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Deep ecology and language: the curtailed journey of the Atlantic salmon

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Abstract

This article explores the representation of fish in ecological discourse through analysis of the recently published Millennium Ecosystem Assessment (MA) synthesis report. The analysis is carried out within an ecological framework based on Arne Naess's 'deep ecology', and examines how the discourse of the MA asserts or denies the intrinsic worth of fish. The discursive construction of fish in the MA is considered in light of the growing aquaculture industry, and the impact that this is having on ecosystems and fish, particularly the Atlantic salmon. The discourse of the MA is then compared to a very different way of constructing fish, that of Rachel Carson's 'Silent Spring'. The article concludes by discussing how alternative discourses could construct fish in ways which are more compatible with the welfare of the fish themselves and the protection of ecosystems.

Introduction

This is an article about fish, their representation in discourse, and how this could potentially influence how they are treated. It is about the journey of Atlantic salmon, which in the wild would involve swimming far out into the Atlantic, but is increasingly being curtailed by the net walls of aquaculture cages in fish farms. And it is about the relationship between humans and other animals in general, and how we value that relationship. The introduction starts by describing some of the consequences that aquaculture has had on salmon and the ecosystems they are part of, and describes how the way we treat salmon depends on their social construction. Of particular importance is the degree to which discourses represent fish as intrinsically valuable, or as valuable only in terms of their utility to humans. The second section analyses the representation of fish in the recently published Millennium Ecosystem Assessment report, focusing on the extent to which the linguistic structuring of the report represents fish in ways which recognise their value. The third section discusses what a discourse which treats fish as inherently valuable, as animals leading their own lives for their own purposes, might look like, with Rachel Carson's 'Silent Spring' acting as an illustration of such a discourse.

Fish, ecology and intrinsic worth

'Salmon farming is a relatively new occupation', says Scottish Quality Salmon (SQS 2005), 'and of course we have learned to do things better during a steep learning curve'. The 'learning curve' for salmon aquaculture around the world has indeed been steep, involving lessons about how diseases quickly spread through populations of confined salmon, and beyond, to infect wild salmon: 'The salmon parasite, *Gyrodactylus salaris*, has destroyed wild salmon populations in 44 Norwegian rivers' (Peeler and Murray 2004:322). Other diseases the aquaculture industry has learned about the hard way are *infectious salmon anemia virus* (Kibenge et al 2004), and *infectious hematopoietic necrosis virus* (Miller et al 2004). To prevent disease, chemotherapeutics such as oxytetracycline are added to feed (Capone et al 1996), a chemical which has been found to cause spinal deformities in the salmon (Toften and Jobling 1996).

The learning curve included discovery of how salmon escaping from farms disrupt the genetic make-up of wild populations (Stephens and Cooper 2004), and of how fish waste leads to 'toxic and harmful' algal blooms (MacGarvin's 2000:1, Berry and Davidson 2001). The steepest

part of curve was the discovery of how sea **lice multiply among the farmed salmon, and spread out to wild populations** (Butler 2002). The lesions caused by these lice **‘cause stress and increase the susceptibility of the fish to secondary infections. In extreme infestations, fish can suffer from osmoregulatory failure and death’** (Davies and Rodger 2000:869).

The problems resulting from the confinement of salmon in sea cages (detailed in Staniford 2002 and Berry and Davidson 2001) are numerous, but do not come as a surprise. There have been many ‘learning curves’ already on land in other intensive animal industries. And the lesson is simple: when we confine thousands, or, on a global scale, billions, of animals in ways which go against their nature, there are serious ecological, welfare and health repercussions (Turner 1999).

The nature of Atlantic salmon is to hatch in a streambed, grow in the stream, and transform into a saltwater fish, before starting out on a journey. This journey takes the salmon down the river, into the Atlantic, where they swim often as far as Greenland, before returning to the stream they were born in to lay eggs in autumn. Instead of this, farmed salmon hatch indoors, and are then helicoptered in steel buckets to sea-cages which have ‘the volume of two Olympic swimming pools’ (SQS 2005), where they will spend the rest of their lives. In these cages, there are as many as 20,000 salmon¹, leading to an environment very different from the one they are adapted to thrive in.

