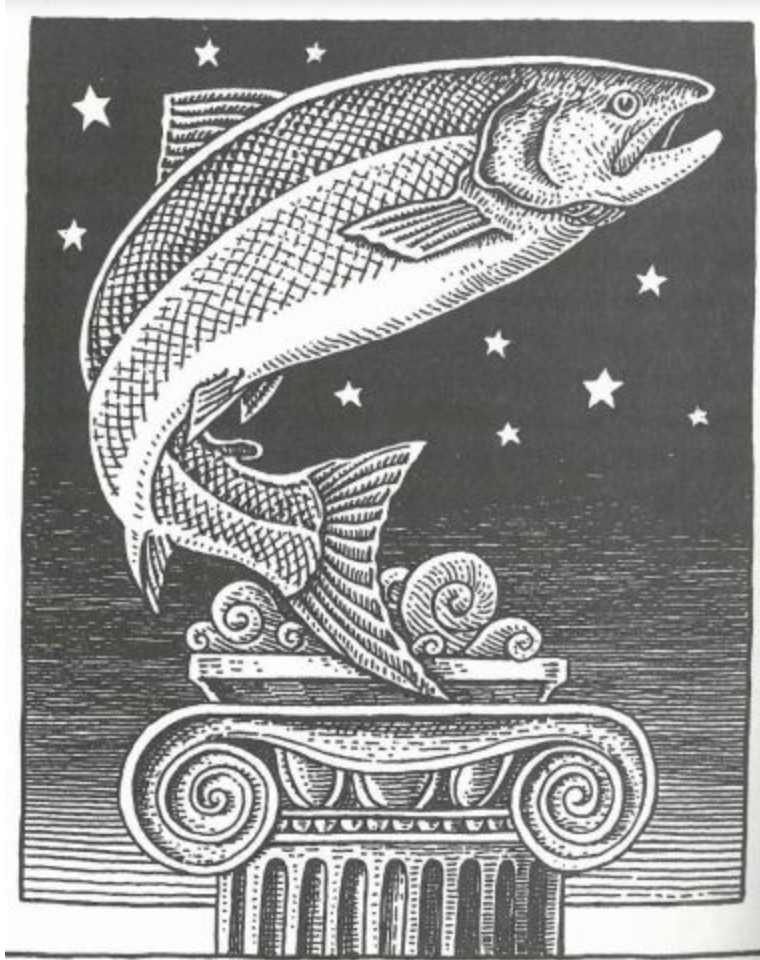


Fish Fights
Values of Nature in Columbia River Salmon Conservation



A thesis presented by
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Abstract

My thesis explores the implications of merging science and values for endangered species conservation in this convoluted era when the relationship between humans and nature is more muddled than ever. The following question frames this research: *how does conservation need to change to better protect endangered species in the Anthropocene?* I incorporate theories of the social construction of science and nature, environmental ethics, the significance of politicized landscapes, and wicked problems/clumsy solutions to address this question. Focusing on the Columbia River and the tension among conservationists surrounding wild salmon vs. hatchery salmon helps to better consider larger dichotomies in conservation that have hindered the movement by oversimplifying nature. I consider how natural spaces are inherently social spaces where tensions over conservation are simultaneously tensions between groups of people competing for various forms of power. Organizations that value nature as a wild space oppose the implementation of hatcheries since it is discontinuous with their perception of a pure natural landscape; organizations who understand nature to be a hybrid human/natural space are more accepting, or actively support, hatchery implementation. An analysis of the values of four salmon conservation organizations reveals that the lines between science/values and nature/humans must be blurred for a more comprehensive and realistic understanding of nature and consequently more effective plans to conserve it. Ultimately I explain the futility of using science alone in conservation decisions and the importance of acknowledging and embracing distinct values of nature to move beyond wicked problems, all for more successful and less contentious endangered species conservation.

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Introduction

“‘Values’ are too often treated in scientific discourse as if they were written not in the book of nature but in an appendix to it, added on afterword rather than intrinsic to the stories through which we constitute nature for ourselves and others.”

-- Katherine Hayles, *Searching for Common Ground*

“What is the Northwest?”

“Anywhere the salmon can get to.”

-- Timothy Egan, *A Year Without Rain*

If you took a walk through Portland, Oregon, what would you see? The Willamette River, probably. Coffee shops, trees, and bikers are all likely sightings. Since beginning this research, what I have noticed continuously in Portland are images of salmon, on license plates, benches, public art, and it is hard to travel far on the West or East side of the river without running into Salmon Street. The city has embraced the image of salmon since the fish is integral to the history and future of Portland. Adult salmon still swim up the Willamette to spawn, and then juvenile salmon swim back out to mature fully in the Pacific Ocean. Faithfully, they pass through Portland each year as an integral step of their life cycle, but not with the same historic magnitude. Generations of Portlanders have witnessed the decline of salmon, trying to slow the trend, to little avail. Salmon populations are struggling. In 2017, a fisheries biologist described the year’s Columbia River salmon and steelhead run as “not looking very good” (Harrison 2017).

My academic interests throughout college have focused on complexities within conserving endangered species and I gravitated towards salmon because it epitomizes many of these difficulties. My specific interest in salmon will be framed within a larger inquiry of the U.S. conservation movement, exploring the values of those who bear the label “conservationist” and the implications of those values. To begin, consider the following: “What do environmentalists want, anyways? Is environmentalism a ‘movement’ or a collection of interest groups hiding under a single umbrella-like label?” (Norton 1991, ix). Interrogating the values that have fueled environmentalism is necessary to completely understand its history and significance today. Discussing discontinuities in environmental values also requires acknowledgement of the roles of perceptions of nature in conservation. The environmental

studies academic community has largely debunked the myth that the definition of nature starts and stops at wilderness, forests, and national parks. A reevaluation of the human-nature relationship is in the works, one that could bring us into a more biodiverse future. This thesis demonstrates the enduring tensions between those who value *wild* or *pure* nature and those who have waved goodbye to this mindset and embraced human/nature *hybridity*. This framework helps to better understand what is happening in Portland, OR and the Pacific Northwest. Why has salmon populations steadily declined while there are numerous efforts from all directions to prevent just that? The ways in which salmon are valued differ and considering the divide I explained above is crucial. Salmon can be a species that embodies untamed nature or, for others, a resource that is a foundational component for economies and cultures.

This thesis, at its core, is an axiological analysis. Axiology is the study of value, and the values that will be studied here are those of salmon conservationists. An organization's valuation of nature has important repercussions for the management of endangered species. Despite the broad terms *environmentalism* or *conservation* that deceptively cast themselves as unified movements with a single goal, various perspectives coexist under those two umbrellas. Will conservation "collapse in to an ineffective cacophonous babble or find unity that can draw on the strength of [its] diversity?" (Lovejoy 1991, xv). I explore the dissimilar values of conservation organizations who are working to protect endangered species in this convoluted era labeled the Anthropocene.

The following question guides this research: *how does conservation need to change to better protect endangered species in the Anthropocene?* I incorporate theories of the social construction of science and nature, environmental ethics, and the significance of politicized landscapes to address this question. My more focused question is as follows: *in what ways do values influence competing management plans for salmon in the Columbia River basin?* I situate this research in the Columbia River and the movement to conserve salmon because it undoubtedly represents the similar tensions that plague the conservation movement at large. Disputes arise from unrealistic dichotomies superimposed onto nature, such as natural vs. human, greatly oversimplifying the world of the Anthropocene, an era characterized by its complexity. I debunk any myth that conservation is a homogenous field; conservation instead

serves as a broad term that encompasses divergent voices advocating for different directions to take the movement.

Clashes over conservation are increasingly becoming a norm in the Anthropocene, amplifying the underlying differences between stakeholders. My research reveals that competing perspectives on salmon conservation directly reflect the way different people value nature and what nature means to them. Organizations that value nature as a wild space oppose the implementation of hatcheries since it is discontinuous with their perception of a pure natural landscape; organizations who understand nature to be a hybrid human/natural space are more accepting, or actively support, hatchery implementation. Values are inseparable from any decision making process, even those purportedly founded on science or fact. Ignoring the importance of values implies nature can be a depoliticized space. Socially constructed scientific studies are a means to further the preferred management plans of various conservation organizations, in order to reflect their own values of nature. *To help conservation transcend many of the disagreements that prevent the movement from making meaningful progress, we need more than solely a science-based approach to conservation, and instead embrace the values we all hold by being more transparent and open about them.* Ultimately this thesis unsettles who is considered a conservationist, what is considered conservation, and especially, what the relationship between humans and the natural world will look like in the future.

I begin by giving an overview of the current state of the conservation movement and the significance social constructivism and environmental ethics have for conservation. Subsequently I describe the Columbia River, Pacific salmon, and the four conservation groups I will analyze in a way that sets a foundation to better understand the relevance of my methodologies. This is followed with a historical analysis, discourse analysis, and a consolidation of four interviews with a description and discussion of the main themes revealed through my methodologies. This thesis wraps up by describing the larger implications my research has for the Pacific Northwest, salmon, and the conservation movement as a whole.

Background

Conservation in a Changing World

Some scholars argue that we are living in a new geological era--the Anthropocene--to emphasize the ways in which humans have come to dominate many of Earth's cycles and processes (Lalasz, Kareiva, and Marvier 2012). The definition or the existence of the Anthropocene is not widely agreed upon. Regardless of whether we have outgrown the Holocene, the world we live in is unprecedented when it comes to its complexity. Even just the idea of the Anthropocene "is an almost self-evident proof of this new complexity of interactions and interrelationships between the natural and the social systems" (Ehlers 2006). The Anthropocene will continue to have serious ethical implications for human-nature relationships, especially considering that humans have already impacted all ecosystems by changing the world's climate (McKibben 1989). Importantly, conservation in the Anthropocene may need to be modified if it wishes to be successful in this new, complicated world. Questions will increasingly arise regarding how to best protect biodiversity that will push our previous ethical limitations out the window since the "ability of global climate change to redefine conservation targets, and with them the underlying values motivating nature conservation and environmental management, is nothing short of profound" (Minteer 2011, 162). We are entering a "no-analog" future, meaning that there is no historical precedent that can advise us on how to best act. This has set into motion a rift in the conservation community between those who do not wish to see the field change and those who argue that it must change in order to make any meaningful impact.

The conservation movement has largely been unsuccessful and the predictions for the future are not bright, with some estimates forecasting the extinction of half of the Earth's species by the end of the century (Kolbert 2014). This is the sixth mass extinction in Earth's history, and this time, the driving force towards extinction is humans. Many argue, unfortunately, that the "traditional tool-kit of 20th century environmental protection is utterly inadequate in considering the biological and social complexities shaping today's and tomorrow's environmental

challenges” (Revkin 2015, 10). Current-day scholars and environmentalists are trying to grapple with what the future of conservation should look like in the Anthropocene. These ethical perspectives can largely be clumped into two “communities of assumptions,” coined by political-scientist Amitai Etzioni, they are communities composed of people with “shared worldviews, judgments about challenges faced, and ways to deal with them” (Etzioni 2006, 6). These communities allow people to build frameworks to understand and propose policies for complex problems, like climate change (Nisbet 2014).

In regards to conservation, the two main communities of assumptions are the following: traditional and new conservation. Traditional conservation values notions of wild and natural, embracing unquestioned and historic approaches to conservation, like setting aside land and protecting it as wilderness. New conservation emphasizes the intersection of innovative technology and natural environments for a more human-friendly future. For them, the future looks like forests and diverse species mixed in with modern human landscapes, however, “conservationists will have to jettison their idealized notions of nature, parks, and wilderness...and forge a more optimistic, human-friendly vision” (Kareiva 2013). These two communities of assumptions have founded their varying viewpoints of conservation on underlying values that dictate the way they think humans should interact with the natural world and the extent to which humans can ethically manage it. Today, both these worldviews are prominent in the Pacific Northwest. Conflict arises when both attempt to conserve species in the same landscape. Successfully resolving value conflicts between these two communities of assumptions could be a serious challenge (Minteer 2011), but a challenge that will have to be overcome for a biodiverse future.

The history of conservation demonstrates how its purpose has evolved from a concern over the wise use of resources towards more biocentric concerns for ecosystems and species (Nash 1990). The ethics behind today’s conservation efforts are a point of contention within the conservation movement; should species be conserved for anthropocentric or biocentric purposes? Instrumental or intrinsic? Some argue that any conservation in the current day needs to be more accepting of human influence in ecosystems. Emma Marris exemplifies this point in *Rambunctious Garden: Saving Nature in a Post-Wild World* where she advocates for human

management of the natural world (2013). Others see this as contradictory to conservation's intention. Look to E.O. Wilson's *Half-Earth: Our Planet's Fight for Life* for an example, where he explains the value of committing at least half of the planet's surface to strictly nature (2016). These opposing sides in the arising conservation conflict are growing more divisive just as the need for effective conservation is most essential.

I am cautious to not make the conservation community seem so evenly split between traditional and new conservationists. In reality, there is a whole spectrum of values within the conservation community (Sandbrook 2011). There is an advantage, however, in working with similar-minded people, which is the justification for communities of assumptions. By collaborating with people who may not be exactly in line with your opinions, but close enough, you can better address the issues that face the modern world, the Anthropocene, with a support group. In summation, "the diagnosis of the Anthropocene has coincided with and energized a period of soul searching, dispute, and realignment within the conservation movement" (Lorimer 2015, 8).

