



## Imaging conservation: Sea turtle murals and their effect on community pro-environmental attitudes in Baja California Sur, Mexico



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### ABSTRACT

Public art in Mexico has historically served as a platform for protest and social commentary. The purpose of this action research was to document sea turtle murals throughout Baja California Sur (B.C.S.), Mexico and to better understand the potential relevance of public art as an impetus for fostering pro-environmental attitudes, and the extent to which murals are a useful tool in efforts to protect the marine environment and the recovery of endangered species. Through qualitative research, we conducted 333 surveys and interviews with both adult and student participants in nine B.C.S. communities. Through descriptive narratives of participant responses, and Type I tabulations, we found evidence of outcomes that sea turtle murals may have in relation to respondent environmental attitudes about support for marine protections and the recovery of endangered species of sea turtles. Unexpected results from semi-structured interviews with respondents pointed weakly to the potential for murals in helping to shape pro-environmental behaviors towards the treatment and recovery of endangered sea turtles. The results of this action research may provide useful insights for improving management practices during future efforts to protect and restore marine environments and endangered species. That is, public participation in strategically placed community accessible art, may prove to be a valuable and innovative component of a broader suite of outreach and education initiatives used for bolstering community responsibility and empowerment for conservation of the marine environment.

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### 1. Introduction

The once isolated state of Baja California Sur (B.C.S.), in northwest Mexico is quickly modernizing, and subsequently facing various environmental threats associated with increased globalization. Additionally, the construction of American “Big-Box” stores and fast food restaurants—ubiquitous to the many strip malls throughout the United States—are now present throughout B.C.S., Mexico. Baja’s visual sphere on building walls, billboards, television, and the Internet is heavily utilized by the business and international development community to promote messages encouraging hyper-consumerism, hyper-individuality, expansion of mineral resource extraction, and boasts the construction of new Spanish-owned coastal mega-development projects which incorporate hotels and condominiums, desalinization plants, marinas, golf courses, and private air strips—some within the buffer zones of the federally protected Cabo Pulmo National Marine Park

(WiLDCOAST, 2013). However, researchers in this study have witnessed a shift in the utilization of various public spaces, potentially as a cultural and ecological necessity, where communities, in cooperation with marine and sea turtle advocacy organizations, are reclaiming spaces for the creation of large marine conservation themed murals which espouse environmental responsibility, appreciation and protection of marine environments, and the recovery of the five species of endangered sea turtles found in the waters surrounding B.C.S.

The purpose of this study was to better understand potential attitudinal outcomes that sea turtle murals in B.C.S.—specifically those utilized by the “umbrella” sea turtle conservation organization Grupo Tortuguero (Delgado and Nichols, 2005; Schneller and Baum, 2010)—may have in affecting pro-environmental attitudes regarding protection of the marine environment and recovery of endangered species of sea turtles. While the initial effort to paint sea turtle murals throughout Baja California Sur was a component of a specific regional conservation strategy initiated by Grupo Tortuguero after its inception in 1999, sea turtle murals throughout the state are now designed and painted by teachers, students, fishermen, and artists. The original murals were painted in a

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collaborative manner with local artists (primarily artist Marcos Aragon Velásquez) and students, and continue to be created today with the assistance of Mexican students, international students, fisherfolk, fisheries communities, and researchers (Grupo Tortuguero, 2013).

By conducting qualitative research in nine B.C.S. communities, we worked to identify the outcomes of viewing sea turtle murals on the environmental attitudes of interview respondents. Environmental attitudes can be considered an individual's concern for the physical environment (with preservation and utilization dimensions), based upon affective, cognitive, and conative domains (respectively: feelings, knowledge, and behaviors) (Gifford and Sussman, 2012). With insights gained through these interview results, we then provide recommendations for the use of publicly accessible art as a potential component of future marine management and environmental advocacy campaigns worldwide. A complementary purpose of this research was to also better understand the effectiveness of utilizing Mexico's public spaces in B.C.S. for artistically promoting protection of endangered species of sea turtles and the marine environment. As such, our literature review works to draw a parallel between notable public art and muralism in Mexico, which was historically used as a platform for social protest and commentary. Using this understanding of the historical context, we're able to recognize how advocates of the marine environment (in Mexico and globally) might find success in capitalizing on this method. It is in these public spaces where we worked to explore the extent to which the public (including fisherfolk, fisheries agency personnel, educators, students, children, etc.) has free access to information, the opportunity to gain awareness of the importance of this global issue, and to potentially adopt pro-environmental attitudes regarding marine protection.

### 1.1. A brief history of sea turtle exploitation in Mexico

Historically, much of the economic activity of B.C.S. has centered on exploitation of marine resources. Despite decreasing productivity due to the overexploitation of marine resources, species such as lobster, abalone, shrimp, shellfish and sardines continue to play an important role in the state's economy. Historically, sea turtles were also a traditional local food item consumed in B.C.S. (Delgado and Nichols, 2005). Following the Spanish colonization and the conversion of most Mexicans to Catholicism, turtle meat became an important meal during Holy Week, as well as other familial celebrations such as Christmas and Quinceañeras. For decades, sea turtles were commercially harvested in B.C.S. for an international market, and Mexican-caught sea turtles accounted for 50% of the global market in the 1970s until the collapse of sea turtle populations in the 1980s (Marquez et al., 1982; Marquez, 1990; FAO Fishery Department, 2000). Unsustainable sea turtle harvest rates in Mexico resulted in a subsequent sharp decline in sea turtle populations, and in 1990 the government of Mexico (via Presidential Decree) declared all five northwestern endangered species of sea turtles as protected from kill and capture (DOF, 1990). Despite the ban, sea turtles continue to be captured and consumed illegally; an entire adult green sea turtle will sell for about \$100–\$200 USD (anonymous interview respondent, 2008). NGOs have responded by working through grassroots campaigns and targeting community involvement in the issue, and have spread the message that cultural appreciation can come in the form of protection rather than consumption. Although ongoing threats to sea turtles in B.C.S. and the recovery efforts instigated by governmental agencies, NGOs, and fisheries communities has been discussed elsewhere (Schneller and Baum, 2010), the specific role of public art in the environmental education efforts has been underappreciated.

