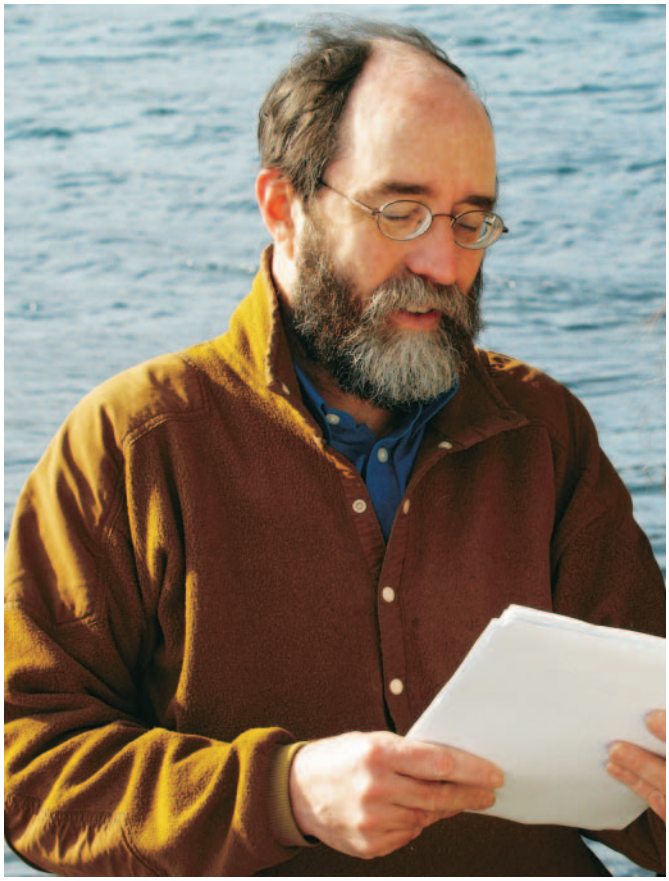
TRIBUTE

Ransom Aldrich Myers (1952–2007): In memoriam

Jeffrey A. Hutchings

Ransom Aldrich Myers (Ram) was a mathematically gifted, intellectually pugnacious, and passionately humane scientist committed to the unconstrained communication of science to decision makers and to society (Fig. 1). He died 27 March 2007 in Halifax, Nova Scotia, Canada, 4 months after being diagnosed with inoperable brain cancer. He was 54 years old and in the prime of his scientific career.

Fig. 1. Ransom Aldrich Myers (Ram) photographed near Halifax, Nova Scotia (February 2004).



Beginnings

The son of a cotton plantation owner in the southern United States, Ram (Randy to his parents and siblings) was born on Friday, the 13th of June, 1952, in the rural community of Lula, Mississippi. After graduating with a B.A. in Physics from Rice University in Houston in 1974, Ram spent 2 years working for Schlumberger Overseas S.A. in the oil fields of Kuwait. He then spent his 23rd year travelling throughout Africa before embarking across the Atlantic to the Caribbean on an 8.5 m sailboat. In 1977, rather than disappointing his father (whose ancestors included Confederate soldiers) by attending a university in the northern "Yankee" states, Ram left the United States for Canada, a country he first visited as a 13-year-old when his cousin took him there on a canoe trip to Ontario's Algonquin Park. Having enrolled in postgraduate studies at Dalhousie University under the supervision of Roger Doyle, Ram defended his M.Sc. in Mathematics on 6 October 1980 before defending his doctorate in Biology 3 years later (20 August 1983).