The Social Construction of Science and Nature

Considering the role of social constructions of science and nature is a meaningful way to understand the complexity within conservation and collaborative management. These lenses will help us fully examine values and the impact they have on endangered species conservation. To begin, Everett Mendelsohn, a historian of science, in his paper "The Social Construction of Scientific Knowledge" argues the following:

- (1) Science is a social activity since it is composed of people (scientists) acting and interacting.
- (2) The knowledge and facts that are a product of science are actually a product of scientists, which are subsequently shared, discussed, developed, and nurtured by more scientists.
- (3) Scientists are a member of more than just the scientific community, but of a larger culture as well that is inescapable.
- (4) Therefore, science is a social activity, more a product of the history and processes of the time than any objective truth or reality (1977).

This paper will focus on the role of socially-constructed science in species management and conservation conflicts. Divergent scientific studies, produced and perpetuated in distinct social settings, have become a tool to justify dissimilar or even contradictory management plans. When science is introduced to a debate, it is supposed to supersede all rhetorical or ethical arguments; science is supposed to be indisputable. When a controversy arises between different parties, scientific literature is brought in and used as proof of being “right.” This tactic, often called the argument from authority, or more colloquially “bringing in friends,” is a reliance on allies that are both more respected and numerous than the individual making the claim (Latour 1987). When a disagreement reaches a point where facts and science are introduced to defend competing rhetoric, it does not imply that the parties will reach an agreement. Rather, arguments can intensify as the disagreement is perpetuated with more and more information (Latour 1987). This is a form of belief persistence, a concept from social psychology, an unwillingness to change foundational beliefs even while being presented with contradictory information.

Values were once thought to be antithetical to science. With time, this myth is being thoroughly debunked. Increasingly, the following question has arisen: “Is conservation biology value-laden? Absolutely. It is value-laden in the same sense that other sciences are - after all, it is a science” (Odenbaugh 2003, 59). By rejecting the notion of an impartial science and embracing the “interpretive flexibility” of science, meaning that scientific findings can be interpreted in numerous ways (Pinch and Bijker 1984), we can fully-understand the role that science plays in furthering conflicting perspectives. We reviewed how the scientist lacks the ability to practice science without being influenced by the larger community they are a part of and the same can be said about the conservationist. In many ways, the conservationist is not rational and “reason is a rare achievement” (Lorimer 2015, 181).

From science we move to nature, considering the ways in which the values, frameworks, and backgrounds of an individual or group can have profound influence on their conceptions of nature. The argument that nature is socially constructed has created a strong following of academics who have written extensively on the matter, in a sort of defense of this more unconventional, but useful, understanding of nature. Richard White explains that “nature is a mirror onto which we project our own views and values” (1996, 429); William Cronon argues

that “far from being the one place on earth that stands apart from humanity, it is quite profoundly a human creation” (1995, 69); Steven Vogel writes that “the natural world is always affected in profound and interminable ways by the social organization and habits and mores and worldviews that structure our perception of everything that surrounds us” (2015, 34). This has given rise to a divisive debate between those who value the “human” and those who value the “non-human” (Cronon 1995). There is often a missing aspect to this conversation, especially from those who advocate for the “non-human,” the wild, or the natural. These conversations ignore how culture and history influences perceptions of nature. By acknowledging this, by affirming the ways in which personal backgrounds shape values of nature, we can move forward to considering the ways in which these values have important implications for policy. Facts are just facts if we do not bring our own values to them; they cannot help us decipher between right and wrong or towards any policy (Proctor 1995). These same cultural and historical influences on individuals and groups of people have significant influence on endangered species management. Specifically, the social construction of nature has relevance to the dichotomy between the traditional conservationists (wild nature enthusiasts) and new conservation (hybrid nature enthusiasts) described earlier. Varying constructions of nature have created varying values of nature that result in varying beliefs of how to best manage nature, or specifically endangered species, in the Anthropocene.

The conception of the natural world as a wild space and the valuation of this form of nature specifically is flawed in many moral and practical ways. Understanding nature in this way may not outlast the Anthropocene, considering that “biological diversity (indeed, even wilderness itself) is likely to survive in the future only by the most vigilant and self-conscious management of the ecosystem that sustain it, the ideology of wilderness is potentially in direct conflict with the very thing it encourages us to protect” (Cronon 1995, 82). By uniting the constructions of both science and nature, we can see how conceptions of science have continued to perpetuate these conflicting perceptions of nature. The social construction of science and nature are not independent phenomena; rather, each has considerable implications for the other.

Environmental Ethics for a Clumsy Solution

Environmental ethics can help weave together many of the concepts above since “the link between values and conduct is the realm of ethics” (Proctor 1995, 280). For the most part, in a discussion of environmental ethics, the conversation never strays far from the polarized concepts of the instrumental vs. intrinsic or anthropocentric vs. biocentric. Very briefly, a species that is instrumental provides goods, services, information, or psycho-spiritual satisfaction to humans while a species that is intrinsically valued has value in and of itself (Callicott 1997). Subsequently, an anthropocentric ethic would value nature for instrumental reasons and a biocentric ethic would value nature for intrinsic and instrumental reasons. Again, we see an antithetical concept that may have caused more harm than good to the conservation movement, as philosopher J. Baird Callicott articulates, since “the intrinsic value issue divides conservationists into two mutually suspicious factions” (1997). In this analysis of environmental ethics, I wish to move beyond this dichotomy that has defined the field for so long. By moving away from a polarized ethics, one where the “human and the nonhuman, the unnatural and the natural, the fallen and the unfallen serve as our conceptual map for understanding and valuing the world” (Cronon 1995, 89), we can settle into an environmental ethics that embraces the complexity of the Anthropocene. This can help lead us out of the ethical conundrums that have come to define this period in conservation.

The ethics in the United States that have long dictated the ways that humans can and should interact with the natural world have been determined by a construction of nature that casts humans as separate and apart. It is this understanding of nature that has become the guide to what is virtuous, and what is not, in the realm of conservation. Subsequently, what has largely made environmentalism so compelling comes from its distance from humans, a source of nonhuman values with which we can evaluate our own actions (Cronon 1995). It is important to note that this human-less perspective of nature is a new phenomenon. Some argue that the 20th century U.S. wilderness movement has greatly contributed to the divorce of humans and nature (Woods 2017). However, another view on nature has gained substantial following where humans and nature are compatible, or even, intertwined. A reworking of traditional environmental ethics

would move to be a reflection of a newer, more forward thinking conception of nature, as well as transcending the polarization that has defined the field. This is crucial to acknowledge the problems that plague the Anthropocene and then work towards effective solutions.

Despite the challenge, this task of rethinking our environmental ethics is morally respectable since it will “surely result in a more inclusive environmentalism, one uniting it with other social movements in a common moral cause: to help create a more livable world for all of us, humans and nonhumans alike” (Proctor 1995, 297). A more pluralistic environmental ethics could help move us closer to clumsy solutions since we could better understanding the convoluted world of the Anthropocene. Since clumsy solutions embody moments when “those implementing them converge on or accept a common course of action for different reasons or on the basis of unshared epistemological or ethical principle” (Rayner 2012, 112), then finally recognizing the diversity within environmental ethics is necessary. By tackling this, by agreeing to see how stakeholders involved in clumsy solutions are in that situation because of a discontinuity in ethics of everyone involved, this fundamental issue can be addressed. The Anthropocene poses problems that seem insurmountable, but we must find ways to get past them. This would be a step towards controlling the Anthropocene, rather than it controlling us. The solutions we reach do not have to be quintessential. In fact, they never will be with the tense value conflicts that make agreeing on a solution tough for all stakeholders involved. To reach agreements where “each group gets just enough concessions for it to be able to claim 'progress' towards its goals” (Lach 2006, 235) is what is called a clumsy solution. In the Anthropocene, it is clumsiness that we are striving for since elegance would address one understanding of the problem only and disregard the concerns of other stakeholders; “clumsy solutions are inherently pluralistic” (Rayner 2012, 112). Once stakeholders realize that there cannot be a situation where conservation policy is in line with everyone’s values of nature, then it will be easier to accept solutions that try their best to please all stakeholders equally, rather than an elegant solution “optimizing around just one of the definitions of the problem and, in the process, silencing the other voices” (Verweij and Thompson 2006, 20).

Environmental ethics can help us get to clumsy solutions, but not the old iteration of environmental ethics that separates values from nature and science. An environmental ethics that

brings us to a biodiverse future would sufficiently appreciate the importance of values. Currently there does not seem to be room for the numerous ways that communities value nature, however, “clumsiness rests on the idea that a limited number of collective ways of organizing and thinking exists, each with its particular strengths and weaknesses, none of which should ever be allowed to gain the upper hand” (Verweij and Thompson 2006, 22). Getting conservationists to agree to relinquish gains so that everyone involved benefits will be the challenge. One of the preconditions for clumsy solutions that sociologist Denise Lach articulates is that there is *more to lose by inaction* (2006). Often, to “adopt strategies of the other is viewed as a clear defeat. However, if entering into an accommodation is seen as essential to long-term survival, collaboration can be viewed as a means to protect interests. Further, even very small gains (or no further losses) can be rationalized as the first step in the right direction” (Lach 2006, 235). To craft a world where stakeholders are willing to cede some personal or organizational gains in order for all stakeholders to benefit equally from conservation policy would be the ultimate achievement of environmental ethics in the Anthropocene. If conservation stakeholders are willing to settle on clumsy solutions and forgo the elegance they might aspire for, conflict can make way for collaboration.

Situated Context

The Columbia River

The Columbia River basin encompasses 260,000 square miles, from its headwaters in British Columbia to the mouth in Astoria, Oregon (“The Columbia River”). Within the basin, there are seven U.S. states, 13 federally recognized reservations, and a Canadian province. From its headwaters to the mouth, the river has a steep decline and drops an average two feet per mile, in some places flanked on each side with rock



Figure 1: The Columbia River Basin

canyons (Harrison 2008). The Columbia's unique geography makes an ideal location for an expansive hydroelectric system. The 19 dams along the Columbia and its tributaries provides energy for about half of the region ("The Columbia River"). At the same time, the large amounts of cold water that rush down the river during Spring and early Summer makes the river ideally suited for anadromous fish, like salmon and steelhead. The Columbia used to be one of the most productive salmon rivers in the world (Lichatowich 2011). Through dam construction, habitat modification, and regional development, the river has evolved substantially and is no longer as suitable an ecosystem for countless fish and wildlife. The Columbia River has fundamentally changed, what was a free-flowing river is now an "organic machine," as environmental historian Richard White declared. Today there is "[s]now melting, dams storing and releasing water, turbines turning, generators producing electricity, lights going on, motors humming all blended together; the Columbia seemed a single well-managed machine" (White 2011, 79).

Pacific Salmon

Fossil records date the presence of salmon in the Columbia River and Snake River to 7-10 million years ago, when both rivers ran to sea (Harrison 2008). Salmon are anadromous fish, meaning that they are born in freshwater, travel to the ocean to grow to adults, then return to freshwater to spawn and die (Woody 2003). Salmon habitat is expansive, which means that they have many ecosystems they rely on, both ocean and rivers, that all must be suitable for salmon to thrive. In pre-industrial times, approximately 15 million salmon returned to the Columbia River each year (Lang 2017); today it's a fraction of that, around 1 million (Harrison 2017). This demonstrates how the changes to the Columbia have tangible impacts on salmon populations. For the numerous Native American communities that were once dependent on salmon economically, culturally, and spiritually, it is unacceptable. The journals from Lewis and Clark's expedition illustrate the native people's reverence for and reliance on salmon; they describe Celilo Falls, a location where fish were caught in huge quantities and which subsequently became an irreplaceable trading and gathering community (Cone 2007). Native people in the region were almost completely dependent on salmon and when Lewis and Clark arrived, they estimated that there was 10,000 pounds of dried salmon being stored. Meriwether Lewis writes,

“[a]n Indian gave me a piece of fresh salmon roasted, which I ate with a very good relish. This was the first salmon I had seen, and it perfectly convinced me we were in the waters of the Pacific Ocean” (Harrison 2008).

While salmon have a long history in the Pacific Northwest, so does salmon conservation. More white settlers arrived not long after Lewis and Clark, bringing with them destructive fishing practices that had collapsed the Atlantic salmon fishery (Smith 1979). With the almost immediate explosion of the salmon canning industry, salmon hatcheries were embraced to continue harvesting high above the sustainable yield. Salmon hatcheries are facilities that artificially breed and raise salmon to be released back into rivers in an effort to increase the catch for fisherman and will be described in more depth in the following paragraph. An 1876 article reads: “It is really wonderful that with all the catch of late years, the supply has not shown perceptible decrease; but the history of Eastern rivers assures us that the end will come unless artificial means are adopted to assist propagation” (Smith 1979, 74) illustrating the mindset of the time that hatcheries were the easy solution to overharvest. From the region’s first hatchery in 1877 to today, hatcheries have become an essential practice for the continuation of the fishing economy, the Columbia River ecosystem, and the salmon conservation movement. Today, 80-90% of fish returning to the Columbia River have been bred in hatcheries (“Salmon Hatcheries Overview”; “Salmon of the West”). These hatcheries are controversial within the conservation community: some see it as an essential tool to reviving populations while others see it as a threat to wild salmon.

