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A FISHY BUSINESS

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The ocean is a vast series of diverse yet interconnected ecosystems. Ocean waters cover the majority of the planet and are home to countless varieties of life. The volume of living space provided by the seas is 168 times greater than that of land-based habitats; 90 percent of earth's living biomass is in the sea (Clark et al. 2006). Despite this opulence, ocean life is in peril, but unlike other threatened ecosystems, the impending oceanic crisis is largely unseen and largely unmentioned even among environmentalists. While animal advocates and environmentalists rally on behalf of dolphins, seals, and whales, neither group seems too worried about Chinook salmon or Atlantic halibut—but they ought to be.

Feeling Fish

Creatures of the sea lack the fuzzy bodies that tend to attract human empathy. Though they do not cry out in pain, or perhaps even grimace, they are sentient. It is "unthinkable that fish do not have pain receptors; they need them in order to survive" (Pittsburgh Independent Media 2005). Fish are vertebrates with a complex nervous system. Anatomical, pharmacological, and behavioral data, as well as evolutionary evidence and neurophysiological analogies, demonstrate that fish suffer (Chandroo et al. 2004; Rollin 1981). Fish have nerve endings designed to register pain just like other vertebrates, and fish produce the same brain chemicals that humans produce to counter pain: enkephalins and endorphins (Balcombe 2006).

Fish interact socially, remember, learn, suffer, fear, and struggle mightily to preserve their lives. They are intelligent: fish interact socially, learn, and remember what they learn. The brains of fish, like those of other sentient vertebrates, provide a means by which to avoid suffering, including a good memory and the ability to learn (Dionys de Leeuw 1996). Fish are intelligent—intelligent enough to use tools (Balcombe 2006). Fish use their long-term memories to survive in

waters riddled with predators, and to navigate a complex social world (Balcombe 2006). We now know that fish are able to recognize "shoal mates," acknowledge hierarchy, track relationships, and eavesdrop on others in their community (Balcombe 2006).

> Gone (or at least obsolete) is the image of fish as drudging and dim-witted pea brains, driven largely by "instinct," with what little behavioral flexibility they possess being severely hampered by an infamous "three-second memory." ... Now, fish are regarded as steeped in social intelligence, pursuing Machiavellian strategies of manipulation, punishment and reconciliation, exhibiting stable cultural traditions, and co-operating to inspect predators and catch food.
>
> (Laland et al. n.d.)

We now know that "fish have all the relevant characteristics attributable to animals requiring humane treatment" (Dionys de Leeuw 1996). The pain that fish experience on a hook is likely comparable to "dentistry without Novacain, drilling into exposed nerves" (Pittsburgh Independent Media 2005). Unfortunately, as with knowledge of farmed animals, this information does not seem to affect our dietary choices.

Fishing Methods—Destroying Ecosystems and Individuals

Ecological impact and suffering associated with industrial fishing is largely determined by indiscriminate methods. Three common fishing methods—long lines, nets, and trawling—are central to industrialized fishing, and each has extremely negative effects on ecosystems and sea life.

Bycatch

Bycatch is marine life that is *accidentally* fished from the sea. The very existence of bycatch demonstrates one of the fundamental problems of industrial fishing: Lines and nets are indiscriminate, catching whatever becomes entangled, including endangered and protected species. When sea gulls or cormorants are caught on a longline hook and pulled underwater, they drown. When seals, turtles, or dolphins are caught in a net, they drown. When deep sea fish are pulled to the surface, blood vessels and air bladders rupture. For obvious reasons, bycatch mortality is 90–100 percent (Clucas 1997).

Shrimp trawlers produce the most bycatch. Worldwide, the Food and Agriculture Organizations (FAO) of the United Nations estimate that 85 percent of any shrimp haul is bycatch (Clucas 1997). With every 15 pounds of shrimp consumed, those who buy shrimp pay for 85 pounds of bycatch—living, breathing creatures that need not have been caught, including sea turtles, seals, and whales. Shrimp trawling destroys more endangered turtles than all other human endeavors *combined* (Decline 1990).

