

THE NEED FOR ALTRUISM: Engendering a Stewardship Ethic Amongst Fishers for the Conservation of Sea Turtles in Canada

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ABSTRACT Enforcing conservation measures for marine organisms is challenging, as the vastness of the ocean makes monitoring human activities at sea nearly impossible. Sea turtles face multiple anthropogenic hazards, including entanglement in fishing gear. Conservation of these animals at sea must largely depend on the involvement of the fishing industry. The Nova Scotia Leatherback Turtle Working Group (NSLTWG), a sea turtle research and conservation organisation, has been working to conserve the critically endangered leatherback turtle (*Dermochelys coriacea*) by collaborating with commercial fishers in Atlantic Canada. One of the NSLTWG's primary goals is to engender a stewardship ethic amongst fishers that will result in the active conservation of sea turtles. There are signs that fishers are embracing opportunities to assist in the recovery of the leatherback.

Introduction

The Nova Scotia Leatherback Turtle Working Group is a collaborative sea turtle conservation initiative involving commercial fishers, tour boat operators, coastal community members, and scientists in Atlantic Canada, a region that encompasses the country's easternmost provinces: Nova Scotia, New Brunswick, Newfoundland, and Prince Edward Island (Figure 1). Formed in 1998, the NSLTWG is an organisation built on the premise that the lasting conservation of marine species can only be obtained through cooperation between fishers and scientists. The NSLTWG is comprised of approximately 500 volunteer commercial fishers (Martin and James 2005) and has contributed new and important information to the study of sea turtles, particularly the leatherback (*Dermochelys coriacea*), both globally and in Canadian waters. The efforts we have made to engender a stewardship ethic amongst the fishers we work with have been crucial to the success of our research and conservation programmes to date.

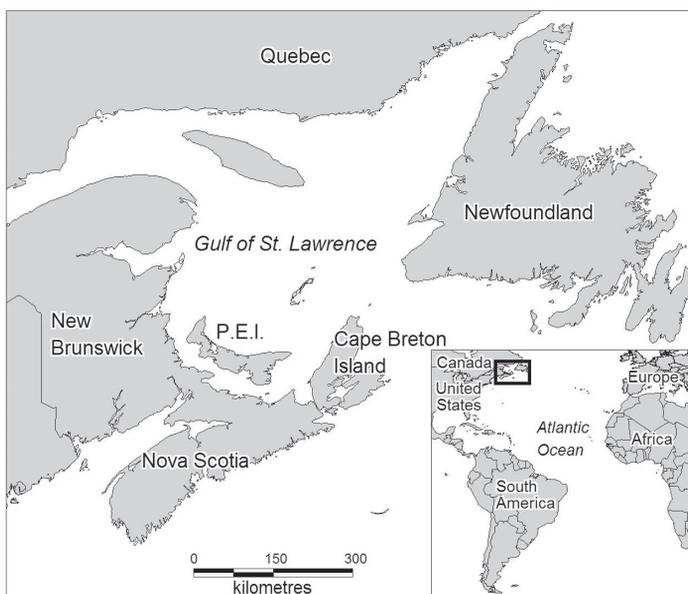


Figure 1. Atlantic Canada; inset shows region in context of the broader Atlantic Ocean.

The leatherback is classified as globally critically endangered (Hilton-Taylor 2000) and as endangered in Canada (James 2001). Leatherbacks are one of the world's largest reptiles; they can grow up to two metres in length and regularly weigh 500 kilograms (Zug and Parham 1996). Atlantic leatherbacks nest on beaches in Florida, the West Indies, South and Central America, and on the West Coast of Africa. After the eggs hatch, the turtles spend their lives at sea. Male turtles never return to land, and females return only to nest. Leatherbacks have the most extensive geographic range of any reptile, with migrations that can cover entire ocean basins (Eckert 1998; Ferraroli *et al.* 2004; Hays, Houghton, and Myers 2004). This, combined with the difficulty of locating the turtles at sea, makes studying this species anywhere but on a nesting beach difficult. Commercial fishers are in the best position to implement practical conservation of leatherback turtles at sea because they observe and interact with them more than any other human group.