The specific problems that occur over time when large numbers of salmon are confined in sea-cages are impossible to predict in advance. Rather than waiting to find out, a precautionary principle of understanding the nature of salmon and violating this nature as little possible seems to be the most practical way of realising ecologically harmonious relationships between humans and the fish. As Capra (2002:188) explains, ‘A sustainable human community interacts with other living systems - human and nonhuman - in ways that enable those systems to live and develop according to their nature’.

This is compatible with an age old cultural apparatus which has assuaged ecological destruction before in indigenous cultures around the world: empathy, respect and compassion for other animals. As McIntosh (2001:39) points out, ‘The harmony with nature we have come to associate with settled indigenous peoples has been in part a *learned* harmony. It has been kept in place by technological limitations and totemistic respect for other life and by taboos against disrespect’. Without the same technological limitations, respect becomes even more necessary as a way of ensuring that technology is applied appropriately.

The ‘deep ecology’ framework (Naess 1973, 1990), encourages the recognition of the ‘intrinsic value’ of the non-human world, and recommends allowing animals and plants to follow their nature as far as possible. This recognition, it is suggested, could act as a safeguard to avoid harming the animals as well as preventing the ecological damage that inevitably occurs when the nature of animals is violated. Mainstream ecology, however, frequently denies the intrinsic value of the non-human world, not through direct statements, but by ideology embedded in its discourse (Stibbe 2005). The following section analyses one particular ecological discourse, as it is realised in the recent Millennium Ecosystem Assessment syntheses report (MA 2005), in terms of how it represents of the value of fish.

The discourse of the Millennium Ecosystem Assessment

The Millennium Ecosystems Assessment synthesis report (MA 2005), conducted at the request of the United Nations, involved the co-operation of more than 2000 authors and reviewers, to produce a detailed statement of the state of the world’s ecosystems. The 219 page report (‘MA’ from now on) was released on March 23, 2005. The assessment is a great achievement, and has enormous potential to contribute to the treatment of ecosystems with more care in the future. However, it is important to analyse the report to reveal the extent to which it represents nature, and in this case fish

¹ Assuming a maximum stocking density of 2%, fish weight of 5 kilograms, and Olympic pool dimensions of 50X25X2m

in particular, in ways which assert, or deny, intrinsic worth. The preamble to the MA contains a statement which directly mentions intrinsic value:

Although the MA emphasizes the linkages between ecosystems and human well-being, it recognizes that the actions people take that influence ecosystems result not just from concern about human wellbeing but also from considerations of the intrinsic value of species and ecosystems. Intrinsic value is the value of something in and for itself, irrespective of its utility for someone else. (MA 2005:9)

This is a deep ecology perspective, but at a distance of three steps: firstly, there is no direct statement that ecosystems have intrinsic value, only that people are involved in ‘*considerations* of the intrinsic value’. Secondly, the phrasing ‘*considerations* of intrinsic value’ than ‘*recognition* of the intrinsic value’, allows the authors to avoid implying that ecosystems actually do have value. Thirdly, it only mentions the value of ‘species’, rather than the individuals who make up the species.

Having said that, the statement does recognise that notions of intrinsic value can motivate people to protect species and ecosystems. Since the aim of the report is to encourage this protection of ecosystems, an important question is: to what extent does the MA itself motivate people to value fish as living beings, to treat fish as intrinsically valuable, through its discourse?

One way to get a clue as to who the MA considers intrinsically valuable is to look at the participant structure of the process ‘harm’. For instance:

algal blooms in coastal waters are increasing in frequency and intensity, ***harming*** other marine resources such as fisheries as well as human health. (MA 2005:20, emphasis added)

The major problems associated with our management of the world’s ecosystems are already causing significant ***harm*** to some people, particularly the poor (p.16, emphasis added)

In the first example, ‘human health’ is represented as being affected by algal blooms, but the harm to the fish (who suffocate because the algae take oxygen out of the water), is represented only as harm to ‘marine resources such as fisheries’. In the second example, the harm to people is directly stated, but no mention is made of the harm to other species which suffer from ‘our management of the world’s ecosystems’.

Analysis of the *affected* participant of the process of ‘harm’ in the MA reveals that it is overwhelmingly humans who are presented as affected. The human *affected* participants in the report are *indigenous communities, women, the world’s poorest people, groups of people, people, [human] individuals, [human] populations, the poor*, and, indirectly, *human wellbeing, livelihoods, human health, [human] populations, and industry*. Where the *affected* participant is not human, it is most often *ecosystem services* and, in one case, *marine resources*, both of which express the non-human world only in terms of provisions for humans. Of the 91 instances of the word ‘harm’, only four directly represent harm to the non-human world - to *native species, biodiversity* (twice), and *ecosystems* (though never to ‘fish’ or animals as individuals). The MA does not explicitly state that harm to fish is of no consequence, but this ideology seems to be encoded in the discourse through the patterning of the word ‘harm’ - the harm to humans is important enough to be considered worthy of mention, but the harm to any other species, including fish, is not.

