

Of Story and Place: Communicating Ecological Principles through Art

Ruth Wallen

MY INTRODUCTION TO ECOLOGICAL ANALYSIS

In 1973 I was a young intern for the Council on Environmental Quality (CEQ) in Washington, D.C., reading huge stacks of environmental documents in order to analyze the documents' compliance with national environmental laws. The assessments were largely based on cost-benefit analysis. But it caused me to wonder about all the impacts that were not so easily quantifiable. How can one assign value to the preservation of a burial ground of native peoples who have long since been displaced? Or the cohesiveness of a community, either human or nonhuman? And how can one possibly quantify the aesthetic impacts of proposed development? Under the guise of objective assessment, value judgments were constantly being made, with unquantifiable factors implicitly considered less important. I still remember thinking about the larger questions that had no place in the reports that I wrote. I dreamed of making art.

Of course, attempts have been made to quantify intangibles. One could list aesthetic features in a fashion reminiscent of 18th-century guidebooks to picturesque landmarks and estimate their monetary value in terms of the tourist dollars they attract. But how to measure the monetary value of a walk in the woods? I recall Rebecca Solnit's elegant discussion connecting significant discoveries in quantum physics to conversations that took place on just such inspirational walks [1]. How does one measure relationship to place? What does it mean to people when a space long considered sacred is dammed over or plowed under? Or when the current inhabitants are not even aware of a place's historical importance?

AN ARTISTIC RESPONSE

I turned to art to pursue these questions that were left out of the reports I wrote for CEQ and other governmental agencies. I wanted to reveal the aesthetic, to acknowledge the sacred and, most importantly, to deal explicitly with values. I wanted to explore the non-quantifiable biological and cultural relationships to place, relationships too often missing from the decision-making processes about development.

My artwork centers around stories—stories that reestablish connections, stories that make relationships, stories that kindle meaning. My work begins by closely observing a place, in a deliberate attempt to slow down, to look and listen carefully. In response to the large scale of heroic earthworks, I start with minute details. I carefully define small systems representative

of larger-scale environmental processes. Through a conflation of time and scale, by repeated documentation of small-scale changes, I provide an intimate appreciation of the long-term, larger-scale environmental dynamics of a given locale. My art tells the story of a place by guiding the viewer through an experience of attentive looking.

My work is informed as much by scientific as by artistic traditions. Despite my complaints about the drudgery of reading stacks of environmental documents, or the limitations of their analysis, the systems theory that informs that assessment process is central to my work. Over the last 20-plus years, my art has evolved in parallel with the new scientific paradigms that emphasize dynamic systems. Fritjof Capra, in his short essay "Systems Theory and the New Paradigm," describes five aspects of the systems approach, including the shifts from "the part to the whole," "structure to process," "objective to 'epistemic' science," "'building' to 'network' as metaphor of knowledge" and "truth to approximate descriptions" [2]. Capra's first point, the need to see holistically, is most significant. It is echoed by many biologists, including Harvard's Richard Lewontin, who argues for a dialectical relationship between the whole and its parts: "Before we can recognize meaningful parts we must define the functional whole of which they are constituents" [3]. My early work emphasizes this

ABSTRACT

The author argues for the importance of art in the exploration of ecological interrelationships. Art can help engender an understanding of and connection to the natural world, illuminate values and illustrate the myriad of ecological processes. Various artistic strategies used by the artist are discussed, including performances that document close observation of place, site-specific artwork that offers the opportunity to look at the natural and cultural environment in a new way, and digital imaging and web design that encourage a careful reading of representation through juxtaposition of imagery.

Fig. 1. *The Sea As Sculptress*, detail of growth on a wooden structure after 6 months in San Francisco Bay near Alcatraz Island (1979). © Ruth Wallen



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exploration of the whole by examining significant ecological processes in relationship to systems and networks of interactions. Many cultural studies scholars, including Alexander Wilson, echo Capra and Lewontin: “Humans and nature construct one another” [4]. Though I began with the desire to document ecological processes, I came to realize that this documentation is conditioned by its place in human culture. Therefore, including the observer in the process of developing knowledge becomes most significant to my work. From this perspective science is no longer outside “our method of questioning” [5]. Values are part of the process. Our understanding is only partial. We can recognize the limits of human cognition and continually interrogate our conceptions of the world around us.

