



**The Art of Resilience:  
How current developments in the  
environmental art world can better  
inform and improve natural  
resource management**

**Clara Bird**

**Natural Resource Management,  
Governance and Globalisation  
Master's Thesis 2007:4**



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Supervisor: Per Olsson

This thesis is written to fulfil the requirements of the Master's Programme:

### ***Natural Resource Management, Governance and Globalisation***

a transdisciplinary programme held by the Centre for Transdisciplinary Environmental Research, CTM, at Stockholm University. The one-year programme consists of four courses and the writing of a Master's thesis on a subject related to at least one of the courses.

#### ***1. Philosophy of Sustainability Science***

Addresses the difficulties and opportunities in transdisciplinary environmental research. In lectures and seminars participants discuss methodological and epistemological issues such as explanations, causality, systems borders, and objectivity.

Held by the Department of Physical Geography and Quaternary Geology

Course leaders: Agr.Dr Thomas Hahn and Dr. Miriam Huitric

#### ***2. Natural Resource Management and Ecosystem Resilience***

Focuses on ecosystem capacity to generate life-supporting services, how different management approaches can affect this capacity, as well as which constraints and opportunities are offered by globalisation.

Held by the Department of Systems Ecology

Course leaders: Prof. Thomas Elmqvist, Dr. Jakob Lundberg and Henrik Ernston

#### ***3. Ecosystem Management: Collaboration in Networks and Organisations***

Investigates the social capacity to develop adaptive governance including arenas for collaboration and conflict resolution.

Held by the Centre for Transdisciplinary Environmental Research

Course leaders: AgrDr. Thomas Hahn and Dr. Fiona Miller

#### ***4. International Governance of Natural Resource Management***

Uses a macro-perspective on governance. The actors and social-ecological drivers of international regimes are analysed, using case studies that provide a historical and institutional context. Legal as well as normative perspectives are discussed.

Held by the Department of Economic History

Course leader: Dr. Åsa Vifell

More information on the programme is available at <http://www.ctm.su.se/egg>

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CTM aims to catalyse environmental research and promote environmental education across the faculties.

CTM is part of Stockholm University and complements the activities of the different academic departments. CTM is also in close cooperation with other Stockholm-based organisations and institutes conducting research in the environmental and sustainable development field.

CTM turns science into knowledge by spreading information about natural resources and environmental issues. We also offer seminars and courses on environmental and sustainable development issues.

Homepage: <http://www.ctm.su.se>

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## **1. Introduction**



(Ernest Daetwyler, »Forest Cell Sphaïres«[http://www.waldkunst.com/2006/wkp\\_de.php?WEBYEP\\_DI=2](http://www.waldkunst.com/2006/wkp_de.php?WEBYEP_DI=2))

Human activity is increasingly compromising the world's ecosystem services that we depend on for our survival. Essential resources are being depleted, there are increasing natural disasters, and we are reaching the limit of the world to absorb and purify the impacts of development and production (MEA 2005). These environmental issues can be described as wicked problems (Ludwig 2001) as they are characterized by high-stakes, complexity and uncertainty (Gunderson and Holling 2002). Solutions to these problems require holistic and integrated management and governance approaches (Berkes and Folke 1998).

Much of the literature attempting to address the increasing uncertainty and complexity of current environmental problems is still in the phase of discovery and generating questions, through connecting previously isolated disciplines (Folke et al 2002). It is, hence, an arena where the positivistic pursuit of deterministic models and causal relationships is problematic. A developmental approach to inquiry is better suited for new knowledge production in areas of great uncertainty (Sofaer 1999). This approach explicitly sees knowledge acquisition as a process of reducing uncertainty. It proposes that situations of high uncertainty necessitate, first, asking questions that in turn are used to frame more appropriate questions, eventually beginning to produce some answers. We can then move from the "context of discovery to the context of justification," (Sofaer 1999 p1103).

In keeping with the developmental inquiry approach, this essay approaches the challenges of adaptive co-management with an explorative mindset. The broader aim of the thesis is to reduce some of the uncertainty still attending adaptive co-management, by exploring some elements and competencies which feature in successful cases of its application. In particular, it wishes to illuminate and elaborate the role of artistic and cultural competencies in leadership of natural resources towards more holistic linked social ecological systems, by reviewing relevant literature and describing and exploring three recent cases of attempts to explicitly integrate art, science and practice in environmental art conferences, exhibitions and Ecoventions. It will seek to uncover necessary ingredients for successful transformation towards adaptive co-management regimes by focusing on the potential ability of artistic leadership to transform perspectives, attitudes and behavior through sensemaking, knowledge integration and stakeholder engagement.

## **2. Method and Structure**



(Pravdoliub Ivanov (Bulgarien) »Steg« – Installation [http://www.waldkunst.com/2006/wkp\\_artist\\_de.php?WEBYEP\\_DI=7](http://www.waldkunst.com/2006/wkp_artist_de.php?WEBYEP_DI=7))

The methodological framework used in this paper is based on the humanistic inquiry philosophy that consists of a series of beliefs about what is knowable, the way in which phenomenon become known and the criteria for evaluating what becomes known. These beliefs dictate that knowledge is constructed, researcher and phenomenon are mutually

interactive, research inquiry is directed towards the development of idiographic knowledge, phenomenal aspects cannot be separated into cause and effects and inquiry is inherently value laden. Therefore, the humanistic philosophy of inquiry requires participation on the part of the investigator and the construction of an interpretation of the phenomenon, rather than a positivist focus on cause and effect and measurable outcomes (Hirschman 1986). According to Kvale (1996), the positivist model of knowledge acquisition is based on the philosophical perspective that fact can be separated from human values and subjective judgment, and should be quantifiable, objective, predictive and unambiguous. The humanistic philosophy of inquiry reflects recent philosophical traditions, such as phenomenology and post modernism that stress the knowledge and reality are constructed (fact does not exist per say), and gauging the subjective position, view, or thought of people, cultures and societies is essential for developing interpretations and understandings that eventually lead to insight necessary for implementation of policy and governance (Kvale 1996). This philosophical perspective and consequent methodological approach are particularly relevant when researching areas of high uncertainty, as is the case in this paper.

This thesis is based on two sources of data. First, a review of secondary sources (literature review) focusing on adaptive co management, systems transformations, innovative leadership as well as ecological art movement; environmental art, 'ecoventions' and eco art. These art practices all use the natural environment as subject matter. Environmental art is anything with an environmental theme, eco art uses nature as a material, and ecoventions seek to change natural resources and natural resource management. There was a particular focus on site specific, public art, as it relates to the case studies explored here.

Secondly, in keeping with a humanistic philosophy, a case study approach was used to retrieve and analyze primary data. A case study approach as developed by Yin (1984), and elaborated by Sofaer (1999), seeks to illuminate specifically chosen cases through one or more intensive exposures to the sites. Data is collected through structured observations and interviews with key informants, which can range from a high to low level of

structure, but usually have opened ended questions (Sofaer 1999). The first case study, the Forest Art Convention was specifically chosen because of the integration of natural resource management with artistic practice. Based on the interviews from this case study, two other case study areas were chosen, The Third International Forest Art Path: Laboratorium, and the Ecoventions, as they appeared to offer more insight into the role of art and artists in transforming perceptions towards a more holistic conception of linked social ecological systems.

As the Forest Art Convention was opened to the public, information could also be gathered through observing the process without fear of influencing the proceedings or tainting the findings (Hirschman 1986). During the two-day conference, the author attended the lectures, taking notes and using an audio recorder, and participated in the activities. Over the same period, interviews were conducted with key informants. A loosely structured interview format was chosen in order to encourage the generation of ideas and questions (Sofaer 1999). Eight interviews were conducted with the following people participating at the Forest Art Convention: Ute Ritschel, Laurie Beth Clark, Nancy Langston, Aris Georgiades, Peter Fischer, Ernest Daetwyler, Darcy Kind, and Emily Blumenfeld. These interviewees were chosen because they were all speakers at the Forest Art Convention, and represented the four groups (artists, curators, academics and natural resource managers) asked to participate in the conference. The author also interviewed Jim Addis, a retired Wisconsin Department of Natural Resources official, because of his influential leadership in resource management. Interview length ranged from thirty minutes to an hour and a half. As stated, the interviews were largely open but were based around a series of major questions (see Appendix 1.1). All interviewees granted the author permission to use the findings in this essay.

This paper has attempted to meet the set of appropriate criteria for the validity of humanistic inquiry. These criteria are credibility, transferability, dependability and confirmability (Hirschman 1986). This paper sought to achieve credibility (findings are to be confirmed by interviewees), transferability (by comparing the findings with interpretations of similar findings from other contexts, such as UNESCO report),

dependability (by encouraging further research into these cases described above and comparing findings about ecoventions), and finally confirmability (by allowing other researchers access to transcripts and sounds recordings of my interviews).

Finally this paper recognizes the limits of the approach taken and the findings:

Limitations of methodologies: A literature review can always be more thorough and extensive. Given my subject matter, finding relevant articles proved challenging.

Literature was amply available on adaptive co management, transformations and environmental art, however linking scholarship, that combines or seeks to explore the possible relationship between these areas was almost none existent. Also, my source for adaptive co management and transformations was primarily works by scholars of the resilience alliance. A broader review could prove rewarding.

It is difficult to draw broad conclusions from qualitative interviews, particularly open, exploratory ones. The findings of this paper are based on the views of key informants, and cannot, at this stage, be generalized to the greater public. As academics, artists, scientists and managers, all interested in the link between art, science and management, their perspective is likely to differ from that of the majority. Although the participants emphasized and experienced the transformative powers of art and artists, future research using surveys and statistical analysis would make findings more applicable to a larger audience. More research must be done in order to draw firm conclusions

### **3. Theory section: a literature review**



(Jennifer Robin Angus (USA/Kanada) »The Necklace« – Installation [http://www.waldkunst.com/2006/wkp\\_de.php?WEBYEP\\_DI=2](http://www.waldkunst.com/2006/wkp_de.php?WEBYEP_DI=2))

The theory section of this paper is based on the notion that environmental art and artists may be able to inform and improve leadership towards adaptive co management and system transformation. To explore this notion further, a review of questions and uncertainties from the resilience, adaptive co-management and transformability literature is juxtaposed with possible responses and answers from the environment art literature.

### **3.1 Questions and Uncertainties in Resilience, Adaptive Co-Management and Transformability Literature**

In the face of population pressures, new technological advances and increasing complexity of global social, economic, and cultural dynamics, attempts to adequately manage natural resources, which have already been relatively unsuccessful, are facing the prospect of even greater difficulties (MEA 2005). In light of this, researchers have proposed new heuristics and management paradigms, which attempt to resolve these difficulties by recognizing that current problems of natural resource management are characterized by complexity, uncertainty and non linearity (Gunderson and Holling 2002). One of the most prominent of these is Resilience Theory: “resilience is the amount of change a system can undergo (its capacity to absorb disturbance) and remain within the same regime—essentially retaining the same function, structure, and feedback,” (Walker and Salt. 2006 p.164). The strength of this theory is that it particularly addresses problems of complexity and non-linearity and provides frameworks for thinking about practical management challenges under these conditions. “Resilience thinking can mean a shift in management policies away from trying to control change in systems viewed as stable, towards practices that attempt to deal with, adapt to and shape change in social ecological systems. Managing for resilience enhances the potential for sustainable development in a complex and changeable world,” (Folke et al. 2002).

Adaptive co-management is one management paradigm that has been identified as likely to increase resilience in complex social ecological systems (SES), wherein humans and nature are interconnected and interdependent (Berkes 2003). Based on a series of cases where researchers have identified what they have defined as successful examples of this type of management (Folke et al. 2005, Olsson et all 2004, Olsson et al. 2006, Hahn et al.