It is significant that in the MA the word ‘fishery’ appears more often than ‘fish’ (110 times compared to 61), revealing how fish are thought of primarily in terms of human industry. This is subtly different from how other animals are represented. For example:

African mammals, birds in agricultural lands, British butterflies, Caribbean corals, and *fishery species* show the majority of species to be declining in range or number. (p.59, emphasis added)

In this example, the decline of mammals, birds, butterflies is expressed as if it was something negative in itself, as if these animals have intrinsic worth. Paralleling ‘mammal’ and ‘bird’ we would expect ‘fish’, but instead we find ‘fishery species’. The same pattern can be seen in Beckerman’s (2002:54) statement that ‘only special regulations and governmental control can prevent the extinction of many endangered species, such as elephants, rhinos, and *fish stocks*.’ (emphasis added).

Writing of fish collectively in terms of ‘fishery species’ could have the effect of making the fish themselves, as individual animals leading their one lives, invisible. Metaphor could also have a similar homogenising affect, for instance:

Currently, one quarter of marine fish *stocks* are overexploited or significantly *depleted*. (p.82, emphasis added)

the fish being *harvested* are increasingly coming from the less valuable lower trophic levels as populations of higher trophic level species are *depleted* (p.29, emphasis added)

Trade in *commodities* such as grain, fish, and timber... (p.94, emphasis added)

In the first and second examples, fish are treated as ‘stocks’ which can be ‘depleted’, representing fish in economic terms which imply that wild animals are owned by humans. In the third example, fish are represented as a commodity, and equated with ‘grain’ and ‘timber’. The parallel between *fish* and *grain* ties in with the metaphor of *harvest* in the second example. This metaphor euphemistically disguises the death of the fish, as do other euphemisms within the MA, such as ‘removed’ (p.150), ‘caught’ (p.98), ‘captured’ (p.172), ‘landed’ (p.172) or ‘eliminated’ (p.119).

The morphology of the word ‘fish’ is such that it is impossible to tell from shape alone whether the word is a count or mass noun. However, in the third example, the parallel with the mass nouns *grain* and *timber* (as opposed to trees) shows clearly that *fish* is being used as a mass noun, representing fish *en masse* rather than as individuals. Dunayer (2001) suggests that the word ‘fishes’ can restore individuality, but in the MA the word is only used twice, and in ways which refer to different *species* of fish rather than individuals (‘the biomass of some targeted species, especially larger fishes’ p. 117).

More detailed consideration of grammatical patterning in the MA further confirms the tendency to avoid acknowledging fish as animals who are living and losing their lives. The positioning of fish within clause structures is summarised in Table 1, which includes all instances of the word ‘fish’ in the MA.

Table 1: Grammatical patterning of all occurrences of the word ‘fish’ in the MA

<i>Modifier of noun</i>	<i>instances</i>	<i>Embedded in noun phrase</i>	<i>instances</i>
fish stocks	6	the catch of fish	1
fish nursery	1	the overharvest of fish	2
fish catch	6	capture of ... fish	2
fish biomass	1	quantity of fish	2
fish production	4	services such as...fish	2
fish harvest	2	commodities such as...fish	1
fish feed	1	demand for fish	3
fish productivity	1	reliance on marine fish	1
fish products	3	products such as meat, fish	1
fish consumption	4	use of fish	1
fish supplies	1		
fish population(s)	3	<i>Affected participant of material process (verbal)</i>	
fish kills	2	the fish being harvested	2
fish species	2	capturing more fish	1
fish demand	1		
fish landings	1	<i>Circumstance</i>	
		Degraded habitat for fish	1
<i>Carrier of attributive process</i>			
fish at higher trophic levels are...of higher...value	1		

Table 1 reveals how rarely fish, in themselves, are participants in verbal processes - only five times out of 91 instances. When they appear in clauses they are usually embedded in noun phrases (eg, ‘quantity of fish’), the majority of which are nominalised processes (eg, ‘fish demand’). The underlying verbal process behind ‘fish demand’ is ‘people demand fish’, and similarly, fish are *consumed, produced, relied on* or *used* by people. This represents fish according to utility value rather than intrinsic value. Importantly, there are no verbal processes which represent fish as doing things for themselves; things like swimming, eating, suffering, or dying. When the death of fish is implied, the agent is always missing (fish catch, fish harvest, fish kills, fish landings, overharvest of fish, the catch of fish, capture of fish).

