

Is “Waste Not Want Not” an Adequate Ethic for By-catch?: Five Biblical Ethical Models for Addressing Incidental Fisheries Catch and Ecosystem Disturbance

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Abstract. The “Protestant ethic” with its emphasis on hard work, efficiency, and frugality has influenced the values of North American fishing communities. Many commercial fishers concur with its principle of “waste not, want not,” and believe that discarding marketable fish is wrong. In industrialized fisheries, this ethic by itself is inadequate, due to the use of mechanized harvest technologies that can capture fish at great depths and sweep over large areas of ocean. Under a general ethic of Christian stewardship of creation, five Biblically based ethical models can offer guidance: “do not destroy” which prohibits wanton disturbance of productive nature; neighborliness which prohibits damage to another families’ livelihood, divine ownership of and joy in creation, which assigns value to non-economic species; stewardship, which requires both active resource protection, and careful resource use; and the Hebrew land ethic, which requires a sabbatical or rest for harvested ecosystems, disallows complete efficiency of harvest, and requires that some of the harvest be left for both God’s creatures and for the poor or disadvantaged members of the human community. Although Christian ethical concepts cannot replace intelligent ocean policy, they can serve as foci for problem solving, and inspiration to better care of the marine environment.

Keywords: by-catch, incidental catch, environmental ethics, Christian ethics, the Bible, fisheries policy

1. INTRODUCTION

Christian ecotheology often proposes general or universal values for the environment or for wildlife, while developing little guidance concerning specific environmental issues or problems. The purpose of this paper is to investigate a major concern for the world’s fisheries – by-catch or incidental catch - and to evaluate the applicability of Christian Biblical ethics to some of the major elements of the “by-catch problem.” Although the issue has only recently come to the attention of the general public, incidental catch is an ancient concern in fishing. The attitudes of the fishers are two-sided - small fish accidentally caught and killed do not grow to be big fish. Inedible or unmarketable species that wander into traps or take bait, interfere with the capture of the intended catch, and add to the fishers work by consuming bait, filling traps, and fouling nets. In the deep past, fishers and their families utilized almost any edible species that was captured. Modern selective markets and regulations, as well as the difficulties of sorting tons of fish, produce far more wastage than the practices of subsistence or pre-industrial fishers.

1.1 The By-Catch Problem

Alverson et al. (1994) categorize bycatch into four types: marketable species that are undersized or prohibited (such as out of season species), species for which there is no market, “species-specific fleet sectors discarding another

fisheries target species, and non-fishery species, such as birds or marine mammals.” In addition, some fish may be discarded because they are damaged, while others may be the wrong gender (usually male in roe fisheries, female in crab and lobster fisheries), or the bodies may be tossed overboard after roe is extracted. Where quotas are in force, some marketable fish may be abandoned post-harvest because the catch is already too great (Pascoe 1997).

Alverson et al. (1994) estimated that global fisheries bycatch was somewhere between 17.9 and 39.5 million metric tons (an average of 30 million tons is reasonable). Although by-catch varies greatly both between and within fisheries, it is estimated as 20% of the total fisheries catch worldwide (Pascoe 1997). Shrimp trawling generated more bycatch than any sector of commercial fishing, accounting for about one third of the global total. Shrimp trawling also had a high ratio of bycatch to target species by weight. Also high in bycatch are bottom trawling, long-lining and fisheries using pots resting on the bottom, and some types of driftnets and purse seines. Many pelagic fisheries, high seas driftnets and purse seines targeting fish in large schools, such as sardines, had low levels of bycatch. Alverson et al. (1994) could not calculate total economic losses, but suggest they “presently run into the billions of dollars.”