2006) a number of factors critical to successful adaptive co-management have been identified. These can be reasonably grouped as follows:

### **3.1.1 Sense making**

Sense making is used here as an umbrella term for factors that relate to building holistic (cultural, spiritual, philosophical, scientific) common understandings of social ecological systems that can be used to interpret knowledge and construct goals. This includes making sense of and guiding the management process, creating public opinion and vision and goals in comprehensive frameworks (Olsson et al. 2006), learning to live with change and uncertainty and nurturing sources of resilience and renewal such as social memory (Folke et al 2005), collaboration and value formation (Hahn et al. 2006) and sense making (Olsson et al 2004).

### **3.1.2 Knowledge management**

The knowledge management of adaptive co-management focuses on the importance of different sources of knowledge, for example scientific and local, and the effective communication of this knowledge between actors as part of a learning process about a given social ecological systems. It includes aspects such as synthesizing and mobilizing knowledge for ecosystem management (Olsson et al 2006), combining different types of knowledge for learning (Folke et al. 2005), generating and communicating ecological knowledge (Hahn et al. 2006) and information flow (Olsson et al. 2004).

### **3.1.3 Engaging stakeholders**

This category includes those factors that encourage direct engagement of stakeholders in the processes of managing and stewarding social ecological systems. This includes encouraging and supporting actors in voluntary participation, performing monitoring and managing ecosystem processes for biodiversity and ecosystem services, initiating and sustaining social networks of key individuals and mobilizing social networks in problem-driven projects and providing arenas for collaboration (Olsson et al. 2006) and creating opportunity for self organization towards social ecological resilience (Folke et al. 2005).

### **3.1.4 Leadership and Transformation**

The above three factors have been highlighted as crucial to successful adaptive co-management. However the focus up to this point has been on their identification rather than on the specifics of their implementation as noted by Olsson et al (2004 p 87): “In this article we have initiated the search for essential features of the adaptive co-management features,” and Berkes (2003 p623):“It has become increasingly important to incorporate the dynamic interactions between societies and natural systems, rather than viewing people merely as “managers” or “stressors”. There is little agreement, however, on how this can be accomplished, conceptually or methodologically.”

One explanation that these authors *do* give for the successful implementation of these processes in their case studies is leadership. Leadership is viewed as encouraging and enhancing knowledge management, sense making and stakeholder engagement. Key individuals, in the case studies, are integral to all of these processes. As Olsson et al. (2006) argue, leadership can build knowledge and networks, reconceptualize issues, generate and integrate a diversity of ideas viewpoint and solutions, communicate and engage with key individuals in different sections, promote novelty by combining different networks experiences and social memories and promote and steward experimentation at smaller scales.

Recent findings have further shown that adaptive co-management on its own will not guarantee social ecological resilience if it is not accompanied by an understanding of how to transform the management regime of the systems that are locked into patterns where ecological, economic or social conditions makes the existing system untenable (Olsson et al. 2006). The process of transforming a system involves a number of additional elements necessary for successful natural resource management. Amongst these elements, changing perceptions and generating ideas are considered particularly important. Folke et al. (2002) suggest that the transition to sustainability derives from fundamental change in the way people think about the complex systems upon which they depend, “Thus a fundamental challenge is to change perceptions and mind-sets, among actors and across all sectors of society, from the over-riding goal of increasing productive capacity to one of increasing adaptive capacity, from the view of humanity as independent of nature to

one of humanity and nature as co-evolving in a dynamic fashion within the biosphere (p. 12). As this quote suggests, such transformation of perceptions can involve the larger society as well as the local context. Again, the specifics of how to achieve this have not yet been fully explored as noted by Olsson et al. (2006 p. 18): “These findings represent a first step in improving our understanding of [social ecological systems] transformations.” All factors mentioned above may be viewed as necessary ingredients in a recipe; what is lacking are the instructions about how to recreate the final product, instructions about the *process*. Although these studies clearly illustrate instances where leaders were able to promote and implement adaptive co-management, this paper argues that more exploration (and questions) should be devoted to how particular processes encourage or strengthen the emergence of truly creative leadership or how to nurture these components of good leadership to ensure system transformation.

This paper particularly hopes to shed some light on these processes by looking to the current development in the world of environmental art. Like the theories and practices mentioned above (generated by the scientific and management disciplines), the environmental art movement also seeks to redefine the relations between humans and the environment in order to allow for a sustainable future. This paper will explore relevant literature as well as three cases of projects in environmental art, which bring together science and art in new ways. The scholarship on environmental art, eco art and ecoventions also explores the components of successful leadership (knowledge management, sensemaking, engaging stakeholders) necessary for the transformation more holistic social ecological system, particularly emphasizing the leadership role artists and their art can play in accomplishing these tasks by changing perceptions and worldviews towards more integrated and sustainable outlooks. By emphasizing culture, creativity, transformation and artistic medium, they may offer helpful insight into the instructions for our recipe.

It is interesting to note that Sven Erik Magnusson, the key leader in one of the most cited examples of successful adaptive co management and transformation (Hahn et al. 2006) was himself a museum curator and used the Eco-museum in Kristianstad as a platform for learning and engaging stakeholders. The importance of using a cultural forum, artistic medium, such as outdoor displays, and artistic leadership to achieving such aims has been

largely overlooked in the conclusions drawn from this case study. In this paper, issues such as these will be considered and discussed in greater depth in order to gauge their significance for successful natural resource management.

### **3.2 An Artistic response and beginning the dialogue: Including environmental art and artists in adaptive co-management**

*“We employ a method that puts our propositions in a conversational form, often poetic. The reasons are many. For instance, the conversation we begin, and often evolve in elaborate ways, can then be more easily adopted by others. Thus it can drift away from us and develop a life of its own. It can also, on occasion, drift back. Conversational drift is a useful way that we have found to describe or, indeed, encourage diverse outcomes for any work” (Helen and Newton Harrison-2007).*

In this section of the paper I shall present a response from literature on environmental and eco-art to the adaptive co-management and transformability concepts I have described in the last section. This section of the paper seeks to gain insight into these processes by reviewing scholarship on environmental art, eco-art and ecoventions, wherein the transformative, engaging, and integrating capacities of the artistic leadership and mediums are emphasized. By so doing, I hope to initiate a dialogue between these bodies of knowledge, with the aim of increasing our understanding how to achieve the mutual aim of transforming the way people think and interact with the natural world. I shall organize the ideas presented here as a conversation, in an attempt to encourage conversational drift as described by the Harrisons in the quote above. It is the hope of this paper to stimulate new linkages and connections between these disciplines that may evolve over time and with more research. Similarly, the notions and ideas of this section are an attempt to further the developmental inquiry, and shed light to the questions and uncertainties from previous literature section.

### **3.2.1 How can the inclusion of environmental art and artists help leaders in sensemaking, so important to transformation?**

Sensemaking is highly dependent on culture. It is our cultures which frame our experience and help us to make sense of past, present and future experience (Berry 1992). This artistic voice is often considered the representative of culture (Sanders, 1992), and thus can be instructive and useful to natural resource managers. As Jackie Brookner states:

*“Art affords us the opportunity for experiencing not only through logos, but directly through the body and the unconscious. Art, like dreams, has the capacity to bring unconscious contents to consciousness. As these surface, art can help us find new physical images, so that we can collectively see, articulate, and integrate what has hitherto been denied or unimagined, and can trust experience the world and ourselves more intimately,” (Bookner 1992 p. 10).*

In order to engage stakeholders, using the cultural context is essential (Hahn et al. 2006). As Fritt et al (1995) state (in the context of wolf recovery projects): “Many recovery issues are perceptual, having more to do with deeply held personal values about the government, outside influences, people’s relationship to ‘nature,’ and the political role of special interest groups than the wolves themselves” (Fritt et al 1995 in Jacobson 1998 p. 624).

The concept of joint social-ecological systems hinges on a notion that social and ecological systems are mutually interacting and interdependent. It recognizes the historical and ongoing relationship between people and the land. Social systems are deeply affected by their cultures. Thus, an understanding of culture is necessary to understanding the complex workings of social ecological systems (Berkes 2003). In her book *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland*, Nancy Langston explores the history of forest culture. She argues that the ways we view nature, be it frightening, chaotic, sublime or mundane, affects the way people interact and manage it (Langston 1995). As such, art may stimulate a more holistic, instead of purely rational, response. It speaks to emotionality, spirituality, morality and philosophy (Gablik

1992). This is important when trying to encourage participation and collaboration, and when trying to get people to change their behavior and may be more successful than overwhelming people with scientific information (Jacobson et al 2007). The cultural values of nature, be they aesthetic, spiritual, or purely entertainment are emphasized in order to create a more holistic vision (Curtis 2003). Environmental artists and art works are in a unique position to reveal these important inclusive cultural implications (Berry 1992), which in turn may make for more appropriate and accurate management.

### **3.2.2 How can environmental art and artists help leaders to manage and integrate different kinds of environmental knowledge?**

Adaptive co management literature asserts the necessity of integrating various knowledge sets when trying to understand complex social ecological systems (Olson 2004).

Environmental art and artists may be particularly adept at these processes because of their capacity to incorporate cultural knowledge as well as the use of artistic medium itself in integrating knowledge forms. Natural resource management dominated by scientific expertise has proved limited in its ability to grasp how complex systems function in the present and the future (Folke et al 1998). The inclusion of local knowledge has been one of the major requisites for any adaptive management strategy. Usually this knowledge reflects local practices and understandings of environmental dynamics. The merger of local and traditional knowledge with scientific knowledge has decidedly improved management practices (Berkes 2003). Despite this, there is a recognized need to include other knowledge sets, in order to allow for a more complete picture of complex social ecological systems. Incorporating cultural knowledge is prioritized but has only been explored to a limited extent in this literature (Hahn 2006). Further, as noted in the theory section, the mechanisms that encourage knowledge integration can also benefit from further illumination.

Agnes Denes, art critic and practicing art, has worked extensively in merging scientific and artistic forms and feels their intersection allows for a novel and more humane understanding of the natural world:

*“When art renders into visual form these analytical processes [of science], the hybrid becomes the script in a new language of seeing and knowing: a summation*

*and dramatization of new associations and analogies. The powerful tools of this new science can this be enhanced by equally powerful tools of artistic vision, image and metaphor, which become expressions of human values with profound impact on our consciousness and collective destiny,” (Wayne et al. 1992, p.35).*

As argued earlier, art reflects culture, and consequently the use of artists' vision and the artistic medium also enhances cultural knowledge about social ecological systems. By including art into scientific understanding, concepts, models and theories are restructured and remodeled to reflect a broader scope of our existence (Wayne et al. 1992). This may be because the addition of art incorporates imbedded cultural information, essential to our comprehension of reality. Often in the context of natural systems this translates into incorporating spiritual and aesthetic values back into our understanding of social ecological systems (Curtis 2003). Many artists working in environmental art movement, using interdisciplinary knowledge, are seeking to resolve the conflict between humans and nature by highlighting aspects of the environmental thought that are not purely utilitarian. “Artists working directly with ecosystems do so not as scientists, but as artists from a desire for wanting to tap the transforming power of levels other than rational,” (Bookner 1992).

The use of the artist medium may also prove an effective and useful tool for knowledge integration. There is evidence that visual representation, in all its forms, has a unique communicative power, with particular impact on retention of information, emotional response and engagement. Mintzberg and Westley (2001), note that participants are much more emotional in their response to visual imagery as opposed to verbal analysis. Also comprehension is often increased (Jacobson et al. 2007). Scientists have demonstrated that people retain and understand new information much more if it is imbued with emotion, and not simply factual information. Moreover, facts alone are less likely to result in change in behavior and response in the short and long term (Cable and Ernst 2003; Levinthal 1988). Visual and artistic imagery is very accessible to people, and can promote motivation and understanding in many people (Jacobson et al. 2007). In this way it is very different from scientific and management rhetoric which is often inaccessible

and alienating (Withrow-Robinson 2002). Often, many news ideas are stimulated by the use of these tools, which in turn leaders may use to ascertain the correct way of proceeding (Mintzberg and Westley 2001).