PERFORMANCES EXPLORING PLACE

My first significant project, *The Sea As Sculptress*, was inspired by the fact that, owing to improved water-quality legislation, the San Francisco Bay was becoming less polluted. Ironically, the result was an increase in marine life, which was destroying wooden structures, including the pier pilings and old ships that many wished to preserve. To investigate the life processes of the bay, I attached a 2×8-ft rectangular wooden structure, with six small blocks strung in the middle, to the pier at Fort Mason (San Francisco). Initially I planned to remove one block each month and preserve it as evidence of the sculpting power of the bay. But preserving the delicate colors of the algae was difficult; the results looked too static, too

much like museum specimens destined for a dusty storage shelf. Instead, I began to photograph, by means of macrophotography, the visually striking forms and patterns in the diversity of what I saw. While working at the Exploratorium [6], I placed wooden sculptures on the surface of the water at three locations in San Francisco Bay: Alcatraz Island, Fort Mason (a park area in a less polluted part of the bay) and China Basin (an industrial area near what is now a baseball stadium). At each site I also placed blocks vertically in the water at 5-ft intervals to a depth of 30 feet.

I initiated the project on the winter solstice of 1978. Over a year’s time I recorded the succession of growth of life in the bay. Beginning with various species of algae, the wood slowly filled with barnacles, mussels and, by the summer, complex communities that included a variety of crustaceans, tunicates, bryzoans and colonial hydroids. In the fall, as storms accompanied the cooler weather, much of the growth washed away.

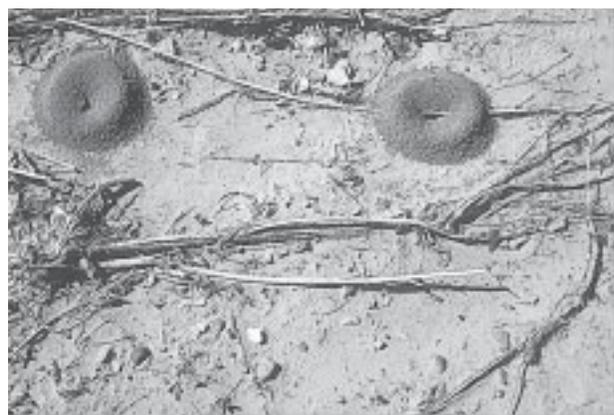
In many ways this work was similar to ecological niche studies in which plates are placed in the water and the life that grows on them is carefully recorded. However, my record was visual and intuitive, not a precise, quantitative measurement. By midsummer the structure at Alcatraz was so heavy that, in order to haul it out of the water to photograph it, I had to attach a rope from the structure to a Park Service vehicle (Fig. 1). Many people, perhaps only able to think of Alcatraz in the context of the formidable prison there, told me that nothing would grow there. But, being located farthest offshore, that structure had the lushest growth. It was the China Basin sculpture,

in a more polluted, industrial area, that was quite barren in comparison with the other two. My simple project presented visually accessible results that corroborated scientific research indicating that there was less marine life in more polluted parts of the bay.

I showed the work in the form of lecture/performances at the Exploratorium, at espace dbd in Los Angeles, and at several educational venues [7]. Accompanied by images that dissolved in a continuous multi-image slide show, I presented stories of working on the project, descriptive scientific information and periods of silence. My performances always ended with a discussion of the impact of development proposals, particularly an upcoming vote on a California proposition to fund a peripheral canal. This canal would have diminished the water quality of the bay by diverting incoming fresh water in order to meet the needs of Southern California. The discussions were always lively, as participants had a heightened appreciation of the variety of life in the bay; but, particularly in Southern California, they also desired more water. I hoped that my project would lead to a greater appreciation and a love for the bay, as well as more concern about the consequences of proposals that if implemented would drastically disrupt ecological processes. In fact, California Proposition 9 was defeated by a three-to-two margin in 1982 and the canal was never built.