Exactly how do salmon hatcheries function? There is no simple answer to this question since both the operations and role of hatcheries have evolved substantially. Traditionally, salmon were reared in facilities that were starkly different than how life would be if they lived in streams (Woody 2003). They lived in concrete raceways, were fed food without any competition, and when sufficiently matured, were released into streams to grow into adults and then caught by fisherman. As this demonstrates, hatcheries served the purpose of maintaining populations of salmon to perpetuate the commercial fishing industry that otherwise would have disappeared with the construction of the Columbia hydroelectric system and other human alterations to the river (Harrison 2012). This, unfortunately, perpetuated a system where hatchery fish were not

well equipped to survive the trials of life in the “real world.” Hatchery fish are less competitive than wild fish, posing a problem for wild salmon who may breed with their hatchery counterparts and weaken their genes (Araki 2008). As ecological and anatomical understandings of salmon increase, salmon hatcheries are evolving to better prepare hatchery salmon to succeed in streams (Taylor 1999). Today, the intention of hatcheries is still mainly to create salmon that will satisfy fishing interests, especially from the commercial salmon industry (Chambers 2018). There is, however, a new trend in supplementation hatcheries, where the fish that are released are not intended for immediate catch, but rather, ideally would return to spawn again and perpetuate populations of wild salmon. Employed by many Pacific Northwest tribes, “supplementation can help to revitalize depleted salmon populations and help create sustainable populations for future generations” (Bodine 2012).

Conservationists

The citizens of the Pacific Northwest are not a homogenous group. The U.S. Fish and Wildlife Service (USFWS) puts it eloquently, “the people of the Pacific Northwest are as diverse and resilient as the salmon that grace our water” (“Voices of the West”). Salmon are valued for a multitude of reasons; look below to see a project by the USFWS where the question “what do salmon mean to you?” was posed to six people. The answers are as follows:

“We need the same things to survive: food, water, shelter, space”

“Food and fishing. I don’t see as many as I used to though. We need to protect them.”

“Everything -- the past, present, and future of my People.”

“Salmon and I get along fine. We both need water and wind.”

“Salmon means jobs!”

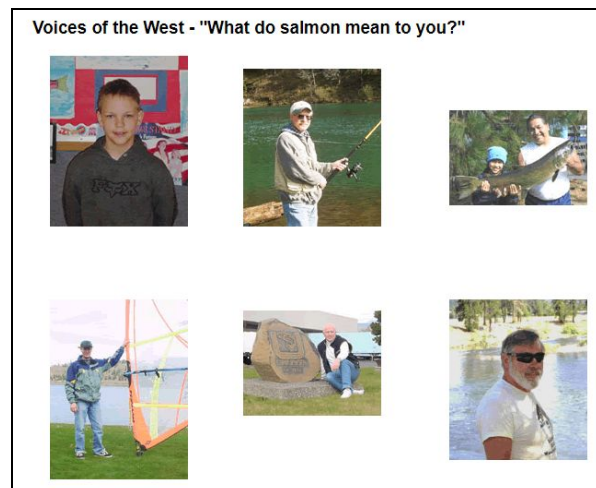


Figure 2: Screenshot from USFWS website showing the different people who answered their question.

“I’m a rancher. I don’t think about them that much. We both need water to survive.”

This demonstrates the ways in which people find salmon meaningful for a whole spectrum of reasons, resulting in different motivations to conserve them. For some, salmon occupy a peripheral space in their lives, for others, it is their livelihood. These variable ways of valuing salmon creates a scenario where the way salmon should be managed is up for debate because the role that salmon play in a someone’s life is inconsistent. How can nature be effectively protected if everyone’s conception of nature differs?

Salmon are the “interjurisdictional fish;” they swim across political and geographical boundaries (“Salmon of the West”). Countless government agencies now have oversight of salmon, including non-profits, tribes, and all levels of government. This makes salmon conservation extraordinarily complicated since various organizations advocate and implement different management plans. What is considered “in the best interest of salmon” varies from group-to-group. In an attempt to “speak for salmon,” to have some higher understanding of what these fish “need,” people have “all too often done a far better job articulating their own needs and perspectives than those of the fish” (Taylor 1999, X). Below is background on four organizations that represent the interests of the four major salmon conservationists in the region: federal agencies, native tribes, non-profits, and recreational fisherman.

Federal agencies are some of the best funded conservationists. They can be divided into two categories: agencies that are dedicated to conservation goals in particular, such as the Environmental Protection Agency (EPA) or Fish and Wildlife Service (FWS), and others who have been mandated to get involved in natural resource conservation. The government implements a variety of public works projects that are not always in the best interest of conserving biological resources (McNeely 1988). So “when national interests dictates that they be accommodated within a protected area, [the federal government] should be expected to contribute financial support in the form of compensation to the affected area” (McNeely 1988, 88). This is called natural resource damage assessment, encouraging federal agencies to take responsibility for environmental degradation or damage to wildlife that they have caused. The **Bonneville Power Administration (BPA)** represents government agencies in this analysis of conservation actors. The role of the BPA in salmon conservation may seem initially surprising

since its central purpose is to market and distribute power from the federal hydroelectric system. The BPA is now integrally involved in the health of salmon populations through what is the country's largest ecosystem improvement program as a result of the responsibility to offset damage to salmon inflicted by dams (Kaplowe 2018). They financially support 40% of the basin's hatcheries, under three federal mandates, and by doing so, fulfill the agency's responsibility to make right historic wrongs.

Tribal people have a critical role in natural resource and species conservation, but it goes beyond the "ecological Indian" stereotype. Native Americans have been considered the original environmentalists, since they managed to live sustainably on this continent for time immemorial (Krech 2000). It turns out that this perception is a product of modern scholarship rather than a historical reality. Today, Native people are some of the most disadvantaged in the nation due to a unfair history between the tribes and the federal government that has benefited the government and impoverished native people. Practicing many of their cultural traditions, including fishing and hunting, can actually be incompatible with the classical environmentalist agenda that decries human labor in nature, but these practices support native communities economically after a long history that has left them with very little. The **Columbia River Inter-Tribal Fish Commission (CRITFC)** represents native tribes in this analysis. It is important to mention here, though, that there is some disagreement about the extent to which CRITFC accurately serves the interests of the region's native people (Liddicoat 2017). Four tribes fall under the umbrella of CRITFC: Yakama, Warm Springs, Umatilla, and Nez Perce Tribes. The mission of the organization is "to ensure a unified voice in the overall management of the fishery resources, and as managers, to protect reserved treaty rights through the exercise of the inherent sovereign powers of the tribes" ("CRITFC Mission and Vision"). The region's tribes have a right to 50% of the salmon that swim by their usual and accustomed (U & A) fishing spots, as a result of the Treaty of 1855 (Taylor 1999). If there are no salmon in the Columbia, the government has failed to fulfill its commitment to tribes. Without the tribes, the federal government would have significantly less motivation to conserve salmon (Ellis 2017). Today, CRITFC is one of the most aggressive salmon conservationists, working to protect not only the fish but related customs and traditions

as well. In practice, this means they fund hatcheries in rivers with depleted stocks in order to continue to fish at their U & A fishing locations.

Non-profits have been playing an increasingly important role in biodiversity conservation, as more and more conservation non-profits are founded. This growth may have important implications for environmental decision making since non-profit organizations have the ability to take action more quickly, with more flexibility and innovation, and to accomplish goals that are out of reach for the government and market (Breckenridge 1998). Questions arose about how the characteristics of an organization (e.g. governmental vs. non-governmental) may relate to the effectiveness of conservation efforts (Sutherland 2009). Here, we take a look at the **Wild Fish Conservancy (WFC)**, a non-profit organization dedicated to the conservation of wild fish and their ecosystems. It is proudly “science-based,” relying on science to guide conservation decisions. An especially zealous non-profit, it has sued numerous federal agencies, including the National Marine Fisheries Service and the National Oceanic and Atmospheric Administration for failing to consider the repercussions of hatchery salmon on wild salmon under the ESA (Profita 2017). Also a harsh critic of native tribes for funding hatcheries that bring fish to their U & A fishing locations.

Recreational fisherman are the last key group in this analysis of conservation actors. Their interests in maintaining strong runs of salmon are clear: recreational fisherman find relaxation and joy in fishing. And with more fish comes more fishing. Sport fisherman who advocate for salmon conservation can be equated to hunters who support land and species preservation in order for their personal hobby, shooting wildlife, to continue. There seems to be conflicting perspectives within the fishing community about hatcheries as a conservation tool despite the fact that there would be no salmon economy without hatchery salmon. No populations of wild Columbia River salmon are large enough to allow for harvest (Ellis 2017). **Trout Unlimited (TU)** is a non-profit organization founded in Michigan in 1959 by a concerned group of anglers that came together “to ensure the health of trout, their habitat, and the sport of angling” (“History of TU”). Now with chapters all over



Figure 3: Logos from the four organizations described here.

the country, their work includes restoring habitat, protecting habitat still intact, and reconnecting habitats that have been fragmented, all of this using the best available fisheries science. Importantly, though, TU is also a social organization, creating a space for anglers to meet, network, and share fishing tips. As an organization, TU is against the addition of hatchery fish into streams that already have populations of wild fish. Individual chapters, though, may take a different stance; the California, Oregon, and Washington chapters all support--with a great deal of caution--hatchery salmon (Turner 2018).

These four groups represent some of the biggest advocates for salmon in the region and all occupy significantly different roles in its conservation. Specifically, the debated role of hatcheries in conservation--or more broadly the role of science, technology, and nature--reveals an underlying discontinuity in values. This is a persistent problem in the region, “what is critically lacking in the Pacific Northwest is moral leadership on these contested matters of human relations with nature” (Proctor 1995, 296). The role that humans can and should play in manipulating the natural world is not universally agreed upon, therefore, some tactics for species conservation can be controversial. It is clear that the values these organizations hold vary, but the ways in which these variant values influence salmon management and policy is the question at hand.

Procedure

Considering the situated context above and the organizations and people involved in salmon conservation, I propose the following question: *in what ways do values influence competing management plans for salmon in the Columbia River basin?* Through a historical analysis, discourse analysis, and interviews, I attempt to answer this question. Understanding the historical values of nature and whether or not they have relevance for how people value salmon today is useful for better appreciating our current situation, within a historical context. By building a timeline of the decline of salmon, the effort towards conservation, and the rise of salmon hatcheries in the Columbia River, it is possible to understand how changes in values have shaped salmon management. Next, a discourse analysis of public statements made by the three organizations and coding them with an eye to the values that are expressed is helpful to get most

directly at what I am asking in my research question, the values of these organizations and their plans to conserve salmon. Similarly, interviews with the salmon conservationists can provide a look into an organization's values in a way that is not as crafted as their published statements may be. Additionally, I am able to ask interviewees questions that reveal their values and perspectives on hatchery salmon specifically. I employ these three methodologies as a way to approach my question from different angles for the best chance at engaging results.

Historical Analysis

The U.S. conservation movement has unfolded since the 19th century, taking on different forms and priorities as it matures. I was curious to see whether these broader shifts have manifested in more specific conservation agendas and inform our understanding of why conservation has become a point of contention. History is essential at understanding the present, "by tracing the origins and social contexts of ideas, it becomes easier to understand their practical implications and significance" (Pepper 1996, 2). Additionally, I am looking for archived articles from *The Oregonian* that have relevance to salmon hatcheries. By searching different keywords like "salmon hatcheries" or "Columbia River salmon" in the online archives of *The Oregonian*, I can see the dates of the articles with those keywords in them. Next, I go find the microfilm at Watzek Library that contains the scan of the newspaper for the day I am looking for and searchd through the newspaper until I see an article on salmon or hatcheries. Perhaps any changes in values of salmon will be represented through articles written about salmon hatcheries since the 19th century.

A History of Salmon Decline and Hatchery Implementation on the Columbia River

Pre-industrial Era - Salmon runs estimated at around 15 million fish annually (Lang 2017).

1855 - The Treaty of 1855 is agreed upon between the federal government and native tribes, guaranteeing the tribes half the salmon that migrated past their "usual and accustomed" fishing locations (White 2011).

1866 - The first salmon cannery along the Columbia is established by the Hume brothers (Schwantes 2010).

1875 - The United States Fish Commissioner, Spencer Baird, explains to the commercial fishing industry how artificial propagation of salmon would eliminate any need for harvest regulation (White 2011).

1877 - The Oregon and Washington Fish Propagation Company is formed after canners saw implosions of similar fisheries in New England and California. The same year, R.D. Hume opens the region's first hatchery (Taylor 2017).

1883 - More than fifty canneries line the Columbia River and salmon populations decline significantly (Schwantes 2010). In this time, hatchery location does not coincide with salmon spawning ground, but instead near canneries to avoid transportation costs. When hatchery salmon are placed in the river, they are not ready to spawn but are already in their spawning ground, highlighting a disconnect between fisheries science and economic efficiency (Taylor 1999).

1887 - When a proposed legislation threatened to impose harvest restrictions, 196 cannery operators and individuals signed a petition against the bill. Instead, the group raised \$25,000 for the construction and operation of a hatchery (Lichatowich 2011).

1898 - The *Morning Oregonian* publishes an article stating that "artificial propagation is the cure for salmon difficulties, and the scientific means for the industry's perpetuation. Fortunately, there is no longer need to argue the merits of hatcheries. That work has been done" (Taylor 1999, 119) demonstrating the mindset of the time that hatchery salmon were the foolproof solution to overfishing. Even though habitat restoration was "desirable" for the environment, it was also "impractical" (Taylor 1999, 70).

Early 1900s - U.S. scientists begin to demand a quantification and concrete evaluation of hatcheries; these scientists are no longer willing to accept claims of hatchery success as the only justification for continued implementation. A study finally conducted in 1906 reports that just 3% of hatchery fish are returning as adults, a stark difference to the information being perpetuated by hatchery enthusiasts. The schism between fish scientists and fish managers forms and will continue to grow (Taylor 1999).

1909 - The Bonneville Central Hatchery is built and becomes the headquarters of Oregon's network of hatcheries (Lang 2017).

