THE ELWHA DAM REMOVAL PROJECT AND THE DEMATERIALIZATION OF NATURE

by

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Abstract

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Throughout the twentieth century dams have been used to bolster America's power, prestige and sense of itself as a nation capable of producing energy for all of its citizens. In the golden age of dam building, from the 1930s to the 1960s, dams' praises were sung by folksingers, Hollywood actors, and government propagandists alike. Big dams such as the Hoover or the Grand Coulee emerged as iconic features of the national landscape, symbolizing the governments' power to do everything from defeat the allies, jumpstart the economy, or control nature by converting wild rivers to natural energy reserves. However, recent data indicate the arrival of an era of dam removals, as dams across the nation have begun to be dismantled at an unprecedented rate beginning in the late1980s. It is vital to document this trend because it indicates a change in the way in which energy is being produced, consumed, and understood in this country, which is reshaping our conceptions of nature. By studying the largest dam removal project in the world and the second largest ecological restoration in the country, the Elwha Plan in Washington State, this dissertation reveals how energy is being reconceived at the local level precisely at the moment when the U.S. is reinvigorating its search for energy resources. This study examines the ways in which the government, corporations, community members, conservationists, and tribe members in Port Angeles all contribute

to producing nature anew. It traces how in the wake of the dam removals, private and public interests are combining in novel ways and invoking the ideologies of restoration, bioregionalism, and renewable energy in order to further penetrate nature. Such new configurations of capital are redeveloping the electricity grid in Cascadia in ways that exploit regional identity in order to remap the region and change the way that energy is flowing throughout the nation. As dams are demolished across the nation and private renewable projects replace them, hitherto public domains, such as the electricity grid, are privatized. Once heralded as national icons, dams are disappearing from the landscape and nature is losing powerful materials.

Acknowledgments

I dedicate this work to my former dissertation director, Neil Smith, sadly deceased in September of 2012. Since my first class at the Graduate Center, when Neil clicked his fingers asking if this act was natural or artificial, he showed me that that a simple snap of the fingers, as anything in nature, was a hybrid act formed by cultural and natural components. Through Neil I discovered a new world of thought that posed nature as not neutral, external and given, but produced socially. Neil taught me to see nature not just in biogeographic and geomorphological processes, but also in each corner, street, skyscraper, and bar of Manhattan. I am indebted to Neil, my teacher, friend, and comrade, whose presence I feel in every cactus, bird, or plaza. *Nunca te olvidaré*.

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INTRODUCTION

Roll on, Columbia, roll on, roll on, Columbia, roll on
Your power is turning our darkness to dawn
So roll on, Columbia, roll on.

And on up the river is Grand Coulee Dam
The mightiest thing ever built by a man
To run the great factories for Ol' Uncle Sam
So roll on, Columbia, roll on
(*Roll on Columbia, Roll on*, Woody Guthrie, 1941)

The folksinger Woody Guthrie was one of thousands of "Okies" that were forced to migrate from the Dust Bowl lands of Oklahoma. Despairing and unemployed, he moved to the West Coast in 1941 where he found work with the immense hydropower system of Bonneville Power Administration (BPA). The BPA urgently needed somebody to sing the praises of its new dam projects. Of the 26 songs that Guthrie composed for the BPA, "Roll on, Columbia, Roll on" was his greatest hit. In this composition, he re-imagined the nation's rivers and dams: the Bonneville and Grand Coulee dams, hitherto seen as masses of concrete and steel, became part of the new national folklore that explained how water and electricity flowed in unison to each corner of the northwest region. In the new lore dams eliminated the "darkness" of the Great Depression and held out the promise of generating enough power to put the entire nation to work.

With the help of men like Guthrie, dams contributed to a new construction of nature in the West. Hollywood, the government, and the press also lent a hand in reshaping the nation's wild and unruly rivers into national reserves. The political, economic, and nationalist expansion of this country required nature to be converted into something useful and exploitable (White 1995, 34-35). Through dams and reservoirs, the U.S. Army Corps of Engineers and the Bureau of Reclamation produced a political discourse capable of erasing the stories, traditions and mysteries that had come to reside

in the rivers, and water became a mere symbol of energy, a bunch of "acre-feet" and "kilowatt-hours" (Worster 1985, 52).

Dams have made America: from the rudimentary dams built in the Northeast to power the earliest stages of industrialization at the end of the eighteenth century, to the larger dam complexes constructed to fuel the first industrial concentration in Lowell, Massachusetts in the early nineteenth century, to the innovative Niagara hydroelectricity project of the 1890s, to the highly celebrated structures built during the golden age of dams from 1930 to 1960 (see figure 1), dams have transformed the North American landscape. Unlike in England and other European countries, where industrialization was mostly fueled with steam, in the United States, hydropower was the main energy source nurturing the nation until the mid-1800s, a unique historical development which fostered a particularly nationalist character to dams that was not shaken until the end of the twentieth century.

Government propaganda films such as *Hoover Dam: The Making of a Monument* (Stept 1999) flex the technological might of the nation by demonstrating how America's wildest rivers became national energy reserves. Released by the Department of Interior, *Hoover Dam* boasts that the Colorado River, "the world's most dangerous river," was put "under control for the very first time in its history" when the dam was built. For the most part, Hollywood movies reiterate the Department of the Interior's taming-of-the-wilds scenario, showing how dams turn white water into still lakes, erase class differences, eradicate sexual outlaws, and even domesticate unruly women (cf., e.g., *Deliverance* (Boorman 1972); *Temptress* (Niblo 1926)). In addition, they demonstrate how dams break down or build up regional boundaries and suture recalcitrant areas into the national

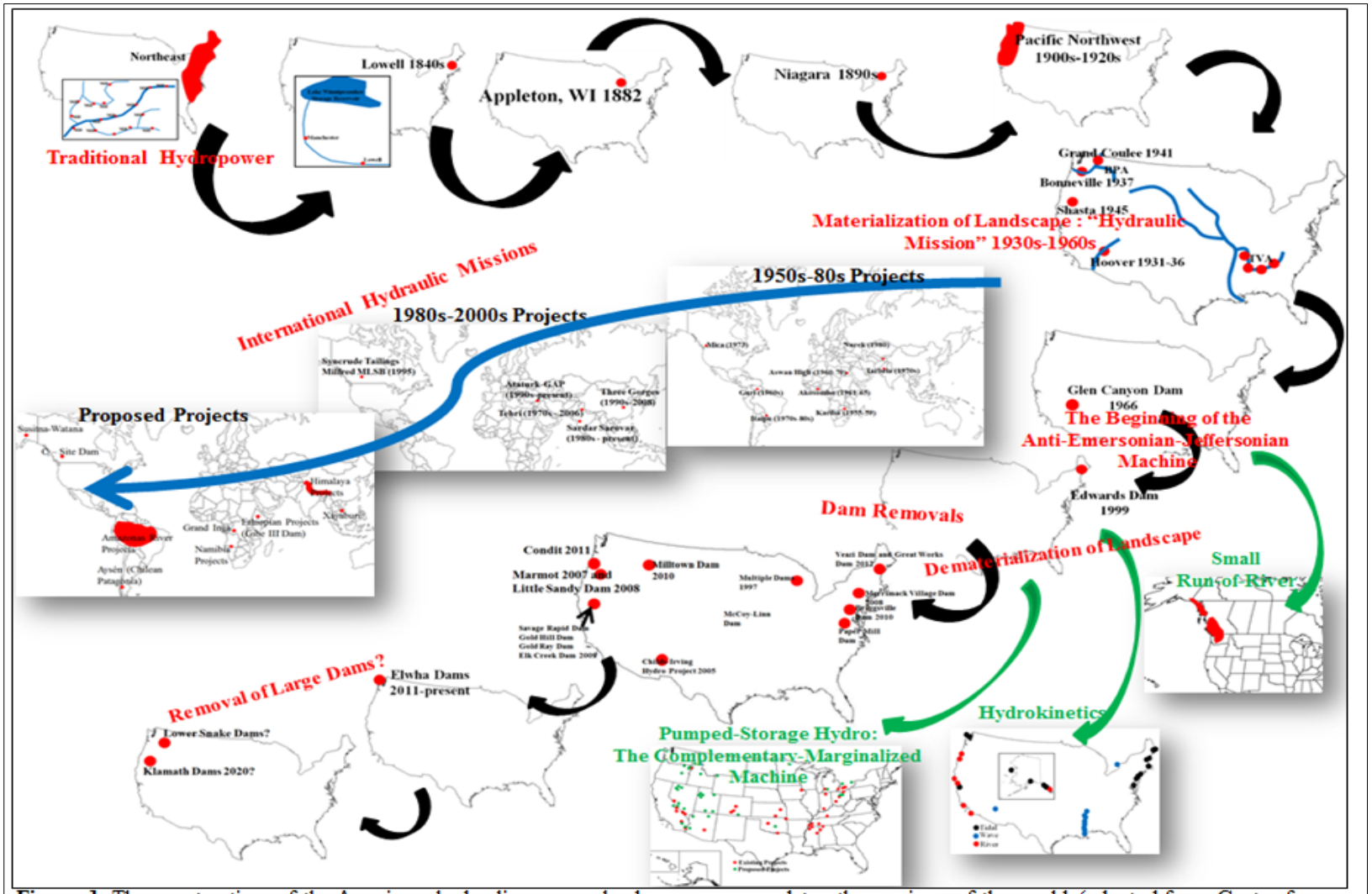

Figure 1. The construction of the American hydraulic-energy landscape compared to other regions of the world (adapted from Center for Climate and Energy Solutions Landscape 2011; Hydropower Reform Coalition 2011; Miller and Winters 2011; Alaska Energy Authority 2012; American Rivers 2012; BC Hydro 2012; Infloplease 2000-2012; International Rivers 2012)

energy flow. *Deliverance*, for example, reveals how a dam can bury a "backward" Appalachian town underneath a reservoir, and in its place set up a sea of power that consolidates the middle class in suburbs with the promise of plentiful consumption. In other films, such as Roman Polanski's *Chinatown* (1974), dams are shown to serve the "public good" as opposed to greedy private interests.

However, after a century of robustly damming up its rivers, the United States has begun to decommission dams. Whereas countries such as China, India, Turkey, Congo, Canada, or even Alaska have continued constructing and projecting dams that in some cases are so large as to dwarf the notorious Three Gorges Dam in China, the United States has initiated a counter-trend beginning in the 1980s (figure 1). In the U.S. a series of dams such as the Marmot (2007) on the Sandy River in Oregon, the Condit (2011) on the White Salmon River in Washington, or most recently, the Great Works Dam on the Penobscot River in Maine (2012) have been torn down (figure 1). The highest density of dam removals is located in the West and Northeast, as figure 2a indicates. Although there is nothing new about the removal of dams, the size and pace of the current spate of removals are remarkable. The boom in dam removals began in the 1980s-1990s, as we can see in figure 2b, with the largest concentration occurring in the past five years. In fact, the national environmental organization American Rivers (2012b) has coined the term "the year of the river" to define 2011, a year by which the United States will have removed 1,000 dams since the beginning of the twentieth century.

The common denominator in past dam removals is that all of them have been small (The Heinz Center 2002); medium or large dams have not been targeted for

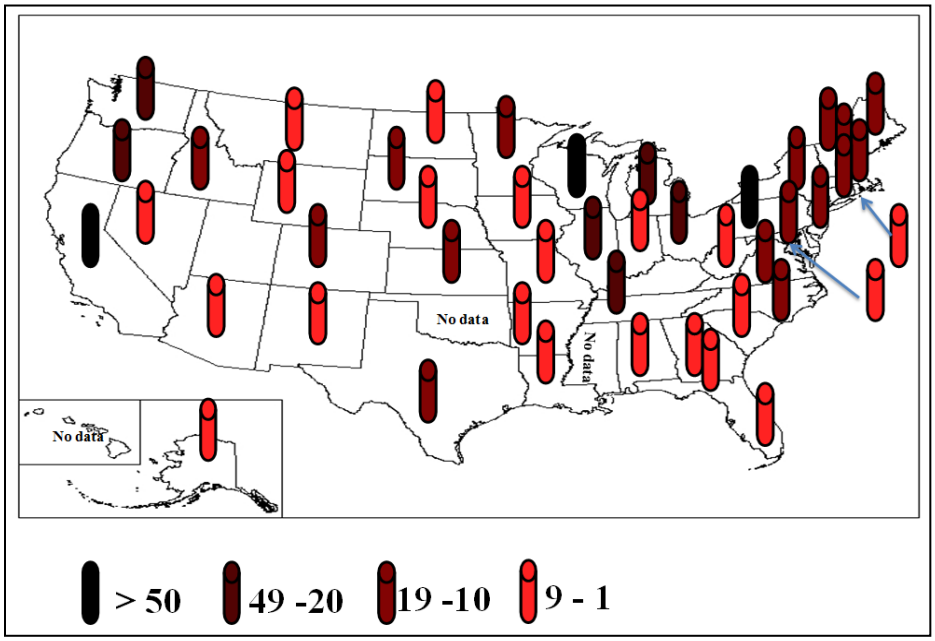

Figure 2a. Number of dam removals per state until 2010 (adapted from Hydropower Reform Coalition 2011)

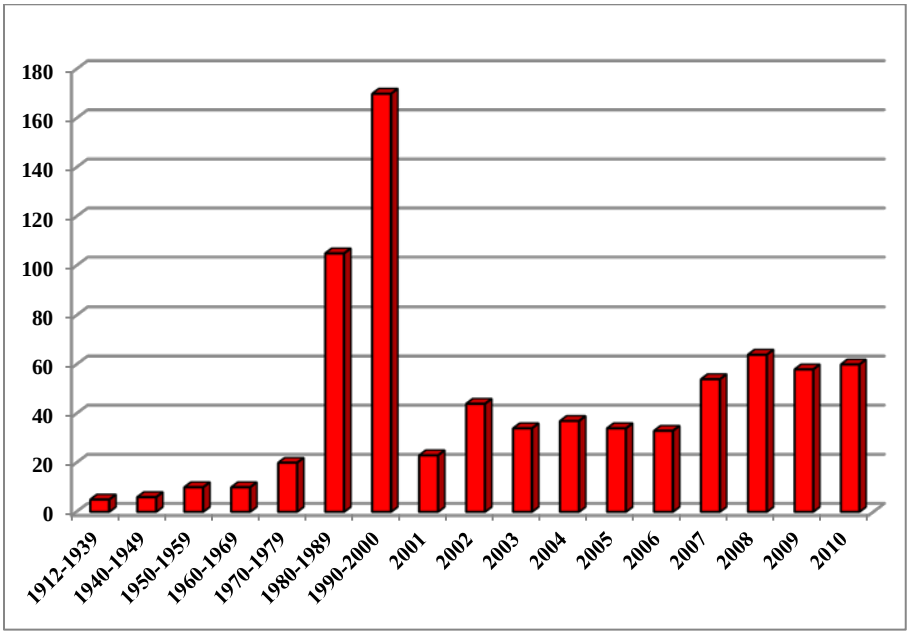

Figure 2b. Number of dam removals per decade and year (adapted from Poff and Hart 2002; American Rivers 2012b)

demolition[1]. That is, until recently. The first removal of a big dam is currently happening in Washington State. Conceived in the early 1990s and planned throughout the following decade, the bulldozers arrived in the summer of 2011 to begin the demolition of the Elwha Dams, the largest dam removal in the world, and the second largest ecological restoration in the United States after the Everglades. National news outlets from the *New York Times* to National Public Radio (NPR) covered the event, and stories appeared as far flung as Belize. Journalists were not the only ones who were captivated by the novelty of a project that would un-dam a river that had not flown freely in nearly 100 years. Environmentalists, fishermen, local residents, city officials, and members of the Elwha tribe all had something to gain from the restoration of the Elwha. Environmentalists and the Elwha tribe, perhaps, had the most to benefit, in that for them the removal represented over four decades of labor in their fight against the dam; moreover, it was a symbolic win for a way of thinking and living in the world, a green ethics.

As a news item, the Elwha came and went. Few news outlets are willing to stick around for the next one hundred years to follow the story of the river's recovery. This dissertation argues that we should pay attention to the Elwha, not only for its importance to the local community, but also for what it can tell us about ourselves. Most of the academic work produced on the Elwha project thus far focuses on the dam removal's effects on the soil, fauna, flora or the river itself. My project is one of only a very few

[1] According to the International Commission on Large Dams (ICOLD), in order for a dam to be catalogued as large it has to have a minimum height of 15 meters from its base to its crest. Dams with a height between 10 and 15 meters can be catalogued as large if: 1) the crest length has 500 meters or more; 2) the minimum reservoir capacity is 1 million of cubic meters; 3) the maximum flood discharge is at least 2,000 cubic meters per second; 4) the dam has special foundation problems and unusual design (McCully 2001, xii).

studies that takes as its subject the human environment, that is, how such a novel enterprise affects and is affected by socio-political factors. Perhaps the reason that humans have been kept out of the research is because of the strong ideological bent of the dam removal projects, which sees benefits to the environment as paramount. Not only did the popularization of environmental ideologies create the first wide-spread anti-dam movements in the 1970s, but it also empowered latter-day politicians to follow the environmentalists' lead to remove the dams forty years later. Yet, there is a clear difference between then and now. This dissertation argues that what distinguishes the first decades of the twenty-first century is the existence of a new cast of characters—a well-heeled group of (inter)national businessmen and women who are prepared to spread the word about green energy. The meeting of green ideology and shrewd corporate capitalism makes for an unwholesome combination, but one that we should take note of because it underlies the way in which nature is currently being produced. Finally, I show how when we back up from the Elwha, and view the landscape as a whole, we can see how alterations in a riverbed reflect much larger changes within the nation. I argue that the Elwha dam removal signals a new way of thinking about energy in our environment, producing a new "energy landscape," in which matter no longer matters, and energy is king.

1. The Elwha Dam Removal in Theory

This dissertation will show that the Elwha dam removal is not an isolated event, despite being treated as so by the media. My unique perspective of study, which considers the Elwha project from a socio-political-ecological point-of-view has allowed me to demonstrate connections that others have not been able to make. A majority of

scholars working on dam removals in general have approached the topic from a biophysical perspective, studying fish populations and riparian biomass (see Burke et al. 2008; Gillis 1995; Kanehl et al. 1997; McHenry and Pess 2008; Trout Unlimited 2001); sedimentation and geomorphology of the river (see Beck, Inc. 1998; Doyle et al. 2003; Mussman et al. 2008; Shuman 1995; Simons and Simons 1991; Stoker and Harbor 1991; Warnick et al. 2008; Wohl and Cenderelli 2000); vegetation (see Bednarek 2001; Chenoweth et al. 2011; Shafroth et. al 2002); nutrients (see Stanley and Doyle 2002); and ecological impacts on fauna (see Sager-Fradkin et al. 2008).

Works focusing on the cultural impact of dam removals, however, are rare. At the last Elwha River Science Symposium in Port Angeles, Washington in 2011, for instance, only 4 of the 32 presentations addressed cultural features of this project (Elwha River Science Symposium 2011). Dave Conca and Kim Kwarsick (2011), for example, studied the archeology of the Elwha River. Perhaps one of the first studies of how dam removals in general affect societies was carried out by Stephen M. Born and colleagues (1998), who focus on the socio-economic factors surrounding these operations, especially how local communities are involved in the decision-making processes. More recently, Johnson and Graber (2002) studied the psychology of the decision-making involved in dam removals.

Neither the more typical research focusing on biophysical conditions, nor the handful of studies exploring culture, however, enable us to make connections among groups of people involved in the project, such as activists, government officials, and businesspeople, nor do they allow us to see just where the Elwha project sits historically. Although they provide vital information about flora, fauna, and geological matter,

biophysical studies rarely cross the human border, while cultural studies seem to omit financial and political considerations. This doctoral study exposes the sorts of shadow connections that these works leave out and situates the Elwha Project historically.

Over a four-year period (between 2008 and 2012) of extended visits to the Olympic Peninsula and Port Angeles, I was able to gather, through interviewing more than 300 people, observing, and consulting primary and secondary sources, information about all of the major contributors to the project. Nobody that I know of has explored the particulars of corporate and government involvement in these dam removals, which becomes important when we realize that some of the companies that are currently making a name for themselves for their green expertise in tearing down dams, are the very same companies who are simultaneously building the nation's biggest new dams. Knowing just which corporate entities are involved in the project, and from where they have gotten their experience, helps us to better understand the 'green' context in which this project has been enshrouded. I also am the first to show how corporate – government involvement has shifted in this current round of dam business, giving private corporations a new role to play in the unmaking of the dams and the remaking of nature.

2. "The Production of Nature": Restoration

Like Guthrie, Dick Goin came West with his family escaping the tragic Dust Bowl that had made life impossible for many Americans in the 1940s. But instead of singing the praises of the dams, he weaves yarns about the abundance of life that once inhabited the Elwha before the dams had done their damage. As a young man, fresh from the plains, he learnt from Elwha Tribe members how to fish and was saved from starvation by that knowledge and the copious fish population, recalling salmon as large as

a bear cub. Goin was one of the key speakers of the Elwha River Science Symposium celebrating the commencement of the dam removal in 2011. While all of the others spoke of restoration, Goin (2011) reminded the audience of all that was lost as a result of the dams, ending his speech with the chilling words: "No longer do we see the hundreds of salmon, no fish jumping, no bears, no huge reds, no kings, no hatches of aquatic insects … it is a quiet river now." Nevertheless, because of Goin's extensive knowledge of the river's abundant life before the damage of the dam took its toll, he is perceived as a sort of witness or living memory of what the river once was and what it shall become. Like a bridge to the past and the future, Goin, despite his gloomy message, has come to represent the ideology that permeates the dam removal project, the idea that the river will return to its past grandeur—the idea of restoration.

The example of Goin shows just how strong is the ideology of ecological restoration. Originally promoted by the Elwha tribe and environmentalists, restoration has become the buzzword for the government, city officials, corporations, and the media. It is the ideology that makes the dam removals possible because it enables the three main players in this process—the community, the government, and capitalists—to come together under one green flag. While the Elwha tribe, environmentalists, scientists and other community members genuinely promote the return of the river, corporations such as Cardno Entrix, an environmental consulting and management company that has designed and constructed some riparian structures for the ecosystem restoration of the Elwha River, eagerly rally around ecological ideas without showing the same level of engagement. Nevertheless, the ideology that fuels this particular organization of capital

is powerful enough to bring about what I argue is the largest transformation in the American landscape since the arrival of big dams.

These dam removals are important then because they enable us to see how nature is being newly produced. The concept of "production of nature" is useful to analyze this change. In *Uneven Development: Nature, Capital and the Production of Space*, the radical geographer Neil Smith (1984), re-interpreting Lefebvre's concept of "production of space," claims that nature is not something given, but is "produced." We produce nature physically, through the way we construct our landscapes, in this case, tearing down what has become naturalized. At the same time, we produce nature ideologically, in this case, building up a green ideology that frames this material transformation of the landscape. As my example of the relatively recent change in perception about dams indicates, the construction of nature is a historical-geographical project in which physical and ideological aspects are continuously reformulated, yet remain dialectically entangled. We might recognize this change more readily by thinking of the windmill, an apparatus which has become a key figure in the post-dam scenario in Port Angeles.

In our lifetimes the windmill has become a ubiquitous symbol, stamped upon everything from electricity bills to copy center rooms to bottles of milk. It suggests a product that is renewable and somehow less abusive of nature than its more industrial predecessors. However, windmills have not always been seen that way, and only recently have been packed with this particular green ideology. At the end of the nineteenth century, the Scottish biographer, reformer, and documenter of industrial expansion in Britain, Samuel Smiles (1905), for example, shows how windmills could only be conceived of by a people who wanted to exploit every last inch of their natural world:

> Nearly every bit of land in Holland has been won from the sea, and it is still kept together by immense dykes and embankments. Everything is utilized by this industrious people, even the shells cast upon the seashore at Katwyk are made into lime. The *wind is not allowed to pass without paying a heavy toll of labour*. It drives the *windmills,* pumps the water from the polders, grinds flour and mustard, and is used for all the purposes for which steam is used in England (emphasis added).

Just as the Dutch reportedly utilized windmills as a way to squeeze every last drop of work out of nature, today's corporations also recognize windmills' potential for exploiting the environment. But their desire to further their penetration into nature must be disguised under a different ideological register than that of the Dutch in order to be acceptable within our society. As I have already stated, their preferred ideology is wound up in ecology. But, I would also like to suggest the power of a sister-ideology. The deep penetration of nature, which is occurring under the guise of ecology, also gets a lift from the persuasive new idea of energy.

3. "Energy Landscape": Dematerialization

Energy landscape is a term that first appears in academic literature in the 1990s to describe the relations between our culture's energy activities and the physical landscape. This term is particularly useful because it encourages us to envision the landscape energetically, and therefore keeps us from falling into patterns in which landscape becomes nearly synonymous with nature. But what I would like to query is why this term appeared when it did. Although some of the very first uses of energy landscape to my knowledge appear in the fields of biochemical and biomedical engineering in relation

to polymers, proteins, and other molecular components (e.g. see Chan and Dill 1998 or Bryngelson et al. 1995), this term began to be popularized in the field of social sciences in the late 1990s. Some of the earliest examples are found in *Wind Energy and Landscape* (Ratto and Solari 1998), *Wind Energy Landscapes: Society and Technology in the California Desert* (Pasqualetti 2001a), and *The History of Energy Landscapes* (Pasqualetti 2001b). The appearance of this concept is no mere coincidence, but signals the rise of an interest in energy, above all, renewable energy, as an organizing principle of the ways in which we envision our world.

Energy landscape appears as a useful concept, I argue, just as matter begins to lose to its privileged position in the world. Matter, of course, is always important, and I am not suggesting its disappearance. What I am pointing to is the increased dependence upon the concept of energy to elucidate new ways to power our economy. In the past, we might have discussed, even glorified, the resource, machine, or factory that brought us power, such as coal, a generator, or a steel mill. Although we have not forgotten about these materials, we depend more and more upon the concept of energy to describe our relations to the physical world. This change has been captured by two very different generations of artists. During the 1930s and 40s, for example, it was not uncommon for painters such as Charles Sheeler to idealize engines, turbines, raw materials, factories, and electric transmission systems. But within the last 10 years, such glorification of American machinery is rare, in fact, nearly impossible. Mitch Epstein's attempts to document photographically the same sort of machinery that Sheeler represented with much fanfare has been severely restricted by the government and corporate entities, as he

documents in *American Power* (2009), suggesting not just post-9/11 paranoia, but a real need to keep America's machinery of power out of sight.

If Leo Marx (1964) argued that the machine forms a vital part of the American landscape, I am noting its disappearance. When the Elwha dam is torn down, nobody expects a machine of equal grandeur to replace it. Instead, people speak of windmills and solar panels, more often than not, emphasizing the energy over the infrastructure.[2] I argue that dam removals are important because they signal a dematerialization of matter and the concurrent valuation of energy.

We are led to believe that dam removals represent a simple shift towards a new valuation of nature, and although to a certain extend they do, I am suggesting that with this apparent green turn comes a strong embrace of ecological firms. These firms, in turn, are reshaping nature as they attempt to penetrate new markets. Through extensive interviews with the people of Port Angeles, I encountered a hunger for a new civic identity now that the dams that served as a symbolic backbone of the city's industry no longer exist. I also discovered that few from Port Angeles could say exactly what sorts of energy would replace the dams or from where it would come. However, many interviewees stated that Port Angeles was in need of new sources of energy to replace the dams. In spite of this general lack of knowledge about where energy would now come from once the dams were decommissioned, Port Angeles was not to be left out of plans for the region's growing energy needs. In fact, this small city was slated to become an

[2] One could argue that the windmill is just a new machine, and as such, its ubiquity shows that we have not shifted our attention away from machines and towards energy, as I have argued. But I would suggest that this particular machine has become such an iconic image in our time precisely because of its small size and the invisible nature of the matter with which it deals. Our schizophrenic reception of this object as desirable and an eyesore demonstrates our desires to consume more energy while keeping its source hidden.

energy hub, a vital center to a series of energy-related projects that would dramatically reshape the electricity grid in the Pacific Northwest, the United States, and Canada.

We need to step back from the immediate setting of the dams, neatly nestled in the forest of Port Angeles as they were, and take a long view of the area if we really want to know how the energy landscape is changing. When we do, we can see how important the discourse of regionalism is to the penetration of corporations into the area. Regionalism, especially bioregionalism, a concept that first appeared in the 1970s to describe a region that is shaped by its geographical contours, offers Port Angelians an identity at the same time that it provides corporations with a way to further penetrate into the nature of the region.

I propose that the recent resurgence of a regionalist identity in Port Angeles should be understood in terms of the electricity grid and suggest that those companies who are remaking the grid are both the major promoters and beneficiaries of regionalism. Furthermore, the newly expanded grid is helping to push at the limits of the Cascadian region itself, extending its borders and giving it a new form. Bioregionalism, then, may be better understood as "electric regionalism," since the corporations and governments who are restructuring the electricity grid are also reshaping the region. The most constructive vantage point from which to view the way that the energy landscape is changing in the wake of the dam removals, then, is through the electric grid.

I argue throughout this dissertation that although the Elwha dam removals were made possible by a confluence of historical events, the project itself should not be seen in isolation because it signals a shift in the way that nature is being produced in this country. The destruction of dams across the nation makes way for a whole host of new projects to

take their place, including small, private "renewable" projects. What becomes clear is that although these ventures are small in size and often scattered over the landscape, they are plentiful, if considered en masse. The proliferation of renewables is significant, especially because many are private projects, and as such they are helping to privatize the electricity grids. I show how such renewable projects spell out a change in the American landscape that diverts attention away from machines, such as the dams about which Woody Guthrie so elegantly sang, and refocuses it onto something much more ethereal: energy. Renewable energy is refashioning our national landscapes, and this dissertation hopes to uncover the changes in political, social, and capital formation that make these new vistas possible.

4. Chapter Summaries

Chapter I, "A River Reborn?: Fish, Loaves, and the Promise of Plenty in the Elwha River," analyzes the final budget of the restoration of the Elwha River, demonstrating that whereas the federal government promotes the Elwha dam removal project as an ecological restoration, the largest percentage of the $325-million budget is being invested in engineering operations rather than restoration works. I show an extraordinary lack of investment in the most fragile riparian sections, especially the restoration of the two reservoirs, which are vital for the future recovery. Moreover, although the government has predicted the swift restoration of the salmon, this is unlikely.[3] Finally, the government has promoted this project as a way to grow the local

[3] A swift recuperation of salmon is unlikely for a variety of reasons including: insufficient investment in the restoration of the reservoirs, the overfishing of salmon in the Pacific Ocean, the general increase of water temperatures due to global warming, and the excessive focus on hatchery practices rather than that of wild/native populations.

economy through the creation of jobs; however, I argue that most of these jobs are just temporary.

Chapter II, "A River Reborn: Behind the Restoration of the Elwha Watershed," explores the ideology of restoration. I argue that this idea helps the government demonstrate its capacity to implement such a colossal task, thereby suggesting that we are capable of fixing our past technological errors by inventing new technologies that are even more potent than earlier ones, if only for their abilities to repair the past. Of course, a much more impossible sort of reparation is intimated here as well, as the government proposes to recover the lost land, livelihood, and culture of the Lower Klallam Elwha Tribe, whose sacred grounds were flooded when the dam was built. A crucial tactic of the government is to promote this restoration as a collective effort; however, this chapter demonstrates that the dominant power is still the federal government. Finally, the government has strategically framed this restoration, misrepresenting the temporal dimension, by emphasizing the short-term works, that is, those engineering operations controlled by private contractors, as the main means by which to recover the river in order to justify the largest percentage of the budget being concentrated on these operations.

Chapter III, "Envisioning Cascadia: Electric Dreams of a Transnational Region," shows how the electric system in the Pacific Northwest is expanding across the border, not only integrating the territory between Canada and United States, but also incorporating new territories such as Alberta or Alaska. Focusing the investigation on Sea Breeze Power Corporation's Juan de Fuca Transmission Cable, a line that will connect Victoria, Canada to Port Angeles, USA, I argue that this new expansion of the

electric grid is peculiar because it will be implemented largely through private channels. These private companies promote their power transmission projects as instruments capable of consolidating, stabilizing and expanding the region, while they hide their main objective, which is the commercialization and expansion of business across the border.

Chapter IV, "Exporting Green Energy: Canada's Challenge to the Cascadian Ideal," explores one of the main discourses that frame these new private electric transmission projects in the Pacific Northwest: bioregionalism. Under this ideology that paints Cascadia as region bounded by ecological commitments, Sea Breeze, for instance, hails its transmission project as one that is getting green energy from fields of compatible windmills. I demonstrate, however, that a large percentage of power will come from Canada's small run-of-river hydro and other hydroelectric developments, a phenomenon which Sea Breeze has kept well hidden, especially since they do not want anyone to know that these new hydro projects are not considered under the law renewable energies in the states of Washington and California by law. I claim Sea Breeze has taken advantage of the dam removal project in Port Angeles, a project that has reinvigorated Cascadian bioregionalism, offering not only a possible energy replacement, but also a source of renewable energy for the region.

Chapter V, "The Dematerialization of the Machine," argues that the Elwha dam removal project and dam removals in general represent a new trend towards the dematerialization and energization of nature, a trend that is not just limited to dam removals. I analyze three areas within the hydroelectricity and electric transmission sectors to demonstrate how the machine is being dematerialized: small run-of-river hydro projects in British Columbia and the Pacific Northwest, hydrokinetic projects

planned in United States, and the Tres Amigas Project, the first electric transmission plan that will create a national electric grid. Finally, I demonstrate how, at the same time, some hydroelectric sectors such as pumped-storage hydro exhibit the machine as a marginal artifact used to complement the expansion of renewable energy. In order to survive (and thrive), hydro corporations are representing their projects, not as grand machines that will empower the nation, but as technical necessities to facilitate the expansion of renewable energies.

* * *

> "What is that, Papa?"
> "It's a dam."
> "What's it for?"
> "It made the lake. Before they built the dam that was just a river down there. The dam used the water that ran through it to turn big fans called turbines that would generate electricity."
> "To make lights?"
> "Yes. To make lights."
> "Will the dam be there for a long time?"
> "I think so. It's made out of concrete. It will probably be there for hundreds of years. Thousands, even."
> (*The Road*, Cormac McCarthy, 2006)

In Cormac McCarthy's best-selling novel, *The Road* (2006), a man and his son roaming a post-apocalyptic America stumble upon a dam. In a novel in which animals have disappeared, social relations have been torn asunder, and the American nation has collapsed, this dam remains inexplicably untouched. It is portrayed as an eternal and invincible monument amidst the rubble of the American nation; in fact, it is the only monument left standing. It would seem that the immensely imaginative McCarthy, capable of creating entire new worlds in his celebrated novels, cannot conceive of an American landscape without its dams. McCarthy's reference to this monument is

particularly enlightening because it demonstrates just how difficult it is to "unthink" a landscape that has become naturalized. Dams have been naturalized, as David E. Nye (1998, 8) would say, "because they have been there since the beginning of an individual's historical consciousness." In many communities, such as in Port Angeles, nobody alive predates the pre-dam period. If dams have generated the physical and metaphorical "light" of the nation, the materialization of the landscape during the years in which America has become a global superpower, then their elimination connotes a deep transformation in how we construct the landscape.