I developed this approach further in a piece about Chaco Canyon National Historical Park (New Mexico). At the time, many types of energy development—including mining for coal, oil shale, natural gas and uranium and construction of

Fig. 2. *Intimate Details*, anthills in the Chaco arroyo, before and after rain, 1981. (© Ruth Wallen) These images were used in performance and also exhibited as black-and-white photographs (11 × 14 in). A close look will reveal a new anthill beginning to form in the upper right-hand corner of the second image.



September 3, 1980



September 12, 1980

coal-fired power plants—were proposed around Chaco Canyon. I was asked by the National Park Service to design a project that would show the effect of the proposed energy development on the park while not disturbing park resources in the slightest way.

The resulting work, *Intimate Details* (1980–1981), examined the interaction of the predominant physical environmental forces—sunlight, wind and rain—on the principle aesthetic form found in the park: sculpted earth, be it ruin walls, cliff faces or arroyo beds. Again I isolated small areas and photographed them repeatedly, in this instance for 3 weeks in late fall and again in the summer. Returning to the same sites every day, I recorded the changing patterns as sand slowly eroded off the arroyo banks, as ice thawed and froze, or as curls of mud formed and cracked. When the rain came, everything changed dramatically; the arroyo would temporarily fill, washing away anthills or eroding muddy banks (Fig. 2). A bit of mortar might fall from a ruin wall. Then, as everything dried, new patterns would emerge in the mud and anthills would form again. Through the conflation of time and scale, the piece demonstrated the process of canyon building. I also recorded the brilliant, changing patterns of light throughout the day on cliff faces and ruin walls. From an aesthetic standpoint, the light at Chaco is stunning. One of the archeological wonders of the canyon is a solstice marker where light shines through rocks at precise angles during the equinoxes and solstices.

Towards the end of my stay, I climbed out of the canyon onto the mesa. I was shocked to see brown haze in the distance, the plume from a huge coal-fired power plant. Energy development would bring small but significant changes to the canyon, such as increased acidity in rain, or increased quantity of rain due to higher particulate matter in the atmosphere. Certainly air pollution would change the quality of the light. In my work I tried to engender a sense of the preciousness of the region. In Chaco Canyon the entire process of canyon building could be disrupted by energy development in ways not so easily measured. Chaco Canyon was the center of the Anasazi civilization from roughly A.D. 900–1150, truly an energy center in another sense of the word. Ninety-foot-wide roads stretched in all directions. Archeologists still debate how the arid environment ever supported so many people, how they built such large pueblos and hauled large logs from mountains 75



Fig. 3. Children's Forest Trail, San Bernardino National Forest, the first of five 22 × 36-in permanent trail markers (1995). (© Ruth Wallen) Each panel consists of digitally composed composites of drawings and stories generated from workshops the artist conducted with local youth.

miles away. Why the inhabitants left is also a mystery; a 50-year drought, a lowered water table with consequent erosion, and a collapse of social institutions have all been postulated as contributing to the desertion of the canyon [8]. My presentations of *Intimate Details* at Chaco Canyon in interpretive talks, as a performance piece for New Langton Arts in San Francisco, or as a slide/sound show that

the park distributed to surrounding communities always ended with the same question: were we about to cause a new series of catastrophic changes to the canyon environment [9]?

In both of these works, I tried to communicate wonder and respect for the myriad ecological processes in an effort to develop a deeper, intuitive relationship with the natural world. I also pre-

Fig. 4. View Points, a viewing station including a hand-colored fiberglass embedded photograph, 11 × 14 in, and mixed media, part of a temporary installation at the Tijuana River Estuary Visitor Center (1995). Each of the 12 viewpoints, which include a viewing scope and a text-image pane, probes how nature is framed. (© Ruth Wallen)





Fig. 5. *I Love Del Mar*, 16 × 20-in title photograph, for an installation at Franklin Furnace, New York (1988), that examines the merchandizing of suburbia in Southern California. (© Ruth Wallen)

sented a sophisticated understanding of ecological dynamics. When I was photographing *The Sea As Sculptress*, people would often come and watch me work and look intently at the growth on the wood. But frequently when I told them the names of things, they stopped looking; they had the answer. For me, an understanding of invertebrate zoology allowed me to look more carefully at what I was seeing and gave me at least a rudimentary vocabulary for distinguishing between anatomical structures. In my performances I suggested that there was more to see, that there was more to understanding a complex system than simply knowing the names of the components.