Early 1900s - Recreational/sport fisherman, begin a decades long war on other fisherman who use different gear, and importantly, inhabit a different class, race, and identity. Gillnetters claimed that fish-wheelers were destroying runs while fish-wheelers claimed that gillnetters were the reason for the decline of the salmon fishery. Initiatives were proposed and passed to restrict certain types of fishing on the Columbia in the name of conservation, but really, this disadvantaged minority fisherman for privilege to runs for elite, white sport fisherman. Environmental and social tensions become woven together (White 2011; Taylor 1999).

The 1920s - The assumption that artificial propagation could solve any fishery issue is no longer widely accepted. Even the Bureau of Fisheries reported that "the hatcheries probably inflicted as much, or more, damage to the salmon runs than they had service of value" (White 2001, 47).

1925 - Henry O'Malley, the U.S. Fish Commissioner, confessed "I should not care to say that the Bureau's work had amounted to nothing, but we must conclude that our efforts have not been sufficient to maintain the fisheries in their former state of productiveness" (Lichatowich 2011, 156).

1937 and 1938 - The Bonneville Power Administration (BPA) is founded and the following year the Bonneville Dam is built, greatly impacting salmon migration and survival. That same year, the Mitchell Act is passed by congress attempting to mitigate ecological externalities of large dams by giving the go-ahead for the construction of many more hatcheries (Lang 2017).

1942 - Construction of Grand Coulee Dam is completed, closing more than 40% of salmon spawning ground on the Columbia. The lack of employment in the 1930s due to the Great Depression created a desire for large infrastructure projects like these dams (Lang 2017).

1945 - Mitchell Act hatcheries begin construction; only 2 out of 25 are located in the tribe's fishing areas ("Fisheries Timeline").

The 1960s and 1970s - After ninety years of fish managers looking for tangible evidence of the success of hatcheries and finding little, there is now real, quantitative increases of salmon populations. Hatcheries receive all the credit. It is now well-accepted that this brief salmon prosperity was, in actuality, due to favorable ocean conditions (Lichatowich 2001; White 2011).

1960 - Hatchery success would mean that the region, as the Washington Department of Fisheries explained, could have "salmon without rivers" (Lichatowich 2001, 212).

1960s - Recreational fisherman had achieved the role of "Most Worthy Protector," establishing their form of fishing as morally superior and other types of fishing as the culprit of salmon overharvest. In reality, salmon conservation had become "a struggle to divide society into haves and have nots, to turn natural space into social space, and to claim exclusive use of resources for oneself and one's group" (Taylor 1999, 165).

1960s - The myth that hatcheries solved any salmon supply issue allowed for the continual degradation of habitat and increasing harvest rates (Lichatowich 2001).

The 1970s - The changes in size, behavior, and genetic diversity was making significant impacts on salmon stocks and by the 1970s, these changes were transforming the survival of wild stocks into a critical management issue (Taylor 1999).

End of the 1970s - Almost all Columbia River canneries had closed (Schwantes 2010).

1980 - Congress passed the Northwest Power Act establishing the Northwest Power and Conservation Council (NPCC) to create policies that better consider the interests of fish and wildlife as well as hydroelectric demands, mandating them as equals. The act requires compensation for federal development in the Columbia Basin that contributed to wildlife losses (Harrison 2012).

1982 - Columbia River Inter-Tribal Fish Commission (CRITFC) is established to better defend their court-affirmed right to harvest half the salmon in the Columbia and act as equals in fish management ("Fisheries Timeline").

1991 - The EPA begins listing Columbia River salmon populations as threatened or endangered under the Endangered Species Act (ESA) ("Fisheries Timeline").

Today - 90% of salmon in the Columbia River are spawned in hatcheries ("Salmon Hatcheries Overview;" "Salmon of the West").

Here are the four main themes that emerged from this timeline:

The Politicization of Salmon Management and Production

Protecting salmon and preventing overharvest is not solely in the best interest of salmon. The history of salmon conservation is riddled with social and economic tensions between groups in the region. Specifically, sport and commercial fisherman engaged in a long battle, each claiming that their own fishing technique was least detrimental to fish populations (Taylor 1999; White 2011). In reality, “salmon management increasingly became a political process of determining who should benefit from salmon and who should be excluded” (Taylor 1999, 137).

Sport fisherman, who already occupied elite roles in society, villainized other fisherman and the gear they used, working to get it outlawed and often succeeding, in order to ensure there were more fish to be caught in the noble, virtuous, sport fisherman-way; see figure 3. They claimed that they had the best interest of the fish at heart but their actions only helped to reaffirm their elite and privileged position in society, as salmon populations continued to decline.

As American historian Hunter Dupree argued, by the early 20th century, conservation had been reduced to the “very stuff of politics” (Taylor 1999, 165).

The geography of salmon hatcheries increased the economic discrepancies between white and tribal fisherman. While federal development most seriously impacted salmon populations on the upper stretch of the river, mitigation funding and resources were concentrated on the lower half (Allen 2003). The majority of native fishing locations were also located on the upper-most stretches of the Columbia, therefore, this spatial bias “contributed to a serious minimization of the fishing rights held by Columbia River Indians” (Allen 2003, 197). While this may not have been the intended result, it was the reality.



Figure 3: An Oregonian article from 1983 that romanticizes the angler as a conservationist.



Figure 4: July 24, 1898. Caption: As It Should Be, If Hatcheries Were Well Maintained.

A Mastery of Nature and Faith in Technology

The rapid growth of the salmon canning industry meant that salmon were being harvested high above the statically efficient sustainable yield (SESY). In order to maintain these yields and the profit that the fisherman and canners had become reliant on, hatcheries were quickly implemented. Early on, hatcheries were considered flawless; they sidestepped the limits of nature in order to maintain and increase profit; see figure 4. Nature was considered inefficient, unable to fully meet the needs of commercial fishing without human intervention (White 2011; Taylor 1999). Hatcheries improved on the natural state of the river, making it “more efficient, more convenient, and more profitable” (Taylor 1999, 205). Nature was something that could be manipulated to serve the desires of people, whatever that may be. This is demonstrated by early hatchery programs which produced salmon outside of their normal lifestyle to boost profit. A complete lack of an anatomical, ecological, or biological understanding of salmon did not prevent decades of hatchery operations. This whole-hearted faith in the power of technology is what allowed for a complete disregard for the habitat requirements of fish. Degradation of riparian habitat continued as demand for salmon increased, assuming that hatcheries could solve any and all fishery problems. In fact, “[n]ature needed loving transformation” by humans (White 2011).

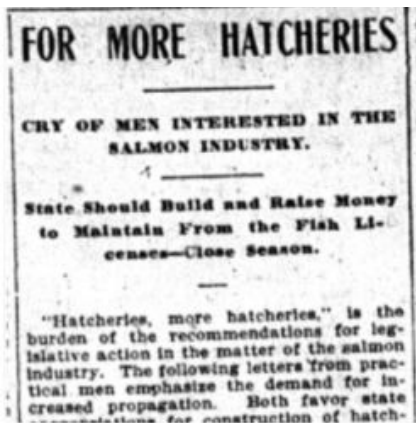


Figure 5: December 25, 1902



Figure 6: April 15, 1912

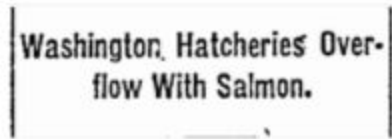


Figure 7: October 28, 1912



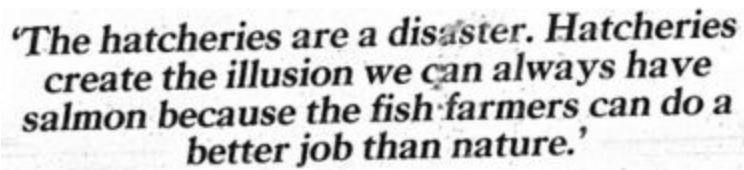
Figure 8: January 23, 1983

The Failure of Science

The faith in science and technology prevented a critical examination of salmon hatcheries for decades. Adequate evaluations of hatcheries was long impossible since complete records were not kept. There was no way to judge the claims made about hatcheries so they continued to be accepted and perpetuated. There was no need for fisheries studies to legitimate their practices since the general disposition of the time proclaimed that scientific knowledge allowed for human authority over nature (Woody 2006). Fisheries science was a field legitimated by rhetoric (Taylor 1999). When studies of the effectiveness of hatcheries began to be conducted, the results challenged the overly optimistic view of hatcheries that was being purported by so many in the fishing and fish management industry. Many disbelieved these reports, especially fish culturists, who “criticized scientists for not conducting more ‘practical investigations’” (Taylor 1999, 215). Science, in this situation, was only right and true when it approved of hatcheries.

Salmon Conservation Mirroring U.S. Environmentalism

Changes in perspectives on hatcheries closely mirrored broader changes within the conservation movement. In the early 20th century, when Gifford Pinchot explained how



'The hatcheries are a disaster. Hatcheries create the illusion we can always have salmon because the fish farmers can do a better job than nature.'

Figure 9: January 23, 1983

“conservation means the greatest good to the greatest number for the longest time” (Nash 1990, 69), salmon conservation practices mirrored this sentiment, as figures 5, 6, and 7 demonstrates. The emphasis was on conserving nature that would benefit humans, so concerns of hatchery salmons influence on wild salmon was non-existent. The purpose for conservation was to conserve the lifestyles of humans and that is what hatcheries achieved. Then, the nationwide conservation movement shifted in the late 20th century, becoming more enamored with the notion of untouched and pristine ecosystems (Nash 1990). The Wilderness Act was passed in 1964, a concrete demonstration of a desire for a natural world without human influence. Similarly, an increased anatomical and ecological understanding of salmon resulted in new critics of hatcheries and a recognition of wild salmon’s value; see figures 8 and 9. This larger shift in the conservation movement seemed to have tangible impacts for salmon. For the first time, salmon hatcheries were being seriously questioned for their ability to actually serve as a conservation tool.

Discourse Analysis

To get an understanding of the various perspectives on hatchery salmon and underlying values, I looked to public statements by the four stakeholders I am studying. This included both information posted on their websites and from news articles where representatives of the organizations were quoted. The news outlets in which I looked for quotes include The Oregonian, Oregon Public Broadcasting, the Seattle Times, and total more than 12 articles, plus content from their respective websites. In these places, I was able to acquire statements regarding Columbia River salmon conservation and hatchery implementation. For the list of citations from this discourse analysis, see the appendix. Next, I applied the framework below, which I built

with inspiration from the EcoTypes project at Lewis & Clark College, to analyze these statements. The perspectives that I use to comprehend and categorize the statements consist of the “axes” from EcoTypes, which are divided into three “themes”: nature/culture, local/global, and past/future. I have chosen six axis of the thirteen in total that seemed the most relevant, then color-coded them in the following way: **Aesthetics**, **Science**, **Ethics**, **Society**, **Technology**, and **Time**. Each axis is a polarized topic, therefore, consists of two opposing perspectives, demonstrating their complexity (which will appear in italics below). Here is a short description of each axis and their relevance to conservation decisions:

- (a) Considerations of nature’s **aesthetics** can be subdivided into only appreciating nature that is untouched by the human hand, essentially nature that is still *wild* or embracing nature that is at the intersection of natural and built environments, nature that has been *crafted*.
- (b) **Science** holds a lot of weight in any and all conversations that it finds itself in. Divergent or conflicting science and facts can, and often does, arise in conservation disputes. What is *mainstream* science and what is *alternative* science can be difficult to evaluate, since science, as explored above, is largely a social construct, influenced by the people, place, and time that it was developed within. Additionally, facts can be interpreted in many ways, often to further already existing beliefs.
- (c) While much of this research is motivated by a pursuit of stakeholder’s **ethics**, it may seem odd that it also has a place of its own as an axis. What it represents, though, is the subsection of philosophers that focus on environmental ethics and have traditionally asked and sought to answer the following question: “why should we conserve the natural world, for *biocentric* or *anthropocentric* justifications?” Despite a thorough exploration of this question, no single answer has arisen; biocentric or anthropocentric conservation is still relevant in modern-day environmental ethics.
- (d) *Conflict* has become a defining feature of 21st century American **society**, as well as conservation decisions. Some consider this an inevitable result of the tough circumstances of the Anthropocene while others believe *consensus* is a necessary building-block to successful species management.

- (e) Learning and understanding the role of **technology** will define the Anthropocene as it slowly gains an ever-more present role in our society. The limits of technology are still being tested; are there places that technology should be barred from? If so, where? Some *technophobic* conservationists are skeptical to deploy technology to solve conservation issues, while others, who are *technophilic*, feel like it will be a necessary tool as conservation becomes an increasingly convoluted field.
- (f) Whether conservation should be a movement that returns ecosystems to previous states or be more forward-looking, considering the needs of future generations, is a hot debate. Back to the *past* or towards the *future* is the persistent question of the **time** axis.

Bonneville Power Administration (BPA)

- Innovative **agreements** with tribes, state and federal agencies, and nongovernmental conservation organizations such as the Nature Conservancy and the Trust for Public Land provide for **long-term stewardship of the land** (“Wildlife”).
- Our fish and wildlife program is founded on **partnerships** and based on the **best available science**. **Together with** federal, state and tribal governments, watershed groups and land conservancies and many others throughout the Columbia River Basin, we are **improving conditions for wildlife and bringing fish back to our rivers** (“Wildlife”).
- A fish jumps. Another darts out from under a ledge, snatches a floating speck and disappears. Birds sing. Wind ruffles the water. This scene repeats daily in streams and creeks throughout the Pacific Northwest as young salmon grow, waiting for their great migration to the sea. But these particular salmon are not in a creek; they’re in the **Yakama Nation’s Cle Elum Hatchery** of central Washington, where **technology mimics nature**. Soon, they’ll be **planted in local streams to keep growing on their own**, waiting to ride next spring’s runoff to the Pacific. Most of those who return two or three years later will spawn naturally and help recover a once-depleted salmon run. From a publication titled, *A Better Environment, A Better Future*
- BPA sees its job as providing an environmentally sustainable engine of the Northwest’s **economic prosperity** (“A Better Environment...”).
- BPA is a steward of the Columbia River system, a valuable public resource. **Serving society** with low cost, reliable power, **accountable to and in collaboration with regional partners**, BPA strives to work in ways that **sustain** the region’s environment (“A Better Environment...”).

