Chapter 4
Learning Science in Aquariums and on Whalewatching Boats: The Hidden Curriculum of the Deployment of Other Animals

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Many people living in suburban and urban spaces appear to crave experiences with "nature" as evidenced by the 181 million people visiting Association of Zoos and Aquariums (2015) accredited facilities in 2014, the 282 million people flocking to U.S. National Parks in 2012 (Errick 2013), and the 13 million people visiting national parks in Canada in 2014 (Parks Canada 2014). Whether this "nature" manifests itself in an urban zoological garden, aquarium, or a national park designated as a site of significant ecological value, it is a complex amalgam of tourist destination, sacred retreat, educational facility, something worthy of preservation, and home to those living within its boundaries. Human-constructed zoos and aquariums house captive animals from all over the globe and national parks are mostly wild spaces where animals generally roam free; these spaces are thus quite different in some respects, but they nonetheless share similar aims as evinced in their mission statements. Their goals include promoting conservation and stewardship of the natural world, often through educational means, while also providing a leisurely, recreational, or restorative experience for visitors. In most of these spaces humans enroll other animals in a variety of educational endeavors, such as the interactive touch exhibits at aquariums and whalewatching excursions that we will describe here.

The informal science education literature generally takes for granted that any experience with the natural world is beneficial. We wish to trouble this assumption by analyzing the hidden curriculum often unwittingly communicated to visitors at

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these sites. We begin by briefly sketching the history of the use of animals in zoos, aquariums, and wildlife-focused tourism in national parks in North America, describing typical interpretations in those spaces, and identifying some of the anthropocentric gaps in the informal science education research literature on this topic. Drawing on ethnographic research conducted at two sites, a public aquarium in southern California and a national marine park in Quebec, Canada, we then describe how the animals who live there are politically deployed in educational processes and the hidden curriculum issuing from such deployment.

4.1 Interpretation in Zoos, Aquariums, and Parks

Zoos, aquariums, and national parks grew out of a desire in the mid to late nineteenth century to escape the confines of urban life and replenish one's mind, body, and soul with contact with nature (e.g., Hanson 2002). Elizabeth Hanson's (2002) environmental history demonstrates how early zoological gardens emphasized a White middle class ethos that constructed what constituted a "proper" balance of nature and culture. For wildness to be part of the city, it needed to be confined to zoological gardens and aquariums in what Irus Braverman (2013) describes as an act of power guised as care. Spaces like national parks, in contrast, embody late nineteenth century notions of "wilderness" mostly devoid of human presence (e.g., Cronon 1996), thereby justifying the forced removal of Indigenous peoples from these areas as part of the larger colonial project (e.g., Sandlos 2008). Parks and protected areas today are seen to offer an "in-situ" experience where people can embrace "realism" through the "fiction of our nonintrusive intrusion" into "nature" (Desmond 1999, p. 189).

Early zoological parks generally aimed to leverage captive wildlife to entertain, educate, advance science, and conserve animal species, although the emphases on these various commitments has significantly changed over time (see Braverman 2013). Current AZA standards require its member institutions to prioritize both conservation and education in their missions, although in some cases entertainment retains a predominant role in actual practice (e.g., Lloro-Bidart 2014). Parks and protected areas have a long history of encouraging nature-based tourism within their boundaries. Typically, ecotourism is justified on both economic and educational grounds; the International Ecotourism Society (2015), for example, asserts, "ecotourism provides effective economic incentives for conserving and enhancing biocultural diversity" and "promotes greater understanding and appreciation for nature, local society, and culture" (¶ 1). Whalewatching is no different in that regard. The tension between economic and educational mandates can be keenly felt in "edutainment" ventures like aquariums and whalewatching, which may influence interpretation in particular ways.

Compared to schooling, which experiences strong pressure to reproduce the status quo (e.g., Kincheloe 2008), informal learning sites such as zoos, aquariums, and parks face far less control when it comes to pedagogical content or approach; no one

is calling for standardized testing in these sites, for example. Yet, ironically, educational endeavors in these spaces often remain highly conservative in terms of both pedagogy and content; many interpreters adopt a transmission mode of pedagogy, *telling* visitors what is important, and content tends to emphasize scientific facts, rarely venturing into advocacy territory (e.g., Russell and Hodson 2002). Further, zoos, aquariums, and parks tend to work from the assumption that experience with nature or other animals automatically leads to knowledge acquisition which then leads to caring and then to advocacy; such a simplistic linear model of experiential environmental learning has long been demonstrated to be without warrant, yet it persists (e.g., Russell 1999).