### 1.2. The history of muralism in Mexico

Mexico has a long history of utilizing the visual arts for political advocacy and communication, which contextualizes the potential for adopting public art as a tool for marine protection. Before the post-revolutionary murals of Los Tres Grandes (The Three Great Ones: Diego Rivera, José Clemente Orozco, and David Alfaro Siquieros), José Guadalupe Posada's graphic broadsheets were distributed throughout the revolutionary turn of the century in Mexico (Montgomery, 2004). While Posada's illustrations are mostly known for their satirical *calaveras* (skeletons), which mocked bourgeois attitudes during a time of social strife, the legacy of his work lies in its "broad accessibility and purported universal language" (Coffey, 2002, p. 9). Posada's never intended his broadsheets, which were essentially the first form of mass media, to be sold to international galleries or collected by Mexican dilettantes. It was a popular art, created to reveal the politically corrupted, socially immoral, and the daily struggle of the *campesino*.

Von Blum (1993) writes that the Mexican Revolution "Set the stage for the major democratization of artistic audiences by systematizing the public space for disseminating political artworks" (p. 463). Los Tres Grandes had access to the public walls of schools, government buildings, and other municipal buildings and, with inspiration and influence from Posada, used these walls to comment on, attack, or support political and social movements of their time. These murals: "served as the artistic means to educate a largely illiterate populace about history, politics, and society," thus "fundamentally [altering] the elitist character of visual creation" (Von Blum, 1993, p. 463). This muralism movement demonstrated that public spaces were a viable option for advocacy and education, a medium for communicating pressing social issues to a large group of potential stakeholders and allies.

While Von Blum (1993) discusses the use of public art as a means for advocacy, he also draws a connection between art of the politically driven and art of the environmentally aware. Speaking about Mexican environmental art (but not specifically of muralists), he mentions: "[environmental] artists use traditional and innovative forms to mobilize public awareness of the impending catastrophes that few political leaders are willing to confront" (Von Blum, 1993, p. 462). He asserts that the importance of public art is as a "new vehicle of visual expression" through which it can attract and invite a new "non-elitist" audience to engage in reflection and critical thinking, actions which could result in positive participation in one's community.

### 1.3. Public art and democracy

Posada's broadsheets and the muralism movement in early twentieth-century Mexico utilized art to convey information and ideas that were both accessible and legible by the general public. McCaughan (2002) argues that this satisfied a function of democracy, because it not only inspired public debate, but it "helped to create a greater sense of entitlement among broad sectors of the population and to redefine politics as an arena for the masses" (p. 101). The murals, McCaughan (2002) continues, challenged previously elitist notions of artwork and instead represented "Mexicanness" and "the people," which created an avenue for involvement of the masses in political and social movements (p. 101).

Conrad (1995) offers that murals are a form of democratic art, "art that is accessible to all, that relates to current or historical events or experiences, and that expresses deeply felt aspirations or visions for the future," (p. 98). He notes that murals have capabilities that are simultaneously educational, didactic, expressive, provocative, and strengthening. Similarly, drawing from

Dewey's art philosophy, Mattern (1999) upholds that "art [is] a stimulus to the debate and discussion that [is] vital to a healthy democracy" (p. 68). To Dewey (1934), artists are necessary social critics and informants to the public, since political commentary is often an integral part of their work. Art realizes this commentary, but public art makes this commentary freely visible. The nature of art, notably public murals, is both participatory and egalitarian through its function as a communicative arena. Socially conscious or politically driven artwork "revitalizes public life" and supports a basis of public involvement (Mattern, 1999, p. 72). Dewey (1934) maintains that art's contribution to the democratic process is a positive one: it functions by "enlisting support for the political agenda of a particular community, [by] publicizing a political issue, [by] drawing citizens into active participation in the public life of a community, and [by] galvanizing action on specific issues" (p. 71).

Dewey (1927) further posits that the democratic inclination of public art, such as murals, would provide a strong foundation for community-based social or political action. Dewey (1934) argues that communication of community values through public art "[makes] common what had been isolated and singular," thus rendering the experience meaningful by reminding the community of its proximity and responsibility to the issue (p. 253). Thus, if murals are didactic and directed, they can succeed in articulating norms, concerns, awareness and objectives (Dewey, 1934).

#### 1.4. Using environmental muralism as a tool for marine literacy

Broadly speaking, environmental art is not a modern phenomenon, and has even been utilized as a means to raise social awareness and encourage public participation (Blandy et al., 1998). Dewey stated that art (in general) is the "most effective mode of communication that exists" (1934, p. 298), and thus should be used accordingly. Environmental learning is an important tool used by NGOs in the B.C.S. sea turtle conservation movement as it has the proven ability to promote pro-environmental attitudes (Schneller, 2008). While it is probable that community members know that the sea turtle prepared for their celebratory meal during Semana Santa is endangered (and was killed illegally), it is less likely that they know that the plastic bag discarded on the ground may possibly end up in the ocean and potentially be eaten by a sea turtle who mistook it as its jellyfish food source. We hypothesized that it is possible that environmental murals, and specifically in the case of B.C.S., murals that depict sea turtles and other marine life, could be meaningful tools for fostering pro-environmental attitudes in support of sea turtle protections.

Since the sea turtle murals in B.C.S. are inherently local and fixed (immobile), their messages relate to local and bioregional marine concerns. Mattern (1999) reasoned that murals function reflexively, forcing viewers to participate with the art itself: "Murals express common experiences and, in viewing them, people commonly re-experience their sentiments, ideas, and beliefs" (p. 62). By creating a cycle of mental reflection, community members maintain their awareness of the illustrated message. Social participation occurs as a result of ownership and buy-in, and ownership occurs after self-identification—recognition of oneself within interpretation of the art (Dewey, 1934). Thus, in order for murals to be effective tools for marine protection, the imagery must generate a connection with the public. Dewey (1934) posits that art generates this connection naturally in the viewing process. Additionally, since murals are meant to be universally accessible, they do not require public knowledge of the aesthetics of art, or even prior knowledge of the environmental message within.

Song (2008) writes that art can play an extremely beneficial role in environmental learning, especially if students directly

participate in the art-making process. Using interdisciplinary approaches such as mural-making when teaching environmental studies works to engage students directly with the topic. Song maintains that "Art makes environmental education more experiential and helps to build appreciation, awareness, and a sense of shared responsibility for nature that students may carry throughout their lives" (p. 1). By working on environmentally themed art-projects students might develop pro-environmental attitudes because of their increased involvement and proximity to the issues. Making the environment meaningful to students through art, can potentially spur students to "follow their own drive toward appropriate individual, community, and global responses" (Song, 2008, p. 6). Furthermore, Song posits that art has a subversive characteristic that may cause children to question conventional thinking and create new conceptual patterns in regards to environmental responsibility, a message potentially passed inter-generationally to their parents and siblings. Finally, Song mentions that public environmental art—especially murals, which stand the test of time—have the capacity to reinforce, remind, and motivate environmental learners.

