

Valuation of Nature in Conservation and Restoration

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Abstract

Valuation of nature is an important aspect of nature conservation and restoration. Understanding valuation in a broad sense may contribute to conservation strategies since it may lead to better support from society. In this article we propose a model of valuation with respect to conservation and restoration of nature. According to the model, valuation of nature can be characterized by a "valuation approach," consisting of ecological, ethical and aesthetic perspectives. Such an approach includes scientific and normative aspects and leads to a particular claim of conservation. In this paper we discuss different perspectives, and accordingly, we sketch three main types of these valuation approaches. Political and policy issues with respect to nature conservation and restoration are considered in terms of this model.

Key words: ecological restoration, nature development, nature conservation, nature valuation, valuation approach, ethics, aesthetics, politics.

Introduction

The main strategy of most conservation organizations and agencies has always been the establishment of nature reserves, often in combination with internally and externally directed maintenance efforts. Recently this strategy has been extended to include eco-

logical restoration (MacMahon 1997). According to the Society for Ecological Restoration, ecological restoration is "the process of assisting the recovery and management of ecological integrity." Ecological integrity is related to biodiversity, ecological processes and structures, regional and historical contexts and sustainable use (SER 1999). Ecological restoration thus may be considered as human intervention to recover nature's integrity which is considered to be threatened or even absent because of human activities such as agriculture, industry, mining or recreation.

Hobbs and Norton (1996) distinguish four types of ecological restoration. First, the intervention aims at the rehabilitation of ecological disaster areas such as old mines and industrial fields. These measures often consist of substituting, removing or isolating the polluted soil, improving water quality and taking measures for the introduction of organisms. A second type of restoration is directed at increasing the production capacity of degraded production land. For example, afforestation can help prevent erosion and inundation can lead to desalinization. A third type of restoration is the improvement of the quality of existing nature reserves or protected landscapes. For example, sod may be removed or burned periodically in Dutch heath reserves to ensure the heath's preservation since sheep grazing is no longer economical. The fourth type of restoration is the enhancement of nature conservation quality in semi-natural production landscapes. These cultural landscapes may contribute to biodiversity because of their characteristic biocommunities and species. Moreover, as was stressed by Naveh (1998), cultural landscapes demonstrate a valuable and sustainable form of interaction between man and nature.

An activity, strongly related to ecological restoration, is the creation of new natural areas from non-natural, often agricultural land. The ecological goals are often ambitious: the newly created nature reserves have to evolve to natural areas that once—often before human settlement—were present there, or that could be there on theoretical grounds. This latter situation occurs when a restoration project is located on a place that was, for example, recovered from the sea. The reference system in such cases is based on ecological principles, soil type, climate, and so on. In the Netherlands, the creation of such completely new nature reserves has been labeled (sometimes *large-scale*) *nature development*. In this essay we interpret nature development as another type of restoration.

Because nature development implies the creation of totally new nature, issues such as "What is nature?" and "Why do we want nature?" often arise. Moreover, nature development easily leads to social conflicts because it strongly influences the local region in which the new reserve is planned. This is perhaps especially true

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for densely populated countries like the Netherlands, although such conflicts are not restricted to this country (Light & Higgs 1996; Pfadenhauer & Grootjans 1999).

In this paper we develop the concept of "valuation approach" as a descriptive model to characterize valuation of nature, especially in relation to nature development, but also to restoration and conservation. It may help to understand other perspectives on the meaning of nature. Biological or ecological conditions appear to be not the only factors determining the success or failure of nature restoration and conservation projects. The socio-economic circumstances and the perceptions of nature by people involved are often key factors in the long run (Higgs 1997).

Societal Aspects of Nature Development

Nature development may be considered to be a proactive, rather than a reactive, strategy of conservation since its primary goal is not to protect, but to extend, natural landscapes. This strategy has gained much attention from policymakers, as is demonstrated by the Dutch Nature Policy Plan of the Ministry of Agriculture, Nature Management and Fisheries (LNV 1990), a pivotal document in Dutch nature conservation policy. Conservation policy in that document is defined as the sustainable conservation, rehabilitation and development of nature and landscape. An important element of the plan is the realization of an ecological network to connect fragmented core areas and new reserves. The plan is to create more than 50,000 ha of new natural areas within 25 years. Hundreds of nature development projects have been started since the plan was adopted. Some projects consist of a few hectares, some of thousands. In densely populated areas, converting production land into natural areas can significantly affect current land use. The socio-economic position of farmers may be changed. They would be required to move to other areas or be severely limited in their land management and possibilities for expansion. The local economy may, therefore, change rather dramatically. Moreover, many local people might feel that the cultural identity of the region was endangered. Such an identity is often derived from current and historical utilization of the land. In the Netherlands, past reclamation and embankment efforts have contributed to the Dutch identity. Many people appreciate the resulting man-made farmland, recovered from the sea, because it reflects the historical struggle against that hostile sea, as well as a modern lifestyle and social progress.