In the informal science education literature, scholars tend to focus on human learning experiences through impact studies (e.g., Dierking et al. 2001) and research on conservation or science attitudes (e.g., Clayton et al. 2014). The literature also invokes sociocultural and identity theories (e.g., Falk et al. 2008) and social theories of kinesthetic or interactive learning (e.g., Rowe and Kiesil 2012) to make sense of what and how people learn in these institutions. While this scholarship certainly has value, the general lack of engagement with more critical, politicized work in science and environmental education and zoo, aquarium, and ecotourism studies in the social sciences and humanities has resulted in a subfield of informal science education that largely fails to consider how these institutions serve as conduits of an anthropocentric hidden curriculum. Indeed, we assert that insufficient attention has been paid to anthropocentrism generally and the "animal question" specifically.

4.2 The Political Deployment of Other Animals

In this section, we provide context to help situate our discussion of how other animals are deployed in these settings. In both cases, the animals involved have little choice but to participate in these teaching and learning processes. This is particularly obvious for the captive animals in the aquarium, but is also the case for the wild whales who need to make the most of the short summer season.

The Aquarium of the Pacific's Shark Lagoon exhibit features both large and small sharks in two separate sections. This analysis focuses on the small sharks, whose bodies are available for touching by any human passerby. Consisting of three shallow and oval-shaped pools, two of which are connected so they make a giant U-shape, this portion of the Lagoon is home to bamboo, epaulette, and juvenile bonnethead sharks and other sea creatures like mangrove rays, horseshoe crabs, and tropical fish. As visitors approach the pools, staff on the microphone discuss the crucial role sharks play in their ecosystems as apex predators and share facts about basic shark physiology. (For example, their teeth are embedded in cartilage instead of bone like ours; they have teeth-like structures on their skin called dermal denticles, which make them feel rough to the touch; they lay eggs colloquially referred to as "mermaid purses"). Some staff infuse these narratives with bits of information to directly counter negative perceptions of sharks, such as informing visitors that

most sharks are small like the ones in the pools and not large like "Jaws," or by explaining that sharks only bite humans in cases of mistaken identity. Staff also repeatedly instruct visitors how to touch the sharks: two fingers only because one finger feels like a "poke" and a whole hand feels like a "grab."

The juvenile bonnethead sharks resided in the single pool and were sometimes described by staff as "wind up toys" due to their swift movements. As obligate ram ventilators (i.e., they have to swim to breathe), bonnetheads are typically difficult for visitors to touch because they constantly swim about the exhibit. This physiological necessity in some ways shields them from visitor touch, especially since the oval pool they live in provides little space for them to avoid contact with people. In the conjoined oval pools, the exhibit design also provides minimal refuge for the bamboo and epaulette sharks, who swim more infrequently and gather together in what staff describe as "cuddling," "huddling," or "piling up" as sharks "nap" or work to "appear larger to a predator." On busy days, a staff member dons rubber boots and wades in one of the conjoined pools to hoist sharks to the surface. This facilitates the touch experience for small children or other people who have difficulty reaching inside. On a busy summer day more than 7000 visitors typically walk through the Aquarium's doors, many flocking to the Lagoon during the average 2.5 hour visit. This means an individual shark in the Lagoon might be touched by hundreds of different people over the course of a day. The vast majority of staff believe that the touch experience is crucial because, in their words, it helps people "learn to love the ocean, protect it, to enjoy it," enables them to "teach guests about animals in the water," and "restore[s] the image of the shark."

The St. Lawrence-Saguenay Marine Park (SSLMP) in Quebec, Canada is approximately 1245 km^2 , covers "the water column and sea bed, and extends to the normal high-tide line," and its mandate includes ecosystem protection as well as encouraging "educational, recreational and scientific uses" of the Park (SSLMP 2010, p. 2). Prior to the advent of whalewatching in the 1970s, the area relied on forestry, shipbuilding, fishing, hunting (including of beluga whales), and some tourism; this is not the typical "pristine" wilderness that many people associate with parks. Whalewatching is arguably the most popular activity in the Park, generally occurring between mid-May and mid-October, peaking in July and August. Since 2002, limits have been placed on the number of whalewatching boats plying the waters, but not on the number of excursions each boat can make (Ménard et al. 2014). Approximately 53 boats operate in the area, ranging from motorized rubber boats carrying as few as 8 passengers to large, multi-deck boats that are capable of carrying almost 500. In 2005, it was estimated that over 274,000 people took part in sea-based whalewatching (SSLMP 2010); there is no reason to believe that these numbers have changed much since then (Ménard et al. 2014).