One would have been hard pressed to predict most of Ram's future research endeavours based on his postgraduate thesis topics. In his M.Sc. thesis (dedicated simply "To my mother"; she had died 2 years before his thesis defence), he presented a model for the evolution of dispersal, based on a nonlinear, stochastic system of difference equations. His primary conclusion was that "the ESS [Evolutionarily Stable Strategy] dispersal distribution is independent of dominance, model assumptions of haploidy or diploidy, maternal or individual genotypic control of dispersal, and the timing of mating" (Myers 1981). The overall objective of his doctoral thesis (Myers 1983) was to use optimization and inverse optimization theory to study the evolution of life histories, focussing in particular on the evolutionary stability of postmaturation growth, the degree to which reproduction–mortality trade-offs could be used to estimate natural mortality rates, and the adaptive basis for empirical patterns of covariation between growth rate and size at maturity.

Prior to defending his doctoral thesis, Ram accepted a position as research scientist in the Department of Fisheries and Oceans (DFO) in St. John's, Newfoundland, where he undertook work on Atlantic salmon, *Salmo salar*. At the time, I was an M.Sc. student, nearing the end of one of two 6-month field seasons. I had collected reams of life history

Received 21 November 2007. Accepted 27 November 2007. Published on the NRC Research Press Web site at cjfas.nrc.ca on 20 December 2007.
J20278E

J.A. Hutchings. Department of Biology, Dalhousie University, Halifax, NS B3H 4J1, Canada (e-mail: jeff.hutchings@dal.ca).

 doi:10.1139/F07-906

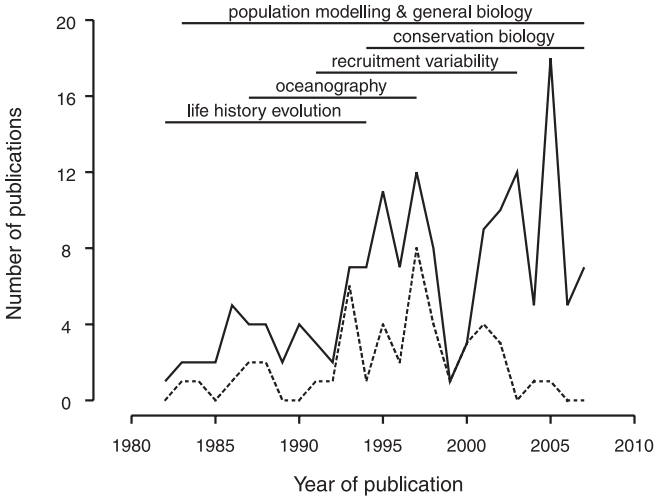
data on two migratory variants of Atlantic salmon in Terra Nova National Park, northeastern Newfoundland, when John Gibson, a DFO scientist of British descent, remarked, "Jeff, we've just hired a new scientist — Ransom Myers — and he's very interested in salmon. I told him about your work. You really ought to meet this chap." It was the first and only time I heard Ram referred to as a "chap" — many other things mind you, but chap was never amongst them. Although we met briefly at a DFO seminar shortly thereafter in October 1983, it was not until April 1984, when I was a financially challenged postgraduate and Ram was a financially flush government scientist, that he hired me as a research associate.

I am not sure whether Ram was prepared for Newfoundland, but I think it is fair to say that Newfoundland was not entirely prepared for Ram. At 31 years, he possessed a massive head of dark-brown hair and a long, flowing beard. When standing on a rock, overlooking the ocean, in a Newfoundland "breeze", the beard did lend Ram a certain physical presence not unlike that of Thor, the Norwegian god of thunder. It was a prescient characterization fitting for a man who would slay many a sacred cow with his question-laden, data-infused hammer.

However, looking god-*like* in a William Blake or Michelangelo sort-of-way was one thing, but it did not come with any divinely bestowed power of flight. We had to drive to work. Every morning, I would pick Ram up at his home, and we would navigate the 5 km or so to DFO on the White Hills in St. John's. I learnt very quickly that Ram was a creature of habit. While I parked at the curb, he would scramble down the steps with a backpack full of books and papers in one hand and a steaming mug of coffee in the other. Riding shotgun, sans lid, only a portion of this coffee ever made it down Ram's throat. As Ram might have put it, the probability of the coffee finding its way to the floor, seat, or dash of the car was nontrivial. On other occasions, reckoning that a half mug of coffee would not quite do it, Ram decided that a full breakfast was in order. With his backpack over a shoulder, he would gingerly make his way to the car, nursing the ubiquitous coffee in one hand and balancing a bowl of cereal, milk, and spoon in the other. Then we would drive off, Ram simultaneously gesticulating, eating, and talking, while I minded the coffee.

