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Essay

The Nature of ecosystem management: postmodernism and plurality in the sustainable management of the boreal forest

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Abstract

Ecosystem management, by seeking to emulate natural disturbance, has been proposed by the ecological and forest management community as a means of maintaining the biodiversity and productivity of boreal forests, key components of sustainable forest management (SFM). However, it is argued that ecosystem management overlooks the paradox inherent in the concept of Nature, limiting the scope of the SFM debate by maintaining a binary opposition between Nature and Society, humans and the environment. Nature is paradoxical because humans are part of Nature, by the theory of evolution, while at the same time Nature is a social construction created by humans, and thus artificial. Recourse is made to postmodernism in order to examine the metaphysical and sociopolitical implications of the deconstruction of this paradox. Based on a review of the philosophy of Foucault and Derrida, the concept of Nature is demonstrated to be socially mediated, an entwinement of reason and power. In order to address metaphysical challenges of the Nature–Society dualism identified above, I refer to Habermas's theory of communicative action and cite results from a case study in this regard. Results from this case study prompt a critical examination of the legitimacy of a discourse ethic about Nature, making use of the negative dialectics of Adorno. As a result, at the metaphysical level, a different role for ecologists and forest managers in public participation procedures is proposed, one whereby ecologists talk *through* Nature to the evolutionary agents to which it is intended to refer as a means of discussing whether specific management options will contribute to sustainable development. It is argued that at the sociopolitical level SFM will necessitate improved transparency and participation in forestry, criteria that can be attained through community-based ecosystem management. Both elements require a science more actively engaged with civil society.

Keywords: Ecosystem management; Nature versus Society; Postmodernism; Sustainable forest management; Communicative action

O chestnut tree, great rooted blossomer,
Are you the leaf, the blossom or the bole?
O body swayed to music, O brightening glance,
How can we know the dancer from the dance?

from "Among School Children" (Yeats, 1928).

1. Introduction

Environmental discourse in Western cultures is characterized by terms that assume a distinction between Nature and Society, overlooking the paradox on which this dualism is based (Haila, 2000, 1995; Latour, 1999; Gerber, 1997). This dualism can be traced to the philosophy of Plato and Descartes who emphasized a division between outer (objective) and inner (subjective) reality. The 20th century in the West, however, has seen the increased influence of art and philosophy that challenge the foundation of dualistic thinking. For the Irish poet W.B. Yeats, the subjective and objective were symbolized by the dancer and the dance, and the closing lines cited above reveal a surprising tension between the two. By a postmodern critique, I address the Nature–Society dualism and its underlying paradox in light of the new paradigm of ecosystem management as used in the boreal context and its implications for sustainable forest management (SFM).

The ecosystem management paradigm is important in that it has ushered the Nature–Society dualism into the discourse on SFM in ecological and forest management circles. Here, the object is "to emulate nature in our interventions in such a way as to minimize potential impact and to conserve biodiversity" (Messier and Kneeshaw, 1999, p. 933). By tailoring harvest and silvicultural operations to imitate forest "natural" disturbances such as fire, insect infestations and blowdown, ecosystem management

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posits that forest productivity and biodiversity can be maintained, important components of SFM (CCFM, 1997). A science-based approach, ecosystem management aims to set objective management criteria determined from research in benchmark, "natural" forests (Seymour and Hunter, 1999; Bergeron et al., 1999; Anglestam, 1998; Bergeron and Harvey, 1997; Attiwil, 1994). For example, criteria regarding stand dynamics and age–class distribution after natural disturbance are used to determine the amount of trees to be maintained on site after harvesting while the severity and frequency of natural disturbance are used to prescribe the area and rotation period of harvesting. What is novel about this approach is that it provides an objective, scientific method for management. This article examines the implications of the Nature–Society dualism for ecosystem management and the broader goal of SFM. By use of a postmodern analysis, the scope of the Nature–Society dualism is expanded by: (i) the recognition of Nature as an abstract concept and thus as a social construction; and (ii) the use of philosophies that address the entwinement of reason and power in the establishment of social order.

A focus on the metaphysical and sociopolitical implications underlying the use of Nature in ecosystem management is imperative given that the social aspects of SFM are now receiving greater attention (CCFM, 1997; Montréal Process, 1995). Indeed, the ecological and forest management community recognizes the social context of SFM to have bearing on ecosystem management: Messier and Kneeshaw (1999) conclude that "The science of ecology could, therefore, be useful in determining acceptable levels of impact and the possible consequences of different interventions, although the final decision is always a 'social' decision" (p. 930). How, and at what level ecosystem management becomes a social decision are the main issues addressed in this article, these being discussed for the Canadian context. It will be argued that a postmodern forestry liberated from the Nature–Society dualism would: (i) improve communication regarding SFM, particularly the capacity of ecologists and forest managers to engage with civil society; and (ii) support the call for a greater role of local residents in forest management.

