2017 State of the Rockies Report

Inclusive River Governance for a Changing West

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State of the Rockies Project

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The Colorado College State of the Rockies Project

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The Colorado College *State of the Rockies Report*, published annually since 2004, is the culmination of research and writing by a team of Colorado College student researchers. Each year a new team of students studies critical issues affecting the Rockies and the American West.

Colorado College, a liberal arts college of national distinction, is indelibly linked to the Rockies. Through its Block Plan, students take one course at a time, and explore the Rockies and Southwest as classes embark in extended field study. Their sense of place runs deep, as they ford streams and explore acequias to study the cultural, environmental, and economic issues of water; as they camp in the Rocky Mountains to understand its geology; as they visit the West's oil fields to learn about energy concerns and hike through forests to experience the biology of pest-ridden trees and changing owl populations. CC encourages a spirit of intellectual adventure, critical thinking, and hands-on learning, where education and life intertwine.

The Colorado College State of the Rockies Project dovetails perfectly with that philosophy, providing research opportunities for CC students and a means for the college to engage the region in a meaningful way. The *State of the Rockies Report* fosters a sense of citizenship for Colorado College graduates and connects the college to the broader regional community.

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Dam Management During an Era of Transition

by Mollie Podmore, 2016-17 State of the Rockies Project Fellow

During the early half of the 20th century, landscapes in the West underwent drastic changes as federal water projects rapidly emerged. However, some scholars speculate that recent decades have seen a changing paradigm in water management as a growing concern for conservation, ecological well-being, and social benefits of environmental health have begun to take hold. How are dams and diversions addressed during this transition toward reduction of environmental impact? In some areas, a changing paradigm has led to drastic measures such as dam removal, while others continue to rely on existing infrastructure models. Environmental restoration and hazard mitigation efforts have demanded formerly profitable projects such as southern Washington's Condit Dam to be decommissioned. Meanwhile, a habit of water hoarding continues to drive diversion initiatives such as the disputed Gila River project. What pushes the opposing sides of these divergent initiatives, and how are conflicting interests managed or open to compromise?

Introduction

Water management has been infamous in the American West as one of the most contentious issues for over a century. The region has seen passionate arguments of countless stakeholders, each one claiming to have the answer for how to thrive in an arid landscape. These voices shift constantly, and each must speak within the context of its time - be it dissent or affirmation of the status quo.

In the West, one could not know water management without water infrastructure. For over a century, dams and diversions have played a key role in such conversations. With the passing of each decade, the way that dams are addressed slowly takes on a new shape. However, the enormity of their presence in water management conversations never falters. For over half of the twentieth century, dam construction was considered the golden ticket to taking control of an arid West and establishing within it a well-watered population. Rivers were harnessed for uses ranging from municipal water supplies and irrigation to hydropower production and flood control. Today, cities, agricultural productions, and electrical grids continue to benefit from these concrete-dotted rivers.

However, the conversation no longer revolves so consistently around where next to build a dam. In the 1970s, an interest in environmental conservation took hold (Tharme 2016). For some, the issue was endangered species; for others, it was preserving wilderness. In the realm of water, questions regarding efficiency, necessity, and alternatives began to replace old dreams of constant dam construction.

Presently, those questions remain pertinent. The benefits that reservoirs provide have slowly begun to emerge from other sources. It has become increasingly common to look to alternative ways of procuring water as our "common conscience" stirs and gradually reworks its water ethic (Jeanette Burkhardt, personal communication 2016). A shared awareness seems to be gaining momentum as many groups of people work to think critically and holistically about water issues (Tharme 2016; Jeanette Burkhardt, personal communication 2016).

For some, there is no doubt that a paradigm shift is afoot. Washington's White Salmon River recently saw the unprecedented removal of the Condit Dam, the largest to be brought down, at its time. As the community along its

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banks settles into their new river landscape, many reflect positively on the process that resulted in explosive dam removal. The story of compromise is one that weaves together factors of economics, environmental law, and common conscience - none of which would have taken such a shape if it were not for a changing paradigm. In turn, the success of the seemingly radical project has begun to inspire and validate similar processes in other locations.

Meanwhile, the Gila River in New Mexico tears in opposite directions as it feels both the weight of a new, conservation-minded paradigm and historic roots in the former Engineering Era. Having previously escaped the frenzy of dam construction, it now faces passionate proposals for new diversion infrastructure. The Gila River remains under heated dispute, and no compromise has yet been reached. However, like the White Salmon River, its discussion largely revolves around questions of economics, legality, and public opinion.

This paper will addresses the supposed changing water management paradigm and examine these two case studies, in an exploration of the effects of such a shift on Western water issues.

Changing Paradigm

The Western system of water management is firmly entrenched. Largely, this is a product of the 20th Century dam-building era (Benson 2013). Scholars widely recognize the time between the early 1900s and the 1960s as a feverish construction of water infrastructure projects, often coinciding with interstate compacts (Ibid.). The period was founded on an "ethic of growth" (Gleick 2000); it was driven by a feeling of "water hubris," in which humans made a habit of asserting their control over natural water systems (McCool 2012). As a result, the West's landscape underwent drastic transformation within a few decades.

The reasons for such endless building were many. On the tail end of the Dust Bowl and the Great Depression, the nation was eager to jump on any opportunity for economic stimulation (Reisner 1986). In the Northwest, the promising notion of hydropower took control of the landscape, coming to play a crucial role in production lines backing the Allies through World War II (Ibid.). Further South, intricate webs of reservoirs and diversions promised water storage to facilitate both a population boom and large-scale irrigation projects (Ibid.). Throughout the United States, flood control stood to defend the value of dams (Ibid.). All the while, water projects consistently had a place in political agendas nationwide (Ibid.). It was the "Go-Go Years;" "If there was a stretch of free-flowing river anywhere in the country, our reflex action was to erect a dam in its path . . . [Water politics] were the oil can that lubricated the nation's legislative machinery" (Ibid., 167-8).

It may have been difficult to predict the end of the dam-building era from amidst the craze of construction projects, but scholars now recognize the era's transience just as widely as they do its historical significance. According to Rebecca Tharme, founder and director of Riverfutures, the Engineering Era came to a close in the 1970s (Tharme 2016). As the 70s and 80s unfolded, the nation saw the Early Conservation Era, with a growing concern for environmental protection (Ibid.). During the 1990s, the Ecological Era emerged, with growing holistic outlooks to rivers and their ecosystems (Ibid.). This later gave way to the Social Ecological Era, focusing on "integrated values for people and nature" (Ibid.). It is there that we find ourselves in present day, grappling with questions of how to balance ecological needs with those of humans among them, while remaining aware of the rich history of water management.

Though the dam-building era has, in large part, faded, it is important to remember the scale of the mark that it has left. Richard White points out that we must acknowledge the development that has taken place:

> "We can't treat the river as if it is simply nature and all dams, hatcheries, channels, pumps, cities, ranches, and pulp mills are ugly and unnecessary blotches on a still coherent natural system. These things are now part of the river itself. There are reasons they are there. They are not going to vanish, and they cannot simply be erased. Some would reduce the consequences to a cautionary tale of the need to leave nature alone. But to do so is to lose the central insight of the Columbia: there is no clear line between us and nature . . ." (White 1995, 109).

The lack of clarity on that line no doubt owes itself to the human dependence on innumerable aspects of the envi-

ronment. But perhaps the increasing interest in conservation following the heyday of dam construction also causes that obscurity.

The line has been blurred in the minds of many. Still, there are ties to the ways we have subjected nature to human ways of sculpting. Yet, "Today, everyone would agree that we have a different economy, a different set of environmental values, and different social values than we did fifty years ago" (Beard 2015, 69). The habits of the Engineering Era slowly break down, and the changes are now significant enough for arguments such as those of author and former commissioner of US Bureau of Reclamation, Daniel Beard: "Dam projects built in the nineteenth and twentieth centuries, when viewed through the cultural lens of today, brought us only the illusion of progress" (Ibid., 65).

The growth of this new cultural lens relies on a wide variety of factors. Shifts in the collective thinking incorporate aspects of water management from every corner of the subject. According to Peter Gleick, "this changing water paradigm has many components, including a shift away from sole, or even primary, reliance on finding new sources of supply to address perceived new demands, a growing emphasis on incorporating ecological values into water policy, a re-emphasis on meeting basic human needs for water services, and a conscious breaking of the ties between economic growth and water use" (Gleick 2000, 127). Most likely, a changing national trend of this sort must attribute itself to evolving mindsets on an individual level as well as a legislative one.

Feeling the pull of emerging trends is reason to be eager for what is to come. As noted by a group of veteran Colorado River scholars, the Colorado River Research Group, recognition of the weighty influence that Western water management has had over its region in the past sheds light on the potential for extensive positive impacts moving forward: "By embracing this modern era of demand management with the same passion, ingenuity, and brashness once applied to water development, management of the Colorado River can again be the envy of the world" (Colorado River Research Group, 2015). Already, the United States has seen national-scale transitions toward more conservation-based regulations that may have seemed unthinkable during the fervor of unchecked dam development.

Following the hubris-driven Engineering Era, ways of thinking about water management and water infrastructure began to change. A variety of new legislation reflected that shift. Some had roots in an anthropocentric concern for safety, while others showed the emergence of a conservation movement. From multiple perspectives, each of these changes in legislation brought forth opportunities to rethink the previously unquestioned patterns of the Engineering Era.

Perhaps the least revolutionary of these new legislation was the National Dam Safety Program Act, established in 1996 (Baecher et al 2011). Inevitably, dams built together in one era will eventually grow old together in the next (Pohl 2002). For the West, a series of collapses took place in the 70s and 80s, resulting in the development of safety-concerned legislation (Baecher et al 2011). While thoughts of regulation due to a recognition that water-containing structures do not last forever may have been few and far between during the engineering frenzy, the safety legislation that has emerged is a logical step from an anthropocentric perspective. Unsound dams may pose direct threats to humans and are likely considered worth mitigating by many, regardless of a shared environmental ethic. Acknowledgement of safety hazards regarding dams reflects a subtle weakening of the hubristic mindset that once considered itself all-powerful in controlling rivers.

Yet, preceding the legal recognition of safety reasons to rethink dams by nearly two decades arose a wave of legislation grounded in environmental concern. With the Conservation Era in the 1970s and 80s, a series of new legal requirements began to curb earlier development. Within less than two decades, several new legal requirements shaped what would be a new era of managing a river-human relationship. Between 1969 and 1986, US river-related environmental policy came to incorporate the mandates of the National Environmental Policy Act, the Clean Water Act, the Endangered Species Act, the Pacific Northwest Power Planning and Conservation Act, and the Electric Consumers Protection Act ("Laws and Executive Orders" 2015; White 1995; Pohl 2002). Sudden-

ly, large-scale project planning involved identification and approval of environmental impacts, laws limited pollutants to water, and harm to endangered species became illegal ("Laws and Executive Orders" 2015). Concerning hydropower, laws sought to balance electrical interests with those unrelated to power (White 1995; Pohl 2002).

Though these laws by no means restored every corner of the environment to pristine conditions, they revolutionarily symbolized an environmental ethic that percolated into various operations throughout the nation. The laws, to varying degrees, slowly worked toward preemptively addressing ecological issues. In the Columbia River hydropower system, ". . . for the first time, they tried to change the operation of the river rather than just mitigate the effects of management" (White 1995, 103). The series of Conservation Era laws initiated a pattern of increasingly holistic policy-making.

But such ideas stretched far beyond the halls of Congress. Conservation Era legislation mirrored a similar public attitude. To Brian Ellison, ". . . public policies are reflections of belief systems in that they incorporate values, priorities, causal theories, etc . . ." (Ellison 1998, 12). Laws and amendments of that era directly correlate to citizen movements in favor of greater environmental focus, as seen by a 1980s drop in water use trends despite ever-increasing population and economic output (Gleick 2000). Beginning in the Conservation Era, the weight of environmental costs within both practice and policy decisions has grown tremendously (Ibid.).

Evolving legislation seen through the second half of the twentieth century brought about the validity of dam removal options, and several scholars affirm the roots to be in a public value system. Molly Pohl, Assistant Professor of Geography at San Diego State University, asserts that "The recent escalation of dam removals for environmental reasons is the outcome of a number of scientific, social, and environmental policy changes in recent decades" (Pohl 2002, 6). Contemporarily, ". . . dam removal proposals represent a radical change in western attitudes about the land, from Manifest Destiny urging us to 'conquer' or 'win' the West, to the understanding that natural systems have intrinsic value and are worthy of restoration and protection, not simply exploitation" (Bender 1997, 4).

Recently, the Conservation Era laws and values have become the norm, and their effects on operations continue to grow. Once outlandish dreams of dam removal have carved out a place for themselves in conversation, in news, and in history. The progression of such events are fascinating case studies in light of stakeholder perspectives. Richard White remarks on the Columbia River's plethora of voices:

> "a river subdivided into separate spaces whose users speak to each other in a babel of discourses: law, religion, nature talk, economics, science, and more . . . [The river] changes, and as it changes, it makes clear the insufficiencies of our own science, society, and notions of justice and value . . . If the conversation is not about fish and justice, about electricity and ways of life, about production and nature, about beauty as well as efficiency, and about how these things are inseparable in our own tangled lives, then we have not come to terms with our history on this river" (White 1995, 113).

Tributary of the Columbia, the White Salmon River, found compromise among those tangled conversations, and, as a result, owes its free-flowing nature to a changing water paradigm.

The Condit Dam

Until close to the turn of the century, northwestern-power company, PacifiCorp, operated a dam that was a direct product of the Engineering Era. However, in its federally-required, periodic relicensing process, they became responsible for complying with environmental legislation that resulted from the Conservation Era. The outcome was a tangible representation of an upturned status quo.

In 1913, the crystal-clear waters of southwestern Washington's White Salmon River saw the construction of a dam that stood 125 feet tall and 471 feet wide, forming behind it Northwestern Lake (Bonham 1999; Blumm and Erickson 2012). The Condit Dam had a relatively small power-production capacity of about 14 megawatts[1] (though usually only seven were in use), providing energy to both the Crown Columbia paper mill **(Figure 1)**

[1] According to the Electric Power Supply Association, via the National Hydropower Association, one megawatt is enough to power 750-1000 homes.

Figure 1: Site of the Condit Dam

The site of the Condit Dam was chosen, in part, due to its proximity of the Crown Columbia Paper Mill, about 43 miles away in Camas, Washington. Source: Google Maps

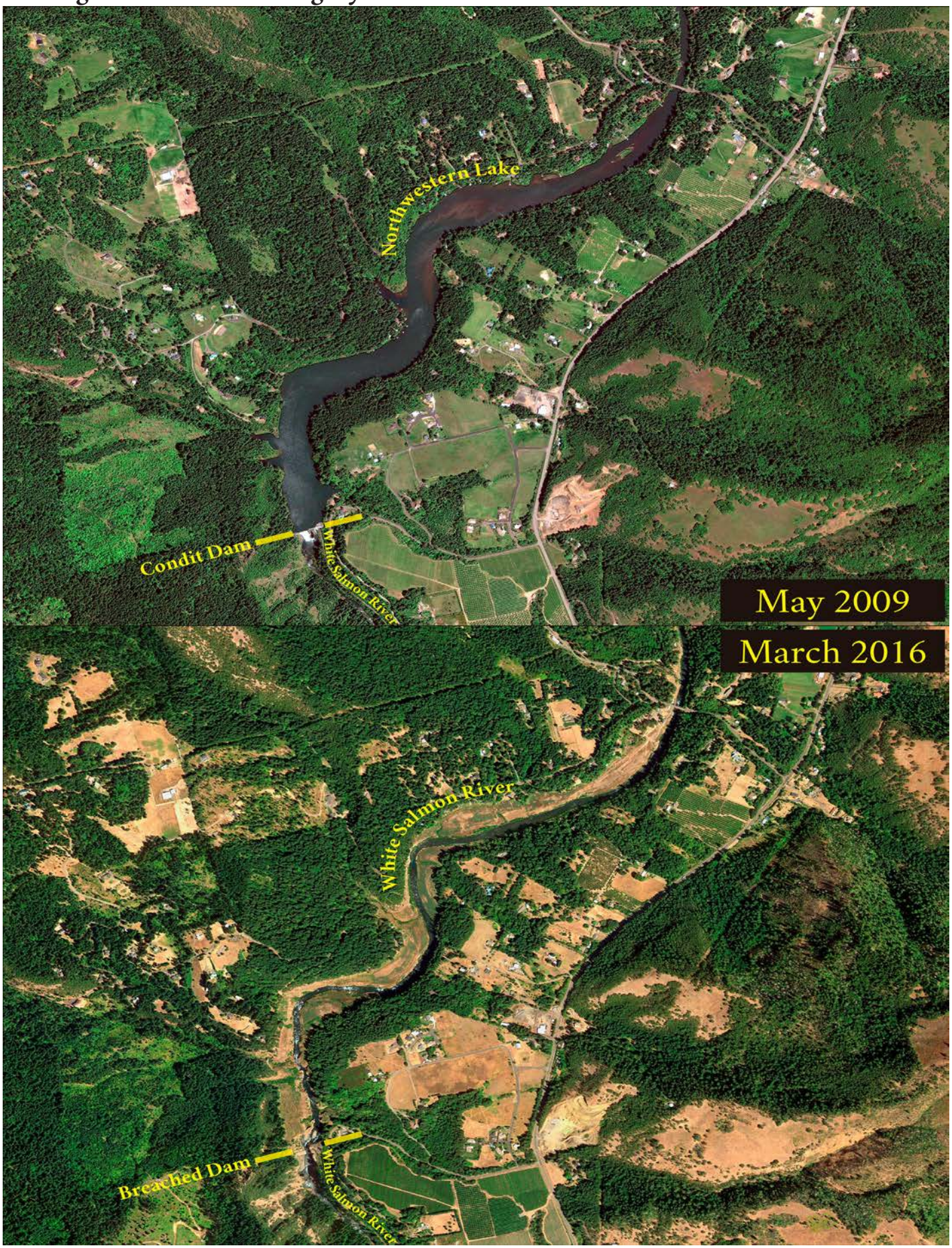
and to regional cities (Blumm and Erickson 2012; Todd Olson, personal communication 2016). Before the electricity became regionally shared via the power grid, the Condit Dam provided one of many well-justified, small energy sources adjacent to a location in demand (Tom O'Keefe, personal communication 2016).

Though construction of the Condit Dam lay under no regulation, it did originally have a fish ladder (Todd Olson, personal communication 2016; Bonham 1999). High water floods merely four years after the dam's construction, however, destroyed the fish passage, and the ladder remained unrepaired for the next century (Blumm and Erickson 2012). Eventually, Conservation Era legislation brought about regulations via the Federal Energy Regulatory Commission (FERC), which requires non-federal dams to undergo periodic revisions of dam operations (Benson 2016). Supposedly, the Condit Dam was subject to complying with this requirement, but for years, it was not strictly held accountable (Bonham 1999). In 1968, the dam's FERC license had no fish passage requirements (Ibid.). In 1980, the commission called for the Condit Dam to allow fish passage, but there was no follow through on the action, and operations remained unrevised (Bonham 1999). With this in mind, the late 1980s saw the first inklings of dam removal ideas dawn in the minds of non-traditional thinkers (Margaret Neuman, personal communication 2016).

During the early 1990s, those ideas began to gain ground. PacifiCorp applied for relicensing and upgrade through FERC. As a result, in 1992, the 1986 Electric Consumers Protection Act suddenly had standing to hold the Condit Dam accountable for equal consideration of power and non-power interests (Bonham 1999; Tom O'Keefe, personal communication 2016). Within the relicensing process, FERC determined the Condit Dam to have little and decreasing importance (Bonham 1999). Meanwhile, fish passage both up and downstream became a priority, and Section 18 of the Federal Power Act allowed federal fisheries managers to determine requirements for relicensing (Margaret Neuman, personal communication 2016; Bonham 1999).

Options for such passage included dam removal, but initial estimates thought it to be very expensive (Bonham 1999). Through independent consulting, however, a collective investigation on the part of environmentalists, tribes, government agencies, and PacifiCorp found the cost of removal to be about 20% of FERC's original estimate of $52 to $58 million (Ibid.). In light of this information, PacifiCorp opted for removal as the most affordable choice. The company temporarily continued operation, using revenue to eventually fund the $17.15 million removal, shown in **Figure 2** (Blumm and Erickson 2012). Meanwhile, the time-intensive nature of the process left locals confused as to whether removal would ever be a reality (Margaret Neuman, personal communication 2016).

Figure 2: Satellite Imagery Before and After Removal of the Condit Dam



The Condit Dam formed Northwestern Lake, seen in the top image. Since the dam's removal, the White Salmon River has reestablished a new channel and efforts to restore the ecology of the former lake bed are successfully underway. Note that differences in vegetative cover are primarily due to seasonal changes, not a result of dam breaching. Sources: NASA and the European Space Agency.

Process

As with any story of controversy, there are countless perspectives regarding the dam removal process. The following are a handful of those voices.

Todd Olson, PacifiCorp's Director of Environmental and Compliance, speaks highly of the stakeholder involvement and satisfaction. In light of increased regulation, PacifiCorp had to choose a new method of management for the Condit Dam site, and their means of doing so was interest-based negotiation. Rather than focusing on positions, Olson worked to engage stakeholders with emphasis on what they hoped to gain from changes in operation, providing a space for mutually beneficial outcomes. For the hydropower company itself, economics drove their interests. Initially, dam removal did not evidently promise the greatest financial gains, but revised ideas and studies of a variety of removal options eventually showed that it could support a sound business decision. Olson greatly values time spent with groups of other interests to break down both sides of the controversy and believes that opposition such as the county, who did not support the plan, ultimately did not stand in the way of removal. (Todd Olson, personal communication 2016)

However, those opposed to PacifiCorp's actions remain reluctant to support the negotiation process. Penny Greenwood, Chair of the Cabin Owners of Northwestern Lake Association has watched this process unfold from her cabin on the banks of the former reservoir. In her opinion, cabin owners, leasing land owned by PacifiCorp, were not considered an outside party and therefore largely excluded from the conversation. As a result, the community fractured, and cabin owners received most of their information regarding the process via word of mouth, rather than directly from PacifiCorp. Instead of direct communication with the hydropower company, the cabin owners relied on others interested in collaboration to make a space for their voices (Penny Greenwood, personal communication 2016).

Greenwood refers to people like Margaret Neuman, Executive Director at Mid-Columbia Fisheries Enhancement Group, who stepped up to improve communication where she saw it falling short (Penny Greenwood, Margaret Neuman, personal communication 2016). For Neuman, the occasional opportunity to comment on public documents or attend a few contentious public meetings were not enough. Her organization took on the tasks of education and outreach as well as salmon recovery and monitoring efforts. Yet, Neuman makes note of understandable reasons for little public involvement. PacifiCorp knew their economic interests, and it was easier to make their own decision from afar. With no public funding and no connection to the federal government, PacifiCorp was under no obligation to involve the public. Unlike Todd Olson, Neuman attributes the slow process to local opposition, reflecting that "People get used to seeing a landscape in a certain way." Between the cabin owners having the most to lose and the county hiring its own lawyer, people were not so quick, at the time of the decision, to jump on the bandwagon behind dam removal (Margaret Neuman, personal communication 2016).

Similarly, American Whitewater Stewardship Director, Tom O'Keefe, recognizes the local reluctance to support the movement. He believes that in the county commissioners, a fear of change caused conflict, and PacifiCorp's need for county permits complicated the issue. Concerning the cabin owners, O'Keefe attributes a lack of understanding of the process, rather than exclusion from it, to the hard feelings. Yet, benefits are worth noting too, and as a river recreation organization, American Whitewater was behind the removal since their early study of the paddling potential below the dam (Tom O'Keefe, personal communication 2016).

For Jeanette Burkhardt, a Ceded Biologist at Yakama Nation Fisheries, the process was much longer than most other stakeholders give it credit. The Confederated Tribes and Bands of the Yakama Nation, with whom Burkhardt works closely, hold treaty rights in White Salmon Basin to hunt, fish, and gather at usual and accustomed sites. But original construction of the dam did not take these people into account, and change came only after one hundred years. For that reason, tribal members were largely longtime supporters of dam removal and some of the most outspoken stakeholders, especially early in the process. Ultimately, the tribes signed on to the settlement agreement with PacifiCorp for removal. Though the tribal perspective actively took part in the removal process, Burkhardt does note limited participation among other local stakehold-

ers. Had all parties been involved earlier and to a greater extent, the general feelings and relationships throughout the process would likely have been more positive, even if the outcome had remained the same (Jeanette Burkhardt, personal communication 2016).

Outcome

Like the process, the near unchangeable results of which Burkhardt speaks are subject to a plethora of perspectives. Despite initial disagreement, however, acceptance of the new nature of the White Salmon River seems to be growing. Most stakeholders recognize outcomes to extend far beyond the riverbed, and each has their own idea of the most noteworthy effects.

To Olson and O'Keefe, the Condit Dam removal was an astonishing example of unexpected commonalities appearing among interest groups. Olson explains that "In the end, it was best for our customers," but they were by no means the only beneficiaries (Todd Olson, personal communication 2016). Through open dialogue, Olson found that groups were able to uncover similar interests as well as ways for PacifiCorp to shift details of the plan to meet specific stakeholder goals (Ibid.). Similarly, O'Keefe concludes that "[Interests] aren't necessarily all incompatible" (Tom O'Keefe, personal communication 2016). Over recent years, environmental and fish-related needs have become increasingly integrated with those of recreation (Ibid.). This is a significant contrast to some historical conflict among environmentalists and recreationalists (Ibid.).

Amidst the success, though, outcomes of dam removal have had their challenges. Cabin owners have felt the weight of negative effects, most of which came unanticipated. With critical ecosystem changes transforming a reservoir into a river flowing through a sparsely vegetated lakebed, cabin owners face increased fire hazard, a more complicated evacuation route, river dangers, and a loss of social elements of the reservoir. Furthermore, shifts to both land and its underlying water table have brought about the loss of several cabins and wells. Greenwood believes acceptance of these outcomes would have been easier had there been proper warning (Penny Greenwood, personal communication 2016).

Yet, cabin owners are not alone as stakeholders working to address unanticipated aftermath of the removal. Returning salmon and river current are both enticing to fishermen and river runners alike. Tribes have chosen to delay exercising their treaty rights to fish areas of the White Salmon River until fish populations grow to a sustainable level. In contrast, the state began allowing sport fishing in the same areas shortly after the river regained its free-flowing nature. Moreover, the growing White Salmon River rafting industry has previously only operated above Northwestern Lake and the Condit Dam, beyond the former upstream limit of fish populations. Now, fish (and fishermen) are returning to the upper stretches of river, where they share space, for the first time, with the rafting business. Listings under the Endangered Species Act complicate this interplay, and anticipation of how each of these interests will accommodate one another remains uncertain (Jeanette Burkhardt, personal communication 2016).

Despite the challenges, however, numerous views reflect successful outcomes. In the big picture, Neuman explains, goals continue to be met, and results have worked out well, given that budget is a limiting factor to PacifiCorp's actions (Margaret Neuman, personal communication 2016). There is no doubt that the river function is bouncing back; fish are returning, environmental goals are being met, and the whole river system recognizably continues to recover (Ibid.). On top of that, the entire process unfurled safely (Ibid.). Meanwhile, the community adjusts as fishing takes on a new form and as recreation becomes a growing stakeholder (Ibid.). Local tribes greeted the dam removal with great celebration, watching their grandparents' fishing sites resurface (Jeanette Burkhardt, personal communication 2016). For Neuman, a feeling of relief fills the air: "This thing could have never happened; it's really sort of a miracle that it did" (Margaret Neuman, personal communication 2016).

Relevance

The story of the Condit Dam represents the changing water paradigm not only on an intellectual level, but also on one felt by individuals involved in the process and the results of dam removal. The area plays a role in an increasingly common ethic of questioning. Locally, attitudes have shifted relative to new eras. The results of the process have

begun to normalize similar ideas for water project management beyond the bounds of the White Salmon River Basin.

Upturning the status quo with projects of this sort has resulted in a feeling of "renewed scrutiny" on the part of many diverse stakeholders (Jeanette Burkhardt, personal communication 2016). Even PacifiCorp, with a seemingly singular interest in economic advance, now constantly asks whether relicensing is truly the best option (Todd Olson, personal communication 2016). And relicensing is simply one example in a growing sea of opportunities to rethink established norms. In the words of Jeanette Burkhardt, "We live in a world where we need to really look at the cost and impact of what we do [and that is becoming] more part of the common conscience" (Jeanette Burkhardt, personal communication 2016). At the site of the Condit Dam, that conscience is significantly more common than it was twenty years ago.

Among dwellers of the White Salmon area, attitudes noticeably transformed as plans for dam removal got underway. After the decision was confirmed, opposition declined while the public anticipated the October 2011 breaching (Tom O'Keefe, personal communication 2016). Jeanette Burkhardt witnessed a "palpable shift in attitude over time about the dam removal" (Jeanette Burkhardt, personal communication 2016). People initially assumed the idea crazy, but river recovery now exceeds the expectations of many (Ibid.). During the two decades from start to finish of the dam removal process, a new paradigm of water management seems to have visibly taken hold among locals of the White Salmon area.

More importantly, such changes in mindset extend far beyond Klickitat and Skamania counties. Trends of dam removal have also taken shape on the Elwha River, and Washington's newly free-flowing rivers have "really changed the dialogue we have now in terms of going into relicensing" (Tom O'Keefe, personal communication 2016). Removal is now "legitimately on the table" (Ibid.). Similarly, Burkhardt speculates that "Subsequent removals will be easier [because] people understand that this is not a crazy idea . . . in some cases it makes sense . . . it makes sense to question [costs versus benefits]" (Jeanette Burkhardt, personal communication 2016). This is already seen with the possibility of dam removal on the Klamath River (Ibid.).

Lessons regarding the river recovery process apply both to canyons that have been dammed and to water systems that remain unrestrained. The importance, including an economic one, of free-flowing rivers increasingly weights conversations (Jeanette Burkhardt, personal communication 2016). Those contemplating new dams now seem to think twice, and presumably, "building a brand new dam on an undammed river is going to be virtually impossible [in the United States]" (Jeanette Burkhardt, personal communication 2016; Todd Olson, personal communication 2016). Even internationally, the White Salmon River proves relevant, as Nepali government officials recently visited Washington to measure the value of natural streams against the possibility of dam construction on their own rivers (Jeanette Burkhardt, personal communication 2016).

The Condit Dam directly experienced each era over the past century. It was built during the earlier part of the Engineering Era and coincidentally came to be a cutting-edge example of dam removal on the early side of the Social Ecological Era. When constructed, the Condit Dam fit the standard of the dam-building time. Yet, it eventually became the direct subject of rising questions, of changes in common mindset, and, consequently, of the Conservation Era's increasing environmental regulation. A variety of interests were able to draw upon each other, and though stakeholders admit to the challenges of aligning their goals, many consider the results a success. Both its shortcomings and its strengths are recognized as stories worth learning from, even far beyond the bounds of the White Salmon River Basin.

Gila River Diversion Project

The Engineering Era left very few water systems in their natural state. In fact, between United States borders, only 2% of rivers and streams endure in their free-flowing nature (Tharme 2003). Although the lower Gila River is dammed in Arizona, its upper reaches in Southwestern New Mexico fit into that 2% ("The Gila River" 2016). Flowing through the heart of a variety of ecosystems, the Gila is home to remarkable wildlife and stunning land-

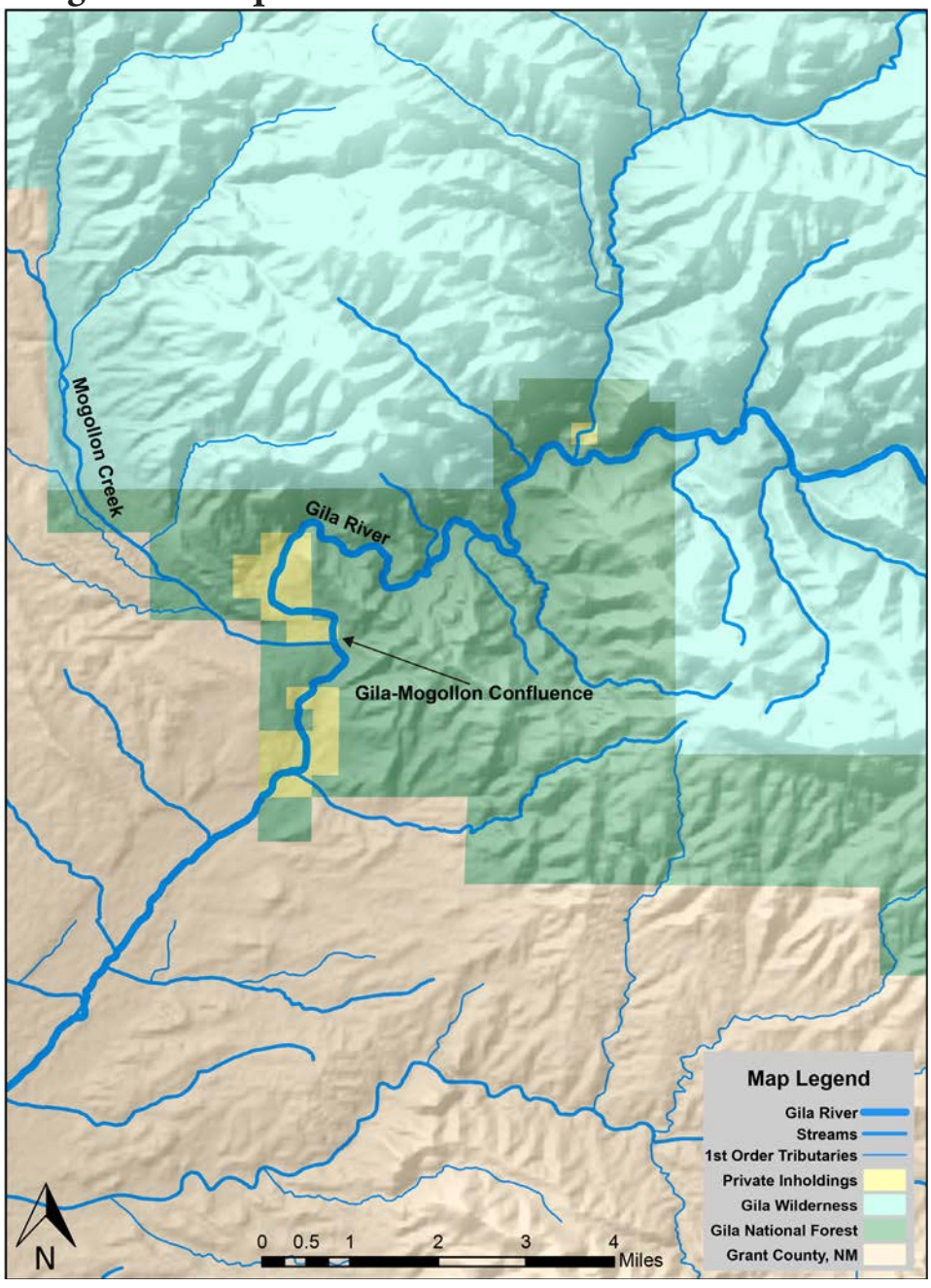
scapes. Aldo Leopold, who is credited with the idea of well-preserved wilderness areas, recognized the value of the Gila's headwaters as early as 1924, setting the stage for it to become the first designated wilderness after the 1964 Wilderness Act ("Gila River: The Origin of Wilderness" 2016). In contrast to the White Salmon River, the Gila area encountered exceptional protection from the first stages of the Conservation Era. But in further contrast to the restored White Salmon River, the Gila River now faces threats of development immediately outside its wilderness boundary (Norm Gaume, personal communication 2016).

2016 marks the 100 year anniversary since the first federal step towards putting a dam in the Gila River (Norm Gaume, personal communication 2016). Over the course of a century, the Gila has repeatedly been the focus of studies and speculations regarding its potential for hydropower and consumptive water use (Ibid.). The first dreams of a diversion on the Gila River in the 1910s gave way to the promise of increased water rights to New Mexico nearly seven decades ago (Allyson Siwik, personal communication 2016; Paskus 2016). In the Western spirit of water-hoarding, lawsuits among states often revolve around allocations of water rights, and many such negotiations have involved the Gila River. In the 1950s, an *Arizona v. California* water settlement apportioned 30,000 acre feet per year to New Mexico, and the 1968 Colorado River Basin Project Act allocated 18,000 acre feet to the state (Norm Gaume, personal communication 2016; Allyson Siwik, personal communication 2016). The upper Gila has rarely had rest as a free-flowing river.

Historically, many incarnations of a Gila River water project have centered around the same point on the river - near the confluence of Mogollon Creek with the mainstem river, lying immediately outside of the wilderness boundary (Norm Gaume, personal communication 2016). Be it for hydropower in the early Engineering Era or for irrigation in contemporary years, developers seem fixated on this location (Ibid.). Yet, support for the various project ideas has never quite been able to follow through. Even as the Engineering Era gained momentum in the 1920s and 30s, the Bureau of Reclamation's studies on the Gila River concluded that the water supply was over apportioned (Ibid.).

Presently, the Gila River is the centerpiece of a contentious discussion of diversion for storage, irrigation, and municipal water use: a water project whose idea

Figure 3: Proposed Site of the Gila River Diversion



Proposed diversions on the Gila River would fall immediately outside of the wilderness boundary, near the river's confluence with Mogollon Creek. Sources: USFS, ESRI, ArcOnline.

germinated in 2004 - the modern manifestation of many historical proposals (Paskus 2016). While this version would not leave the Gila with a typical dam and reservoir, water project proposals loom with the possibility of large, flow-altering diversion infrastructure (Walton 2015, "Gila River Diversion Reaches Decision Point").

With the Arizona Waters Settlement Act (AWSA) of 2004 this recent version of a Gila River water project became a possibility (Paskus 2016). The Act reduced allocation to 14,000 acre feet per year for New Mexico but allowed the state to potentially divert from the Gila River in exchange for delivery of Colorado River water to the Gila River Indian Community downstream in Arizona (Allyson Siwik, personal communication 2016). The operation would potentially include off-stream reservoirs in nearby Spar Canyon or on individual farms, underground water storage, or use of existing infrastructure from Freeport McMoRan Mining Company (Paskus 2016). Plans pose complexities of politics, infrastructure, and payment, but federal funding has been a possibility since the state's 2014 decision to support diversion (Ibid.).

In response to this opportunity, five entities formed the Gila San Francisco Coordinating Committee and began working to fund studies illustrative of the impacts of diversion. Simultaneously, a technical committee made up of forty diverse-interest representatives discussed what had quickly become a controversial issue. By the end of 2005, involved parties agreed to spend $943,000 on studies seeking the best ways to meet water needs, and state legislators passed the plan to do so. However, environmental groups soon urged Governor Richardson to veto the bill, and stakeholders were back to the drawing board in terms of reaching consensus. In the wake, Southwest New Mexico Stakeholders Group emerged, in search of an agreement fundable under AWSA requirements by the state's water management entity: the New Mexico Interstate Stream Commission (NMISC). Any plan would have to meet water supply demand and consult the Southwest Water Planning Group (Craig Roepke, personal communication 2016).

By 2011, however, the discussion still presented a powerful rift among locals, and the NMISC began pursuing an alternative to their compromise-focused plan (Craig Roepke, personal communication 2016). The commission accepted proposals from any interested stakeholders for how best to address Gila area water issues, sending them through a two-tiered judging process until a handful remained that they deemed worthy of further study and possible funding (Ibid.). Of the fifteen proposals more closely considered, only three involved diversion (Walton 2015, "Gila River Diversion in New Mexico Pits New West vs Old"). Furthermore, those three plans are vastly more expensive than their twelve alternatives (Ibid.).

Pressured by a deadline in 2014, the New Mexico Interstate Stream Commission voted in support of a diversion project (Paskus 2016). Their decision pursued three available sources of funding, each with its own constraints on how the state could use it (Walton 2015, "Gila River Diversion Reaches Decision Point"). The first amounted to the 2004 value of $66 million and could fund a variety of water projects to increase efficiency in four Southwestern New Mexico counties (Ibid.). The second source was valued at $34 million and could pay for the construction of new infrastructure for a diversion (Ibid.). The third source would potentially provide $28 million from a federal Colorado River Basin investment fund, but depended on availability of funds (Ibid.). A 2015 assessment by the Bureau of Reclamation expected the third option to be a very slim possibility (Ibid.). Of these three sources, the NMISC held the most interest in the second and third - those that could support a new diversion (Ibid.). They subsequently informed the Interior Department of their aims to divert the river (Ibid.).

In anticipation of the next steps in the process, the New Mexico Central Arizona Project Entity (NMCAPE) formed as members from the county, cities, and irrigation districts joined with the hope of involvement in building, funding, and operating a diversion (Paskus 2016). As of 2016, it is up to NMCAPE to determine sources and distribution of additional funding, some of which may be the financial responsibility of irrigators, municipal water users, or taxpayers (Craig Roepke, personal communication 2016; Allyson Siwik, personal communication 2016).

However, throughout 2016, planning momentum has met hurdles, largely due to financial restraints (Artz 2016). New Mexico Senator Tom Udall and Rio Grande Foun-

dation President Paul Gessing have both publicly opposed the billion-dollar versions of Gila River diversion plans (Artz 2016; "Udall Raises Concerns about Gila River Diversion, Pushes for Funding for New Mexico Water Projects"). As similarly determined in the case of the Condit Dam relicensing process, economic interests coincide with those of environmentalists. Gessing clarifies, "We understand the environmental angle, but our main concerns are financial" (Gessing, as quoted in Artz 2016). Humbled by budget, the NMCAPE has recently instructed engineering contractors to study project possibilities that fall within the bounds of funding expected from the federal government (Paskus 2016; Allyson Siwik, personal communication 2016). According to some sources, this limit means a range of $80-$100 million, but such estimates leave others skeptical (Ibid.). Concerns from the opposition grow on the basis that planners now split potential diversion projects into phases, considering each section to be more affordable (Allyson Siwik, personal communication 2016). Environmentalists fear total prices could still reach $800 million, and it is unclear whether that budget includes costs of analyses and non-diversion alternatives (Ibid.).

Currently, the buzz of disagreement fills the Gila River area (Paskus, 2016). Lingering features of the Engineering Era tug the river toward diversion, while simultaneous support for the Conservation and Social Ecological Eras manifests itself in stakeholders tirelessly defending the natural river. A tremendous lack of both trust and transparency is a recurring theme that slows progress toward agreement (Norm Gaume, personal communication 2016). Community members, state officials, and fellow stakeholders ardently discuss their water needs, as they approach a 2019 deadline for their final decision (Paskus, 2016). In order to receive the possible federal funding in full, the state must create a detailed plan and perform required studies under the National Environmental Policy Act by December of 2019 (Ibid.). The Southwest anxiously awaits the outcome, as groups from all sides of the dispute work to impress their opinion upon the decision-makers (Ibid.).