### **3.2.3 How can the inclusion of environmental art and artists increase stakeholder engagement?**

As early as the 1950s, English writer Colin Wilson was appealing to artists to forgo modernist detachment in favor of actively seeking to restore a metaphysical consciousness to the age (Gablik 1992). This sentiment has been echoed by Suzi Gablik, who views restoring awareness of the human-nature relationship as a spiritual and political challenge, one in which artists will play a key role by affirming our deeply imbedded connection to the earth (Gablik 1992). The important role that artists and art play in sense making and knowledge management likely increases stakeholder engagement and participation as well, by creating culturally relevant visions and knowledge as elaborated above.

Further, many of the current artistic endeavors in the environmental art movement encourage direct public participation in their conception, formation, and completion. Thus stakeholders are included in the art making process, be it in clearing a field, picking up garbage, writing poetry, giving feedback or simply playing (Jacobson 2007). This creates a communion with the art object, a sense of belonging and ownership and motivates further participation. In the case of environmental site specific, public art, where the subject matter is almost always the natural world, this means people are building (or rebuilding) a relationship to the resources around them (Sanders 1992). People, who may be normally excluded from natural resource management, are given a chance to engage and develop connections to natural spaces (Spaid 2002).

### **3.2.4 What role can environmental art and artists play in leadership?**

Our review of the literature on adaptive co-management indicated that in complex situations, routine is not sufficient. Successful leadership in such situations requires innovation (Hahn et al. 2005; Olsson et al. 2004; Olsson et al. 2006) and that, in turn,

requires 'creativity' (Westley et al. 2006). When trying to lead and manage in situations of complexity and uncertainty the capacity to think and act innovatively becomes paramount (Westley et al. 2006), often decisions must be made with little information, and many obstacles, and finding the appropriate solution for a given situation involves thinking outside the box (Mintzberg and Westley 1989).

Interestingly, the literature on leadership in many arenas has increasingly emphasized this element of creativity. In fact, there is research that suggests that the most successful leaders in such contexts have a personality profile very similar to the artist (Pitcher 1995). Patricia Pitcher (1995) describes leaders in terms of three personality types: artists, craftsmen and technocrats. She credits 'artists' with being the visionaries, the inventors and the drivers of new ideas and projects, those who have the creative capacity and social and intuitive skills to engage people:

*“To summarize, my artists are emotional and sometimes moody, volatile and funny. They are nonconformist and frustrated by the gospel with a small “g.” These characteristics, features of their basis psychological functioning, mean that to the outside world they appear imaginative, intuitive and visionary. Behaviourally, they are daring, adventurous and entrepreneurial and, therefore, for some, exciting. Feeling or temperament, thought processes and behaviour come, as I tried to emphasize earlier, in packages. The package is character in this case, the artist character” (Pitcher 1995 p44-45).*

In short, creative leaders and artists share fundamental qualities. And this similarity would appear to go beyond the purely personal, to the point in fact of the capacity of such leaders to engage their followers in common visions and common action (Westley et al. 2006). The literature on environmental art and artists, like that on innovative leadership points to a capacity and a responsibility to use the imagination to powerfully create visions of possibility. Artists are described as having a basic mandate to create, innovate and generate newness, and many in the environmental art field feel that this mandate carries with it a responsibility: to conceive of alternate ways to understand and interact with nature (Luke, 1992, Berry 1992, Sanders 1992). “It is time for us all to participate in the healing and regeneration of the earth. We can only do this if we can imagine it”

(Bookner, 1992, p.11). Imagination seems essential to this process and it may be the role of artists to generate new environmental visions:

*“Recent art, some of it explicitly ecological, some of it not, is asking us to look at what our toxins and garbage and overpopulation are doing to the earth, to acknowledge our own vulnerability and limitations, to find new ways of seeing ourselves and our identity with earth, within the larger infinity” (Bookner 1992, p11).*

It is one of the propositions of this paper that if creativity and innovative environmental leadership in fact have similarities in capacities and in mandate, then explicitly integrating artistic values and approaches, as well as using artistic forms and forums could intensify the capacity of the creative leader to be effective in the areas of knowledge management, sensemaking and stakeholder engagement which are key to preparing the ground for transformation (described above). As noted earlier, in one of the most renowned of cases of successful adaptive co-management, Sven Erik Magnusson used such an approach. Could it have been more critical to his success than has been previously estimated?

### **3.2.5 How can the inclusion of environmental art and artists aid in social ecological system transformation?**

Ultimately, creative leaders attempt, through sensemaking, knowledge management and stakeholder engagement of various kinds, to transform the SES into a more desirable, more resilient state. We know that art draws heavily on imagination, that genuine art is transformative both in content and impact (Martinez 1992). We can see the possibility that when art works incorporate the natural world directly, and use it as their vehicle of expression, new definitions of nature can result, which transform perceptions and behaviors on the part of other stakeholders (Withrow-Robinson et al 2002). As Patricia Sanders (1992) notes: “Art, with its ability to symbolize complex abstractions in concrete ways, has a unique potential for raising awareness and advancing the shift in mind-set that must occur for the sake of our survival and well-being,” (p.77).

The ultimate goal, as cultural theorist Thomas Berry suggests: “is to achieve a new cultural coding for the ecological age—a new, more integral language of being and value that can overcome the devastating consequences of the existing mode of cultural coding,” (Berry 1988 p. 25). Can environmental art and artists, in collaboration with adaptive-co-management contribute to creating such new language and such transformations?

This paper will argue that indeed, this is precisely the value that engaging environmental artists and art in adaptive co-management can add. While falling outside the purview of much of the research on resilience and adaptive co-management, there has in fact been significant experimentation in bringing together ecosystem management and environmental art in ways promising for both theory and practice (Spaid 2002). The research for this paper has identified three cases of such activity. The case studies demonstrate much of what the theory has proposed and emphasized and are potential examples wherein sensemaking, knowledge management and stakeholder engagement were utilized by artistic leadership in order to encourage and create system transformation. I will turn now to the detail of the cases themselves.

#### **4. Case Studies: A Dialogue, A multi-Faceted Interaction and Creative Solutions**



(Mel Chin Revival Field 1990-present, view during early July 1991 St. Paul, Minnesota © Mel Chin <http://greenmuseum.org/c/aen/Images/Ecology/revival.php>)

This section of this paper describes three case studies that illuminated the interface between environmental art and artists, leadership, adaptive co management and transformations. The case studies have been organized according to their contribution to concepts under investigation. The Forest Art Path Conference was a dialogue between scientists, academics, curators and artists and contributed to conversational drift through knowledge integrations, sense making and transforming perceptions. The Third International Forest Art Path: Laboratorium was a multi faceted interactive experience that integrated knowledge, emphasized culture, encouraged stakeholder engagement, and used creative leadership. The ecoventions used these necessary components in order to provide creative and novel solutions to the environmental problems facing the world today.

#### **4.1 A Dialogue: case study number 1: Native Invasive forest art convention, April 20<sup>th</sup> and 21<sup>st</sup> 2007**

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(Aris Georgiades, Gail Simpson projection for Forest Art Wisconsin 2007)

The Native-Invasive International Forest Art Wisconsin Convention, held in Madison, Wisconsin on April 20<sup>th</sup> and 21<sup>st</sup> 2007 was funded by the University of Wisconsin, and was organized by curator and artist in residence, Ute Ritschel. The theme of the conference was “Native/Invasive: perspectives on art and nature, culture and curating,” and as stated in the program brochure was designed to “bring together artists, curators, foresters and environmentalists to discuss the future of the forest, sustainability and design, nativeness/invasiveness, recreation,” (Forest Art Wisconsin Brochure 2007). In

order to explore each of these themes, the conference was divided into four panel discussions, followed by a question and answer period. Each panel consisted of four speakers, who gave brief lectures on the themes mentioned above. Each panel included an artist, a curator, a forester and an environmentalist/scientists or academic. The conference took place in the Madison Arboretum, and on each of the two days, guided walks, tours and performances accompanied the talks. The conference was designed as the academic prelude to the actual Forest Art Path Wisconsin, taking place in the Northern Highland American Legion State Forest of Wisconsin. According to the website designed for the Art Forest Wisconsin Project:

“The three main themes of Native/Invasive for Forest Art Wisconsin are:

**ecological aspect:** native/invasive behavior in nature, especially in fauna and flora

**social aspect:** native/invasive in terms of history, social setting and migration

**artistic aspect:** native/invasive behavior of art in the forest and in natural settings”

(<http://www.waldkunst.com/2007/>).

Further,

*“Native/Invasive will provide the opportunity to work with the species and plants of the forest, to reflect invasive behavior towards nature and in nature, to think of native and invasive treatment in ecological and social settings, to use native and invasive materials, to consider sustainability and ecological equilibrium, to see nature in connection to art as native or invasive matter” (Forest Art Path Wisconsin Brochure 2007).*

This will be the fourth Forest Art Project curated by Ute Ritschel, but the conference was a first. According to Ute Ritschel, the conference provided the opportunity to have an interdisciplinary discussion in a broader context, to allow people from different backgrounds to meet and discuss art and the environment and stimulate further partnerships and new ways of perceiving both art and the natural environment (pers. comm. Ute Ritschel 2007).

**4.2 A Multi Faceted Interaction: Case study number 2 International Forest Art Exhibition and *The 3<sup>rd</sup> International Forest Art Path: Laboratorium in Darmstadt, Germany, August 25<sup>th</sup> 2006 to September 24<sup>th</sup> 2006***



(From left clockwise: Ernest Daetwyler (Forest Cell Spheres), Manuela Ribadeneira (Zaun), Alec Finlay, (Worldwide Letterbox-a circle walk with 5 poems), Helina Hukkataival (Forest Dream), Joachim Kuhlmann (Point de Vue), Waltraud Munz («Anthill oder Gullivers Reise nach Brobdingnag – dem Reich der Riesen«)  
[http://www.waldkunst.com/2006/wkp\\_artist\\_de.php?WEBYEP\\_DI=13](http://www.waldkunst.com/2006/wkp_artist_de.php?WEBYEP_DI=13))

The Third International Forest Art Path, like the first and the second, took place in the state forest neighboring Darmstadt, Germany, and was a collaboration between many individuals: Ute Ritschel, the curator, Peter Fischer, the head forester, and many artists, sponsors, foresters and the local community. Forest Art Path began because Peter Fischer wanted to bring more people into his forest, and wanted people to interact with the forest in new and revived ways. After consulting a local forest resident and artist Joachim Kuhlmann, Peter Fischer was put into contact with Ute Ritschel, a local curator. (pers. comm. Peter Fischer. 2007). Ute Ritschel saw in Peter Fischer's plans an opportunity to explore her ideas of public, site-specific art in the Forest near Darmstadt, and together, she, Peter Fischer and several others began planning for the first Forest Art Path, held in 2002. The first Forest Art Path proved an instant success, as Peter Fischer states "my mandate was to get 7000 visitors to the forest, in the first year of the convention I had 10000" (pers. comm. Peter Fischer 2007). Subsequently, there have been two more

International Forest Art Exhibitions, each one surrounding a theme, which as Ute explains, “informed each other and grew out of each other” (pers. comm. Ute Ritschel. 2007). First, there was Recherche (2002) then Expedition (2004) and finally Laboratorium in (2007). Each exhibition combined artists, curators, a team of assistants, the forests and the local community, who housed and fed the artists. As well as the exhibitions themselves, the projects were accompanied by tours of the forest, educational workshops, talks by artists and foresters and performances. The art works were constrained by the theme of the show as well as the environmental guidelines given by the forester. As emphasized by Ute Ritschel and Peter Fischer, the works themselves must biodegrade, or be exhibited for a short period of time (pers. comm. Peter Fischer 2007). Thus, the pieces and performances cannot remain, in their current shape, permanently in the forest. Also, many of the pieces were “interactive” meaning that the public could directly engage and “play” with the works (pers. comm. Ute Ritschel 2007).