The tenacity with which we hold onto our ideas about nature is demonstrated by McCarthy's vignette. This dissertation is an attempt to "unthink" an ideology of nature that has motorized local communities, regions, and nations, in short, the American economy and the way that matter and energy have been conceived of throughout the twentieth century. But I also attempt to describe what I see as a reformulation of the American landscape that involves more than just bulldozers and dynamite. My claim, that the Elwha dam removal, a project that has spanned the first decade of the 21st century, is not just an isolated phenomenon, but indicates larger processes at work in the nation, I hope will be validated in the following pages.

CHAPTER I

A River Reborn?: Fish, Loaves, and the Promise of Plenty in the Elwha River

1. Introduction

"It's [The Elwha River Restoration Plan] going to put people to work. It's also going to improve the salmon runs. I think it's a classic project" (Cornwall 2009)

"It is pissing in the ocean." (Ed Schreiner, personal interview 2009)

"Twenty years ago a young Canadian bank clerk in the city of Toronto, tired of confinement and itching for a life in the open, struck out for the Pacific Coast and pulled up finally at a sea coast town of Port Angeles, in the State of Washington" (*The Bulletin* in Thomas T. Aldwell's *Conquering the Last Frontier* (1950). Thus begins the dramatic life story of Thomas T. Aldwell, the promoter of the first dam on the Elwha River,[4] (see figure 3) the Lower Elwha Dam, built between 1910 and 1913. Like many men of his era, he migrated west in the quest of fortune, and like many books of this rags-to-riches genre, *Conquering the Last Frontier* is a hymn to the exponential transformation of space and the aggressive penetration of capitalist dynamics into an undeveloped region, in this case the Pacific Northwest. Indeed, Aldwell's meteoric rise from a man "who did not have one cent to rub against another" at the beginning of the century to the Vice-President of "the Company which is developing 25,000 horse power" (Aldwell 1950) must be understood historically in relation to capitalist development. Aldwell and his hydro-industrial project epitomize the peak of the pioneering spirit in America, which sought to conquer the wilderness in order to extract natural resources. Each page of his

[4] The Elwha River is approximately 44 miles long and starts in the glacial field located in the southeast sector of the Olympus Mount. The whole Elwha watershed occupies an area of approximately 831 km^2 (321$miles^2$) (Federal Energy Regulatory Commission (FERC) 1990).

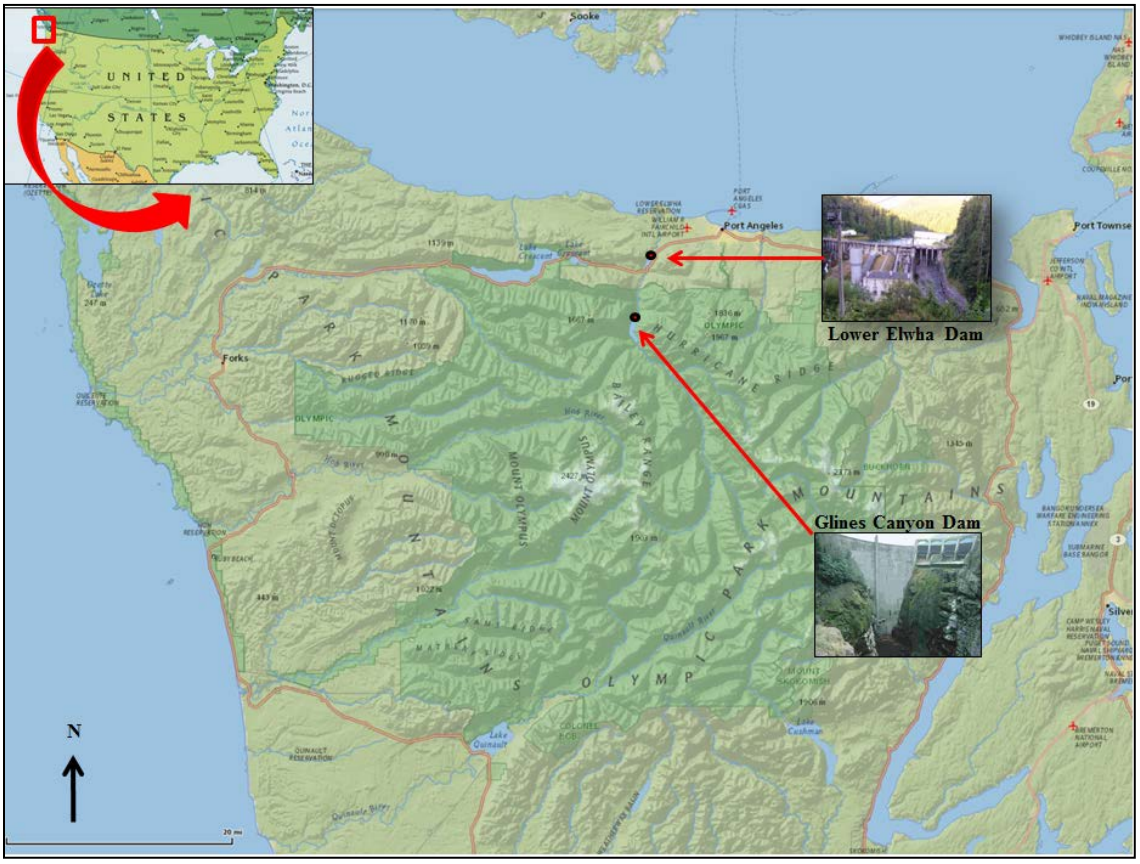

Figure 3. The Elwha River and the Olympic Peninsula (photo of the Lower Elwha Dam taken by Enrique Lanz, image of the Glines Canyon Dam courtesy of David D. Zelenka (2009), and map courtesy of U.S. Energy Information Administration (Oct 2008)

193-page tome extols individual efforts to commodify the Olympic Mountains. Aldwell's greatest monument to his own success, the Lower Elwha Dam, should be seen for what it is, a reduction of the Elwha River to cubic meters, acre-feet, kilowatts, and ultimately dollars. As such, the Elwha Dam is a project that had its moment in time.

The Elwha hydroelectric project marked the end of an era of small private projects that had characterized the early twentieth century in the United States. In just a few decades after the completion of Aldwell's energy project not only did dams become larger, but the rhythm of their construction quickened, and the transformation of the landscape accelerated demonstrating what Neil Smith (1992) has called a "jump of the

scale." The pace of dam construction was extraordinary: thirty-six big dams[5] were built in the Columbia River and its tributaries alone between 1930 and 1960 at the incredible rhythm of one big dam per year (Reisner 1986, 164–165). Between 1930 and 1960, the United States embarked on a mission to construct massive dams such as Hoover, Bonneville, and Grand Coulee that made the federal government the largest builder and manager of dams in the country and around the world. The result of this aggressive policy of federal and private forces to build dams is that almost every river in the United States has been regulated for hydroelectricity, irrigation, flood control, transportation or recreational activities.

Recent dam removal projects are beginning to change the views that have proliferated since the advent of colossal government projects such as the Hoover Dam. Among the main reasons for decommissions is the aging of dams (The Heinz Center 2002). Approximately 5,000 large dams around the world are older than 50 years[6], and in the United States the average age of dams is nearly 40 years (McCully 2001, 125). The aging of many of these hydraulic facilities has heightened awareness about security and safety considerations. According to the United States Army Corps of Engineers, of the 8,800 non-federal dams that were inspected between 1977 and 1982, approximately one third were unsafe (McCully 2001, 126). In fact, 85 percent of U.S. dams will reach the end of their operational lives by 2020 (Federal Emergency Management Agency

[5] According to the International Commission on Large Dams (ICOLD), in order for a dam to be catalogued as large it has to have a minimum height of 15 meters from its base to its crest. Dams with a height between 10 and 15 meters can be catalogued as large if: 1) the crest length is 500 meters or more; 2) the minimum reservoir capacity is 1 million of cubic meters; 3) the maximum flood discharge is at least 2,000 cubic meters per second; 4) the dam has special foundation problems and unusual design (McCully 2001, xii).

[6] The average life expectancy of a dam is approximately 50 years.

(FEMA) 1999). In addition to the aging of dams, the high cost of repairs has contributed to this wave of dam deconstructions. In most of the cases, these costs were projected to be higher than the price of removal (Doyle et al. 2003). Other considerations such as economic obsolescence, new recreational opportunities, improvement of water quality and quantity, and the restoration of the ecosystem have precipitated recent dam removals (The Heinz Center 2002).

Although many dams were demolished in the last century, the Edwards Dam in Maine, removed in 1999, was the first dam to be decommissioned by the Federal Government because of environmental issues. Other dams such as Oregon's Marmot or the Gold Ray Dams, removed in 2008 and 2010 respectively, have followed the same tendency. However, all of these dam removals have been small. The Elwha Restoration Plan, launched in the mid-2000s, is in the vanguard of this new wave of dam removals. Its magnitude and complexity make it the largest dam decommission and the second biggest environmental restoration plan to date in the United States. No other dams of this size have been removed anywhere in the world.

The Elwha Restoration Plan consists of three phases: pre-dam removal, dam removal, and the post-dam removal phases (see chapter 2 for more details). Among the works that compose the pre-dam removal phase are flood protection operations, habitat restoration works, and the construction of two water treatment plants. The second phase, which will take approximately three years, corresponds with the physical removal of the two Elwha dams, the Lower Elwha and the Glines Canyon and the total decommission of this hydroelectric system, including the removal of powerhouses and high-voltage transmission lines (see figure 3). Furthermore, this phase involves associated works such

as the excavation of two diversion tunnels to drain the water from the reservoirs, the drawdown of the Lake Aldwell and Lake Mills reservoirs, and the control of sediments stored in these bodies of water (Federal Energy Regulatory Commission (FERC) 1993). Finally, the third phase will be focused on the habitat restoration operations of the reservoirs such as revegetation with native species, seeding and planting operations, elimination and control of exotic and invasive species, and monitoring of these processes (National Park Service 1994).

The federal government, the main promoter and manager of the plan, claims that the removal of these two dams will restore the riparian ecosystem of the Elwha River, recuperating the salmon population and jumpstarting the local economy. While commercial and sports fishermen stand to gain from the reestablishment of salmon in the Elwha River, the Lower Elwha Klallam Tribe will receive the biggest boost. The construction of the dams in the early decades of the twentieth century severely disrupted the salmon-based economy of this tribe. The Federal Government has concluded that the annual benefits obtained from hydroelectric generation are lower than those that will be created from salmon exploitation. In addition to the direct revenues, various studies indicate that sectors such as recreation (kayaking, rafting, or fishing) and tourism (restaurants, hotels, and motels) will earn substantial income from this restoration. Finally, the federal government indicates that the dam removal will generate employment opportunities throughout the region. If the recuperation of the fisheries will create hundreds of jobs, the habitat restoration operations, the construction of two water treatment plants, and the dam removal works will be vital sources of employment in the area. Furthermore, the Government and the National Park Service have calculated that

the benefits from removing this hydroelectric system far surpass the costs. In other words, the National Park Service maintains that this project is necessary not only to recuperate this fluvial ecosystem, but also to reinvigorate the fragile regional economy.

With a budget of 325 million dollars, such promises may seem possible. But, as this chapter will demonstrate, the reality is a different story. Although the Elwha project has as its main objective the ecological restoration of the Elwha River in order to facilitate salmon colonization, I will show that the restoration of this watershed is a secondary priority for the federal government. The largest percent of the budget will not be spent on the ecological restoration, especially that of the Lake Aldwell and Lake Mills reservoirs, but on the construction of two water treatment plants and engineering works such as the removal of the two dams. In fact, the reservoir habitat restoration appears as a marginal component within the macro budget, and the subsequent monitoring of the restoration has also been significantly reduced. Furthermore, I will demonstrate that although the federal government predicts that the return of salmon will occur in a relatively short period of time, it seems that a full recovery of the species could take many decades. At the same time, factors such as hatchery operations, global warming, overfishing, and timber activities could retard the restoration and survival of the wild salmon. Finally, although this project has been generating jobs, I will show that most of these are temporary. The only jobs that have any permanency stem from the recuperation of the fisheries; however, healthy fisheries will depend on the full restoration of the salmon.

2. "The Return of the Salmon" and other Modern Tales of Development

The Elwha dam removal is considered by many to be an experiment that could open the gates for larger dam removals in the U.S. and around the world.[7] The plan consists of removing the Lower Elwha and the Glines Canyon dams (see figure 3) that were constructed between 1910-1913 and 1925-1927 respectively in order to restore the Elwha fluvial ecosystem and recuperate the salmon population in this watershed. Regulating the Elwha River in the Olympic Peninsula in Washington State (figure 3), these two dams were constructed by Aldwell's Olympic Power Company (Lower Elwha Dam) and Northwestern Power and Light Company (Glines Canyon Dam) (National Park Service 2012a; FERC 1991, 1-3). The Lower Elwha Dam[8] is a 32-meter-gravity dam[9] (105 feet) situated roughly 7 kilometers (4.34 miles) from the mouth of the Elwha River (figure 3). The Glines Canyon dam[10] is a 64 meter-high arch dam[11] (201 feet) located approximately 21 kilometers (13 miles) from the deltaic area. With a power generation capacity of about 28 megawatts (MW), these dams were originally built in order to supply power to timber and lumber companies such as Crown Zellerbach Corporation in the city of Port Angeles and later the United States Navy Yard of the town of Bremerton

[7] The Elwha Plan is serving as a model for other large dam removals such as the Condit, Klamath or the Snake Dams in the U.S. and abroad.

[8] The Lower Elwha dam powerhouse was installed with two 4800-horsepower Wellman Seaver Morgan-Francis type turbines that were connected to 3,000 Kilovolt-amperes (kVA) Westinghouse generators. Its total capacity is 13 megawatts (MW) (FERC 1990).

[9] A gravity dam is a sort of trapezoidal shape structure that holds the total weight of reservoir water behind it. This type of dam is built with materials such as earth, rocks, or concrete.

[10] The Glines Canyon Dam powerhouse was installed with only a Francis type turbine fabricated by Pelton Water Wheel Company (Louter 1995). The generating unit installed in this powerhouse possesses a capacity of 16 MW (FERC 1990). The Glines Canyon facility became at that time an engineering marvel because it has the largest automatic equipment controlled by remote control (*Ibid.*). In fact, the operators located in the downstream Elwha dam are capable of controlling the Glines Canyon equipment.

[11] An arch dam is an arch-like structure built with concrete and anchored in solid rock usually in narrow valleys. Unlikely gravity dams, the arch dams transfer the total weight of reservoir water to the sides that are usually attached to rocky slopes.

during World War II (Grossman 2002, 158). Indeed both dams have been crucial for providing cheap energy to first the timber companies and subsequently the Japanese-owned paper company, Daishowa (nowadays Nippon), in Port Angeles. In the past, approximately 40 percent of energy consumed by this company came from the Elwha hydroelectric system (FERC 1991, xxxvi).

However, these dams radically altered the riparian ecosystem of the Elwha River, most drastically, causing the salmon upstream of the first dam to vanish. Even though Washington State formulated a bill in 1890 requiring every dam to have fish passages, builders did not always comply (Grossman 2002, 156), and the State of Washington permitted dams to be built without fish passages not only on the Elwha River, but also on other streams throughout the state in the name of progress and electricity (Brown 1990, 94-95). The Washington State Fish Commissioner at the time, Leslie Darwin, waived this requirement for the Elwha Dam in 1915 on the condition that Thomas Aldwell construct a fish hatchery in the Elwha (National Park Service 2012b). Although the hatchery operated between 1915 and 1922, it was unsuccessful, and was closed by the state in 1922 (Winter and Crain 2008; National Park Service 2012b). The impact that the Elwha dams had on salmon was so severe that the Department of Fisheries of Washington State gave up hope for their recovery, claiming that the Elwha River was a lost cause between 1920s and 1930s[12] (Brown 1990, 94).

[12] Some efforts to preserve the salmon stock, especially Chinook salmon, were implemented in 1930 when Ernie Brannon, superintendent of Washington States Dungeness hatchery, took interest in the Elwha River (Winter and Crain 2008). Until the 1970s, the main method used to preserve the Elwha salmonid stock was to take the Elwha Chinook salmon to the Dungeness hatchery and several years later to bring them back to the Elwha River (*Ibid.*). Interestingly, Washington State has always decided to implement artificial methods for salmon production instead of generating salmon naturally through fish ways (*Ibid.*). In 1978, the Lower Elwha Klallam Tribe constructed its own hatchery (*Ibid.*). Whereas the Washington state hatchery has focused on Chinook and steelhead, the Elwha Tribe facility has concentrated on coho salmon

The dams have caused a decline in species such as salmon and trout, blocking 90 percent of the salmon habitat (Grossman 2002, 160). In the pre-dam period, salmon were able to reach more than 100 kilometers up the main stream as well as the tributaries of the Elwha watershed. In addition to blocking the salmon's transit, the dams and their associated reservoirs have contributed to a rise in summer water temperatures. The fishery biologists Robert C. Wunderlich, Brian D. Winter, and John H. Meyer (1994) have observed that when the snowpack and rainfall rates are low, the water temperatures can exceed 18^0C, causing an increase in diseases and parasites that affect fish mortality downstream from the dams. Consequently, only 3,000 fish (see table 1) spawn naturally below the Lower Elwha Dam, compared to an estimation of about 392,000 fish in the pre-dam period (National Park Service 2005, 135).

The disappearance of the wild salmon and trout runs has in turn altered the Elwha ecosystem. Salmon, an *anadromous*[13] species, passes its life in fluvial and oceanic worlds. Born in fluvial streams, the Northwest Pacific salmon travels through the oceanic currents following a cyclical movement between the Pacific Northwest and Alaska (see figure 4), returning to the same stream where it was born to spawn and then die after several years. Its death is vital for the formation and maintenance of fluvial habitats because the decomposition of its body releases nutritional components such as nitrogen (N), phosphorous (P) and carbon (C) that were incorporated during its oceanic life. Moreover, salmon are eaten by other species such as the American black bear

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(*Oncorhynchus kisutch*) and steelhead (Oncorhynchus mykiss) (FERC 1993; cited in Winter and Crane 2008). However, chum (Oncorhynchus keta) and pink (Oncorhynchus gorbuscha) salmon have not received special attention (*Ibid.*). Finally, there has not been any effort for the production of sockeye (*Oncorhynchus nerka*).

[13] A*nadromous* is a Greek expression that means "running upward" (Merrian-Webster Online Dictionary 2010). They are fish species that "born in fresh water, spends most of its life in the sea and returns to fresh water to spawn" (NOAA Fisheries Service 2011).

(*Ursus americanus*) or the bald eagle (*Haliaeetus leucocephalus).* According to Jeff Cederholm (1989; cited in Cederholm et al. 1999, 11), a fishery researcher of the Washington Department of Natural Resources, 22 different animals (mammals, birds, and fish), including the young salmon, depend on salmon carcasses for their nutrition in seven streams of the Olympic Peninsula. Cederholm (1999; see also James M. Helfield 2001) indicates that his team of researchers has even found nitrogen, phosphorus, and carbon

	Full Restoration	**Current Conditions**
	Number of Fish	**Number of Fish**
Chinook	31,360	1500 – 2000
Coho	34,570	< 500
Chum	36,000	200 – 500
Pink	274,286	0 – 50
Steelhead	10,100	< 500
Sockeye	6,500	0 (considered extinct in the Elwha River)

Table 1. New wild salmon and steelhead production under the current conditions (with dams) and full restoration conditions (number of fish/ year) (adapted from National Park Service 1995, 50)

isotopes brought by salmon in leaves and plants. The National Park Service (1996, 272) has calculated that the full restoration of the salmonid and steelhead species would incorporate 5,896 kg of nutrients (nitrogen and phosphorus) to the Elwha River ecosystem. Salmon can be visualized as a sort of 'organic conveyor belt' that transport energy between the rich waters of the Pacific Ocean and the glacial waters of the PacificNorthwest rivers in a cyclical motion. Salmon's disappearance from the Elwha River provoked therefore an ecological short-circuit in this energy flow between the Pacific Ocean and the Elwha River.

In addition to the impact created by the dams, overfishing, and habitat deterioration (e.g. logjam destruction or water deterioration), timber activities developed over decades have also contributed to the reduction of salmon. When the forest cover is removed, the soil is exposed to the dangers of landslides that can cause the destruction of spawning areas in the river. Furthermore, the excessive sedimentation created by those landslides has raised the riverbed so that the stream becomes shallower and the channel width is forced to expand. This geological-fluvial process, as Dick Goin, the foremost

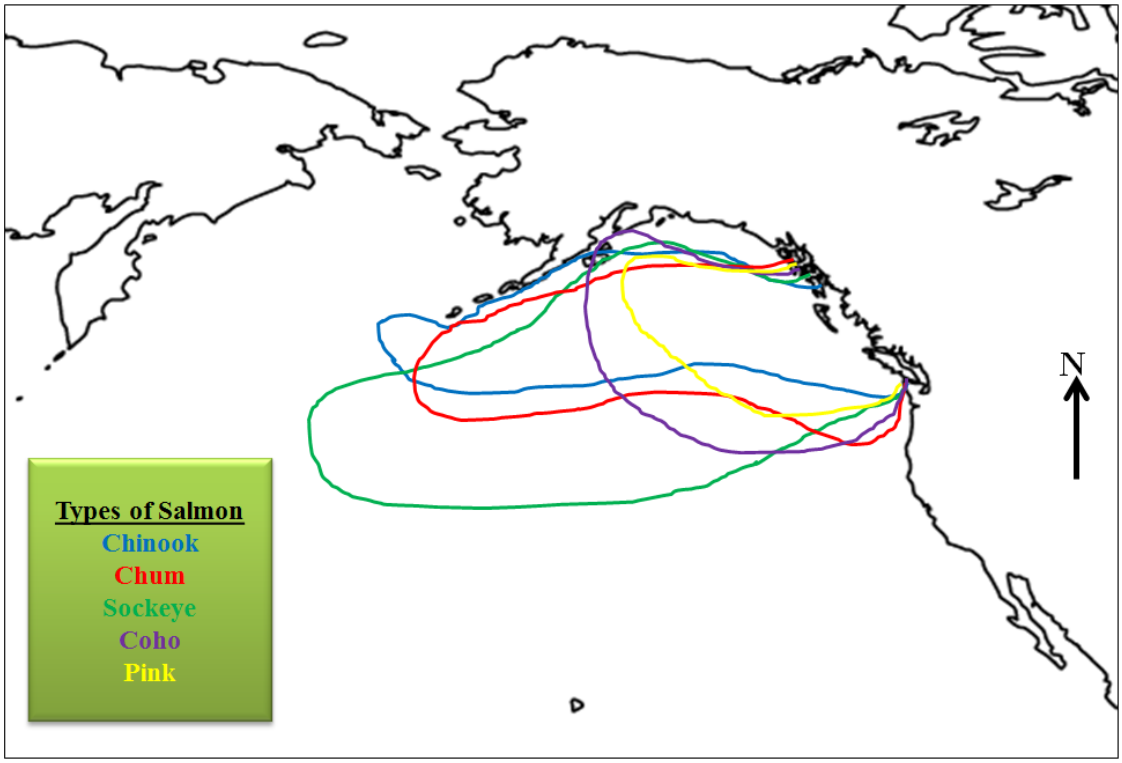

Figure 4. The Pacific salmon migration routes (adapted from Gold Seal 2012)

expert in salmon in the Olympic Peninsula, claims, provokes the disappearance of resting holes that serve as refuge micro-ecosystems for the young fish to live in (cited in Robert Lundahl's *Unconquering the Last Frontier* 2002). Goin points out that in the early

1990s, a parasite[14] attacked the Elwha king salmon in the Washington state hatchery in the Elwha River, provoking losses estimated at approximately 70 percent of the population.

The Lower Elwha Klallam Tribe was the community hardest hit by the disappearance of the salmon. But beginning in the early 1970s their luck began to change as the general population became more attuned to the needs of its rivers as a result of the efforts of various activists, environmentalists, and writers. Throughout the late 1960s and 70s Crown Zellerbach Company, owners of both dams, faced off with various groups, including the Klallam tribe. But the company was first introduced to this new ecological climate in 1968, when they tried to license the Lower Elwha Dam and relicense the Glines Canyon Dam (American Rivers 2012b). According to the statutes of the FERC, the construction and operation of a dam requires a license, and dam owners must re-apply for a new license every 30 or 50 years (The Heinz Center 2002, 61)[15]. Crown Zellerbach's troubles began when the Lower Elwha Klallam Tribe began to pressure the FERC to refuse the company a license (American Rivers 2012b).

Rick Rutz, an activist in the Mountaineers organization, added additional pressure when he demonstrated that according to the Federal Power Act of 1921 it was illegal to have hydroelectric dams inside a national park (American Rivers 2012b). Rutz targeted the Glines Canyon Dam because it was situated within the Olympic National Park

[14] This parasite settles in the salmon gills in a type of dormant stage without causing any damage to the fish. However, in certain conditions, this parasite can become active and generate a type of mucus that affects the gas exchange of the adult salmon, ultimately provoking the suffocation of the animal. Interestingly, this parasite is often more abundant in dammed rivers (Goin; cited in Lundahl (2002).

[15] The Lower Elwha Dam did not have a license because of it was constructed before the creation of the Federal Energy Regulatory Commission (FERC) and the Federal Power Act of 1920 (National Park Service 2012c). The Glines Canyon Dam had to be relicensed because its original license reached its expiration date (50 years) in the 1970s.

boundaries, although this had not been the case when it was constructed, as the Park had not yet been created. Shortly after the park was established in 1938, it expanded its boundaries and in so doing incorporated the dam (National Park Service 2012c). Rutz argued that the relicense of the Glines Canyon Dam should be considered not as a relicense procedure, but as a new license (American Rivers 2012b) and pointed out that the Lower Elwha Dam should not be licensed (American Rivers 2012b). Ignoring Rutz, FERC decided that both dams were interconnected and therefore an application for an updated license for the whole project should be granted in 1979 (National Park Service 2012c). Incredibly, the Department of the Interior denied the jurisdictional authority of FERC to license the Glines Canyon Dam in 1986 (National Park Service 2012c). Furthermore, the federal government passed the Electric Consumers Protection Act that year (U.S. General Accounting Office (GAO) 1992), according to which any corporation or group that wants to obtain a license for its hydroelectric project must assess the environmental impacts of its project in relation to the benefits (Grossman 2002, 161). This act imposed restrictions on Crown Zellerbach's project and even obligated the company to take measures to reduce destructive ecological impacts, through such means as the construction of fish passages.

Taking advantage of the internal conflict between federal agencies and the federal government's turn towards environmental considerations in the licensing processes, groups such as Seattle Audubon Society, Friends of the Earth, Sierra Club, Lower Elwha Klallam Tribe and the National Marine Fisheries Service increased their pressure on the government when they filed a motion demanding the immediate removal of the dams and the restoration of the Elwha River (National Park Service 2012c). In fact, the federal

government granted these groups intervener status in this ecological process in November 1986 (National Park Service 2012c). Furthermore, the publication of Bruce Brown's *Clouds in the Mountains: A Search for the Wild Salmon* in 1990 added even more pressure to the government, as it brought the Elwha tragedy to the attention of the nation.

In 1992, after decades of conflict, the Elwha River Ecosystem and Fisheries Restoration Act was passed by the U.S. Congress and signed into law by President George H. W. Bush[16]. This act demanded "the full restoration of the Elwha River ecosystem and native anadromous fisheries" (Olympic Park Institute 2009). According to this document, the removal of both dams was a *sine qua non* condition for the total restoration of the Elwha River. The Federal Government purchased the dams from James River Corporation[17] in 2000, paying $29.5 million, in order to facilitate their removal (American Rivers 2012b). Although the original dam removal date was scheduled for 2012, it was subsequently rescheduled to September 2011 due to receipt of stimulus package funding of $54 million from the Obama administration. According to the National Park Service, this money will pay for several works such as flood protection for the property close to the river and a new fish hatchery for the tribe (Cornwall 2009).

The National Park Service calculates that the removal of the dams could greatly increase the salmon population (see table 1) and resuscitate the local economy by generating total annual net business benefits of roughly $3.46 million (see table 2). But if the dams are not removed (see table 2), the net revenues will reach only $0.84 million. Moreover, the potential benefits to the fisheries created by the dam removal are also

[16] Public Law 102-495 (National Park Service 2012c).
[17] In 1987 James River Corporation (now called Fort James Corporation) purchased the assets of Crown Zellerbach, including the Elwha and Glines Canyon Dams and the Port Angeles pulp and paper mill. The mill was later sold to Daishowa America Co., Ltd. Until February 2000, Fort James Corporation owned the two dams and Daishowa operated them to obtain power from their hydroelectric facilities.

estimated to be higher than the current benefits accrued from power generation, approximately $1.5 million annually (Winter, personal interview 2009).

One of the principal beneficiaries of the fishery restoration would be the Lower Elwha Klallam tribe[18] (see table 2). Under current law, the Elwha tribe, like other Native American groups in the Olympic Peninsula and Puget Sound region, are in a privileged position to exploit salmon on their own lands. In the 1970s, the battle among sport and commercial fishermen and Native American groups over salmon in Washington State intensified, but dissipated somewhat in 1974 when the U.S. District Judge George Boldt recognized treaties signed between Washington's Native American tribes and the U.S. Government in the mid-1850s[19] (Washington State. House of Representatives Office of Program Research 1988, 3; Northwest Indian Fisheries Commission 2004). Boldt, supporting the treaty, decided that Native Americans had the right to take 50 percent of the total fish catch in their territories (Washington State. House of Representatives Office of Program Research 1988, 7). Local sport and commercial fishermen would also gain by a larger catch (see table 2 and 3). In its *Final Supplement to the Final Environmental Impact Statement*, the National Park Service (2005, 205) evaluated the

[18] The Lower Elwha Klallam Tribe could become the main group that controls the Lake Aldwell reservoir area after the dam removal. The Olympic National Park will manage the restoration of the Lake Mills reservoir area.

[19] This agreement was established on the 26th of January, 1855 at Hahdskus, or Point No Point, Suquamiah Head, in the Territory of Washington. The principal participants in this agreement were Isaac I. Stevens, governor and superintendent of Indian affairs in the territory of what is now Washington State and several chiefs, headmen and delegates of diverse villages of the S'Klallams: Kah-tai, Squah-quaihtl, Tch-queen, Ste-tehtlum, Tsohkw, Yennis, Elh-wa, Pishtst, Hunnint, Klat-la-wash, and Oke-ho, and also of the Sko-ko-mish, To-an-hooch, and Chem-a-kum. Non-Tribal Signers: M. T. Simmons, C. H. Mason, Secretary, Washington Territory, Benj. F. Shaw, Interpreter, John H. Scranton, Josiah P. Keller, C. M. Hitchcock, M.D., A. B. Gove, H. A. Goldsborough, B. J. Madison, F. A. Rowe, Jas. M. Hunt, George Gibbs, Secretary John J. Reilly, Robt. Davis, S. S. Ford, Jr., H. D. Cock, Orrington Cushman, J. Conklin. This treaty was ratified on the 8 of March and proclaimed the 29 of April, 1859. Among the fourteen articles agreed in this meeting, article 4 was fundamental. It says: "The right of taking at usual and accustomed grounds and stations is further secured to said Indians, in common with all citizens of the United States" (*The Free Online Encyclopedia of Washington State History* n.d.).

Species	Fisheries Type	No Action ($ millions)	Dam Removal ($ millions)
Chinook	Commercial Non-Tribe	0.09	0.25
	Commercial Tribe	0.38	1.06
	Sport Business	0.09	0.24
Coho	Commercial Non-Tribe	0.05	0.16
	Commercial Tribal	0.11	0.38
	Sport Business	0.05	0.16
Pink	Commercial Non-Tribe	-	0.29
	Commercial Tribe	-	0.32
	Sport Business		0.07
Chum	Commercial Non-Tribal		0.13
	Commercial		0.15
Sockeye	Commercial Non-Tribe	-	0.03
	Commercial Tribe	-	0.04
Steelhead	Commercial Tribal	0.05	0.13
	Sport Business	0.02	0.05
Total Annual Benefits		**0.84**	**3.46**

Table 2. Estimated annual net business from the Elwha fish restoration – after completion of fisheries rebuilding (adapted from National Park Service 1995, 98)

profits that would be generated in a 100-year period after the dam removal and calculated (in 2001 dollars) that commercial and sport fishing business combined could generate approximately $47 million (see table 4). In addition to these direct revenues in fisheries, the arrival of commercial and sport fishermen as well as recreational tourists would create a higher demand for hotels, R.V. parks, campsites, recreational businesses, restaurants, and supermarkets (see table 3). Salmon could be an especially big draw, and events such as the Salmon Derby, a fishing competition celebrated in Port Angeles a few decades ago, could be revived. During this festival thousands of fishermen came from

Washington and neighboring states to the town to compete for prizes as large as $10,000 in the 1970s (*Port Angeles Evening News* June 4th, 1970).

Several hotels are already seeing a rise in revenues from the arrival of workers, operators, and engineers participating in the Elwha project. An R.V. Park owner confessed that when she bought her campsite several years ago, her objective was not only to benefit from tourism, but also from those whom she believed would come to work on the dam removal. In fact, a few workers who are currently employed in the water treatment plants in the Elwha River stay in her R.V. Park. The National Park Service (2005, 205) has estimated the number of annual trips to the area by tourists after the restoration of the river could be half a million. Moreover, the increase of recreational and tourist activities could generate additional business expenditures of $57.1 million per year and business profits of $11.4 million annually (National Park Service 2005, 205). The total amount generated in recreation and tourism for the 100-year period after the dams are removed is estimated to be $317,600,000 (see table 3).

Category	Benefits of Dam Removal ($)
Commercial fishing	36,700,000
Sport fishing business	10,300,000
Ediz Hook	1,000,000
Recreation/Tourism	317,600,000
Total	**355,300,000**

Table 3. The 100-year period revenues (in 2001 dollars). Calculated using a 3 percent discount rate (adapted from National Park Service 2005, 205)

Another projected benefit of the dam removal is the reinforcement of Ediz Hook, a geomorphologic feature made of sediments from the Elwha River that protects the harbor of Port Angeles from storms. The construction of the dams eliminated this sedimentation leading to the erosion of Ediz Hook. In 1978 the U.S. Army Corps of Engineers reinforced this sedimentary feature with a rock structure (National Park Service 2005, 96) that cost roughly $5.6 million, with an additional annual cost for maintenance and repair of nearly $100,000 (National Park Service 2005, 96). Removing the dams would create a new supply of sedimentary materials for Ediz Hook and ultimately save $1 million dollars in maintenance over a 100-year period (National Park Service 2005, 205).