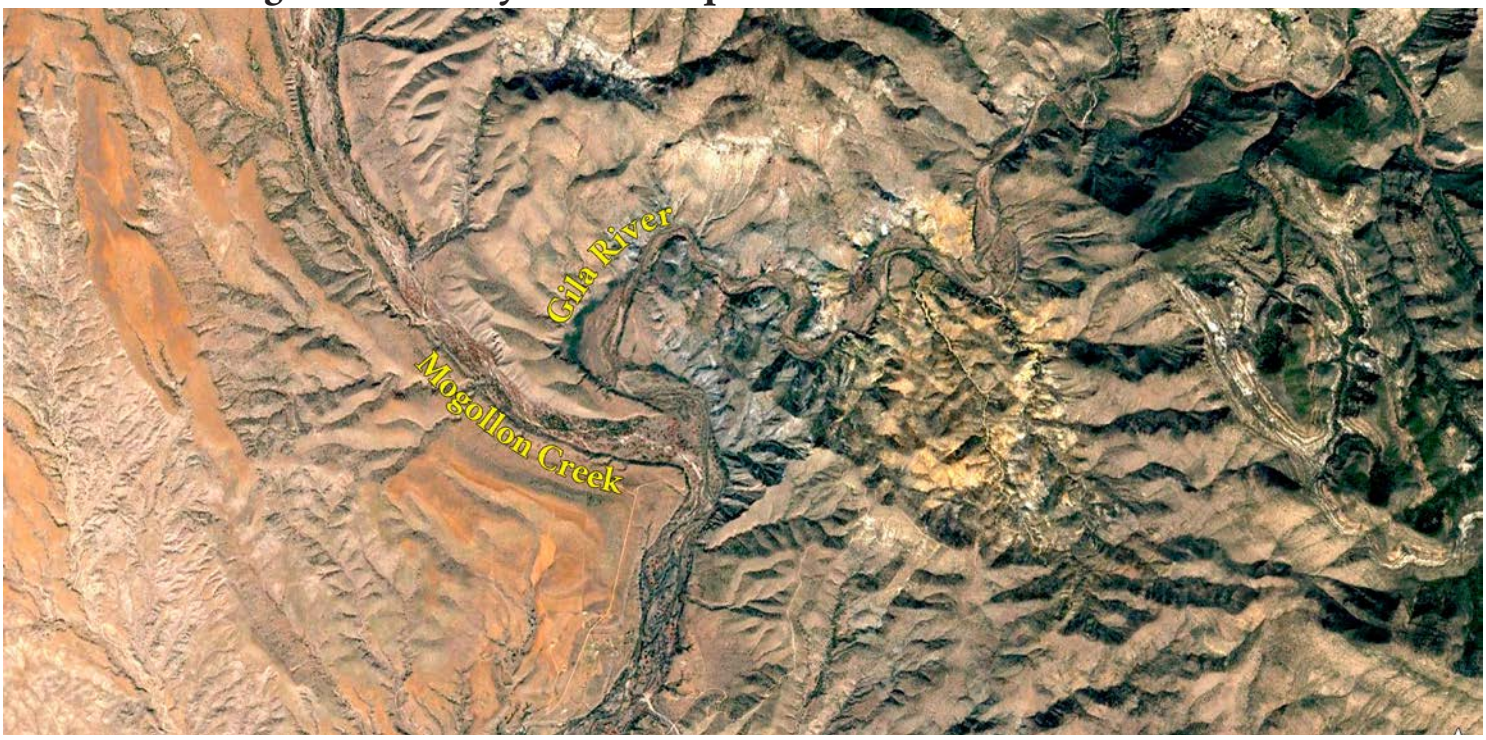
Process

While the Condit Dam removal process managed to draw parallels among a variety of interests, the Gila River diversion project remains deep within controversy. Diversion proponents advertise their project as providing water for irrigation, in-stream flows, and municipal water supply, an attempt to bring together interests from across the spectrum (Final Tier-2 Proposal Submitted by the Gila Basin Irrigation Commission in Grant County, NM to the ISC Evaluation Panel). However, a lack of trust among environmentalists and diversion proponents, and an overall lack of transparent communication leaves stakeholders questioning the true intentions of their communities.

Despite the disagreement, those involved in the Gila River controversy know the importance of appealing to interests across the board. Those in favor of the diversion make a case for the possible benefits beyond their own personal interests. A proposal submitted to the NMISC's two-tier process defends the project saying it would bring dependable flows for agriculture, listed species, recreation, riparian areas, wildlife, and "other environmental considerations" (Final Tier-2 Proposal Submitted by the Gila Basin Irrigation Commission in Grant County, NM to the ISC Evaluation Panel). From this point of view, there seems to be a congruence in terms of potentially supporting both ranching interests and the environmentally focused side. Opponents, however, believe that a variety of interests would find more common ground in the absence of a diversion. A leading organization for those opposed to diversion is the Gila Resources Information Project. The group's Executive Director, Allyson Siwik, explains that locals across the board are often against the project (Allyson Siwik, personal communication 2016). Liberals, she notes, generally consider the free-flowing Gila River to be more beneficial to environmental issues, while their more conservative counterparts often oppose the rise in taxes that a diversion would entail (Ibid.).

Craig Roepke, Deputy Director at New Mexico Interstate Stream Commission, tells yet another story of the need for agreement. He explains that the Gila area wrestles with a way to balance the environmental importance of the river with the human need for its water "to feed their families basically." The NMISC works within that dichotomy to "meet both those needs with the same drop of water." According to Roepke, there is no question regarding the need for water; arid southwestern New Mexico faces dropping aquifers and a significant water deficit of up to 30 to 40,000 acre feet per year. Even if local municipalities

Figure 4: Aridity of the Proposed Gila River Diversion Site



Tension surrounding the proposed Gila River diversion is amplified due to the area's arid climate. Many opposing groups desire access to the small amount of water that is available. Source: NASA.

halved their yearly use of 50,000 acre feet, the remaining 25,000 would not meet the deficit. While increased costs of water use due to a new diversion are not ideal for irrigators, "people are saying they are willing to [pay]," as it is cheaper to pay for water than to lose an entire crop. (Craig Roepke, personal communication 2016)

Roepke reflects upon the enormous rift among Gila River stakeholders, feeling little hope toward the possibility of reaching a consensus. He explains that the "conflict [between irrigators and environmentalists] is not going away . . . because there just simply isn't enough water to give every person, every bird, every fish . . . the water it needs." Even if everyone got their fair share, there still wouldn't be enough water in the system to fully supply every interest. The NMISC's inability to facilitate consensus among irrigators and environmentalists is inevitable, Roepke says, due to the nature of stakeholders' goals. Environmental groups "want to completely restore the wild and free-flowing nature of the Gila . . . The only way to do that is to get the people out of there." Therefore, the NMISC, he says, had no choice but to abandon hope of facilitating a unanimous agreement, and was forced to instead accept and evaluate proposals. (Craig Roepke, personal communication 2016). Where the White Salmon River and the growing Social Ecological Era emphasize inclusivity and collaboration, the approach to the Gila River seems to grow narrower and less democratic - reminiscent of Engineering Era patterns.

However, environmentalists deeply disagree with the NMISC's narrative. Conservation group, Western Resource Advocates, for example, points out the array of costs associated with the proposed project: not only would a diversion risk enormous costs for ratepayers and taxpayers, but it would also endanger recreation and its related tourism, a diverse riparian ecosystem, and species listed under the Endangered Species Act (Tellinghuisen). Throughout historical proposals to dam the Gila River, financial and environmental costs have been found to exceed the potential benefit (Tory 2015). Currently, appraisal analyses have determined similar outcomes (Walton 2015). Noting this information, Siwik cries, "Any rational person would say oh my God this is not doable!" (Allyson Siwik, personal communication 2016). While the proposal submitted by the Gila Basin Irrigation Commission pursues a diversion that ". . . supports the long and rich history of diversified agricultural production, which is the major industry in the Gila Basin," their opposition denies any large-scale economic value of Gila area agriculture (Final Tier-2 Proposal Submitted by the Gila Basin Irrigation Commission in Grant County, NM to the ISC Evaluation

Panel; Norm Gaume, personal communication 2016). According to former Director of the Interstate Stream Commission, Norm Gaume, most existing irrigative water use goes to hobby ranchers, while possibly four or five people earn their living from irrigating on the Gila River (Norm Gaume, personal communication 2016). Unlike other areas raising cash crops, Siwik believes agriculture in the Gila area community to lose money every year (Allyson Siwik, personal communication 2016). Ratepayers for water would see costs rise to potentially $8000 per acre foot, and jobs created by construction of the diversion would be temporary (Tory 2015; Allyson Siwik, personal communication 2016).

For both Siwik and Gaume, the entire disagreement revolves around manipulation and dishonesty, resulting in continued unrealistic ideas. Where Roepke believes consensus is impossible, Siwik believes the NMISC has "creat[ed] a water crisis" in order to get the promised federal funding the state so avidly pursues (Allyson Siwik, personal communication 2016). Throughout the process, analyses have focused on worst case scenarios, denied the value of proven efficiencies like drip irrigation, and failed to address existing irrigation diversions as the cause for periodically dry stretches of river (Ibid.). Siwik laments this obscurity, saying "Listen, we have to agree on a common set of facts . . . I put the blame for that on the state . . . There's never been an agreement on the need . . . We don't even agree on the science" (Ibid.). On numerous occasions, the local CAP entity has violated the Open Meetings Act, and the NMISC has secretly held meetings (Allyson Siwik, personal communication 2016; Norm Gaume, personal communication 2016). In response, opponents have repeatedly requested information and public records (Norm Gaume, personal communication 2016). According to Siwik, the disconnect lies in the NMISC's interest in the full 14,000 acre feet simply because it is a possibility, while irrigators have a more humble interest in consistent water during low flow months (Allyson Siwik, personal communication 2016). In her perspective, a full understanding of irrigators' modest needs would present possible solutions, while a full explanation of diversion cost to ratepayers would result in a very different discussion than is presently seen. (Ibid.)

Due, Siwik says, to the State's reluctance to give up the century-old dream of a diversion, compromise has been so elusive. While the State did provide some money to non-diversion alternatives, Siwik believes any further space for compromise would pose a threat to the State's goals, and they have therefore broken up discussions of other possibilities. A previously existing multi-stakeholder planning process, for example, has been removed since a 2011 change in office. Siwik believes that, since the beginning, those who disagree with her have sought federal funding and the fruition of a lingering 1910 idea. They want to make sure they get it, she explains (Allyson Siwik, personal communication 2016).

For Norm Gaume, the dishonesty of which Siwik speaks is the most defining feature of the dispute. Interest in a Gila River water project is nothing new, but, he believes, "What makes this particular effort unique is that it's based entirely on fraud." As far as Gaume's personal involvement, what was initially an effort to save the Gila River as it flows through designated wilderness until its confluence with Mogollon Creek is now an effort to speak out against what he considers to be the State's fraud and dishonesty. He mentions multiple secret and illegal meetings that have been held, and he blames the State for simultaneously playing up expert disagreements to discourage locals from paying attention. While there were originally huge efforts among stakeholder groups and exhaustive meetings, the facts of hydrology and impacts to designated wilderness fell to the wayside in contrast to talk of values. Many discussions focused on proponents feeling cheated of their supposed right to diversion. In contrast to the Aldo Leopold ethic that protected land in the Gila area decades ago, Gaume cries, "this fraudulent approach just incenses me" (Norm Gaume, personal communication 2016).

Outcomes

Though a decision regarding the Gila River diversion has by no means been reached, the discussion has already played an enormous role in local interactions between residents as well as in their engagement with water issues. Locally, water conservation (particularly in the municipal realm) has gained momentum, shedding light on the influences of a modern Social Ecological Era. Meanwhile, opponents on either side of the dispute passionately

defend their own viewpoints (Allyson Siwik, personal communication 2016).

The fervor surrounding water use has left locals thinking critically about the issue more than they otherwise may have, and it has brought about noteworthy results (Allyson Siwik, personal communication 2016). In a political sense, elections for local Grant County offices have reflected a strong preference for candidates who oppose the diversion (Ibid.). Concurrently, the AWSA funded $3 million for municipal conservation efforts (New Mexico Interstate Stream Commission). Water consumption on an individual level has noticeably decreased (Allyson Siwik, personal communication 2016). Siwik has found that "people are much more engaged in water issues as a result [of the ongoing discussion]" (Ibid.). As with the White Salmon River, these water management decisions bring their related issues to the forefront of locals' minds, influencing their conversations, actions, and opinions.

Simultaneously, water has come to have a powerful influence over relationships between proponents and opponents living in the arid Southwest. Interviews and personal experience in the Gila River area have illuminated the severity of local's divided nature. Not only are involved parties wary of interviewers, but each side is also quick to fault and even name-call their opponent. Roepke reflects that "It's too easy to split ourselves up in little polarized groups of people," and it is imperative to find ways around those divisions (Craig Roepke, personal communication 2016). Though there are deep fissures between opposing parties, Siwik believes that the need to be civil to one another within a heated debate presents positive opportunities for relationship building (Allyson Siwik, personal communication 2016). Despite nearly opposite perspectives regarding the diversion proposal itself, Siwik and Roepke agree upon the need to admit the validity of others' interests. Roepke recognizes that, "When there are valid needs . . . you can't just arbitrarily say we are going to meet one and not the other" (Craig Roepke, personal communication 2016).

In Gaume's eyes, the entire process has shed light on the importance of public advocacy. True to his word, he has personally spent thousands of hours fighting on behalf of a free-flowing Gila River, and considers his efforts successful. Gaume notes that, for many, a desire for the diversion remains, despite the confusion regarding where and how it would come to fruition. However, he holds that plans to divert the river either within National Forest boundaries or immediately downstream of the Wilderness are no longer on the table. In his opinion, this means that "[diversion advocates] no longer have any viable options - none," but having not fully studied the options, the State remains either unaware or unaccepting of that fact. Gaume attributes the success of the environmentalist side to the public advocacy work of himself and others. Diversion opponents have managed to hold the State accountable to the Open Meetings Act and to public record requests (Norm Gaume, personal communication 2016).

Relevance

With a constant back and forth battle between proponents and opponents of the Gila River diversion project, it is evident that this issue spans both historical and contemporary patterns of water management. While rooted in habits of the Engineering Era, the Gila River diversion project also sees a significant push to embrace a movement of conservation and increased efficiency within the bounds of existing infrastructure. On the banks of the Gila River, water management is still very much in a time of slow transition, straddling both old and new paradigms.

Several writers have pointed out the Gila River as a symbol of current water ethics, each point in the decision-making process being a choice between the old and new paradigms. In the heat of the State's 2014 deadline for a decision, reporters explained that, "If the [NM]ISC elects to pursue diversion, it will be in keeping with water management precedent. Diversions are a fact of life in the Southwest . . ." (Goldfarb 2014). One year later, Secretary of the Interior Sally Jewell faced a similar choice and the press noted that, "She can continue the pursuit of a water project that follows the 20th century path of economic growth through the construction of big centralized infrastructure. Or she can reject the plan because it does not embrace the emerging development ethic of the 21st that recognizes ecological limits, and prizes conservation and efficiency" (Walton 2015, "Gila River Diversion Reaches Decision Point").

Jewell approved forward movement on the diversion project, and those who worry that precious water will land in the hands of other users applauded her (Fisher 2015; Final Tier-2 Proposal Submitted by the Gila Basin Irrigation Commission in Grant County, NM to the ISC Evaluation Panel). The Gila Basin Irrigation Commision, for example, is troubled that, "At present, during high water events, excess water flows down the river into Arizona and is lost to New Mexico water users" (Final Tier-2 Proposal Submitted by the Gila Basin Irrigation Commission in Grant County, NM to the ISC Evaluation Panel). According to some, this mindset is so powerfully ingrained that it will inevitably carry forward: "Even if the Gila diversion ultimately fails, the idea will not die. If history is a guide, as long as there is water in the river, someone will want to take it" (Walton 2015, "Gila River Diversion In New Mexico Pits New West vs Old"). However, there seems to be a growing interest in the Ecological Era's influence on the Gila River issue. While the 2014 and 2015 decisions reflected a lingering Engineering Era, many remain curious as to whether a new, ecological paradigm will influence the 2019 decision.

As recent decades give way to new national trends concerning water, increasing questions pressure the 20th century status quo in the Gila debate. These questions often begin in the voices of avid river lovers such as Gaume, who declares the present system "incredibly inefficient . . . primitive and unmanaged." Presently, irrigators use bulldozers to push riverbed sediment up, creating an earthen diversion, lasting only until the next flood. This technique illegally moves nearly the entire flow of the river from its course. Gaume welcomes the opportunity for increased efficiency, claiming that most pasture irrigation could be done with one fourth of the water presently used (Norm Gaume, personal communication 2016).

Ideas based in this changing paradigm no longer appear only in the minds of progressive environmentalists. Despite its frequent position as the driving entity behind water projects, "the Bureau of Reclamation found that municipal conservation and wastewater reuse had the highest ratio of benefits to cost" (Walton 2015, "Gila River Diversion In New Mexico Pits New West vs Old"). Many New Mexico citizens agree with that, as shown in a 2013 poll conducted by Public Opinion Strategies: 85% of New Mexicans prefer "Using our current water supply more wisely, by continuing to conserve water, using new technology to help reduce wasted water, and increasing recycling of water," as opposed to the 12% who favor "Diverting more water from New Mexico's rivers to communities where more people live" (Weigel 2013). Furthermore, 69% of those surveyed viewed the Gila River Diversion Project as "a temporary fix that will NOT permanently help to solve the water supply problems in part of our state" (Ibid.). Meanwhile, the possibility of legal requirements for conservation-oriented approaches specific to the Gila emerged in 2014, when Senator Peter Wirth wrote a bill for non-diversion alternatives (Goldfarb 2014). The bill's mandates for the NMISC to spend $82 million in federal funds on conservation techniques including watershed restoration, reuse, and infrastructure improvement may have promised the possibility of a 22,000 acre foot increase in supply (Ibid.). However, action on the 2014 bill has been postponed indefinitely ("New Mexico SB89").

To Gaume, the greatest opportunities for compromise and successful river management lie in efficiency efforts of that sort, and so too do they reflect a growing new paradigm. Gaume personally believes Southwest New Mexico to have a significant ethic of "resources for empire," and he is suspicious that federal resources may end up going towards private gain. Yet, he speculates that the area's growing retirement community has diluted that ethic over time. Gaume notes that both sides still have "perspectives that are deeply entrenched," but he believes that, in light of an increasing ethic of conservation and efficiency, "It's inconceivable to me [Gaume] that we [diversion opponents] are going to lose." Fifty years ago, he explains, the possibility of a Gila River dam met rejection due to its high cost and unneeded water. Now, as a result of the Endangered Species Act, elimination of potential dam locations, and a set of impossibly strict NMISC restraints, a diversion would be "an order of magnitude more difficult [to implement]" (Norm Gaume, personal communication 2016).

With one foot in each era, the Gila River ties to water issues in countless other regions, particularly those of similar aridity. For Roepke, the cross-regional similarities reside mainly in a widespread lack of water (Craig Roepke, personal communication 2016). He stresses, "I don't think the Gila, at its core, is any different than any other

water issue . . . [Be it] in New Mexico, the West, the United States, or the world, there's very little freshwater" (Ibid.). Unfortunately, the preciousness of this resource, Gaume and Siwik have found, has caused controversy - and in some cases, fraud - to be the common ground among Western rivers (Norm Gaume, personal communication 2016; Allyson Siwik, personal communication 2016). On the topic of manipulation and dishonesty, Siwik laments, "I mean it's the same old story everywhere . . . And I wish we could say we are different" (Allyson Siwik, personal communication 2016).

In contrast, though, the Gila's relatability to other regions also lies in new paradigm modes of thinking. Gaume sees its greatest link to broader water issues to be a question: "When are we going to recognize that rivers have value as rivers," rather than merely an effort to make their water's value economic? (Norm Gaume, personal communication 2016). Although the Gila presently stands as more of an opportunity for ecological thinking than as an example, it is not exempt from the paradigm shift that shapes rivers across the West.

Conclusion

On a surface level, the Condit Dam removal and the Gila River diversion project appear nearly complete opposites. Ecologically, the lush White Salmon River Basin could not be more distinct from arid southwestern New Mexico. The former challenges the status quo through an undoing of the infrastructure which has been integral to the West for the past century. The other, in contrast, seeks to continue the thirsty pattern of new water project construction. Such a juxtaposition shows that the transition is slow, though each case study points, in its own way, toward a growing scrutiny regarding the patterns that persistently shaped previous water paradigms.

Both the Condit Dam removal and the Gila River diversion project center around factors that consistently have tremendous influence over modern issues. Stakeholders in both the Colorado and Columbia River Basins frequently refer to financial, legal, and public opinion pressures throughout the river management decision making process. Simultaneously, environmental factors steadily underscore the management decisions of each geographic region. In a society shaped by economics, the White Salmon and Gila Rivers each pose questions heavily dependent on and constrained by budgets. Similarly, legislation in place, to a large degree, structures their management. Meanwhile, as with any controversy, the whirlwind of a gradually shifting common conscience and voices of public opinion play a critical role in addressing dams. Among the constant interplay between a wide variety of interests, each side of each debate draws on credible values to make its case.

With such a heavy influence from these factors, there arises an opportunity to rethink the status quo, look to important interests tangled in river management, and ideally compromise. The Condit Dam removal can by no means speak for the future of all dams, but it is a fascinating example of appealing to a variety of interests while diving into the growing new paradigm of our present era. The decision for dam removal relied on a combination of economic interests and legal constraints. Coincidently, these factors made an environmentally sound decision possible. Previously marginalized groups such as tribes and environmentalists found a voice through pulling on PacifiCorp's interests to prove the economic benefit and legality of dam removal (Bonham 1999). Eventually, the power company indeed maximized income through a process originally assumed unprofitable. The focus on interests, coupled with a growing sense of welcome for drastic change, produced remarkable results. Though the area's ample supply of water may have uniquely eased the troubles of parting with a reservoir, the process holds continual relevance beyond both the river's geographical area and its historical moment of dam breaching.

Similarly, each side of the Gila River argument draws on nearly identical factors. On the part of the State, the temptation of millions of dollars drives an interest in diversion, while advocates for a free-flowing river use the would-be expense to locals as defense of their viewpoint (Paskus 2016; Allyson Siwik, personal communication 2016). As a result, the project has been scaled down but remains under dispute. Under requirements of law, six endangered species and the need for fish passage limit the possibilities for diversion (Walton 2015, "Gila River Diversion In New Mexico Pits New West vs Old"; Allyson Siwik, personal communication 2016). Yet, the State's legal

rights to additional water are, for some, sufficient reason to pursue the project. Conflicting common consciences underlie each side of the dispute, as those in the habit of consumptive water use come face to face with those establishing conservation efforts as routine (Allyson Siwik, personal communication 2016). Both sides feel the pressure of their drought-prone area to make some sort of change. Consequently, much of the community feels a heightened interest in water issues (Ibid.).

As locals of the Gila and White Salmon Rivers seem to be finding, the present is a fascinating time to engage in water management. Both regions owe the foundations of their water issues to the paradigms that have shaped the past century, and their relevance will indubitably extend far into the future. Both rivers tie into a web of interrelation and commonality stretching across the West and across the globe. Perhaps there has been no better time to embrace a renewed scrutiny while carefully balancing an environmental ethic with a sense of honor for existing systems upon which we rely.

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Impacts of Climate Change and Changing Seasonal Flow Regimes on the Columbia River Basin

by Joseph Friedland, 2016-17 State of the Rockies Project Fellow

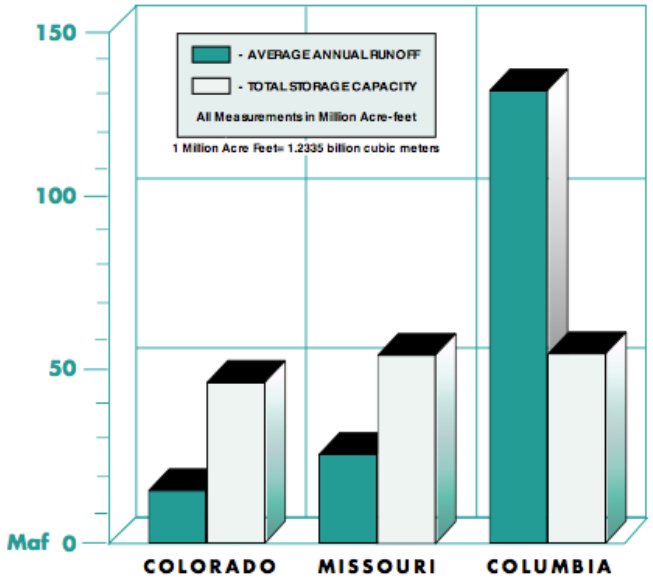
Introduction

The Columbia River is the lifeblood of the Northwest United States, and its drainages stretch across the entire region. The Columbia River Basin comprises over 258,000 square miles across southwestern Canada, Washington, Oregon, Idaho, Montana, Wyoming and small sections of northern Utah and Nevada (see **Figure 1**). Over the course of a single year 130,000,000 acre-feet of water pass through the system (BPA 2001). Millions of people rely on the Columbia River system for municipal, agricultural and industrial uses.

What sets the Columbia River Basin apart from many other large basins in the United States is its reliance on mountain snowpack and spring runoff as its primary water source (Clow 2009). Approximately 70% of annual flows in the Columbia River Basin originate from snowpack in the Rocky and Cascade Mountains. According to the USGS, snowpack alone provides 60%-80% of the annual water supply for 80 million people across the American West (Struzik 2014).

Across the Columbia River Basin, approximately 70% of total annual precipitation has historically fallen as snow during winter and early spring (Guido 2008). More localized climate and precipitation patterns exist within the basin, however, this figure makes it clear that the Columbia River Basin is dependent on winter precipitation as its primary water source. With such a large proportion of annual precipitation falling over a relatively short period of time, it is critical that water can be stored during the wet part of the year for use during dryer times. Historically, snowpack has accumulated at high and middle elevations over the course of the winter in the mountains of the headwaters region (U.S. Department of the Interior 2011). As winter becomes spring and temperatures warm, this snowpack begins to slowly melt, providing steady flows of cold, fresh water to the system over the course of the summer when precipitation is sparse (FWEE 2017). Although significant development of man-made water storage infrastructure has occurred in the Columbia River Basin (see **Figure 2**), snowpack is still by far the most important storage method. The capacity of reservoirs, dams and impoundments in the Columbia River Basin is significantly outweighed by the storage capacity of mountain snowpack (Clow 2009). Unlike other western river basins such as the Colorado River Basin,

Figure 2: Average Annual Runoff vs. Storage



This graph shows the average annual runoff (expressed in millions of acre-feet) compared the storage capacity of man mad impoundments in the Colorado, Missouri and Columbia River Basins. Source: BPA 2001

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Figure 1: Map of the Columbia River Basin

The Columbia River Basin spans seven states as well as British Columbia and contains an extensive network of dams. The dams' cumulative storage capacity, however, pales in comparison with the water stored in mountain snowpack. Source: ESRI, Bureau of Indian Affairs, National Watershed Boundary Dataset, National Inventory of Dams, Canadian Department of Natural Resources, Columbia River Inter-Tribal Fish Commission, National Elevation Dataset

dams and reservoirs in the Columbia River Basin were constructed expressly for the purposes of hydropower generation and flood control, not long term water storage for municipal, agricultural and industrial use.

Consequently, water storage infrastructure in the Columbia River Basin only has the capacity to store 40% of the basin's total annual water volume (Bureau of Reclamation 2011). This means that snowpack and spring runoff are absolutely vital to ensuring ecosystem health and water supply viability in the Columbia River Basin.

Effect of Warming on Snowpack Development and Spring Runoff

Natural systems of snowpack development and snowmelt runoff have sustained the Columbia River system for modernity. Now, however, climate change and rising temperatures are threatening the delicate water supply balance of this snowmelt driven basin (Stewart 2004). The western United States is warming faster than the global average, and increases in winter, spring and summer temperatures have been observed across almost all of the western United States (Stewart 2005). Although aggregate temperature changes and rates of change vary across the region, average warming has been about 1°C (1.8°F) per century. Additionally, the rate of increase from 1947 to present is roughly double that of the longer period from 1916 to present, and the majority of the observed warming has occurred since 1975 (Tohver 2014).

Over the course of the next century, mean annual temperatures in the western United States are expected to rise by 2°C to 4°C (~3.6°F to 5.4°F) at the low end of the uncertainty range, to 4°C to 6°C (~8.9°F to 10.7°F) at the upper end of the uncertainty range (Canziani 2007; Miles et al. 2007). Future changes in temperature will be largely dependent on greenhouse gas emissions, which will depend upon human activities and development.

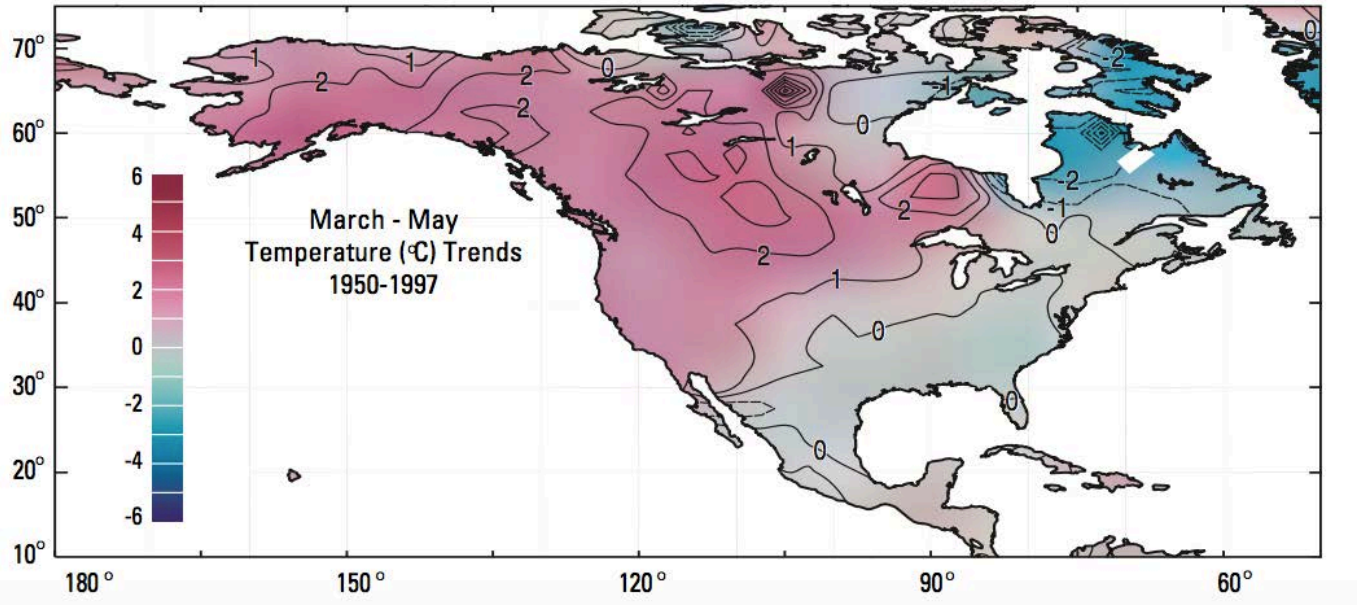
The Columbia River Basin in particular has experienced a mean annual temperature increase of approximately 1°C in the last 40 years, and like in the Colorado Basin, winter and spring temperatures have seen the greatest increase, causing temperature changes to have significant impacts of snowpack development and spring melt and runoff (Washington State Department of Ecology 2016). Additionally, temperature increases in the Columbia River Basin are expected to continue well into the 21st century, with some models predicting mean annual temperatures to rise by an additional 2°C by 2050 (Graves 2009).

Rising temperatures, especially during the late winter and early spring, have the potential to significantly disrupt natural patterns of snowpack development and spring runoff. In the Columbia River Basin, warmer late winter and early spring temperatures are already causing and will continue to cause a greater proportion of annual precipitation to fall as rain rather than snow (Knowles et al. 2006). Warming temperatures and changes in the form of precipitation occurring have already begun to cause earlier snowpack melt, as well as decreases in overall snowpack in some watersheds. These trends are expected to worsen in the coming decades (Struzik 2014).

The 2008 Intergovernmental Panel on Climate Change (IPCC) report estimates that mountain ranges across the western United States will see a significant reduction in snowpack by 2050, however, estimates on just how much snowpack will decrease vary greatly (Washington State Department of Ecology 2016). With snowmelt providing between 70% and 90% of the annual water supply to watersheds in the Columbia River Basin, even minor changes in patterns of snowpack development and seasonal snowmelt have the potential to significantly alter natural flow regimes in rivers and streams (United States Bureau of Reclamation 2016).

Projections for mountain snowmelt–dominated watersheds in the Columbia River Basin suggest that the most significant changes in annual stream flow will not be seen in the quantity of water, but rather in the timing of when the water passes through the river basin. Warmer winter temperatures and earlier springtime warming (see **Figure 3** and **Figure 4**) will cause snowpack to begin melting earlier in the year and cause a higher proportion of annual precipitation to fall as rain rather than snow. The shift towards rain dominated precipitation patterns and earlier spring snowmelt will have a variety of impacts on seasonal flow regimes (Mote et al. 2005; Knowles et al, 2006; Luce and Holden 2009).

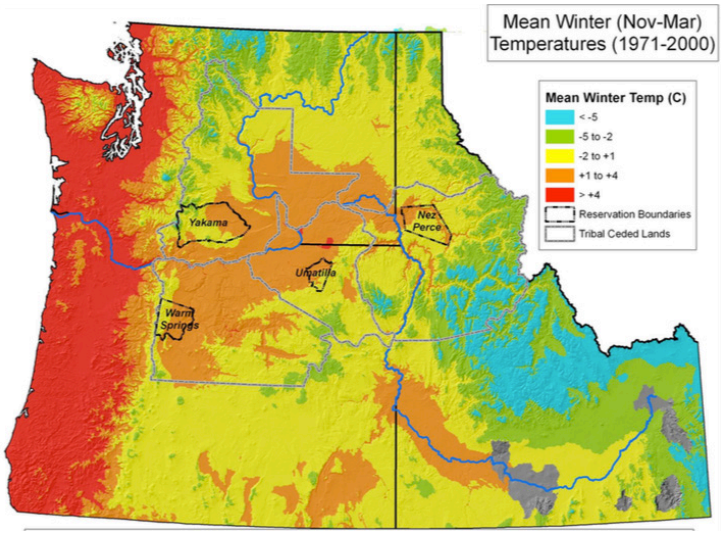
Figure 3: Spring Temperature Changes Across North America



The Northwest has experienced more significant warming than other regions of the country. Source: Dettinger 2006

When precipitation falls as rain rather than snow, it cannot be retained in snowpack and a critical "natural reservoir" or source of water storage is lost. Rather than being stored and slowly released into the watershed during the dry summer months, the water will pass through the system at a time of year when precipitation is already plentiful (Knowles et al. 2006). Additionally, when rain falls on snowy hillsides, large amounts of snowmelt and associated runoff can occur over a very short period of time. This further reduces the amount of snowpack that is available to provide water to the basin later in the year and has the potential to cause significant flooding events (Mote et al. 2005). Earlier springtime warming also contributes to earlier snowpack melt, which further reduces the amount of water available to the system in the form of runoff during low precipitation summer months (Ibid.). Reductions in summer streamflow as well as an increased frequency of winter flood events could have major implications for fisheries, wildlife, water supply, and agriculture, particularly in drier regions. The current and expected future trends in hydrology suggest a coming crisis in water supply for the Columbia River Basin and the western United States (Barnett et al. 2008).

Figure 4: Winter Temperature Changes in the Columbia River Basin



Parts of the Columbia River Basin have warmed with the rest of the Pacific Northwest. Source: Graves 2009

Changes in Streamflow Timing

While projections indicate that natural spring runoff regimes will change significantly in the future, these projections are already being borne out in watersheds across the Columbia River Basin. This shift has been documented through trends towards earlier timing of the initial pulse of snowmelt runoff, earlier timing of the center of mass of flow, and a redistribution of the average monthly fractional flow from the historical snowmelt season towards earlier in the water year (Stewart et al. 2005). The trends in stream flow timing, as well as their inter-annual and long-term variability, have been most strongly connected with spring air temperature variations, in the sense that warmer temperatures have led to advances in snowmelt timing. Studies examining shifts

in snowmelt and spring runoff timing often use three primary indicators: seasonal fractional flows, spring pulse onset and the date of the timing of the center mass of annual flows (Stewart et al. 2004).

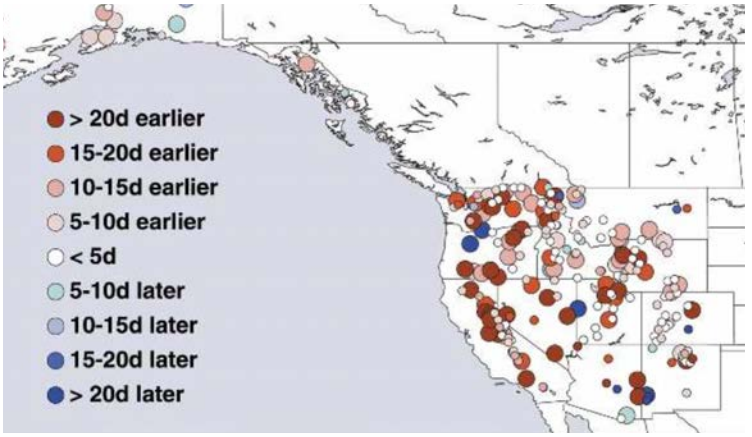
Seasonal fractional flows are defined as the ratio of the stream flow that takes place in a given month or season to the total stream flow in the given water year. The spring pulse onset date is simply the day on which the beginning of the spring snowmelt derived stream flow pulse begins. This is calculated by determining which day the cumulative departure of the daily flow from the mean flow is minimum. The timing of the center of mass of annual flows (CT) is the day on which half of the water years' total flow volume has passed through the Columbia River system. The spring pulse onset date is the best indication of actual earlier snowpack melts. CT timing and seasonal fractional flows provide the best overall picture of changes in temporal distribution of flows throughout the year. Essentially, spring pulse onset date shows that snowmelt is occurring earlier, and CT timing and seasonal fractional flows highlight the effects this earlier melt has on actual stream flows and temporal distribution of water over the course of the entire water year. It is these factors that will have the most significant implications for ecosystem health and water management (Ibid.; Stewart et al. 2005).

Spring pulse onset data from stream gauges across the western United States show widespread trends towards an earlier onset of the snowmelt spring pulse. Although the exact nature and magnitude of this trend varies across the West, one study found that the most prevalent regionally coherent trend was a 10-30 day shift towards earlier spring pulse onset since 1948 (see **Figure 5,** Stewart et al. 2005).

The same study found that CT timing correlates well with spring pulse onset date, and determined that a corresponding 10-30 day shift towards earlier CT timing had occurred over the study period (see **Figure 6**, Stewart et al. 2004).

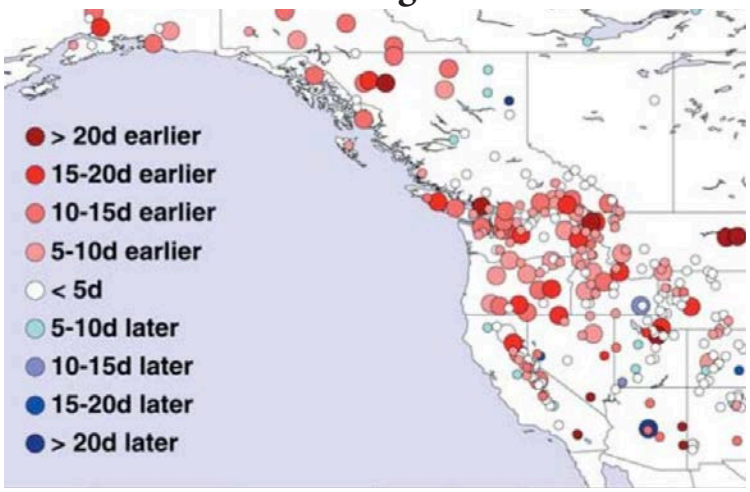
In addition to changes in CT and spring pulse onset timing, studies have shown concurrent changes in seasonal fractional flows, particularly spring and summer flows. In the Columbia River Basin, April, May, June and July (AMJJ) fractional flows have shown significant declines since the mid 20th century. A study of watersheds within the Columbia River Basin found that 81% of snowmelt dominated drainages exhibited a decline in AMJJ fractional flows. For most snowmelt-driven watersheds in western North America, AMJJ flows are the most important contribution to the annual streamflow, comprising 50%–80% of the annual total (Ibid.). June fractional flow represents a significant portion, 10%– 30% for many gauges, of average annual flow for the snowmelt-dominated gauges. The sizable and widespread trends toward decreasing June fractional flows appear to be a compensation for the increase in fractional flow during March. Decreases in June average fractional flow range from 5% to 25% (Ibid.; Graves 2009).

Figure 5: Observed Trends in Spring Pulse Onset Since 1948



Spring pulse onset is now occurring 10-30 days earlier in the year across the Columbia River Basin. Source: Stewart 2005

Figure 6: Observed Trends in Center of Mass Timing since 1948



The center of mass of flow is occurring approximately 10-30 days earlier in the Columbia River Basin. Source: Stewart 2004

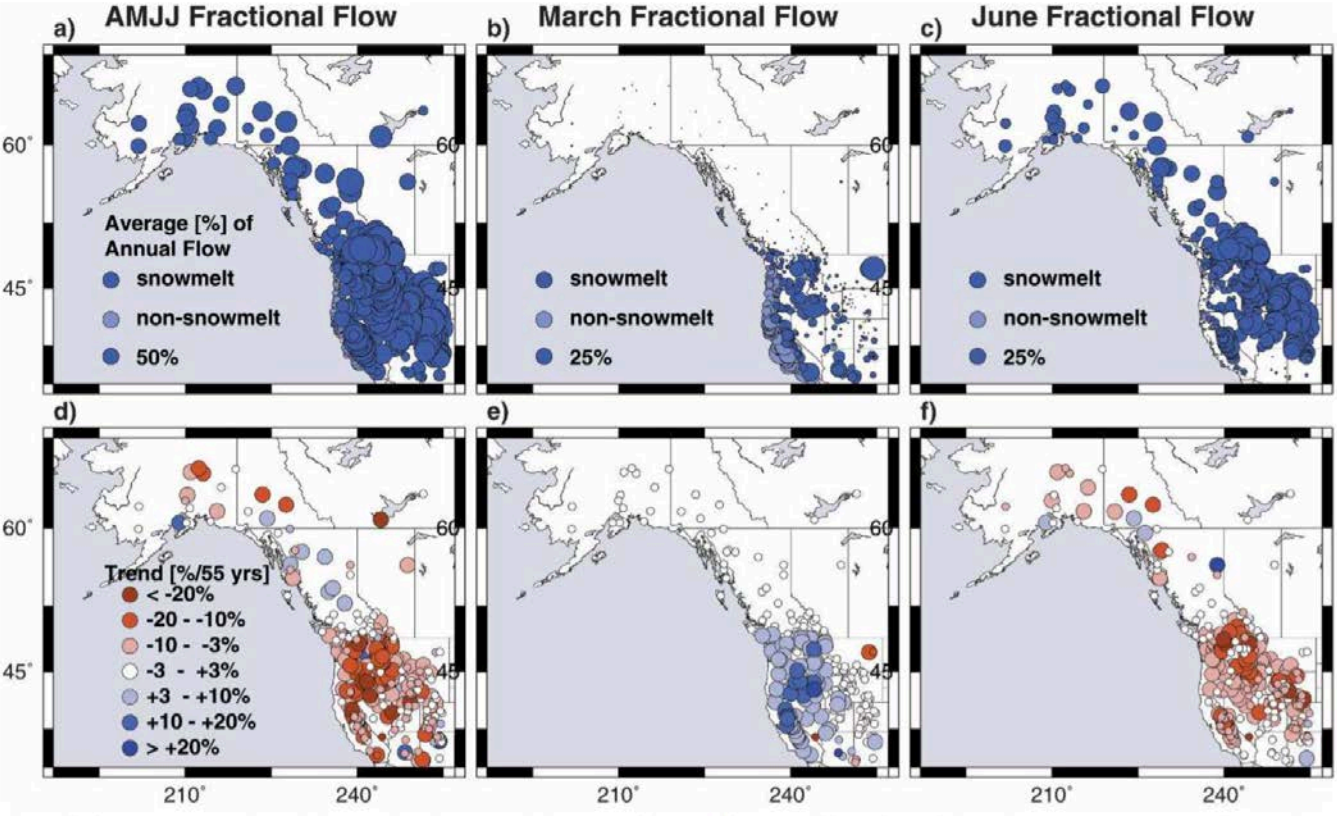
In the Columbia River Basin AMJJ fractional flows and the timing of spring pulse onset have changed dramatically. During field research in the Pacific Northwest, I was fortunate to meet with David Graves and Kyle Dittmer of the Columbia River Intertribal Fish Commission (CRITFC). Their research has shown that snowpack is, in fact, melting earlier in watersheds that are home to traditional tribal fisheries, leading to important changes in seasonal flow regimes. Perhaps most importantly, average spring flow onset date has shifted earlier by an average of 5.7 days in the Columbia River Basin, with some watersheds shifting towards an earlier onset date by as much as 17-31 days (Kyle Dittmer, personal communication 2016). Additionally, the timing of peak spring runoff has shifted 34 days earlier in just the last 80 years (Graves 2009).