It is not a secret amongst people who work on species that interact with fishing gear, that it is difficult -- some would say impossible -- to effectively police fishers' activities at sea. Vessels are widely dispersed, and as we have observed, the fishers' social code generally demands that they do not report each other for infractions, such as transferring bycatch to vessels that have licenses to harvest the species, fishing beyond a quota in order to maximise the value of the take (by discarding the less profitable catch), et cetera. On the other hand, fishers we have worked with are quick to point out that they believe they are subject to unreasonable constraints on their fishing activities by management agencies. A 'we-they' dichotomy exists between the groups that is often perceived as, or is in fact, adversarial.

One of the primary goals of the NSLTWG was to implement true and lasting change in fishers' at-sea conduct toward sea turtles. In order to do this, we needed to work with fishers as partners. In addition to our respect for their traditional eco-

logical knowledge (ТЕК) about the species we study and our genuine belief that they have much to contribute to leatherback science, we were certain that the only way to truly conserve sea turtles was to ensure that commercial fishers were working cooperatively with us (Martin and James 2005). But, they had to do more than pay lip service to our goal. Their conduct at sea had to be driven not by regulations, which they might be tempted to ignore, but by an earnest desire to help the turtles.

The premise is altruistic.¹ It is important to remember that most fishers with whom we work are self-employed and, in Atlantic Canada, where the landed value of shellfish has nearly tripled in recent years, many are operating thriving businesses (Fisheries and Oceans Canada 2002).² Altruism and any profit-oriented business are a difficult mix, particularly when the implications of that altruism might have a detrimental effect on the business' bottom line. Fishers are keenly aware of the potential for profit or loss implicit in fishing gear modification and, in our experience, many will structure their responses to fact-finding initiatives focused on species conservation (informal interviews, printed questionnaires, et cetera) to protect their business interests and by extension, the business interests of others in their community. The first challenge facing the NSLTWG was to generate sufficient interest within the fishing community in sea turtles to encourage reporting of turtle sightings. The second was to maintain and nurture this interest despite publicly acknowledging the problem entanglement in fishing gear poses for turtles. Added to these challenges was our definition of 'interest,' which required that the fishers working with us act as volunteers.

Voluntarism is at the heart of our sea turtle work with fishers and is one of the things that separate our efforts from the majority of fisher-scientist data gathering initiatives. There is a history of scientists working with fishers to obtain data on sea turtles (for example, Bleakney 1965; Goff and Lien 1988; Rakotonirina and Cooke 1994; Morreale and Standora 1998) and other marine species (for example, Lien, Staniforth, and Fawcett 1985; Lavigueur and Hammill 1993; Zwanenburg, King, and Fanning 2000). But, fishers are accustomed to being paid or to receiving monetary substitutes (such as opportunities to participate in sentinel fisheries) for their help with scientific studies (Lavigueur and Hammill 1993; Zwanenburg, King, and Fanning 2000, Martin and James 2005). However, providing monetary or other incentives for data is expensive and can be difficult to maintain long term (Lavigueur and Hammill 1993; Best 1998; Zwanenburg, King and Fanning 2000). Conversations we have had with fishers have also confirmed that information they collect for payment rarely has any value to them other than as a means to the reward (Pretty and Smith 2004). From our perspective, paying for the data also clearly controverts engendering a conservation ethic amongst the fishers. It is the normative pull of this ethic that we hope will ultimately override capitalistic values. It is this ethic that is crucial to the success of our programme and, in our mind, to the conservation of all marine species by resource users.

Signs of Success

In the beginning

The NSLTWG approached commercial fishers across Atlantic Canada to draw on their

TEK of the leatherback turtle in this region and to enlist their help in voluntarily contributing data to our initial study of its abundance and distribution in Atlantic Canadian waters (Martin and James 2005). For the most part, the NSLTWG's collaborative model has been enormously successful as measured by the number of fishers volunteering with the group, the data they have contributed, their active participation in field research, and the signs of changing attitudes toward sea turtles amongst many of the fishers we have encountered and interviewed (Martin and James 2005).

During our first season of fieldwork, which ran from June to November of 1998, we experimented with several methods of enlisting fishers to help us with our leatherback turtle research. We made presentations at fishing organisation meetings, promoted our programme at fishing derbies and community festivals, and visited 175 fishing wharfs across Nova Scotia (where the vast majority of our volunteers are located), covering approximately 6,000 kilometres, in an effort to make direct contact with as many fishers as possible (Martin and James 2005). We soon learned that presentations at fishing organisation meetings were not the most effective way of obtaining fishers' cooperation, because the assembled group could decide as a whole whether or not to help, and individual fishers were sometimes reticent to express interest in the company of their peers. If organisations chose to help, we could win over a large block of fishers. If they didn't, we sometimes lost the opportunity to win over individuals, whose personal opinion might differ from that of the majority. The best way to obtain volunteers was to speak to fishers individually or in small informal groups to talk about why we were interested in sea turtles and how we thought fishers could help conserve them (Martin and James 2005).