Dam Removal Plan	Costs of the Plan ($ million)
Water quality, supply, flood mitigation	69
Physical dam removal and associated works	96.5
Flood Protection and Cultural Resources	17
Total Costs	**182.5**

Table 4. Costs of the dam removal plan (2001 dollars) (adapted from National Park Service 2005)

The National Park Service (2005, 204) has calculated that the cost of removing the dams is approximately $182.5 million (projected in 1996) (see table 4), whereas the total revenues that the removals could generate in a 100-year period is $355.5 million (see table 3), making the benefits twice that of the costs in 2001 dollar values. Other studies have analyzed the nonmarket profits that this restoration could generate.[20] John

[20] Nonmarket benefits or values, the National Park Service points out (1995, 101), "are estimates of what people would be willing to pay over and above the market price of a product or service to use it."

B. Loomis (1996) from Colorado State University conducted a survey in which 300 residents of Clallam County and more than 1,300 U.S. citizens participated, and found that the annual nonmarket benefits could be as high as $3.5 billion (based upon 1994 dollars) over a 10-year period. This amount represents what US citizens would be willing to pay through an increase of federal taxes in order to fully restore the Elwha River (National Park Service 1995, 101).

The Elwha Dam Removal Plan is already creating jobs for the local community of Port Angeles and its vicinity. In table 5, one can see the number of workers that the primary private contractor Watts Construction LLC and its sub-contractors have hired to construct the water treatment plants, one of the biggest works in the first phase of this restoration project. This table shows how the largest percent of workers are either from Port Angeles or from nearby towns such as Sequim. The total number of people employed in the construction of both water treatment plants has been estimated at 149 (National Park Service 2012d). Whereas engineering and management jobs would be reserved for the principal company in charge, predominantly employing those who are not local, most of the basic jobs such as driving trucks, carpentry, or electrical work would come from the local community, but these jobs should be numerous.

The evacuation of materials produced by the excavation of the tunnel that will divert the river near the Lower Elwha dam alone will take roughly 23,000 truckloads (FERC 1993). The Elwha tribe stands to gain employment through their involvement in the restoration of the reservoir Lake Aldwell and are preparing themselves to find partners with whom to purchase trucks to prepare for the work. According to some studies, the activity associated with this dam removal process could generate between

760 and 1,067 jobs in Clallam County during the dam removal process (National Park Service 1995, 103). On the other hand, the plan could generate a sort of collateral damage in some sectors. For example, although the amount of power generated in these

Company / Cities/Towns/ Communities/States	Watts	Delhur	Blaylock	Cascade	C&J	Jensen	Olympic	Rainier	Viking
Port Angeles	35	13	1				8		
Sequim	12				7				
Gig Harbor	1								
Sekiu	1								
Allyn	1								
Poulsbo	2								
Kingston	2								
Silverdale	2								
Coulee City	1								
Eatonville		1							
Olalla									1
Bremerton	2								1
Port Orchard	6								1
Union									1
Auburn								4	
Ellensburg	1								
Tacoma	2								
Spanaway	2								
Port Ludlow	1								
Lakebay	1								
Quincy	1								
Oregon State	1	1		1		3			
Total Employed	117								

Table 5. Number of workers that each company has per city/ town/community /state in the water treatment plant construction (Winter, personal communication 2009)

two dams was minuscule compared with the whole electric grid of the Pacific Northwest region, its elimination could have small costs that cannot be easily forecasted. In fact, Brian Winter and Patrick Crane (2008) point out that this removal could cause an

increase in electricity rates (Winter and Crane 2008). And some jobs associated with the hydropower industry could be lost (Winter and Crane 2008). Because the Elwha hydroelectric plant is one of the last non-automatic hydropower systems, its operations have to be managed by operators and workers (approximately 14). Some of these workers will probably retire, but others will have to look for other employment. Nevertheless, most forecasts indicate that the restoration could be lucrative for the local community.

3. "Pissing in the Ocean": Habitat Restoration and the Elwha Budget

It was a cold day in July in Port Angeles. The sky was clear and the west wind brought fresh air from the Pacific Ocean. The road that led to the Lower Elwha Klallam Tribe Reservation seemed more crowded than usual, perhaps because of the opening of the new casino managed by the Lower Elwha Klallam Tribe. Going down the last hill before arriving to the floodplain, one could see the first houses of the reservation. The hatchery is located on the west side of this floodplain beyond the main headquarters of the tribe.

The main purpose of this visit was to talk with Mike McHenry, one of the habitat biologists working with the Lower Elwha Klallam Tribe. Several days earlier, McHenry denounced the meager funds that the Federal Government had dedicated to the habitat restoration of the Elwha River in an article titled "$2 Million to Aid Elwha Restoration" (Callis 2009a). According to the article, the National Oceanic and Atmospheric Administration (NOAA) had awarded a $2 million-grant to his hatchery to continue the restoration of the Elwha River. This fund was one of the 50 grants that NOAA had awarded in 2009 to diverse institutions and organizations involved in habitat restoration

plans around the country. Of a total of $167 million awarded by the NOAA across the country, $2 million would be given to the Elwha Tribe for the restoration of the Elwha River.

McHenry's office was covered with topographic maps, statistics and graphs that showed the evolution of salmon and the current plans for the habitat restoration of the floodplain of this watershed. While walking around one of the rectangular-shaped pools where thousands of juvenile salmon were swimming, McHenry (personal interview 2009) said that the construction of the Lower Elwha dam in 1914 and the Glines Canyon dam in 1925 was disastrous for the salmon population because of the blockage of their migrations, the enormous change in the fluvial flow and sedimentary dynamics, and the changes in temperature that it engendered. Even during the 1940s, 1950s, 1960s and 1970s, the channel of the river downstream of the first dam was modified using bulldozers in order to eliminate meanders and facilitate the extraction of gravel for construction. As stated earlier, the timber activities in the watershed have caused enormous losses for the salmon population.

Since 1999, the Elwha Tribe has been attempting to repair the damage done by the dams by building structures to protect their areas against the post-dam flood, eliminating exotic plant species, replanting native species, modifying the channelization of the river, and constructing new logjams (see chapter 2). Logjams create small pools and microhabitats that are well-protected niches where adult fish can spawn quietly in the river. Throughout most of the twentieth century, logjams were often removed or burned.

People like McHenry (personal interview 2009) have been struggling to procure funds to continue with the river restoration works since funds dedicated to these pre-dam

removal works have been insufficient. For this reason, McHenry claimed with satisfaction that this $2 million grant is vital to support such necessary works as the building of logjams and replanting of native species. However, McHenry then made a surprising claim when he insisted that the Elwha dam removal plan had not taken into account the habitat restoration of the most affected areas: Lake Aldwell and Lake Mills reservoirs. Ed Schreiner, a former botanist and biologist who had worked for the Olympic National Park Service since the 1970s, corroborated McHenry's point that the funds for the reservoir restoration were insufficient. Schreiner (personal interview 2009) was one of the lead authors of the plan to restore inundated areas of the reservoirs. According to him, the Department of Interior constantly cut his plan. Schreiner pointed out that the final budget for the restoration of the reservoirs was ridiculously small saying, "It is pissing in the ocean."

Considering that the Lake Aldwell and Mills reservoirs are the riparian areas that have experienced the largest ecological damage and therefore the fluvial sectors that require the largest investment if they are to be restored, Schreiner and McHenry's opinions are alarming. The formation of Lake Mills and Aldwell reservoirs almost a century ago meant the rapid annihilation of part of the fauna and flora and a radical geomorphological transformation of the river structure in those fluvial sections. After one century, these submerged soils have lost many of their nutritional components and their capacity to regenerate vegetation. Therefore, the restoration of these areas not only implies the edaphological regeneration of these abiotic soils and their revegetation but also the reconstruction of the river structure on those floodplains.

In addition, it is necessary to take into account that the flooded surface is relatively vast, forming a combined area of approximately 3.2 km^2 (800 acres) (Chenoweth, personal interview 2010; Chenoweth, Acker, and McHenry 2011). Joshua Chenoweth, the primary Olympic National Park agent charged with the revegetation design of the reservoirs, indicates that the ecological restoration of these flooded areas, especially the revegetation, is probably one of the most challenging and complicated processes of the whole project. Chenoweth (personal interview 2010) explains that the production of seeds could take many years. During the last few years, the National Park Service has been gathering seeds from the wild to be planted in greenhouses in Oregon and just outside of Port Angeles. According to Chenoweth, approximately 400,000 native plants (National Park Service 2012e) will be planted in the area of the reservoirs once they are drained. Since these materials will be transported from nursing areas to the reservoirs by trucks, trailers, helicopters, mules, and on foot, the logistic operation of this process will be quite complicated. In addition to the seeding, planting, transporting and installing operations, the geomorphology of the river's bed needs to be restructured.

However, as McHenry and Schreiner point out, the funds dedicated to restore the reservoirs are scarce. Although the ecosystem restoration portion of the project consumes 8 percent of the total budget, roughly $24 million in 2008, the actual amount invested in these delicate restoration operations is much smaller (see figures 5 and 6). In my interview with Chenoweth (2010), he claimed that while $15 to $20 million would be an appropriate amount of money to revegetate these areas, the amount they had available for the work was much smaller. This puny sum is also reflected in a document produced by the National Park Service and the Lower Elwha Klallam Tribe where the total

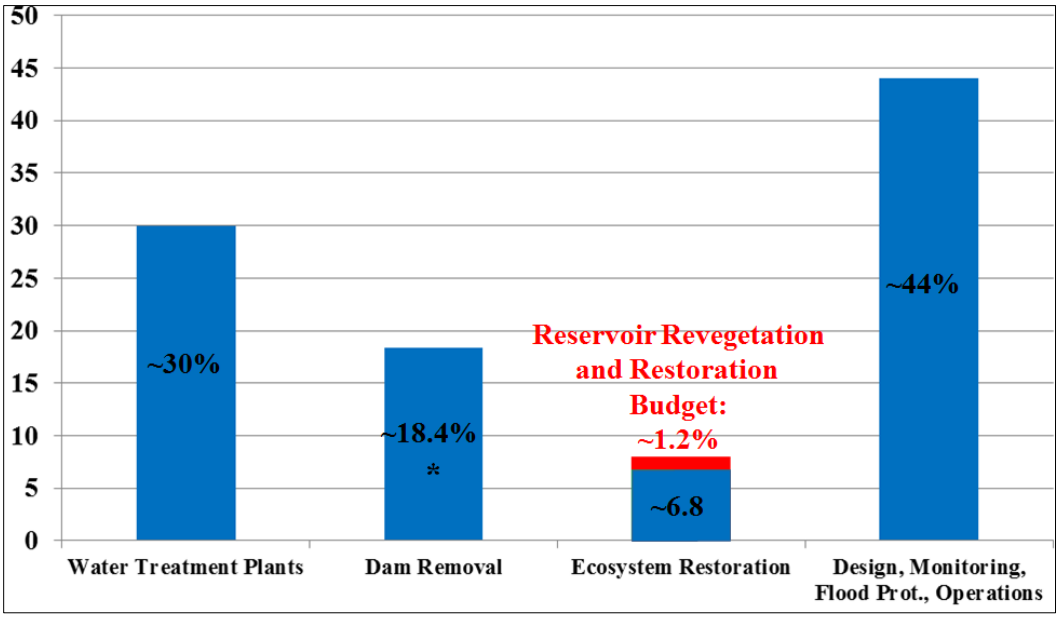

Figure 5. Approximate percentages of the operations of the $325-million Elwha budget in 2012 (Callis 2010; Chenoweth, personal interview 2010; Chenoweth, Acker, and McHenry 2011; City of Port Angeles Public Works and Utilities Department 2010; National Park Service 2008a and 2011)

Note: *The acquisition of the dams (~$29 millions) is integrated in the dam removal section.

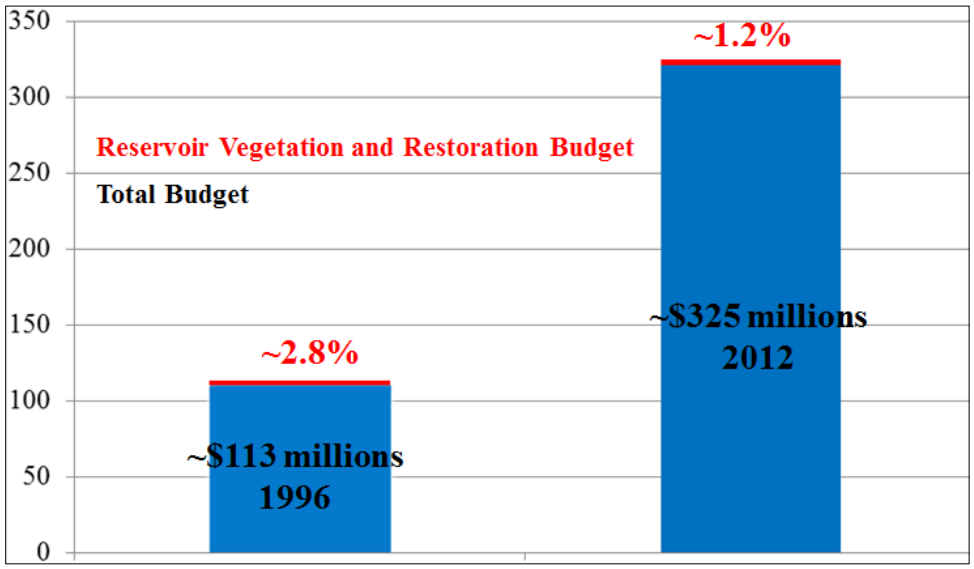

Figure 6. Comparison between the project and reservoir ecosystem restoration budgets in millions of dollars and percentage between 1996 and 2012 (Chenoweth, personal interview 2010; Chenoweth, Acker, and McHenry 2011; National Park Service 1996)

revegetation budget is of $4,104,044 (Chenoweth, Acker, and McHenry 2011), which represents approximately 1% of the total budget (see figures 5 and 6 and table 6). Restoring and revegetating with native species, eliminating invasive plants, and restructuring an area roughly the same size as Central Park (3.4 km^2), requires a bigger investment. In fact, Chenoweth hopes that other sections of the project, such as dam removal operations, will generate a surplus that could be transferred to the revegetation operation.

Year	Dam Removal*	Habitat Restoration (Revegetation)	Water Treatment Plants**	Fish Restoration	New Tribal Hatchery	Total
Early 1990s	~64.2	No data	No data	~3.7	No data	~76
1996	~84	~3.2	No data	~2.6	No data	~113
2001	No data	No data	No data	No data	No data	~135
2004	~96	No data	No data	No data	No data	~182
2009	No data	No data	No data	No data	No data	~308
2010	~60	No data	~100	No data	~18	~350
2012	~60	~ (3 - 4)	~100	No data	~18	~325

Table 6. Approximate costs (in millions of dollars) of some operations of the Elwha Restoration Project between 1990s and 2012 (Callis 2009b and 2010; Chenoweth, personal interview 2010; Chenoweth, Acker, and McHenry 2011; City of Port Angeles Public Works and Utilities Department 2010; FERC 1993; Gawley 2008; National Park Service 1996, 2005, 2008a, and 2011)

Notes:
*The acquisition of the dams (~$29 millions) is integrated in the dam removal section.
**The incorporation of these two water treatment plants had not been taken into account in the first budgets.

The low priority of the reservoir restoration is also reflected in the staffing of the seeding and planting operations. Nearly 90 percent of the workers in the greenhouse facilities near Port Angeles are volunteers (Chenoweth, personal interview 2010), and according to Chenoweth, only 50 percent of the personnel planting plants in the reservoir will be hired by the Olympic National Park, with the remainder being volunteers. It would appear that the National Park Service is relying on non-salaried personnel.

It is clear that the percentage of the budget dedicated to the ecological restoration of the reservoirs has been reduced over the last two decades (see table 6 and figure 6). Whereas the engineering operations such as dam removal, plan design, and especially the inclusion of the water treatment plants in the project have been allotted the largest percentage of the budget, the reservoir habitat restoration has become a meager component of the total budget, a fact that is reflected in the *Draft Environmental Impact Statement* published by the National Park Service in April 1996. From a final budget of approximately $113 million in 1995 dollars, $54,397,000 plus the acquisition of the dams (~$29 million), that is, around $84 million of dollars, has been reserved for the engineering operations of the physical dam removal and its associated works such as the diversion works (see table 6)[21]. The $84 million of dollars reserved for engineering processes represented roughly 74 percent of the total 1996 budget. If one compares this $84 million devoted to engineering processes to the $3,205,000 allotted for habitat restoration of the reservoirs (according to the 1996 budget), which represents just 2.8 percent of the total budget, it becomes clear that restoration is getting the shaft.

[21] Without considering the engineering design budget: ~$3.7 million of dollars (National Park Service 1996).

It is important to remember that many of these budgets are just estimates. This fact was exemplified when after many years of planning, the contractor was finally chosen by the federal government in 2010, and this contractor estimated that the dam removal operations would cost $13 million less than the $40 and $60 million that the government had originally estimated (Gottlieb 2010a). Even though the estimate for the dam removal operations have been reduced to $26.9 million (Gottlieb 2010a), there has been no plan to allocate new monies for the ecological restoration of the reservoir. Nobody knows what will be done with the money released because of this new revelation.

A critical part of any ecological restoration, according to McHenry (personal interview 2009), is the monitoring of how the condition of rivers, fish, and other riparian elements progresses. Without this information, it will be impossible to gauge the restoration of the Elwha River post-dam. Furthermore, what is learned through monitoring the progress of the habitat restoration could be applied to future dam removals. Given that the monitoring of the revegetation process is just 5 percent of the revegetation budget of $4.1 million (Chenoweth, Acker, and McHenry 2011), McHenry acknowledged that the lack of funds for long-term monitoring was one of the most frustrating aspects of this project. Most ecological restoration projects are not adequately funded during their post-restoration period (Palmer et al. 2006). Ironically, the Elwha Plan has been advertised as an experiment that will serve as a model for future dam removals, such as the Klamath or the Snake Rivers. As Norm Dicks, the U.S. Congressional Representative of this area of Washington State, put it: “It can, and it will, be a model for similar dam removal efforts” (Ollikainen 2010). However, with such a

small fraction of the budget devoted to the monitoring process, it seems that future habitat restoration projects will glean very little from the Elwha plan.

Considering that the restoration of the Elwha River ecosystem has been touted as the main objective of this project, educating the public about such an unprecedented endeavor should be a priority. The Elwha Project has been advertised as a laboratory where society can understand not only the environmental costs of stream regulation but also how a damaged current becomes alive again. As Sue McGill, the Olympic National Park Acting Superintendent, claimed: "Removal of the two Elwha River dams and restoration of the river and ecosystem present a unique and powerful opportunity for education" (National Park Service 2008b). Despite this official emphasis on educating the public, the final budget demonstrates an alarming lack of funds for education. According to Tim McNulty (personal interview 2010), the paltry sum dedicated to education represents one of the main complaints so far. Included in the original proposal of the Elwha Project was a plan to construct a visitor center where the public could learn about the Elwha ecosystem and the diverse phases of its ecological reconstruction, which would be similar to the visitor center built at Mount Saint Helens. There, the visitor can learn about the volcanic events as well as the ecological recuperation of the ecosystem after the catastrophic volcanic eruption of the 1980s. But no such center is on the agenda now. Furthermore, this lack of investment in education is further demonstrated by the role of the agent newly hired by the National Park Service to be in charge of education. This "educator" is in fact simply an intermediate agent dealing with the media (McNulty, personal interview 2010), a spokesman for the National Park Service that transmits a particular image of the project. The scant attention to education demonstrates again how

the Park Service has diverted monies once reserved for other activities--such as education or monitoring--to engineering.

The time that it will take to recuperate salmon is yet another contested part of the Elwha plan. According to the National Park Service (see table 7), it will take anywhere from 12 to 25 years to restore the six salmon species fully, and by 2039 around 400,000 salmon could reach the Elwha River each year (Callis 2011). But, if hatcheries 'outplant' their salmon stock in the Elwha River once both dams have been eliminated, the time of recuperation could be reduced substantially, adds the National Park Service (see table 7).

	Full Restoration
Salmon Specie	**Years to Recovery**
Chinook	21 – 25
Coho	15 – 18
Chum	18 – 21
Pink	16 – 20
Steelhead	15 – 18
Sockeye	12 – 20

Table 7. Estimated recovery period for the salmon species in the Elwha River (National Park Service 1995, 50)

Note: (Assuming no outplanting or hatchery production. Outplanting may reduce recovery time by as much as half).

Outplanting consists of 'artificially' reintroducing those stocks that have been maintained in the hatcheries into several sections of the river during two cycles inside a period of between 8 and 10 years after the dams are removed (National Park Service, 1994, 121). Each salmonid species will be outplanted in different sections of this stream. Thus, the

34th river mile has been designated as the limit between spring and summer/fall for the Chinook salmon[22] (*Oncorhynchus tschawytscha)* and between summer and winter for the steelhead or rainbow trout[23] (*Oncorhynchus mykiss*) ecosystems; whereas the 16th river mile will be the upper limit for the pink[24] (*Oncorhynchus gorbuscha*) and chum[25] (*Oncorhynchus keta*) salmon ecosystems (National Park Service 1994, 121). Above the 16th river mile, the outplanting will be done by helicopter, and below it will be carried out by tank trucks (National Park Service 1994).

McHenry (personal interview 2009) doubts that the recuperation will take as little as 12 to 25 years, saying, "I think it [the salmon recuperation] will work, but I think it is going to take longer than people believe." When the government gave these numbers, he reasons, it was perhaps to advertise a faster period of recuperation than was actually possible. Under pressure by the anti-dam removal movement created in the 1990s, the government was forced to predict a shorter period of recuperation. Like McHenry, Larry Ward, the Elwha tribe hatchery manager, has confidence in the eventual salmon recuperation, but he does not know how long it will take (Callis 2011). Moreover, Ed Schreiner (personal interview 2009) claims that a decent recolonization of some salmon species could take between 10 and 15 years, but for a full restoration, it could take 30, 40 or 50 years. He even speculated that the salmon restoration would not be possible under

[22] Catalogued as endangered, threatened and species of concern. The largest salmon between salmonidae family. Its name derives from native groups of Alaska and Siberia. The average weight of an adult exceeds 18 kilograms (40 pounds), but some Chinook salmon can reach up to 54 kg (120 pounds) (NOAA Fisheries Service 2009a). It is thought that this weight was not very unusual in the Elwha River before the construction of the dams.

[23] Catalogued as endangered, threatened and species of concern. Its weight can reach up to 25 kg (55 pounds). They make the transition, as the salmon, between fresh and salty water. However, unlike the Pacific salmon, they can spawn more than once (NOAA Fisheries Services 2009b).

[24] The pink salmon is between the fastest growing salmon species in the Pacific Ocean. Its weight is near 6.8 kg (15 pounds) (NOAA Fisheries Services 2009c).

[25] The chum salmon average weight is between 3.6 and 6.8 kg (8 to 15 pounds) (NOAA Fisheries Service 2009d).

the present conditions, including everything from increases of temperatures to overfishing. Furthermore, Jeffrey Duda, a U.S. Geological Survey researcher, commented at a public meeting at the Olympic National Park Visitor Center, "We likely won't see the full impact for several generations of salmon… Salmon spawn when they are about 4 years old, so when you talk in those terms it will be probably 20 years before we see the full effects" (Dickerson 2010a). He added, "realistically, it could be 100 years before we can tell exactly what is happening" (Dickerson 2010a). In other words, the regeneration of the salmon is unlikely to occur in just a few decades as the government has predicted, but rather could take more than one generation. Even so, it is unclear what type of salmon are going to come back and whether they will be capable of surviving in the new Elwha.

Although the number of Pacific salmon has doubled in the last 50 years because of hatchery policies of Pacific countries, the wild salmon is at risk in the Pacific Northwest (Barcott 2010). If overfishing, timber operations, water quality deterioration, exotic species, predators, riparian transformations, and above all dams have been the major foes of wild salmon, hatchery operations have also contributed to their deterioration. In the first place, the increase of genetically manipulated salmon is threatening the capacity of the declining number of wild runs to obtain nutrients in the North Pacific Ocean (Barcott 2010). In the second place, hatchery operations generate deterioration of the genetic variety of salmon species, which is apparent in the reduction of the size of salmon. Size matters for salmon because the smaller the salmon is, the less muscular capacity it has to reach higher sections of the river. Because the cost of feeding salmon in the hatcheries is high, these facilities often shorten the period of time that

salmon stay in the hatchery (Brown 1990, 102), causing hatchery salmon to weigh less than wild salmon. Moreover, salmon born in hatcheries do not possess the same survival capacity as those born in the wild because they lack the same variation in their DNA diversity (Barcott 2010). E. Brannon and W. Hershberger (1984; cited in Wunderlich et al. 1994) argue that although the potential to regenerate the historical 45-kg Chinook salmon is stored in the genetic remnant stock, the present hatchery practices are constraining this capacity. Don Chapman, a fishery scientist and former energy-industry consultant, corroborates this view, claiming, "hatchery fish are not part of the recovery…This is about the future. We're talking about irreplaceable genetic material in these wild stocks" (Olsen 2009, 23). Many scientists believe that the hatcheries' methods of recuperating lost stocks are unsuccessful; Goin (2000) for example, thinks that it is "unlikely that we will ever find anything to replace the lost Elwha stock, because …wild fishery stocks are not replaced." Although hatcheries can produce thousands of 'manufactured salmon' genetically speaking, some wild salmon stocks have disappeared forever. Thus, the summer Coho salmon has not been seen in the last 35 years or the spring Chinook salmon has also vanished from the Elwha waters (Goin 2000).

Although Goin (2000) points out the enormous possibility opened for the salmon with the restoration of the Elwha River, the "saddest' thing, as he says, is that "we have lost so much…Stocks lost are gone forever." Goin (2000) adds, "When we get rid of the dam, they [the spring Chinook] will not be there." The loss of the wild genetic stock of salmon is catastrophic for restoration efforts because, as Goin (2000) claims, each salmon stock represents a particular riparian system or even a specific section of a stream. That

is, each salmon stock is unique and irreplaceable, and its customary environment is thus altered as well.

In addition to the long-term period of recuperation and the genetic deterioration of wild salmon stocks, the climate plays a role in the restoration of salmon. Thus, for example, temperature increases produce stress in the population, constraining their development. Some scientists (e.g. Mote et al. 2005) argue that temperatures will continue to rise. Dwight Barry, Director of Environmental Science and Resource Management at the Peninsula College (Port Angeles, WA) and a researcher working with the Elwha Restoration Project (personal interview 2009) suggests that the only problem that he could discern for future salmon restoration is not access to the Elwha river, but global climate change. He even indicated, as have others, that perhaps the best solution for salmon restoration is to concentrate the repopulation efforts in Alaska rather than Washington or Oregon. Global warming could be so devastating that some experts have postulated that perhaps 40 percent of wild salmon and steelhead could become extinct in the next couple of years, especially fish spawning in the lower Columbia River watershed (Olsen 2009, 23). According to the results obtained from 20 climatic models managed by the Intergovernmental Panel on Climate Change (IPCC), the annual temperatures will increase 1.1^0 C (2^0 F) by 2020, 1.7^0 C (3.2^0 F) by 2040 and 2.9^0 C (5.3^0 F) by the 2080s (compared to 1970 to 1992) in this region (Littell et al. 2009, 1). Other estimations (Mote et al. 2003) show a thermal increase that can oscillate between 0.5^0 C and 2.5^0 C (central estimate 1.5^0 C) by the 2020s and between 1.5^0 C and 3.2^0 C (2.3^0 C) by the 2040s, resulting in the reduction in snow cover in the Pacific Northwest. The reduction

in snow could seriously deplete waterways and therefore wild salmon in the Pacific Northwest.

Finally, it is unclear that the Elwha project will generate jobs for the local community. Despite claims of politicians such as Norm Dicks, Washington's 6th District Congressman, who proclaimed, "It's going to put people to work…. I think it's a classic project" (Cornwall 2009), most of the jobs that the Elwha project has generated are temporary. Most project workers have been employed for a maximum 4 or 5 years, a fact demonstrated in the construction of the two water treatment plants that were finished recently. The majority of workers on that project have ended their contracts. The only work that could be long-term is in the fisheries, especially if salmon arrive in great numbers. Nevertheless, as we have seen, the full restoration of the salmon not only will not take place immediately after the dam removal, but also could be affected by other factors.

4. Conclusion

For centuries the Elwha River was well-known for its capacity to produce giant salmon. Its waters coming from the glaciers of the Olympic Mountains provided the habitat for 100-pound salmon that circulated between the North Pacific Ocean and the core of the Olympic Mountains. The construction of the Aldwell and Glines Canyon dams at the beginning of the twentieth century changed all that. In the name of progress, electricity, and industrial development, millions of salmon have been sacrificed. Nobody living has seen any salmon swimming, jumping or fighting with the powerful waters of the Elwha River above the first dam. For decades, salmon have been seen battling with the walls of the Lower Elwha dam, trying to reach the white waters of the Olympic

Mountains. Not unlike the salmon, the Lower Elwha Klallam Tribe and other inhabitants of the Port Angeles area were blocked from their way of living because of the imposition of megawatts, electrons, and profit logics on the river.

The Elwha Restoration Project offers a solution by promising to restore the salmon and the local economy and raises the hopes of injured communities. The federal government has calculated that this ecological restoration will reopen the Elwha River to hundreds of thousands of salmon each year. The recuperation of the fisheries is crucial for the economic recovery of the region, propelling commercial and sport fishing activities. Moreover recreational and tourist activities will be reactivated with the restoration of the river. Finally, the construction works of the water treatment plants, the ecosystem restoration of the reservoirs, and the dam deconstruction operations have created hundreds of jobs for the local community and environs.

Although this restoration project is held out as a way to save the environment while bolstering the local economy, a closer analysis shows that the environment may not prosper and the real beneficiaries are not the local inhabitants. Although the main objective of this federal project is the habitat restoration of the Elwha watershed, the percentage of funding dedicated to ecosystem restoration, above all the reservoir habitat restoration, remains small compared to the other operations included in the plan. Moreover, the monitoring and education that are essential components in any ecological restoration plan appear marginal. Furthermore, although the recuperation of the fisheries could be lucrative, it will not happen as quickly as the federal government claims. On the contrary, it could take decades or even a century before salmon fully colonize these waters and can be fully exploited commercially. Other factors such as climatic dynamics,

hatchery operations, overfishing, or timber activities could also influence this period of recuperation considerably. Finally, the hundreds of jobs promised to be generated by the project and heralded as a solution to the regional economy are actually temporary, with the exception of the fisheries.

Whereas this chapter has demonstrated how the final budget of the Elwha dam removal slights restoration, the following chapter will show just how important the concept of restoration is to the framing of this project. Heralding the Elwha Plan as an ecological restoration, the federal government desires to show publicly the capacity of the nation to solve damages created in the past, but also implement a type of historical reconciliation with the Native American community of this region, the Lower Elwha Klallam Tribe.

CHAPTER II

"A River Reborn": Behind the Restoration of the Elwha Watershed

"Manmade landscapes define who we are as people"
Edward Burtynsky, *Manufactured Landscapes* (Baichwal 2006)

1. Introduction

Edward Burtynsky, the Canadian photographer best known for his work showcased in Jennifer Baichwal's film *Manufactured Landscapes* (2006), describes how he came to photograph industrial and post-industrial landscapes around the world. He was driving his car through the Pennsylvanian countryside, near a town called Frackville, when he came across "the most surreal landscape I ever saw," an abandoned coalmine that left a colossal scar on the earth's surface (Burtynsky in *TED Talks* 2006). Until this point in his career, he had been searching for "pristine" natural landscapes to photograph, but seeing the shockingly naked ground in front of him caused him to have an "epiphany" (*TED Talks* 2006). He immediately understood that this barren landscape was the consequence of the aggressive extraction of coal in the late-nineteenth and early-twentieth centuries. From this point on, he made manmade landscapes into his life's work. In subsequent years, he travelled the globe photographing everything from oil fields in the United States to the Three Gorges Dam in China, from shipwrecks in Bangladesh to quarries in Italy. Burtynsky was searching for a common denominator among these landscapes to explain how this radical reformulation had happened.

In his travels to the Three Gorges Dam, he best expresses his understanding of how human beings shape their natural world. Describing a photograph of a city in the Yangtze Valley that had been dismantled brick by brick by its residents to make way for the reservoir, he explains his concept of a "manufactured landscape." The rubble that

stood where a city once flourished, Burtynsky suggests, could be discounted as a "bombed out landscape, but it isn't. What it is is a landscape that is an intentional one. This is a need for power" (*TED Talks* 2006). Perceiving the dismantled city as a "need for power" suggests two things. First, it shows how far we will go to generate new energy sources, and second, it demonstrates the complex social and political processes that are behind the physical production of a landscape. Such complexities had already been observed by thinkers such as the radical geographer Neil Smith in the 1980s, William Cronon (1983), John B. Jackson (1984), Alexander Wilson (1992), Donald Worster (1995),or Erik Swyngedouw (1999).

Smith's "production of nature" is a crucial concept for understanding how nature is produced materially and ideologically. In *Uneven Development: Nature, Capital and the Production of Space,* Smith (1984), re-interpreting Lefebvre's concept of "production of space," claims that nature is not something pristine or innocent, but is "produced"[26]. Nature is a product, a creation, or using Burtynsky's terms, a manufactured entity engendered by a particular mode of production. That is, nature is a social product. According to Smith, this creative act is based upon three processes. Nature is produced materially; for example, we reshape rivers with the construction of dams. At the same time, the production of nature involves a social construction of ideas about nature such as the understanding of the Colorado River as a wild and chaotic force. Finally, this process

[26] Smith claims that although Lefebvre has been an important scholar in the study of space, Lefebvre does not consider nature as having the same status as space. According to Smith (1998, 59), whereas Lefebvre correctly observes that space is socially constructed, he visualizes nature as dead—external and lifeless, like a corpse without initiative. Lefebvre perpetuates the prioritizing of space over nature that characterized the Newtonian-Cartesian doctrine. In fact, Lefebvre follows the Frankfurt School view of domination and destruction rather than the production of nature (Smith 1998, 61). Smith does not reject Lefebvre's conception of the "production of space"; however, he does point out (1998, 61) that the "production of space" is only a "corollary" of the "production of nature."

of producing nature is accompanied by "ideologies of nature" that may come from engineers, planners, or technocrats, or "discourses of nature" (Moeckli, Anderson and Gregory; cited in Castree 2001, 12) that are ideological mechanisms that help to articulate, advertise, or justify these material productions of nature carried out by public and private entities. Thus, for instance, the Hoover Dam was propagated as a necessity to lift the nation out of depression and defeat the Axis powers. In short, this capacity to integrate the physical and ideological construction of hydraulic nature makes Smith's "production of nature" a useful theoretical tool to study how individuals, communities, governments and corporations manufacture, represent or envision rivers.