A NEW APPROACH TO INTERPRETATION

Such an approach challenges much of the traditional interpretation offered in parks and natural history museums. As a discipline, interpretation has been influenced by the commodification of the tourist industry, with accessible, packaged educational materials geared to specific types of visitors [10]. Though many individuals working for these institutions are very creative, the methodology favors a reductive, simplistic view of science as absolute fact. Furthermore, in the name of avoiding political controversy, interpretation often avoids addressing the effects of cultural beliefs and political policy on the natural environment, issues that are central to the discussion I wish to develop. I want to involve the viewer in a discourse about a given place.

Years later, I was invited by San Bernardino Children's Forest to develop a series of large, 2×3-ft trail markers to be created by local youth (Fig. 3) [11]. I conducted workshops where the youth made drawings and stories to be incorporated into the finished panels that I designed. One plaque, for Ant Treesa, the name given to a tree that survived a forest fire and that is covered with ants in the summer, includes an interview with ants about their horror while watching their companions die during the fire. Another panel, about a rock that the youth thought looked either like a snowman or an eagle, includes myths about how the rock might have gotten either name. While the trail markers provide information about the fire and regrowth of the forest, there is also a place for play, for imagination, and for children to create their own relationship to the forest. Since that time I have also worked with youth to create a mural in the San Bernardino visitor center and an interpretive "Explorer Guide" to aid visitors in their exploration of the forest. The design of the collaboration was crucial to the success of all of these projects. While it was important to leave room for the youths' process of discovery, I was responsible for providing a conceptual framework and many opportunities for experiential learning about ecological relationships. Though it is appealing to have projects designed by kids, it is important to consider the adult contribution, in that the way the project is conceptualized and directed by an adult artist strongly influences the final outcome. Working in collaboration with

youth is a wonderful process of discovery. But it is also important to acknowledge the adult contribution. Even though youth were involved in the conception as well as the execution of the work, the initial information and conceptual framework that I brought to these projects significantly informed the final products.

Another project, *View Points* (1995), created for the Tijuana River Estuary, provides more complex interpretation addressed to adults as well as children (Fig. 4) [12]. Straddling the U.S./Mexico border, the estuary itself is an intriguing place, rich in contradictions. What is a sanctuary for bird watchers by day is just the opposite for the many undocumented workers who attempt to cross the border at night. On the U.S. side, without railroad and freeway development, the site is the least disturbed of the many estuaries and lagoons in San Diego county, serving as a home to several endangered plant and animal species. Though the river meets the ocean on the U.S. side of the border, the largest part of the watershed is in Mexico. Along the way the water is heavily polluted from Mexican industrial waste and raw sewage as well as erosion from construction on both sides of the border.

In the nature walk I encourage the viewer to contemplate the biological and political realities that affect the estuary. Though I was directed by park officials to avoid controversy and focus on the biological resources, my challenge was to frame ecosystemic concepts in a way that included human beings in the "natural" environment.

The work begins with the metaphor of the Claude glass. In the 18th century, Europeans on country walks would stand with their backs to the landscape and use this concave glass mirror to frame an idealized view. As I state in the introductory panel:

Before the advent of photography, a popular pastime was to use a Claude glass to frame the perfect picturesque landscape. The viewer would stand with their back to the vista, moving the glass until the ideal image appeared. Rose, yellow, scarlet—the glasses even came in different colors to simulate the color of light at different times of day.

What is the ideal view of the estuary? At one time wetlands were viewed as wastelands. Later they glittered with dollar signs and were filled in to make prime shoreline real estate. By the seventies scientists sounded the alarm, claiming that coastal wetlands were among the most productive habitats in the world.

This work is a proposal in a dozen questions: Instead of answers it offers a suggestion to think ecologically, to examine relationships. The viewing stations

point to phenomena from all parts of the estuary. Viewing scopes both frame and deliberately distort the view. Do we, like the users of the Claude glass, turn our back on nature in search of preconceived or idealized views?

