Art and the Ecology of Leisure

Curtis Carter

Marquette University, curtis.carter@marquette.edu

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ABSTRACT
Philosophers, scientists, and artists alike are prone to explore important questions concerning ecology as it relates to the impact of human actions for the future of nature and human civilizations. The main focus in this essay is to consider ecological implications of art understood as a form of leisure. Art is of course more than leisure for the artists and other arts professionals, but its personal and societal roles also serve as leisure activities. Both the production of art and its consumption have important ecological implications. Select philosophical (Hegel) and scientific (Escobar) concerning art and nature provide a context for exploring art’s role in ecology. Complementing the philosophical and scientific understanding of ecological concerns are the efforts of artists and arts institutions to address ecological concerns both in their creative works and in assessing ecological implications of their respective practices. Ecology concerns environmental relationships taking place among the elements of nature (weather, land and water for example) that relate to evolutionary change and the effects on life in the built environments that comprise human civilizations. Leisure, as I shall understand it here functions as a creative force in the life of human persons.

Introduction
My explorations in this essay began with a concern for questions pertaining the ecology of leisure. It offers opportunities for the exercise of human freedom in developing personal and communal identities. This probe however is focused on art as a form of leisure and not on the ecological impacts on aquatic and marine habitats resulting from outdoor recreation and ecotourism, games, or other multiple forms of leisure. Hence my focus here will be on the ecological issues raised by the practices of the arts and their presentations, especially in exhibitions, biennials, and art expo which consume large resources and impact the
environments where they take place, leaving aside for the purposes here ecological impacts of outdoor recreation and ecotourism.

Art includes the images or processes that painters, musicians, dancers, poets, film makers, and others who are working in a tradition of artistic skills, create for the purpose of interpreting human experience. The images and processes—paintings, dances, poems—artists produce are symbols for interpreting values, feelings, ideas, and other significant aspects of human experience. The arts provide interpretive reflections on nature and culture and offer enrichments to human experience and cultural formations such as cities. Artists thus bring their understanding to ecological concerns as well as other aspects of human experience.

Ecological concerns of the current generation arise in part in reference to differing understanding of nature’s identity and its role in relation to changing formations of human cultures. For example, a traditional view of nature in Western cultures might assume that nature exists as an independent entity consisting of natural properties and the laws which govern their operations functioning alongside, and interacting with the inventions taking place in human history. Alternatively, a Daoist understanding of nature in Chinese landscape paintings might suggest that humans participate in but do not dominate the natural landscape. In general, it seems that Chinese traditional views, evolve from understandings of nature as “chaotic and dangerous” to an understanding of nature as “well ordered and manageable.”

Philosophers, scientists, and artists alike are prone to explore important questions concerning ecology as it relates to our understanding of nature. For our discussion of ecological concerns related to art here it is necessary to consider not only ecological issues relating to art, but also to take account of philosophical and scientific issues relating to nature. Among the considerations to be explored here are these: As seen through a philosopher’s eyes, what might art contribute to appreciation and valuing of nature? How might science contribute to the understanding of art’s relation to ecological concerns? What might be the role of the
arts in interpreting ecological concerns and as forms of advocacy aimed at communicating ecological concerns? And lastly, can art change minds about climate change?

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I. Philosopher’s Contributions to Ecological Understanding

It is perhaps useful to begin our discussion here of the subject of art and ecological issues with a brief look at Hegel’s understanding of art and nature, taking note of the importance Hegel places on the role of art in fostering the connections between human life and life as it exists in other forms of nature.

Hegel’s Philosophy of Nature comprises part II of his Encyclopedia of the Philosophical Sciences (1817, 1827, 1830), with additional commentary in the Logic (1812-1816) and the Aesthetics. Additionally, there exists a considerable body of secondary writings on Hegel’s views on nature including, for example, Stephen Houlgate, ed. Hegel and the Philosophy of Nature (1998) and Errol Harris’ account of nature in his The Spirit of Hegel (1993). From these sources we learn that Hegel intends nature as the lowest level of being with respect to Spirit.⁴ Houlgate offers a defense of Hegel’s account of nature as being consistent with the limits of empirical science of his time, and provides an edited volume addressing a range of issues concerning Hegel’s views on nature. Harris tell us that nature is part of the dialectical process through which mind is generated.