1.2 The Fishers' Ethic

Environmentalists who are unfamiliar with commercial fishing often incorrectly assume that fishers ignore or disregard by-catch and thoughtlessly damage the natural resources on which they depend. An east coast by-catch conference held in Newport, Rhode Island, in 1995, for example, published reports by not just scientists, but fishers and representatives of fisheries associations, which are typical of the range of attitudes towards by-catch. Nelson Beideman of the Bluewater Fishermen's Association, for example, touted a voluntary program by long-liners to donate dead swordfish that government regulations would require them to discard to "hungry Americans, especially the poor and homeless in urban areas. This program is designed to help improve the available scientific information for the swordfish fishery." He complained that different interest groups perceive bycatch differently and this confuses the commercial fishers. Beideman described long-line bycatch as "a dead wasted fish. Whether this waste stems from regulation or simple unmarketability, the definition and problem are one in the same." He thinks all mortalities from one operation should be lumped together, and "need to be properly accounted for before our present scientific approach will be accurate and effective. "Fishermen as well as the public aspire to the commonsense "waste not, want not" goal and continuously adjust their fishing gear to maximize their targeted catch. Hook fishermen are especially aware of incidental catch because every hook taken by an unmarketable species is unavailable to catch a targeted species."

Bob Smith of the Rhode Island Lobstermen's Association (1995) described changes in the lobster industry, which began with no size limits and then slowly adopted first total length and then carapace length to determine keepers - thus creating bycatch. Smith shows no concern for other invertebrates or fish, but discusses numerous industry attempts to reduce the handling of lobsters to improve chances of live return. Lobstermen were concerned about ghost fishing of lost wire traps, so they added a biodegradable vent, which can be based either on a pin that falls out or on wire that corrodes - eventually making the trap unfishable. Smith (1995) related the successful lobster release directly to the growth and health of the industry.

Michael Fogarty of NOAA (1995) noted that the escape vents have both increased the capture rates of legal sized lobsters, which reduces the capture of crab bycatch. Further, the "efficiency of fishing operations" has increased due to reduced culling time. The lobstermen fish one species in areas where they can recapture the same individual multiple times. The limited range of lobsters places an emphasis on careful release of undersized individuals.

Ted Ames (1995), representing the New England Gillnetters Association, reported the difficulties in employing time-area closures to prevent accidental capture of harbor porpoises in gillnets, and touted the success of pingers, which warn porpoises of nets. He suggested the entire New England gillnet fleet will be using them within a year. Maine fishermen are "on the oddball side": for volunteering to reduce juvenile bycatch by using the Nordmere grate. Support for large mesh has been long term. Ames reports: "We see juvenile bycatch as a horror show. At least a half a dozen species of fish have been lost to fishermen in coastal Maine during the last 30 to 40 years. The bottom line is, there aren't enough fish to go around anymore. The quickest way to replace them is to reduce or eliminate juvenile bycatch." He stated "we know we can't catch babies and expect to have anything left... why catch the peewees for 50 cents a pound when you can catch them a year later for 90 cents, plus gain in the added weight?" He thus advocated new technology, such as six-inch mesh, the Nordmere grate, and pingers, as the best means to reduce incidental captures.

Ted Mattera, (1995) of the Port Judith Fishermen's Cooperative emphasized the role of bycatch reduction in protection of future stocks, and a preference for smaller quantities of larger fish. He backed larger mesh and more careful sweeps to reduce capture of small ground fish. Mattera (1995) expressed a concern over the scup fishery because it brings everything in and then the fish are sorted at the processing plant. He emphasized the fisher's discovery that the use of rope nets for squid reduces capture of hake and whiting. He noted that conservationists "sensationalize or fabricate facts," and that inaccurate articles have been published about the state of New England fisheries. Mattera referred to the squid fishery as "clean." He describes bycatch as "undersized fish, underutilized or unmarketable fish, juvenile fish, undesirables, and regulated species they aren't allowed to retain. Essentially, what goes out the scupper and back overboard is bycatch."

This author and her students, in a series of interviews of both commercial fishers and charter fishers, on the Pacific coast of the US and in Ireland, found that fishers dislike waste of any commercial species, and protest regulations which force them to toss edible catch overboard. Fishers especially object to throwing back dead or injured salmon, halibut or other highly valuable catches. Fishers express values such as "I only keep what I can use," or "we try not to kill anything we can't use." Charter fishers are extremely careful when they return undersized salmon to the sea, in the hopes that the fish released without injury will grow to greater size. (Bratton and Hinz, submitted; Hinz and Bratton, in press)