Focal species for whalewatching are fin and minke whales who migrate to the area each summer for food. Both are baleen whales who feed by using their baleen plates like sieves, filtering out water and retaining creatures like krill and capelin. Fin whales are the second-largest whales in the world, usually around 60–70 feet long, weighing up to 50 tons, and can often be seen feeding in groups. Minke whales are considerably smaller, 20–35 feet long, weighing up to 10 tons, and can regularly

be seen lunging out of the water as they chase krill or capelin to the surface. There is also a resident population of beluga whales in the Park; these white, toothed whales are "only" 15 feet long. Designated as threatened, this population of belugas has been particularly hard hit by pollution. There thus is strict regulation on how close boats can approach them, although there continue to be infractions (Ménard et al. 2014).

Whalewatching expeditions generally last between 2–3 hours. The larger boats employ naturalists who deliver interpretation through a sound system. The smaller boats often rely on the captain to not only drive, but also provide interpretation. The Park requires compulsory training of captains and naturalists, which includes knowledge of Park regulations, the natural and cultural history of the area, whale biology, and threats to whales (SSLMP 2014). As is common in much park interpretation, the transmission of scientific facts tends to be emphasized, even though some whalewatchers have expressed a desire for more politicized discussions of whale conservation (see Russell and Hodson 2002). Over a third of the whalewatchers interviewed stated that they had not learned anything at all on their trips, emphasizing that interpretation was either "minimal" or an "endless stream of blather." Such seemingly contradictory reports may reflect varied skills of interpreters, but also illustrates how little interpreters usually know about what visitors already know or desire, which is not surprising given how little time they have with them.

In both of these cases, individual animals find themselves part of educational processes designed to contribute to conservation of the wider population of animals and/or the ecosystems to which they belong. These sites can thus be seen to politically deploy animals in educational processes (see Ogden et al. 2013). Little attention, however, appears to be paid to the hidden curriculum of this deployment. When seemingly objective scientific facts and depoliticized discourses of care are emphasized in such edutainment ventures, what other messages might visitors be receiving? Is the hidden curriculum communicating particular values related to human/animal relationships that contradict the intended curriculum? These are the questions we turn to next.

4.3 The Hidden Curriculum

At the Shark Lagoon, two aspects of the hidden curriculum emerge as particularly contentious: the touching of small sharks residing in exhibits where they have little refuge and the lack of discursive focus on the lives of the animals as individuals. Animal touch exhibits at aquariums, marine parks, and related facilities have grown in popularity, with some research indicating that they may provide important developmental activities for children and even promote scientific reasoning (e.g., Rowe and Kisiel 2012). Yet this research focuses strictly on human experience and sensemaking, categorizing live animals as "tools of organizing behavior, communicating, and, ultimately, thinking" (Rowe and Kiseil 2012, p. 64). It also assumes that *any* experience with "nature" is incontrovertibly beneficial for people and ultimately

animals, which counters the findings of critical research in environmental education (e.g., Lloro-Bidart 2015b). Not surprisingly, this anthropocentric research perspective largely supports the idea that zoos and aquariums contribute to conservation through educational means. Yet only three of the 28 visitors in this study reported learning a new fact about sharks; none indicated caring more about sharks or discussed plans to take concrete actions to benefit sharks. Interviewed visitors mostly reported enjoying the exhibit as part of their family outing, birthday celebration, or weekend getaway.

These findings, coupled with extensive observations and analysis of the exhibit, suggest the institution implicitly communicates to visitors that the exhibits, and by extension the animals, exist primarily for people's entertainment. Although the Aquarium emphasizes actions that seemingly account for the small sharks' needs and wants, such as the two-finger touch rule and the provision of restaurant-quality "sustainable seafood" for their daily meals, the encounter is ultimately created for human visitors. The exhibit design, which provides little refuge for sharks who may not desire interaction, coupled with staff who wade in the pools and lift sharks to the surface, communicates to visitors that confined wild animal bodies are essentially objects available for viewing, touching, and interacting. These sharks are not hunters (they are fed through controlled means), lovers (the sharks in the tank are all females who do not appear to interact sexually with one another), or parents (their eggs are removed), nor can they be seen as truly wild animals; rather, they are docile bodies who seemingly enjoy regular human interaction. These sharks are safe, touchable, and controllable, domesticated yet wild enough that they get discursively lumped together with the Aquarium's large sharks as "remarkable predators" of *non*human animals. This careful balance of domestic and wild is designed to provide direct contact with the sanitized wildness that visitors to these facilities have come to expect and to convince visitors that the small sharks' wild counterparts (of all shapes and sizes) are worthy of saving precisely because they, too, are unlike the vicious beast in the film "Jaws."