When the viewer walks down the path, instead of focusing on plant and animal identification as in a traditional nature walk, the panels refer to ecological concepts, such as “niche,” “diversity” or “endangered species,” as well as to historical occurrences such as a proposed sewage treatment plant or the reliance of the endangered clapper rail population on periodic dredging to keep the mouth of the estuary open. To encourage further thought, each panel includes a challenging question that relates the human to the nonhuman environments. For instance, one estuary panel describes the fact that

for millennia life has flourished in the rich, fertile zone where waters from the land meet waters from the sea. In recent years heavy storms coupled with increased sedimentation of rivers and erosion of coastal dunes have caused sand to block the mouths of many San Diego estuaries and lagoons. How might aquatic habitats change when the river no longer flows into the sea? What life forms perish when a boundary no longer permits exchange?

Additionally, each station includes some type of viewing scope—ranging from spotting scopes to polarizing filters to kaleidoscopes—that in some way frames or distorts the view. As suggested by the metaphor of the Claude glass, one’s preconceptions about the landscape affect one’s perceptions of the estuary. This idea is summed up in the last panel, which refers to Heisenberg’s uncertainty principle, i.e. that what is seen

and how it is described depend on the position held by the observer.

EMBODIED METAPHOR

In addition to the systems perspective, this work is also influenced by developments in cognitive science, particularly the work of Maturana and Varela [13] and Lakoff and Johnson [14]. In the “Santiago theory,” Maturana and Varela argue that cognition “brings forth a world,” as opposed to the idea that a world exists independently outside the mind. Such theories challenge the notion of objective observation, or science’s “God trick,” as Haraway calls it [15]. Many scientists fear that relativist postmodern and deconstructive strategies that deny an external objectivity dilute the power of scientific argument. My work suggests another alternative, an embodied relationship to place. As N. Katherine Hayles puts it, traditional objectivity “can be defined as the belief that we know reality because we are separated from it. What happens if we begin from the opposite premise, that we know the world because we are connected to it?” [16]. My work communicates an experience that combines visceral and intellectual understanding of ecological systems. In *View Points*, the viewing scopes create a momentary disorientation, making the viewer conscious of the visual experience of seeing. This experience coupled with the interrogatory text encourages a re-examination of the viewer’s relationship to place.

Lakoff and Johnson argue that abstract concepts are largely metaphorical and that these metaphors exemplify the embodied, even neurological, nature of experience. A potent metaphor describes

one thing in terms of another and points to relationships between layers of meaning. Metaphor is central to many of my projects. I use it to explore existing belief systems and to propose alternatives. In *View Points*, the Claude glass exemplifies an idealized view of nature. The viewing scope becomes a metaphor for the frame.

My work that explores the constructed environment is developed around an examination of the metaphors used in real estate advertising. This work, and in particular several installations and artists’ books about the rampant real estate development in San Diego County, where I have lived for many years, responds to local marketing strategies that deny historical, cultural and biological contexts while promulgating clichéd, imported fantasies of an ideal life. Text, images and objects are carefully juxtaposed to provide a humorous but astute analysis of the fantasies concocted to sell the Southern California dream. The viewer is encouraged to read postcards, to play with a pop-up book—i.e. to investigate the work actively. One project, *Greetings from San Diego* (1989), an installation in the form of a tourist gift shop, begins with a large map titled, “Tour the World—See San Diego County.” Following the path set out in advertising brochures, visitors may travel to Antigua, Marseilles or Cherokee Canyon, all without ever leaving home [17]. My installation piece *I Love Del Mar* (1986) (Fig. 5) centers around an inland development known as North City West—more affectionately called Del Mar Highlands or Carmel Del Mar by developers—and examines the narcissism and lack of boundaries involved in the merchandising of the good life by the sea. In this work, central metaphors, in-

Fig. 6. *If Frogs Sicken and Die, What Will Happen to the Princes?* Image used in web site and bus poster show (1999). Through dissection of frogs, William Harvey demonstrated that blood does not ebb and flow but follows a continuous circuit. (© Ruth Wallen)