Nature development projects may, therefore, meet opposition and criticism from different groups: farmers' organizations, landscape architects, archaeologists and citizens. Often, the announcement of such plans leads to the articulation of competing perceptions and

views of the desired nature and landscapes. It is important to understand such views; otherwise the process of restoration may easily stagnate because of social conflicts.

Elements of Valuation

The starting point of nature conservation is that nature is valuable and worthy of protection, preservation, restoration and even development. In general, valuation is related to three classical, philosophical questions: what is true, what is right and what is beautiful? Corresponding classical disciplines are epistemology, ethics and aesthetics, respectively. Nowadays epistemological perspectives are usually replaced by scientific perspectives, and in the case of nature management, by ecology. However, this does not rule out valuation as an important factor. In order to disentangle valuation aspects with respect to nature development, restoration and conservation, we will discuss some main perspectives from within ecology, ethics and aesthetics.

The Ecological Perspective

As in most other disciplines, competing research programs exist in ecology. Perhaps because of its complex object of study, ecology seems to have even more room for different scientific claims and competing views of presumed key structures and processes, as compared to many other sciences. As a consequence, ecology is strongly institutionalized into different disciplines, traditions and paradigms. This has consequences for the practice of nature restoration, which is often guided by ecological considerations and historical references. This latter term refers to former ecosystems that function as exemplars in the practice of restoration. Even when restorationists agree about the period that they intend to reconstruct—often the period before human settlement—there may be disagreement about how such a situation should look and whether a reconstruction is possible. The idea of indeterminacy has been strengthened since the view of nature in balance has been countered by the view of nature in flux, stressing the continuous change of an ecosystem (Botkin 1990; Pickett & Parker 1994). As MacMahon (1997) put it, restoring ecosystems is like shooting at a moving target.

Different ecological paradigms may thus lead to different ecological descriptions and different guidelines for the practice of restoration and conservation, at the level of species, populations, communities and ecosystems. As an example, in the 1990s some ecologists in the Netherlands attacked the dominant ecological idea of succession of plant communities leading to a natural climax vegetation stage. For a sizeable part of Europe, this succession would lead to a closed forest system that

would not seriously be affected by large herbivores. Instead of this approach, it was proposed that under natural circumstances large herbivores and "catastrophes" such as drought, flooding and storms often determine the structure and dynamics of natural vegetation, resulting in park-like landscapes. The adherents of this latter theory proposed a radical shift in nature management that was less focused on plant communities and particular stages of succession. They paid much more attention to large natural areas and promoted the occurrence of natural processes as drought, flooding and grazing by large herbivores (Vera 2000).

In nature development and restoration projects, different disciplines may be involved. Relevant ecological disciplines are population biology, community ecology and ecosystem ecology. Autecology, synecology, landscape ecology and evolutionary ecology, stressing other aspects, may also be added to the list. These disciplines do not exclude each other but often differ in their views of the ecological benchmarks in the process of restoration. Thus, an ecosystem ecologist may stress the flow of energy and matter, whereas a community ecologist will probably stress species composition. Consequently, from an ecosystem point of view, biodiversity may be seen as a function of basic abiotic parameters, whereas community ecologists probably consider biodiversity to be a basic parameter in itself.

The Ethical Perspective

Ethics is primarily concerned with the question of right and wrong and may provide answers to the question of why we should conserve. The role of ethics is clearly demonstrated by leading ecologists. For example, Soulé (1985) proposed that the diversity of organisms, ecological complexity and evolution are good as ethical principles. Two important ethical positions—anthropocentric and ecocentric ethics—dominate conservation ethics (Callicott 1997; Oksanen 1997).