Unsurprisingly, given the topics of his postgraduate thesis research, Ram was adamant that fundamentally important questions in biology could not be addressed without a sound knowledge of ecology, evolutionary biology, and quantitative genetics. He argued this point repeatedly (among others) during Ecology and Evolution Discussion Group meetings held weekly in the Biology Department at Memorial University of Newfoundland. The verbal jousting that took place between Ram and people such as Doug Morris and Jake Rice, neither of whom could be described as shrinking violets, were legendary both for the degree of uninhibited enthusiasm they exuded and for the unparalleled influence their interactions had on some of us during our formative postgraduate years. It was Ram who, all before 1987, introduced me to life history evolution, additive genetic variance, epistasis, John Maynard Smith, ESSs, maximum likelihood, APL (A Programming Language, a computer program for which the sole username at DFO was "droff", after Derek Roff), John Thorpe, threshold traits, the quantitative genetics of liability, Sewall Wright, and Ronald Fisher.

Fig. 2. Number of research contributions (including anonymously peer-reviewed book chapters and papers in the primary scientific literature, but excluding letters, consultant reports, and government research documents and working papers) authored or co-authored by Ram Myers from 1982 to 2007. Solid line represents the total number of contributions; the broken line represents those published in the *Canadian Journal of Fisheries and Aquatic Sciences*. The labelled horizontal bars identify the range in publication year for six research themes.

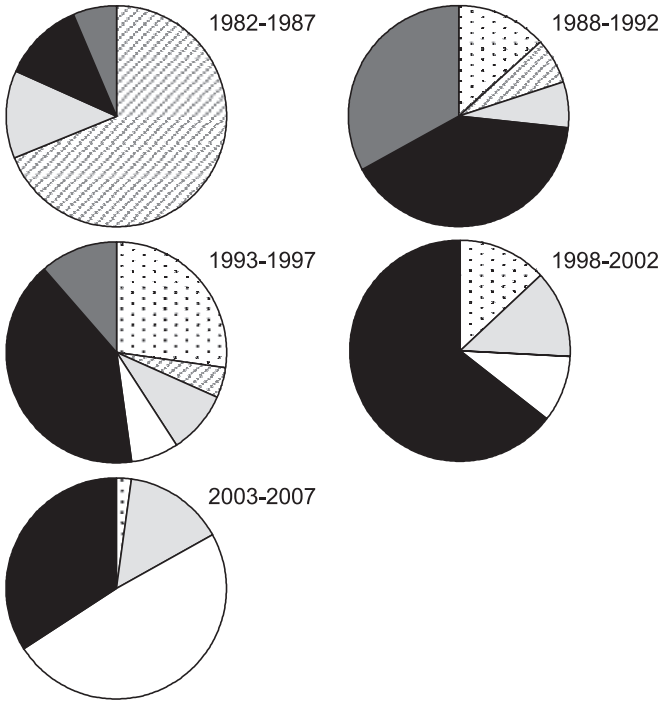


One of my most cherished "Ram-isms" was his response to my scepticism of the utility of, and logical basis for, distinguishing between *r*- and *K*-selection (a scepticism I firmly embrace today). Ram's simple response, written in his own uniquely expressive hand, was "r-K-ic". Among the myriad interactions we were to share over the coming years, none, but for these four letters, captured quite so well the succinctness, wit, clarity, and mischievousness that Ram was always capable of.

