture practices and technologies and ultimately contribute to economic prosperity. Similarly, the introduction of technology can improve aquaculture efficiency, operational logistics, industry growth and new business attraction, ocean management and research, personnel safety and business security as well as contribute toward preserving and protecting the surrounding ecosystem.