The anthropocentric view is related to consequentialism in which human action is considered to be good if positive consequences outnumber negative consequences. In nature management, this position is sometimes called *resourcism* (Oeleschlager 1991). Benefits of nature include material goods (food, fuel, medicines), services (recycling of nutrients, homeostatic regulation) and non-material goods such as scientific information and pleasure (Ehrlich & Ehrlich 1992). Disadvantages of nature conservation, restoration and development are limitations for human economics and natural threats such as diseases and dangerous animals.

The ecocentric view of nature does not primarily take the instrumental value of nature or the consequences of action as a point of reference but deliberates on human conduct itself, based on the principle of respecting the

intrinsic value of nature and its elements (animals, species, communities or ecosystems). This concept of intrinsic value admits that nature has a value for its own sake. The intrinsic value is often based on considerations with respect to the autonomy, self-organization and self-directedness of nature (Callicott 1997).

The concept of intrinsic value also has consequences for consequentialistic positions. If non-human entities are accepted as moral subjects, the deliberation will also include non-humans as moral subjects with interests. Both instrumental and intrinsic motivations for nature conservation may, therefore, often converge to comparable practices of conservation (Norton 1991). Callicott (1997), however, pointed out that the ecocentric position shifts the burden of proof from conservationists to those whose actions jeopardize nature.

A third position that can be distinguished is *stewardship* (Black 1970). This position is characterized by a principle of care pointed toward both human society and nature. Often, but not necessarily, it is related to a deity, as in Christianity and Judaism. Religion has been accused of being a cause of ecological catastrophes (White 1967) but is also considered to be a precondition for its solution (Baker 1996). A communitarian position may also be considered as stewardship since the quality of the community, including both humanity and nature, functions as the guiding principle of human conduct (Callicott 1989). Although the concept of intrinsic value often leads to the concept of care, they may also conflict. For example, cattle, beavers, birds of prey, etc., are sometimes introduced in restoration projects. Accordingly, the question is whether we have to leave them—as an ecocentric principle—to their own capacity to survive or whether we have the obligation to take continuous care of them because we were, and are, responsible for their introduction (Callicott 1989, 1997; Oksanen 1997; O'Neil 1997).

In summary, we define the ethical part of valuation in a broad sense, since it also includes religion and economics. Moral justification of human action may be derived from anthropocentric, ecocentric and stewardship considerations. It may be clear that, besides ecological considerations, ethical motives play an important role in nature development designs. One of the main issues is whether we should utilize newly created nature or whether we should leave this new nature to its own dynamics, not taking the economic profits that may be generated.

The Aesthetic Perspective

Besides ecological and ethical motives, nature and the natural landscape are valued for aesthetic reasons. Landscape painting and modern outdoor recreation are often based on the aesthetic appreciation of nature. In

nature development projects, the question may arise whether we should create attractive natural landscapes or not. Some argue that we must limit ourselves to realizing preconditions for the subsistence of endangered natural entities. In that case, aesthetic aspects are only coincidental side effects. However, although many conservationists and restorationists will admit that ecological and ethical considerations have a primary role in the valuation of nature, aesthetics may often underline ethical and ecological care (Callicott 1989). Nevertheless, aesthetic considerations often are not articulated.

An important distinction in aesthetics is between objectivist and subjectivist or cultural aesthetics (Sheppard 1987; Bourassa 1991). This distinction refers to the primary source of aesthetic judgement. According to objectivist theories, the aesthetic quality of an object is derived primarily from the object itself, whereas according to subjectivist theories, appreciation of an object is legitimized by its reference to a cultural domain of values. An important objectivist theory is the imitation or representation theory. According to this theory, the aesthetic value of an object depends on its agreement with reality (Sheppard 1987). The representation theory seems to be relevant for ecological restoration when it relies on existing or historical ecosystems as a reference. However, there is a big difference between representation in art and in nature restoration. Artwork as a representation is appreciated because the work of imitation itself has a high quality, even if the original object is considered to be ugly. Restored or created ecosystems and landscapes are primarily valued not as a piece of imitative work, but because of their resemblance to the reference system, which is in turn highly appreciated. This shifts the question to why the reference system—often, but not necessarily, pristine nature—is considered to be beautiful. One of the answers is given by another objectivist approach, the formal theory (USDA Forest Service 1974; USDI Bureau of Land Management 1980; Litton 1982). According to this line of thought, aesthetic objects have special qualities with respect to composition, pattern, texture, color and so on. Picturesque or scenic aesthetics can also be considered in terms of such an objectivist approach. Elements such as peaks, valleys and waterfalls, and manmade elements like cottages, are according to that view arranged in line with some aesthetic rules.