This earlier flow onset date combined with higher summertime temperatures has caused April-July fractional flows to decrease by an average of 16% across the Columbia River Basin with April-June fractional flows decreasing by as much as 22%-28% in some basins (see **Figure** 7, Ibid.). Research from the Columbia River Intertribal Fish Commission has shown that as spring runoff has begun occurring earlier, AMJJ fractional flows have decreased in tributaries, and summer flows in the main stem of the Columbia River have decreased by between 10% and 50% (Ibid.).

In addition to regional trends towards earlier snowmelt and spring runoff, Native American tribes have also observed these types of trends on a more localized, watershed level. Tribal fisherman and water resource departments from both the Nez Perce Tribe and Confederated Tribes of the Colville Reservation have reported earlier peak spring runoff in the watersheds and on their reservations. Rebecca Miles of the Nez Perce Tribal Council informed us that tribal fisherman have observed the timing of spring snowmelt and runoff move forward by nearly a month in the Clearwater River and its tributaries. Changes in the headwaters region of the Clearwater River located near the Nez Perce reservation in Lapwai, Idaho have significant implications for the health of the Snake River and main stem of the Columbia River.

The water resources department of The Confederated Tribes of the Colville Reservation reported

Figure 7: Changes in Seasonal Flows as a Percentage of Total Annual Flows



AMJJ, and especially June fractional flows, have decreased throughout the Columbia River Basin while March fractional flows have increased. Source: Stewart 2005

a similar trend in the tributaries of the Columbia River located on their reservation. Changes in these smaller watersheds have the potential to significantly impact the Columbia River Basin system as a whole.

Impacts of Streamflow Timing on Salmon Survival and Water Quality

Earlier spring snowmelt and changes in AMJJ fractional flows in tributaries of the Columbia River have significant implications for water conditions throughout the basin. During my meeting with Mr. Graves and Mr. Dittmer, they were able to provide a clear picture of how climate change, earlier snowpack melt, and changes in seasonal stream flow patterns have negatively impacted water conditions throughout the Columbia River Basin (Independent Scientific Advisory Board 2007).

Both Mr. Dittmer and Mr. Graves indicated that as AMJJ fractional flows have decreased, spring and summer water temperatures in the Columbia River Basin have increased drastically. One of the most notable consequences of changes in seasonal flow patterns and increasing water temperatures is the potential for additional damage to salmon populations which are already struggling to recover from decades of dam construction and overfishing (Mantua 2010).

Lower spring and summer water levels allow rivers to heat up more quickly and decrease the number of cool, deep pools salmon can seek refuge in when temperatures are high. Additionally, earlier snowmelt means less cold melt water is entering river systems during the hot summer months. In the past, melt water has helped to keep rivers cool during hot summer months. Now, however, this natural cooling mechanism is disappearing due to earlier snowmelt (Crozier 2008).

As a result of lack of snowmelt, even tributaries high in the Columbia River Basin watershed are warming to a dangerous degree. Water temperature monitoring on Lapwai Creek, a tributary of the Clearwater River located on the Nez Perce reservation, found that maximum daily temperatures in the creek regularly exceeded Idaho State Department of Environmental Quality guidelines in June through September (Rebecca Miles, personal communication 2016). This is particularly alarming as small tributaries such as Lapwai Creek have historically supplied cool, fresh melt water to the lower watershed. Without sources of cold water in the upper watershed, the lower watershed and the main stem of the Columbia will suffer.

A study examining water temperatures passing through the Bonneville Dam on the main stem of the Columbia River found that the number of days in which water temperatures exceeded stressful levels for salmon (above 68°F) had increased dramatically, and the time of year at which these temperatures were reached came far sooner. Additionally, the study found that average monthly temperatures for April-August exceeded the 75 year monthly averages in all months in both 2015 and 2016 (Graves 2016). Although water temperatures are, for the most part, not higher than temperatures seen in the past, rivers in the Columbia River Basin are becoming hotter earlier in the year and remaining at higher temperatures for longer periods of time.

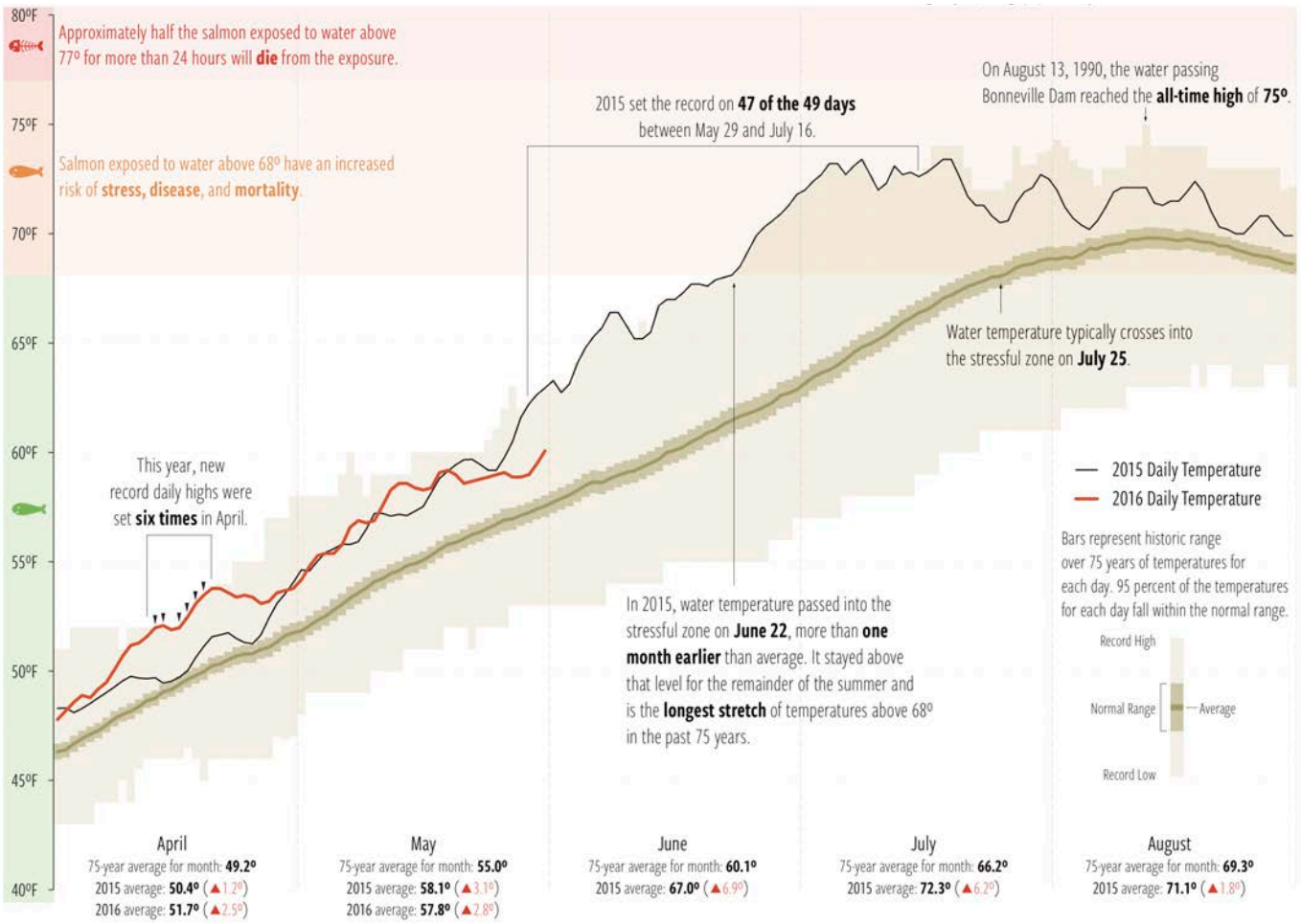
Decreases in spring and summer flows and associated increases in water temperatures are of special concern to salmon populations as these changes are occurring at the time of year when mature salmon are entering the Columbia River system to spawn. Low flows can disrupt habitat continuity and significantly increase migration times, or even prevent the salmon from reaching the spawning grounds completely (Mantua 2010).

The Columbia River Basin is home to fall, spring and summer runs of Chinook salmon as well as smaller numbers of Sockeye and Coho salmon. The earliest spring salmon begin entering the Columbia River in March with fall runs concluding by the end of October. While salmon migrations in the Columbia River Basin occur over approximately six months, the majority of salmon complete their journey to the spawning grounds in the late summer and early fall (Ibid.). This makes Columbia River salmon particularly susceptible to decreases in summer flows and increases in summer water temperatures. Studies have shown that higher water temperatures and low flows significantly increase upstream migration times for returning salmon (Kyle Dittmer, personal communication 2016).

Increases in water temperature combined with delays in upstream migration significantly increase the amount of time migrating salmon are exposed to temperatures above their lethality threshold. High water temperatures can have a variety of impacts on spawning salmon including heat shock, stress, and reduced disease resistance (see **Figure 8**). Both Mr. Dittmer and Mr. Graves pointed to the mass die off of Sockeye salmon in the Snake River during the summer of 2015 as an example of the severity of this problem. During this event salmon traveling upriver became trapped in rapidly shrinking pools as normally reliably flowing tributaries became intermittent. As the salmon became trapped, water temperatures rose, eventually killing 99% of the salmon that returned to the Snake River that year (Kyle Dittmer and David Graves, personal communication 2016).

Discussions with representatives of the Nez Perce Tribe and Confederated Tribes of the Colville Reservation Tribes further confirmed that high water temperatures are having a negative impact on returning salmon populations. Members of both tribes spoke of how tribal fisherman have observed greater numbers of unhealthy or diseased fish as water temperatures have warmed. Rebecca Miles of the Nez Perce Tribe also informed us that tribal fishermen have begun to observe that the quality of the meat obtained from migrating salmon is deteriorating earlier in the season as water temperatures have warmed (Rebecca Miles, personal communication 2016). This means that while fish may still be able to spawn before they succumb to the heat, tribal fisherman now have a shorter window to catch their annual quota of salmon before the fish deteriorate to the point where the meat is no longer a viable food source. Although this may not have a direct impact on the viability of salmon populations, it does threaten the viability of subsistence and commercial salmon fisheries, as well as a tremendously important cultural resource.

Figure 8: Increases in April-August Water Temperatures at the Bonneville Dam



April-August water temperatures in the main stem of the Columbia River has increased dramatically between 1946 and 2016. The chart shows that water temperatures are now warming earlier in the year and that summer temperatures often exceed stress thresholds for salmon. Source: Graves 2016

Many projects, some meant to help protect existing habitat and others to create new salmon spawning habitat, are underway throughout the Columbia River Basin. Most of these projects are focused on planting riparian vegetation to help shade rivers and creeks in the upper watershed in an effort to reduce water temperatures. Ms. Miles explained that while these efforts are helpful, and similar habitat restoration efforts are underway on the Nez Perce reservation, creating good salmon habitat in the upper reaches of the Columbia River Basin will not be sufficient to ensure the survival of salmon. Even if water temperatures in spawning grounds are successfully lowered, the effort will be for nothing if warm water continues to persist in the lower basin (Rebecca Miles, personal communication 2016). Mr. Graves and Mr. Dittmer explained that if salmon encounter a patch of warm water during their migration it can act as a thermal barrier preventing the salmon from travelling any further upstream. According to both Mr. Dittmer and Mr. Graves, the temperatures recorded at the Bonneville Dam are potentially warm enough to act as a barrier to further migration. Consequently, temperature issues on the main stem and lower reaches of the Columbia River Basin must be addressed before the full benefit of habitat restoration in the upper basin can be realized. Unfortunately, the process of regulating temperatures on the larger rivers in the basin presents a far more difficult challenge than restoring habitat in the tributaries (Kyle Dittmer and David Graves, personal communication 2016).

Increases in water temperature are not just killing migrating salmon, but are also having significant impacts on the biogeochemistry of the Columbia River Basin. According to The Columbia River Intertribal Fish Commission and sources at the Nez Perce Tribe and the Confederated Tribes of the Colville Reservation, higher water temperatures are also increasing the rate of mercury methylation in tributaries of the Columbia River. Although mercury levels in the sediment of the Columbia River Basin have long been a concern due to mining pollution, the mercury present has historically remained in an un-methylated form. In this form, the mercury has a low bioavailability and largely remains in the abiotic levels of the ecosystem. Studies have shown, however, as water temperatures warm, the rate at which mercury undergoes methylation increases dramatically. Once methylated, the bioavailability of the mercury increases significantly. This allows for mercury uptake at the producer level of the food chain. Once the methylated mercury has entered the food web of the river, it bio-accumulates up the food chain to herbivorous species and eventually all the way up to predatory species such as salmon and sturgeon (CRITFC, personal communication 2016). There are significant concerns that increases in methylated mercury are causing significant reproductive harm to salmon and sturgeon and that mercury methylation may be the culprit for the disappearance of salmon from some spawning grounds (Rebecca Miles, personal communication 2016).

Although mercury levels in the tissue samples of fish from studied parts of the Columbia River Basin do not exceed levels considered hazardous by FDA guidelines, members of the Native American tribes of the Columbia River Basin consume fish such as salmon at significantly higher rates than non-Indigenous people. The FDA guidelines do not account for this discrepancy and, as such, this means that mercury poisoning could become a very real concern for members of Indigenous communities. Even slight increases in mercury methylation due to rising water temperatures pose a significant threat to a historic and culturally important food source (CRITFC, personal communication 2016).

Higher water temperatures have also led to increased predation of migrating spawning and juvenile salmon populations. The Columbia River Intertribal Fish Commission reports that as water temperatures have warmed, populations of predatory species such as sea lions have increased in the estuaries of the Columbia River. Sea lions are responsible for killing thousands of migrating adult salmon as they enter coastal waters and estuaries to begin their journey to the spawning grounds. Warmer temperatures in inland waterways have also been blamed for the proliferation of freshwater predator species such as bass, which are normally found in more temperate watersheds. These species have become efficient predators of juvenile salmon, killing them before they have a chance to reach the ocean and grow to maturity (CRITFC 2016).

Hydrology and Salmon Migration

Warmer temperatures and decreases in AMJJ fractional flows are not the only way in which earlier spring snowmelt and runoff are impacting salmon populations. Changes in the timing of spring runoff can have significant implications for the migratory patterns of juvenile salmon in the Columbia River Basin (Kyle Dittmer, personal communication 2016). In the Columbia River Basin, most salmon hatch from their nests sometime in the early spring and spend the early part of their lives feeding and growing in the freshwater tributaries of the Columbia River. After developing for a short period of time, these juvenile salmon begin their long and dangerous migration out to the ocean to begin their adult lives (CRITFC 2017). What exactly stimulates juvenile salmon to begin their seaward migration is not completely understood, however, Kyle Dittmer and David Graves were quick to point to the beginning of the April/May freshet (spring snowmelt) as a primary biological indicator for juvenile salmon to begin migrating towards the ocean. As a result, early spring snowmelt may cause juvenile salmon to begin their seaward migration earlier in the year (Kyle Dittmer and David Graves, personal communication 2016).

A change in the timing of seaward migration in juvenile salmon is potentially problematic for a variety of reasons. One issue that was highlighted in interviews with the Columbia River Intertribal Fish Commission was that the seaward migrations of juvenile salmon have historically been timed to match nutrient upwelling in the Pacific Ocean. The timing of the start of seaward migrations in Columbia River salmon has been such that the juvenile fish arrive at the ocean at a time at which nutrient levels are high. This ensures that the young fish are able to grow quickly upon entering the ocean, increasing survival rates (Ibid.). If alterations in the timing of spring freshet cause changes in the timing of juvenile salmon migration, their arrival at the ocean may no longer closely coincide with times of high biological productivity. Several studies have shown that survival rates for juvenile salmon entering the ocean are highly dependent upon the salmon's ability to find food and grow quickly. Consequently, lower biological productivity at the time juvenile salmon are arriving at the ocean could significantly increase mortality in juvenile salmon populations, threatening the future of Columbia River salmon (Scheuerell 2009).

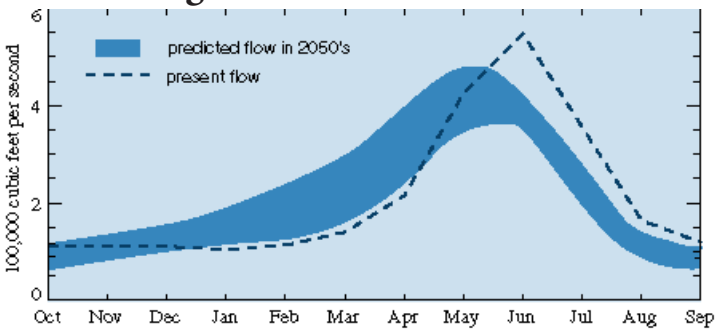
A substantial spring freshet at the time juvenile salmon are migrating towards the ocean is also critical to ensuring the fish are able to successfully complete their long journey. Due to their small body size, juvenile salmon are relatively inefficient swimmers and must expend considerable amounts of energy to travel even short distances. In some cases, however, juvenile salmon must travel nearly 1000 miles from their natal streams to the ocean (Dittmer 2013). Consequently, juvenile salmon rely on high instream flows during the spring and early summer to carry them from the spawning grounds in the headwaters out to the ocean. As snowmelt and peak runoff occur earlier and earlier in the year, however, periods of high runoff flow will no longer coincide with the time juvenile salmon are migrating (Scheuerell 2009).

Additionally, peak flows are not as high as they once were. Without these high flows, juvenile salmon will encounter longer stretches of slack water and low flows along their migratory route (see **Figure 9**). This will force fish to expend more energy during their migration which will reduce the size of the juvenile salmon reaching the ocean. Studies have shown that the larger juvenile salmon are when the reach the ocean, the higher their survival rates will be.

Lower flows will also significantly increase the amount of time it takes the salmon to reach the ocean (Ibid.). According to the Columbia River Intertribal Fish Commission, migration times for juvenile salmon have historically averaged between 2 and 3 weeks. As spring runoff has moved earlier in the year and fallen out of sync with the timing of seaward migration, however, migration times in some areas of the Columbia River Basin have increased to almost 2 months. (Cosens 2017) This significantly increases the likelihood the salmon will fall prey to predators before reaching the ocean.

Longer migration times mean that juvenile salmon will remain in inland waterways further into the summer. This fact combined with decreasing summer flows and increasing water temperatures could also cause more salmon to die of heat stress during their migration to the

Figure 9: Changes in Timing and Magnitude of Peak Runoff



Peak runoff will occur earlier and release less water than historical averages. This may mean that high flows will occur at the wrong time to help catalyze juvenile salmon migrations, or that flows will not be sufficient to help juvenile salmon migrate downstream. Source: Scheuerell 2009

ocean (Scheuerell 2009). Delays in reaching the estuaries could also cause juvenile salmon to miss periods of nutrient upwelling in coastal waters. The loss of large numbers of juvenile salmon could seriously threaten the future of salmon in the Columbia River Basin.

Decreases in AMJJ fractional flows and warmer water temperatures are not the only consequence of climate change and earlier spring snowmelt impacting the Columbia River Basin. Since 1949 the proportion of total annual precipitation occurring as rain has increased by 75% (Guido 2008). In addition to decreasing winter snowpack and natural water storage capacity, this phenomenon has also lead to a drastic increase in the occurrence of severe fall and winter floods. A study conducted by the Columbia River Intertribal Fish Commission found that October, November and December floods are now occurring 49% more frequently than historical averages (Graves 2009).

Winter flooding has always been a part of the hydrology of the Columbia River Basin and is, in fact, vital to maintaining healthy riparian ecosystems. Even salmon have relied on winter high flow events and floods for the success of their reproductive cycle. During the spawning season, salmon make nests in the gravel of riverbeds throughout the basin. Salmon eggs then develop in these nests over the winter before hatching in the spring. In order to develop properly, the salmon eggs require fast flows of cold, highly oxygenated water. During the winter, high flow events help keep nests clear of silt, allowing for a continuous flow of water over nest. Additionally, flooding events temporarily increase dissolved oxygen levels in rivers and streams, which helps to ensure the developing salmon eggs are getting the oxygen they need (Dittmer 2013; Kyle Dittmer personal communication 2016).

While some winter flooding is clearly important for the health of developing salmon eggs, high intensity floods resulting from rain on snow events pose a serious threat to the survival of salmon nests. Kyle Dittmer and David Graves spoke of how in some years, singular severe floods and repeated lower intensity flooding events on tributaries of the Clearwater, Snake and Columbia Rivers have wiped out entire generations of salmon nests from a single mating season (Kyle Dittmer and David Graves, personal communication 2016). Although these types of catastrophic events have typically occurred on smaller tributaries with relatively small spawning populations, if flooding continues to worsen, larger tributaries of the Columbia River that are vital spawning grounds for recovering salmon populations could soon be threatened.

Traditional, Ecological, and Economic Values of Salmon

The threats posed to salmon by changing snowpack melt and spring runoff regimes are an especially notable issue as salmon are an ecologically important keystone species throughout the Columbia River Basin. Spawning salmon populations play a critical role in food webs and nutrient cycling in both ocean and riparian ecosystems in the Pacific Northwest (Rahr 2017). Salmon act as a vital source of nutrients for large mammals such as grizzly bears, sea lions and orcas as well as nearly 140 other species of plants and animals (Ibid.). The role of salmon as predators in managing populations of prey species must also not be overlooked. Without salmon, a vital link in the food web of the Pacific Northwest would be lost.

In addition to their roles as both predators and prey in the food web of the Pacific Northwest, spawning salmon populations are also critical to nutrient cycles in the region. When salmon migrate upstream to spawn, they carry nutrients from highly productive areas of the ocean into the relatively nutrient poor headwaters regions of the Columbia River Basin (Helfield 2001). When salmon die and decompose after spawning, the nutrients that have accumulated in their bodies during

their time spent feeding in the ocean are transferred to the riparian ecosystems of the headwaters regions. Additionally, terrestrial predators such as bears and birds of prey disperse nutrients derived from salmon deeper into riparian forests through defecation (Rahr 2017). A study conducted in several watersheds in Alaska found that marine derived nitrogen from decaying salmon carcasses can provide up to 25% of the nitrogen present in northwestern forests. This makes salmon critically important to riparian forest health in the Northwest as nitrogen is the primary limiting nutrient in most northern forests. The same study also found that foliage growth rates in watersheds with returning salmon populations were three times higher than forests in watersheds without returning salmon populations (Helfield 2001).

Riparian forests play a critical role maintaining watershed health and water quality. Vegetation helps to stabilize stream banks, prevent erosion and shape stream channels. This helps to limit problems such as siltation and channel widening. Vegetative cover from streamside vegetation also helps to keep water temperature low during hot summer months and provides cover for fish. When trees die and fall across the stream they create log jams that provide habitat and shelter for juvenile salmon. By helping to maintain the heath of riparian forests, salmon populations play a critical role in positive feedback loops that promote healthy riparian habitats and healthy salmon populations (Ibid.).

In addition to being ecologically important, salmon are also a cultural and subsistence resource to many of the Native American tribes in the Columbia River Basin. This aspect of the importance of salmon became abundantly clear when speaking with Rebecca Miles of the Nez Perce Tribe in Lapwai, Idaho. Speaking with Ms. Miles, she highlighted the importance of salmon and salmon fisheries as a cultural and subsistence resource for the Nez Perce and other tribes in the Pacific Northwest. The tribes of the Pacific Northwest have relied on salmon as a primary food source for thousands of years, and Ms. Miles passionately told us about the special place salmon hold in the spiritual traditions of the Nez Perce Tribe. So closely linked are the Nez Perce people and salmon that the Nez Perce sometimes refer to themselves as the "salmon people" (Rebecca Miles, personal communication 2016).

Salmon are not only an important cultural resource to the tribes of the Pacific Northwest, but also have historically been and continue to be an important economic resource for both the tribes and non-native peoples alike. Salmon fisheries and related industries account for $3 billion of economic activity in the Pacific Northwest (Rahr 2017). While this large-scale salmon economy is certainly a more recent development, salmon have long been considered an important commercial resource in the Pacific Northwest. Celilo Falls, once located on the Columbia River in Oregon, was not only a waterfall, but also home to a large number of Native American settlements and trading villages. It was also one of the most productive native salmon fisheries in the region. The area was once the longest continually inhabited community in North America and has been referred to as the former "Wall Street" of the region due to its importance in the salmon economy. Unfortunately, the falls, fishery and surrounding communities were inundated by the construction of the Dalles Dam in 1957. The loss of the falls struck a significant blow to salmon populations and the native economy of the region and represented the loss of an irreplaceable cultural and subsistence resource for the native peoples of the Pacific Northwest (Rebecca Miles, personal communication 2016).

If salmon and salmon fisheries disappear from other rivers and areas of the Pacific Northwest as has happened at Celilo Falls, not only would it be an ecological disaster, but the region and its native peoples would also be robbed of a traditional spiritual, economic and subsistence resource.

Since the first dams were constructed in the Columbia River Basin, dams have presented the most serious threat to the health of the basin's riparian ecosystems. Dams have prevented millions of salmon from reaching their spawning grounds, and untold numbers of juvenile salmon have died going over dam spillways and through hydropower turbines. Indeed, dams have long been the most pernicious threat to salmon survival in the Columbia River Basin. Now, in the face of climate change and an altered hydrograph, however, it seems that dams may offer a solution to some of the Columbia River Basin's most pressing problems.

Dams and the Future of Salmon

In some areas of the Columbia River Basin, controlled dam releases are already being used to help regulate water temperatures downstream. During the summer as water in the rest of the basin warms, the water at the bottom of reservoirs remains cool. Consequently, dams with bottom outlets or selective release mechanisms can send flows of cold water from the bottom of the reservoir through the dam and into the river below (Martin 2004). The Nez Perce are already using this method at dams on the reservation to release cold water from Dworshack and Hungry Horse reservoirs into the Clearwater River. The hope is that the influx of cold water into the Clearwater River will not only help to manage temperatures in the Clearwater, but that it will also help to decrease temperatures in the Snake River below the confluence of the Snake and Clearwater Rivers (Rebecca Miles, personal communication, 2016). Although this method seems promising, its efficacy is somewhat limited by the fact that the lower Snake River dams prevent the augmented cold water flows from reaching the main stem of the Columbia River. Instead, the cold water becomes backed up in reservoirs behind the Snake River dams where it warms before being released into the Columbia River (Kyle Dittmer, personal communication 2016). As a result, the lower main stem of the Columbia remains a potential thermal barrier for many migrating salmon (Graves 2009).

In order for cold water releases from dams to be effective throughout the Columbia River system, dam operators must coordinate releases so that cold water from upstream does not become trapped in reservoirs where it can warm up. This task is made more difficult by the fact that not all dams have the infrastructural capacity to selectively release cold water. Many dams release water over the top or through spillways higher in the water column. Consequently, dam infrastructure must be altered and cooperation between dam operators increased before selective dam releases can effectively be used to control water temperatures throughout the Columbia River Basin (CRITFC, personal communication 2016).

In addition to helping regulate in stream temperatures, dams may also be able to play a central role in restoring seasonal stream flow patterns to a more natural state. According to a study by Mr. Dittmer and the Columbia River Intertribal Fish Commission, dam managers may be able to work with changes in seasonal flow regimes and alter dam operations to recreate a more natural hydrograph and benefit salmon (Martin 2004).

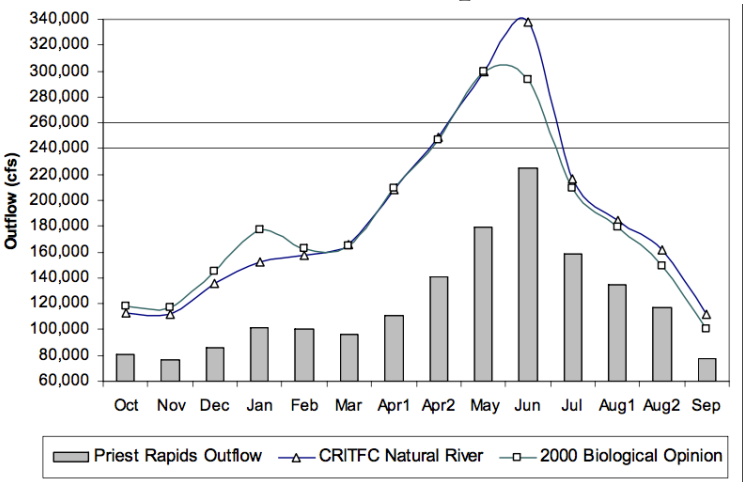
Currently, dam operators in the Columbia River Basin must manage for three factors: flood control, hydropower generation and minimum instream flows. Under the current Army Corps of Engineers flood control plan, water levels in reservoirs on the Columbia River are drawn down January-April 30th in anticipation of spring floods. After May 1^{st,} the spillways are shut and the reservoirs are filled in preparation for a hot and dry summer. Currently, water managers aim to have reservoirs refilled by June 30th, after which point releases can be increased to help meet instream flow requirements downstream of the dam. As seasonal flow regimes have shifted due to climate change, however, this management paradigm has become out of sync with nature and the water management needs of the Columbia River Basin (Dittmer 2006). With more flooding occurring during winter, there is no longer a need to continue draining water out of reservoirs so late into the spring in anticipation of floods. Additionally, the fact that spring runoff is now occurring earlier in the year means that reservoirs must begin filling earlier in the spring in order to fully take advantage of the water provided by melting snowpack. With spring runoff occurring earlier in the year, if dam managers do not begin filling reservoirs until May, they are allowing a significant amount of spring melt water to pass through the system at a time when it is not needed, decreasing the amount that they are able to store for use during the summer. In some cases this has caused dam managers to be unable to re-fill reservoirs, making it impossible to simultaneously achieve hydropower, flood control and environmental flow goals (Kyle Dittmer, personal communication 2016).

During a meeting with PacifiCorp, a large utility company that owns hydroelectric dams, Todd Olsen, Director of Compliance, thoroughly explained the nature of this problem. In the Columbia River Basin, where dams and reservoirs have little storage capacity, dam operators must often draw down reservoirs during winter months in anticipation of floods. This practice will

become even more critical as rain on snow events and other winter floods increase in frequency. Historically, melting snowpack has been relied upon to refill reservoirs during the spring and summer. As snowpack decreases and melts earlier, however, dam operators may often find themselves unable to refill their reservoirs after winter drawdowns, leaving less water for power generation, environmental flows and recreation during the summer months. Mr. Olsen explained that this exact series of events occurred at PacifiCorp's Lewis River project in the summer of 2015. As a result, recreation opportunities were lost in reservoirs, and PacifiCorp struggled to meet environmental flow requirements and to generate enough hydropower to meet electricity demand. Environmental uncertainty erodes reliability for human and natural stakeholders alike (Todd Olsen, personal communication 2016).

To bring dam management paradigms in line with the new seasonal flow regimes, Mr. Dittmer recommends decreasing spring flood control drafts and beginning reservoir re-charge earlier in the year. Under the new dam management guidelines proposed by Mr. Dittmer, managers should aim to end flood control drawdowns earlier in the spring with the goal of having reservoirs re-filled by May 31st, not June 30th. This will allow reservoirs to capture and hold early spring runoff and decrease the amount of water that passes through the basin in the winter and early spring. The water stored and saved throughout the early runoff period can then be strategically released throughout the summer to augment declining summer instream flows. In this way dam managers may be able to artificially return the Columbia River Basin to its pre-climate change hydrograph by delaying peak runoff and increasing the magnitude of peak runoff through controlled dam releases (see **Figure 10**). According to Mr. Dittmer, this new dam management paradigm will allow for an additional 2.9 million acre feet of stored water that can be used to augment summer flows to benefit migrating salmon, while also ensuring reservoirs are sufficiently filled to meet recreation and hydropower needs throughout the summer (Dittmer 2006).

Figure 10: Current Hydrograph at the Dalles Dam vs. Revised Dam Operation Plan



This data compares the current timing and magnitude of peak runoff with the new hydrograph that would exist if the CRITFC-altered flood control plan was implemented. Source: CRITFC

Conclusion

Stretching across seven states and two countries, the Columbia River Basin is home to a wide array of unique and complex ecosystems. These ecosystems provide homes to countless critically important species, including several threatened or endangered species. Additionally, these ecosystems and their constituent parts provide a wide range of critical services and resources upon which cultures have been built and civilizations have survived for thousands of years.

What sets the Columbia River Basin apart from many other large river basins in the United States is the fact that snowpack, not rain, is the primary source of water to the basin, with water from mountain snowpack comprising upwards of 70% of the basin's total annual flows. The Columbia River Basin receives the vast majority of its annual precipitation during the winter, and relies on snowpack as a natural reservoir to store water for use during the dry summer months. Warmer late winter and early spring temperatures are causing winter snowpack to melt earlier, altering the timing of peak runoff events and changing the temporal distribution of the water supply in the Columbia River Basin.

Both human populations and ecosystems within the Columbia River Basin depend upon the once reliable pattern of snowpack accumulation in the winter followed by slow, sustained snowmelt over the course of the spring and summer. Now, however, climate change is threatening to disturb historic patterns of snowpack accumulation and springtime runoff, posing a threat to ecosystem health and human wellbeing alike.

Warming spring and winter temperatures are causing mountain snowpack to melt earlier in the year, and are leading to a shift from snow to rain dominated precipitation patterns. These factors are significantly diminishing the natural water storage capacity of the Columbia River Basin. As a result, many tributaries within the basin are seeing more of their total annual flow pass through the system in the winter and spring, leaving less for the summer months. Simply put, rivers are drying up in the summer and flooding in the winter.

This temporal redistribution of annual flow has significant ecosystem health and water management implications for the Columbia River Basin. Decreases in summer instream flows are causing water temperatures to warm which negatively impacts salmonid species in myriad ways. Additionally, decreases in snowmelt runoff and earlier peak runoff have the potential to significantly hinder inland migrations of spawning salmon and seaward migrations of juvenile salmon.

Since the mid-20th century, dams have played a critical role in managing the hydrology of the Columbia River basin and currently operate under a mandate to manage for hydropower production, flood control, and environmental flow requirements. As seasonal flow distribution has changed, however, dam management paradigms have fallen out of step with the realities of the basin's hydrograph, making it increasingly difficult for dam managers to meet flood control, hydropower and instream flow demands. These challenges will only become more daunting as climate change continues to alter natural patterns of snowpack accumulation and springtime runoff. As a result, new dam management paradigms must be developed to ensure the Columbia River Basin can continue to meet ecological and human demands.

Although the challenges will be significant, it does seem that new dam management paradigms can be developed that will help restore the pre-climate change hydrograph of the Columbia River Basin. This may allow the Columbia River Basin and its water management infrastructure to continue to support healthy ecosystems and provide vital services to human populations in the face of a changing climate.

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A Fine Line:

Federal Agency Decision-Making in the Development of Recovery Plans for Endangered Fish in Western Rivers

by Lea Linse, 2016-17 State of the Rockies Project Fellow

Introduction

When signing the Endangered Species Act (ESA) on December 28th, 1973, Richard Nixon optimistically declared that "this legislation provides the Federal Government with needed authority to protect an irreplaceable part of our natural heritage – threatened wildlife… Nothing is more priceless and more worthy of protection than the rich array of animal life with which our country has been blessed" (The American Presidency Project). Since then, the act has proven to be one of the United States' most influential pieces of environmental legislation, leading to the protection of over two thousand fish and wildlife species and millions of acres of these species' habitat since 1973. Yet the ESA has sparked considerable controversy, both because of its success and shortcomings. Many criticisms of the ESA result from its tendency to pit conservation against economic development and, as some claim, inappropriately inhibit consideration of economic needs (Corn et al. 2012). Others assert that in fact the ESA has not been enforced strictly enough, and call for even stronger prioritization of species over economic activities. A cornerstone of this argument is often to point out that the goal of the act is after all twofold; not only is it supposed to protect listed species, it is also supposed to bring about their recovery such that the species is self-sustaining and no longer requires protection (16 U.S.C. §3(1)). While the act has been statistically quite successful in achieving the first goal (only nine species that were previously listed have gone extinct), the act's success in terms of the second goal has been questionable. Since 1973, only twenty nine species of over two thousand have recovered enough to be delisted (ECOS). In some places, such as in the Columbia River Basin where protection of endangered salmon and steelhead has been at odds with hydroelectric power operations for decades, these two complaints about the ESA stand in direct opposition with each other. In such cases, federal agencies are left walking a fine line between interests.

This report aims to better understand federal agency decision-making under these circumstances, specifically in the development of the recently proposed Spring/Summer Chinook Salmon and Steelhead Recovery Plan for Snake River, a tributary of the Columbia River **(**see **Figure 1)**. It does not assess whether recovery of listed fish species in this or any region has been successful, or whether federal agency decisions are appropriate or in accordance with the ESA or any other legislation, rather it examines how agencies respond to opposing pressures and choose between potential species recovery strategies. This analysis utilizes a comparison of recovery planning processes in the Snake River with those in the Upper Colorado River. In this analysis, three specific political factors are shown to influence which recovery actions federal agencies choose to pursue or ignore in the recovery planning process. While federal agencies must always account for numerous factors (which may or may not include the three mentioned below) in any decision-making process, this

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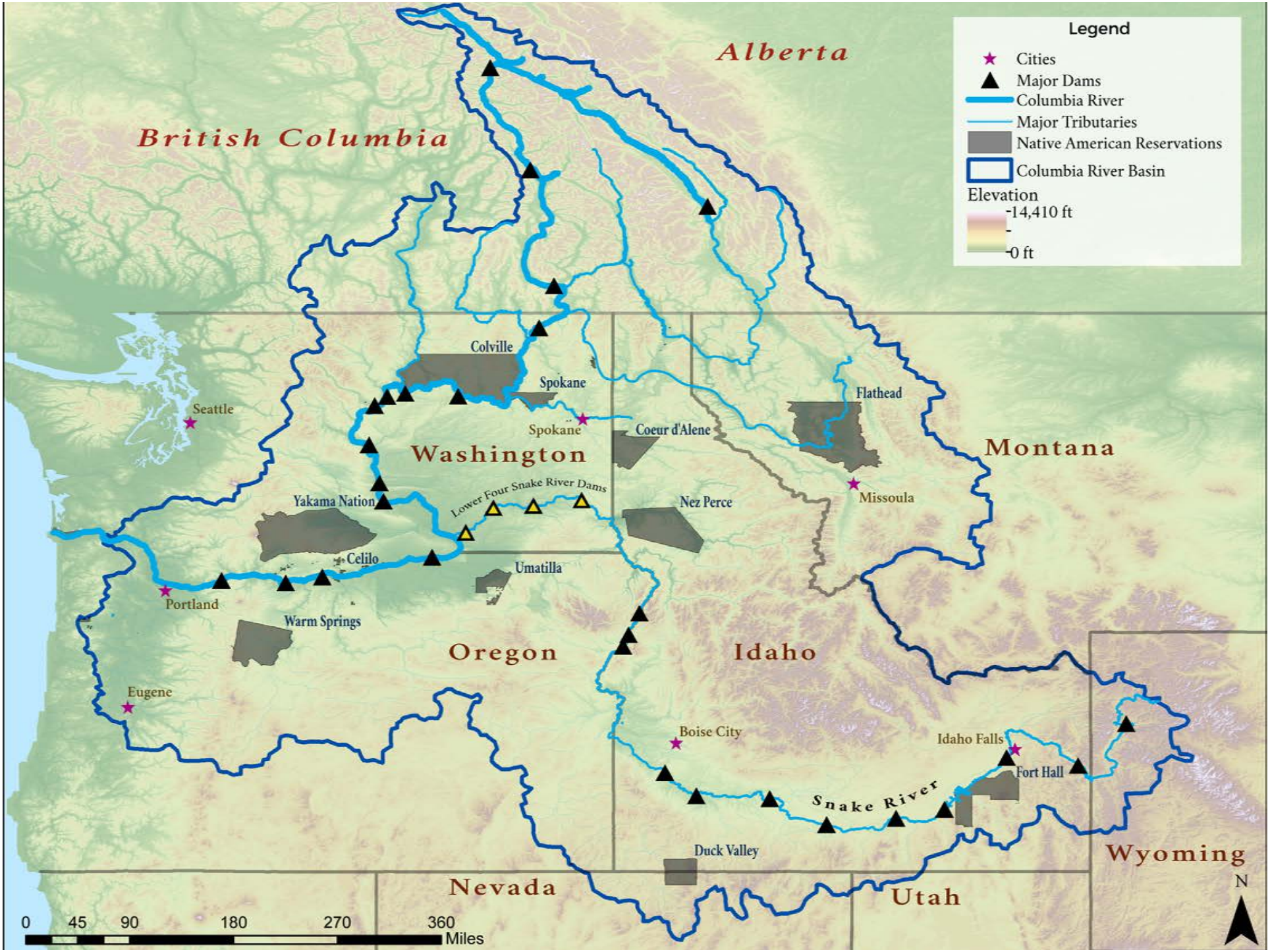
Figure 1: Map of the Columbia River Basin



The Snake River is the largest tributary of the Columbia River and drains the easternmost portion of the basin. Source: ESRI, Bureau of Indian Affairs, National Watershed Boundary Dataset, National Inventory of Dams, Canadian Department of Natural Resources, Columbia River Inter-Tribal Fish Commission, National Elevation Dataset

report focuses on these three because of the interesting role they played in the case studies examined here. These are (1), a "no surprises" agreement made between the National Marine Fisheries Service (NMFS) and dam operators in the Columbia River in exchange for their cooperation with recovery planning in the Snake River Basin, (2) similar agreements made between the Fish and Wildlife Service (FWS) in the development of the Upper Colorado Recovery Implementation Plan (RIP), and (3), the "best available science" mandate for federal agency action enforced by the Clinton Administration and the Supreme Court decision *Bennett v. Spear* (1997). This report further examines how these three elements developed throughout the 1970s-1990s, and thus how they came to be significant. Though it can't be assumed that these three factors influence agency decision-making outside of these case studies, this type of contextual analysis may be more widely applicable as a framework for understanding the power of the status quo in environmental management and thereby provide useful insight into the challenges of designing adaptive policies for a changing West.