Aesthetics: Wild/ Crafted	Science Alternative/ Mainstream	Ethics: Bio/Anthro	Society: Consensus/ Conflict	Tech: Phobic/Philic	Time: Past/ Future
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Crafted	Mainstream	Bio & Anthro	Consensus	Technophilic	Future
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Columbia River Inter-Tribal Fish Commission (CRITFC)

- We as a society have made conscious decisions to significantly alter habitat, and we also made **commitments to people who utilize fish** - tribes and non-Indians - that **fish will be available**...To the extent that hatchery programs may pose some sort of risk to remaining natural populations, you have to balance those risks with the **promises that were made** (“Court challenges...”).
- Job one is taking care of the fish, but job two is **taking care of the fishermen** (“Plentiful fall chinook...”).
- Lawsuits like these are expensive distractions from the important work of salmon recovery, and they **jeopardize the livelihoods of tribal and non-tribal fishing communities**...The lawsuit is based on the **flawed logic that hatcheries caused the decline of wild salmon abundance** and **wrongly asserts that simply closing hatcheries will increase wild salmon abundance**. In the tribes experience, that path only leads to fewer fish in the rivers and does virtually nothing to improve the condition of natural runs (Profita 2016).
- The tribes have always supported using the **best available science** to inform good management decisions. This study documents what we have believed all along – that **hatcheries are needed** to rebuild natural salmon populations. Our goal is to use **hatcheries as wild salmon nurseries** to **protect our treaty fishing rights** in all of our usual and accustomed areas and to rebuild salmon runs (“New science shows...”).
- It almost feels like we’re **constantly under attack** of defending our programs, trying to get them funded. I’m frankly getting really tired of the **intense scrutiny of the tribal programs**, when I don’t see that kind of scrutiny of other programs out there (Manning 2012).

Aesthetics: Wild/ Crafted	Science Alternative/ Mainstream	Ethics: Bio/Anthro	Society: Consensus/ Conflict	Tech: Phobic/Philic	Time: Past/ Future
Crafted	Alternative	Anthropocentric	Conflict	Technophilic	Future

Wild Fish Conservancy (WFC)

- In just one generation, you can do a lot of harm...We are extremely sympathetic toward [the tribes], but they have a vested interest in **harvesting soon and having income** (Kim 2015).
- On the Elwha we have an opportunity to restore wild salmon and steelhead to a **pristine river** unlike any remaining in our state. **Before dam construction** in 1910, the river

supported robust populations of steelhead and five different species of salmon, including some of the largest chinook ever documented (“Elwha River Restoration”).

- We want to make sure we’re **not funding both the problem and the solution**... We put millions into these programs without knowing how much harm they’re causing (Profita 2016).
- Yet **despite an overwhelming body of evidence confirming the harmful impacts of hatcheries, state, federal and tribal governments** have agreed upon a plan that relies heavily on hatchery supplementation. Faced with the single greatest opportunity to restore wild salmon, they've opted for business as usual, perpetuating a failing paradigm of replacing native fish with a **man-made alternative** (“Elwha River Restoration”).
- Our goal remains that the recovery plan should be focused on **naturally sustainable wild fish**, not hatchery fish, and that such a plan should be in place when we have a **free-running** Elwha (“Elwha River Restoration”).
- While the Tribe played an essential role in removing the dams...their intent to now plant millions of hatchery fish in **disregard of the scientific evidence undermines salmon recovery** in the Northwest and the goals of the ESA. However you look at it, it’s a **horrible precedent** if left to stand (Steves 2012).

Aesthetics: Wild/ Crafted	Science Alternative/ Mainstream	Ethics: Bio/Anthro	Society: Consensus/ Conflict	Tech: Phobic/Philic	Time: Past/ Future
Wild	Mainstream	Biocentric	Conflict	Technophobi c	Past

Trout Unlimited (TU)

- Watersheds and **wild places** are home for North America’s coldwater fisheries. By **working in partnership with key players** Trout Unlimited strives to protect these places for **future generations of anglers** (“Our Conservation Approach”).
- Our mission across the state remains consistent: “Protect, Restore and Reconnect our coldwater fisheries habitat using the **best available science**” (Turner 2014).
- TU does not overlook the value of **social interaction and fishing opportunities**. Monthly chapter meetings feature a variety of speakers on topics from resource restoration and management to **“secret” fishing tips** (Turner 2014).
- From the beginning, TU was guided by the principle that if we "take care of the fish, then the **fishing will take care of itself.**" And that principle was **grounded in science** (“Our Conservation Approach”).
- This type of work — bringing back one of North America’s **great sport fish** — is hard work, but damned meaningful, the kind of **work you can take pride in** (“We Need Your Help”).
- Success really comes down to the word **“united.”** If we bring the talents, know-how, and passion we as a **community of anglers** have to the table, and we are committed not only to

maintaining our heritage, but to each other as fellow anglers, then we'll succeed (“We Need Your Help”).

Aesthetics: Wild/ Crafted	Science Alternative/ Mainstream	Ethics: Bio/Anthro	Society: Consensus/ Conflict	Tech: Phobic/Phobic	Time: Past/ Future
Wild	Mainstream	Anthropocentric	Consensus	---	Future

Interviews

I looked for people to interview whose opinions would most closely represent and reflect those of the larger organization they are a part of. Below are the questions I asked all interviewees:

- (1) *How did you get involved in salmon conservation?*
 - (a) *Why do you think it is important/why do you care?*
- (2) *What do you feel will be the most successful path to abundant Columbia River salmon populations in the 21st century?*
 - (a) *What role will hatcheries play? (only if they haven't already brought it up)*
- (3) *What role does your organization play in the larger effort for salmon conservation?*
 - (a) *What makes you different from other organizations?*

Significant quotes from these interviews have been divided into two categories: statements that reveal more general sentiments about Columbia River salmon conservation as well as perspectives on hatcheries specifically.

Salmon Conservation Values

Salmon Hatchery Perspective

David Kaplowe, Fish Biologist at BPA

“So what I have found is that we have to find common ground and we have to base our prioritization on the data as much as we can	“I think that the hatchery supplementation has maintained it, at least at the level it is, so I wish we never needed hatcheries , I am
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<p>so it's not one organization and what they think is best and their opinion, but if we keep it empirical and based on data that has been collected by different regions over the years, that usually tends to dissipate some of the tension.”</p> <p>“A lot of people often say that the only reason we are spending millions if not billions on habitat restoration and hatcheries in trying to increase the abundance of salmon and steelhead is because people like to catch them and eat them, because of harvest. And I hate to say it but I think that is largely true, I think a lot of people want to be able to catch and eat salmon.”</p>	<p>not a big fan of hatcheries, but I think that if people want to continue, I think tribal members especially should be able to continue to harvest salmon and steelhead and I think that hatcheries should play a role in this.”</p> <p>“So I really wish we didn’t need hatcheries but I think we do in the state we are in, especially for the tribes and their culture and way of life to preserve that as much as we can.”</p>
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Stuart Ellis, Harvest Management Biologist at CRITFC

<p>“So one of the big legal aspects of the tribe’s fishing rights is that the courts have made it clear is that the right is meaningless if there are no fish to catch. Basically that gets the US and the states on the hook to help preserve and restore fish runs so that the tribes can have meaningful fisheries. That is kind of some of the genesis of the legally mandated requirements that folks spend money on restoring fish runs and rebuilding fish populations.”</p> <p>“We kind of think that [salmon conservation funding] wouldn’t be nearly as plentiful if the tribes didn’t have rights to these fish and the United States didn’t have a right to make sure that there are fish available to catch.”</p>	<p>“I actually think that hatcheries can play a real important role in the restoration of fish.”</p> <p>“We think that when you balance out the risks and the benefits that, if done right, the benefits can far outweigh the risks of these programs and so the tribes really feel strongly that hatcheries can and should play a role in the rebuilding of fish populations.”</p>
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Kurt Beardslee, Executive Director of WFC

<p>“They are a keystone species and to lose a keystone species could mean the collapse of the ecological function throughout the Northwest. Besides the fact that they are the largest and most sustainable source of protein for people it’s also, again, the keystone for the health of our ecosystems.”</p> <p>“Having our goal, basically our client, as the fish instead of fisherman; and we feel that if the fish do well, fisherman will eventually do well. But we have to have the goal of fish being our ultimate goal because if we end up compromising what the fish need by what the fisherman might be asking for in the short-term, we could be losing what fish need in the long term.”</p>	<p>“...we really need to back off of the use of hatcheries, if we keep using hatcheries in the way we are using them today we will not have any wild salmon and very likely not have any salmon in the future. It is the ultimate broken promise.”</p> <p>“Management today is highly conflicted with politics; we need to remove some of the politics and interject science... with that in mind we have to be a lot more conservative and take less risks with this resource and use science to decide how we manage.”</p> <p>“Many groups are more political and less engaged in the science itself.”</p>
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Nicholas Chambers, Wild Steelhead Initiative Organizer at TU

<p>“There is just a value in the Pacific Northwest that salmon and steelhead have that I feel like regardless they should be here and they should persist and be allowed to exist in this environment, it is one of the things that makes the Northwest really, really cool and unique. They are super cool species. On the other hand, there is a long history of fishing and fishing culture built around them and that is something that should also be allowed to continue and I think it would be sad to lose that and that opportunity to fish for them.”</p> <p>“There is this sentiment that we are going out and doing all this wicked science to drive policy on the ground but there is really a big disconnect in reality between the most</p>	<p>“People are not willing to give up hatchery production and harvest to allow fish to recover. Instead of really following what the science strongly says, they bend to political pressure from interest groups, be that tribal or sportfisherman or whatever. And it is pretty frustrating”</p> <p>“We are not giving wild fish a chance to really flourish.”</p> <p>“If we allow wild fish to kind of do their thing and adapt to their surroundings, then they can adapt to change much better than say a hatchery program can...Increasing resilience of wild fish populations is going to help us buffer this future change we are looking at because we don’t really know what is going to happen.”</p>
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current science and what is actually happening on the ground.”	
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Discussion

The following section is a discussion of these results to process the meaning of the three methodologies implemented above. As a reminder, what propelled this research is the following question: *in what ways do values influence competing management plans for salmon in the Columbia River basin?* My methodologies suggest that organizations who value nature as a representation of wild or wilderness see hatchery fish as a threat to their preferred understanding of nature and are in opposition to their introduction into rivers. Organizations that either understand nature as hybrid or value nature for the natural resources it supplies are much more accepting of hatcheries, in fact, they actively support their implementation. I discovered that constructions of science are employed to further differing narratives of the importance of salmon in the Northwest, which I will chart in detail for the four organizations studied. This perpetuates a system of conflict among conservation organizations. Lastly, I will present my larger argument regarding the environmental ethics of the Pacific Northwest.

Constructing Science

My interest in science as a means to further contrasting discourses was initially pricked while scrolling through articles about salmon in the Oregonian, OPB, the Seattle Times, etc. and seeing discontinuities in not only opinions of hatcheries but the science as well; see figure 10. If you were to visit the website of CRITFC, for example, you would see a page titled “Bibliography in Support of Supplementation Science,” a self-explanatory webpage. Then, you could navigate your way to the CRITFC website and under their “Science Library” you can find dozens and dozens of studies on hatchery vs. wild fish, proclaiming the improved evolutionary fitness, ecological competition, genetics, and survival of wild over hatchery salmon. The historical analysis, similarly, reveals a skepticism of any science that is contradictory to the dominant fishery practices of the time. When hatcheries were initially gaining prominence in the early 20th

century, scientific and technological advances were seen as synonymous with the advancement of the country as a whole. To doubt hatcheries was to doubt the modernization of the West that could unleash the limits that nature had previously placed on capitalist exploitation of natural resources. This “conspiracy of optimism” allowed for fishery managers, who were wholeheartedly promoting hatcheries like cheerleaders, to go unquestioned (Taylor 1999). Finally, when researchers were seriously evaluating salmon hatcheries and information was released which exposed the reality of this system, scientists were belittled for conducting research that was considered impractical.

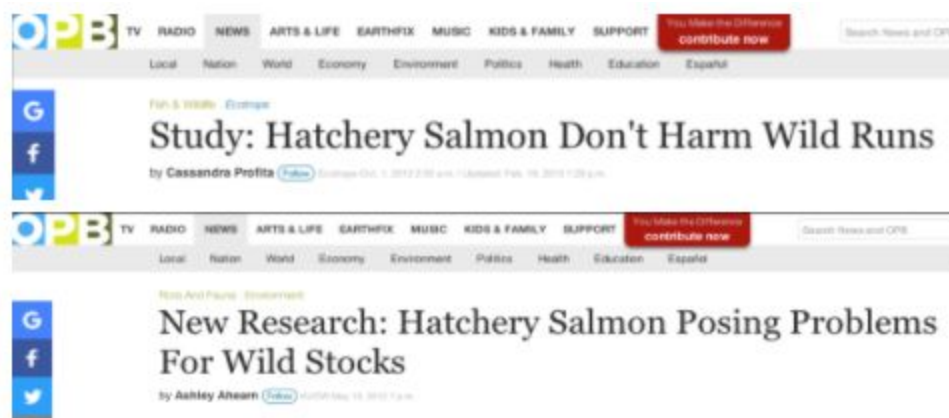


Figure 10: Two headlines from OPB that demonstrate variation in hatcheries science.