Fishers were almost always generous in their offers to help once we made personal contact with them. On more than one occasion, individuals mentioned that their interest stemmed from meeting us in person and seeing our enthusiasm for the turtles. Having a personal connection with the research team was crucial for the fishers (Neis *et al.* 1999a; Neis *et al.* 1999b; Fischer 2000; Gendron, Camirand, and Archambault 2000; Zwanenburg, King, and Fanning 2000; Martin and James 2005). Equally important to the fishers was our affiliation with a university rather than with a government agency. Many fishers made it clear that they were not willing to assist with government projects. They frequently inquired about our affiliation and made it clear they were not interested in helping many well-known environmental non-governmental organisations, including local, national and international groups, because they perceived them as being radical and unfriendly to fishers' interests (Martin and James 2005).

Before 1998, there were approximately seventy-three published records of leatherbacks in Atlantic Canada (Squires 1954; Bleakney 1965; Miller 1968; Steele 1972; Threlfall 1978; D'Amours 1983; Goff and Lien 1988; Bossé 1994; Fuller 1998). By the close of our first field season (1998), the NSLTWG had enlisted the volunteer help of 209 fishers and collected 246 geo-referenced sightings of leatherback turtles. The findings served to substantiate the hypothesis put forth by Bleakney in 1965 that had remained virtually uninvestigated: that leatherbacks are regular seasonal visitors to Atlantic Canadian waters. We believe this information has had a global impact on leatherback biology and conservation.

In addition to phoning our toll-free turtle sightings hotline with the details of their encounters with leatherbacks, fishers shared with us both recent and histori-

cal photographs they had taken of these turtles. They seemed genuinely pleased that we were interested in what they were observing. We received dozens of pictures of leatherbacks, some swimming or basking at the surface of the water, others feeding on jellyfish, and some entangled in fishing gear. We believe that these photographs represent the fishers' increasing interest in the turtles and our research. The entanglement photographs are the most noteworthy and, ironically, the most encouraging. They indicate both the fishers' concern for the turtles in the photographs and the fishers' trust in our policy not to distribute the images (Martin and James 2005). On more than one occasion, entanglement photographs were sent by fishers who, although they identified themselves to us, asked that their contributions remain anonymous for fear of negative repercussions from their peers. This was particularly true of those fishers involved in the pelagic longline fishery, who noted that they understood the photographs confirmed that sea turtles were among the bycatch of their highly-controversial gear sector.

A particularly encouraging instance of this kind of selflessness occurred when a fisher not only called us about a turtle that had become entangled and drowned in his fishing gear, but brought the turtle to shore for us to examine. The animal had been so badly entangled in a buoy line that its flipper had to be severed post mortem to disentangle it. Not only was the fisher willing to go to the trouble of bringing the animal in for us to study, he was also willing to do so in the presence of his entire community. The first thing the fisher wanted to know when we arrived was the sex of the animal. We confirmed that it was a female, which distressed him. He understood that the death of the female meant not just the loss of one turtle, but also the loss of her long-term reproductive potential. He was comforted somewhat when we explained how much we were able to learn from a dead turtle and how grateful we were that he had been willing to bring the turtle to shore for necropsy.

In 1999, the NSLTWG expanded its programme to engage fishers not just in collecting sightings and photographs of leatherback turtles, but also in helping with a pilot field research programme to tag leatherback turtles at sea. Once again, fishers volunteered to help us with our work, offering to take us out on their vessels to look for animals and ultimately becoming an integral part of our tagging programme. The knowledge the fisher members of our organisation have contributed to our tagging protocol -- based on their years of work with marine life, their familiarity with the mechanics of boats and fishing gear, and their practical understanding of the marine environment -- has been invaluable.