Subjectivist or cultural perspectives stress the appreciation of the meanings of the environment. According to this line of thought, aesthetic preferences have a symbolic and functional role and are socially transmitted (Bourassa 1991). Landscapes are preferred because they represent such valuable things as culture or the historical identity of a group. The historic and cultural landscapes in Europe are, for example, appreciated because they represent a long history and a way of living that

often seems to be lost (Naveh 1998). However, modern agricultural or even technological landscapes may also be appreciated from a subjectivist point of view because they symbolize modern life by stressing its technological functionality for humanity. In this latter case, we may better speak of functional aesthetics.

Current aesthetic theory is, however, developed for, and usually directed to, manmade objects such as artworks, buildings and gardens. The considerations discussed above may therefore meet the aesthetic experiences of conservationists and ecologists only partly. Some authors even question if aesthetic theory can be applied to natural objects (for discussion see Carlson 1981). However, in the works of many conservationists and ecologists (Leopold 1949; Soulé 1985; Callicott 1989), the aesthetic motive is clearly present. Carlson (1981, 1984) has proposed an aesthetic theory in which science plays a pivotal role. Saito (1998) recently reinforced this view. According to these authors, nature or the natural landscape is appreciated because we are able to understand it as an authentic identity where science provides us with information on the right categories of nature. Thus, according to this objectivist theory, nature is experienced aesthetically because it is recognized as an instance, a representation or a reflection of current ecological knowledge. Carlson has named this type of aesthetics “positive aesthetics.” Because of negative connotations to the term logical positivism, “science aesthetics” would be a better term.

In our preceding discussion on the representation theory in relation to restoration efforts, we posed the question of how to legitimate aesthetic valuation of restored ecosystems. It was concluded that the aesthetic value of restored ecosystems seems to be related to a reference area or to a way of living, which are in turn appreciated for formal aesthetic, historical and cultural, or functional reasons. Science aesthetics provides us with an additional answer. Both formal and scientific judgements assume theoretical knowledge and are, therefore, more expert-driven as compared to cultural or functional aesthetic judgements. The latter are more rooted in daily life.

Valuation Approaches

As we have discussed, valuation of nature is based on perspectives from ecology, ethics and aesthetics. Although many combinations of the positions stemming from these perspectives are possible, in practice we often find a few dominant valuation approaches. This is because such combinations should not be seen as independent, but rather as structured sets of theories, principles, values, facts and often habits and attitudes. They fit together; some elements may have a dominant role. For example, stressing the need for pristine natural land-

scapes from an ecological point of view is an important aspect of both ecocentrism and science aesthetics.

The matching of scientific, ethical and aesthetic elements raises the issue of how these elements are actually related. Although concerned conservationists and ecologists will often refer to ecological facts and theories when they stress the value of natural or semi-natural ecosystems, scientific information is not sufficient for a normative claim since "is does not imply ought." Moreover, as stressed before, an ecological perspective can often be characterized as a set of sometimes competing research programs providing different perspectives on conservation goals. This, and uncertainties with respect to theoretical and empirical data, undermine the scientific soundness for strong normative claims. To support a claim of conservation, normative principles or values are, therefore, needed. As an example, the Dutch Wadden Sea is an area with a high international conservation value (Olson & Dinerstein 1998). Dutch ecologists recently described the cascade consequences of suction-dredge fishing technology in this shallow coastal sea (Piersma & Koolhaas 1997). This fishing activity led to the probably irreversible decrease of a coastal bird, called a Knot (*Calidris canutus*). In subsequent discussions in the Dutch media, the authors pleaded for a ban on this type of fishing and referred to the so-called precautionary principle because of the inevitable uncertainties of this type of ecosystem research.

On the other hand, normative principles are often not applicable if there are no substantial data. Asserting, for example, that reducing biodiversity is morally bad is not enough to take action. Data on the consequences often appear to be needed in practical decision-making. Normative and scientific considerations often go together.

The entanglement of ecological, ethical and aesthetic elements should not be seen from a logical or causal framework but rather as converging premises and conclusions from different vocabularies. We have therefore labeled a particular arrangement of these valuation elements as a "valuation approach." How the convergence of the elements of such an approach actually occurs is worth studying within the field of "social studies of science" (Latour 1987; van der Windt 1995).