Thanks to bycatch, at least five species of deepwater fish—only pursued since the 1970s—are now on the critically endangered list (MacKenzie 2006). "Roundnose and onion-eye grenadier were once commercially fished, but are now taken almost entirely as accidental bycatch alongside Greenland halibut, another deep-water fish that has also begun to decline" (MacKenzie 2006). Three other species—blue hake, spiny eel, and spinytail skate—*have never been taken except as bycatch*. Between 1978 and 1994 these five species "lost between 87 and 98 percent of their initial abundance," and between 1995 and 2004 grenadiers "declined still further—93.3 percent for the onion-eye and an astonishing 99.6 percent for the roundnose over 26 years. Their average size has also halved, showing that few fish are getting a chance to mature and breed" (MacKenzie 2006). Bycatch further depletes decimated fish populations and endangers otherwise healthy populations.

Longlines

Longlines are one of the most common fishing methods worldwide. Longlines can stretch over sixty miles: "Bottom longline fishing uses hundreds or even thousands of baited hooks along miles of lines laid behind fishing vessels and stretching down to the reef and ...[sea] floor" (Gulf Sea Turtles 2009). Longliners set an estimated one billion razor-sharp hooks each year; about five million of these hooks are sent down into the ocean every day (Sea Turtle Restoration Project 2003). Though intended to catch large predator fish, like tuna and swordfish, longlines kill an estimated 4.4 million seabirds, marine mammals, sharks, billfish, and sea turtles annually (Ovetz 2004). Some 40,000 endangered sea turtles fall victim to longline hooks each year (Sea Turtle Restoration Project 2003; Bycatch Reduction Devices n.d.). Longlines incidentally hook an estimated 4.4 million seabirds, marine mammals, sharks, billfish, and sea turtles annually (Ovetz 2004). Most often turtles drown when caught by these hooks, but if they escape, hook injuries "affect a turtle's ability to feed, swim, avoid predators, and reproduce" so that even turtles who escape are rarely able to "recover from the extreme physiological stress of being caught" (Gulf Sea Turtles 2009).

Every year longline hooks also kill 300,000 seabirds, including twenty-two endangered species (Sea Turtle Restoration Project 2003). Fishing further threatens nearly half of the earth's endangered seabirds (Seabirds 2007). For example, nineteen of the twenty-one known albatross species are considered threatened with extinction worldwide and longline fisheries are the core problem (Black-Footed 2007). Cetaceans (whales, dolphins, and porpoises) such as the Pseudorca, a smaller cousin to the orca (living in and around the Hawaiian Islands) also fall victim to longlines. Many of these cetacean die as a predictable "accidental side effect" of longline fishing (False 2009).

Nets

Nets—drift nets, gill nets, trawling nets, and seine nets—are the most common industrial fishing methods. The basics of net fishing are simple: Sea life swims or is

swept into a net where they are trapped and pulled from the water. Netting, like every other method of fishing, is indiscriminate: Nets catch everything that comes into their web, including endangered species and an abundance of bycatch. Seals, whales, and dolphins often drown in nets because they are unable to surface for air.

Tuna nets have caused the deaths of "more than seven million dolphins since the introduction of purse seine tuna fishing in the late 1950s" (Palmer 2009). The vaquita, endemic to the northern part of the Gulf of California, is currently the world's most endangered cetacean, and biologists have determined that gill nets are primarily responsible. Even though reserves have been set aside to protect the vaquita and their essential habitat, these busy swimmers still turn up in fishing nets at alarming rates—a minimum of 20–30 each year—an alarming number for a population that has fallen to only 300 individuals (Dalton 2004; Vanishing 2008; Rodríguez-Quiroz 2012).

Fishing nets are invariably lost at sea, becoming "ghost nets" that ensnare and kill sea creatures for as long as their strong nylon fibers last—which is to say, a very long time. Making a questionable practice yet more shameful, mega-fleets lose hundreds of kilometers of drift nets each year, and they continue to ensnare ocean life for decades, if not centuries (Mission Blue 2013). At present, more than 10,000 plus miles (16,000 km) of ghost nets are estimated to be floating the seas, luring new victims with their floating glob of decaying matter, destroying millions of additional sea creatures each day (Watson 2012, p.643).