The Endangered Species Act: An Overview

As described above, the primary purpose of the Endangered Species Act (ESA) is twofold: first, to protect listed species and their essential habitat such that the species are kept from extinction, and second, to bring about their recovery such that they no longer need to be protected under the act. The act is enforced by the Fish and Wildlife Service (FWS) under the Department of the Interior, and the National Marine Fisheries Service (NMFS) under the Department of Commerce. The FWS manages all listed species except for anadromous fishes (fish that migrate between the ocean and freshwater streams, such as salmon and steelhead), which are managed under the NMFS. The following section provides a brief overview of the act's provisions most applicable to Western river management and an introduction to their significance to recovery planning. This is not a comprehensive overview of the act or any of its sections, and is meant to serve only as background for understanding the following analysis.

Section 4 of the ESA ("Determination of endangered species and threatened species") outlines the fundamental process of listing species. Species may be listed for a variety of reasons, including "natural and manmade factors affecting its continued existence" (16 U.S.C. § 4(e)(1)). Species can either be listed as endangered (that is, its populations have become so minimal that the species is in danger of becoming extinct) or threatened (at high risk for becoming endangered). Threatened and endangered species are herein referred to collectively as "listed species." Importantly, subsection 4(f) also requires the federal government to develop recovery plans for listed species. This subsection alone carries the *recovery* part of the act's purpose. It includes information which must be incorporated into each plan, including "a description of site-specific management actions that may be necessary to achieve the plan's goal for the conservation and survival of the species" and "objective, measurable criteria which, when met, would result in a determination… that the species be removed from the list," as well as estimates of how much carrying out those actions would cost in time and money. Despite its importance to the purpose of the ESA, Section 4 recovery provisions carry little regulatory clout. Recovery plans instead are voluntary, nonbinding documents that by nature require the cooperation of all actors involved if they are to be effective (Rosemary Furfey, NMFS Regional Salmon Recovery Coordinator, personal communication, July 2017). As Patlis writes, "recovery is thus the heart and soul of the Act. It is not, however, the muscle" (1996, 57). The "muscle" of the act is contained in Section 7 and Section 9 regulatory provisions.

Often quoted, Section 7 ("Federal Agency Actions and Consultations") of the ESA requires that federal agencies "insure that any action authorized, funded, or carried out by such agency… is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat." This provision is legally binding. Section 7 also requires that federal agencies (called "action agencies," if they are the ones carrying out an action in question) "consult" with the FWS or NMFS before carrying out any action that may jeopardize an endangered species. In the consultation process, the FWS or NMFS reviews the proposed action and issues a

written "biological opinion" determining whether or not the action would jeopardize a species or "result in the adverse modification" of their habitat. If affirmative, they may also describe "reasonable and prudent alternatives" that would offset the impact of the proposed project (for example, the action agency may be able to make habitat improvements to offset the negative effect of their project on a species). While Section 7 consultations do require agencies to pay much greater attention to how their actions impact listed species, most consultation processes result in the determination of reasonable and prudent alternatives, and projects that have undergone consultation are rarely, if ever, halted due to the presence of an endangered species (Gosnell 2001; Corn et al. 2012).

Section 9 ("Prohibited acts") has proven to be one of the most far-reaching and influential pieces of the ESA. It makes it illegal for *any person*, not just federal agencies, to "take" a listed species. "Take" is defined in Section 3 as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect." Like Section 7, the provisions of Section 9 are legally binding, and have been instrumental in efforts to achieve greater protection of species and their habitats, including citizen suits. Section 11(g) ("Citizen suits") allows citizens of the U.S. to bring lawsuits against "any person, including the United States and any other governmental instrumentality or agency… who is alleged to be in violation of any provision of this act." Throughout its history, the ESA has been largely enforced through citizen suits and the courts, setting it apart from many other federal laws which are enforced by government agents or officers of the law.

The following section examines how these provisions of the ESA have been applied in two case studies from two major Western river basins, focusing on how protection of listed fish in each basin has been approached by federal agencies and other stakeholders. While the requirements of the ESA may seem very definitive, in practice, there is some variation in the standards to which they are upheld, and much debate as to the degree of economic impact that is acceptable in species conservation. Federal agency officials at regional levels are often responsible for deciding how forcefully to wield the ESA against economic projects operating in listed species' habitat; these decisions are addressed with particular interest in the following cases.

Case Studies

This report examines federal agency decision-making through detailed investigation of two case studies. First, the Upper Colorado River Recovery Implementation Program and the circumstances that led to its establishment in the 1970s and 1980s are examined through literature review. Though this plan has had limited success in terms of measurable fish recovery, few have suggested that the federal government isn't doing enough to move toward that goal, and the program has instead been heralded as a success in cooperative management. This scenario is contrasted with the development of the recently proposed Spring/Summer Chinook Salmon and Steelhead Recovery Plan for the Snake River. This second case is examined through literature review as well as personal interviews with federal agencies and stakeholders.

Unlike in the Upper Colorado, a number of vocal stakeholders have demanded stronger recovery standards for decades. For instance, Native American tribes, who have long revered native salmon, have claimed that recovery standards under the ESA are the "lowest bar," and that the ESA has failed to give listed species priority over human activities (specifically, the operation of hydroelectric dams) which threaten them (Columbia River Intertribal Fish Commission, personal communication 2016). Still, federal agencies implementing the ESA in the Columbia Basin have been extremely reluctant to use the law to justify significant alterations to hydropower operations, and conflict over salmon and hydropower in the basin is ongoing.

These two case studies are very different in terms of the level of controversy surrounding ESA implementation, though the ways in which they are similar are potentially more important. In both basins, water developments such as dams and reservoirs significantly impact endangered fish populations, yet their removal or significant alteration has not been seriously considered by the FWS or NMFS in the recovery planning process. In the Columbia River Basin, this has been true historically, though there are signs that intense public pressure may have the ability to sway decision-makers to look at more progressive options. Thus, a comparison of the two basins shows the pervasiveness of the trend described.

The Upper Colorado Recovery Implementation Program (RIP)

In the Colorado River above Lee's Ferry (known simply as the Upper Colorado River), there exist small numbers of four endangered species of fish. At best, these fish might be called "unglamorous" (Bolin 1993, 41). They are the humpback chub, bonytail minnow, Colorado pikeminnow, and razorback sucker. The humpback chub and Colorado pikeminnow were first listed under the Endangered Species Preservation Act of 1966, which was replaced by the Endangered Species Act of 1973. The bonytail minnow and razorback sucker were listed later, in 1980 and 1991, respectively. While culturally important to native tribes, all four of these species have been largely brushed aside by modern developers and water users (coloradoriverrecover.org; Bolin 1993).

As a testament to the negative reputation that these fish have developed, in 1962, prior to the ESA, they were targeted in a widespread extermination effort carried out by Utah and Wyoming fish and game departments. In an act that would be unimaginable today but was a profitable idea at the time, a plant-based poison called rotenone was released from fifty-five drip stations along the Green River and its tributaries for the sole purpose of eliminating native fish from waters that were to be stocked with the more popular sport fish, the nonnative rainbow trout (see in **Figure 2)**. Despite this harsh attempt at their removal, the subsequent damming of the river at the Flaming Gorge Reservoir proved to be even more effective at endangering the species. Today, in addition to the impacts of dams and reservoirs on stream flow and habitat quality, habitat loss and alteration from a variety of other river developments is considered one of the biggest factors endangering the river's four endangered species (Bolin 1993).

When the pikeminnow and humpback chub were formally listed under the ESA in 1973 (see **Figure 3**), it took critics no time to respond. In *Colorado River Water Conservation v. Andrus* (1979), plaintiffs (the Colorado River Water Conservation District and Southwestern Water Conservation District) claimed that the

Figure 2: Razorback Sucker and Rainbow Trout

The endangered Razorback Sucker (top) isn't known for its aesthetic qualities or personality. In part because of its unpopularity among sport fishermen, who preferred the more lively and delectable rainbow trout (bottom), this species was one of the federal government's targets in its 1962 native fish removal efforts.
Source: National Park Service and South Carolina Department of Natural Resources

Figure 3: Colorado Pikeminnow and Humpback Chub

When listed as endangered in 1973, Colorado pikeminnow (top) and the humpback chub (bottom) became central to heated controversy between water users and the federal government. Even today, under the Upper Colorado RIP, these fish must compete with agricultural, municipal, and industrial water diversions for a share of the Colorado's limited water. Source: coloradoriverrecovery.org

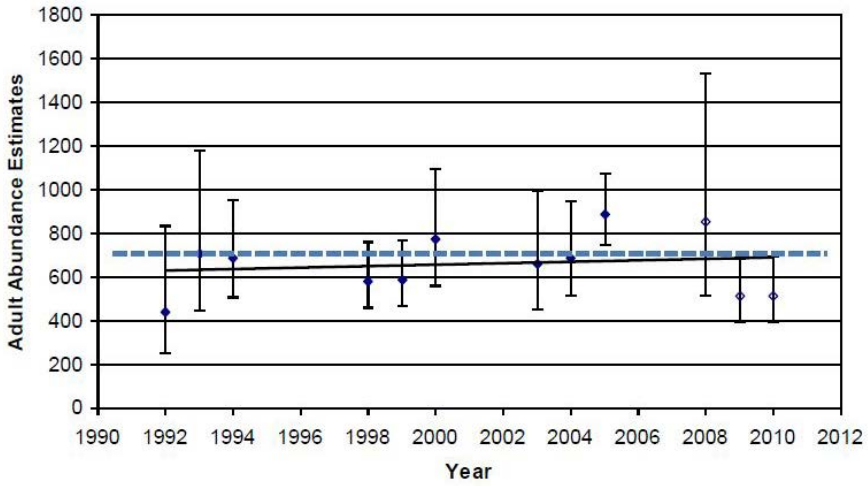
Governor of Utah and other state officials had violated the ESA by stocking nonnative fish in the Colorado River and thereby causing injury to the species. Plaintiffs alleged that the listing of the humpback chub and Colorado pikeminnow (formerly called the Colorado River Squawfish, as it is referred to in court documents) was not appropriate, and the listing was "impeding valuable property rights owned by the plaintiff districts, delaying the construction starts on certain district projects, and in general, inflating the cost of project construction." Although the Colorado District Court dismissed the case for lack of *in personam* jurisdiction, it made an important statement about how water users of the region viewed conservation. These stakeholders saw the listing of these two economically-unimportant species an impediment to valuable economic development and an overreach of federal action into the realm of private property.

Andrus was just one component of a controversy that had been building for years between water users and the federal government over the protection of endangered species. As Wydoski and Hamill write, "the requirements of Section 7 of the Endangered Species Act had potentially serious ramifications for new water projects that were being proposed by the Bureau of Reclamation… and the operation of several existing Reclamation facilities (e.g., Flaming Gorge and Blue Mesa reservoirs)" (Wydoski and Hamil 1991). This was of great concern to Colorado River water users, many of whom had built their livelihoods on their current access to the river's overallocated waters. "Western law, tradition and politics all stress consumptive uses of water" writes scholar James Bolin Jr. "Historically, economic productivity in the west has depended on ranching, farming, and mining, which in turn depend on moving significant quantities of water out of rivers and streams" (Bolin 1994, 40).

After strong resistance to in-stream flow designations and perceived threats to water use from the ESA listings, the federal government recognized that any program to protect endangered fish would only succeed if it allowed for the continued use and development of the river by water users. It wasn't until 1984 that a lasting solution was finally achieved in the form of the Upper Colorado River Basin Recovery Implementation Program (RIP). This program provided a reasonable and prudent alternative under Section 7 of the ESA in which water developers make a one-time monetary payment for each acre-foot of water removed annually from the river. These funds aided recovery projects by the FWS such as habitat improvements, hatchery operations, and scientific research (Bolin 1993).

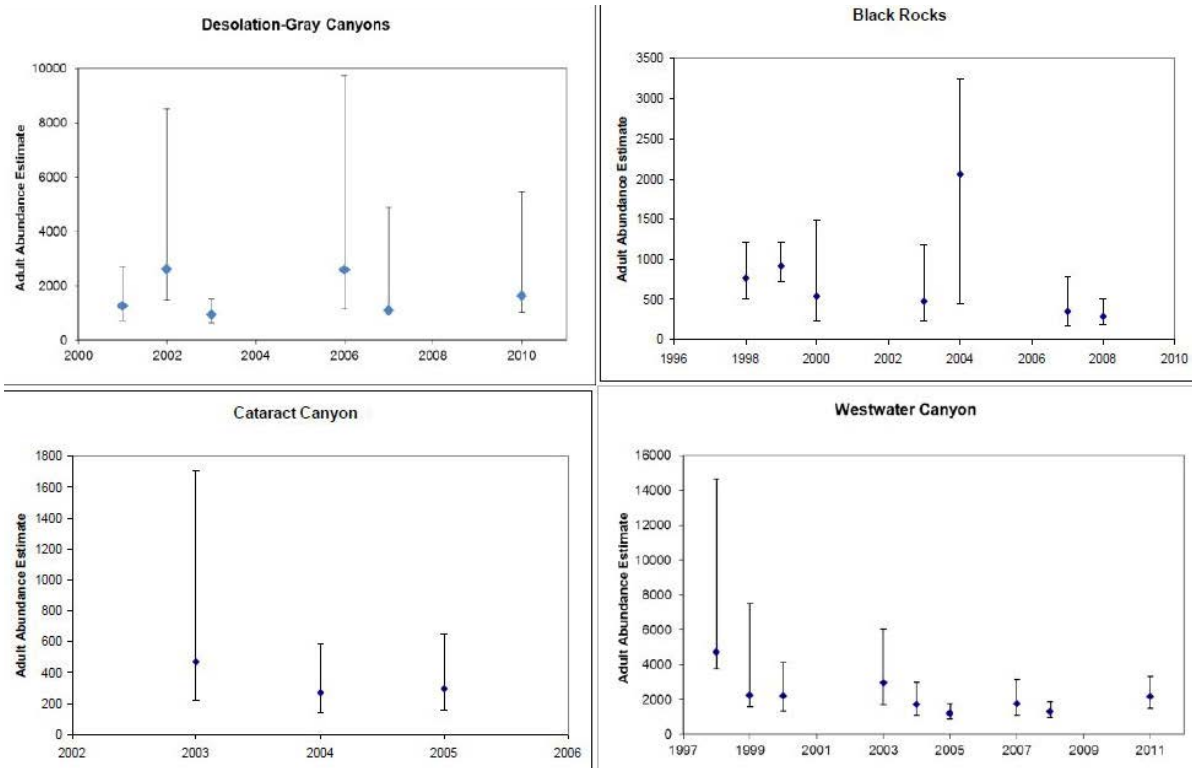
Though heralded as a cooperative success, some have doubted the effectiveness of the Upper Colorado RIP at achieving its stated goals (Ibid.). For instance, populations of all four endangered fish in the upper Colorado River remain low, though supplemented with fish stocked from hatcheries. Pikeminnow populations have increased slightly since monitoring began in the early 1990s as seen in **Figure 4**, and three separate populations of humpback chub are recognized, though none have shown a remarkable increase since 2000 as seen in **Figure 5**. As of 2012, populations of the bonytail minnow and razorback sucker were "not sufficiently numerous in the wild for population estimates," (Upper Colorado River Endangered Fish Recovery Program 2012). These fish remain threatened by habitat loss, competition with nonnative species, and dams and diversions that impede migration routes and cause other types of environmental degradation.

Figure 4: Population Estimates for the Colorado Pikeminnow



Adult Colorado pikeminnow population abundance estimates and trend for the Colorado River (Osmundson and Burnham 1998; Osmundson and White 2009; D. Osmundson, U.S. Fish and Wildlife Service, personal communication). Error bars represent the 95% confidence intervals. Estimates are preliminary for the last three years (2008–2010). Dashed horizontal line represents the current population size down-listing criterion.
Source: Upper Colorado Endangered Fish Recovery Program 2012

Figure 5: Population Estimates for the Humpback Chub



Adult humpback chub population estimates with confidence intervals for four populations in upper Colorado River Basin. Clockwise from upper left: Desolation-Gray Canyons (from Badame 2011, 2012); Black Rocks (from Francis and McAda 2011); Westwater Canyon (from Elverud 2011); and Cataract Canyon (from Badame 2008). Source: Upper Colorado Endangered Fish Recovery Program 2012

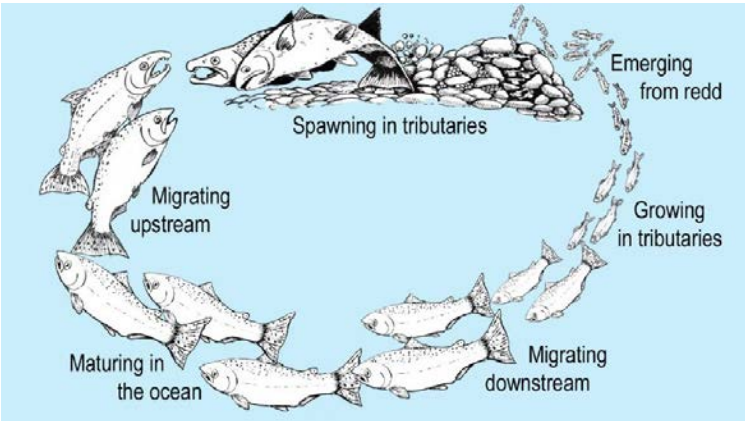
Development of the Proposed Spring/ Summer Chinook Salmon and Steelhead Recovery Plan

Threats faced by endangered fish species in the Columbia River have likewise involved water development and construction of dams, though mitigating them has proved much more controversial. The Columbia River used to host some of the world's largest runs of salmon, fish that are now listed as threatened or endangered under the ESA. Today, it hosts an impressive hydroelectric system, but as many argue, at the expense of the native fish. Because of its unique topography – wide valleys, large rivers, steep, but not too steep – the Columbia River Basin is extremely well suited for the construction of large dams capable of generating tremendous amounts of electricity (Northwest Power & Conservation Council 2008). Today, more than half of all electricity in the Pacific Northwest is generated by hydroelectric dams, which amounts to about 44% of the nation's hydropower generation as a whole in 2012, and residents of the state of Washington enjoy some of the lowest electricity prices in the country (EIA 2014; EIA 2016).

Starting in the early 1900s, salmon populations began to decline substantially, coinciding with a rise in the number of large hydroelectric dams constructed along the Columbia River and its tributaries. While habitat loss and degradation, as well as other factors, have contributed to declines in salmon populations as well, hydroelectric dams are known to have particularly significant impacts such as blocking migration routes, increasing water temperature, and contributing to pollution. Salmon are anadromous, meaning that they migrate between salty ocean waters for their adult life to lay their eggs in high freshwater streams (see **Figure 6**). This migratory pattern is essential to their survival. Newly-hatched salmon must exist in clean, cold, moving water during their first few days of life, meaning that adults must travel many miles up-stream from the ocean where they spend their lives to find a suitable place to lay their eggs (CRITFC). Because of salmon's migratory nature, hydroelectric dams, which often completely block passage up or down stream, have proven to be severely problematic for the fish.

Mitigating the impacts that hydroelectric dams have had on salmon is complicated by the fact that many of the largest dams in the Columbia basin were built during the 1930s and predate any legislation that

Figure 6: Life Cycle of an Anadromous Fish



Each stage of a salmon's life is spent in a different environment. They begin their lives when they hatch in high mountain streams. Before leaving small tributary rivers and streams, juveniles gain their strength for the long journey to the ocean. If they survive, they reach adulthood in the ocean, migrating as far North as Alaska. As adults, they repeat their journey in reverse, returning to the headwater streams where they were hatched to spawn and lay their eggs. There, their life ends and the cycle begins again.
Source: National Marine Fishery Service

sought to protect and improve salmon populations. For example, the impressive Grand Coulee Dam, the largest hydroelectric dam in the basin and one of the largest in the world, began generating electricity in 1941 (Northwest Power & Planning Council 2008). This means that they were constructed without any regard to fish passage (a requirement added much later), and that today, making these old dams fish-friendly can be expensive at best or nearly impossible. For that reason, some have pressed for removal of smaller dams in the basin, such as four dams on the Lower Snake River.

Currently, seventeen populations in the Columbia River and its tributaries (officially called "evolutionary significant units" or ESUs, or "distinct population segments," DPSs) of salmon are listed under the ESA as either endangered or threatened. Most were listed between 1993 and 2005 after their populations had already declined to dangerously low levels (NMFS 2016).

The plight of the salmon is extremely concerning to many in the Pacific Northwest because of the important role that they have played in the culture and economy of different peoples in the region. Salmon fishing was once a significant driver of economic activity, though it has been substantially limited since the introduction of the ESA. More poignant in the current debate is the cultural, spiritual, and economic importance of salmon to the many Native American tribes residing in the Columbia River Basin. Their reverence for salmon goes much deeper than the practical uses for the fish. In the words of Federal Indian Law Practitioner and scholar Bruce Didesch, tribes' fundamental spiritual and cultural connection to salmon is "stronger than you or I could imagine." It is rooted in their story of Creation:

> When the Creator was preparing to bring humans onto the earth, He called a grand council of all the animal people, plant people, and everything else… He asked each one to give a gift to the humans—a gift to help them survive, since humans were pitiful and would die without help. The first to come forward was Salmon. He gave the humans his body for food. The second to give a gift was Water. She promised to be the home to the salmon. After that, everyone else gave the humans a gift, but it was special that the first to give their gifts were Salmon and Water (CRITFC 2014).

Though many tribes have become displaced from their traditional hunting and fishing grounds along the banks of the Columbia, salmon remains a sacred food and irreplaceable part of their culture. This sentiment was unanimously echoed by tribal members in the region who were interviewed for this study. It has motivated tribes to play a very active role in the conflict between salmon and hydropower. As James Holt from the Nez Perce Tribe Water Resource Division described, the tribe's special cultural relationship with salmon puts them in a unique position to fight for their protection. Additionally, some tribes hold fishing rights in parts of the river through treaties with the U.S. government, and argue that these rights are meaningless if there aren't any fish for them to catch.[1] Rebecca Miles, Executive Director of the Nez Perce Tribe said, "the pendulum starts to swing in the history of salmon when tribes get involved" (Rebecca Miles, personal communication 2016). Tribes have been so influential in salmon protection and recovery operations that Rosemary Furfey, Regional Salmon Recovery Coordinator with the NMFS, even went so far as to say that hatcheries owned and operated by the Nez Perce tribe have kept at least one species from going extinct (Rosemary Furfey, personal communication 2016).

[1] Prior to the listing of most of the Columbia Basin's salmon under the ESA in the early 1990s, tribes had used these rights as leverage to fight for stronger federal action to protect the fish. Unfortunately, some tribes feel that their treaty rights are in themselves fragile, and after the listing of salmon under the ESA, they have often preferred to base legal action under that legislation instead of their treaty rights (Christine Golightly, personal communication 2016).

Much of the political controversy surrounding ESA implementation in the Columbia involves claims from tribes, environmental groups, and other parties alleging that the NMFS has been too soft on hydroelectric operations and that the agency must mandate more significant changes if salmon recovery is to move forward. For example, to mitigate the impact of dams on salmon, the predominate approach taken by the NMFS has been to focus on habitat improvements, hatchery operations, and artificial transport around dams (such as using tanker trucks to move young fish past large dams, and constructing structures called fish ladders to allow fish to swim around smaller dams).

In focusing on these strategies, which are clearly intended to avoid economic impacts on hydroelectric operations, the NMFS has received a great deal of criticism. Tribes such as the Nez Perce along with environmental groups have repeatedly called on the NMFS to mandate significant changes to the hydroelectric system, such as increasing the flow of water over the dams to aid salmon migration or in some cases, removing certain dams altogether, but claim that NMFS has been avoiding taking aggressive action. For instance, Earthjustice, an environmental nonprofit active in lawsuits against the federal government, has claimed that the agency "has ignored science and its legal responsibilities under the Endangered Species Act" and has been avoiding making significant alterations to the status quo (Earthjustice 2016).

Similarly, Rebecca Miles, Executive Director of the Nez Perce Tribe (many members of which have been vocal critics of the government's efforts to protect salmon) has also accused the NMFS of siding with hydroelectric interests and avoiding mandating changes to the hydroelectric system that could reduce fish mortality and help populations recover. She has complained that the "Big Four," federal agencies (NMFS, Bureau of Reclamation, Army Corps of Engineers, and BPA) were "all in bed together," and that the NMFS's decisions regarding endangered fish management were being influenced by hydroelectric interests. What was required under the ESA shouldn't be negotiable, she argued, but the process had become a negotiation (Rebecca Miles, personal communication 2016).

In the Snake River, which is the focus of this report, this conflict takes the form of a conversation about dam removal. Unlike in other tributaries of the Columbia, there has been much discussion about the possibility of the removal of four dams on the Lower Snake River, mostly among tribes, stakeholders, and scholars. As University of Idaho Law Professor Barbara Cosens explained, the reason that the Snake River dams have received more attention is mostly because they don't produce quite as much electricity as other dams in the basin (Barbara Cosens, personal communication 2016). While other dams in the basin have similar impacts on fish, the Snake River dams may simply be easier targets for removal. The case for their removal is strengthened by the suggestion of some scientists that recovery of salmon in the Snake River is not feasible without the removal of those dams (Robert Anderson, personal communication 2016; James Holt, personal communication 2016). Nonetheless, there are significant political barriers that have prevented the federal government from even seriously discussing dam removal as an option, and earlier attempts to place blame on dams in recovery plans have sparked outcry from water users that led to revision of the plan (Rosemary Furfey, personal communication 2016). Thus, in development of the 2016 Snake River plan, dam removal has been touched on only very lightly.

The current state of these events in the Columbia River may seem to cast the NMFS in a bad light from a conservation standpoint, but as this report shows, there is more to the agency's reasoning than simply favoring economic interests. Where advocates of stronger federal action often base their arguments on straightforward interpretations of how the ESA reads, federal agencies view the act as a product of a controversial history with many strings attached.

History and Evolution of the ESA

In order to understand federal agency decision-making, it is important to consider that agencies operate in a highly politicized environment, the terms of which are defined largely by the history of the statutes in play. In the case of the Endangered Species Act, the actions of NMFS and FWS are influenced by historical developments such as interpretations of the act by the Supreme Court, and

commitments made by the federal government to pacify critics of the act during contentious periods. Additionally, it is helpful to understand that such commitments were not made haphazardly or necessarily as a result of agency bias, but were rather made in response to other political trends that were lending power to certain interests, especially private property owners and those advocating for deregulation and free-market solutions to governance. Neoliberalism in particular is a trend that gained traction through the 1970s, 1980s, and 1990s and led indirectly to a number of significant modifications to the ESA through congressional amendments and Supreme Court decisions. The following section details how neoliberalism and the ESA interacted through the latter part of the 1900s, and what impact that interaction has had on federal decision-making, beginning with an event that set the ESA on a collision course with neoliberal ideals.

Many who call for greater federal action to protect and recover listed species cite the 1978 Supreme Court case where it all began, *Tennessee Valley Authority v. Hill*. While today it is often heralded as an example of the ESA's power, at the time it sparked fears that the ESA might be a significant obstacle to economic development. The case started with a lawsuit brought against the Tennessee Valley Authority about a dam that was under construction. The suit was entered on grounds that the dam would have jeopardized the last remaining population of a small fish called the snail darter (see **Figure** 7), and thereby violated the ESA. The case was complicated by the fact that the dam was already well on its way to being completed (see **Figure 8**). A District Court had previously heard the case, and ruled to allow completion of the dam on the basis that Congress could not have possibly intended the ESA to halt projects that were already mostly completed, emphasizing both that Congress had funded the project and that construction of it had begun prior to enactment of the ESA in 1973. The case was then heard by the Court of Appeals, which found that the completeness of the project should have no bearing on a decision where a project clearly jeopardizes an endangered species. Finally, after attempts to relocate the population of endangered fish were attempted and were unsuccessful, the case went to the Supreme Court (437 U.S. 153 (1978)). The driving questions became whether the dam operators (the Tennessee Valley Authority) would be taking illegal action under the ESA by completing the dam, and if the court could halt a project of such significant economic benefits as the Tellico Dam, especially considering that construction was already well underway (Ibid.; Ruhl 2012, 497-498).

The Supreme Court ultimately ruled against completion of the dam, an opinion that simultaneously made the ESA one of the nation's most powerful

Figure 7: Snail Darter

Even fully grown, the Snail Darter is tiny. Partly because of the fish's miniscule appearance, the story of its protection in the face of the Tellico Dam project is one of the most frequently cited in the history of the ESA.
Source: currentsofchange.net

Figure 8: 1978 Tellico Dam Construction

When the Tellico Dam project was halted to protect the recently listed snail darter, the construction was already well underway, as shown in this image taken from around the same time as the Supreme Court was reviewing *Tennessee Valley Authority v. Hill.* Source: currentsofchange.net

environmental laws as well as one of its most controversial. Chief Justice Burger delivered the majority opinion, ruling that Section 7 of the ESA commands "all federal agencies 'to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence' of an endangered species." The Court ruled that indeed the dam would be illegal under the ESA, and that *regardless of economic losses*, the dam could not be completed (Ibid.). This statement that the ESA allowed no consideration for economic costs and benefits established the act as an "economically insensitive statute" and raised fears that the ESA had too much power over valuable economic activities (Blumm, Thorson and Smith 2008, 709). Indeed, both Chief Justice Burger as well as Justice Powell, who wrote the dissenting opinion, agreed that implementation of the ESA would have significant costs. As Burger wrote:

> "It may seem curious to some that the survival of a relatively small number of three-inch fish among all the countless millions of species extant would require the permanent halting of a virtually completed dam for which Congress has expended more than $100 million... We conclude, however, that the explicit provisions of the Endangered Species Act require precisely that result…Concededly, this view of the Act will produce results requiring the sacrifice of the anticipated benefits of the project and of many millions of dollars in public funds. But examination of the language, history, and structure of the legislation under review here indicates beyond doubt that Congress intended endangered species to be afforded the highest of priorities" (437 U.S. 135 1978, 173-4).

Though Powell argued, contrary to the majority opinion, that Congress could not have intended that such an "absurd result" be produced by the act, he recognized, similar to Burger, that "this decision casts a long shadow over the operation of even the most important projects, serving vital needs of society and national defense, whenever it is determined that continued operation would threaten extinction of an endangered species or its habitat" (437 U.S. 153 1978, 196).

Not directly related to the outcome of *Tennessee Valley Authority v. Hill*, the next events to raise concerns about the impact of the ESA happened as people simply began to use and more widely apply the legislation. First, the scope of the act was realized to be much wider than originally thought as the number of listed species began to grow. Some argue that the ESA initially appeared to be just a localized regulation. Though powerful, it seemed that it only applied here and there, to "one creek, one spring, one cave, one valley" (Plater 2004, 291). This changed, however, beginning with an explosion of citizen petitions to list additional species. In a period of twenty years, from 1975 to 1995, the number of listed species more than quadrupled. Necessarily, the geographic influence of the ESA also expanded as critical habitat was designated to each species pursuant to Section 4 (Ruhl 2012). The consequence, as Ruhl writes, "was to expand the ESA's reach far throughout the nation as the 'one creek' feature multiplied to such an extent that there was a potential 'one creek' problem around every corner" (Ibid.).

Around the same time that the ESA was expanding, other trends in U.S. policy were creating an inhospitable atmosphere for large scale top-down regulations of the sort that the ESA was becoming. In particular, the growth of neoliberalism was dramatically shifting how Americans thought about governance. While most often associated with *laissez-faire* and free-market economic reform, neoliberalism is not isolated only to strict economics. Many would probably agree with Grewal and Purdy who "gladly acknowledge that neoliberalism is not conceptually neat and cannot be defined by a set of necessary and sufficient conditions for its use" (Grewal and Purdy 2014). Generally, neoliberalism is associated with state restructuring involving contraction of command-and-control regulations and re-allocation of federal power to other actors in accordance with distrust of government intervention and emphasis on economic growth and strong private property rights (Harvey 2005; Igoe and Brockington 2007; Fletcher 2010; Peck and Tickell 2002). This restructuring was based, as Harvey describes, on the notion "that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade" (Harvey 2005, 2).

The growth of neoliberalism closely followed, and was to some degree sparked by, the extension of federal

regulation in the 1960s and 70s. Citing Harris and Milkis (1996), Wilson writes "often overlooked in the long-running debate over the ESA are the act's origins in the era of social regulation that produced the National Environmental Policy Act, Clean Air Act, Clean Water Act, and Occupational Safety and Health Act. This era of social regulation extended dramatically the scope and reach of the federal regulatory state" (Wilson 2001; Harris and Milkis 1996). This "deepening" of regulatory reform was brought about largely in response to rising inflation and unemployment in the wake of the collapse of Roosevelt's New Deal policies (Harvey 2005, 12-13). Yet the 1970s still saw many turbulent years of economic crisis, which many blamed on the interventionist, Keynesian economic policies that had prevailed since the New Deal (Peck and Tickell 2002, 388). Tensions between the "social democracy and central planning" advocates and emerging support for corporate and market freedom began to conflict, and with the unravelling of the economy the latter group was gaining influence by the mid-1970s (Harvey 2005, 13-14).

Until 1979, the Carter administration had only "shifted uneasily toward deregulation" in the wake of the 1970s economic crisis. But in October of 1979, Paul Volcker, chairman of the Federal Reserve Bank under Carter, instituted dramatic changes to current monetary policy. In a complete reversal from New Deal policies that had favored full employment, Volcker's policies attacked inflation at the expense of employment. The dramatic turnaround came to be known as the Volcker shock (Harvey 2005, 23).

Following the Volcker Shock, Ronald Regan's election in 1980 was a critical point in the history of neoliberal reform. Volcker was quickly reappointed to his old position under the new administration, and Reagan spearheaded a "campaign against big government" in an era of deregulation and reform (Harvey 2005, 25). This marked the beginning of a significant transition in the political agenda in the U.S., after which deregulation became priority. It is to this time period that the emergence of neoliberalism is usually attributed in the United States (Harvey 2005, 39; Peck and Tickell 2002, 388).

The election of President Clinton in 1994 brought another, wave of neoliberal reform. In 1996, describing the sentiments of this era, Thompson writes:

> …virtually everyone now agrees that our historical command-and-control approach is inefficient and inadequate by itself to carry us to where we still need to go. Even those who credit our prior environmental successes to this approach concede that it has been costly. As economists and a handful of legal experts have been telling us for decades, the detailed, unrefined, and inflexible rules intrinsic to a command-and-control system have often squandered our scarce societal resources to achieve marginal environmental gains. Money spent to comply with some regulatory rules could have generated far greater environmental gain if our laws had permitted industry itself to decide how best to achieve particular outcomes rather than dictating specific processes and equipment (Thompson 1996, viii).

Congress was fast to act on the TVA decision. The expansion of the ESA in terms of its impacts on private property owners and economic activities did not go unnoticed, especially since the trend of neoliberalism was growing. Congress seemed to think that a powerful act with a tendency to conflict with major economic projects wasn't what the country needed. Their first attack on the ESA's supremacy came nearly immediately after the Supreme Court issued its ruling in TVA. In the same year, both the House and the Senate moved to allow the Tellico dam project to proceed despite the Court's ruling, proposing a set of amendments that would significantly alter the ESA. Although the most extreme of these recommendations (including the removal of Section 7, which commands federal agencies to ensure that their actions no not harm listed species and requires agencies to go through a cumbersome consultation process with the Secretary of the Interior or Secretary of Commerce before executing any action which may impact listed species) were not accepted by Congress, the amendments they did introduce added some flexibility into the act as well as a process by which projects such as the Tellico dam could apply for exemption from the ESA (Ruhl 2012).

Some of the biggest changes to the ESA came during the Clinton Administration. At this time, the ESA had generated heated debate, and was up for reauthorization

by Congress in 1993.[2] It was thus a period during which the ESA was more susceptible to significant changes. Wilson describes a hostile environment in which "the new Republican majority, sympathetic to claims that the ESA hindered economic development and infringed on the rights of property owners, proposed a number of changes to the act." The most extensive plan included giving more consideration to impacts on economic activities and private property rights, providing compensation to landowners who lost money or property under the ESA, making it easier to petition for the delisting of species, and narrowing the definition of "harm" under the ESA to mean only actual physical injury to a member of a listed species (instead of causing population declines, impacting critical habitat, etc.) (Wilson 2001, 165).

While this exact proposal (the Endangered Species Conservation and Management Act of 1995) was never passed into legislation, it served as the basis for a report released a year later by the Clinton administration. It also indicated that the Clinton administration was responsive to Republicans' concerns over the ESA. The Administration sought "a fair, cooperative, and scientifically sound approach to improving the endangered species act." Such was the title of a document submitted by Secretary of the Interior Bruce Babbitt to a congressional hearing in 1995. Notably, the document states that "the Administration recognizes that implementation of the ESA should be improved by building stronger partnerships with states, local governments, private industry, and individuals; by exercising greater administrative flexibility to minimize socio-economic effects and assure fair treatment for landowners; and by reducing delay and uncertainty for States, local governments, private industry, and individuals." Clinton and Babbitt sought "win-win" outcomes for the environment and private interests in their regulatory changes, and made distinct efforts to move away from traditional command-and-control governance (Ruhl 2004). To that end, the administration outlined a package of reforms, titled "*Ten Principles for Federal Endangered Species Act Policy*." These principles included "base ESA decisions on sound and objective science" and "minimize social and economic impacts" (Bear 1996, 3). As shown later in the case study discussion, these two principles would continue to have a legacy in ESA implementation much beyond the Clinton administration.

A near cousin to this report outlining these ten principles was introduced by the Clinton Administration in 1997, and received broad bipartisan support. Titled the *Endangered Species Recovery Act*, its purpose was to reauthorize the act, and it included a mandate for timetables for recovery plans with the goal to delist more species, focused on state government involvement in recovery planning, and emphasized inclusion of cost-effective and economically sensitive recovery strategies. Nonetheless, the legislation was never passed into law, attributable to "the rushed and somewhat contentious end of the 105th Congress" (Wilson 2001, 166).[3]

With the failure of Congressional action, the Clinton Administration sought a more creative approach to ESA reform. Secretary of the Interior Bruce Babbitt was instrumental in developing these reforms. Consistent with the neoliberal outcomes that were increasingly in demand from Republicans, he aimed to give property owners a stronger voice and more security without compromising environmental protection. His solution was a rejuvenation of a provision added to the ESA in the 1982 amendments but seldom used since called Habitat Conservation Plans (HCPs) (Ruhl 2004, 430). As stated in a 1994 Department of the Interior (DOI) news release titled, "Administration's new assurance policy tells landowners: 'No Surprises' in endangered species planning," the policy was intended "to give more economic certainty to landowners involved in reconciling endangered species conservation with land use development." The policy stated that if an endangered species was found on a private landowner's property and they agreed to a habitat conservation plan (HCP) in compliance with the ESA, and they adhere to that plan, they "will not be subject to later demands for a larger land or financial commitment… even if the needs of the species changes" (DOI 1994).

[2] As stated by Buck et al., "the authorization for spending under the ESA expired on October 1, 1992. The prohibitions and requirements of the ESA remain in force, even in the absence of an authorization, and funds have been appropriated to implement the administrative provisions of the ESA in each subsequent fiscal year" (2012).

[3] The ESA has remained unauthorized ever since, though its provisions remain intact. See Buck et al. 1992, 1.

Babbitt's actions have been praised for their innovation, but some ways in which they affected the future of the act were perhaps unintentional (Ruhl 2004). While they did afford landowners more flexibility, they extended the reach of federal authority under the ESA by expanding the number of HCPs in existence and accompanying incidental take premise. A similar expansion of federal reach had already happened once with the increase in species listed between 1978 and 1982, and with the second wave it became even less popular.

The Supreme Court as well seemed to be favoring more neoliberal outcomes, at least in many cases. As both Ruhl and Lazarus observe, in its decisions regarding the ESA and the environment more broadly after the 1970s, the Supreme Court appears increasingly hostile toward environmental causes (Ruhl 2012; Lazarus 2000). Instead of hostility toward *environmental* causes, these authors suggest that the root of the court's reasoning is more related to government and the enforcement of regulation, regardless of environmental impacts. As Lazarus writes, the Court seems to lack a distinct opinion on the environment, and does not see environmental law as being distinct in its implications from other types of court cases (Lazarus 2000, 37). Rather, "they perceive environmental law… as merely an incidental factual context, in which environmental concerns are at stake, but there is nothing uniquely environmental about the legal issues being raised" (Lazarus 2000, 706). Ruhl suggests that the court was more concerned with regulation of private property rights. When the ESA began to do just that, the Court reacted with hostility.

Lujan v. Defenders of Wildlife was the first in a series of court decisions in which the Supreme Court began to slowly but surely eviscerate the strong language and ambitious provisions set out in *Tennessee Valley Authority v. Hill* (Ruhl 2012). Thus, in Lujan, the court took its first stab at the legislation by emphasizing what is required for groups to have standing to sue under the ESA. Not unique to the ESA, plaintiffs are required to demonstrate that they have been "injured" in some way by the actions of the defendants in order for them to have legal standing to bring a lawsuit. In this case, environmental groups had challenged a rule made by the NMFS and FWS that limited the scope of the requirement for Section 7 interagency consultation under the ESA to federal actions within the U.S. only. Previously, a 1978 rule had extended the scope of Section 7 consultation to also apply to federal actions in foreign nations. Environmental groups challenged that Section 7 of the ESA should apply to federal actions anywhere, and that the 1978 rule should be reinstated. After debate in lower courts, the Supreme Court ruled that the environmental groups had failed to provide evidence of how they would be directly "injured" by the agencies' 1986 interpretation of Section 7. Environmental groups had showed concern for harm to species or ecosystems as a result of the decrease in the ESA's scope, but it was concluded that this concern did not constitute "concrete" injury *to the groups themselves* resulting from the federal agencies' decision not to apply Section 7 of the ESA internationally (Ruhl 2012, 499-500; 504 U.S. 555, 581). In short, the rest of their claims against the agencies were dismissed because the court determined that the environmental groups hadn't established their legal standing.