Within the four verbal processes that fish do appear in, one is a passive sentences, with the agent deleted (‘the fish being harvested’). One is active, with the fish as *affected* participant, but the agent (who does the capturing) is still deleted:

‘The growing demand for these ecosystems services was met...by...capturing more fish’ (p.19).

What is being described in all these cases is the relationship between fish and humans, but through the disguise and deletion of the agent, the relationship is represented in the absence of humans.

There is only one active sentence in which fish are the subject of an active sentence - ‘fish at higher trophic levels are...of higher economic value’ (p.45), though this represents fish in the role of *carrier* of the *attribute* ‘economic value’. With only one exception, all of the grammatical patterns of clauses involving fish in the MA represent fish as economic commodities rather than as animals with intrinsic value. The one exception is the following:

the potential consequences include eutrophication of coastal and freshwater ecosystems, which can lead to *degraded habitat for fish* and decreased quality of water for consumption by humans and livestock. (p.119, emphasis added)

The expression 'for fish' in 'degraded habitat for fish' represents degrading as something which directly, and negatively, affects the lives of the fish themselves, which accords them a measure of intrinsic value. This stands in contrast with statements which describe pollution only from a human perspective, such as the following:

toxic chemicals produced by some blue-green algae during blooms keep people from swimming, boating, and otherwise enjoying the aesthetic value of lakes (p.119)

Overall then, the discourse of the MA does not explicitly devalue the lives of fish, but with very few exceptions fails to accord them intrinsic value, representing them *en masse* as commodities, rather than as beings living their own lives for their own purposes.

Ideology, hegemony and intrinsic worth

In reaction against the devaluing of nonhuman life inherent in 'shallow ecology', the first platform statement of deep ecology states explicitly that:

The well-being and flourishing of human and non-human life on Earth have value in themselves (synonyms: intrinsic value, inherent worth). These values are independent of the usefulness of the non-human world for human purposes. (Naess 2003:264)

Luke (2002:184) criticises deep ecology, however, for being idealistic:

Political action is pushed off into the realm of ethical ideals...Without real opportunities to change collective activity - in the economy, ideology, technology, or polity, this...might be, at best, a green quietism.

Whether deep ecology is a form of quietism or not depends partly on whether its ethical ideals find their way, through intertextual transfer, into official documents which have an influence on policy making. In fact, there is evidence that the ideas of deep ecology *are* finding expression in documents which, if not widespread and official, are close to it. One example is the Earth Charter, which has been adopted by a large number of institutions, though not yet by the United Nations. This charter offers a commitment to:

Recognize that all beings are interdependent and every form of life has value regardless of its worth to human beings. (EC 2005:2)

Another example is the UK Sustainable Development Commission, which reports directly to the United Kingdom government, and states that:

Even as we learn to manage our use of the natural world more efficiently, so we must affirm those individual beliefs and belief systems which revere Nature for its intrinsic value, regardless of its economic and aesthetic value to humankind. (SDC 2005)

Even the MA goes as far as saying:

Ultimately, the level of biodiversity that survives on Earth will be determined not just by utilitarian considerations but to a significant extent by ethical concerns, including considerations of the intrinsic values of species. (MA 2005:94)

All of these are using the terminology of the deep ecology movement. However, as we have seen, the discourse of the MA constructs fish in ways which deny their intrinsic value. And this leads to an important point. In order to encourage recognition of the intrinsic value of fish, it is not enough just to state that 'fish have intrinsic value'. Such statements lead to a great deal of philosophical discussion of whether fish objectively have that value in themselves, or whether it requires a human observer to notice that value, or of how it could be rationally proven that fish have intrinsic value (Light and Rolston 2003). This is reminiscent of similar discussions of the intrinsic value of humans during times of slavery before the idea that humans are intrinsically valuable became widespread and commonplace.