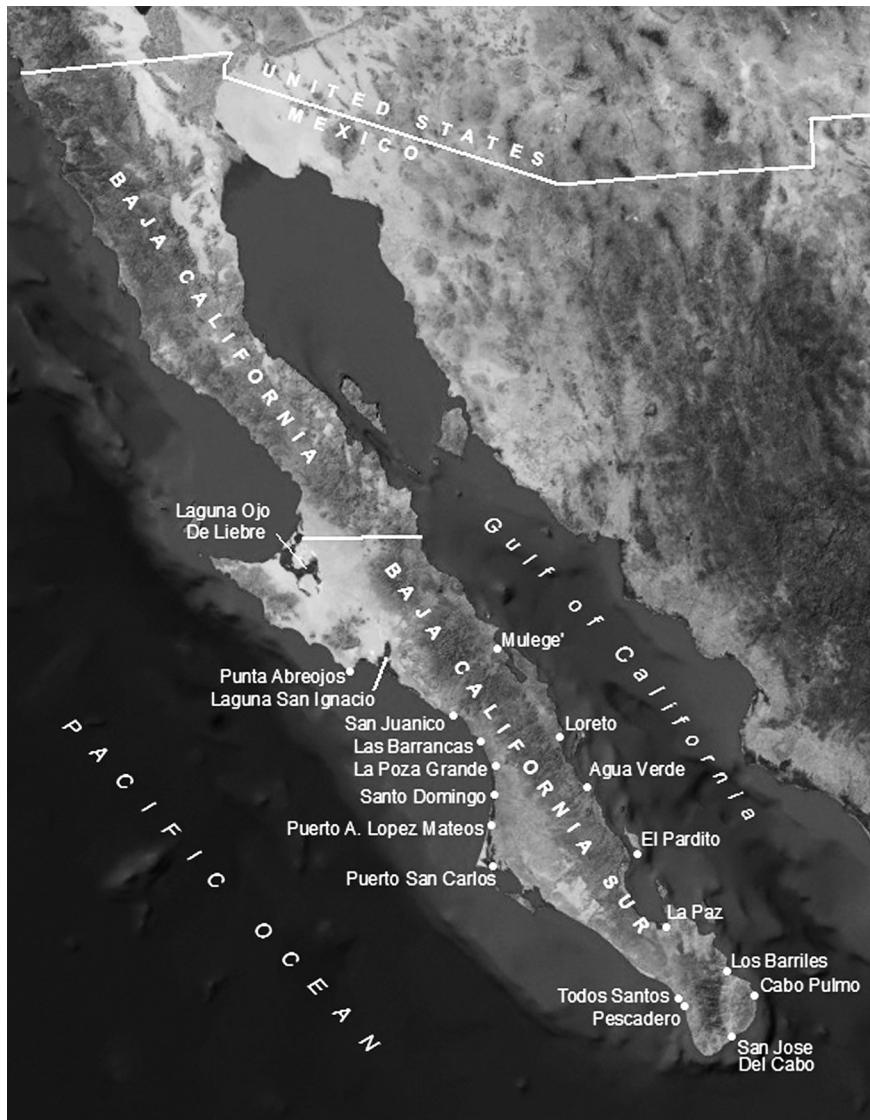
#### 1.5. Growth of the sea turtle conservation movement, community participation, and public art in Baja California Sur, Mexico

Although research on the emergence of Mexican civil society is comparably shorter than that of research on Mexican art history, the extent to which civic participation in the Third Sector (civic engagement) has proliferated in Mexico (due to a variety of social, economic, and political factors) during the past two decades is considerable (Bucher, 2010; Sabet, 2008; Schneller and Baum, 2010). A comprehensive overview of the emergence of civil society in Mexico is beyond the scope of this paper; however, it should be noted that public participation in environmental learning, service learning, and volunteerism, and exposure to community based social marketing are factors that have been documented as having positively contributed to the growth of pro-environmental attitudes in B.C.S., Mexico specifically (Delgado and Nichols, 2005; Schneller, 2008; Schneller and Baum, 2010).

Schneller and Baum (2010) document the political, social, and environmental factors that led to the rapid growth of the B.C.S. sea turtle conservation movement, and the associated public participation with the groups, from 1999—when only two NGOs were working for sea turtle protections in the state—to 2010, when they found that 19 community groups and 17 NGOs were working towards this common goal with robust instances of public volunteerism and civic engagement. (Fig. 1).

The unifying non-governmental organization in the state, Grupo Tortuguero de Las Californias, acts as an umbrella under which the sea turtle conservation movement is supported with a strategic participatory framework. In addition to community groups and NGOs, fisherfolk, children, students, educators, elected officials, federal and state environmental agency officials, and international marine scientists attend Grupo Tortuguero reunions, festivals, and workshops to participate in sea turtle recovery efforts. According to Schneller and Baum (2010), despite the fact that sea turtle community groups and NGOs in B.C.S. are geographically dispersed:

The social networking opportunities provided through norm entrepreneurs such as Grupo Tortuguero have contributed to the emergence of new voluntary associations. Growth of the movement is due in no small part to community access to a broader conservation network, technical training, funding, and organizational and ideological support, all contributing to competency, solidarity, empowerment, and political clout for the communities (p. 278).



**Fig. 1.** Map of coastal communities participating in sea turtle conservation efforts in Baja California Sur, Mexico (Schneller and Baum, 2010).

As a result of the sea turtle conservation groups' orientation within the 19 remote coastal communities, sea turtle murals in many of these locations depict sea turtles interacting with other species in a marine environment, include maps (and written information in Spanish) illustrating sea turtle migration patterns between Mexico and Japan, exhibit foraging habits (Fig. 2), and promote and model pro-environmental responsible human (tourist and fisherfolk) interactions and behaviors between the two species (Peckham, personal communication, 2010).