Fig. 7. *If Frogs Sicken and Die, What Will Happen to the Princes?* One of 19 bus posters, 9 × 16 in, produced for an exhibition sponsored by CEPA Gallery, Buffalo, NY (1999). This extensive work explores the frog as an indicator of the changing human interaction with the environment in which we live. (© Ruth Wallen)

cluding candy hearts (which are a wonderful source of found text) and bright red tomatoes (which are often planted in the area prior to real estate development) point to the commodification of desire and the distortion in the relationship to both land and family [18]. A later piece, *Legends* (1990–1994), was inspired by a housing development by that same name, comprising houses available in four models—the Helen of Troy, the Cleopatra, the Don Quixote and the King Arthur. The King Arthur section of the piece, created in the form of a pop-up book, I dubbed *The Camelot*, after another real estate development centered around a man-made lake in the driest part of San Diego County. Information about water use is juxtaposed with text from the advertising brochure, which quotes from the musical *Camelot*. After citing statistics on rainfall, averaging only 9.5 inches a year, as well as the rapid increase in population growth and per capita water use, the last page points to the unsustainability of such development. It quotes directly from the advertiser's text, "Don't let it be forgot, that once there was a spot for one shining moment, that was known as Camelot" (italics added) [19].

IF FROGS SICKEN AND DIE, WHAT WILL HAPPEN TO THE PRINCES?

Metaphor is most fully explored in my recent work, *If Frogs Sicken and Die, What Will Happen to the Princes?* (1998–2002). Frog and toad populations have been diminishing in many places all over the world. Countless species recently have become extinct. While frog disappearance cannot be correlated with a specific environmental factor, it is indicative of a more

worrisome general environmental malaise in which multiple interrelated causes contribute to population decline. Throughout history human societies have used the frog in myth, fairy tales, science and popular culture to explore our relationship to nature. In my project, consisting of digital montages that trace the historical importance of the frog to human cultures, I extend the metaphor of indicator species, using the frog as an indicator of the human relationship to nature.

In the process of working on this piece, I spent hours in the library, visited innumerable curio and souvenir shops, and amassed a huge collection of anthropomorphic images of frogs. I often recalled Carl Jung's remark: "the frog, more than any other cold-blooded animal, anticipates man." I was fascinated by the images I collected: representational sculptures, abstract talismans, fearsome creatures crawling on corpses, decapitated frogs in scientific illustrations, and a wide array of contemporary pop characters. In John Berger's seminal essay "Why Look at Animals?" he argues that the first symbols were animals, which had lives "parallel" to human beings, and functioned in rich symbolic relationship, entering "the human imagination as messengers and promises" [20]. He adds that, since Descartes, people have increasingly separated themselves from nature and relegated animals to a lost "innocence" or to spectacle. Similarly, I found that while both ancient and modern representations are anthropomorphic, modern popular representations tend towards simplistic, exaggerated caricatures, emphasizing distance, spectacle and a reductive cartoon-like view.

In my images I have used digital technology to combine traditional represen-

tations of frogs and illustrations of scientific experiments with innumerable photographs of contemporary frog souvenirs, biology classes and even a frog jumping contest in California (modeled after Mark Twain's famous story "The Jumping Frog of Calaveras County") [21] (Fig. 6). This use of montage demands that the viewer read the images to decipher the relationships—the stories—out of the symbols presented. Some of the juxtapositions I have constructed are humorous, even absurd, pointing towards both the magnitude of the environmental problems and the difficulty of understanding them in strictly quantitative terms.

Many of my images about ecology point to the distortion and simplification of the human relationship to the natural world in contemporary Western culture. The panel for habitat degradation features ceramic frogs in business suits, carrying Japanese Keroppee lunch boxes, sitting on the most artificial-looking fountain I could find (Fig. 7). A panel about introduced species shows frog characters surfing, photographing and exercising in front of images of a Budweiser truck and a Señor Frogs restaurant (Color Plate A No. 3). Another image about the disappearance of tropical frogs includes a huge array of curios photographed from gift shops at the San Diego zoo.

In the interest of making this material accessible to a large audience, to date I have shown the work largely outside of gallery settings. Sponsored by CEPA Gallery, I developed a series of 19 bus posters that were placed on a city bus in Buffalo that took a different route each day [22]. I also showed the work as intermission images in movie theaters in

downtown Los Angeles [23]. The entire work is displayed on a large web site that I continue to develop [24]. As I hope that the images will incite the viewer's curiosity, they are linked to a library that includes extensive background information about both cultural history and biological research.