Trawling

The Gulf of Thailand has suffered a 60 percent decline in large sharks, skates, and finfish with just five years of trawling (Myers and Worm 2003). Smaller fish are also threatened; the New England herring population collapsed in the 1970s:

> The herring industry is becoming increasingly dominated by high-volume industrial ships known as midwater trawlers—which drag massive small-mesh nets behind them, catching everything in their path. The trawlers sometimes work in pairs so they can drag even bigger nets between them. The practice can lead to localized depletion of herring and contribute to the overfishing and stalled recovery of severely depleted populations of cod, hake, haddock, and other fish that live near the ocean floor.
>
> (Under 2007)

Clear cutting does to landscapes what trawling does to the sea floor. Yet, while most environmentalists understand the negative effects of clear cutting, few seem aware of the harm caused by trawling. The massive weight of a trawl, as much as five tons, leaves only finely ground debris in its wake (Destructive 2004). An ocean-bottom environment forms over centuries; trawls destroy these ecosystems in one pass. Coral grows slowly, averaging only 0.2–1.1 inches per year (Coral 2006). Trawling thereby has a long term negative affect on fish populations, on sea life more generally, and on ocean ecosystems. Sponges, coral, and rock formations on the sea's bottom provide feeding and breeding grounds for marine life, and shelter from predators.

Bottom trawling also decimates fish populations, scooping up tons of fish in a single haul, ravaging habitat along the way, and making species recovery difficult, if not impossible. Because they are critical and fragile, requiring centuries to recover, the earth's sea-floor ecosystems ought to be protected.

Solutions

Industrial fishing wreaks havoc on species, habitats, and on the food web, causing injury and death to countless living beings, many of whom are sentient. What can we do to ease the momentous problems caused by our taste for sea flesh?

Aquaculture—Factory Fishing

Aquaculture, more commonly referred to as fish farming—and more accurately labeled factory fishing—is on the rise. But factory fishing comes with an additional series of worrisome problems, including disease, bio-contamination, pollution, and suffering. Just as grass fed beef and organic chicken do not mitigate the massive environmental problems inherent in animal agriculture, factory fishing does not mitigate the horrific environmental problems inherent in the consumption of fish. It simply creates a different set of environmental problems.

Factory fish are raised in netted-off areas of the open ocean. Consequently, there is risk of bio-contamination, of "domestic" fish escaping into and breeding with wild populations. As with factory farms, factory fish live in crowded conditions, where they suffer from parasite infestations and the spread of disease. While crowded factory farmed fish are treated with chemicals and antibiotics (like factory farmed cattle, hogs, and hens) to reduce the spread of disease and infestation wild salmon, for example, have no such protection, so they are more vulnerable to infection (Rosenberg 2008). The free flow of water from captive fish into the open ocean allows food, waste, parasites, chemicals, and antibiotics from fish farms to contaminate surrounding waters and wild fish populations (Cufone 2008). Factory fishing has put "several wild salmon populations at risk of extinction" (Salmon 2008). For example, there is "a direct connection between the aquaculture industry's rapid growth in the Broughton Archipelago off British Columbia and the sharp decline in its wild pink salmon" (Salmon 2008). Though older salmon can handle the parasite, young wild salmon migrating through these areas are much more vulnerable.

> In the natural system, the youngest salmon are not exposed to sea lice because the adult salmon that carry the parasite are offshore. ... Fish farms cause a deadly collision between the vulnerable young salon and sea lice. They are not equipped to survive this, and they don't.
>
> (Salmon 2008)

While harming and endangering seas and sea life, factory fishing increases demand for wild-caught fish. As with the terrestrial flesh industry, raising salmon (and any other carnivorous fish) burns up more food than is ultimately produced. Three pounds of fish are required to produce one pound of farmed salmon (Pauly and Watson 2003). On factory farms, grain is inefficiently cycled through animals to create flesh, dairy, and eggs. On factory fish farms, wild-caught fish are inefficiently cycled through farmed fish to create fish flesh. The University of British Columbia recently reported that "90 percent of the global small fish catch—which includes anchovies, sardines, and mackerel—is processed into fish meal and fish oil and used in animal feed" (A Broken 2009). Factory farms and factory fisheries are both dependable places to sell bycatch.

Technologies Reducing Bycatch

Fishing technologies have been developed to protect endangered species (such as sea turtles) and to reduce bycatch (especially birds and cetaceans). For example, net design modifications allow dolphins to escape from nets through trapdoors, sound-emitting devices keep dolphins away, and streamers that flap in the wind frighten birds away from longlines. Other methods include placing lines deeper, so that birds will not see baited hooks, and fishing at night, when most birds sleep (Humane Society of the United States 2007).