In the end though, much of ethics comes down to a struggle for ideology to be naturalised (see van Dijk 1993). The idea that all humans have intrinsic value has been naturalised across a wide range of discourses, meaning that it is assumed as a taken-for-granted and obvious fact about the world rather than something to be discussed or asserted. An example of this is the following:

The degradation of ecosystem services is harming many of the world's poorest people (MA 2005:25)

The MA does not explicitly state that poor people have intrinsic value and that harming them is a bad thing, but takes this as a completely common-sense assumption, and this is a powerful way of spreading this idea (see Fairclough 1989:70). Likewise, ecological discourse could help to instil a sense of the intrinsic worth of the non-human world through discourse which treats it as plain common-sense that other species actively lead their own lives, and that harm to them is something negative in itself, to be avoided as far as possible. For many, this is indeed common sense and obvious, but the discourse of the MA shows how the world can be represented in ways which deny this.

Recognising intrinsic worth: *Silent Spring*

This raises an important question. What would an ecological discourse which implicitly recognises the intrinsic worth of fish look like? An example can be found in the writings of the marine biologist Rachel Carson, particularly in her seminal work 'Silent Spring' (Carson 1962). This book, more than any other, helped to raise consciousness about the ecological crisis and found the environmental movement. There are no explicit statements within the book claiming that fish or other animals have 'intrinsic value', or need to be respected or empathised with. Despite this, there is something about her writing which manages to present fish as valuable in themselves, as sentient beings leading their own lives. Analysis of the discourse of *Silent Spring* can help reveal what this 'something' is.

In places, Carson (1962) describes the effects of ecological destruction for humans in much the same way as 'shallow' ecological discourses such as the MA:

the invasion of streams, ponds, rivers, and bays by pesticides is now a threat to both recreational and commercial fishing (Carson 1962:131)

The fisheries of fresh and salt water are a resource of great importance, involving the interests and the welfare of a very large number of people. (p.141)

But in the majority of cases, fish are represented in ways that differ markedly from the MA. Firstly, the harm that pesticides and pollution cause is expressed first and foremost in terms of the fish themselves, not 'fisheries' or 'marine resources'. For instance:

(a chlorinated hydrocarbon) killed all the fish inhabiting the streams. (p.51)

fishes and crabs were killed in enormous numbers (p.116)

In Pennsylvania, fish were killed in large numbers (p.131)

In these examples, fish are the *affected* participant in verbal processes. The agent is not made explicit, but the particular verb is 'kill', which at least refers directly to the death of the fish (as opposed to *capture, catch, harvest, or eliminate*). Killing is something which is generally viewed negatively, so this phrasing, together with the fact that human interests are not mentioned, suggests that the killing of the fish is a bad thing in itself.

In the second and third examples, it is unambiguously the count-noun version of 'fish' that is used ('large numbers' as opposed to 'a large quantity of fish'), highlighting that it is individuals who have been killed. Similarly, the frequent use of the pronoun 'they' for fish (eg, 'they had few competitors', p.126) highlights their individually.

In a discussion on co-operation between the forest service and the government, Carson's first concern is with the fish 'But can such cooperation actually succeed in saving the fish?' (p.129), rather than saving the fishing industry or 'fisheries'. Carson goes as far as describing fish as 'the principal victims' ('Again, fishes and crabs were the principal victims' p.138). There is no hiding the fact that the fish die, and the following sentence represents the fish as going through the process of 'dying':

Dead and dying fish, including many young salmon, were found along the banks of the stream...All the life of the stream was stilled. (p.123)

This implicitly represents the suffering and death of the fish, and the stilling of life in the stream, as something negative in itself.

The most noticeable difference between Carson's writing and that of the MA is the participant roles that the fish fill. The expression 'the fish inhabiting the streams' (p.51) places 'fish' in agentive role, actively leading their lives in the stream. The following sentences likewise give fish a participant role in verbal processes:

the salmon...moved in...ascended their native river...deposited their eggs...These young fed voraciously, seeking out the strange and varied insect life of the stream. (p.123)

For thousands upon thousands of years the salmon have known and followed these threads of fresh water that lead them back to the rivers. (p.122)

In the first sentence, the salmon are *agents* of the processes of 'moving', 'ascending', depositing', 'feeding' and 'seeking out' - these are material processes, in active sentences, representing the salmon as sentient beings actively engaged in living their lives. Importantly, the second sentence makes salmon the *senser* of a mental (cognitive) process of 'knowing', representing salmon as conscious beings.