Research contributions and collaborations

Ram's breadth of interest in the arts (he read all manner of nonfiction voraciously, loved live theatre, and thoroughly enjoyed opera) was mirrored by the diversity of the science he undertook. At the time of writing (December 2007), Ram had co-authored 153 research contributions (including anonymously peer-reviewed book chapters and papers in the primary scientific literature, but excluding letters, consultant reports, and government research documents and working papers). His primary research outlet was the *Canadian Journal of Fisheries and Aquatic Sciences*, the journal in which almost half (46%) of his 98 papers through to 2002 were published (47 of 141 papers overall) (Fig. 2). Among these was his first scientific paper, which explored ways of estimating natural mortality and associated trade-offs from fish life history data (Myers and Doyle 1983) and his first sole-authored paper, which documented a survival cost of reproduction in mature male Atlantic salmon parr (Myers 1984). He also co-authored nine publications in *Science* and three in *Nature* (including a Reply).

Fig. 3. Proportional representation of research contributions by Ram Myers for each of six research themes: life history evolution (hatched area), oceanography (dark grey), recruitment variability (stippled area), conservation biology (open), population modelling (solid), and general biology (light grey).



Ram worked very closely with others, successfully combining his modelling and mathematical skills with the varied strengths of his collaborators, a group that included fisheries scientists, statisticians, stock assessment modellers, conservation biologists, oceanographers, field biologists, evolutionary ecologists, natural historians, and legal scholars. Numerically, the most prominent of his collaborators were Nick Barrowman (n = 18 publications), Jeff Hutchings (n = 16), Gordon Mertz (n = 16), Mike James (n = 10), and Boris Worm (n = 9). Among others who co-authored five or more papers with Ram were Noel Cadigan, Ken Drinkwater, Jamie Gibson, Mike Hammill, Ian Jonsen, Dan Kehler, Andy Rosenberg, and Gary Stenson. Additional collaborators, each of whom co-authored three of Ram's dual-authored contributions, included Bill Montevecchi, Pierre Pepin, Jeff Runge, and Peter Ward. Even if not identified explicitly, the contributions of these individuals and many others are interwoven within the fabric of the corpus of Ram's research.

Research career

Newfoundland

Upon arrival at DFO, Ram learned of data on salmon parr collected between 1956 and 1963 in Little Codroy River, Newfoundland. Quickly grasping the uniqueness of this data set, he immediately set about estimating the heightened mortality experienced by mature male parr relative to immature males and the loss of anadromous salmon productivity that would ensue (Myers 1984). These analyses comprised part of his work on life history evolution, one of six research themes in which I have attempted to categorize his research

Fig. 4. Photograph of Ram standing next to the Department of Fisheries and Oceans' experimental stream channel at Noel Paul's Brook, a tributary of Exploits River, Newfoundland, where he and I undertook experimental work on Atlantic salmon (October 1984).

contributions (Fig. 3). Predicated by his doctoral thesis research (Myers 1983), Ram's keen interest in how fitness trade-offs influence life history evolution led to a series of papers published in the mid-1980s on alternative reproductive tactics in male Atlantic salmon (Fig. 4). Among his nine co-authored papers that have been cited more than 100 times (hereafter, his highly cited papers), the earliest was a product of this life history research and represented one of the first attempts to use genetic markers to estimate fertilization success in fishes (Hutchings and Myers 1988).

In 1989, Ram became part of a small group of modellers and statisticians at DFO that comprised the Resource Assessment and Survey Methodology Centre of Disciplinary Expertise (RASM CODE), under the direction of John Hoenig. This section was intended to serve as a national resource for other DFO research scientists. One consequence of this shift in Ram's responsibilities was a substantive increase in the proportional representation of papers (1988–1992) on various elements of population modelling (particularly the demography of marine mammals), a research theme that was to remain dominant throughout the remainder of his

career. It was also during this period that Ram's interest in oceanography was most prominent. His work on environmental correlates of larval and juvenile mortality, for example, contributed to his first two publications on recruitment variability (Myers 1991; Pepin and Myers 1991), a topic he was to explore in increasingly greater detail through the 1990s.