Slogans that have characterized the Elwha project such as "A River Reborn" make it seem as if the restoration marks a brand new era in history in which nature is born again, or restored to a pristine state. Within the scientific discourse generated around the project, the Elwha restoration has been seen as a "turning point in land stewardship" and even a "giant landmark in our care for the planet earth" (Elwha River Science Symposium 2011). But we need to be aware of the way that this discourse about nature that has surrounded the project from its beginnings hides the similarities between two grand epochs of capitalist development in modern history--the construction and the deconstruction of dams. The construction of the Hoover Dam in the 1930s and the on-going planning of the deconstruction of the two Elwha dams since the 1990s are two fundamental cases in the manufacturing of the North American landscape. Both episodes represent, as Neil Smith (1992) would say, a "jump of scale" in the capacity to transform the waterscape, and each has created a radical transformation of the land without precedent. If Hoover epitomized the attempt to regulate the wild Colorado River at a

magnitude never carried out before, the Elwha Restoration Project represents a hydraulic operation that would convince North Americans of their capacities to restore powerful rivers to their original grandeur. Although they seem to have opposing physical and ideological missions, I point out similar economic interests supporting these projects, at the same time that I show how historical differences create and reflect different ideological registers.

Although the Elwha Restoration Project is often touted as a "grassroots" project made possible by a number of people such as the Lower Elwha Klallam Tribe, environmental and scientific organizations, and the local community, this chapter will demonstrate that the U.S. government, especially the National Park Service and the Bureau of Reclamation, is the principal agency in the project, and that it facilitates the entrance of private contractors, some of them with long-held connections with the federal government and military. In this capacity, the Elwha project is not unlike the Hoover Dam, a project sponsored by the federal government in alliance with the Six Company Corporation, a giant construction conglomerate that was headed by the American industrialist Henry Kaiser.

Without denying the hard work and good intentions of the many communities involved in the restoration of the Elwha River, I argue in section two that the federal government and private corporations have taken advantage of the green ideology that such well-intentioned activists have provided in order to extract profits. Embracing the cultural cache of "going green," the government and corporations wave the flag of "restoration" in order to gain access to new markets created as a result of the fashionableness of greenness. However, the concept of restoration is not appropriate

because the Elwha Project will create a new ecosystem rather than replace the historical Elwha ecosystem. Even Alexander Wilson's more flexible idea of restoration as an attempt "to reproduce, or at least mimic, natural systems" and learn from them (1992, 114) could be as inapt as the traditional concept or restoration because of the impossibility of mimicking the biocoenosis (e.g. zoocoenosis, phytocoenosis, and microbiocoenosis) and biotopes of a natural system. The federal government perpetuates this expression of restoration because it is an attractive concept in the post-industrial era of renewable energies and ecologism. Restoration is a useful concept because it convinces Americans of our capacity as a modern, technological nation to bring back the historical landscape of Elwha River that was lost during industrialization, giving hope, as did Roosevelt, in a new age. If Americans were capable of building the colossal Hoover Dam during an economic depression, the nation is still capable of such largess; moreover, it is able to fix past ecological errors. But the federal government also manages the concept of restoration as a maneuver of political mitigation to establish a historical peace with the Native American community, in this case the Lower Elwha Klallam Tribe. Restoring the Elwha does not only involve the return of an ecosystem, but also the recuperation of a cultural landscape in Vidal de la Blache or Carl Sauer's terms, that is, the reconstruction of the Lower Elwha Klallam Tribe's traditions and its connections with the historical Elwha.

In framing the Elwha project as a restoration, the government's main ideological strategy is based upon misrepresenting the temporal quality of the operations, I argue in section three. Thus, they advertise the short-term works, such as the physical dam removal, as the only requirements necessary for the restoration of the River, concealing

the actual amount of time needed for such a restoration. Although the removal of these two dams is crucial to begin the restoration of the Elwha River, the government attempts to convince the public that the demolition of the dams is the main and only mechanism for returning the river to its natural state. Emphasizing the importance of these short-term processes, the government can justify the largest percent of the budget being concentrated on the dam demolition and the construction of the water treatment plants and camouflage their rapid extraction of profits from the project. In short, the Elwha Plan is at the forefront of a new wave of ecological restoration projects in the post-industrial period and shows how ecologism is being taken advantage of by federal and private forces to transform nature's restoration into delicious plunder.

When Edward Burtynsky reflected upon the Chinese city that had been demolished by its own residents to make way for one of the world's largest dams, he was struck by how a landscape isn't naturally occurring but is "intentional," and as such could expose the "need for power." In the two final sections of this chapter, I expose the powers behind the Elwha restoration. Although the restoration has been broadly praised as a grassroots effort, I show how local communities will not be the only ones profiting from the return of the wild waters of the Elwha. Local authorities, the government and private corporations, some with ties to the military, oil, or gas industries, have much to gain by restoring the natural flow of the Elwha. Moreover, there is little difference between the corporations that tear down dams and the ones that build them up, and in some cases, they are indeed the very same entities. If the vision of a freely roaming Elwha is preferable to the pent up reservoir pictured below, then it is only because the

latest powers to emerge and extract profit from nature find this pristine vision most useful for their purposes. It is ultimately the object of this chapter to expose these powers.

2. Restoration

The Elwha project has been hailed as a model ecological restoration by nearly everybody involved. According to Robert Young, an expert in coastal shoreline restorations, "it should become the poster child of ecological restorations" (September 16, 2011). However, all of the coastal restorations that have occurred in the United States in the past four decades—including the Miami, Alabama, and Louisiana shores--should

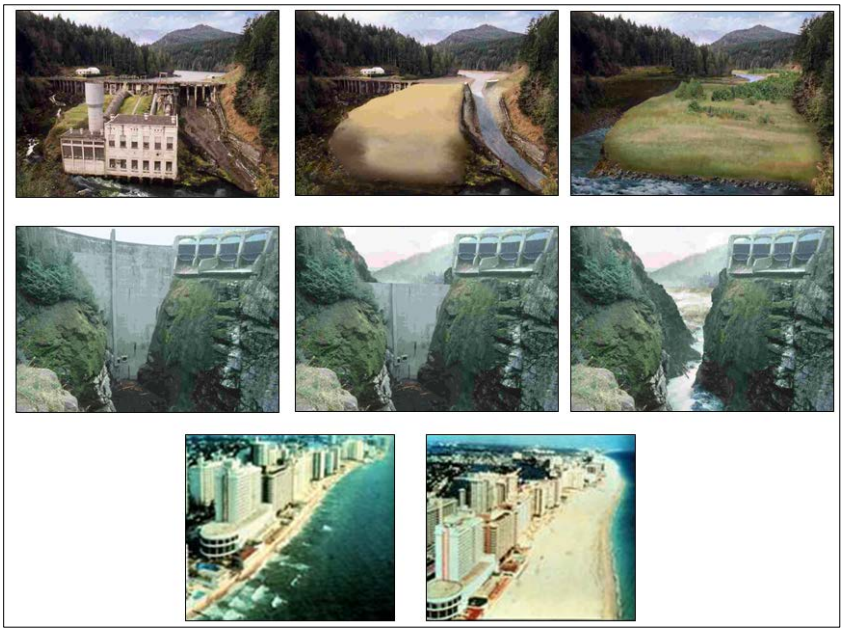

Figure 7. The Lower Elwha Dam and Glines Canyon Dam and their removal (courtesy of David D. Zelenka 2009) and Miami Beach restoration (courtesy of U.S. Geological Service (USGS) n.d.)

not be considered restorations, because they simply restructure coasts for the sake of property values and do not restore habitat; furthermore, once restored, these coasts "don't behave as ecosystems did." Young (2011) insists that instead of "ecological restorations," these projects should be called "engineered restorations" since they did not

take into account the marine and weather dynamics that characterize these neritic ecosystems[27], but were designed to protect housing, recreational, economic and speculative interests.

Federal agencies such as the U.S. Army Corps of Engineers have acted as if the reconstruction of an ecosystem can be reduced to engineering processes alone; bulldozers are their main tools, and the construction of protective structures and the replenishment of sand their accomplishments. Beaches, barrier islands, and coastal areas are not reconstructed therefore as ecosystems, but as mere technological products that can be standardized through engineering expertise and machinery, demonstrating, as Young (2011) claims, that "people try to protect the map, not the ecosystem." Thus, for example, the government merely reshaped the topological features of the Miami Beach area (figure 7), increasing its size for the sake of speculation and tourism, rather than rehabilitating the organic and non-organic processes of this coastal ecosystem.

In contrast to such engineer-driven projects, Young (2011) defends the Elwha Project as one of the only real "ecological restoration" projects to have ever happened in the United States, although he does concede that the ongoing restoration of the Everglades comes close to being a true restoration. According to Young, the Elwha Project is an "ecological restoration," for three reasons. First, it has the capacity of sustainability in the long term. Second, the Elwha Project is a resilient plan: it is has the elasticity to recuperate itself against any possible modification of the current ecological conditions of the watershed. Unlike other dammed watersheds, the Elwha has a higher ecological adaptability because most of its watershed is located inside the borders of the

[27] The neritic zone is the marine sector characterized by shallow waters and located between the coastal line and the edge of the continental platform.

Olympic National Park and has therefore experienced no urban or industrial development. As seen in figure 3, the area from the upper reservoir, Lake Mills, to the headwaters located in the glaciers of the Mount Olympus, has not been subjected to development. This geographical peculiarity means most of the river has remained relatively intact and therefore has the potential to recuperate salmon and the rest of the fluvial habitat.

Finally, Young (2011) claims any ecological restoration should integrate the native communities. The Elwha Project further qualifies as a "real restoration" since the Lower Elwha Klallam tribe and the rest of the local community is participating in this process. In other words, the Elwha Project is a paradigm of ecological restoration because the agents involved take into account the long-term elasticity and durability of the ecosystem. Thus, a multitude of operations such as the revegetation of the reservoirs and river banks with native species, the construction of new riparian structures such as logjams, or the salmon and fauna rehabilitation are works that demonstrate a much higher ecological capacity to reconstruct this fluvial scenario than those coastal engineered restoration projects. Furthermore, this project includes the neighboring communities such as the Elwha Tribe.

Although Young is right about the potential of the Elwha Project, upon closer inspection, the Elwha restoration is more like the restoration of Miami Beach than first meets the eye. The two most striking ways in which the Elwha resembles the Miami restoration are in the lack of financial commitment to the long-term processes of the restoration, exhibited most clearly by the budget, and the refusal of the government to take into account the natural flows and overflows of the river. The final budget, as I have

shown in chapter one, is concentrated on engineering operations, especially in the construction of the two water treatment plants and the dam removals that are controlled by private contractors such as Watts or Barnard, while crucial ecological works such as the restoration of the two reservoirs, the monitoring process, or the salmon restoration represent only a small component of the final budget. Even though the Elwha Project has been hailed as the paradigm of ecological restorations, its budget suggests that the priorities of the government are at odds with those of the local community as it does not provide amply for long-term restoration. While many in the community believe in the necessity of the sort of restoration outlined by Young, the Government has taken advantage of such a discourse to forge relations with private corporations and profit off of nature, just as they had done with the building of the Hoover Dam.

According to Young, a restoration is "not a restoration if it ignores what nature wants" (2011). Miami, then, cannot be called a restoration because it does not allow the beach to behave as a beach would, expanding, contracting or disappearing with the currents over time. The Elwha project could be similarly faulted, as it does not permit the river to follow its historical flood patterns. The government settled the Lower Elwha Klallam Tribe in the floodplain in 1935-36, when they first acquired this land at the mouth of the River, and in1968 the area became officially designated as a reservation (Lower Elwha Klallam Tribe n.d.). They then built a levee to protect the reservation, houses, and other private properties that were in the floodplain. When millions of sediments are released after the dams are removed, the riverbed is going to rise between six inches and 2.5 feet near the river mouth, causing floods downstream. Some areas of the reservation as well as other real-estate also located in the floodplain, such as the

Elwha Tribe's former hatchery, will not be protected. For this reason, as a part of the restoration works, the Corp of Engineers has built protective barriers to either expand the levees or reinforce them, and the levee will be raised 3.3 feet, reinforced, and extended 1,650 feet to the south and 450 feet to the north (National Park Service 2013; see also *Final Supplemental Environmental Impact Statement (SEIS) on Elwha Ecosystem Restoration Implementation* (National Park Service 2005, 26)). Following Young's logic, a true restoration would relocate settlements to allow water bodies to behave in natural ways. But in the case of the Elwha, nobody is being resettled to make way for the River.

Earlier federal dam projects such as the Hoover or the Grand Coulee, presented the federal government with the relatively easy task of publicizing the robust engineering operations in the name of conquering an unruly river, and recreating the natural landscape. The penetration of powerful private contractors with their monopoly over the engineering operations was justified as a way to propel the American economy, create jobs, and defeat the Axis enemies. Even the dangerous conditions of the workers who toiled away in the extreme temperatures of the Southwest desert were accepted in the name of economic struggle. There were no doubts about the correct path to follow: hard work, sacrifice, even the casualties of workers were justified in the name of the nation during the building of the Hoover Dam.

With the Elwha Project, this tactic of hydro-nationalism would not work. The government had to discover new ideological resources to legitimize its domination of technical operations and the participation of private corporations. Restoring a river that has been dammed for over a century is a solid ideology in this new era of green

economies and renewable energies. Although dams have been vital artifacts in the construction of communities and the development of United States, many of them have become obsolete artifacts for many communities around the country, and local communities, as in Port Angeles, demand their immediate removal not only to propel employment, but also to return landscapes that were lost to what is now considered by so many to be an antiquated mode of hydropower. Since the destruction of the Edwards Dam in 1999, the removal of dams, especially those that are obsolete, are represented as new necessities to return life to our rivers.

Restoration has become especially useful as an ideology in two ways. First, it convinces us that we are able to reconstruct something on a scale never tried before, and in so doing remedy grave ecological errors made in the past, perhaps even suggesting that we can reverse some of the irreversible harm that we have done to the environment, such as global warming. Second, it promises to restore a cultural landscape by reconstructing links to Native American communities, assuaging national guilt about the U.S.'s genocidal history. Not surprisingly, it is the salmon that acts as the link between these two desires, as the salmon uniquely stands in for both nature and the Elwha Klallam Tribe, since the salmon is the Tribe's totem. It is through such local heroes as Dick Goin, that the linkage between the salmon and the Tribe can be seen. Goin (2011) emigrated with his family to Washington State from Iowa during the Dust Bowl in 1937, and he tells stories about living off of the fish that his family caught in the Elwha. It is through his dependence on the Elwha for survival, that he first forged relations with Tribe members who fished alongside him. Reminiscing about regularly catching 70 pound King salmon and often spotting 100 pound King jumping in the Elwha, Goin (2011)

fondly claims, “these were giants.” With this anthropomorphization of the salmon, Goin reminds us of a moment before the dams, when nature and man could be embodied in one mythic figure of the giant.

There is no doubt that in the past twenty-five years the decline of American power has been represented increasingly in novels and films, from movies, such as Denys Arcand’s *Le déclin de l'empire américain* (*The Decline and Fall of the American Empire)* (1986) that theorizes the end of American hegemony, to novels, such as Cormac McCarthy’s *The Road* (2006) that depicts a grim reality of the social chaos that would accompany America’s fall. At the same time, ecological disasters, exacerbated by man, have swept the country leaving death and destruction in their wake from New Orleans to Vermont. And financial debacles from the Savings and Loan Crisis of the 1980s and 1990s to the near collapse of the financial sector in 2008 suggest a political and financial corruption only equaled in American history by the infamous robber barons of the 1930s. Within this context, the Elwha restoration and other projects such as the Everglades promise a new era of ecological and political hope, as Joshua Chenoweth, the main botanist for the revegetation of the reservoirs (personal interview, 2010) indicates when he ponders the usefulness of the term “restoration”: “it provides hope in this era of global warming and financial meltdowns. It is nice to have something that you can be proud of.” Although he prefers the word “rehabilitation,” he admits that it doesn’t have quite the same appeal, a point that McNulty picks up on when he speculates on the reason that “restoration” resonates so widely: “bringing back the pre-dam landscape is very sexy to the public . . . It is popular . . . Everybody likes that idea” (McNulty, personal interview 2010).

If the government is peddling hope in their own technical capabilities to usher in a new green future, they also are trading on their ability to make amends with the people they most harmed by their push to develop, the Native Americans. When the dam was built, the most holy site of the Lower Elwha Klallam Tribe was inundated. On this site, the tribe performed their cleansing ceremonies for centuries. With the removal of the dams, this site would return, and with it a culture lost to the sort of development projects that the dams represented. Linked to the cultural revival of the Lower Elwha Klallam Tribe, is the return of the salmon, as Karen Gustin, the Olympic National Park Superintendent emphasizes, "This project is of course significant for environmental reasons, no doubt about that, but just as significant for cultural reasons. The restoration of this river and the importance of salmon to the tribe's culture cannot be overstated" (Ollikainen 2010). Salmon restoration does not only imply the recuperation of an incredible fish population, but also the return of the mythical 100-pound Chinook salmon that became a main totem for the Tribe. Reconstructing this fluvialscape implies a type of healing mechanism that would repair old injuries. The discourse of restoration represents an environmental-scientific operation, but above all a political maneuver to demonstrate the reestablishment of a balance with nature and the Elwha Tribe.

If we return to the before and after pictures of the Elwha valley that head up this section, we see that the computer simulation of the landscape enables a magical view, in which vegetation that would take years to grow appears instantaneously. What's hidden by this picture, as in the discourse surrounding the restoration in general, is the exposition of the long period of time that it will actually take to restore the Elwha valley. Next I consider how downplaying such long-term processes is one of the major strategies that

the government uses to justify a model of ecological restoration that emphasizes engineering operations rather than reconstructing an ecosystem.

3. "If the Dams are Removed, the Salmon will Come": Temporal Strategies of the Elwha Dam Removal

In a *New York Times* article (27 December 1964) titled "What Goes Up Must Come Down," Sam Blum indicates that when wreckers have demolished a building, creating an empty space in the urban landscape, automatically "the enemy will have arrived – the construction worker." The author is noting what would be observed by academics such as Marshall Berman (1982), Neil Smith (1984) or David Harvey (1989) in following decades, and had already been observed by Marx a century earlier, that construction – demolition –construction is integral to capitalism, and that capitalists continually speed up these processes in order to maximize profits. Under the present mode of production, space is altered constantly and practically instantaneously, a phenomenon that Daniel Bell (1976), and later David Harvey (1989, 286-287), has called "time-space compression." During the construction of the Hoover Dam, the largest concrete structure ever made at the time, the landscape changed rapidly. In a period of just five years (1931-1936), workers transformed the Colorado fluvioscape, moving millions of tons of rocks and gravel, altering the hydrological and sedimentary flows, and putting together concrete and steel on an unprecedented scale. But even the construction of the gigantic dams such as Hoover, Grand Coulee or Bonneville during the 1930s took a couple years relatively speaking.

This frenetic rhythm of dam construction has continued until the present. Thus, the second largest dam project in the world, the Itaipú hydroelectric project located

between Paraguay and Brazil, generates roughly double the electricity (approximately 14,000 MW) of the biggest hydroelectric facility in the United States, the Grand Coulee Dam (approximately 7000 MW). In just 16 years, between 1975 and 1991, the Brazilian and Uruguay military governments together with the corporate consortium formed by IECO Company from San Francisco, United States, and ELC Electroconsult S.P.A. from Milan, Italy, (Electroconsult del Paraguay S.A. 2009) were able to regulate the seventh largest river in the world, the Parana. They constructed a 65-story dam with enough iron and steel to build 380 Eiffel Towers, or 15 times the concrete volume used in the Channel Tunnel that connects France and England (Cleveland et al. 2008).

The new macro-ecological projects of the 1990s, however, pose a challenge to the way that we think about time-space compression, especially time compression. Projects such as the Everglades restoration, the decommissioning of nuclear plants, or the new phenomena of medium and big dam removals cannot be articulated in short-term pulses. A total restoration of a dammed river or decommissioning of a nuclear plant can take decades or even centuries. The full restoration of the area where the Calder Hall nuclear plant in England is located will take 100 years (Brown 2003). Thus, the logic of capitalism with its continual need to compress time is now challenged by another sort of logic—one which demands time expansion. Such a phenomenon was already observed in a different economic milieu by Cindi Katz (2004, 226) when she analyzed the adaptation of local communities to the global market in some villages of the Sudanese savanna in the 1990s.

Federal and private corporations are clamoring to participate in new macro-restoration projects because they recognize that money is to be made. The largest macro-

ecological project to date, the Everglades Restoration Plan, has a budget of roughly 10 billion dollars (in Oct. 2007 dollars) (U.S. Army Corps of Engineers (USACE) and South Florida Water Management District (SFWMD) 2012). If projects like the Everglades restoration pose a challenge to myopic short-term strategies that have the familiar Keynesian ethos of "in the long term we all are dead" (quoted in Harvey 1989), then they also trouble political structures, which are articulated in the short term. Moreover, short-term political thinking affects long-term restoration projects. The adjudication of the construction of the water treatment plants or the demolition of the two dams in the Elwha Plan is connected to the election period in the U.S. Congress and the Senate that have a frequency of two and six years respectively. Demonstrating the way in which politics plays a role in projects like Elwha, is the example of Norm Dicks, who is the principal political figure involved in the Elwha Restoration Project. Being the former U.S. Representative for Washington's 6th congressional district from 1976 to 2010 as well as a member of the U.S. Committee on Appropriations, Dicks has combined a strong support of Boeing Corporation and defense contractors such as Bechtel or Lockheed Martin with environmental projects. Although we can only speculate about how such political maneuverings with these private contractors can affect the Elwha Project, we do know that URS and HDR corporations, two of the companies that have participated in the construction and design of the water treatment plants for the project, became among Dick's top-100 campaign donors during the construction period (2008-2010) of these facilities.[28]

[28] URS and HDR were not within the top 100 donors of Dick's campaign until they began their participation in the two water treatment plants of the Elwha project. URS became the 44th biggest donor in 2008 and HDR became the 5th largest donor in 2010 (The Center for Responsive Politics n.d.).

Contracts to build new assembly plants such as Boeing's cannot wait for 30 years: they must be made now. Similarly, lobbyists and politicians cannot be flexibly attached to a 50-year ecological restoration process; rather they pressure Congress to implement projects and show results as soon as possible. Federal and overall private entities know that their agendas cannot be integrated into a long-term process, but they also know that restoring the Elwha will take a long time. How, then, do they strategize to extract short-term revenues and control the largest percent of the Elwha budget? How are the government and corporations hiding their short-term strategies?

If we imagine that the time scale articulating this river restoration is represented through a cylinder, the bottom of the cylinder would correspond with the time that the pre-dam removal works such as the water treatment plants, certain habitat restoration operations, and the demolition of the dams are implemented. The rest of the cylinder would represent the post-dam period that includes all of these fluvial-geomorphologic and biological processes that slowly reform the new undammed habitat of the Elwha River. Almost the whole part of the cylindrical volume would show the arrival of the salmon and other fish species, the reconfiguration of the reservoirs, the revegetation of certain riparian sectors, the new sedimentary dynamics, and the colonization of flora and vertebrate and invertebrate species. In short, these processes will take not just decades, but centuries.

However, the extensive time that an ecological restoration of this magnitude would take has not been a part of the public discourse about the Elwha project; neither the politicians, government representatives, or local authorities who have spoken publicly about the project, nor the budget that has had little public exposure, represents the

Elwha's restoration as a long-term process. Congressional Representative Dicks expressed the common sentiments about the restoration's timeframe most succinctly when he proclaimed: "In just a few years, the free-flowing Elwha will be capable of producing and sustaining 250,000 salmon" (Ollikainen 2010). It would not be an exaggeration to say that Dicks is the political face of the Elwha project, not only as a long-term advocate of the project as the Congressional representative of Washington State district, but also as a key member of the U.S. House Appropriations Committee, the main agency in charge of establishing the expenditures of the federal government. Only through his powerful influence working within these agencies was he able to obtain the funds for the Elwha project.

The U.S. National Park Service as the representative agency of the U.S. Department of the Interior has also emphasized the short-term nature of the project. The National Park Service (1994, 121; see chapter I) has declared that the full restoration of the salmon should take between 12 and 25 years depending upon the species: the Sockeye salmon population would be recovered in between 12 and 20 years, and the Chinook salmon would be fully restored in between 21 and 25 years (National Park Service 1994, 121; see chapter I). By 2039, the National Park Service predicts that around 400,000 salmon could reach the Elwha yearly to spawn rather than the estimated 3,000 salmon that do so currently (Gottlieb 2010b).

However, as suggested in the previous chapter, Mike McHenry, one of the main biologists of the Elwha tribe hatchery (personal interview 2009), disagrees and forecasts a significantly longer period of time for the restoration of the salmon than the representatives of the National Park do. McHenry (personal interview 2009) indicates a

possible reason that the government has misrepresented the amount of time that it will take for a full salmon colonization in the Elwha River to occur. When the government gave these numbers, he reasons, it was perhaps to advertise a faster period of recuperation than was actually possible. Under pressure by the anti-dam removal movement created in the 1990s, the government chose to predict a shorter period of recuperation (personal interview 2009). Corroborating McHenry, Ed Schreiner, one of the former lead scientists involved in designing the ecological restoration of the reservoirs, thinks that a full salmon restoration could take as long as a half century. He even suggests that the total re-colonization may not happen under present biogeographical conditions (personal interview 2009).

By oversimplifying the processes of ecological restoration the government misrepresents the real rhythms of recovery. According to the government, the total river restoration would be almost an instantaneous process that is triggered by the dam removal. Schreiner (personal interview 2009) indicates that the main discourse that has represented this project is that: "If the dams are removed, the salmon will come." That is, the government's program is based upon a simple equation: tear down the dams and the total restoration of the river and the benefits for the community will instantly start to appear. Short-term engineering operations are the only requirements to restore the river and preserve the water quality of the valley. Just as with the building of the Hoover Dam, during which the government claimed that technology would be the main mechanism to control the powerful Colorado River, the restoration of the Elwha, purportedly depends upon engineering expertise. According to this logic, short-term operations, such as the removal of the dams, are hailed as the principal requirements to

facilitate the reconstruction of the Elwha ecosystem, eliminating the necessity to incorporate and budget for the long-term restoration operations vital to the rehabilitation of this watershed. What remains to be seen is exactly who will benefit in the short term—a topic I take up in the next two sections.

4. "Down to Earth, Down to Business": The Corporate Deconstruction of a Dammed River

Unlike the first era of hydroelectricity in the beginning of the twentieth century marked by private entrepreneurs or small public entities being in charge, the second era of hydroelectricity, spurred on by the construction of the Hoover Dam in the 1930s, was characterized by a strong, centralized federal government running the show (Hiltzik 2010). Hoover, Grand Coulee, Bonneville or TVA systems epitomized the era of direct control by the federal government in the transformation of the country's hydraulic landscape. These projects became symbols through which the government perpetuated their power and advanced a national discourse, a phenomenon that Marc Reisner (1986) and Eric Swyngedouw (1999) have called a "hydraulic mission." The federal dams reflected an extraordinary rescaling process controlled by the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers. At the same time, these projects enabled the government to form a powerful coalition with private corporations such as the Six Company Corporation, a conglomerate headed by Henry Kaiser and comprised of Morrison-Knudsen (Boise, Idaho), Utah Construction Company (Ogden, Utah), Pacific Bridge Company (Portland, Oregon), Bechtel Corporation (San Francisco and Oakland, California), MacDonald and Kahn (Los Angeles), and J.F. Shea (Portland, Oregon) (Wolf

1996). With a final budget of $108 million (including interest), Hoover Dam represented the largest federal project ever made until then (Hiltzik 2010, xi).

Hoover Dam precipitated the consolidation and growth of the companies involved in its making (Hiltzik 2010, 401). As a result of its participation in the Hoover Dam project, Six Company Corporation, for instance, went on to procure contracts to build other massive federal dams such as Bonneville and Grand Coulee in the Columbia River, as well as the $11-million concrete contract for the massive Shasta Dam in the North of California (Hiltzik 2010, 403). They even won the contract to build the Golden Gate Bridge in San Francisco. It was through the influence that Kaiser gained from his participation in Hoover, that he became one of the most important shipbuilders during the Second World War (Hiltzik 2010, 403; Wolf 1996). Another company to gain from its participation in the Hoover project was Bechtel Corporation, which became one of the largest American construction contractors of the 20th century. As Stephen Bechtel Jr., the Corporation's director between 1960 and 1990, puts it: "There's no question that it was a stepping stone for us…The Hoover Dam project and our role in it was a major platform for advancing on to other bigger projects since then" (Bechtel Corporation 2011). Bechtel's operations span the globe--from the Arabian Peninsula to the oil platforms in the North Sea, from the Three Mile Island nuclear power station to the Kuwait oil wells (Hiltzik 2010, 404). As with Kaiser, Bechtel used its participation in the Hoover Dam to gain influence with key figures in the government such as Henry Kissinger, Caspar Weinberger, and Gerald Ford (Hiltzik 2010, 405).

Unlike Hoover, the Elwha Restoration Project downplays its associations with the federal government; rather, it is configured publicly as a project that happened in spite of

the government's interest or investment. Celebrated as a collective plan in which diverse organizations collaborated, the rehabilitation of the ecosystem is represented as a participatory process in which everybody plays a role. Whereas with Hoover the construction of large dams was conceived of as the effort of the nation through the abstract figure of the government, the deconstruction of those colossal projects and the pursuant construction of a new landscape are configured through collective narratives.

It's hard to debate the collective nature of the Elwha restoration. Since the 1960s when the Lower Elwha Klallam tribe's campaigns against these dams first became visible to the public, a variety of communities in addition to the tribe, such as environmental, scientific, and non-profit organizations have collaborated in the process of advocating for the demolition of the dams. Nevertheless, a more detailed analysis of the project demonstrates that the federal government continues being, as in Hoover, the principal managerial force, although the Elwha Tribe has implemented and will carry out restoration works. Since the government bought the two dams in 2000, the National Park Service has directed this restoration process and the U.S. Bureau of Reclamation has controlled the hydroelectric system, managing the electricity generation and decommissioning both facilities in 2011. Furthermore, the Elwha removal project, just like the construction of the Hoover dam in the 1930s, demonstrates how private corporations have been integrated in the control of the principal engineering operations of the project.

The best example of this narrow federal-private collaboration is the construction of the two water treatment plants, the Elwha and the Port Angeles municipal treatment plants, which will serve to protect the quality of the water supply of the City of Port

Angeles and its vicinity, the Elwha River. With a budget of 69.6 million of dollars (National Park Service 2008a), the Elwha water treatment plant will supply water for the Wild Life and Fishing Department of Washington State and the Elwha Tribe hatcheries, the Nippon paper corporation and the City of Port Angeles municipal water treatment plant. The second plant, the Port Angeles municipal treatment plant, will provide water to the City of Port Angeles with a final cost of $27.6 million (City of Port Angeles Public Works and Utilities Department 2010). Combined, these facilities represent approximately one third of the total $325 million budget of the project, and the contract is one of the largest awarded in the whole history of the National Park Service (see chapter I) (National Park Service 2008a). Begun in early 2008, this water treatment plant system was completed in February 2010. The federal government awarded this contract to Watts Constructors LLC, a private contractor based in Honolulu (Watts Constructors LLC 2008-2011a). Watts built the treatment plant with two subcontractors, Delhur and John Korsmo Corporation (Watts/Korsmo A JV) (for the municipal water treatment of Port Angeles). Yet it is not generally known who Watts Constructor LLC is. Nor is it known why the federal government awarded the contract to Watts.

Watts Construction LLC is a private corporation specialized in construction and water works. Although only recently founded in 1993, Watts has merged with one of the top construction companies in the country, the Weitz Company[29] in 2006, the second oldest commercial general contractor in the United States (Musgrave 2012). In the top-400 *Engineering News-Record Magazine* contractor ranking for 2012, Watts-Weitz occupies 57th place (*Engineering News-Record* (*ENR*) 2012a). The merging of Watts-

[29] "The Weitz Company was created in Des Moines, Iowa in 1855. This company has annual profits of roughly $1 billion (The Weitz Company 2012).

Weitz forms a multinational construction conglomerate of the first order. Furthermore, Watts is a regular contractor for the federal government, U.S. Navy, Army, Air Force, U.S. Army Corp of Engineers, the Department of the Interior and National Park Service (Watts Constructors LLC 2008-2011b), a fact that has not appeared in any newspaper articles to date. This private company has been awarded some of the biggest federal and military contracts planned in Hawaii (Magin 2009). In fact, one of Watts' recent joint-venture construction plans, a $86 million submarine facility at Pearl Harbor, was the seventh biggest military contract in 2008 (Magin 2009).

In addition to Watts and its two subcontractors, a handful of private corporations such as Olympic Electric have participated in the construction of the water treatment plants. CHG Building Systems, for example, a Renton, WA-based corporation, has been hired to help with the structural steel and metal engineering (City of Port Angeles Public Works and Utilities Department 2010). In addition, HDR Corporation[30], a U.S. multinational dedicated to architecture and engineering that has been involved in projects in over 60 countries, has helped to manage the construction of the plant (HDR, Inc. 2012a). HDR is also considered an important environmental firm in the United States. Although it is participating in projects connected to this ecological restoration plan, it obtains substantial revenues from the oil and gas industries (HDR, Inc. 2012b). Moreover, HDR is involved in other dam removal projects such as Gold Ray Dam (HDR 2012c).

[30] One of the main HDR board directors is Mary Peters, the former United States Secretary of Transportation, serving with George W. Bush between 2006 and 2009 (HDR 2012d). Furthermore, this corporation has carried out parts of the Pentagon renovation of its Wedges 2 and 5 and also the Hoover Dam Bypass Project design in 2001 (HDR n.d.- a).

The water treatment plant project was designed by the Seattle, Denver, and Portland offices of United Research Services (URS) Corporation, a private company which is one of the largest engineering and design corporations in the nation, occupying the 2nd position in terms of engineering design in the *ENR* magazine in 2011 and 2012 (*ENR* 2012b). This San Francisco-based company is also one of the main private contractors hired by the U.S. military. URS has been participating in the construction of nuclear submarines for the U.S. Navy for roughly 43 years (URS 2012a) and supplies flight training for the U.S. Army and Air Force and shipboard training for the U.S. Navy (URS 2012b). In *G.I. Jobs 2012*, a magazine specialized in military transitioners, URS is catalogued as number 5 on a list of Top 50 Military-Friendly Employers (URS 2012c).

Not until recently did the federal government reveal who would be responsible for demolishing the Lower Elwha and Glines Canyon dams, although some speculated that it might be the Corps of Engineers. But in August of 2010, the National Park Service's Denver Service Center revealed that a private contractor, the multinational Barnard Construction Company, Inc. of Bozeman, Montana would remove the dams (National Park Service 2011). They were awarded a contract of $26.9 million to begin the deconstruction in September of 2011 (National Park Service 2011**).** Revealingly, Barnard has been working on the largest ongoing dam construction in the country, the Saluda Backup Dam in South Carolina (Barnard Construction Company, Inc. n.d.). It may seem ironic that the corporation that has been awarded the largest dam removal contract in history is also one of the nation's top four dam builders (Barnard Construction Company, Inc. n.d.), but that irony only goes to show how similar the two processes are. It is not by chance that Barnard has become one of the largest dam constructors and

deconstructors in the country, for we cannot understand the new wave of dam deconstruction if we do not see how these constructive and deconstructive processes are linked. From the strengthening of the Gilboa Dam that supplies water to New York City to the reconstruction of an earthen dam in Nevada for the Walker River Paiute Tribe and the U.S. Bureau of Reclamation to the implementation of certain operations for the largest restoration project in the country, the Everglades Project in Florida (Barnard Construction Company, Inc. n.d.), Barnard integrates under the same business dams, reservoirs, dams decommissions, and ecological restoration works.