2. The nature of the paradox

Research in ecology over the past 20 years has demonstrated that disturbance is an integral part of almost all ecosystems (Pickett and White, 1985; Huston, 1979; Petraitis et al., 1989). This has unearthed the startling conclusion and hope that forest interventions may be conducted in a manner contiguous with the forces that have led to the forest's evolution. In the boreal forest, in particular, disturbance has occurred at a sufficient frequency to represent a selective pressure and has, therefore, elicited adaptation (Rowe, 1983; Rowe and Scotter, 1973). As a result of this new ecology, emphasis has shifted away from the maintenance of old-growth to the maintenance of successional patterns as driven by disturbance. This has considerably changed the debate on SFM. Forest operations such as clear-cutting once easily labeled as "unnatural" by opponents of industrial forestry no longer have such firm footing. Industry itself appears to have embraced the new paradigm and to have incorporated it into modern practice, for example:

> . . . Ecosystem Management, a method of forest stewardship that considers the ecological, social and economic values of forest use and attempts to balance them. Traditional forestry often focuses on sustainable yield, ensuring harvest rates can be maintained. Alberta-Pacific added a new emphasis on maintaining biodiversity by working within the forest's natural systems of regeneration.
>
> Fire is the main disturbance in the forest, and the forest has adapted its natural regeneration systems accordingly. The principle of ecosystem management is: if we try to act like fire as much as possible, regeneration will be more effective, maintaining ecosystem health and biodiversity. (Alberta-Pacific Forest Industries, 2001)

As disturbances in the boreal generally cover large tracts of forest, one explanation for this trend is the hope of using this new ecology to defend industrial forestry. It is in this manner that forest industry advocates ask "Aren't people a part of the ecosystem, too?" (Weyerhaeuser, 1998). The effect of this discourse however is to collapse the SFM debate simply to one of Naturalness claims; that is, whichever management method is most similar to Nature is deemed most sustainable. Conversely, the contrast with Nature subsumes often unequal and competing segments of Society under a unique label such as "people". In doing so, however, one loses sight of SFM's key social aspects, particularly the hierarchies of power that constitute Society and, correspondingly, legitimize which resource uses are acceptable. But what is this Nature and how is it able to take precedence over Society?

Before we can answer this question, it needs to be emphasized that we are distinguishing here between Nature the concept, which is a social construction, and the things to which the term Nature is intended to refer. It is the usage of this concept that is being criticized here. Constructionism might be defined as the manner by which subjective values become objective realities (Gerber, 1997, p. 10). Latour (1999) and Haila (2000, 1995) give convincing accounts of the Nature–Society model and how it is constructed and understood. Briefly, Nature is that which is exterior and different from us while Society is that of which we, as humans, are already a part. Scientists however have been granted a special privilege to move between these two realms. Following Latour's (1999) critique of Plato's analogy of the Cave, scientists are able to go out and search for the objective truth of things, which cannot speak for themselves, and bring this back to the realm of humanity, otherwise devoid of such

truths. This capacity imparts a special power to scientists in that they are allowed to by-pass political procedures in the name of Nature (Latour, 1999, p. 89). There is thus a link between the social construction of Nature and power.

However, there is a paradox in the Nature–Society dualism that is being overlooked in the current discourse on ecosystem management. This paradox is evident in a phrase taken from Haila (1995): "On one hand humans are natural beings but, on the other hand, human nature is artificiality" (p. 13). The first half of the sentence is drawn from Darwin: humans are Natural beings by way of the theory of evolution, having descended via natural selection. Thus, the effects humans have on ecosystems serve only as a new selective pressure which, according to the theory, must be Natural. But if we subscribe completely to Darwinism, the grim truth may be that habitat loss, urban sprawl, and garbage dumps *are* Natural: "It's evolution, baby" (Vedder, 1998). Environmental deterioration and homogenization may simply reflect the choice on the part of our Society that Nature be, above all, a resource—something to be used and consumed. Evolution alone may thus not be the appropriate moral barometer. The second part of Haila's statement functions at two levels. First, it is human nature to need artificiality, the man-made. When going camping in the woods, how many go without carrying food in a back-pack? This would be more a test of survival than a "wilderness" experience. But in another sense, Nature is a concept, a subjective construction recalling a paradise lost (see Evernden, 1992). Despite Darwinism, there is still a residue of this worldview in contemporary, ecological definitions of Nature as exemplified in the following definition of "natural variability":

> the ecological conditions, and the spatial and temporal variation in these conditions, that are *relatively unaffected by people*, within a period of time and geographical area appropriate to an expressed goal. (Landres et al., 1999, p. 1180, my emphasis)

However, we may still go further with Haila's phrase, tying the two ends together: "evolution" itself could be considered a concept impressed on the world, the result being that "evolution" itself is artificial. But even this—"evolution" as a concept—can be considered Natural if we accept human rationality (which led to the conclusion) as part of Nature. The problem is that we can go on and on, each concept swallowing the next: there is no foundation nor are there any limits. It is here however that we must give recourse to postmodernism.

3. A postmodern critique of Nature

Though it itself eschews a formal definition, postmodernism might be described as the simultaneous analysis of metaphysical concepts and the sociopolitical forces which support and have given rise to them. It is a critique of how power manifests itself inadvertently in the ways Society constructs and enforces reality. To demonstrate this I make use here of the work of two well-known French post-structuralist philosophers, Jacques Derrida and Michel Foucault. Foucault in particular sought to discern "the ways in which our 'will to truth' produces effects of power" (Ashenden and Owen, 1999, p. 9). Given the power associated with the concept of Nature in the sciences, a postmodern approach is warranted here. An early encounter between Foucault and Derrida in the 1960s, over the subject of madness as discussed by Boyne (1990) demonstrates the pertinence of postmodernism towards the Nature–Society paradox.