As Terry Pinkard has pointed out in his biography of Hegel (2000), Hegel’s broader aim was to offer a view of nature that would provide a modern foundation for the advancement of human culture based on the ongoing development of Spirit and the pursuit of human freedom.⁵ This
challenge Hegel believed was possible to meet, while remaining consistent with the pursuit of a scientific investigations of nature, which might include but not be limited to then current and future views of the empirical sciences.⁶ These developments include the role of nature in everyday life and history,⁷ as well as in reference to art and philosophy.

By giving the junctures of art and nature a central place in his aesthetics, Hegel sends a message concerning the worth of nature that is needed, even more today as we address the ecological concerns about the future of nature in today’s world. The present urgent concerns over threats to nature, and the ability of an injured nature to strike back, resulting from a century of largely unchecked technological and industrial exploitation of nature’s resources in the pursuit of economic and other cultural advancements, highlight the call for the pursuit of a global ecological civilization. Over consumption of natural resources vital to longer range human survival, disposal of toxic waste materials, harmful food production practices, the choice of pollutant energy sources, global changes in nature’s climate patterns signal that contemporary earth inhabitants must view nature more than just a resource to exploit for economic or other cultural interests including leisure activities.

Here, it is useful to recall Hegel’s views on the origins of art and its purposes with respect to its understanding of art’s relation to nature. Art “has its origin in the fact that man is a thinking consciousness....” and its “vocation is to unveil the truth in the form of sensuous artist configuration.”⁸ Hegel does not view the purposes of art to merely instruct in any didactic sense. Rather, art conveys its truth in individualized sensuous form drawing upon artistic
imagination instead of abstract rational principles to convey its contributions to human understanding.

Are the virtues of appreciation and respect for nature through art that which follows from Hegel’s treatment of art and nature? How might we expect that Hegel’s views on art and nature might contribute to the current ecological concerns about the future of nature? Hegel, in his holistic view of reality, offers art as a means of understanding and appreciating nature through recognition that nature participates with human consciousness and cultural development in the continuous development of Spirit or being. Hegel offers no aesthetic or moral rules guiding the link between art and nature. Art is not related to nature as a mere representation, nor as a form of moral persuasion. Rather, art’s power lies in its ability to awaken our aesthetic sensibilities toward concerns such as the ecological crisis unfolding today.9

II. Science and Ecological Concerns
Adding to a philosopher’s understandings of ecological concerns are contemporary scientific views as developed by anthropologists, biologists, or others who argue that understanding the identity of nature based on science is a key issue central to addressing contemporary ecological problems such as climate control. Barbara Bender writes that people’s experiences of nature and landscapes “is based in large measure on the particularity of the social, political and economic relations within which they live out their lives.”10 Rejecting a tradition that holds that nature exists independently of human history, Raymond Williams argues that our ideas of nature “contains, an extraordinary amount of human history.”

Among the recent efforts to sort out the question of the identity of nature as a concern for establishing political strategies to comprehend and combat ecological crisis issues, is a study conducted by anthropologist Arturo Escobar who sets forth a constructivist anti-essentialist understanding of nature. His aim is to reinvent the concept of nature as a product of the forces of organic, capitalist, and technological aspects of contemporary culture. Like Bender, Escobar
rejects the notion that nature exists as a freestanding objective, bio-physical entity functioning independently of the social, cultural, and political lenses through which it is examined. Instead, he believes that nature is culturally and socially constructed, as opposed to being a “real” entity independent of the cognitive apparatus that humans use to engage nature. Escobar’s hybrid structure for understanding nature consisting of three distinct but interrelated components: organic, capitalist, and techno nature.\textsuperscript{11}

**Organic Nature**: Organic Nature is a cultural framework that is “characterized by a connection between culture and biology that interposes organic and social life. “Organic life originates and is maintained because of a perpetual interchange with its environment. On this view, nature and society are not separated ontologically.”\textsuperscript{12} Access to organic nature is through its manifestations in local cultures which may vary in their interests.\textsuperscript{13} Anthropological and ecological studies show that rural communities relate to natural environments in individual ways and vary their impacts on the environment.