The period 1993–1997 was Ram's most wide ranging in terms of research (Fig. 3). It was also the period during which his interest in recruitment was at its height, as Ram examined how density, life history, and oceanography affected the magnitude and spatial scale of recruitment variability. Four of his highly cited papers were published during this period: one examined the influence of density on juvenile mortality in marine fishes (Myers and Cadigan 1993); one represented the first meta-analysis to test for depensation, or Allee effects, in fish stock–recruitment relationships (Myers et al. 1995); and two pertained to the collapse of marine fishes, particularly Atlantic cod, *Gadus morhua* (Hutchings and Myers 1994; Myers et al. 1997*a*).

It seems reasonable to conclude that the diligence and fervour with which Ram undertook his later work in conservation biology had its genesis during the time between 1993 and 1997 when we (Ram, Nick Barrowman, and myself) undertook our work on the collapse of northern cod. The loss of this once massive fishery had, and continues to have, enormous economic, sociological, and emotional impacts on Newfoundlanders. You could not work at DFO in Newfoundland in the early 1990s (as we three did) and not be cognizant of the obligations that scientists have to society of communicating their research widely, publicly, and honestly.

This perspective was not, however, shared by all. The societal and moral obligation of scientists to communicate the results of their research was being traded off by the desire of some bureaucrats to control the information that flowed from DFO to the public. Bureaucratic impediments to the communication of fisheries science were discussed by Hutchings et al. (1997), who reported that a DFO scientist had received an official reprimand for communicating to the media conclusions consistent with the peer-reviewed scientific literature but inconsistent with the views expostulated by department spokespersons. Ram was the scientist in question (according to a memorandum; footnote 1, Hutchings et al. 1997).

Dalhousie University

It was this reprimand that sealed Ram's future with DFO. From his perspective, he could "put up and shut up", or he could leave. He opted for the latter, attaining the right of freedom of expression that universities offer when he returned to Halifax in 1997 as Dalhousie's inaugural Killam Chair in Ocean Studies. Upon arrival at Dalhousie, Ram and postgraduate Jill Casey completed their work on the extraordinary decline experienced by the barndoor skate, *Dipturus laevis*, one of Canada's larger marine fishes (maximum length of 153 cm), that occurred, as Ram frequently put it, "when no one was looking". Indeed, no one was looking, primarily because the focus was traditionally on temporal trends in species directly targeted by the fishing industry. Consequently, changes in the abundance of those species caught incidentally often went unnoticed. The increased attention to bycatch species by fisheries agencies in the early 2000s can be attributed to a considerable degree to the attention generated by Casey and Myers' (1998) highly cited paper in *Science*.

