

**CRISIS ECOLOGY AT THE VANCOUVER AQUARIUM: PUTTING OCTOPUSES TO  
WORK FOR CONSERVATION**

by

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## **Abstract**

In this time of accelerating ecological crises, captive care has emerged as a triage site where nonprofit conservation organizations attempt to resuscitate species and ecosystems rapidly disappearing from the planet. Zoos and aquariums play a central and controversial role in this care. The Vancouver Aquarium, leveraging environmental crisis narratives to justify and garner support for its work, considers conserving aquatic life its central mission. My research focuses on the Giant Pacific octopus exhibit at the Vancouver Aquarium, investigating how people at the Aquarium use this exhibit to implement conservation work by reconfiguring octopuses' socioecological relationships. Using a mix of semi-structured interviews, document analysis, and multispecies ethnography, I examine how wild octopuses come to the Aquarium and how their socioecological relationships transform in this space. I then explore how staff hope to leverage the octopus exhibit for conservation, science, education, and entertainment. Through this work, I find that narratives about environmental crisis produce modes of caring for octopuses and their ecosystems which enclose octopuses within new forms of human control. This control only unravels where human care fails or ends. However, both the success and undoing of human care for octopuses produce violence and give life: reconfiguring octopuses' ecological relationships in captivity restricts their movement and degrades their health even as failed care can kill, and liberating octopuses exposes them to environmental ills that captivity protects them from. This work therefore illustrates how the Aquarium's conservation mandate operates in tension with an environmental crisis it simultaneously erodes and relies upon.

## **Lay Summary**

On March 16, 2018, the Vancouver Aquarium released a captive giant Pacific octopus into the wild for the first time in its 62-year history. Mired in court battles over the city's whale and dolphin captivity ban, the Aquarium had recently seen its admissions and membership revenue decline for the first time after watching these revenues increase by more than a million dollars annually for several previous years. Here I examine what possibilities exist for the Vancouver Aquarium to practice conservation in ways that depart from zoos' deeply colonial history and do not replicate the same forms of domination that have facilitated devastatingly effective resource extraction. Is this even possible? To do this, I investigate how care, domination, and violence intersect in complex ways as people use this exhibit and non-endangered species like the Giant Pacific octopus (*Enteroctopus dofleini*) to implement conservation work.

## **Preface**

This thesis is the original, unpublished work of Mollie Holmberg. The fieldwork carried out for this thesis was approved by the full University of British Columbia Behavioral Research Ethics Board or by an authorized delegated reviewer, UBC BREB number H18-01303; Principal Investigator: Dr. Jessica Dempsey.

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## List of Abbreviations

BC	British Columbia
DFO	Fisheries and Oceans Canada
GPO	Giant Pacific octopus

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*For Phoenix, Mystique, and Ceph*

# Chapter 1: Introduction

## 1.1 Research questions and objectives

In a time of accelerating ecological crises, captive care has emerged as a triage site where nonprofit conservation organizations attempt to resuscitate species and ecosystems rapidly disappearing from the planet. Zoos and aquariums play a central and controversial role in this care. The Vancouver Aquarium, for example, considers promoting a “world in which oceans are healthy and flourishing”<sup>1</sup> its central mission. Since conservation is the work of reshaping social and ecological relationships<sup>2</sup> in ways that allow a richer diversity of organisms to thrive, the Vancouver Aquarium practices conservation by transforming exhibit animals’<sup>3</sup> ecological relationships and attempting to transform human visitors’ relations with other species. Captive

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<sup>1</sup> “About the Vancouver Aquarium,” n.d.

<sup>2</sup> While recognizing the intertwined nature of ecological and social relations, I use these terms to emphasize different aspects of what are often the same relationships. Ecological relationships include all the biotic (with other organisms, dead and alive) and abiotic (with the environment) relationships organisms need to live. A wild octopus has ecological relationships with the molluscs and fish it consumes, sea lions which might try eating it, other octopuses when it seeks a mate, and the watery environment that provides it oxygen and shelter. Using the term ‘ecological’ emphasizes the material nature of these relationships because they regenerate an organism’s body (or nourish another organism) and ensure its ability to reproduce. I deploy the term ‘social,’ on the other hand, to emphasize how power, narrative, and emotion inflect organisms’ relationships. For example, calling an octopus’s relationship with the fish in its exhibit social highlights how the octopus and fish come to understand and respond to each other, how they shape each other’s behavior, and the histories and broader power structures that shape their interactions. These terms can both describe intraspecies relationships, interspecies relationships that include people, and interspecies relationships that do not.

<sup>3</sup> For brevity, I use ‘animals’ here to refer to other-than-human animals.

care at zoos and aquariums is becoming increasingly important for developing wildlife management policy and implementing endangered species recovery plans.<sup>4</sup>

Although Aquarium exhibits reinforce a clear, hierarchied division of humans from the rest of nature through the literal separation of people and other animals, the Aquarium also entangles human and animal lives in new ways that challenge nature-culture binaries, and the consequences of these entanglements are often not obvious. What possibilities emerge from the moments when human visitors and staff become aware of animals looking back or successfully evading humans' gaze? How do unintended encounters with animal sickness, death, and defecation<sup>5</sup> at the Aquarium subvert human control and comfort? What about the ways human caretakers become intimately embedded in animals' social and ecological relations or disciplined by animals' behaviors? At the Aquarium, violence, care, and domination work together and in opposition in complex ways. Understanding how practices that both support and subvert human domination over nature operate at the Aquarium matters because it influences this institution's potential to promote two very different forms of conservation. Is the Aquarium merely preserving ecosystems through the same forms of control and domination that have enabled devastatingly effective resource extraction, or does this domination unravel during the Aquarium's care work and public outreach? If so, does this ever open space for practices at the

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<sup>4</sup> Olive and Jansen, 2017

<sup>5</sup> Zoos and aquariums work hard to protect guests from exposure to all three of these but frequently do not succeed. For example, the Vancouver Aquarium's scarlet ibises often poop on visitors in the Amazon exhibit.

Aquarium to promote relations of mutual care and shared vulnerability?<sup>6</sup> In this thesis I explore what (if any) possibilities an institution that practices conservation through captive care offers for building interspecies relations fundamentally different from the ones producing the current ecological crisis.

Geographers have approached animal captivity in diverse ways. Scholarship on the governance of animal subjects in captivity has emphasized zoos' complex legal geographies and the role of science in captive animal management.<sup>7</sup> Meanwhile, more-than-human feminist political economy has examined how capital produces violence against captive animals by transforming their social and ecological relations.<sup>8</sup> In this project, I build on this scholarship by examining how the Vancouver Aquarium reshapes exhibit animals' ecological and social relations through captive care and public display in ways that both challenge and reinscribe humans' domination over other species.

To study this, I investigate the production, maintenance, and display of the Giant Pacific octopus exhibit at the Vancouver Aquarium using a mix of semi-structured interviews, document analysis, and ethnographic observations. First, I examine the ecological and social relationships required to produce and maintain the giant pacific octopus exhibit. How do wild octopuses come to the aquarium, what are captive octopuses' socioecological relationships, and how do people keep octopuses alive or healthy in this environment? I then investigate what happens when

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<sup>6</sup> While recognizing that less hierarchical relations are not necessarily more life-giving, examining whether and how hierarchical nature/culture divisions unravel at the Vancouver Aquarium can help uncover ways conservation work does not require people to dominate other species.

<sup>7</sup> Braverman, 2013; Hennessey, 2013; Neo and Ngiam, 2014

<sup>8</sup> Gillespie, 2018; Collard, 2014; Collard, 2018

captive octopuses die. How does this institution approach care and outreach when it confronts the impossibility of keeping animals alive in captivity forever? What happens to captive octopuses' social and ecological relationships at the end of their lives? Finally, I explore why the Vancouver Aquarium displays an octopus. What do people at the Aquarium hope to accomplish for conservation, science, education, and entertainment by having an octopus exhibit? Together, this work allows me to access what is often a "hidden" production of nature<sup>9</sup> and connect it to public conservation outreach practices at the Aquarium. Throughout this study, I attend to how power, hierarchy, and care intersect in the octopus exhibit; how the octopus exhibit links the Vancouver Aquarium to BC coastal ecosystems; how the octopus is oriented (or not) to capitalist social relations; and why the octopus's specific orientations - "relational, patterned positions"<sup>10</sup> - within and outside capitalist social relations<sup>11</sup> matter for how the octopus lives and what it accomplishes for the Vancouver Aquarium.

## 1.2 Context

Today an ocher red, *Mystique* pulses gently as her many arms dance over the glass. The motion reminds me of what a punctured balloon would probably look like falling in slow motion through the air. Unable to look away, I struggle to find the right words in my bipedal, terrestrial

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<sup>9</sup> At zoos and aquariums, most animal care, gallery design, and exhibit maintenance happens outside visitor hours and behind the scenes (away from public view). Braverman (2013: 25) uses the term naturalization to describe how zoos hide the extensive human labor required to produce and maintain "nature" in their exhibits.

<sup>10</sup> Collard and Dempsey, 2017: 78

<sup>11</sup> I explain in greater detail how I conceptualize capitalist versus noncapitalist social relations when I situate this work within more-than-human feminist political economy in the Literature Review and Conceptual Framework later in this chapter.

language for how an octopus moves. I have always found animal exhibits impossible to ignore. Visits to Seattle's Woodland Park Zoo formed an integral part of how I came to know animals as a child, and as I grew older opportunities to meet animals continued to draw me to zoos and aquariums even as my unease in these spaces grew. Despite abundant indications that these places rescued animals from ecological violence<sup>12</sup> and contributed valuable knowledge to conservation science,<sup>13</sup> I could not dismiss my growing discomfort with certain forms of captivity. I struggled to imagine an alternative to zoos and aquariums which would not cause many individuals' and species' deaths in the short term. Nor could I not make sense of these spaces as either urban or natural. They seemed simultaneously urban, natural, neither, and both. This fascination, discomfort, and confusion brought me to the Vancouver Aquarium where I first met Mystique the Giant Pacific octopus (*Enteroctopus dofleini*).

### **1.2.1 Stanley Park and the Vancouver Aquarium**

Tucked between towering cedars and manicured lawns with picnic tables, the Vancouver Aquarium sits in the eastern end of Vancouver's iconic Stanley Park. Here, thousands of Squamish, Musqueam, and Tsleil Watuth people lived for millennia on land they have never

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<sup>12</sup> Here ecological violence refers to a wide range of activities that include killing and injuring plants or animals and damaging ecosystems and includes both rapid/acute and slow forms of violence. For example, under this definition hunting a sea otter for its pelt, spilling oil that destroys its habitat, and emitting carbon dioxide that acidifies the ocean all count as ecological violence.

<sup>13</sup> Olive and Jansen (2017) usefully summarize the kinds of conservation work major zoos and aquariums do in Canada. In their analysis of 54 zoo websites, Carr and Cohen (2011) also found that conservation messaging was the most prevalent theme on these sites (over entertainment, research, and education) – suggesting that modern zoos and aquariums primarily market themselves to the public as conservation organizations.

ceded to the British or Canadian governments.<sup>14</sup> The village of X'way X'way, one of the largest local settlements before colonial authorities forcibly evicted its inhabitants, stood less than 200 meters from the present-day location of the Vancouver Aquarium.<sup>15</sup> After colonial authorities forced Coast Salish communities onto reserves in the late nineteenth century, several families continued living in the eastern end of Stanley Park through the 1930s when the city evicted them, and the last resident from this community remained there through the 1950s.<sup>16</sup> These homes stood at what is now known as “Brockton Point,”<sup>17</sup> less than a kilometer from the Aquarium’s current site. Although Canadian courts ultimately ruled against the Brockton Point families’ petition to retain ownership of their land, Stanley Park lands have also been contested by others who never surrendered it to the colonial governments.<sup>18</sup> In her work on colonial legacies in Stanley Park, Renisa Mawani (2003, 2004) explains how colonial authorities attempted to develop Stanley Park as “a little piece of empire” by selectively exhibiting symbols of past Indigenous presence in manufactured wilderness. City officials celebrated the park’s opening next to the grave of Khaytulk, the son of Squamish Chief Khaatsahlano,<sup>19</sup> and Vancouver’s Art, Historical, and Scientific Association erected totem poles in the park taken from First Nations villages on Northern Vancouver Island.<sup>20</sup> This history matters because it demonstrates how

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<sup>14</sup> The widespread and long-standing Coast Salish presence in what is now Stanley Park is corroborated by oral histories and extensive anthropological evidence throughout the Park (Mawani, 2003).

<sup>15</sup> The site where X'way X'way once stood was renamed “Lumberman’s Arch” in 1912 (Mawani, 2003).

<sup>16</sup> Mawani, 2003

<sup>17</sup> Ibid.

<sup>18</sup> “B.C. First Nation nets huge land claim settlement,” 2000; Lee, 2014

<sup>19</sup> Mawani, 2003

<sup>20</sup> Mawani, 2004

British and Canadian authorities created the space where the Vancouver Aquarium now sits: they forcibly removed Indigenous people in order to create a park space which doubles as an outdoor exhibit where citizens can appreciate responsible environmental stewardship. This thesis work is rooted in understanding Stanley Park and the Vancouver Aquarium as exhibit spaces built through Indigenous dispossession. When I ask what kind of conservation work is happening and is possible at the Vancouver Aquarium, it starts here.<sup>21</sup>

### **1.2.2 The Vancouver Aquarium and Giant Pacific octopuses**

The Vancouver Aquarium advertises itself as a global leader in aquatic conservation. It has successfully pursued multiple rigorous accreditations (including AZA, CAZA, and American Humane)<sup>22</sup> and operates as the Vancouver office of an international, nonprofit conservation organization known as Ocean Wise.<sup>23</sup> This not only sets it apart from most zoos and aquariums

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<sup>21</sup> Staying cognizant of these histories has been crucial for noticing and interpreting the absence of Indigenous lives, knowledge, and epistemologies from this institution's portrayals of local landscapes. It also informs my understanding of why different configurations of octopus ecology matter for the kinds of environmental politics possible at the Aquarium.

<sup>22</sup> The Vancouver Aquarium was the first AZA (Association of Zoos and Aquariums)-accredited aquarium in Canada and one of the first four institutions globally to be certified by American Humane for ethical animal care. Having both CAZA (the Canadian Association of Zoos and Aquariums) and AZA accreditations matters because according to staff at the Vancouver Aquarium, accreditation standards for CAZA are stricter than the American counterpart AZA. However, AZA-accredited institutions can only exchange animals with other institutions holding AZA accreditation (Braverman, 2013).

<sup>23</sup> About the Vancouver Aquarium, n.d.

in North America that remain unaccredited<sup>24</sup> but also from zoos and aquariums that hold less stringent accreditations or operate as single-branch institutions. Ocean Wise's international projects and the Vancouver Aquarium's involvement in wildlife policy development connect everyday practices at the Aquarium to conservation work around the world involving nonprofit, for-profit, and government actors. Unlike comparable institutions like the Calgary or Toronto zoos, most species displayed at the Vancouver Aquarium are also native to Canada rather than foreign.<sup>25</sup> However, Vancouver's recent cetacean captivity ban (targeted at the Aquarium's sole remaining dolphin) has reinvigorated controversy around the Aquarium<sup>26</sup> as this institution struggles to publicly distinguish itself from unaccredited, for-profit institutions like Marineland in Ontario with abysmal animal care records.<sup>27</sup> This recent controversy and the Vancouver Aquarium's history of leadership in conservation and captive care makes this institution an ideal place to re-examine the role of captivity in conservation as practices at zoos and aquariums continue to evolve.

The Giant Pacific octopus (GPO) exhibit exemplifies these evolving practices. The Vancouver Aquarium frequently deploys images of its charismatic GPO to represent and advertise exhibits displaying local species.<sup>28</sup> Since GPOs only live for four to five years, staff must frequently deliberate on what to do when their octopus dies, whether to exhibit a new octopus, and how to acquire one. In the past, the Vancouver Aquarium has experimented with

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<sup>24</sup> Braverman, 2013

<sup>25</sup> Olive and Jansen, 2017

<sup>26</sup> Chiu and Chan, 2017

<sup>27</sup> Sorenson, 2008

<sup>28</sup> See Vancouver Aquarium, 2017b

breeding octopuses. Zoos and aquariums often attempt to breed endangered species, and many of these attempts fail repeatedly because people understand so little about the animals' reproductive ecology. They justify failed breeding programs by arguing that failures generate important scientific knowledge and improve the success of future breeding programs.<sup>29</sup> In this way, the Vancouver Aquarium's GPO breeding experiment resembles more common endangered species breeding programs. However, since GPOs are not endangered, breeding them in captivity does not fit as clearly within the Aquarium's conservation mandate. More recently, the Vancouver Aquarium released its previous octopus (another female GPO known as Phoenix) off the coast of Bowen Island when staff biologists noticed behaviors indicating it was time for her to find a mate and pass away.<sup>30</sup> Although this successful experiment had no precedent in the Aquarium's GPO exhibit, it reflects a wider move in captive exhibits towards experimenting with catch, display, and release<sup>31</sup> rather than permanent display. Mystique arrived to replace Phoenix after becoming entangled in a fisherman's net as by-catch. This illustrates one way zoos and aquariums have expanded their conservation mandate to include protecting all animals (not only endangered species) from ecological violence. Although past scholarship in human geography has emphasized zoos' and aquariums' endangered species programs,<sup>32</sup> how these institutions

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<sup>29</sup> Braverman, 2013; Hennessey, 2013

<sup>30</sup> Brown, 2018

<sup>31</sup> This is most visible at the Vancouver Aquarium in its Marine Mammal Rescue program that cares for marine animals in distress throughout British Columbia. However, the Ucluelet Aquarium on Vancouver Island is the first aquarium in Canada to practice only catch and release, meaning it does not display any animals permanently (The Ucluelet Aquarium, 2017).

<sup>32</sup> Braverman, 2013; Hennessey, 2013; Collard, 2018

reconcile displaying nonendangered species with their conservation missions remains understudied.<sup>33</sup>

Studying the octopus exhibit also offers an opportunity to challenge conversations that leverage animals' similarity with humans to evoke care for nature. For example, debates about ethical interspecies relations have often reinforced ableist, anthropocentric hierarchies by arguing for protecting certain animals because they think and feel like humans. Sunaura Taylor (2017) explains how granting abilities like reasoning or feeling special moral relevance simultaneously marginalizes particular species and non-neurotypical people such as infants, the intellectually disabled, and elderly individuals with dementia. Primates<sup>34</sup> and birds<sup>35</sup> also dominate scholarship on power, care, and violence in conservation. In this way, animal geography and debates about ethical interspecies relations have therefore tended to marginalize aquatic and cold-blooded animals.<sup>36</sup>

Investigating octopuses crucially expands this scholarship because octopus and human biology differ profoundly. Unlike mammals, an octopus's body temperature varies with its

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<sup>33</sup> For one notable exception, see Neo and Ngiam (2014)'s analysis of dolphin display at Singapore's Marine Life Park. Neo and Ngiam examine how arguments for and against dolphin captivity conceptualize nature (and ideal human relationships with it) differently. Questions about what counts as "natural" figure centrally in this debate since the dolphins in question are not endangered and captivity proponents therefore face a more difficult time justifying captive display as "rescue." Neo and Ngiam (2014) also examine how the messy legality of dolphin captivity influences its perceived morality in this context, noting that proponents seem to conflate these two by arguing that since dolphin display is legal in Singapore it must also be morally acceptable.

<sup>34</sup> Braverman, 2013; Collard, 2014; Hua and Ahuja, 2013; Nelson, 2017; Parreñas, 2012

<sup>35</sup> Collard, 2014; van Dooren, 2014

<sup>36</sup> Bear, 2011; Jones, 2000; Neo and Ngiam, 2014

environment. Its three hearts pump blue blood rather than red because copper binds oxygen more efficiently than iron does in deep water habitats. Although they have renowned problem-solving abilities, three fifths of octopuses' neurons are located in their arms, which continue foraging for food if severed from the rest of the body. This makes octopus intelligence distributed rather than centralized and fundamentally unlike that of humans. They investigate their environments by tasting surfaces with the hundreds of suckers on their thinking arms.<sup>37</sup> Lacking any bones or shell, a GPO with an arm span longer than a Volkswagen Beetle and heavier than a rottweiler<sup>38</sup> can squeeze through any opening larger than its teacup-sized keratin beak. Octopuses also have a remarkable ability to alter the color and texture of their skin to match nearly any surface. They do this instantaneously using sophisticated neural networks to orchestrate fine-grained control over muscles and pigment sacs embedded in their skin. Octopuses' life history also diverges wildly from anything observed in mammals: at the end of her short life,<sup>39</sup> a female octopus will lay over one hundred thousand eggs<sup>40</sup> which she hangs in strings from the ceiling of a cave where she slowly passes away (her body will become food for the newly hatched babies). In our

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<sup>37</sup> Each octopus sucker requires over 100,000 central neurons to operate, meaning that every segment of an octopus arm associated with one sucker contains more neurons than many invertebrates contain in their entire bodies.

Octopuses have more than 300 suckers, each lined with over 10,000 chemo- and mechano-receptors for tasting and feeling the octopus's environment (Grasso, 2014).

<sup>38</sup> Although sources such as the Vancouver Aquarium's website (Octopuses & Squids, 2018) report that GPOs can weigh nearly 600 pounds (more than three adult men combined), peer-reviewed literature places GPOs' maximum recorded weight at closer to 110 pounds (Conrath and Connors, 2014).

<sup>39</sup> Male octopuses also die shortly after mating.

<sup>40</sup> Studies of GPOs in the North Pacific have found enormous variability in octopus fecundity, ranging from 41,600 to 239,000 eggs per female and averaging at just over 100,000 (Conrath and Connors, 2014).

bipedal, vertebrate bodies powered by a single heart and centralized brain, enclosed in unremarkable skin, imagining life as an octopus can seem equal parts impossible, horrifying, and wonderful. Centering octopuses in a study about conservation practices also centers the question of how people can care for and develop conservation practices with a creature radically different from *homo sapiens*.

### **1.3 Literature review**

Here I define key concepts for my analysis and situate my work within three interrelated conversations about zoos and aquariums: cultural studies of animals and tourism, more-than-human feminist political economy, and conservation science studies.

#### **1.3.1 Cultural studies of animals and tourism**

Critical animal studies scholarship on the evolving roles of zoos and aquariums demonstrates that many of these institutions' modern conservation mandates have unexpectedly deep roots. However, legacies of the colonial menagerie and for-profit entertainment also continue to haunt even the most progressive of these institutions. Shifting political contexts have driven zoos to cycle through four dominant paradigms over the twentieth century: colonial menagerie (displaying control over exoticized people and landscapes), amusement park (emphasizing entertainment), museum (research and education), and conservation centers.<sup>41</sup> However, early British and American hunters and photographers also leveraged conservation, research, and education to justify the violent practices that allowed them to collect specimens for

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<sup>41</sup> Anderson, 1995; Braverman, 2013; Sorenson, 2008

display, even when glorifying colonial rule remained their primary objective.<sup>42</sup> Similarly, ties with imperialism, human incarceration, and the entertainment industry still pervade modern zoos and aquariums. Historical connections between zoos and human incarceration extend beyond the metaphorical: Louis XIV's menagerie apocryphally inspired the design of Jeremy Bentham's panopticon,<sup>43</sup> and zoos have notoriously exhibited people with animals.<sup>44</sup> Sorenson (2008) condemns practices at modern aquariums and marine parks for their similarities to P.T. Barnum's racist and ableist displays of people and cetaceans in his circuses. Much of this work emphasizes how zoos commodify animals for entertainment<sup>45</sup> without differentiating for-profit and nonprofit institutions.

Within tourism studies, scholars have identified entertainment, education, research, and conservation as modern zoos' and aquariums' primary roles, with conservation messaging dominating promotional materials.<sup>46</sup> However, analyses of survey data have struggled to determine whether zoo visits actually produce clear education and conservation outcomes in guests.<sup>47</sup> In response, industry representatives have argued that survey-based, quantitative methods are ill-suited to detect the unstructured, exploratory forms of learning zoos best facilitate.<sup>48</sup> Ethnographic methods have allowed geographers to more productively explore the context-specific way different roles interact with each other and animals' ecological relationships

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<sup>42</sup> Ryan, 2000

<sup>43</sup> Mullan and Marvin, 1987 - cited in Anderson, 1995

<sup>44</sup> Braverman, 2013

<sup>45</sup> Anderson, 1995; Davies, 2000; Sorenson, 2008

<sup>46</sup> Carr and Cohen, 2011

<sup>47</sup> See Balmford et al., 2007; Marino et al., 2010

<sup>48</sup> Moss and Esson, 2013

at zoos. Through a case study of the Auckland Zoo and Rotoroa Island sanctuary in New Zealand, Kearns et al. (2016) describe how zoos' conservation and education mandates operate in tension with visitors' recreational desires.

Despite mentions of zoos' increasing emphasis on local species in discussions of their evolving conservation mandates,<sup>49</sup> scholars have yet to substantively engage with how this shift changes the institutions they have critiqued for imperial displays of dominance over distant species and landscapes. This does not eliminate the possibility that zoos have merely morphed into colonial displays of control over local landscapes, but the implications of new socioecological relationships between zoos and local ecosystems remain underexplored. My work advances this literature by investigating how the octopus exhibit's socioecological relationships link the Vancouver Aquarium with local ecosystems and how the Vancouver Aquarium's conservation mandate interacts with entertainment, education, and research objectives in the context of the octopus exhibit.

### **1.3.2 More-than-human feminist political economy**

More-than-human feminist political economy outlines how capitalist accumulation requires and reproduces hierarchical difference between animal subjects. By attending to complex interplays between power, care, and violence, this scholarship distinguishes different kinds of capitalist social relations that earlier scholarship on zoos and aquariums elides and identifies the concrete effects these differences have on animal lives. Gillespie (2014) demonstrates how differentiating cows by gender and age in the dairy industry facilitates capitalist accumulation. Through attention to animal bodies and their representations, she

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<sup>49</sup> Anderson, 1995

illustrates how capitalist exploitation produces both gendered and sexualized violence against cows.<sup>50</sup> This work thus elucidates how capitalism relies upon and produces hierarchical social difference between animals and not only between humans and other species. Moving outward from highly commodified spaces, Collard (2014, 2018) details how power, care, and violence intersect in the practices people use to rehabilitate animals rescued from the exotic pet trade or otters recovering after the Exxon Valdez oil spill. Critically, this work pushes political economy to consider how animals interact with capitalism beyond their time as commodities and how processes other than commodification (such as devaluation) impact economic systems and animal lives. Unlike treatments of power and care that do not take an explicitly feminist standpoint,<sup>51</sup> more-than-human feminist political economy also stresses that practices that care for animals often operate through highly unequal power relations and can still exact unintended violence.<sup>52</sup> This framing of power, violence, and care will be crucial for thinking carefully about practices at the octopus exhibit. As animals move from wild to commodity and back in the exotic pet trade or from sought-after commodity to endangered species (in the case of sea otters), their social and ecological relationships also change drastically. In each case, how people categorize animals - male/female, young/old, commodity, or endangered - has concrete effects on the forms of violence animals experience. Collard and Dempsey (2017) demonstrate the importance of law for producing and formalizing these hierarchical social differences between nonhuman subjects.

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<sup>50</sup> These forms of violence are gendered because people subject male and female cows to different forms of violence and sexualized when this violence exploits cows' reproductive capacities.

<sup>51</sup> i.e., Braverman, 2013

<sup>52</sup> Collard, 2014; Collard, 2018; Nelson, 2017

This includes the many ways animals can be oriented to capitalist social relations without being directly commodified.<sup>53</sup> Here, an orientation is a relational position that acquires its pattern through repeated performance, and Collard and Dempsey (2017) outline five orientations nonhuman animals take to capitalist social relations that I will engage with in the context of the octopus exhibit: officially valued, potential future exchange value, unvalued but useful, superfluous to capital, and threat. Although these orientations are never fixed, they do endure and create the conditions for future repetitions through their performance. Thinking with this framework opens space to examine how capitalism subjects octopuses to violence even when they are not officially valued commodities and how capital's relationship with octopus life changes across contexts. How might octopuses be useful to capital even when unvalued? How might they generate future exchange value through the relationships they develop at the Aquarium? In what ways might octopuses threaten capital or also not matter for capitalist production at all? How does moving into and out of the Aquarium change octopuses' relationships to capital through their orientations in different spaces?

Thinking about animals' different orientations to capitalist social relations – processes that generate the conditions for capitalist production – also provides useful guidance for identifying how noncapitalist logics interact with capitalist ones (or don't) in this context. Here, I consider noncapitalist logics to be those such as logics of care or liberal improvement oriented to different ends than accumulating profit for owners and shareholders. These logics often coexist with and support capitalist production. However, reducing them to the capitalist drive for profit accumulation misconstrues how power operates in many spaces and erases the complex ways capitalists co-opt logics which might at times seem to threaten them. This matters in the context

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<sup>53</sup> Collard and Dempsey, 2017

of the Vancouver Aquarium because many of the Aquarium's activities are superfluous to capital accumulation or threatening to particular sectors like the plastics industry. Unlike marine parks and circuses, the Aquarium is also a nonprofit organization that does not accumulate profit for owners or shareholders. It generates surplus income from ticket, gift shop, and concession sales (as well as donations) but invests this in its conservation activities such as sustainable seafood labelling, environmental education, and anti-plastics use campaigns. While it remains important to understand that the Vancouver Aquarium must produce income in order to exist,<sup>54</sup> claiming that profit accumulation or growth ultimately shapes every social relation in this space misconstrues the logics operating here. Asking about noncapitalist logics also highlights the potential importance of octopuses' interactions with processes that threaten or are superfluous to capitalist production. How might social relations that do not support capitalism matter at the Vancouver Aquarium? How might they tangle with or obscure profit logics? Might they expose octopuses to different forms of power, care, and violence? By considering animals' orientations to diverse social relations, my work therefore expands on more-than-human feminist political economy that has emphasized the many ways animals matter as more than commodities, but also that non-commodified social relations can be wrapped up in violence.

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<sup>54</sup> For a compelling counterexample, see Susan G. Davis's (1997) ethnography of Sea World which details how Anheuser-Busch extracts profit from this space. Davis (1997) helpfully contrasts Sea World's exhibit design and educational programming with that of zoos, aquariums, and museums which have the freedom to prioritize the quality of educational content over their ability to generate profit.

### 1.3.3 Conservation science studies

Conservation science studies examines the governance of captive animal subjects through conservation work, detailing zoos' and aquariums' complex legal geographies and how this governance operates through sight and the apparatus of modern science. Zoos and aquariums must navigate a quagmire of international, national, and local legislation to acquire and care for animals.<sup>55</sup> Most of this legislation operates differently across taxonomic groups or applies only to certain kinds of animals (depending on their importance to particular industries or protected/endangered status), and almost none of it has been designed with zoos in mind. For this reason, opt-in industry accreditations such as the AZA play a major role in governing animal care at these institutions.<sup>56</sup> As cephalopods, octopuses occupy a liminal space in this legal landscape that sometimes lumps them with fish (granting them minimal protections) and at others treats them more like intelligent mammals. This makes octopuses particularly useful for investigating how this patchy legal geography produces and formalizes hierarchical social difference between nonhuman animals.

The governance of animal subjects at zoos operates through formal surveillance and everyday visual encounters. Using case studies at American zoos, geographers have described how record-keeping and experimental science practiced by zoo staff render animal subjects legible to both industry and state governance.<sup>57</sup> This echoes wider conversations about synergies between conservation science, state surveillance, and violent control over human and animal

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<sup>55</sup> Braverman, 2013; Neo and Ngiam, 2014

<sup>56</sup> Braverman, 2013

<sup>57</sup> Braverman, 2013; Hennessey, 2013

populations.<sup>58</sup> Scholars in geography and cultural studies have also written extensively about how sight objectifies zoo animals, selectively normalizes more palatable animal views (while hiding potentially disturbing ones like illness, death, and predation), erases animals' agency through forced visibility, and normalizes humans' domination over other species.<sup>59</sup> However, scholarship on the disciplinary power of sight at zoos has paid little attention to differences between species or individual animals. A Pacific white-sided dolphin, Giant Pacific octopus, and lion's mane jellyfish all respond differently to being watched by people and in many cases so do different individuals of the same species. Like more-than-human feminist political economy, conservation science studies has also begun to explore the role of violence in practices that care for animals.<sup>60</sup> My work emphasizes how legislation and scientific methods shape conservation practices that enact different forms of power, care, and violence in the context of the octopus exhibit while noting the role of sight in these power dynamics if it becomes relevant (for example, if legislation or industry regulations reference hiding places as a habitat requirement for octopuses). In this way, my work investigates how captive animal governance shapes hierarchical social difference between nonhuman animals and the consequences of this difference.