Artist Aragon Velásquez was commissioned to paint nine sea turtle murals in Adolfo Lopez Mateos, and two in San Juanico, B.C.S. Velásquez explained that he and Grupo Tortuguero developed some of the sea turtle murals with specific intentions:

To get people to have a more personal interest in the sea turtles, showing things you feel with a sea turtle, for instance, when you liberate a sea turtle. That meaning will never go away. The images you see in the murals remind you of your experience, and that will stay with you (personal communication, August 7, 2010).

While *environmental muralism* has presently received little scholarly attention in Mexico (or globally for that matter), the concept is heightening in importance as a potential complementary tool for promoting appreciation of the marine environment and celebrating environmental protection. The impetus for this research was our observation of artists, conservationists, researchers, fisherfolk, and community members working together to coordinate alternative methods for communicating and enhancing environmental literacy and appreciation. As such, we believe that the results of this action research can be helpful for informing future efforts of a variety of environmental campaigns that are working to promote, expand, and improve pro-environmental attitudes through public art, as well as to those actors (community organizations, NGOs, governmental agencies, etc.) that are attempting to advance sea turtle and marine protection efforts in Mexico. Additionally, messaging espoused through public art is not necessarily relegated to the environmental arena, and as such, it is possible that murals have the ability to be a strategic tool adopted by other social causes.



**Fig. 2.** Left: Adolfo Lopez Mateos mural illustrating the pelagic red crabs, an important food source for loggerhead sea turtles "Special Food" and (right), mural in Adolfo Lopez Mateos showing the coastal habitats of the sea turtle near Magdalena Bay, depicting the "Refuge zone of the yellow [loggerhead] sea turtle" and "Adolfo Lopez Mateos, sea turtle capital of the Pacific Ocean."

## 2. Methods

The purpose of this study was to document sea turtle murals throughout B.C.S., Mexico and to analyze the potential relevance of public art as a tool for fostering pro-environmental attitudes in relation to sea turtle and marine protections. By identifying the outcomes of sea turtle murals in 333 student and adult interview respondents, we provide recommendations for the use of public art for future marine management campaigns in Mexico and beyond. As utilized in our prior research (Senko et al., 2011), we approached this effort from the qualitative research paradigm (lens) of action research, which incorporates a collaborative approach as a means to systematic action in an effort to resolve social and environmental conditions (Creswell, 2003). More specifically, according to Berg (2004): "Action research is one of the few research approaches that embraces principles of participation, reflection, empowerment, and emancipation of people and groups interested in improving their social situation or condition" (p. 195). Daymon and Holloway (2011) add that one of the aims of action research is "to develop best practice as well as contribute to new knowledge about professional communication" (p. 111). The process incorporates participatory research, thoughtful planning and evaluation, and sharing results with stakeholders. As such, researchers and international students from the United States collaborated with the NGOs and community respondents in B.C.S. in order to better understand the outcomes of environmental muralism and how they might be utilized to enhance viewers' pro-environmental attitudes.

### 2.1. Population and setting

Baja California Sur is located at the northwest corner of Mexico, on the Baja peninsula. It makes up the southern half of the peninsula, with an area of approximately 28 369 square miles (ICF, 2006). The state contains the second largest amount of protected lands in the country, bested only by the northern state Baja California (ICF, 2006); 41% of B.C.S. is managed by the National Commission for Natural Protected Areas (CONANP). The desert climate and the surrounding ocean has made B.C.S. rather inaccessible, perhaps causing it to be the least populated state of Mexico, with a population of 697 611 (INEGI, 2012). Residents of B.C.S. earn, on average, higher wages than residents of other states, and B.C.S. has a much higher Human Development Index than the rest of Mexico (ICF, 2006).

### 2.2. Instrumentation

Data from students was predominantly obtained using open-ended Spanish survey questions that were completed by respondents with pen and paper. Written surveys were time

consuming, and our respondents also needed to feel comfortable writing. Adults completed written surveys as well as semi-structured verbal interviews, that were recorded using a voice recorder or transcribed onto paper by interviewers (Creswell, 2003). Survey and interview questions were developed with the assistance of native Spanish-speaking researchers from B.C.S., pilot tested with both native Spanish-speaking student and adult participants from B.C.S., and later refined for clarity and accuracy. Our semi-structured interview design and open ended survey questions consisted of questions and discussion items pertaining to participant attitudes and descriptions of their exposure to environmental communication, sea turtle murals, and organizations working for sea turtle conservation in B.C.S. Respondents were asked to broadly define the outcomes or effects (if any) of viewing sea turtle murals in various coastal communities; the effectiveness of the Mexican government at communicating conservation messages regarding sea turtles (in any medium); the existence of respondent historical participation and volunteerism in the local community (with sea turtles); historical attendance of sea turtle festivals and/or workshops; descriptions of modes of media contact and environmental education; respondent perceptions of sea turtle conservation groups in B.C.S.; attitudes about protections for endangered sea turtles; and ultimately, how respondent attitudes about sea turtle protection efforts might have changed over time. Since the results of this manuscript are focused specifically on a better understanding of the outcomes of sea turtle muralism, the broader results discussed above can be found at Schneller and Baum (2010).

### 2.3. Data collection, analysis, and limitations

Interview and survey data were collected anonymously in nine cities in B.C.S., Mexico, including: Ciudad Constitución, Puerto San Carlos, Loreto, La Paz, Cabo San Lucas, Cuidad Insurgentes, Puerto Adolfo Lopez Mateos, Isla Magdalena, and San Juanico, which represent different coastal and inland regions of B.C.S. A total of 333 semi-structured interviews and open ended written surveys were conducted in Spanish with student and adult respondents over a period of six months, during 2008 and 2009, with the assistance of international students from The School for Field Studies Center for Coastal Studies. We collected a total of 160 student open-ended written surveys and conducted 12 student semi-structured interviews. Student respondents ranged in age from 12 to 18 (mean = 14). We collected a total of 97 adult surveys, and conducted a total of 64 adult semi-structured interviews. Adult respondents ranged in age from 18 to 72 (mean = 39). All respondents were residents of the state of B.C.S. Of those who stated their gender, 175 were males and 147 were females (students and adults combined). Interviews and surveys lasted approximately 10–15 min.