The importance of science still has a place in contemporary discussions of salmon conservation. The executive director at WFC explained that “management today is highly conflicted with politics; we need to *remove some of the politics and interject science*...and use science to decide how we manage.” An organizer at TU has a similar perspective, that “there is this sentiment that we are going out and doing all this wicked science to drive policy on the ground but there is really a *big disconnect in reality between the most current science and what is actually happening on the ground*.” At the same time, a BPA biologist argued that “we have to base our *prioritization on the data* as much as we can so it's not one organization and what they think is best.” This sentiment that science can and should dictate the way endangered species management should be decided is flawed.

What they are proposing is that you can derive an *ought* from an *is*. That if we simply look towards the “hard facts” or the “true science,” the solution on how to best support salmon populations will be revealed magically. In reality, once scientific data have been collected, it can actually point policy in many directions, still leaving a values-based decision to be made. Science can only take us so far; it can give us the means by which to manage the region’s salmon, but not the intention or goals. For an example outside of the realm of fisheries, consider a kid who learns that eating chocolate cake is not healthy. Just because the kid finds out the nutritional value of chocolate cake, or lack thereof, does not mean the obvious next step is to never eat chocolate cake again. Rather, he will have to consider both this information about cake and his values of perhaps satisfying desires or celebrating birthdays with family and friends. To quote Bruno Latour, “[i]f we concede too much to facts, the human element in its entirety tilts into objectivity, becomes a countable and calculable thing” (2004, 4).

In my conversations with the different conservationists, this idea that science will be enlightening prevailed. Consider this quote from the executive director of WFC, explaining how the non-profit was founded, when they “ended up deciding that we needed to form a group that was not a fishing group but it was a group that actually represented fish, they would basically be our client and we would use science to determine what our client needed” (Beardslee 2017). Science cannot tell us what salmon need; values can tell us the ways in which humans appreciate salmon, but there are no objective needs of salmon. Based on the track-record of the WFC, they have concluded that the science tells them that hatcheries are detrimental to wild fish. However, to take data that indicates hatchery salmon impact wild salmon and then conclude that hatcheries need to be shut down demonstrates that wild fish, or wildness in general, has more value than anything artificially created. There is still a values-based decision in any course of action.

I am conscious of not sounding like science has no place in conservation decisions. In fact, I know it is a necessary way of understanding how to guide policy decisions, but just because it is necessary does not imply that science is all we need. Science in conservation is *necessary, but insufficient*. Values play a crucial role in management decisions; not only are values necessary, they are inherent to the system of practicing science. It is idealistic to suppose that science stays strictly within the realm of facts and management decisions based on those

facts are only driven by values. Since scientists are active participants in the societies that they find themselves and which inevitably influence the results they publish, science and the way we understand the world is constructed. As soon as we acknowledge that the scientific community is not an isolated one, that it is susceptible to influence by the larger society, the idea of value-free science begins to fall apart (Douglas 2009).

Additionally, now that I have discussed the three interviewees and their support for a science-based conservation plan, I will discuss how the fourth interviewee's perspective has provided yet another kink in their argument. Stuart Ellis, a fisheries biologist at CRITFC, expressed that "it is pretty easy to get the impression that the science around the impacts of hatcheries on wild fish is settled. It really isn't. There is a lot of active work on it and still lots of lively debate." As illustrated earlier, the social construction of science lends itself to be shaped by the values of those practicing science. How, then, do we base our conservation decisions on what science is saying, when science is saying different things? As philosopher Heather Douglas articulates, "both citizens and policymakers in a democracy must have a way to decide how to interpret scientific findings that are not settled science. A more careful appreciation of the role of values in science is essential to such an understanding. This approach, however, rejects the value-free ideal of science going against the dominant position of the past forty years in philosophy of science" (2009, 45).

CRITFC conducts its own scientific studies. According to its website, one of the main reasons for the founding of CRITFC was to provide member tribes with more technical information. Before they were doing their own research, "the tribes were beholden to state and federal agencies and evaluations" implying this research alone was insufficient ("Fishery Science Overview"). Just like all scientific research, the research that CRITFC conducts allows it to overlay its own values of nature onto the science to support their preferred management plan for salmon, which is hatchery implementation. As geographer Noel Castree articulates "new evidence can be made relevant to more than one set of values, means and ends, so too can any established or new technology...It is thus important to reveal how science and technology can serve to internalize and reproduce certain values without seeming to" (2014, 766). It is not

necessarily altered science that results in different understandings of hatchery salmon, but rather, our inescapable values which create a lens through which we interpret scientific fact.

The appeal of fact-based conservation is its perceived objectivity, fundamentally superior since it is factually correct. This increases the desirability of their position since “speech that announces itself as value-free is given more respect than speech that tries to promote a certain viewpoint” (Kahn 2015, 34). We need to change the stigma so that perspectives based on values, or part-value/part-fact, are equally justifiable. It is important to be sympathetic of the values within the Pacific Northwest. If this region did not find value in salmon to begin with, there would be a fraction of the effort to conserve them today. We must learn how to accept and embrace these values, in a way that considers the science as well. Science and values have great potential to support each other on the wicked path forward to conserving salmon.

Nature Valued Differently

The following is a breakdown of how these four organizations value nature, specifically salmon, and how this translates into their more specific opinion of hatcheries as an aspect of salmon management.

The values

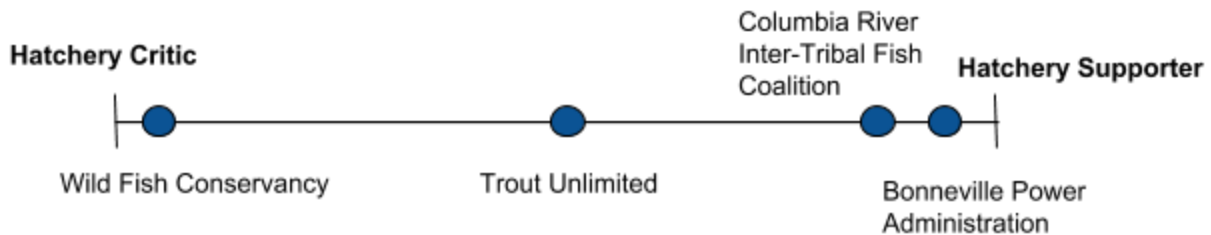
<p><i>BPA</i> <i>This organization has been associated with the taming and alteration of the region’s landscape. Therefore, they value what salmon represent: nature, wilderness, and the history of the Pacific Northwest.</i></p>	<p><i>CRITFC</i> <i>Value the abundance of salmon and the economic prosperity that abundance brings.</i></p>
<p><i>WFC</i> <i>Value the naturalness and wildness of wild salmon specifically.</i></p>	<p><i>TU</i> <i>Value the recreational opportunity that salmon brings for the region’s anglers.</i></p>

These values have translated into management plans for salmon that lay out differing futures and fates for this fish.

The management plans (focusing on perspectives of hatcheries)

<p><i>BPA</i> Fund a large portion of the hatcheries in the region since they are mandated to do so. Hatcheries have also been the historically easy and quick solution to conservation. It allows BPA to fulfill their commitment without completely shutting down their operations, which would be the other path towards conservation.</p>	<p><i>CRITFC</i> Actively and fervently support hatchery salmon, as well as other forms of conservation that has the potential to increase salmon abundance.</p>
<p><i>WFC</i> Are anti-hatcheries and works on the offensive to prevent the continuation of hatchery activities in the region.</p>	<p><i>TU</i> See value in hatcheries, but do not actively promote them. Their allegiance lies with wild salmon so they mainly are involved in habitat restoration and other similar activities.</p>

As a visual representation, below is a scale, with *hatchery critic* on the left and *hatchery supporter* on the right, with the organizations placed on the scale based on the views they expressed on their websites and during interviews.



Based on the relationship between how these organizations value salmon seems and differing perceptions of the best way to conserve them, it seems salmon conservation cannot be taken out of its social context. Despite the fact that three out of the four people I interviewed emphasized the importance of *basing salmon management on science*, this feat is close to impossible. Salmon, like other objects that find space between human-nature relationships, “embody a unique nexus of social value and scientific curiosity” (Scarce 2000, 6). Fishery management, simply put, is more than the fish. Salmon swim up the Columbia and its tributaries, consequently passing through the bustling and robust Pacific Northwest community. They are an

integral part of the region's people and it is these same people who have conceptualized salmon to be more than a fish but an icon of the Pacific Northwest. Without this broader cultural significance that has been imbued onto salmon, there would be only a fraction of the same fervent effort to protect them. Therefore, to argue that salmon conservation should be founded on some form of objective science assumes it is possible to have a "view from nowhere."

Philosopher Thomas Nagel illustrates this point when he asserts that "we are who we are, we can't get outside of ourselves completely....A great deal is essentially connected to a particular point of view, or type of point of view, and the attempt to give a complete account of the world in objective terms detached from these perspectives inevitably leads to false reductions or to outright denial that certain patently real phenomena exist at all" (1986, 6-7). We all come from some perspective; we all have a view from somewhere. Subsequently, the well-being of salmon cannot be lobbied for successfully as a species that exists separate and apart from so many human communities. Rather, the needs of the wider community must be taken into account.

In the case of salmon, when you use science alone as a guide for how to most meaningfully help salmon, you ignore the many ways that salmon can be beneficial to not only the ecosystem but numerous human communities as well. Conservation should "demonstrate how the fates of nature and of people are deeply intertwined -- and then offer new strategies for promoting the health and prosperity of both" (Lalasz, Kareiva, Marvier 2012). The salmon conservation movement cannot galvanize the necessary support from communities that would be impacted by conservation if they don't consider all of the people of the Pacific Northwest. Though the community that salmon finds itself within is not homogenous; the Pacific Northwest is composed of a variety of people. Each community may try to attain different benefits from salmon, may that be social, political, economic, spiritual, etc. (Smith 1979). Just think back to the question that USFW posed to different community members and their diversity of responses ("Voices of the West"). What does it mean to found salmon conservation on the preferences of human communities, when salmon are meaningful to different groups, or to go full-circle, different "communities of assumptions" in different ways. This is when the situation gets messy and conflict arises.

Natural Space as Social Space

As explained earlier, some perceive conflict to be an unavoidable aspect of conservation in the Anthropocene. Clashes of opinion are a norm within salmon conservation and seemed especially combative between CRITFC and WFC. WFC is quick to criticize tribal management practices while CRITFC is eager to go on the defensive. Again this demonstrates the fundamental differences in the organizations, “these issues tend to be decisive because they represent a clash between competing values and perspectives” (Lackey 2006, 15). This clash can be attributed to contrasting interactions with nature. Richard White delves into this topic in his essay “Are You an Environmentalist or Do You Work for a Living?” explaining how the elite, white environmentalist associates nature with leisure and play, chastising those who find work or a home in that same nature (1996). The ways in which humans relate to nature results in significantly different ethics on how nature should be managed. The disagreements between CRITFC and WFC exemplify this point. CRITFC represent those who “work for a living;” native people are dependent on strong fishing seasons as an essential part of their economy, as well as other aspects of their culture. WFC clearly represents the environmentalist, a group of people who recreate in nature by hiking, camping, canoeing, etc. in the Northwest. These two groups are an archetypal example of the prominent and historic rift between those who are economically dependent on natural resources, usually represented by the logger, and those who see the natural world as something to visit on the weekend or on vacations, a place to see but not touch, and especially not to work within, who is typically the city-dwelling environmentalist.

This conflict, however, was not isolated between the tribes and the environmentalists. Critiques of the sportfisherman arose as well. To demonstrate this, the following is the argument of David Kaplowe, a fish biologist at the BPA:

I think tribal members especially should be able to continue to harvest salmon and steelhead and I think that hatcheries should play a role in this. But I think in terms of the non-tribal members who came from somewhere else and moved to the west and settled in this area, I don't think that those individuals should be able to claim as much of a right for harvest and say “I don't care, I want hatcheries because I want to be able to catch and eat salmon and steelhead as I please” whether it is for sport or for harvest or for both, I think that when you have endangered species that, outside of tribes, I don't think non-tribal members should be catching and eating endangered species. I think that it is counterproductive to trying to contribute to increase in abundance and recovery.

Whether conflict or harmony is more useful in conservation processes is not universally agreed upon (Sandbrook 2011). Yet to come to the conclusion that some people in the region should not even have the right to reap the benefits of salmon is a bold, combative position. Personally I have found the conflict that exists between salmon conservationists to hinder their ability to successfully manage salmon. Just like other debates in this era where animosity frequently prevails, even fisheries biology has become politicized. This contention over conservation began back in the early 20th century between different types of fisherman continues today and has managed “to turn natural space into social space” (Taylor 1999, 165).

An attempt to found salmon management on science alone is a means of asserting personal preferences while trying to avoid openly critiquing different groups of people. To disagree with someone’s management plans by citing science rather than values could be perceived to be a less controversial or less racist sentiment, but does not get at the root of the issue. Organizations like WFC contend that CRITFC is disregarding hard science in a way that threatens their recovery efforts and the targets of the ESA (Steves 2012). They critique CRITFC for having a vested interest in harvesting early and generating an income (Kim 2015). They fail to realize that there are important intricacies between these groups; tribes have a legal right to harvest salmon and is only possible with hatcheries. The director of CRITFC, Paul Lumley, shared that he “feels like we’re constantly under attack of defending our programs, trying to get them funded. I’m frankly getting really tired of the intense scrutiny of the tribal programs, when I don’t see that kind of scrutiny of other programs out there” (Manning 2012). Environmental and social tensions have become one and the same (White 2011).