Briefly, Foucault has argued that sociopolitical and historical forces have given rise to systems of power that marginalize certain groups, the *Other*, to the benefit of a more powerful segment of Society. This is usually conducted by reasoning which, at the same time as being shaped by political forces, legitimizes them. In his first major work, *Histoire de la folie*, Foucault (1961) attempted to demonstrate such a mechanism by tracing the history, or rather the "archaeology", of madness. This led him to a criticism of Descartes who, with his conclusion "*Cogito ergo sum*", established the subject's personal reason as the basis for reality, for truth. For by basing reality on the rational subject, Descartes necessarily excluded madness. As Foucault notes, Descartes' famous conclusion might as well be interpreted as: "I who think cannot be mad" (Foucault, 1961, p. 55 (translation as in Boyne, 1990)). In other words, Descartes had to accept his thinking as rational, otherwise he could not accept what he reasoned as true. But the method by which he arrives at this is, at best, an act of faith—there is no rational basis for it. This is the Cartesian exclusion. Such thought was easily transferable (or indeed reflected) the autocratic political structure of the time. "Madness" was able to be applied to anyone who did not conform to the norm, thus easily quieting the protests of the marginalized by categorizing them as the irrational *Other* and, reciprocally, defining the dominant authority as rational simply by insisting on its access to truth and justice by reason.

Derrida (1967) argued however that the aim of *Histoire de la folie* was twofold: to describe the history of this exclusion but also to recover the essence of madness before the Cartesian exclusion took place. Derrida criticized this on two counts, both of which are important to our treatment of Nature. First, *Histoire de la folie* served Derrida as yet another example of Western thought's obsession with the original, the true, the center. This led Derrida to his second critique: how could madness every really be described or known if all we have at our disposal is language, which in order to be communicable must be rational (i.e. not mad). In other words, madness can never be known as *madness-in-itself* as our rational language is the only means of describing it. The philosopher of madness is swallowed by his own rationality. This confrontation gives postmodernism both its metaphysical and sociopolitical character.

Of key importance to Derrida's philosophy is that one can never express or know this *presence*, the-thing-in-itself,

because there is always a medium in between the thing and the intellect, a medium which can be as simple as a picture or language (see Boyne, 1990; McCumber, 2000). In other words, there is no foundation for our thoughts and beliefs, direct and absolute knowledge of them is always deferred by some medium (refer to Derrida (1988) for his discussion of *iterability*, pp. 49–53). In agreement with Foucault however, Derrida acknowledges that the insistence on access to *presence* produces effects of power. Derrida takes it as his task the *deconstruction* of the "logic of presence". Deconstruction is a critical, hermeneutical analysis of relations between hierarchically structured binary concepts (e.g. man–woman, sanity–insanity). Generally, within binary oppositions one term is dominant and is designated as the origin. Deconstruction seeks to reverse this hierarchy by demonstrating at once their lack of foundation and their interdependence. Such analysis demonstrates that the distinctions and importance traditionally attributed to one concept over the other are not completely rational, but rather entail an important sociopolitical component.

3.1. Deconstructing Nature in ecological and forest management discourse

When re-examining the Nature–Society paradox from a postmodern point of view, it is apparent that the usage of the term Nature does produce effects of power because it is by definition "The essential qualities or properties of a thing" (OED, 1989, def. I.i.a). Thus, any attempt to distinguish the Natural from Unnatural is inherently fraught with the difficulty of setting the limits of this essence. In North American ecological scientific literature, this "line" is the time before European arrival (Heyerdahl and Card, 2000; Hunter, 1996), more explicitly described by Bonnicksen and Stone (1985, p. 479) in their paper "Restoring naturalness to national parks":

> A natural ecosystem is defined as one that portrays, to the extent feasible, either the same scene that was observed by the first European visitor to the area or the scene that would have existed today, or at some time in the future, if European settlers had not interfered with natural processes.

The above is a historical simplification. The first Europeans in North America were neither visitors nor settlers, but explorers/traders. These people were important in initiating the *Naturalization* process (and the allusion to immigration here is intentional)—that is, they rendered the "New World" understandable by rendering it different, as the *Other*. Explorers are integral in this procedure because naming and mapping are necessary to render foreign peoples and things identifiable within a specific cosmology (Haila, 1999a; Eco, 1999). The first explorers made the area open for settlement by claiming it as "wilderness", and thus "empty", despite the presence of other cultures (Haila, 1997). For their part, traders were important in bringing distant lands within the sphere of global trade. Forestry in both the Abitibi region of Quebec (Malenfant, 1997) and in New Brunswick (Wynn, 1981) have from the beginning been directed by distant centers of economic activity. This is not to condemn these activities but to recognize that the Naturalness attributed to the "New World" is not something that it assigned itself.