Turtle excluding devices (TED) are designed to prevent turtles from being caught by shrimp trawlers, and have had some measure of success (depending on the features of the ocean floor, such as debris, vegetation, and rock formations) (Decline 1990). TEDs have bars in a grid pattern with an opening at the top or bottom of the net. Small animals (such as shrimp) pass through the bars, but when larger animals (such as sea turtles) are caught "they strike the grid bars and are ejected through the opening" (National Oceanic and Atmospheric Administration Fisheries Service n.d.). Unfortunately, many fishing boat operators have resisted adopting TEDs, partly because they are expensive, and partly because TEDs reportedly reduce the volume of shrimp caught (Decline 1990). In some areas, such as the Gulf of Mexico, TEDs are a legal requirement for all shrimp trawlers, but any successful solution to declining sea-life populations must be international and cooperative, not local and individual.

While these technological advances are a step in the right direction, they address just a few industrial fishing problems, and they lack both international application and the strength of law enforcement. Protective technologies are only effective in conjunction with well-developed management programs, including both supervision and enforcement (Herring Alliance n.d.). New technologies are only a partially effective way of plugging some of the smaller holes in the environmental catastrophe of industrial fishing.

Enhanced Regulations, Limited Harvests

One frequently voiced solution to the fisheries problem is to lower catch limits, and to reduce the number and size of fishing fleets, but "[h]arvesting long-lived species on a sustainable basis is much more difficult than we used to believe. Populations don't seem to bounce back just because fishing effort is reduced" (Schiermeier 2003). This is especially true in areas where trawling has damaged or destroyed the ocean floor. Coral and other deep-sea habitats will require centuries to heal (Destructive 2004). Enhanced regulation and stricter limits is simply too little, too late.

Marine Parks

Wide-ranging networks of marine parks—closed to fishing—offer a measure of hope. Industrial fishers have fished themselves out of a job. Governments currently pay between $15 and $30 billion in fishing subsidies every year to fishers who are out of work due to government imposed fishing restrictions (Harder 2004). Vast marine parks will also provide jobs for displaced fishers, employing their knowledge of marine life and habitat to oversee and protect marine parks. Rather than subsidize a destructive, devastating, and dying industry, it would be more sensible—ecologically and financially—to pay fishers to manage marine parks.

Consumer Choices

Fish change hands so many times between ocean and plate that it is impossible to dependably purchase "sustainable" sea flesh. Sea flesh is often renamed and/or mislabeled, foiling even the most conscientious consumer. DNA analysis on seventy-seven Pacific red snapper fillets determined that about 60 percent of the flesh came from some other species, in which case "there's no way you can know whether you are buying an over-fished species" (Fox 2008).

The only dependable way that consumers can do their part to prevent further decline of sea species, decimation of underwater habitat, degradation of ocean ecosystems, and the suffering and premature death of billions of sea creatures is to *stop eating sea flesh*. There is no "sustainable" source of fish flesh—especially when compared with other dietary options, such a vegan diet.

Conclusion

Fish and oceanic ecosystems are in peril because we choose to eat animals who live in the sea—lots of them—frequently destroying their habitat in the process. Which is more important—our habit of consuming shrimp, crabs, salmon, tuna, and innumerable other disappearing sea creatures, or protecting and preserving the earth's oceans? Do we want dipping dolphins, ponderous sea turtles, and wheeling albatross in underwater

seascapes rich with undulating kelp beds and colorful coral reefs? If we do not alter the items we put on our plate, we will continue to alter ocean ecosystems. The decision is ours, and we decide where we stand every time we sit down to eat.

Discussion Questions

1 What are your levels of concern with regard to salmon or sharks as opposed to bears or wolverines? If there is a difference, how do you explain this difference? Are you willing to defend any interest in one over and above the other? If so, how?

2 Do you think fish and the ocean ecosystem have an equal footing in the world of wildlife conservation and research? If not, why do you suppose this is the case? Should they have an equal place in this discussion? Why or why not?

3 Do you think fish feel pain? If you don't, how do you dismiss the scientific evidence presented at the outset of this chapter? How do you know that dogs—or for that matter, other human beings—are sentient?

4 How do fishing and hunting compare environmentally? What similarities and/or differences seem most important environmentally?