Continuing Benefits for the NSLTWG

Over the years, the relationship the NSLTWG has developed with fishers has helped our conservation programme to grow both quickly and cost effectively. Not only do the volunteer fishers report sea turtle sightings, photograph animals, and help us with our research on leatherback movements, but they also report dead leatherbacks. During our first field season, a fisher on Nova Scotia's south shore found a leatherback dead at sea more than a hundred kilometres from his homeport, and recovered it for us to necropsy. As may be obvious, the large size of leatherback turtles makes them difficult to handle. When necessary, fishers have offered us the use of their boats as platforms, on which to conduct necropsies and have been instrumental in transporting turtle remains away from shore for disposal. They have also facili-

tated the movement of turtle carcasses on land, using tools ranging from winches to forklifts. Early in January 2002, in a case that would boggle the minds of those who study sea turtles at tropical latitudes, a fisher helped us hitch a dead leatherback to his all-terrain vehicle enabling us to drag the carcass from the icy shore, where it was spotted on New Year's Day, to a safer workplace (Figure 2). We currently dispatch volunteer fishers to examine and obtain morphometrics of turtles that have stranded in remote areas of Nova Scotia.



Figure 2. Fishers help dig a dead leatherback out of the snow near Pugwash, Nova Scotia, before dragging it behind an all-terrain vehicle to a safer workspace for necropsy (January 2002). Photo: NSLTWG.

Fishers have also been generous in offering their vessels for other aspects of our research. When we have received reports of dead turtles floating in shelf waters, they have willingly responded to our requests for help in recovering the animals. They have also made trips out on the water to survey for turtles in an effort to help us determine when and where we should conduct our fieldwork. The NSLTWG does not operate its own research vessel, although it does conduct at-sea fieldwork for three months of the year. To accomplish this, since 1999 we have collaborated with commercial fishers, using their fishing boats as research platforms and involving them as field research assistants (Figure 3). We have accepted many generous invitations from captains and crews of commercial boats across Nova Scotia to accompany them on trips to study leatherbacks at sea. Such opportunities have included a two-week trip aboard a harpoon swordfish boat, which the captain allowed us to retrofit for our research purposes. The captains of the two fishing boats we use most regularly have also allowed us to retrofit their vessels for capturing and handling leatherbacks at sea and, remarkably, when modifying or renovating their vessels for their own purposes, they have been careful to maintain a design conducive to our fieldwork activities.



Figure 3. Nova Scotia Leatherback Turtle Working Group scientists and fishers collaborate to satellite tag a female leatherback turtle in waters off Cape Breton Island, Nova Scotia (August 2002). Photo: NSLTWG.

Challenges

Fear

Although we generally characterise our work as successful, we are cognisant of the challenges we face. As previously mentioned, altruism and business are a difficult mix when a business' bottom line is potentially at risk. Our major challenge is engaging fishers in the active conservation of leatherback turtles despite the fact that in many other areas of the world, management agencies frequently regulate changes in how, when, or where fishers operate in order to reduce turtle interactions with fishing gear.

We know that some fishers would never report their turtle sightings, because they are concerned that this information could be used to make management decisions that could restrict their fishing activities. We know that many more turtles become entangled or die in fishing gear each year than are reported to us. We know that even if a fisher has willingly contributed turtle sightings in the past, he will be less likely to call to report a dead animal if one is found entangled in his own gear. And we know that when we question fishers directly about entanglement, some of them choose not to relate their experiences to us.

When we first began our work on leatherback turtles we hypothesised that these animals were not infrequent visitors to Atlantic Canada as they had previously been described in the literature, but that they represented a seasonal aggregation. To better understand the temporal and spatial distribution of leatherbacks in Canadian waters, we asked fishers to document their sightings of turtles (Martin and James 2005). When we began, neither our project nor the information we sought was

perceived as an immediate threat to the fishing community. Instead, nervousness about our work among fishing fleets at that time stemmed from fishers' past experiences with scientists and environmental groups. Some fishers were worried that contributing data to a scientific study could result in additional regulations that they would characterise as detrimental to their industry and their earnings. They were also apprehensive about working with high-profile environmental groups (Martin and James 2005). It is important to note that many of the fishers we have worked with tend to universalise these experiences. They themselves had not necessarily had a negative experience with either a scientist or an environmental group, nor had anyone in their immediate community. Learning about actual or rumoured temporary closure of fishing areas or regulated gear modifications that affect other fishers -- even those in a different country -- was sometimes sufficient to alarm them, leading to low or decreased levels of cooperation in scientific studies.