#### **1.4 Methods and ethics**

Using a combination of semi-structured interviews, document analysis, and ethnographic observations has allowed me to access, verify, and contextualize information about the

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<sup>58</sup> Adams, 2017

<sup>59</sup> Acampora, 2005; Braverman, 2013; Kearns et al., 2016; Morin, 2015

<sup>60</sup> Hennessey, 2013; Parreñas, 2018; van Dooren, 2014

Aquarium's conservation practices through multiple routes. Although I was able to study the Aquarium's public programming using all three methods, ethnography and interviews were essential for understanding internal practices and decision-making at the Aquarium. Interviews also allowed me to access information I was unable to obtain during ethnographic work due to time and space restrictions. Analyzing publicly available documents and paying attention during ethnographic work helped me identify potential interviewees and learn what questions to ask during interviews, and spending time at the Aquarium as a volunteer helped me gain the institutional trust I needed to successfully obtain interviews.

Despite this focus on what people say and do, I also remained attentive to how octopuses responded to people, how people responded to octopuses, and how octopuses interacted with different environments throughout my field work and document analysis. Inspired by Kohn's (2013) guidelines for practicing anthropology beyond the human and Kirksey and Helmreich's (2010) multispecies ethnography, this emphasis on how people and other species respond to and produce signals made it possible to talk about multispecies interaction without relying on human language or formal techniques from ethology. The Aquarium context differs radically from the Amazon Rainforest where Kohn conducts his ethnography. However, his attention to ways all life forms represent the world that extend beyond language — describing how ecological relations are also semiotic ones — opens space to reconsider how octopuses change and are changed by their socioecological relations at the Aquarium.

Following Braverman (2013), I occupy an uneasy political space by neither supporting nor condemning nonprofit zoos and aquariums — unable to dismiss either their violence or certain aspects of the conservation work they practice. The Vancouver Aquarium retained the power to ask me to leave at any point due to my position as a volunteer and graduate student.

Despite having serious critiques of how this institution practices conservation, I did not uncover evidence of gross misconduct during this research and therefore consider it unlikely that this study will harm the Vancouver Aquarium, the staff who donated their time for interviews, or animals kept at the Aquarium. Throughout this study, I attempted to take people who work and volunteer at the Vancouver Aquarium seriously and to responsibly portray their actions while remaining wary of possibilities for violence to emerge from conservation work despite the best intentions. When interacting with interviewees, I made clear my desire to faithfully depict their work and differentiate it from that of for-profit institutions like marine parks and circuses. However, I also considered myself responsible to octopuses living at the Aquarium and in local ecosystems (who may one day become Aquarium residents) to frankly describe the complex ways violence and care intertwine in this space. Finally, I worked to ensure that the colonial histories of zoos and Stanley Park informed the questions I asked during all three components of my field work so that my research would reflect (and stay responsible to) some of the ways these histories continue to unfold. For example, asking about how the Aquarium's portrayals of local ecosystems either sustain or challenge these histories highlighted the absence of Indigenous lives, knowledge, and politics from the BC galleries.

#### **1.4.1 Interviews**

From October 2018 to February 2019, I conducted nine semi-structured expert interviews with staff at the Vancouver Aquarium in parallel to my ethnographic work. Interviews generally lasted between 30 and 60 minutes, and staff I interviewed had expertise in the production and management of the octopus exhibit as well as octopus-related research and education. Interviewing these people helped me obtain detailed information about the work involved in

putting the octopus exhibit together and putting it to work for the aquarium. Interviewees also referred me to public documents (laws, industry protocols, reports by/about the aquarium, scientific research) crucial to my analysis which I would not have discovered otherwise.

Although I did not interact with the octopus beyond visits to the Aquarium's public galleries, staging some of these interviews next to the octopus exhibit helped me better understand how staff conceptualized this animal's role in the Aquarium's conservation work.

#### **1.4.2 Document analysis**

I analyzed materials about octopuses and the octopus exhibit on the Vancouver Aquarium's website and social media to assess how octopuses are used for education, conservation outreach, advertising, and entertainment in the Aquarium's online materials. Materials I found online include pages on the Aquarium's website, its YouTube and Twitter accounts, and media coverage about the recent octopus release. Documents produced by regulatory bodies such as the DFO, AZA, and CCAC also proved valuable for understanding octopus capture, captive care, and release. Finally, I used peer-reviewed scientific literature on cephalopods to make sure I faithfully portrayed current scientific thinking on octopuses. This also proved useful for comparing wild and captive octopus biology and understanding how people practice captive cephalopod care in a range of contexts. I consider fact-checking the biology in this work against primary sources a key part of respecting both my human and octopus subjects.

### **1.4.3 Multispecies ethnography**

As a volunteer gallery educator at the Vancouver Aquarium, I interacted with guests, volunteers, and staff at the aquarium and engage visitors at many exhibits including the octopus tank in Treasures of the BC Coast. I began training for this field work in mid-January 2018 and started volunteering once a week in May 2018. This volunteer work continued through January 2019. During each four-hour shift, I rotated through several galleries, spending about an hour talking with visitors about aquatic animal conservation in each. Through this work, I embodied the same conservation work I was studying. Although I only spent about an hour in front of the octopus tank each time, rotating through other parts of the Aquarium and talking about other animals with guests helped provoke new questions and insights about octopus care and display — for example, I came to appreciate how unusual it was for the octopus to receive live food while talking with visitors about the anacondas’ and caimans’ diets in the Amazon gallery. When volunteering at the octopus tank, I used a cart with jars of preserved biological specimens to discuss octopus biology and connections between the aquarium’s exhibit and BC coastal ecosystems. (Specimens include an adult red octopus, a giant pacific octopus sucker, an octopus beak, octopus eggs, octopus spermatophores, and a juvenile octopus about the size of an acorn.) After each shift, I journaled about what galleries I’d rotated through; what I’d observed while near the octopus tank; notable interactions with staff, guests, and other volunteers; and new developments in animal care and programming at the institution. The surprises I encountered as I situated myself at the Aquarium through this work, interacting with a wide range of people and animals, provoked questions I would not have been able to develop otherwise. This participant observation gave me an opportunity to learn how a wide variety of people engage with the octopus and her exhibit as well as how the octopus interacts with her surroundings – for

example, noting the extensive time she spends out of sight and how she responds to staff and visitors when visible. In the galleries I also observed how images and text about the octopus and its exhibit were used for education, conservation outreach, and entertainment. Together, these ethnographic observations helped me assess how the octopus exhibit is publicly put to work for the Vancouver Aquarium.

## 1.5 Chapter summaries

In what follows, I outline how people construct captive ecology, how the Aquarium seeks to keep octopuses useful as they approach the end of their lives, and what this institution hopes to accomplish by displaying these animals. Chapter 2 follows the practices involved in octopus capture and captive care. As I trace how octopuses come to the Aquarium and how people work to keep them alive and healthy in this environment, I examine the complex ways violence and domination interact with care practices. How people categorize octopuses and other species — as encoded in legal and industry regulations, Western science, and economic (de)valuations — plays a crucial role in how these care practices operate because these categorizations help form and reinforce hierarchical social differences between species. Most of the violence of captive care involves slow violence<sup>61</sup> that gradually attenuates animals' well-being or coaxes them into new social relations. Understanding the (violent) application of power in this space as pastoral power directed at keeping octopuses alive and healthy helps make clear why acute violence usually results when this power fails.

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<sup>61</sup> Drawing on Rob Nixon (2011) and Rosemary Collard (2018), I use slow violence to describe forms of violence that slowly degrade health and well-being (in contrast to more rapid, dramatic forms of violence).

In Chapter 3, I examine what happens when captive octopuses approach the end of their lives. How does this institution adapt care and outreach practices when forced to confront the impossibility of keeping these short-lived animals alive in captivity forever? What happens to captive octopuses' socioecological relationships at the end of their lives? Since octopuses reproduce once shortly before they die, care and outreach practices must also shift to accommodate a creature who has recently become reproductively active. I first follow an attempt to breed two aging GPOs. Although none of the young octopuses from this experiment survived to adulthood, this experiment helped generate positive press for the Aquarium. Had it succeeded, this experiment would have also helped facilitate octopus farming for human consumption and biomimicry research. I then detail how for many years the Aquarium attempted to keep octopuses useful through the end of their lives by turning them into educational props. However, the Aquarium has recently changed its end-of-life policy for GPOs and began releasing them when they show signs of reproductive activity. I finish Chapter 3 by outlining how this policy change developed and explaining why this marks a significant departure from the Aquarium's previous approaches to octopus death. Here I emphasize how different end-of-life decisions impact octopuses' socioecological relationships because releasing octopuses allows them to return to and (in death) nourish the ecosystems that gave them life. Failing to return octopuses to local landscapes therefore turns captivity into a permanent theft from ecological communities. These stories also show that when the Aquarium purposefully cedes control over animal lives, this produces much less violent outcomes than when care unravels accidentally.

In Chapter 4, I explore what this institution hopes to accomplish by publicly displaying octopuses. I examine how staff hope to influence visitors through gallery design and interpretation, what makes octopuses charismatic, and how the institution seeks to leverage

octopuses to reproduce and expand liberal forms of environmental stewardship. Here I rely on close readings of the exhibit galleries and Aquarium's online materials as well as interviews with staff and analyses of the Aquarium's annual reports. Drawing on more-than-human feminist political economy, I argue that octopuses in this context are unvalued but useful for the reproduction and expansion of "capitalist-adjacent" conservation work. I characterize this work as "capitalist-adjacent" because it both supports and depends on continued capitalist production: relationships between the Vancouver Aquarium and oil, gas, and mining companies reveal how for-profit industries closely linked with ecological catastrophe and the Aquarium's conservation work both depend on one another.

Finally, I situate practices at the Vancouver Aquarium within the context of ongoing ecological crises and shifting political landscapes in British Columbia. How will the Vancouver Aquarium and institutions like it continue evolving alongside ecological crisis? What do shifting public perceptions towards captivity and changing legal landscapes in Canada and elsewhere mean for these institutions? I discuss how findings from this work can inform understandings of both ecological crisis and the implications of different actions in response to it. Through this work, I hope to highlight both violence and possibilities embedded in different ways of living and relating with ecological others amidst crisis.

## Chapter 2: Constructing captive ecology

This chapter details the construction of captive octopus ecology – how people produce it, how octopuses shape it, and the struggles involved in perfecting it. I emphasize the material and political consequences of constructing this ecology in different ways through vignettes that highlight how care, violence, and domination influence octopus lives as these animals move into and through the Aquarium. By exploring how deeply unequal relations of care between people and octopuses both give life and produce violence in different contexts, I add to a growing literature that explores fraught intersections between violence, care, and conservation work.<sup>62</sup> Centering living animals and their material relations in this analysis allows me to connect everyday care practices to broader systems of governance and extraction.

Following Maria Puig de la Bellasca (2012), I understand care as a combination of affective and material labor that cultivates particular ways of living together. Feminist critiques of care have pointed out how care work frequently involves exploitation and domination through the nurturing of some lives and relations at the expense of others. Additionally, care often requires constant, grueling work from those who provide it.<sup>63</sup> Thinking about care as relational therefore makes clear how performing it can involve violence and that care and violence are neither contradictory nor mutually exclusive effects of the same activities. Here, violence includes a broad range of activities that kill, injure, or damage the health of people, plants, animals, and their ecosystems. Numerous scholars have outlined how care work for conservation

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<sup>62</sup> Collard, 2014; Collard, 2018; Hennessey, 2013; Hua and Ahuja, 2013; Nelson, 2017; Parrenas, 2018; van Dooren, 2014

<sup>63</sup> Collard, 2014; Hua and Ahuja, 2013; Parrenas, 2018; Puig de la Bellasca, 2012; van Dooren, 2014

often sacrifices certain animals to save others, reinforces anthropocentric hierarchies, and involves highly demanding labour conditions.<sup>64</sup> Belcourt (2015) explains how anthropocentric species relations and the production of animality as inferior to humanness requires moving animals into spaces like zoos, “empty” wilderness, and laboratories where they become intelligible to settler epistemologies. In places like British Columbia, this production of animality can only happen through the violent emptying of Indigenous lands and erasure of Indigenous bodies to generate spaces where animals can be encountered and made useful for settlers. Captive care in spaces like the Vancouver Aquarium therefore requires and reproduces multiple forms of hierarchical social difference. By examining how care and violence intersect at the Vancouver Aquarium, I aim to foreground how different ways of doing conservation produce particular ways of living together at the expense of others. Foucault’s pastoral power provides a useful framework for thinking through how people deploy care to govern other species in contexts like the Aquarium and how care and violence exist in tension and are also entangled. The Vancouver Aquarium uses its conservation mandate to justify keeping animals in captivity, and similarly, under pastoral power a metaphorical shepherd or pastor deploys care to govern a population for its own salvation. Unlike biopower or sovereign power, pastoral power operates for the benefit of a population rather than a territory or state and concerns itself equally with a population and the individuals who comprise it. Although Foucault framed pastoral power as benevolent, other scholars have outlined how implementing it involves multiple forms of violence.<sup>65</sup> For pastoral power to operate effectively, members of the flock must submit to the

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<sup>64</sup> Collard, 2018; Hua and Ahuja, 2013; Nelson, 2017; Parrenas, 2018; van Dooren, 2014

<sup>65</sup> Mayes, 2010; Shukin, 2012; Taylor, 2013

authority of the shepherd,<sup>66</sup> which at the Aquarium means captive animals must alter their behavior to facilitate the care that will keep them alive and save their ecosystems. In the context of the Vancouver Aquarium, the goal of saving individuals and populations as a justification for exerting power (and violence) under pastoral power resonates strongly with the institution's goal of saving species and ecosystems – and exerting whatever power it deems necessary for their salvation. Under the logic of pastoral power, populations driven from home by violence require a shepherd to ensure they survive under unfamiliar and changing circumstances. This makes violence integral to the formation and justification of this form of domination.

In her discussion of Foucauldian approaches to animal studies, Taylor (2013) emphasizes how nonhumans interrupt the application of force against them and argues that this justifies their treatment as subjects (rather than passive objects) in captivity. This includes the deliberate subversion of human caretakers' objectives by nonhumans as well as errors in the application of power, gaps and contradictions in how power operates, and forms of resistance that do not result in liberation. It is important to examine how power unravels or fails as people capture and keep octopuses in captivity because those moments often highlight where captivity becomes most violent as well as where forces like public pressure, improvements in scientific knowledge, and animals' unpredictability have already directed captivity to become different (but not necessarily less oppressive). Much of the violence that results from captive care is slow violence (in contrast to more visible, dramatic violence) which gradually degrades animals' health and operates through routine care activities.<sup>67</sup> Although Foucault and Taylor (2013) distinguish between domination – the application of force without any possibility of resistance – and power – the

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<sup>66</sup> Taylor, 2013

<sup>67</sup> Collard, 2018

application of force with resistance – here I use the terms domination, power, and force interchangeably since distinguishing between them makes little sense in a context where humans, living and dead nonhumans, and so-called objects like water and rocks can all interrupt the smooth application of power. At the Vancouver Aquarium, *elusiveness* best characterizes the many ways octopuses disrupt efforts to make them useful for captive display (even as – as I detail in Chapter 4 – this elusiveness contributes heavily to octopuses’ charisma).

Here I first outline how people capture octopuses for display and the regulatory frameworks that shape octopus captivity. I then explore octopuses’ relationships with their physical environments and other species at the Aquarium. By examining how octopuses’ socioecological relationships change as they enter and acclimate to captivity, I illustrate how violence and care operate together and in tension (but not in contradiction) with one another here. Legal and industry regulations, scientific knowledge, and economic (de)valuations work together in this space to categorize octopuses and other creatures – as aquatic invertebrates, cephalopods, nonendangered, bycatch, and good display animals – in ways that heavily shape how these animals do (or don’t) experience violence at the hands of people. However, octopuses elude categorization and humans’ attempts to regulate their behavior in captivity in a multitude of ways. Although this resistance can produce pleasant or liberatory outcomes for octopuses, when pastoral power aimed at protecting captive animals unravels, this almost always involves violence as well.

## **2.1 Capture**

In the darkness, one diver stations themselves before an opening in the rock face while another swings around to locate the den’s back entrance. They both take care not to shine their

lights too brightly and alert the resident within to what is about to unfold. At this point, hunting an octopus to eat and capturing it for display look the same – in both cases, the DFO prohibits the use of sharp objects like spears or hooks as well as poisonous chemicals.<sup>68</sup> These restrictions apply specifically to octopuses and not to other “shellfish”<sup>69</sup> with whom DFO categorizes octopuses in its guidelines for animal collection.<sup>70</sup> Hunters and aquarium teams looking for display animals must therefore attune themselves to octopuses’ ecological rhythms and behaviors rather than relying on physical force to capture animals. This does not render capture nonviolent, but it does make anticipating and manipulating octopus behavior more essential to the form violence takes during capture.

“[In the wild, e]ach den usually has a front door and a back door,” a staff member explains to me, so capture teams station divers by each door to prevent their quarry from escaping out the back while they prepare for the den resident to emerge. Once divers have stationed themselves around all exits of a probable octopus den, one will squirt a mixture of alcohol and clove oil — what staff at the Aquarium call “hooch” — into the front entrance to irritate the octopus. If an octopus emerges, the dive team will scoop it into a plastic bag and slowly carry it to the surface of the water where they transfer the octopus into a container full of seawater. The divers must do all of this as gently as possible to avoid spooking the octopus into

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<sup>68</sup> Fisheries and Oceans Canada, 2011; From the DFO’s “Shellfish Harvesting Information” page (2019): “You are not allowed to use sharp-pointed instruments, snares, hand pumps or chemicals to harvest octopus.”

<sup>69</sup> The DFO also categorizes clams, crabs, shrimp, and prawns as shellfish for regulatory purposes (“Shellfish Harvesting Information,” 2019).

<sup>70</sup> “Shellfish Harvesting Information,” 2019

inking, which will soil the water in the bag and container. Just in case, they carry buckets to perform a water change if needed on the trip back via boat and over land.

To locate an octopus den, dive teams from the Vancouver Aquarium rely on local and institutional knowledge about octopus ecology. They search places known for hard, rocky substrates that provide ideal octopus habitat, especially those where they have historically had success finding GPOs such as the southern coast of Bowen Island where staff captured Phoenix. Aquarium staff also build institutional knowledge about where GPOs live throughout the year by noting octopus sightings when out collecting other species or conducting research in local waters. A dark crevice with a pile full of crab shells (GPOs' favorite prey item) out front indicates a strong probability of recent octopus presence. This capture process therefore demonstrates the importance of knowledge about octopus biology for successfully removing octopuses from their wild ecosystems. Although octopuses' behavior and ecology shape how people capture them – and ignoring this would risk reducing octopuses to mere bodies rather than living beings with their own histories and ways of relating to the world which have little to do with people – overemphasizing octopuses' power over the collection process would obscure the violence involved in capture. Instead, octopus behavior complicates collection in a multitude of ways even as knowledge about this behavior facilitates a process which aims to sever lifegiving relationships and replace them with the ecosystem of captivity.

The Vancouver Aquarium obtains most of its octopuses through this kind of dive collection, which requires scientific collection permits from the DFO. Each scientific collection



**Figure 2.1.** DFO application for scientific collection, downloaded from “Scientific Licences - Coastal Pacific Region” at <https://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/sci/index-eng.html>.

However, since the Vancouver Aquarium only collects one or two octopuses per year — at most — from the entire BC region, these site-specific limitations far exceed what the Aquarium would ever seek to collect. Regulations that ban hunting octopuses with sharp objects or poisonous chemicals in BC waters also are unlikely to alter what the Aquarium would be doing anyway since spearing octopuses or releasing chemicals more noxious than alcohol into local waters would harm animals the institution would prefer to keep on display as long as possible.

Instead, these regulations matter because they define and enforce what constitutes acceptable violence against wild octopuses. They do this through a framework that singles out octopuses for protections from particularly violent methods of capture – hunting by spear, hook, or snare – allowed for many other aquatic animals in BC. Although the DFO does not list a reason for this protection, octopuses and other cephalopods also have the distinction of being the only invertebrates protected through scientific use guidelines drafted by the Canadian Council on Animal Care (CCAC), a body that governs uses of animals in science for all institutions that receive money from Canada’s federal granting agencies (CIHR, NSERC) for projects with animals.<sup>72</sup> The DFO’s site-specific harvest limits position the provincial government as the primary authority on acceptable levels of violence against octopus populations.. This regulatory framework is the primary one relevant to wild octopus populations in BC and governs them as populations bound to land and seascapes. It therefore differs from how regulatory frameworks

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<sup>72</sup> “Guide to the Care and Use of Experimental Animals Volume 1, 2nd Edition,” 1993

for captive octopuses mobilize pastoral power to care for individual animals and captive populations uprooted from their home ecosystems.

Economic valuations further complicate how the Aquarium collects octopuses by determining which animals it targets for collection. Even with detailed knowledge about octopus behavior and preferred habitats, successfully locating a den occupied by an animal within the desired size and age range for exhibit display almost always requires multiple dives (most recently, over half a dozen). Although the DFO does not regulate either of these for octopuses collected under scientific licenses,<sup>73</sup> staff explained to me that they avoid collecting small octopuses since guests will have extreme difficulty spotting the tiny animals among all the potential hiding spots. Small GPOs such as the 183-gram creature staff captured in fall 2018 can also fall prey to rockfish or sea stars in the Port Hardy exhibit. To avoid this, staff have been keeping their smaller octopus in a tank by itself behind the scenes while it grows large enough to occupy Port Hardy. Exceptionally large or old animals, on the other hand, may be near the end of their lives and therefore last a short time on display. The high variability in octopus size at maturity<sup>74</sup> can make gauging octopus age – and therefore its worth as a potential display animal – difficult unless it shows signs of advanced age.

In rare cases, octopuses' low value in local fisheries and comparatively high value as display animals can help the Vancouver Aquarium obtain octopuses from for-profit collectors who operate locally. In summer 2017, *Mystique* the GPO came to the Aquarium via a collector

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<sup>73</sup> However, it does require that octopuses collected under Exploratory Licences, which are issued to determine if a fishery “can sustain a commercially viable operation,” (“New Emerging Fisheries Policy,” 2008) are at least 2 kg (Fisheries and Oceans Canada, 2011).

<sup>74</sup> Conrath and Conners, 2014

with lots of contacts in the fishing industry who staff explained to me “basically operates a business where he’ll collect things and then he’ll sell them to aquariums,” especially fishermen’s bycatch that “is not commercially viable but is interesting for aquariums.” Fishermen frequently find GPOs in their shrimp and crab gear, and this is how the Aquarium’s business contact obtained Mystique. Collectors from the Aquarium noticed this contact had four GPOs with him when he arrived to pick up animals that Aquarium staff were holding temporarily for him, and staff asked if they could have one. (The rest of the octopuses, presumably, went to other aquariums locally or across North America.) Mystique’s pathway to the Vancouver Aquarium via bycatch and a for-profit collector illustrates some of the less visible permeabilities between nonprofit conservation centers like the Aquarium and diverse forms of for-profit industry. Her status as “not commercially viable” to fishermen channeled her through a very different set of exchanges than the crustaceans she was hunting when the humans captured her. Money never changed hands as Mystique passed from the custody of fishermen to a private collector to Aquarium staff who “were able to take one [octopus] from him” even though she passed between people who buy and sell animals with each other. Additionally, it’s important to distinguish what happened to Mystique from rescues the Aquarium conducts with wounded or stranded marine mammals because octopuses can usually survive immediate release into the wild after accidental capture by fishermen. Mystique arrived at the Aquarium not out of necessity but because people perceived her as an animal who was peripheral to for-profit fishing but potentially valuable for display. In this way, particular economic (de)valuations protected her from the rapid violence of becoming prey while channeling her towards the slow violence of captivity.

## 2.2 Regulating captivity

In contrast to the DFO's detailed permitting process for octopus capture and collection, very little formal regulation impacts an octopus's life once it enters the Aquarium. Regulations written and enforced by industry groups like the AZA and CAZA contain the most detailed and species-specific instructions for proper animal care. However, what little regulation exists for captive octopus care has often been designed to cover broad groups of animals or adapted from guidelines designed for very different types of organisms. Limits to scientific knowledge have also limited the capacity for regulations to protect octopuses' specific needs in captivity. Legal and industry regulations therefore protect captive GPOs in only minimal ways. However, blind spots in regulations designed using population-level categories like species also provide leeway for caretakers to better customize their care for individual octopuses, creatures known for their distinct personalities and idiosyncrasies. These silences and gaps in captive care regulations thus have the potential to facilitate both increased violence against octopuses and better, more customized captive care.

Formally, only general animal cruelty laws such as sections 444 through 447 of the Criminal Code of Canada still apply once octopuses enter captivity, and for GPOs at the Aquarium this legally allows anything short of torture and neglect.<sup>75</sup> CCAC guidelines for scientific uses of animals cover cephalopods but do not include specific provisions for

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<sup>75</sup> These sections of Canadian criminal code specifically prohibit behavior which injures or endangers animals, causes "unnecessary" suffering, or fails "to exercise reasonable care" (An Act to amend the Criminal Code (cruelty to animals), 2008).

cephalopods separate from the other animal taxa they protect.<sup>76,77</sup> These guidelines detail best practices for nearly every aspect of animal care in laboratories, including housing, food, water, enrichment, human handling, record keeping, and monitoring animal health. This also includes separate sections with extensive guidelines for controlling animal pain, anaesthesia, and euthanasia.<sup>78</sup> However, although the University of British Columbia (which has faculty and graduate students affiliated with the Aquarium) holds a CCAC certificate, the Vancouver Aquarium is not publicly listed among CCAC certificate holders.<sup>79</sup> The CCAC website notes that many institutions which hold certificates may not appear on this list,<sup>80</sup> but it seems unlikely — given how prominently the Vancouver Aquarium displays its other certifications on its website<sup>81</sup> — that the Vancouver Aquarium would hold a CCAC certification without posting this information publicly.<sup>82</sup>

Industry regulations laid out by CAZA and AZA contain detailed guidelines for octopus care but still leave many aspects of it to caretakers' discretion. These groups inspect the Aquarium during regular re-accreditations and impose stricter animal care standards than formal

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<sup>76</sup> "Types of Animals," 2019

<sup>77</sup> CCAC guidelines cover all non-human vertebrates and cephalopods (CCAC Programs, 2017).

<sup>78</sup> "Guide to the Care and Use of Experimental Animals Volume 1, 2nd Edition," 1993

<sup>79</sup> "Certified Institutions," 2019

<sup>80</sup> Ibid.

<sup>81</sup> "About the Vancouver Aquarium," n.d.

<sup>82</sup> Vancouver Aquarium staff also did not respond to inquiries about the status of their CCAC certification.

legislation<sup>83</sup> in Vancouver, British Columbia, or Canada in almost all cases.<sup>84</sup> The AZA and CAZA are both nonprofits staffed by personnel from the same organizations they accredit — for example, Vancouver Aquarium Chief Operating Officer Clint Wright spent many years as the president of CAZA while also holding his position in Vancouver.<sup>85</sup> Although the AZA and CAZA therefore lack the independence of the CCAC, like the CCAC, AZA and CAZA standards outline best practices for specific aspects of animal husbandry like physical environment, nutrition, enrichment, and veterinary care. The AZA manages GPO care through its Aquatic Invertebrates Taxonomic Advisory Group (AITAG). This governing body is responsible for drafting guidelines for all aquatic invertebrates under the care of AZA-accredited institutions — a group scattered throughout the different families of invertebrates, which comprise approximately 97% of all animal species<sup>86</sup> and span many times the diversity of all vertebrate animals combined.<sup>87</sup>

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<sup>83</sup> Braverman (2013) details this extensively in her work on the legal geography of zoos in North America.

<sup>84</sup> Cetacean captivity bans passed by the Vancouver Park Board and Canadian government are arguably a major exception to this, but this legislation does not directly impact GPOs. The possible indirect impacts of this legislation on GPOs at the Aquarium are covered in Chapter 3.

<sup>85</sup> “Board of Directors,” n.d.; Charbonneau, 2016

<sup>86</sup> May, 1988

<sup>87</sup> Unlike vertebrates, invertebrates are not a distinct taxonomic group - they include groups that split from each other both before and after vertebrates became a distinct taxon, so grouping all invertebrates together (separate from vertebrates) is the taxonomic equivalent of grouping your sibling and first cousin together in a family that excludes yourself. For example, humans are more closely related to echinoderms like sea stars than either sea stars or humans are to octopuses, but echinoderms and cephalopods are both invertebrates.

The AZA's official care manual for GPOs drafted by the AITAG frequently discusses how poorly many standards written with terrestrial vertebrate husbandry in mind apply to Giant Pacific octopuses. For example, it explains how

The nutritional requirements of aquatic animals (excepting marine mammals) have traditionally not received nearly the same attention as the feeding of larger terrestrial animals within the AZA. Aquatic animals are radically different from most terrestrial species whose diets are well-understood. The diversity of feeding niches exploited by the animals under the purview of the Aquatic Invertebrate TAG is likely the widest any animal management group is likely to encounter. As such, there is no established framework or guidelines for the nutritional requirements of Giant Pacific octopus, *Enteroctopus dofleini*, though there is a good amount of growth and metabolic information in the literature.

This passage on nutritional requirements for GPOs exemplifies how protections for zoo animals codify anthropocentric species hierarchies by differentially exposing less 'human' animals like octopuses to less appropriate (and therefore more violent) care. It explicitly describes how these regulations have prioritized proper care for other mammals, other vertebrates, and species that share our terrestrial spaces. The GPO care manual describes similar difficulties applying AZA standards designed for terrestrial animals and vertebrates to octopuses when considering noise stress,<sup>88</sup> health assessments,<sup>89</sup> proper veterinary care,<sup>90</sup> captive breeding,<sup>91</sup> and enrichment

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<sup>88</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 20-21

<sup>89</sup> Ibid: 54-55, 64

<sup>90</sup> Ibid: 52, 58, 65, 66

<sup>91</sup> Ibid: 72, 75

needs.<sup>92</sup> Furthermore, staff explained to me that the AZA care manual for GPOs is better described as a guide developed based on general AZA standards for animal care and industry knowledge about GPOs' specific needs rather than as a set of strict regulations. Even members of the industry note that CAZA and AZA regulations fall short. Staff I spoke with at the Vancouver Aquarium took pride in often far exceeding standards required by the AZA or CAZA, at times seeming perplexed at (for example) how little space the industry recommends as a minimum for GPOs. Whenever they expressed skepticism about these standards however, staff quickly qualified it with assertions that even minimal standards were better than none at all: the care standards imposed by both industry governing bodies far exceed anything covered by Canadian criminal code as it applies to GPOs. However, this lack of formal regulations may be in part due to efforts by the zoo and aquarium industry — Irus Braverman (2013) documents how the AZA and its member institutions have vigorously resisted government regulations for captive animal care in the United States. These industry efforts to resist interference combined with the difficulty of fitting Giant Pacific octopuses into anthropocentric categorizations – as they are neither vertebrates nor like most other invertebrates – have made it more difficult to develop regulations that effectively protect captive octopuses from violence.

### **2.3 Captive ecology**

“The octopus is a stupid creature, for it will approach a man’s hand if it be lowered into the water.”