What are the implications of postmodernism for sustainable forest management? The ecosystem management paradigm has been successful because it has been able to provide an apparently objective basis for SFM: Nature. From an ecological point of view we can improve forest productivity and biodiversity by basing our methods on historical ecological conditions. But at this point I hope a parallel is apparent between the argument of Foucault and Derrida and that concerning ecosystem management. From Foucault comes the recognition of Nature as the contemporary *Other*, the concept against which our current identity has been shaped (Haila, 1999a; Latour, 1999). However, by extolling Nature, ecology is constructing an "archaeology" of Nature which seeks by rational methods to identify *Nature-in-itself*, which excludes humans. Derrida's criticism applies equally well here. Our interdependence with Nature inhibits our ability to know *Nature-in-itself*. Such knowledge of Nature is unattainable; it is a social distinction. In accepting this, we are treading dangerously close to the nadir of postmodernism: that there is no objective reality and that all we can know is our subjectivity which is in between ourselves and the *things-in-the-world*. This subjectivity disassociates and segregates us (try Ducharme's novel *The Swallower Swallowed* Ducharme (1968)). There is a certain sense of detachment and disillusion associated with the postmodern and a feeling of angst against it in ecological and conservation science circles for specifically these reasons (see Soulé and Lease, 1995).

It must be emphasized again that it is the concept of Nature and its usage which are being criticized here, and not the importance of ecological systems and their conservation or maintenance. This criticism is warranted as Nature produces effects of power which distort the SFM debate to the detriment of indigenous and local peoples and the social goals of SFM. The concept of Nature is necessary to legitimize the rationale of forest management to people living outside of a given environmental context. But Nature is only thought to exist when the relationship between resource and consumer is unclear. At the local level, the Nature–Society dualism does not exist: the concept of "wilderness" has no meaning for people living in deemed "wilderness" areas (Klein, 1994). The power hierarchy implicit in the structure of the Nature–Society dualism manifests itself in forest management policy by restricting indigenous and local residents in their participation in forest issues. There is no room left in the dualism for peoples that have historically lived in North American ecosystems prior to European settlement—the underlying message is that indigenous cultures are excluded from civilization because they are a part of Nature (for an example, read critically Cooper, 1960). Extreme examples

have even led to the eviction of indigenous peoples in the name of forest conservation (see Lohmann (1994) quoted in Hildyard et al. (2001)). To answer the question posed earlier in the previous section, Nature is able to take precedence over Society in the SFM debate as it avoids accountability to civil society and simplifies decision making.

4. Towards a postmodern forestry: ecology and forest management engaged with civil society

In the following sections, I outline a postmodern practice in forestry, distinguishing between metaphysical and sociopolitical implications of a deconstructed Nature. One result of postmodernism is the realization that the treatment of the metaphysical issues independently of changes at the sociopolitical level will not achieve SFM. Thus, the first two subsections address metaphysical issues of ecosystem management, particularly in terms of communication, while the last section proposes changes to the forest management institutional structure.

4.1. Communicative action and ecosystem management: the Val-Paradis case study

In this section, I assess the functionality of Nature as a pluralistic, social construction applicable towards SFM. Vogl (1996) has proposed a communicative theory of Nature, based on the theory of communicative action of the German philosopher Jürgen Habermas of the Frankfurt School. Reviews of Habermas's theory may be found in Ashenden and Owen (1999) and McCumber (2000). The *Routledge Encyclopedia of Philosophy* provides the following description of the theory of communicative action:

> [Habermas's] basic distinction is between 'consent-oriented' (or communicative) and 'success-oriented' (or purposive-rational) actions ... The goal or 'telos' of communicative action is not expressed or realized in an attempt to influence others, but in the attempt to reach an agreement or mutual understanding (*Verständigung*) about something in the world. Thus, while all action is teleological or goal-oriented in a broad sense, in the case of communicative action any further ends the agent may have are subordinated to the goal of achieving a mutually shared definition of the agent's lifeworldly situation through a cooperative process of interpretation. In acting communicatively, individuals more or less naïvely accept as valid the various claims raised with their utterance or action and mutually suppose that each is prepared to provide reasons for them should their validity be questioned. (Baynes, 1998)

Communicative action is thus a way of doing things (action), but in a manner that seeks to understand opponents' points of view and having yours understood in return. This mutual understanding is achieved through a special form of argumentation, which in his philosophy is described as a *discourse ethic*. Vogl (1996, p. 148) summarizes a discourse ethic as a "*procedure* for the justification of rightness claims: subjecting them to the scrutiny of public discourse in which all affected are equally able to speak." It is based on the interpretation that when one utters a statement, one is prepared to defend it logically in argumentation.

Habermas makes his case for communicative action by arguing that all forms of thought and belief are guided by an underlying, universal reason. This universal reason is imbedded in our means of communication, the forms of which are currently restricted. Under ideal circumstances we communicate with each other via rational argument and discussion in order to establish ontological validity (the validity of a thing's existence). Otherwise, one would not partake in discussions but would achieve a desired end through other means such as coercion, force or a call for adherence to an abstract moral standard—motives which are largely not rational. Habermas draws a profound conclusion from the universality of reason: that communicative action allows for the achievement of ontological foundation because the validation of a concept is *analogous* to its truth (Habermas, 1986, p. 78). This is because the requirements of the validation process can be considered as surrogates for the requirements for truth (Habermas, 1986, p. 89). Thus a discourse ethic serves as a rational procedure for validating claims to ontological foundation.