But even as I look at my collection of images of frog curios and am repulsed by their cloying cuteness, I also sense a yearning in them, from their purveyors, for a deeper relationship with the natural world. One figure I frequently encountered is Kermit the frog. Kermit, from the TV show "Sesame Street" and *The Muppet Movie*, is the wise character, the leader. His initial portrayal in a swamp in *The Muppet Movie* is a classic image of lost innocence, but his development as he travels the country and skillfully escapes numerous mishaps also suggests the role of frog as messenger and trickster.

What do we need to learn from frogs' disappearance? What can we learn from their roles in folktales as well as from their depictions in contemporary culture? In the popular fairy tale, the ugly frog turns into the handsome prince. But now we find ourselves with too many princes and not enough frogs. Can we write a new ending to the story?

References and Notes

1. Rebecca Solnit, *As Eve Said to the Serpent: On Landscape, Gender and Art* (Athens, GA: University of Georgia Press, 2001) pp. 15–44.

2. Fritjof Capra, "Systems Theory and the New Paradigm," in Carolyn Merchant, ed., *Ecology: Key Concepts in Critical Theory* (New Jersey: Humanities Press, 1994) p. 338.

3. Richard C. Lewontin, *The Triple Helix: Gene, Organism and Environment* (Cambridge, MA: Harvard Univ. Press, 2000) p. 82.

4. Alexander Wilson, *The Culture of Nature: North American Landscape from Disney to the Exxon Valdez* (Cambridge, MA: Blackwell Publishers, 1992) p. 13.

5. Werner Heisenberg, *Physics and Philosophy* (New York: Harper and Row, 1971) p. 58, quoted in Capra [2] p. 337.

6. The Exploratorium is a hands-on science museum in San Francisco. During this period I became artist-in-residence there.

7. See Ruth Wallen, "The Sea As Sculptress," *High Performance* #22, 6, No. 2 (1983) pp. 83, 88.

8. See Linda S. Cordell, *Ancient Pueblo Peoples* (Washington D.C.: Smithsonian Books, 1994) and Lynne Sebastian, *The Chaco Anasazi* (New York: Cambridge Univ. Press, 1992).

9. *Intimate Details* was presented at Chaco Canyon Natural Cultural Park, New Mexico, in September 1980, and at 80 Langton Street, San Francisco, 9 May 1981.

10. Wilson [4] pp. 53–87.

11. These five murals were installed in 1995. They appear as trail markers located in San Bernardino Children's Forest off Highway 18 just east of Running Springs, California.

12. *View Points* was installed next to the visitor center for the Tijuana River Estuary, Imperial Beach, California, for 3 months in the winter of 1995.

13. Humberto R. Maturana and Francisco J. Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding* (Boston, MA: Shambhala, 1988).

14. George Lakoff and Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought* (New York: Basic Books, 1999).

15. Donna J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991).

16. N. Katherine Hayles, "Searching for Common Ground," in Michael E. Soule and Gary Lease, eds., *Reinventing Nature? Responses to Postmodern Deconstruction* (Washington D.C.: Island Press, 1995) p. 48.

17. *Greetings from San Diego* was commissioned as part of Street Sites and shown at Sushi Gallery, San Diego, CA, 1989.

18. The installation of *I Love Del Mar* was shown at Mandeville Annex Gallery, La Jolla, California, and Franklin Furnace, New York. My artist's book of the same name is in the collection of the Museum of Modern Art, New York, and has appeared in several group shows.

19. *The Camelot* has been shown at museums and galleries in California.

20. John Berger, "Why Look at Animals?" in John Berger, *About Looking* (New York: Pantheon Books, 1980) p. 2.

21. Mark Twain, *The Celebrated Jumping Frog of Calaveras County and Other Stories* (Philadelphia, PA: Running Press, 1989).

22. These posters were shown in CEPA Gallery and on Buffalo, NY, buses in the summer of 1999. For complete documentation see <<http://www.cepagallery.com/cepa/exhibits/EXHIBIT.19992000/rwallen/index.html>>.

23. These were shown in the fourth "Intermission Images," sponsored by Side Streets Gallery, Los Angeles, 1999.

24. This site is hosted by the California Museum of Photography <<http://www.cmp.ucr.edu/site/exhibitions/frogs/pages>>. See this site for extensive references as to the causes of decline in frog and toad populations.

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