- Aristotle, *The History of Animals, Book IX*, translated by D’Arcy Wentworth Thompson (2013)

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<sup>92</sup> Ibid: 26-27, 81, 85, 91

Once at the Aquarium, octopuses' relationships with landscapes and other species develop through human care and the endless inventiveness, elusiveness, and idiosyncrasies of individual animals. Here, through a series of vignettes about different aspects of captive care, I detail how octopuses' relationships with other species and global landscapes change once people bring them into the Aquarium. Although the Vancouver Aquarium's proximity to GPO habitats keeps these animals partially embedded in local landscapes, forcing an octopus into human care also ensnares it within many of the same relationship networks as its caretakers. I also outline here how humans exert control over octopuses' ecologies through care (and vice versa) along with the many limits to this care. People often perform care for GPOs with limits to human control in mind: for example, by designing habitats with abundant hiding places or allowing GPOs to direct many aspects of their feeding. Other forms of human care for GPOs such as veterinary care or industry regulations have limits imposed by the difficulty of knowing an octopus's mind and gaps in scientific knowledge about cephalopods. In other cases, human control unravels despite caretakers' best efforts to plan for GPOs' curiosity, carnivory, and proclivity for escape. Although this can benefit octopuses who discover unexpected treats, more often this elusiveness endangers GPOs who thwart the very systems designed to keep them alive.

### **2.3.1 Physical environment**

At the Vancouver Aquarium, GPOs in the publicly-facing Port Hardy exhibit inhabit a space of “approximately 4080L”<sup>93</sup> (about the size of a walk-in closet). Although this is much smaller than the 250,000 litre Strait of Georgia tank into which staff previously rotated GPOs, it meets the AZA recommendation that institutions house GPOs in at least 1000 gallon volumes

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<sup>93</sup> Vancouver Aquarium staff member

(just under 3800 litres) and far exceeds the minimum AZA requirement of 500 gallons (about 1900 litres, or just larger than the average hot tub).<sup>94</sup> The AZA care manual contains very little justification of this minimum beyond one (unnamed) institution's claim that "octopus behavior and responses to enrichment were unchanged when housed in a 500-gallon tank vs. a 1,500-gallon tank (with the same GPO)."<sup>95</sup> Staff at Vancouver explained,

The one bone of contention that seems to come up though is how much space they actually physically need, right? So... that's a tough one. It's a tough one for a den-oriented animal — how much roaming around do they need? It's hard to say. People find octopus[es] in the wild that are out walking around on the bottom usually at night or later at dinner times or whatever, darker water... but how much actual territory do they need? It's hard to say.

Unlike many other portions of the AZA guidelines which extensively cite peer-reviewed literature, the discussion of recommended GPO tank size only references anecdotes from keepers and a survey of common practices at AZA institutions<sup>96</sup> to determine minimum and recommended standards. Although confining animals clearly impacts their ecology, using humans' experiences of space to understand these impacts often misconstrues the effects of confinement on species whose interactions with space differ substantially from our own.

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<sup>94</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 22

<sup>95</sup> Ibid.

<sup>96</sup> "...A survey of 33 public aquaria keeping GPOs in 2012 revealed that 33.3% of institutions had exhibits between 1000–1500 gallons, 26.7% under 1000 gallons, and 20.0% had exhibits between 1500–4000 gallons. Four of the surveyed institutions (13.33%) have GPO exhibits in excess of 4000 gallons" (AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 22).

Comments on octopus tank volume by staff at the Vancouver Aquarium and the ambivalence of the AZA care manual on this topic reveal some of the problems with focusing on volume when assessing captivity's effects on other species. Octopuses' wild habitats clearly exceed the dimensions of an aquarium tank, but how far does an adult octopus actually wander during an average day or over the course of its lifetime – especially since octopuses spend much of their time inside the protective confines of a den?

The effects of confinement (violent or otherwise) instead manifest through the tank environment's effects on octopus ecology. For example, what experiences, behaviors, and relationships does the physical structure of this space allow octopuses to have, which does it force upon them, and which does it disallow? In the Port Hardy exhibit, the octopus cave opens just below eye level, tucked between several large boulders and anemones the size of dahlias. Another boulder the size of a semi-truck tire leans against the faux cliff face, crevices the width of a finger or two wind away from the cave in several directions, and in the dim underwater lighting everything shimmers shades of blue, purple, and brown. Staff I spoke with describe a den as the most important feature of an octopus's habitat in captivity. In the wild, an octopus's soft body and lack of any hard shell makes it attractive prey for marine mammals and carnivorous fish like wolf eels. Sheltering in difficult-to-reach places is therefore one of an octopus's most effective strategies for staying alive. At the Vancouver Aquarium, staff also keep the octopus tank dark despite the trouble this creates for guests trying to locate the octopus in order to replicate light conditions at the depths GPOs prefer.<sup>97</sup> The AZA care manual also recommends against allowing flash photography in GPO exhibits, although Vancouver does not prohibit it. A sliver of light does shine down the back of the den, making it easier to spot the

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<sup>97</sup> GPOs in the north Pacific have been documented at more than 182m deep (Scheel, 2002).

silhouette or tentacle of an octopus lurking there. The AZA care manual advises back-lighting an octopus's den like this in order to encourage GPOs to emerge more often from hiding.<sup>98</sup>

Octopuses in Port Hardy used to also have access to a dark crevice at the bottom of the exhibit dubbed "the Cave" by volunteers, but the Aquarium closed this hard-to-view location recently because GPOs spent so much time there. In this way, the structure of the octopus display tank deploys pastoral power by accommodating octopuses' need for places to hide and dim lighting while shaping their behavior in ways that help make them available for people to encounter.

Although octopuses at the Vancouver Aquarium no longer interact with many other creatures the way they would in the wild, they maintain connections to the ecosystems they come from through the Aquarium's "open system" where water from outside cycles through their tank. However, the Aquarium controls the properties of this water through constant filtration and maintenance. Cleaning tanks and monitoring key water parameters consumes most of an aquarist's time at an institution like the Vancouver Aquarium. For example, staff aim to keep octopuses' water around 10 degrees Centigrade, wrestling with seasonal fluctuations in the temperature of water entering the open system (which sometimes pose a challenge). However, keeping GPOs in an open water system helps staff more easily maintain optimal water chemistry (proper levels of nitrates, nitrites, ammonia, and pH) for these animals. Ammonia and nitrogenous chemicals accumulate more quickly in the tanks of "heavy-waste animals" like GPOs, acidifying the water. This matters because octopuses' sensitive, porous skin makes them especially sensitive to fluctuations in water chemistry compared to many fishes. Water filtration systems and the energy needed to maintain them make captive octopuses dependent on the same energy networks that fuel the households and workspaces of octopuses' human caretakers.

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<sup>98</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

Collecting uneaten food is also important for maintaining good water chemistry since microorganisms feeding on the leftovers would poison the water chemistry in such a small space. Human husbandry must replace the actions of currents, scavengers, and microorganisms which would (outside captivity) ferry this detritus and the nutrients it contains into local ecosystems. The physical components of captive ecology therefore resemble wild ones but with subtle alterations which bring octopuses into more frequent contact with people, make them dependent on human energy and waste systems, and filter even the chemical makeup of their environment through human care.

### **2.3.2 Behavior, health, and everyday care**

Examining octopus behavior at the Aquarium shines a light into the limits to human knowledge about and control over these animals despite ways that the tank environment makes octopuses more available for human encounters. Most guests who visit the Vancouver Aquarium never see an octopus. GPOs at the Aquarium spend most of their time out of sight under rocks, inside crevices, and at the back of their dark den, and as a volunteer gallery educator, I've witnessed Ceph pull herself through crevices the width of two fingers and into spaces hardly bigger than my fist. Octopuses are also nocturnal animals who conduct most activity like foraging and exploring under the protection of darkness.

When an octopus does emerge from hiding at the Aquarium, staff can use this opportunity to assess its health. Routine husbandry activities like scrubbing, siphoning gravel, or collecting detritus can often draw an octopus out who may decide to investigate or engage in “a game of tug-of-war” over the cleaning equipment.<sup>99</sup> As one aquarist explained to me,

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<sup>99</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 91

...we do want to make sure that [if] she comes out then we can look at her, make sure she's moving around normally, make sure her skin texture is correct, she's reacting to things in the way an octopus should — all that kind of stuff. So we're monitoring to make sure she's looking and acting like a normal octopus and that she's eating as often as an octopus should, which is usually relatively frequently for an octopus.

Regular visual inspections occur during daily cleaning and biweekly feeding and are the main way staff monitor a captive octopus's well-being. (However, if an octopus does not emerge for inspection, staff do not force it out.) Signs of acute stress remain the primary way caretakers assess octopus well-being in captivity, which include reduced appetite, disoriented behavior, skin lesions, and in extreme cases, autophagy (where an octopus consumes its own limbs) — all of which can also indicate senescence.<sup>100</sup> Behaviors associated with reproduction such as egg-laying and sperm packet deposition can help distinguish chronic stress from natural aging because stress does not trigger reproductive activities. Signs of more acute distress in octopuses include inking, violent color changes, and escape-jetting (attempts to jet through the water at high speed). Extended exposure to bright light, oxygen deprivation, or imbalanced water chemistry can all trigger mild or serious symptoms of stress in captive octopuses. Work by researchers at the National Resource Center for Cephalopods in Texas has also demonstrated that the skin of captive octopuses has more than one hundred times as much bacteria as that of wild octopuses.<sup>101</sup> However, researchers have documented very little about infections of any kind (bacterial, fungal, parasitic, or viral) in cephalopods.<sup>102</sup> Maintaining good water chemistry and

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<sup>100</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

<sup>101</sup> Oestmann et al., 1997

<sup>102</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

minimizing octopuses' exposure to stressors like bright lights are therefore the primary ways aquarists keep octopuses healthy in captive environments like the Vancouver Aquarium.

Although veterinary staff at the Vancouver Aquarium have treated octopuses for a wide variety of conditions, scientific and industry literature reveal substantial uncertainty in proper medical treatments for cephalopods which also raise troubling questions about violence in this context. The AZA care manual contains a full 22-page section on veterinary care for GPOs, but most of this details how little humans understand about cephalopod disease. It explains how much veterinary care for cephalopods like GPOs has been adapted from fish husbandry<sup>103</sup> — animals scarcely closer to octopuses in physiology or evolutionary time than human beings. (Fish and humans, in fact, share a more recent common ancestor than octopuses do with either because humans and fish are both vertebrates.) For example, work by Roland Anderson (1996) at the Seattle Aquarium has shown that common anaesthetics used for fish like quinaldine or tricaine methanesulfate (MS-222) cause pain in octopuses. Until 2018, scientists also had “no evidence that agents believed to act as anesthetics [in cephalopods] produce effects beyond immobility.”<sup>104</sup> Three of five general anaesthetics tested by Butler-Streuben et al. (2018) failed to effectively block pain signaling in cuttlefish and octopuses. This work – the first study to explicitly test whether cephalopod anaesthetics stopped pain signaling or merely induced paralysis – helpfully resolves a major source of uncertainty in ethical cephalopod care but also reveals that invasive surgeries had likely been performed on immobilized, fully conscious

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<sup>103</sup> Ibid.

<sup>104</sup> Butler-Streuben et al., 2018: 1

octopuses in laboratories and aquariums.<sup>105</sup> Writing on octopus anaesthesia provides a particularly horrifying example of care intended to improve animals' well-being instead resulting in situations comparable to torture.

Fortunately, most octopus veterinary care at the Vancouver Aquarium involves administering drugs for infections, injuries, and skin lesions rather than surgery. Octopuses' thin, porous skin makes them extremely sensitive to chemicals dissolved in their water which means staff can administer most drugs by simply adding them to seawater and putting the octopus in a small tank with the medicated solution (although the care manual also details procedures for injecting drugs into veins or muscle). Staff also sometimes allow minor injuries, such as those sustained by one octopus after a live crab hunt, to heal on their own without treatment. Although wild octopuses would not depend on veterinary care for survival, the high concentration of bacteria and other microorganisms in even the cleanest aquarium tanks relative to outside environments makes continual monitoring of injuries for infections that would require veterinary care essential – and also renders the choice not to treat octopuses potentially violent. Aquarium veterinarians expressed confidence that antibiotics, antifungals, and other drugs which work effectively in animals like fish and marine mammals also work well in octopuses even as care staff outside the veterinarian team expressed confusion about the relevance of questions about veterinary care for octopuses given how rarely they could recall treating these animals for serious ailments. Despite recent improvements in cephalopod science, the uncertainty and disagreement expressed by different caretakers and scientific and industry sources on proper cephalopod

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<sup>105</sup> The authors focus on the two general anaesthetics confirmed to be effective without reflecting extensively on past uses of those which failed to block pain signaling (Butler-Streuben et al., 2018).

veterinary care therefore raises questions about the violence (and therefore the ethics) of keeping animals in captivity which humans still understand so little about.

Variations in individual behavior also complicate straightforward, science-based assessments of octopus well-being in captivity. Mystique, the Aquarium's previous octopus, emerged from her den during visiting hours more often than either Phoenix or Ceph but still spent most daylight hours hidden. Multiple staff I spoke with described Mystique as relatively outgoing compared to either Phoenix or Ceph, and Ceph has quickly gained a reputation as a particularly reclusive octopus. As a volunteer gallery educator, I've also observed Ceph transform herself more dramatically than I ever witnessed with Mystique, who usually emerged from her den a dark ocher and faded to pale white while resting, smooth-skinned the entire time. In the handful of times I've seen Ceph, I've struggled to keep track as she morphs effortlessly from speckled to solid, half white and half purple (as if someone had drawn a vertical line down her body), red mantle and white body then white all over, smooth then erupting in wrinkles (*papillation*) like crumpled tissue paper. It took several minutes the first time before I realized that what I thought was a trick of the light shimmering unevenly over a moving octopus in fact was dramatic color and texture change unfolding at the speed of a flickering animation. These differences between individual octopuses corroborate what lab and field scientists often report about personality differences between different octopuses of the same species.

Variations between individual octopuses can also make assessing what counts as 'normal' behavior and what indicates stress difficult. For example, much about octopus color and texture changes remains unknown, and ethologists<sup>106</sup> have used octopus color change as

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<sup>106</sup> Ethology is the scientific study of animal behavior.

indicators of both alertness and stress.<sup>107</sup> Aquarists may also struggle to determine whether an octopus stays in its den “because it just... wants to stay in its den all the time” or whether “it is staying in its den all the time because something’s wrong.”<sup>108</sup> It therefore remains difficult to interpret Ceph’s elusiveness and proclivity for color change or to know how she understood the gaze of human visitors crowded around the glass. One staff member speculated that keeping Mystique behind the scenes for several months before rotating her onto display helped her acclimate more easily to captive life and feel more comfortable spending time exposed in the Port Hardy exhibit. However, they were quick to avoid making sweeping judgments about the effects of time spent off exhibit on octopus behavior based on observing a few individuals — “that could be a difference in personality too, right?” They elaborated,

Like I’ve heard that octopuses have different personalities but just being able to get a chance to see it from the different octopuses that I’ve worked with — like Mystique, especially. She just really seemed to be quite engaged with touching and she just always looked really interested in everything like that. And so yeah, I think it’s definitely... just getting the chance to actually kind of get to know each individual octopus and see their personalities and that’s one of the most surprising things. Cause they’re so fascinating.

They’re my favorite animal and I just... I knew a lot of information about them but actually getting to interact with them is... I think that’s been the most... surprising-

*Author:* To get to know the individuals.

*Staff member:* Yeah, the individuals.

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<sup>107</sup> Mather and Roland, 1993

<sup>108</sup> Vancouver Aquarium staff member, pers. comm.

Unlike staff in more managerial roles who seemed perplexed when I referred to recent octopuses at the Aquarium by name (laughingly commenting that “It’s funny you’re saying all these names...” as another quipped “I’m going, which one is that?”), the biologists who had currently or recently worked with these animals one-on-one lit up when describing their interactions with individuals.

These aquarists always took care to avoid misleading anthropomorphisms — for example, by noting that they cannot know how octopuses are processing information about them even when it becomes apparent that the octopuses are watching, processing information, and reacting in diverse ways to what they taste and see. Since octopuses taste everything they touch with their hundreds of highly sensitive suckers (a single octopus sucker has more neural processing power than most invertebrates have in their entire bodies),<sup>109</sup> numerous stories from people who interact with captive octopuses suggest that these animals can tell different humans apart by taste and sense chemicals people secrete in their skin when scared or angry.<sup>110</sup> Abundant anecdotal and scientific evidence also demonstrates octopuses’ ability to tell individual humans apart by sight.<sup>111</sup> One keeper I spoke with described how *Mystique* would readily grab the familiar keeper’s hand but display more trepidation with others, explaining that “...she’s more used to my touch... more used to my taste. It would be like ‘Hey, this fleshy thing touches me and then food happens! So I want to touch this one.’” These careful descriptions of octopus behavior illustrate some ways of speaking about other-than-humans as individuals who we know have lifeworlds without presuming — or needing — to know exactly what those lifeworlds are.

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<sup>109</sup> Grasso, 2014

<sup>110</sup> Montgomery, 2015; “Our People: Ruby Banwait,” n.d.

<sup>111</sup> Anderson et al., 2010

Biologists' training makes them acutely cognizant of the radical differences between our species which diverged over half a billion years ago,<sup>112</sup> long before either of us resembled the creatures we are today, and wary of language their peers or supervisors might dismiss as unprofessional 'anthropomorphizing.' However, interacting with an octopus with this in mind forces a recognition of personhood across difference that cannot imagine (and therefore never tries) reducing that other into our own likeness. Responsible captive care for octopuses must therefore negotiate substantial scientific uncertainty about how to interpret octopus behavior paired with substantive evidence (both scientific and otherwise) that individual octopuses have different needs and preferences. This makes it likely that caretakers miss some signs of octopus stress but also forces them to constantly reflect on how their octopuses might experience captivity in order to provide the best possible care for these individuals.

### **2.3.3 Feeding**

Aquarists employ diverse strategies for feeding GPOs. About once or twice a week, depending on how often an octopus displays foraging behavior, aquarists will attempt to coax it to the water's surface to take fish and clams from the keeper's hands. Staff I spoke with explain that this doubles as interactive enrichment and allows them to check the octopus's physical condition. If the octopus refuses hand-feeding, staff may also drop food into the bottom of the tank to allow it to feed on its own. (All staff I spoke with stressed that they never force the octopus to come out for feeding if it chooses not to and that the octopus receives food on schedule regardless of whether it swims up to the surface for hand-feeding.) Although staff do

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<sup>112</sup> Cephalopods and vertebrates both emerged as distinct taxonomic groups during the Cambrian period (Holland and Chen, 2001; Kroger et al., 2011).

not view coaxing octopuses to come to the surface as training, they do describe this as a way to teach octopuses that if they emerge from their den they may receive food sooner. Staff also emphasized the importance of teaching octopuses they will receive food regularly and therefore do not need to eat their tank mates. Most feeding occurs during the daytime outside regular visiting hours. In this way, captive care shifts both the mode and timing of these (otherwise nocturnal) animals' feeding regimes to facilitate animal care when it is most convenient: during the day when human caretakers are most active, and outside times when guests crowd the galleries.<sup>113</sup> However, it can also serve to potentially increase octopuses' display value when staff attempt to lure octopuses out for guests by offering them food during visiting hours. As a gallery educator, I once witnessed staff use tongs to present a small fish in front of the den where *Mystique* lay hidden. An octopus arm shot out of the den, gripping the fish and tugging it towards the cave, but the metal tongs holding the fish refused to budge. Eventually, *Mystique* gave up and released it. Staff pulled the treat out of her tank uneaten. Although proper feeding poses a challenge for many animals at the Aquarium, according to staff biologists, octopuses are voracious eaters who quickly acclimate to their new diet and feeding schedule at the Aquarium. Unlike many animals, feeding octopuses until they stop eating (to satiation) as the Vancouver Aquarium does is common practice in captivity and does not appear to harm them.<sup>114</sup> Scientists who study cephalopod biology have demonstrated enormous variability in octopus diet and feeding strategies outside captivity and posit that octopuses likely evolved their advanced cognitive capacities because this allowed them to hunt across a wide range of micro-

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<sup>113</sup> During peak visiting times in the summer, the Vancouver Aquarium receives over six thousand visitors per day.

<sup>114</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

environments and access many different food sources while avoiding predation.<sup>115</sup> Attempts to shape captive octopuses' feeding habits illustrate one important way captive care involves cultivating “particular inclinations and dispositions”<sup>116</sup> in individuals rather than controlling populations or territories – a key aspect of pastoral power.

At the Vancouver Aquarium, frozen herring and capelin (small, silvery varieties of fish) comprise the majority of an octopus's diet. Staff also sometimes feed them Atlantic surf clams. In contrast, wild GPOs primarily eat crustaceans (especially crabs) and other molluscs,<sup>117</sup> which matters because octopuses' digestive tracts lack emulsifiers,<sup>118</sup> and octopuses therefore digest protein-rich foods like crustaceans much more efficiently than fatty alternatives. Numerous studies of captive cephalopods suggest they grow fastest when fed low-fat, protein-rich diets,<sup>119</sup> and the AZA care manual for GPOs recommends that keepers minimize how often they feed GPOs high-fat items like herring and capelin in favor of “leaner fishes” like flounder and mackerel.<sup>120</sup> Wild GPOs also never consume their prey thawed or frozen. The AZA care manual notes that vitamins degrade in frozen seafood, making frozen feed inherently less nutritious than live prey. Learning to eat frozen food is one of the main adjustments octopuses undergo while

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<sup>115</sup> See Mather et al. (2014) for an excellent review of this topic.

<sup>116</sup> Shukin, 2012: 154

<sup>117</sup> However, wild GPOs display enormous diet variability (Scheel and Anderson, 2012).

<sup>118</sup> O'Dor et al., 1984

<sup>119</sup> Garcia and Gimenez, 2002; O'Dor et al., 1984; Perez et al., 2006; Rigby and Sakurai, 2004. For a detailed discussion of these studies, see AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 41.

<sup>120</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 45

acclimating to their tank environment. In mature GPOs, the most noticeable effect<sup>121</sup> of this new lipid-rich, thawed-from-frozen diet is a reduced growth rate, and insufficient nutrition from these sources likely plays a major role in humans' failure to rear octopuses from hatchling to adult in captivity.<sup>122</sup> This illustrates one of the less visible ways slow violence operates in captivity. The Aquarium purchases animals frozen from approved seafood vendors such as Albion, "one of Western Canada's largest fully integrated suppliers of meat and seafood from all over the world."<sup>123</sup> Commercial fisheries harvest the Aquarium's preferred octopus foods (herring, capelin, and surf clams) throughout the globe,<sup>124</sup> and all of these animals — especially herring and surf clams — are popular for human consumption. This means that bringing octopuses into the Aquarium substantially changes their diet, largely disentangles them from local food webs, and embeds them in the same global socio-ecological networks that feed the humans who care for them.

#### **2.3.4 Stimulation**

Effective captive care for octopuses also requires cultivating desired habits and behaviors through enrichment activities. A fraction of captive octopuses' diets still comes from local ecosystems in the form of live feeds. Every few weeks, staff at the Vancouver Aquarium will

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<sup>121</sup> Here "the most noticeable effect" means "the most noticeable effect from the perspective of humans," given how little humans understand about cephalopod health (AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014).

<sup>122</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 39-42

<sup>123</sup> "About Us," 2018

<sup>124</sup> Primarily the north Atlantic and Pacific

release a living crab collected from local waters into the octopus tank so it can hunt. Although the Vancouver Aquarium has previously promoted live octopus feeding as part of its daily animal show rotation,<sup>125</sup> it no longer holds these regularly for the public. Crab hunting therefore primarily serves as stimulation for octopuses who get to stalk their preferred prey animals even though in the past these events have doubled as a live spectacle. Octopuses too small to hunt crabs<sup>126</sup> can instead receive live snails. (Staff explained to me that even full-size octopuses sometimes suffer minor injuries from crabs who fight back during these hunts.) Although unintended predation occurs in some exhibits,<sup>127</sup> octopuses are one of the few predators who receive live prey as part of their scheduled feeding at the Aquarium — the green anacondas, for example, eat only frozen rabbits and rodents. Collectors from the Aquarium have permits to harvest a limited number of red rock crabs and dungeness crabs from local ecosystems for this purpose, taking only male animals so the females remain to breed as well as only animals above a particular size (although staff also sometimes purchase the crabs from seafood suppliers). Live hunts therefore illustrate some of the ways social categories shape allowable forms of violence against animals: female crabs and young crabs cannot be harvested because of their importance for reproducing economically and recreationally valuable populations, and terrestrial mammals cannot be killed in front of visitors while cold-blooded aquatic animals like fish and crabs can.

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<sup>125</sup> Vancouver Aquarium, 2010a, 2017a, 2017c

<sup>126</sup> Collecting red rock or dungeness crabs below a certain size is prohibited by the DFO (“Crab Harvesting Information,” 2018).

<sup>127</sup> Even well-satiated predators will occasionally snack on their tank mates, and many exhibits at the Aquarium house predator and prey species together. Predators kept with animals they occasionally snack on or attack include sharks, caiman, sturgeon, red perch, hermit crabs, and (of course) octopuses.

Costs and labor time involved in obtaining live crabs, whether collected or purchased, also limit how often octopuses living at the Aquarium get to hunt. In this way, removing octopuses from wild ecosystems and re-embedding them in ecological networks designed by and for people not only shapes what octopuses eat but how they experience the world.

The AZA care manual for GPOs emphasizes the importance of providing enrichment for this species in captivity, explaining that “Undesirable behaviors such as escape jetting and autophagy can be decreased seemingly as a result of enrichment... in addition to increasing the overall activity level of the animal, making for a better display.”<sup>128</sup> Autophagy refers to when octopuses consume their own limbs — presumably (as this quote implies) out of confusion or boredom. Although many institutions also present GPOs with “puzzle boxes” filled with food and plastic toys, the Vancouver Aquarium prefers to avoid these forms of enrichment. Staff I spoke with explained that they “don’t really want to introduce anything to them [octopuses] that they wouldn’t find in their natural environment,” especially now that the Vancouver Aquarium eventually releases its GPOs.

Instead, caretakers rearrange rocks in the Port Hardy exhibit and offer the octopus diverse interspecies interactions. Octopuses in the wild often rearrange rocks and other structures around their dens. Staff explained to me that after humans have shifted items around the exhibit, the octopus will always further rearrange them according to logics discernible to no one but the octopus. Moving rocks around can also provide octopuses with new hiding places. Additionally, octopuses live with a wide variety of tank mates who they may ignore, harass, or kill depending on their disposition, mood, and the species involved. The AZA care manual for GPOs includes numerous warnings not to keep valuable animals with GPOs due to the risk that octopuses will

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<sup>128</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 84

eat them, and animals currently housed with GPOs at the Vancouver Aquarium include yellowtail rockfish, sea stars, sea cucumbers, sea urchins, sponges, anemones, and orange cup corals.<sup>129</sup> On multiple occasions, I have witnessed rockfish stray too close to an octopus who decided to grope it with her tentacle, curling around the unsuspecting animal before it dashed away in alarm. Past GPOs at the Vancouver Aquarium have occasionally eaten their rockfish tank mates regardless of how much the aquarists fed them. (Phoenix ate several rockfish housed with her.) Although the Vancouver Aquarium displays multiple species of endangered or threatened rockfish, it does not keep any of these in the octopus tank. This again illustrates how the ways people categorize animals – as too expensive to sacrifice, endangered, or neither – differentially exposes them to and protects them from violence in captivity.

Staff also allow octopuses to interact with humans directly — what they refer to as “tactile enrichment.” As one staff member explained to me,

*Staff member:* ...we'll put our hands in the water to get them a little bit cold because we're quite warm compared to the cold-blooded octopus... So we usually put our hands in the water to get them cold, and then we'll basically allow the octopus to come to us. And we'll allow them to control the amount of touching that goes on to some extent. Sometimes the octopus wants to touch us more than we want them to be able to touch us. So it is trying to keep control of the situation... Basically, I don't want to have the octopus completely grab onto me with six out of her eight arms or anything like that and pull my hand too far into her — cause, you know, they're wild animals. I one hundred percent believe that if an octopus got a finger up close to its beak it would try to bite it,

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<sup>129</sup> Note that none of these animals include crustaceans or other molluscs, octopuses' preferred prey items.

because why wouldn't it? 'What does this taste like?' Exactly. You can tell what it tastes like from the outside but I'm sure it probably wants to know what it tastes like-

*Author:* Yeah, just to check. [laughter]

*Staff member:* Yeah. So we try to keep control of the situation and that's usually by limiting the number of arms [that] are allowed to touch-

*Author:* What's like- you said six was too much-?

*Staff member:* Six is too much. Usually like, one to two is optimal. One to two is optimal. Any more than that and you're just constantly trying to pull — gently — but trying to get them off of you, and by the time you get one off you've got another one on.

Although staff carefully monitor these interactions to avoid letting the octopus bite them, as this testimony demonstrates, interactions with octopuses even in the confines of a tank are rife with uncertainty and can leave physical marks on keepers in the form of bites or “octopus hickeys,” “little circle marks where it [the octopus] just pulls so hard that it's exactly the same as a hickey where the suction breaks some of the blood vessels in your skin.” As a gallery educator at the Vancouver Aquarium, I've spoken with numerous visitors who recount even more dramatic encounters with these animals while diving in local waters. One diver described how octopuses would frequently investigate humans they encountered at the bottom of the ocean and occasionally wrap their powerful bodies around him or his dive buddy. In order to coax the octopus into releasing them, the divers learned to stroke the animals between the eyes so they would relax and let go. Another guest described to me how a red octopus stubbornly clung to the go-pro strapped to his chest while diving. Due to octopuses' enormous strength, even coercive encounters with these animals often involve some degree of negotiation. However, this also

illustrates how effective captive care requires cultivating particular habits and dispositions in octopuses to produce desired interactions with their caretakers.

### **2.3.5 Mishaps in human care**

“...the history of evolution is that life escapes all barriers. Life breaks free. Life expands to new territories. Painfully, perhaps even dangerously. But life finds a way.”

*- Dr. Ian Malcolm, Jurassic Park*

Interspecies interactions are also where staff at aquariums report the most mishaps in octopus care. One biologist at the Vancouver Aquarium explained to me how

*Biologist:* ...the interpretive staff called it Voldemort. And Voldemort one hundred percent lived up to his name because once he outgrew the Port Hardy Exhibit and moved into the Strait of Georgia exhibit- cause at the time that's how we were rotating them out... I had, I think, five dogfish sharks in there and I was going to try training them so that they would target feed from me when I was diving and I had this whole target program figured out and then slowly this octopus just started eating my dogfish sharks one by one. And it wasn't even eating the whole thing! It would just like bite their bellies and then... kinda that's it. So it was just systematically knocking off all of my dogfish and I was like, 'Well, there goes my whole target feeding program! I guess I won't do that.' But yeah, they're definitely... they help themselves, but I think that's also why bringing them in at a younger, smaller age so that they kind of get the idea that they will be satiated on their own... but you know, you can't help it if they're curious and they just want to be wild animals. They are [wild animals].

*Author:* Yeah. Was it attacking them out of any sort of defense possibly, or was it just like-?

*Biologist:* I think it was probably that the dogfish sharks just got close enough to grab. And then you know, it would always seem to happen after hours cause it never really happened in the day. So in the night time when octopus are more active maybe, and they were out hunting or kind of at that dusk time maybe... and yeah, yeah just systematically one, after the other, after the other...