One of the requirements of achieving validity is a legitimate sociopolitical context. Specifically, Habermas argues that a discourse ethic—and thus the establishment of validity—is dependant on consensus and open participation: "a rule can only be considered valid if all those concerned are in agreement (or could be in agreement) in the measure that they are participants to a practical discussion on the validity of the rule" (Habermas, 1986, p. 87 (my translation from the French version)). In this way, the injustice of monological reason of Descartes is avoided by a call for communication between actors. It is through a universal, communicable reason that Habermas thus seeks to disentangle knowledge from power. To restate the postmodern dilemma, Habermas acknowledges the lack of absolute truth and foundation identified by Derrida, but argues that, nevertheless, validity through communicative means is capable of serving this function for Society if it is arrived to in an open and equitable manner.

At a small forest conference held in village of Val-Paradis in the Abitibi region of Québec (49°10′N, 79°17′W, see Fig. 1 (inset)), I took a first step towards the use of a communicative theory of Nature in forest management. A small village of approximately 300 people, Val-Paradis is found at the edge of the boreal forest, in the transition area from mixed-wood to coniferous forest (Gauthier et al., 2000). It was first established in 1937 and formally made a parish in 1942; in the beginning farming and a sawmill were its primary economic resources (Leblanc et al., 1992). My premise at the conference was that ecosystem management would

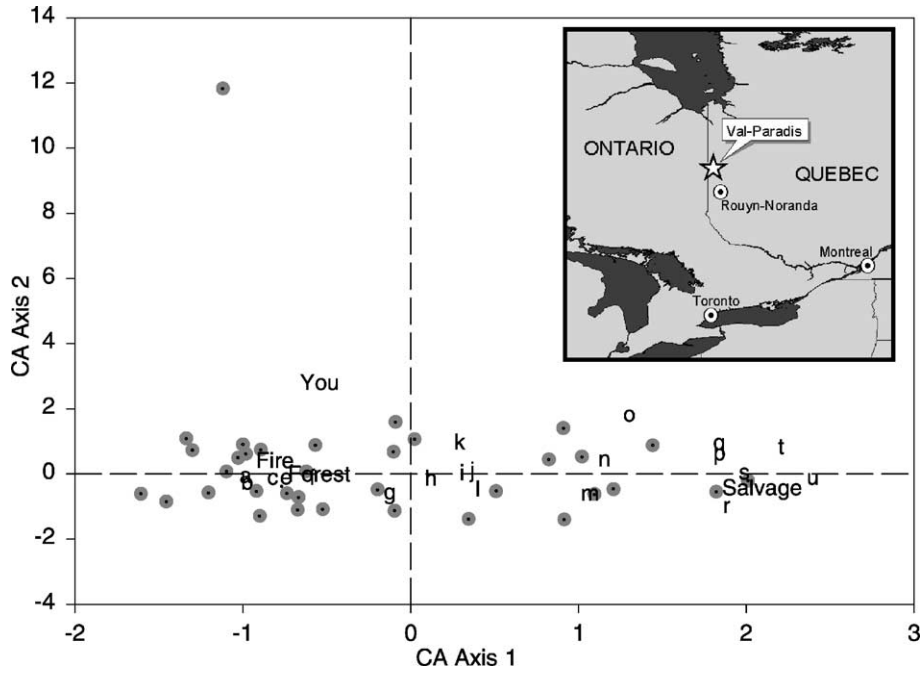

Fig. 1. Correspondence analysis of participant ($n = 38$) responses to a survey administered at scientific conference held for the public of the municipalities of Ville-bois, Val-Paradis and Beaucanton. a: stump; b: lichens; c: game; Fire: forest fire; d: woodpeckers; e: Lac Pajégasque (local recreational swimming area); f: erratic block features; Forest: forest; You: yourself (question directed to participant themselves); g: seedlings; h: blueberry field; i: fishing; j: hunting; k: ecosystem management; l: farmland; m: forest roads; n: house; o: Montréal; p: mines; q: municipalities of Ville-bois, Val-Paradis and Beaucanton; r: covered bridges; s: forest fire control service; Salvage: Salvage-logging; t: survey; u: university. Axis 1 $\lambda = 0.243$ and axis 2 $\lambda = 0.115$, representing 26.6 and 12.7% of the total variation, respectively; $\sum$unconstrained $\lambda = 0.910$. Inset shows location of Val-Paradis, Que., Canada.

necessitate the identification of thresholds of Naturalness—when is a harvesting method sufficiently similar to Natural conditions? Bergeron and Harvey (1997, p. 236) describe a procedure for establishing ecosystem management that would be compatible with a discourse on Nature:

1. reconstruction of the historical disturbance regime of a particular region;
2. ecological analysis of disturbance related ecological processes, both historical and human induced;
3. the development of silvicultural interventions to resemble Natural disturbance dynamics.

It is in between the second and third steps that a discourse on Nature needs to be held, which should include three steps:

(A) Conduct a *vulgarization* of the results achieved in (2). A vulgarization is a French term describing the manner by which complex results are rendered in "laymen's terms".
(B) The presentation of this vulgarization to various members of the forest policy community.
(C) Discussion amongst various members of Society with the intention of reaching consensus on what level of impact would still be Natural.

The first and second steps undoubtedly require some creativity, but vulgarizations are already well established in the routine of most ecologists and forest managers. It is the third step that is novel, but for which the Val-Paradis conference provided an excellent opportunity.