**Capitalist Nature**: According to Escobar, Capitalist Nature originates in late 18\textsuperscript{th} century Post Renaissance Europe and offers a view of nature as a commodity within the socio-cultural-economic spheres. Capitalist Nature is linked to capitalist modernity and introduces new ways of undertaking the commodification of nature. As Escobar understands it, “Capitalist nature is uniform, legible, manageable, harvestable.”\textsuperscript{14} Capitalist nature brings together nature and human labor based productivity as a means of incorporating nature into the social systems of commodification. As seen in Eighteenth Century Western landscape art, nature is depicted in a controlled, passive role deprived of its powers and force under the control of the viewer’s perspective as seen from outside nature.

**Techno-nature**: Based on techno-science, techno-nature succeeds the organic and capitalist understandings of nature. The understanding of nature that evolves under techno-nature results in experimentation based on new ecological practices. “At the root of this visionary
stance is a different view of technology itself. New technologies bring into existence new
significations and universes of reference.\textsuperscript{15}

While critics may find grounds for questioning Escobar’s account of nature based on three
categories of contemporary life, his larger aim is to establish grounds for a political ecology of
nature to facilitate addressing ecological problems such as climate control, assaults on nature,
and failure to address conservation of natural resources.

It is necessary, Escobar argues, that social groups understand and find ways to address the
environmental crisis.\textsuperscript{16} A critic might question whether Escobar’s anti-essentialist account of
nature marginalizes the organic (biological) aspects of nature. However, his analysis is useful
for clarifying the understanding of nature with respect to its environmental concerns that arise
in the spheres of economic activities and the application of new and existing technologies to
organic nature.

Here so far we have seen ways in which a philosopher (Hegel) and a scientist (Escobar) might
approach nature in relation to ecological concerns. Hegel’s view of nature is one aspect of his
world view grounded in the ontology of mind or Spirit where art plays a key role in reference to
nature. Art captures the life-spirit of what is valued in nature and brings it into the sphere of
human consciousness. Nature resonates in the souls and heart of humans who are confronted
with nature through art, thus awakening sympathetic appreciation. Hence, one important
truth that we can draw from Hegel’s understanding of art and nature is a message concerning
the importance of respect for, and the need to actively care for nature in the face of a growing
ecological crisis concerning climate change and the uncertainties generated by the impact of
unmeasured consumption of nature’s resources on the quality of current and future human life.
A cursory search of articles relating to Hegel, aesthetics and ecology by Timothy Morton and
others touch upon possible applications of Hegel’s aesthetics to ecology. To make this point it
is not necessary to claim that Hegel would be properly labeled an ecologist in the contemporary
sense of that term. Yet Hegel offers insightful understanding of the relation of humans to nature. Nowhere is this more evident than in his aesthetics where he discusses the relationship of nature and art. This connection brings us to the question, what then is the role of the arts with respect to ecology.

Escobar’s characterization of nature does not deal directly with art as he is mainly concerned with developing a political agenda to advance the cause of ecology. Political ecology is concerned with confluences pertaining to nature, culture, and the politics of power. \(^{17}\) Art in his system would fall in the cultural landscapes that participate in all three of the areas designated in Escobar’s cultural understandings of nature. But it makes sense, as we shall see in the following discussion of art and ecology, that art has a role in making the case for political awareness and understanding of the need to address ecological concerns. Escobar’s Organic account of nature linking culture and biology seems not far from Hegel’s effort to link art and nature. His Techno-nature calling for bringing into existence new significations and universes of references seems applicable to the arts as well as to other areas of culture.

III. Artists and Ecology

Let us continue this inquiry, with attention to artists and art presenters’ efforts to address ecological concerns. My attention has been drawn to this topic by “Sun and Sea (Marina)” an installation-performance opera-performance featured in the Lithuanian Pavilion at the 2019 Venice Biennale. “Sun and Sea Marina” features a constructed live beach scene with pleasure seeking bathers dressed in bathing suits sprawled on blankets scattered across the scene. The piece consists of an opera Created by three Lithuanian women artists, Rugilé Barzdžiukaitė, Lina Lapelytė, and Vaiva Grainytė. \(^{18}\) Set in an artificial beach at the Venice Biennale, *Sun and Sea: Marina* bathers interrupt their sun bathing to intone forewarnings of ecological crisis. The opera is performed during the Venice Biennale continuously with singing by a chorus of estranged sun bathers perched on a simulated sandy beach continuously for eight hours a day during segments of the Biennale.
“The performance of “Sun and Sea (Marina)” echoes a lament to the eclipse of the world, as the sky and sea change colour, the reefs bleach and nature dies.”