We will discuss three main types of valuation approaches, which should be seen as modes of thinking and acting rather than as a particular view of a social group or institution. These valuation approaches are paradigmatic instances of such modes. Intermediate positions are possible. To start with, we follow Christensen et al. (1996). These authors distinguish three categories of ecosystems: natural systems, semi-natural systems and intensively managed systems. Their approach elaborates on the influence of humans, inputs and outputs and the type of management, but not ex-

plicitly on normative aspects of ecosystems (Table 1). Normative approaches are elaborated by, among others, Worster (1977) and Schama (1995). Worster distinguishes an imperialistic and an arcadian view of nature. These imply, respectively, a strong utilization and sometimes a deterioration of nature, and a cautious or restrictive intercourse with nature. According to Schama, a pastoral and a primitive attitude toward nature can be distinguished. The pastoral view considers nature ideally as a more-or-less well balanced system including humans. According to the primitive attitude, the situation before human settlement should be seen as the ideal type of nature. If Schama's distinction is seen as a refinement of Worster's arcadian view, three normative positions result. We like to avoid negative connotations associated with the terms "imperialistic" and "primitive." Therefore we use as descriptive terms "wilderness approach," "arcadian approach" and "functional approach" for the normative counterparts of the three main ecosystem types distinguished by Christensen et al. (1996). We will discuss these systems in the following sections.

The Wilderness Approach

Important ecological concepts of the wilderness approach are ecosystems and food webs. Accordingly, biological and physical processes such as erosion, sedimentation, decomposition, photosynthesis, migration, predation and grazing are key features. They direct flows of energy and matter. Real nature is conceived as self-regulating nature with no or low human influence. Recreation and other activities are possible on a small scale and are not allowed to disturb the ecosystem seriously. Because of the importance of natural processes, relatively large areas are required. Therefore, nature and culture, especially modern agriculture, have to be separated. Utilization of nature is unimportant and often rejected. The ethical value of nature has an ecocentric flavor, meaning that nature in itself is valuable.

Aesthetic valuation is strongly determined by science aesthetics, stressing the value of authentic wilderness. Scientific research is significant because revealing and seeing the ecological mechanisms is considered a source of aesthetic appreciation. It provides us with "nature's story" behind the superficial phenomena. Therefore, the output of such systems (see Table 1) is strongly associated with educational or knowledge-seeking enterprises.

An outstanding example of the wilderness approach can be found in the mission statement of the Wildlands Project in the United States, stressing wilderness as extensive areas of native vegetation with viable, self-sustaining populations, free of any artifacts of civilization, where evolutionary and ecological processes can continue (Foreman et al. 1995). Even in a densely populated

Table 1. Valuation approaches as derived from ecosystem types.

Ecosystem Types After Christensen et al. 1996			Perspectives			Valuation Approaches
Ecosystem Category	Inputs*	Outputs	Ecological Perspective	Ethical Perspective	Aesthetic Perspective	
Intensively managed	high	manufactured products, food, water, pollutants, toxins	production ecology, population ecology	strong anthropocentric	formal aesthetics, functional aesthetics	functional approach
Semi-natural	moderate	timber, livestock, minerals, fish, fuel, ecosystem services	community ecology, population ecology	weak anthropocentric, stewardship	historic-cultural aesthetics	arcadian approach
Natural	minimal	recreational and educational use, ecosystem services	ecosystem ecology	ecocentric	science aesthetics	wilderness approach

*Inputs are energy and labor, matter (soil, water), etc.

country like the Netherlands, references to wilderness can be found. For example, in 1992 the World Wildlife Fund (WWF) announced the *Plan Levende Rivieren* (Living Rivers Plan). About 200,000 ha of new nature was planned around lowland rivers in this country (Helmer et al. 1992). These river systems have been canaled and diked intensively during the last few hundred years. This has led to fast-flowing canal-like rivers instead of the original wide meandering river systems with slow-flowing water, marshes, water meadows, open water and temporarily flooded areas. The WWF plan refers strongly to this former situation. Since about 1990 a few hundred nature development projects have been started in the Netherlands, and many of them were inspired by the wilderness view. Inner dikes were broken, clay layers were removed in order to restore gullies, fish passages were established and semi-wild cattle grazing was introduced (Barendregt et al. 1998). From the examples discussed, it follows that stakeholders of the wilderness approach can be found among different groups, including professional ecologists, conservation activists, policy makers and even engineers, illustrating that the wilderness approach is not exclusively connected to a clearly socially-defined group.