The conference was held with the intent of communicating to local residents the results of ecological research conducted in the nearby boreal forest and initiating discussion on post-fire management. In 1997, this forest was subject to a 12,540 ha fire, burning to within 6 km of the village (Bordeleau, 1998). Of the burned area, 62% was subsequently salvage-logged from 1997 to 1998 (Jerome (Norbord), personal communication; Laprise (Tembec), personal communication). A number of ecological research projects had been initiated to assess the effects of fire and salvage-logging, ranging from a comparison of their effects on bird populations to those on nutrient cycling (see Purdon et al., 2002). At the conference, results of ecological research were first presented and participants were asked to identify subjects of further research; then, representatives from government, industry and a local agro-forestry co-operative spoke of the socioeconomic implications of fire and salvage-logging before engaging in a more open discussion (see Bourassa et al., 2001). Social issues raised at the conference were the poor quality of burned dead trees (snags) set aside from salvage-logging for use by local residents as fuelwood as well as the hope of conducting an organic blueberry co-operative on sections of the burned forest area, already under license to industry.

In lieu of a full discussion, a question on Nature was included in a survey issued at the end of the conference

asking participants ($n = 38$) to identify elements as a part of their definition of Nature. These ranged from the fire and salvage-logging operations, to specific local landscape features, people and regional and provincial institutions (Appendix A). Responses were subjected to correspondence analysis ordination (ter Braak, 1991) and are presented in Fig. 1. Ordination is a multivariate statistical technique developed to visualize the variation between objects (in our case, participants) based on similarities in their descriptors (in our case, responses) (Legendre and Legendre, 1998). It proceeds by calculating resemblance measures (scores) between participants based on their responses, and projecting these onto a scatter plot. To be meaningful, this plot is based on axes that account for the largest, statistically independent fractions of variation in the dataset. It should be noted that there are as many axes as there are responses; however, ordination proceeds by identifying the largest source of variation in the dataset (axis 1), with successive axes accounting for statistically independent, yet progressively smaller fractions of the total variation. Thus, the position of participants (circles) in Fig. 1 can be interpreted as their resemblance to one another in terms of the two largest, statistically independent trends in variation in the responses (axes 1 and 2). The closer two participants are together, the more similar were their responses. The scatter plot of responses (letters) that is overlaid indicates which types of answers were associated with which participants.

The pattern emerging in Fig. 1 supports the Nature–Society dualism. The first axis of the ordination, accounting for the largest amount of variability, demonstrates a polarity ranging from fire on the left to salvage-logging on the right. Curiously the response "yourself" was associated more towards the fire side of the spectrum. It could be argued that if fire and salvage-logging were placed near to one another in the ordination, then the social perception of these two were equivalent and, thus, that a certain agreement on a threshold of human impact that was deemed Natural had been obtained.

However, a prerequisite of a survey asking whether things are Natural or not is that Nature in itself exists. The legitimacy of this is questionable. Indeed, establishing Nature's ontological functioning via its communicative *re*construction leaves a certain feeling of chagrin after having *de*constructed it in previous sections. Morris (2001) has criticized communicative action on the grounds that Habermas's theory assumes truth-seeking to be the telos of reason. Imperative to a discourse ethic on the Naturalness of landscape features is a pretension to the validity of Nature. Participants in a discourse ethic need to orient themselves to a presupposed, social conception of truth so that their arguments have validity and so that they may be able to partake in the process to achieve social solidarity. In a discourse ethic on Nature then, participants need to believe in the truth of Nature to discuss and communicatively realize its ontology. Such a discourse is limited however to the Nature–Society dualism from the very start. This explains the polarized, Nature versus Society pattern evident in the ordination from the Val-Paradis case study.

4.2. Nature's non-identity

I believe that forest management needs alternatives to the Nature–Society dualism. An alternative method by which to apply ecology would be to refocus the communicative action in SFM discourse directly to sustainable development and its achievement in a specific social context. I believe this process requires two steps.

First and perhaps most difficult, in order to avoid the metaphysical false-start of the Nature–Society opposition, ecologists and forest managers should abandon the use of Nature as a referent in forest discourse. The concept of Nature should not be at the forefront of the debate, but rather the ecological systems which Nature represents. Ecologists and forest managers should therefore change their discourse in order to talk *through* Nature to the evolutionary context for which "natural variability" is a referent. For instance in the boreal, this would be to explain that a rich stand age–class structure is a characteristic not of "natural conditions" but of historical patterns of fire and other disturbance. The problem is that often Nature and historical context are used by ecologists to indicate the same thing. Though evolutionary context may be the intended meaning of Nature, the usage of Nature implies that people are still to be restricted in their interactions with these ecological processes in order that they remain Natural. Historical ecological context can be discussed in a manner that avoids this effect.

Secondly, in order to address the social aspects of forest management, ecologists and forest managers should explain why historical, evolutionary conditions would meet the needs of a particular social context better than alternatives whose results fall outside of these conditions. In other words, the conditions that characterize the evolutionary history of a region may not be able to support the sustainable development of its current inhabitants. There are a number of cases indicating that changes in forest management have been conducted in a manner that disregards local socio-economies (for instance, see Hildyard et al. (2001)). An alternative method of applying ecology in SFM would require that there be a communicative action to validate the ontological foundation, not of Nature, but that of sustainable development.