5 If you eat fish, how many fish do you generally eat in the course of a week or month? As an environmentalist, how do you justify this choice?

Essay Questions

1 Do an internet search for "aquarium" or "SeaWorld." From your reading and research do you feel that these institutions can be ethically maintained? Explain your point of view. Be sure to factor in sentience and intelligence and welfare laws designed to protect sentient nonhumans.

2 At your local grocery store, examine the "seafood" section. Which fish species are represented, how many species of fish are represented, how are they displayed, is there information on sourcing? How does it make you feel to look at these individual fish and pieces of dead fish knowing what you know about fish and sea ecosystems?

3 Write a detailed job description or job announcement for a conservation position that would put unemployed fisherman back to work. Write an essay detailing a handful of alternative livelihoods that might be available and suitable for those currently employed in factory or industrial fishing.

4 Search the internet for environmental organizations working to protect the seas. How many of these organizations advocate for a change of diet? How would you assess the importance of fish in their platform (as opposed to concerns with sea ecosystems)? Does it make sense to be concerned about sea ecosystems but not concerned about fish or dietary choice?

5 Watch *The Cove*. Would you risk your freedom—would you risk imprisonment—to fight industries that, by nature, damage/destroy ecosystems? What about industries that imprison wildlife? What might you do and how do you justify such acts? Is it possible to rationally justify such acts for some animals but not others?

6 Watch *Blackfish*. What is the government's role in controlling capitalist enterprises that are damaging to the environment and/or other animals? If you feel that wildlife should not be exploited by the entertainment industry, what actions can you take to bring change? Choose one of your actions and carry it forward.

7 Watch *Blackfish* and *The Cove*. One film highlights environmental destruction and animal suffering in the food industry, the other focuses on the entertainment industry. Which film do you find more compelling and why? In light of information in this chapter, in what specific ways are you implicated in either or both of these forms of exploitation, and what specific changes might you make to come clean as an environmentalist?

Suggested Further Reading

Clover, C. (2006). *The end of the line: How Overfishing is Changing the World and What We Eat*. New York: New Press.

Lichatowich, J. (1999). *Salmon without rivers: A History of the Pacific Salmon Crisis*. Washington, DC: Island Press.

Pauly, D. (2010). *Five easy pieces: The Impact of Fisheries on Marine Ecosystems*. Washington, DC: Island Press.

References

A Broken Food Chain. (2009). *AWI Quarterly*, 58(1), p.18.

Balcombe, J. (2006). *Pleasurable kingdom* London: Macmillan, pp.187–188.

Black-Footed Albatross Advances Toward Protection: Seabird threatened by Longline Fishing. (2007). *In Brief*, p.6.

Bycatch Reduction Devices. (n.d.) Australian Fisheries Management Authority. Australian Government. Accessed Dec. 20, 2013. http://www.fish.gov.au/fishing_methods/Pages/bycatch_reduction_devices.aspx.

Chandroo, K., Duncan, I. and Moccia, R. (2004). Can fish suffer?: perspectives on sentience, pain, fear and stress. *Applied Animal Behaviour Science*, 86(3), pp.225–250.

Clark, M., Tittensor, D. and Rogers, A. (2006). *Seamounts, deep-sea corals and fisheries*. Cambridge, United Kingdom: UNEP World Conservation Monitoring Centre.

Clucas, I. (1997). A study of the options for utilization of bycatch and discards from marine capture fisheries. *FAO Fisheries Circular*.

Coral. (2006). *Britannica Concise Encyclopedia*. [online] Available at: http://www.credoreference.com/entry/ebconcise/coral [Accessed 14 Jul. 2010].

Cufone, M. (2008). Ocean Fish Farms and Public-Resource Privatization". *The American Prospect*, 19(12), p.A17.

Dalton, R. (2004). Net Losses Pose Extinction Risk For Porpoise. *Nature*, 429(6992), p.590.

Decline of the Sea Turtles: Causes and Prevention. (1990). Washington, DC: National Academies Press, pp.74–117.

Destructive Power of Deep-Sea Bottom Trawling on the High Seas, The. (2004). *DSCC Policy Paper*. [online] Available at: http://www.savethehighseas.org/publicdocs/DSCC_Bottom_trawling.pdf [Accessed 10 Jan. 2010].

