The Role of Technology in the Implementation of Property Rights in Atlantic Canada's Commercial Fishery

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Chapter Summary

Apold and Guy begin by noting two tests that must be met if rights-based fishing is to realise its theoretical potential of improved economic and conservation outcomes. First comes a straightforward economic test: the regime must operate at levels of efficiency, reliability and cost that are acceptable to industry participants and to the taxpayer. Second is the more subjective test of credibility. "If any rights-based system is to function as intended, all those directly involved in it must have confidence that the 'numbers are always right' and that cheaters will be caught and punished." This chapter's contribution to the volume is to explore the extent to which existing and reasonably foreseeable technologies can help rights-based fishing pass these tests.

Rights-based fishing, while eliminating many of the inefficiencies to which a common property regime gives rise, does not solve all of the resource management issues inherent in the wild fishery. The authors suggest that there are two questions in particular whose answers will powerfully shape any commercial fishery. These questions are:
1) How much fish can safely be harvested; and 2) how much fish has actually been harvested?

The better our answers to these questions, the better will our fishery management regime be. Moreover, the better our answers to these questions, the more practical rights-based fishing becomes, and the greater becomes the scope for industry self-management and self-regulation and, eventually, rights-based fishing. These points are illustrated by reference to Canadian and international experience, and the general conclusion emerges that improved technology, and hence growing potential and actual self-regulation, have produced clear and identifiable improvements in the economic performance of various fisheries, as well as more economically and ecologically responsible behaviour by fishermen themselves.

Before moving to a detailed consideration of the technologies relevant to improving the self-management and self-regulation of Atlantic Canada's fisheries, however, the authors point out the limits of what technology can accomplish. While there is much speculation about the possible emergence of technologies allowing for the electronic "branding" of individual fish, or the use of artificial reefs and sonic fencing to produce truly private ownership of fish within large areas of ocean, Apold and Guy remain sceptical. Not only are many of these technologies highly speculative at this time, but several of them (such as artificial reefs and sonic fencing) are not appropriate to the behaviour of our region's fish stocks, because "the fish must migrate to survive." While not discounting the fact that rights-based fishing would, in itself, create an incentive to find new technologies for control of fish stocks and exclusion of non-owners, the authors have preferred to stay within the realm of the currently available technologies.

Next, the management challenges facing anyone wishing to put rights-based fishing in place in Atlantic Canada are identified. These include the collection of accurate and timely information on quota ownership, quota harvest and biomass and other scientific data; maximising flexibility within the management regime while simultaneously minimising

costs; and maintaining credibility. The complexity characteristic of the region's fishery is identified as a key problem in all these areas because of factors such as the large numbers of species fished, of vessels and fishermen, and of routing options for anyone wishing to land illegally caught fish. In addition to these challenges, there are a number of regulatory problems to which any self-regulated fishery would have to find adequate solutions, such as the use of illegal fishing gear, fishing in closed areas or during closed seasons, transfers of catch between boats at sea, misreporting of landings, discarding bycatch species and highgrading (dumping of low value but "legal" fish, which are then never reported and charged against a quota).

Against this challenging background is the already noticed need for a system that engenders confidence in all the participants:

> Even if the resource assessment, management and monitoring systems of a rights-based fishery meet all the criteria of accuracy cost efficiency and flexibility, etc., it would still not be... successful unless every rights holder believed that all the others were following the rules... Ensuring that this high degree of credibility was never in doubt would probably be the single most important role for technology in support of the rights-based approach.

The technology exists to meet all of these requirements and therefore permit the full functioning of rights-based fishing. Some of the highlights of the many increasingly sophisticated techniques now available to which Apold and Guy draw our attention include:

- Constant improvements in species identification and gear sorting capability that allows ever greater selectivity - both by size and species - while the fish is still in the water;
- electronic logs on every vessel supplying a constant stream of information on vessel location (linked to satellite-based navigational aids), on catch and bycatch, on water temperature and other scientific data, much of this information being captured automatically by onboard computer;
- onboard video monitoring by sealed tamperproof cameras that automatically film strategic areas of the vessel (e.g. the trawl deck or the processing room) when key pieces of equipment such as winches or conveyors are in use;
- improved forensic accounting techniques, coupled with improved dockside monitoring, are making it progressively more difficult for cheaters to conceal illegal landing and sale of catches.

These and many other techniques can be used in various combinations, with the appropriate mix being determined in large part by the cost of particular techniques relative to the value of the catch being sought. Of particular interest in this regard is the change in approach it allows from traditional fisheries management regimes where enforcement efforts have concentrated on trying to catch offenders red-handed.

> With a rights-based, catch-limited system, however, obtaining real-time evidence is no longer of such importance. A whole variety of relatively inexpensive but powerful devices (e.g. personal computers, video recorders, sensors, secure data storage) allow a complete range of onboard activities to be monitored for review at a later date.

As the requirement for real-time reporting diminishes, total monitoring costs for the fishery

could fall significantly, even while improving the range and quality of the data collected. The authors give us a detailed overview of the comparative costs of various monitoring techniques to illustrate the incentives that will exist to shift to lower cost alternatives. The authors also point out that under a rights-based regime, there is a greater incentive for fishermen to monitor each other, because cheaters harm not some abstract group like the government or the Department of Fisheries and Oceans, but the quota owners themselves. Under the current arrangements, fishermen often regard many regulatory rules as outside impositions, and the regulatory agency as ignorant of local conditions, a distant and impersonal force to be contended with and outwitted. This attitude increases regulatory costs. By contrast, rights holders see the value in setting and enforcing sensible rules that will protect the value of their quota now and in the future.

In reaching their final conclusion--that there exist no significant technological obstacles to the putting in place of a comprehensive rights-based fishery on the Atlantic coast--Apold and Guy are at pains to emphasise one condition. That condition is that decision making must be devolved to rights holders if technology's promise is to be fulfilled:

> ...rights holders must have the flexibility to develop the mix of management policies and innovative technology that they feel is most appropriate for their own fishery. The more the management system can be customized to accommodate the uniqueness of a particular commercial fishery, the more likely that it will be fully accepted by all those involved, and therefore function as intended.