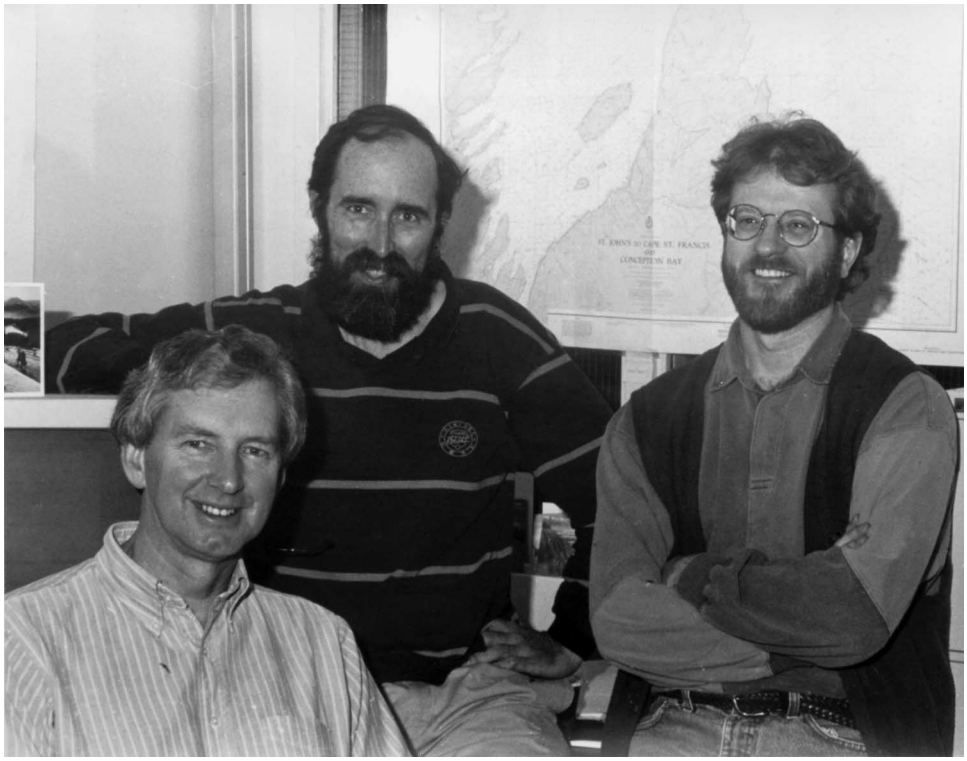
Following intellectually in the footsteps of fisheries scientists Bill Ricker and Ray Beverton and pioneer life history modeller Lamont Cole, it was Ram's primary assertion that the maximum rate of population growth was the single most important parameter required to fully understand the factors that affect the ability of fish populations to sustain exploitation, to resist decline in the face of unpredictable environmental change, and to recover following collapse. It was this parameter (r_{max}) that represented the intellectual and empirical anchor that grounded much of Ram's research, be it the life histories of zooplankton, alternative reproductive behaviours in Atlantic salmon, the relationship between parental and offspring abundance in harvested populations, or the factors that affect the collapse, recovery, and extinction risk of marine fishes.

Two influential examples of Ram's research on maximum population growth were published between 1997 and 1999. Myers et al. (1997*b*) introduced methods to estimate r_{max} from stock–recruit data, applying it here to multiple stocks of Atlantic cod and making explicit the link that exists between r_{max} and recovery. Based on an analysis of more than 700 spawner–recruit relationships, Myers et al. (1999; one of the nine highly cited papers) concluded that maximum annual reproductive rate is relatively constant across a broad range of fish species. Ram declared this result to be a "very important finding" (Myers et al. 1999). A touch of arrogance, to be sure, but on this occasion, as on many others, he was right.

Following the stock–recruitment database that Nick Barrowman, Jessica Bridson, and he had compiled in the mid-1990s and armed with an extraordinarily acute understanding of analytical modelling techniques, Ram continued his marshalling of massive data sets from around the globe. During a 5-year period beginning in 2003, Ram's research contributions to conservation biology reached a pinnacle. Concomitant with a highly cited paper in *Science* on the decline of pelagic sharks in the Northwest Atlantic (Baum et al. 2003), a publication that was a part of Julia Baum's M.Sc. research, Ram and postdoctoral researcher Boris Worm took on the task of estimating the magnitude of the post-1950s decline experienced by large, predatory fishes targeted by industrialized fishing, species such as tunas and billfishes. The authors' conclusion that the global ocean has lost more than 90% of large, predatory fishes attracted an unprecedented amount of attention for a publication in marine conservation biology. The paper by Myers and Worm (2003), published in *Nature*, is the most referenced of Ram's research contributions at present and, having been cited more than 330 times to date, will almost certainly remain so.