Dionys de Leeuw, A. (1996). Contemplating the Interests of Fish: The Angler's Challenge. *Environmental Ethics*, 18, pp.37–39.

False Killer Whales in Decline—Suit Seeks to Rescue Hawai'i Population. (2009). *In Brief*, p.5.

Fox, D. (2008). Imposter Fish. *Conservation*, 9(4), pp.14–19.

Gulf Sea Turtles Get a Breather: Government Orders Review of Long-Line Fishing. (2009). *In Brief*, p.11.

Harder, B. (2004). Cost of Protecting the Ocean. *Science News*, 165(26), p.414.

Herring Alliance (n.d.). *Bycatch and Monitoring*. [online] Available at: http://www.pewtrusts.org/~/media/Assets/2010/09/10/Bycatch_Monitoring.pdf [Accessed 23 May. 2013].

Laland, K., Brown, C. and Krause, J. eds, (n.d.). Learning in Fishes: An Introduction. In: *Fish and Fisheries*, pp.199–202.

MacKenzie, D. (2006). *Deep-sea Fish Species Decimated in a Generation*. [online] *New Scientist*. Available at: http://www.newscientist.com/article/dn8533-deepsea-fish-species-decimated-in-a-generation.html [Accessed 13 Aug. 2010].

Mission Blue, (2013). *Ghost Nets, among the greatest killers in our oceans…* [online] Available at: http://mission-blue.org/2013/05/ghost-nets-among-the-greatest-killers-in-our-oceans/ [Accessed 15 Jun. 2014].

Myers, R. and Worm, B. (2003). Rapid worldwide depletion of predatory fish communities. *Nature*, 423(6937), pp.280–283.

National Oceanic and Atmospheric Administration Fisheries Service (n.d.). *Turtle Excluder Devices: NOAA Fisheries*. [online] Available at: http://www.nmfs.noaa.gov/pr/species/turtles/teds.htm [Accessed 20 Jun. 2010].

Ovetz, R. (2004). *Pillaging the Pacific: Pelagic Longline Fishing Captures and Kills About 4.4 Million Sharks, Billfish, Seabirds, Sea Turtles, and Marine Mammals Each Year in the Pacific Ocean*. Forest Knolls: Sea Turtle Restoration Project.

Palmer, M. (2009). Mexico Tries to Crush "Dolphin Safe" Tuna Label Via WTO. *AWI Quarterly*, 58(1), p.22.

Pauly, D. and Watson, R. (2003). Counting the last fish. *Scientific American*, 289(1), pp.42–47.

Pittsburgh Independent Media, (2005). *Sports fishing: bad for fish and other living things*. [online] Available at: http://pittsburgh.indymedia.org/news/2005/07/19545.php [Accessed 4 Jun. 2011].

Rodríguez-Quiroz, G. (2012). *Fisheries and Biodiversity in the Upper Gulf of California, Mexico*. [ebook] Available at: http://cdn.intechopen.com/pdfs/33951/InTech-Fisheries_and_biodiversity_in_the_upper_gulf_of_california_mexico.pdf [Accessed 22 May. 2012].

Rollin, B. (1981). *Animal rights and human morality*. Buffalo, N.Y.: Prometheus Books, p. 31.

Rosenberg, A. (2008). Aquaculture: The price of lice. *Nature*, 451(7174), pp.23–24.

Salmon Farming Threatens Wild Populations. (2008). *AWI Quarterly*, p.18.

Schiermeier, Q. (2003). Europe dithers as Canada cuts cod fishing. *Nature*, 423(6937), p.212.

Seabirds Needn't Die in Vain. (2007). *New Scientist*, 195(261), p.6.

Sea Turtle Restoration Project, (2003). *Long Line Fact Sheet*. [online] Available at: https://seaturtles.org/wp-content/uploads/2014/06/CCF02062014_00001.pdf [Accessed 2 June. 2014].

Under Pressure, Government Moves to Protect Herring. (2007). *In Brief*, pp.6–7.

Vanishing Vaquita, The. (2008). *AWI Quarterly*, 57(4), p.21.

Watson, P. (2012) "Tora! Tora! Tora!" In D. Schmidtz and E. Willott (eds) *Environmental Ethics: What really Matters, What Really Works*, 2nd edition. Oxford: Oxford University Press, pp.639–643.