Above all, Carson's writing expresses empathy with the fish. A clear example of this is how Carson takes what must have been quite dry, objective data from the Fisheries Research Board of Canada, and represents the information from the perspective of the fish themselves, describing what the fish at the time must have 'found':

Even in the second year after DDT enters a stream, a foraging salmon parr would *have trouble finding* anything more than an occasional small stonefly (p.124 emphasis added)

The young salmon hatching in the north-west Miramichi in the spring of 1955 *found* circumstances practically ideal for the survival (p.126 emphasis added)

The salmon fry of that year not only *found* abundant food but they had few competitors for it. (p.126 emphasis added)

Conclusion

It may seem absurd to analyse a discourse (that of Carson's *Silent Spring*) and point out explicitly that it represents salmon as conscious beings living their lives for their own purposes, whose suffering and death is something negative in itself. For many readers, Carson's writing just represents things how they obviously are. However, when looked at in contrast with the MA's representation of fish, it becomes clear that this is not the only way of representing fish. The other way uses phrasings and grammatical constructions which make fish, as individual beings, invisible and unimportant, and only mattering collectively as a 'stock' or 'resource'.

In the MA there are no explicit statements denying the intrinsic worth of fish, such as the following one from the economist Beckerman 'it is much more useful to think of pollution as existing only in so far as harm is done to human beings...As regards water pollution, for example, we are interested only in mankind, not fishkind' (Beckerman 1974:108-109). However, by recognising harm to humans caused by damage to the ecosystems fish are part of, but not recognising the harm to fish themselves, the MA seems to be based on a similar, though implicit, ideology.

In terms of social justice in the human world, the MA makes a powerful and important statement, because it presents a world where it is not just *some* humans but *all* humans who have intrinsic worth, and emphasises that ecological destruction will harm the poor first. However, in terms of presenting models of the world which encourage respect, the MA may be limited by its portrayal of the natural world (of which fish are one part) as containing little or no intrinsic value.

The extensive ethnographic research into the social construction of salmon among biologists carried out by Scarce (2000, 1997) suggests one possible reason for why documents such as the MA may be reticent to acknowledge intrinsic worth. Scarce's argument is that until recently, biologists could study the lifecycle of salmon for its own sake, something which is quite compatible with treating fish as animals with intrinsic value. However, public policy and economic pressures have lead to a situation where biologists can only get funding and recognition if their work is directly tied to commercial interests: 'politics and economics impress upon scientists a new sense of urgency, and these pressures lead to a narrowing cognitive construction of salmon. Even to biologists the salmon become embodiments of public policy and tools for economic gain.' (Scarce 1997).

The MA is not an isolated example of a text which treats the non-human world in ways that deny its intrinsic worth; it is, rather, an instance of a far more widespread discourse. In similar fashion, other discourses, such as those of land-based animal product industries, also employ a variety of linguistic techniques to deny intrinsic worth, for narrow economic interests (Stibbe 2003, 2001). It seems that a mutually reinforcing relationship has arisen between science and commercial interests, which favours controlling, and in some cases, violating, the nature of animals rather than working towards a greater understanding and respect for that nature.

How can we prevent repeating the 'learning curve' of disease, suffering and ecological problems that resulted from the curtailment of the journey of the Atlantic salmon? If the deep ecology movement is right, then one of the best ways could be through encouraging recognition of the intrinsic worth of fish in people who directly or indirectly influence their life and death.

This article argued that explicit statements declaring that fish have intrinsic value may not be enough to influence social constructions. Instead, discourses which treat the intrinsic value of fish as a taken-for-granted assumption about the world are potentially much more powerful. Rachel Carson has shown how this is possible even within a science-based discourse. With the increasing influence of deep ecology, it may be possible that future ecological discourses will encourage respect for fish as animals with intrinsic value, leading their own lives according to their nature.