A major implication of this ruling had less to do with the ESA's use internationally and more to do with the future of lawsuits brought against it. In determining that agencies' decisions about how to interpret Section 7 did not cause injury to environmental groups concerned about the impacts of such decisions, the Court essentially deemed Section 7 consultation procedures as "a black box shielded from public scrutiny" (Ruhl 2012, 500). As Ruhl writes, the case solidified that "the consultation between the action-taking agency and the FWS or NMFS is not the kind of procedure in which third parties have any direct participation rights that could be injured should the agencies disregard or improperly conduct the procedure" (Ibid.).

In 1995, the court further restricted the applicability of the ESA in *Babbitt v. Sweet Home Chapter, Communities for a Great Oregon.* This case stands out because on the surface, it appeared to be a win for the environment, but in reality worked against the statute as a whole. The ruling determined that there had to be a direct causal connection between harm to a species and an action for it to qualify as a "take" of that species. In some cases, such as habitat destruction, proving direct causality is difficult (Ruhl 2012, 501-2). For instance, while one might be able to show with

population data that numbers of a species began to decline when a certain habitat disturbance occurred, that data does not necessarily prove that the habitat disturbance – and not an unrelated event – caused the population decline. As a result, it became more difficult to prove that any particular human action should be made illegal under the ESA.

The 1997 case, *Bennett v. Spear*, clearly showed that the court was becoming more hostile toward the ESA and more sensitive to private property rights. In this case, ranchers brought suit against the federal government on grounds that the FWS had failed to use the "best available science" in their decisions. This provision had never been used in court to contradict the power of the ESA, and lower courts had claimed that the ranchers did not have standing to sue against the ESA. After all, the purpose of the ESA was to protect listed species against human activities that harmed them, and it seemed counterproductive to allow perpetrators of those activities to claim injury and sue the federal government. Thus, prior to this case, standing had not been extended to include parties representing economic interests that may be harmed by carrying out the act. The Supreme Court, though, showing clear bias toward the protection of private property rights and economic activities, reversed. They thereby expanded the notion of standing to encompass "any person," including economic interests harmed by the act, had standing to sue. In addition, the Court also confronted the scope of the legislation directly by strictly enforcing the "best available science" mandate "to ensure that ESA not be implemented haphazardly, on the basis of speculation…to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursuing their environmental objectives" (520 U.S. 154 1997, 177-8). This unanimous court opinion was a clear departure from the sentiments of *TVA v. Hill* and the "at any cost" concept of species protection (Ruhl 2012, 504).

In both this case and in the previous ruling in *Lujan v. Defenders*, the Supreme Court used the issue of standing to restrain the ESA, but in different ways. In *Lujan v. Defenders*, the court made it more difficult for environmental groups to prove standing with regard to Section 7 consultation, thereby limiting their ability to attack agencies' application of the ESA and demand more stringent application of the act. In contrast, in *Bennett v. Spear,* the court used standing to open the ESA to attack from those who favored economic growth and private property rights over strong federal species protections. Furthermore, though the "best available science" mandate was nothing new in the ESA, *Bennett v. Spear* gave it power. The terminology actually dates back to the 1982 Congressional amendments (Corn et al. 2012, 17-18). The "best available science" mandate also comes up in the designation of critical habitat (though economic considerations are allowed here), and especially in the consultation process. In the consultation process, everything must be scientifically supported (Corn et al. 2012, 22-24). If an agency fails to do so, they may be susceptible to litigation, often in the form of citizen suits, which have been important to ESA implementation (Ruhl 2012, 496).

Fully a decade after *Bennett v. Spear*, the Supreme Court again took up the ESA in the 2007 case *National Association of Homebuilders v. Defenders of Wildlife*. The most significant outcome of this case was the ruling that the ESA applies only to discretionary agency actions, marking a full turnaround since the ruling in *TVA v. Hill,* in which the court so famously upheld the strictly applied to *all* federal actions (Ruhl 2012, 505). Discretionary actions, while not explicitly defined in the ESA, are distinguished from nondiscretionary actions, which are actions which agencies are specifically directed to carry out under a separate statute (Davison 2006, 31).

As these cases showed, *TVA v. Hill*, rather than setting a new precedent, turned out to be an outlier in Supreme Court decision-making which instead leaned considerably toward deregulation and weakening of centralized laws (Court 2003, 29-31). Plater observed that the surprising victory of TVA is likely because the ESA was viewed differently at the time than other major environmental legislation passes in the 1970s. The Clean Air Act and Clean Water Act, for example, were distinctly command-and-control regimes, marked by broad geographic scope and heavy government regulation and requirements imposed on private land owners and developers. The ESA, on the other hand, seemed to apply primarily to federal actions instead of private landowners, and instead

of blanketing the entire geography of the nation with mandates, it could only be applied to the immediate critical habitat in which endangered species were found (the "one creek" idea). Furthermore, its implementation relied heavily on public action in the form of citizen suits, lawsuits against the government by private citizens, instead of the government imposing unwanted control over its subjects (Plater 2004, 290-291). Only after the ESA's transition to a much more expansive piece of legislation did the court begin to take a more unfavorable stance.

Understanding NMFS and FWS Decision-Making

Given the contentious history of the ESA as described above, from the perspective of the federal government, taking direct action against large-scale water development projects is not so straightforward as critics would make it sound. As the primary decision-makers in many ESA conflicts, the NMFS and FWS more than any other parties must be keenly aware of the political context of their actions. Specifically, the history of ESA implementation since the rise of neoliberalism in the federal government and Supreme Court decisions has set a precedent for prioritization of economic growth and private property rights over conservation. The result of this history has been to limit the power of the federal government with regard to what it can ask or demand of other agencies and stakeholders with regards to recovery planning.

In the Upper Colorado River, this should be immediately clear considering the stated purpose of the Upper Colorado River RIP. As stated on the program's website, "The Recovery Program is a unique partnership of local, state, and federal agencies, water and power interests, and environmental groups working to recover endangered fish in the Upper Colorado River Basin while water development proceeds" (coloradoriverrecovery.org). Its stated purpose is in practice as much to allow the continuation of water development as it is to ensure compliance with the ESA. This is quite similar to the explicit "no surprises" policy studied more in-depth below as part of the development of the proposed Snake River Spring/Summer Chinook Salmon and Steelhead Recovery Plan.

The "No Surprises" Policy and "Best Available Science" Criterion in Snake River Salmon Recovery Planning

As mentioned above, recovery planning under the ESA is a non-regulatory, but nonetheless important tenet of achieving the ESA's goal of recovering species such that they no longer need federal protection. Like other aspects of the ESA, recovery planning also has the ability to become very controversial. Because of the volatile nature of the ESA, the NMFS in the Snake River Basin has been very careful to develop its recovery plans in such a way as to minimize the likelihood of conflict and litigation. The following discussion of the "no surprises" policy and "best available science" standard show two ways in which the NMFS has sought to accomplish this. Both clearly reflect neoliberal philosophy in that they both, directly or otherwise, result in the prioritization of economic interests over drastic action to conserve and recover endangered species.

The "no surprises" policy has become the standard for communication between the NMFS and other agencies in the course of developing recovery plans for listed species of fish in the Snake River. It means that NMFS will not include anything in their final recovery documents that has not been internally reviewed by the agencies involved (Rosemary Furfey, personal communication 2016). This policy actually dates back to the Clinton administration's ESA reforms, though originally it does not appear that it was intended to apply to communication between agencies. Instead, Secretary of the Interior Babbitt's HCP initiative used the language to describe assurances to private landowners. This was a significant element of Clinton's neoliberal reforms which focused on giving private property owners and economic interests more consideration under the ESA. Today, this remnant of earlier neoliberal reforms still serves the purpose of allowing those who would have to alter their economic activities under the ESA more certainty that they will not be asked to do anything beyond actions they agreed upon. The only difference is that, instead of private landowners, it is now federal agencies benefitting from this policy. Thus, so long as the Bureau of Reclamation, Army Corps of Engineers, and Bonneville Power Association are allowed to review and comment on recovery plans before

they are released and agreed upon, recommendations such as dam removal or significant, profit-reducing alterations to the hydroelectric system likely will not be found in the final reports. The "no surprises" policy therefore works to perpetuate a neoliberal power structure which gives economic interests power over regulatory agencies, and prevents the NMFS from moving in new directions when old strategies are shown to be ineffective. It was an impasse such as this which prompted a recent lawsuit against the federal government over the impact of the Federal Columbia River Power System on endangered salmon.[4] In his ruling against the NMFS, an Oregon District Court judge concluded that "federal agencies have… continued to focus essentially on the same approach to saving the listed species – hydro-mitigation efforts that minimize the effect on hydropower generation operations with a predominant focus on habitat restoration. These efforts have already cost billions of dollars, yet they are failing" (*National Wildlife Federation v. National Marine Fisheries Service* 2016). In short, the NMFS had failed to fix existing problems and consider new solutions, a trend consistent with the impasse created by the neoliberal "no surprises" policy.

Additionally, NMFS faces pressure to be certain that their policies are in accordance with the "best available science," a mandate which has shielded economic interests from the ESA at least to some degree. As University of Idaho Law Professor Barbara Cosens explained, agencies must always be aware of the possibility to be challenged on their science. They may just as easily be challenged for doing too much for salmon as not doing enough, so they must ensure that without question, their decisions can be backed up by science (Barbara Cosens, personal communication 2016). The best available science mandate also dates back to Clinton's neoliberal ESA reforms, it was the first of the administration's "Ten Principles for Federal Endangered Species Act Policy." It was also strictly enforced in *Bennett v. Spear* with the explicit intent of avoiding "needless economic dislocation." This economically-sensitive enforcement of the statute clearly reflects the neoliberal tendencies of Clinton's administration. Indeed, by being extremely conservative in its actions as a result of the best available science mandate, the NMFS is avoiding "economic dislocation," though advocates of stronger protections for salmon would likely say that impacts to hydroelectric operations must be accepted in order to achieve meaningful recovery.

The impacts of these practices are clearly shown in the content of the 2016 recovery plan, and especially in what content it does not include. Specifically, it barely touches on dam removal as a possible recovery action, and both the "no surprises" policy and the best available science requirement contribute to the agency's reluctance to breach this topic. As described earlier, the "no surprises" policy has made it difficult for the NMFS to publish any plan that contains recommended actions that the dam-operating agencies involved do not like. This certainly includes dam removal. Also, the agency would not suggest such a controversial action, such as dam removal, without concrete science supporting their decision. The problem is, as discussed earlier, that in a complex ecosystem, it is very difficult to prove what impact any given action will have on salmon populations (Barbara Cosens, personal communication 2016). Similarly, it is difficult to prove that dam removal is the only option which would successfully lead to recovery, and because of their "no surprises" policy working with other agencies, the NMFS can be assured that they would not be able to publish a plan that recommended dam removal when there are still other more palatable options on the table.

Despite its limitations, the 2016 plan has actually been described as being more progressive than other recovery plans developed earlier for other populations of fish in the Columbia River (Rosemary Furfey, personal communication 2016). First, the Snake River plan focuses largely on an adaptive management strategy, and identifies a number of key uncertainties such as potential impacts of climate change and current gaps in the agency's scientific understanding of salmon's interaction with the hydropower system (NMFS 2016, 160-162). One section in particular within the adaptive management strategy represents a small, hesitant move on the part of NMFS to

[4] This lawsuit was the latest in a series of lawsuits brought against the NMFS and other federal agencies in the Oregon District Court over the operation of the Federal Columbia River Power System. While this paper does not discuss the details or significance of these cases, they clearly show the reluctance of the NMFS to mandate significant changes to hydropower systems. For more information, see "The Role of the Judge in ESA Implementation: District Judge James Redden and the Columbia Basin Salmon Saga," Blumm & Paulsen (2013).

reach beyond their historical impasse with hydroelectric interests and implement more drastic recovery actions. Section 6.4 of the report, titled "Potential Future Actions," states that "we believe that the site-specific recovery actions recommended in this Plan, combined with actions already completed, will result in *progress toward* recovering species. However, these actions alone are *unlikely to achieve recovery*" (NMFS 2016, 185-6, emphasis added). This line is quite important to understanding the recovery planning scenario in the Snake River. It reveals that the NMFS is aware of the fact that they are being economically sensitive in their recovery planning, especially because the plan fails to include some potential recovery actions, such as the breaching of dams in the Lower Snake River. It also represents a conscious effort to move beyond the existing power structure and attempt to take more progressive action. For instance, table 6-8 in the report outlines "potential future actions," including a category titled "improve mainstem Snake and Columbia River hydropower programs, operations, and effects." While this section does not specifically address dam removal as a potential future action (instead, it focuses on reducing water temperature and pollution problems associated with reservoirs, improving fish passage around existing dams, and implementing research programs), the table does make brief mention of dam removal (NMFS 2016, 185-187). This table, which does not appear to have been created by the NMFS but instead by Beechie et al., summarizes "habitat restoration types and their ability to ameliorate climate change effects," includes a category called "longitudinal connectivity" or (in parenthesis), "barrier removal." This category includes "removal or breaching of dams," an action which Beechie et al. find "ameliorates temperature increase," "ameliorates base flow decrease," and "increases salmon resilience" (Beechie et al. 2013; NMFS 2016, 185). In short, what this table says is that indeed (as tribes and others have been saying for years) is that dam removal would seem to be beneficial to salmon recovery. It is significant in this report because it indicates that perhaps, dam removal could be part of the NMFS's adaptive management strategy.

Many interviewees for this project expressed exasperation when asked about a possible solution to the impasse between salmon and hydroelectric power. A common sentiment was that no good solution existed, and that the conflict would continue indefinitely. What salmon recovery planning in the Snake River shows, though, is that, while the impasse between the NMFS and hydroelectric operations is perpetuated by practices that originated decades ago through neoliberal reforms to the ESA, there are signs, however small, that it will not last indefinitely.

Conclusion

The relationship between the ESA and the rise of neoliberalism has largely lead to a decline in the scope of the act and agencies' ability to take drastic measures to restore species' populations. From the height of the act's scope at *Tennessee Valley Authority v. Hill*, the legislation has been altered and influenced to embrace neoliberal policy and deregulation. Transformed by presidential administrations and congressional actions, and affected by Supreme Court decisions, the law's reach has been changed in some expected ways and others that were not foreseen. The introduction of the "no surprises" policy under the Clinton Administration assuaged the concerns of private landowners and property rights advocates, but the adoption of this "no surprises" policy among federal stakeholders involved with species' recovery has had larger implications in the case studies discussed in this paper. These changes were compounded by the *Lujan* decision, in which the Supreme Court placed the Section 7 consultation process in "a black box shielded from public scrutiny" (Ruhl 2012, 500). Thus, the "no surprises" policy, originally intended for private landowners involved in HCPs, has been adopted amongst federal agencies, and cannot be challenged in court. While the use of the policy may seem benign, and aimed at inter-agency cooperation, it has required NMFS to abide by the interests of agencies deeply invested in the Federal Columbia River Power System. Thus, hydropower interests have an equal seat at the table in a conversation that should be prioritizing species' recovery. In this atmosphere, it seems difficult for NMFS to make the unpopular decision to reconsider the relationship between imperiled anadromous fish and water infrastructure in the basin.

In the Upper Colorado River, the ESA has been considerably less controversial, largely due to lack of

pressure from stakeholders to increase protections for fish. Interestingly, in this atmosphere, we see federal agencies behaving in much the same way as federal agencies in the Columbia River. A similar standard of communication as the "no surprises" policy exists between stakeholders and federal agencies through the cooperative Upper Colorado Recovery Implementation Plan, and federal agencies are limited in what sacrifices they can ask water-users to make to improve endangered fish survival. This regional comparison reveals that agencies have limited political freedom not only in the Columbia, but in the Upper Colorado as well, and likely in other regions and circumstances. Thus, it indicates that acknowledgment and analysis of such restrictions might be necessary to understand federal agency decision-making in a broad array of natural resource management scenarios. Further research could be conducted to determine whether similar patterns observed in this report occur elsewhere.

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Reservations and Reservoirs:
Deferred Tribal Justice on the Columbia and Colorado River

by Emelie Frojen, 2016-17 State of the Rockies Project Fellow

This paper will analyze Native American water injustice, as well as representation in river policy and management in the Columbia and Colorado River basins. In recent years, water justice in these two basins has become a pressing issue. However, the means by which Native American water rights and representation are actualized from paper rights to wet water rights varies dramatically between the two western river basins. Despite the differences between the two basins, there is a strong commonality in that all Tribes experience a form of deferred justice, meaning there is a lag time between when the courts declare Native American water rights and when, if ever, those rights are tangibly quantified. Here, I analyze three Tribes as case studies: the Southern Ute Indian Tribe (Colorado), the Confederated Tribes of the Colville Reservation (Washington), and the Nez Perce (Idaho). This paper will examine the means of achieving water justice on the two rivers, and the issue of deferred justice, by seeking to answer the primary questions of: what is the cause of deferred water justice? What can be done to diminish it? How does settler-colonialism contribute to deferred justice? What does modern water justice look like, and what are some challenges and solutions to achieving it?

Introduction

West of the 100th meridian lies two great river basins that facilitates prosperity for half of the United States: the Colorado and Columbia Rivers. The Colorado River flows from its headwaters in the Rocky Mountains southwest through high desert plains to the Gulf of California. Colorado, Wyoming, Utah, New Mexico, Arizona, Nevada, and California all hold rights to some Colorado River water, and the 1922 Colorado River Compact is the main governing document that divides up the river water. The Columbia River headwaters lie in the Canadian Rockies, and flows southwest to meet the Pacific Ocean on the Oregon-Washington border. Seven states also have claims on this river—Washington, Oregon, California, Montana, Idaho, Wyoming, and Nevada—as well as Canada. The Columbia River is governed by the international 1964 Columbia River Treaty. The Treaty is currently in a ten-year review process to renegotiate the treaty's terms.

A commonality between both rivers and most waterways in the West is that a user's water right is determined by the process of prior appropriation. Rather than in the East, where users have a water right if their property borders a waterway, the concept of first-come first-serve rules in the west. The first party to divert the water from the stream and apply it to a beneficial use has the right to that much water indefinitely. The next to divert has the second highest priority right.

Although the Colorado and Columbia River basins are both west of the 100th meridian and are ruled by prior appropriation, they differ in many ways. The Colorado basin is defined by aridity that, through ambitious engineering projects, the federal government turned into prosperous farmland and sources of hydropower. Fights over Colorado water quantity rights are as old as the first settlers, and the stakes have only grown with time. In the Columbia basin, hydropower is the main use for the river.

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Run-of-the-river dams are used on the Columbia and its tributaries to produce up to 80% of the Pacific Northwest's electricity. The federal government, or private entities, can own dams, which makes regulating them a challenge. In addition, dams make it challenging for salmon, a source of sustenance for the physical and spiritual health of the Pacific Northwest Tribes, to return to their runs to spawn. Despite these seemingly different water issues, the legal system that resolves them is identical.

My research focused on three case studies pertaining to Tribal water justice. Each Tribe had water quantity rights issues as well as additional water related injustices. My first case study is the Southern Ute. Their water rights were adjudicated in the Colorado Ute Settlement Act; however, the Tribe still faces issues with how they can put that water to use. My next case study is the Confederated Tribes of the Colville reservation. The Confederated Tribes of the Colville Reservation pioneered Tribal water rights. Yet, the reservation suffers from serious water quality issues related to mining waste and the Grand Coulee Dam. The last case study is the Nez Perce, major stakeholders in the 2005 Snake River Basin Adjudication. The Nez Perce struggle to use water rights for instream flows to benefit endangered salmon. These three different Tribes face a variety of issues, however, they all face challenges in the ways that water rights issues continue to structure their futures.

All Tribes affected by prior appropriation law experience a deferred justice, meaning that there is a lag time between when the courts declared Native American water rights and when, if ever, those rights are tangibly quantified and delivered. I frame the experience of these three Tribes—the Southern Ute Indian Tribe, the Confederated Tribes of the Colville Reservation, and the Nez Perce—to argue that deferred justice in Tribal water rights is best explained by past legacies of settler-colonialism in resource access and alienation.

Tribal water rights are important because water settlements "are like modern day treaties" and they will affect the future generations of Indigenous and non-Indigenous people alike (R. Anderson, personal communication 2016). Executive Director of the Nez Perce, Rebecca Miles, said, "the courtroom is the modern-day battlefield," and the outcome of this new battle is paramount because "among all Tribes, water is the most sacred thing. Above food, water always comes first" (R. Miles, personal communication 2016).

Colorado Basin

The Colorado River Basin is governed by the Colorado River Compact and it is comprised of two basins. The Upper Basin includes Wyoming, Utah, Colorado, and New Mexico; while the Lower Basin has California, Arizona, and Nevada (see **Figure 1**). The compact was signed in 1922, a year with abnormally high flows for the river that has rarely been reached since. In its natural state, the river would flow through Mexico to the Gulf of California. A treaty was signed in 1944 that sets out water delivery requirements from the U.S. to Mexico. The United States, however, does not have to comply with the treaty in cases of extreme shortage, which is ill defined (Christensen, 2004).

In their 2004 paper, Christensen explains, "the Colorado River has the most complete allocation of its water resources of any river in the world and is also one of the most heavily regulated." Since the river is the main source of water for the most arid places in the United States, the value of that water is tremendously high. This, paired with extensive storage infrastructure, has led to the over allocation of the river. With over 90 reservoirs on the Colorado River and its tributaries, the infrastructure can store up to four times the river's average annual flow (Christensen, 2004). In times of drought, however, the current storage infrastructure loses more water to evaporation than water replenishing the reservoir.

Storage is essential on the Colorado River because the river supplies water to millions of people for various uses. While some of that use is for municipal or industrial purposes, most of the Colorado River's water is used for crop irrigation. The river irrigates approximately 2 million acres of land (MIT, 2012). In addition to these uses, the river is also valued for hydropower production and recreational opportunities, among other uses (MIT, 2012).

With use comes over use. The storage capacity on the Colorado River is facing a structural deficit. This economic term describes the current state of the Colorado River.

Figure 1: Colorado River Basin

The Colorado River Basin covers seven states, as well as parts of Mexico, and hosts one of the highest concentrations of tribal lands in the United States. Source: ESRI, Bureau of Indian Affairs, National Watershed Boundary Dataset, National Inventory of Dams, National Elevation Dataset, Pacific Institute.

If the river and its subsequent reservoirs are a bank account, then more money is being taken out in withdrawals than deposited. Use, evaporation, and diminished flows due to drought are to blame, and these combine to form the "structural deficit," complicating the future of the river.

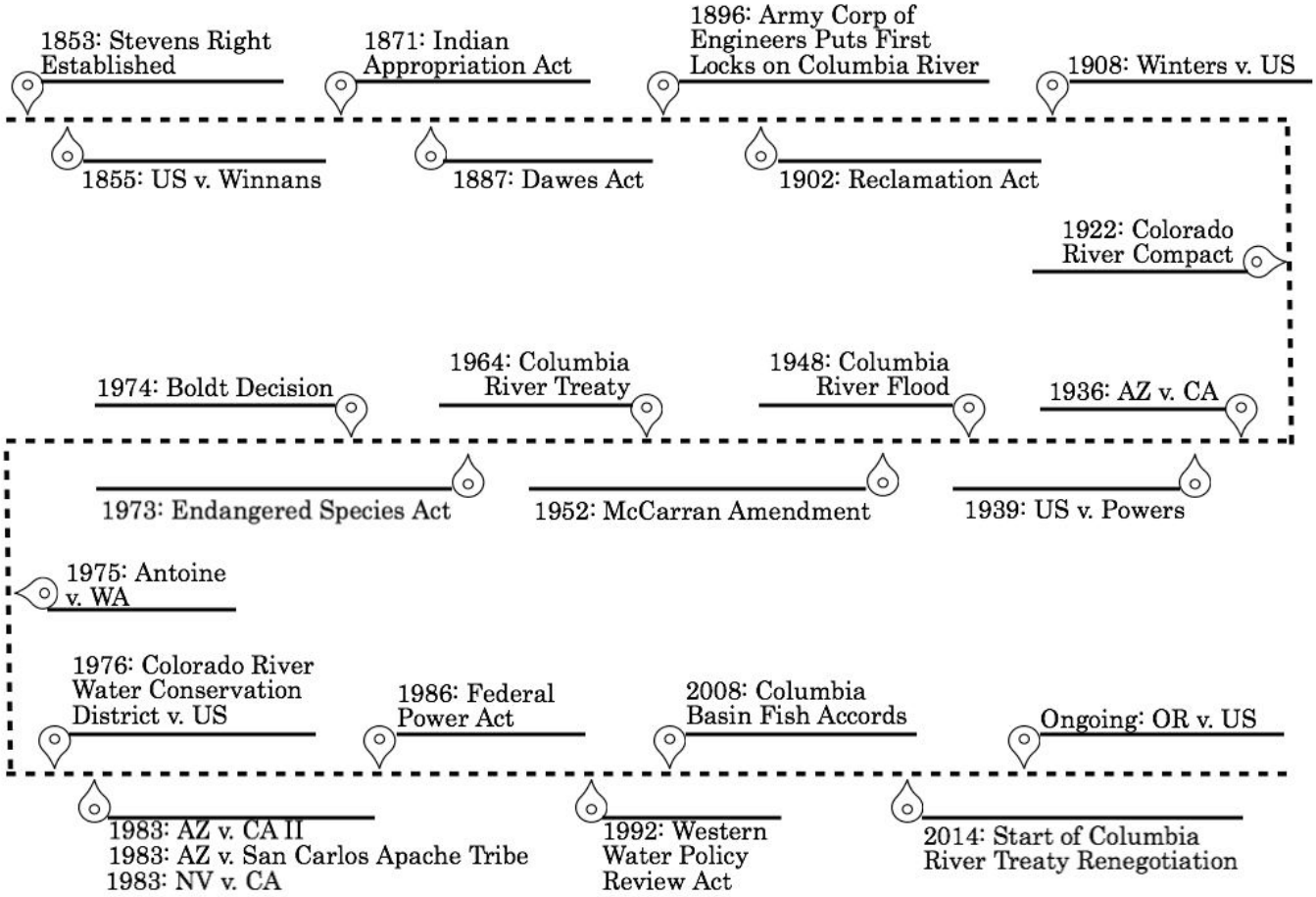
Within the basin, there is the Colorado River Basin Tribes Partnership, which is composed of 10 federally recognized Tribes: Ute Indian Ute, Ute Mountain Ute, Southern Ute Indian Tribe, Jicarilla Apache Nation, Navajo Nation, Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Quechan Indian Tribe, and the Cocopah Indian Tribe. Their mission statement reads:

> "The ten member Tribes formed the Partnership for the purpose of strengthening Tribal influence among the seven Basin States over the management and utilization of Colorado River water resources. Specifically, the Partnership intended to assist member Tribes to develop and protect Tribal water resources and to address technical, legal, economic and practical issues related to the management and operation of the Colorado River" (CRWUA, 2016).

Despite this it is often "difficult to find common voice because [the] upper and lower basins have different priorities as well as Tribes having different values," as one river stakeholder put it recently (S. McElroy, personal communication 2016). Although these Tribes have different values and political power, they share a common experience with settler-colonial attitudes that shaped Native American federal policies.

The historical setting to understand Tribal water rights and deferred justice through a settler-colonial lens is imperative. For most Tribes, the historical trauma of past federal policies and actions is still relevant today. Additionally, these old laws and court cases set important precedents that continue to have relevance. Most significant federal policies, acts, and ideals that govern the west started in the mid to late nineteenth century through the promotion of non-Tribal industry in the western half of the United States (see **Figure 2**). Treaties were and still are the primary source of Tribal sovereignty and rights in America. Yet the roots of most federal policy started as early as 1778, and by 1871 with the Indian Appropriation

Figure 2: Timeline of Native American Water Law



Act, "the United States negotiated and ratified 367 Treaties with Indian Tribes" (Anderson, 2000). These structured the pathways and dependencies of many Tribal entities for water in the American West. The Indian Appropriation Act of 1871 prohibits the United States from making any new treaties with Tribes. The constitutionality of this act is up for debate since Tribal rights and sovereignty comes from treaties. However, the act has yet to be challenged directly in the Supreme Court. "Since…[1871], Indian policy has been created and implemented through the legislative process and executive agreements" (Kannan, 2008).

A little over a decade later came the Dawes Act of 1887, which was the most prominent of the western policy acts geared towards transforming Indians into American citizens. Known as the General Allotment Act, it promoted the development of non-Indigenous water-intensive economies, such as agriculture and mining, through parceling out property to those who first journeyed out west (Anderson, 2015). Specifically, "the Dawes Act intended to fragment Native American reservations into individual land holdings that broke up the collective land and weakened power of the Tribes as sovereign, diverse bodies" (Semlow, 2015). With that, "the surplus lands within reservation boundaries were opened to homesteading and other forms of use under the laws encouraging settlement of the public domain" (Ibid.). Thus, Dawes would act in concert to transform identity and re-regulate property under simple fee title ownership in accordance with other settler-colonial acts (like the Homestead Act of 1862).

With the promotion of agriculture in the west, there was a dramatic increase in demand for irrigation infrastructure. The Reclamation Act of 1902 began to establish a fund and a department of the federal government for just that—the Bureau of Reclamation. The fund was backed by the sale of public lands, and it "unambiguously emphasized the primary congressional objective of encouraging development of arid western land" (Burness, 1980).

It wasn't until 1908 that the land and water rights of Tribes were considered in the precedent setting case *Winters v. United States*. On January 6th, 1908 the Supreme Court came to an eight-to-one decision in favor of the Fort Belknap Native American Indian Reservation (Hundley, 1982). With regards to future rights, the Winters decision promulgated that "the Supreme Court has implied reserved Tribal rights to water when construing treaties and other legal instruments establishing Tribal reservations when water is necessary to fulfill the purposes behind establishing the reservation" (Anderson, 2010). However, what was left implicit in Winters was "the precise scope and extent of these rights in any treaty are unknown until quantified by a court ruling or an agreement ratified by Congress" (Anderson, 2010). One of the main purposes or values of the resulting *Winters Doctrine* was "basically to interject some equity into federal-Tribal relations in which Indian reservations were being "pulverized" by Dawes Act allotments" (Blumm, 2006). Although *Winters* was more of an exception rather than the rule, it established a solid future foundation for Tribes to reclaim lost water rights. However, during this time and after the *Winters Doctrine*, the federal government was spending exuberant amounts of money on western water developments for non-Tribal use, specifically on the Colorado River through the Bureau of Reclamation.

What was allocated to Tribes was specifically intended for agriculture, and contributed to promoting the government's ideal of Native American living a stationary agrarian lifestyle. This is specifically seen in the example of the Colorado River Indian Tribe (CRIT). "The government alternated between promising irrigation to incentivize Indian settlement, and threatening that if the CRIT did not take steps to increase their Indian population, the promised irrigation would never be completed and/or the land would be opened for white settlement" (Krakoff, 2013). With this, Krakoff outlines the two major themes of western development, "one is that desert lands had no greater use than to be irrigated and farmed. The other, a companion to the first, is that the solution to the West's 'Indian problem' lay in concentrating as many Indians as possible on small patches of their former aboriginal territories, and converting them to a sedentary and agricultural existence" (Krakoff, 2013). Due to this settler-colonial policy, settlements favor consumptive use over instream flows (R. Anderson, personal communication 2016). Tribal water rights perpetuated the ideal of stationary, agrarian people, "irrigation was imposed on the Colorado River Tribes as the colonial ideal of what water and water rights should be used for" (B. Cosens, personal communication 2016).

The 1952 McCarran Amendment created one of the largest obstacles for Tribes today and notion of sovereign water rights. The amendment itself does not specifically address Tribes or water rights, yet the "U.S. Supreme Court ruled that the McCarran Amendment waived the federal government's sovereign immunity defense and gave consent for the government to be joined in state court suits determining the water rights of all users within a river basin, the Court ruled that reserved rights were subject to state adjudications. The Court then twice ruled that Indian reserved rights were subject to McCarran Amendment adjudications" (Blumm, 2006). Specifically, "Over two decades ago, in 1983, Justice William Brennan assured Indian Tribes that their reserved water rights would not be compromised by subjecting them to state court adjudications under the so-called McCarran Amendment, an appropriations rider given expansive interpretation by the Supreme Court in the 1970s and 1980s" (Ibid.).

In a greater sense, "The Supreme Court has interpreted the McCarran Amendment broadly to provide state courts with the authority to adjudicate federal and Indian reserved water rights" (Krakoff, 2013). The McCarran Amendment is challenging because, Tribes who are theoretically treated as sovereign, and who had no say in where the United States put their reservation, are forced to go through the politicized courts of the state(s) in which their reservation boundaries fall. With some states being much more receptive to Tribal sovereignty, rights, and jurisdiction than others, this amendment creates political inconsistency, reflecting the tension of unequal state treatment towards sovereign Tribes in the West.

Outside the walls of the courtroom, the Bureau of Reclamation and the Army Corps of Engineers were at work creating the plumbing infrastructure for western water. This infrastructure contributed to the unequal distribution of power over water. "Consider, for example, how the provision of water to large cities often implies carrying water over long distances from other places or regions. The mobilization of water for different uses in different places is a conflict-ridden process and each techno-social system for organizing the flow and transformation of water (through dams, canals, pipes, and the like) shows how social power is distributed in a given society" (Swyngedouw, 2009). Additionally, continuous infrastructure development led to the over-appropriation of water and shaped new perceptions of water scarcity.

After the Winters doctrine came a series of court cases attempting to deal with Tribal water rights issues in a settler-colonial legal system. "Some early to mid-20th century cases in lower federal courts also recognized implied Indian reserved water rights but similarly did not quantify the amount reserved with any finality" (Anderson, 2010). Cases dealing with the "nature and scope of Indian Reserved water rights" are *Winters v. United States*, mentioned above, and *Arizona v. California* (Anderson, 2010). The latter case dealt mainly with the original allocation and division of water between the upper and lower basins defined in the Colorado River Compact. However, the United States participated on behalf of Colorado River Indian Tribes to qualify claims for the permanent allocation of Colorado River water to Tribes. The Supreme Court agreed, and also set a practicable irrigable acreage (PIA) doctrine, "which allowed a quantification of reserved water rights for the present and future needs of the several Indian reservations" (Anderson, 2010). Some say that the case has even "resolved the question of determining the quantity of water sufficient for irrigating reservations" (Semlow, 2015).

In addition to this, there was a relevant case dealing with Indian allotments—*United States v. Powers*. "In *United States v. Powers,* the Court addressed whether non-Indian successors to allotment owners acquired any right to use a portion of the water right originally reserved by a Tribe under the Winters doctrine" (Anderson, 2010). The case concluded that the water rights of reservations pass along to the new owner in the case of selling Tribal land (Semlow, 2015). However, the "language in the opinion indicates that the allotments and the non- Indian successors could have been limited, but only by the development of 'rules and regulations' under the Dawes" (Anderson, 2010).

Arizona v. California II and *Nevada v. United States* addressed the "procedural cases limiting opportunities to bring additional claims" (Anderson, 2010). *Arizona v. California II* made it clear that Tribes can intervene, on their own behalf, on water issues, after originally ignoring the Tribe's claims (S. McElroy, personal communication,

2016). While *Nevada v. United States*, "ruled non-Native Americans did not have control over Tribal reservation water based on the appropriative system" (Semlow, 2015).

Following the McCarran Amendment, *Colorado River Water Conservation District v. United States*, *Arizona v. San Carlos Apache Tribe*, and *United States v. Idaho* all describe "the circumstances under which state courts may adjudicate Tribal water rights without Tribal consent" (Anderson, 2010).

With regards to relevant police, in the Western Water Policy Review Act of 1992, "Congress expressly found that 'the Federal Government recognizes its trust responsibilities to protect Indian water rights and assist Tribes in the wise use of those resources" (Royster, 2006). This new act allowed for social justice movements to shift towards the settlement process that became favored in the late 20th century for Indian water rights claims.

Explicit Tribal water rights were the result of the social movements of the late 20th century, "as the civil rights movement shifted racial paradigms, the delegitimation of racial paternalism disrupted the institutions of federal Indian policy. This created openings for strategic action that Tribal leaders utilized to address the particular forms of domination facing American Indians" (Steinman, 2012). This is why a majority of water rights settlements took place in the 1980s or after, and why water rights for Tribes can also be considered civil rights given the long-ignored Winters Doctrine decision from over a century ago.

Water settlements are now the favored route for quantifying Tribal water rights claims since, "when litigation is the quantification tool, Tribal claims are generally caught up in massive general-stream adjudications" (Anderson, 2010). This is a costly process in both time and money.

> "The result can be that there are thousands of state water right holders who must be joined as parties to exceedingly complex litigation that takes too long and costs too much even when such adjudications are litigated to a conclusion and Tribes win a decreed water right, such a 'paper right' may do little to advance Tribal needs without the financial ability or the infrastructure to put the water to use" (Anderson, 2010).

However, the biggest issue in, "litigating Indian water rights is how to interpret Indian treaties and agreements that rarely, if ever, deal explicitly with water rights" (Anderson, 2010). It is essential to note that "paper rights transfer to wet water rights through adjudication, [but] litigation is more rare" (B. Didesch, personal communication 2016).

Today, the United States water policy is left with the challenge of decolonizing its western water law. "Indian law and water law are therefore enmeshed in ways that force confrontations not only between the demands of many users to an increasingly scarce resource, but also between our settler-colonial past and our self-determination era present" (Krakoff, 2013).

However, even as the resolution of this delayed water injustice unfolds, the process of decolonization faces numerous social and financial strains. The Colorado and Columbia rivers have countless stakeholders with various interests and value sets (Anderson 2010). The three case studies presented here attempt to frame some of the settler-colonial legacies of past policy in a way that allows for future federal policy to better address water injustice for Native American sovereign groups.

Case Study: Southern Ute

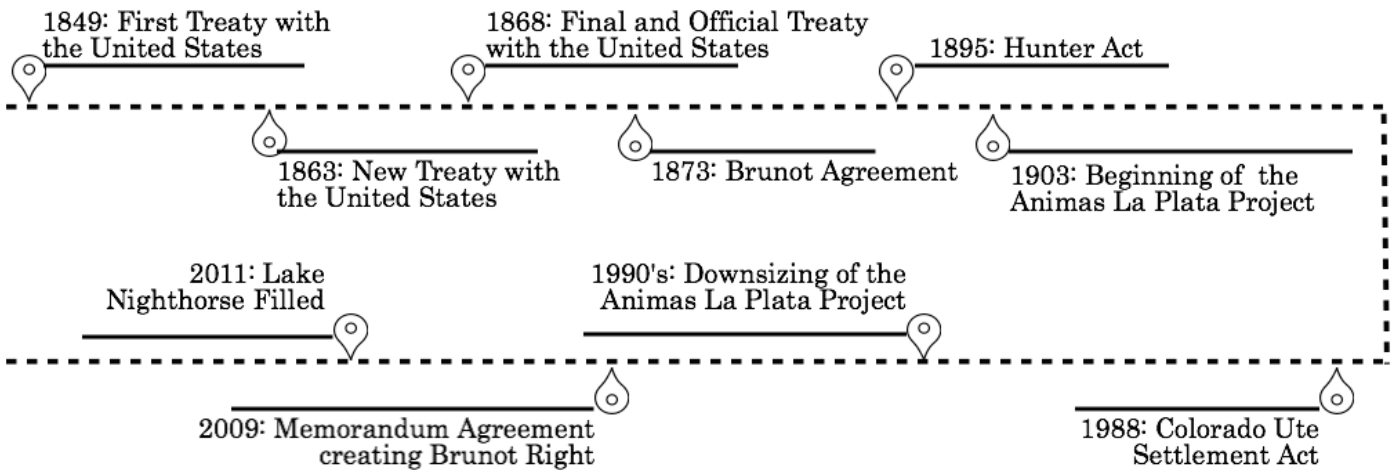
The Southern Ute are a very prominent Tribe in the Colorado River basin. Their original lands span the mountains and plateaus of Colorado, Utah, Wyoming, Eastern Nevada, Northern New Mexico, and Arizona. Traditionally, the Ute Tribe would travel on well-established trails throughout the Colorado Plateau. The Southern Ute were known for their skilled big game hunting and traded tanned deer and elk hides with the Spanish before Zebulon Pike led the United States' influence into Ute lands (Southern Ute, 2016).

The first peace treaty between the United State and the Utes was in 1849. The treaty established boundaries and acknowledged the sovereignty of the United States and the Ute Nation. In 1863, another treaty took precedent, which terminated all Ute claims to mineral rights and lands in the San Luis Valley. In 1868 the official boundaries of the Ute reservation was established. Therefore, Ute water rights date back to 1868 (D. Rue-Pastin, personal communication 2016).

The 1873 Brunot agreement forcibly took away large swaths of land from the Utes, especially land that was traditionally for subsistence hunting. However, in 2009, the unjust nature of this settler-colonial policy was recognized by the state of Colorado, and a Memorandum of Agreement was signed in 2009, which reaffirmed Ute's rights to hunt and fish on off-reservation lands. It is now known as a Brunot Right. Coupled with the Hunter Act of 1895, which sold Ute land for non-Indian development, set the small sliver of land that was left for the Utes reservation (Southern Ute, 2016).

The original ALP had substantial Tribal support (S. McElroy, personal communication 2016). However, some scholars of the process see more of a conflict. "Sometimes I refer to this project as cowboys and Indians" (D. Rue-Pastin, personal communication 2016). This comment illuminates the innate tension between non-Indian ranching and Tribal water rights. Whether there was an original conflict between the ALP Project and Tribal water rights became irrelevant as soon as Colorado realized it was in their best interest to settle Southern Ute and Ute Mountain Ute water rights. "Some states see the recognition and

Figure 3: Timeline of Federal Actions Affecting the Southern Ute



To the United State's surprise, the small sliver of land that was left was some of the most oil rich land in the west. Throughout the 20th century, the Utes wealth grew through oil, and now natural gas development (S.McElroy, personal communication 2016). This has contributed to the Tribes' relative success in their water rights cases. The most notable being the Colorado Ute Settlement Act.

The Animas La-Plata (ALP) project was prevalent long before it was incorporated into the Colorado Ute Settlement Act. ALP was originally an irrigation project conceived in 1903. There was no Federal interest or funding until the 1980s when the main focus of the ALP became the settlement aspect of it (D. Rue-Pastin, personal communication 2016). The ALP project started and ended with the Bureau of Reclamation, but there were many issues of necessity and practicality that prohibited the project from starting until the 1980s.

protection of Indian water rights as a way to gain a competitive advantage over other states in the future allocation of interstate streams by piggybacking the state onto Indian claims" (Tarlock, 1987).

The Ute Mountain Ute and Southern Ute Tribes' settlement act in the 1980s is comparable to a modern-day treaty. First was the agreement in 1986, then approved by congress as a settlement act in 1988, the Colorado Ute Settlement Act originally quantified almost 60,000 acre feet per year for the Southern Ute and Ute Mountain Ute Tribes (McElroy, 1998). In order to satisfy that large amount of claims, the Animas La-Plata (ALP) water development project was adopted as a part of the settlement agreement. The project's original objective was to create a large reservoir to meet Tribal and non-Indian water needs.