Other aquariums such as the Seattle Aquarium have reported GPOs attacking dogfish sharks as well,<sup>130</sup> and another staff member at Vancouver explained to me that they no longer rotate GPOs into the massive Strait of Georgia tank since the octopuses often “tend to go after... cartilaginous fishes” such as sharks in that exhibit. The AZA care manual for GPOs contains over half a dozen warnings about the species’ proclivity for feasting on tank mates. At one unnamed institution, the manual describes how a

...tank was mandated to be a ‘multi-species’ tank, to hold wolf eels, rockfish, and sculpins along with various invertebrates, in spite of the staff’s caution that GPOs would eat the fish. The octopuses did eat some of the fish, which horrified the interpreters, but provided enrichment to the GPOs. The octopuses also forced the wolf eels from their dens into the small cylinder where they looked out-of-place.<sup>131</sup>

Unlike many zoo environments which house fewer species of animals together, aquariums like the one in Vancouver will often display upwards of half a dozen species together in their tanks. This matters because humans can do very little beyond providing abundant shelter

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<sup>130</sup> Montgomery, 2015

<sup>131</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 25

and food or occasionally removing individuals<sup>132</sup> once they release many different kinds of animals into a tank together. Although single- and mixed-species enclosures both subject other animals to human control, the mixed-species environments normal at aquariums temper the level of mastery staff can expect to have over animal life in most tanks. When staff describe GPOs as ‘wild’ animals who may bite a human or kill a shark given the opportunity, they are discussing a different form of ‘wildness’ than what they want (and also need) the public to perceive through naturalistic enclosures and exhibit panels with facts about non-captive animals’ biology. Casual visitors to zoos and aquariums usually miss genuine signs of animal behavior that is not controlled or anticipated by these institutions. Instead, these stories about octopus mishaps illustrate a recognition from people who work with GPOs face-to-face — or, more accurately, hand-to-tentacle — of real limits on human control over other species even in this deeply unequal environment. Similarly, the anecdote from the AZA care manual suggests appreciation for an incident that “provided enrichment to the GPOs” even though it “horrified the [human] interpreters.”<sup>133</sup> Not only do aquarium staff recognize limits over their control in multi-species tanks, but they openly express a willingness to relinquish some control so other animals can participate in behaviors they enjoy but some humans may find unpalatable. This also illustrates one way the unraveling or relinquishing of human control in captivity often produces violence — in this case, against animals who octopuses choose to harass and kill.

Octopuses kept in tanks throughout the world have long developed reputations for other forms of mischief as well. At the Vancouver Aquarium, several staff members recounted an

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<sup>132</sup> For example, while I was volunteering staff decided to remove a particularly murderous hermit crab from the Stanley Park Shores exhibit after he killed a nematode and injured numerous Pacific sandfish.

<sup>133</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 25

octopus who pulled the plug out from the bottom of its tank, draining much of the water and endangering both the octopus and its tank mates. A heavy boulder now sits on top of the tank plug in the Port Hardy exhibit. Similarly, GPOs' enormous strength and ability to squeeze through any opening larger than their teacup-sized beak and the slim cartilaginous plate between their eyes makes preventing escape an ongoing challenge. A thick coat of mucus allows octopuses to survive outside water for brief periods of time without drying out, and in the wild some use this ability to crawl between different tide pools to feed.<sup>134</sup> However, at aquariums escape usually spells death for octopuses who dry out on the floor long before they locate another body of water.<sup>135</sup> To prevent escapes, the Vancouver Aquarium employs barrier gates and locked hinges on all its octopus tanks. Even after deploying strategies like this though, numerous institutions have at times struggled to contain their GPOs. Footage from 2015 at the Seattle Aquarium shows one octopus crawling over the edge of its tank during the middle of the day in front of guests,<sup>136</sup> and at one New Zealand Aquarium in 2016, an octopus named Inky navigated a complex pipe system to crawl from his exhibit back into the Pacific Ocean.<sup>137</sup>

Persistent rumors also percolate through the Vancouver Aquarium about an alleged in-house octopus escape. Although staff I spoke with were adamant that any stories about octopus escapes from galleries at the Vancouver Aquarium are nothing but "urban myths," both volunteers and members of the public have frequently repeated stories to me about the notorious escapee. According to these tales, years ago staff noticed fish mysteriously disappearing in tanks

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<sup>134</sup> Montgomery, 2015

<sup>135</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

<sup>136</sup> "Giant octopus tries to escape Seattle Aquarium," 2015

<sup>137</sup> "Octopus makes daring escape from aquarium to Pacific Ocean," 2016

around the octopus exhibit. When they checked the security cameras, they discovered the cephalopod culprit who would watch security guards pass on their nightly rounds and wait for them to leave before crawling out to feed in the other tanks and crawling back to its own exhibit before the guards returned. These rumors date to at least pre-2006, before most of the staff I spoke with were hired.<sup>138</sup> In his article “Being Angelica,” animal geographer Christopher Bear (2011) recounts a similar tale at The Deep, an aquarium in Kingston-upon-Hull in the UK, which could indicate that this type of behavior is common among captive GPOs. However, it just as likely means this incident in fact occurred at neither the Vancouver Aquarium nor The Deep. If it occurred at all, this octopus escapade likely happened elsewhere decades ago. Other mishaps detailed in the AZA care manual for GPOs include an octopus who electrically shocked itself and a keeper by grabbing a power strip placed near the tank (citation: “B. Christie, personal observation”) and another octopus who blasted jets of water at a nighttime employee carrying a bright flashlight it disliked.

#### **2.4 Conclusions: The violence of captive care and its failures**

Keeping octopuses in captivity requires constructing an ecology that embeds them in energy and food systems originally designed to nourish people. Removing octopuses from wild ecosystems and forcing them into the ecosystems of captivity involves diverse forms of violence – some of them dramatic, such as when dive teams flush wild octopuses from their dens with alcohol – but most of them slow, such as the reduced growth rates (from suboptimal nutrition)

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<sup>138</sup> Over e-mail, CBC journalist Bethany Lindsay - who tweeted about this story in April 2016 shortly after Inky escaped the New Zealand Aquarium - recounted hearing the tale as a volunteer with the Aquarium’s cetacean research lab in 2006.

and increased exposure to irritants like light they experience in tank environments. Hierarchical social differences both within and between species heavily shape how violence impacts octopuses and other animals in this context. This includes distinctions by age and size that determine what octopuses the Aquarium's dive teams choose to collect, anthropocentric species hierarchies that marginalize aquatic invertebrates in animal welfare science and related regulatory frameworks, and economic (de)valuations which mark octopuses as valuable for aquariums but not fisheries. Legal and industry regulations, scientific knowledge, and economic (de)valuations therefore differentially expose particular animals to violence within captive ecosystems through how they produce and reinforce hierarchical social difference.

At the Vancouver Aquarium, captive care for octopuses aims to also cultivate habits that make octopuses good display animals. Keeping octopuses as healthy as possible while on display is an essential part of this, but the subtle ways tank design and feeding routines aim to coax octopuses out of hiding illustrate how captive care seeks more than keeping animals alive or healthy. To succeed, it must also coerce octopuses into new social relations with human caretakers and visitors in the galleries. However, much of the violence of captive care manifests where systems designed to keep animals alive or healthy in captivity fail. Octopuses confound these systems through their individual idiosyncrasies and creativity, limits on scientific knowledge about cephalopods, and the difficulty of adapting industry practices designed for terrestrial vertebrates for animals radically different from people. In the chapters that follow, I elaborate on what happens when captive care confronts its ultimate obstacle – the inevitable end of octopus lives – and what makes octopuses useful at the Aquarium for science, education, and ultimately conservation.

### **Chapter 3: Confronting octopus death**

“...cephalopods ‘live fast and die young,’ a motto borrowed from the Hell’s Angels and applied to cephalopods.”

- *AZA Giant Pacific Octopus Care Manual, “Reproductive Physiology and Behavior”*

The previous chapter detailed how the Aquarium ensnares octopuses in captive care and the complex, power-laden relationships octopuses develop during captivity. This chapter shows what happens when those octopuses reach the end of their lives. It covers struggles to get them to reproduce in captivity, octopus accidents, and old age, as well as ways the Aquarium can either continue its care in perpetuity or relinquish control over these animals after death. Different end of life decisions embed octopuses in different ecological relations. Following Plumwood (2008), I frame captive ecologies that alienate dead octopuses from the landscapes where they originate as a form of ecosystem theft. This helps reveal how captive care enacts violence in a context where death is imminent. Continued captive breeding failures have also sacrificed thousands of small octopus lives but preclude the violence of industrial octopus breeding which their success would allow. Regardless of how assiduously aquarists tend to captive octopuses’ needs, these short-lived animals inevitably pass away within a few years after they arrive at the Aquarium. Every time an animal approaches the end of its life at a zoo or aquarium, staff must decide how to best adapt care to fit an aging animal’s evolving needs. In the case of octopuses, this also means determining how to care for a creature that has recently become reproductively active. Searching for a mate signals the imminent onset of octopus senescence, the terminal deterioration of bodily functions associated with aging. Questions about octopus reproduction therefore frequently inform questions about what to do when an octopus nears the end of its life,

and vice versa. Although many scholars have written about zoos' tendency to hide animal death from the public,<sup>139</sup> the Vancouver Aquarium has often left traces of and stories about octopus death in plain sight. In fact, it has frequently incorporated them into its own promotional and educational programming, immortalizing these short-lived animals in new ways through their deaths.

### **3.1 Reproducing ephemeral lives**

A small alien life form — translucent, bulbous, tentacled — bounces across the screen. It looks like a Japanese sky lantern, lit from within and floating against a dark atmosphere. The size, maybe, of a grain of rice. Dreamy instrumental music plays in the background. The camera pans to pale eggs bunched like grapes, with tentacled creatures visible pulsing within, before switching back to paralarval<sup>140</sup> octopuses drifting through dark water. Across the top, the title reads “Baby Octopuses at the Vancouver Aquarium,” and in the YouTube video caption the Aquarium’s director of Animal Operations explains that “To further our knowledge of octopus reproduction, we will attempt to feed and maintain the larvae for as long as possible.”<sup>141</sup> A second video six weeks later shows several ghostly octopus paralarvae pouncing on bits of food and tugging at krill twice their size. Sometimes two or three latch onto the same lifeless crustacean, pulling back and forth in several directions. After this, all online traces of the young octopuses disappear.

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<sup>139</sup> For example: Benbow, 2004; Braverman, 2013; Chrulew, 2011; Sorenson, 2008

<sup>140</sup> Newly hatched octopuses are known as paralarvae and drift in the open ocean as plankton during the early stages of their lives.

<sup>141</sup> “Baby Octopuses at the Vancouver Aquarium,” 2011

When the Vancouver Aquarium found itself with C.C., a female GPO, and Clove, a male, both approaching senescence in late 2010, staff decided to try introducing them to each other to see if they would mate. In the words of one staff member I spoke with,

It was more just ‘Well, we’ve got two adults. Let’s put them together and see what happens.’ And... that could be dangerous because they could fight each other, or they could mate, and they happened to mate. And then [we decided], ‘Let’s go with it and see if they’re fertilized.’ It was cool.

Thus, this decision emerged more from serendipity and a desire to learn more about octopuses’ reproductive and paralarval biology than design. As the quote above hints, introducing the octopuses also came with well-documented risks: rather than mating, two octopuses may also decide to fight or eat each other if the mood strikes them.<sup>142</sup> In October 2010, Aquarium staff introduced Clove and C.C. in the Strait of Georgia exhibit, filmed the four-hour encounter, and uploaded a video titled “It’s octopus sex!” to the Aquarium’s YouTube channel.<sup>143</sup> Shortly after, Clove passed away while C.C. disappeared into her den, tending her eggs and rarely seen.<sup>144</sup> Only three hundred of C.C.’s eggs hatched the following summer.<sup>145</sup> (The Aquarium did not report how many she laid, how many were fertilized, or how many she had left unladen in her mantle.) Of these, not one survived past the first few months of life. How does this attempt at

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<sup>142</sup> In fact, this has happened before at the Seattle Aquarium when they have attempted to mate their octopuses (Montgomery, 2015). For this reason, institutions generally do not put octopuses in tanks together unless hoping to breed them.

<sup>143</sup> “It’s octopus sex!” 2010

<sup>144</sup> Once they lay their eggs, female octopuses stop eating and no longer emerge to forage.

<sup>145</sup> Studies of GPOs in the North Pacific have found enormous variability in octopus fecundity, ranging from 41,600 to 239,000 eggs per female and averaging at just over 100,000 (Conrath and Connors, 2014).

breeding GPOs connect to the Vancouver Aquarium’s conservation mandate (given that GPOs are a nonendangered species), and what caused this experiment to fail? Had it succeeded – regardless of what staff intended – this effort to unlock the secrets of captive octopus reproduction held potentially devastating consequences for conservation and animal welfare because it could have facilitated large-scale octopus aquaculture: laboratories and for-profit companies interested in mass-producing octopuses in captivity currently face the same scientific hurdles as non-profit zoos and aquariums.

For an octopus, mating begins the end of their life. Unlike humans and other mammals, octopuses live short lives — for GPOs, three to five years — and reproduce once, although both males and females mate with multiple partners.<sup>146</sup> A female GPO like C.C. will often lay over one hundred thousand eggs<sup>147</sup> which she hangs in strings from the ceiling of a cave where she slowly passes away, and male GPOs like Clove also die within a few months of first mating.<sup>148</sup>

The Vancouver Aquarium’s difficulty raising GPO hatchlings also confirms what scientific and industry literature have documented for decades. According to the AZA care manual for GPOs, accredited aquariums have only reared a GPO from egg to adult once, at an unspecified institution during the 1980s. The care manual cites a presentation from an industry

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<sup>146</sup> Morse et al., 2018

<sup>147</sup> Conrath and Conners, 2014

<sup>148</sup> Clove passed away 67 days after meeting C.C., and C.C. died several months later, shortly after her eggs began to hatch.

conference that is not available online,<sup>149</sup> but describes how, after aquarists collected 200 eggs from 20,000-30,000 laid by the female (presumably discarding the rest)

...the larval rearing was quite labor intensive, requiring approximately 6-8 hours per day for fastidious feeding and cleaning. After 7 months there were 25 surviving animals that had begun to settle, and by 9 months there was one survivor who was transferred to a standard aquarium to take up residence in a clam shell... The surviving octopus (a male) lived to adulthood and reached a peak size of 29kg before expiring after 38 months.<sup>150</sup>

Since then, multiple institutions have tried and failed to breed GPOs in captivity. Most attempts to breed wild species in captivity require comparable levels of violence – years of research, generations of young animals sacrificed, and often forced or artificial insemination – to successfully breed them in captive environments.<sup>151</sup> Like all the staff I spoke with about this experiment at the Vancouver Aquarium, the care manual cites feeding as the primary difficulty in raising GPOs from hatchling to adult. Aquarists struggle especially with providing newly hatched paralarvae the right size, concentration, and type of food as well as a proper nutrient balance and feeding frequency.<sup>152</sup> In light of this revelation, the Aquarium’s video of paralarvae attempting to feed, where multiple octopuses tug back and forth on the same piece of plankton or drag around creatures twice their size, suddenly becomes macabre. The care manual also

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<sup>149</sup> Referenced in AITAG, 2014 as “Snyder, S. (1986). Successful rearing of Octopus dofleini from hatching to settlement. Minneapolis, MN: Proceedings of the 1986 AAZPA Annual Conference.”

<sup>150</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 76

<sup>151</sup> Braverman, 2013; Hennessey, 2013; Parreñas, 2018; van Dooren, 2014

<sup>152</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

grudgingly admits that “frozen first foods are nutritionally insufficient”<sup>153</sup> for newly hatched octopuses and that paralarvae fare best with live crustaceans. (Institutions generally prefer frozen foods because they cost less to provide.) Finally, the care manual laments how “the limitations of SCUBA and the temperatures in which these animals live”<sup>154</sup> has constrained what scientists have been able to learn about GPOs’ reproductive biology in the wild.

Although staff touted the scientific merits of observing GPO egg and hatchling development by mating C.C. and Clove, the Vancouver Aquarium’s experiment contributed no data to the AZA care manual and generated no peer-reviewed publications on octopus reproduction or development. However, failing to produce useful scientific data on captive octopus breeding may have helped avert more suffering and death than this experiment’s failure caused. Concerned scientists have recently spoken out against growing interest in large-scale octopus aquaculture for human consumption: in addition to researchers’ concerns about the ethics of factory farming animals who have complex cognitive needs, octopus aquaculture would have potentially devastating environmental consequences.<sup>155</sup> Farming carnivorous aquatic animals like octopuses strains wild fish stocks, pollutes surrounding waters, and puts wild populations at increased risk for disease.<sup>156</sup> (Arguments that octopus farming would aid ocean conservation efforts by alleviating pressure on wild populations therefore have questionable merit.) Although octopus fisheries are not commercially valuable in BC, demand for octopus continues to grow in places like Japan, South Korea, and the northern Mediterranean. Private

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<sup>153</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 78

<sup>154</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014: 73

<sup>155</sup> Jacquet et al., 2019

<sup>156</sup> Ibid.

companies, universities, and governments from these regions have all invested money in octopus farming to reduce pressure on depleted wild octopus populations which increasingly struggle to meet demand for octopus from upscale markets.<sup>157</sup> The difficulty developing an affordable diet which can keep young octopuses alive has so far caused most of these efforts to founder.<sup>158</sup> Cephalopod scientists have also expressed hopes “that researchers may very soon unlock the potential of cephalopods to be kept and studied as an experimental laboratory model organism, much like mice.”<sup>159</sup> This would require producing captive octopuses at a larger scale than wild capture currently allows. Mass-producing octopuses and other cephalopods in captivity for use in laboratories would help expand research on traits like distributed cognition and camouflage of interest to both scientists and their government funders.<sup>160</sup> For example, Johnson (2015) has documented how military interests in camouflage technology have often driven funding for research on cephalopods’ astounding colour-changing abilities.

Although the Vancouver Aquarium’s failed attempt at captive breeding did not produce insights that would have facilitated octopus aquaculture for farming or science, it did produce three YouTube videos. The first in this series, “It’s octopus sex!,” in some ways adds literal heft to Ralph Acampora’s assertion that zoos are pornographic.<sup>161</sup> Acampora (2005) argues that zoos are pornographic by outlining similarities between how both zoos and pornography erase

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<sup>157</sup> Jacquet et al., 2019; McKie, 2019

<sup>158</sup> According to one report in the *Nikkei Asian Review* and circulated by *The Guardian*, the Japanese seafood company Nissui claims it has successfully hatched over 100,000 octopus eggs in captivity and plans to begin selling farmed octopus by 2020 (“Fully farmed octopus on its way to your dinner table,” 2017; McKie, 2019).

<sup>159</sup> O’Brien et al., 2018: 5

<sup>160</sup> Ibid.; Johnson, 2015

<sup>161</sup> Acampora, 2005

subjects through highly controlled, forced visibility to consumers. Although the difficulty of spotting octopuses in their exhibit at the Vancouver Aquarium makes Acampora's comparison questionable in the context of live octopus display, it usefully highlights how octopuses' forced visibility in the Aquarium's YouTube videos feeds viewers' fantasies about impossible encounters with and mastery over wild animals. The Vancouver Aquarium's public video of C.C. and Clove mating also resembles the annual "Octopus Blind Date" science writer Sy Montgomery describes on Valentine's Day at the Seattle Aquarium.<sup>162</sup> Here, Montgomery (2015) recounts watching with hundreds of other onlookers as staff at the Seattle Aquarium remove a Plexiglass barrier separating two octopuses, narrating the encounter while loudspeakers blast Barry White. At first the Vancouver Aquarium's video might seem to pale in comparison to the gaudier live affair in Seattle: the video uploaded from Vancouver contains no music, narration, or sound of any kind. While staff narrating the event at the Seattle Aquarium draw parallels between their octopus "date" and a human blind date, the Vancouver video contains only a short, clinical caption explaining that "Within minutes of introducing the male to a female octopus - sex happened" and describing Clove's reproductive anatomy. No live onlookers appear on screen. However, by January 2019 this spectacle had garnered over 48,000 internet views<sup>163</sup> - far more than the event in Seattle drawing around six thousand visitors per day<sup>164</sup> - and numerous raunchy comments. The two videos of C.C. and Clove's offspring have received overwhelmingly positive online feedback. Collectively, the Vancouver Aquarium's three octopus reproduction

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<sup>162</sup> Montgomery, 2015

<sup>163</sup> "It's octopus sex!" 2010

<sup>164</sup> Montgomery, 2015

videos have amassed over 125,000 views.<sup>165</sup> The wide circulation these videos received, paired with their silence on the fate of the animals they portray, corroborates observations that filming causes animals to circulate and accumulate value for profit or conservation far more rapidly than they could otherwise while concealing the (often violent) conditions of film production with animals.<sup>166</sup> Although the Vancouver Aquarium did not earn money directly through these videos, the overwhelmingly positive responses to them in the comments sections indicate that their circulation reflected favorably on the institution and therefore doubled as advertising to entice people to visit and donate to the Aquarium.<sup>167</sup> When comparing electronic zoos to in-person encounters at traditional zoos, Gail Davies (2000) explains how film erases animal agency by rendering its subjects permanently available for consumption by human viewers. This also resonates with Acampora's (2005) argument that forced visibility in exhibits destroys animals' subjectivity. Filmmakers working with animals in the wild or contexts like the Aquarium rarely (if ever) grapple with questions of consent,<sup>168</sup> even though many creatures display an awareness of and aversion to cameras.<sup>169</sup> Long after C.C., Clove, and their hatchlings have passed away,

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<sup>165</sup> As of January 2019

<sup>166</sup> Collard, 2016; Davies, 2000; Igoe, 2010; Ryan, 2000

<sup>167</sup> Watching wildlife film has been shown to increase donations to environmental groups among groups with an existing sense of connectedness to nature (Arendt and Matthes, 2014)

<sup>168</sup> Bousé, 1998; Collard, 2016; For an example that illustrates some of the difficulties, ambiguities in, and possibilities for obtaining consent when filming wildlife, see photographer David Slater's (2016) account of filming macaques in Sulawesi. Slater (2016) recounts attempting unsuccessfully to photograph the animals' faces until he allowed them to handle his camera equipment themselves.

<sup>169</sup> Meek et al., 2016; Slater, 2016

scenes from events that marked the ends of their lives remain immortalized and celebrated on the internet.

### **3.2 Death and after-life at the aquarium**

“...the number of times you’d see where —<sup>170</sup> came to the wet lab, opened it up, and then sees a dead octopus on the ground. So they’ve crawled out of the tank, and so that does happen.”

- *Vancouver Aquarium staff member*

Down below the galleries, past concrete walls and fluorescent lights, I file into an office with half a dozen other volunteers-in-training. We crowd around shelves stretching to the ceiling, filled with bones, feathers, glass jars, skulls, pelts, and other remnants. A turtle shell the size of a boulder sits at eye level, and the space where its absent head would be stares back at me. Traces of octopus litter the shelves too: a petri dish holding what look like plastic beads (“Giant Pacific Octopus Lens (2) I-142”), a dark keratin lump glued into a plastic cup (“Giant Pacific Octopus Beak from ‘Hachi’ I-151”), and a jar where an eyeless octopus floats (“Octopus collected from Wet Lab Freezer 19 June 2010 Vancouver Aquarium in 20% Alcohol (2-Propanol) I-4122 See MSDS”). The shelves hold nearly every variation on “octopus” imaginable: a sucker the size of a sand dollar, a maroon hectocotylus curled in on itself, eggs and spermatophores protected in separate pill bottles. More beaks and small octopuses in jars. Someone has even preserved several wispy radula, the tongue-like appendage octopuses use to drill through crustacean shells and scrape flesh. I’m brought back to a similar behind-the-scenes tour at the University of Washington’s Burke Museum where instead of a turtles and octopuses, I’d encountered hippo parts drying in the sink and giraffe leg bones strung together with wire, stretching from the floor

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<sup>170</sup> Name removed to protect subject anonymity

to well above my head. They came recently from the Woodland Park Zoo which donated them to the university museum after the animals passed away.

The AZA Policy on Responsible Population Management (2016) recommends that member institutions “optimize the use and recovery of animal remains” and maximize their “educational use” by (for example) transferring them to local universities and museums. Diverse scholars have helpfully outlined the close relationships between colonial extraction networks, hunting, taxidermy, and institutions like natural history museums and zoos that display animals.<sup>171</sup> The AZA’s recommendation that member institutions maximize animals’ “educational use” even after their death reinforces Matthew Chrulew’s (2010) conclusion that zoos discipline live animals to make them visible for “a scientific or democratic gaze”<sup>172</sup> rather than productive as commodities. In her studies of taxidermy, Merle Patchett (2017) details how taxidermy has historically “made dead animals mobile and ensured their long-term preservation in entirely alien environments,” (400) which aptly describes how preserving dead zoo animals perpetuates their alienation from the landscapes where they originate. Here at the Vancouver Aquarium, captive animals also live out their after-lives on eternal display in the name of science, education, and conservation. In a posthumously-published piece on human mortuary practices, Val Plumwood (2008) outlines how attempts to immortalize our own human bodies – for example, by encasing them in coffins – amount to “attempts to... cheat the earth community, to take nurturance from others but not to give it back” (326). Although Plumwood speaks specifically about attempts to preserve human bodies, her argument can be extended to

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<sup>171</sup> Chrulew, 2010; Patchett, 2008; Patchett, 2017; Ryan, 2000

<sup>172</sup> Chrulew, 2010: 201

understand the preservation of animals for scientific, educational, and display purposes as a theft from earth communities those bodies would otherwise nourish.

All of the Aquarium's octopus props<sup>173</sup> come from former residents of either the galleries or wet labs. Until recently, octopuses brought to the Vancouver Aquarium lived out their entire lives there. Giant Pacific octopuses, one of the longest-lived species, die naturally between the ages of three and five years, and red octopuses live less than two years. When they senesce, octopuses begin to physically disintegrate, stop eating, and lose coordination until near the end they enter "sort of a zombie state."<sup>174</sup> At this point, large patches of skin on the mantle slough off, producing a set of white lesions dubbed "butt burn" in the AZA Care Manual. In some cases, senile octopuses may even begin amputating their own limbs.<sup>175</sup> Detailed descriptions in scientific literature and the AZA care manual as well as frequent turnover in octopus residents (due to their short lifespans) allow aquarists to readily recognize these signs of imminent death and distinguish them from illness in pre-senescent octopuses.

In the past, the Vancouver Aquarium vet team has euthanized senescent octopuses by immersing them in a bath of ethanol and magnesium chloride then injecting them with pentobarbital.<sup>176</sup> This practice ended in winter 2018 when they began releasing octopuses instead. As discussed in Chapter 2, prior to 2018 there was "no evidence that agents believed to

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<sup>173</sup> The Aquarium uses the term "props" to describe interactive materials staff and volunteers use to engage and educate visitors. Ideally, props are items people can touch, manipulate, or otherwise interact with. In Chapter 4, I elaborate on how the Aquarium deploys these materials for outreach and education.

<sup>174</sup> Vancouver Aquarium staff member

<sup>175</sup> AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG), 2014

<sup>176</sup> Pentobarbital is commonly used in animal euthanasia as well as executions and physician-assisted suicide in people (Fass and Fass, 2011; Mears, 2012; "Texas executes Yokamon Hearn with pentobarbital," 2012).

act as anesthetics produce[d] effects beyond immobility.”<sup>177</sup> In other words, scientists and aquarists working with cephalopods faced the horrifying possibility that chemicals like ethanol which they believed blocked cephalopod pain receptors instead merely paralyzed the animals. Fortunately, a February 2018 study published in *Frontiers in Physiology* confirms that magnesium chloride and ethanol in fact stop nerve signaling.<sup>178</sup> Although scientists recorded signs of irritation just before alcohol’s anaesthetic effects kicked in, this means the Aquarium’s former euthanasia method aligns with what cephalopod ethologists consider the most humane practices today.

As the quote at the top of this section alludes, however, not all octopuses who pass away at the Aquarium undergo senescence or euthanasia. Accidents happen. Although no evidence suggests recent octopus mishaps in the Aquarium’s public exhibits, a comment by a purported former volunteer on one of the posts in the Aquarium’s popular Aquablog claims to recall “the large Octopus escaping regularly in search of food in other tanks only to be found drying out on the floor” during the 1970s.<sup>179</sup> Claims like this are difficult to either confirm or refute since they date to well before most of the animal care staff were even born and are unlikely to appear in any publicly endorsed statements by the Aquarium. However, octopus accidents have occurred in the Aquarium’s educational wet labs where students come to learn about local sea life. Most commonly, red octopuses would escape their containers overnight where staff would find them dried up on the floor in the morning. A sea star also broke through the mesh separating it from a juvenile octopus in the wet lab and gripped the octopus until it died.

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<sup>177</sup> Butler-Struben et al., 2018

<sup>178</sup> Ibid.

<sup>179</sup> “An Open Letter on Cetaceans in Our Care” Feb 20, 2014

When an octopus dies at the Vancouver Aquarium, vet staff record the animals' final weight<sup>180</sup> and perform a necropsy if they are able. (Performing a necropsy can prove difficult or impossible on an octopus who has reached advanced senescence because its organs will have already started decomposing.) If veterinarians perform a necropsy, they remove and sample the animal's major organs while searching for abnormalities and confirming the animal's cause of death. Necropsies can provide valuable educational experience for veterinary students, residents, and interns working at the Aquarium, and the vet team may also collect tissue samples for researchers. Staff then either dispose of the body or pass its remaining parts to staff involved with education and interpretation. Octopuses get frozen then sent to an animal health center for cremation if vet staff have recently treated them but otherwise become compost. Either way, "disposal" means that dead octopuses enter human waste systems. In the Wet Lab, staff may leverage this opportunity to teach K-12 students about octopus anatomy through a dissection. Most octopus dissections, however, occur behind the scenes.

Once animal care staff have finished with an octopus body, the props team decides which parts to preserve, how to best preserve them, and which to discard. They rarely preserve an octopus whole since GPOs would require massive containers, can weigh more than 50 pounds, and lose much of their physical integrity by the time they die. Some red octopuses persist mostly whole<sup>181</sup> in jars, and the young octopus murdered by a sea star in the wet lab has now become "Juvenile Octopus in 70% Alcohol (2-propanol) See MSDS I-4105." Since the Aquarium does

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<sup>180</sup> It's unclear whether this will remain as standard practice now that the Vancouver Aquarium releases octopuses: staff did not weigh Phoenix after release, but they did take a final weight for Mystique (the latest octopus to leave the Aquarium).

<sup>181</sup> Often minus their eyes and beaks

not normally collect juvenile octopuses,<sup>182</sup> this acorn-sized specimen felt like a unique prize for the props team, who encased it carefully inside two pill bottles. Staff at this point treat octopus bodies as resources for sought-after parts. In this way, living animals who zoos have conscripted to teach the public particular ways of relating to nature<sup>183</sup> continue in this role after they die. For example, from the body of an especially large octopus named Voldemort came “Giant Pacific Octopus (*Enteroctopus dofleini*) Sucker Disk In 50% 2-Propanol Sil Lid See MSD I-4169a” and several more suckers the size of hockey pucks, stitched to clear plastic and suspended in alcohol.

Reproductive organs — eggs, spermatophores, and the hectocotylus used to pass sperm to the female — trigger lots of interest as well because octopus reproduction strategies differ so radically from those of humans. Staff harvested “as much as possible” from an unnamed female whose “mantle was just full of eggs.” Similarly, male octopuses whose mantles are “full of spermatophores” present an opportunity for staff to collect items for use throughout the galleries, wet labs, and other educational programs. Nearly all octopus eggs used in props at the Vancouver Aquarium come from a single nameless female. Beaks, radula, and rare items — such as a regenerating arm — are also in high demand as props. Staff assign each prop a unique ID number and enter this into a catalogue with additional details about every prop, including the name of the octopus staff harvested the item from where applicable.<sup>184</sup> Although names still

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<sup>182</sup> Although it’s unclear whether this juvenile is a GPO or red octopus, it could not have come from the Aquarium’s short-lived GPO propagation experiment in 2010-2011 since none of the young who hatched grew this large. None of the staff I spoke with were able to clarify how this specimen ended up in the wet lab many years ago.

<sup>183</sup> Braverman, 2013; Chrulew, 2010

<sup>184</sup> The Vancouver Aquarium has only named a fraction of its exhibit octopuses, and staff did not start including octopus names in the prop catalogue data until recently.

appear on some prop labels, this allows staff to separate information about most individual animals from the representative body part preserved in a jar or plastic case. An individual who once represented its species and class (*Cephalopoda*) in the galleries or wet lab now becomes representative parts for its taxon, divided into jars, bottles, and cases.