This award winning theater piece asks the question, “To what extent are we cognitively capable of conceiving of things as wide and distributed as climate change, or global environmental crisis, or species extinction? And how does that infiltrate or permeate our experiences of everyday life?”

The appearance of “Sun Sea Marina” in the Venice Art Biennale in 2019 and its recognition as recipient of the Venice Biennale’ Golden Lion award is perhaps symptomatic of the art world’s growing awareness of society’s need to address environmental concerns. For the thousands of visitors to the Biennale who experienced this artistic effort to create awareness, as well as the worldwide media coverage, it can be said that art in this case does serve to generate awareness of environmental concerns.

“Trees,” a group exhibition at the Fondation Cartier in Paris featuring artists, botanists, and philosophers, offers further evidence of the growing interest among artists and exhibitions of contemporary art in exploring the role of art in addressing ecological concerns. The focus of the Fondation Cartier exhibition is on trees. This exhibition brings together “outsider” and indigenous artists and established artists with the intent of exploring relations between plant and animal forms of life that show a common ground among nature’s varieties of life. The exhibition evokes connections between the explorations of artists alongside scientists. One aim is to create greater awareness of the life connections that exist between the forest environment and its products and human activities that make up everyday life (furniture, chairs, tables, building structures) and the complex material environments of the city. Another aim is to show that plants in common with humans share sensitivities to “temperature, humidity, air pressure, vibrations, trauma and chemical information,” thus bringing into context the common elements that occupy the natural spaces also necessary to human existence.

Moving more explicitly to the focus of ecological concerns is a selection of the art works in this exhibition focused on “Trees” that represent efforts in contemporary art practices intent on creating citizen awareness of the emerging global crisis with respect to actions harmful to global ecology. Protest against widespread deforestation and exploitation of nature is evident
in a selection of the artwork in the exhibition focused on deforestation. Large scale canvases by Brazilian artist Luiz Zerbini offer “an Anthropocene jungle of sorts in which urban and natural forms “reveal “a city/forest of the future, where nature is exploited but not exhausted, and beauty and utility coexist.”21

Continuing with the question of the place arts in addressing environmental concerns is a “carbon neutral” exhibition at the Garage Museum in Moscow. This exhibition features among its components an installation work where New Zealand born artist Hayden Fowler occupies a cage with a real live wolf for ten days, a tank of jelly fish, and a bee museum. The exhibition curated by Snejana krasteva and Elaterian Lazareva includes some 50 artists with eight large-scale installations. The aim in this exhibition, according to the curators, is to do the exhibition in an ecologically responsible way by incorporating environmentally friendly means in the exhibition’s design and implementation. Their means include calculating the carbon footprint for the six months of the exhibition and offsetting environmental impact of the exhibition by planting trees. Additionally, the presence of live animals in the exhibition aims to diminish to distances between art, human experiences, and nature, thus contributing to more friendly environmental relations among these forms of life. However, it is not lost on knowledgeable visitors that the Garage Museum is funded largely by oil industries.

But the message of the Venice Biennale performance, Sun and Sea (Marina)” and the exhibitions focused on ecological themes do not hide that fact that Art Biennales and exhibitions themselves, which include substantial consumption of energy as visitors generate significant travel miles for art works, artists, and others necessary to mounting a successful art event with environmental impact. Sensitivity in the art world to environmental concerns pertaining to crates and packing materials call for recycling consistent with best practices for minimizing environmental disruption. It would be impossible of course to stage a biennale or other art expo without some sort of environmental impact. It is at least encouraging that artists, galleries, and those responsible for mounting the Venice Biennale and other such
venues are increasingly making efforts to employ transport and materials consumption that shows accountability to environmental impact. 22

Apropos of the concerns of the art world for environmental impact of its activities, the program for Art Basel 2019, and international gathering of collectors, galleries, museum curators, and the press, included a discussion on “The Carbon Footprint of Contemporary Art.” 23 In fact some of the persons responsible for “Sun Sea Marina” at the Venice Biennale participated in the Art Basel event. Students and young artists organized a performance at the opening of Art Basel organized by the Paris Foundation ART OF CHANGE 21 took place during the Fair. Among the panels that took place in the context of Basel Conversations was a session, devoted to ecological weather issues.