The Arcadian Approach

The arcadian approach refers to semi-natural and extensively used cultural landscapes where human influence is considered, under some conditions, to be a positive element because it may enhance biodiversity and may lead to a harmonious landscape. This valuation approach is related to community ecology, such as plant sociology, and to moderate human use of nature instead of self-regulation. Natural processes and human intervention are allowed as far as they contribute to the conservation of valuable patterns. Many of these landscapes can be found in Europe and have been used by humans for thousands of years. Recently, Naveh (1998) stressed the importance of preservation and restoration of such cultural ecosystems because of their cultural and biological values. In the Netherlands, the 18th- and 19th-century landscapes made up of moist grassland, bogs and heathland are the leading historical references for this type of nature conservation.

Proponents of this approach stress the cooperation between man and nature. This position—often called stewardship (Black 1970)—can ethically be qualified as weakly anthropocentric. Besides the value of nature itself, utilization and cultural-historical elements are important as far as they harmonize with natural values.

The aesthetic valuation may be qualified as subjective stressing the cultural or cultural-historical meaning of the landscape. Accordingly, estates and historical sites are important elements. The aesthetic and ethical evalu-

ation is not entirely expert-driven. Besides professional ecologists and landscape architects, amateur ecologists, amateur archaeologists and local people are also involved in its aesthetic valuation.

Nature conservation following this approach is a very influential type of conservation in the Netherlands as well as in the United Kingdom, Germany and probably in most Western European countries (Henderson 1992; Sheail 1995; van der Windt 1995; Ditt 1996). It also refers to the two types of ecological restoration we mentioned before: improving the quality of natural (and cultural) elements in cultural landscapes and nature reserves.

The arcadian approach can also be found within some nature development projects. An example is the *Plan Goudplevier* (Golden Plover Plan), named after the Golden Plover, a bird (*Pluvialis apricarius*) that once lived in the heathlands in the northern part of the Netherlands. This plan was announced by the main Dutch non-governmental nature conservation organization, *Natuurmonumenten*. According to this plan, a number of existing small heathlands will be extended to about 1,000 ha by buying arable land from farmers and developing a moderately open landscape with drift-sand, heathland and forest communities. Measures consist of removing the fertilized topsoil, digging pools for bog development, tree planting and water leveling. The plan aims at restoring the 19th-century cultural landscape on the Drenthian Plateau; this landscape consisted of sheep grazing on the heath fields, providing dung for small arable fields around the villages (Bakker 1989). As with the wilderness approach, proponents of the arcadian approach can be found among professional scientists (ecologists, but also, for example, archaeologists and historians), conservation activists and policy makers, but these people are often, but not necessarily, more associated with local interests. Engineers are much less involved since conservation management related to this approach relies much more on the traditional utilization of the landscape.

The Functional Approach

The third approach is the functional approach in which nature is adapted to the current utilization of the landscape such as modern agriculture, hydro-engineering and urban functions. Because of the conditions produced by human utilization, the resulting nature is often characterized by species that typically follow human settlement. Such sites sometimes function as typical species pools: for example, roadsides, production forests and meadow fields. Relevant ecological disciplines are population dynamics and production ecology. Conservation practices according to this approach have a long tradition in forestry in the Netherlands (van der

Windt 1995), Germany (Erz 1987) and the United States (Worster 1977), and can be found in Dutch water management as well. In Dutch nature policy, this approach has gained momentum in recent years through the strategy of "agricultural nature management" in which, under some conditions, farmers get paid for the specified nature elements they produce, e.g., breeding meadow birds or rare plant species (Buys 1995).

The functional approach is strongly anthropocentric and considers nature primarily as an economic resource or at least subservient to humanity. Formal aesthetics, emphasizing lines, colors, texture and so on, may flourish within this approach, since it is not the underlying scientific or historical-cultural meaning that counts for its appreciation. In addition, appreciation may reflect the fulfillment of functions for man and may, therefore, be labeled as functional.