The Third International Forest Art Path was unique in its particular mandate to team each artist with a scientist to inform their work. Thus, working along side the 15 artists, from international backgrounds, were 15 scientists from diverse disciplines themselves, including geology, biology, physics, or ecology. Also included were participants from as diverse avenues as architecture, German philosophers, scene painters, forest engineers and sponsors. As such, Ute hoped to create a working “Laboratorium”, from which new ideas, visions, understandings and art installations could emerge and consequently engage and attract a large variety of people (pers. comm. Ute Ritschel 2007). As she states in her curatorial statement, in the catalogue,

*“In the experimental situation with scientists and specialists, the preparatory and realization phase led to 14 very different works. The range of perception in the forest and its strengthening by the trained eye of the specialist has proved itself as a valuable extension. Accordingly, “the 8000 to 10,000 visitors during opening hours and the 57 guided tours with 1400 participants bear witness to the fact that Forest Art Path 2006 attracted a very wide audience,” (3 Internationaler Waldkunstpfad Laboratorium Catalogue 2006).*

As well, the theme of the exhibition reflects the long and lasting relationship of the German people to their forest: “In central European culture, the forest is characterized by a thousand years of human use. This intensive utilization includes settlements as far back as the Roman-Teutonic era. Until the present day, the economic exploitation of the forest by humans has had far-reaching consequences.” (Corts Udo in 3 Internationaler Waldkunstpfad Laboratorium Catalogue 2006 p.4) The relationship between people and the forest, and its cultural manifestation was highlighted as a relevant theme of the Forest Art Paths.

As art historian Elisabeth Kuhlmann notes,

*“The unification of art and forest is an example of the spiritual joining of human creativity and natural resources. It is an act of re-creation that sets a sign of things to come, a timely symbol for the increased self-understanding of a cultural community. Art-time places influence the social consciousness, change the zeitgeist and provide new insights. In this way, they gain a particular function and task,”* (Elisabeth Kuhlmann: 3 Internationaler Waldkunstpfad Laboratorium Catalogue 2006 p. 10).

For Peter Fischer, a forest manager of 18 years, the success of the Third International Forest Art Path means continued funding for the management and upkeep of the forest. As he sees, it people have always lived/with the forest, and cannot be separated from it. Increasing visitors means more people caring for the resources, which he feels will enable its survival. With the help of Ute Fischer, and eventually many others, Forest Art Path came into being, bringing people back into the woods, and possibly saving the forest (pers. comm. Peter Fischer 2007).

### **4.3 Creative Solutions: Case Study #3: The Ecoventions of Mel Chin, Agnes Denes and the Harrisons**

### 4.3.1 Helen Mayer and Newton Harrison

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(Harrison Studio, A Vision for the Green Heart of Holland  
Map illustrating the Bio-Diversity Ring, 1995 <http://greenmuseum.org/c/eovention/greenheart.html>)<sup>2</sup>. (Newton and Helen Harrison  
Future Garden, Part 1: The Endangered Meadows of Europe, 1996-1998 Kunst-und Ausstellungshalle der Bundesrepublik  
Deutschland, Bonn, Germany <http://greenmuseum.org/c/eovention/future2.html>)

Helen and Newton Harrison have created many plans and ideas for ecoventions. Though their plans are often not fully realized, many of their recommendations and designs are used by governments, organizations, planners and the public. They describe their working process and contribution as ‘Conversational Drift’ as many of their ideas are born out of discussion and are spread by word of mouth. Their methodology regularly has a public discussion component where they engage the media, the government, public officials, community members, organizations, business people and fellow artists (Adcock 1992). They create elaborate plans to reshape, redesign, invent and create new cultural landscapes. Their work is based on the belief that cultural diversity and biodiversity “exist in a state of mutual interaction – the former self-conscious and able to intend and transform, and the latter the pattern of self-organization from which we all spring and to which we all return, and which ultimately determines the possible,” (Helen and Newton Harrison 2007). They are usually invited by project planners to join them in thinking about novel solutions to ecological problems. Their proposition take the form of large-scale installations of cartographic imagery, poetic texts, collaged photographs, and video, which offer deconstructivist or fragmented narratives, that entail shifting metaphors (Adcock 1992). Since the 1980’s several of their art works have lead directly to environmental change. In 1982 they created a project entitled *Barrier Islands Drama: The Mangrove and the Pine (1982)* for the Ringling Museum in Sarasota, Florida. This work was partly responsible for the banning of the so-called Australian pine from South Florida. Further, their 1985 proposal to restore a tributary of the Los Angeles River, *the Arroyo Seco Release* for California Institute of Technology's Baxter Gallery, was

completed by others almost fifteen years later. Despite these successes, the pair continue to emphasize “conversational drift” versus direct action (Spaid 2002).

#### 4.3.2 Mel Chin’s Revival Field



(Mel Chin (with Dr. Rufus Chaney), Revival Field, 1990-1993 Pig’s Eye Landfill, Saint Paul, Minnesota <http://greenmuseum.org/c/ecovention/revival1.html>) (Mel Chin (with Dr. Rufus Chaney), Revival Field "collecting soil samples," 1993, Pig’s Eye Landfill <http://greenmuseum.org/c/ecovention/revival2.html>)

*“Chin’s relationship to the landscape--his efforts to reshape conceptions of places and events has exceeded the metaphorical. His synthesis of art, history, and science changes not only the viewers’ conception of life on earth but ultimately also the earth itself,”* (Kastner 1991p. 135).

In the late 1980s, artist Mel Chin came across an article that explored the use of plants as remediation tools. He immediately saw the potential of these plants as sculptural tools capable of returning life to devastated landscape and set out to do more research.

Hyperaccumulators are plants that have evolved the capacity to selectively absorb and hold large amounts of metals and other minerals in their vascular structures and, therefore have to potential to revive and reinvent ‘spoiled’ landscapes. At the point that Chin began his investigation, little was known about these hyperaccumulators, so choosing the appropriate ones was a difficult task. Still, being determined, Chin management to track down a scientist, Dr. Rufus Chaney who had done research on phytoremediation (using plants as remediation agents) but never followed through with a field test. Chaney, excited for an opportunity to test this biotechnology, readily agreed to help Chin.

However, the team could not begin their project right away, as the National Endowment For The Arts (NEA), having initially agreed give the project a grant, withdrew support claiming the project was more science than art (Spaid 2002).

Luckily, in a separate meeting, Chin managed to convince then NEA chairman John Frohnmayer of the merits of the project and the grant of \$10,000 was restored. In June 1991, after six months of negotiations for sites all over the country, Chin and Chaney choose to begin their work in a landfill, nicknamed Pig's Ear, situated outside of Saint Paul, Minnesota. There, they planted *Revival Field*, the first ever experiment of its kind and only one of two in the world. The results of *Revival Field* provided data essential to confirm laboratory tests and create a new technology. Furthermore, once the toxin-laden weeds were harvested, they could be incinerated and resold as ore, which in turn paid for the process. The "aesthetic" is revealed in the return of growth to the revitalized soil. Though Chin is wary about the new technology, one business analyst predicts the phytoremediation industry will become a \$ 400 million business by 2005 (Spaid 2002).

In 2001, Chin returned to initiate the tenth anniversary of planning *Revival Field*, at which point he transferred a new variety of "super" accumulating plants to another collaborator, Dr. Volker Romheld. His decision to return was partially fueled a by concern that environmental scientists in other countries (such as Germany) doubted the validity of his work due to the confidential research initiatives in the U.S. that limited information. By transferring the knowledge to another region, new people and ecosystems can benefit and contribute.

#### **4.3.3. The work of Agnes Denes**

*"My work addresses itself to an age of complexity when knowledge and ideas are coming in faster than can be assimilated while disciplines become progressively alienated from each other through specialization. The hard-won knowledge accumulates undigested, blocking meaningful communication. With overview and direction lacking, human values tend to decline. Artists are not locked into a single discipline. Art is a specialization that*

*need not feed upon itself. It is capable of imbibing key elements from other systems, unifying them into a unique and coherent vision. The new role of the artist may be to create an art that is more than decoration, commodity, or political tool. It is an art that questions the status quo and the direction life has taken, the endless contradictions we accept and approve. An art that elicits and initiates thinking processes has the power to make statements with universal validity and thus benefit humanity” (Denes 1992 p.22).*

### Wheatfield --- A Confrontation

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**(Agnes Denes, "Wheatfield - A Confrontation", Battery Park Landfill, NY, 1982  
[http://greenmuseum.org/content/artist\\_index/artist\\_id-63.html](http://greenmuseum.org/content/artist_index/artist_id-63.html))**

In 1982, with the help of two assistances and a handful of volunteers, Agnes Denes planted a wheat field in lower Manhattan, two blocks from Wall Street and the World Trade Center, and facing the Statue of Liberty. The area was cleared of rocks and garbage and then seeds were planted by hand in 285 furrows in the ground. The fields were maintained for four months. In order to do this, an irrigation system was established, the area was weeded, wheat smut (a common North American wheat disease) was removed, fertilizers were applied and rocks, wires, boulders were taken away by hand. The crop was then harvested on August 16<sup>th</sup> 1982, with an output of 1000 pounds of healthy, golden wheat (Spaid 2002). Of that day, Denes writes: “The air was stifling and the city stood still. All these Manhattanites who had been watching the field grow from green to golden amber, the stockbrokers and the economists, office workers, tourists, and others attracted by the media coverage, stood around in sad silence. Some cried. TV crews were everywhere but they spoke too little and then in a hushed voice,” (Denes 1992 p.22).

## Tree Mountain

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(Agnes Denes, "Tree Mountain - A Living Time Capsule - 11,000 Trees - 11,000 People - 400 Years", winter view, Yl j rvi, Finland, planted in 1996. [http://greenmuseum.org/content/artist\\_content/ct\\_id-198\\_\\_artist\\_id-63.html](http://greenmuseum.org/content/artist_content/ct_id-198__artist_id-63.html))

*Tree mountain* was a proposal, created by Agnes Denes, for a forest of 10 000 trees, planted by 10 000 people from around the world. The forest was intended to be 1.5 miles in length, half a mile in width and oval in its shape. The tree type to be used was silver fir, because they were dying out. Each tree was to be planted by one person. The design for *Tree Mountain* was an intricate pattern derived from a mathematical formula. The mathematical expansion changes with one's view and movement around and above the mountain, thus revealing hidden curves and spirals in the design. The project was intended to be highly collaborative, including people from landscaping, forestry and funding. To this was added the participating and collaborating of ten thousand people working together to plant the trees, which would bear their names and remain their property for generations to come. The trees could change ownership but *Tree Mountain* could not be bought or sold, nor could the trees be moved from the forest. Thus, the trees would be saleable commodities and collectible works of art, gaining fame and value as they would grow. At the same time, they would be part of the landscape, the larger, whole forest. The trees and the forest design pattern would live on even as the owners and planters died (Spaid 2002). As Denes puts it, Tree Mountain was to be "a living time capsule" (Denes. 1991 p23). Few realize that Tree Mountain-a proposal for a Forest (1982-1983) could actually function as the design for a massive land reclamation project. On June 5, 1992, Earth Environment Day, the Finnish government surprised the world when it announced during the Earth Summit in Rio de Janeiro that it would build Denes' Tree Mountain as Finland's contribution to help alleviate the world's ecological stress (Spaid 2002).