A point that deserves credit that I have not sufficiently addressed is that this *disagreement* finds itself within a larger *agreement* within conservationists. The work that all these groups are pursuing is fundamentally conservation work because they all have a vested interest in seeing salmon populations prosper. Despite the tensions that may flare up regarding the specifics of conservation policy, there is a large degree of understanding within these groups. There are numerous scenarios in which stakeholders with divergent values have overcome disputes to make progress towards their larger goals, such as fair water policy in California (Lach 2006). This agreement does not come easily. Sociologist Denise Lach even dedicates a whole section to

“The conditions conducive to clumsy solutions” when she describes this water resource dispute in California (2006). Currently, the Pacific Northwest has not found useful ways to bypass the roadblocks values create for problem solving. In other scenarios, larger objectives can supersede value conflicts and force collaboration between stakeholders by uniting around commonalities. From my perspective, salmon conservationists have not been able to unite around their larger goals because there is no universal agreement over whether hatcheries are beneficial or problematic for salmon conservation. Problem solving is complicated when the problem is not even clear.

The field of environmental pragmatism has some useful light to shed on the subject, an ideology that strives to overcome many of the theoretical struggles that hinder environmentalism, and rather, make the movement about policy instead of philosophy (Light and Katz 1996). Some environmental pragmatists argue that value plurality is actually needed for successful policy and management. Since, as Bryan Norton argues, “environmentalists can usually agree on what to do, a diversity of value concerns need not debilitate the movement. Indeed, freedom to appeal to a variety of value systems may ultimately prove the greatest strength of the movement, allowing environmentalists to appeal to the broadest spectrum of voters” (Norton 1994, 12).

Through my research I have seen that this approach to environmental pragmatism can only go so far. Even if everyone agrees that salmon are valuable and need to be conserved, I have noticed that this diversity of value can directly reflect into advocating for different management plans. Perhaps for an organization like the BPA, where salmon conservation is only a fraction of the work they do, they would be willing to give up hatcheries as long as they were still able to fulfill their federal mandates. Though value conflicts are not always surmountable on the path to policy, best exemplified by CRITFC. They have conceptualized salmon to embody the well-being of their people, so for them salmon abundance means economic prosperity. They cannot, and will not, find common ground with a group like WFC if it means abandoning hatcheries. They value salmon for its abundance and hatcheries provide this abundance. For WFC, they value salmon for what they represent--wild, untamed nature--as well as the ecological services they provide, both of which are specific to wild salmon. So yes, when you zoom out slightly from the disagreements within these organizations, you see that they fundamentally want

the same thing, a thriving salmon population. But as soon as agreeing with a policy means abandoning their foundational conception of nature, any progress toward agreement halts. To keep moving towards solutions, to overcome these hurdles, a deeper appreciation for the varying values of stakeholders is crucial, especially the values that have historically been ignored or underappreciated. We must “combine scientific, interpretive and critical knowledge in different ways that are reflective of life in a plural world where some worldviews are hegemonic, and others are notably less so” (Castree 2014, 765).

The divide that I explored in the background between traditional and new conservationists has manifested itself within Columbia River salmon conservation. The region is feeling the impacts of the Anthropocene. The Columbia River winds throughout this region that is bustling with human population growth. Resource demands are high in the Pacific Northwest, which ultimately--directly or indirectly--transforms the river and its ability to sufficiently support salmon. How to grapple with this reality has taken different forms by conservation organizations. In my interviews, in response to the question “*what do you feel will be the most successful path to abundant Columbia River salmon populations in the 21st century?*” responses were all over the place. This conservation movement is a broad umbrella over cries for dam deconstruction and habitat restoration intermixed with fierce support of hatcheries. Salmon conservation is split between traditional and new conservationists; Emma Marris might as well be standing on one side of the river and E.O. Wilson on the other, arguing with each other over what should be done about salmon, and the conservation movement as a whole.

Grappling with Wicked Problems

Something I have struggled with throughout this research--as well as a larger trend in my four years as an Environmental Studies student--is that problems are often easier to define than solutions. For example, it is a breeze to assert that climate change is real and that it is human-caused, however, discussions around climate change solutions can easily induce a headache. What happens when the definition of what is a problem differs from the perspectives of various stakeholders? How do we problem solve when we cannot settle on what is a problem? This scenario is considered a wicked problem, defined below:

A wicked problem is characterized by a high degree of scientific uncertainty and deep disagreement on values. The definition of a wicked environmental problem is in the eye of the beholder, or the stakeholder, and therefore there is no single correct formulation of any particular problem. Consequently, there is no single, correct, optimal solution (Balint 2011, 2).

Columbia River salmon conservation is just that, wicked. Today, our environmental ethics has allowed for each interested group to take their individual stance on salmon conservation and implement agendas that reflect their own valuation of salmon. Despite the reality that organizations can pursue the path they prefer for salmon, there is still discontent about the decisions of other organizations regarding hatcheries. The ironic aspect to this scenario is that hatcheries were intended to be the please-all solution to salmon decline. Other conservation methods would have inevitably placed forms of restrictions on the actions of many regional stakeholders: hydroelectric power interests, fisherman, tribes, ranchers, to name a few. So is it possible for each and every stakeholder to be satisfied when hatcheries--considered to be the crowd pleaser--is gaining a growing community of people who resent them? Reaching any consensus may be unachievable due to distinctly different values of nature that create conflicting understandings of what is best for salmon. There is not even agreement about what poses a threat to salmon. So there may not be a path where everyone's preferences are suited, everyone is made to be happy, or even satisfied. Succinctly, "there may simply be no 'best' choice" (O'Neill, Holland, and Light 2008, 86).

My succinct argument is the following: that salmon management cannot be based solely on science since it cannot be separated from the larger society and culture of the Pacific Northwest. Policy based strictly on science is a flawed, and unattainable, goal. This society is not homogenous and, as Nagel asserts, it is overly optimistic to assume we can jettison our own values of nature in order to find common ground. In this case, some organizations will inevitably be dissatisfied in the pursuit for salmon conservation. We know this to be true since some organizations are pleased with hatcheries while others are deeply troubled by the practice. Therefore, conflict may be inevitable in the Anthropocene, or to go even farther, a defining feature of the era. I am hesitant to come to this conclusion, especially since I believe that collaboration is so much more advantageous than conflict. But salmon are so deeply entrenched in our lives, economies, politics, and most other realms of society for their conservation to be

easy and simple. Salmon are more than a fish; they represent the tensions between groups within society who are vying for various forms of power, that in the end, has transformed its conservation into a debate much larger than the fish itself. They pose nothing less than a wicked problem.

Here is a suggestion to ameliorate this tension, to transcend the wickedness of salmon conservation. Imagine this: all stakeholders involved--federal agencies, tribes, environmentalists, fisherman--are gathered to sit down at a table together. They have all taken a survey, perhaps the Ecotypes survey developed at Lewis & Clark College, that displays their values and their beliefs on how to approach environmental issues for all to see. A few things could be accomplished. First, the underlying agreement within these groups can be brought to the forefront. These organizations agree on more than they disagree on, but despite that, still get hung up on smaller obstacles like the wild salmon vs. hatchery salmon debate. There are much larger enemies to salmon survival like climate change, which will soon become their largest threat (Lackey 2007), even more than dams, habitat modification, and salmon hatcheries. Displaying their communalities could help them unify and face larger threats with solidarity. Second, by sharpening awareness of how different organizations value nature and how this translates into distinct goals for salmon could perpetuate deeper understanding of others. Even if someone does not agree with another's perspective of what is best for salmon, they could at least recognize why they might support a different conservation option. Recognition of another's values should result in compassion for the perspective and beliefs of others to overcome value clashes. Despite conflict, we must figure out how to *move forward*. That is my best suggestion for wading out of conflict: more transparency about individual and organizational values for a better appreciation of the perspectives of stakeholders, allowing everyone involved to feel satisfied with a clumsy solution.

A clumsy solution for Columbia River salmon conservation could take a few different forms. For example, it could mean implementing hatchery systems in the most critical tributaries and then leaving tributaries that have the potential to sustain wild salmon populations be. Additionally, it is crucial to uphold the centuries-old treaty the tribes have to harvest salmon at their U & A fishing locations, and in many cases, hatcheries are the only way to fulfill this treaty.

Right now, hatchery salmon call just about all of the Columbia River basin their home. Being more specific about where hatcheries can and should be placed would be a step towards a clumsy solution for everyone.

Larger Implications

Moving Beyond Salmon

The lessons learned from salmon conservation are not isolated to this case study, but rather, have arisen persistently in recent history, with extra frequency in the Pacific Northwest. The region can easily recall the battle between environmentalists and resource-dependent communities over the protection of the Northern spotted owl. The economy seemed pitted against the environment. What was really being contested, though, were differing values of nature. Various facts emerged over the debate around the owl, as is common when environmental regulations are proposed (Layzer 2012). Natural resource advocates publish predictions for massive job losses and drastic economic repercussions while environmentalists countered with their own numbers suggesting natural resource regulations would not be responsible for economic losses. Four different predictions of job losses due to the protection of the Northern spotted owl demonstrates this point (Layzer 2012):

- (1) Forest Resource Alliance – 102,757 jobs
- (2) Wilderness Society, Forest Service, and the Scientific Panel on Late-Successional Forest Ecosystems – 30,000 to 35,000 jobs
- (3) Forest Service – 28,000 jobs
- (4) Congress – 13,000 jobs

Purporting different facts about conservation decisions to support personal values of nature is clearly not limited to the case of salmon hatcheries. To step out of the Pacific Northwest, the challenges of conserving and restoring wolves to their historic habitats have galvanized substantial support as well as fierce opposition (Nie 2003). The topic of wolves in the American west has become such a contested subject that it is considered “the abortion issue of wildlife” (Worrall 2017). On one side you have the ranchers and hunters who conceive wolves as pests

that must be eradicated and on the other side stands the environmental who wants to see wolf populations thrive since they represent a return to some form of historic American landscape. Also, undeniably, wolves embody rugged, wild nature that is so attractive to environmentalists. Again we see how the values of different communities within the West results in conflict which will only become more prevalent and intense in the Anthropocene.

The contested role of science and the scientist is also examined in the U.S acid rain efforts. Scientists became actively involved in public debate after seeing substantial proof of the legitimacy of acid rain being published with little resulting action (Alm 2000). In the 1970s and 1980s, over 150 scientists presented testimonies about acid rain to Congress and became involved in the public debate in a variety of ways. The fact that “many scientists crossed over the accepted professional boundaries that define their disciplines, despite the possible negative consequences within the scientific community” is an admirable risk that did result in negative repercussions (Alm 2000, 10). Critiques of the “politicization of science” emerged and some believed that scientists were becoming entangled in something much larger than acid rain, the degradation of science’s purity.

Much can be learned from the case of acid rain, especially the distinction between scientists who consider their results and subsequently suggest policy based on those results and scientists who manipulate results to serve a particular policy objective. Scientists can play a beneficial role in policy decisions if done correctly. In fact, they should. Philosopher Heather Douglas asserts that “no convincing argument has been articulated to give scientists even an occasional moral exemption for the consideration of the consequences of their work” (2009, 79). To borrow Bruno Latour’s concept, scientists have a responsibility to *love their monsters* (2011). When Latour proposed the idea of loving your monsters, it was in the context of society needing to accept the technology it has created, even those with unintended consequences, and finding ways to care and nurture this technology for a prosperous future. I appropriate this argument here, asserting that scientists have an obligation to take their scientific conclusions and draw meaningful policy options from these results; they should not just publish facts and let it loose into the world with little consideration of what will be done with them. Since scientists are in a unique position to advise policy because of their deep understanding of the relevant ecology and

biology, they have a responsibility to do so for the well-being of both endangered species and human communities.

A Future for Conservation

Circling back to the question that underlies this whole thesis, *how does conservation need to change to better protect endangered species?* The movement has been unsuccessful in meeting biodiversity goals despite fervent efforts on the behalf of threatened and endangered species. The long-term conservation movement for Pacific salmon epitomizes this point. Conservation efforts began in the late 19th century and continues today, as populations still struggle to recover. If we want to prevent the mass extinction of species that is predicted for the near future, than yes, conservation will need to change. We cannot continue to do the same thing and expect different results. The part where I falter and pause to think more is *how* the movement must change. There is no catch-all solution to endangered species conservation. Each species has its own set of challenges that must be considered for any meaningful impact. Salmon are unique since they are an endangered species that has been so thoroughly commoditized; we still catch and eat salmon and their market is a substantial part of the Pacific Northwest economy. Additionally, salmon are integral to the history of this land and its people, with significance for native people continuing today. There is, however, no species in this era that would be simple to conserve and protect.

A path forward for salmon conservation will not be an easy road; no options are flawless, and they each pose distinct challenges. The complexity of the Anthropocene not only results in stakeholders bickering over solutions to problems, but even what is considered a problem. Wicked problems are becoming a defining feature of the Anthropocene. In the Pacific Northwest, there is a fundamental disagreement over whether salmon hatcheries are problematic. This makes salmon conservation challenging, clearly, if some conceptualize hatcheries as the *problem*, putting the livelihood of wild salmon at risk, while others see hatcheries as a *solution* to declining populations as a whole. This wickedness can only be met with a clumsy solution. Clumsy solutions may honor elements of different stakeholders interest, but not everyone will be completely satisfied. In the Anthropocene, “we cannot easily accommodate everyone’s nature in

the Pacific Northwest; society has no other option but to make hard choices” (Proctor 1995, 289). Accepting the inevitability of clumsy solutions is essential to avoid the trap of trying, hopelessly, to get everyone to agree on a solution. Instead, accepting clumsy solutions is the best chance of reaching consensus for successful endangered species management.