Surveys and interviews were conducted near town plazas and other populated areas such as retail shops and beaches. Through non-probability convenience and snowball sampling, participants were contacted opportunistically while walking the streets, and sitting in restaurants and plazas (Bernard, 2000; Creswell, 2003). Further, we utilized purposive sampling on four occasions in order to reach a larger number of student respondents (Creswell, 2003). This sampling was conducted with secondary school students and their cooperative teachers. We visited four middle schools in the state and distributed 40 surveys at each site. One semi-structured interview was conducted with Marcos Aragon Velásquez, muralist/artist/environmental advocate from Adolfo Lopez Mateos, B.C.S. One semi-structured interview was conducted with Dr. Hoyt Peckham, former Director of Proyecto Caguama (a.k.a proCaguama), and co-designer of 11 sea turtle murals in B.C.S.

After the interviews and survey data were collected, responses were translated into English and entered into word processing and spreadsheet software. Content analysis of interview and survey data (the descriptive narrative quotes) allowed us to code and categorize representative samples of content into five emerging dominant themes (related to environmental muralism) (Creswell, 2003). At the outset of this action research effort we had hoped to gain a better understanding of *how* publicly accessible art complements marine management and environmental advocacy campaigns, and as such, the themes which emerged (from participant responses) during the coding process, have helped us to identify the usefulness of murals. We were able to identify these four themes as: aesthetic qualities (of the murals); intrinsic rights of sea turtles; plight of the species ecologically; and raising environmental issue consciousness.

Distinct limitations of this qualitative research (and qualitative research more broadly) relate to the lack of a pure control group of respondents who ideally would *only* have been exposed to sea turtle murals, and no other form of education media, outreach, or communications regarding sea turtle or marine conservation. Respondents and the broader population of B.C.S., however, do of course have access to television, word of mouth, radio, workshops, comic books, and conservation education in the schools and at sea turtle festivals, etc. Our qualitative research—an attempt to gain a holistic understanding of how publicly accessible art complements marine management and environmental advocacy campaigns—is not intended to present measurable facts, and relies upon subjective self-reporting and rich description that is presented by the experiences of human beings (Daymon and Holloway, 2011). Further, our research was not commenced with access to baseline data, and as such, this qualitative research does not work to *prove* with any certainty (statistically significant results) changes in attitudes, knowledge, or behaviors as a result of viewing sea turtle murals. It should be noted that our qualitative findings do work to present research evidence (data), which may help the sea turtle conservation community to acquire a *better understanding* of the outcomes of sea turtle muralism.

The broader qualitative research community working through the lens of action research and evaluation of community based social marketing has addressed (and demonstrated) the quality of action research by: engaging with a setting and community through a lengthy period of time; data triangulation (multiple data sources, collecting data from different age levels and social groups, data collection in various settings, and at different times); gathering rich description/descriptive narratives; searching for negative cases and alternative explanations; and identifying the existence of differences within the characteristics of respondents who had (and had not) been exposed to messaging (Berger, 2010; Daymon and Holloway, 2011; Gregson et al., 2001). Our qualitative research effort worked to employ these techniques to the greatest extent possible.

Analysis of descriptive narratives has proven useful in our historical research as a low-inference data analysis technique for recognizing trends in responses and to convey our multiple research findings (Schneller, 2008). Validity of our findings was further addressed by identifying accounts of discrepant information (deviant cases) (Creswell, 2003). The inclusion of these outlying participant perspectives provides for a more holistic understanding of the variations in responses while also allowing for a more contextualized and descriptive participant response framework. “The prevalence or lack of discrepant information therefore allowed for greater insights into the credibility of perceived patterns of phenomena identified by this research” (Schneller, 2008, p. 297). Finally, our qualitative analysis also employed Type 1 tabulations as prescribed by Silverman (2006), and as such, we assigned percentages to some of the interview data to more accurately report frequencies of phenomenon. It should also be noted that researchers lived full-time on the peninsula for a period of four years.

### 3. Results and discussion

#### 3.1. Analysis of content from a sampling of sea turtle murals in Baja California Sur, Mexico

Since this study's focus is based on the sea turtle murals of Baja California Sur, throughout the manuscript we present a sampling of the murals themselves in Figs. 2–6. These figures demonstrate the various images and messaging used in the sea turtle murals of B.C.S. It is in the nature of art to be open to interpretation and participation. In many of these murals, art viewers and community members were invited to design and participate in the painting of the pieces. In part, it is the viewer's interaction (connecting with the messaging and imagery and/or actually participating in painting works of art) that potentially makes murals an effective medium for communicating marine protection messaging. It is especially important that the act of muralism incorporate these components, if the aim is to encourage attitudinal social (and environmental) change and participation in marine recovery efforts. The sea turtle murals presented below exhibit various imagery and use discrete methods for communicating sea turtle and marine protection messages. The major themes presented in the murals incorporate elements of sea turtle ecology (feeding patterns, migratory paths, and nesting zones) fisherfolk involvement in sea turtle conservation and research efforts, and interaction with the species during fishing activities; and others focus on socially responsible ways of human interaction with sea turtles, such as ecotourism, voluntourism, and community participation in citizen science initiatives, while some murals merely present sea turtles in idyllic marine environments.

While we can't identify the ways in which all of the specific imagery has implications for how the murals affect viewers, according to muralist Aragon Velásquez, fisherfolk were strategically placed in some of the murals so as to see themselves and their livelihoods reflected in the artwork:

A lot of people are fishermen and use nets, and a lot of people think sea turtles are tasty...and in the past, everyone could [legally] eat one. So the murals show how to conserve sea turtles. The murals can help to bring a consciousness about sea turtle conservation. The murals get you familiarized with the animal and remind you of how great they are, worth much more than just food (personal communication, August 7, 2010).

What looks simply like a salutation painted on the gas station wall at the entrance to a fishing port, the mural panel in Fig. 5 depicts two fishermen holding a banner that reads, “Welcome to



**Fig. 3.** Left: Adolfo Lopez Mateos detail of a mural depicting people releasing a sea turtle fitted with a transceiver and (right), Adolfo Lopez Mateos mural depicting pelagic sea turtle tourism.