Under a new program by the Arts Council of England some 30 British cultural institutions including national theatres and museums have joined together in a project called Spot Light pledging to reduce their carbon footprints by 2023. 24 Museums and other cultural institutions in New York are under mandatory legislation to reduce their emissions 50 per cent by 2030 and by 80 percent at a future date. 25

IV. Can Art Change Minds About Climate Change?
Having looked at questions relating to how art, science, and philosophy each contribute to our understanding of different approaches to ecological environmental concerns, let us now return to the empirical role of the arts in reference to ecological concerns. Specifically, one important question of interest is, can art change minds about climate change? To answer this question, we must turn to science for information on the subject.

Given these efforts of artists and arts institutions cited here to create performances and exhibitions of art that address ecological concerns, it is necessary to consider in what ways the arts advance the messages concerning ecological concerns and the future of our natural and built environments. Social science researchers curious about the relation of art and ecology
conducted an experiment at the environmental art festival in Paris held during the 2015 United Nations climate summit focused on the question, “Can Art Change Minds About Climate Change?” Researchers presented some 37 works of art to viewers. Of these 37 works, only 3 were found to motivate viewers to feel inspired to take some action. The common element in the three that motivated people to take action all contained a hopeful message.\textsuperscript{26} Neither playful nor colorful works, unless also of high artistic quality, nor gloomy dystopian images motivated participants to take action with reference to environmental issues such as climate change.

A more fully developed scientific approach to the question of the role of the arts in influencing people’s views on matters pertaining to ecology appears in a paper by Laura Kim Sommer, Christian A. Klöckner, and Andras in the journal, \textit{Psychology of Aesthetics, Creativity and the Arts}.\textsuperscript{27} The goal of this study by researchers Sommer, Klöckner, and Andras “was to investigate whether activist art can have a stimulating psychological effect on its spectators” relating to their views on climate change. Their research project surveyed 874 visitors’ responses to works located in various settings throughout the city of Paris at the ARTCOP21 Climate Change Festival in conjunction with the World Climate Change Conference. The focus of the Sommer, Klöckner, Andras study of 874 respondents considered “emotional reactions, the relevance of each work of art to their daily lives, and how much the works inspired personal reflection or action.” Responses were organized into four categories: “the comforting utopia,” “the challenging dystopia,” the mediocre mythology,” and “the awesome solution.” The responses were intended to identify ways in which the works of art might encourage the viewers to reflect on or consider “their own role within the climate crisis or the consequences of a changing climate.” Not unexpectedly, “the awesome solution” category of responses resulted in the highest emotional and cognition activation.

Art, by challenging us to reconsider the way we think and feel concerning climate control and other environmental concerns, has a role in addressing ecological concerns and the call to action. The actions of artists and exhibition presenters, together with researchers concerned with the effects of art on the environment, suggest that art with the right balance of emotions
have the potential to activate the public’s interest in climate change and related environmental concerns. What is promising here is the potential for collaboration between the various segments: artists, scientists, and by philosophers who contribute to our understanding of nature and the arts and their interrelations.

V. Art and the Ecology of Leisure

The particular issue that will consume the remainder of this essay is art as an aspect of the ecology of leisure. The focus will be with leisure activities arising from the creation, presentation or consumption of art that may have direct or indirect impact on the environment. While there is growing awareness of the ecological impact of the arts as cited previously here, little attention has been given to the arts as a form of leisure, or to the ecological effects of art in the context of leisure. John R. Kelley’s essay on “Leisure and the Arts” offers a beginning discussion of arts as a form of leisure, but does not include any consideration of art’s roles in ecology.28 Kelley’s account of the roles of art in leisure includes both practicing fine artists, folk or community arts as well as the participants in arts education, and those who engage in the arts as amateur artists or as attendees at museums and performances.