Other operations included in the Elwha Project's budget are certain riparian restoration activities carried out prior to the dam removal. Among the most important of them are works being built by the Lower Elwha Klallam tribe in the Elwha River. One of these operations is the construction and settlement of a system of logjams in various areas of the river. A logjam is a set of decayed trees and other timber pieces that form a structure in the river similar to an island and create microhabitats that are vital for spawning and refuge of riparian species such as the salmon. Unfortunately, many of these logjams were modified, destroyed and even burnt in the past. For this reason, the Lower Elwha Klallam tribe is trying to recuperate them, building new logjams in the river. Although the primary managers of the logjams are the Elwha tribe, the engineering design of these structures has been implemented by a private company called Cardno Entrix. Mike McHenry (personal interview 2009), who is in contact with this corporation, said that the tribe knows this company is a large environmental firm, but they do not know anything beyond that.

Based in Houston, Texas, and integrated in the Australian corporative group Cardno Limited, Cardno Entrix is an environmental firm that has offices across the United States as well as in other countries (Cardno Entrix 2012). Rated within the 50 top environmental firms in 2012 (*ENR* 2012c), Cardno Entrix markets itself as an agency specialized in the conservation and reconstruction of ecosystems. But it has recently come to light that this Texas company has been involved in the controversial TransCanada's Keystone Project (Rosenthal and Frosch 2011), a plan designed to transport oil from the tar sand region in Alberta, Canada, to refineries in Houston. The U.S. State Department, at the recommendation of TransCanada Corporation, hired Cardno Entrix to conduct an environmental study of the possible negative impacts that this oil pipe installation could cause to various states (Rosenthal and Frosch 2011). However, the evaluation does not seem to have been rigorously implemented, as suggested by the U.S. Environmental Protection Agency (E.P.A.), which has criticized Cardno Entrix's study indicating it is "inadequate" and supplies "insufficient information" (Rosenthal and Frosch 2011). Cardno Entrix represents the new type of corporation that has been capable of linking private profit and environmentalism, as its slogan conveys so clearly: "Down to Earth, down to business" (Cardno Entrix 2012).

Finally, the pre-dam removal phase of this project has also had another objective: the construction of a new fish hatchery that will replace the current Elwha tribe hatchery, costing $18 million (Callis 2011). It was begun in the fall of 2009 and is projected to be finished in 16 months (Callis 2011). This hatchery will produce and keep the stocks of Coho, Pink, Chum salmon and Steelhead during the dam removals (KNOP Newsradio AM 1450 2009). Until recently, there were several corporations such as Watts

Constructor LLC that opted to obtain the hatchery contract from the Department of the Interior. In September 2009, the National Park Service announced that the contractor in charge of building this facility would be the private corporation James W. Fowler Co. General Contractors of Dallas, Oregon (KNOP Newsradio AM 1450 2009). Two additional companies have participated in this hatchery, Montgomery Watson Harza (MWH) (design) and Post, Buckley, Schuh & Jernigan, Inc. (PBS&J Corporation) (construction management services) (National Park Service 2009).

Although the federal government represents the Elwha Restoration Project as a participatory plan in which a multitude of players collaborate, the reality is that the main managerial agency has been the government represented by two federal agencies, the National Park Service and the Bureau of Reclamation, as happened with the federal projects in the 1930s, 1940s and 1950s. Moreover, the government has integrated several private contractors to control most of the engineered restoration operations. As in Hoover, the physical production of nature in the Elwha Valley reflects the deep interconnections that exist between the federal government and private contractors such as Watts, HDR, Barnard, URS, and Entrix. These relations were forged before the first bulldozers appeared on the muddy floodplain of the Elwha River. At a meeting organized by the Olympic National Park Service in Seattle in May of 2007 for corporations interested in participating in the restoration project, Entrix, Watts, and URS were most notably in attendance. But the federal government and multinational corporations are not the only ones to feed off of the waters of the Elwha: local authorities, too found economic gain in restoration work, as we shall see in the final section.

5. Filtering the Muddy Waters in the Elwha River: The Local Real Estate Dream

In the beginning of 2010 Glenn Cutler, the Port Angeles City Public Works Director, announced that two water treatment plants would be necessary to preserve the quality of the city's water which would be affected by the dam removals (Dickerson 2010b). The treatment plants were needed because millions of cubic meters of sediment that had accumulated in the reservoirs, would be released when the dams came down. Although the construction of these multimillion-dollar plants is therefore vital to the welfare and economy of Port Angeles, the facilities are far too large for the current needs of the community. According to the National Park Service (2008a), the total depuration capacity of the $27.6 million-municipal water treatment plant is approximately 10.6 million gallons per day. But this amount is nearly three times the Port Angeles' summer peak demand for water, 3.5 million of gallons per day, according to Tim McNulty (personal interview and communication 2010). While theoretically, it is recommendable to build a bigger facility in the case of emergency within the area, this facility far exceeds what is recommended.

The full embrace of the water treatment plants by the Chamber of Commerce came as a surprise to many because the local business community had been the strongest opponents of the Elwha project initially (McNulty, personal interview and communication 2010). Realtors, the owners of the dams and paper mills, and the Chamber of Commerce formed the most vocal resistance against the removal project in the early 1990s. Brian Winter, the Elwha Restoration Plan Chief Manager, who met with many in the business community to explain the plan, admits to being "confused" by their tremendous hostility towards it (personal interview 2009). Such opposition was even

visible in the streets of Port Angeles during the 1990s when many business and real estate office windows sported the slogan, "Save the Dams, Save the Lakes." Winter (personal interview 2009) believed that there was no logical reason for their behavior, but simply fears and animosities against the federal government and the National Park Service[31]. Winter (personal interview 2009) even remembers that during one of the meetings held with the business community, a man, seeming to express the general sentiment of the group, stated that "everybody knows that the Park is not a good neighbor."

Even when the corporation that owned the dams accepted the federal government's offer in the 1990s because they understood that it was the best economic solution in the long term, the business community was still opposed to the Elwha project (Winter, personal interview 2009). The belief that "the government had a gun against the mill's head," expressed in one of the meetings that the Park held with the business community, pervaded throughout the 1990s (Winter, personal interview 2009). When one of the most influential businessmen in the community, the paper mill's manager Orville Campbell, tried to convince local businesses to accept the dam removals, he had little success. Yet, in just one decade, the business community has radically shifted their view, and now wholeheartedly accept the Elwha project.

If we want to understand this change of heart, we must consider the demographic growth of the city and the nearby town, Sequim, according to McNulty (personal interview 2010). Many newcomers, especially retired people from California, are settling

[31] One of the groups that could represent these collective fears and overall rejections against the government has been 'Rescue Elwha Area Lakes (R.E.A.L.), a citizen group that has defended the reservoirs by considering them perfect natural habitats for species such as trumpeter swan (*Cygnus buccinators)* (Chastain, personal interview 2008).

in Sequim because this area has a benign climate with relatively low precipitation[32] for the Olympic Peninsula. Moreover, Daniel E. Gase, the Coldwell Banker Real State Company Manager (personal interview 2009) points out that Sequim's extraordinary growth is a result of Sequim being identified as one of the top ten places for retired people to settle, a situation about which Gase (personal interview, July 2009) admits: "We are open to capitalize on that." And Port Angeles also has great potential for further development, confirms McNulty.

Population growth has generated more demand for water, a demand that threatens Sequim's potential development. Thus, Dwight Barry, the Director of Environmental Science and Resource Management at Peninsula College, indicates that Sequim "cannot continue to grow the way that they grow now" (personal interview 2009). It seems probable that the oversized water treatment plant is the result of a desire to foster growth, an idea which Barry believes "is more likely than not" (personal interview 2009). Although Kathryn Neal, Water Engineer Manager of the City of Port Angeles, points out that "We cannot sell water or this surplus nowadays," she adds, "in the future who knows" (personal interview 2009). Schreiner (personal interview 2009), who prepared the reservoir restoration plan (see chapter I), comments that when they were configuring the ecosystem restoration of the reservoirs several years ago, they could see how the final budget was gradually reduced. However, incredibly, the water treatment plants were introduced into the budget. It was the City of Port Angeles who pressured the federal government to include the plants into the budget, Schreiner (personal interview 2009)

[32] Although Sequim is in the northern section of the Olympic Peninsula, this town is located in the leeward section of the Olympic Mountains, being protected from humid air masses coming from SW and West directions from the Pacific Ocean. In fact, Sequim possesses the only cactus specie in the Olympic Peninsula.

claims. He further affirms that the city had more power to pressure the government than people like him who were working inside the restoration project.

Although the federal government, national, and multinational corporations quickly recognized the possibilities of profit in green projects, it took a while for the local business community to jump on the bandwagon. It seems that more than anything, what stood in the way of their support, was their own anti-government ideology. But when they discovered that there was something for them in restoring the Elwha to its original grandeur, they too got behind the project, changing the slogans posted in their windows from, "Save the Dams, Save the Lakes," to the ubiquitous "Last Damn Summer" that was first seen in Spring of 2010. Schreiner (personal interview 2009) probably sums up the local powers behind the Elwha restoration best, when he says: "The City, the County, the Tribe, everybody wants a piece of the pie."

6. Conclusion

Although we seem to be entering a new era in American history, in which all of the harm that has been done to nature and indigenous cultures in the name of progress is erased with the rebirth of a river, we actually are seeing something that looks a lot more familiar. The building of the Hoover dam eighty years ago and the destruction of the two dams on the Elwha have more in common with each other than might meet the eye. In both of these massive transformations of the American landscape, the federal government in association with private contractors was the master of ceremonies. Yet, the ideologies behind the projects are different. Whereas the government framed Hoover as a national symbol that would light the way for the economically troubled nation by providing jobs, creating electricity, and facilitating the defeat of the Axis enemies, the government has

hailed the Elwha Project as an ecological restoration that will restore an injured ecosystem, rebuild salmon stock, revive the Native American's culture, and reinforce the local and regional economy.

Whereas the National Park Service has heralded the Elwha Project as an ecological restoration, engineering operations dominated the final budget, leaving scant funds for restoration. In order to legitimize the decreased funds and the penetration of private capital into the project, the government has oversimplified the processes of restoration to suggest that simply removing the dams would lead to a successful return of the historic landscape. Moreover, the government has masked both its direct control and its alliance with private corporations by touting this project as a collective effort. Although late to the trough, local authorities and the Port Angeles business community have likely pressured the National Park Service into integrating two water treatment plants into the budget so that these plants became the largest percent of the final budget.

If we understand our landscapes as "a need for power," as does Edward Burtynsky, the photographer with whom this chapter began, then even ecological restorations are marked by power, as I have demonstrated in this chapter. In the following two chapters I take a step further in looking at the sort of power that is underwriting our new green landscapes. While doing the fieldwork for this dissertation, I discovered that Port Angeles was on its way to becoming a key site for the expansion of the electric grid in the Pacific Northwest. Upon first look, the removal of the dams and the reconfiguration of the electricity grid may seem coincidental, but I argue that it is all of one piece. Dam removals signal shifts in power that are happening in the region. In the following two chapters I consider Port Angeles within the broader context of the

portion of the Pacific Northwest known as “Cascadia,” and I show how a reemergence of a regional identity helps to enable further penetration of private corporations into the business of nature.

CHAPTER III

Envisioning Cascadia: Electric Dreams of a Transnational Region

Figure 8. *The Sarah Cronauer Memorial Bridge to Victoria, BC* by Jack Gunter (Courtesy of Jack Gunter 2009)

1. Introduction

During the final five months of 2009, the Port Angeles Fine Arts Center organized an exhibition entitled *Envision Cascadia: 33 Pacific Northwest Artists Imagine a Homeland*. Artists from all over the Pacific Northwest displayed their concept of Cascadia, a region comprised of Washington, Oregon, parts of California and British Columbia. Through their oils, watercolors, and sculptures representing primordial forests, wild animals, and ecological futures, artists strove to capture their vision of Cascadia. Searching for a geographical identity for a region that sits between two of the world's most powerful nation-states, these artists, in essence, were attempting to define

what often eludes definition—a transnational region. Each artist attempted to answer questions posed by the Director of Port Angeles Fine Arts Center, Jake Seniuk, concerning the identity of the region, such as: "Who are we as Pacific Northwesterners?," "Where is Cascadia in the trans-border context in North America?," "Are we Canadians, United States citizens, Cascadians or all of them at the same time?," and "What is the relation between nature and Cascadia?" Seniuk's project arises from his sense that the city of Port Angeles was losing its identity and desperately needed to create one. Seniuk (personal interview 2009) said, "Everything is changing and we do not know where it is going…In Port Angeles they have been struggling with an identity…I want people in Port Angeles to think about Cascadia."

In an analysis of the ideologies that configure this geographical project called Cascadia, Matthew Sparke's work (2005), *Reterritorizing Locality in Globality: Cascadia and the Landscaping of Cross-Border Regionalization* uncovers what lies behind the most recent attempts to forge a regional identity for Cascadia. Sparke (2005) examines how Cascadia is being reconfigured by corporate forces in order to support neoliberal strategies throughout the Pacific Northwest. The idea of Cascadia, which has existed since Thomas Jefferson envisioned a separate nation in the Northwest, is being newly promoted. Influenced by anti-nation-state personalities such as the Japanese Kenichi Ohmae, some local governments, chambers of commerce, private businesses and think tanks of this region have propagated the notion of this territory as a free-trade zone where *laissez-faire* practices can circulate without being constrained by national borders or nationalist ideologies (Sparke 2005, 66-67). One of the common denominators that these groups have used to justify the idea of Cascadia as a homogeneous trans-border

territory is the similarities in landscape that exist on both sides of the border (Sparke 2005, 82), such as the close proximity of wilderness to thriving urban settlements. The only rational divisions in Cascadia are not manmade, but topographically imposed by the mountains and watersheds.

According to Sparke (2005), these corporate promoters of Cascadia believe that the nation-state border is a mere fiction, a "cartographic illusion" (Ohmae 1995) that denies the true spatial homogeneity of the territory. Their purported threats are the powers that be in Ottawa and Washington D.C. who have imposed a conception of the territory based upon absolute spatial features such as borders that reinforce governmental regulations and constrain the flows that would vitalize economic development in the region. Sparke, however, calls the regionalists bluff (2005, 82), arguing that geographical continuity is merely a spatial illusion that is being constructed by these public and private institutions to promote their economic and political enterprises.

Sparke (2005, 82) indicates that if one looks closely at the economic makeup of this region, one will see most businesses are restricted either to a national or an international scale; they do not organize their financial or marketing strategies with a trans-border regional perspective. Corporations such as Boeing, Microsoft or Amazon fail to organize their commercial and managerial strategies on a regional scale limited to Washington, Oregon and British Columbia but rather on a national or even international scale (Sparke 2005, 83). The same tendency, Sparke (2005, 83) insists, appears in British Columbia; for example, Brollywood, the film industry based in the city of Vancouver, is completely independent from the states of Washington or Oregon. The only exception to this lack of regional vision, according to Sparke (2005, 83), is the logging industry, citing

as an example, the Washington state-based wood and paper company, Weyerhaeuser, which acquired the British Columbia corporation, MacMillan Bloedel (Sparke 2005, 83). In other words, Cascadia's identity as an independent region and contiguous territory does not jibe with the business reality. Moreover, its identity has been hijacked by these promoters of regionalism in order to advance their own economic agenda.

Taking into account Sparke's thesis of corporate regionalisms in Cascadia, I will consider the ways that the electric grid does facilitate regionalism, and how that grid is currently being reformulated under neoliberalism. Specifically, I show how the trans-border regional structure of the electric network in the Pacific Northwest will be expanded in the near future by private projects outside of the federal monopoly. Since the final decades of the nineteenth century, this electric system has integrated a multitude of federal, public (e.g. municipal and cooperative utilities) and private companies into a framework that interconnects cities, towns, counties, states, provinces and even countries through the border. In fact, both national electric grids in the Pacific Northwest territory have exchanged thousands of megawatts (MW)[33] every year through the border since the beginning of the twentieth century. Today there are four trans-border high-voltage transmission lines that connect Washington state and British Columbia. Whereas Bonneville Power Administration (BPA), a U.S. federal agency, controls these four power connections in the U.S., British Columbia Transmission Corporation (BCTC) and BC Hydro, two Crown companies, have the control of three transmission lines in Canada[34]. In short, the federal and crown governments monopolize trans-border power

[33] A megawatt (MW) is 1,000,000 watts. 1,000 MW is the power generation capacity of a third-generation nuclear power station.
[34] The fourth line called Line 71 is managed by a private company, Fortis BC (BC Hydro 2012a and b).

transmissions.

However, the appearance of new private transmission projects such as the Juan de Fuca Cable promoted by Sea Breeze Company or the Northern Lights Project controlled by TransCanada Corporation is generating a new era in the construction of the trans-border power transmission landscape in the region. These projects will be the first private transmission projects to cross the border between the United States and Canada in the Pacific region[35].

According to Sea Breeze Corporation and TransCanada Corporation, their trans-border transmission projects are necessary to create a grid that is more versatile; moreover, they claim the need to stabilize and reinforce an aging and congested regional grid because it will be incapable of handling future demand. However, corroborating Sparke's thesis, this chapter will demonstrate that although these new private projects will expand the trans-border power exchange, the main corporate objective is not the reinforcement, stabilization, and expansion of the regional grid, as they claim, but the penetration of business interests through the border. Sea Breeze, TransCanada and other utilities have elaborated an ideology of regionalisms in order to convince the public of the necessity of their project, and mask their commercial objectives of rupturing the federal monopoly of the trans-border power transmissions. Through this new expansion of the electric grid, achieving a "jump of scale" (Smith 1992) from the regional to the transnational-regional, Sea Breeze Corporation, is in the vanguard of binding together this trans-border region and in so doing implementing its economic agenda. The Juan de

[35] Although Fortis BC manages and transmits electricity directly to the BPA grid through the line 71, its transmission line is located just in the Canadian territory without crossing over to the U.S. Juan de Fuca Cable, on the contrary, will be a power transmission cable that spans both countries. Similarly, the TransCanada Corporation's Northern Lights Project will run in both sides of border.

Fuca Cable transmission project, then, is a pioneer in the penetration of neoliberal strategies into a regional identity.

While Sparke discovered few corporations who practiced the "Cascadia" that they preached, I will demonstrate how a host of private electricity companies, with Sea Breeze at the forefront, are aggressively re-envisioning Cascadia. It is true that Sea Breeze and TransCanada do not operate on a regional scale, nor do they restrict their capital flows to Cascadia, corroborating Spark's thesis; however, they uniquely create a regional infrastructure in establishing their electric grid. This grid is changing the face of Cascadia. Corporations such as Sea Breeze are not just enforcing Cascadia's frontiers with their neoliberal ideology, but also pushing at its territorial limits, expanding the region with their incorporation of neighboring areas such as Montana and Alberta, as well as territories further flung, such as Alaska. I demonstrate not only how delicate the container of Cascadia is in the face of neo-liberal expansion, but moreover, how useful such ideologies of trans-border regionalism have become for remapping the nation's electricity grid, a project that will have ramifications that reach far beyond the borders of Cascadia.

If dam removals are phenomena that display the construction of a new energy landscape, as I argue in chapters I and II, the restructuring of the electricity grid, facilitated by the dam removals, also demonstrates a new way of producing nature. Viewing Cascadia from the perspective of its electricity grid allows us to detect what is at stake in the resurgence of regionalism, and enables us to trace the removal of two dams from a quiet valley on the outskirts of Port Angeles to energy trends within the wider region. By doing so, we can begin to put the dam removals into perspective.

2. Powering Cascadia: A Brief History of Bilateral State Networks

Since the first applications of Thomas A. Edison's direct current (DC) system in the Pearl Street power station in Lower Manhattan in 1882, the electric grid in the United States has been expanding. But nobody did more to enlarge the grid than Nikola Tesla, whose technological innovations in alternating current (AC) facilitated the transfer of power across long distances for the first time when applied to the Niagara hydroelectric project in the 1890s. Towns, cities, counties, and even rural areas, became interconnected, especially during the rural electrification programs under the New Deal Administration in the 1930's (Schwantes 1996). However, this progressive expansion of the electric transmission landscape during the twentieth century has not managed to create a system that unites the whole country. On the contrary, United States still has a balkanized network that divides the nation into three grids (plus Alaska): the Western and the Eastern Interconnections and the Electric Reliability Council of Texas (ERCOT)[36]. Canada is also integrated into the Western and Eastern Interconnections (U.S. Department of Energy, Office of Electricity Delivery & Energy Reliability n.d.)[37]. From the standpoint of the grid, North America looks more like a conglomeration of regions than two sovereign nations (Figure 9). The grid forms trans-border regions that unite the U.S. and Canada and accentuate the north-south transmission of electricity between states and countries while marginalizing the east-west interconnections (Figure 9).

[36] This mosaic electric grid is divided in regional electric councils. The Western Interconnection is managed just by Western Electricity Coordinating Council (WECC). The Eastern Interconnection is sub-divided in various councils: Florida Reliability Coordinating Council (FRCC), Midwest Reliability Organization (MRO), Northeast Power Coordinating Council (NPCC), Reliability First Corporation (RFC), SERC Reliability Corporation (SERC), Southwest Power Pool, Inc. (SPP). The third council is Electric Reliability Council of Texas, Inc. All of them are under the management of North American Electric Reliability Corporation (NERC) (*The Energy Library* 2004-2009).

[37] Quebec (Canada) and Alaska electricity networks are separated.

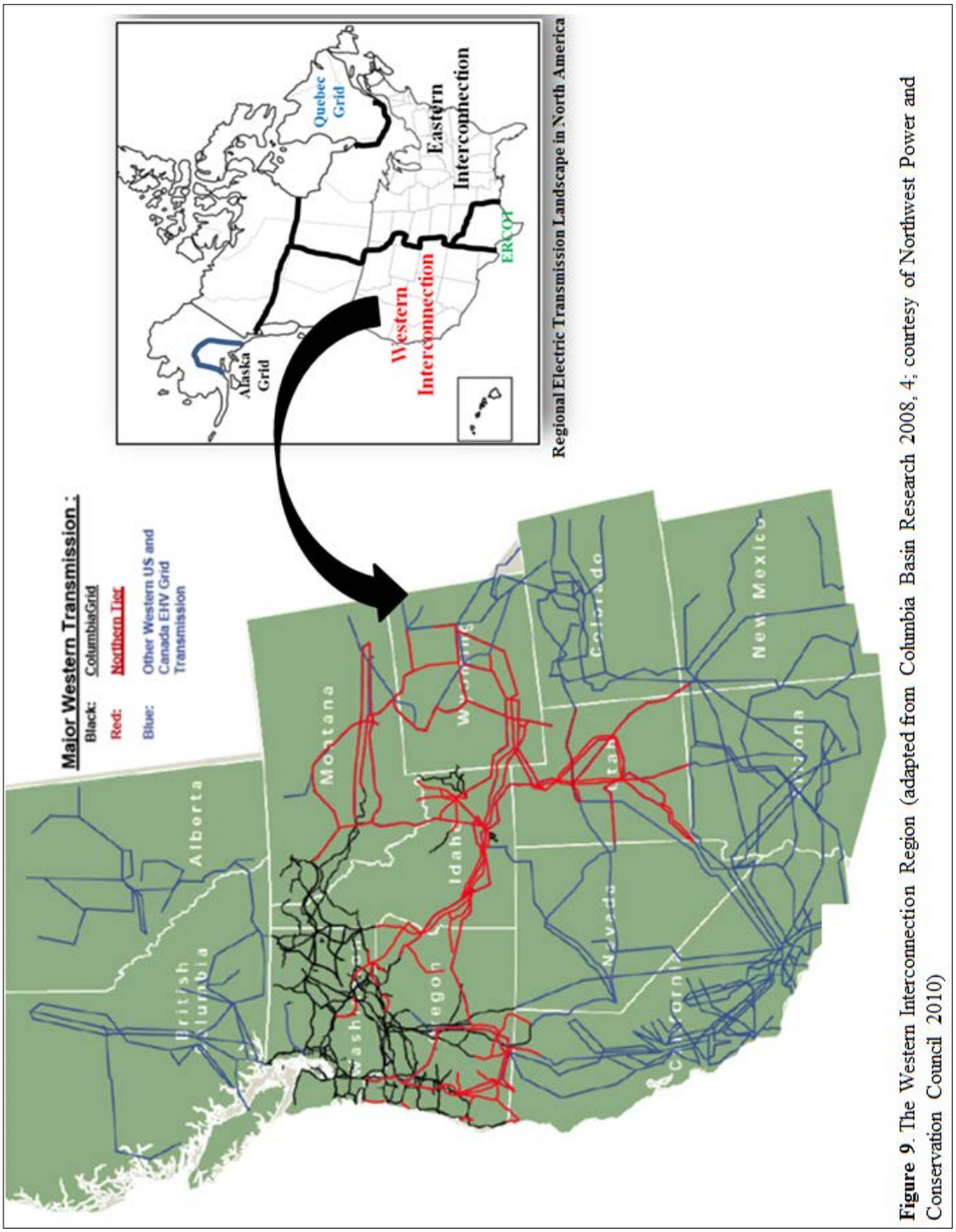

Figure 9. The Western Interconnection Region (adapted from Columbia Basin Research 2008, 4; courtesy of Northwest Power and Conservation Council 2010)

British Columbia and the Pacific Northwest form one such trans-border region. Integrated in the Western Interconnection network (see figure 9), electricity flows from British Columbia to Baja California and from the Pacific Coast to the east section of the

Rocky Mountains, with a preponderance of north-south flows. In fact, the power interconnections are more developed from British Columbia to the Pacific Northwest than from British Columbia to Alberta or from Oregon to the central area of the United States. Perhaps the best example of this north-south interconnection and regional integration is the Pacific Direct Current Intertie[38], a high voltage direct current (HVDC)[39] system that runs 1,354 kilometers (846 miles), linking the electric stations of Celilo, Oregon and Sylmar[40], near Los Angeles (BPA 2003), seasonally transmitting power between California and the Pacific northwest.

The Pacific Northwest-British Columbia region is a complex electric network composed of an extraordinary mix of entities, including federal (e.g. Bonneville Power Administration (BPA)), corporate (e.g. Avista Corporation or Sea Breeze Power Corporation), public (e.g. Clallam County PUD), municipal (e.g. Seattle City Light), rural cooperative and mutual utilities (see figure 10). However, the dominant players by far in this plethora of utilities are federal or crown: BPA is the biggest power marketer in the

[38] Constructed initially in 1970, Pacific Direct Current Intertie or Path 65 was the first commercial HVDC system constructed in the United States (BPA 2003). This system has a carrying capacity of 3,100 MW (BPA 2003).

[39] The first official commercial HVDC system built was developed by the Swedish-Swiss corporation ABB in 1954 between the Gotland Island and the continental area of Sweden (ABB 2011). Nowadays there are approximately 120 HVDC systems working around the world (ABB 2011). Furthermore, there is another type of HVDC called HVDC Light®. Although AC is currently used more frequently used than DC, HVDC systems have certain advantages. Thus, for example, HVDC is more efficient in transferring power over long distances than high-voltage alternating current (HVAC). HVDC has only approximately 3 % of losses in 1,000 km (Blakeslee 2009). Furthermore, HVDC is more flexible to connect two electric networks with different frequencies. In fact, a HVAC cannot connect two electric grids with different synchronization. One of the main disadvantages of HVDC is that it has to be transformed into AC, since this former type of current is more flexible to be increased or decreased in voltage. This flexibility is crucial to bring electricity from power stations to houses, industries and other facilities. For this reason, HVDC has to have converter transformer stations to transform DC into AC. This type of station is often expensive.

[40] Celilo and Sylmar are the two converter transformer stations of the Pacific Direct Current Intertie.

Northwest Territory[41], and BC Hydro and British Columbia Transmission Corporation (BCTC) are the largest on the Canadian side.

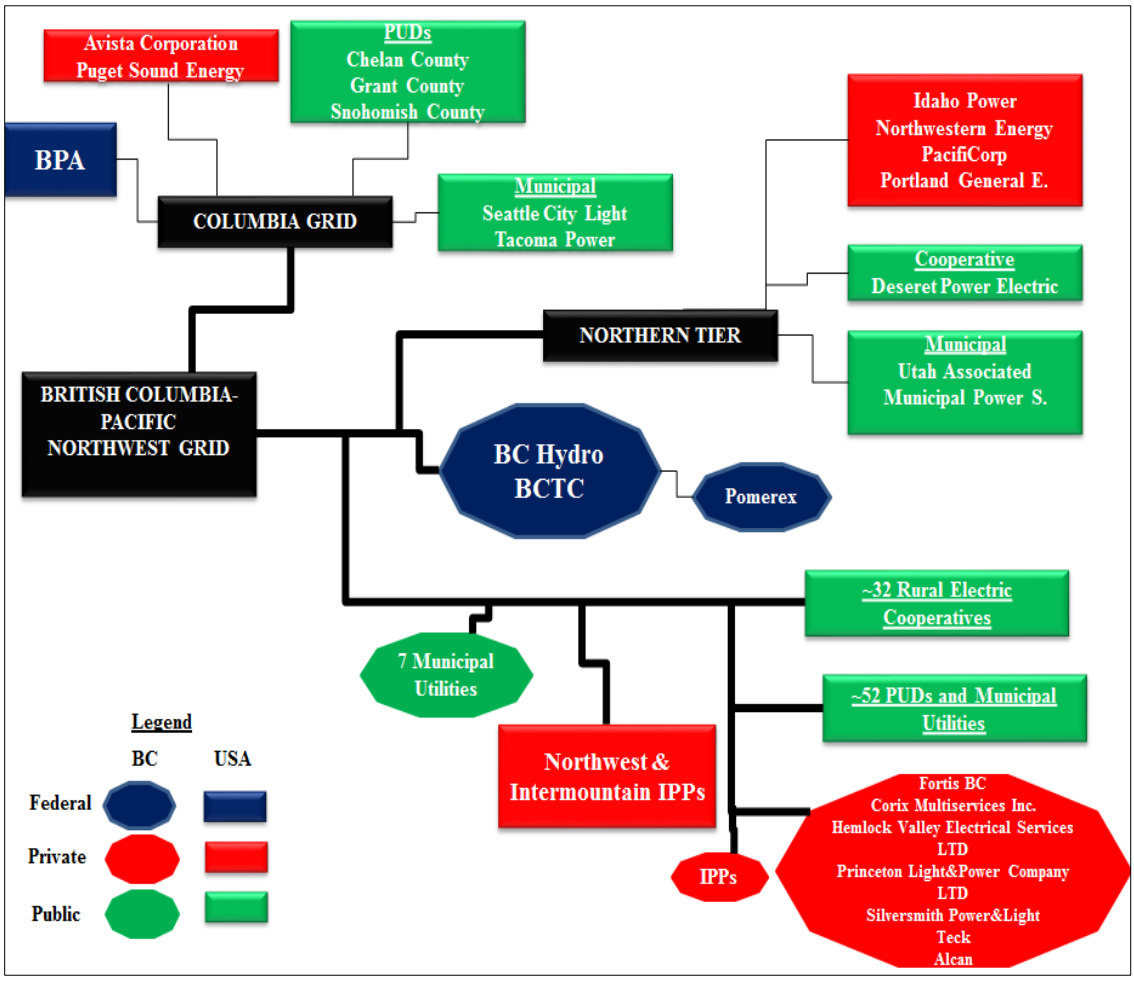

Figure 10. Electric utilities and organizations in the British Columbia and Pacific Northwest region (PPC 2006; WPUDA 2009; BC Government, Ministry of Energy 2010; Columbia Grid 2011; Columbia River PUD 2012; NIPPC 2012; Northern Tier Transmission Group 2012; WRECA 2012)

Presently, there are four major trans-border interconnections (paths or interties) that transmit electricity through the border (see figure 11). Four agencies control these four trans-border electric transmission lines: the federal agency BPA takes care of them

[41] A power marketer is an entity that works as an intermediate agent between the producer and the consumer of energy. This entity often does not possess power generation, transmission and distribution infrastructure. A power marketer just markets power to get the best deals.

in the US territory, the Crown agencies BC Hydro and BCTC manage three of these lines on the Canadian side, and the private companies Teck Cominco and Fortis BC own and operate respectively the fourth line in Canada (see figure 11) (BC 2012a and b; BCTC 2005). In other words, these four trans-border connections are almost completely under the control of federal and crown agencies, excepting one of the four lines that is owned and managed by two private corporations in Canada. However, Fortis BC controls that transmission line just inside Canada, without any prolongation in the U.S. There is not any private company (or public) that manages a high-voltage line that crosses the border.

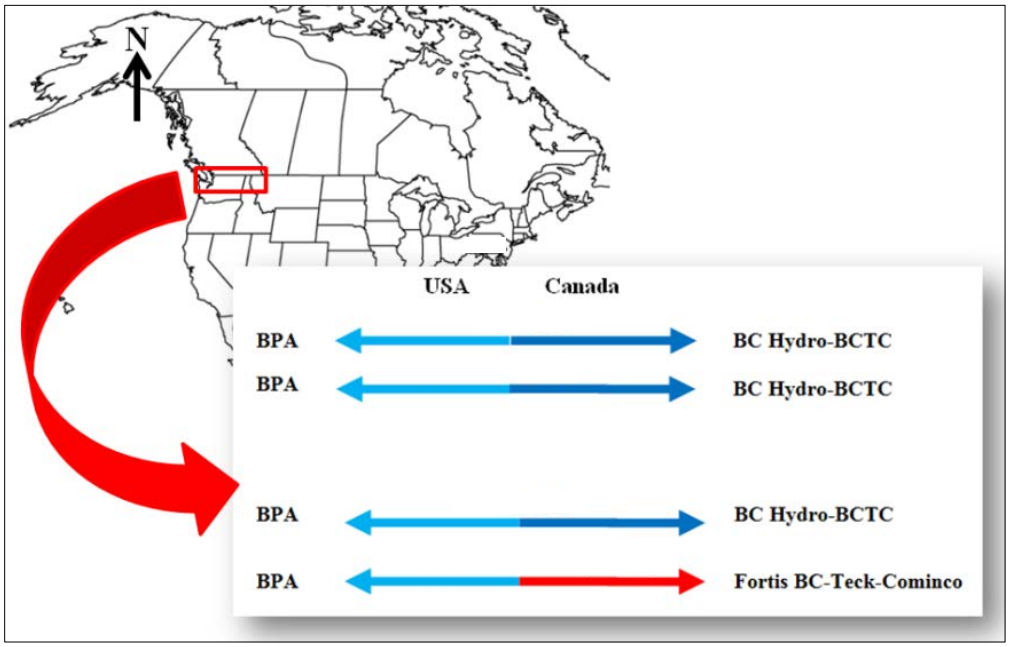

Figure 11. The four main trans-border transmission lines between USA and Canada in the Pacific region (BC Hydro 2012a and b; BCTC 2005)

Although there are some utility companies that market power on both sides of the border, for example, Canadian utilities who sell electricity to U.S. customers, this does not imply that these power marketers manage their own transmission line that crosses the border. Such an energy transfer is often through the electric grid of other companies,

with a high probability that that transmission is through a federal system in the Pacific Northwest and Canada. While electrons flow freely through the border, the electricity transmission infrastructure has always been controlled by a nation state. In the following section we shall see how this status quo is about to change.