It is prudent to note, however, that this recent work has not been without criticism (e.g., Walters 2003; Hampton et al. 2005; Polacheck 2006). In this vein, Ram has been described as one of those responsible for a rift that currently exists between some fisheries scientists who perceive marine fish population declines to have been unduly exaggerated and others who consider it important that studies of marine biodiversity be integrated with studies of fisheries science (Pauly 2007). This is a characterization with which Ram

Fig. 5. Photograph of George Lilly (left), Ram (centre), and me in my office at the Department of Fisheries and Oceans, White Hills, St. John's, Newfoundland, on the occasion of our Wilfred Templeman Publication Award (December 1993).



would have agreed, finding solace in Winston Churchill's assertion, "You have enemies? Good. That means you've stood up for something, sometime in your life." The last decade has demonstrated the utility of integrating studies of fields typically associated with conservation biology (e.g., ecology, biodiversity, evolution, genetics) with studies typically associated with fisheries science (e.g., temporal changes in fishing mortality, recruitment variability, stock structure). Pauly (2007) coined this field "fisheries conservation biology", identifying Ram as one of its founders.

The paper by Myers and Worm (2003) succeeded in bringing an extraordinary amount of attention to the plight of the world's oceans and to declines in marine fish biodiversity. Among other things, it provided Ram with opportunities to communicate directly with decision-makers and politicians; he served as a witness at hearings of the Canadian House of Commons Standing Committee on Fisheries and Oceans (2003, 2005) and at two US Senate Committee hearings on overfishing (2003). In October 2005, *Fortune* magazine named Ram one of the "Ten to Watch" (i.e., individuals whose work *Fortune* believes will have lasting influence), citing his work on the decline of large predatory fishes. Recognition of Ram's research excellence over the years came in a variety of other forms. Among his awards were the 1993 Wilfred Templeman Award (shared with George Lilly and myself; Fig. 5), a 1996 Visiting Fellowship to Imperial College at Silwood Park (UK), the inaugural Killam Chair in Ocean Studies at Dalhousie University (1997), Memorial University of Newfoundland's Great Auk Lectureship (1999), and the Blue Ocean Society for Marine Conservation Science Award (2004). He also served as Director of the Sloan Foundation's Future of Marine Animal Populations project, member of the World Conservation Union (IUCN) Shark Specialist Group, editor for *Ecology Letters*, and member of science advisory boards for Sierra Club of Canada and *Oceana* (Washington, D.C.).

L'envoi

When Ram died, the first thing I thought about were those breakfasts in my car. I never did say anything to him about the mugs, bowls, and spoons that would be left under the passenger seat, often for several days. The fact that he saw nothing untoward in using my car as a café was, in an odd sort of way, touching. His behaviour in general was not what I was used to, but I was drawn to him nonetheless.

When he did not feel threatened, Ram's demeanour often reflected a child-like sincerity, honesty, and innocence. But it is the innocence of children that makes them vulnerable, and it was this underlying vulnerability, often juxtaposed with uncompromising forthrightness, often juxtaposed with unselfish acts of kindness, that made Ram such a singular individual.

The collapse of Atlantic cod and myriad other marine fishes has occurred on our collective watch in an alarmingly short period of time. The responsibilities we have to those who follow us are non-negotiable. It was acceptance of these societal responsibilities that lay behind the passion and enthusiasm that fuelled Ram's work and the determination with which he communicated the results of his research to society.

There are those who disagreed with Ram, but there are few who would disavow the impact he has had on fisheries science and marine conservation biology. He earned the respect of lawmakers in Canada and the United States. He is lauded for his mentoring of students and for his ability to

communicate the plight of the world's oceans broadly and meaningfully. Society has benefited from his scientifically driven provocations and his proddings. They have forced us to look very carefully at our oceans, to learn from past mistakes, and to acknowledge that maintaining the health and biodiversity of marine ecosystems is a priority and a fundamental responsibility to future generations. We can neither afford nor have the right to ignore these matters.

Ram Myers was my colleague, my confidante, and my friend, and he is sorely missed. He is survived by his wife, Rita Kindl Myers, and children, Emily, Rosemary, Sophia, Carlo, and Gioia. He also leaves his brother, Abbott Myers, and sisters, Joan Peters and Susan Myers.

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