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## Are We Doing Enough to Save the Oceans?

After a lifetime of study, UBC fisheries scientist Daniel Pauly has little optimism about the future of our marine environment.

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It's a while ago now. But not that long back, not really — not in the full sweep of history. It's the late summer, early fall of last year, and I'm sitting on a sun-bleached log at Jericho Beach with an internationally renowned fisheries academic. A paddleboarder strokes westward with a dog onboard, joggers and cyclists pass each other, and above the anchored freighters the windmill on Grouse Mountain spins slowly on the thermals of a placid Vancouver afternoon. It's heaven on earth, that Super, Natural beauty we've all grown used to. But not Daniel Pauly.

"I see a cancer encroaching on the marine environment," he says, his cheerful tone at odds with this terminal statement.

Pauly, a senior prof at UBC's Fisheries Centre, has an academic career peppered with provocative papers — a prolific researcher, he's arguably one of the most published and cited fisheries scientists in the world, with some 500 academic papers and several books, including Darwin's Fishes and 5 Easy Pieces to his name. At 68, his curly black hair is tinted silver and his lanky frame — a basketball forward's — has some trouble on the soft sand. Yet lively eyes peer from behind reading glasses, and his speech, revealing a pan-European accent that hints at his unlikely life story, is strong and sure if curt and not immune to self-praise. These traits could be deemed arrogant but are more likely those of a confident thinker whose body of work is unquestionably mountainous and often profound in implication.

As we walk the beach looking out at the English Bay idyll, Pauly's concept of the shifting baseline seems particularly poignant. In 1995, he published a paper titled "Anecdotes and the Shifting Baseline Syndrome of Fisheries." In essence, he showed how fisheries scientists repeatedly use the beginning of their own careers as a reference when doing research; that relativist perspective impedes them in grasping former abundance, leading to a baseline — and sense of what is ecologically normal — that is constantly diminishing. It's a simple concept, one many understand intuitively, but he gave it a catchy name backed with hard numbers. For instance, we get excited when a few killer whales occasionally poke into False Creek: we imagine — falsely — that what lies at the city's doorstep is still a more or less pristine ocean. But Pauly would say it's because our frame of reference is so shallow: 25, 30, 70 years tops. When George Vancouver anchored in Burrard Inlet, by contrast, you could have jigged for cod, salmon spawned in the dozens of streams now obliterated by urbanization, killer whales made regular forays into these sheltered waters, and the shoreline was bursting with intertidal life. "Today you'd be lucky to catch a few crabs or miserable little smelts," he says.

PAULY WAS BORN IN PARIS to a French mother and an African-American GI. It was a difficult start, to put it gently, a single mother with a sickly black baby struggling against the attendant racism and alienation that her situation garnered. By chance she met a Swiss couple in Paris who agreed to allow young Daniel to live with them, in hopes that the fresh air of Switzerland would benefit his health. What she didn't know was that the couple had recently lost their own young son and instead of treating Pauly as a son, they regarded him more as a domestique, a servant. "I was essentially kidnapped," he says, "and wasn't reunited with my mother again until I was 18."

If nothing else, his adolescence — a brown-skinned youth in a postwar Switzerland that still bristled with xenophobia — fortified him and laid the psychological foundation for the self-admittedly "brash" young scientist to emerge. When he finished school he left for Germany and the University of Kiel, intending to study an applied science. But the agronomy department was "full of Nazis," so he focused his scientific curiosity elsewhere. On a whim he signed up for an oceanography project, and became, he says, the pet student of a benevolent professor who, recognizing initiative and drive, advanced Pauly's career at every opportunity. That's how he fell into fish science, which to him was also a means to work in developing nations where skin colour would not be a liability. "I had no particular affinity for the ocean," he says.

Pauly hit his provocative stride in the mid '90s. In 1995, a year after joining UBC's Fisheries Centre (he'd completed a doctorate in marine biology in Germany), he published a densely researched paper with colleague Villy Christensen in *Nature*, titled "Primary Production Required to Sustain Global Fisheries." In it he accused fisheries managers around the world of greatly underestimating the amount of plankton required to sustain global catches. When Pauly and Christensen crunched the numbers, they pegged that minimum at eight percent, almost four times what was regularly

referenced. The implication was that the oceans' key building block — plankton — was being plundered at a far greater rate than common wisdom allowed, with possibly catastrophic effects for marine life abundance. Critics accused them of heresy, but Pauly and Christensen defended their analysis, raising serious questions about the assumptions around what is considered a sustainable commercial fishing yield.

“Fishing Down Marine Food Webs” — a co-authored report published in *Science* in 1998 — was so catchy and evocative that its title has slipped into common usage in ecology circles. In the paper he sifted through historical fishing data, looking at the trophic level of catches — the position the caught species occupied in the food chain. He demonstrated that for virtually all fisheries, the average trophic level of landed catches was falling. “Short-lived, low trophic level invertebrates and planktivores” were replacing high trophic-level species, causing him to predict a dire future for ocean biodiversity and an impoverished marine environment in which the lowly jellyfish would reign supreme.



ONE OF PAULY'S PET PEEVES has always been science, at least in the realm of ecology, that serves industry rather than the environment it purports to examine. Naturally our conversation drifts to home-grown initiatives like the Vancouver Aquarium's Ocean Wise program or the David Suzuki Foundation-supported Sea Choice, consumer-based efforts that aim to help wholesalers, chefs, diners, and shoppers make sustainable seafood choices. He pauses, searching for some diplomatic words, then quickly defaults to his more natural tenor.