For example, in October 2000, the United States' National Marine Fisheries Service (NMFS) issued a temporary closure of a 90,056 square-kilometre fishing area on the Grand Banks to protect loggerhead (*Caretta caretta*) and leatherback sea turtles (NMFS 2004). The area was closed to the American pelagic longline fleet from October to April for three years (NMFS 2004). The closure did not directly affect the Canadian pelagic longline fleet (one of the many fishing sectors that work with the NSLTWG), and Canadian management agencies did not implement similar measures at that time. Nevertheless, participation in our project by the Canadian pelagic longline fleet virtually ceased following the US closure, save contributions from a handful of extremely dedicated volunteers.

The Need for Public Education

We are fortunate that fishers in most other gear sectors are not constrained by this type of fear. Approximately 500 fishers work with our group today (Martin and James 2005). Their enthusiasm presents that most desirable of challenges -- maintaining their interest over the long term. When our programme began, part of what engaged the fishers was the broadly held scientific notion that leatherback turtles did not regularly enter Atlantic Canadian waters. They were intrigued by our efforts to collect data on leatherback occurrence in Atlantic Canada in order to corroborate Bleakney's (1965) suggestion that these animals were seasonal migrants to this part of the world. Fishers were clearly motivated by our rationale for approaching them to assist us: there was relatively little known about the species, because the scientific community had historically not drawn on fishers' TEK. The fishers responded as much if not more to the challenge of detailing their observations so that they would be convincing scientifically, as they did to the idea that their contribution would help conserve a critically endangered species. Later, when their geo-referenced observations of leatherbacks were summarised and the regular seasonal occurrence of leatherbacks in Atlantic Canada was no longer in doubt, we were able to engage them with the prospect of developing a novel field research programme to study the biology of these animals in northern waters (for example, James and Mrosovsky 2004; James, Ottensmeyer, and Myers 2005).

Although other scientific breakthroughs have followed in the seven years the NSLTWG has been active, research goals will become less relevant to fishers, as

the science associated with conserving leatherbacks in Atlantic Canada answers the biggest questions and begins to concentrate on less obviously engaging topics. It becomes increasingly imperative that fishers' continued interest in participating in the conservation of leatherbacks be motivated by the intrinsic worth of sea turtles. The NSLTWG must engender in fishers a broader interest in helping the turtles -- to convince them that the turtles are an end in themselves.

The most successful way we have found of doing this is by maintaining our public outreach programme (Martin and James 2005). This programme includes initiatives, such as visiting fishing wharfs across Nova Scotia each spring and talking to fishers in person about sea turtles, informing them of recent developments in sea turtle research, and generally communicating our enthusiasm about the animals. It involves continuing to put up posters soliciting sea turtle sightings; and it involves maintaining the annual newsletter we send to our fisher volunteers that focuses on sea turtle biology, our research, how fishers have contributed and what they can continue to do. It also means continuing concerted sea turtle outreach programmes for children in coastal communities.

Public outreach and scientific research must work together, if we are to see lasting changes in how resource users relate to species of little or no commercial value -- if altruism is to have a chance of winning out over business interests. As this is not the standard approach to science, it presents an additional practical challenge: convincing funding agencies that are conditioned to support traditional research that funding 'softer' aspects of a conservation programme, like community outreach, is supporting science (Pretty and Smith 2004).

Why Collaboration Works

The Case of the NSLTWG

There are a number of factors that have contributed to the success of the NSLTWG's programme. We have had no control over some of the factors that we have used to our advantage. For example, the ability to spot leatherback turtles at sea requires observational abilities that only those who have fished on the ocean for years can cultivate. These same skills are required to spot the fin of a swordfish breaking the surface of the water, which is key in the harpoon fishery targeting this commercially important fish. Although there is an active harpoon fishery off southwestern Nova Scotia, the swordfish have all but disappeared from waters off Cape Breton Island, where the fishery historically flourished (Fitzgerald 2000). 'Turtling', the term used by NSLTWG fishers to refer to surveying the seascape for leatherbacks, gives the many dedicated swordfishers in places like Cape Breton a good excuse to go to sea to look for animals -- turtles in this case -- while keeping a sharp eye out for unlikely swordfish sightings. Turtling also satisfies the love of hunting that many fishers share. They are able to spend hours at sea in search of a rare animal, and although they don't harvest it, they do receive positive reinforcement from our group when they report their sightings (Martin and James 2005).