References

- Berry, C and A Davison (2001) *Bitter Harvest: A call for reform in Scottish aquaculture* WWF available <http://www.wwf.org.uk/filelibrary/pdf/bitterharvest.pdf>
- Beckerman, W (2002) *A Poverty of Reason: Sustainable Development and Economic Growth*. New York: Independent Institute
- (1974) *In Defence of Economic Growth*, London: Jonathan Cape
- Butler, J (2002) Wild salmonids and sea louse infestations on the west coast of Scotland: sources of infection and implications for the management of marine salmon farms. *Pest Management Science*, 58:6:595-608
- Capra, F (2002) *The Hidden Connections: A Science for Sustainable Living*. New York: Harpercollins
- Carson, R (1962) *Silent Spring*. Harmondsworth: Penguin
- Capone D, D Weston, V Miller, C Shoemaker (1996) Antibacterial residues in marine sediments and invertebrates following chemotherapy in aquaculture. *Aquaculture* 145:1:55-75
- Davies, I and G Rodger (2000) A review of the use of ivermectin as a treatment for sea lice infestation in farmed Atlantic salmon. *Aquaculture Research*, 31:11:869-883
- Dunayer, J. (2001). *Animal equality: language and liberation*. Derwood, Maryland: Ryce
- EC (2005) *The Earth Charter*. Available on-line from www.earthcharter.org
- Ekins, P, M Hillman and R Hutchinson (1992) *Wealth beyond measure: An atlas of new economics*. London: Gaia
- Fairclough, Norman (1989) *Language and Power*. London: Longman
- Kibenge, F, K Munir, M Kibenge, T Joseph and E Moneke (2004) Infectious salmon anemia virus: causative agent, pathogenesis and immunity, *Animal Health Research Reviews*, 2004:5:1:65-78
- Light, A and H Rolston (2003) *Environmental ethics: an anthology*. London: Blackwell
- Luke, T (2002) *Deep Ecology: living as if nature mattered: Devall and Sessions on defending the earth*. *Organisation & Environment* 15:2:178-186
- MacGarvin, M (2000) *Scotland's Secret? Aquaculture, nutrient pollution eutrophication and toxic blooms*. WWF, available <http://www.wwf.org.uk/filelibrary/pdf/secret.pdf>
- McIntosh, Alastair (2001) *Soil and Soul. People versus corporate power*. London: Aurum
- Miller, K, J Winton, A Schulze, M Purcell, T Ming (2004) Major Histocompatibility Complex Loci are Associated with Susceptibility of Atlantic Salmon to Infectious Hematopoietic Necrosis Virus, *Environmental Biology of Fishes*, 69:1-4:307-316
- MA (2005), *Millenium Ecosystem Assessment Synthesis Report*. Available online from <http://www.millenniumassessment.org/en/Products.Synthesis.aspx>
- Naess, A (1990) *Ecology, Community and Lifestyle : Outline of an Ecosophy*. Cambridge University Press
- (1973) The shallow and the deep, long range ecology movements: a summary. *Inquiry* 16: 95-100
- Peeler, E and A Murray (2004) Disease interaction between farmed and wild fish populations, *Journal of Fish Biology* 65:1:321-322
- Scarce, R (2000) *Fishy business : Salmon, biology, and the social constructions of nature*. Philadelphia : Temple University Press.
- (1997) Socially constructing Pacific salmon. *Society and Animals* 5(2):117- 135.
- SDC (2005) *Sustainable Development Commission: Our work, our principles*. Available on-line from http://www.sd-commission.org.uk/pages/our_work/our_principles.html
- SQS (2005) *Scottish Quality Salmon, The Facts*. Perth: Scottish Quality Salmon

- Staniford, D (2002) Sea cage fish farming: an evaluation of environmental and public health aspects
Paper presented at the European Parliament on 1st October 2002. Available on-line from
http://www.europarl.eu.int/hearings/20021001/pech/programme_en.pdf
- Stephens, A and A Cooper (2004) Ecological model of interactions between escaped and wild
 Atlantic salmon *Salmo salar*, *Journal of Fish Biology* 65:1:323-323(1)
- Stibbe, A. (2005) Counter-discourses and the relationship between humans and animals. *Antrozoös*
 18:1
- 2003. As charming as a pig: The discursive construction of the relationship between pigs
 and humans. *Society and Animals* 11:4
- 2001 'Language, power and the social construction of animals.' *Society and Animals*. 9:2
- Toften H. and M Jobling (1996) Development of spinal deformities in Atlantic salmon and Arctic
 charr fed diets supplemented with oxytetracycline, *Journal of Fish Biology*, 49:4:668-677
- Turner, J (1999) *Factory Farming & the Environment*, Hampshire: Compassion in World Farming
 Trust. Available on-line at <http://www.ciwf.co.uk>
- Van Dijk, T (1993) 'Principles of Critical Discourse Analysis', *Discourse and Society*, 4(2): 249-
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