The outcome of the settlement was seen as very good for the Utes with respect to other settlements taking place at the same time but in different areas. "The Tribes got the

best deal that they could" (R. Anderson, personal communication 2016). Along with the quantified water rights, the two Tribes also got the right to market water, which was unique at the time and allows the Tribe to treat their rights as financial assets (R. Anderson, personal communication 2016). Utes can lease water to a 3rd party for beneficial use (B. Griffin, M. Chiarito, personal communication 2016). However, a settlement meant that federal funding for the ALP was lost because states handle settlement funding (Ibid.). Despite this, "without the Tribal component, I don't think this project [ALP] would ever be built" (Ibid.). Overall, the original settlement was seen as, "a very good negotiation process for both Tribes" (S. McElroy, personal communication 2016).

There are three main reasons as to why the settlement and the ALP project originally turned out to be in favor of the Southern Ute. The first was the Southern Ute had very good lawyers and representation. As mentioned earlier, the Southern Ute Tribe is relatively wealthy because of oil and gas reserves on the reservation. This allows them the opportunity to decide to hire the smartest lawyers, they are not limited to "someone from the within Tribe" (MSI, personal communication 2016). This is a common component of successful water rights settlements. Secondly, Colorado is a good state for Tribal water rights. Colorado water court is one of the best judicial systems for Indian water rights (R. Anderson, personal communication 2016). One of the lawyers on the case said it was, "refreshing to be in Colorado where the state government was interested in resolving issues involving Indian water rights" (S. McElroy, personal communication 2016). Lastly, the personalities involved in the project were very cooperative. "The settlement is really a credit to good Tribal leadership" (Ibid.).

The settlement was approved by congress in 1988, eighty years after the Winters Doctrine. Although the settlement was enacted, there was still a ways to go when it came to building the infrastructure to eventually deliver those now quantified rights.

As soon as the public caught wind of a new dam being built in an arid place, activism against the ALP project was vocalized. It was primarily environmentalists who opposed new water infrastructure in the Southwest, and immediately sought to stop the project, creating a divide between social justice and environmental needs. The Tribes were the "principal beneficiaries of such a project," but those who oppose feared environmental degradation, and claimed that the Tribal component was solely for justification of the project (McElroy, 1998). However, in his 1998 article, head lawyer for the Southern Ute, Scott McElroy, disputes that, explaining claims are met under the ALP project, which is "the core of the settlement." He adds, "the Indian and non-Indian parties to the settlement have shown an amazing willingness to compromise…" as long as the core components of providing water were met (McElroy, 1998). In a later interview, he added, "the ALP became a poster child for the anti-water development environmental movement in the west," (S.McElroy, personal communication 2016).

Despite this, environmental groups continued to litigate against the ALP project on numerous issues such as the protection of the pikeminnow, an endangered species. The project grew costly in money and time. "Delay was the worst enemy of the settlement, given the ever-increasing cost of the project and the increasingly hostile attitude in Congress toward the federal financing of Western water projects in the difficult budget climate of the 1990s" (McElroy, 1998). In return, the project was downsized from 57,100 acre-feet of water per year to 19,000. Additionally, the reservoir was moved off stream and the irrigation component, the main desired water use for the Ute Tribes, was taken off the table (McElroy, 1998).

McElroy discusses how this issue arguably falls too far on the environmental sustainability side of the spectrum between environmentalism and social justice, when talking about the environmental activists and their lawyer Maynard. "The project's opponents, as exemplified by Ms. Maynard's arguments, have been willing to go to any length to kill the project without regard to the benefits of the settlement to the Ute Tribes, and no matter how insignificant the environmental consequences of the now greatly reduced project" (McElroy, 1998).

The conflict over the Animas La-Plata project is not only significant in a political ecology lens through its relation to the tension between social justice and environmental sustainability, but also, "current debates about Indian

water settlements… can be seen in their proper context, as measures of corrective justice that recognize Indigenous peoples preexisting political, moral, and legal claims, rather than as special rights doled out to select minorities" (Krakoff, 2013).

Since then, the ALP has changed though different federal administrations (D. Rue-Pastin, personal communication 2016). This downsizing put the project in a huge rush to finish before it was downsized more, or scrapped altogether. "States and Tribes and water users stayed at the table, and Babbitt pushed it through very fast, this may have made the outcome a little less thought through" (S. McElroy, personal communication 2016). "People wanted to see ALP go forward, but in retrospect, ALP was an environmental disaster in the making" (Ibid.). Over all, "Animas- La Plata Project divided the community into the liberal mindset or the water buffalo mindset," (D. Rue-Pastin, personal communication 2016).

After the series of downsizing, the final product of the Animas La Plata project is an off-stream reservoir, Lake Nighthorse, which negated some of the ecological effects a traditional dam would have caused. "ALP diverts water from the Animas River to Lake Nighthorse, from there some of the water is moved back into the river, while other water is parceled out to stakeholders" (B. Griffin, M. Chiarito, personal communication 2016). The reservoir stores 120,000 acre feet of water and 30,000 stays in the reservoir at all times while 90,000 can be pumped out to satisfy various claims. One third of the 90,000 goes to the Southern Ute (whose reservation borders Lake Nighthorse), another one third goes to the Ute Mountain Ute, and last third goes to other stakeholders and users (Ibid.).

The infrastructure is fairly adapted to a changing climate, "the pumping numbers are dynamic depending on weather and snowpack, and in the event of a shortage the burden is shared amongst all users" (Ibid.). However, it is argued by the Tribes that this is unfair due to the reasoning that they did not receive the economic benefits that led to climate change, so why should they have to share the burden? In the inevitable future shortage, "the ideal situation is everyone sitting down and coming to an agreement" (Ibid.).

In the creation of the Lake Nighthorse, many cultural resources of the Utes were lost, illuminating the tension between environmental sustainability and social justice. If the reservoir wasn't moved off river, then this would not have been the case. "Lake Nighthorse flooded the Ute trail as well as many other cultural resources" (Ibid.). Before filling of the reservoir began, there was a research trip for archaeologists to collect cultural resources in the soon to be flooded area. Lake Nighthorse showed the interesting challenge of finding the middle ground between fulfilling the settlement water rights and flooding cultural resources.

Despite being filled five years ago, the reservoir is still closed to the public and to Tribes; and there is no water being pumped out of it due to a recent mining cleanup accident on the Animas River. This leads Lake Nighthorse to be aptly called by many, "the bridge to nowhere." The ALP project and Lake Nighthorse is no longer maintained by the Bureau of Reclamation but by the Animas La Plata Operation, Maintenance, and Replacement Association. If the lake will be used for recreation is still up for debate. The majority of the four corners community is in favor of it but, "recreation troubles Tribal leaders with the threat of further degradation of cultural resources in the Lake Nighthorse area" (S. McElroy, personal communication 2016). However, before addressing the issue of recreation, stakeholders must first address the issue of what is to be done with all of the water in the reservoir now?

First and foremost, infrastructure is needed to get the water from the lake to the Southern Ute reservation. However, the once it's there, the issue of water uses must also be addressed. "The Southern Ute wants water that it can use, not just water that can be marketed, however this was taken away with the loss of irrigation" (Ibid.).

Water quality in the reservoir must also be considered. As mentioned above, they are not pumping water out of the Animas River this year. "This is partially due to Tribes being extremely sensitive about water quality" (B. Griffin, M. Chiarito, personal communication 2016). However, although there may not be another accident like there was in August of 2015, the Animas river is severely polluted from upstream, inactive mines in the river's headwaters in the San Juan Mountains. The Tribe must determine if the water quality is adequate for them, and seek water quality justice through various legal avenues.

What is left is 120,000 acre feet of semi-questionable water in a reservoir that is not sustainable and still lacks proper infrastructure and management to move forward. What are the Southern Ute to do? "The Southern Ute are currently contracting other rivers and building pipelines" (Ibid.). However, the Tribe evidently experienced a huge casualty in the long process of actualizing the Animas La-Plata project and their reserved water rights. "It was a loss to the Tribe to lose the irrigation component. Their primary goal was to create a reliable water supply on their reservation, not to sell water to Arizona" (S. McElroy, personal communication 2016).

Despite its failures the Colorado Ute Settlement, "in the end it did strengthen the community and communication, even if the outcome wasn't what was originally promised" (Ibid.). To the Southern Ute, modern water justice is, "to have a firm and reliable water supply to make their reservation into homelands," and to allow, "Tribes to make the decision on how, where, and when to use water" (S. McElroy, personal communication 2016).

Columbia River Basin

The Columbia River Basin is approximately 259,500 square miles. Of the basin, 15% lies in Canada, while the other 85% is in the United States (see **Figure 3**). Like the Colorado, it covers seven states: Washington, Oregon, Idaho, Montana, Nevada, and Wyoming. "Although only 15% of the basin lies within the Canadian province of British Columbia, 38% of the average annual flow and 50% of the peak flow measured at The Dalles (a dam located on the mainstem between Oregon and Washington) originates in Canada. In addition, due to the later runoff from snowpack, flow originating in Canada can be 50% of the late summer flow" (Cosens, 2010).

The river is valued by current managers for the four H's: hydropower, habitat, harvest, and hatchery. The last three focus on the numerous livelihoods based on a flowing river, and the central species of concern, the most well-known being salmon.

The Columbia River used to be one of the most productive salmon runs in the United States. However, salmon populations have been on an exponential decline for many decades now. "The decline in wild stocks was caused by a well-known but poorly understood combination of factors, including unfavorable ocean or climatic conditions; excessive commercial, recreational, and subsistence fishing; various farming and ranching practices; dams built for electricity generation, flood control, irrigation, and many other purposes; water diversions for agricultural, municipal, or commercial requirements; pollutants of many types; hatchery production used to supplement diminished runs or produce salmon for the retail market; degraded spawning and rearing habitat; predation by marine mammals, birds, and other fish species; competition, especially with exotic fish species; diseases and parasites; and many others" (Lackey, 2012). Now the Columbia Basin hosts only 1.7% of its original salmon run (Ibid.).

Salmon are a sacred and subsistence species for Tribes on the Columbia River, and their dramatic decline has hurt and affected the religious freedom, health, and overall well-being of Columbia River Tribes. Tribes have been sustaining themselves from hatcheries, but in recent years there have been efforts from most stakeholders to improve salmon habitat on the river. However, we should "keep environmental success in perspective, because if you've completely killed a river, anything is a success" (D. Olsen, personal communication 2016). As far as local, state, and federal efforts to increase fish population, "thus, there is a policy conundrum: salmon ostensibly enjoy universal public support, but society collectively has been unwilling to arrest their decline, much less restore depleted runs" (Lackey, 2012).

Like the Colorado, to understand modern day deferred justice on the Columbia River, some historical perspective is necessary. "In 1805 when Lewis and Clark made their way down the Columbia River to Astoria, there were no dams. Salmon fisheries sustained the native population. Falls slowed upriver migration of salmon and provided excellent fishing locations. Each year thousands of Native Americans from numerous Tribes gathered at locations such as Celilo Falls (now inundated by water behind The Dalles Dam) to fish and trade. Competition from commercial fishing and an influx of canneries began in 1866. The U.S. Army Corps of Engineers began transforming the Columbia River for navigation with locks at the Cascades as early as 1896" (Cosens, 2010).

Figure 4: Map of the Columbia River Basin

The Columbia River Basin spans seven states as well as British Columbia and contains an extensive network of dams. The dams' cumulative storage capacity, however, pales in comparison with the water stored in mountain snowpack. Source: ESRI, Bureau of Indian Affairs, National Watershed Boundary Dataset, National Inventory of Dams, Canadian Department of Natural Resources, Columbia River Inter-Tribal Fish Commission, National Elevation Dataset

In 1853, the United States and Tribes established a Stevens Right. "The Stevens Treaty Water Rights stem from treaties made by Governor Isaac Stevens of the Washington Territory 1853 granting aquatic habitat protection to the surrounding Tribes. The exact words securing Native American historic fish sites, even off reservation, were in nine treaties" (Semlow, 2015). In addition, the Stevens Treaty Water Rights also gave confederated Tribes and bands the right to take fish in all usual and accustomed places (Ibid.). This is the language that set a precedent for all future instream flow policy.

The 1855 case *United States v. Winnans* is where the "the Supreme Court considered the rights of Yakama Tribe members to cross privately owned land in order to exercise off-reservation treaty rights to fish at usual and accustomed grounds and stations" (Anderson). This case that is one of many that sought to enforce Tribal rights on private land.

During this time, and especially through the 20th century, federal and private dam development on the river was taking place at astronomical rates. The main agencies doing this are the Bonneville Power Administration (BPA) and the Army Corps of Engineers, both run by the federal government. Hydropower supplies up to 80% of power in the Pacific Northwest, and 28% of that is exclusively from the Bonneville Power Administration (BPA, personal communication 2016). Despite their dams being the main barrier to wild salmon repopulation, BPA provides mitigation funding to Tribal hatcheries from their dam profits. They also claim to practice, "an all H approach to dam management" (Ibid.). An all H approach means valuing hydropower, habitat, hatchery, and harvest as equals. As social values shift to a more ecological mindset, BPA has also started buying water rights for instream flows. So far they have reserved 373,000 acre-feet of water (Ibid.). However, some see BPA as a conflict of interest since it is a branch of the federal government, and the federal government is supposed to also be a trustee for Native American Tribes. To BPA and most dam managers on the Columbia River, "the biggest new energy is conservation," the same could be said for the Colorado (Ibid.).

One of the main differences between dams on the Colorado and dams on the Columbia is purpose. While most of the Colorado River dams primarily serve as storage, the Columbia's primary purpose for dams is energy. There is some storage in the upper Columbia, however that is mostly for flood control. The majority of Columbia river dams are run of the river dams, meaning that rather than holding a significant amount of water back, they primarily harvest the energy of moving water.

In 1948 there was a huge flood on the Columbia River, which spurred inter-governmental conversations about flood control and a treaty. "Even before the 1948 flood, the International Joint Commission formed by the 1909 Boundary Waters Treaty between the United States and Canada, was directed to study the possibility of storage within Canada to provide flood control or power benefits to both countries. The Columbia River Treaty that would form the framework to accomplish this task was not adopted until 1964" (Cosens, 2010). Negotiations between the United States and Canada took place between 1961 and 1964, and in 1964 the Columbia River Treaty was signed into action. This is still the primary governing policy on the river (Ibid.).

Nine years later the United States Congress signed the Endangered Species Act, one of the firmest environmental policies to date. The purpose of the Endangered Species Act (ESA) is to recover and protect diminishing species populations and their surrounding habitat. The U.S. Fish and Wildlife Service has regulatory authority over to terrestrial and freshwater species, and the National Marine Fisheries Service exercises authority over to marine and anadromous species. The two levels of protection under the ESA are endangered or threatened, both listings related to the likelihood of the species extinction (Petersen, 1999).

Since 1991, multiple Columbia River fish species have been listed as endangered or threatened under the Endangered Species Act. Twelve populations within four species of salmon and steelhead, bull trout, and white sturgeon have all been listed for protection and recovery. The job of developing and implementing recovery plans for these protected species falls to the National Oceanic and Atmospheric Administration (NOAA), which houses the National Marine Fisheries Service. Recovery plans seek to bring species back to self-sustaining populations, however,

they are only suggestions and are not regulations. The recovery plans attempt to provoke collaboration of federal, state, Tribal, local, and private groups (Waples, 1991).

"Tribes have a huge role under the Endangered Species Act in the Pacific Northwest" (R. Anderson, personal communication 2016). A lot of the recovery plans have involved Tribal hatcheries, and state, federal, and private groups are slowly realizing that Tribes have the most successful hatchery practices. Although there are infrastructural problems greater than the hatcheries, "getting the fish upstream is relatively easy through fish ladders and the truck and haul method. The real issue is how to get the juvenile fish back down" (T. O'Keefe, personal communication 2016). Despite Tribal management success, "federal agencies have ultimate implementation of ESA" (CRITFC, personal communication 2016). Many are critical of this and the ESA as a whole, "ESA is the lowest bar of what recovery might be...Tribes have a higher threshold for recovery" (Ibid.).

Two years after the signing of the ESA into law, the 1974 Boldt decision was promulgated. This refers to the precedent setting ruling by Federal Judge George Boldt in the case of *United States v. Washington*. The goal of the ruling was to reaffirm that Tribes have a right to fish in all usual and accustom places. The Boldt decision said that treaty Tribes are entitled to half of all of the fish in the basin (Bruun, 1982). Around the same time, was the *Antonine v. Washington* case, which also reaffirmed fishing and hunting rights of Tribes in traditional lands and waters (Cosens, 2010). Despite these important, precedent setting cases, there needs to be more management over the outcomes. "There is the need to have agencies to regulate and improve fisheries in order to ease inter-Tribal conflict over the 50% of salmon" (B. Cosens, personal communication 2016).

In 1986 there was a necessary amendment to the Federal Power Act, which said equal consideration must be given to power and non-power values in the Columbia River basin. "However, equal consideration does not mean equal values or treatment" (T. O'Keefe, personal communication 2016).

Today there is still the ongoing case of *United States v. Oregon*. This case established technical management teams, which makes basin recommendations, and is currently dealing with matters of the intersection between water rights and treaty rights for salmon in the basin (CRITFC, personal communication 2016).

There are two important Tribal organizations that hold various power and management roles on the river: the Columbia River Inter-Tribal Fish Commission (CRITFC) and the Upper Columbia United Tribes (UCUT). CRITFC is composed of the lower basin Tribes: Nez Perce, Umatilla, Warm Springs, and the Yakama. While UCUT is primarily Tribes in the upper basin: Coeur d'Alene Tribe, Kalispel Tribe of Indians, Spokane Tribe of Indians, Kootenai Tribe of Idaho, and the Confederated Tribes of the Colville Reservation. These two groups have varied roles in the basin and many argue that CRITFC is more powerful (CRITFC, personal communication 2016). "This organization was born out of controversy" (Ibid.). CRITFC's role in salmon management has been extremely impactful in the basin, especially their Spirit of the Salmon plan. CRITFC is shifting the broader public's focus to the fish's life cycle rather than just numbers of returns, in order to have fish for future generations. This has caused them to "butt heads" with other groups over long term versus short-term view and goals (Ibid.).

In contrast, the "upper Columbia Tribes are viewed as settling," (R. Miles, personal communication 2016). This could be because there are not salmon in the Upper Columbia due to all of the infrastructure, whereas the lower Columbia still has some wild populations left. "They have a huge injustice done onto them through Grand Coulee," since there are no wild salmon above Grand Coulee due to the dam having zero methods of fish passage (Ibid.).

In order to address salmon and other endangered or threatened populations, some Tribes within the Columbia River Basin signed the 2008 Columbia Basin Fish Accords. The accords were between the Umatilla, Warm Springs, Yakama, and Confederated Tribes of the Colville Reservation, the Bonneville Power Administration, U.S. Army Corps of Engineers, and the Bureau of Reclamation. In a broad sense, the accords dedicated $900 million to these Tribes for Salmon restoration projects, in return for ten years of active dams and the signing parties to not advocate for dam removal. What spurred this policy is the

removal of the Condit Dam on the White Salmon and the increased activism for the removal of the four lower Snake River dams. "The Condit dam removal was the gateway drug to the lower snake dams," (T. O'Keefe, personal communication 2016). The "Accords helped Tribes better their relationship with BPA and Army Corp," (CRITFC, personal communication, July 19th, 2016), which is necessary for a greater co-management of the Columbia River Basin. However, the $900 million goes directly into hatchery projects, which is a strategy that conflicts with a lot of environmental groups interests. Hatcheries divide environmental interests and Tribal interests (B. Cosens, personal communication 2016). Additionally, some argue that the Tribes were financially forced to sign the agreement because BPA dramatically cut funding to Tribal hatcheries right before the signing of the Columbia Basin Fish Accords. It is also important to note that the Nez Perce did not sign the Accords, which is due to the fact that they are more financially independent and that they are the most affected by the four lower Snake River dams. This Columbia Basin Fish Accords and the surrounding activism for or against dams in the Columbia Basin illuminate a shift in values and attitude towards dams. "I feel like things are shifting. It's not a case of will these dams ever come out but when" (B. Hurlbutt, personal communication 2016).

This shift in values on dams is representative of greater changes in the Columbia River Basin. The goals are now clear, "we've come a long way since the 1920's, but that's not what we should compare ourselves to, we should return the salmon numbers to the pre-dam numbers" (BPA). There are five major changes to getting there (Cosens, 2010). The first is a change in values concerning the river. This is the shift in an increasing desire for public input in policy. This is in contrast with the broader Columbia basin public formerly being agnostic to river policy (Cosens, 2010).

The next is a change in empowerment of local communities and in particular, of Native American and First Nation governments. This is practiced through CRITFC and UCUT's member Tribes' governments working to "renew their sovereign authority in fisheries management" (Cosens, 2010). What is needed next is for that sovereignty to be recognized and included in more management practices.

Third is the change in the viability of populations of anadromous fish that spawn within the Columbia River system. "It is possible that we have so altered the ecological system of the Columbia River that salmon restoration in any way resembling a natural system is impossible," (Ibid.). However, Cosens argues that the, "key to restoring salmon resilience is not merely to maintain genetic diversity through hatcheries, but to re-establish the natural processes that led to adaptation" (Ibid.).

There also needs to be a change in energy demand, and in the type of energy demanded. Currently, "hydropower remains the dominant energy source in the region and the value of the system has grown dramatically. With the current push to develop non-carbon sources of energy, hydropower is likely to become even more valuable" (Ibid.).

Lastly, the largest change in the basin is climate change, and there needs to be an increase in policy and management response to the changing Pacific Northwest climate. "In this way, the [Columbia River] Treaty provides sufficient flexibility for adaptive management to account for seasonal and year-to-year uncertainty within the limited purposes of the Treaty" (Ibid.). However, "climate change takes us out of the range of variation that can be predicted based on historic behavior" (Ibid.). Due to the lag effect in climate change, planners and managers must look into all scenarios of climate change and plan accordingly. The Columbia River treaty is currently in a review process which could provide excellent management plans for high flow scenarios but lacks any for low flow. "The result of failure to address low flows: fish and farmers will bear the brunt of climate change if no effort is made to adapt" (Ibid.).

The Columbia River Treaty currently is in a ten-year renegotiation process, from 2014 to 2024. The process is the Columbia River Treaty Review and it is organized and managed by the Bonneville Power Administration and the Army Corps of Engineers with significant Tribal and public input. Scholars such as Barbara Cosens think that there has been "a complete paradigm shift" which is seen in this review process and that the aspect of Tribal input is not a façade, but indeed genuine. BPA made an effort to get information of the changes being made in the Columbia River Treaty

Review process out to Tribes before going to the public, but that "info was going to Tribal representatives who were filtering out info to the rest of the Tribe" (BPA, personal communication 2016). A road bump was hit during the review process when deciding how much detail BPA should give in the recommendation. If there was too much detail in the recommendations for the revisions that should be made to the Columbia River Treaty, then the recommendations might not be taken into account, "but too little and there will be no change" (Ibid.). This posed a risk to the review not getting finishing in time; however, the BPA says that the Tribes were the main actors in "pushing it through" (Ibid.).

There are two sides to this story, and most Tribes feel like the extent of their input is exaggerated. "We have input," but "the input we have is not better than the input we had when we first established the treaty in the 60's" (CRITFC, personal communication 2016). In most cases, Tribes are just copied on emails and their input is mostly for a token Tribal perspective, and is not seriously considered.

Regardless of the two-sided story, the outcome of the review process has been great. The most significant change is that "ecosystem functions are elevated to the level of flood control and hydropower" (B. Cosens, personal communication 2016). This means that ecosystem function is now, in theory, valued as equal with flood control and hydropower. "Tribes led the change on bringing ecosystem function to a third pillar on the Columbia River Treaty" (BPA, personal communication 2016).

Case Study: The Confederated Tribes of the Colville Reservation

The numerous bands that compose of the Confederated Tribes of the Colville Reservation were nomadic until the mid 1800s when discussion of a treaty began between Tribal leaders, the Chief, and the U.S. government. In 1855, a five-day council took place in eastern Washington to discuss and claim specific reservation boundaries for individual Tribes in the area. The first reservation that came out of this was several million acres of diverse and prosperous land. However, in 1872 President Grant moved the Confederated Tribes of the Colville Reservation to its present day location, and decreased the reservation size to 2,825,000 acres (Colville, personal communication 2016). Twenty years later, the north half of their reservation was ceded to the United States. The Tribe reserved the right to hunt and fish on the ceded land (Du Bey, 2004). Again in 1910, the southern half of the Colville reservation was opened to homesteading, which began in 1916 (Colville, personal communication 2016).

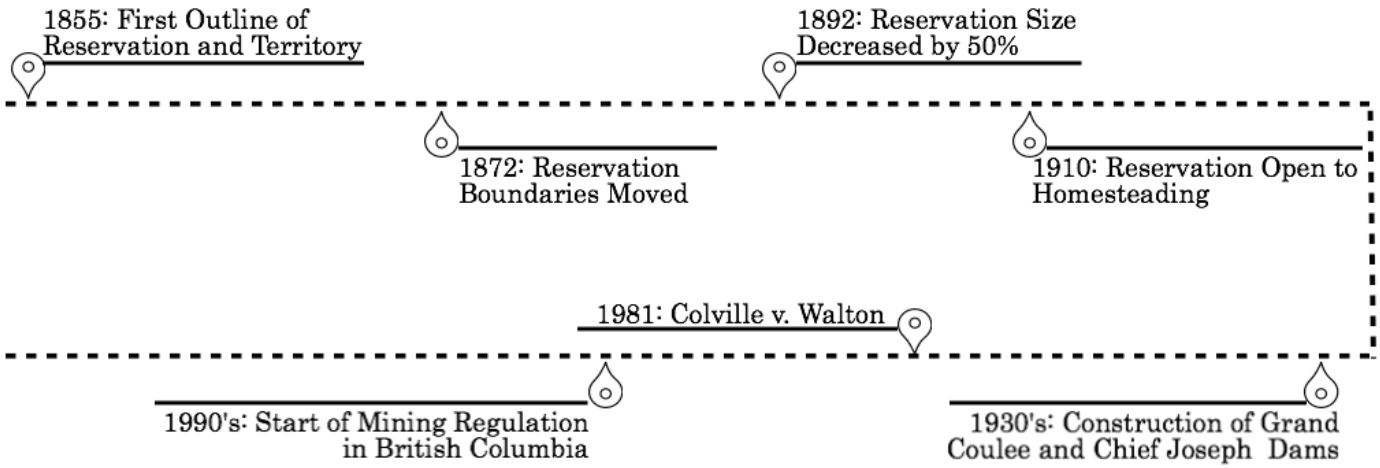
Today, the Confederated Tribes of the Colville Reservation is composed of twelve bands: Chelan, Chief Joseph Band of Nez Perce, Colville, Eniat, Lakes, Methow, Moses-Columbia, Nespelem, Okanogan, Palus, San Poil, and Wenatchi. As of 2015, the Tribal enrollment was just shy of 10,000. At 1.4 million acres, their current reservation is slightly larger than the size of Rhode Island (Ibid.). The Tribe is located in eastern Washington. The Columbia River is both the eastern and southern border of the reservation, and the Okanogan River is the western border. Both the Grand Coulee and Chief Joseph dams also border the reservation.

No wild salmon reach above the Chief Joseph and Grand Coulee dams since their construction in the 1930s. Additionally, these dams cause numerous water quality issues for the Tribe. Alongside these issues, the Confederated Tribe rejected the agrarian lifestyle pushed on them by the United States government; therefore there is very minimal water infrastructure (Ibid.).

One of the precedent setting cases in Native American water law was *The Confederated Tribes of the Colville Reservation v. Walton*. This case involved the adjudication of No Name Creek to the three parties that had claims on the water. One of those users was Walton, who was not a Tribal member but had inherited homesteaded land on the reservation. Walton was diverting too much water from No Name Creek, and therefore too little water was reaching Omak Lake. The other two upstream water users were a Tribal farm and school. The court upheld Tribal jurisdiction and rights to the water within the reservation, and Walton lost his claim (Anderson, 2015). As this case was pre-McCarran amendment, it was tried in federal courts, which lead to a more favorable outcome for the Confederated Tribes of the Colville Reservation due to the federal government's values compared to Washington's.

The Ninth Circuit ruled that state regulation of a non-navigable waterway that is entirely within the bound-

Figure 5: Timeline of Federal and International Actions Affecting The Confederated Tribes of the Colville Reservation



aries of an Indian reservation cannot be regulated by the State of Washington because "a Tribe retains the inherent power to exercise civil authority over the conduct of non-Indians on fee lands within its reservation when that conduct threatens or has some direct effect on the health and welfare of the Tribe. This includes conduct that involves the Tribe's water rights" (B. Didesch, personal communication 2016). This case is relevant to all Tribes because it reaffirms Tribal jurisdiction and rights to water resources that lie within the reservation.

Although their rights might have been supported on water sources within reservation boundaries, rivers that border the reservation are a different story. The Federal Columbia River Power System's (FCRPS) largest dam is Grand Coulee (GCD). In its time, this dam stood for American resilience and brought many jobs to the area. Grand Coulee construction was finished in 1940, and formed Lake Roosevelt, which holds 9 million acre-feet (Du Bey, 2004). "When the US Bureau of Reclamation (USBR) began constructing GCD in 1933, planners intended to build a dam that would put people to work during the depression and generate inexpensive hydropower. A few years after construction began, the project was expanded to include irrigation. Since the initial project was completed in 1941, additional project purposes have been added, the most notable being recreation, flood control, and wildlife conservation" (Ortolano, 2002). However, the dam was built with no fish ladder and killed all salmon runs upstream of the dam. Before Grand Coulee, the Upper Columbia had 1 million salmon, during the end of construction it had approximately 25,000, and today there are zero (Du Bey, 2004).

Grand Coulee and Chief Joseph dams are really issues of environmental justice because it is very clear that those who benefit from the dams are not the ones who pay the cost.

> "Major beneficiaries have included irrigators, electrical utility ratepayers, downstream businesses and residents who received flood protection, and residents of the Pacific Northwest who benefited from the economic development linked to low-cost power, irrigation, and project-related recreation. The people who bore the major costs of the project were US Native American Tribes and Canadian First Nations. The project's main adverse direct effect was the inundation of lands and the elimination of salmon and steelhead runs upstream of the dam site" (Ortolano, 2002).

Due to the lack of fish passage, the reservoirs behind the dams are stocked with hatchery fish. "Colville still rely heavily on salmon through fishing hatchery fish on the Okanogan river which are called kokanee, for landlocked salmon, between and Grand Coulee and Chief Joseph dams," and "relying on kokanee means a lot of health problems" (Du Bey, 2004). Getting rid of wild salmon attributed to the huge rise in obesity, heart disease, and diabetes because Tribal members are replacing fish with fattier beef (Ibid.). However, another, perhaps far great issue with hatchery fish and the dams is their effect on water quality.

While also keeping salmon out, Grand Coulee and Chief Joseph dams hold in toxic waste from mining drainage upstream. Arsenic, cadmium, lead, and zinc are found in high concentrations in the sediment of Lake Roosevelt, the reservoir behind Grand Coulee, as well as the sediment trapped behind Chief Joseph. Many mines in Northern Washington and British Columbia drain into the Columbia River headwaters. What is essential to understand is that waste from mines upstream of these dams is causing large amounts of toxic runoff into the Columbia River. When the flowing water, saturated with mining waste, hits the large dams it is completely halted; the mining waste begins to settle out and gets into the sediment, the substance hatchery salmon, or continues to move downstream through metal-laden water (Ibid.).

Most of these mines are in the Silver Valley, upstream from the Confederated Tribes of the Colville Reservation, or in British Columbia. The Tribe's Environmental Trust has specifically been working against an active nickel mine in British Columbia. This interaction has been going on since the 1990s, and now the goal is to finish negotiations in the next couple of years (Colville, personal communication 2016). This is challenging "because transboundary water quality is very hard to enforce" (B. Didesch, personal communication 2016). A lot of this waste is also due to a huge lead-zinc smelting plant and mine located in British Columbia that remained unregulated until the 1990s (Du Bey, 2004). Within the United States, the Confederated Tribes of the Colville Reservation is working on getting recognized under the Environmental Protection Agency's Treatment as a State program. If their application is accepted, the Tribe could set water quality standards for the water coming into the reservation that are higher than that of Washington state (Colville, personal communication 2016).

A common process that happens with mining waste is that it settles out of the water and into the sediment. "Sediment is the number one water quality issue on the reservation"(Colville, personal communication 2016). This has led to an increase in sandbar cleanup efforts along the Columbia River by the Confederated Tribes of the Colville Reservation's Environmental Trust. "Additionally the lake is drained about 80 feet per year for flood control, which exposes settled sediments. When they dry they emit air pollutants as well as seep into the surrounding flora"(Du Bey, 2004).

The quality of hatchery fish in these reservoirs is also diminished by mining waste in the river, as they too absorb a lot of the mining waste as it settles out of the still water. Fish in these reservoirs show high quantities of arsenic, cadmium, zinc, and lead (Ibid.). The big problem with this is that salmon, specifically these hatchery salmon between Chief Joseph and Grand Coulee as well as above Grand Coulee, are subsistence food for the Tribe and a huge part of their diet. Additionally, these fish are used for sacred and ceremonial practices. "There is a fish advisory because of poor water quality. However that advisory is set based on the average American diet, and although Tribes are eating less than they normally would, they still eat three times as much as the average American" (Colville, personal communication 2016). The Environmental Trust is currently working with the United States government on developing stronger and more accurate fish quality standards for Tribal members.

Another large part of water quality for the Confederated Tribes of the Colville Reservation is water temperature. Temperature affects the habitat of fish, but also the amount of plant life and oxygen in the water. Coupled with the mining waste, algal blooms have a detrimental effect on the environment and the Confederated Tribes of the Colville Reservation. "Cyanobacteria blooms with toxins in lakes on and surrounding the reservation and treaty lands deeply affect members of the Colville" (Colville, personal communication 2016).

When it comes to solving these water issues, the Tribe must work with private groups as well as the State and Federal governments. The Environmental Trust works a lot with the Washington State Department of Ecology on water issues. "We have a collaborative and co-manager relationship on Lake Roosevelt" (Ibid.). When compared to Tribes working in other states, "I would say Washington is less antagonistic" (Ibid.). However, "we do a lot of work with them, but we don't always see eye to eye" (Ibid.).

Currently the Environmental Trust has a fair amount of funding for restoration projects due to a natural resource mismanagement settlement with Department of Interior; $193 million in total went to the Confederated Tribes of the Colville Reservation. Twelve million of that sum went to the Environmental Trust to get rid of pollut-

ing roads, increase riparian areas, and remove fish boundaries (Ibid.). When it comes to federal agencies, there is "some collaboration on water quality with the Army Corp of Engineers, but their relationship with the Colville is rocky and lacks recognition of sovereignty" (Ibid.). Most of the collaboration is about total dissolved gas from water leaving the Grand Coulee dam (Ibid.). In truth, "no one really works with each Tribe on an individual basis," and, "consultation with the Colville usually looks like a mass email or a telephone conference with all the Tribes" (Ibid.).

In addition to all of this, the Confederated Tribes of the Colville Reservation is also dealing with numerous other environmental issues. First, there is an unwanted dam on the Okanogan river. Second, the reservation has a lot of feral and wild horses that are causing huge environmental degradation. Trust land and water ways, land outside the reservation but within hunting and fishing trusts, also needs to be cleaned up to water quality standards. Lastly, the Confederated Tribes of the Colville Reservation have not yet quantified water rights due to the prohibitive basin adjudication process. There are simply too many claims and stakeholders and not enough incentive to overcome the transaction costs that are associated with adjudicating basins that the Tribe holds claims in. "This will also put Tribal interest against agriculture," which is not what the Tribe wants to do (Ibid.). Even if the water rights were quantified, there would be no current infrastructure to put it to use, "the challenge for Indian Tribes in adjudication is getting the funding for the infrastructure to put that water right to use" (B. Didesch, personal communication 2016).

To the Confederated Tribes of the Colville Reservation, "water justice would be universal recognition of Tribal water quality standards and water rights coupled with a productive working relationship with local, state, federal, and international regulatory entities. The goal would be to ensure adequate water of sufficient quality on the Colville Indian Reservation to provide a permanent and prosperous home for the Confederated Tribes" (Gary Passmore Colville, personal communication 2016).

Case Study: Nez Perce

The Nez Perce, or Nimi'ipuu (meaning the real people or we the people) are one of the most vocal and activist Native American Tribes (B. Hurlbutt, personal communication 2016). Prior to being moved to their current reservation, the Nez Perce traveled frequently and freely in groups along the Snake, Clearwater, and Salmon Rivers, spanning what is now Oregon, Washington, Idaho, Wyoming, and Montana. Today their reservation lies in north-central Idaho, with the Clearwater River running through it.

The Nez Perce were a part of the 1855 Treaty, alongside the Umatilla, Yakama, Cayuse, and Palouse. This treaty ceded 7.5 million acres of Nez Perce land to the U.S. government. Shortly after, gold was discovered on the remaining land. However, rather than allowing settlers, the United States government initiated another treaty that ceded 90% of the remaining land. This resulted in the 1863 treaty, which is known as the "Steal Treaty" (Nez Perce, 2016).

A significant court case in Nez Perce history is the 1994 *Nez Perce Tribe v. Idaho Power Co.* In this case, "the federal District Court of Idaho denied the Tribe compensation for the damage done to its salmon fisheries by Idaho Power Company's (IPC) construction and operation of the Hell's Canyon dams on the middle Snake River" (Blumm, 2006). The ruling of the case said,

> "despite judicial precedent recognizing that the Stevens treaties not only created Tribal property rights, but also reserved for the Tribes a fair share of harvestable salmon runs and water necessary to protect fishing rights, the district court held that the Nez Perce had no property rights for which compensation was due because the Tribe did not own an absolute right to the individual fish in any given salmon run. Instead, so the court reasoned, the Nez Perce Treaty created only treaty rights—that is, the treaties merely reserved to the Tribes an opportunity to catch fish if they are present at the accustomed fishing grounds" (Blumm, 2006).

This set an unfortunate precedent for Nez Perce treaty rights, and might have been ruled differently if the case was tried outside of Idaho Courts.

Before this case, began the discussions of the Nez Perce's Winters right claims on the Snake River. In the 1980s, conversations began about adjudicating the Snake

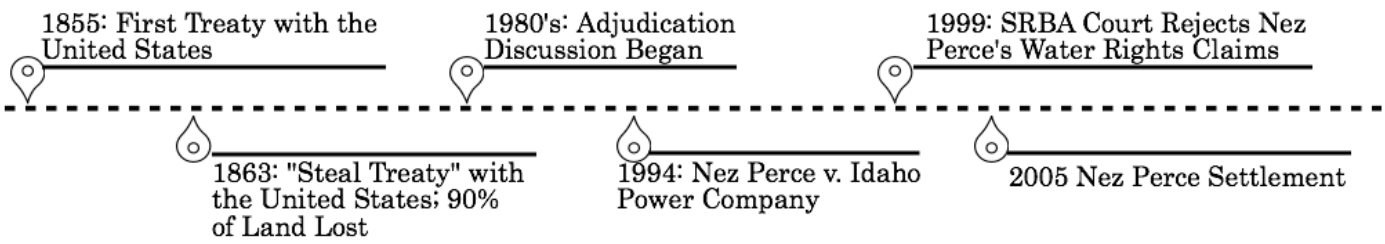
River and were done so in secret until 2003 (R. Miles, personal communication 2016). Some argue that this was necessary so that the parties could be candid, however it had negative repercussions that hurt intra-tribal trust. The adjudication process attributed water quantity rights to every stakeholder in the basin and tributaries. There were over 150,000 water rights claims on the Snake River. The process took around twenty years, which is extremely speedy for a large basin, such as the Snake River (Ibid.). This led to the 2005 Nez Perce Settlement. "In March 2005, the Nez Perce Tribal Executive Committee agreed to waive in stream reserved water rights claims for salmon throughout the Snake River Basin in a settlement with the federal government, State of Idaho, and Idaho water users. These claims arose from treaties signed by the Nez Perce and federal government in 1855 and 1863, which exterminated aboriginal title to millions of acres in Idaho, Oregon, and Washington but also explicitly reserved fishing rights for Tribal members on and off the Nez Perce reservation in north central Idaho" (Hays, 2006).

After the conversation began on the Snake River Basin adjudication (SRBA), "the Nez Perce and federal government on behalf of the Tribe filed over one thousand claims for in stream reserved water rights in the SRBA. The SRBA Court ruled on the Nez Perce claims in 1999 and rejected Tribal claims to reserved water rights in the Snake River Basin. In a decision assailed by some commentators, the court ruled that the Nez Perce did not imply reserved water rights to protect Snake River salmon when it reserved fishing rights in the treaties," (Hays, 2006). Despite this, "the Tribe appealed this decision to the Idaho Supreme Court while continuing efforts to reach a negotiated settlement with the federal government, State of Idaho, and Idaho water users. Negotiations culminated in 2005 when settlement parties reached accord. Under the settlement, the Nez Perce Tribe agreed to waive its reserved water rights claims in the SRBA, which avoided a significant reordering of priorities in the State of Idaho's priority-based water rights system. The Nez Perce secured an array of terms in exchange, including commitments from the federal government and State of Idaho to enhance salmon habitat in the Snake River Basin" (Ibid.). It is important to note that this 2005 water settlement is almost a century after the 1908 Winters Doctrine and highlights the process of deferred justice.

The whole process happened from 1987 to 2005. "This was a relatively speedy negotiation and adjudication process. It was passed very fast, which was cost effective, but almost too fast, before everyone could agree" (R. Anderson, personal communication 2016). On top of this, "the 2005 Nez Perce water settlement was the biggest decision since the treaty," and it reaffirmed the negative effects of Tribal water settlements (R. Miles, personal communication 2016). "Tribes don't like to do settlements because it always means a loss. Settlement really means concession" (Ibid.).

The settlement had some good outcomes for the Nez Perce. The federal government had to transfer, "11,000 acres of federal land within the Nez Perce reservation into trust for the Tribe, and creation of a Tribal water right to 50,000 acre-feet from the Clearwater River with a priority date of 1855" (Hays, 2006). The SRBA also did reserve water for endangered species under state's law. Additionally, the settlement created means for on reservation in stream flows (Ibid.). These gains are not much, but the settlement is considered a success because Idaho is a very challenging state for Tribal water rights. Idaho traditionally does not acknowledge Tribal sovereignty, so "getting anywhere with them is a win. They don't view Indian water rights as more important than standard rights. They are the largest injustice actor to the Tribes" (R. Miles, personal communication 2016). Some of the settlements relative success is due to a very good legal team. "The Tribe fared very well

Figure 6: Timeline of Federal Actions Affecting the Nez Perce



in the settlement due to a very strong legal team, all whom were outsiders," and, "if you voted no [on the settlement], you were just putting your people into battle in the courtroom" (Ibid.).

Despite relative gain, as outlined above, a lot was lost. Of greatest import to the Tribe was access to local springs and fountains, however these were forfeited in the settlement. "Still in 2016, it comes up in meetings as our biggest hurt," and "they are lost forever. Unless we buy back what was already our treaty right" (Ibid.). They also lost the claim to off reservation instream flows. "Nez Perce instream flow claims threatened an irrigated agricultural economy in Idaho created and sustained by water diversions in the Snake River Basin. That Nez Perce would dedicate these water rights to provide non-consumptive flows for Idaho's imperiled salmon runs whipped agricultural and municipal water users into a frenzy" (Hays, 2006). On a larger scale, the Nez Perce also has to waive a significant amount of water rights claims in the Snake River Basin, which was critical for salmon habitat, as well as culturally significant springs and streams. "Courts have interpreted similarly worded provisions in other Indian treaties and have held that fishing rights necessarily include instream water rights sufficient to sustain the native fishery. Thus, the waiver of treaty-based claims to water under the Nez Perce fishing right represented a major concession by the Tribe" (Ibid.).