**Fig. 4.** Left: San Juanico mural illustrating an ocean ecosystem in which fisherfolk, surfers, and sea turtles coexist and (right), mural at the Puerto San Carlos Sea Turtle Festival.

the yellow [loggerhead] sea turtle capital of the Pacific Ocean.” By illustrating the message as a banner held by fisherfolk, rather than simply painting the words over the scene, the mural informs viewers that some local fishermen are largely responsible for, and

proud of, their sea turtle conservation efforts. Furthermore, the *pangas* (boats) are named proCaguama (the name of a former sea turtle NGO), and reads “*pesca responsable, pesca inteligente,*” (responsible fishing, intelligent fishing) heralding the NGO



**Fig. 5.** Left: Adolfo Lopez Mateos mural illustrating the international Japan to Mexico migration pattern of the loggerhead sea turtle “Fishermen saving the sea turtles” and (right), Adolfo Lopez Mateos mural painted on the gas station, depicting fisherfolk holding a sign that reads: “Welcome to the yellow [loggerhead] sea turtle capital of the Pacific Ocean.”



**Fig. 6.** Left: Study abroad students from the School for Field Studies touching up a neglected sea turtle mural at the High School in Puerto San Carlos and (right), Mexican student and artist painting a new sea turtle mural at an elementary school in La Paz during the Reunion of the Grupo Tortuguero.

responsible for the mural commission, as well as their objective to promote responsible coastal fisheries practices. The murals that illustrate humans in the marine environment demonstrate the proper ways of interacting with sea turtles: viewing, monitoring, and respecting—not catching and eating—sea turtles (Figs. 3 and 4) (Peckham, personal communication, 2010). By exhibiting scenes in which the two species (often contending forces) coexist freely, these murals help to reinforce the idea that local fisheries play a direct role in the responsible management, protection, and recovery of this endangered species.

An important role that the sea turtle murals in B.C.S. play is one of environmental education (Peckham, personal communication, 2010). The murals that we document may help to promote marine ecological literacy at a level accessible to both students and adults. For example, in Adolfo Lopez Mateos, a mural series depicts the red crab food source of sea turtles, and the sea turtles' frequented habitats in B.C.S. (Fig. 2). Fig. 5 shows the migratory path of the loggerhead sea turtle between Japan and Mexico, functioning to educate viewers (international and domestic tourists) that Mexico has an important responsibility to the protection of sea turtles, a globally wide-ranging endangered species which necessitates international cooperation for successful species recovery. These murals educate viewers that marine-based industries and environments are interconnected; successful recovery of the sea turtles as a species must encompass not only the protection of its nutritive source, but also its foraging and nesting habitat and international migratory route. By reminding the community, and especially the fisherfolk of this, murals are one component of a broader management and communications campaign that could result in heightened pro-environmental attitudes towards the environment.

These broader sea turtle management and communications campaigns throughout Baja California Sur are conducted by both state and federal government environmental agencies, as well as NGOs. We used a Likert scale question to gauge adult respondents' perceptions of the effectiveness of sea turtle communication campaigns initiated by NGOs and governmental agencies. Out of 161 responses, on average, NGOs were rated at 3.9, while governmental agencies were rated at 3.6. Specifically in relation to sea turtles, while most respondents stated that "I agree" that NGOs/environmental agencies communicate well with the public, NGOs on average scored about 10% higher for successful communication campaigns related to sea turtle conservation. We note here that in regard to sea turtle conservation communications programs, state and federal government agencies produce printed brochures, posters, and directly coordinate with NGOs on a variety of projects (catch/recapture data, reports, policy, environmental education, workshops, conferences, and have a small presence at sea turtle festivals); however, to date, we have found no evidence that state or federal environmental agencies are working to design, paint, or promote sea turtle murals for communicating environmental messages.

Our adult respondents discussed that television and sea turtle festivals offer additional avenues for learning about sea turtle conservation. Respondents explained that the television coverage of sea turtle conservation was limited to Mexican news coverage about sea turtles: *arribadas*<sup>1</sup> in Oaxaca; issues related to poaching and bycatch; and news coverage of the sea turtle festivals. Sea turtle festivals are popular throughout the region, and every festival site (city) paints a new sea turtle mural as the years progress (Fig. 4). Respondents also discussed television coverage of "Environmental Telethons" that include fundraisers for national parks, sea turtles,

and whales. And finally, student respondents also described that they had at times watched television natural history programs such as those found on the Discovery Channel.

### 3.2. Sea turtle murals – respondent survey and interview outcomes

The respondent survey and interview data are coded and presented thematically through our identification of participant-created descriptive narratives; adult results are presented separate from students. We organized the themes that emerged from the data according to the affective (feelings), cognitive (knowledge), and conative (behavioral) outcomes of murals on our interview participants. The themes include: aesthetic qualities (of the murals); intrinsic rights of sea turtles; plight of the species ecologically; and raising environmental issue consciousness.

#### 3.2.1. Aesthetic qualities (of the murals)

Participant responses which predominantly highlighted the beauty of the art, and more specifically, the beauty and appreciation of sea turtles themselves, offered the least amount of insight into pro-environmental attitudes; however, we do not believe that these responses should be discounted, as participant responses showed that viewing sea turtle murals can evoke the affective domain, and feelings related to an appreciation for natural beauty. Ultimately, if murals can foster the promotion of finding beauty in the marine environment, then this is a positive trait that could eventually morph into behaviors that support environmental protection. A student representative quote in this category included the following: "Thanks to murals I remember that the sea turtles are beautiful".

#### 3.2.2. Intrinsic rights of sea turtles

A second category of participant responses demonstrates that the effect of viewing the murals included a better understanding of the rights of the species, regardless of their monetary value or utility to humans. Simply stated, humans do not have the right to kill or extinguish this species, which implies stewardship. Since B.C.S. experiences some of the highest global rates of incidental sea turtle by-catch and illegal consumption, the emergence of this category is of value (Nichols et al., 2003; Hays et al., 2003; Nichols and Safina, 2004; Peckham et al., 2008; Mancini and Koch, 2009). A student representative quote in this category included the following: "The mural taught me that the sea turtles have a right to live".

#### 3.2.3. Plight of the species ecologically

The third category we identified related to the conservation status of sea turtles. Respondents who had viewed sea turtle murals described that murals were educational reminders that sea turtles have a role in the marine environment, and are in danger of extinction due to mistreatment of the species and illegal consumption. A representative student quote in this category included the following: "We should be careful with the sea turtles because they are in danger of extinction and it's ugly." A telling adult representative quote included: "In the future sea turtles will not be known by our kids".