Whales have a much better reputation than sharks. Metta Bryld and Nina Lykke (2000) chart the general transformation of whales from feared to revered creatures. Arne Kalland (1993) described this as the "superwhale" phenomenon, wherein characteristics of various species are lumped together into an image of a generic whale who is very large and highly intelligent, as well as an amazing singer who engages in co-parenting. He argues that the superwhale has eroded support for whaling, so this particular social construction likely has been very good overall for whales. Still, there is something problematic about failing to attend to specific species and to individual whales, as Anne Bell (1997) argued in her discussion of the important role the practice of natural history can play in environmental education. Some of the more experienced interpreters were able to disrupt this construction by naming individual whales they recognized and sharing their own stories of encounters with specific whales. In general, though, the interpreters more often focused on the whales' spectacular behaviors. This is not surprising since it is hard not to be impressed when belugas fluke, minkes lunge feed, and fin whales move through the water in groups. There is nothing wrong with being amazed by whales, as all the

whalewatchers in this study were, but when promotional materials and media representations of whales raise expectations that whales will "perform" in spectacular ways, disappointment can follow. Some whalewatchers indeed confided that they were somewhat underwhelmed by the whales, including a group of high school students who expressed dismay at not seeing a whale give birth on their 3-hour tour! The whalewatchers, then, stepped on the boats with particular expectations of the whales (see Russell 1999). In this way, the whales can be understood as prepackaged and marketed commodities that are an integral part of a big business. The dangers inherent to the commodification of nature have been extensively discussed in the critical tourism literature, particularly in discussions of the "tourist gaze" (e.g., Fletcher 2015).

The majority of whalewatchers also arrived with concern for whales. A number of them, in fact, shared their worries about the possible impacts of whalewatching on the whales prior to embarking on their trip. When asked post-expedition about whether whalewatching was negatively impacting the whales, less than a third of them were able to confidently say "no," with some stating that they would never go whalewatching again. For those whalewatchers, the pleasure of encountering whales was tinged with guilt. Still, all the whalewatchers expressed delight in seeing whales in their natural environment. An oft-mentioned source of pleasure was the opportunity to experience the whales through senses other than vision. The sound of a whale's blow, the feel of the breeze and the sea underfoot, and for those close enough, the fishy smell of the whale's breath contributed to a wondrous encounter. Such fully embodied attention to other life and the more-than-human world is a commonly overlooked yet essential element of interspecies education that seeks to disrupt anthropocentrism (see Fawcett 2013). Nonetheless, there remains a shadow side to such encounters if there is a lack of reciprocity; for example, if whales are being negatively impacted by whalewatching, of which there is some evidence (e.g., Higham and Lusseau 2007), one must ask what the whales are getting out of the encounter.

4.4 Re-thinking Animal-Focused Informal Science Education

As we hope we have illustrated, the informal science education offered in animal-focused edutainment ventures such as these need to be critically examined. While there are obvious time constraints in place that limit interpreters' opportunities to get a sense of what visitors already know and want to know, pedagogies that rely on the one-way transmission of depoliticized facts are problematic. Critical environmental education research demonstrates, for example, that when teachers or interpreters explicitly engage the political aspects of environmental learning (such as policies guiding animal treatment), learners emerge with greater sense of responsibility for caring for other animals (e.g., Gannon 2015). Further, the hidden curriculum in both cases contains anthropocentric elements that undermine stated conservation goals. As commodities packaged for our viewing pleasure, the sharks

and whales are transformed into docile creatures who do not seem to be bothered by our intrusions into their lives. There is very little attention to them as individual subjects of their own lives; rather, they act as representatives of their kin or their ecosystems, martyred in the name of conservation.

There is a growing body of educational literature that we argue informal science education would benefit from engaging. Critical animal pedagogy (e.g., Corman and Vandrovcová 2014), ecopedagogy (e.g., Kahn 2010), environmental education that engages the "animal question" (e.g., Oakley et al. 2010) and "naturecultures" (e.g., Fawcett 2013), humane education (e.g., Oakley 2009), interspecies education (e.g., Andrzejewski et al. 2009), and posthumanist education (e.g., Lloro-Bidart 2015a) have much to offer given their troubling of anthropocentrism, their attention to other animals as both members of ecological communities and as individuals, and their calls for building sustained and more reciprocal relationships with other life. Informal science education would do well, then, to ponder how a more "politicized ethic of care" (i.e., Russell and Bell 1996) could be fostered in places like aquariums and whalewatching boats. Only in doing so might we be better able to bring the explicit and hidden curriculum into congruence to tackle the root problems underlying our destructive relationships with other animals and the planet.

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