However, the term *sustainable development* has been criticized for being defined in so many ways that it has become meaningless and already appropriated by non-environmental interests (for example, Burda et al., 1997; D'Amato, 1996). This metaphysical dilemma might be better appreciated when considering the negative dialectic of Adorno, also of the Frankfurt School of critical theory and a prior mentor to Habermas. Morris (2001) argues that Adorno's theory can compensate for some of the inadequacies in the theory of communicative action. Negative dialectics is a philosophy that argues that in the process of identifying things,

we necessarily impress upon them a form recognizable to our consciousness. However, identification prevents us from knowing the *thing-in-itself* because it severs us from the residue of that which we are unaware, the thing's *non-identity*. To make an analogy to science, negative dialectics is similar to Heisenberg's uncertainty principle whereby the act of determining the momentum of an electron precludes the possibility of knowing its position and vice versa. With negative dialectics in mind we can understand how Marco Polo identified rhinoceroses as unicorns (Eco, 1999); the process of *knowing* is culturally based (Haila, 1999a).

The difficulty encountered in the term *sustainable development* indicates that it is akin to this notion of non-identity, implying a base that is continuously deferred by time, context, and point of view—a critical remainder always remaining open to reinterpretation. It is precisely this plurality which permits sustainable development to assemble several different, often competing, points of view (Lélé, 1991). Rather than being avoided however, the uncertainty implicit in sustainable development must be pursued "not to resolve it, but to bring forth an awareness of *why* it brings forth its difficulty" (Morris, 2001, p. 132). In such a communicative forum, a scientific ecological discourse would be just one of many voices of reason discussing SFM, but a reason still grounded in objective ecological results.

4.3. A community-based forest ecosystem management

There are also important sociopolitical implications of a deconstructed Nature. Most fundamentally, when the distinction between Nature and Society is collapsed we realize that when decisions are made that affect Nature, they will also affect Society. But I am here caught up in the language of dualisms. Rather, the interpretation being sought here is not that the two are inter-related, but that Nature and Society are not distinct categories of things. It is one system. Thus, an impact at one part will necessarily have effects on another part. In other words, in all our decisions, we are deciding for them *both*: ourselves and the ecosystem. It is important to emphasize that it is we humans who decided what is good or bad: "[environmental] deterioration is defined according to human criteria" (Haila, 1999b, p. 338). Thus, who can participate in these decision-making procedures, and what powers and incentives they have, will determine what level of impact *is* acceptable. Changes in the manner by which ecologists and forest managers discuss ecosystem management must be conducted in concert with concrete changes in the institutional structure of forest management.

Habermas's project has been criticized as utopian because it imagines communication free of power relations, thus ignoring the capacities that ineluctably bolster one agent's arguments over another's (i.e. interest, research and development, training, experience in the procedural mechanisms, etc.) (Tully, 1999). A community-based forest ecosystem management, which requires a transfer of power and thus responsibility and incentive to local communities while making full use of scientific understanding of ecosystem processes, may serve as an ideal institutional structure to overcome the estrangement of humanity from the environment.

A lack of local involvement in resource management has been recognized at the international level as one of the fundamental obstacles to sustainable development (WCED, 1987; UNCED, 1992). Public involvement in forest management is important in the Canadian context because the majority of forest land is under public, provincial jurisdiction (Hogg, 1996). For instance, in Québec ninety percent of the forest land base is provincially owned Crown land (MNRQ, 1994). As in other provinces, forests in Québec are primarily managed for wood production by a tenure system whereby the provincial government grants public land to forest companies. The result is a transfer of management responsibility from the state towards industry, where it ultimately assumes the function of owner (Brochu, 1990).

Over the past decade there has been a considerable increase in public participation in forest management across Canada, an opening of the forest policy network (government, industry and labour) to the greater forest policy community (Ross, 1995). Following other provinces in Canada, Québec has recently modified its legal framework[1] so that members of the public have a better opportunity to participate in the development of forest management plans themselves. However, public participation in such plans may be insufficient to influence important decisions at higher institutional levels which determine land allocation, volume quotas and financial structures imposed by government and corporate bureaucracies (Sizer, 2000; Desjardins and Monderie, 1999; Burda et al., 1997).

As an institution, community-based forest management is still highly marginalized in Canada. In Québec, for instance, of the 448,928 km^2 of productive forest public lands, 69% are allocated to industrial tenure, and 30% to forest reserves where forest production is prohibited (MNRQ, 2000, p. 7). Only about 1% of this land base is allocated to Forest Management Contracts, which are forest lands granted to public organizations such as municipalities (ibid.). Burda et al. (1997) report a similar distribution for British Columbia. There is thus little incentive for local residents to be involved in resource planning.

In reference to community-based resource management, one cannot avoid Hardin's (1968) influential *Tragedy of the Commons*, important in that it redirected the focus of management from technical fixes to management itself. But the tragic message, that common property would be over-exploited by individuals seeking to maximize their personal gains, has been challenged in recent years (Gibson et al., 2000; Feeny et al., 1990; Berkes et al., 1989). The basic hypothesis is that when communities have a communal, yet private ownership of a resource, more care will be

[1] Bill 136: An act to amend the Forest Act (L.R.Q., c. F-4.1) and other legislative provisions. Assented to May 23, 2001. Ministry of Natural Resources, Québec, Québec Official Publisher.

given to its sustainable management because they have a vested interest in its maintenance.