## **5. A Constructed Interpretation: Findings and Discussion**



(Dorothee Bielfeld (Bochum) »Baumkino« – Installation [http://www.waldkunst.com/2006/wkp\\_de.php?WEBYEP\\_DI=2](http://www.waldkunst.com/2006/wkp_de.php?WEBYEP_DI=2))

### **5.1 Synergies between sensemaking, knowledge management and engaging stakeholders and the impact for transformation**

What do these cases of environmental art illuminate about leadership and adaptive co-management processes? The three cases represent a movement from dialogue (the conference) to more multi-faceted interactions (the forest art project) to creative solutions (the ecoventions). At each stage we see a deeper engagement between scientists and artists and the general public. Interviews with the artists and scientists involved in these projects suggest that each deeper level also had a more powerful impact on transformation – of perceptions, of behaviors and ultimately of the linked SES itself. The theory section of identified three different important components for successful leadership towards transformation to adaptive co-management and more holistic linked SESs. However, the findings of this paper demonstrate that these three components cross-fertilize to a significant extent. Sensemaking, it appears, is key for engagement, engagement for knowledge management and integration, and all three combine in moments of transformation when utilized by creative leaders. The cases vividly illustrate these connections and the thread of emotion and motivation, which seems the particular by-product of the use of artistic media.

#### **5.1.1 How powerful sensemaking associated with environmental art and artists engages stakeholders**

Interviews with participants in the Forest Art Conference and the Third International Forest Art Path: Laboratorium revealed that environmental artists and art may have a particularly important function in highlighting, recognizing and reestablishing the cultural importance of ecosystems. Integrating the public in their work, and invoking emotional connection through visions, representations, and imagination are the tools by which artists succeed in doing so.

*The idea [from] Germanic tribes came up again, [German word] ‘blood and soil’: that all Germans are deeply connected to their ground, to the place where they come from... [In] one forest I know up north they planted unbelievable big swastika in the forest. You can still see when you fly over it...the trees are now about 20 meters high and you can’t see it when you walk through. Time doesn’t change so fast [here] as in other parts” (pers. comm. Peter Fischer 2007).*

Peter Fischer, the forester in charge of the forest where the International Forest Art Path exhibitions have occurred is emphatic in his belief that forests are largely human constructs:

*“There is no natural forest in Germany... We can’t be apart from our environment, we have already influenced too much of our environment. We influence the nature with everything we do,” (pers. comm. Peter Fischer 2007).*

Human-nature interactions are not one sided, rather, just as we may affect the land, so too, perhaps, has the environment shaped our worldviews, and identities: “People are influenced by nature, it’s their basis for art, it is their inspiration. People go to places tied to aesthetically to them” (pers. comm. Darcy Kind 2007). In turn, people’s relationship to nature is often dictated by cultural input, be it spiritual, scientific or emotional. Thus, what people believe, feel, or know about a nature, may inform they way they interact with it. Nancy Langston describes a case she studied about the cultural conflict over riparian areas, that exemplifies this:

*“We don’t have a clear concept of these regions, it is still either land or water... We don’t even have legal categories for it, its imaginary. So people would just not believe that it is really there, they would build their houses and the houses*

*were flooded away every single year. They just had this idea that water shouldn't come across land so they would just persist in living there, in the floodplain,"* (pers comm. Nancy Langston 2007).

Understanding this intricately complex relationship is important in order to be able to manage natural resources in an appropriate and reflexive manner. Recognizing that ecosystems are cultural places can provide insight into what motivates people's actions and choices (Hahn et al. 2006). Moreover, reestablishing the cultural significance of nature in the mind of the stakeholders and the public may encourage greater stewardship and involvement (Jacobson 2007).

With this in mind, Peter Fischer decided to try an alternative approach to engage visitors. He believed having art in the forest could encourage more people to visit, as well change their perceptions about the woods and promote a greater connection (pers. comm. Peter Fischer 2007). Ute Ritschel, the curator of the Forest Art Path exhibits, notes that this was an important aspect of her undertaking:

*"In my region of Germany, forest is something you grew up with, you use it, you know it, it is a cultural identity... in Germany forest is such an important thing... to give that [experience in the forest] to all generations, but particularly the next generation was always my concern and we have been educating many generations with an artistic and naturalist view [the forest art exhibitions]"* (pers. comm. Ute Ritschel 2007).

Peter Fischer and Ute Ritschel, in their choice to use artistic medium to communicate culture, harnessed the capacity of artists and their art to be interactive, participatory and speak to people in alternative ways, engaging their emotions through visions, connections and imaginings (pers. comm. Ernest Daetwyler 2007). Martinez Inez, an art critic, confirms the importance of art to move us and stimulate interaction with our surroundings "Next to religion, there is nothing in culture more capable of stirring us to risk the solitary experience of psychic space than art," (Martinez Inez, 1992 p 60).

As noted in the theory section, information that is not purely scientific, but is imbued with spiritual, philosophical and emotion meanings, is more likely to be retained by the audience and move people to action (Jacobson 2007). Nancy Langston emphasizes this in terms of environmental and conservation efforts:

*“Conservation is as much about emotional identification with places that are important to you, and I think that art has a huge role to play in that... Ultimately we see the world through our own human eyes, through the stories and the art and the poems, the making of places, the sense of place,” (pers. comm. Nancy Langston 2007).*

Site specific, public art in the natural environment may be particularly persuasive as it demands interaction and encourages connectivity with the art and with nature. Peter Fischer describes one piece constructed in the forest, called *Cathedral*, which came to be a meeting place for people:

*“It was a place you could go from 5 o’clock in the morning to 12 o’clock at night and always people were there. In the morning doing their tai chi under the shelter of the sail or people just sitting there, lying next to a tree stub, drinking beer, bringing their guitars out,” (pers. comm. Peter Fischer 2007).*

This revived relationship with the forest lasted long after the exhibition ended marking, arguably a change in the general consciousness about the forest (pers. comm. Peter Fischer 2007). Similarly, *Tree Mountain*, by Agnes Denes, in which 10 000 trees were planted by 10 000 people, has become a place of great cultural meaning, as participants return to care for and observe their little part of the forest (Spaid 2002). The artist Ernest Daetwyler aptly describes the power of art in general and public art in particular:

*“To get used to contemporary art in the public realm, you get immediate responses...It’s not a lecture, it’s not talking. Contemporary art can inspire, in a way you might not understand but your subconscious might relate to it. It can be interactive and engages differently. It is just different than a purely dialectic deductive tool. It’s an immediate experience-to learn without knowing” (pers. comm. Ernest Daetwyler 2007).*

In the context of the environmental movement, what is often inspired and understood is the importance of natural spaces, as cultural places with spiritual and emotional value

(Curtis 2003). It would appear that emotion is key to motivation (Cable and Ernst 2003) and that environmental art has a unique capacity to intensify the emotion of those who view it and to attach that emotion to a political idea – that of a renewed relationship between humans and nature (Curtis 2003). It is not enough to understand how to save the earth, it is important to know why it is worth saving. The Forest Art Path projects, in particular, seem to have re-connected people to their culture, and through culture to their “nature” (pers. comm. Ute Ritschel). This can easily become motivation and caring – two key resources for engaging stakeholders in the management of the SESs.

### **5.1.2 How environmental art and projects, as collaborative forums, provide bridges for knowledge and venues for active engagement**

*“He [the scientist working with Ernest] was impressed with the appearance of the spheres, with this kinda dreamlike illusionary appearance because for him spheres are extremely robust, and for me it is a very volatile, temporary, visionary thing, where you don’t know if it’s real or not,” (pers. comm. Ernest Daetwyler 2007).*

Not only is the cultural significance of ecosystems very important for engaging people and encouraging stewardship, it may also be important for encouraging collaborations and cooperation. In order for adaptive co-management to be successful, stakeholders must work with scientists and managers. Scientific knowledge and managerial expertise, though essential to natural resource management, can often be alienating and cause conflict (pers. comm. Jim Addis 2007). As it has been thoroughly demonstrated in the literature, it is very important to integrate other knowledge sets with the scientific, and very difficult. (Gunderson and Holling 2002, Olsson et al. 2004, Olsson et al. 2006, Hahn et al. 2006, Folke et al 2002). However, our cases suggest that environmental artists and their art may offer some insight into the process of knowledge integration *through their capacity for stakeholder engagement.*

#### **5.1.2.1 Environmental art productions as forums for collaboration.**

Environmental art and ecoventions are very often collaborative projects. Each of the ecoventions artists from the case studies used scientific and/or managerial expertise to

design and implement their projects. Mel Chin worked with a plant specialist and Agnes Denes enlisted the help of mathematical modelers and forest planners. This had the effect of furthering their artistic endeavors but also of illuminating the science of plant remediation or forest planning (Spaid 2002). Similar collaborations occurred during the 3<sup>rd</sup> International Forest Art Path: Laboratorium, which paired each artist with a scientist. The scientists were there to provide assistance and expertise about the projects under way. As Ute Ritschel notes:

*So when expedition started, for the first time artists invited scientists so they would ask me, we need help. It was amazing how it all came together, [the] visual, [the] ecological. It was perfect, these things happen. Laboratory means a place where you are working together doing your research together and find new ways of looking at things,” (pers. comm. Ute Ritschel 2007).*

All three of these cases invited participation of multiple stakeholder groups. Further they were informed by multiple disciplines. Teams of artists, environmentalists, scientists, managers, government officials and the public worked together to create truly transdisciplinary projects (Spaid 2002). Artistic projects are a medium in which knowledge can be shared, compared and integrated. Participation in artistic endeavors may encourage spontaneity and innovation and does not require the same rigor and expertise, as do scientific exchanges. The result tends to be both interdisciplinary and impactful, as they bridge conventional disciplines and speak to a larger audience (Curtis 2003).

#### **5.1.2.2 Environmental art as a bridge to understanding science**

The artistic medium, in this case visual, can also be a means for knowledge integration, by providing representations or imaginings that engage stakeholders:

*“It’s something really good in that it is combining something visual with invasives. I think it’s an unique approach, I’ve never heard of using art and invasives before. For me...it was a really good learning process. Making people more aware of it at different levels, talking to people about it in different ways is the only way to get it. I think that is really what is needed to get it through to a lot*

*of people. I think a lot of people, myself included, learn better that way,” (pers. comm. Darcy Kind 2007).*

Similarly, Ernest Daetwyler notes: “The whole educational aspect is communicated with [art] tools, like the whole environmental aspect like, what is the forest? And what is happening to the forest and why is the forest changing? All that can be communicated given the right tools,” (pers. communication Ernest Daetwyler 2007).

As was emphasized in the above section (engaging stakeholders through sensemaking), the particular role of art and artists in these collaborations is often in their capacity to bring out cultural knowledge, which can allow for a more integrated perspective. Nancy Langston: “Science is only one part of the puzzle and forests are about more than just science, they have always been incredibly important to the community...and I think art, and stories and literature can really help people imagine what the woods might mean to them” (pers. comm. Nancy Langston 2007).

Often, the process of these collaborations and the use of these tools, results in generation of new ideas and perspectives. The Forest Art Path conference was created explicitly to promote this kind of activity. As Laurie Beth Clark notes.

*“The whole point to me of putting an artist and a curator and a forester and a naturalist on a panel together when they would never normally be there is the dialogue afterwards...The kind of mixing up that went on in peoples heads...was worth while... [and] lots of serendipitous connections happened” (pers. comm. Laurie Beth Clark 2007).*

Nancy Langston felt the conference stimulated new connections and ways of communicating: “Some of us were saying after the conference that it would be great to collaborate again, on a coffee table, very visually created, book, about this forest culture and history and art historians and artists would work together on visual part and I would write the story and then we would integrate it” (pers. comm. Nancy Langston 2007).