#### 3.2.4. Raising environmental issue consciousness

The last category we coded emerged from respondents who called attention to how viewing a sea turtle mural can raise consciousness surrounding the issue, broadly. The heightened consciousness of issues is related to educational aspects of the murals, which include pollution, ecological aspects (Baja is a major feeding zone for internationally migrating sea turtles), the immediate need for marine protection, and the legalities related to illegal

<sup>1</sup> A massive nesting phenomenon where hundreds to thousands of female sea turtles come ashore to lay eggs.

consumption. A representative student quote explained: "I think we should help save the sea turtles and promote that with murals".

An unexpected theme that emerged during interviews and surveys with respondents was an impetus for pro-environmental behavior. The responses suggest a desire toward pro-environmental behavior based on raised awareness of marine conservation issues. Respondents who had viewed sea turtle murals in B.C.S. described how murals helped to *renew* or *remind* them of their commitment to support the protection of sea turtles, supporting the sea turtle conservation "cause," and reported a potential commitment to change their behavior regarding consumption and harm to the species. While sea turtle murals are a constant (fixed) reminder of the pro-environmental behaviors, other variables likely contributed to, or bolstered, these statements of proposed behavior, including: legal aspects (illegality of consuming sea turtles and fear of fines), exposure to prior educational campaigns or festivals in their community, lack of access to black market products, and even social stigma. A student representative quote states: "I don't want to eat sea turtles anymore. They are beautiful". Representative adult quotes include: "They are pretty, and murals remind me that sea turtles shouldn't be eaten".

The results from our surveys and interviews (conducted in nine communities) revealed that among adult respondents, 51% (71/138) had seen a sea turtle mural in the state of B.C.S., while 49% (67/138) of adults had never seen a sea turtle mural. Within the adults that answered "Yes" to having seen a sea turtle mural, 70% (50/71) of participants had the ability to describe the outcomes of the viewing, yet 30% (21/71) described that even though they had seen a sea turtle mural, it had *no specific effect* (on themselves or otherwise).

Students were far more likely to have seen a sea turtle mural in B.C.S.: 76% (124/163). The higher visibility among student respondents is most likely due to the presence of sea turtle murals at their schools, and their participation in designing and painting the murals. Among students, 84% (104/124) of our respondents had the capacity to explain the effects of viewing sea turtle murals, with

16% (20/124) responding that the murals had no specific effect (on themselves or otherwise).

As described above, interview responses are organized according to the subject matter within their answer. In Tables 1 and 2 (below) we display a variety of representative quotes from our respondents. The largest *quantity* of student and adult created responses described that sea turtle murals raised their environmental issue consciousness, which might induce pro-environmental behaviors (in relation to curbing pollution and illegal consumption of the species). There was no mention of adult behaviors in relation to incorporating fishing techniques that would reduce incidental take of sea turtles.

The public of B.C.S. explained the various outcomes of viewing sea turtle murals that are painted in public spaces in their community. After analyzing these responses, we now have a better understanding of the extent to which murals can help to act as reminders of the need for sea turtle conservation, and potentially assist motivationally in regard to practicing pro-environmental behaviors. The following student and adult responses demonstrate that mural viewing acts as a reminder of our responsibility to act pro-environmentally towards endangered species: "Murals are a way of remembering that we should care for the sea turtles" (adult interview respondent); "Murals give us knowledge about them [sea turtles] and we do a favor to the environment by not eating them" (student interview respondent). While we cannot report the frequency with which respondents practiced pro-environmental behaviors, the murals have the ability to serve as a reminder and motivational tool to instigate behaviors in support of sea turtle and marine protections.

Both students and adults explained with greater frequency that the murals affected their knowledge, attitudes, or behaviors, than they responded that murals were solely regarded as an item of beauty. Such responses point to the educational and motivational value of murals—essentially influential—rather than purely aesthetic. In other words, the B.C.S. sea turtle murals may act as an

**Table 1**  
Student created responses to "How have sea turtle murals affected you?"

Aesthetic qualities	Intrinsic rights of sea turtles	Plight of the species ecologically	Raising environmental issue consciousness
Happiness and beauty amongst other things.	To respect the sea turtles	We should be careful with the sea turtles because they are in danger of extinction and it's ugly.	Murals teach you that it isn't good to kill turtles.
I felt emotional to see a mural about [sea turtles].	It's important to save them.	When we kill them it is bad for the environment.	Murals make me want to help.
I like them, they are very pretty.	Now I know that sea turtles are very important.	We are losing sea turtles.	Murals inspired me to support the cause in favor of the sea turtles.
Sea turtles are curious and beautiful.	The mural taught me that the sea turtles have a right to live.	People eat sea turtles.	I don't want to eat sea turtles anymore.
Thanks to murals I remember that the sea turtles are beautiful.	I see the importance of caring for them and not killing them. Sea Turtles are beautiful.	Sea turtles are disappearing.	They are beautiful.
It has little effect since it's just a drawing.	I thought that it's cruel to kill them.	Murals give us knowledge about these animals.	I want to help preserve the sea turtles so they don't go extinct.
			The murals taught me to not eat sea turtles and to take care of them. To not contaminate or kill them.
			I have a mural at school and it is good to know more about the sea turtles.
			Murals called my attention to the sea turtles.
			I found out that we hurt sea turtles and we shouldn't pollute, so that they live longer.
			Murals give us knowledge about them [sea turtles] and we do a favor to the environment by not eating them.
			Murals teach about nature.
			I think we should help save the sea turtles and promote that with murals.

**Table 2**

Adult created responses to "How have sea turtle murals affected you?"

Aesthetic qualities	Intrinsic rights of sea turtles	Plight of the species ecologically	Raising environmental issue consciousness
Murals are pretty.	Killing sea turtles is bad, and we need to give them love. They are intelligent like humans.	We are finishing off the beautiful things in the ocean.	They don't affect me, but murals give people a consciousness not to kill sea turtles.
I loved it.	The existence of sea turtles is important.	In the future, sea turtles will not be known by our kids.	It's a new culture – it's forming a new vision for the community, and it's good for the groups who work for the existence of sea turtles.
I loved to see the mural.		Sea turtles are disappearing. It is exciting to know the history of those animals.	I believe murals motivate people to care.  By means of a mural, it explains everything!

impetus for civic engagement and social change, as Dewey (1934) had asserted, as well as being pleasing to the public eye.