In conflicts about the realization of nature development plans, functional forms of management may be put forward by farmers and citizens as an alternative position. This happened, for example, in Gaasterland in the province of Friesland in the northern part of the Netherlands (Vos 1995). The government planned a nature development area of 550 ha in order to enhance the local biodiversity. Arable land was to be acquired voluntarily from farmers. The reaction to these plans was a loud and emotional protest by farmers and other local people. They felt ignored, and accordingly, they stressed the beauty of the existing landscape that was established in historical and current use. The decision-making process stagnated and local farmers' organizations got the opportunity to design a nature plan according to their own insights.

Although wilderness approaches often have a dominant position in nature development projects, functional elements may easily move in when the aim of wilderness also has a meaning for human utilization. As an example, in the Living Rivers Project, recreation, clay exploitation and flood safety management were combined with nature development, making it "financially neutral" (Helmer et al. 1992). This makes clear that ecologists, representing the wilderness approach, can sometimes be found within functional circles and the reverse may happen as well. Generally, the functional valuation approach is associated with engineers, modern farmers and their representatives within policy-making institutions, and citizens who are primarily concerned about a green-looking environment.

Policy and Steering in Nature Restoration Projects

The wilderness approach may be considered the dominant valuation approach in nature development and often in restoration. Pristine, indigenous ecosystems and the occurrence of natural processes currently play an

important reference role in the definition of restoration as is shown by definitions of the Society for Ecological Restoration (Jackson et al. 1995; SER 1999). In many restoration projects, reference systems are derived from situations prior to human settlement. The Dutch practice of nature development is also characterized by an emphasis on wilderness concepts, ecological references, self-regulating ecosystems and the absence of land utilization, as is made clear in the Nature Policy Plan (LNV 1990) and its preparing documents, discussed above.

The practice of nature development demonstrates that arcadian and functional valuation approaches may easily move in during the process of implementation, especially when it is accompanied by social conflicts. From our examples, it can be concluded that ecological restoration according to the wilderness approach will be successful if functional interests do not compete and no opposition exists. In other words, nature development in densely populated areas seems only realizable if it coincides with other interests. Otherwise it needs strong advocates or top-down steering methods. The latter term refers to a type of policymaking in which a central actor (often the national government) assisted by experts and professionals, formulates endpoints and measures. Top-down or hierarchical steering requires the availability of political resources such as land ownership, finances and authority. The alternative steering method is consensual steering, in which several interdependent actors have only limited power. They are therefore forced to interact, to listen or to negotiate on measures, views and endpoints. Within this latter method, a strong central actor is missing or restricts its influence (Susskind & Cruikshank 1987; Glasbergen & Reh binder 1996).

As a preliminary conclusion, wilderness and, to a certain extent, arcadian approaches seem to fit best to hierarchical steering methods because the preferred type of nature is largely formulated and legitimized by experts, mostly ecologists. The aesthetic perspective of the wilderness approach is more or less expert-driven and its ecocentric ethical position does not easily fit into dominant anthropocentric views in society. The functional approach fits much more to consensual types of steering because restoration benchmarks are partly formulated by stakeholders.

Because of this, one may think that hierarchical steering is to be preferred having an ecological and ecocentric point of view in mind. From that perspective, social conflicts during the implementation of the project can be considered simply as an inevitable side effect of hierarchical steering. However, this kind of steering may lead to disadvantages from an ecological point of view. Often it leads to more partitioning of the potential natural space. This is the artificial splitting of a proposed natural area into different units with different types of

nature. Furthermore, by focusing on wilderness nature, the (potential) quality of nature outside these wilderness areas and the ecological network may easily be ignored. Moreover, and probably worse, opinions are also partitioned for a long time. Sticking to hierarchical methods in order to realize high ecological endpoints may be counterproductive in the long run. Higgs (1997) recently touched on this point and proposed a so-called "expanded conception" of ecological restoration. This concept aims at formulating evaluation criteria not only from an ecological point of view but also from economic (efficiency), historical, cultural, social, moral and aesthetic points of view. Good restoration is thus also a political issue that needs special types of decision-making. Nature development projects often need a deliberative form of decision-making where local participation and consultation are important elements. To be successful in nature management, especially in restoration and nature development, one should not pass over the positions and views of ordinary people who are involved. Knowing and respecting these views is necessary. It paves the way for respect for one's own point of view. It is important that conservationists and restorationists do not fall into the trap of ecological elitism, i.e. proposing the exclusivity of their own view of nature. Ecologists are surely the experts on ecology, but on nature there are many more.

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