### **5.1.2.3 Environmental art as an opportunity for deep engagement**

New ideas need an audience in order to inspire changes in action or thought. Stakeholders may be more likely to be engaged if they are presented with novel insights and notions, in a medium that speaks to them (pers. comm. Peter Fischer 2007). As Darcy Kind noted in

reference to the upcoming 4<sup>th</sup> International Forest Art Path: “It gets to people. A different audience that won’t go to the museum. The fact that the art is going to be along a trail means you get people who wouldn’t normally go and suddenly they might think ‘oh’ they did not realize that they are seeing art-and its all about their perspective” (pers. comm. Darcy Kind 2007). As the forest manager, Peter Fischer has witness the concrete benefits of bringing art into his forest: more people in the woods. Further, the people who came out for the art exhibitions are now returning just to be in the woods (pers. comm. Peter Fischer 2007). In his view, combining art and forestry engages peoples' interest: “it is only when they are interested in the forest that [then] they will do anything for it. If they have no personal interest why would they? Only things that bring them something will be interesting enough [to take care of]” (pers. comm. Peter Fischer 2007). As Ute Ritschel points out: “The idea really was that we bring out people into the forest to see with new eyes, with a new view towards nature,” (pers. comm. Ute Ritschel 2007).

Further, collaborations and integrating knowledge seems to encourage engagement, because it may result in information that is more accessible and even emotional: “I think that art is much more accessible than a climate change model. I think that [with] quantitative models people get overwhelmed. I actually think Al Gores movie, “An Inconvenient Truth”, did much more better job than most climate change models. What made that movie work was the emotion of it, I think he did a very good job of explaining some of the science behind it and that moves people,” (pers. comm. Nancy Langston 2007).

### **5.1.3 How the power of sensemaking, new knowledge creation and deep engagement in environmental art brings about transformation**

*“Art may never save the world, but saving the world is not the same thing as saving the phenomenon ‘world’ itself, which is something that art can do,” (Suzi Gablik 1992 p.50).*

New ideas can be made manifest in many forms – from intangible shifts in perspective, to new modes of behavior, to tangible inventions- and all of these are in evidence in our

ecoconventions cases. Artists like Agnes Denes and the Harrison often make up scenarios for future projects and new relationships between people and nature: “Through scenarios, thinkers can “sketch a paradigm (an explicitly structured set of assumptions, definitions, typologies, conjectures, analyses, and questions) and then construct a number of explicitly alternative futures which might come into being under the stated conditions,” (Adcock 1992 p.42). Other artists will use different medium to transmit their message and express their novel insights (Jacobson et al. 2007).

Our cases, reflecting the literature (Withrow-Robinson et al. 2002), reveal that exposure to art works dealing with environmental themes was felt to result in a change in perceptions about a given landscape, ecosystem, or park. Mel Chin’s project *Revival Field* reclaimed a public dump and made it a urban garden and a recreation zone, changing our notion of land-use and waste. Agnes Denes’ *Tree Mountain* turned a strictly ecological forest into a cultural heritage site and a family archive (Spaid 2002). The Forest Art Path exhibitions offered the view of forests as museums, playgrounds, as in Ernest Daetwyler floating spheres, and treasure chests, like Laurie Beth Clark’s little wooden houses, claimed by the community, or Jenny Angus’ bug collection, a favorite with children (pers. comm. Laurie Beth Clark, Ernest Daetwyler 2007). Further, environmental art can challenge long held assumptions, introduces new ways of seeing and has the power to shift the public’s mindset (Curtis 2003). By making art, with and in natural settings, audiences are confronted with novel uses of spaces and resources. This can trigger a re-evaluation of human-nature connections (Withrow-Robinson et al. 2002). Public, site specific art, in particular, has the power to reach out to a wide variety of people, who may engage with it either purposefully or accidentally in their daily lives; be it while going for a run through the woods in Darmstadt and coming across a natural amphitheatre, or boat like sails drifting in the wind, encountering large screen projections of salmon runs in downtown Seattle or turning a corner in Manhattan and discovering a golden wheat field (pers. comm. Ute Ritschel, Aris Georgiades 2007, Denes 1992).

Moreover, in a few cases of environmental art we have cited, such as the work of Mel Chin, the transformation was a tangible innovation. His novel use of plants in land remediation, provided a new technology but also helped encourage changes in perception

about sustainable alternatives as well as the ‘usefulness’ of art in scientific endeavor. Similarly, the work of the Harrisons has lead directly to change in managing natural resources (Spaid 2002). More often, however, the work of artists working in the environmental movement in general, and these cases in particular, has been focused on the shift in mindsets and sensemaking and engaging emotions necessary for system transitions. As Nancy Langston notes: “Art allows us to imagine a different future-to imagine our relationship to the forest-to the land,” (pers. comm. Nancy Langston 2007). It is the unique ability of art to stimulate the imagination by proposing new ideas, and visions, which makes it a useful tool in encouraging a transformation in perspective (Brookner 1992). Artists, such as Ernest Daetwyler, exhibiting their work in the Third International Forest Art Path Convention, create their projects with the intention to challenge people’s views: “So on a trip to the forest, seeing the transparent spheres containing people, people might ask themselves if they are in a forbidden area or if this is some site of a government test...[The spheres] looked alien...At the same time very seductive, they invite interaction and thought,” (pers. comm. Ernest Daetwyler 2007). Aris Georgiades has similar aims for his work: “For my sculpture I like it to communicate something or imply something directly,” (pers. comm. Aris Georgiades 2007). For Forest Art Path, like many other environmentally minded projects, this means generating new ideas about nature and our relationship to it. This was what Ute hopes to achieve with her Forest Art Path series: “I wanted to create this feeling for people...[so] they can go through the forest and see all these different plants and different trees, new bark, [in] a different way,” (pers. comm. Ute Ritschel 2007).

Offering people new visions about a particular project in a given space and can potentially lead to broader shifts in ideals and views. As Ernest Daetwyler further notes: *“It’s a fantastic project with so much potential for engaging audience. The potential is where it could go, and the awareness it raises, about contemporary art, and environment issues and ecological issues, it can show politicians that there is another way to do things, it could be potentially even a popular way for politicians, if supported by academics, to raise awareness,”* (pers. comm. Ernest Daetwyler 2007).

Aris Georgiades uses the example of another Mel Chin project, called *Melrose Place*, to demonstrate the transformative power of art:

*“He worked with a bunch of students...they got the scripts of the Melrose place for the last two or three seasons and they got permission from the producers to design all the visual art work in the show...they would redesign the absolute vodka posters [to look like images of]...the Oklahoma city bombing instead of the usual...[or] because showing images of condoms on TV is illegal they printed all the fabrics in the bedroom in condoms pattern[s]...The writers were furious at first but by the time the show ended [and] all the writers were moving on to other projects, [they] wanted to make sure they had a visual artist on the next project. To me that is really cool, [now there are] creative visual artists in the economy,” (pers. comm. Aris Georgiades 2007).*

In sum, as Ernest Daetwyler notes: “...Art can act as a transformational tool, as a catalyst. There is no filter. It goes right to your mind” (pers. comm. Ernest Daetwyler 2007).

## **5.2 Soft Innovations and the inclusion of environmental art and artists into natural resource management regimes**



(Edgardo Madanes (Argentinien) »Blue Globe of the Forest, Installation  
[http://www.waldkunst.com/2006/wkp\\_de.php?WEBYEP\\_DI=2](http://www.waldkunst.com/2006/wkp_de.php?WEBYEP_DI=2))

The last section of this paper attempted to demonstrate how synergies between the necessary components of successful adaptive co-management, in the context of environmental art projects, seem to have encouraged transforming ways of perceiving,

interacting and acting. The next section of this paper will explore the possibility of including artists and artistic medium into natural resource management practice in order to harness this potential more directly.

### **5.2.1 Art as “soft innovation” – Integrating environmental art and artists more fully into adaptive co-management.**

*“To adumbrate transitional pathways...visions must be appealing and imaginative and be supported by a broad range of actors. Inspiring final visions are useful for mobilizing social actors,” (Rotmans and Kemp 2003 p.18).*

New ideas, novel connections and innovating visions are all necessary for transforming perceptions as they inspire alternative ways of seeing and doing. In turn, transforming perceptions is an important aspect of system transitions, when combined with practical changes in scientific and managerial methods (Rotmans and Kemp 2003). As Rotmans and Kemp (2003) further explain, radical societal changes necessitate integral system innovation whereby ‘hard innovations’ like technological or machinery advancements is accompanied by ‘soft innovations’ that alter worldviews and perceptions. They note that the more complex an innovation is, the more necessary ‘soft innovations’ are.

As the cases and findings as well as the past research and literature suggest, environmental art may be a powerful means for creating soft innovation, thereby supporting real transformations in management of SES. However, artists have traditionally played a passive role in politics and management, and are viewed as commentators instead of direct actors (Gablik 1992). Artists participating in the current ecological art movement are reversing this trend, and have played crucial leadership roles in dealing with real world problems. (Spaid 2002). They are often in a unique position to do so, as their visions and views are not constrained by scientific methodology or bureaucratic conventions. When an artist is asked to participate in a project, their expected contribution differs drastically from that of the scientist or manager. It is precisely because of the myth that art “has no real application” that artists are not expected to produce results. Rather, their imagination and creativity in creating a vision,

and their ability to communicate that vision to the public is what adds value (Spaid 2002). Artists working in environmental movement are playing important roles as designers, initiators and leaders of projects aimed to encourage social-ecological resilience (Spaid 2002). The inclusion of artists into adaptive co-management may promote novel ways of dealing with complex problems and more creative, reflective management.

*“Only with the syntheses of recent art can we achieve technological breakthroughs necessary for our survival. Artists intuit material conditions, art is a practical tool. In other words, let artist do something in the real world,”*  
(Brookner 1992 p. 10 quoting Peter Fend in Alan Jones “Thinking Big” Arts 66:1991: 54).

### **5.2.2 Interdependence—a call for integrative transformation and collaborative, artist inclusive leadership**

*“A prerequisite for the realization of a transition is a fundamental change of ideas, perceptions and assumptions, denoted here as a change in worldview...In concrete terms this means steering through creating a climate in which societal innovation can flourish and through the initiation of the right initiatives at the right moment. A sound and transparent communication among all parties involved is of crucial importance in this process,”* (Rotmans and Kemp 2003 p. 13).

As Rotmans and Kemp aptly summarize, transitions necessitate change in ideas, transforming perceptions and a good communication between all parties involved. Though each component that this paper initially proposed in isolation is important, it their synergy that presents real possibility. This study of the environmental and eco art movement, demonstrates that this synergy is not only possible but also powerful. In order to benefit from the transformative capacity of art, however, artists and the artistic medium should be included into management teams.

One of the definitive aspects of ecoventions is that their inventors have often been played a leadership role in the community in which they were created. The artists engaged key individuals from across stakeholder groups to assist them in bringing their ideas to fruition (Spaid 2002). Mel Chin engaged the help of scientists, board members of the

NEA, and community leaders to help him create Revival Field. His visionary thinking bridged science and art; convincing people from both disciplines that his ‘invisible aesthetic’ of plants that clean polluted earth was worth funding and implementing:

*“One of my favorite artists is Mel Chin, and he got an NEA grant for this project (revival field) and in the grant he called it an invisible aesthetic, and they took the NEA grant away because they didn’t buy the invisible aesthetic, well he got it back, again, he was sharp enough as a citizen to win it back, he was professional enough, or political enough, whatever it was, he got it back,” (pers. comm. Aris Georgiades 2007).*

Likewise, the Harrisons have inspired change in policy, ways of thinking and managing natural resources:

*“The artists that come to mind are Helen and Newton Harrison, it might have been related to the fragile ecologies show, where all the artists were working in this way, that means that they were partners with sewage company as the new treatment center was being planned and the artist were thinking about the process together with the sewage treatment plant,” ( pers. comm. Laurie Beth Clark, interview).*

Lastly, Agnes Denes is responsible for greening the cityscape of Manhattan and the creation of a protected forest in Finland. The work of these artists with government, the public and scientists has resulted in transformation of policy and, arguably, perceptions (Spaid 2002) and demonstrates the benefits of including artists in environmental management teams.