Our data suggests that sea turtle murals are reminders of the need to be conscious about the plight of our oceans and sea turtles as a species; people are aware of, and reminded through murals, that sea turtles are indeed in danger of extinction. Respondents explained that sea turtles have a right to exist as a species, are deserving of love, respect, and care, and that future generations of humans should not be robbed of their right to encounter sea turtles. We heard responses relating to the affective domain of participants who discussed the outcomes of murals on their feelings of concern. While some respondents discussed that the murals evoked emotional responses of sadness, anger, happiness, and beauty, others described that the murals gave them an appreciation for how beautiful the sea turtles as a species are.

#### 4. Recommendations and conclusions

While interviews and surveys did result in data related to pro-environmental attitudes and behaviors, there was no specific evidence of adult fisherfolk who self-reported that murals had an effect on their choice of using fishing equipment which might reduce the incidental take of sea turtles. While incidental take of sea turtles is a serious environmental problem for communities such as Adolfo Lopez Mateos, not all fisherfolk are experiencing incidental take during their fisheries activities. While it is unrealistic from a management perspective to believe that murals would have such a direct and potentially wide-reaching behavioral effect in this regard, we found that the murals do, however, serve as a reminder to fisherfolk that we (as humans) have a responsibility to be good stewards of our marine environment, and that the recovery of endangered sea turtles is one vital component. During our community interviews and surveys, we encountered fisherfolk who were working with conservation organizations to directly change fishing methods with the goal of reducing incidental take of sea turtles, as well as participating in sea turtle voluntourism, but it is unlikely that the murals affected this decision. Perhaps this is a shortcoming of the content of the current murals. While current murals do

explicitly say (and depict) "Fishermen saving sea turtles", future murals could be designed to directly show how specific fisheries methods are resulting in incidental take of endangered species. For example, in locations such as Adolfo Lopez Mateos, one mural could be designated as a weekly updated artwork that reflects the number of documented incidents of sea turtle by-catch.

In the words of our interview respondents, the community murals *teach, inspire, call attention to, motivate, remind, and explain* to viewers the importance of sea turtle and marine conservation. Through collecting these data from our respondents we now have a better understanding about the contributions of murals when utilized as one tool within a suite of outreach initiatives where the overall goal (as implemented through Grupo Tortuguero) is community empowerment for responsible marine management. As described by Peckham, the true potential of murals, however, is realized when they are incorporated into a holistic outreach campaign—one that educates, engages, and inspires in thoughtful and locally resonant ways, which may include informative workshops for fisherfolk, curriculum enrichment for schoolchildren, comic books, brochures, radio programming, regional festivals, holiday parades, sports competitions, and puppet shows (personal communication, 2010). And in many Baja California Sur locations, this integrated approach to conservation communications has resulted in substantial decreases in sea turtle bycatch and poaching (Peckham, personal communication, 2010). While these multi-media approaches to sea turtle and marine conservation complement one another, we found, as with similar efforts to evaluate community-based social marketing, "this range of methods and interventions presents particular challenges for evaluation" (Gregson et al., 2001, p. 4).

International governmental and civil society conservation initiatives should continue to consider the inclusion of thoughtfully designed<sup>2</sup> and strategically located murals to serve as a useful medium to promote pro-environmental attitudes and behaviors, as well as heighten environmental issues awareness among the

<sup>2</sup> Designed by the local community, civil society, regional agency offices, and as much as possible, painted including the participation of local residents.

public. In the case of B.C.S., Mexico, pedagogically, environmental murals have provided a means by which communities have public access to information about the marine environment. While much work still needs to be accomplished in B.C.S. to reduce incidental take and recover sea turtle populations (through enforcement, policy, retooling fisheries, advocacy, etc.), these unique murals continue to espouse a political, cultural, environmentally ethical, and bioregionally didactic public art tool.

We believe that public spaces in Mexico and worldwide could be better utilized for environmental messaging. Civil society has an opportunity to expand the use of these spaces, using muralism for the promotion of environmental protection far beyond sea turtle conservation. According to [Delgado and Nichols \(2005\)](#), “cultural symbols are intrinsic elements of human society. It is through symbols, such as language, art, and music, that humans send, receive, and share meaning about our world and ourselves” (p. 101). The cultural symbol to which they are referring is the sea turtle, the “flagship species” for Baja’s movement for marine habitat and species conservation ([Delgado and Nichols, 2005](#)). Because Grupo Tortuguero specifically uses the sea turtle as a means of communicating their marine conservation messages—with the aim to shift the cultural symbol of sea turtles as a *delicacy* to one worthy of *marine preservation*—it is possible that sea turtle murals can be used as a tool to transmit conservation ideals as well as bring together a community that may be conflicted.

This new tradition of working towards marine and species protections will hopefully be manifested in the next generation of B.C.S. citizens. Those who are currently 22 years old or younger have only known it to be illegal to consume sea turtle products. Interestingly, 76% (124/163) of students in our study reported as having seen a sea turtle mural. The visibility of these sea turtle murals in schoolyards can complement environmental education and could increase the next generations’ appreciation of, and responsibility to, conservation of the marine environment. Educators too should be reinforcing a positive relationship between nature and art, and this could be accomplished through art-making on the school grounds. Conversely, 49% (67/138) of adults had never seen a sea turtle mural, leading us to recommend that more murals should be painted in more visible locations.

While sea turtle poaching, the Black Market, and illegal consumption still exists today in Mexico, many individuals who were raised *legally* eating sea turtles (before 1991) have made a very conscious decision to stop the practice today. If sea turtle murals function by helping to illustrate points of view that may have not been considered before—such as working to protect sea turtles rather than eating them—then perhaps behaviors, attitudes, and consciousness can also be positively influenced. As muralist Aragon Velásquez explained more specifically: “Murals show how in the past it was normal to kill and eat sea turtles...but now things are different, and we have to change. [Their] purpose is raising the consciousness of humans” (personal communication, August 7, 2010). We found that sea turtle murals are but one tool useful for encouraging the community to unite under the shared sentiment of conservation; encouraging public participation in the movement. Indeed, several of the respondents explained a trend in their community that indicated a shift away from the consumption of sea turtles, moving towards a desire to care for the species and assist the sea turtle conservation movement. This gives us an indication of an evolution in ideology, or a shift away from considering sea turtles as representative of consumptive traditions, to a tradition of conservation. Environmentalism and conservation is no longer solely the realm of scientists, and [Dame \(1970\)](#) was far ahead of his time when he asked: “Can the artist as well as the scientist make a contribution toward developing this ‘environmental ethic?’” (p. 53). The answer unsurprisingly, is yes!

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