Another important factor in our success was that we began work on leatherback turtles and their presence in Canadian waters before any government agency did. This allowed us to approach fishers both as separate from a regulatory body and

also with a subject that had never been broached with them by a regulatory body. This gave us the chance to be the first to present a case for fishers helping advance scientific knowledge of leatherback turtles, which enabled us to enlist the fishers as partners from the start -- to change the 'we-they' dichotomy into an 'us.' Because we initiated the work in Nova Scotia, we had time to establish our programme before other groups with different ideologies entered the picture. Firmly entrenched in the minds of our volunteer fishers -- and in the way we operate the NSLTWG -- is that turtle work is collaborative. Fishers are not forced to help us because of regulations. They are the agents of conservation for sea turtles, because they are in the best position to help, and because they want to help. There is a sense of responsibility for the animal that is implicit in this mindset. We think that sense of responsibility is what drives some fishers -- and will hopefully motivate more -- not just to report sightings of free-swimming turtles or to disentangle turtles from their gear, but also to report those turtles that have died as a result of entanglement. We believe that ultimately it will be this stewardship ethic that prompts fishers to help develop and use new gear technology where necessary to conserve sea turtles.

Perhaps the key, however, has nothing to do with serendipity and everything to do with ideology. We believe that collaboration works, and we base our programme on this premise. We make it clear to both the fishers, who volunteer to help us, and to all, who ask about the results of our research, that we could not have learned what we have without the active participation of fishers in our programme. We do not only depend upon commercial fishing vessels for transportation to our field research sites, but also rely on boat captains to be active research assistants. Fishers help in all aspects of handling, measuring, and tagging turtles, and have contributed to and executed the design of associated field equipment. They are given ownership of the programme, and we make sure that we report to them accordingly. We make sure our volunteers are personally thanked for their individual contributions; we give them copies of photographs they've taken; we copy them on necropsy reports of turtles they've helped recover, measure or dissect; and we provide synopses of the latest research developments in our annual newsletter (Martin and James 2005). On too many occasions fishers have told us about other research projects they have contributed to -- from reporting fish bearing tags to spending hours hauling a full-size whale to shore -- for which they have had no follow-up. We are determined that this will not happen with NSLTWG projects.

The Case for Lasting Change

The fact that it is difficult to convince some fishers that species with no commercial value are intrinsically important is undeniable. It will take many years -- possibly decades -- before this mindset is universally adopted by the fishers who currently volunteer for the NSLTWG. But there is also no question in our minds that if we hope to truly engender a stewardship ethic that has sway when a fishers' business interests are potentially at risk, that working collaboratively with fishers is the only option. This has required, and will continue to require, enormous patience, particularly in light of Canada's Species at Risk Act (Martin and James 2005).

One of the overwhelming lessons we have learned through our work is that most fishers fundamentally enjoy their profession and are generally interested in the dynamic ecosystem, on which they depend. Many are deeply concerned by the

depletion of marine diversity, though they do not always seem to understand -- and even more rarely embrace -- the proactive role they must inevitably take to preserve such diversity. Collaborative efforts like the NSLTWG's sea turtle conservation programme help fishers see how they can contribute. They give fishers a way to express the value they place on the sea in something other than monetary terms. In a society often overly concerned with economic gain, this is a message of hope not just for leatherbacks, but for all species.

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Notes

¹The definition of altruism assumed in this paper accepts altruism as a relative ethic. It defines altruism as helping another without expecting material reward in return, although it may indeed entail the internal benefit of a good feeling derived from any number of sources, including positive social feedback (Audi 1995). It should be noted, although there is positive social feedback from sectors like the scientific community or the general public, fishers who volunteer with the NSLTWG do not generally receive positive social feedback from their peer group. In fact, the opposite is often true. Fishers participating in voluntary conservation initiatives are often breaking the accepted social code (as discussed later in this paper) for a higher social good that they perceive, which others among their peers do not. There is no way to 'repay' the cultural risk entailed in this kind of action; there is no currency for it. It is simply altruistic.

²The landed value of shellfish (primarily lobster, shrimp and snow crab) has nearly tripled in recent years jumping from \$589.2 million CAD in 1992 to \$1.5 billion CAD in 2002, with Nova Scotia's landings representing forty-one per cent of the total value.

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