In this way, captivity can radically transform where octopus bodies go and what they become after death. Outside the Aquarium, octopuses become food for other life forms: prey for animals like white-sided dolphins or harbor seals, nourishment for newly hatched young, or nutrients decomposing and dispersed through coastal ecosystems. Here, incinerated bodies and parts enter human waste systems. Although only the oldest prop jars use formalin for preservation, if they break the Aquarium has to dispose of their contents as toxic waste. (For this reason, nearly all octopus prop jars — and all the ones carried in the galleries — now contain alcohol instead.) Most props preserved in plastic jars, bottles, or cases at the Aquarium last until someone loses or breaks them. At more than forty years old, the oldest ones pre-date the Aquarium’s current cataloguing system for them. Thus, an octopus who lives five years at most may spend more than 8 lifetimes — three quarters of an octopus millennium — preserved in plastic and glass for education.

During a public dissection, a dead octopus becomes a mix of education and spectacle: observers have described the unique reek of cephalopod,<sup>185</sup> and dissection allows staff to emphasize radical differences between human and octopus anatomy by showing guests internal organs such as the ink sac and three fist-sized hearts.<sup>186</sup> Props help interpreters and educators stress octopuses’ “alien” qualities to guests in similar ways. In both cases, people can now view

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<sup>185</sup> Horak, 2013

<sup>186</sup> Shaw, 2015

internal organs and items such as beaks which an octopus would rarely (if ever) show them willingly. In death, an animal notorious for hiding now becomes permanently visible. Many critiques of zoos and aquariums have highlighted animals' forced visibility in exhibits as a key way they reinforce humans' domination of other species<sup>187</sup> (including empirical evidence that visiting zoos strengthens visitors' sense of superiority over other animals).<sup>188</sup> When considering how often living animals like octopuses frequently evade visitors' gaze in zoo and aquarium exhibits, the empirical basis of these critiques appears questionable. However, moving octopuses into jars obliterates their ability to escape detection. Dubious assertions that living zoo animals can neither meet nor escape the gaze of human visitors<sup>189</sup> resonate after the institution places dead animals' parts in jars human visitors can inspect and manipulate as they please. Although the ethical issues involved in viewing and controlling dead animals differ from those relevant to controlling live animals under captive care, this viewing still constitutes a form of domination over other species. Additionally, although octopuses within and outside the Aquarium both transform into something other than an individual after they die, the ephemeral, soft tissue of these animals would also never last in perpetuity without the special efforts of staff to wash and preserve appendages and organs in alcohol. These acts of preservation render permanent the theft and alienation of octopus lives from ecological communities initiated by removing octopuses from their wild ecosystems and placing them in the Aquarium.

Rather than dissolving into the environment after death (as nutrition), octopuses transformed into props become resources for science and education. The Aquarium's staff would

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<sup>187</sup> Acampora, 2005; Berger, 1980; Malamud, 1998; Mullan and Marvin, 1987; Watts, 2000

<sup>188</sup> Kellert, 1997

<sup>189</sup> Acampora, 2005; Berger, 1980

likely consider their octopus props a different kind of resource “for the environment” since they work to incorporate conservation messaging into all educational and interpretive programs.

Although not incorrect — it’s hard to overemphasize that staff genuinely want to inspire guests to treat local ecosystems better through educational and interpretive programming — equating these two elides conservation practices that operate within very different power relations.

Octopus parts in jars are resources for an environment that is ordered, catalogued, controlled, and knowable. Although displaying octopuses in tanks also reifies this, it reifies it to a lesser extent because live octopuses can evade the human gaze (and therefore human control) in ways a dead octopus in a jar cannot. When octopuses instead dissipate into ocean food webs, they pass into networks that remain largely beyond our reach, never fully knowable or controlled. Octopuses who finish their lives in the ocean rather than jars nourish a set of socioecological relations that have the capacity to support us without existing *for* us. This matters because in March 2018, the Vancouver Aquarium for the first time released an aging octopus instead of splitting her into jars — opening space, perhaps, for this institution to become otherwise.

### **3.3 Phoenix**

“On Friday, Mar 16, a team from Vancouver Aquarium®, an Ocean Wise® initiative, transferred a female Giant Pacific octopus (*Enteroctopus dofleini*) to the ocean off the coast of Bowen Island, B.C. A close collaboration with Fisheries and Oceans Canada (DFO), this release is a first for the not-for-profit organization...”

- *Vancouver Aquarium Press Release issued March 22, 2018*

An orange mass of suckers and tentacles roils as two pale human arms plunge into a plastic container. The container has a snap-on lid and is the size of a hay bale. In the next shot, a man in a life jacket and distinctive red shirt of Vancouver Aquarium staff hoists the octopus out of the container in a plastic bag. She has pressed her suckers up against the plastic on all sides. Divers also in uniform check their gear, and the camera follows them into the murky depths holding the octopus in her bag. The voice of biologist Ruby Banwait (shown suiting up to dive in the video) narrates:

She's being released now because she's getting to that stage of her life where she's becoming reproductive, she's looking for a mate and we'd like to give her the opportunity to reproduce in the natural environment.

A few seconds later, the portentously-name Phoenix spills on the ocean floor, a pale brownish red.<sup>190</sup>

The Vancouver Aquarium posts this video to its YouTube channel the day after the Aquarium's official press release, alongside another video announcing the new octopus who has moved in to replace Phoenix in the Port Hardy exhibit.<sup>191</sup> Two days later, the Aquarium tweets an article by the *Vancouver Sun*<sup>192</sup> covering Phoenix's release and linking to both videos.<sup>193</sup> The article and a second post<sup>194</sup> with the release video collectively receive 28 re-tweets. In the press release, Banwait explains how

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<sup>190</sup> Vancouver Aquarium, 2018b

<sup>191</sup> Vancouver Aquarium, 2018c

<sup>192</sup> Brown, 2018

<sup>193</sup> Vancouver Aquarium, 2018d

<sup>194</sup> Vancouver Aquarium, 2018a

We couldn't be happier with the outcome from this mission. While at the Aquarium, this octopus fascinated countless visitors who caught an up-close glimpse of this incredible animal. Now, with this next step, she is back in the ocean where she can find a mate, lay eggs, and contribute to our local Giant Pacific octopus population.<sup>195</sup>

What does a change like this mean for conservation practices at the Vancouver Aquarium? Does it indicate any possibility of similar institutional policy changes for other local animals kept here? How did this change come about, and why now?

### **3.3.1 Release, part A: Changing institutional practices**

According to staff at the Vancouver Aquarium, the push to release Phoenix came from aquarists inspired by other regional aquariums in Ucluelet, Gibsons Public Market, Campbell River, and Sidney, BC<sup>196</sup> as well as Seattle, WA<sup>197</sup> who have already established practices of releasing GPOs. Staff biologists who had previously worked at these aquariums could vouch for the feasibility of moving to catch-and-release for GPOs and ease of securing release permits from the DFO. Unlike some animals, staff expressed confidence that an octopus would revert quickly to “all of its natural functions”<sup>198</sup> once back in the wild. According to one staff biologist, “They still retain all those natural instincts. So they don't become too used to humans... So it's

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<sup>195</sup> Penny, 2018b

<sup>196</sup> The Ucluelet Aquarium, Discovery Passage Aquarium in Campbell River, and Nicholas Sonntag Marine Education Centre in Gibsons Public Market practice collect and release for all their animals — not only GPOs. The Sidney, BC Shaw Ocean Discovery Centre's GPO releases date back to at least 2015.

<sup>197</sup> Although the Seattle Aquarium is not a collect-and-release-only aquarium, it has been releasing GPOs since at least 2015 as well (Seattle Aquarium, 2015).

<sup>198</sup> Vancouver Aquarium staff member

not going to be the case that an octopus is going to come up to the surface and be like ‘Hey, where’s my stuff?’” making octopuses a strong candidate for release after months in captivity.<sup>199</sup> Additionally, the Vancouver Aquarium had recently decided to stop transferring aging GPOs from Port Hardy to the Strait of Georgia exhibit at the end of their lives because of the octopuses’ proclivity for killing valuable cartilaginous fish (i.e., sharks) who lived in that tank. Releasing GPOs who grew awkwardly large for the Port Hardy tank by the end of their lives presented an attractive solution to this dilemma. When aquarists noticed behaviors indicating that Phoenix was preparing to find a mate and lay eggs, they began an application to release her with the DFO and several months later received official permission to release Phoenix in the same place they had originally captured her off the southern coast of Bowen Island.

As with octopus collection, staff must proceed with care throughout an octopus release to minimize the animal’s stress during handling and transport. Octopus release was the only time

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<sup>199</sup> Although the Vancouver Aquarium does not track its octopuses after release, and there are no peer-reviewed studies by collect-and-release aquariums to verify this, staff elaborated that “Octopuses seem to have no issues with maintaining their natural hunting behaviours when kept in aquariums, as evidenced when they are given live prey such as crabs. They can also hunt our display animals, we have had octopuses eat rockfish and cartilaginous fishes before. *That is the biggest piece of evidence we have that they would return to natural behaviours post release.* They also maintain the natural behaviour of hiding in dens when held in aquarium facilities that provide adequate den space, which is a large component of their wild behaviour. Other facilities that are located on the west coast and so have access to appropriate release sites also release their Giant Pacific octopus after a display period, so there has been a precedent for our choice to start releasing our octopus.” There is also extensive evidence that octopuses readily develop new feeding strategies to suit different environments and exploit new kinds of prey (Mather et al., 2014). This extraordinary behavioural plasticity paired with the many wild behaviours GPOs retain while living at the Aquarium makes it likely that aquarists’ confidence in octopuses’ ability to thrive after release is well-founded.

staff I spoke with had ever seen an octopus ink, as they moved Phoenix's successor from her exhibit to the transport container. As one staff member explained, "We're always trying to do it [transfer from the exhibit] as gently as possible, but they [the octopuses] don't know what's going on. Which is also why we don't do a lot of weighing or anything like that." Staff also follow many of the same procedures they do during octopus capture: securing the octopus container with snap-on lids and bungee cords, using sea ice to keep water temperature cool, and keeping an air stone in the crate to aerate the water. Throughout this process, they monitor water temperature and make sure the octopus has not inked in her bag out of stress. They also bring extra seawater in the truck and keep buckets in the boat to run a water change just in case — although octopus ink is not toxic, it can quickly soil the water and suffocate an octopus in a closed system like the crate. Unlike octopus capture, staff do not use any anaesthetic to facilitate handling or slow the octopus down before release. Once back in the ocean, staff dive with the octopus in a plastic bag to the ocean floor and release her near suitable den habitat, avoiding opening the bag in open water where predators could easily find and overpower her.

The DFO requires the Aquarium to report the species, sex, and location and time of collection for all animals the institution releases into local waters, and it issues a release permit only for a specific location. Before issuing this permit, the DFO also makes the Aquarium's vet staff perform a full check-up to verify that they are releasing a healthy animal. The DFO will only issue a release permit for the location where the octopus was originally collected.

According to Aquarium staff, this requirement helps avoid "spreading out gene pools" and crossing the genetics of animals that are "not supposed" to mix. Canadian law specifies that the government may only issue a release license if aquatic animals "do not have any disease or disease agent that may be harmful to the protection and conservation of fish" and "the release or

transfer of fish will not have an adverse effect on the stock size of fish or the genetic characteristics of fish and fish stocks.”<sup>200</sup> This meant that when the Aquarium released Phoenix’s successor Mystique in September 2018, they had to trek 125 kilometres northwest to Egmont where a fisherman had first captured her. Releasing both Phoenix and Mystique has helped normalize this practice, and staff now speak about collect-and-release as the institution’s default policy for GPOs.

### **3.3.2 Release, part B: A tale of two animals**

However, even as staff rallied for Phoenix’s release and the Aquarium’s media team documented her successful return to the wild, the public battle over the fate of another female animal at this institution drew to a close, concluding with a very different outcome. That winter, the B.C. Supreme Court prepared to rule on a Vancouver Park Board bylaw banning cetacean captivity in Stanley Park which would decide the fate of Helen, a Pacific white-sided dolphin and the sole remaining cetacean living at the Vancouver Aquarium. Since sorting out the paperwork and logistics of the Aquarium’s first octopus release took several months, preparation for Phoenix’s March 16 release would have likely begun in November or December 2017. Hearings for the Supreme Court trial began in early October 2017.<sup>201</sup> Helen’s last tank mate, Chester the false killer whale,<sup>202</sup> also died of an infection<sup>203</sup> in November 2017, adding “fuel to the debate

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<sup>200</sup> Fisheries Act, 1993. Note that although molluscs like octopuses are not biologically fish, aquatic invertebrates are often legally defined as fish.

<sup>201</sup> *Ocean Wise Conservation Association v. Vancouver Board of Parks and Recreation*, 2018

<sup>202</sup> A false killer whale (*Pseudorca crassidens*) is a species of dolphin commonly mistaken for orcas.

<sup>203</sup> “Necropsy suggests Chester the false killer whale died from infection,” 2017

that... raged for years over whether the Vancouver Aquarium should keep captive whales and dolphins (cetaceans).”<sup>204</sup> On December 7, 2017, Animal Justice Canada and Zoocheck, two Canadian animal advocacy groups, submitted arguments against the Aquarium in the B.C. Supreme Court case.<sup>205</sup> Local academics opined publicly on the cetacean captivity debate, weighing the challenges and benefits of moving Helen to a marine sanctuary.<sup>206</sup> Annual financial reports demonstrate that between 2016 and 2017, the Aquarium’s revenue from admissions and membership fell by \$442,000<sup>207</sup> after rising by more than two million dollars between 2015 and 2016,<sup>208</sup> and more than a million dollars from 2014 to 2015.<sup>209</sup> It also lost some “major donors” during this time period.<sup>210</sup> In other words, just as the Aquarium’s public image and attendance-based revenues plummeted and the institution fought vigorously to keep Helen in captivity, staff prepared to free Phoenix. The B.C. Supreme Court ruled in the Aquarium’s favor<sup>211</sup> about a month before Phoenix’s release. This allowed the institution to keep Helen in her tank, although management determined they would no longer bring in new cetaceans.<sup>212</sup> After the Supreme

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<sup>204</sup> Larsen, 2017

<sup>205</sup> Fraser, 2017

<sup>206</sup> Chiu and Chan, 2017

<sup>207</sup> Ocean Wise, 2017

<sup>208</sup> Vancouver Aquarium, 2016

<sup>209</sup> Vancouver Aquarium, 2015

<sup>210</sup> Penner, 2018

<sup>211</sup> “BC Supreme Court strikes down Vancouver Aquarium’s captive cetacean ban,” 2018

<sup>212</sup> This announcement meant that the Aquarium could no longer bring in new cetaceans born in captivity, on loan from other institutions, or rescued from the wild (Lindsay, 2018). A 1996 Licence Agreement made by the Aquarium had already dictated that any new cetaceans brought to the facility must come via marine rescue centres

Court's ruling, the Aquarium ceased to make public announcements about its whale and dolphin programs except to confirm their cooperation with new legal restrictions on cetacean captivity.<sup>213</sup>

Thus, as the Aquarium publicly released one animal, it quietly secured another.

Without direct evidence that anyone deliberately orchestrated these decisions in tandem, how does one make sense of this story? It's difficult to connect the octopus policy change directly to a set of fraught decisions about the Aquarium's cetacean programs. For one, in separate interviews multiple staff described the decision to release Phoenix as aquarist-driven, whereas a very different set of actors — certainly upper management and the Aquarium's legal counsel, at minimum — likely steered the decisions about Helen. This does not preclude overlap between key actors in both of these processes since they both would have required input from people across multiple departments and sign-offs from management. As the financial data from 2014 through 2017 indicates, the legal battle over the Aquarium's cetacean programs also threatened the institution more generally and therefore affected everyone working or volunteering at the Aquarium. During my volunteer pre-screening interview in January 2018, a long-time volunteer asked about my opinion on cetacean captivity. I have found throughout my time as a volunteer and during conversations about my research that staff and volunteers discuss

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or captive breeding programs at other facilities (*Ocean Wise Conservation Association v. Vancouver Board of Parks and Recreation*, 2018).

<sup>213</sup> See press releases since the court ruling on February 9, 2018: <https://ocean.org/media-releases/>. About a year after a BC Supreme court ruled in the Vancouver Aquarium's favor on *Ocean Wise v. Park Board*, an appeals court overruled that decision and upheld the Park Board bylaw (Mulgrew, 2019). A few months later, the Canadian legislature passed a national ban on cetacean captivity (which allowed institutions to keep animals currently in tanks) (Howells, 2019). Shortly after, the Aquarium announced that it had signed a new 35-year lease agreement with the Vancouver Park Board acquiescing to the cetacean captivity ban (Lancaster, 2019)

difficulties related to the ongoing cetacean controversy without any prompting from me.

Awareness of changing public sentiment about keeping marine mammals in tanks and anxiety over the consequences it could have for the Aquarium and its work pervades the institution.

Staff also emphasized in conversations with me how rarely the Aquarium releases animals<sup>214</sup> — in fact, other than Phoenix and Mystique the GPOs, the Vancouver Aquarium has only obtained release permits for coldwater corals and a single Pacific spiny dogfish. In the case of coldwater corals, staff explained that “their husbandry is really tricky so they tend to decline while they’re here and we want to put them back in the wild before it’s unrecoverable.”

However, the Aquarium’s press releases also reveal that the “first rescue, rehabilitation, and release of a shark [the Pacific spiny dogfish] for the Vancouver Aquarium in its 62-year history”<sup>215</sup> occurred on Valentine’s Day 2018: less than one week following the first B.C. Supreme Court ruling on cetacean captivity in Vancouver, and just over a month before Phoenix’s release. As public opinion soured over Helen’s captivity, staff throughout the Aquarium found opportunities to leverage negative sentiment towards captivity for the institution’s benefit by arranging and publicizing two unprecedented animal releases.

### **3.4 Conclusions**

When confronting the inevitability of octopus death, the Vancouver Aquarium has thus deployed diverse strategies to try keeping octopuses useful even after they pass away. Until

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<sup>214</sup> Here staff were referring exclusively to display animals. The Vancouver Aquarium’s Marine Mammal Rescue Centre rehabilitates and releases numerous harbor seals and sea lions every year, but unless biologists determine that an animal can no longer survive in the wild, the rescue centre does not send animals to the exhibits. Staff biologists also breed endangered Oregon spotted frogs and release the tadpoles into local ecosystems.

<sup>215</sup> Penny, 2018a

recently, these strategies have all worked to keep octopuses embedded in the Aquarium's ecosystems for perpetuity. Filming Clove, C.C., and their short-lived offspring during its captive breeding experiment allowed the Vancouver Aquarium to use these animals for advertising indefinitely. Had any young octopuses from this project survived to adulthood, they would have also helped fill display tanks at the Vancouver Aquarium (or elsewhere) and made it possible to produce generations of GPOs divorced from the social and ecological relations that gave their ancestors life. Through this failed experiment, the Aquarium also sought to make Clove, C.C., and their offspring into resources for the production of new knowledge about octopus husbandry and reproductive biology. Knowledge about how to rear octopuses from egg to adulthood in captivity has potentially valuable applications in both the aquaculture industry and biomimicry research. The Vancouver Aquarium has also kept many octopuses under its care in perpetuity by preserving parts of deceased animals in jars, pillboxes, and plastic containers. Deceased animals have also served as educational resources through dissections and necropsies staff have performed for the public and veterinary students. For most of the Aquarium's history, deceased octopuses have only exited this institution through human waste systems. These strategies which attempt to "optimize the use and recovery of animal remains" and maximize their "educational use"<sup>216</sup> therefore alienate octopuses from the ecosystems that originally gave them life by preventing them from returning to and nourishing those ecosystems through their deaths. Extracting octopuses for permanent scientific and educational use amounts to a theft from the earth communities those animals come from.

The Vancouver Aquarium began to change this when it moved to releasing octopuses at the end of their lives. Despite how releasing Phoenix garnered positive press during a time when

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<sup>216</sup> Association of Zoos and Aquariums, 2016

the Aquarium's public image was suffering, this differed from previous strategies because it returned an octopus to the same socioecological relations that had given her life. This does not undo the violence involved in removing octopuses from local ecosystems and embedding them in captive ecosystems in the first place. However, it does render the severing of wild socioecological relations less permanent. When the Vancouver Aquarium released Phoenix, it also marked the first time the institution's care for an octopus completely unraveled without also threatening the animal's life (in contrast to accidents in the wet lab or the institution's failure to properly feed octopus paralarvae). It matters that staff did not bother to tag or track either of the octopuses they released because doing so would have involved an invasive incision or injection<sup>217</sup> and kept these 'released' animals under its care remotely.<sup>218</sup> Furthermore, when the Aquarium released Mystique it did not bother to issue a press release: staff now considered this business as usual. Thus, when the Aquarium releases an octopus instead of immortalizing it through death — and decides to make release its default policy rather than an exception — this marks a departure from usual practices which permanently alienate animals from the ecosystems where they originate.

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<sup>217</sup> From AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG) (2014): "Invasive tagging methods applied to the mantle of octopuses are often ripped out by the animal- leaving a gaping wound (Barry et al., 2011). More secure tags (e.g., Peterson tags) that are bolted onto the mantle have been used successfully in some studies, though Barry et al., (2011) found necrosis at the site of application of such devices. Visible-implant elastomer (VIE) tags consist of brightly colored plastics that may be injected under the skin to create distinct markings. These VIE tags are much less invasive than other methods and have been shown effective in *E. dofleini* (Barry et al., 2011, Brewer and Norcross, 2012)" (53).

<sup>218</sup> Since GPOs are not endangered or commercially valuable in BC, octopus location data would have little value to the Aquarium anyway.

## Chapter 4: Putting octopuses to work

This chapter outlines how the Vancouver Aquarium seeks to transform visitors into particular environmental subjects through captive octopus display. In doing so, the Aquarium also enlists octopuses as unpaid workers for its project of expanding its brand of environmental stewardship over local landscapes. This form of environmental stewardship primarily asks members of the public to change their consumption and waste habits rather than challenging forms of production such as fossil fuel extraction, mining, or plastics production that lay waste to the environment. Although these strategies can operate in parallel (and do not have to be mutually exclusive), work on environmental politics has documented how framing behaviors like eco-friendly consumption as the most effective form of environmental action fails to confront systemic processes that harm the environment and makes it more difficult for people to imagine viable alternatives that hold powerful actors accountable for their role in environmental destruction.<sup>219</sup> Building on Foucault's work on governmentality, critical environmental scholars have deployed terms like *green governmentality*<sup>220</sup> and *environmentality*<sup>221</sup> to describe how environmental organizations like the Vancouver Aquarium work to produce self-regulating environmental subjects who take individual action to protect nature. Following Agrawal (2005), the term "environmental subject" describes someone who values the environment (as defined by a particular group) and acts accordingly. When the Vancouver Aquarium says its mission is "to inspire the global community to become Ocean Wise by increasing its understanding, wonder

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<sup>219</sup> Maniates, 2001; Rutherford, 2011

<sup>220</sup> Rutherford, 2011

<sup>221</sup> Agrawal, 2005

and appreciation for our oceans,”<sup>222</sup> it is describing the production of environmental subjects.

Non-governmental environmental organizations like the Vancouver Aquarium often derive their authority on environmental issues from Western science rather than the state.<sup>223</sup> They use this scientific authority to produce particular environmental subjects by deploying it to help define what nature is, how human actions threaten it, and what kinds of actions can save it.<sup>224</sup>

Exhibits at institutions like natural history museums, zoos, and aquariums conjure a vision of pristine, untainted nature which they suggest could exist if people became the ideal environmental subjects they describe.<sup>225</sup> Anderson (1995) explains how zoos’ representations of untouched nature reinforce arbitrary delineations between who counts as human and who counts as animal. She and others<sup>226</sup> have connected the evolution of zoos and their portrayals of nature to colonial desires to classify and control colonized landscapes. Furthermore, Belcourt (2015) has argued that placing animals in spaces like zoos and laboratories plays an important role in making animals knowable for settlers as separate from and subordinate to people. Displaying animals in this way is made possible through the emptying of Indigenous lands and erasure of Indigenous people. The Vancouver Aquarium does this in the gallery where it keeps the Giant Pacific octopus in three ways. First, the Port Hardy exhibit and those around it portray British Columbia’s coastal ecosystems – ecosystems where people have lived and worked for millennia – as free from people or human influence. Furthermore, these exhibitions of “empty” wilderness

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<sup>222</sup> “About the Vancouver Aquarium,” n.d.

<sup>223</sup> Agrawal, 2005; Davis, 1997; Maniates, 2001; Rutherford, 2011

<sup>224</sup> Agrawal, 2005; Rutherford, 2011

<sup>225</sup> Agrawal, 2005; Chrulew, 2010; Kearns et al., 2015; Rutherford, 2011

<sup>226</sup> Chrulew, 2010; Ryan, 2000

occupy land that colonial governments have forcibly evacuated of their native inhabitants. Finally, producing these exhibits requires extracting animals from ecological communities elsewhere and placing them here. The Vancouver Aquarium's BC gallery and its exhibits therefore exemplify what Belcourt (2015) calls a colonial "politics of space" which supports ongoing colonization through the production of animality as separate from and subordinate to the human – and therefore in need of colonial management. This makes the form of environmental stewardship the Vancouver Aquarium promotes through its Giant Pacific octopus exhibit inherently colonial. When I refer to the types of conservation promoted in the Aquarium's BC exhibits as colonial environmental stewardship, it describes an environmentalism that fails to contest ongoing projects of colonization and capitalist extraction. It includes the diverse ways this institution reproduces colonial hierarchies through its portrayals of local landscapes and relationships with extractive industries responsible for ongoing Indigenous displacement – all in the name of conservation.

Through a close reading of the Aquarium's Port Hardy exhibit as well as interviews with staff and several months' experience engaging guests in this gallery as a volunteer, I detail how the Treasures of BC gallery that contains the Port Hardy exhibit models colonial stewardship over local landscapes and seeks to reproduce and expand this stewardship through strategies deployed in the gallery space. Octopus charisma plays a key role in attempting to enroll members of the public in this environmental work. Building on Lorimer's (2007) work on nonhuman charisma and Igoe's (2010) work on digital media in conservation, I examine what makes octopuses so charismatic and how the Aquarium seeks to use this charisma in its galleries and promotional materials to shape relationships between people and BC's coastal environments. I

also outline how the Aquarium works to make captive display more successful – and therefore more viable as a conservation strategy – by enrolling its octopuses in animal welfare research.

Across its public galleries, promotional media, and scientific research, the Aquarium uses octopuses in different ways to help reproduce and expand its colonial brand of environmental stewardship without directly exchanging octopuses for money. Although octopuses help the Aquarium accumulate dollars for conservation in a way that resembles how for-profit institutions accumulate money for shareholders and owners, this institution reinvests its profits in projects that expand its colonial environmental stewardship and only indirectly supports the accumulation of further profits. To better understand how the Aquarium’s conservation work relates to capitalist accumulation, I examine mutually beneficial relationships between extractive (and environmentally catastrophic) industries and the Aquarium’s conservation work, concluding that both these industries and the Aquarium play important roles in helping the other continue to exist. This builds on work that has outlined how extractive industries benefit from sponsoring environmental organizations that celebrate scientific innovation and suggest individual behavior change rather than collective action.<sup>227</sup>

#### **4.1 Producing environmental subjects**

In this section I outline how the Vancouver Aquarium aims to use octopuses to turn members of the public into more ideal environmental subjects. Through a close reading of the Treasures of BC gallery and Port Hardy exhibit where it houses the octopus, I illustrate how the Vancouver Aquarium uses scientific authority and octopuses’ charisma to direct visitors towards more ideal behaviors. These ideal behaviors all involve self-regulation rather than collective

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<sup>227</sup> Maniates, 2001; Rutherford, 2011

action or political opposition to extraction threatening local ecosystems: for example, disposing of waste more responsibly, consuming less plastic, and helping clean up local shorelines – as well as spending money at the Vancouver Aquarium. I further emphasize how this gallery messaging and the kinds of relations with nature it promotes assume a colonized present and future for BC ecosystems. I then explain why the Vancouver Aquarium perceives octopuses as charismatic and therefore useful for promoting this brand of environmental stewardship. Finally, I outline how the Aquarium deploys octopus charisma to help fund and promote its conservation work through advertising. Tracing how the Vancouver Aquarium uses octopuses in its galleries and promotional materials to produce more ideal environmental subjects therefore illustrates the importance of scientific authority and the transformative potential of animals’ charisma to this institution’s colonial brand of environmentality.

#### **4.1.1 Putting octopuses to work for education**

A panel marking the entrance to the BC coast exhibits evokes a treasure map in both name and form, beckoning visitors to come search for animals it depicts in the galleries ahead. “Welcome to the treasures of BC Gallery,” the panel reads, “Meet some of the marine life - the treasures of British Columbia - that lives under the waves off our own coast.” The panel map has labeled none of the animals — only places — and inserted their pictures into bubbles neatly pinned to points on the map. Inside one labeled “Port Hardy” at the northern end of Vancouver Island sits a picture of an octopus. The map charts animals like resources and exemplifies how as Belcourt (2015) writes, “settler colonialism... operates through a militant and racist politics of territoriality whereby Indigenous lands are physically and symbolically evacuated to be re-made

into settler spaces.”<sup>228</sup> Nowhere do Indigenous communities or place names appear on this otherwise empty map. This entry panel celebrates imperial dominion over creatures and coastlines and implies that both these creatures and the places they represent lay waiting for guests to visually consume.

Each tank in the Treasures of the BC Coast gallery represents a distinct place in British Columbia, displaying a selection of animals curated to represent an ecosystem in that location. In her ethnography of Sea World, Susan Davis (1997: 98) notes how this “process of folding up distance” is a central feature of “all theme parks, zoos, and museums.” Given the deeply colonial history of these institutions,<sup>229</sup> this folding of space functions to facilitate a quick tour of lands under settler colonial control. At a modern, conservation-oriented aquarium, I argue that this exhibit design works to produce colonial environmental subjects who feel a sense of responsibility for and benevolence towards local landscapes.

The so-called treasure hunt continues at the Port Hardy exhibit. “*Where is the octopus?*” a large panel reads, inviting guests to “be a detective” by searching crevices and caves in the exhibit for the elusive animal. Like the octopus tank it marks, this panel is lit from above but dimly. Both the messaging and physical design of the exhibit suggest mystery, inviting guests to make an activity out of looking for this animal. In one sense, this messaging attempts to transform an experience guests might find disappointing into one that will entertain them. However, this messaging also helpfully reinforces one key takeaway from an aquarium visit which wildlife film frequently fails to achieve: entering animals’ space does not entitle people to

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<sup>228</sup> Belcourt, 2015: 5

<sup>229</sup> For a more detailed discussion of this history as well as the material and symbolic connections between these spaces, see Anderson, 1995; Ryan, 2000; Rutherford, 2011; Sorenson, 2008

viewing animals performing spectacular feats or even viewing them at all. It therefore sets very different (and far more realistic) expectations for animals' visibility than film often does — normalizing a situation where human viewers cannot control other species' behavior or visibility.

A “did you know” bubble and smaller text throughout the large panel and a smaller ID card also spout facts about octopus physiology, behavior, and life history for guests whose curiosity has been piqued. To work around the relatively static nature of exhibit paneling, staff also utilize mobile, arrow-shaped whiteboards throughout the Aquarium's galleries. These arrows assist guests with finding creatures like the octopus or sloth that guests have trouble spotting and allow staff to post updates about animals in the galleries. For example, in the Port Hardy exhibit staff have used the arrow to post octopus facts not included in the panels and keep guests informed about new exhibit animals.

The ID panels in front of the Port Hardy tank display labeled pictures of nearly a dozen species kept in the exhibit: in addition to the octopus, two varieties of sponges, three anemones, orange cup coral, giant sea cucumbers, painted sea stars, blood stars, green sea urchins, and yellowtail rockfish. Unlike many zoos, aquariums often house a multitude of species together in their displays. Although captivity has radically transformed the real ecological relationships of animals housed together in the Port Hardy tank, ecological relationships play a central role in the Aquarium's storytelling about protecting habitats that house charismatic species. As staff explained to me,

You need to be able to help visitors understand that the habitat they live in is important.