The Forest Art Conference 2007 was initially designed to meet the needs for funding of Forest Art Path Wisconsin. Ute Ritschel, the curator of the Forest Art Path projects and artist in resident at the University of Wisconsin was inspired by the possibility of taking the Forests Art Path projects into a new venue. As part of the prerequisites of the funding for her project and residency, she was required to do something within a more ‘academic’ setting and during the school semester,” (pers. comm. Ute Ritschel 2007). Faced with obstacles and limitations, Ute conceived of a perfect solution, an academic conference that would act as a prelude to the exhibition itself. As Henry Mintzberg states in *Crafting Strategy*: “Thus error becomes opportunity, and limitations can stimulate creativity”

(Mintzberg 2001 p.70). Her creative solution brought together artists, curators, scientists and managers to tackle important issues, bridge knowledge gaps, and in turn generate creative solutions of their own. Each speaker presented their understanding of the issues. At times their voices were disconnected and alien, but the author noted the emergence of a new interdisciplinary perspective. Several of the people present were innovators in their own right, and their collaborations stimulated more creative visions and management practices and reaffirmed their ideas, be it the forester Steve Petersen's decision to hold a Forest Art Path in his woods, Ute Ritschel's commitment to more ecologically minded exhibitions, Aris Georgiades dedication to using sustainable materials and ideas for future collaborations or Nancy Langston's idea for a future book (Recordings from the conference and pers. comm. with Aris Georgiades, Ute Ritschel and Nancy Langston 2007).

By working with an artist, Joachim Kuhlmann and curator Ute Ritschel, Peter Fischer initiated a novel approach to forest management and revived the public's interest in the ecosystem he loved (pers. comm. Peter Fischer 2007). The vision of art in the forests was strong enough to convince University of Wisconsin to fund a similar project in North America, making it a truly international phenomenon (pers comm. Ute Ritschel 2007).

All these projects used artists and art, not as complement to an ongoing management plan, but as integral voices in their very design and implementation. As Laurie Beth Clark notes:

*“We need to get away from the thinking where somewhere along the way the scientist thinks; oh I need a humanists, so you have a pianist playing in the lobby of the nanotech center...or a bunch of climate change scientists [who] get some artists to make art about climate change. There is nothing wrong with that but that is a really different thing [from] what might happen if artists were in the room when people were planning [what] climate change research is going to look like. Artists are trained to ask ‘weird’, ‘stupid’, ‘irrelevant’ questions, [like] what are you not seeing kind or what if I just threw this in your petri dish” (pers. comm. Laurie Beth Clark 2007).*

The need for innovation in leadership of natural resources is already recognized (Hahn et al 2006, Olsson et al. 2004, Olsson 2006). So too, as Aris Georgiades points out, is the needs for ‘creatives’ in other arenas: “Even Bill Gates [from] Microsoft has a room full of creatives, they may not be people who are computer savvy but they are thinkers. They are trying to figure out what the next thing should be...that is another thing that I like about [projects like] Forest art, I think [interdisciplinary environmental art projects] is another avenue that good creative people can get into to, it’s a place for creatives, where they can make a difference,” (pers. comm. Aris Georgiades 2007).

The environmental movement is fuelled by a desire to protect nature, which means changing the way we are currently living and thinking. Because this hinges on a whole societal perspective shift (Folke et al. 2002), including artists into leadership forums is particularly important. As noted earlier, environmental art and artists may be uniquely capable of ‘soft innovations’ necessary for SES system transformation. This is not only because of their creative thinking and message and medium of their art, it is also because of, as Laurie Beth Clark notes, the transformation power of the process of art making itself:

*“I think there is a whole...class of people [Eco-artist] for whom making their work is the engagement with the bureaucracy...I think it is political to have a creative experience in our current society [as] its about the relationships between people and how we organize ourselves in the world and then really there isn’t much that is not political” (pers. comm. Laurie Beth Clark 2007).*

Here, she draws attention to another important point, which is that art often acts in opposition to current widely held views. This is another very important aspect of system transformation. The art discussed in this paper has, more often than not, been created with the purpose of challenging current unsustainable worldview and improved human-nature interactions. As such, it is political. The dissonance voice (alternative perspective) is important to transformation, (Rotmans and Kemp 2003) as it can be the ‘tipping point’

that enables a system to transition into a new configuration that is more sustainable (Olson 2006).

Several authors from transformation literature have emphasized the important of subsystems (True et al. 1999), or shadow networks (Olsson et al 2006), that provide forums for these alternative ideas to be conceived and discussed and planned. These forums are often the birthplace of dissonance against a current dominant system. As the main system begins to breakdown because of over rigidity, ideas from these shadow networks can be incorporated as the system being to reconfigure itself and transform (Olsson et al 2006, True et al. 1999). This paper has argued that artists, and/or their work, may be responsible for generation new ideas and transforming perceptions, and in fact often act as cultural shadow networks to dominants paradigms. Thus, in addition to the other benefits they bring, incorporating them in to management regimes could allow for greater access to these cultural shadow networks and thus improve the ability to encourage and navigate the system transformation necessary for a more sustainable future.

### **5.3The Challenges of Including Artists at All Stages of Adaptive Co-Management**

Despite the success of eco art projects and artistic leaders in engaging stakeholders, integrating knowledge, encouraging transformations, they are continue to be excluded from the academic discourse on adaptive strategies for management the earth's social ecological systems. The last section of this paper shall explore reasons for the disconnect between these two worlds, which according to the author, seem to have so much to offer each other. My findings suggests the blockage to future collaborations are caused by a disconnect in terms of time-scales, spaces scales, emphasis on outcomes, and authorship/authority.

#### **5.3.1 Space-scales-site specific**

Most of the current ecoventions and eco-art practices are site specific, and, as such may have limited applicability to other environments. Also, they are often the product of particular communities' efforts, which are rarely quantifiable and difficult to transfer. However, this is beginning to change; community level projects are beginning to get the attention of government and national/international bodies. In 2006, UNESCO published a

report about Eco-Art and Sustainability (UNESCO report). Further, the Australian government is currently designing a proposal to include the arts in community natural resource management, based on ongoing research by government minister, David Curtis (Curtis 2003). Perhaps the increased attention and sanction will encourage more academic focus.

### **5.3.2 Time-scales/efficiency and outcomes**

*“Worldviews usually change only slowly and gradually, due to increasing knowledge, empirical facts, new insights, or through articulation and confrontation of divergent visions” (Rotmans and Kemp, 2003 p12.*

It is difficult to measure the practical outcome of artistic endeavors (Curtis 2003). As they are largely ‘soft’ innovations that influence perceptions and worldviews. As such, perceivable change may take over a long time frame. The ideas and designs proposed by Helen and Newton Harrison for the Green Heart of Holland, only manifested themselves over 10 years later, and then penned by someone else entirely. Agnes Denes’ *Tree Mountain* took well over 20 years to come to fruition (Spaid 2002). The time lag may be even more significant to see changes in perceptions of broader society. Joint artists-manager collaboration on projects may allow for more tangible and timely benefits of artistic creativity. Alternatively, artistic process may advise management on how to foster and nurture slow cultural variables. As Nancy Langston suggests: “Art can help us express or articulate, slow us down, help us recognize, help us pay attention to the earth, life on earth, stop wandering through it in a daze, engage with it, take it seriously, engage the world around us,” (pers. comm. Nancy Langston 2007). Similarly, Ernest notes “its very powerful tool- to influence people in a positive way, at their leisure, at their time, [to] let them experience things,” (pers. comm. Ernest Daetwyler 2007).

Laurie Beth Clark takes a stronger position, noting that the drive for efficiency and timely solutions is part of our unsustainable ethos:

*“I don’t think you ever going to have efficient collaborations...efficiency has got to go. If we want real outcomes we really have to take efficiency off the list...You*

*know I am glad that the Gore film has gotten all the attention that it has gotten and that now 62 percent instead of 35 percent of Americans believe that we might actually have a problem. That is fabulous, but a lot of the rhetoric that Gore uses in the film is rhetoric of urgency: we need to do something about this in a hurry...its escalating...In ten years its going to be too hot to live in Brooklyn...but I actually think that a kind of urgency orientation got us here, you know I urgently need this product before I think of the outcome of putting pesticide in this river in order to produce this product and that maybe a little slowing down might be in order,” (pers. comm. Laurie Beth Clark 2007).*

Laurie Beth Clark proposes a solution that is not fixated on outcome but instead on the process of exchanging ideas:

*“The stuff that I am pushing very hard for on this campus and people are having a very hard time understanding is that you are not going to get art -science collaboration until you create hothouses, without a particular outcome expected, [a place where] you have artists and scientists in a lot of regular contact with each other...I also believe tremendously in what happens with a bunch of people put together in a room, trying to produce an outcome...[even if they] don’t produce [what they intended]...the way those people were changed by that experience is outcome,” (pers. comm. Laurie Beth Clark 2007).*

The idea that experience of new ideas or new connections can be outcome is echoed by the Harrisons, in their notion, explained in the beginning of this paper, of conversational drift. They emphasis exchanging ideas, using their imaginations, collaborating with scientists as forms of conversation that will trickle through society, through other ongoing conversations over time (Adcock 1992).

### **5.3.3 Authorship and Authority**

A forum for exchanging ideas between knowledge sets might also have the effect of leveling the playing field and given some more authority to artists. The scientific emphasis on outcomes and quantifiable results makes artistic endeavor seem less

significant or even silly, as Aris Georgiades points out, “We are living down a reputation of hundreds of years of artists being wild and reckless, part of my position is to earn the respect of that engineer or that city planner, they just have such doubts. I would love it if scientists thought we [artists] could contribute something,” (pers. comm. Aris Georgiades 2007). Several of the artists I spoke with shied away from assigning practical significance to their work, even when they championed the role of artists and art generally.

Acknowledging the merits of an artist’s own work seems frowned upon generally. Both Mel Chin and The Harrisons pride themselves of not taking credit for their ideas, and allowing others to claim ownership and the credit. Aris Georgiades too, is excited by the prospect of this audience taking ownership of his public installations. Whereas this may have huge benefits for engaging stakeholders, or transforming perceptions, it does little for the validity of artists and their endeavors.

Also, many scientists and managers, accustomed to a rule bound, factual information mode of operating, do not seem comfortable offering their insights. As Aris Georgiades notes: “I have worked with many engineers and architects in my past work. More often than not, they limit themselves to assessing the scientific feasibility of my ideas, and tend to be involved only to give their approval, its rare that they actually contribute their perspective or offer different ideas,” (pers. comm. Aris Georgiades 2007). Ernest Daetwyler’s experience of working with scientists was similar: “I liked it because he agreed with everything I did instead of offering feedback or other potentials,” (pers. comm. Ernest Daetwyler 2007). From this it would seem that scientists are reluctant to exercise judgment about art making. Similarly, artists are often very cautious about interfering with the science: “I think it has to be collaborative [but] I hate to see art that is misinformed” (pers. comm. Aris Georgiades 2007).

Perhaps discussion forums and emphasis on conversational drift running concurrently to problem solving oriented meetings, could help overcome some of the blockages described in this section, and allow a greater partnership between environmental artists and scientists.

## **6. Summary and Directions for Future Research**



(ems Robert Koko Bi (Deutschland/Elfenbeinküste) und Wolfgang Hekele (Deutschland) »Erinnern – Wiederholen – Durcharbeiten« – Installation [http://www.waldkunst.com/2006/wkp\\_artist\\_de.php?WEBYEP\\_DI=9](http://www.waldkunst.com/2006/wkp_artist_de.php?WEBYEP_DI=9))

The aim of this paper, in accordance with the introduction, has been to use literature and case studies from the environmental art in order to gain insight into questions and uncertainties about the operationalization of factors crucial to the success of adaptive co-management and systems transformation: knowledge management, sense making, engaging stakeholders and leadership. A response from the environmental art, eco art and ecoventions literature demonstrated the unique ability of environmental art and artists to address these issues because of their capacity to promote and add creativity to leadership, through creative solutions and artistic mediums, and through their inclusion in management regimes. In terms of sense making, environmental art and artists may add a much needed emphasis and inclusion of cultural context of social ecological systems, they may also promote a more holistic view of nature and environmental dynamics, and use artistic medium which assists the process of knowledge management. Further, environmental art and artists encourage direct participation by including the public in their work and by emphasis cultural and emotional understandings. The processes all promote the necessary transformation in perceptions.