3. Privatizing Cascadia: Neoliberal Flows and the Expansion of the Regional Electric Network

On May 3rd, 2005, Sea Breeze Pacific Regional Transmission System Inc., a Canadian company unknown to most of Port Angeles's citizens, met with the city officers at City Hall (Gawley 2005a). At the meeting, the representatives of this Vancouver-based corporation unveiled to Port Angeles authorities the Juan de Fuca Cable Project, a private electric transmission project that will transmit "renewable" energy from power plants to be constructed by Sea Breeze Corporation in the North of Vancouver Island in British Columbia to Washington State through the Port Angeles municipal area. Twenty-one days later, BPA organized a "scoping meeting" at Peninsula College, Port Angeles, where 50 people had the opportunity to hear Sea Breeze's representatives explain details of this innovative plan (Gawley 2005b). In these meetings, Sea Breeze explained that they had applied to the U.S. Department of Energy (DOE) in December 2005 for a permit to construct a power transmission line from Vancouver Island to Port Angeles (see figure 12) (U.S. Department of Energy 2008).

This energy transfer plan is based on the construction of a cable that will connect the power endpoints of the British Columbia and Washington State transmission grids (Sea Breeze Power Corporation 2011a). Running under the Juan de Fuca Strait, the cable will connect the city of Victoria, a locality integrated into the BC Hydro network, to the

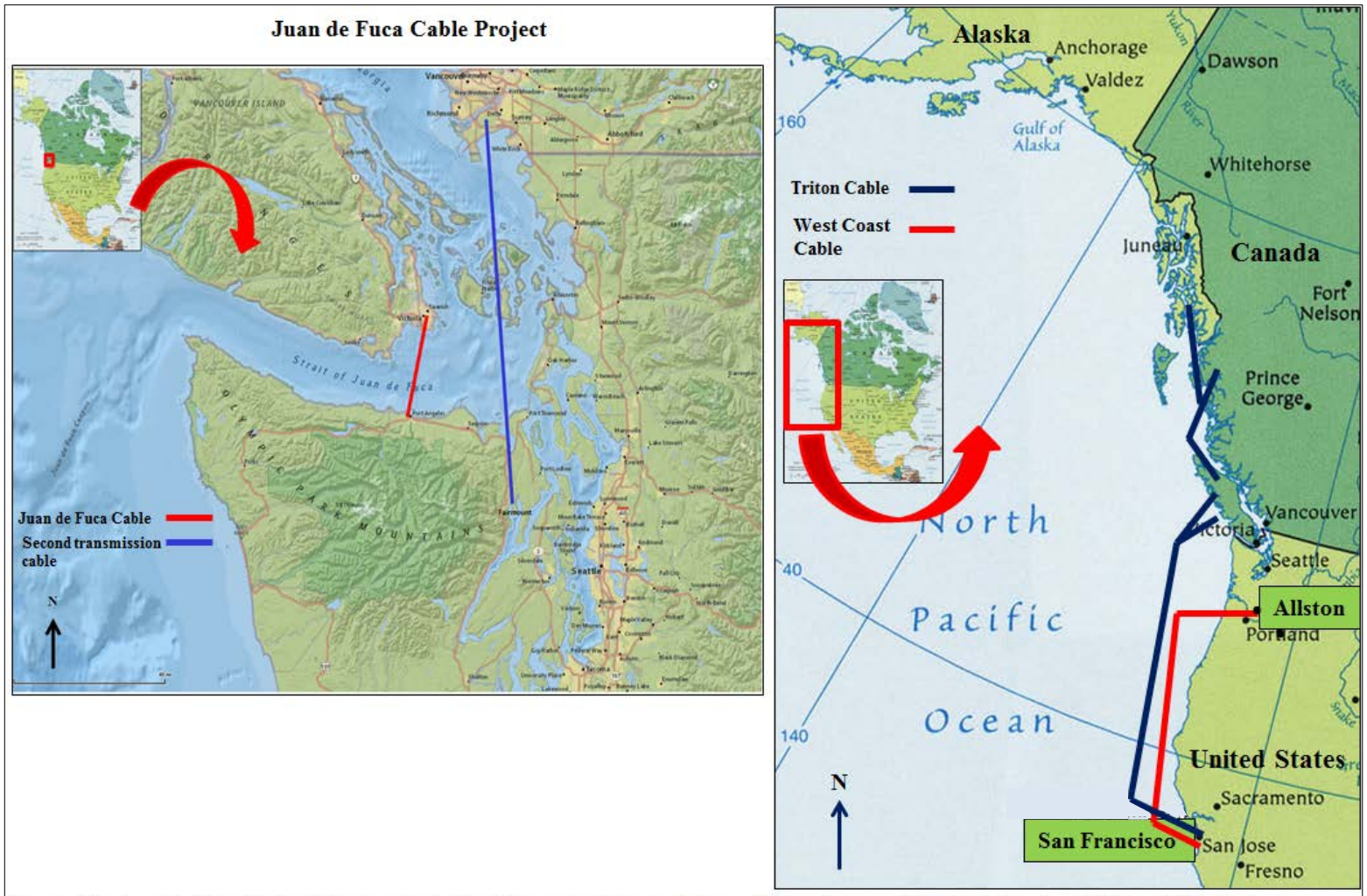

Figure 12. Juan de Fuca Project, the proposed plan for a second transmission cable project, and the West Coast and Triton Cable Projects (adapted from Sea Breeze Power Corporation 2011a and 2011b and WECC 2012; maps courtesy of the University of Texas Libraries, the University of Texas at Austin (2011) and US Energy Information Administration (2008)

BPA substation in Port Angeles (see figure 12) (Sea Breeze Power Corporation 2011a). The length of this line will be 50 km, with 12 km in British Columbia, 2 km in the United States, and 35 km underwater (Sea Breeze Power Corporation n.d.- a). The Juan de Fuca Cable will be constructed using one of the most advanced technologies in transmission based upon high voltage direct current (HVDC) Light rather than alternating current (AC), which is used in most long distance high voltage networks.[42] According to Sea Breeze (2011c), the construction and installation of Juan de Fuca Cable Project will be carried out from 2012 to 2013, taking approximately two years. Moreover, Juan de Fuca Cable will be bidirectional and transmit approximately 550 MW of power capacity (Sea Breeze Power Corporation 2011a). Bi-directionality implies not only that the energy will flow in both directions, but also that this transmission project intimates the consolidation of a region through a reciprocity of flows, rather than its symbolic marginalization through unidirectional exclusion in which energy flows only from the power generator to the consumer.

In addition to Sea Breeze Power Corporation functioning as the primary manager of Juan de Fuca Cable Project, various other corporations are integrated in this private plan. One of them is Boundless Energy NW, Inc., a company that worked on the 660-MW-Neptune Transmission Project that connects New Jersey to Long Island with 107 km (67 miles) of cable (Neptune Regional Transmission System (RTS) n.d.). Another participating corporation is Energy Investors Funds (EIF), a financial group that has recently risen to prominence in the world of finance because of its investments in many projects sponsored by the independent power industry (EIF 2009). The fourth private

[42] Some utilities use HVDC Light systems, especially for underwater transmission.

corporation involved in the Juan de Fuca Project is the Swedish-Swiss power corporation, ABB, one of the world's leading companies in electric and engineering systems.

In addition to Juan de Fuca Cable Project, these representatives also pointed out the possibility of constructing a second transmission cable from the Vancouver city area to the Fairmont substation near Port Townsend (see figure 12) (Gawley 2005a). Furthermore, Sea Breeze Power Corporation revealed plans to erect another transmission line, the West Coast Cable (see figure 12), a project that would connect an electric substation in Portland, Oregon to the San Francisco Bay area (Sea Breeze Power Corporation 2011d). With a length of approximately 965 km (650 miles) and a transmission potential of 1,600 MW, this project would be the longest HVDC submarine transmission in the world (Sea Breeze Power Corporation 2011d).

Certainly, Sea Breeze is revolutionizing electric transmission in the Pacific region because their projects are integrating advanced technologies such as HVDC transmission systems. At the same time Sea Breeze's plans have an enormous potential to consolidate the electric grid of the region. But what is truly novel about the Juan de Fuca Cable is that this project is a pioneer in the construction of a new electric transmission landscape in this trans-border region in the Pacific Northwest. Two aspects demonstrate the originality of this project. In the first place, Sea Breeze Corporation could become the first electric utility that will control the construction and management of a trans-border transmission line on both sides of the frontier in the Pacific region. There is no company, public or private, that manages a high-voltage line that crosses the border (see figure 11). The federal and crown agencies, BPA, BCTC and BC Hydro, and the private corporations Fortis BC and Cominco-Teck, own and manage these four trans-border

connections, but only in their respective countries. Although they interexchange electrons through the border, and other companies called “power marketers” launch packages of electricity to both countries, none of them possesses the control of a trans-border high-voltage transmission line that spans the border. Although electrons understand nothing about the frontier, the physical transmission infrastructures through which they flow are anchored to nation-state infrastructures. Sea Breeze will contribute to the construction a new regional trans-border transmission landscape.

In the second place, since the beginning of the twentieth century, the trans-border interconnections have been practically exclusively in the hands of federal entities such as BPA or BC Hydro (also BCTC). As already observed, there is only one private corporation, Fortis BC, which manages one of the four contacts on the border (see figure 11); however, this transmission line runs on one side of the border only, in Canada. Fortis BC manages therefore the interconnection in Canada. Sea Breeze will be the first *private* power transmission project to run electricity through the border in this region. Sea Breeze will therefore establish a type of private channel in this electric landscape in the Pacific region. Juan de Fuca Cable Project represents a rupture of the federal and royal establishment with the beginning of the privatization of power transfer through the border.

Furthermore, Sea Breeze has launched another transmission project, the Triton HVDC Sea Cable Project (see figure 12), that could be significant not only as a private trans-border channel connecting British Columbia and the United States, but also because it could connect the Alaska grid to the west of North America. With a total transmission capacity of approximately 1600 MW, this cable would link the southeast region of Alaska

to the San Francisco area by an underwater cable (WECC 2012). Although Alaska is a U.S. territory, this region remains isolated from either of the national grids[43]. In other words, through Sea Breeze Corporation's private channels, this corporation has the potential to redraw the electric transmission landscape and open the gates for private transmission projects through the nation-state framework.

Various private projects that highlight this new electric panorama in the Pacific can be seen in figure 13. The Montana Alberta Tie Ltd, represented by number 9 in figure 13, is planned to interconnect the Canadian province of Alberta to Montana. This projected project emphasizes the changing landscape of electricity networks in the region in that it, similar to the Juan de Fuca Cable, is a trans-border project constructed and maintained by a private corporation, the Montana Alberta Tie Ltd, a Calgary-based company and a subsidiary of Tonbridge Power Inc. (integrated nowadays in Enbridge Inc.). And as in the case of the Triton Cable, the Montana Alberta Tie integrates regions that sit outside of Cascadia's traditional borders.

Another transmission project in this series of new private trans-border projects is the NorthernLights Celilo Transmission Project, represented by number 8 in figure 13, a DC cable that would run 1,561 kilometers (970 miles) from Alberta to the BPA substation in Celilo, Oregon (TransCanada 2008). Currently, there are plans to expand this line even further north in Alberta and south all the way to California (TransCanada 2008). Curiously, TransCanada, the Calgary-based company that owns this project, has become a sort of corporation *non grata* because of its role in the construction of the controversial Keystone Pipeline Project, a plan designed to transport hydrocarbons

[43] Another transmission project, AK-BC Intertie, could be constructed by BCTC in the near future, linking the southeast of Alaska and BC grid (Alaska Energy Authority 2010).

extracted from oil tar or bituminous sands in Alberta, Canada, to the Houston area in Texas (TransCanada 2012a). Called "Wrong Pipeline, Wrong Assessment" by the *New York Times* (Chameides 2011), this project, which is still pending, as the final decision has been postponed by President Barack Obama until 2013 (U.S. Department of State 2012), would transfer millions of cubic meters of hydrocarbons through a pipeline with a high probability of oil spills in the middle of the rich agricultural areas in South Dakota

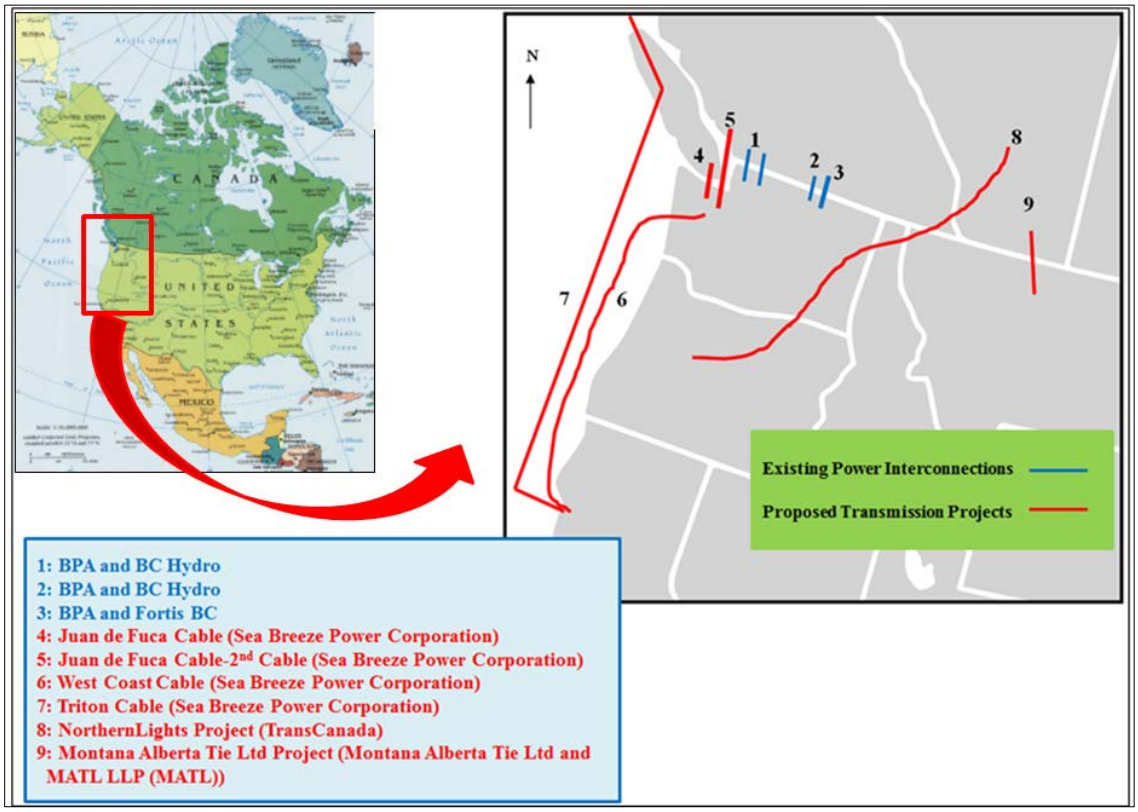

Figure 13. The existing and proposed trans-border power transmission projects (adapted from TransCanada 2008; Sea Breeze 2011a and 2011b; Enbridge, Inc. 2011a; BC Hydro 2012a and b; and WECC 2012; map of North America courtesy of the University of Texas Libraries, The University of Texas at Austin (2011)).

and Nebraska, putting at risk one of the principal underground aquifers in the world, the Ogallala Aquifer. TransCanada's notorious role as an international oil transporter calls

attention to the changing role of private corporations in the transfer of electricity across national borders.

Taken as a whole, these new electricity projects reflect a change in the configuration of electric transmission in this region. This regional trans-border energy landscape is becoming both denser and more diversified with the entrance of new private projects. The proliferation of trans-border electricity projects over the past five years suggests that the growth of the trans-border region will be implemented through private channels. Sea Breeze is pioneering the private connections between Canada and America in the Pacific Northwest, threatening any utopian dreams of a regional identity, with a binding neoliberal reality. Besides its internal consolidation, this electric region in the Pacific will be experiencing a new extension with the incorporation of isolated or outlying territories such as Alaska, Montana, or Alberta, a fact that is quite striking in figure 13, where the red lines representing these new projects are expanding the Cascadian borders in all directions.

If the southeast of Alaska has **"**a long history of working toward energy independence" as State Senator Bert Stedman claims (Southeast Alaska Power Agency (SEAPA) 2012), then projects such as the Triton Cable not only threaten the self-sufficiency of the state, but also menace the dreams of a coherent Cascadia by redrawing its initial ideal borders. Taken in consideration with the other new projects such as the Montana Alberta Tie or the Northern Lights Project, the Triton HVDC Sea Cable seems to be using the idea of Cascadia to push the boundaries of Cascadia outwards. In other words, just as a regional discourse about Cascadia is being amped up, the region is being expanded beyond its own limits. Another way to look at it is to see that with each new

electricity project, neighboring regions get bound together, creating what is starting to resemble a national grid. For the first time in U.S. history the hitherto balkanized electricity network seems to be uniting into a national energy network. Moreover, this new grid is about to burst its national framework, and stitch together the U.S. and Canada through the border, to become the first North American electric block.

4. Reviving Regional Relics in a Global Era

That the boundaries of Cascadia are being expanded at the very moment that the idea of Cascadia is being so aggressively peddled, suggests just how potent the concept of regionalism is for expansion and development. Not surprisingly, then, this current robust regionalism of Cascadia finds echoes in the past, especially during periods of rampant development. In this section, I place Cascadia's regionalism in a historic context and demonstrate how the concept of regionalism has been vital for economic development. I identify four stages of regionalism in the Pacific Northwest: proto-electric regionalism, federal regionalism, bilateral regionalism, and global-private regionalism (see figure 14). And I claim that at the center of each re-emergence of the regional identity is a stepped-up need to power the nation through new electricity projects.

With projects such as the Elwha dams, built during the first decades of the twentieth century, hydroelectricity began to shape the region's identity. Not only was the Pacific Northwest hailed, as the Southwest desert was, as the nation's last corner of wilderness to be conquered, but it was also meant to lead the way--conceived of as a sort of avant-garde in the process of lighting up the region's surrounding cities. A multitude of small public and private dams such as the Elwha (1913-27), the Condit (1913), the

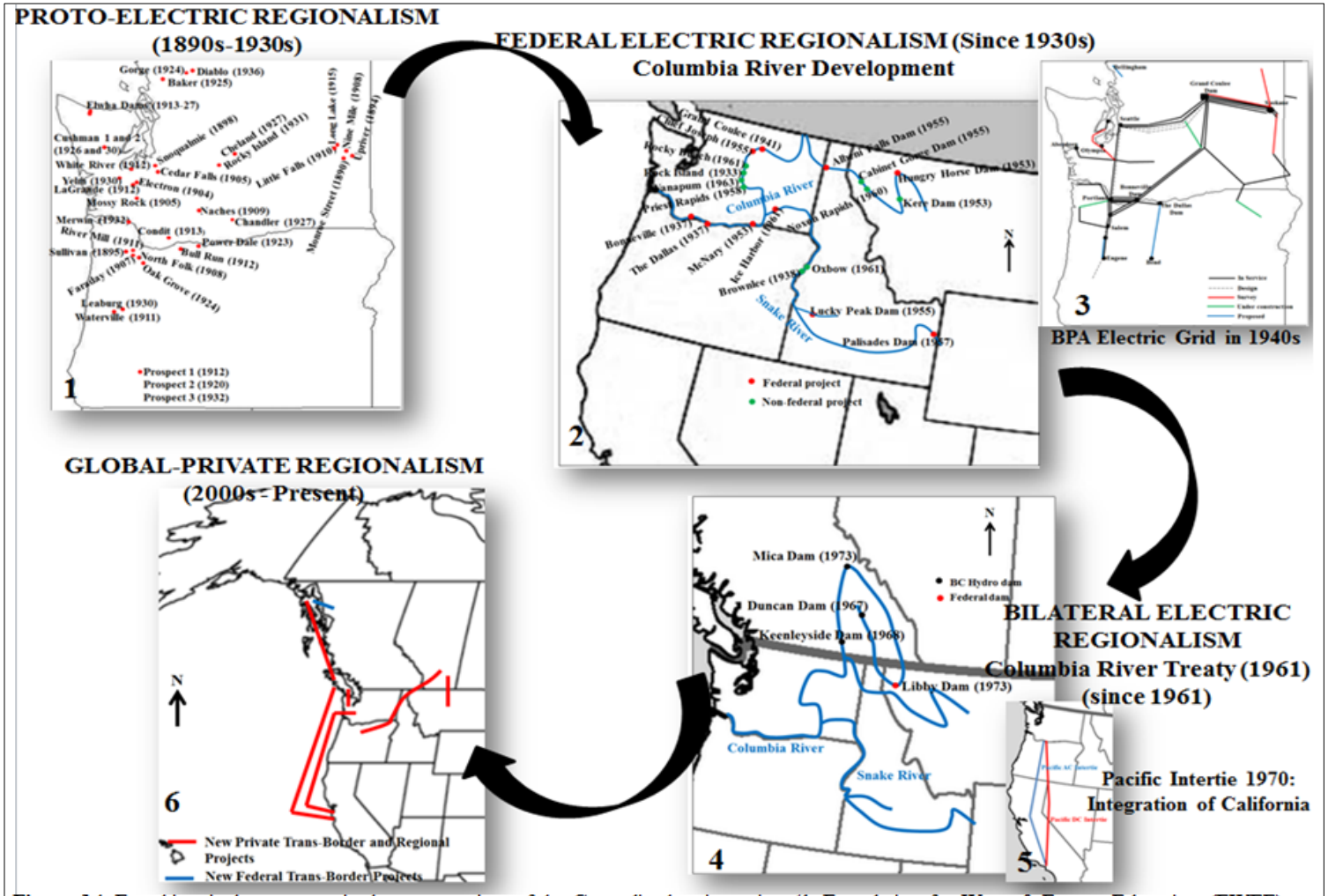

Figure 14. Four historical processes in the construction of the Cascadia electric region (1. Foundation for Water & Energy Education (FWEE) 2012a and b; 2. adapted from Columbia Basin Research 2008, 4; 3. adapted from BPA 1944, via Holstine 1988, 4; Krutilla 1967; 5. adapted from Northwest Power Planning Council 2001; 6. adapted from Alaska Energy Authority 2007, TransCanada 2008, Sea Breeze 2011a and b; Enbridge, Inc. 2011a, BC Hydro 2012a and b, and WECC 2012)

Cushman (1926-30), and the Faraday (1907), enabled cities like Seattle, Portland, and Port Angeles to grow by supplying much-needed power for their budding economies. An electric grid was in the making that would provide the basis for territorial consolidation. This first phase in the production of a regional identity, which I am calling "proto-electric regionalism" (Figure 14), ends with the large-scale entrance of the federal government into the energy business. The Elwha dams were one of the last small private projects of this era.

Franklin Delano Roosevelt's grand-scale development of the Columbia River with the construction of the gigantic dams such as the Grand Coulee and the creation of the Bonneville Power Administration (BPA) propelled regional consolidation and national expansion as never before as can be seen in figure 14. With the spread of consciousness about the River's new productive role in the area, a sense of territorial community was formed. As Richard White (1995, 64) indicates, "In a sense the Columbia River dams made the Pacific Northwest a region. The lines of the Bonneville Power Administration marked the region's boundaries." Roosevelt propagated this regional project as an enterprise that would invigorate the nation. On the home front, towns, cities, and even rural areas throughout the nation were woven together through electrical wires to create a strong national fabric, especially during the rural electrification programs under the New Deal Administration in the 1930's (Schwantes 1996). During the Second World War, regional resources were heralded as the key to national triumph. Eric Storm's (2003, 252) argument that regional agencies have been fundamental in the construction of national symbolisms is useful to help us see how the federal government in this case managed this regional project to illuminate the national

mission. White (1995, 69) indicates that Roosevelt's regional projects involving the Columbia River changed "the relations of the region to the nation as a whole" because it ruptured the theoretical historical colonial dependence on the powerful East coast. Under what I call "federal regionalism" (Figure 14) Cascadia came into its own as a vital powerhouse of the nation. Yet, regional consolidation fueled exclusively by government interest would prove insufficient during the next stage of national development.

As the United States' desire for power continued to grow, the government sought new solutions to its energy needs. But building more dams on the Columbia River was not an option, as there were no more sites available within the U.S. (White 1995, 77). The solution, then, became a deal with Canada, an innovation that characterizes the third phase of regional identity, "bilateral regionalism," depicted in figure 14. The Columbia Treaty, signed in 1961, stipulated that Canada would construct three dams on the Canadian side of the Columbia--the Mica, Duncan, and Keenleside (Krutilla 1967, 90). Electricity from these dams would be generated for the U.S. market and revenues returned to Canada. This agreement helps to explain why North-South flows dominate the current electricity grid, as energy generated on the Canadian side was transferred to American cities as far south as Los Angeles. But more importantly, it explains how Canada came to form an integral part of the region that is called Cascadia.

Canada continues its role in the development of energy for the U.S. market in the fourth stage of regionalism, global-private regionalism. However, new private players appear on the scene in the new millennium. These companies, predominantly self-described as "green" and "renewable," I suggest, are not being called upon by the U.S. and Canadian governments because of their expertise in green energy, but rather, because

of their fluency with a wide range of energy-related industries, including mining, engineering, and transporting oil and gas. The pioneering work of modernizing the electricity grid can therefore be left to them, while the larger and more sensitive projects of consolidating, but overall supervising the first national electric grid for can be done by the federal government, as it occurred with President Eisenhower and the construction of the first national highway system in 1956. Although Mike Heyek, senior vice president of American Electric Power, indicates that unlike Eisenhower's highway system, they "don't need federal dollars to build the interstate transmission grid," the reality is that the construction of this compact national network will possibly require the central oversight of the federal government (Gold 2009).

Sea Breeze itself is a prime example of the sort of diversified experience that Ottawa and Washington value. Much can be learned about this company through its name. Sea Breeze is actually the sixth name of this company that began operations in 1979 as GHZ Resource Corporation, a company specializing in mining of all sorts (TSX Venture, Inc. n.d.). After the company changed its name to Canadian Reserve Gold Corporation in 1994, it soon became Christina Gold Resources Ltd. in 1996, Powerhouse Energy Corporation in 1998, and then International Powerhouse Energy Corporation in 2001 (TSX Venture, Inc. n.d.). Throughout its first twenty years, this company mined nearly everything under the earth's surface with the exception of oil and gas, and in 1998, it took on water (TSX Venture, Inc. n.d.). It was not until 2003 that it turned to the "mining" of wind, and with its most recent name change signaled a green turn, introducing itself as the refreshing Sea Breeze.

Sea Breeze's name change conveniently occurred just two years before the announcement of the Juan de Fuca Cable project in 2004-2005. Figure 15 puts this critical period in a wider context as it indicates the winds of change that Sea Breeze's name-change exemplifies. A flurry of corporate activity appears to have happened since 2005, as we can see in figure 15. Most of the new trans-border power transmission projects were announced between 2005 and 2007, suggesting both that this new type of private transmission project is no mere happenstance and that there must have been a few years of incubation prior to 2005. Sea Breeze's new name, it turns out, was just the tip of the iceberg.

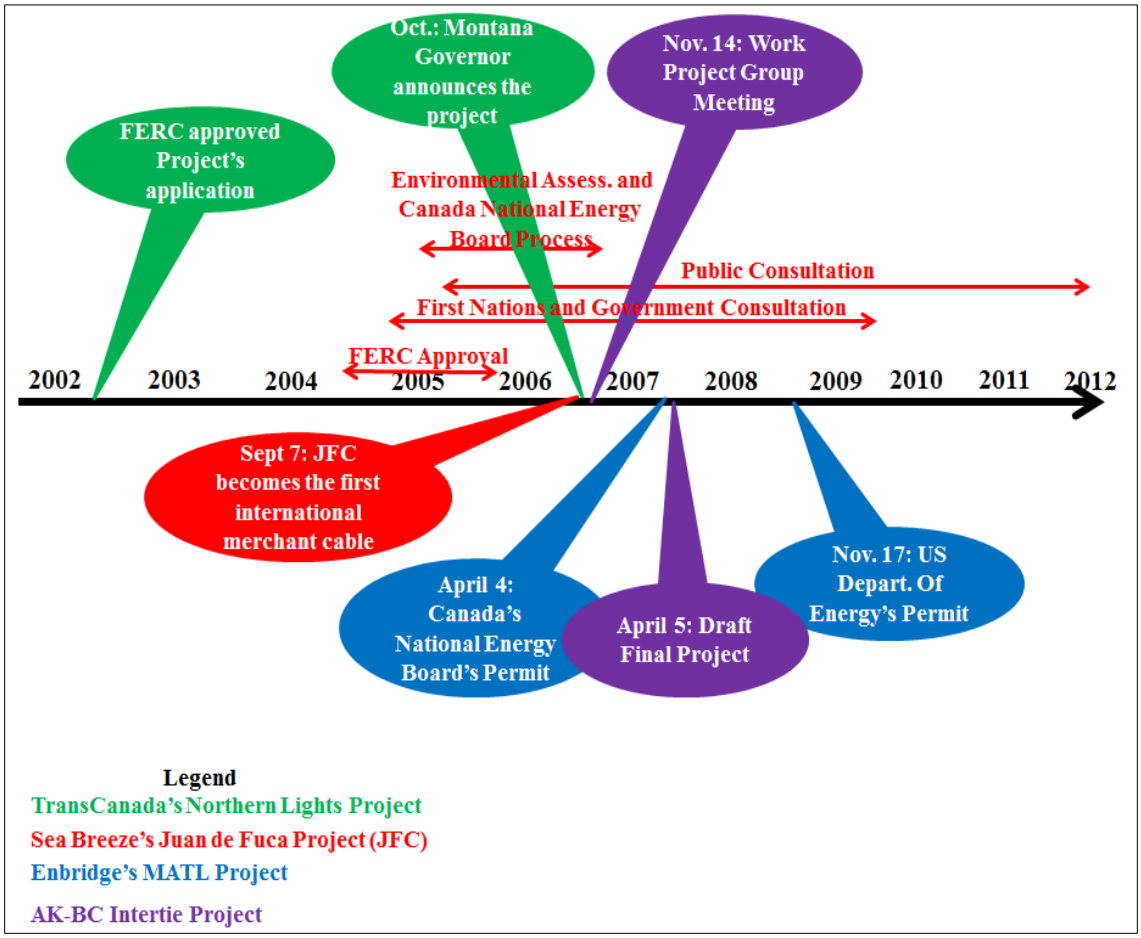

Figure 15. Approximate time schedule of the projected trans-border regional electric transmission plans (TransCanada 2004; Gawley 2005a; *Transmission and Distribution* 2006; Hatch Acres 2007; Enbridge 2011b; Sea Breeze 2011a and c)

With the examination of Sea Breeze's name changes, not only do we see the wealth of experience that the company brought to the table, but also its flexibility. Such dynamic features are shared by the other corporations involved in the cross-border transmission lines discussed in this chapter. Like Sea Breeze, many of these companies are well-versed in electric transmission, as we have already seen. And they also have long and diversified histories in all sorts of energy-related industries. The Swedish-Swiss corporation ABB, for example, is one of the largest engineering corporations in the world.

Comino-Teck, a mining and metal corporation and Fortis BC, which controls over 47,000 km of natural gas pipelines, are two private Canadian companies that, as seen above, own and operate respectively one of the four electric transmission connections that run from Canada to the United States. Enbridge, a Calgary-based company that will construct and operate the Montana-Alberta Tie-Line (MATL), specializes in the transport of crude oil and natural gas, as does TransCanada, which transports 20 percent of the total natural gas consumed in North America (TransCanada 2012b). With their wealth of experience in electric transmission and their diversified expertise in the energy sector, it is no wonder that the federal governments have welcomed these companies onto the scene.

As these corporations improve the "obsolete" infrastructure through their trans-border electric transmission projects, federal governments work behind the scenes to consolidate the existing grid and promote the creation of a future electric grid that interconnects the whole country, as demonstrated with the foundation of new federal agencies such as the Office of Electric Transmission and Distribution (TD) and the Office

of Energy Assurance (EA) in 2005 and later the Office of Electricity Delivery and Energy Reliability (OE) under the U.S. Department of Energy. Today what is happening is nearly the reverse of what occurred from the 1930s to the 1960s, the golden age of the Columbia River, when the government was the main pioneering entrepreneur in the region. The shift, perhaps, intimates a different strategy during an era in which all things public are maligned, and private forces are heralded. An example of this strategy can be seen in the current space race. One of the most potent symbols of U.S. power has been NASA. Yet, in May 2012 a private corporation, SpaceX, brought cargo to the International Spatial Station for the first time (NASA 2012). This entrance of private agencies into the highly symbolic national realm does not suggest a weakening government, but rather a new strategy in which NASA focuses on future expeditions into space such as Mars or the asteroids, while private corporations take over residual work (Dunn 2012). What this example seems to indicate is not an abdication of governmental power, but rather a re-orientation of strategies that enables both growth and consolidation to take place, using the most efficient means to get the job done. It is within this context that private corporations can obtain their niche. The supervision of the future national network is an adventure that the federal government is promoting in coalition with other public and private agencies, similar to the exploration of the Asteroids belt and Mars, which propels a new national symbolism in the 21st century.

5. Promoting Cascadia: "Electric Regionalism" and the Ideology of Choice

One of the many pleasures that Port Angeles offers is a walk along the Ediz Hook. Like a tongue penetrating into the ocean, this narrow sedimentary-sandy structure that protects the port of this small city from storms is a perfect location from which to

contemplate the panorama of San Juan de Fuca Strait. Facing south, the Olympic Mountains rise majestically above the clouds, framing Port Angeles like a picture postcard. Pointing north, the mountains of Vancouver Island appear dwarfed in comparison, and Victoria seems much further away than just a ninety-minute ferry ride. Indeed, only the daily flow of the Coho and Victoria Express ferries running between Port Angeles and the provincial capital of British Columbia, the city of Victoria, seem to connect the two towns. Despite the awareness of Canada created with the daily movement of cars, passengers and trucks carried by these ferries, Canada often appears as a deformed silhouette buried in the fog caused by contact between the cold upwelling oceanic waters and the warmer Pacific air above. Perhaps Jack Gunter's painting *The Sarah Cronauer Memorial Bridge to Victoria, BC* (2009), recently exhibited as part of his art show, *The History of the Olympic Peninsula including the Future*, is an exception in this general lack of awareness of the northern neighbor. This painting, pictured at the beginning of this chapter, portrays the cities of Victoria and Port Angeles connected by a mammoth-sized bridge (see figure 8).