Without that, you can't save the species... And there's interconnections between these animals, right? It's not just a species standalone. So if you save the habitat, you save the

whole complex of related animals in an ecosystem... So that's part of the storytelling that we wanna tell.

Thus, the emphasis on places rather than individual species in the “Treasures of the BC Coast” map panel and exhibit labeling — for example, labeling the octopus exhibit “Port Hardy” rather than “Giant Pacific Octopus” — also functions to draw guests' attention to a broader range of species who inhabit local places.

Although Davis (1997) notes that Sea World's own staff differentiate the educational quality of information displayed at their institution from that of more education-oriented nonprofits like museums and aquariums, some key patterns Davis observes in exhibit paneling at the for-profit theme park apply to this nonprofit aquarium space as well. For example, Davis describes how at Sea World “there are no breaks in the authority of scientific research and no disputes about the directions of research,”<sup>230</sup> which also holds at the Vancouver Aquarium's Port Hardy exhibit. Nowhere does the exhibit mention Indigenous knowledge about this common coastal species – a curious omission given how much longer Indigenous nations throughout the west coast have known GPOs than Western science.<sup>231</sup> Neither does it discuss any of the many mysteries about octopus physiology and life history. Furthermore, the exhibit fails to reference octopus cognition at all. This tracks with an aversion across both institutions to anything potentially associated with anthropomorphism as well as a distaste for discussing other species' thoughts and feelings within much of the scientific community.<sup>232</sup> In the context of a society that finds captive display of and experimentation on humans morally reprehensible, reminding guests

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<sup>230</sup> Davis, 1997: 149

<sup>231</sup> McGill Centre for Indigenous Peoples' Nutrition and Environment, n.d.

<sup>232</sup> Davis, 1997; King, 2013

of how the animals before them might think or feel has the potential to stir discomfort and political opposition to institutions which keep these animals in tanks. When asked about their aversion to anthropomorphism, Aquarium staff explained the institution's position that since it cannot use scientific evidence to verify animals' thoughts or feelings, commenting on them would risk misleading the public. Avoiding discussions of octopus cognition in the name of avoiding anthropomorphism or scientific inaccuracy overlooks the fact that diverse groups within and outside academia<sup>233</sup> have developed languages for discussing other species' thoughts and feelings in ways that do not reductively use human experience as the universal yardstick for mental processing. Finally, as at Sea World, the Port Hardy exhibit's family-oriented messaging steers away from facts that guests may find disturbing such as the frequency of octopus cannibalism.

The BC Coast gallery's current paneling dates back to the 1990s and has changed very little since. Each time the Aquarium decides to redesign an exhibit or open a new one, it convenes an exhibits committee comprised of various heads of operation, biologists, members of its marketing team, people from visitor services, and content design specialists responsible for designing and writing content displayed on the exhibit panels. Together, this committee decides what animals to display and what stories to tell about them. Determining what stories to tell about animals in the gallery and how involves carefully negotiating between several competing sets of priorities. As one staff member explained to me,

My job is to be the middle man between the visitors that come in for a visit because Aunt Martha came to Vancouver and the researchers who are passionate about their work and want to tell all the technical details about the work that they're doing. Right? So my job is

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<sup>233</sup>For example, see Kohn, 2013; King, 2013; Mather and Anderson, 2007; Rose, 2013; Todd, 2016

to say, ‘Aunt Martha wants to know what that is and what makes it tick,’ and then our scientists are going to want them to understand ‘why is their blood doing that? And how is that important for conservation?’

In order to keep exhibit storytelling in line with the institution’s broader goals of inspiring the public to care about aquatic life, staff designing content therefore have to balance guests’ varied priorities and often limited attention span against biologists’ desire to communicate as much information as possible to visitors in the galleries. They imagine many members of the public as holding very different value sets than most of the staff who work at the Aquarium or in other environmental organizations who “have a wider value set usually - they care about helping people, helping animals, helping the environment.” For example, one staff member explained to me how “in most parts of the world people’s values are centered around security, their family” instead of the environment and that “the one harder [value] set [to engage] tends to be more like ‘I want adventure, power, money.’” However, staff emphasized that “you want to try and engage all of those different value sets” in the galleries. According to these Aquarium staff, narrow value sets and competing priorities prevent people from acting ethically towards the environment. Messaging in the Aquarium’s galleries therefore aims to motivate people to care more about other species so their priorities will expand to include protecting coastal ecosystems. This logic assumes that “conservation very much is a continuum” and imagines environmental work as a universal good which brings people with diverse value sets into agreement. Conceptualizing conservation as a continuum this way erases struggles over who governs conservation work, who determines what ‘conservation’ means in diverse contexts, who participates in implementing it, and who this work benefits and harms — all deeply fraught and contested questions in the context of colonial British Columbia and beyond.

Gallery design similarly assumes a spectrum of guest engagement and attempts to funnel visitors through this spectrum: from interest in live fauna to deeper immersion in exhibits' panel messaging. Exhibit paneling and ID labels form the lowest tier of engagement, serving to support living people and animals. Text and images in exhibit panels are also structured hierarchically, with word count and informational content increasing as font size decreases. Large, conversational, messages such as "Where is the octopus?" encourage guests to return and take a second look at exhibits. ID panels which tell visitors what they might find in the exhibit also play a crucial role in directing people to text blocks with higher information content. These also help visitors — especially parents and caretakers — participate in engaging others with the exhibit by answering questions about what lives in the tank. The Aquarium imagines families as one of its key visitor demographics. Exhibit structures thus aim to provide guests with multiple entry points to deeper engagement with scientific information in the panels.

People interpreting the exhibits and engaging with guests operate on a second tier of engagement, peripheral to the live animals. Gallery education aims to help guests build relationships with animals in the exhibits through conversations with human volunteers and tactile engagement with props. Staff view gallery education work as a critical way to engage visitors more deeply through activities other than looking. Although most octopus props come in jars (which staff direct volunteers to keep visitors from handling), one staff member explained to me their view that

In terms of trying to make a connection with the generic visitors, 'thing in jar' is not the most engaging prop. You can't touch it. You can't manipulate it. You can't look at it that closely cause it's in a... jar.

This anecdote helpfully illustrates the importance of gallery education for engaging senses other than sight. In contrast to jars, a prop like the cloth octopus and plastic tube allows guests to pull an item the size and shape of a full-grown GPO through a tiny opening, providing an activity and tactile engagement that help people build a deeper understanding for how these animals move through the world. Resources to help gallery educators engage guests with the octopus emphasize many of the same themes as the Port Hardy exhibit paneling — octopuses’ tendency to hide, the many unique aspects of their biology, and their connections to the other animals and landscapes that make up BC ecosystems. Ideally, gallery educators also work to inspire guests to take particular conservation actions: sample messaging provided for volunteers to use with the Port Hardy exhibit explains that

Octopuses are not the only things that are good at hiding in local waters. Many garbage items — plastics in particular — show up in places you would not expect the. Find out more and pledge to make a difference with the Plastic Wise Pledge at [Pledge.Ocean.org](https://pledge.ocean.org).

Much of the conservation messaging throughout the Aquarium’s galleries resembles this call to action. Rather than urging guests to intervene by voting, lobbying for or against legislation, or pressuring businesses to change their practices, this sample gallery education message urges individuals to change their consumption and waste habits. Through interactive activities, conversations, and story-telling, gallery education can therefore provide a powerful tool for helping guests build stronger connections to animals in the galleries and a deeper understanding for how their actions can impact these animals positively or negatively. By aiming to enroll visitors as self-regulating environmental subjects who improve their own conduct towards coastal ecosystems, gallery education exemplifies the kind of environmentality also operating in the Treasures of BC gallery.

However, live animals in exhibits form the core of the Aquarium’s public engagement in its galleries. Within the live galleries, the most charismatic species function as “entry animals”<sup>234</sup> because they inspire guests to come to the Aquarium and hopefully cause these visitors to notice other creatures housed in the exhibits and galleries nearby. Although many people I spoke with framed charismatic megafauna like dolphins as the most important “entry animals,” octopuses count among the few invertebrates who can also function this way for visitors. The central location of the Port Hardy exhibit in Treasures of BC encourages guests to pause in the middle of the gallery, either looking for or admiring the octopus on rare occasions when it emerges. Hopefully, by pausing for this charismatic animal visitors notice and engage with other local species who they might not otherwise stop to examine.

In the Aquarium’s tanks, representations of places and ecosystems shimmer like living gems, and filters and regular cleaning keep the water an impossibly clear and brilliant turquoise. The tanks suggest an untouched ideal which could exist — simultaneously free of contaminating human influence and cultivated to perfection under human care. Although charismatic species like the octopus help draw guests into the exhibits, as the map at the gallery entrance and these multispecies tanks indicate, the Aquarium ultimately aims to shift how guests relate to landscapes rather than individual animals. It imagines ideal human care for these landscapes as operating across a tightly regulated divide between humans and other species and under the guidance of scientific authority. By leveraging animal charisma and careful gallery messaging,

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<sup>234</sup> The term “entry animal” differs from the term “ambassador species” many zoo and aquarium professionals use to describe exhibit animals because “entry animal” specifically describes animals that help drive entry ticket sales while “ambassador species” describes how *all* animals on display function as “ambassadors” between the public and the species and ecosystems they represent.

the Vancouver Aquarium therefore aims to bring visitors' behavior in line with this ideal. Ideal behavior includes a suite of actions such as responsibly disposing of waste and buying less plastic which minimize consumers' impact on coastal ecosystems within a capitalist economy. The form of environmentality operating in the Vancouver Aquarium's BC gallery therefore contributes to an environmentalism which centers capitalist and settler colonial values while erasing ways of living with and caring for local ecosystems rooted in different value systems and ontologies.

#### **4.1.2 Putting octopus charisma to work**

Octopuses have charisma, and the Aquarium seeks to leverage this charisma to raise its profile among the public and attract visitor dollars. Understanding how the Aquarium deploys octopus charisma for conservation requires examining what makes octopuses charismatic. This also matters for understanding what the Aquarium hopes to accomplish by keeping this nonendangered species in captivity and why these animals feature so heavily in its promotional materials. Staff I spoke with described octopuses as iconic local animals who the public expects to associate with this institution, and the AZA's official care manual for GPOs describes them as one of the most popular display animals at aquaria.<sup>235</sup> The care manual asserts that this popularity means "reasons for wanting to keep and display octopuses in aquaria are self-evident."<sup>236</sup>

However, what makes octopuses so compelling for both the public and people who work with them on a daily basis? What does it mean to say octopuses have charisma, and what features

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<sup>235</sup> Aquatic Invertebrate Taxonomic Advisory Group, 2014: 6

<sup>236</sup> Ibid.

grant them this quality from the perspective of aquariums seeking to leverage it? The term ‘charisma’ etymologically means ‘divine favor or gift’ and describes a distinctive power certain human and other-than-human beings have to enchant and influence people who encounter them. Although both humans and other beings can have charisma, popular and scholarly uses of this term all emphasize its effects on (specifically) human subjects. Here I explore how aquariums understand octopus charisma because this understanding drives how they use it for public outreach. As one staff member I spoke with pointed out, “you’d have to ask a psychologist” to fully understand what makes octopuses so compelling for the public. However, both industry documents and Aquarium staff I spoke with repeated several key beliefs about what makes octopuses valuable display animals for them. Lorimer’s (2007) work on nonhuman charisma provides a useful framework for making sense of these beliefs. Drawing on sociology and ethology,<sup>237</sup> Lorimer conceptualizes other-than-human<sup>238</sup> charisma as an assemblage of properties which facilitate “becoming-animal” for human subjects during their encounters with other species. He proposes three overlapping but distinct facets of other-than-human charisma, and I outline how each of these — ecological, aesthetic, and corporeal charisma — provide a useful starting point for understanding how the Vancouver Aquarium attempts to mobilize octopus charisma.

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<sup>237</sup> Lorimer (2007) builds his understanding of charisma as ‘multifaceted’ on the work of sociologists Charles Thorpe and Steven Shapin who examine the properties and effects of human charisma in science. He also uses techniques from ethology, the scientific study of animal behavior, to develop his understanding of ecological charisma.

<sup>238</sup> Although Lorimer uses the term “nonhuman charisma,” I use “other-than-human charisma” to frame other species as those who differ from humans rather than those who lack humanity.

Lorimer describes *ecological charisma* as a combination of the ecological and physiological qualities that determine how readily people can detect an organism and distinguish it from others. For Lorimer (2007), ecological charisma determines how readily people notice an animal, identify it, and attune themselves to its ways of moving through the world. According to this logic, the more readily people become attuned to an organism, the more powerfully that organism can influence them. Ecological charisma thus provides the basis for Lorimer's other two facets of other-than-human charisma. Qualities that influence an organism's ecological charisma include unique physiology and behaviors, its abundance, its visibility (determined by size, speed, color, etc.), habitats it frequents (can people access them?), and times it becomes active (especially day versus night). GPOs are relatively common animals on the BC coast and inhabit waters accessible to local divers. Their enormous size also makes them easier to spot than other cephalopods. Additionally, divers often report encounters with octopuses who approach and interact with them.<sup>239</sup> Octopuses' many arms and suckers, soft body, round mantle, and complex eyes make them unlike almost any other animal and easy for people to distinguish from similar creatures. However, arguably GPOs' elusiveness — the ease with which they evade detection through camouflage, hiding in rock crevices, and nocturnal activity — adds to their charisma rather than subtracting from it. Exhibit signage in Port Hardy encourages guests to make an activity out of searching for the octopus, and as a gallery volunteer I've often witnessed guests intently working together to spot the animal. This aspect of octopuses' charisma resembles that of rare species like endangered whales which people go to great lengths to encounter.

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<sup>239</sup> "Giant Pacific octopus wraps itself around diver's face near Port Hardy, B.C.," 2015

Understanding how an elusiveness that often impairs animals' charisma can instead sharpen it requires unpacking how octopuses powerfully embody the second facet of other-than-human charisma Lorimer describes, *aesthetic charisma*. Aesthetic charisma encompasses organisms' physical and behavioral properties that evoke strong feelings (both positive and negative) in people. Here, Lorimer suggests that people often have stronger positive responses to animals with anthropomorphic physiology (especially faces) and who respond sympathetically to human presence. In contrast, he notes that organisms like insects who differ radically from people perform a "feral" form of charisma and often trigger intense revulsion instead of sympathy. However, Lorimer argues that when people instead celebrate animals for their radical differences from people, "this ethics of feral charisma" exemplifies "a sense of respect for the other and for its complexity, autonomy, and wildness,"<sup>240</sup> and contrasts to the anthropomorphic (and therefore anthropocentric) ethics of what he calls "cuddly" aesthetic charisma.

Octopuses powerfully mobilize positive emotional responses to feral aesthetic charisma through their combination of apparent similarities with and radical differences from people. For different visitors at the Vancouver Aquarium, these polarizing animals frequently evoke wonder and adoration as well as horror and disgust. Convergent evolution, where similar anatomical structures evolve independently in different lineages, has produced advanced nervous systems and complex eyes in both cephalopods and humans. Humans who work with octopuses in labs and aquaria often report the sensation that these animals are watching them back and processing information about individual humans they interact with — an intuition supported by animal welfare science.<sup>241</sup> These apparent similarities grant octopuses some aspects of what Lorimer

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<sup>240</sup> Lorimer, 2007: 920

<sup>241</sup> Anderson et al., 2010

calls “cuddly” aesthetic charisma, which often evokes strong feelings of sympathy with animals who embody it. However, apparent similarities between octopuses and people quickly unravel upon close inspection. Unlike mammals who have round pupils, cephalopods like octopuses have U-, W-, or dumbbell-shaped pupils. Since cephalopods only have one type of photoreceptor in their retinas, scientists for many years believed them to be colorblind until discovering that these animals can differentiate colors by using their wide pupils to selectively focus and blur specific wavelengths of light.<sup>242</sup> This makes octopuses’ color vision fundamentally different from that of humans who rely on multiple kinds of photoreceptors to distinguish colors. Octopuses also concentrate sixty percent of their neurons in their arms rather than a central brain, making their nervous system decentralized and radically different from that of vertebrates like people. Their multitude of arms and suckers, ability to change color and texture, invertebrate bodies, aquatic habitats, and rapid life history all further differentiate them from humans. Here octopuses’ elusiveness also forms part of their radical difference from people. Thus, they strongly embody both positive and negative aspects of ecological and aesthetic charisma — both distinctive and elusive, “cuddly” and “feral.”

Octopuses’ unique forms of ecological and aesthetic charisma intensify how they embody Lorimer’s third facet of other-than-human charisma, *corporeal charisma*, because humans’ intense emotional responses to octopuses’ aesthetic qualities readily lead to what Lorimer calls “interspecies epiphanies.” Corporeal charisma relates closely to aesthetic charisma and refers to how organisms evoke affective and emotional responses in people through embodied interactions. It differs from aesthetic charisma because it emphasizes how repeated interspecies interactions over different time scales transform human subjects. This transformation can occur

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<sup>242</sup> Stubbs and Stubbs, 2016

through long-term care and scientific study as well as brief encounters. Brief, transformative encounters form the basis for interspecies epiphanies which generate “a memory and the foundations for a lifetime attachment, interest, and concern.”<sup>243</sup> Speaking of the conservation scientists he studies, Lorimer describes how certain cross-species encounters can trigger “interspecies epiphanies in which the future human scientist is affected or reterritorialised by a nonhuman organism,” and how “these epiphanic affections are reinforced and topped up in moments of excitement and enchantment that natural historians experience in everyday encounters with their target organisms.”<sup>244</sup>

This applies both to aquarists who care for animals at the Vancouver Aquarium<sup>245</sup> and guests who encounter animals like the octopus in the galleries and return repeatedly hoping to relive that experience. It exemplifies the kind of transformative event many staff spoke to me about attempting to facilitate by engaging visitors with animals in the galleries. Octopuses’ elusiveness and distinctiveness makes any encounter with them in the galleries an unusual and often memorable occasion for visitors, and thus octopuses’ unique combination of positive and negative ecological charisma functions to intensify their potential corporeal charisma. Staff explained that the fact that most visitors have heard of an octopus before they arrive is “a leg up on most of the other animals in the Aquarium.” They also described octopuses as “iconic” local animals who people are “desperate” to see and hear about. When people have these rare encounters, octopuses’ human-like eyes and widespread stories about their “intelligence” and curiosity help render their radical differences from people fascinating rather than frightening in

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<sup>243</sup> Lorimer, 2007: 922

<sup>244</sup> Ibid.

<sup>245</sup> Multiple aquarists I spoke with described octopuses as their favorite animal to care for.

many cases. For example, when asked what draws people to octopuses, one staff member explained that, “Broadly speaking... like... they’re weird. And not in like a scary [way]. Not like the hagfish,<sup>246</sup> which creep people out” and reflected on how “every little thing people know about them makes them seem that much weirder... but also, that much cooler.” Another staff member repeatedly emphasized octopuses’ “very alien” qualities when speaking to me about the animals’ appeal to visitors. Multiple staff described juxtaposing octopuses’ striking similarities with and differences from people as an effective strategy for visitor engagement with these animals. The AZA care manual for GPOs reiterates this logic by listing octopuses’ “human-like eyes, alien body shape, and their reputation as the most intelligent invertebrate”<sup>247</sup> as key reasons for these animals’ popularity at aquaria. Octopuses’ unique combination of both feral and cuddly aesthetic charisma therefore intensifies their corporeal charisma and power to induce interspecies epiphanies.

In this way, through the unique qualities of their charisma, the Aquarium seeks to use octopuses to powerfully and transformatively engage visitors with interspecies difference in a way it can with very few other animals. Lorimer (2007: 918) describes how understanding other-than-human charisma as an assemblage of properties which trigger “becoming-animal” means other-than-human charisma produces the “reorganization, or the deterritorialisation and

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<sup>246</sup> The Pacific hagfish (*Eptatretus stoutii*) is a benthic, eel-like fish known for producing enormous quantities of slime to escape predators. At the Vancouver Aquarium, the Pacific hagfish tank sits just to the left of the Port Hardy exhibit that holds the octopus. It provides a useful contrast to the octopus since both animals embody feral charisma in different ways. Unlike GPOs, the hagfish has no visible eyes and its best-known behaviors — feeding on detritus and generating slime — both trigger visceral disgust in many visitors.

<sup>247</sup> Aquatic Invertebrate Taxonomic Advisory Group, 2014: 6

reterritorialisation of the human organism within the cultural frames in which they are enmeshed.” Throughout my time as a volunteer gallery educator, staff and other volunteers frequently spoke to me about how encounters with live animals transform people into more responsible environmental actors by inspiring “awe” or “wonder.” When the Vancouver Aquarium says that its mission is to “inspire the global community to become Ocean Wise by increasing its understanding, wonder and appreciation for our oceans,”<sup>248</sup> encounters with living animals are the primary way it aims to inspire guests. Through the transformative potential of animals’ charisma, the Aquarium therefore seeks to remake visitors into environmental subjects who consume goods, generate waste, and steward the environment in “eco-friendly” ways because they care more about animal lives. This is the reterritorialization the Aquarium seeks to achieve by helping guests ‘become-animal.’ It makes sense for an organization which conceptualizes eco-friendliness as a spectrum and this set of behaviors as ideal conservation actions to assume that moving visitors along a spectrum of care for other species will result in visitors moving closer to what this institution conceives of as ideal conservation behaviors. Notably, the Aquarium seeks to facilitate humans “becoming-animal” while actively seeking to curtail anthropomorphism where visitors “make human” animals kept in tanks. This has clear political stakes for an institution whose public image suffers when people begin to view animals in tanks as individuals with human-like emotional and intellectual needs. However, it also means that this institution attempts to teach the public to identify with other species without reducing other-than-humans to our own species’ categories.

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<sup>248</sup> “About the Vancouver Aquarium,” n.d.

### 4.1.3 Putting octopuses to work for advertising

By featuring octopus imagery on its promotional materials, the Vancouver Aquarium therefore advertises itself as a place where guests will have transformative encounters with other species. Although this institution deploys a broad range of media to broadcast this message, here I highlight materials from its website and social media pages that use octopus imagery. In these materials, the Aquarium transforms octopuses into a digital conservation spectacle which aims to produce environmental subjects who steward the environment as directed by the Aquarium. Crucially, this includes spending money on entry fees and merchandise to support the Aquarium's work to produce the kind of wilderness and relationships with wilderness pictured in its promotional media. Here I understand spectacle as the mediation of people's relationships by images, building on but also diverging from Igoe's (2010) understanding of spectacular digital natures which emphasizes how this mediation redirects consumer dollars towards distant conservation projects. Igoe (2010: 377) frames spectacular images as commodities which mediate relationships through two forms of 'world-making': both through the production of fictional universes (as in film) and through performative claims about the world aimed at redirecting resources (especially finance) towards projects that help conjure imagined worlds into being.

Through this first form of world-making, images of the octopus and its BC ecosystems generate a fictional set of relationships between viewers and local landscapes which can feel real. An advertisement titled "Below the Surface" on the Aquarium's YouTube channel, which also runs frequently in its galleries, rapidly pans through close-ups of a sea lion, jellyfish, octopus, otter, and rockfish gliding through the water. Although likely shot in the Aquarium's tanks, these close-ups omit any signs of plexiglass, people, or obviously artificial structures and therefore

suggest an equivalence between environments at the Aquarium and local BC waters. Text at the end of the video further reinforces this by juxtaposing the Vancouver Aquarium's name and the Ocean Wise logo above an appeal to "Discover British Columbia below the surface" — implying that by visiting this institution one can explore authentic BC underwater ecosystems. Similarly, octopus photos and videos shared on the Aquarium's Twitter account often show close-ups of the octopus in naturalistic tank settings. In these images, humans only figure as viewers, with some combination of camera and plexiglass separating them from landscapes apparently unpopulated by people. The fictional relationships these images mediate between humans and octopuses (as well as BC ecosystems) position people outside BC ecosystems and obscure material socioecological relations between BC's human and other-than-human residents. For example, human activities such as hunting, fishing, boating, diving, generating pollution, or even removing human waste from local ecosystems do not figure in this video.

This separation almost never breaks down except when media depicts interactions between the octopus and humans who care for her. For example, the Aquarium has posted video of staff feeding the octopus<sup>249</sup> and the octopus grasping a "Dr. Marty Doll" representing its head veterinarian.<sup>250</sup> By only showing the human caretaker's hand, footage of the octopus feeding allows viewers to imagine themselves in this caretaking role. In March 2018, the Aquarium's care team also introduced their new display octopus by handing her a GoPro camera and posting the footage to YouTube. They branded this an "Octopus selfie." These intimate shots depict aquarist hands passing the GoPro to the octopus and bring the viewer close to this animal in ways people would almost never experience when encountering these animals in the wild or at

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<sup>249</sup> Vancouver Aquarium, 2017c

<sup>250</sup> Vancouver Aquarium, 2017d

the Aquarium. Thus, these shots generate a fictional intimacy between octopus subjects and human viewers. Together, images that frame people as outside nature and those that position them as nature's caretakers suggest a world where humans steward pristine environments from a distance or up close in the carefully controlled setting of a tank. Furthermore, these images illustrate ways that settler epistemologies construct animality by producing particular spaces – especially landscapes evacuated of people and carceral spaces like tanks – and placing animals in them so that they become legible to settler ways of knowing.<sup>251</sup>

The Aquarium also features more cartoonish octopus imagery that promotes more explicitly hierarchical relations between different groups of people and between humans and other species. In a fall 2018 social media campaign, the Vancouver Aquarium offered visitors a chance to submit and vote on names for the new exhibit octopus. This campaign encouraged members of the public to participate in virtual octopus care by naming the animal, just as they might name their own pet. The campaign quickly garnered local and international news attention after the Aquarium released its naming poll and locally-grown actor Seth Rogen re-tweeted the contest, encouraging his followers to help name the octopus “Ceph Rogen.” Thanks to Rogen’s celebrity, “Ceph Rogen” beat other options such as “Luna” and “Octavia” by a landslide. Media from the CBC<sup>252</sup> to the Daily Mail<sup>253</sup> and Independent.ie<sup>254</sup> spread the news about Vancouver’s new octopus named after the actor, and within a few months, Rogen’s mother and sister visited the Aquarium where staff introduced them to Ceph behind-the-scenes. The Aquarium’s social

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<sup>251</sup> Belcourt, 2015

<sup>252</sup> Migdal, 2018

<sup>253</sup> Press Association, 2018

<sup>254</sup> Dracott, 2018

media team retweeted pictures of the encounter from Rogen’s sister with the caption “Our resident Rogen met its human family today, and Ceph was INTO it. [octopus emoji] #familygoals.”<sup>255</sup> This story powerfully illustrates how the Aquarium leverages the charisma of individual animals like the octopus to raise the entire institution’s profile among the public. In public interviews and a newsletter to their volunteers, staff celebrated the naming campaign for aiding the institution’s conservation work by garnering positive international publicity.<sup>256</sup> However, unlike more careful messaging in the Aquarium’s gallery panels or on its website, this promotional campaign engaged in blatant anthropomorphism which encouraged the public to think of the octopus as a member of a human family and generated fictional intimacy between octopus and human subjects. Framing the octopus as a member of a human family helps naturalize deeply unequal relationships of dependence that equate wild octopuses with children or pets and humans with benevolent guardians. Spreading the naming campaign story on social media and in news outlets therefore also promotes paternalistic modes of relating to other species and practicing conservation.

Although these “spectacular” images direct money and resources towards actors and institutions, this does not make them commodities. Describing spectacular images as commodities (as Igoe (2010) does) elides differences between for-profit and non-profit conservation work and obscures how – in the context of the Vancouver Aquarium – these images primarily work to reproduce and expand colonial environmental stewardship rather than accumulating profit for shareholders. Many of the social media posts and advertisements which use octopus imagery directly implore viewers to come visit the Aquarium where they will spend

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<sup>255</sup> Rogen, 2019

<sup>256</sup> Martinello interview in Little, 2019; Vancouver Aquarium, personal communication, November 17, 2018

money on entry fees and likely other goods such as food and gift shop souvenirs. Staff have often described their employer to me as a business operating under tight budget constraints and the need to profit because continuing to profit allows this institution to continue and expand its work.

However, as a nonprofit, the Vancouver Aquarium does not accumulate money for shareholders or owners but instead reinvests all profits back into its own operations with the ultimate goal of expanding its brand of environmental stewardship. In contrast, capitalist organizations aim to accumulate profits that enrich those who own them and allow capitalists to reinvest a portion of their profits in expanding production which will generate further profits. This makes the claim that spectacular conservation media like the Aquarium's octopus videos generate *capitalist* value questionable. Although the Vancouver Aquarium works with diverse for-profit businesses<sup>257</sup> and even invests some of its profits in capital asset and reserve funds,<sup>258</sup> it does not have to answer to shareholders who expect regular returns on their investment. Instead of investors, the Aquarium has donors and board members who expect evidence that it provides quality recreation and care for animals and local ecosystems.<sup>259</sup> In fact, the Aquarium's photo copyright policy states that "the Aquarium is the rightful holder of any image/footage taken within the Aquarium's premises" by all visitors, volunteers, and staff<sup>260</sup> and therefore prevents others from generating capitalist value off photographs of animals in the Aquarium's

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<sup>257</sup> This includes Sea World, which currently has displayed belugas on loan from the Vancouver Aquarium ("Vancouver Aquarium beluga dies while on loan to SeaWorld," 2015).

<sup>258</sup> Vancouver Aquarium, 2012; Vancouver Aquarium, 2013; Vancouver Aquarium, 2014a; Vancouver Aquarium, 2015 ; Vancouver Aquarium, 2016; Ocean Wise, 2017

<sup>259</sup> For example, the Aquarium lost some major donors during its court battles over cetacean captivity since the controversy led these donors to doubt the quality of care the Aquarium provided (Boynton, 2019).

<sup>260</sup> "Photography, Video and Filming Policy," n.d.

tanks.<sup>261</sup> The returns this institution generates are not dollars but the advancement of a particular brand of colonial environmental stewardship over local and distant environments, led by scientific expertise. Furthermore, guests never exchange money directly for animal images or live animals they view at the Aquarium even though both images of animals and exhibits seek to motivate members of the public to visit and spend money on entry fees. Guests must also exit through the gift shop where they can purchase mugs and t-shirts featuring octopuses as well as octopus plushies.<sup>262</sup> Octopuses and octopus images therefore remain unvalued but useful for generating conservation dollars.

Building on the typology Collard and Dempsey (2017) outline for understanding different orientations — “relational, patterned positions” — nature can take to capitalist social relations, I differentiate between lively commodities (organisms with direct exchange value) and living beings who relate to value production in other ways. Collard and Dempsey (2017: 79) describe how living beings such as wild pollinators are “recognized as useful” for capitalist production but do not themselves have exchange value. This resembles the role octopuses and their images play at the Vancouver Aquarium. However, here octopuses are primarily useful not for capital accumulation but for reproducing and expanding the Aquarium’s brand of environmental stewardship. This environmental stewardship operates staunchly within capitalist and settler colonial social relations: it depends upon the construction of emptied landscapes and carceral spaces and placing animals in these spaces so they become legible to settler epistemologies, and frames particular forms of consumption and waste disposal as ideal environmental behavior. It

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<sup>261</sup> More alarmingly, this policy has been used to attempt to silence the Aquarium’s critics and has been compared to “Ag-gag” laws in the United States which criminalize filming on farms without the owner’s consent (Sykes, 2016).