2. CHRISTIAN ETHICS

The New Englander fishers' abhorrence of waste is compatible with the Protestant ethic and its emphasis on frugality. Consumption of resources should be neither wanton nor conspicuous. Yet this approach is too general. In industrialized fisheries, this ethic by itself is inadequate, due to the use of mechanized harvest technologies that can capture fish at great depths and sweep over large areas of ocean. Some fisheries have great difficulty in avoiding incidental catch, while in others, incidental catch is rare. Humans have not refined harvest technologies to point where fishers only taking one species or size of fish at a time. The lobsterman cited above is willing to go to great lengths not to remove immature lobsters. The gill-netter is searching for better technologies to exclude marine mammals from his catch. Ted Mattera of the Port Judith Fishermens' Cooperative is willing to modify his nets in an attempt to fish "cleanly" and avoid incidental capture of species sought by other fisheries. The long-liners wish to donate swordfish to "hungry Americans." Could Christian ethics support these responses? Is there a Biblical basis for keeping hake out of squid nets?

2.1 Key Ethical Questions

Ethical questions concerning incidental catch include: 1 – When is the amount of incidental catch too high? What principles should be used to identify excessive levels? 2 – Is attention to live removal of young or female individuals of commercial species, by itself an adequate approach to bycatch? 3 - Is it ethical to kill unmarketable species? Does the general removal of bycatch from ocean ecosystems matter? 4 – Is it ethical to degrade marine food chains or webs due to bycatch? 5 – Are there some incidentally captured species deserving specific conservation measures (such as marine mammals), and is it ethical to require fishers to offer special protection (at the cost of their time or catch) to these species? 6 – Since the target species of one fishery becomes by-catch in another, what responsibilities do different fisheries have to avoid bycatch or to assist in bycatch monitoring? 7 – Is it ethical to discard large volumes of unmarketable catch? And is it ethical to pass laws or establish regulations that force fishers to throw marketable or edible fish overboard? And 8- Should all discards be banned, in order to discourage polluting the ocean with dead fish, and excessive levels of by-catch?

2.2 Biblical responses

Herding and farming peoples wrote the Hebrew scriptures (the Old Testament). The Jewish Torah (the first five books of the Bible), however, not only articulate a great appreciation of oceanic and aquatic creatures, they

provides basic instructions for protecting the interests, including the economic interests, of one's neighbors. Other Biblical texts, such as the Psalms and the prophetic books extol the beauty of God's handiwork. Although most of the references are terrestrial, texts about sea creatures begin in Genesis 1:20-22, where God says "Let the waters will swarm with creatures" and he creates the great sea monsters, and then blesses them all with continued reproduction. (All Biblical quotes are from Metzger and Murphy, 1994, *The New Oxford Annotated Bible*).

Several principles of Biblical ethics can provide a basis for response to the ethical issues listed above. Under a general ethic of Christian stewardship of creation, five Biblically based ethical models can offer guidance: "do not destroy" which prohibits wanton disturbance of productive nature; neighborliness, a concept which prohibits damage to another families' livelihood, divine ownership of and joy in creation, which assigns value to non-economic species; stewardship, which requires both active resource protection, and careful resource use; and the Hebrew land ethic, which requires a sabbatical or rest for harvested ecosystems, disallows complete efficiency of harvest, and requires that some of the harvest be left for both God's creatures and for the poor or disadvantaged members of the human community.

Looking at these five ethical models in more detail, one finds "do not destroy" is a principle often emphasized in Jewish environmental ethics. We are an integral part of the creation, and have to utilize the land and sea to sustain our selves. We should never, however, wantonly or wastefully destroy the productive portion of creation. Jewish theology calls this principle *Ba'al Tashhit* - and cites a text in the Torah which admonishes armies at war not to cut the enemies' fruit trees or unnecessarily devastate the landscape. Once combat has ceased, after all, the fruit trees will again be needed to feed the people. The Rabbis reasoned that if one should not cause damage during war, which is the worst and most stressful of circumstances, then during peaceful times wanton destruction was an even more serious violation of Jewish law (Fink 1993). Applied to the sea, humans should avoid any unnecessary or wasteful damage to ocean ecosystems. We should make every effort not to kill fish or invertebrates if we do not intend to utilize them.