This is not to say that there are not important challenges to be met in community-based forest ecosystem management. Indeed, a number of authors have attested to an incongruence between the optimism for community-based forest management in academia and its realization on the ground (Agrawal and Gibson, 1999), in both developing (Campbell et al., 2001) and developed countries (Kitchen et al., 2002). A criticism common to these studies is that common property models are based on "design principles" that do not account for the context-specific realities of resource management. In addition, some authors have questioned the legal and political legitimacy of public participation in forest management, which has the potential to erode the power-base of elected governments, and the silent majority they represent, to the benefit of more vocal special interest groups (Côté and Bouthillier, 1999). Others have criticized participation on the grounds that it is easily appropriated by higher-level institutions to achieve their desired ends (Hildyard et al., 2001), that it is a form of "empowerment" impressed on participants and that induces conformity (Kothari, 2001), and that it results in abnormal group behaviour of participants (Cooke, 2001). It is clear that the conditions for legitimate, sustainable community-based ecosystem management will need to be better understood so that it leads to real empowerment and solidarity. Rather than discrediting a community-based forest ecosystem management approach, however, these criticisms indicate that forest research needs to be co-developed and shared with local residents in order to be meaningful in specific contexts. An ecology that does not discriminate between Nature and Society is required to facilitate this communication. As such, community-based forest ecosystem management appears as a promising vehicle for ensuring both a broader responsibility and greater incentive for local residents to be engaged in SFM. It may thus be a concrete way to address the disadvantaged socioeconomic status of rural regions (for Québec see Dugas, 2000).

5. Conclusion

It has been the goal of the first part of this article to identify the effects of power produced by the concept of Nature, these being divided between metaphysical and sociopolitical consequences of the Nature–Society dualism. In the second part I have argued that only a postmodern modification of forest-related communication and institutions can address both of these consequences simultaneously. In doing so, I have developed and then discarded a discourse ethic on Nature itself in favour of one on sustainable development. This requires a change in the way ecologists and forest managers communicate research to interested stakeholders. However, institutional reform is also necessary in order that ecologists and forest managers might better engage with civil society. This would be best addressed through the institutional structure of a community-based forest ecosystem management: management based upon the sustainable development of forest resources by local residents, where scientific knowledge would be co-developed, used and applied via a communicative discussion of objective ecological research.

This conclusion is similar to the knowledge–practice–belief system that underlies Traditional Ecological Knowledge (TEK) systems in indigenous cultures (Berkes et al., 2000, p. 1252) where:

> there is a component of local observational knowledge of species and their environmental phenomena, a component of practice in the way people carry out their resource use activities, and further, a component of belief regarding how people fit into or relate to ecosystems.

In community-based ecosystem management, local observational knowledge (science) would be provided by local residents working along with forest ecologists, practice (management) would be organized and carried-out by local residents in cooperation with forest managers, and it would be based on a belief system where the forest is not the *Other*. Regarding the belief system of indigenous cultures, it is important to note that the Nature–Society distinction is absent from indigenous cultures: what was recognized in the West as a harmony between Nature and Society in these cultures is now understood rather as their lacking any notion (and thus distinction) of the two (Latour, 1999). As such, ecosystem management as currently advocated interferes with the development of TEK by local residents in non-traditional communities.

The lack of the Nature–Society dualism in indigenous cultures is an important insight as it shows that the holistic solution envisioned here has a parallel in many indigenous worldviews. Though it is misleading to say that all indigenous cultures have practiced sustainable resource management, this suggests that one of the main distinctions between traditional and non-traditional resource-based communities is the concept of Nature and the power hierarchy that accompanies it. Given the above criticism of this power hierarchy, indigenous disquiet regarding the use of ecosystem management in natural resource management appears justified. In Canada, for instance, First Nations have expressed concern about it being a technology used to control the forest, a philosophy in contrast to their vision of a mutual relationship with the environment (Stevenson, 1999).

However, with the rapid loss of indigenous languages and cultures it is feared that there is also a great loss in the diversity of perspectives on the environment and on culturally specific land uses (Nabhan, 1995). This is a regrettable situation, given that there is now surprisingly large agreement among researchers that to solve the Nature–Society dualism "we need a new language, that we need new metaphors and categories!" (Gerber, 1997, p. 1)—we need new ways of thinking for sustainable forest management that avoid binary oppositions, the separation of the dancer from the dance.

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Appendix A. Of the following elements, which according to you are a part of Nature? (you may encircle several)[2]

• The forest	• Covered bridges	• Fishing
• Forest roads	• Blueberries	• Hunting
• Yourself	• Salvage-logging	• Fire
• Ecosystem management	• The university	• This survey
• Municipalities (Ville-bois, Val-Paradis and Beaucanton)	• Your house	• Montréal
• Farmland	• Erratic block features	• Lac Pajégasque
• Everything (all is natural)	• Mines	• Game
• Planted seedlings	• Blackbacked woodpecker	• Lichens
• Stumps	• Forest fire control service	• Other
• Nothing (nature does not exist)		

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[2] The responses of two participants who only circled "everything" and "nothing" were removed completely, one of them being the author and the other a colleague. For participants who encircled "other", these responses were not included in the final analysis, though other listed responses by these participants were still used. Unfortunately, such creative responses tended to be highly specific and difficult to compare with other, standard responses.

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