<sup>262</sup> “Gift Shop: Vancouver Aquarium,” 2019

therefore fails to contest ongoing projects of colonization and capitalist extraction that have historically devastated (and continue to pose serious threats to) local coastal ecosystems.<sup>263</sup>

#### **4.2 Putting octopuses to work for science**

The Vancouver Aquarium has only recently started to put its octopuses to work for science. This work illustrates one less visible way keeping octopuses in captivity helps reproduce and expand environmental stewardship where people seek to help other species flourish under human control. In collaboration with facilities across North America, biologists at the Vancouver Aquarium collect data for the GPO Health Matrix Project which aims to improve criteria for evaluating GPO health in captivity. Additionally, this project explores how variables such as “gender, collection location, temperature, diet, enrichment”<sup>264</sup> and others correlate with long-term GPO health outcomes. To do this, researchers use a “health matrix” to record observations about GPOs’ physical condition and behavior. Biologist Meghan Holst developed the GPO Health Matrix to standardize GPO health assessments during her time at the Oregon Coast Aquarium and leads the current GPO Health Matrix study. Any institution with at least one GPO may enroll in this project, and researchers will ideally contribute at least six months’ worth of data. (However, Holst emphasizes that researchers with GPOs they do not expect to survive through the next six months can still participate in the study.) All participants and their data remain anonymous. At the end of this study, Holst hopes to publish a version of her GPO Health Matrix in a peer-reviewed journal and contribute guidelines for evaluating GPO health to the next update to the AZA care manual for GPOs.

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<sup>263</sup> For example, see Collard, 2018

<sup>264</sup> “Introduction to the GPO Health Matrix Project,” n.d.

Although regular record-keeping for GPOs at the Vancouver Aquarium notes key parameters such as water quality, feeding, and enrichment, data collection for this project greatly expands the level of detail keepers record. Holst’s matrix includes 23 criteria for evaluating GPO health, with each criterion broken into four levels of severity as demonstrated in Figure 4.1:

Modified by Meghan Holst from *Fiorito et al, 2015* and  
 Potential Indicators of Giant Pacific Octopus, *Enteroctopus dofleini*, Health and Welfare  
 Contact: meghanholst@gmail.com

Categories Of Stress Response	Level 1	Level 2	Level 3	Level 4
	Positive welfare status (healthy/good welfare)	Monitor animal with increased frequency depending upon the parameter; increased WQ assessment	Monitor for signs of resolution or increased severity; seek advice and treat where possible.	Requires Immediate action including euthanasia when observed or at the end of a defined monitoring period.

**Figure 4.1.** Levels of stress severity used in the GPO Health Matrix Project. From “Table 1. Description of the categories of observations evaluating *Enteroctopus dofleini* and the corresponding levels of severity” downloaded from <https://docs.google.com/document/d/1hAd3L74Gcf8Ebs-JzYemzalaTOk4fBKO0Au5sglChwk/edit?usp=sharing>.

The Health Matrix organizes most of these criteria into three categories: external appearance (seven categories), behavior (fifteen categories, further subdivided into “provoked,” “unprovoked,” and “feeding”), clinical signs (seven categories). It also includes space for “Free observation”: “Observations of other behavior not anticipated in the checklist which may have negative impact on welfare,” an especially relevant criterion for any standardized assessment of octopus care in captivity. Most of these criteria require only passive observation during routine care activities, and keepers at the Vancouver Aquarium generally avoid removing octopuses from tanks unless moving the animal to a new habitat or administering veterinary care. Therefore, to determine clinical markers such as body weight, staff estimate animal size through

visual inspection rather than removing animals from the tank for more precise measurements. Many behavioral criteria also emphasize octopuses' reactions to humans and stimuli provided by people — for example, does the octopus respond enthusiastically to feeding? Does it change color and texture regularly and in response to diverse stimuli throughout the day? If presented with novel objects in the tank, does it respond with curiosity rather than apathy and disinterest? When recording matrix data about each animal, staff also note the octopus's sex, arrival date, location of origin, tank temperature and volume, water quality parameters (NH<sub>3</sub>, NO<sub>2</sub>, NO<sub>3</sub>), and frequency and content of feeding.<sup>265</sup> Although publishing this work will undoubtedly help resolve ambiguities in GPO care and improve animals' lives in captivity, this study has nearly nonexistent applications to wild octopus lives. If it has applications to wild octopus habitat conservation, these lie with its potential to help promote and expand the Aquarium's brand of environmental stewardship by improving techniques for helping octopuses flourish in captivity and making successful captive display attainable for more institutions. By improving captive octopus health, this science also contributes to a body of animal welfare science used to justify expanded domination over other species through evidence that nature can thrive under human control.

### **4.3 Putting octopuses to work for capitalism-adjacent conservation?**

When I call the Aquarium a “capitalist-adjacent” institution whose profits reproduce colonial environmental stewardship over local and distant landscapes, this describes the particular way this institution generates and invests profits. Although the Aquarium's activities indirectly support (and are supported by) capitalist accumulation and capitalist social relations,<sup>266</sup>

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<sup>265</sup> “GPO Health Matrix Survey,” n.d.

<sup>266</sup> Here, “capitalist social relations” include all social relations involved in capitalist production.

I avoid reducing value generated at the Aquarium to capitalist value in order to highlight and problematize the institution's primary objective: reshaping relationships between people, other species, and landscapes.

Since 2012, the Aquarium has generated most of its revenue from admissions and membership, grants and donations, and retail sales. Growth in admissions and membership revenues drove most of the increases in total income over this period, but grants and donations also became much more essential revenue sources, expanding from 7% of the Aquarium's income in 2012 to 19% in 2017.<sup>267</sup> Major donors (recognized for donating over \$25,000 CAD in a given year) in 2017 unsurprisingly included other groups working on environmental protection and management such as the National Fish and Wildlife Foundation, the DFO, and FishChoice as well as outdoor recreation businesses like Patagonia and REI. However, oil and gas companies like ExxonMobil, Nexen Energy, and Imperial Oil as well as Teck Resources Limited (which proudly describes itself as "Canada's largest diversified mining company")<sup>268</sup> also figure among these top-level donors. LNG Canada, "a joint venture among Shell, PETRONAS, PetroChina, Mitsubishi and KOGAS [Korean Gas Corporation]"<sup>269</sup> ranks in the next-highest tier of donors ("President's Circle": \$10,000-\$24,999). Fossil fuel and mining industries therefore collectively donated at least \$100,000 to the Vancouver Aquarium in 2017. This comprised a relatively small but still substantial portion of the Aquarium's total income from grants and donations that year (about 1.8% if each of these organizations donated the minimum amount in their donor

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<sup>267</sup> Vancouver Aquarium, 2012; Ocean Wise, 2017

<sup>268</sup> Teck, 2018

<sup>269</sup> "About LNG Canada," n.d.

categories).<sup>270</sup> Earlier annual reports<sup>271</sup> single out Teck Resources Limited as the Vancouver Aquarium's largest donor, recognized as the only organization to donate over a million dollars to the Aquarium in 2012 and 2013. News articles from 2012 reveal that in this year the mining giant donated \$12.5 million to redesign the Aquarium's entry gallery and support education activities – the largest donation in the Aquarium's history.<sup>272</sup> Only a few months later, an American court order forced Teck to reveal that it had been unleashing toxic slag into the Columbia River in Washington State for over a century.<sup>273</sup> If Teck continued to donate at least a million dollars annually to the Aquarium over the next four years, this means at least 18% of the Aquarium's grants and donations — about 1% of the institution's total revenue — in 2017 would have come from oil, gas and mining industries.<sup>274</sup> Given the Aquarium's messaging about the dangers of climate change in its galleries, it also matters that major fossil fuel emitters like Air

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<sup>270</sup> Neither the Aquarium or its major donors release public information on exact amounts gifted to the institution by different donors. However, a break-down of the conservative values and math I used to reach these estimates is detailed below:

(4 oil, gas, and mining top-tier donors) x (\$25,000 each) = \$100,000

(1 second-tier oil and gas donor) x (\$10,000) = \$10,000

\$110,000 oil, gas, and industry donations total / \$6 million dollars grants and donations total = 1.8%

<sup>271</sup> 2012, 2013

<sup>272</sup> Carman, 2012; "Our Partnerships with Vancouver Aquarium and the Nature Conservancy of Canada," 2013

<sup>273</sup> Moore, 2012; Matthews, 2015

<sup>274</sup> Revised break-down of the math, again using the minimum values in each donation tier:

1 mining company donation over \$1 million

(3 oil and gas top-tier donors) x (\$25,000 each) = \$75,000

(1 second-tier oil and gas donor) x (\$10,000) = \$10,000

\$1,085,000 oil, gas, and industry donations total / \$6 million dollars grants and donations total = 18%

Canada (Canada's largest airline) and the Vancouver Airport Authority have ranked among the Aquarium's top donors since 2012. Others have noted the institution's failure to critique pipeline expansions in the wake of the 2005 oil spill in English Bay which would increase the risk of these disasters.<sup>275</sup> Similarly, the Canadian Plastics Industry Association reached President's Circle donor status in 2017 even though messaging about reducing plastics waste packs nearly every corner of the Aquarium's galleries.<sup>276</sup>

These funds support a wide variety of operations, with an increasing portion (as well as increasing absolute value) devoted to "Conservation, research, and education" (CRE)<sup>277</sup> over the last six years.<sup>278</sup> Between 2012 and 2017, the fraction of the Aquarium's operating budget spent on CRE activities rose from 12% to 18%,<sup>279</sup> a 50% increase. Most of this increase came from reducing the portion of its budget spend on retail operations from 19% to 9%.<sup>280</sup> The fraction of the Aquarium's budget earmarked for all other activities such as administration, marketing, and animal care remained relatively constant during this time.<sup>281</sup> Since the Aquarium's total annual revenue rose substantially between 2012 and 2017 (by over 25%), increasing the fraction of the

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<sup>275</sup> Matthews, 2015

<sup>276</sup> In spring 2018, the Aquarium even installed a temporary art exhibit on the Great Pacific Garbage Patch which aimed to "immerse" guests "in the ocean plastic pollution crisis" ("Art meets science meets ocean," n.d.).

<sup>277</sup> Unfortunately, the annual reports do not elaborate in detail on what constitutes "conservation, research, and education" activities and how this has changed over time.

<sup>278</sup> Vancouver Aquarium, 2013; Vancouver Aquarium, 2014a; Vancouver Aquarium, 2015; Vancouver Aquarium, 2016; Ocean Wise, 2017

<sup>279</sup> Ibid.

<sup>280</sup> Ibid.

<sup>281</sup> Ibid.

institution's budget for CRE 50% resulted in the absolute number of dollars spent on CRE nearly doubling from \$3.5 million to \$6.8 million CAD.<sup>282</sup> This indicates that the Aquarium has made a genuine effort to improve its focus on CRE activities in recent years and supports the assertion that this institution aims to use its profits to expand its environmental stewardship.

Together these income and expenditure patterns illustrate how industries responsible for the current environmental crisis also play a substantive role in funding the Aquarium's expanding conservation work. This funding pattern is not a contradiction, and its implications run deeper than greenwashing. The Aquarium, the oil and gas industry, and industries like airlines and plastics need each other. After the Exxon Valdez oil spill in Prince William Sound, Alaska in 1989, the Vancouver Aquarium played a prominent role in animal rescue and clean-up,<sup>283</sup> and Kinder Morgan's short list of contacts to call in case of an emergency with its Trans Mountain project includes the Aquarium.<sup>284</sup> More recently, the Vancouver Aquarium participated in clean-up after one of Kinder Morgan's tankers spilled oil into Vancouver's English Bay in 2015. The Aquarium conducted this clean-up work alongside the Western Canada Marine Response Corporation (WCMRC), an organization "completely funded by [the oil and gas] industry"<sup>285</sup> to clean up coastal oil spills. However, unlike WCMRC (which made news for its connections with Kinder Morgan), the Aquarium has not received press attention for its funding from the industries it cleans up after — even though the same article raising questions

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<sup>282</sup> Ibid.

<sup>283</sup> Collard, 2018

<sup>284</sup> National Energy Board of Canada, n.d.

<sup>285</sup> Hui, 2015

about the consequences of WCMRC's industry funding featured a photo provided by the Vancouver Aquarium.

The kind of conservation work the Aquarium spearheads does not threaten polluters' ability to continue business as usual. In fact, arguably the Aquarium's work facilitates it by holding consumers accountable for disposing of waste responsibly and helping remove the evidence of the industry's violence against local landscapes from public view more quickly. Working to contain environmental disasters like Exxon Valdez or the English Bay oil spill functions to contain and minimize the intense public outrage that follows these disasters, and the industry therefore has a vested interest in funding clean-up operations. Environmental disaster also furnishes the Aquarium and institutions like it with charismatic endangered species they could not legally obtain except through rescue operations:<sup>286</sup> for example, following the Exxon Valdez oil spill the Vancouver Aquarium obtained eight sea otters for its exhibits.<sup>287</sup> Numerous scholars<sup>288</sup> have documented how changing public attitudes towards animal captivity and captive display during the 20th century drove zoos and aquariums to evolve from entertainment venues to scientific catalogues of nature to conservation "arks" aiming to preserve disappearing species and ecosystems for future generations.<sup>289</sup> Without ecological crises threatening animals' survival in the wild, zoos and aquariums like the one in Vancouver face a much tougher challenge

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<sup>286</sup> Collard, 2018

<sup>287</sup> "YouTube celebrity otter dies in Vancouver," 2008

<sup>288</sup> Anderson, 1995; Braverman, 2013; Carr and Cohen, 2011; Kearns et al. 2016

<sup>289</sup> Of course, all of these roles still co-exist to some extent at modern institutions like the Vancouver Aquarium.

justifying their existence to increasingly skeptical publics.<sup>290</sup> To be clear, by highlighting connections between oil and gas extraction and organizations like the Vancouver Aquarium, I am not arguing against clean-up and rescue operations after oil spills or even using industry dollars to fund responses to environmental disasters those industries cause. Instead, I want to problematize how industries closely linked with ecological catastrophe and the Aquarium's conservation work both depend on one another. This fraught interdependence with polluting industries, paired with the Aquarium's dependence on profit to reproduce and expand its operations, makes the Vancouver Aquarium a "capitalist-adjacent" institution: neither reducible to nor separable from the for-profit industries it works closely with.

#### **4.4 Conclusions: Putting octopuses to work**

The Vancouver Aquarium therefore puts octopuses to work for a conservation project that aims to enroll the public in colonial forms of environmental stewardship. It does this through exhibits, gallery paneling, and advertising designed to transform visitors into environmental subjects who aspire to ideal conduct towards nature. This institution imagines conservation as a spectrum, with ideal conduct towards nature defined as behavior like consuming less plastic, recycling plastic, and cleaning up local shorelines. Although these behaviors do not exclude actions like resisting pipeline construction or supporting Indigenous sovereignty, framing individual actions like responsible consumption and waste disposal as ideal environmental behaviors can make it more difficult for people to imagine alternative ways of protecting

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<sup>290</sup> For a useful discussion of changing public attitudes towards zoos and the industry's evolving response, see Carr and Cohen (2011). Neo and Ngiam (2014) also helpfully outline public debates on the ethics of captive display for nonendangered dolphins in Singapore.

ecosystems.<sup>291</sup> Exhibits and promotional materials that include octopuses and represent their ecosystems also illustrate what the Aquarium imagines as an ideal coastal landscape: purified of human influence and/or contained in protected spaces like tanks. These exhibits and promotional materials exclude any mention of Indigenous place names, people, and knowledge and instead center settler communities and Western scientific authority.<sup>292</sup> In this way, these representations promote colonial forms of environmental stewardship by assuming the continued absence of Indigenous people and epistemologies from local landscapes and environmental governance.

Through the transformative potential of octopuses' charisma, the Aquarium aims to help make these idealized landscapes a reality. This includes using octopuses as "entry animals" that draw guests into the Treasures of BC gallery and in advertising that encourages people to donate to and spend money at the Aquarium, a crucial part of reproducing and expanding this institution's conservation work. I describe the Aquarium as a "capitalist-adjacent" conservation organization since it requires profit to continue and expand its operations but reinvests profits in its conservation work rather than enriching board members or shareholders. The Aquarium also uses octopuses in animal welfare research which generates knowledge that staff hope will make captive octopus care more successful at aquariums and laboratories and help legitimize captive care as an ethical conservation strategy. As Belcourt (2015) explains, settler epistemologies require placing animals in spaces like laboratories and zoos so they can become known and governed as animals subordinate to "human" subjects. Furthermore, examining the Aquarium's major donors reveals a close interdependence between this institution and notorious polluters

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<sup>291</sup> Maniates, 2001

<sup>292</sup> By "local landscapes," I specifically refer to those near Vancouver, especially in the British Columbia lower mainland. The Aquarium's Canadian arctic galleries do include some engagement with Inuit communities.

from the oil, gas, and mining industries. Many of the same oil, gas, and mining companies that count among the Aquarium's major donors have played highly visible roles in historical and ongoing Indigenous dispossession. In combination with the erasure of Indigenous lifeways from the Aquarium's portrayals of local landscapes, this makes the form of environmental stewardship promoted at the Vancouver Aquarium inherently colonial. The Vancouver Aquarium therefore deploys octopuses in diverse ways to reproduce and expand its colonial brand of environmental stewardship through the production of particular environmental subjects.

## Chapter 5: Conclusions

“Our nature seems to require us to hope that our life and the world’s life will continue into the future. Even so, the future offers no validation of this hope. That validation is to be found only in the knowledge, history, the good work and the good examples that are now at hand.”

- *Wendell Berry, Our Only World*

Since I’ve concluded my field work, a shifting political landscape has continued pressuring the Vancouver Aquarium’s conservation practices to change. When an appellate court overruled the BC Supreme Court decision in the Aquarium’s favor on the *Ocean Wise v. Vancouver Board of Parks and Recreation* case, the fate of Helen the dolphin swung back into limbo.<sup>293</sup> Then in April 2019, the Canadian House of Commons fisheries committee passed a bill banning cetacean captivity,<sup>294</sup> which became national law two months later when Parliament approved it.<sup>295</sup> Although neither of these changes directly affects octopuses, they both reflect shifting public attitudes against captive display as a conservation strategy: thousands of Canadians called and e-mailed their MPs to support the national ban in the days prior to the fisheries committee’s vote.<sup>296</sup> In June 2019, the Vancouver Aquarium formally dropped its lawsuit against the Park Board’s ban and signed a 35-year lease agreement with the Park Board

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<sup>293</sup> Lupick, 2019

<sup>294</sup> Tasker, 2019

<sup>295</sup> The bill bans captive breeding and capture but allows institutions to keep whales and dolphins like Helen currently in captivity (Howells, 2019).

<sup>296</sup> Tasker, 2019

agreeing to end its cetacean captivity programs. How (or whether) this will cause the Vancouver Aquarium to rethink its practices beyond plans to phase out cetacean display remains uncertain.

Current and proposed policies elsewhere offer possibilities for imagining alternative practices in this space. Several institutions in the Lower Mainland — the Ucluelet Aquarium,<sup>297</sup> Nicholas Sonntag Marine Education Centre,<sup>298</sup> and Discovery Passage Aquarium<sup>299</sup> — practice collect-and-release for all animals they display. So does the Petty Harbour Mini Aquarium in St. John's, Newfoundland.<sup>300</sup> Exclusively practicing collect-and-release requires these small institutions to display only local species and limits the range of local species they can house. For example, collect-and-release institutions would likely be unable to keep mammal and bird species which lose the ability to survive in the wild after living under human care. However, activists have worked for years towards the opening of the world's first outdoor marine sanctuary for retired cetaceans from marine parks,<sup>301</sup> and if successfully implemented in places like British

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<sup>297</sup> The Ucluelet Aquarium proudly brands itself as “Canada’s First Collect-and-Release Aquarium.” (“The Ucluelet Aquarium: Canada’s first catch-and-release aquarium,” 2017)

<sup>298</sup> From their website: “After a short stay at the Centre, animals will be released back to their environment. This forward-thinking “collect-and-release” policy is unique to only three other aquarium societies in Canada, making the Centre a leader in the field of ocean conservation practices and animal care standards. “Release days” will be memorable events organized with community groups and volunteers.” (“About Us,” n.d.)

<sup>299</sup> From the Discovery Passage Aquarium’s website: “Specimens from representative local species are collected from the marine environment in the spring and returned to the area of collection at the end of the season.” (“Discovery Passage Aquarium,” 2016)

<sup>300</sup> From their website: “The best part about the Mini Aquarium is that we release the animals back to the ocean where they were collected. Bid a fond farewell to our marine friends as you help us return the animals to the sea. It’s the perfect ending to another season of aquatic awesomeness!” (“Petty Harbour Mini Aquarium,” n.d.)

<sup>301</sup> MacDonald, 2018

Columbia, these sanctuaries could also offer promising alternative homes for rescued sea lions and otters who would not survive in the wild.

Shifting to exclusive collect-and-release therefore pushes captive display institutions further from colonial menageries which celebrated domination over distant landscapes represented by the animals in their exhibits and permanently transformed animals' socioecological relations. Several of Canada's collect-and-release institutions also hold public animal releases that involve members of the public in celebrating the act of relinquishing control over animal lives. However, as imagery in the Vancouver Aquarium's *Treasures of BC* gallery illustrates, displaying local animals does not (by itself) eliminate imperial legacies from these institutions. Changing from permanent display to collect-and-release also does not move these institutions any closer to preventing ecological catastrophes rather than cleaning up after them – even if it renders captive display less violent. It also does not change the fact that in the Lower Mainland, they occupy unceded Indigenous lands and waters: how can the Aquarium participate in the process of decolonizing? To determine this, captive display institutions will need to realign their conservation messaging to include actions that support Indigenous sovereignty while investigating alternative ways of constructing captive ecologies (such as collect-and-release). Care practices and gallery messaging rooted in Western science that omit Indigenous knowledge about local ecosystems will always remain insufficient for this task. Although experimenting in this way would not guarantee that the Aquarium and institutions like it will be able to contribute to building interspecies relations fundamentally different from the ones producing the current ecological crisis, studying the Vancouver Aquarium has convinced me that changes to both captive care and conservation messaging is necessary for making this possible.

The Vancouver Aquarium has gambled on the possibility that bringing members of the public into close contact with creatures like octopuses will spark a transformation that will inspire visitors to take action to protect the coastal ecosystems where those animals live. It uses this possibility to justify the many slow forms of violence involved in extracting these animals from local ecosystems and exhibiting them for people. This is what makes captive ecology at the Vancouver Aquarium a crisis ecology: ecological crises play a central role in justifying the production of this space and display of even nonendangered species like GPOs. Throughout recent decades, the Aquarium has experimented with numerous ways to keep octopuses useful for its brand of science-based, consumer-oriented environmental stewardship even as octopuses approach death and pass away. When I visit the Vancouver Aquarium and (if I'm fortunate) encounter the octopus there, I'm confronted with both the violence and possibilities promised by the exhibits' impossibly beautiful portrayals of the landscapes where I live. At times – and increasingly, the more time I spend in the galleries – it feels like a memorial to dying ecosystems. It could be easy to forget in a place like this that the untouched local landscapes portrayed here likely never existed: people have lived and worked in these places for thousands of years. The Vancouver Aquarium so far has made clear through its silence on particular topics that the forms of environmental stewardship it promotes do not include political opposition to major donors from the oil, gas, or mining industries whose names grace its galleries or the repatriation of Indigenous land. This matters in coastal British Columbia because issues like oil tanker traffic, plastic pollution, and climate change driven by extractive industries and facilitated by Indigenous displacement all pose serious threats to local ecosystems. By outlining the captive ecology of one prominent local species at the Vancouver Aquarium and examining how this institution aims to use it for conservation, I have aimed to highlight overlooked possibilities for

this space to become different but also clarify the ongoing colonial legacies shaping how zoos and aquariums continue to practice conservation.

## References

- About LNG Canada. (n.d.). Retrieved February 4, 2019, from LNG Canada website:  
<https://www.lngcanada.ca/about-lng-canada-2/the-companies-behind-lng-canada/>
- About the Vancouver Aquarium. (n.d.). Retrieved February 6, 2019, from Vancouver Aquarium website: <https://www.vanaqua.org/about>
- About Us. (2018). Retrieved February 8, 2019, from Albion Farms & Fisheries website:  
<https://albion.ca/about-us/>
- About Us. (n.d.). Retrieved from Nicholas Sonntag Marine Education Centre website:  
<https://gibsonsmarine-ed.org/about>
- Acampora, R. (2005). Zoos and Eyes: Contesting Captivity and Seeking Successor Practices. *Society & Animals*, 13(1), 69–88. <https://doi.org/10.1163/1568530053966643>
- Adams, W. M. (2017). Geographies of conservation II: Technology, surveillance and conservation by algorithm. *Progress in Human Geography*, 030913251774022. <https://doi.org/10.1177/0309132517740220>
- Agrawal, A. (2005). *Environmentality: Technologies of Government and the Making of Subjects*. Duke University Press.
- An Act to amend the Criminal Code (cruelty to animals). , SC § (2008).
- Anderson, K. (1995). Culture and Nature at the Adelaide Zoo: At the Frontiers of “Human” Geography. *Transactions of the Institute of British Geographers*, 20(3), 275. <https://doi.org/10.2307/622652>
- Anderson, R. C., Mather, J. A., Monette, M. Q., & Zimsen, S. R. M. (2010). Octopuses (Enteroctopus dofleini) Recognize Individual Humans. *Journal of Applied Animal Welfare Science*, 13(3), 261–272. <https://doi.org/10.1080/10888705.2010.483892>

Arendt, F., & Matthes, J. (2016). Nature Documentaries, Connectedness to Nature, and Pro-environmental Behavior. *Environmental Communication*, 10(4), 453–472.

<https://doi.org/10.1080/17524032.2014.993415>

Art meets science meets ocean. (n.d.). Retrieved from Vancouver Aquarium website:

<https://www.vanaqua.org/explore/exhibit-vortex>

Association of Zoos and Aquariums. (2016). *AZA Policy on Responsible Population Management*. Retrieved from

[https://www.speakcdn.com/assets/2332/aza\\_policy\\_on\\_responsible\\_population\\_management\\_final\\_june\\_2018.pdf](https://www.speakcdn.com/assets/2332/aza_policy_on_responsible_population_management_final_june_2018.pdf)

AZA Aquatic Invertebrate Taxonomic Advisory Group (AITAG). (2014). *Giant Pacific Octopus (Enteroctopus dofleini) Care Manual*. Retrieved from Association of Zoos and Aquariums website:

[https://www.speakcdn.com/assets/2332/giant\\_pacific\\_octopus\\_care\\_manual\\_final\\_9514.pdf](https://www.speakcdn.com/assets/2332/giant_pacific_octopus_care_manual_final_9514.pdf)

Balmford, A., Leader-Williams, N., Mace, G. M., & Manica, A. (2007). Message received?

Quantifying the impact of informal conservation education on adults visiting UK zoos. In A. Zimmerman, M. Hatchwell, L. Dickie, & C. West (Eds.), *Zoos in the 21st Century: Catalysts for conservation?* (pp. 120–136). Cambridge: Cambridge University Press.

B.C. First Nation nets huge land claim settlement. (2000, June 10). *CBC News*. Retrieved from

<https://www.cbc.ca/news/canada/b-c-first-nation-nets-huge-land-claim-settlement-1.212043>

B.C. Supreme Court strikes down Vancouver Aquarium's captive cetacean ban. (2018, February 9). *CBC*. Retrieved from [https://www.cbc.ca/news/canada/british-columbia/supreme-court-](https://www.cbc.ca/news/canada/british-columbia/supreme-court-cetecean-ban-1.4528936)

[cetecean-ban-1.4528936](https://www.cbc.ca/news/canada/british-columbia/supreme-court-cetecean-ban-1.4528936)

- Bear, C. (2011). Being Angelica? Exploring individual animal geographies. *Area*, 43(3), 297–304.
- Belcourt, B.-R. (2014). Animal Bodies, Colonial Subjects: (Re)Locating Animality in Decolonial Thought. *Societies*, 5(1), 1–11. <https://doi.org/10.3390/soc5010001>
- Benbow, S. M. P. (2004). Death and Dying at the Zoo: Death and Dying at the Zoo. *The Journal of Popular Culture*, 37(3), 379–398. <https://doi.org/10.1111/j.0022-3840.2004.00074.x>
- Berger, J. (1980). Why Look at Animals? In *About Looking* (pp. 1–26). New York: Pantheon Books.
- Board of Directors. (n.d.). Retrieved February 6, 2019, from Canada’s Accredited Zoos and Aquariums website: <http://caza.ca/fr/board-of-directors/>
- Bourlat, S., Nielsen, C., Economou, A., & Telford, M. (2008). Testing the new animal phylogeny: A phylum level molecular analysis of the animal kingdom. *Molecular Phylogenetics and Evolution*, 49(1), 23–31. <https://doi.org/10.1016/j.ympev.2008.07.008>
- Bousé, D. (1998). Are wildlife films really “nature documentaries”? *Critical Studies in Mass Communication*, 15(2), 116–140. <https://doi.org/10.1080/15295039809367038>
- Boynton, S. (2019, May 20). Vancouver Aquarium sues city, park board over lost revenue from cetacean ban. *GlobalNews.Ca*. Retrieved from [https://globalnews.ca/news/5291173/vancouver-aquarium-lawsuit-cetacean-ban/beta/?utm\\_expid=.kz0UD5JkQOC06yMqxGqECg.1&utm\\_referrer=https%3A%2F%2Fwww.google.com%2F](https://globalnews.ca/news/5291173/vancouver-aquarium-lawsuit-cetacean-ban/beta/?utm_expid=.kz0UD5JkQOC06yMqxGqECg.1&utm_referrer=https%3A%2F%2Fwww.google.com%2F)
- Braverman, I. (2013). *Zooland: The institution of captivity*. Stanford, California: Stanford Law Books, an imprint of Stanford University Press.

- Brown, S. (2018, March 23). Vancouver Aquarium gave their new octopus a GoPro – because why not? *Vancouver Sun*. Retrieved from <https://vancouversun.com/news/local-news/vancouver-aquarium-gave-their-new-octopus-a-gopro-because-why-not>
- Butler-Struben, H. M., Brophy, S. M., Johnson, N. A., & Crook, R. J. (2018). In Vivo Recording of Neural and Behavioral Correlates of Anesthesia Induction, Reversal, and Euthanasia in Cephalopod Molluscs. *Frontiers in Physiology*, 9. <https://doi.org/10.3389/fphys.2018.00109>
- Carman, T. (2012, April 27). Vancouver Aquarium receives \$12.5-million donation from Teck. *Vancouver Sun*. Retrieved from <http://www.vancouversun.com/vancouver+aquarium+receives+million+donation+from+teck/6531521/story.html>
- Carr, N., & Cohen, S. (2011). The Public Face of Zoos: Images of Entertainment, Education and Conservation. *Anthrozoös*, 24(2), 175–189. <https://doi.org/10.2752/175303711X12998632257620>
- CCAC Programs. (2017, March). Retrieved from [http://www.ccac.ca/Documents/Standards/Policies/The\\_Scope\\_of\\_CCAC\\_Programs.pdf](http://www.ccac.ca/Documents/Standards/Policies/The_Scope_of_CCAC_Programs.pdf)
- Certified Institutions. (2019). Retrieved February 6, 2019, from Canadian Council on Animal Care website: <https://www.ccac.ca/en/certification/certified-institutions.html>
- Charbonneau, G. (2016). *Vancouver Aquarium Uncovered* [Documentary, Online]. Retrieved from [www.vancouveraquariumuncovered.com](http://www.vancouveraquariumuncovered.com)
- Chiu, C., & Chan, K. (2017, December 21). Opinion: Creating a whale Sanctuary is not as easy as it sounds. *Vancouver Sun*. Retrieved from <https://vancouversun.com/opinion/oped/opinion-whale-sanctuary-not-as-easy-as-it-sounds>

- Chrulew, M. (2010). From Zoo to Zoopolis: Effectively Enacting Eden. In R. Acampora (Ed.), *Metamorphoses of the Zoo: Animal encounter after Noah* (pp. 193–220). Lexington Books.
- Chrulew, M. (2011). Managing Love and Death at the Zoo: The Biopolitics of Endangered Species Preservation. *Australian Humanities Review*, 50.  
<https://doi.org/10.22459/AHR.50.2011.08>
- Collard, R.-C. (2014). Putting Animals Back Together, Taking Commodities Apart. *Annals of the Association of American Geographers*, 104(1), 151–165.  
<https://doi.org/10.1080/00045608.2013.847750>
- Collard, R.-C. (2018). Disaster Capitalism and the Quick, Quick, Slow Unravelling of Animal Life. *Antipode*. <https://doi.org/10.1111/anti.12389>
- Collard, R.-C., & Dempsey, J. (2017). Capitalist Natures in Five Orientations. *Capitalism Nature Socialism*, 28(1), 78–97. <https://doi.org/10.1080/10455752.2016.1202294>
- Conrath, C. L., & Conners, M. E. (2014). Aspects of the reproductive biology of the North Pacific giant octopus (*Enteroctopus dofleini*) in the Gulf of Alaska. *Fishery Bulletin*, 112(4), 253–260. <https://doi.org/10.7755/FB.112.4.2>
- Crab Harvesting Information. (2018, November 2). Retrieved February 10, 2019, from Fisheries and Oceans Canada website: <https://www.pac.dfo-mpo.gc.ca/fm-gp/rec/crab-crabe-eng.html>
- Davies, G. (2000). Virtual animals in electronic zoos: The changing geographies of animal capture and display. In C. Philo & C. Wilbert (Eds.), *Animal spaces, beastly places* (pp. 243–267). London: Routledge.
- Davis, S. G. (1997). *Spectacular Nature: Corporate Culture and the Sea World Experience*. Berkeley, CA: University of California Press.