The second principle is that of neighborliness or our obligation to protect the interests of others in the human community (Bratton 1998). Again the relevant Biblical texts are agricultural, but can also be applied to fisheries. Exodus 22:6, for example, instruct the ancient Hebrews not to accidentally burn their neighbors fields or grain while managing their own property. Exodus 22:5 demands restitution if a family allows their livestock to stray into the neighbors' orchards or fields. In the case of

by-catch, therefore, one fisherman or one fishery should not damage the catch or resources of another. Vessels fishing for rockfish should not destroy halibut, and boats seeking shrimp should not degrade the spawning stock of redfish. Making a living from the sea is justified, but a one fisher should avoid damaging the resources of another fisher – who is his neighbor.

The third concept, that of divine joy and interest in the Creation, is based directly on Biblical texts concerning marine organisms and species dependent on aquatic ecosystems. Psalm 95:5 states: “The sea is his, for he made it...” Psalm 104 reports God’s concern for the birds, including specifically the stork (who is fishing eating). Psalm 104: 24-27 declares: “O Lord how manifold are your works! In wisdom you have made them all; the earth is full of your creatures. Yonder is the sea great and wide, creeping things innumerable are there, living things both small and great. There go the ships, and Leviathan that you formed to sport in it. These all look to you to give them their food in due season, when you give to them, they gather it up; and you open your hand, they are filled with good things.” These texts support the ethical concept of inherent value for all life, including whales, dolphins, and sea birds accidentally caught in nets. God’s concern extends to spider crabs and starfish accidentally dredged from the benthos. Even the non-economic species benefit from God’s care and providence (Bratton 1993, DeWitt 1998).

The fourth concept, Christian stewardship, has two major implications for the by-catch problem. The earth and the seas are the Lord’s, and therefore have value to God, regardless of their human uses and ownership. Further, all human property, all exclusive economic zones, and all transferable quotas belong to God, and ultimately remain in divine hands. We are stewards – called to represent God’s interests. Further, when we harvest or utilize the Creation, we should not only avoid damaging God’s world, we should share God’s blessings with other humans. In the church, stewardship implies being responsible with financial resources, including caring for others with our wealth (Hall 1990, De Witt 1998). The same applies to natural resources – and to fisheries and fisheries by-catch.

The last concept, that of a Christian land ethic, originated in the need to manage agricultural fields for community benefit. The land ethic incorporates grain fields and vineyards into the Jewish concept of Sabbath rest to honor God’s rest on the seventh day after creating the universe. Not only would the ancient Hebrews not participate in farm labor (other than that necessary to protect animals from harm) on the Sabbath, the Torah instructs Hebrew farmers to rest their fields for the Sabbatical year – which occurs once in every seven. Every fifty years, the Torah declares a Jubilee, where all property is returned to its

original owners and all slaves are set free. Exodus 23:10 explains that the Sabbatical fallow for the fields is “so that the poor of your people may eat; and what you leave the wild animals may eat.” Further, Hebrew farmers were not to glean their fields, picking up all the grain, nor should they harvest the corners. Deuteronomy 24:19-24 instructs farmers to leave forgotten sheaves, fallen corn and olives, and the standing grain in the corners for the widows, orphans and resident aliens in the land (Brueggemann 1977).

These religious laws prohibit complete efficiency in harvest. Not only must something must be left for the poor and for other humans who cannot farm for themselves, but the wildlife must have access to some of the productivity of the land. We can deduce from these instructions for righteous land management that all the earth deserves a Sabbatical, including the oceans. We should never harvest with complete efficiency, but should always leave some fish for consumption by orcas and bald eagles. The principles of gleaning could be applied to by-catch. If possible, fish that cannot be sold could be donated to the poor. Or food banks and other charities could “glean” the leftovers from the fishing operation. God’s intent is to provide for all the members of the human community and for all the creatures of the sea, not just for an elite few, who can afford an expensive meal of poached salmon or blackened redfish.

In light of these five ethical models, the inadequacies of “waste not, want not” are obvious. This old adage applies primarily to the needs of the person doing the harvesting. It ignores the inherent worth of the fish, the health of the oceans and the needs and interests of the fishers’ human neighbors.

3. SYNTHESIS

Returning to the eight ethical questions, we can attempt to apply Biblical ethics to practical issues concerning by-catch.