"The Nez Perce argued that the treaties implied a federal right to instream flows necessary to preserve the Tribe's bargained-for treaty right to fish in the Snake River Basin. Without such a right, the Tribe maintained, its treaty fishing rights would be virtually meaningless. The SRBA court proceeded to ignore the precedents supporting the Tribe and the federal government and ruled that its reserved treaty right to" (Blumm, 2006). The Tribe also lost a large volume of water for wetlands, a vital ecosystem on the reservation (J. Holt, personal communication, July 14th, 2016). Overall, "the judicial system was very biased against the Tribe and the federal government" (R. Anderson, personal communication 2016).

As time passes, the true outcome of SRBA and the 2005 Nez Perce Water Settlement will be seen. Today, "the Tribe still has a sour taste in its mouth, but generations from now we'll look back and see it as the best Tribe could have done" says Nez Perce Executive Director Rebecca Miles (R. Miles, personal communication 2016). Settlement was not the best for the people immediately but over time it is, and it is important to have that reliability (R. Anderson, personal communication 2016).

Eleven years after the settlement there are a lot of current water issues that the Nez Perce are dealing with. Ecological restoration is one of them. "Nez Perce is the largest Tribal fishery and most successful in the US" (J. Holt, personal communication 2016). Alongside salmon, the Nez Perce are working on improving lamprey habitat and passage over dams because they can, "do everything but go over a 90 degree angle" (Ibid.). The Nez Perce hatchery is one that both Tribal and non-Tribal hatcheries alike strive to learn from. They have a "cutting edge hatchery that is designed to mimic nature as much as possible, including tree roots, and curved runs"(Ibid.). The Nez Perce are also striving to improve their on-reservation wetlands. "Wetlands are the kidneys of the system. They are the source and keep the water cool. Wetlands are vital to the ecosystem as well as they contain a lot of culturally vital plants," but "I worry about our wetlands. Our subsistence plants need wetlands" (Ibid.).

On top of ecological restoration, the Nez Perce are also dealing with the effect that the Fish Accords have had on them. As mentioned above, the Fish Accords are an agreement signed between all CRITFC Tribes (except the Nez Perce) and the United States government that says the Tribes will not advocate for dam removal, and in return the United States will provide more funding for Tribal hatcheries. From the Nez Perce's perspective, BPA cut funding to Tribes when they were undecided about signing and agreed to give money back if they signed the accords. This "lessened their negotiation power" (R. Miles, personal communication 2016). Rebecca Miles says that the, "divide and conquer method was used in the Accords by pinning Tribes against each other" (Ibid.). In the past, "advocating for dam breaching was hard because of inter-tribal politics, but this has changed in recent years in favor of dam breaching" (J. Holt, personal communication 2016). Today, the Nez Perce are some of the most prominent activists for dam removal, and especially the removal of the four lower Snake River dams.

Today the Nez Perce are striving to have a seat at the decision making table. When asked if they currently feel like they are included in the river management process, Rebecca Miles says, "absolutely not. We are not actual negotiators, like a state. We are cc'ed on emails, but we don't have a seat at the table. We are scared that the process is going to happen, the ships are going to sail, and we are going to be left at the docks" (R. Miles, personal communication 2016). "I think the Tribes are doing everything they can to be a part of the treaty in both management and benefit. They [BPA] aren't honoring the aspects of the government that they are supposed to operate by. I think the Tribes have been ignored in a large way" (J. Holt, personal communication 2016).

To the Nez Perce, "Water justice would be to have adequate, healthy, clean, accessible water; and having the way we think and view water valued" (R. Miles, personal communication 2016).

Discussion and Analysis

There are, of course, key differences between the Columbia and Colorado River Basins as well as the Tribes within them. The geography, climate, and culture vary greatly between the Southern Ute, the Confederated Tribes of the Colville Reservation, and the Nez Perce. Each of these Tribes also struggle with a different water issues outside of water quantity. The Southern Ute are shackled by how their water can be used. The Confederated Tribes of the Colville Reservation struggles with water quality. While the Nez Perce are fighting for better salmon habitat. Additionally, the basins hold different uses and user priorities for the shared waters. In the Colorado Basin, water is primarily for agriculture and municipal and industrial use, while in the Columbia Basin water is mainly valued for electricity generation. For the Tribes, the meaning and use of water also varies from an economic right to a religious right to a subsistence right based on salmon.

Treaties are a commonality of all federally recognized Native American Tribes, however not all treaties outline the same rights or representation for decision-making power. Some argue that the treaties in the Northwest are more thorough than other parts of the United States because of the connection to salmon, and "because of the treaty rights in the Northwest they [Columbia River Tribes] have a huge legal presence" (R. Anderson, personal communication 2016). Each of these three Tribes also experience similar but not identical representation in management. Native American empowerment, "happened in the wake of civil rights movement, but change in policy and management happened through lawsuits and through activism" (B. Cosens, personal communication 2016). However, the difference lies in the fact that, "it has taken longer for the upper Columbia River Tribes to come to the table or really be invited to the table because they literally have no salmon, while CRITFC Tribes still have some salmon in streams" (Ibid.). Despite this all Tribes do struggle with the issue of tokenism. Although, many hope that the change in representation will contribute in a positive direction and benefit future Tribal generations, "I've seen things go from an era of confirmation to an era of collaboration" (CRITFC, personal communication 2016).

Despite these differences there is one over-arching commonality between the Southern Ute, the Confederated Tribes of the Colville Reservation, the Nez Perce, and all North American Tribes: *deferred justice*. The causes of this deferred justice are due to four factors: federal colonial policies, violated federal treaties, state federalism, and settler-colonial infrastructure priorities. The systematic mechanism that best explains why deferred justice happens is settler-colonialism.

Settler-colonialism structured much of the history of the United States, and the oppression of the Indigenous peoples. While the colonial period has been over for a hundred years, arguably, the legacy of settler-colonial resource policy continues to this day. "Winters was a blip in the sea of homesteading acts and development period of non-Indian water rights by the feds" (R. Anderson, personal communication 2016). "However, instead of protecting Indian water rights, the federal government has consistently expended the vast majority of its resources developing water projects for non-Indian use" (Anderson, 2000). Additionally, the [Indian] assimilation period was built on the premise that Tribes would disappear into western culture, "so why spend money [in courts] protecting their rights?" (R. Anderson, personal communication 2016). In 1934 congress passed the Indian Reorganization Act (IRA); "the IRA prohibited further allotment of Indian reserva-

tion land and extended existing restrictions on alienation of trust land" (Anderson, 2010). During that time, and some argue even to this day, "we ignored the fact that Indians are more than just a novelty" (B. Didesch, personal communication 2016). The Nixon era changes allowed for the start of the litigation of these rights. However, "The concern for Tribes ebbs and flows, and Tribal issues tend to get back-burnered" (S. McElroy, personal communication 2016).

The benefits of this deferred justice accrued to the vast majority of white settler-colonial inhabitants of the West, as well as state governments. Yet now, "the trust responsibility extends as well to federal representation of Tribes in water rights adjudications and settlement negotiations, and any judicial decision binding on the United States as trustee is also binding on the represented Tribes" (Royster, 2006). As history has shown, it is clear that the law "at times favored federal interests over Tribal interests, the Supreme Court held that, if Congress directs the government to represent both Tribal and competing federal claims to water, the dual representation does not, by itself, breach the federal trust obligation" (Ibid.). Due to this breach in responsibility by the federal government, "Tribal water rights exist in a sort of trust limbo. They are trust assets due protection from the federal government. But the government is, in almost all circumstances, under no legal obligation to act and under no cloud of legal liability if it fails to act" (Ibid.). As seen in the case studies, the federal government's conflict of interest comes from its branches - the Bureau of Reclamation, the Army Corp of Engineers, and the Bonneville Power Administration- all profiting from stolen resources.

This critical analysis is not intended to exclude the role and power of *state* actors in deferred justice. States play an ambivalent part in Tribal water rights, and some states are far more cooperative and receptive to Tribal rights and sovereignty than others. Despite this, Tribes had no say in which state their reservation was located. For example, Colorado has always been a good state for Tribal water rights because there are only two Tribes in the state (S. McElroy, personal communication 2016). When compared to a state like New Mexico with 19 pueblos and two Tribes, they fear that if they rule one way with a Tribe or pueblo, then they must do the same for all the others, which is very costly. Then there are states like Arizona and Idaho, who "have always been hostile to Tribal interests" (Ibid.). The states' true power in Tribal water rights lies in the McCarran Amendment, which gives basin adjudication power to the states. States act adversely to Tribal water rights because, "states don't see water to Tribes as their responsibility" (Ibid.). Another reason that a state would not be supportive of a Tribe is because, generally, western states are opposed to the federal government's power and they see the Tribes as an avenue for federal influence. Anderson takes the argument so far that the states are even "jealous of Tribal jurisdiction within state lines" (R. Anderson, personal communication 2016). Additionally, there is still inherent racism against Native Americans that affects the outcome of these water settlements and contributes to deferred justice. "By authorizing state courts to interpret federally-reserved water rights, the McCarran Amendment has forced Tribes into hostile forums in which Tribes must be prepared to compromise their claims for stream flows that fully support the purposes of the reserved rights, perhaps settling for stream improvements that can partially restore river ecosystems," and, "although Tribal reserved water rights claims may open the door to discussions about stream flow restoration, in practice the McCarran Amendment Era has reduced these claims to mere bargaining chips rather than vehicles for achieving the purpose of reservations through stream flow restoration" (Blumm, 2006). In reality, "everyone expects the worst out of the state courts because of bias and racism" (R. Anderson, personal communication 2016).

Lastly, one of the main factors contributing to deferred justice is those who are benefiting from the current policy. "In every one of these cases, there is always a party that is benefiting from the status quo" (S. McElroy, personal communication 2016), and it is in that party's best interest to make these cases as long as costly as possible.

As seen in these case studies, and countless other issues in the west, the current policy structure subjugates Indigenous groups. Krakoff states,

> "if early public land and water laws were grounded in assumptions about the elimination of Native people and we are concerned about reversing the unjust effects of those laws, we should assess contemporary

> decisions about resource allocation in that light. In the water context, arguments about appropriate standards for quantifying Tribal water rights and the uses to which Tribes can put their water should be viewed against two backdrops" (Krakoff, 2013).

The first being a historical perspective on the countless unfulfilled promises and marginalization of Tribes, and the second being the present perspective and accounting for modern needs of Tribes, especially addressing climate change, "together, these contexts point to solutions that allow Tribes to have maximum flexibility with respect to their water rights in order to meet pressing and varied demands on our natural resources today, while simultaneously reversing the unjust effects of our eliminationist past" (Ibid.). In addition to this, she addresses the fact that decolonization of policies would move the West forward, "the final unraveling of settler-colonialism, which would redeem both American Indian law and natural resources law, would be to unhook natural resources law from its Lockean (and Jeffersonian) assumptions," (Ibid.).

However, Schneider critiques some aspects of the settler-colonial lens, "scholarship dealing with settler-colonialism has tended to take for granted the discursive construction of land as a generic space that is determined by the nature and extent of human interaction with it, both in terms of how settler-colonialism is understood and what 'solutions' or processes of decolonization are proposed" (Schneider, 2013). Despite this, it appears the settler-colonial framework best explains Tribal water issues.

> "To establish Tribes' status as sovereign nations, Tribal leaders aggressively enacted infrastructural power, transposed favorable legal rulings across social fields to legitimize sovereignty discourses, and promoted a pragmatic coexistence with state and local governments. Identifying the United States as a settler colonial society, the study suggests that a decolonizing framework is more apt than racial/ethnicity approaches in conceptualizing the struggle of American Indians" (Steinman, 2012).

Moreover, there is a tension in the spectrum between environmental sustainability and social justice, and it is linked to a settler-colonial past,

> "the separation of land into spaces of production and consumption, or private allotments and wilderness, is based entirely on whether or not humans (and in particular, men) have interacted with it. This androcentric division of space not only assumes a false chronology of human interaction with land in the West (i.e., that it began with Lewis and Clark), but also elides the effects and implications of settler-colonialism for non-human species and natural entities, such as rivers, lakes, rocks and other minerals, air and weather, and the soil" (Schneider, 2013).

In future conflicts over Tribal water rights in the west, commodification of water may be the biggest challenge. The privatization of water is not only favorable to small government and states' rights advocates, but the federal government incentivizes it through the 2002 Water Investment Act also (Johnston, 2003). However, as Johnston points out, one on the main issues with the commodification of water is that it perpetuates an already uneven power structure,

> "when water is commodified, the meaning and prioritization of use values shifts from household subsistence and regional markets to the national and global economic arena. Centralization of authority and capital is an increase in distance between those who decide water resource development, management and distribution, and those who experience the consequences of decisions. This environmental alienation produces local conflicts and crises" (Ibid.).

Additionally, Johnston elaborates on the social justice and environmental conflict with neoliberalism water policy,

> "in communities around the world, municipal and regional water supply systems are increasingly being taken over by large corporate entities and water resource development projects are being financed and built as private rather than public ventures. However, as the management of water supply and delivery systems moves from the community and their watershed to the corporate boardroom and commodity markets, the prioritization of profit often trumps social welfare and environmental quality concerns," (Johnston, 2003).

Settler-colonial policy is our past and present, and there are many challenges that stand in the way of achieving modern water justice. Anthropogenic climate change is going to make it increasingly challenging to adjudicate basins and decree a Tribe's Winters Right. Because of climate change, the temperature of rivers is increasing. Traditional snowpack is disappearing while winter rain becomes more common, leading to smaller flows of warmer water.

One possibility to combat this is to regulate water temperature through the Clean Water Act, however few cases have been tried with this approach. Additionally, dams might be used as a temperature control technique by letting cold water out from the bottom of the reservoir. Many support this, however some question the role of human influence in natural cycles, and how much human intervention would be too excessive. With rising water temperatures come an increase in bioaccumulation of mercury, which poses a public health threat (J. Holt, personal communication 2016). Additionally, in warm temperatures, fish habitat diminishes, "we have to hope that climate change won't completely kill all the fish" (Colville, personal communication, July 15th, 2016). Today, "there are current temperature standards but with climate change they will be impossible to meet" (Ibid.).

The relationship between dams and salmon is zero-sum. Dams are currently contributing to their extinction, but if the dams are removed and there is no other infrastructure in place to meet clean power needs, there would be an increase in greenhouse-gas producing energy. This leads to increased river temperature, and therefore to the salmon extinction as well. Climate change also leads to resource scarcity. Parts of the Colorado River basin have been experiencing severe drought, and climate models only predict an increase in drought and water scarcity. With this, it is expected that California agriculture will move north where there is more water, which will only contribute to more competing interests (Ibid.).

Climate change will also affect the Indigenous community's seat at the table. There is no doubt that "climate change is the biggest obstacle that the Tribes face" (B. Cosens, personal communication 2016). However climate change is a double edged sword. It can create a policy window for collaboration or yet another means of oppression. Scholars Barbara Cosens and Robert Anderson believe that one gets a bigger voice, or seat at the table, at times of increased conflict. Tribal members such as Rebecca Miles of the Nez Perce fear that the marginalization will only grow. "Scarcity of supplies has made it very difficult to come up with solutions," and climate change will show that, "there is no such thing as finality in what your water rights are" (S. McElroy, personal communication 2016; R. Anderson, personal communication 2016).

The current political climate is also another hurdle for quantifying a Tribe's Winters Right. "We need new legislation, but in our political climate it would be impossible to pass. So, more likely, small changes and nickel and diming is more promising" (B. Didesch, personal communication 2016). The polarization of the American political system has led to inefficiency when it comes to these settlements. "Even when the parties *can* reach a settlement, Congress may not be willing to take action to ratify the agreement or provide funds needed to make the deal work" (Anderson, 2015). It is understood that, "the settlement process can certainly be improved, but it isn't realistic to expect that" (S. McElroy, personal communication 2016). In addition to this, the recent shift in America's political climate might create even more challenging and oppressive process for water settlements, however it is too early to tell.

Many argue that what could help Tribes overcome the political hurdle is finding a common voice. This can be hard because each Tribe is unique and has a different set of values, and therefore putting them in the box of 'Native Americans' can be oppressive and racially biased. However, there is power in numbers, and the commonly used divide and conquer tactic would not work on Tribes who used a common voice. Rebecca Miles of the Nez Perce argues that Tribes need to be "learning from each other, not competing with other Tribes." Additionally, Tribes are sometime paired against environmental interest, and there is a constant push and pull between environmental sustainability and social justice. This is exemplified in irrigation and water projects with the Southern Ute and many other Colorado River Basin Tribes, but also with issues like Tribal hatcheries in the Columbia River Basin.

Another obstacle is that there is a deep value misunderstanding between Tribes and western society. History has shown this as an issue when looking at communal water rights for a Tribe versus an individual water right, but today it is still present in areas like river health evaluation. Traditional knowledge is used by organizations such as CRITFC, "the fish will tell us if what we are doing works." Yet the state and federal government do not largely accept this mode of evaluation. There is also the misunderstanding of a moral versus legal claim to water.

> "Native Americans view water as a part of their spiritual being and in turn it is part their moral responsibility to protect the water on their land for very different reasons than simply conservation like non-Native Americans. The tensions between moral and legal claims is increasingly salient in the discourse of Native American water and land rights. Native Americans must make the legal arguments that seem logical to the United States 'outsider' government and this approach neglects the cultural importance of water to Native Americans" (Semlow, 2015).

In addition to this, "moral to legal claim translation oppresses cultural significance by putting water in the same lens as the majority of the population that views water less as a symbol embedded in their collective identity, but rather a material good that can be utilized" (Ibid.).

The last obstacle to achieving modern water justice, and arguably the largest, is that these water resources are already allocated. "The issue with water rights is that it's a reallocation of a resource that has already been divided up" (CRITFC, personal communication 2016). Barbara Cosens agrees, "a water right is only a right if the water is there." Best said, "the biggest issue for Tribes is that they don't have the water. Possession is nine tenths of the law and Tribes are starting behind everyone else" (R. Anderson, personal communication 2016).

As time passes, "it is becoming more and more difficult to find and develop settlements for Tribes who have yet to settle" (S. McElroy, personal communication 2016). However, these challenges are not insurmountable, and there are many Tribes that are striving to achieve water justice.

One way to move towards achieving water justice is to have effective consultation and collaboration. This can be done with a shift to a better understanding of values. "We live on two different systems. Seeing water in the river is valuable to us. We don't see pumping it out as the only value" (R. Miles, personal communication 2016). Along the same lines, "Tribes want more than a museum piece fish" (CRITFC, personal communication 2016). Rather than continuing with the current 'token Tribal input' system, the government should shift to making a stronger effort to be on the same page as the Tribes they are working with.

Since resource scarcity is one of the main ailments to modern water justice, incentivizing efficient resource management could help alleviate that. This means that the government could provide incentives for non-Indians to be more efficient water users, for example providing funds for switching from flood irrigation to drip irrigation (R. Anderson, personal communication 2016). There needs to be, "a serious reallocation of how water is used, which calls for an adjustment from agriculture on how water is used" (Ibid.). Reducing urban sprawl and overall population growth is also discussed when looking at alleviating resource scarcity. "Until we are ready to have an adult conversation about exponential population growth, we are in for a world of hurt" (D. Rue-Pastin, personal communication 2016). When facing a diminishing resource, the only way to create more water is to use less.

To truly work towards justice, outdated policy must be changed to have more long term and inclusive management strategies. "We need a comprehensive solution that is federal, not small and disorganized," (B. Cosens, personal communication 2016) and, "we need legislation to be updated, and the principle of economics changed in the decision-making process" (B. Didesch, personal communication 2016). Realistically, Barbara Cosens says, "We need a modern New Deal" (B. Cosens, personal communication 2016). The west is governed by outdated laws and, "there needs to be flexibility and adjustments in the law" (R. Anderson, personal communication 2016). When it comes to management we are looking at the ends rather than the means, "non-Indians want to measure the outcome to determine success, they want a number. But there are very many challenges to that" (CRITFC, personal communication 2016). As far as concrete solu-

tions, "there is one simple thing that the Department of the Interior could do: lift the moratorium on approval of Tribal water codes. In 1975, the Secretary of the Interior mandated that any Tribal law that "purports to regulate the use of water on Indian reservations" (Royster, 2006) should be automatically disapproved. For any Tribe with a constitution that requires secretarial approval of Tribal laws, the Department's approach raises serious obstacles to Tribal water management. Tribal water codes may set forth both procedures for obtaining use rights in reserved Tribal waters and the substantive uses to which the water may be put" (Ibid). Royster isn't the only one who suggests this, "the Department of the Interior's moratorium on the approval of Tribal water codes is an impediment to Tribal management that should be removed" (Anderson, 2015). Policy makers could also change the definition of the baseline, or bare minimum, of water quantity and quality to include all Tribal rights. "The strongest trust protection for Tribal reserved water rights, and thus the preferable alternative, is for all such water rights—quantified or unquantified, exercised or unexercised—to be included in the ESA environmental baseline" (Royster, 2006). Additionally, the McCarran amendment's interpretation should be evaluated in the courts. "The State's unlimited power and attitude over these issue has got to go" (R. Anderson, personal communication 2016). The constitutionality of the Indian Appropriation Act of 1871 should also be evaluated by the judicial system.

When it comes to updating policy, the resilience theory should be included. "Resilience theory provides a framework for understanding complexity within an ecological system and for developing governance to enhance the resilience, and thus sustainability, of the social-ecological system" (Cosens, 2010). Other organizations are already working on this, for example the CRITFC is currently "learning resilience from a salmon." Additionally, adaptive governance should be applied to new river management practices. "Adaptive governance moves from a focus on efficiency and lack of overlap among jurisdictional authorities, to a focus on diversity, redundancy, and multiple levels of management that include a role for local knowledge and local action" (Ibid.). There six key elements of adaptive governance that should be followed in order to be successful:

> "multiple, overlapping levels of control with one level of either control or strong coordination at the scale of the particular social-ecological system,… horizontal and vertical transfer of information and coordination of decision-making among entities and individuals with a decision making role, …meaningful public participation, …local capacity building, …authority to respond (adapt) to changes in circumstances across a range of scenarios, … and diversity" (Ibid.).

If these elements of adaptive governance are applied to river management in both basins, modern water justice could be within reach.

However, none of the means above can alone reach water justice, without recognition of Tribal sovereignty and jurisdiction over natural resources, water justice will be unachievable. "First, all parties should recognize that Indian Tribes and their members have paramount rights to the use of some if not all reservation water resources" (Anderson, 2015). Additionally, "it makes most sense for Indian Tribes to be the lead regulatory body on Indian reservations with respect to water permitting and water quality control" and, "Tribal governments are the ultimate in local control, and states should recognize the advantages that can come from cooperating with Tribes and melding technical and enforcement authority under Tribal institutions" (Anderson, 2015). Rebecca Miles of the Nez Perce emphasized, "our values have always been in natural resources." Furthermore, it it's to everyone's best advantage to have Tribal sovereignty over natural resources. "Tribes have an environmental ethic that is stronger than you or I. It is their fiber and being. It is who they are. Tribal control over their natural resources is not being driven by an alternative motive, it's in their blood" (B. Didesch, personal communication 2016).

Conclusion

Despite their differences, like all Indigenous people in the United States, the Southern Ute, the Confederated Tribes of the Colville Reservation, and the Nez Perce experienced a form of deferred water justice due to federal policies favoring settler-colonialism. Federal colonial policies, violated federal treaties, state federalism, and settler-colonial infrastructure priorities are factors of the

systematic marginalization that creates deferred justice. There are many avenues to diminish deferred justice, yet the best and most essential one is that the United States government needs to recognize Tribal sovereignty and jurisdiction over natural resources. Modern water justice looks different to each Tribe; however, all Tribes share the same goal of participation in management and recognition of sovereignty. "Water justice would be to have adequate, healthy, clean, accessible water; and having the way we think and view water valued" (R. Miles, personal communication 2016).

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The Columbia Basin Fish Accords:
Can Cooperation Save the Salmon of the Pacific Northwest?

by Amy Rawn, 2016-17 State of the Rockies Project Fellow

Introduction

In a unique instance of collaboration between salmon advocates and hydropower interests, parties formerly at odds decided to seek common ground. The resulting compromise was the Columbia Basin Fish Accords, a 10-year memorandum of agreement (MOA) between the federal agencies that operate and retail power from the federal hydropower system on the Columbia and Snake Rivers, and state and tribal entities interested in the preservation of salmon and steelhead populations. The Accords were conceived in 2008 and guarantee close to $1 billion in funding for diverse salmon recovery projects such as habitat restoration (CRITFC 1). The agreement also placed particular restrictions on the signing parties, one being that they could not support dam removal or more spill over the dams in any form[1] (MOA 2008; Goldfarb 2014). Funding for these projects is generated from the sale of hydroelectricity by a federal agency. For the parties involved, the Fish Accords sought to reconcile legal disagreements related to federal agencies adherence to a number of federal laws such as the Endangered Species Act and the Northwest Power Act (MOA 2008, 1). In addition to resolving these decades-old disputes over environmental legislation, the Fish Accords also sought to cultivate a more "cooperative" working relationship between the parties (Ibid.).

At their core, the Fish Accords grapple with challenges that have long perplexed the Columbia River Basin: the coexistence of endangered salmon and steelhead with the hydropower system. Can these fish, which face a myriad of challenges in a complex natural environment, thrive on a dammed river? Can the endangered runs of salmon and steelhead be revived through mitigation alone, or do more far-reaching tactics like the modernization of dam operations or perhaps dam breaching need to occur? The Fish Accords brought to light some of the benefits of compromise and collaboration, but also stirred criticism from those who saw the Accords as preserving a legacy in which the impacts of hydropower are not sufficiently addressed or scrutinized. In the second to last year of the Accords, many of these questions still don't have clear answers. As the Accords are set to expire in 2018, it is still uncertain if the signatories will seek to renew the compromise or draft a new version of the Accords, but a recent U.S. District Court for the District of Oregon decision may have the potential to guide federal agencies toward more careful consideration of their dam operations.

The Fish Accords Signatories

Tribal Sovereigns and a Fish and Wildlife Agency

The projects funded by the Accords extend across the large geography of the Columbia River Basin and have diverse foci that aim to mitigate the impacts that the federal dams have on fish in the basin. In addition to habitat restoration, the Accords also provide funding for improvements to hatchery programs and enhanced monitoring techniques, among other restoration initiatives (CRITFC 1; MOA 2008). Some Accords funding even went towards providing rubber bullets to control salmon

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[1] Spill refers to "water released from a dam over the spillway instead of being directed through the turbines" (Supplemental Biological Opinion 2014, 27). Spill benefits migrating juvenile fish, also known as smolts (Goldfarb 2014).

predators such as sea lions. The parties implementing these types of projects funded by the Fish Accords are the non-federal Accords signatories, which are composed of six tribal sovereigns and three states[2] (Goldfarb 2014). Three of the participating tribes, the Yakama, Umatilla and Warm Springs[3] are member tribes of the Columbia Basin Inter-Tribal Fish Commission (CRITFC), a science and policy agency that serves the four main Columbia Plateau tribes in the basin (CRITFC 3).

CRITFC was the result of a collaborative effort between the four main Columbia plateau tribes, the Umatilla, Yakama, the Warm Springs and the Nez Perce Tribe[4] (CRITFC 5). The organization is vested in their mission "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." The agency pursues these goals through policy development and scientific research (CRITFC 3). CRITFC also received funding from the Fish Accords for a diverse set of restoration initiatives (MOA 2008).

The Columbia River basin is governed by a complex network of tribal, state and federal entities, all of which have different histories, interests and positions of power. The tribes in the Columbia River basin have their own histories of salmon advocacy and are some of the strongest actors undertaking restoration action (McCool 2007). For the Pacific Northwest tribes, the preservation and revitalization of salmon populations is immensely important as they remain vital to economic livelihoods and hold significant cultural and spiritual meaning (CRITFC 2). Treaty rights and past legal cases have shaped the tribes' position as managers in the basin (Volkman & Mcconnaha 1993). In an 1855 series of treaties known as the Stevens Treaties, tribes ceded 35 million acres of land to the federal government for the guarantee that they would be able to fish at "all other usual and accustomed stations," meaning their traditional fishing grounds (McCool 2007, 554; Che Wana Tymoo 2010). The tribes have struggled for their right to harvest these salmon runs and it has taken decades of activism, advocacy and litigation to secure what they were promised (Che Wana Tymoo 2010; Goldfarb 2014). The tribes continued to fight for their harvest rights into the 1960s and early 70s. Legal victories in this era resulted in the ruling that tribes should receive a "fair share" of the harvest, which was determined to mean 50 percent, in accordance with the 1885 treaty (Che Wana Tymoo 2010). Tribal efforts reshaped the management of fisheries, and by the mid-1970s, the tribes were being acknowledged for their habitat preservation efforts (Volkman & Mcconnaha 1993). The tribes have a deep interest in preserving these species, and have continued to advocate for fish and the recognition of their treaty rights, for as McCool points out, treaty rights "…are, of course, meaningless if there are no fish in the rivers" (McCool 2007, 554).

Salmon and steelhead in the Columbia River Basin contend with a multitude of challenges when making their journey from inland estuaries to the Pacific Ocean. It is no secret in the Pacific Northwest that salmon and steelhead runs have dramatically declined from their historic levels. One of the obstacles that these fish face, which has contributed to the species' decline, is navigating the river's extensive network of hydroelectric projects, known collectively as the Federal Columbia River Power System (Blumm & Paulsen 2013).

The Federal Columbia River Power System and the Associated Federal Agencies

The Federal Columbia River Power System (FCRPS) is comprised of 31 federally owned hydroelectric projects in the Columbia River basin (BPA 1). The two federal agencies that operate these dams are the U.S. Army Corps of Engineers (the Corps) and the Bureau of Reclamation (BOR). A third federal agency, The Bonneville Power Administration (BPA) is responsible for retailing the electrical power produced by these hydroelectric projects throughout the region. The agency falls under the umbrella of the Department of Energy, but they are unique

[2] Other signing parties included the Confederated Tribes of the Colville Indian Reservation, the state of Idaho, the state of Montana, the state of Washington, the Shoshone-Bannock Tribes and the Kalispel Tribe of Indians (Goldfarb 2014; Federal Caucus). These parties are not part of the same Memorandum of Agreement (MOA) as the parties listed above (MOA 2008).

[3] The official names of the tribal sovereigns are the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon and the Confederated Tribes and Bands of the Yakama Nation (Federal Caucus).

[4] The Nez Perce Tribe chose to not sign onto the Accords for reasons explored later in this report.

in the sense that they are funded by their own sales of wholesale power rather than having funds allocated by Congress (BPA 2). BPA was established with the signing of the Bonneville Power Act in 1937 and since then has become cemented as a powerful institution in the Pacific Northwest (White 1995). By their own account, BPA supplies around 28 percent of the electricity that is consumed in the Pacific Northwest (BPA 2). The development of the Columbia and Snake Rivers, however, has not come without a cost. The river in many ways has been transformed. Once wild and rumbling with substantial rapids and waterfalls, the Columbia has been tamed by concrete and currently only flows unhindered in a couple sections of the river (Rohlf 2006).

The twentieth century brought a cascade of dam construction to the Pacific Northwest. It was a time of incredible optimism for those planning ways to utilize this mighty power. They saw the region as brimming with the potential to be bettered by the promise of hydroelectricity. The philosophy was simple, as White articulates, "Hydropower was good, clean and renewable. There could never be too much of a good thing" (White 1995, 72). This transformation, while it has yielded particular benefits, has also obstructed the migration of anadromous fish (Rohlf 2006). Besides being merely a physical barrier for fish, dams can also elevate water temperature and make it easier for predators to feed on juveniles. Dams can also make the journey to the ocean longer for fish, which can throw off their biological responses that readies them to enter a saltwater ecosystem (Blumm & Paulsen 2013). In a basin in which salmon and steelhead runs once reached copious numbers, thirteen species of salmon and steelhead are now listed as either threatened or endangered (Rohlf 2006; Supplemental Biological Opinion 2014).

Implementation of the Endangered Species Act and The Federal Columbia River Power System Biological Opinion

The decline of these important fish did not go unnoticed. In 1990, citizens[5] rallied and began to call for what some have referred to as the "pit bull of environmental laws" to show its teeth (Blumm & Paulsen 2013; Rohlf 2006, 3). The Endangered Species Act (ESA) became law in 1973. Its purpose is clear: to preserve and recover threatened and endangered species. It is to be applied when a problem already exists and powerful measures are needed to correct it (Blumm & Paulsen 2013; Benson 2013). When the ESA made its debut in the Columbia River Basin, it ushered in new standards for how the federal agencies could operate (Volkman & Mcconnaha 1993). The ESA dictates how the federal agencies that manage the dams, address the impacts those operations have on ESA listed species. This is accomplished through what is known as a Biological Opinion (BiOp). The origins of the Columbia Basin Fish Accords are rooted, in part, in a long legal dispute over the BiOp for the Federal Columbia River Power System (Blumm & Paulsen 2013). In signing the Accords, the signatories agreed to withdraw from the litigation disputing the BiOp and opted for an approach outside of the courtroom (MOA 2008; CRITFC 1). In order to understand the origins of the Fish Accords it is important to first recognize how federal law shapes salmon policy in the Pacific Northwest, including historic implementation of the Endangered Species Act.

The Nuts and Bolts of the Endangered Species Act

The Endangered Species Act (ESA) bars federal agencies from operating in a manner that has a likelihood of negatively impacting a species listed under the ESA to the degree that it puts the species in jeopardy or disturbs habitat that it depends on, which is defined in the ESA as "critical habitat" (Blumm & Paulsen 2013, 100). Although the term jeopardy is not given an exact definition in the ESA, Blumm & Paulsen point out that an ESA regulation does describe "jeopardize the continued existence of" as follows: "engag[ing] in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (Ibid.). If a federal agency suspects that they are operating in a way that could have an impact on a threatened or endangered species or its critical habitat, it is required to go through a series of

[5] The Shoshone-Bannock Tribe called for the listing of Snake River sock-eye salmon under the Endangered Species Act. NOAA listed the fish in November of 1991 (Blumm & Paulsen 2013).

steps to try to determine the nature of that impact; this process starts with a biological assessment. In the context of the ESA, these federal agencies are often referred to as action agencies, as it is their conduct or *action* that is being evaluated (Ibid.).

The biological assessment can have one of two outcomes; the action agency can determine that their actions are unlikely to harm the species or its critical habitat and they can carry out a "no-jeopardy" process (Ibid.). Alternatively, it can conclude that its actions may in fact do the opposite and harm a threatened or endangered species. In this case, under Section 7 of the ESA, action agencies are required to refer to a consulting agency to "insure that any action authorized, funded, or carried out by such agency…is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of [designated critical] habitat…" (NWF v. NMFS 2016, 20). The consulting agency for the FCRPS is the National Oceanic and Atmospheric Administration (NOAA) Fisheries (also known as the National Marine Fisheries Service (NMFS).[6] Following a consultation with the action agencies, the consultation agency (NOAA Fisheries) produces a Biological Opinion (BiOp; Blumm & Paulsen 2013).[7]

If a proposed action is identified in the Biological Opinion as potentially jeopardizing a species or having an adverse effect on its critical habitat, it is required to propose a "reasonable and prudent alternative" to the action. The ESA defines "reasonable and prudent alternatives" as "alternative actions identified during formal consultation that can be implemented in a manner consistent with the intended purposes of the action" (Benson 2013, 488). "Reasonable and prudent alternatives" can be diverse in nature and can range from a modification to the hydropower system to a habitat improvement project, like some of the initiatives that are being implemented with Fish Accords Funding (Supplemental Biological Opinion 2014).

Ultimately, the BiOp examining the Federal Columbia River Power System evaluates the condition of ESA designated species and their habitat, makes an assessment of the actions of federal action agencies and decides if they think the actions are "likely to jeopardize the continued existence" of an ESA listed species or have a negative effect on its critical habitat (NWF v. NMFS 2016, 21). If the actions have the potential to put ESA listed species in jeopardy, the BiOp may include "reasonable and prudent alternative[s]" or a plan for how to avoid jeopardy and remain in compliance with Section 7 of the Endangered Species Act (Ibid.).

Many argue that the Endangered Species Act is one of the nation's most powerful environmental laws. As Volkman & Mcconnah assert, "The Act is shifting the burden of persuasion away from those who urge attention to the problems of wild salmon to those whose development activities affect listed fish" (Volkman & Mcconnah 1993, 1263). Some environmental statues dictate giving equal attention to ecological concerns and other interests such as development, the ESA however, makes no requirement of assigning the same weight to the region's hydroelectricity as it does endangered fish (McGinnis 1995). In other words, "In accordance with the ESA, industrial, commercial, residential, and recreational use-values of the regional ecosystem are secondary to listed species preservation" (Ibid.). Under the ESA, salmon is king. Although a listing under the Endangered Species Act in the Columbia River Basin may appear to be the cure-all for increasing fish populations, the actual implementation of the law has been more difficult, and has resulted in more than two decades of litigation over the Federal Columbia River Power System (FCRPS) Biological Opinion.

The History of the Litigated Federal Columbia River Power System Biological Opinion

In the Columbia River basin, the production of a legally sound Biological Opinion (BiOp) has been an unsuccessful task. The Federal Columbia River Power

[6] The U.S. Fish and Wildlife Service and the National Marine Fisheries Service, also known as NOAA Fisheries, are two federal agencies that are responsible for producing biological opinions on ESA listed species. The FWS is responsible for landlocked species and NOAA Fisheries is responsible for species that live exclusively in the ocean or are anadromous (Benson 2013).

[7] The action agencies for the FCRPS BiOp are the Army Corps of Engineers and the Bureau of Reclamation (NWF v. NMFS 2007).

System (FCRPS) BiOp has faced continued litigation that has now lasted for close to two decades. Upon examining the plaintiffs concerns, the U.S. District Court has repeatedly found the attempts of NOAA Fisheries to produce a FCRPS BiOp that meets the requirements of the law to be inadequate. It has been a long cycle of litigation that remains unresolved. Some of the parties who chose to not participate in the Accords, still remain involved in the litigation involving the FCRPS BiOp, such as the state of Oregon and the Nez Perce Tribe (NWF v. NMFS 2016)

In December of 2000, NOAA Fisheries produced a BiOp evaluating the FCRPS, after a previous version in 1993 was remanded on the grounds that it was arbitrary and capricious (NWF v. NMFS 2007). The 2000 BiOp concluded that the ongoing activities of the FCRPS would "jeopardize" eight ESA listed species of salmonids. NOAA Fisheries then considered "reasonable and prudent alternatives" to see if other actions could be taken to avoid jeopardy. They concluded that these actions would not avoid jeopardy and turned to "off-site mitigation activities" such as hatchery and habitat projects to remain in compliance with Section 7 of the ESA (Ibid.).[8] Ultimately, however, the legality of the 2000 BiOp was challenged in court. The lead plaintiff in the case against the BiOp, from a large roster of environmental organizations, was the National Wildlife Federation. The four mid-plateau Columbia Tribes, the Yakama, the Warm Springs, the Nez Perce Tribe and the Umatilla, along with the state of Oregon, presented amicus curiae briefs in favor of the plaintiffs (Blumm & Paulsen 2013). The 2000 BiOp was ultimately found to be "arbitrary and capricious" for two main reasons: "it relied on (1) federal mitigation actions that had not been subject to Section 7 consultation and (2) non-federal mitigation actions that had not been shown to be reasonably certain to occur." (NWF v NMFS 2007). Although Judge Redden, the presiding U.S. District judge at the time, determined that the BiOp did not meet the requirements of the law, he did not completely throw out the plan. He called for the BiOp to remain in place as a temporary solution (Blumm & Paulsen 2013). NOAA Fisheries was given another attempt at the BiOp, and in 2004, they returned with an amended version

The 2004 Biological Opinion, like its predecessors, faced legal scrutiny. Unlike its forerunners, however, this Biological Opinion presented a new way of evaluating if executed actions jeopardized an endangered species. It essentially incorporated the network of dams in the "environmental baseline," the standard used to determine harm. In other words, it grandfathered in the FCRPS and treated the dams as a fixed component of the river system. The BiOp concluded that the dams were not something that the agencies had the mandate to address. NOAA Fisheries determined (referring to the authority of the federal agencies) that "each of the dams already exist[ed], and their existence [was] beyond the scope of the… discretion" (Ibid.).

Environmental groups disagreed with the standard this was setting, as they saw it as prioritizing hydropower over endangered species—the same qualm the groups had with the previous Biological Opinion (Blumm & Paulsen 2013). There were multiple problems with the 2004 Biological Opinion, and ultimately, Judge Redden determined that the 2004 BiOp did not meet the requirements of the law. On appeal, the Ninth Circuit Court affirmed his decision and found the BiOp to be "structurally flawed" (NWF v. NMFS 2007; Blumm & Paulsen 2013). NOAA Fisheries was sent back to the drawing board to attempt yet another Biological Opinion.

Despite the plaintiff's legal victories in court, the litigation put a considerable strain on tribal resources. CRITFC policy analyst Laurie Jordan explained that litigation has a "high transaction cost" (Laurie Jordan, personal communication 2016). The BiOp litigation has been a cyclical pattern. After a BiOp was pronounced unlawful, it would be remanded and NOAA Fisheries would get a chance to start over with few tangible benefits for fish and fish managers. For the parties that chose to sign the Accords, the agreement was an opportunity to redirect resources outside of the courtroom where they could be put towards more material benefits for fish (CRITFC 1).

[8] Under Section 7 of the ESA, action agencies are obligated to refer to a consulting agency to "insure that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [designated critical] habitat..." (NWF v. NMFS 2016, 20).

Compromise in the Basin

For the signing parties, the Accords signified an important turning point, the end of a long legal dispute over the FCRPS Biological Opinion. The new cooperation utilized resources formerly allocated for litigation and put them towards mitigation projects. In the eyes of participants, one of the clear victories of the Accords was this redirection: a shift in focus from litigation to tangible fish recovery projects. "These Accords move focus away from gavel-to-gavel management and toward gravel-to-gravel management. By putting litigation behind us and putting actions to help fish in front of us, we will better ensure that Columbia Basin fish will benefit," said Steve Wright, the BPA administrator at the time (Ibid.). For the signatories, the influx of funds from BPA directed toward fish recovery projects was not only a promising sign for restoration projects, but signified a change in the relationship between CRITFC, the tribes and the federal agencies. They were no longer defendants and plaintiffs, they were partners (CRITFC 1; MOA 2008).