Today, conservation is divided into two groups based on their perspective of what is the best role for humans in the natural world. Since it is value differences that divide environmentalists or conservationists into these two groups “environmental policy conflicts are rarely resolved through appeals to reason; no amount of technical information is likely to convert adversaries in such disputes” (Layzer 2012, 2). This point has actually been proven in a study of public opinion on climate change. The topic is not contentious due to a lack of understanding of the science involved, but in actuality, from conflicts of interest (Kahan 2012). Better comprehension on the technical or scientific facts does not sway people to believe in climate change. Similarly, Latour explains how more information introduced to a debate can actually intensify arguments rather than alleviate them (1987). It is only through recognizing deep differences will we be able to understand why environmental decision making is hardly as simple as agreeing on a problem and then implementing a suitable solution (Layzer 2012). A brighter future for conservation would be aware of a constant in most conservation disputes, that values of nature are deeply divided.

Perhaps farther along in the Anthropocene when our conceptions of what is human and what is natural blend until the borders are indistinguishable, organizations can pursue conservation without the constant contention. In this world, there would no longer be a divide between those who value wild or crafted nature because all of nature will embody the hybridity of humans and nature. A world where groups with different aspirations worked independently towards their own goals in a discontinuous, “patchy landscape, in which urban elements, productive elements, and pristine elements are arranged” (Norton 1991, 189) can be a thing of the past. This would require the destruction of so many of the binaries that are superimposed onto nature through a heightened awareness of the values and perspective of other conservationists.

Collaborative Management in a Politicized Landscape

The convoluted world of the Anthropocene, full of polarization and dispute, has posed a challenge to collaborative management efforts. It has been suggested that, in the future, the choice may not be between creating conflict or avoiding it, but rather, the different ways to engage with the contentious situations “that are inevitable when complex ecological dynamics interact with diverse human interests and identities, and with historically rooted practices” (Laws, Hogendoorn, and Karl 2014). This field is a response to the precedent set by earlier problem-solving tactics of the 1990s, which was arguably a series of failures.

To complicate this matter even further, we must also acknowledge that not everyone is given a seat at the metaphorical table during conversation decisions; not all opinions are equally respected. American landscapes have become politicized, they are imbued with inherent power relations. Specifically, the ways different groups of people engage with nature can either be labeled as virtuous or destructive, ignoring both history and culture. This is particularly unwarranted considering the destruction of the natural world was not a universal doing by all groups of people. In Garrett Hardin’s landmark essay “The Tragedy of the Commons” he explains that with a public resource, individuals will act in their own self-interest, ultimately leading to a severe depletion or obliteration of this resource (1968). This commons that Hardin describes does not take into consideration the power, racial, and spatial imbalances that arise when a landscape becomes politicized; “historians know that Hardin’s model of the commons is an invention” (White 2011, 40). Similarly, not everyone’s perspective on problem solving is given equal validity. This adds another dimension to the complexity that defines collaborative natural resource management. Conservationists are people, meaning social hierarchies arise.

Engaging with others who come from different perspectives is challenging; what is even more challenging is to work towards a common goal. In the complex situations that arise in the Anthropocene, “it can be difficult to reconcile conflicting ethical responsibilities and values” (Minteer 2011, 142). While various stakeholders may have a common goal in mind, such as previously endangered species now flourishing, everyone may advocate for different paths to this goal that they consider to be most effective, logical, or virtuous. Differences in values that are

foundational in conservation decision-making often impact a person's perspective on how goals can and should be achieved. Even if there is a universally agreed upon problem, does not mean there is a universally agreed upon solution (Balint 2011). Similarly, it should not be taken for granted that everyone can agree about what problems face conservation; values are imbued onto what is and is not problematic. Simply put "today we find conservation challenging not our muscles, but our minds" (McHenry 1972, 350).

This perspective has proven to be effective with other threatened species. A study of social representations of wolves in Norway helped to better understand the conflict over whether wolves belong in the Norwegian landscape (Figari and Skogen 2011). The research reveals that "efforts to understand controversies surrounding wolves in a broader societal context, we believe, have been important in breaking new ground in terms of deepening the understanding of social conflicts related to large carnivores" (Figari and Skogen 2011, 318). Just like these Norwegian wolves, through a increased awareness of the communities that care about salmon and work to conserve them, a deeper understanding of the tensions could prove fruitful for agreeing upon conservation policy. This is an essential step since "management practices must find a way to cope with the diverse reasonable views that are anchored in the divergent framings and cope with the differences to which this diversity gives rise" (Laws, Hogendoorn, and Karl 2014).

Integrating Science and Values, Nature and Humans

The in-depth assessment of the flaws of a science-based approach to conservation illustrates the need for a more directly beneficial role for science and scientists in conservation. Scientists are the people in ecological debates that are most informed about the specific ecological and biological questions that emerge in policy debates. Fisheries scientist and political scientist Robert T. Lackey asserts that scientists have a meaningful role in the deliberations of ecological policy questions due to their heightened understanding of the circumstances. For scientists to expect that they can simply publish their results and that policy makers will somehow know what is the right course of action is nothing more than idealistic. There are valid reasons why a scientist may be hesitant to offer their own suggestions for policy, including that

“scientists are often asked to contribute scientific information in the midst of clashing values, differing preferences, and opposing, often mutually exclusive, societal priorities” (Lackey 2007, 13). If scientists step outside the realm of what they consider to be the objective, hard fact, they risk becoming embroiled in societal conflicts that sprout from disputes over values. Essentially, when scientists take the data they publish and then offer suggestions for what is to be done, science and values find common ground. The day that scientists are comfortable sitting in both of these worlds, the future of effective endangered species management will look brighter.

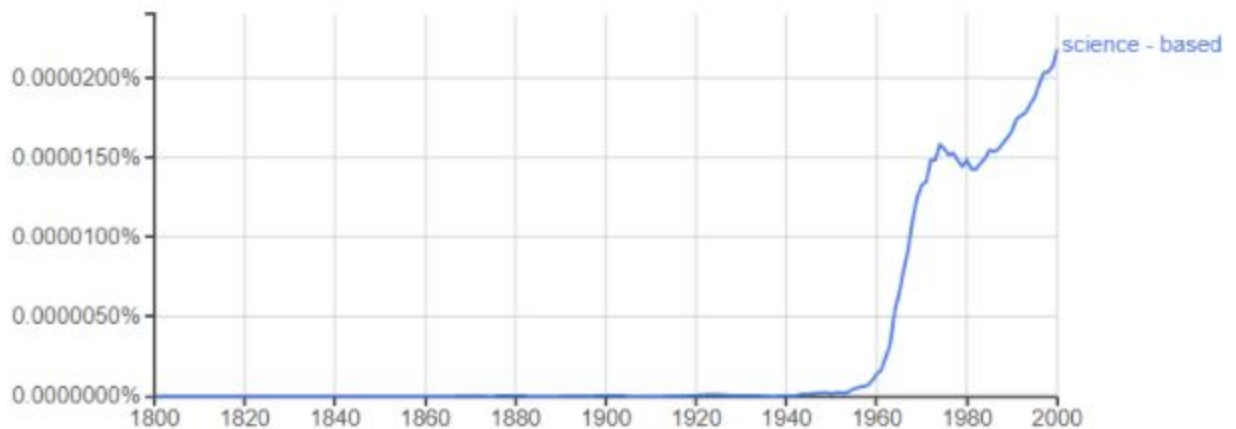


Figure 11: Google N-Gram that displays the rise in the use of the term “science-based” beginning in the 1960s.

Science is often misused, however, such as how “debates of questions of science often end up serving as a surrogate polemic for the inability (or unwillingness) of decision makers to adjudicate unpleasant value and preference trade offs...substituting debate over scientific information and interpretation of data over which value and preferences will carry the day” (Lackey 2007, 16). For example, when conservationists advocate for decisions based on science alone, it allows them to disagree with others values without explicitly doing so. Instead, they are claiming to only listen to what science tells them but “science offers little or no sense of humans as diverse, interpretive creatures who frequently disagree about values, means and ends; and there is nary a mention of power, violence, inequality and the perennial desire of some people to replace one socio-environmental regime with an entirely different one” (Castree 2014, 765). This may be why we have seen an emphasis on fact-based or science-based conservation, as a way to avoid the social and political tensions that are inherent to the Anthropocene; see figure 10.

Hiding behind facts is not an effective way to come to collective decisions about what is best for everyone involved. Environmental policy decisions should stem from questions of what humans value, rather than what science tells us is best based on normative constructions of nature. What we need is to “start from our human relations to other beings and to the worlds we inhabit, and from our human responses to those beings and worlds” (O’Neill, Holland, and Light 2008, 202).

Anthropocentrism or biocentrism, instrumental or intrinsic, pure or hybrid, nature or culture, the field of environmental ethics is riddled with attempts to put nature in one box or another. Living successfully in the Anthropocene could require less reliance on these large boxes that has previously helped us conceptualize the natural world (Proctor 2013). This polarity has hindered the ability to fully appreciate the complexities of the Anthropocene and hampers effective problem solving. In Columbia River salmon conservation, there are two loose communities of assumptions, one of which conceptualizes nature as pure and wild and the other as a hybrid landscape. The continuation of this disagreement over what nature *is* has resulted in different ideas of how it can be and should be managed. This exemplifies why founding conservation decisions on only science would not bring meaningful change to the conservation movement (Layzer 2012). In fact, we must do the opposite. If diverse conservation groups were straight-forward about how they value salmon and laid them out on the table for everyone to see, the challenges that values pose for conservation could be better addressed because they would be better understood. Hiding behind the myth that science will be a saving grace to salmon conservation in the Anthropocene, that “we need to remove some of the politics and interject science” as the executive director of WFC purports, will not remedy the disagreement that divides the conservation community. It is values that has created conflict, therefore science is not the appropriate solution (Layzer 2012). Being straightforward about the way different communities within the Pacific Northwest value salmon is the best way to overcome this values-based challenge.

Integrating our understandings of what is human and what is natural is a slow process since that distinction has been so fully ingrained into western conceptions of the environment. To hasten this breakdown, increased transparency of individual and organization values would result in greater likelihood of understanding other perspectives of nature and accepting clumsy

solutions. When this separation is finally unified, conservation will be all the better for it. Nature and human, science and values, these “[g]rand dichotomies...thrive only in ivory towers; when held up against the real world, they do not fit, and are tumbled about and scratched. Underneath, one usually finds a continuum with an oversimplification superimposed” (Norton 1991, x). How were we expected to successfully conserve nature when our conceptualization of it hindered our ability to see its full extent? The Anthropocene will force us to rethink what we consider conservation if the movement itself wants to be successful. Looking past the binaries that have been overlaid on nature in the past is critical (Latour 2004). Why see wild salmon or hatchery salmon when you could more easily just see a fish of enormous importance to the region whose conservation, in any form, is the priority?

Further Research

My research was limited in many ways and this is where I would suggest further research could be done. My analysis focused on only four conservation organizations that served as representatives of larger stakeholders. To study one these stakeholders--government agencies, native tribes, non-profits, recreational fisherman, or another relevant group--more thoroughly would yield intricacies that I was unable to identify or elaborate on in this thesis. Throughout this process, I often had in the back of my mind that I could have done this same research by examining the debate surrounding how dam deconstruction and the salmon conservation movement could profit from an analysis of how values and facts interact, or don't, in this contested subject.

Throughout this research project, I have been confused as to why perceptions of technology have evolved so significantly in the United States. In the early 20th century, when hatcheries were being opened and expanded quickly, there was substantial faith in science and technology (the simultaneous construction of dams throughout the country demonstrates this point as well). Back then, when fisheries science was not truly a science at all and technological abilities was minimal, there was fervent enthusiasm for hatchery systems. Now, in the 21st century, when our technological and scientific capabilities are better than at any point in history, there is a strong movement against the merging of technology with natural systems for the

greater good of everyone and everything involved. This is perplexing to me and I would support any research that explores this phenomenon further.

A Note on Optimism: A Conclusion

Despite the somber conclusions I have derived from my year researching the largely failed movement to conserve Columbia River salmon, I personally feel confident that the future is hopeful for this species. More challenges will undoubtedly arise: rivers will continue to warm as a result of climate change and the continuous economic growth in the region will surely come to an end, with less people willing to see funding go to conservation, just to name a few. Maybe I just feel obligated to offer some glimmer of hope to a field that has plenty of doom and gloom to begin with. Salmon are lucky, though, since there is an army of people who passionately fight for them and would not want to live in a world where the Pacific Northwest was lacking one of its defining characteristics. And in tough political times when citizens feel most disillusioned with the priorities of their government, as is the case in the United States as I am writing this, unity among environmentalists has historically been at its strongest (Norton 1991). For the movement more broadly, there is a lot of worthwhile reflection on the effectiveness of conservation in its current state. The new conservation movement I articulated earlier demonstrates this: countless scholars and activists are attempting to radically rethink conceptions of nature and the human/nature relationship to produce a more successful environmentalism. The flaws in conservation have been identified, opening space for numerous innovative understandings of how humans should manage species, and the natural world, for the well-being of everyone.

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