3.1 Damage to stocks and ecosystems

The first four questions all concern the issue of what levels of degradation of fish populations or of ocean ecosystems are ethical in commercial fishing. The Biblical concepts of “do not destroy” and of God’s blessing of creation and provision for all types of marine species imply that harvest levels that cause productivity to decline are unethical. Harvest technologies that greatly reduce the food available to either commercial or non-commercial species or that destroy habitats, such as the benthos, exceed God’s intent for human provision. Attention to excessive mortality of the young or reproductive age females of target species is not adequate.

Fisheries should maintain ocean food webs, and spawning areas for all species. “Do not destroy” implies that fishing methods that disturb far more than the intended catch, such dynamiting reefs or some forms of dragging nets over the bottom, disregard the normative working of divine providence. Although complete exclusion of unmarketable species is impossible in many fisheries, ethical fishing is as selective as possible and reduces incidental disturbance to negligible levels.

Further, the Biblical land/sea ethic discourages complete efficiency in harvest. The principle of the Sabbath suggests that fishing “every day” and thereby allowing no escapement does not honor God’s creativity. Some fish should always be left (preferably alive) both to propagate their kind, and to feed other species. Models of fish populations and catch should never attempt to take all possible fish, but should leave some areas and a portion of each school or population unharvested. Each area that is fished should periodically “rested” for a year (or more) and allowed to recover. Humans should never assume they completely know or understand a marine ecosystem, and therefore are able to read the mind of God.

3.2 Protection of non-commercial species

The concept of God’s delight in creation, and of God’s specific intent in creating “the great sea monsters” implies that human economic concerns should not totally dominate the practices of fishing. God blessed the marine mammals, sharks and sea birds, before Adam and Eve arrived on the scene. God still delights in Leviathan. In cases where fishing is threatening the long term survival of organisms, such as sea turtles or puffins, a major effort should be made to prevent human carelessness from removing God’s blessing from these creatures forever (Nash 1991, Bratton 1993). Efforts at reducing sea bird catch, such as those of Melvin et al. (1997), protect the oceanic equivalent of the “stork in the cedars” of Psalm 104. The use of pingers to prevent harbor porpoises from entering nets is, according to Biblical principles, a righteous act, which shows respect for God’s handiwork.

3.3 Damage between fisheries

The principles of neighborliness, stewardship and land/sea ethics imply that participants in one fishery have a responsibility not to damage or reduce the productivity of another. Fishers should assist in by-catch monitoring for non-target species. Historically, the more economically important or elite fisheries, such as those for salmon and halibut, have made greater efforts to force other fisheries to monitor by-catch of their favored species. The US and Canadian halibut fishery, for example, has long kept statistics on halibut by-catch by flounder and rockfish fishers (Bell 1956,1981; Hoag and French 1976). The halibut fishery, however, also has a

responsibility to monitor and reduce its own bycatch – not just of juvenile halibut, but of any other economic species incidentally taken. Any effort made to maintain the health of someone else’s fishery is a neighborly act, showing a concern for God’s human community.

3.4 Banning discards

Several nations have banned discards for some fisheries or regions. Norway has banned discarding of a number of commercial species, and placed their emphasis on intensive surveillance of fishers, and on area closures when bycatch becomes excessive. The revenue from the sale of “illegal” fish remains in the accounts of the fisheries organizations, rather than falling to the individual fisher. Norway has made selective gear compulsory through their regulations. (Clucas 1997)

Canada has banned discarding at sea, although only for its Atlantic ground fishery. Canada has placed observers on larger vessels to prevent illegal discards, and allows release only of species known to have high survival rates. Fishers may sell small fish and any species accidentally harvest, but these are counted toward their total quotas. Iceland, in an attempt to establish markets for discards, promoted “strange fish weeks” in restaurants, and developed new recipe books. As a result, a number of species with no previous commercial market in Iceland are becoming part of the normal fish trade. These species include piked dogfish, and Portuguese shark, as well as rough dabs. (Clucas 1997) It should be noted this system of expanding utilization, can also expand fishing impacts on previously untargeted species. As of this writing, The European Union has allowed a mix of species within its system of transferable quotas, but the partners have rejected a general ban on discards, and are pursuing greater selectivity in fishing gear and practices instead. (Clucas 1997)

Although low of levels of discarding at sea may actually benefit some species, such as dogfish sharks, in general the practice disrupts food chains and causes pollution (Murawski 1995). Discarding fish or dumping fish heads and entrails in port may be a boon to bald eagles, as in some cities in Alaska, but it may also attract seals and sea lions and thereby create nuisance populations of marine mammals and local harbor pollution due to their excrement.