Case Study: Implementing Accords Funding in the Hood River Basin

In order to understand how mitigation projects funded by the Fish Accords are being implemented, we traveled to the Hood River Basin, one of many sub-basins in the Columbia River Basin, where Accords signatories are engaging in a variety of efforts to revitalize salmon and steelhead populations. The Hood River is a tributary that joins with the Columbia in northwestern Oregon. The river eventually forks three ways, branching into the West Fork, the Middle Fork and the East Fork. The Parkdale Fish Hatchery sits between the Middle Fork of the Hood River and Rodgers Creek. Driving to the hatchery from the town of Hood River, one is struck by the abruptness with which Mount Hood juts towards the sky, a towering backdrop against rows of fruit trees. Even in the summer, the volcano is still snowcapped. At the Fish Hatchery, we met up with Chris Brun, the Hood River Production Program Coordinator for the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO). The

Figure 1: Mount Hood

The view of Mount Hood from Parkdale, Oregon. Snowmelt from the mountain feeds the Hood River in the valley below.
Source: Photographed by Don Siebel and accessed at donsiebelphotography.wordpress.com

facility is operated by the Confederated Tribes of the Warm Spring's Branch of Natural Resources and owned by the Bonneville Power Administration (HRPP Annual Operation Plan 2016).

The Hood River Production Program began operating in the early 1990s and is run in collaboration with the Oregon Department of Fish and Wildlife. The program seeks to reintroduce spring Chinook salmon in the basin after the run became extinct in the late 1960s. It also seeks to boost the natural production of winter steelhead. Its third goal is to supply these two types of salmonids for tribal and recreational fisheries. The program also has a strong focus on habitat restoration (HRPP Annual Operation Plan 2016; McCanna & Eineichner 2015). The program has received funding from the Fish Accords (MOA 2008; Chris Brun, personal communication 2016).

A short car trip from the Parkdale Hatchery is the Moving Falls Fish Facility. Located on the West Fork of the Hood River, the Facility has recently built a new fish trap—infrastructure made possible by the Fish Accords. Here, at the fish trap, salmonids at the top of Moving Falls are ushered into a small holding pond below the facility. Once corralled, the fish are hoisted up in an elevator-like contraption from the river below and ushered onto a platform that allows individuals to perform management and monitoring techniques. The fish are temporarily subdued with electrical currents, checked for small electric devices that monitor migration, and sampled for DNA to determine age (HRPP Annual Operation Plan 2016; Chris Brun, personal communication 2016). Chris acknowledged the importance of the work that the tribes are doing. "[It's] not just about restoring fish," he says "but restoring [the tribe's] presence." (Chris Brun, personal communication 2016). McCool has also recognized the significance of tribal restoration efforts, commenting that "in a larger sense, these river restoration projects are really tribal restoration projects; they are part of an effort to restore cultural tradition, sovereignty, and self-reliance" (McCool 2007, 561). For tribes participating in the Accords, the agreement was an opportunity to not

Figure 2: Moving Falls Fish Facility

At the Moving Falls Fish Facility on the West Fork of the Hood River, staff members at the "Fish Trap" temporarily subdue a salmon to conduct management and monitoring techniques. Source: Jonah Seifer

only restore salmon and steelhead populations, but also improve struggling tribal economies (Goldfarb, 2014).

The initiatives of the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWSRO) to revitalize fish populations are diverse. Funding from the Accords allowed for a partnership between the tribes and two irrigation districts, the East Fork Irrigation District and the Mt. Hood Irrigation District (Personal Communication, Chris Brun 2016; MOA 2013). In the Hood River Basin salmon and steelhead must compete with agriculture for their share of the river. According to Brun, water management in this basin is tremendously important. Close to sixty percent of the Hood River is diverted for irrigation. Climate change is expected to result in wetter winters and drier summers, and more precipitation is expected to come in the form of rain, rather than snow. Now and in the future, every drop will be important for both migrating fish and irrigators in the Hood River Basin (Chris Brun, personal communication 2016).

The Accords provided more than $1.5 million for new irrigation diversion infrastructure with a fish passage improvement that allows fish to navigate up the East Fork of the Hood River (MOA 2013; Chris Brun, personal communication 2016). The CTWSRO voiced concern that the diversion site on the East Fork of The Hood River, which the two districts use to divert water, was hindering fish passage at times when the river flow was modest. CTWSRO, using Accords funding, orchestrated a new project that would install a diversion structure that allowed for permanent fish passage on the condition that "…a minimum flow is provided which will aid fish passage through the Project area" (MOA 2013, 2). The project was completed in the fall of 2013 and is still in a five-year evaluation period, in which tests are being conducted to determine the adequate flow for adult spring Chinook to pass the diversion site (MOA 2013; Hood River Soil & Water Conservation District). In a basin where river flow is a limiting factor for fish, projects negotiated by diverse stakeholders that keep water in the river represents a significant success for salmon and steelhead (Chris Brun, personal communication 2016).

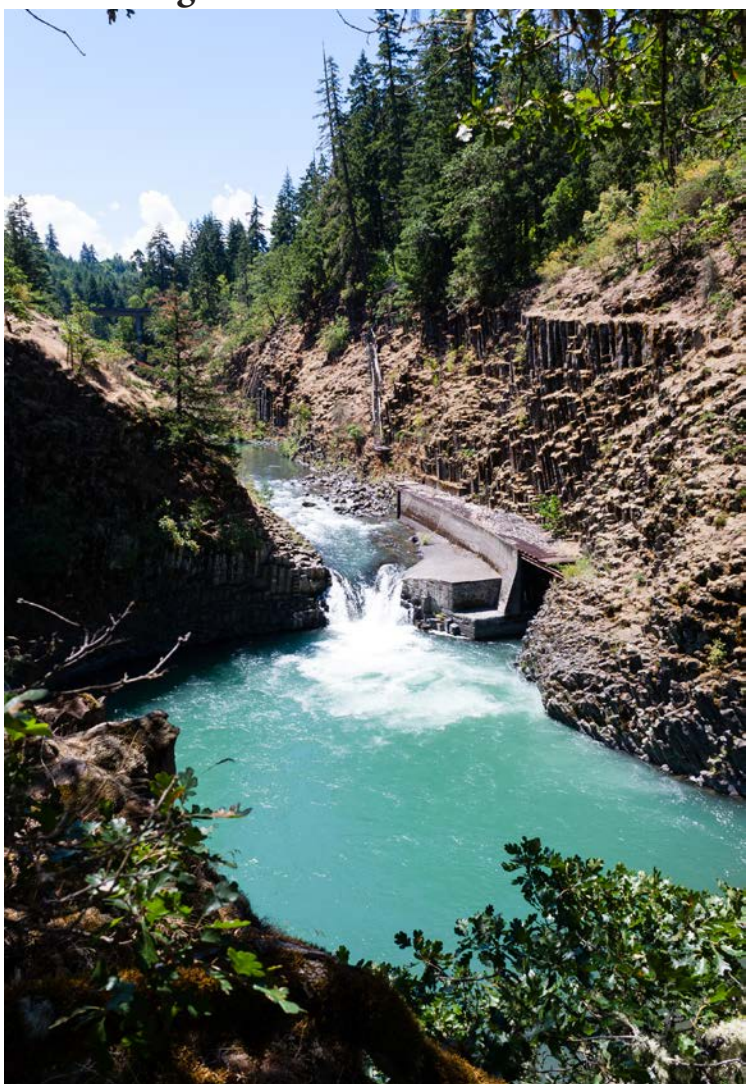
For Brun and his program, the Accords also presented a welcome improvement in the funding mechanism for fish projects in the basin. In his opinion, the Accords

Figure 3: Staff Member Transports Salmon at the Moving Falls Fish Facility

An adult Chinook salmon is released back into the West Fork of the Hood River from the Fish Trap at the Moving Falls Fish Faculty. Source: Jonah Seifer

provided more certainty and durability in funding than a prior process that required applying on an annual basis or multi-annual basis for BPA funding through the Northwest Power and Conservation Council, a regional organization created by the passing of the North West Power Act. The Accords guaranteed funding for more extended periods of time, allowing long-term projects to have increased financial security. Chris added that funds are not distributed without oversight, and projects must seek approval from an independent scientific review board and meet certain criteria, but ultimately he says, "you know the dollars are there" (Chris Brun, personal communication 2016).

Figure 4: Punch Bowl Falls



Punch Bowl Falls is a tribal fishing location and County Park at the confluence of the East and West fork of the Hood River. Source: Jonah Seifer

Brun also praised the efficiency of the Accord's review process and the ability to get the *green light* for projects to move forward. (Chris Brun, personal communication 2016). Christine Golightly, a policy analyst at CRTIFC, also spoke to this increased flexibility and ability for long-term planning that came with the Accords. "With ten years of funding we could plan longer term projects," said Golightly. This assurance provides increased "security" for tribal members and communities, who could count on project funding not running out (Christine Golightly, personal communication 2016). One of the goals of the Accords was "to address the Parties' mutual concerns for certainty and stability in the funding and implementation of projects for the benefit of fish affected by the FCRPS and Upper Snake Projects…" (MOA 2008, 1) The Hood River Production Program is an example of how the resources from the Accords are meeting a diverse set of needs. For Chris Brun and others, the Accords provided more dependable funding than distribution through the Northwest Power and Conservation Council, and has allowed for important long-term planning .

The Northwest Power and Conservation Council and the Northwest Power Act

Before the Fish Accords, the Hood River Production Program previously received funds for some of its projects now financed by the Fish Accords from the Northwest Power and Conservation Council. Like the Fish Accords, the Council's funding comes from the Bonneville Power Administration. The Accords are not the first instance of BPA money being distributed for restoration and recovery projects in the Columbia River Basin, but for some it changed the mechanism by which these funds are distributed (McGinnis 1995; Chris Brun personal communication 2016).

The Northwest Power Planning Council, which today is called the Northwest Power and Conservation Council, was created by an act of congress in 1980 as a component of the Northwest Power Act[10] (Mentor 2008; McGinnis 1995). The Council is not a federal agency, but rather an interstate compact between Idaho, Montana,

[10] Commonly referred to as the Northwest Power Act today, the act is also known as the Pacific Northwest Electric Power Planning and Conservation Act (Mentor 2008)

Washington and Oregon. The Council is made up of two representatives from each state nominated by their respective governor and lacks tribal representation (Northwest Power and Conservation Council Annual Report 2007). When the act was passed, it was an unprecedented federal approach to fish and wildlife concerns in the basin. Both the Act and the Council came about at a point in history when there were mounting apprehension about both the long-term electricity demands of the Pacific Northwest as well as the continued existence of salmon, who were experiencing alarming reductions in their population (Mentor 2008).

At its core, the Northwest Power Act was meant to address these two concerns and was intended to reconcile the competing interests of hydroelectricity and fish (Mentor 2008; McGinnis 1995; Volkman & Mcconnaha 1993). The act explicitly states that it aims to require "equitable treatment" for fish and wildlife in conjunction with energy interests (McGinnis 1995, 69). The Council's hybrid approach works on a plan that "will assure the region of a safe, reliable, and economical power system with due regard for the environment" as well as a program with the intent to "protect, enhance, and mitigate fish and wildlife affected by the Columbia River hydroelectric system" (Ossmann 2014). This program is formally known as the Columbia Basin Fish and Wildlife Program (McGinnis 1995).

The funding for the Fish and Wildlife Program comes from the Bonneville Power Administration (Ibid.). States and tribes make proposals to the Council for projects that they would like to see implemented. The Act demands collaboration and relies on the input and knowledge of federal, state and tribal fish and wildlife managers (Mentor 2008). Although the Council makes recommendations to BPA, ultimately BPA establishes the Council's budget for the Fish and Wildlife Program (McGinnis 1995). When the law was created, the expectation was that both of these interests could be treated with equal concern, but some argue that a more complicated reality exists. Instead of promoting *both* interests simultaneously, McGinnis argues that the act employs competing messages that challenge each other:

> "The Act provides a mixed mandate: "to protect, mitigate, and enhance" fish and wildlife, but to do so while planning for the energy needs of the region at the "lowest cost." This mixed mandate pits the interest for energy production, the Bonneville Power Administration (BPA), against advocates for ecological conservation and restoration" (McGinnis 1995, 85).

The Northwest Power Act sought to increase cooperation and participation, but some are of the opinion that involving more actors that have other interests and priorities in restoration initiatives may have some negative effects. Volkman & Mcconnaha argue:

> "if the Northwest Power Act provided important incentives for coordination, it also broadened the range of influential parties. Before the Act, a wide array of fish and wildlife agencies, Indian tribes, fishing and conservation groups, and federal courts determined salmon policy. After the Act's passage, many salmon recovery measures have been financed by the hydroelectric system through the Bonneville Power Administration. Bonneville, the electric utilities, the Army Corps of Engineers, public and private utilities, and others have joined the debate, and the problems of coordination have been compounded" (Volkman & Mcconnaha 1993, 1266)

The Northwest Power Act enabled a significant amount of funding to be put toward recovery and restoration, but it also gave federal agencies such as BPA, (an agency that has a commitment to fish and wildlife recovery, but ultimately holds the generation of hydropower sales as its bottom line) increased authority in determining fish policy in the basin. The question of influence that Volkman & Mcconnaha were pondering back in the 1900s still remains relevant today, and has been highlighted by some opponents of the Fish Accords. How has the position of federal agencies at the decision-making table influenced salmon restoration efforts in the basin, and in particular, has it shaped the origins of the Fish Accords?

BPA Funding Cuts to Tribal Programs

"This is a time for a greater regional commitment, not a lesser commitment" (Letter of Public Comment, Suppah, Washines, Minthorn, Miles 2006, 3).

In the early 2000s BPA started to take steps to cut back on spending for the Columbia Basin Fish and Wildlife program. In 2003 when close to $21 million was cut from the program, the Northwest Power and Conservation Council expressed concern about the drawbacks, saying that although they may be acceptable this year, they would not be sustainable in the future (Mentor 2008). In 2005, BPA started to consider its budget for the years 2007 through 2009 (see **Figure 5**). Their proposal showed a rise in expenditures and was set at $143 million annually, but according to the Council that type of funding was not enough to meet even its minimal needs. The Council pushed back against the budget in a letter to BPA saying that they did "not believe that this level of expense funding would support the most fundamental work of the program" (Mentor 2008, 23). The Council recommended that in order to meet their goals, an annual expense budget of $161 million would be adequate in 2007. BPA did not follow the Council's request:

> "On February 9, 2007, BPA issued a Record of Decision for its 2007-09 funding decision. Once again, BPA disregarded the Council's concern about inadequate funding for Program implementation and established the 2007-09 Fish and Wildlife Program Budget at $143 million expense and $36 million in capital expenditures" (Mentor 2008, 23-34).

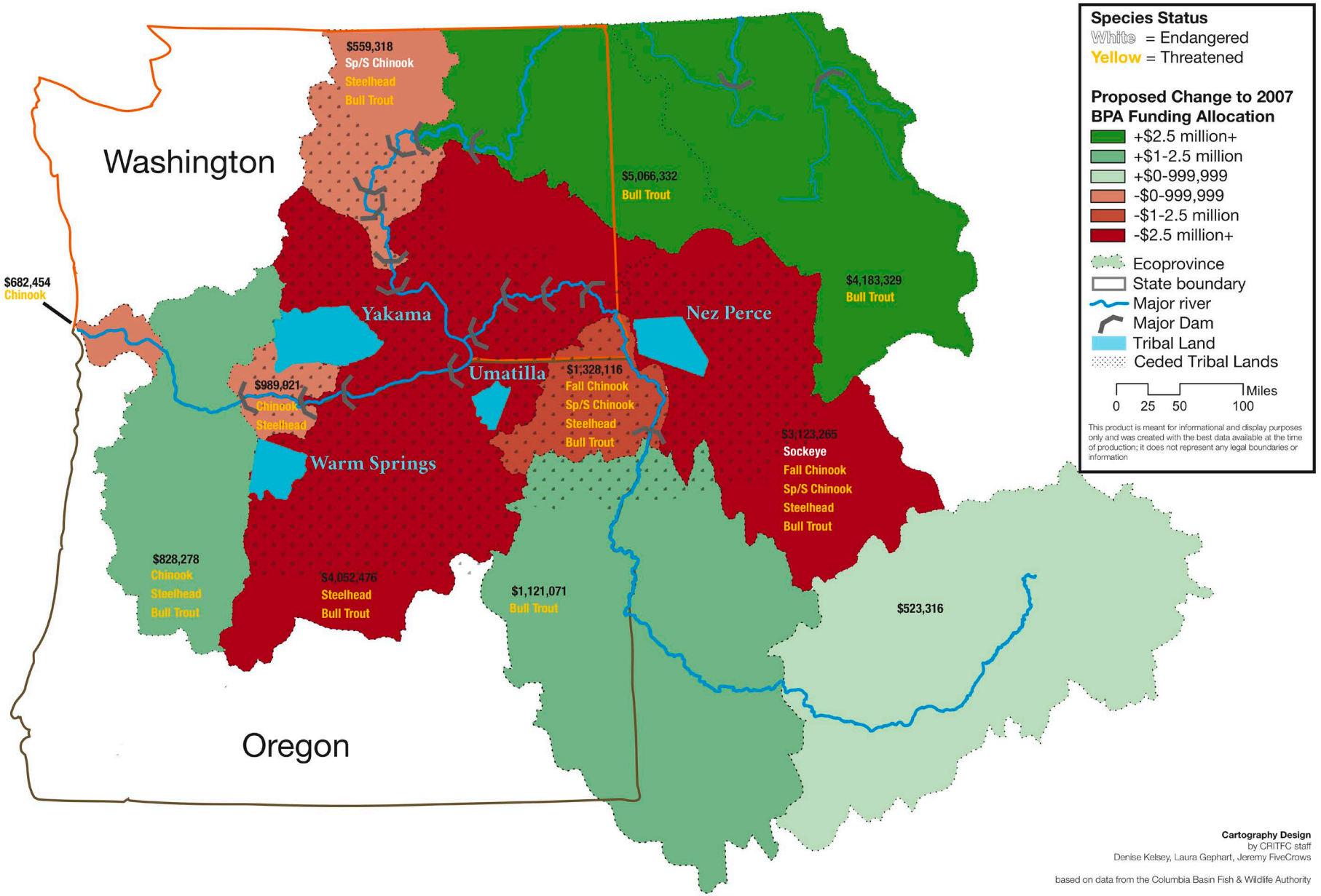
There was concern within and among the tribes that the budget was significantly falling short of meeting the biological targets for the Fish and Wildlife program and that more funding was necessary to keep the program on track. In a letter from the Yakama, Umatilla, Warm Springs and Nez Perce Tribe addressing these concerns, they point out that both of their attempts to inform the Council of their unease with the budget (on June 21, 2005 and January 10, 2006) were met with no reply (Letter of Public Comment, Suppah, Washines, Minthorn, Miles 2006, 2). In a 2006 letter addressing the Council from the four tribes that compose the Columbia River Inter-Tribal Fish Commission, the member tribes shared their concerns with the inadequate budget:

> "The overall funding made available is inadequate, programs that are critical for the tribes are being slashed, entire species are dropping from the Program..." (Ibid.).

There was also criticism of the Council's acceptance of a budget before projects were completely evaluated, "The Council adopted a Program funding cap prior to submission and review of project proposals, thereby limiting the ability to objectively recommend a suit of projects that fulfills the intent of the Act and the Program" (Letter of Public Comment, Minthorn, 2006, 2). Not only did the budget itself receive criticism, but the funding of particular programs over others also came under scrutiny. The four tribes that make up CRITFC commented on the process for evaluating proposed projects, saying that the "standards, criteria, and methods to prioritize projects (if there were any) were inconsistent from state to state" (Letter of Public Comment, Suppah, Washines, Minthorn, Miles, 2006, 2).

The Council, CRITFC and many of the tribes had warned that BPA was grossly underfunding the Fish and Wildlife Program. As CRITFC policy analyst Laurie Jordan shared that it was an impactful time, especially for the tribes. Programs were facing major cutbacks and individuals were losing their jobs. "The middle Columbia [was] getting programs gutted with serious consequences" (Laurie Jordan, personal communication 2016). For the signing tribes, the Fish Accords addressed this need for funding. But for others, it was not such a simple solution. Some opponents of the Fish Accords were critical of the fact that BPA ultimately controlled the purse strings for both funding mechanisms, The Columbia Basin Fish and Wildlife Program, which is overseen by the Northwest Power and Conservation Council *and* the newly packaged solution: the Fish Accords, a deal that does not allow signing parties the ability to endorse dam removal or support increased spill.

Figure 5: Proposed Budget Reallocation for the Northwest Power and Conservation Council's Fish and Wildlife Program for the 2007-2009 Fiscal Year



This map is illustrates the proposed BPA budget allocation to the Northwest Power and Conservation Council's Fish and Wildlife Program. Tribal programs faced significant cutbacks in the budget restructuring. Source: CRITFC and the Columbia Basin Fish and Wildlike Authority

Disaccord in the Columbia Basin: The Nez Perce Tribe and a Commitment to a "4-H" Approach to Salmon Restoration

"What it came down to was that we are the tribe that has the most to lose by not talking about breaching the Snake River dams."
(Rebecca Miles as cited in Hawley 2011, 212)

Located in north central Idaho, the Nez Perce Reservation is encompassed by three waterways, the Salmon, Clearwater and Snake Rivers. Treaty agreements in 1855 shrunk the territory of the Nez Perce Tribe to 7.5 million acres, an area that was later diminished to 770,000 acres by the U.S. government. Prior to entering into a treaty that promised the tribe fishing rights at their "usual" fishing areas for the price of vast amounts of land, the territory of the Nez Perce Tribe expanded close to 16 million acres across what are currently the states of Washington, Idaho and Oregon (McNeel 2007; McCool 2007).

The tribe is well known for reintroducing Coho Salmon in Idaho's Clearwater Basin after they became extinct in 1987 (Kunz 2012), as well as for their work in revitalizing the Snake River fall Chinook run (Learn 2012). The tribe has also gained a reputation for their innovative hatchery methods, which James Holt, director of the Water Resource Division within the Nez Perce tribal Department of Natural Resources, describes as "nature's rearing." (James Holt, personal communication 2016). The Nez Perce Tribe utilizes curved rearing ponds with currents that imitate stream flows; a dynamic environment that is more representative of Idaho's waterways (CRITFC 4). The efforts are focusing on "teaching them to be wild" says Rebecca Miles, the executive director of the Nez Perce Tribe (Rebecca Miles, personal communication 2016).

Almost a decade ago, the Nez Perce Tribe decided to abstain from the Fish Accords. Rebecca Miles has explained the tribe's reasoning for opting out. Overlooking the impact that dams have on their fish runs was not something that the Nez Perce Tribe thought they could afford to do, and signing the Accords would prevent the tribe from promoting dam removal. Miles explains:

> "What it came down to was that we are the tribe that has the most to lose by not talking about breaching the Snake River dams. We respect the decisions the other tribes made. But we feel like all of the options had to be on the table. We've advocated dam breaching along with the other tribes for a long time now. Like the other tribes downstream, salmon are a huge part of our culture and our religion and economy. But for us, our salmon have to deal with those dams before we can fish them. Getting some kind of major change done with the dams is a good thing for us to fight for" (Rebecca Miles as cited in Hawley 2011, 212).

The Nez Perce Tribe sits downstream from the Lower Four Snake River dams, which present an additional obstacle for salmon and steelhead to navigate. In an interview in High Country News, Dave Johnson, Program Manager of the Nez Perce Tribe Department of Fisheries Resource Management points out that habitat restoration is less of a priority for the Nez Perce Tribe, because much of their critical salmon habitat is in good condition and are protected lands, "This is some of the best salmon habitat we've got left" he says (Goldfarb 2014). Despite this exceptional habitat, fish numbers remain low, says Johnson, an indication that habitat-focused efforts alone cannot allow for substantial recovery (Ibid.).

The Save Our Wild Salmon Coalition, a cohort of NGO environmental advocacy groups, also commented on the extent of the Accords focus on habitat restoration, saying that these efforts are important for some listed runs like the Upper Columbia spring Chinook and the Upper Columbia Steelhead, but are not the "silver bullet" for all salmonids in the basin (Letter of Public Comment, Save Our Wild Salon Coalition 2008, 4). They cite a study by Budy and Schaller that was focused on Snake River spring/summer Chinook:

> "[E]ven if restoration efforts are large scale (i.e., restoration of many tributary streams) and feasible, if the animal of concern is far ranging with a complex life-cycle, factors in other life stages (e.g., passage through mainstem dams) may provide a bottleneck and limit the overall effectiveness of restoration actions" (Letter of Public Comment, Save Our Wild Salmon Coalition 2008, 4).

Ultimately, to the Save Our Wild Salmon Collation, habitat restoration, though beneficial in some applications, was not the end-all be-all approach for salmon recovery. For them, there were also issues "with the management and ongoing operation of the federal hydropower system" that needed to be addressed (Ibid.).

This summer when the State of the Rockies team visited Rebecca Miles in Lapwai, Idaho she shared similar sentiments about the Fish Accords. She talked to us about the importance of incorporating "a four H" approach in to restoration efforts. The four H's are hydropower, hatchery, harvest, and habitat; four key factors that impact salmon and steelhead in the basin. For Miles, the Accords did not take a balanced approach to handling these influences, as they neglected addressing the full impacts of hydropower (Rebecca Miles, personal communication 2016). As was aforementioned, the Accords bar signing parties from supporting dam breaching or increased spill (MOA 2008). She argued: "no longer can habitat, hatchery and harvest take on the conservation burden and hydro can do whatever it wants" (Rebecca Miles, personal communication 2016). Theodore Kulongoski, the former Governor of Oregon, shared a similar sentiment to Miles' concern that federal agencies were turning a blind eye to the impacts of dams. In a letter of public comment to BPA on the subject of the Fish Accords he wrote:

> "I have long been a proponent of a comprehensive "all-H" strategy to satisfy ESA requirements and lead to recovery. The solution that ultimately ends the litigation and recovers wild fish will be one that places appropriate emphasis on each tool available (hatcheries, habitat, harvest *and hydropower* operations)" (Letter of Public Comment, Kulongoski 2008, 2).

Miles also noted that in the period prior to the Accords, tribal programs funded by BPA through the Northwest Power and Conservation Council, were facing serious funding cutbacks. They were getting "gutted" at the same time that tribes were expending resources on litigation challenging the Biological Opinion. It was during this time when tribes were facing serious financial strain, says Miles, that the "scales started to tip" towards the agreement (Rebecca Miles, personal communication 2016).

Hawley discusses the views of the Nez Perce Tribe who have identified shortcomings in the deal, one critical flaw being that "funding for these endeavors should have been guaranteed anyway" (Hawley 2011, 210). Of the total budget for the Fish Accords, which tallies close to 1 billion dollars, $540 million was allocated for new initiatives. The rest was to ensure the continued funding of projects that were already in the works (Hawley 2011). As Hawley points out, some of the projects that were now "guarantee[d]" to occur under the Fish Accords should have been commitments that were already pledged by BPA as many of the projects appeared as mitigating efforts in the FCRPS Biological Opinion. If these were not sure commitments, then they would not meet the requirements of the ESA. Indeed, in the extensive litigation over the FCRPS Biological Opinion, part of the reason why multiple BiOps have encountered legal scrutiny is because of a certain level of uncertainty surrounding the execution of habitat initiatives. In the 2014 BiOp this continued to be a problem, as Judge Simon writes, "…some of the habitat projects relied on are not reasonably certain to occur" (NWF v. NMFS 2005; NWF v. NMFS 2016, 85).

A letter of public comment from Save Our Wild Salmon Coalition recognized the importance of the tribal projects included in the Accords, but questioned why these initiatives were not being implemented as part of BPA's current legal responsibilities:

> "Of almost $1 billion that will be spent under these MOAs, at least 50% of that money is dedicated towards projects that already receive funding. We are largely supportive of that continued funding and understand the benefit of securing that funding into the future. However, given that BPA believes that these projects are biologically meaningful, deserve funding, and are necessary to fulfill statutory or treaty requirements, BPA should be funding them anyway and not promoting this part of the agreement as anything more than it is: **a promise to continue its existing obligations**" (Letter of Public Comment, Save Our Wild Salmon Coalition 2008, 3).

In the eyes of some, the Fish Accords fulfilled the shortcomings of an underfunded Columbia River Fish and Wildlife Program, a problem, it could be argued, BPA created in the first place. The Fish Accords also

disadvantaged some parties that chose to not sign onto the deal. John Shurts, General Council to the Northwest Power and Conservation Council, said that it has been difficult to provide funding for parties that did not sign onto the Accords, such as the Spokane Tribe (John Shurts, personal communication 2016). Hawley highlights the negotiating advantage of the federal agencies, which he sees as one of "take what we offer you or wind up with nothing" (Hawley 2011, 210). An approach, he asserts, that is not unique in the federal government's treatment of the tribe when it comes to historical agreements. As both Hawley and Miles point out, BPA had a significant brokering advantage in the shaping of the Fish Accords, a deal, which has been criticized for not fully addressing the impact of hydropower along with the other three H's. Years ago when the Fish Accords, were being considered by the tribe, Rebecca Miles responded to a comment from the federal parties suggesting that the Nez Perce Tribe were waiting to sign the Accords in order to receive more funds: "You'll cut my legs off, then offer to sell them back to me only if I come over to your side" she told them (Hawley 2011, 211).

The Glacial Pace of Justice: the Remand of the 2014 Biological Opinion

In early May of 2016 Judge Michael H. Simon, successor to Judge Redden on the U.S. District Court, remanded the most recent attempt at the Biological Opinion for the Federal Columbia River Power System: the 2014 Biological Opinion (NWF v. NMFS 2016). It was the fifth consecutive time that the Federal Columbia River Power System Biological Opinion has been rejected (Profita 2016). The lawsuit ultimately sought to determine if NOAA Fisheries' BiOp met the requirements of the Endangered Species Act. It also examined if the U.S. Army Corps of Engineers (the Corps) and the U.S. Bureau of Reclamation (BOR) were in compliance with the National Environmental Policy Act (NEPA). The BiOp did not hold up against either of these inquiries (NWF v. NMFS 2016).

There were multiple areas within the BiOp that Judge Simon found to be problematic. How the BiOp addressed climate change was one section of concern. He called attention to the fact that NOAA Fisheries seemed to acknowledge its findings that climate change may have a negative effect on some of the BiOp's habitat mitigation initiatives, but did not let it sufficiently inform agency action (NWF v. NMFS 2016).

The court also found the way that NOAA Fisheries made their assessment of habitat benefits to be insufficient. The benefits from these projects lacked a certain tangibility for they "are too uncertain and do not allow for any margin of error" (NWF v. NMFS 2016, 13). The court also criticized NOAA Fisheries' treatment of uncertainty in their evaluations, which allowed them to ignore important warning signs related to species reductions. Judge Simon writes in his 2016 decision:

> "Further, a key measure of survival and recovery employed in the 2014 BiOp already shows a decline, but NOAA Fisheries has discounted this measurement, concluding that it falls within the 2008 BiOp's "confidence intervals." Those confidence intervals, however, were so broad, that falling within them is essentially meaningless" (NWF v. NMFS 2016, 13).

The court is clear in its effort to assert that "there is significant benefit to the listed species from habitat improvement" and points out that the shortcomings of habitat restoration in the BiOp are due to the fact that projects that NOAA Fisheries depends on to satisfy ESA requirements "are not reasonably certain to occur and that NOAA Fisheries relied on habitat mitigation projects achieving the exact amount of extremely uncertain survival benefits required to avoid jeopardy" (NWF v. NMFS 2016, 85). The court is cautious in its approach, as it does not wish to discourage NOAA Fisheries from habitat restoration projects "because they cannot conclusively quantify those benefits...," but for these types of projects to meet the standards of the Endangered Species Act, these projects must be able to show "some amount of survival benefits beyond the minimum survival benefit required to avoid jeopardy..." (NWF v. NMFS 2016, 85-86). It is also important to note that the benefits from these types of habitat mitigation projects, some of which are funded by the Fish Accords, are difficult to quantify and not always instantaneous. For some projects it will be years or perhaps decades before the benefits can be seen (NWF v. NMFS 2016).

The rejection of the FCRPS BiOp yet again may seem like a vicious repetition of the past. There are ways, however, in which this Biological Opinion both echoes the previous rulings of the court, but also departs from prior versions in noteworthy ways (Chasen 2016). The plaintiffs' assertion that the requirements of the National Environmental Policy Act (NEPA) were not being fulfilled was a relatively new development as this particular law had not been used in the case since 2001(NWF v. NMFS 2016). Under NEPA, all federal agencies are obligated to produce an Environmental Impact Statement (EIS), which examines "major Federal actions" that impact the "quality of the human environment" (NWF v. NMFS 2016, 23). In an EIS, it is necessary for agencies to consider "reasonable alternatives" to the proposed action (Ibid.). Judge Simon did not think that the defendants were in compliance with NEPA. He concluded that the EIS that was produced by the U.S. Army Corps of Engineers (the Corps) and the Bureau of Reclamation (BOR) was not up-to-date and no longer relevant. The Corps and BOR leaned on past EISs from 1992, 1993, and 1997 as well as some additional contemporary documents. The court found these to ultimately be outdated and in of need modernization; "For the purposes of compliance with the law, relying on data that is too stale to carry the weight assigned to it may be arbitrary and capricious" (NWF v. NMFS 2016, 17).

Judge Simon identified advances in our understanding of climate change as an important reason why the two agencies could not lean on older assessments in their EIS. He also recognized the production of a current and lawful EIS as a potential avenue for the BiOp to consider modifying dam operations or even dam removal. In the following section he quotes *Thomas v. Peterson* to illuminate his point:

> "a central purpose of an Environmental Impact Statement is "to force consideration of environmental impacts in the decision-making process." For example, the option of breaching, bypassing, or even removing a dam may be considered more financially prudent and environmentally effective than spending hundreds of millions of dollars more on uncertain habitat restoration and other alternative actions" (NWF v. NMFS 2016, 18).

As Chasan points out, the judge did not instruct the defendants to examine the possibility of dam breaching directly, but his language clearly indicates that he thinks it is a good idea. Attorney for Earthjustice, Steven Mashuda, says that it would be hard for the agencies to make a sensible defense for not including that option in an EIS, "they have to come up with some explanation why it's reasonable to not even consider it. I can't imagine how they could justify it" (Chasan, 2016).

Douglas MacDougal, a water resource, energy, and litigation lawyer at the Marten Law firm, grapples with a question common for those who have examined NOAA Fisheries long and arduous attempt to produce a Biological Opinion. Why has it been so challenging for NOAA Fisheries to meet the standards of the law? One of the reasons may be the mere size of the geographical area that the BiOp seeks to cover. It is an intricate and convoluted system and salmonids do not merely spend their life in one place, they travel vast distances and face many environmental pressures (MacDougal 2016). MacDougal also points to "the elephant in the room"—the dams. Do salmonids have a fighting chance on a dammed river? Is there some way in which these longtime foes can coexist? MacDougal gets to the heart of the question that has long been asked on the Columbia: "Can we have dams and fish too? The clear overriding message of Simon's opinion is that agencies *must* come to grips with this fundamental question" (Ibid.).

In Judge Simon's 2016 ruling over the 2014 Biological Opinion, he recounts the BiOp's long and troubled history, which has clamored on for more than two decades. He shares the remarks of a former U.S. District Judge, who declared that the nominal effort by NOAA Fisheries in their 1993 FCRPS Biological Opinion was not sufficient and preserved the "status quo" when the circumstance "cries out for a major overhaul" (NWF v. NMFS 2016, 7). He also reminded the defendants of Judge Redden's continued prompting to examine the possibility of breaching a dam, or even multiple dams on the Snake River. In May of 2016, Judge Simon recognized the 2014 BiOp as a perpetuation of a stagnant approach to controlling for the impacts that the dams have on salmon and steelhead:

> "Judge Redden, both formally in opinions and informally in letters to the parties, urged the relevant consulting and action agencies to

> consider breaching one or more of the four dams on the Lower Snake River. For more than 20 years, however, the federal agencies have ignored these admonishments and have continued to focus essentially on the same approach to saving the listed species—hydro-mitigation efforts that minimize the effect on hydropower generation operations with a predominant focus on habitat restoration. These efforts have already cost billions of dollars, yet they are failing. Many populations of the listed species continue to be in a perilous state. The 2014 BiOp continues down this same well-worn and legally insufficient path taken during the last 20 years." (NWF v. NMFS 2016, 18-19).

From the perspective of the courts, it is clear that habitat focused mitigation projects, initiatives that were funded in part by the Accords, are not enough to fully support fish recovery efforts in the Basin and meet the requirements of the Endangered Species Act (MOA 2008). Judge Michael H. Simon ends his opinion and order with his instructions for the federal defendants. He writes:

> "No later than March 1, 2018, NOAA Fisheries is directed to file with the Court its new Biological Opinion. The Court retains jurisdiction over this matter to ensure that the Federal Defendants: (1) develop appropriate mitigation measures to avoid jeopardy; (2) produce and file a Biological Opinion that complies with the ESA and APA; and (3) prepare an EIS that complies with NEPA. **IT IS SO ORDERED**" (NWF v. NMFS 2016, 149).

Conclusion

The Fish Accords ushered in a new era of compromise, enabled funding for important fish recovery projects, and provided financial security and opportunities for long-term planning for the signatories. There was also disaccord in the Columbia River Basin, however, as some were critical of the agreement and the circumstances under which they were negotiated. For some, the Fish Accords were seen as a limited attempt to address the multiple factors that impact salmon and steelhead, a perspective that was backed by the U.S. District Court of Oregon. The remand of the 2014 BiOp suggests that the federal agencies may need to address what they sought to avoid in the Fish Accords and what NOAA Fisheries has been tiptoeing around in their extensive BiOp litigation: the examination of possible dam removal. Judge Simon's ruling on the 2014 BiOp as unlawful as well as his frank comments regarding the federal agencies continued failure to consider modernizing dam operations or breaching have reinvigorated salmon advocates to press the federal government for the removal of the Lower Four Snake River Dams (The Associated Press 2016). The Nez Perce Tribe has not wavered from their stance on the Snake River Dams; ultimately they are confident that the most effective way to revitalize salmon and steelhead populations is to take them out (Public News Service, 2016).

It is unclear what the Fish Accord members will choose to do in 2018, when the Accords expire. From the perspective of the United States District Court of Oregon, however, although habitat projects and sub-basin initiatives are important and do have practical application, the compromise has done little to dislodge the "status quo" that has dominated salmon policy for so long in the Columbia River Basin (NWF v. NMFS 2016, 19). It seems that perhaps the first step to dislodging this legacy is for NOAA Fisheries to produce a Biological Opinion that meets the requirements of the law, ensuring that the federal government's legal responsibilities, which include its treaty obligations, are upheld. The waiting game for the next Biological Opinion has begun again. If the past is any indicator of the future, however, it is clear the wheels of justice turn slowly.

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Christine Golightly, Personal Communication, July 19 & August 10 2016.

James Holt, Personal Communication, July 14, 2016.

Laurie Jordan, Personal Communication, July 19, 2016.

2016-2017 State of the Rockies Project Contributors

Brendan Boepple is the Associate Director for the State of the Rockies Project. In his seventh year with the Project, Brendan previously held the position of Program Coordinator from 2011 to 2013. Prior to that, he was a Student Researcher during the summer of 2010 and researched the Eastern Plains region of the Rocky Mountain States. Originally from Wilton, Connecticut, Brendan graduated from Colorado College in May of 2011 with a Political Science major and an Environmental Issues minor. While growing up Brendan developed a love for the outdoors and the environment, and he later worked with environmental organizations like Trout Unlimited and his local land trust. In the future, Brendan hopes to further his education in natural resource policy and management, and later pursue a career in that field. His interests include skiing and fly-fishing, two activities that drew him to the Rocky Mountain region.

Joseph Friedland is a Student Fellow for the 2016-2017 State of the Rockies Project. Originally from Larchmont, New York, Joseph has become an avid fly fisherman since moving to the west. Through the pursuit of this hobby as well as a summer spent working for the Nature Conservancy in Idaho, Joseph has developed an interest in issues of western water and land conservation. As an Environmental Science major and State of the Rockies Student Fellow, Joseph is exploring how climate change is altering natural patterns of snowpack accumulation and springtime runoff in the Columbia River basin and how these changes are impacting stakeholders such as Native American tribes, salmon population and dam operators.

Emelie Frojen is a Student Fellow for the 2016-2017 State of the Rockies Project. Emelie is from Corona del Mar, California and developed a passion for the outdoors through her childhood summers spent backpacking and rock climbing in the Eastern Sierra Nevada mountains. Emelie's research focuses on Native American resource justice and the lag time associated with transitioning "paper" water rights to "wet" water rights. She will graduate from Colorado College in 2017 with an Environmental Policy degree and a double minor in Journalism and Resource Systems in the American West.

Lea Linse is a Student Fellow for the 2016-2017 State of the Rockies Project. Lea grew up in the small mountain town of Carbondale, Colorado. At a young age, she acquired an appreciation and passion for the land and environment through frequent hiking and camping trips, which has driven her interest and involvement in land and resource management. Her research investigates how hydroelectric interests are interfering with species recovery plans under the Endangered Species Act. She will graduate from Colorado College in 2017 with a degree in Environmental Policy.

Mollie Podmore is a Student Fellow for the 2016-2017 State of the Rockies Project. She grew up in Glenwood Springs, Colorado and developed a passion for the outdoors through ample time spent rafting, kayaking, skiing, and hiking. Mollie's research explores decision-making processes within the context of transitioning water management eras. Mollie is studying Philosophy and Spanish and will graduate from Colorado College in 2017.

Amy Rawn is a Student Fellow for the 2016-2017 State of the Rockies Project. Growing up on the coast of Maine, Amy spent her summers racing sailboats and winters skiing on the icy slopes of the East. As a Southwest Studies major and Environmental Issues minor, Amy is interested in human-environment relationships and understanding how people relate to the natural world. Amy's research focuses on the Columbia Basin Fish Accords, an unprecedented agreement between hydropower and salmon advocates in the Columbia River Basin. By placing the Accords within the larger context of the environmental legislation that governs the Basin, her research seeks to understand the achievements and shortcomings of this unique compromise.

Jonah Seifer is the Program Coordinator for the 2016-17 State of the Rockies Project. Jonah was also a Student Fellow from 2015 to 2016 and researched mechanisms by which Native American tribes can assume regulatory authority over water quality, thereby enhancing tribal sovereignty and catalyzing water infrastructure development. He grew up in Newton, Massachusetts and graduated from Colorado College with a degree in Environmental Physics. Jonah's interest in environmental science was cultivated by years spent skiing and hiking in Vermont, as well as a semester spent exploring indigenous water management and justice in New Zealand.

Stephen G. Weaver is an award-winning photographer with over 30 years experience making images of the natural world and serves as technical director for the Colorado College geology department. Educated as a geologist, Steve combines his scientific knowledge with his photographic abilities to produce stunning images that illustrate the structure and composition of the earth and its natural systems. As an undergraduate geology student, he first visited the Rocky Mountains where he fell in love with the mountain environment and the grand landscapes of the West. Steve currently photographs throughout North America with a major emphasis on mountain and desert environments. His use of a 3x5 large format view camera allows him to capture images with amazing clarity and depth.

State of the Rockies Project Mission:

The State of the Rockies Project engages students, faculty, conservation experts, and stakeholders to address critical environmental and natural resource issues through interdisciplinary research in the Rockies and the American West.

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