What does the concept of leisure refer to? In the simplest frame, leisure refers to free time apart from requirements for work or other societal duties. Leisure activities are intended to enrich personal life. Leisure broadly understood fulfils a need to recharge human energies. Leisure activities provide pleasure, a preferred human value cited by philosophers including the Greek philosopher Epicurus (341-370 B.C.E.) Leisure activities relate to the interests of persons and depend upon the availability of resources in nature and city life. For example, leisure activities pertaining to nature might include seaside sunning or swimming on a natural beach, camping, bird watching, fishing, skiing, mountain climbing, hunting, leisure travel, gardening, and other activities bearing directly on nature. City life provides a wide range of ways of participating in art including museums, performances, and individual projects that enable leisure activities.
Recent studies such as Chris Rojek's *Decentering Leisure: Rethinking Leisure Theory* have called for a broadening of our understanding of leisure activities allowing for changes in the field. Among Rojek’s concerns is to show how cultural conditions alter the meaning of leisure including the assumption that leisure is coextensive with free actions.

Leisure opportunities in the form of art, unlike those requiring access to natural resources such as ocean front, depend upon the talents and interest of art producing individuals and the cultural institutions necessary to the support and availability of art. Typically, though not exclusively, modern leisure activities belonging to art are linked to city life. Hence given that the dominant populations of the world now increasingly focuses on city life, art takes on a more important role in leisure.

Why is leisure in the form of art important in the context of ecological concerns? First, as we have seen, art especially in the form of biennales and exhibitions, and the maintenances of museums and concert halls, for example, is a major consumer of nature’s resources in the form of materials and energy consumption. Examples of this consumption are the natural materials in art exhibit construction, display, and transportation with notable impact on natural resources. Secondly, art has the potential for serving to aid in communicating understanding and appreciation of nature. Art, though perhaps in its embryonic stages in doing so, is able to help create awareness of ecological concerns through the creation of works of art focused on ecological issues as the exhibitions and experiments with the use of art to influence thinking and behavior cited here have shown.

In addition to the broader ecological threats to nature, there are also concerns affecting the future access of art being available to participate in addressing ecological concerns. Among these, as Rojek recounts, is the increasing intrusion of maximizing profit. The ecological consequences of pricing art out of reach will influence both the availability of art as a form of leisure and arts’ use as a means of advancing ecological concerns. No less of concern is the
influence of social engagement arising from individuals in passive mode such as being glued to their cellphones that replace living experiences with electronic sound bites. Imagine individuals at the museum or the concert venue glued to their cell phones!

Conclusion
Ecology aims at prompting actions to address disturbances in natural processes such as climate change and exhaustion of nature’s resources, by appeal to scientific data. Such changes threaten the conditions that we take for granted as the basis of the quality of life, and which we hold necessary to sustain human existence. Philosophy contributes to the conceptual understandings of key concepts such as nature and art and provides for integrating the contributions of science and art into a more wholistic understanding of ecological issues.

Art offers important forms of leisure contributing to and, as we have seen here, also has an important role in contributing to awareness and reflection on ecological concerns that may result in action beneficial of a healthy global ecology. In this essay, the aim has been to take account of art as a form of leisure that also serves as a means of advancing our understanding of ecological concerns. Hence art joins ecological studies as one more means of responding to the need for addressing the environmental problems that threaten both the natural and built environments, and the future of human well-being. In the words of a current ecologist, “The cave painting has given way to its modern equivalent: urban graffiti. As a species, we are still driven to broadcast our feelings graphically and publicly for others to see. But simple, factual depictions have given way to urgent statements of frustration and aggression. The human subjects are no longer mere participants but either participants or victims.”


20 Lucia Pietroiusti, Curator, La Biennale di Venezia, 2019. Pietrosi addresses the environmental concerns pertaining to art biennales and fairs at the Basel Art Fair in May, 2019.


22 Emily Sharpe, “How the art world is going green,” *The Art Newspaper, June 10, 2019.*

23 Cited in *Fair Dailies, Art Basel 2019*. Also, Emily Sharpe, “How the art world is going green,” *The Art Newspaper, June 10, 2019.* Sharpe’s Art Newspaper article, “How the art world is going green,” reflects on current efforts of the art world to address environmentally friendly practices in such venues as the Venice Biennale, the Basel Art Fair and private galleries across the world.


31 Michael Begon, Ecology from Individuals to Ecosystems (Malden Massachusetts: Blackwell Publishing, 2006), ix.
Bibliography