From a Biblical ethical perspective, banning the discarding of dead fish or those unlikely to survive when thrown overboard has strong support. It helps to prevent ocean pollution, and, if properly practiced, degradation of ocean ecosystems. It also, properly executed, is better stewardship of the catch. As will be discussed below, banning discards can make the incidental catch available to the needy.

3.5 Donating by-catch to the poor

A strategy, which is increasingly deployed, but is complex to execute, is “charitable disposal of fish that would be discarded.” Clucas (1997) notes that voluntary donation of bycatch from ground fisheries is being practiced in Alaska, and that after the International Pacific Halibut Commission proposed a regulatory change that would allow bycatch halibut to be donated to food banks, “industry activists” were also seeking “to amend management plans for trawl fisheries of Washington, Oregon and California states to allow similar charitable donation schemes to operate in these states. Salmon taken as bycatch in the whiting trawl fishery off the Oregon coast, which cannot be sorted at sea, are landed, sorted, enumerated at the dockside. Rather than dispose of the fish at sea it will be frozen for collection by the local food bank. No payment is made to either fishermen or processor.” (Clucas 1997) The New England long-liners cited above would also like to donate by-catch to the needy.

Biblical land/sea ethics imply that not utilizing edible fish in a world full of hunger is unethical, and that donating fish to food banks is a far superior approach. The Biblical model also suggests that those receiving the fish should assist in the “gleaning” – thus charitable organizations or the recipients of the fish or invertebrates (such as squid) should assist in sorting or preparing catch. Just as some charitable organizations provide jobs to the economically marginalized by teaching them to repair donated furniture, it would be appropriate for charitable organizations to provide work in processing by-catch. Historically, prior to the proliferation of regulations, many fishers did donate extra fish to widows or needy families in their homeports. This author and her students have interviewed fishers in Ireland and the Pacific Northwest who have either given fish to the needy, or have organized events to raise money for families who have lost members at sea or who are under stress due to a chronic illness. Donation of fish is entirely consistent with the values of many fishing communities. The actions of the Pacific Halibut Commission, in making fish available to food banks, would have pleased the Biblical prophets.

An alternative to this strategy could be implemented in the case of very stressed fisheries, such as the salmon populations of the Pacific Northwest. One could also Biblically justify collection and sale of salmon as by-catch, with the income of the effort donated to a fund for salmon restoration or enhancement. Humans, as stewards, have a responsibility to maintain and protect God’s creation, and in the case of declining fish populations, where a species could disappear entirely, conserving the resource for the future, could be allowed to preempt the immediate needs of the poor. Many fishers would enthusiastically participate in programs that used

economically valuable by-catch to conserve fisheries.

4. CONCLUSION

Although Christian ethical concepts cannot replace intelligent ocean policy, they can serve as foci for problem solving, and inspiration to better care of the marine environment. In many cases, Biblical ethics are consistent with values already held by commercial fishers. Christians should question discarding large volumes of edible catch at sea, fishing practices that reduce the productivity or species diversity of the oceans, or practices that lead to conflicts between fisheries.

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5. REFERENCES

- Alverson, D. L., Mark H. Freeberg, Steven Murawski, and J.G. Pope, *A Global Assessment of Fisheries Bycatch and Discards*, Rome: Food and Agriculture Organization of the United Nations, FAO Fisheries Technical Paper, No. 339, 1994.
- Ames, Ted, New England Gillnetting, in *Proceedings of the East Coast Bycatch Conference*, Kathleen Castor, Tony Corey, Joseph DeAlters, and Chris Gagnon, eds., Newport, RI: Rhode Island Sea Grant, 21-22, 1995.
- Beideman, Nelson, Atlantic Pelagic Longline Fishery, in *Proceedings of the East Coast Bycatch Conference*, Kathleen Castor, Tony Corey, Joseph DeAlters, and Chris Gagnon, eds., Newport, RI: Rhode Island Sea Grant, 25-27, 1995.
- Bell, F.H., *The Incidental Capture of Halibut by Various Types of Fishing Gear*, Seattle: International Pacific Halibut Commission, Rep. No. 23, 1956.
- Bell, F. H., *The Pacific Halibut: The Resource and the Fishery*, Anchorage, AL: Alaska Northwest Publishing Co., 1981.
- Bratton, S.P. *Christianity, Wilderness and Wildlife: The Original Desert Solitaire*, Scranton: University of Scranton Press, 1993.