“These are feel-good programs that are wrapped in a mist of positivity,” he says, “a way to make middle-class consumers feel good about their seafood choices without addressing the larger issues of overexploitation of the world’s diminishing marine resources.” The work can be credible, he continues, but only “if the awareness that they are supposed to raise leads to political action.”

His support for such consumer-based seafood conservation programs soured after early involvement with the pioneer in this field, the Marine Stewardship Council, a London-based NGO that certifies sustainable fisheries around the world, sets standards, and helps consumers identify credible choices with its blue MSC label. Pauly says he has witnessed its evolution into a bureaucratic behemoth that makes increasingly dubious calls around sustainability. For example, conservation groups panned the MSC’s decision in 2010 to certify Fraser River sockeye at a time when the Canadian government was deep into a \$26 million judicial inquiry into the river’s collapsing sockeye stocks (the recommendations from which have been largely ignored by government). Two of the distinct populations routinely caught by the Fraser River fishery have been listed as endangered since 2003.

He prefers direct action on the regulatory side of fisheries management, in essence shaming politicians and bureaucrats into taking action. He believes policy and enforcement will yield the greatest impact for scarce conservation dollars. Today he’s the principal investigator for the Sea Around Us Project funded by the Pew Charitable Foundation. On the conservation front, he dedicates his energies to a Washington, D.C.-based nonprofit called Oceana and sits on its board of directors with actor/activist Ted Danson and a powerhouse group of businesspeople, filmmakers, philanthropists, and funders.

Scott Wallace, a senior research scientist with the David Suzuki Foundation, had Pauly for an advisor while completing his PhD at UBC in 1999. Wallace says what impressed him most was Pauly’s tenacious pursuit of the grand challenges facing marine ecosystems and fisheries management. As an academic mentor, however, he often came up short, inspiring simply because of his track record and dedication to research. “Let’s just say there wasn’t a lot of coddling.” Wallace believes Pauly’s greatest contribution to fisheries science is his steadfast belief that an understanding of ecosystem complexity must inform the management of commercial fisheries around the world. However even Pauly would admit success in this endeavour has been hard to come by. Some of his work has been accused of being full of flaws and assumptions. His EcoPath, for example, is an ecological modelling software aimed at evaluating the ecosystem effects of fishing, management policy options, the impacts and placement of marine protected areas, and the effect of environmental change. Wallace says it’s received criticism because ecosystem-based approaches don’t lend themselves well to conventional management, which needs to “pin a number on a sustainable yield, yet an ecosystem model quickly tells you that no such number really exists.”

In academic circles Pauly, whether loved or loathed, has an almost demigod reputation. John Reynolds, a Simon Fraser University marine scientist, says he has had a huge impact on the field. “His forte has been global mega-analyses, presented with a killer sense for sound bites.” He points to one of Pauly’s signature achievements: FishBase. “I remember when it first came out. It was probably the most ambitious and comprehensive database on any major group of animals at the time. Incredibly audacious,” Reynolds says. The massive FishBase database began in the Philippines, where Pauly went to work at the International Centre for Living Aquatic Resource Management in 1979. Faced with the challenge of testing certain data-intensive hypotheses (in this case, trying to determine how the growth of fish was affected by the size of their gills), he decided scientists needed better access to massive amounts of empirical data. He recruited colleague Rainer Froese and began compiling the volumes of fish data that were sequestered in research papers and studies, aggregating them into a standardized, public database. The enormous undertaking launched on the internet in 1996 and remains the largest and most accessed online database for fish in the world.

He’s certainly ruffled lots of feathers along the way, and some of his conclusions have faced robust challenges from other researchers,” Reynolds says. “But that’s how science progresses, and this field has moved well forward over the past couple decades thanks to his insights.”

Pauly’s prolific scientific output, with the constant demands of field research, conferences, and speaking engagements, has not come without personal cost. He says his wife persevered when most people “would have run away.” And he has struggled, at times, to maintain his relationship with his daughter and son, now 31 and 36. Though he claims to be getting “long in the tooth,” his academic pace doesn’t appear to be slowing. He has always worked internationally on the big-picture challenges facing marine ecosystems globally and doesn’t consider himself an expert on Canada’s specific fisheries. But when he looks at the current state of his adopted country, with the muzzling of scientists and closing of world-renowned research facilities and libraries, he sees nothing in Stephen Harper’s government but contempt for scientific inquiry — a chilling environment for someone whose naturally anti-establishment mind is grounded in leftist ideals born of a Europe still reeling from extremism. In a January interview for the Paris daily *Le Monde*, he accused Canada of being a petro-state on par with Texas. “For government scientists, it’s impossible. They clamp down on them in ways that are unprecedented in western democracies,” he said.

Pauly looks at his watch and abruptly ends our chat. But not before I ask one last question about how a man who has spent a career documenting the disastrous decline of oceans is able to sustain hope. “It’s not about that. The stuff we’re doing to the planet is horrible. It’s not a question of ‘Will I win?’ or not. You have to fight.”

He scrolls through his European past for a suitable analogy. When young men of the previous generation took up arms against the Nazis, they didn’t do it because they thought they could win, he says. They did it because they had to.

When I started out it was the ’60s. I wanted to change the world, and it turns out I played my part.