Evoking the Italian Surrealist, Giorgio De Chirico's eerie vanishing points and stark architectural lines, the bridge seems to both connect the two geographical points and push them further apart. Perhaps this is because the belly of the bridge is the focus of the painting, rather than its two endpoints. Appearing to burst at the seams, the bridge contains hundreds of empty retail spaces and waterfront properties, offering up to prosperity what seems to be a hollow future in which every last piece of Port Angeles is up for sale. Gunter's painting bridges the gap between Port Angeles and Victoria at the same time that it calls into question the motives behind the recent flare up of interest in

imagining the transnational region of Cascadia. We must not forget Gunter's critique as we look at one of the most fertile engines of these recent imaginings, a series of meetings between the Canadian company Sea Breeze Power Corporation and Port Angeles's officials and citizens that began in 2005 and continue into the present. These meetings have done a great deal to raise awareness in Port Angeles of their not-so-distant neighbor.

At these meetings as well as in various public documents, Sea Breeze has consistently defended its Juan de Fuca Cable Project as a regional plan that will consolidate the Pacific Northwest territory. On the portion of its webpage devoted to the Juan de Fuca Cable Project, Sea Breeze defines its project as "a progressive regional approach to transmission technology" (Sea Breeze Power Corporation 2011e). Furthermore, Sea Breeze claims that the principal goals of this cable are "to increase opportunities for economic development, provide more secure and reliable electrical power, and promote international trade for the residents and businesses of the Pacific Northwest – especially on the Olympic Peninsula and Vancouver Island" (Sea Breeze Power Corporation 2011e).

Through these meetings Sea Breeze has tried to demonstrate to the public that their project was a necessity to solve the extraordinary problems that the current electric transmission grid is experiencing. Sea Breeze portrayed the grid, most of it controlled by BPA, as an obsolete framework that will not be capable of keeping the future rhythm of power flows necessary to nurture the development of the region. Thus, in one of the public hearings Resja Campfens, Vice President of Environmental Affairs for Sea Breeze Pacific Regional Transmission System Inc., stated that "the region is energy-constrained. The electric grid is aging" (Gawley 2005a). Campfens added that BPA "will not be able

to meet the area's peak power needs after 2007" (Gawley 2005a). This could explain why BPA had plans to construct a second transmission line to bring more electricity to the Olympic Peninsula from the south (Gawley 2005a). Anything could generate a sudden congestion of the system, and Sea Breeze's transmission plan, Campfens claims, "is an opportunity."

Indeed, this transmission plan is an opportunity not only to reinforce the internal electric network of the U.S. northwest and Canadian southwest section, but also to strongly interconnect the end-grid points of both countries in the western-most section of the grid. The Juan de Fuca Cable Project is represented as a constructive machine of regional landscapes, or as a "bridge" as Mike Wise, Sea Breeze Project Manager, points out (BPA 2010) through which power "would go from south to north or north to south, wherever, and really it is between the supplier of the electricity and the customer that would determine where the electricity is going." But that is not all that is being connected here. Wise's visualization reveals a consumerist ideology that promotes the capacity of the customer to 'choose' or "determine where the electricity is going." Not unlike Jack Gunter's painting that converts a bridge, a structure that has long been associated with public works, into a sort of bloated shopping-mall on stilts, Wise envisions his transmission project not as a mechanism that distributes equally and homogeneously power through the border, but as a selective instrument that brings energy directly from the producer to the specific consumer depending on economic strategies.

Through posters, maps and other documents Sea Breeze, like many other private corporations in the region, has forged an ideology that we could call "electric

regionalism," and this discourse has influenced public opinion. A good example of this type of ideological maneuver appears in a recent cartographic representation on Sea Breeze's website. In a figure titled *Completing the Missing Link,* Sea Breeze displays two maps that correspond with the current stage of the electric grid as well as its future situation including its transmission project Juan de Fuca Cable (Sea Breeze Power Corporation 2011f). Whereas one of the maps shows the current electric network as disconnected and disarticulated especially in its most western section, the other map emphasizes the importance of Juan de Fuca Cable Project as a type of territorial amalgamator that satisfactorily interconnects the electric grid. Without Sea Breeze's proposed cable, the electric system looks incomplete, like a gaping mouth or a broken circuit. But with the inclusion of the project on the map, the mouth is filled, and the circuit is closed. Here Sea Breeze represents the Juan de Fuca Cable as a tool to reformulate the energy transmission landscape of the region.

Demonstrating this regional strategy yet again is a video posted on Sea Breeze's website meant to articulate the necessity of the Pacific West Coast Cable Project (Sea Breeze 2011g). This video demonstrates the logic of constructing a cable to transfer power from the Pacific Northwest to California. As the video implies, without the transmission lines proposed by Sea Breeze, the western-most area of the map is orphaned—left out of the grid and out of the region. Only the construction of the cable could close this Pacific regional circuit and unite the region, as shown in this video. It is as though Sea Breeze sutures together the region through the construction of these transmission cables. With the use of such maps, Sea Breeze constructs a new geographical vision of the region as whole, complete, and unified.

In the same way, Montana Alberta Tie Ltd and MATL LLP (MATL) corporations, two electric utilities that are building the other pioneer transmission project through the border, the Montana Alberta Tie Ltd., are practicing a similar cartographic tactic. A map advertising the current trans-border connections across the northern border of the U.S. and the Southern border of Canada, depicted by figure 16, presents an empty space between Alberta and Montana.

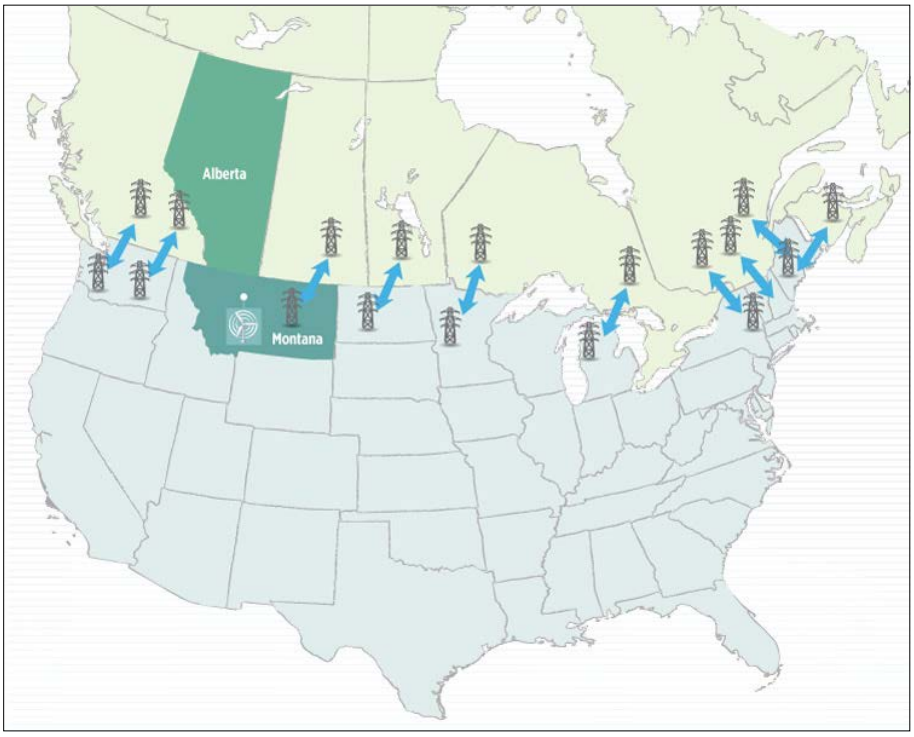

Figure 16. Trans-border electric interconnections and the Montana Alberta Tie Ltd (Tonbridge Power, Inc. 2010; Courtesy of Enbridge, Inc. 2011a)

Whereas almost the whole border is articulated through the high-voltage interconnections between both countries, Alberta and Montana appear disconnected, as territories that call for a regional articulation[44]. Like a chant this map, with its repetitive

[44] Although electricity circulates through the border, the wires, high-voltage towers and other transmission facilities are restricted to a national structure. Sea Breeze ruptures this aspect because this Canadian company will be settling its cable infrastructure in both countries.

iterations of connectedness, beats out the necessity to close the remaining gap and unite the territory. In the words of the geographer Thongchai Winichakul (1994, 130), a scholar who has explored the creation of the nationalism in Thailand, we could say that all of these corporations, Sea Breeze, Montana Alberta Tie Ltd, and MATL LLP have developed public campaigns that "anticipated a spatial reality, not vice versa." That is, these documents help to configure a new political and economic discourse that advertises a future regional reality between countries, a new spatial awareness articulated in electric flows. From the perspective of Port Angeles, Vancouver Island will no longer be just that distant territory where the wild wolf roams and the salmon swims, and Victoria will no longer simply be a cosmopolitan town with British Victorian airs. Sea Breeze is re-sparking that old geographical dream of the regional integration of the Pacific Northwest, first conceived of as Cascadia.

Underneath Sea Breeze's regionalist discourse based upon flexible interconnections between the power producer and consumer lies a material reality. Whereas most of the time Sea Breeze has described its project as a type of vehicle with no other aim than the consolidation of the region, not surprisingly its representatives rarely refer to the fact that its main objective is commercial. Although the construction of the Juan de Fuca Cable Project will interconnect and therefore more firmly consolidate the regional grid between British Columbia and the BPA network, this transmission plan is a private transmission line focused on the generation of electricity for financial gain, a reality that was clearly exposed by the BPA representatives in the public hearing held at the Port Angeles Library in 2007. There, BPA representatives tirelessly insisted that although Juan de Fuca Cable Project possesses the potential to reinforce the electric

network, it is a private project that does not have to do with their federal agency (BPA 2010). Thus, Jerry Pell, a U.S. Department of Energy Project Manager, insisted that Juan de Fuca Cable "is not a Department of Energy project…It's not a federally designed project" (BPA 2010). Demonstrating the separation of this private plan from the public and federal spheres, Mark Korsness, BPA Project Manager, said that "The cable is being proposed by a private company as a commercial opportunity to sell capacity across it."

And Mike Wise, a Sea Breeze representative, bluntly stated during the hearing, **"**We see it as a commercial opportunity to reinforce the grid" (BPA 2010). In response, a member of the public raised the question that if the project is constructed as a "commercial opportunity," then "Who do you perceive to be your market?" Wise replied that "Our market would be companies that are generating electricity in British Columbia. And it would be companies in the Pacific Northwest that would want access to that generation" (BPA 2010). That is, Juan de Fuca Cable Project would be a private conductor that would facilitate the regional trans-border commercial relations between the power producers in British Columbia and the consumers on the U.S. side, obtaining benefits from both parts as a transmission utility. In short, although Juan de Fuca is touted as a territorial consolidator of the electric grid this enterprise will be carried out through channels of privatization and commercialization. This transmission project could be understood as a type of regional neoliberal vehicle that combines discourses of territorial consolidation and *laissez-faire* strategies through this trans-border territory. Sea Breeze is pioneering the private connections between Canada and the United States in the Pacific Northwest, threatening any utopian dreams of a regional identity with a binding neoliberal reality.

6. Conclusion

Corroborating Matthew Sparke's thesis that corporations cultivate the regional identity of Cascadia in order to foster their own neoliberal projects, I have shown how the Juan de Fuca Cable Project is at the forefront of a group of new private electric transmission projects that propagate the idea of a coherent region to muscle their way into what has hitherto been a public domain. With their new private trans-border connections, these electricity projects are chipping away at the federal monopoly of electricity that had prevailed in this region since the turn of the century, and facilitating further corporate penetration through the cross-border grid. Whereas Sparke sees little proof of on-the-ground corporate regionalism outside of the logging industry, I suggest that the new electricity projects, such as the Juan de Fuca Cable, operate within regional boundaries. They therefore offer perfect sites through which to trace this new phenomenon of trans-border-corporate regionalism. What we find when we look closely at the electricity projects slated to happen within the upcoming decade, is a territorial expansion of the Cascadia region as well as an agglomeration of regions. Within the next ten years, we may have the first nation-wide electric grid as a result of this current influx of private transmission projects. But the birth of a nationally-integrated electricity grid is not the only end-product of this corporate-sponsored regionalism. While projects such as Sea Breeze's Juan de Fuca Cable solidify the regional bonds of Cascadia through its trans-border connections, it is also in the vanguard suturing Canada and the U.S. together through private channels, changing the electricity landscape of both countries by creating the first North American electric transmission block.

While many in Port Angeles have experienced the dam removals as the end of an era and the beginning of a new identity, few have thought about how this identity might be sparked by electricity. In this chapter I have shown how changes being made to the electric grid in the wake of the dam removals signal a new phase in the construction of the energy landscape that puts regionalist discourse at its center. In the next chapter, I continue in this line of inquiry by considering how the rise of interest in "renewable" and "green" energies gives a further push to corporate regionalism. Uncovering a useful alignment between corporate interests and new green technologies of transmission, I demonstrate how the technologies themselves become some of the newest promoters of Cascadia's bio-regional identity.

CHAPTER IV

Exporting Green Energy: Canada's Challenge to the Cascadian Ideal

> [The Ecotopians] . . . have a sentimental dislike of stringing power lines over their landscape and believe there is something unnatural in processes that concentrate gigantic quantities of energy at any point (Ernest Callenbach, *Ecotopia* 1975, 111-112).

> There is a lot of wild territory up in BC – – with few to monitor the impacts or get concerned over the development" (Rich Bowers, personal communication 2009).

1. Introduction

In *Ecotopia* (1975) Ernest Callenbach narrates the strange trip of Will Weston, a *New York Times* reporter who visits Ecotopia, a fictional territory seceded from the United States, comprised of Northern California, Oregon and Washington. Like Gulliver in Jonathan Swift's *Gulliver's Travels*, Weston travels around this odd land describing with a mixture of surprise and admiration the peculiar and sometimes radical ecological views of the Ecotopians. Callenbach portrays Cascadia as a world beyond industrialism, without pollution, and devoid of the ideology of constant economic growth that permeates modern capitalist societies.

Paralleling Callenbach's ecotopian scenarios, sociologist David McCloskey also contributed to this ecological view of the region. Borrowing the concept of "Cascadia" from the geologist Bates McKee's book *Cascadia: Geological Evolution in the Northwest* (1972), in the late 1970s McCloskey began teaching various courses at Seattle University in which he analyzed the connections between culture and nature (Henkel 1993, 110). Subscribing ideologically to the bioregionalist[45] movement that emerged

[45] Peter Berg is considered the main figure of the bioregionalism. Kirkpatrick Sale (1994; cited in Henkel 1993, 110) defines 'bioregion' as "a part of the earth's surface whose rough boundaries are determined by

between the 1960s and the 1970s, McCloskey represented this region through its natural foundations. In one of his better-known works, a map that depicts the Pacific Northwest (see figure 17), McCloskey treated this region biogeographically. He imagined this territory as a colossal water system that was governed by the hydrological cycle; as McCloskey (cited in Henkel 1993, 113) says, Cascadia "is a land of falling waters."

Figure 17. *Cascadia* (David D. McCloskey (circa 1988, Cascadia Institute,(reduced from a 3' X 4' wall map)). This map "depicts major river systems and watersheds as proxies for ecosystems in a bioregional geography." (Courtesy of David McCloskey)

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natural rather than human dictates, distinguishable from other areas by attributes of flora, fauna, water, climate, soils and landforms, and human settlements and cultures those attributes give rise to."

Callenbach and McCloskey have been key figures in the propagation of Cascadia because they re-imagined this region as a natural territory, as a "bioregion" that balances human activities and natural conditions. A catalogue produced by the Port Angeles Fine Arts Center (2009) for a recent art exposition titled *Envision Cascadia: 33 Pacific Northwest Artists Imagine a Homeland* still propagates this ecological vision of Cascadia several decades later, stating that "conceived with a belief that political boundaries should match ecological boundaries, the realized nation of Cascadia is above all a distinct bioregion inhabited by a people who have environmental stewardship as their primary ethic." In fact, most of the Californians and Northeasterners interviewed in this fieldwork perpetuate the notion of the Pacific Northwest as the last ecological refuge of the country (Group Interviews 2008, 2009, 2010, 2011). Moreover, this vision is currently being reinforced through a spate of river restoration projects such as Marmot Dam in 2008, Elwha dams (on-going deconstruction), Condit Dam in October 26th, 2011, the future projects to remove the Klamath dams (2020) and perhaps the four-lower Snake River dams. That is to say, the notion of environmentalism is deeply rooted in this geographical project called Cascadia.

Corporations wanting to operate in the region are extremely sensitive to Cascadia's bioregional identity and they use it to their best advantage. Sea Breeze Power Corporation is one such company. This corporation's projects in the region combine renewable energy with regional identity primarily by advancing windmills as the source that will reinvigorate Cascadia. Promoting new renewable projects such as wind farms to be built in Canada and their Juan de Fuca Cable through which this energy will flow, Sea Breeze promises to usher the region into a new green era. Whereas McCloskey has

imagined Cascadia as "a land of falling waters," Sea Breeze is reimagining it as what we might call "a land of blowing winds."

In the previous chapter, I have examined how a group of companies, with Sea Breeze at the forefront, have capitalized on Cascadia's regional identity to facilitate their neoliberal agendas, focusing on the politics, policies, and physical infrastructure behind the construction of the region. In this chapter, I hone in on another sort of politics, what we might call "ecopolitics," in which corporations exploit ecological values to promote regionalism for their own ends. Specifically, I show how Sea Breeze has used Cascadia's vision of itself as a bioregion to implement its energy projects. Publicizing itself as a company that fosters renewable energies, especially wind, Sea Breeze has been able to implement a commercial agenda that is not as green as it would appear.

Although Sea Breeze has propagated a vision of the Juan de Fuca Cable as a green channel, bringing winds from the North, in reality the energy that the cable will carry will not come totally from the wind. It will come from a series of small run-of-river hydroelectric projects and other hydroelectric facilities in British Columbia. Located in remote mountain areas, a small run-of-river project is a type of hydro facility that diverts water from a mountain stream and brings it to a powerhouse often located at the bottom of a valley. However, Sea Breeze does not want to admit that publicly because first of all, it would not be opportune in the current cultural climate since Port Angeles has just conducted the largest dam removal in history and is therefore sensitive to such projects. And secondly, these new hydroelectric facilities are not considered renewable sources under the laws of Washington and California states. In their campaigns, Sea Breeze

therefore emphasizes their wind turbines as their chief energy plan, and windmills have been used to camouflage the burgeoning energy sector.

Sea Breeze has arrived at the right time and the right place. Just as Port Angeles removes the two dams that have supplied the city with energy for the past century, and rids itself of a remnant of its past regional development, this corporation is offering an alternative form of development that complements the revived ecological values of the region being promoted by the river restoration. Sea Breeze's ability to capitalize upon the winds of change in the region is not just accidental good luck, but rather a strategy that combines astute political, infrastructural, and ecological planning. Sea Breeze's strategy highlights a new historical period in the construction of the American energy landscape characterized by the corporatization of a bioregional identity.

2. Winds of Change?: The Wind Farm Project

Sea Breeze's webpage represents a radical change in the political discourse of energy corporations within the last decade. Whereas British Petroleum entered into the millennium with an iconic new logo consisting of a yellow-green daisy and a promise to go "Beyond Petroleum", Sea Breeze's website exhibits peaceful-looking wind turbines as its public image. Wind turbines perched on top of an outcropping of rocks and evergreen forests, a landscape typical of the Pacific Northwest, introduce the world to this corporation, advertising Sea Breeze's harmony with nature, and a post-industrial, renewable scenario for Cascadia. Sea Breeze's President, Paul B. Manson, comments on this page that they are "a renewable energy company focused on *unlocking* British Columbia's enormous but *stranded* renewable energy potential" (Sea Breeze Power Corporation 2011h; emphasis added). These forces have to be not only awakened and

unlocked, but also exploited in order to develop British Columbia and the region. Sea Breeze has deemed wind power and the sophisticated HVDC Light transmission technology as the main ways to unlock and channel renewable powers from the Canadian province.

Further into the website, sits a much more accurate representation of the corporation's agenda to domesticate Canadian resources for an American market. A Magritte-like image of a plug, wire, and electric outlet hanging in space and superimposed onto the Juan de Fuca Strait obscures where the power is coming from, as the electricity cord is conveniently cut from its source, or at least the source exists off the page, out of the viewer's sight. Exactly what type of energy is being transmitted through that cord, it seems, is not only out of sight, but out of mind as well. Reinforcing the abstraction of the grid, the image invokes the surreal magic of electricity, always available, but rarely known. Yet, it also manages to domesticate electricity with its depiction of the common household outlet, and in the process this second image domesticates the Juan de Fuca Cable, which it clearly is meant to symbolize. The cable brings the consumer what he or she most wants without the complications of thinking about where it came from.

Sea Breeze wants the public to think that all of its electricity comes for just one source—the majestic windmills that front its website. Situated approximately 35 km northwest of Port Hardy on the northern part of Vancouver Island, Cape Scott Wind Farm (formerly Knob Hill Wind Farm Project) has been propagated as the main energy source to be transferred by the Juan de Fuca Cable (see figure 18) (Sea Breeze Power Corporation 2011i). Because of its location on the top of a plateau near the coastal line,

Cape Scott facility has an extraordinary exposure to air masses coming from the Pacific Ocean (Sea Breeze Power Corporation 2011i). This wind power complex will be built in two phases, the first of which is scheduled to be completed by late 2012 (Sea Breeze Power Corporation 2011i). Phase I is to build 55 wind turbines of 80 meters tall with three 50 m-long blades; this wind facility has a power generation capacity of 99 MW, that is, enough capacity to supply around 30,000 homes (Sea Breeze Power Corporation 2011i).

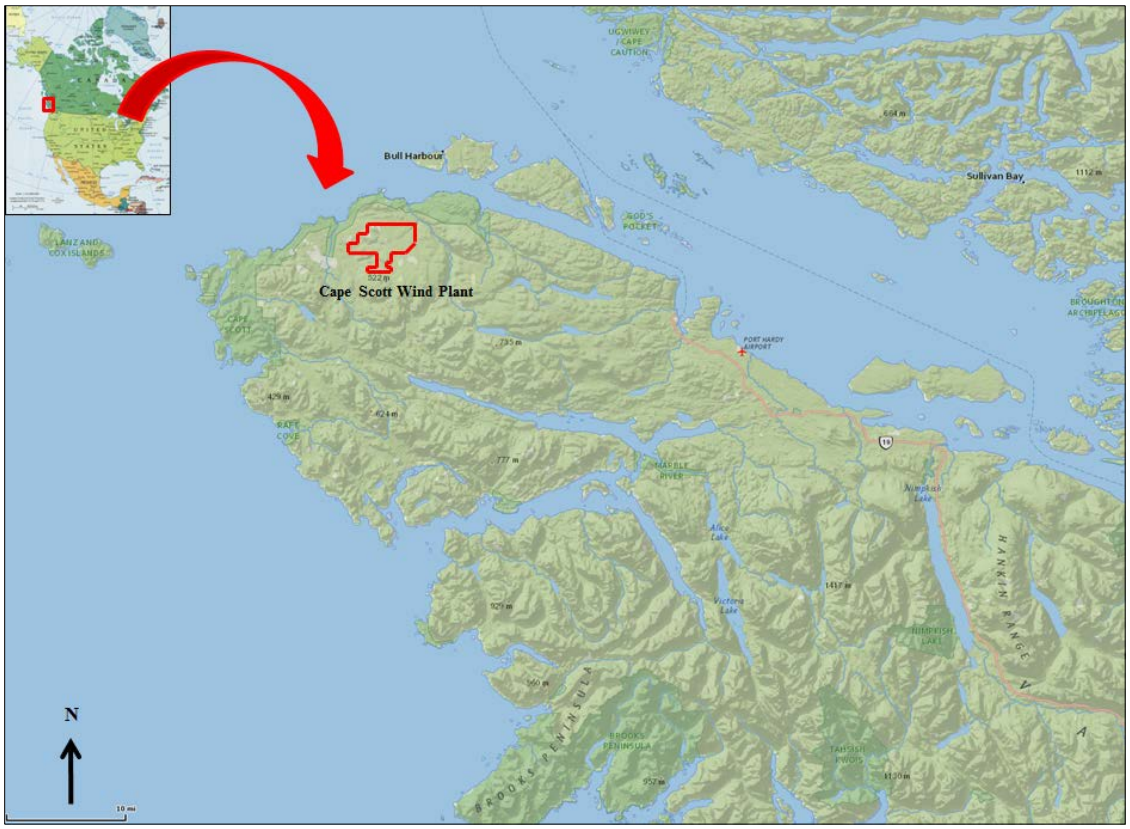

Figure 18. Cape Scott Wind Farm (adapted from Sea Breeze Power Corporation 2011i; map courtesy of U.S. Energy Information Administration 2008)

Although initially Sea Breeze Power Corporation designed and owned this project, the International Power Canada together with the French corporation GDF Suez now owns phase I of the Knob Hill Wind Farm project (CNW Canada Newswire 2011).

Besides the payments from the sale, Sea Breeze will also obtain royalties based upon a percent of the total benefits of the project (CNW Canada Newswire 2011). Although Cape Scott Wind facility is no longer owned by Sea Breeze, it continues to be marketed as the main renewable energy source to be transmitted by the Juan de Fuca Cable.

In addition to the wind farm project, Sea Breeze has insisted that the other foundation of its energy enterprise is the Juan de Fuca Cable (see chapter III for more details), an innovative electricity transmission project that would be capable of providing enough power for approximately half of a million of people. Sea Breeze in collaboration with Boundless Energy NW Inc., Energy Investors Funds, and the Swedish-Swiss corporation ABB Inc. will implement this trans-border transmission plan. According to Sea Breeze, this cable would be the main conductor of the renewable energies generated through the windmills in the North of the Vancouver Island.

These two projects, Juan de Fuca Cable and the Cape Scott Wind Farm, have been articulated by Sea Breeze to form the foundation of their enterprise in the Pacific region. Their importance is demonstrated at public hearings as well as in corporate documents. Thus, for example, during a public meeting that Bonneville Power Administration (BPA) hosted in 2005 at Peninsula College, Port Angeles, Sea Breeze Power announced that its Juan de Fuca Cable transmission line project would be the principal channel through which renewables would come from the north (Gawley 2005b). Maps, posters and other documents showed that the energy that would come to Port Angeles through the Juan de Fuca Cable would be generated from wind power facilities, especially Cape Scott Wind Farm, located in the North of Vancouver Island (see figure 18).

The explanation given by Sea Breeze representatives in this meeting seemed clear. As Mike Wise, Sea Breeze project manager, indicated: “We are trying to be as open as possible to describe what the project is” (Gawley 2005b). However, some details revealed at the 2005 meeting sparked doubts about this ecological-energy project for this researcher. Although Cape Scott Wind Farm Project was shown to be the main component of these “alternative” energy sources, Resja Campfens, Sea Breeze's vice president of environmental affairs, offhandedly commented that this wind farm facility would have to compete with other energy sources in an auction if it were to occupy a space in the Juan de Fuca transmission cable (Gawley 2005b). Campfens added that although the wind farm network was the foundation of this project, Juan de Fuca Cable Plan was no longer dependent on those wind projects (Gawley 2005b). In other words, the majority of the energy that would flow along Juan de Fuca Cable would not come from this wind facility, but from other energy sources, which may or may not be green; moreover, the lack of transparency concerning the potential sources suggest the latter.

Two years later, these initial suspicions were confirmed at another public hearing (see also chapter III) at the Port Angeles Branch Library where a few members of the public seemed to catch some of the contradictions. Though some of the public believed that the wind power facilities in Vancouver Island would be the main energy source transmitting power along the Juan de Fuca Cable, others thought that something remained murky. For example, Mark Korness, the Bonneville Power Administration (BPA) project manager, answered an attendee, who believed that this power would come from a wind source, that that it could, but that he was not sure about it (BPA 2010). Even, Mike Wise, the Sea Breeze representative, claimed they could not affirm that these wind facilities

would be the main package of electricity to be carried along the Juan de Fuca Cable (BPA 2010). Although Wise underscored how the coastal section of the province had great potential to install wind facilities, he, at the same time, pointed out the advantages that the region held for hydroelectricity, especially small run-of-river projects (BPA 2010).

Wise did not assure his audience that Cape Scott wind facility would be the main power source for the project. Yet, he subtly points out the possibilities that hydroelectricity, overall small run-of-river facilities, has in this Canadian province. Wise's lack of clarity is perplexing. Did he mean that perhaps small run-of-river hydroelectricity could be integrated as just one part of the whole? Sara Mitchell, one of the Sea Breeze Power Corporation executives, triggered these doubts again when she said that although the Cape Scott Wind Farm would be *a priori* one of the power sources to be transmitted along the Juan de Fuca Cable, they are still not sure what type of energy would be the principal one (personal communication 2009). Some of the audience was left wondering what other "renewable" power sources would be transmitted through the cable.

These uncertainties about the energy sources of the project became visible during the fieldwork phase of this dissertation begun in 2008. Through interviews and conversations with more than 300 residents of Port Angeles and environs, I noted that some interviewees had never heard of the Juan de Fuca project, but those persons that had seemed mesmerized with its semantics of "harmless" submarine transmission cables and "renewable" scenarios. Various examples illustrate this lack of knowledge as well as incomplete picture within the community. Tim McNulty (personal interview 2009), a

well-known nature writer, poet, environmental educator and activist in the Pacific Northwest commented that he had "not very much, no idea" even of the existence of this transmission project. His lack of knowledge is striking because McNulty is one of the best-informed people in the country about the Olympic Peninsula. Moreover, Lou A. Tauben (personal communication 2009), an engineer working for the Federal Hydro Projects Group integrated in the BPA, said that he had no knowledge of the project. And Glen Cutler (personal interview 2009), the Director of the City's Public Works & Utilities Department of the City of Port Angeles, commented that the only thing that he knew was that Sea Breeze would obtain those “alternative” energies from Vancouver Island in British Columbia. Incredibly, Cutler is one of the few people in Port Angeles that is in contact with Sea Breeze Corp. His department is collaborating with this company to plan the route along which the high-voltage wire will be buried under the Port Angeles streets to be connected to the BPA substation. A few days after our discussion, two of his engineers, Kathryn Neal (Water Engineer Manager) and Terry Dahlquist (Electrical Engineering Manager) claimed that this Canadian corporation was constructing wind plants in the north of the Vancouver Island to transmit that energy to the south (personal interview 2009). They said that “everybody is talking about wind, tidal experiments, etc.” However, none of them was more precise about other types of energy sources. In fact, Dahlquist added that although they hear these rumors, “my crystal ball is not enough to visualize where this power could come from” (personal interview 2009).

Whether the former Knob Hill Wind Farm would be the main energy source for Sea Breeze or not was further exposed in June 2011 when Sea Breeze sold Phase I of the Cape Scott Wind Project to the conglomerated energy group formed by Britain’s

International Power Plc (IPR) and the French multinational GDF Suez for Canadian $12 million (Herndon 2011), as mentioned above. This sale clarifies that although Sea Breeze may have initially considered the Cape Scott Wind Farm as the main energy source, this project will be neither the only nor principal power source that would run along the Juan de Fuca Cable. If Cape Scott Wind Farm Project indeed is not a vital player, what then are those other "green" energy sources that will compete, as Campfens said, with this wind facility?

Whatever these "other" energy sources are, it is increasingly clear that part of this energy package will not come solely from Vancouver Island. Considering that only 32 percent of Vancouver Island's energy consumption comes from the island, and the remaining 68 percent, 2100 megawatts, comes from continental British Columbia[46] (The Greater Victoria Chambers of Commerce 2012), it is clear that the Island will not be capable of exporting energy to the United States just from its current power generation. If the wind power project in the north of the island combined with other energy projects in the area, the only possible energy source that could be transferred through the Sea Breeze transmission line will be either from new power projects constructed on Vancouver Island or from the mainland of British Columbia. In fact, one of the Clallam County PUD (Public Utility District) engineers claimed that although initially Sea Breeze's proposal was to bring energy generated in windmills in the north of the Vancouver Island, there were rumors that indicated the possibility of bringing that power

[46] Although Vancouver Island has hydropower sources such as Campbell River hydroelectric system (BC Hydro 2012c), it cannot generate enough power to be exported since it consumes all of its own energy domestically. And in remote areas of the island, some communities have to be supplied locally with diesel-electric generators (Integrated Land Management Bureau, BC Government 2011). Although the Island has rich hydrocarbon deposits, especially natural gas, there is a provincial moratorium that prohibits the exploitation of offshore oil and gas, and the island has to import fossil fuel from the British Columbia mainland (Integrated Land Management Bureau, BC Government 2011).

from some hydroelectric generation facilities such as the Frazer River watershed located in the mainland of British Columbia (personal interview 2009).

Transmitting power from the British Columbia mainland seems more likely than from Vancouver Island because the ability to transmit power between the mainland and the Island has been enhanced with the construction of the Vancouver Island Transmission Reinforcement Project (*Transmission & Distribution* 2007). Approved in 2007 (Godfrey and Jepsen 2009) and completed in 2009 this transmission plan has increased the existing submarine transmission cables from 135 kilovolts (kV) to 242 kV (Godfrey and Jepsen 2009)[47]. In fact, Mike Wise, Sea Breeze project manager, was aware of this transmission capacity increase, which he indicated in the 2007 public meeting when he said that "there's a new transmission line that's under construction to link the mainland near Vancouver Island. So that would provide additional power for Vancouver Island" (BPA 2010). Sea Breeze, it seems, has taken advantage of its knowledge about this increase of electric transmission capacity between Vancouver Island and the mainland to implement its Juan de Fuca Cable. In other words, Sea Breeze founded a new road to the U.S. market, and a new way to circumvent the Crown's grip on the Canadian energy grid.

3. Repowering America: Flooding the U.S. Market with Canadian Hydropower

In the summer of 2009 the Hydropower Reform Coalition (HRC), a conservation organization established in 1992 to improve the fluvial conditions of dammed rivers throughout the country, organized a regional meeting for the western United States. Approximately 15 members coming from California, Idaho, Oregon and Washington met

[47] The Vancouver Island Transmission Reinforcement Project is a 600 MW-transmission project with a final cost of $295 million (Godfrey and Jepsen 2009). The company Caldwell Marine International (CMI) has constructed this project with the collaboration of Mitsubishi International (Godfrey and Jepsen 2009).

at the Olympic Park Institute near the Port Angeles. Surrounded by the Olympic Mountains and the glacial Lake Crescent, these members shared information about the health of their local rivers, but they mainly came to hear Jan Dettmer of BC Creek Protection Society, an environmentalist group from British Columbia, who was invited to respond to rumors that commercial relations had been established between Californian and British Columbian energy utilities.

According to this member, Pacific Gas and Electric Company (PG&C) of San Francisco had initiated contacts with some private electric utilities in British Columbia in order to transmit "renewable" energy from British Columbia, Alberta, and the Pacific Northwest to California. It was the first time that HRC considered a process happening outside the U.S. borders. Since then, they have included in their weekly e-mail newsletter a section dedicated to the hydraulic events in British Columbia.