- Bratton, S.P. Penning the Goring Bull: Evaluating Five Potential Christian Ethical Responses to Environmental Pollution, in *Ecology and Religion: Scientists Speak*, John E. Carroll and Keith Warner, eds., Richmond, IN: Franciscan Press, 111-133, 1998.
- Bratton, S.P. and Shawn Hinz, Ethical Responses to Fisheries Decline in the Republic of Ireland, *Ethics and the Environment*, under review.
- Brueggemann, Walter, *The Land*, Philadelphia: Fortress Press, 1977.
- Clucas, Ivor, A Study of the Options for Utilization of Bycatch and Discards from Marine Capture Fisheries, Rome: *Food and Agriculture Organization of the United Nations, Fisheries Circular No. 928, FIIU/C928*, 1997.
- DeWitt, Calvin, *Caring for Creation: Responsible Stewardship of God's Handiwork*, Grand Rapids, MI: Baker Books, 1998.
- Fink, Daniel B., The Environment in *Halakhah*, in *Judaism and Ecology*, Haddassah and Shomrei Adamah, eds., New York: Department of Jewish Education, Haddassah, The Women's Zionist Organization of America, Inc, 34-47, 1993.
- Fogarty, Michael J., The Lobster Fishery: Escape Vents and Bycatch Issues, in *Proceedings of the East Coast Bycatch Conference*, Kathleen Castor, Tony Corey, Joseph DeAlters, and Chris Gagnon, eds., Newport, RI: Rhode Island Sea Grant, 63, 1995.
- Hall, John Douglas, *The Steward: A Biblical Symbol Come of Age*, Grand Rapids, MI: William B. Eerdmans Publishing Co., 1990.
- Hinz, Shawn and S.P. Bratton, Religious Responses to Fisheries Decline in the Republic of Ireland Communities with a Comparison to the Pacific Northwest Region, USA, *Ecotheology*, in press to appear in 2000.
- Hoag, Stephen H. and Robert R. French, *The Incidental Catch of Halibut by Foreign Trawlers*, Seattle, WA: International Pacific Halibut Commission, Scientific Report, No. 60, 1976.
- Mattera, Fred, Small-mesh Bottom Trawl and Gear Modification, in *Proceedings of the East Coast Bycatch Conference*, Kathleen Castor, Tony Corey, Joseph DeAlters, and Chris Gagnon, eds., Newport, RI: Rhode Island Sea Grant, 23-24, 1995.
- Melvin, Edward B., L. L. Conquest and Julia K. Parrish, *Seabird Bycatch Reduction: New Tools for Puget Sound Drift Gillnet Salmon Fisheries: 1996 Sockeye and 1995 Chum Salmon Test Fisheries, Final Report*, Seattle, WA.: Washington Sea Grant Program, University of Washington, 1997.
- Metzger, Bruce M. and Roland E. Murphy, eds., *The New Oxford Annotated Bible*, New York: Oxford University Press, 1994.
- Murawski, S.A. Biological Implications of Bycatch, in *Proceedings of the East Coast Bycatch Conference*, Kathleen Castor, Tony Corey, Joseph DeAlters, and Chris Gagnon, eds., Newport, RI: Rhode Island Sea Grant, 31-39, 1995.
- Nash, James, *Loving Nature: Ecological Integrity and Christian Responsibility*, Nashville: Abingdon Press, 1991.
- Pascoe, S., *Bycatch Management and the Economics of Discarding*, Rome: Food and Agriculture Organization of the United Nations, FAO Fisheries Technical Paper, No. 370, 1994.
- Smith, Bob, Industry-generated Success in the Lobster Fishery, in *Proceedings of the East Coast Bycatch Conference*, Kathleen Castor, Tony Corey, Joseph DeAlters, and Chris Gagnon, eds., Newport, RI: Rhode Island Sea Grant, 61-62, 1995.

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