An analysis of the case studies used in this paper provides a constructed interpretation in which further insights were produced. The necessary components of successful co-

management and transformations mentioned above were seen to cross-fertilize to a large extent and can be viewed as synergistic within the context of environmental art projects. As such the inclusion of environmental art and artists encourages the processes of first, powerful sensemaking that engage stakeholders, second, engaging stakeholders resulting in knowledge integration and management and bridging understanding science and culture and third, provides an opportunity for deep engagement.

The conclusion of this paper interprets that the combined processes and tools used by environmental artists through environmental art has great potential to result in transformation of perceptions and ideas, thus 'soft innovations' and should therefore be integrated into adaptive co-management and system transformation. Further, this paper finds that an inclusion of artists into leadership teams proves particularly proficient in encouraging these necessary dynamics and outcomes.

This paper also highlights some reasons for the ongoing disconnect between environmental art projects and natural resource management and provides some suggests for overcoming this disconnect. Differences in space and site scales, time scales and the importance of efficiency of outcomes and emphasis on authorship and authority all contribute to an inability to communicate and continue a mutually informative conversation.

In order to overcome this disconnect and incorporate the findings, this paper provides some theoretical questions for further research and some practical suggestions for improving the success of adaptive co management and system transformation. The paper suggests a more in-depth study of the connection between creative leadership and natural resource management, a study of how artistic medium and creative thinking has enabled creative leadership. A historical overview of the role of art in defining our understanding of natural systems and engaging the public, as well as changing the way we see the world, further studies of the parallels between ecoventions and natural resource management, and the tools that have enable the success of such environmental art projects and the benefits of including artists in scientific and managerial endeavors. Also

research that includes public opinion and surveys may be crucial in understanding the transformative power of art and artists.

Further this paper has some practical recommendations to natural resource management practitioners interesting in the implementation of adaptive co-management and transformability by improving the processes of knowledge integration, sense making and engaging stakeholders:

- Like Sven Erik Magnusson, use a cultural platform, such as a eco museum, to bring people together and encourage interest and participation in the management of an ecosystem.

- Use artistic mediums, such as public, site specific art, to promote knowledge integration and learning through connecting nature, culture and science.

- Promote conversational drift by focusing on ideas, perceptions and feelings as outcome, broader perceptual shifts and long time frames.

- Use 'hothouses' between artists, scientists, managers and the public as forums for deep and meaningful integration of knowledge and generation of ideas about the management of social ecological systems.

- Include artists in the planning and implement of new projects to increase creativity and innovative solutions, emotionally and holistically engage stakeholders and assist with knowledge management and sensemaking necessary for successful adaptive co management and transformability.

This essay hoped to continue to process of development inquiry, by proposes new connects, new questions and some potential solutions in a constructed interpretation that may be helpful to researchers and practitioners dealing with current environment problems and consequent natural resource management.

The environmental problems facing the world are unparalleled in the potential damage they may cause. The need for solutions is pressing. Though technological fixes are emerging, a fundamental shift in perception and behavior towards sustainability is

essential. Given the high stakes and limited time frame, this make take a miracle, and as author and art critic Jeanette Winterson reminds us, art is perhaps singularly capable of achieving this:

*“You could say that whatever is not mechanical is a miracle. That is, whatever is not predictable, statistical, habitual, programmed, planned, running to time, quantifiable, cogged, chipped, causal, will be the thing that we long for and dread in equal measure. What art does is to coax us away from the mechanical and towards the miraculous... Art makes us better people because it asks for our full humanity, and humanity is, or should be, the polar opposite of the merely mechanical. We are not part of the machine either, but we have forgotten that. Art is memory - which is quite different to history. Art asks that we remember who we are, and usually that asking has to come as provocation - which is why art breaks the rules and the taboos, and at the same time is a moral force”*  
(Jeanette Winterson 2007).

## **Appendix**

### **1.1 Some Questions to the Interviewees**

What is your line of work?

Why are you attending this conference? What do you hope to learn/achieve/contribute over the course of this conference?

What are your views on the role of art?

Can artists and environmental art contribute directly to the management of ecosystems?

How does culture affect management practices?

How is art related to culture?

What is the relevance of context in art? In management? In science?

Can environmental art inform science, can science inform art?

How does art affect perceptions? Can it change perceptions?

### **1.2 Participants in the Wisconsin Forest Art Conference**

The following people participated in the two day conference:

Ute Ritschel, Curator and Artist in Residence, University of Wisconsin (UW)

Paul DeLong, Chief Forester, Department of Natural Resources (DNR), Wisconsin

Gerhard Fischer, Hessen-Wisconsin Partner States, DPI

Kevin McSweeney, UW-Madison, Arboretum

Frances Westley, Nelson Institute, Moderator

Laurie Beth Clark, Artist, UW

Paul DeLong, DNR

Nancy Langston, Nelson Institute, Department of Forest and Wildlife Ecology

Laurie Beth Clark, UW, Moderator

Aris Georgiades, from the collaborative Actual Size Artworks, UW

Amy Lipton, Curator, Abington Art Center and Sculpture Park, PA

Peter Fischer, Forester, Darmstadt, Germany

Raymond P. Guries, Department of Forest Ecology and Management, UW

Erica Howard, Nelson Institute, Moderator

Bently Spang, Artist

Truman Lowe, Curator and Artist, UW

Steve Petersen, Superintendent of Northern Highland American Legion State Forest

Sam Dennis, Landscape Architecture, UW

Ernest Daetwyler, Artist and Curator, Contemporary Art Forum Kitchener and Area (CAFKA), Canada

Darcy Kind, Conservation Biologist, DNR

Emily Blumenfeld, Via Partnership, Consultant Public Art Program, Calgary, Canada

Dr. Jutta Weber, Geologist, UNESCO Geopark Bergstrasse-Odenwald, Germany

### **Works of Helen and Newton Harrison**

In 1995, the Cultural Council of Southern Holland invited the Newtons, amongst other artists, architects and urban planners to propose solutions; given the need to house 600 000 more people in the area by 2010, for large piece of land, coined the Green Heart of Holland, at the center of a ring of cities. Most of the issues raised and strategies proposed by the Harrisons in their piece, *A Vision for the Green Heart of Holland*, were included in The Minister of Environments formal presentation 8 months later. In response to their efforts, the Cultural Council of southern Holland sent out 3000 posters, organized public discussions and even had a television program. Their success has been attributed in part to collaborations with Dutch ecologists, Landscape Architects and the Public. (Spaid 2002)

*A Vision for the Green Heart of Holland*, proposed the creation a Bio-Diversity Ring, which would entail a multi-use park of several kilometers width, in a ring formation around the existing farmland of the Green Heart. They proposed that new housing be built around the outside perimeter of the ring. The Ring would act as a protective eco-urban edge for the bio diversity of the green heart as well as the surrounding cultural diversity of the cities of Amsterdam, Rotterdam, Utrecht, Den Haag, Haarlem and Delft. The Bio-Diversity Ring would be preserve the Green Heart as well as ensure that the economic influx of the 600 000 thousand home would flow into the existing communities around the area, instead of being invested into a new megacity being built up in the center of the Green Heart. Furthermore, if built, the Bio-Diversity Ring could absorb 5,000 tons of carbon dioxide and make about 25,000,000 cubic meters of clean water available, thus eliminating the need to use polluted Rhine water in summer. (Spaid 2002)

The initial acceptance and inclusive of “A vision for the green heart of Holland” in 1995, was overturned and completely discarded by the new government of 1996/1997. Then, in 1998, the properties of the project reappeared in the planning process. In 2000, the Harrisons were invited to teach a master class by the Ministry of Agriculture forestry and the environment, at which point their entire project was represented and exhibited again. Shortly thereafter, the Helen and Newton Harrison were awarded the Groeneveld Prize for 2002 for our work on the Dutch landscape. Recently, they were informed that a Dutch Architect, to whom they had presented their ideas in 1995, had claimed ownership of them and was successfully implementing to the benefit of himself and the Dutch People. The Harrisons view this as part of an ongoing Conversational Drift, whereby information is freely exchanged, altered, generated and owned in a participatory and inclusive manner, that they feel changes the cultural landscape.  
(<http://moncon.greenmuseum.org/papers/harrison1.html>)

### **Works of Mel Chin**

Dr. Chaney selected one cadmium and one zinc hyperaccumulator, and two other known indicators of metals (*Silene cucubalus* and hybrid *Zea mays*). Merlin red fescue and romaine lettuce were also included to test for metal tolerance and food chain influence. From the 96 plots designed to assess different soil and pH treatments, they discovered that *Thlaspi* samples absorbed the most zinc and cadmium. (reference ecoventions)

More recently, Chin has been working in collaboration with International Center for Urban Ecology, (ICUE) to help restore or reinvent a neighborhood of Detroit, Michigan that had been badly destroyed in fires. Chin Proposed a project called S.W.I.N.G (Sustainable Works Involving Neighborhood Groups) that would combine conceptual art, educational experimentations with the ecological and economic concerns of a specific context. In the case of Detroit, Chin suggested that instead of demolishing half burn, and destroyed buildings, the city should pivot them for the cultivation of worms, which can then be sold to the sport fishing industry. The compost from garden clippings and recycled newspapers could in turn be sold to more affluent neighborhoods as well as used in public work projects in inner city Detroit. In so doing, Chin proposes transforming an abandoned space into a functional neighborhood: "Instead of only targeting blighted areas to add culture, the challenge to artists and architects, both professionals and students, is to invent, with the peoples and communities, projects to transform the disturbing destroyed-house icon into a new-use icon. (Spaid 2002)"

Like Josephs Beuys, who coined the catch-phase "creativity=capital, Chin is interested in the relationship between inventive ideas and their payback. Accordingly: "The ideas provide the gentle push, that sends us coolly cutting through the still air of division and fears, arcs toward economic benefits and sweeps back to each new form of creative engagement. (Spaid 2002)"

### **Agnes Denes Works**

"Tree mountain is a collaborative environmental project touching on global ecological, social, and cultural issues. It tests our finitude and transcendence, individuality versus teamwork, and measures the value and evolution of a work of art after it has entered the environment. Tree Mountain is designed to unite human intellect with the majesty of nature."

*. A massive man-made mountain, elliptical in shape, measuring 460 yards long, 295 yards wide and 30 yards high, was constructed atop the Pinziö gravel pits near Ylöjärvi, Finland. While the original plan called for 10,000 Finnish Pines, this particular application of Denes' proposal required 1,000 extra trees, each planted by 11,000 people who received certificates naming them as the custodians of the trees for 400 years. Each certificate is an inheritable document, valid for twenty or more future generation. (Spaid 2002))*

The Finnish Pine, or Silver Fir, is dying out. The mountain, formed by piling up left over soil, was so soft that the mountain kept collapsing. The little trees' roots began to strengthen the mountain, creating three times as many roots as limbs to hold it up (Spaid, 2002).

This is not Denes' only forest design that has been realized. Forest for Australia, Australia's first forest (1300 feet by 263 feet) was created for the Altoona Treatment plant near Melbourne. Her design entailed planting five sections of 1200 trees (River Red Gum, Paper Bark, and Eucalyptus – all dying out) of varying heights to form spiraling step pyramids. Since 2000, Denes has been working on a 25-year master plan for the 170-mile long Waterline, a 19th Century defense line in the Netherlands, consisting of 70 forts, batteries, and other fortifications (Spaid, 2002).

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## Personal Communications

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Personal Communication with Emily Blumenfeld, Via Partnership, Consultant Public Art Program, Calgary, Canada. April 2007.

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