Discovery Passage Aquarium. (2016). Retrieved from Discovery Passage Aquarium website:

<http://discoverypassageaquarium.ca/>

Dracott, E. (2018, November 9). Seth Rogen joyous after octopus is named Ceph Rogen in his honour. *Independent.Ie*. Retrieved from

<https://www.independent.ie/ca/entertainment/movies/seth-rogen-joyous-after-octopus-is-named-ceph-rogen-in-his-honour-37512953.html>

Fass, J., & Fass, A. (2011). Physician-assisted suicide: Ongoing challenges for pharmacists.

*American Journal of Health-System Pharmacy*, 68(9), 846–849.

<https://doi.org/10.2146/ajhp100333>

Fisheries Act. , SOR/93-53 SC § (1993).

Fisheries and Oceans Canada. (2011). *Pacific Region Exploratory Fishery Guidelines: Octopus*

*by Dive August 1, 2011 to July 31, 2012* [Exploratory Harvest Guideline]. Retrieved from

<http://www.dfo-mpo.gc.ca/Library/344562.pdf>

Fraser, K. (2017, December 7). Animal advocacy groups appear in court in Vancouver Aquarium

lawsuit. *Vancouver Sun*. Retrieved from <https://vancouversun.com/news/local-news/animal-advocacy-groups-appear-in-court-in-vancouver-aquarium-lawsuit>

Fully farmed octopus on its way to your dinner table. (2017, June 12). *Nikkei Asian Review*.

Retrieved from <https://asia.nikkei.com/Business/Trends/Fully-farmed-octopus-on-its-way-to-your-dinner-table>

Garcia, B. G., & Gimenez, F. A. (2002). Influence of diet on ongrowing and nutrient utilization

in the common octopus (*Octopus vulgaris*). *Aquaculture*, 211, 171–182.

Giant octopus tries to escape Seattle Aquarium. (2015, March 6). *CBC News*. Retrieved from

<https://www.cbc.ca/news/trending/giant-octopus-tries-to-escape-seattle-aquarium-1.2984204>

Giant Pacific octopus wraps itself around diver's face near Port Hardy, B.C. (2015, February 23).

*CBC News*. Retrieved from <https://www.cbc.ca/news/canada/british-columbia/giant-pacific-octopus-wraps-itself-around-diver-s-face-near-port-hardy-b-c-1.2968468>

Gift Shop: Vancouver Aquarium. (2019). Retrieved October 19, 2018, from Vancouver

Aquarium website: <http://www.vanaquairetail.mybigcommerce.com/>

Gillespie, K. (2014). Sexualized violence and the gendered commodification of the animal body in Pacific Northwest US dairy production. *Gender, Place & Culture*, 21(10), 1321–1337.

<https://doi.org/10.1080/0966369X.2013.832665>

Gillespie, K. (2018). *The Cow with Ear Tag #1389*. Chicago: University of Ghicago Press.

GPO Health Matrix Survey. (n.d.). Retrieved November 29, 2018, from GPO Health Matrix

Project website:

<https://drive.google.com/file/d/1t6a0VvCabIRpfaSsG2I0qN3N5tQDHnPw/view?usp=sharing>

Grasso, F. W. (2014). Camouflage in benthic cephalopods: What does it teach us? In A.-S.

Darmaillacq, L. Dickel, & J. Mather (Eds.), *Cephalopod Cognition* (pp. 94–122).

Cambridge: Cambridge University Press.

*Guide to the Care and Use of Experimental Animals Volume 1, 2nd Edition*. (1993). Retrieved from

[https://www.ccac.ca/Documents/Standards/Guidelines/Experimental\\_Animals\\_Vol1.pdf](https://www.ccac.ca/Documents/Standards/Guidelines/Experimental_Animals_Vol1.pdf)

- Hennessy, E. (2013). Producing ‘prehistoric’ life: Conservation breeding and the remaking of wildlife genealogies. *Geoforum*, 49, 71–80. <https://doi.org/10.1016/j.geoforum.2013.05.012>
- Holland, N. D., & Chen, J. (2001). Origin and early evolution of the vertebrates: New insights from advances in molecular biology, anatomy, and palaeontology. *BioEssays*, 23(2), 142–151. [https://doi.org/10.1002/1521-1878\(200102\)23:2<142::AID-BIES1021>3.0.CO;2-5](https://doi.org/10.1002/1521-1878(200102)23:2<142::AID-BIES1021>3.0.CO;2-5)
- Horak, J.-C. (2006). Wildlife documentaries: From classical forms to reality TV. *Film History: An International Journal*, 18(4), 459–475.
- Howells, L. (2019, June 10). “A more humane country”: Canada to ban keeping whales, dolphins in captivity. *CBC News*. Retrieved from <https://www.cbc.ca/news/canada/hamilton/whales-1.5169138>
- Hua, J., & Ahuja, N. (2013). Chimpanzee Sanctuary: “Surplus” Life and the Politics of Transspecies Care. *American Quarterly*, 65(3), 619–637. <https://doi.org/10.1353/aq.2013.0043>
- Hui, S. (2015, April 10). Kinder Morgan-owned company called in to clean up oil spill in English Bay. *The Georgia Strait*. Retrieved from <https://www.straight.com/blog/428816/kinder-morgan-owned-company-called-clean-oil-spill-english-bay>
- Igoe, J. (2010). The spectacle of nature in the global economy of appearances: Anthropological engagements with the spectacular mediations of transnational conservation. *Critique of Anthropology*, 30(4), 375–397. <https://doi.org/10.1177/0308275X10372468>
- Introduction to the GPO Health Matrix Project. (n.d.). Retrieved November 29, 2018, from GPO Health Matrix Project website: <https://sites.google.com/view/gpo-health-matrix-project/project-proposal?authuser=0>

- Jacquet, J., Franks, B., Godfrey-Smith, P., & Sanchez-Suarez, W. (2019, Winter). The Case Against Octopus Farming. *Issues in Science and Technology*, XXXV(2), 37–44.
- Johnson, E. (2015, September 14). Lying Like Cuttlefish. *The New Inquiry*. Retrieved from <https://thenewinquiry.com/lying-like-cuttlefish/>
- Jones, O. (2000). (Un)ethical geographies of human-non-human relations: Encounters, collectives and spaces. In C. Philo & C. Wilbert (Eds.), *Animal spaces, beastly places* (pp. 268–291). London: Routledge.
- Kearns, R., Collins, D., & Wiles, J. (2016). The Rotoroa Island and Auckland Zoo partnership: Connecting heterotopic spaces. *New Zealand Geographer*, 72(3), 192–204. <https://doi.org/10.1111/nzg.12134>
- Kellert, S. R. (1997). *The value of life: Biological diversity and human society*. Island Press.
- King, B. J. (2013). *How Animals Grieve*. Chicago: The University of Chicago Press.
- Kirksey, S. E., & Helmreich, S. (2010). The emergence of multispecies ethnography. *Cultural Anthropology*, 25(4), 545–576. <https://doi.org/10.1111/j.1548-1360.2010.01069.x>
- Kohn, E. (2013). *How Forests Think: Toward an Anthropology Beyond the Human*. <https://doi.org/10.1525/california/9780520276109.001.0001>
- Kröger, B., Vinther, J., & Fuchs, D. (2011). Cephalopod origin and evolution: A congruent picture emerging from fossils, development and molecules. *BioEssays*, 33(8), 602–613. <https://doi.org/10.1002/bies.201100001>
- Lancaster, D. (2019, June 25). Ocean Wise and Vancouver Aquarium sign new 35-year licence agreement. Retrieved from Ocean Wise website: <https://ocean.org/media-releases/ocean-wise-and-vancouver-aquarium-sign-new-35-year-licence-agreement/>

- Larsen, K. (2017, November 24). Chester the false killer whale has died, Vancouver Aquarium says. *CBC News*. Retrieved from <https://www.cbc.ca/news/canada/british-columbia/chester-false-killer-whale-dead-1.4418521>
- Lee, J. (2014, December 2). New land claim seeks massive territory on B.C.'s South Coast, including Stanley Park. *Vancouver Sun*. Retrieved from <http://www.vancouversun.com/life/land+claim+seeks+massive+territory+South+Coast+including+Stanley+Park/10431709/story.html>
- Lindsay, B. (2018, January 18). Vancouver Aquarium will no longer keep whales, dolphins in captivity. *CBC*. Retrieved from <https://www.cbc.ca/news/canada/british-columbia/vancouver-aquarium-will-no-longer-keep-whales-dolphins-in-captivity-1.4492316>
- Lindsay, B. (2019, January 9). *Quick question* [Letter to Mollie Holmberg].
- Little, S. (2019, November 9). The Vancouver Aquarium now has an octopus named after Seth Rogen. *GlobalNews.Ca*. Retrieved from [https://globalnews.ca/news/4650016/seth-rogen-octopus-vancouver-aquarium/beta/?utm\\_expid=.kz0UD5JkQOC06yMqxGqECg.1&utm\\_referrer=https%3A%2F%2Fwww.google.com%2F](https://globalnews.ca/news/4650016/seth-rogen-octopus-vancouver-aquarium/beta/?utm_expid=.kz0UD5JkQOC06yMqxGqECg.1&utm_referrer=https%3A%2F%2Fwww.google.com%2F)
- Lorimer, J. (2007). Nonhuman Charisma. *Environment and Planning D: Society and Space*, 25(5), 911–932. <https://doi.org/10.1068/d71j>
- Lupick, T. (2019, February 19). B.C. Court of Appeal finds city has authority to ban cetacean captivity, sending Vancouver Aquarium back to court. *The Georgia Strait*. Retrieved from <https://www.straight.com/news/1202771/judge-finds-city-has-authority-ban-cetacean-captivity-sending-vancouver-aquarium-back>

- MacDonald, M. (2018, June 7). Secret location off N.S. may host world's 1st sanctuary for captive whales and dolphins. *CBC*. Retrieved from <https://www.cbc.ca/news/canada/nova-scotia/secret-location-off-n-s-may-host-world-s-1st-sanctuary-for-captive-whales-and-dolphins-1.4695521>
- Malamud, R. (1998). *Reading Zoos: Representations of animals in captivity*. New York: New York University Press.
- Management Areas—Pacific Region. (n.d.). Retrieved November 12, 2018, from Fisheries and Oceans Canada website: <http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/areas-secteurs/index-eng.html>
- Maniates, M. F. (2001). Individualization: Plant a Tree, Buy a Bike, Save the World? *Global Environmental Politics*, 1(3), 31–52. <https://doi.org/10.1162/152638001316881395>
- Marino, L., Lilienfeld, S. O., Malamud, R., Nobis, N., & Broglio, R. (2010). Do Zoos and Aquariums Promote Attitude Change in Visitors? A Critical Evaluation of the American Zoo and Aquarium Study. *Society & Animals*, 18(2), 126–138. <https://doi.org/10.1163/156853010X491980>
- Mather, J. A., & Anderson, R. C. (1993). Personalities of Octopuses (*Octopus rubescens*). *Journal of Comparative Psychology*, 107(3), 336–340.
- Mather, J. A., Leite, T. S., Anderson, R. C., & Wood, J. B. (2014). Foraging and cognitive competence in octopuses. In A.-S. Darmaillacq, L. Dickel, & J. Mather (Eds.), *Cephalopod Cognition* (pp. 125–149). <https://doi.org/10.1017/CBO9781139058964>
- Mather, J., & Anderson, R. (2007). Ethics and invertebrates: A cephalopod perspective. *Diseases of Aquatic Organisms*, 75, 119–129. <https://doi.org/10.3354/dao075119>

- Matthews, J. (2015, June 21). Vancouver Aquarium Clams Up Over Pipelines And Tankers. *HuffPost*. Retrieved from [https://www.huffingtonpost.ca/jeff-matthews/vancouver-aquarium-pipelines-funding\\_b\\_7081520.html](https://www.huffingtonpost.ca/jeff-matthews/vancouver-aquarium-pipelines-funding_b_7081520.html)
- Mawani, R. (2003). Imperial Legacies (Post)Colonial Identities: Law, Space and the Making of Stanley Park., *Law Text Culture*, 7, 98–141.
- Mawani, R. (2004). From Colonialism to Multiculturalism? Totem Poles, Tourism and National Identity in Vancouver’s Stanley Park. *ARIEL: A Review of International English Literature*, 35(1–2), 31–57.
- May, R. M. (1988). How Many Species are There on Earth? *Science*, 241(4872), 1441–1449.
- Mayes, C. (2010). The Violence of Care: An Analysis of Foucault’s Pastor. *Journal for Cultural and Religious Theory*, 11(1), 111–126.
- McGill Centre for Indigenous Peoples’ Nutrition and Environment. (n.d.). Octopus. Retrieved from Traditional Animal Foods of Indigenous Peoples of Northern North America: The contributions of wildlife diversity to the subsistence and nutrition of indigenous cultures website: <http://traditionalanimalfoods.org/marine-invertebrates/cephalopods/page.aspx?id=6527>
- McKie, R. (2019, May 12). Octopus farming is ‘unethical and a threat to the food chain’ \_ Environment \_ The Guardian.pdf. *The Guardian*. Retrieved from <https://www.theguardian.com/environment/2019/may/12/octopus-farming-unethical-and-threat-to-food-chain>
- Mears, B. (2012, May 21). States urge feds to help import lethal injection drugs. *CNN*. Retrieved from <https://www.cnn.com/2012/05/21/politics/states-lethal-injection-drugs>

- Meek, P., Ballard, G., Fleming, P., & Falzon, G. (2016). Are we getting the full picture? Animal responses to camera traps and implications for predator studies. *Ecology and Evolution*, 6(10), 3216–3225. <https://doi.org/10.1002/ece3.2111>
- Migdal, A. (2018, November 10). Vancouver Aquarium names octopus “Ceph Rogen” after...you know who. *CBC News*. Retrieved from <https://www.cbc.ca/news/canada/british-columbia/ceph-rogen-vancouver-aquarium-1.4900995>
- Montgomery, S. (2015). *The Soul of an Octopus: A Surprising Exploration into the Wonder of Consciousness*. New York, NY: Atria Paperback.
- Moore, D. (2012, September 10). Teck Resources Admits Polluting Columbia River For 100 Years; Damage To Be Assessed. *HuffPost*. Retrieved from [https://www.huffingtonpost.ca/2012/09/10/teck-columbia-river-pollution\\_n\\_1871034.html](https://www.huffingtonpost.ca/2012/09/10/teck-columbia-river-pollution_n_1871034.html)
- Morin, K. M. (2015). The cage, the supermax, and the zoo. In K. Gillespie & R.-C. Collard (Eds.), *Critical Animal Geographies: Politics, Intersections, and Hierarchies in a Multispecies World* (pp. 73–91). London: Routledge.
- Morse, P., Huffard, C. L., Meekan, M. G., McCormick, M. I., & Zenger, K. R. (2018). Mating behaviour and postcopulatory fertilization patterns in the southern blue-ringed octopus, *Haplochlæna maculosa*. *Animal Behaviour*, 136, 41–51. <https://doi.org/10.1016/j.anbehav.2017.12.004>
- Moss, A., & Esson, M. (2013). The Educational Claims of Zoos: Where Do We Go from Here?: The Educational Claims of Zoos. *Zoo Biology*, 32(1), 13–18. <https://doi.org/10.1002/zoo.21025>

- Mulgrew, I. (2019, February 20). Ian Mulgrew: Vancouver park board wins appeal on cetacean ban. *Vancouver Sun*. Retrieved from <https://vancouversun.com/opinion/columnists/ian-mulgrew-vancouver-park-board-wins-appeal-on-cetacean-ban>
- Mullan, B., & Marvin, G. (1999). *Zoo Culture*. Urbana: University of Illinois.
- National Energy Board of Canada. (n.d.). *Organizations typically represented on Emergency Management Contact List for Trans Mountain*. Retrieved from <https://apps.nelb-one.gc.ca/REGDOCS/File/Download/2482296>
- Necropsy suggests Chester the false killer whale died from infection. (2017, December 1). *CBC News*. Retrieved from <https://www.cbc.ca/news/canada/british-columbia/necropsy-suggests-chester-the-false-killer-whale-died-from-infection-1.4429899>
- Nelson, I. L. (2017). Interspecies care and aging in a gorilla 2.0 world. *Geoforum*, 79, 144–152. <https://doi.org/10.1016/j.geoforum.2016.02.007>
- Neo, H., & Ngiam, J. Z. (2014). Contesting captive cetaceans: (Il)legal spaces and the nature of dolphins in urban Singapore. *Social & Cultural Geography*, 15(3), 235–254. <https://doi.org/10.1080/14649365.2014.882974>
- New Emerging Fisheries Policy. (2008). Retrieved February 6, 2019, from Fisheries and Oceans Canada website: <http://www.dfo-mpo.gc.ca/reports-rapports/regs/efp-pnp-eng.htm>
- Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Cambridge, MA: Harvard University Press.
- O'Brien, C. E., Roubledakis, K., & Winkelmann, I. E. (2018). The Current State of Cephalopod Science and Perspectives on the Most Critical Challenges Ahead From Three Early-Career Researchers. *Frontiers in Physiology*, 9. <https://doi.org/10.3389/fphys.2018.00700>
- Ocean Wise. (2017). *Ocean Wise 2017 Annual Report*. Ocean Wise.

- Ocean Wise Conservation Association v. Vancouver Board of Parks and Recreation.* , No. S175651 (Supreme Court of British Columbia February 9, 2018).
- Octopus makes daring escape from aquarium to Pacific Ocean. (2016, April 13). *CBC News*. Retrieved from <https://www.cbc.ca/news/trending/finding-inky-1.3534784>
- Octopuses & Squids. (2018). Retrieved August 19, 2018, from Vancouver Aquarium website: <https://www.vanaqua.org/learn/aquafacts/invertebrates/octopuses-and-squids>
- O'Dor, R. K., Mangold, K., Boucher-Rodoni, R., Wells, M. J., & Wells, J. (1984). Nutrient absorption, storage and remobilization in octopus vulgaris. *Marine and Freshwater Behaviour and Physiology*, 11(3), 239–258.
- Oestmann, D. J., Scimeca, J. M., Forsythe, J., Hanlon, R., & Lee, P. (1997). *Special Considerations for Keeping Cephalopods in Laboratory Facilities*. 36(2), 89–93.
- Olive, A., & Jansen, K. (2017). The role of accredited zoos in the recovery process for species at risk in Canada: Accredited zoos. *The Canadian Geographer / Le Géographe Canadien*, 61(3), 319–333. <https://doi.org/10.1111/cag.12394>
- Our Partnerships with Vancouver Aquarium and the Nature Conservancy of Canada. (2013, June 30). Retrieved December 10, 2018, from Teck website: <https://www.teck.com/news/stories/2013/our-partnerships-with-vancouver-aquarium-and-the-nature-conservancy-of-canada>
- Our People: Ruby Banwait. (n.d.). Retrieved October 19, 2018, from Ocean Wise website: <https://ocean.org/stories/our-people-ruby/#ow40-octo-mom>
- Parreñas, J. S. (2018). *Decolonizing Extinction: The Work of Care in Orangutan Rehabilitation*. Duke University Press.

- Parreñas, R. “Juno” S. (2012). Producing affect: Transnational volunteerism in a Malaysian orangutan rehabilitation center. *American Ethnologist*, 39(4), 673–687.  
<https://doi.org/10.1111/j.1548-1425.2012.01387.x>
- Patchett, M. (2008). Tracking Tigers: Recovering the Embodied Practices of Taxidermy. *Historical Geography*, 36, 17–39.
- Patchett, M. (2017). Taxidermy workshops: Differently figuring the working of bodies and bodies at work in the past. *Transactions of the Institute of British Geographers*, 42(3), 390–404. <https://doi.org/10.1111/tran.12171>
- Penner, D. (2018, March 2). Vancouver park board to appeal court decision that overturned cetacean-ban bylaw. *Vancouver Sun*. Retrieved from <https://vancouversun.com/news/local-news/park-board-to-appeal-court-decision-that-overturned-cetacean-ban-bylaw>
- Penny, A. (2018a, February 15). Vancouver Aquarium Releases Rehabilitated Shark For The First Time. Retrieved from Ocean Wise website: <https://ocean.org/media-releases/vancouver-aquarium-releases-rehabilitated-shark-first-time/>
- Penny, A. (2018b, March 22). Vancouver Aquarium Transfers Giant Pacific Octopus to Ocean. Retrieved October 21, 2018, from Ocean Wise website: <https://ocean.org/media-releases/vancouver-aquarium-transfers-giant-pacific-octopus-ocean/>
- Perez, M. C., López, D. A., Aguila, K., & González, M. L. (2006). Feeding and growth in captivity of the octopus *Enteroctopus megalocyathus* Gould, 1852. *Aquaculture Research*, 37(6), 550–555.
- Petty Harbour Mini Aquarium. (n.d.). Retrieved from Petty Harbour Mini Aquarium website: [www.miniaqua.org](http://www.miniaqua.org)

Photography, Video and Filming Policy. (n.d.). Retrieved August 10, 2018, from Vancouver Aquarium website:

[https://www.vanaqua.org/application/files/5715/3755/8818/photo\\_policy.pdf](https://www.vanaqua.org/application/files/5715/3755/8818/photo_policy.pdf)

Plumwood, V. (2008). Tasteless: Towards a Food-Based Approach to Death. *Environmental Values*, 17(3), 323–330. <https://doi.org/10.3197/096327108X343103>

Press Association. (2018, November 9). Seth Rogen joyous after octopus is named Ceph Rogen in his honour. *Daily Mail*. Retrieved from <https://www.dailymail.co.uk/wires/pa/article-6373833/Seth-Rogen-joyous-octopus-named-Ceph-Rogen-honour.html>

Puig de la Bellacasa, M. (2012). ‘Nothing Comes Without Its World’: Thinking with Care. *The Sociological Review*, 60(2), 197–216. <https://doi.org/10.1111/j.1467-954X.2012.02070.x>

Rigby, P. R., & Sakurai, Y. (2004). Temperature and feeding related growth efficiency of immature octopuses *Enteroctopus dofleini*. *Aquaculture Science*, 52(1), 29–36.

Rogen, D. (2019, January 3). Retrieved from Twitter website:

<https://twitter.com/DrRogen/status/1080909573827878912>

Rose, D. B. (2013). Val Plumwood’s Philosophical Animism: Attentive interactions in the sentient world. *Environmental Humanities*, 3(1), 93–109. <https://doi.org/10.1215/22011919-3611248>

Rutherford, S. (2011). Governing Nature. In *Governing the Wild: Ecotours of Power* (pp. ix–xxvi). Minneapolis: University of Minnesota Press.

Ryan, J. R. (2000). “Hunting with the camera”: Photography, wildlife and colonialism in Africa. In C. Philo & C. Wilbert (Eds.), *Animal spaces, beastly places* (pp. 203–221). London: Routledge.

Scheel, D. (2002). Characteristics of Habitats Used by *Enteroctopus dofleini* in Prince William Sound and Cook Inlet, Alaska. *Marine Ecology*, 23(3), 185–206.

<https://doi.org/10.1046/j.1439-0485.2002.02776.x>

Scheel, D., & Anderson, R. (2012). Variability in the Diet Specialization of *Enteroctopus dofleini* (Cephalopoda: Octopodidae) in the Eastern Pacific Examined from Midden Contents. *American Malacological Bulletin*, 30(2), 267–279.

<https://doi.org/10.4003/006.030.0206>

Scientific Licences—Coastal Pacific Region. (n.d.). Retrieved August 15, 2018, from Fisheries and Oceans Canada website: <https://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/sci/index-eng.html>

Seattle Aquarium. (2015, February 20). February 15, 2015: Octopus release. Retrieved June 28, 2019, from YouTube website: <https://www.youtube.com/watch?v=f4yqtk-f9mA>

Shaw, K. (n.d.). Meet the Dissection Queen. Retrieved from Ocean Wise AquaBlog website: <https://www.aquablog.ca/2015/10/meet-the-dissection-queen/>

Shellfish harvesting information. (2019, January 1). Retrieved February 6, 2019, from Fisheries and Oceans Canada website: <https://www.pac.dfo-mpo.gc.ca/fm-gp/rec/shellfish-coquillages-eng.html>

Shukin, N. (2012). Tense Animals: On Other Species of Pastoral Power. *CR: The New Centennial Review*, 11(2), 143–167. <https://doi.org/10.1353/ncr.2012.0003>

Slater, D. J. (2016). Sulawesi macaques... Retrieved from DJS Photography website: [http://www.djsphotography.co.uk/original\\_story.html](http://www.djsphotography.co.uk/original_story.html)

- Sorenson, J. (2008). Monsters: The Case of Marineland. In J. Castricano (Ed.), *Animal Subjects: An Ethical Reader in a Posthuman World*. (pp. 195–221). Waterloo: Wilfrid Laurier University Press.
- Stubbs, A. L., & Stubbs, C. W. (2016). Spectral discrimination in color blind animals via chromatic aberration and pupil shape. *Proceedings of the National Academy of Sciences*, *113*(29), 8206–8211. <https://doi.org/10.1073/pnas.1524578113>
- Sykes, K. (2016, April 27). Opinion: Aqua-gag—How the Vancouver Aquarium abuses copyright law to silence criticism. *Vancouver Sun*. Retrieved from <https://vancouver.sun.com/opinion/aquagag-how-the-vancouver-aquarium-abuses-copyright-law-to-silence-criticism>
- Tasker, J. P. (2019, April 3). Ban on whale, dolphin captivity poised to become law in Canada. *CBC News*. Retrieved from <https://www.cbc.ca/news/politics/tasker-whale-dolphin-captivity-ban-1.5082664>
- Taylor, C. (2013). Foucault and Critical Animal Studies: Genealogies of Agricultural Power. *Philosophy Compass*, *8*(6), 539–551. <https://doi.org/10.1111/phc3.12046>
- Taylor, S. (2017, May 30). On Ableism and Animals. *The New Inquiry*. Retrieved from <https://thenewinquiry.com/on-ableism-and-animals-2/>
- Teck. (2018). Retrieved December 10, 2018, from Teck website: <https://www.teck.com/>
- Texas executes Yokamon Hearn with pentobarbital. (2012, July 19). *BBC*. Retrieved from <https://www.bbc.com/news/world-us-canada-18897310>
- The Ucluelet Aquarium: Canada’s first catch-and-release aquarium. (2017). Retrieved from Ucluelet Aquarium website: <https://uclueletaquarium.org/>

Todd, Z. (2016). From fish lives to fish law: Learning to see Indigenous legal orders in Canada. *Somatosphere*, 12.

Types of Animals. (2019). Retrieved December 2, 2018, from CCAC website:

<https://www.ccac.ca/en/standards/guidelines/types-of-animals.html>

van Dooren, T. (2014). Breeding Cranes: The Violent Care of Captive Life. In *Flight Ways: Life and Loss at the Edge of Extinction*. New York, NY: Columbia University Press.

Vancouver Aquarium. (2010a, February 19). Clove, our juvenile Giant Pacific Octopus is “crabbing”. See this for yourself... 50% off admission daily before 9am during Olympics!

Retrieved from Twitter website: <https://twitter.com/vanaqua/status/9347737410>

Vancouver Aquarium. (2010b, October 29). It’s octopus sex! Retrieved January 8, 2019, from

YouTube website: <https://www.youtube.com/watch?v=aSvq7GdFwvY>

Vancouver Aquarium. (2011, September 2). Baby Octopuses at the Vancouver Aquarium.

Retrieved January 8, 2019, from YouTube website:

<https://www.youtube.com/watch?v=5MHJbxWO6OM>

Vancouver Aquarium. (2012). *2012 Annual Report: Effecting Conservation*. Vancouver Aquarium.

Vancouver Aquarium. (2013). *Vancouver Aquarium 2013 Annual Report*. Vancouver Aquarium.

Vancouver Aquarium. (2014a). *Vancouver Aquarium 2014 Annual Report*. Vancouver Aquarium.

Vancouver Aquarium. (2014b, February 20). An Open Letter on Cetaceans in Our Care.

Retrieved January 10, 2019, from Ocean Wise AquaBlog website:

<https://www.aquablog.ca/2014/02/an-open-letter-on-cetaceans-in-our-care/>

Vancouver Aquarium. (2015). *Vancouver Aquarium 2015 Annual Report*. Vancouver Aquarium.

Vancouver Aquarium. (2016). *Vancouver Aquarium 2016 Annual Report*. Vancouver Aquarium.

Vancouver Aquarium. (2017a, January 29). Striker vs. Crab! Snack time for the giant Pacific

Octopus in our Treasures of B.C. Coast exhibit. Come visit today:

[Http://ow.ly/Ilpf308qUeh](http://ow.ly/Ilpf308qUeh). Retrieved from Twitter website:

<https://twitter.com/vanaqua/status/825832146115973124>

Vancouver Aquarium. (2017b, April 21). Below the Surface. Retrieved from

<https://www.youtube.com/watch?v=bsLdQryW9w4>

Vancouver Aquarium. (2017c, October 8). Retrieved from Twitter website:

<https://twitter.com/vanaqua/status/917170366283501568>

Vancouver Aquarium. (2017d, December 15). Retrieved from Twitter website:

<https://twitter.com/vanaqua/status/941710794689048578>

Vancouver Aquarium. (2018a, March 22). Retrieved from Twitter website:

<https://twitter.com/vanaqua/status/976923217813299201>

Vancouver Aquarium. (2018b, March 23). Female Giant Pacific Octopus Transferred to Ocean.

Retrieved from <https://www.youtube.com/watch?v=MaSIEF7muos>

Vancouver Aquarium. (2018c, March 23). Octopus Selfie. Retrieved from

[https://www.youtube.com/watch?v=7Q\\_WgK8Qw84](https://www.youtube.com/watch?v=7Q_WgK8Qw84)

Vancouver Aquarium. (2018d, March 25). Retrieved from Twitter website:

<https://twitter.com/vanaqua/status/978030039538298881>

Vancouver Aquarium. (2018, November 17). *Your Saturday's Up!*

Vancouver Aquarium beluga dies while on loan to SeaWorld. (2015, February 20). *CTV News*

*Vancouver*. Retrieved from <https://bc.ctvnews.ca/vancouver-aquarium-beluga-dies-while-on-loan-to-seaworld-1.2246612>

Watts, M. J. (2000). Afterword: Enclosure. In C. Philo & C. Wilbert (Eds.), *Animal spaces, beastly places* (pp. 292–304). London: Routledge.

YouTube celebrity otter dies in Vancouver. (2008, September 23). *CBC News*. Retrieved from <https://www.cbc.ca/news/canada/british-columbia/youtube-celebrity-otter-dies-in-vancouver-1.761999>