Dettmer corroborated the Californian members' conjectures about the connection between PG&C and British Columbia, stating that their province was experiencing a boom of hydroelectric projects never seen before, especially small run-of-river projects, a type of hydroelectricity that has been referred to like a type of damless technology because it does not regulate the flow of the streams. The run-of-river projects exposed in this meeting form part of a coordinated energy plan established by the provincial government of British Columbia and supported by the British Columbia Independent Power Producers (IPPs). The energy plan has as its main objective the exploitation of water in this Canadian province to generate electricity through the production of hundreds of small run-of-river hydroelectric projects in the streams of the coastal mountains and inlets.

The Liberal Party of British Columbia under the leadership of the former BC Premier Gordon Campbell has been the main proponent of the penetration of the private sector into the energy market. In 2002, Campbell made his party's Energy Plan public, a plan designed to reduce the control and power of the main regional public utility, BC Hydro (Hydropower Reform Coalition 2011). Through this plan, Campbell prohibited BC Hydro from constructing new power projects, especially those involving hydroelectricity (Keller, Caldicott, and Abram 2009), facilitating the entrance of private corporations in the market. Campbell's policy forced BC Hydro to buy power from these private corporations. As a result of the plan, BC Hydro made 61 Electric Purchase Agreements (EPAs) with IPPs in February 1, 2010. Through these contracts with private energy producers, BC Hydro has been receiving approximately 10,228 gigawatt hour (GWh) annually (BC Hydro 2010).

Campbell has promoted this privatization of the electricity market not to generate more energy for domestic use, but rather to increase energy exports to the U.S. market. Although British Columbia has been importing 2,000 MW from the United States, it has in turn exported approximately 3,000 MW in recent years, which demonstrates a Canadian surplus in the balance of trade between British Columbia and United States. This tendency towards the U.S. market was corroborated by Donnald McInnes, Chief Executive Officer of Plutonic Power Corporation (nowadays Alterra Power Corporation), one of the main "green" companies in British Columbia. McInnes bluntly stated, "you'd have to be in a coma to not see where the B.C. government is going…an export plan is an obvious place for us to go" (Kimmett 2009). But what is really at stake here is not just

the simple exportation of energy to the Pacific Northwest, but the transmission of power deemed as "renewable" through which private corporations can play a crucial role.

In November 2009, Campbell announced to the Canadian public that "We have enormous resources in British Columbia and those resources allow us to provide not just the people that live in this province with green and clean, low-carbon power, it allows us to expand our horizons to build an economy based on green, clean low-carbon power" (BC Guardians 2009). In fact, in the beginning of 2010, Campbell announced his Clean Energy Act (Bill 17), a plan that is mainly focused in the exportation of "renewable" energy (Legislative Assembly of British Columbia 2010), transforming British Columbia into a leading provider of clean and low-carbon electricity for North America[48]. Campbell and his party were aware of the needs of large utilities in some U.S. states where these corporations have had to comply with recent legislation dictating the use of renewable energy. In 2006 the state of Washington passed the Energy Independence Act also known as Initiative Measure No. 937[49] that requires large utilities[50] to obtain 15 percent of their power from renewable sources by 2020 (State of Washington 2006). Furthermore, the former California Governor, Arnold Schwarzenegger, signed the Executive Order S-14-08 in November 17, 2008 that obliges large power corporations in California to get 33 percent of their energy from "renewable" sources by 2020 (The California Energy Commission 1994-2010). Moreover, the current California governor,

[48] The Clean Energy Act (Chapter 22) indicates that among British Columbia's energy objectives are "to be a net exporter of electricity from clean or renewable resources with the intention of benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia" (Legislative Assembly of British Columbia 2010).

[49] This bill obtained 52 percent of the votes, that is, 697,133 votes (MSNBC 2006).

[50] To be considered large, a utility must have more than 25,000 customers (MSNBC 2006).

Jerry Brown, has ratified his predecessor's commitment to renewable energies in 2011 (Holland and Weintraub 2011).

Under pressure created by this legislation, U.S. large utilities must find new alternative energies that can be considered renewable. British Columbia sits among the diverse territories that these companies have recognized as being good options for the extraction of green energies. The Canadian province has an enormous potential for the exploitation of water and wind sources. In fact, according to a study implemented by Kerr Wood Leidal Associates LTD and commissioned by BC Hydro and BC Transmission Corporation (BCTC) in November 2007, British Columbia could have approximately 8,000 sites to develop small run-of-river hydroelectricity with a total power generation capacity of around 12,000 MW (Hardman & Co 2008).

Furthermore, American utilities such as PG&C take advantage of the fact that British Columbia is in another country and therefore less visible to the U.S. public. For these reasons, Campbell, supported by the IPPs, has advertised British Columbia as a "green" product capable of sating that thirst of "alternative" energies inside the U.S. market. Campbell, his predecessors, and the IPPs have imagined British Columbia as a giant dynamo of "renewable" energies that can power the post-industrial world of Cascadia. In short, this province is being turned into a kind of Saudi Arabia of renewable energy (Keller, Caldicott, and Abram 2009), a virgin territory awaiting a "gold rush" of small hydroelectric projects.

Shielded under this ecological-political ideology based upon green energy exportation, the IPPs have aggressively launched a conquest of available spots in the rivers. Until 1999, the number of licenses for the construction of new hydroelectric

projects especially small run-of-river hydroelectric plants was lower than 250; most of them had been submitted by BC Hydro (Watershed Sentinel 2007). In just five years since Campbell's energy plan was announced (2002-2007), there were 365 new licenses for small hydropower projects (Watershed Sentinel 2007). And 650 "run of river" applicants have tried to control each river and stream that has potential for small hydropower projects (Keller, Caldicott, and Abram 2009). In fact, almost 600 rivers had received applications for hydro projects in this area of British Columbia.

The best example of this possible expansion of run-of-river projects in British Columbia is the macro project that the Canadian corporation Alterra Power Corporation (formerly Plutonic Power Company) and the U.S. energy giant General Electric (GE) have planned to construct on the Sunshine Coast (see figure 19). Located to the north of the metropolitan area of Vancouver, this project consists of the regularization of 39 creeks and rivers situated inside the Bute, East Toba River-Montrose Creek, Upper Toba Valley, and Knight inlet watersheds, a group of fiords located in the Sunshine Coast (see figure 19). With a budget of $4 billion, it is the most expensive run-of-river project in the history of Canada (*Business Wire* 2008). To date, the only section of this run-of-river hydroelectric complex that has been constructed is the East Toba River-Montrose Creek system that has already been connected to the electric grid in British Columbia in August of 2010 (Simpson 2010). With a final budget of $663 million and a combined generation capacity between East Toba and Montrose Creek facilities of 196 MW, this combined facility possesses a larger generation capacity than any of the eight BC Hydro hydroelectric facilities (Friends of the Bute Inlet n.d. - a). GE owns 60 percent and Alterra Power owns 40 percent of this project (Alterra Power Corporation 2011).

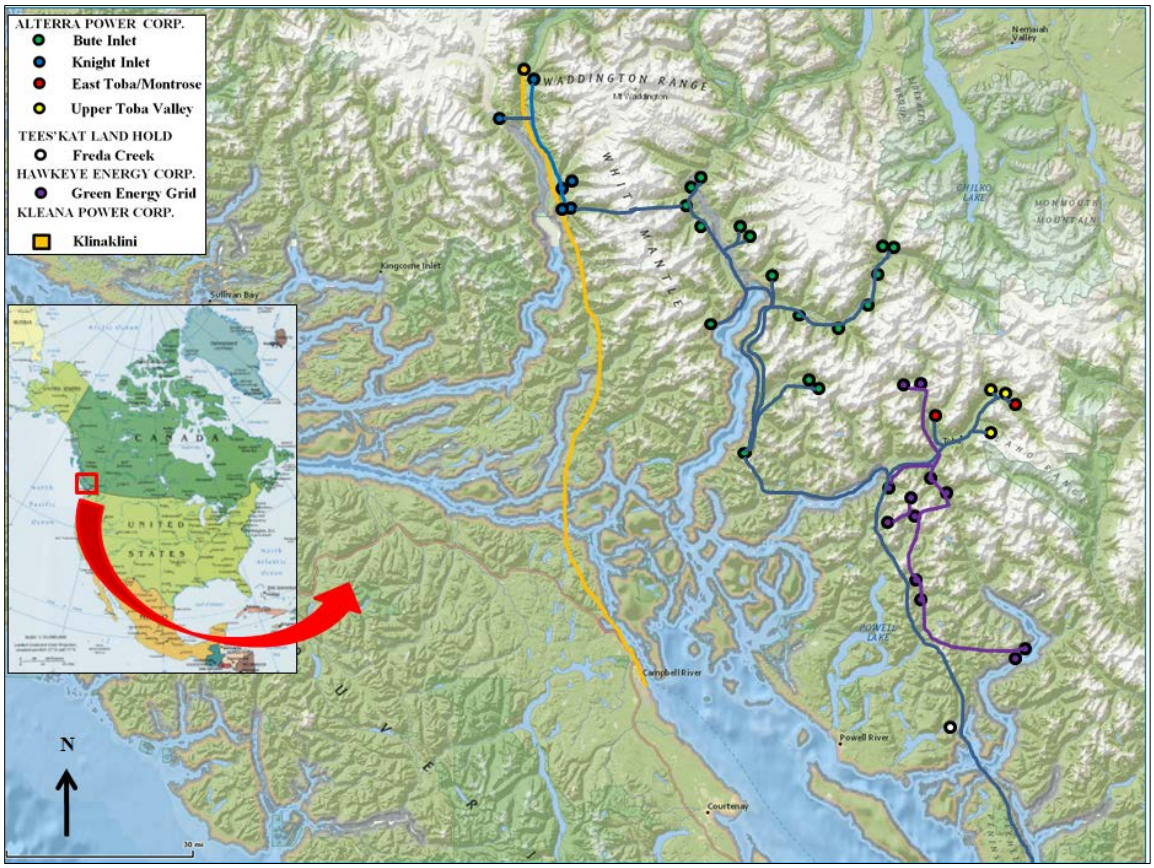

Figure 19. Hydropower development in the British Columbia coastal region (adapted from Friends of the Bute Inlet n.d. – b; maps courtesy of the University of Texas Libraries, The University of Texas at Austin 2011 and U.S. Energy Information Administration 2008)

Furthermore, another section of this macro-run-of-river complex, the Upper Toba Valley Project has been approved. Located in the deepest headwaters of Toba Inlet, this hydroelectric project (see figure 19) consists of three small run-of-river facilities[51] with a total power generation capacity of around 133 MW (Friends of the Bute Inlet n.d.- c).

It is necessary to remember as well that the largest section of this macro-run-of-river project, the Bute Inlet Project (see figure 19), has not been constructed yet because it has been provisionally rejected by BC Hydro (Friends of the Bute Inlet n.d. - d). As the

[51] These three hydroelectric facilities are Dalgleish Creek (30 MW), Jimmie Creek (56 MW), and Upper Toba River (47 MW) (Friends of the Bute Inlet n.d. - c).

largest private hydroelectric project in Canada, the Bute Inlet Project would be composed by 17 small powerhouse facilities located in the glaciated headwaters above the Bute fiord (see figure 19). Although formed by small run-of-river projects, this project forms a vast hydroelectric structure with a potential hydraulic generation capacity of approximately 1,030 MW (Friends of the Bute Inlet n.d. - d). That is, it would be similar in power generation capacity to the controversial proposed $8-billion Site C dam project (Hunter 2011).

Because of restrictions imposed by British Columbia Utilities Commission (B.C.U.C.)[52], the public entity that regulates electricity in the province, the number of projects that was adjudicated during the second week of March 2010 was 19, of which 14 correspond with run-of-river hydroelectric plans and the other 5 are wind projects (Taylor 2010). In total, these 19 projects can generate approximately 2,400 GW/hour of electricity annually, that is, enough energy to supply to 218,000 homes (Taylor 2010). Although just 19 projects have been approved (Taylor 2010), it seems that these projects could represent the first phase of a massive construction of "renewable" energy plans. R. Michael M'Gonigle (personal interview 2010), a researcher specialized in environmental law from the University of Victoria, BC, concerned about the aggressive development of "renewable" projects in the province, claimed that the adjudication of these contracts is just the beginning of a much larger plan to increase exports of energy to the U.S. market.

[52] In a 236-page document, B.C.U.C. "denied" a priori the long-term acquisition energy scheme to obtain energy especially from I.P.P.s (SurreyLeader.com 2009). B.C.U.C. claimed that BC Hydro had overestimated future energy demand of the province, and therefore, it was not necessary to get more energy from these IPPs' run-of-river hydroelectric and other "renewable" and "green" projects such as wind. John Horgan, the B.C. New Democratic Party energy critic, commented to CBC News (2009), a Canadian broadcasting corporation, that "it's a slap in the face to the B.C. Liberal." This setback caused these energy corporations to lose on the stock market (CBC News 2009).

He added that approximately $30 billion are at stake in these developments (personal interview 2010).

Many of these projects will not be granted a license because of environmental restrictions and austere policies put in place by the BC government, such as those announced in February 2012, that could reduce BC Hydro's necessity to get power from new private power projects (*Island Tides* 2012). However, some of these private corporations could succeed. Thus, for example, Kwagis Power's Kokish River Project, a $200-million run-of-river hydro project (BC Government 2011) included in the group of 19 projects that had been adjudicated, has been granted an environmental assessment certificate in December 2011. Moreover, although the Bute Inlet Project has been abandoned since 2010 because of the clean-energy policy requirements imposed on these types of projects in 2011 the Bute Inlet Project could be revived. The merger between Plutonic Power Corporation and Magma Energy, forming Alterra Corporation in early 2011, has reinvigorated the expectations of this project (Hunter 2011). Although Alterra still needs a governmental permit, Alterra has reached an agreement with the Homalco Tribe, the First Nation group living in the Bute Inlet, by promising benefits from this hydraulic operation (Hunter 2011). In other words, these projects reflect a possible future transformation of the energy landscape on a large scale in British Columbia. Although these run-of-river hydroelectric projects individually are not large, mostly occupying small mountain streams and currents, together they form a significantly large power-generation structure. Thus, for example, most of 17 hydroelectric facilities of the Bute Inlet Project have less than 50 MW of power generation capacity; however, considering

the whole 17-powerhouse structure, its total power generation capacity is similar to a third-generation nuclear power station (approx. 1,000 MW).

Furthermore, we should not forget two important aspects in this hydroelectric scenario. In the first place, the British Columbia government has plans to construct the Site C Clean Energy Project (Site C), a large hydroelectric dam that would be located in the Peace River in the northeast area of this Canadian province (BC Hydro 2012d). With a capacity 1,100 MW, it would provide enough energy for approximately 450,000 homes a year (BC Hydro 2012d). In the second place, the hydropower sector is paying careful attention to the southeast area of Alaska, a territory that has an extraordinary hydroelectric potential. According to some studies, the southeast of Alaska could yield more than 10,000 MW of hydroelectric power (*International Water Power and Dam Construction* 2011a). Thus, whereas the southeast region of Alaska has 32 existing hydroelectric plants with a total of 200.7 MW, there are currently another 32 proposed or under construction projects with a total power capacity of 395 MW (*International Water Power and Dam Construction* 2011b and c).

Increased interest in this area is further demonstrated by the conference that the National Hydropower Association (NHA) held in Girdwood, Alaska, in August 2011(Church 2011). This organization dedicated to promoting the industrial hydropower interests in the United States invited several hydropower organizations to analyze the possibilities of hydroelectric development in the southeast territory of Alaska (Church 2011). Furthermore, new macro-hydroelectric projects are appearing in other areas of Alaska, such as the Susitna-Watana Project, a 600 MW facility that could cost around $4.5 billion (Susitna-Watana Hydroelectric Project 2011). If this dam were built, it

would be the first large dam constructed in United States since the Glenn Canyon Dam in the 1960s.

Although part of the plans of the developers is to construct a multitude of small hydroelectric projects in this region to reach the state's goal of making 50 percent of the energy that Alaska generates renewable by 2025, as Alaska Governor Sea Parell promised (Church 2011), the reality is that something similar to what is happening in British Columbia is occurring in this northernmost state. These hydropower developments not only are oriented to supply energy locally, but to export power to the continental U.S. market (Brown 2011). For this reason, there is currently an extraordinary push to connect this region to the British Columbia grid through the electric power transmission line called Alaska-British Columbia Intertie (AK-BC) (see also chapter III).

Observing these hydropower plans in British Columbia and Alaska and considering the developments outlined in chapter III, it seems more and more clear that Sea Breeze's transmission projects will be largely carrying power originated from these hydroelectric projects. Sea Breeze has strategically designed its transmission projects to channelize this energy surplus. The next section will show how in order to capture these new resources, Sea Breeze has decisively exploited not only the geographical location of Port Angeles, but above all its bioregional identity.

4. Tapping into the Grid: Taking Advantage of Port Angeles' Strategic Location

When the BC Premier Gordon Campbell opened Canada's doors to the IPPs for the privatization of "renewable" energy in British Columbia, Sea Breeze entered. This Vancouver-based company clearly understood that the expansion of small run-of-river

hydroelectricity in British Columbia required new transmission lines that would channelize that energy surplus to the United States. Astutely, Sea Breeze observed that one of the best routes to install this new power line would be through the western-most section of the electricity grid in the U.S., a disconnected area far away from the main federal connections inside the grid described in Chapter III. As the main BPA electric substation at the northwest end-point of the Pacific Northwest electric network, Port Angeles is the gate through which Sea Breeze can plug "clean" and "green" energies into the BPA electric system and therefore into the U.S. Pacific Northwest market (see figure 20). In fact, this small city is the most strategic point for the Juan de Fuca Cable in the U.S. grid because it is the closest major population to Victoria where the cable begins (see figure 20); in short, the Victoria-Port Angeles axis is the main electric connection and perhaps the cheapest route to communicate both nation-state grids in the western-most section of the territory.

Moreover, Port Angeles is geographically strategic for two other major projects of Sea Breeze. The West Coast Cable, running from Alston, Washington to San Francisco, California, as shown by the green line in figure 20, would pass through Port Angeles' BPA substation. And the Triton Cable Project, represented by the yellow line in figure 20, running underwater from the southeast of Alaska to San Francisco will also have a portion of its energy flowing through the Port Angeles substation. In other words, Sea Breeze selected Port Angeles as their main station in which to connect to the United States because this small city's location and infrastructure makes it the most obvious site to implement their three transmission projects.

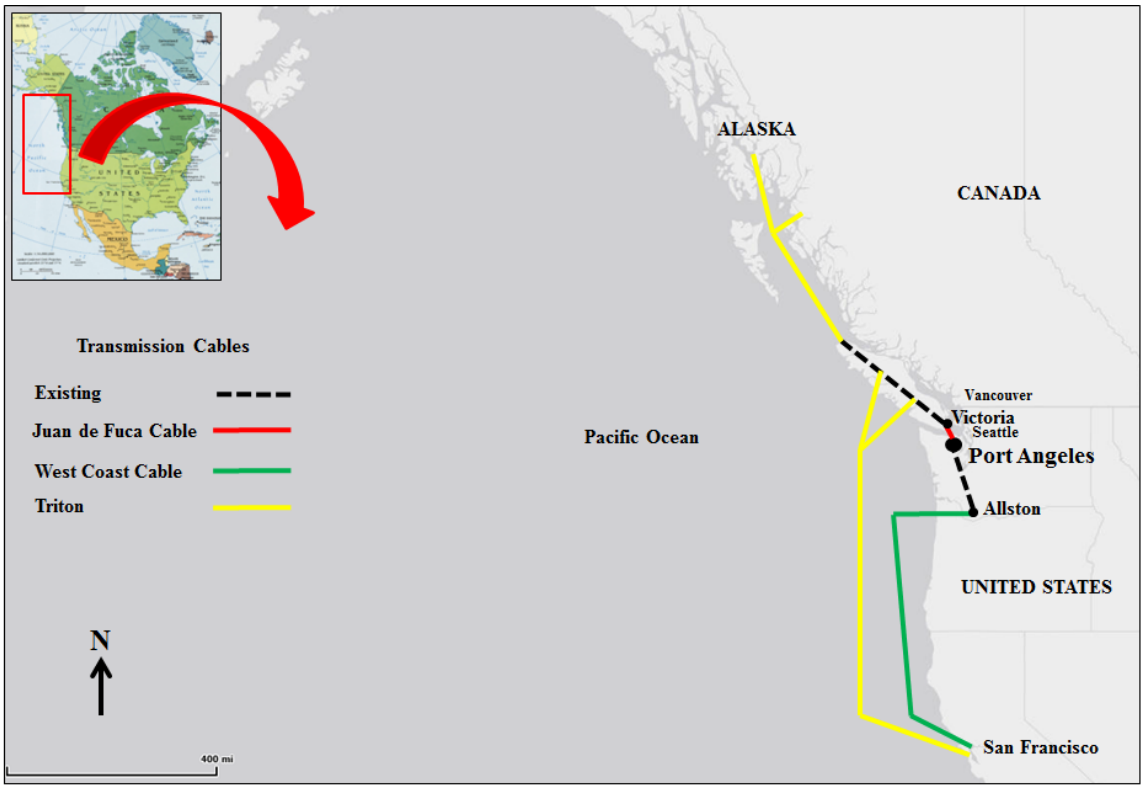

Figure 20. Port Angeles and Sea Breeze Power Corporation's transmission agenda (adapted from Sea Breeze Power Corporation 2011d and WECC 2012; and maps courtesy of the University of Texas Libraries, The University of Texas at Austin (2011) and U.S. Energy Information Administration (2008))

Port Angeles holds another attraction for Sea Breeze: the on-going Elwha dam removal project, described in the first two chapters. As the largest river restoration project in the United States, this plan has turned Port Angeles into a sort of Mecca for ecological projects. With the spotlight on Port Angeles' innovative dam removal, the sort of bioregional discourse that Callenbach and McCloskey first initiated in the 1970s has made a strong comeback. The Elwha dam removal, together with other river restoration projects such as the Marmot or Condit dams as well as a handful of proposed decommissions in the Klamath and Snake rivers, facilitate bioregionalism.

Dam removals reflect the new green perspective that has recently permeated some areas of the country, especially the Northwest, because they promise to return rivers to

their "natural" state. Jake Seniuk, the director of the Port Angeles Fine Arts Center, outlined the relationship between the Elwha dam removal project and the idea of Cascadia:

> Dam removals go with Cascadia's ideals. It tries to restore these unwild places to a more natural state. This restoration of the salmon, this recuperation of the salmon as a symbol is part of the background of Cascadia as an ecotopia. Symbolically, Cascadia came from waterfall semantics. Therefore, the restoration of a river is totally embodied in the foundation of Cascadia. It is a very Cascadian act. (personal interview 2009).

Seniuk's words recall McCloskey's vision of Cascadia, first articulated forty years ago, with a map that imagined this region as "a land of falling waters."

In the beginning of the 20th century, the Port Angeles community transformed a cultural landscape dependent upon salmon into a new ecosystem based on hydroelectricity, paper mills, and timber. Port Angeles' identity has been built on this trinity until very recently. The Elwha dams were crucial in the construction of both Port Angeles' identity and its related cultural landscape because it nurtured the industrial production of the locality. However, this landscape started to change in the 1970s when the closure of the local paper mills and timber restrictions imposed by the National Park Service prompted severe unemployment and with that an identity crisis in this community. The news about the removal of the dams, coming a decade later, only served to deepen this crisis.

The Elwha Restoration Project enables this community to recuperate confidence in their abilities to reconfigure lost connections with their place and construct a new

cultural landscape based upon ecological values. Furthermore, an influx of Californians and Northeasterners has helped to facilitate the elaboration of these new ecologies based upon environmental values. Although many residents of Port Angeles know that most of their energy comes from the large dams in the Columbia River (Group Interviews 2008, 2009, 2010, and 2011), they have become more sensitive to restoration and environmental discourses, the result of which is that hydroelectricity and dams are now unpopular for many. That is, Port Angeles has become a model that is serving to propel this new bioregionalism.

Sea Breeze is more than aware of this restoration project, of the long battles connected to it, and the ideological implications behind restoring a river to its natural state. Such knowledge is demonstrated, for example, with Sarah Mitchell, one of Sea Breeze's representatives, who (personal communication 2009) has even been in contact with Elwha Tribe council members to discuss the best path of the submarine cable to reach the coast where the Elwha Tribe controls the land rights. This is just one minor example of how Sea Breeze ingratiated itself with the community, suggesting a well-conceived plan.

Sea Breeze arrived at precisely the right time to take advantage of Port Angeles' crisis and the accompanying resurgence of bioregionalism. They alleviated fears about the dams' removals by offering not only a plan for the replacement of a vital energy source (Groups interviews 2008, 2009, 2010, and 2011), but a promise of a new identity as a green region. Cultivating wind as the main energy source that would be ushered through Port Angeles' power station while concealing any hydroelectric developments in the North, the company built up its reputation as a renewable company. Picturesque

windmills on Vancouver Island would not only generate all of the energy necessary to propel the region into the future but would also soothe fears in an uneasy time.

Sea Breeze's biggest challenge, then, was to silence news about its hydroelectric development in the North because these small hydro projects are not considered renewable energy sources under the current Washington and California laws. In the first place, the Senate Bill 5840[53] in the state of Washington passed in February 2009 includes hydroelectricity as a "renewable" source as long as its generation is the result of "efficiency improvements" in existing facilities and are completed after March 31, 1999 or hydroelectric projects installed in "water supply pipes, irrigation pipes, or canals located in the Pacific Northwest, where the additional generation in either case does not result in new water diversions or impoundments" (State of Washington 2009).[54] That is, this bill clearly excludes new hydropower projects (e.g. British Columbia's new projects) from this category (State of Washington 2009). As Rich Bowers (personal communication 2009), the Northwest coordinator for the Hydropower Reform Coalition, said: "Even with the current language in the Bill 5840, it is our understanding that power from BC would still need to meet environmental requirements here in WA – which they do not." In the second place, under the California law, those hydroelectric projects

[53] In November 2006, the state of Washington passed the Energy Independence Act also known as Initiative Measure No. 937 that required that the large utilities obtained 15 percent of their power from renewable sources by 2020 (State of Washington 2006). However, this Act did not count conventional hydropower as a way to meet those requirements of 15 percent of renewable generation (State of Washington 2006). Initiative 937 was supposed to restrict hydroelectricity and develop alternative energies such as wind or solar (Bower, personal interview 2009). Under pressure of some groups to eliminate this Act, in 2009 the state of Washington accepted to reduce certain limitations that had been imposed on hydropower. According to the Senate Bill 5840, hydropower became a renewable source; however, the new hydroelectric projects were not considered as renewable sources.

[54] In January 2013, the Republican Larry Haler, the State Representative 8th District, proposed a new resolution, House Joint Resolution 4200, to include hydroelectricity as a renewable energy source in the State of Washington (State of Washington 2013).

having a power generation capacity of 30 MW (approximately 10 MW more than the Elwha hydroelectric system power generation capacity) or less are identified as "renewable" sources; however, many of these run-of-the-river projects in British Columbia have a power generation capacity of around 50 MW because this power generation amount corresponds with the minimum requirement imposed by the BC government to any energy project developed in the province to have an environmental assessment process (Delaney 2008).

What this Vancouver utility did not want to say to Cascadians is that whereas some of "your" rivers will be cleaned up, many small streams and currents in British Columbia and most likely Alaska would be integrated into a murky industrialism in the name of renewable and ecological energy. As John Calvert (2007), a scholar from British Columbia, indicates in his book *Liquid Gold: Energy Privatization in British Columbia*: "The worst-case scenario is that we get the environmental damage while utility firms in California plus the investors who own these facilities get all the benefits."

5. Conclusion

Regionalism in North America has not had roots as deep as in Europe. Texas, Québec, or Cascadia, of course, are exceptions to this rule. Whereas Texas justifies its regional identity upon its historical development as a frontier state, Québec proclaims its geographical particularism through its cultural, historical, and linguistic connections to the Francophone world. Unlike these two regions, Cascadia structures its geographical project not only in its historical utopian conception of its territory, but also in its theoretical natural and ecological foundations. That is, Cascadia has been promoted as a type of bioregion with mountains and watersheds as its limits.

In its appearance in the energy scenario, Sea Breeze has promoted this green and ecological imagery of Cascadia through the Juan de Fuca transmission wire and the Knob Hill Wind Farm Project. The Juan de Fuca Cable will tether the north to the south, uniting the region as never before, while at the same time the wind farm facility at the northern tip of this territory promises to supply the whole region with the sort of renewable energies that will put this territory in the post-industrial vanguard. Together, these projects offer a new sort of light that will illuminate the current turbid period of global warming and greenhouse threats.

However, Sea Breeze has not shown the whole picture behind this new rescaling process of the energy landscape in the north of this region, highlighting simply the most convenient and green public image of this new transformation of the energy landscape, but concealing the proposed hydroelectric development in British Columbia and perhaps in Alaska. Sea Breeze understood that the success of its power generation and transmission enterprise depended on adapting their project to the emergent bioregionalism propelled especially by the Elwha Restoration Project. Various reasons, as this chapter has demonstrated, have forced to this company to conceal hydroelectricity as the main energy source. First, Port Angeles, the main geographical point of this plan, has become a sort of hostile territory for hydroelectricity, especially dams. Second, these hydropower projects are not considered "renewable" under recent laws in the states of Washington and California. Sea Breeze, as well as other private corporations such as General Electric Company and public entities in Canada and the United States, is downplaying the role of hydroelectric energy, especially small run-of-river projects, in

the region. Such run-of-river projects would regulate and destroy many streams in British Columbia and the southeast section of Alaska.

This chapter traces the new patterns in energy production that are emerging as the waters of the reservoirs of the Elwha recede. In so doing, it suggests that the removal of the Elwha dams was not simply a singular ecological project, but rather signals a shift in the way that nature is being produced. As big dams (often promoted by the government) have begun to be demolished, small, private “renewable” projects are taking their place, with the proliferation of "renewables" helping to privatize the electric grids. In the next chapter, I show how such projects spell out a change in the American landscape that diverts attention away from machines, such as dams, and refocuses it onto something much more ethereal, energy.

CHAPTER V

The Dematerialization of the Machine

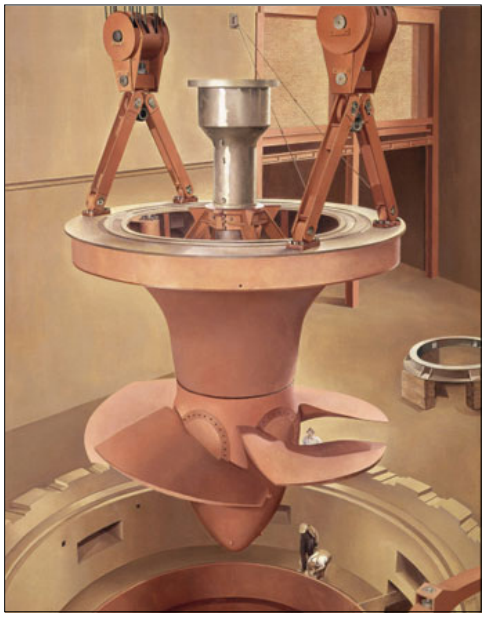

Figure 21. *Suspended Power* by Charles Sheeler (1939) (Courtesy of Dallas Museum of Art)

1. Introduction

In *Suspended Power*, Charles Sheeler, perhaps the most famous American painter of industrial landscapes, displays almost photographically the precise moment at which a group of engineers and operators install a Kaplan turbine in a hydroelectric power plant (see figure 21). In the middle of the scene, this mechanical artifact, eerily fleshy in texture, hangs by cranes above the cylindrical cavity where the turbine is about to be installed to transmit the energy of water to the generators. Compared to the omnipresence of the turbine, the couple of workers at the base of the object are dwarfed by its presence, appearing as Lilliputians lost in the middle of this cyclopean space. Sheeler's painting is like a temple to matter. Similar to René Descartes' cosmos, Sheeler's is a mechanical universe where the machine becomes the Atlas-like pillar that

sustains the American landscape. However, the overpowering presence of the machine raises questions about why Sheeler glorifies the material world in a way that marginalizes humans. One wonders, in short, what is behind the representation of this mechanical object.

In *The Whale and the Reactor: A Search for Limits in an Age of High Technology,* Langdon Winner (1986, 19), asking the reader if machines have politics, demonstrates that mechanical artifacts are not neutral mechanisms, but elements that reflect the cultural, political, economic, and ecological background of their societies. Technology is not something antiseptic that simply changes through new inventions and innovations; on the contrary, it becomes like an organism that alters in its construction and representation, depending on the diverse political-ecological transformations of society. As Lewis Mumford (1963, 6), a well-known thinker about technology, indicates in *Technics and Civilization*: "to understand the machine…is also a means toward understanding society and toward knowing themselves." Machines are therefore products, "measures of men," as Michael Adas (1989) defines them, which certainly embody the work of their workers, technicians, engineers and designers, but also implicitly integrate the ideologies that dominate that particular mode of production. The machines neither speculate nor lie, "nothing speaks more than a machine when it speaks," the Chilean writer, Rafael Gumucio (2010), claims in his denouncement of Sebastián Piñera's right-wing Chilean government during the rescue of the 33 miners trapped in the San Jose mine in the Atacama Desert.

In this context, Sheeler's turbine helps us visualize the ideological apparatus promoted by *Fortune*, the pro-corporate magazine that commissioned Sheeler in the late

1930s to glorify the machine, but at the same time understand this turbine as evidence of a sedimentary process that has accumulated over time. This turbine highlights the ideology of power, domination, sublimity, utility, and naturalization, values that have been crucial in the integration of the machine into American culture.

Between the end of the eighteenth and the first half of the nineteenth centuries the principal system of values that prevailed in the United States was the Republican discourse, an ideology, as demonstrated by Thomas Jefferson or Henry David Thoreau in his book *Walden* (1854, 1971), that idealized rural life, rejecting above all the factory and the mechanical world that predominated in Europe. Though many Americans in the beginning of the nineteenth century praised British technology, many were also afraid of its social consequences in Europe (Kasson 1976, 55). Jefferson conceived the European factory as "feudal oppression in a slightly modified form" (Marx 1964, 150). But, at the same time, he thought that what was largely responsible for these evils, was the social-political atmosphere that prevailed in Europe rather than the machine per se. Thus, he affirmed that once the machine was integrated into the American landscape, outside of the "dirty", polluted and "crowded cities of Europe", the technological artifact would be cleansed through American nature (Marx 1964, 150). Corroborating this view, Tench Coxe, an American political economist, claimed that even textile production would be more "natural" in America than in Europe (Marx 1964, 159). Coxe, as Leo Marx (1964, 159) points out, was anticipating what became the main foundation of pro-American industrialism, the idea that the New World had the capacity to "purify" the machinery and factory system.

An example of this ideology of naturalization is found among the works of George Innes, a landscape painter who was hired by the Lackawanna Railroad Company to advertise its new railway system as perfectly adapted to the countryside (Marx 1964, 220). In his *Lackawanna Valley* (1856) (see figure 22), Innes flexibly integrated the train and steam into the surrounding countryside, turning that industrial object into something as natural as the trees, the fields and the hills that surround it.[55] Marx (1964, 221) claims that "Innes' painting (train) seems to say," "there is nothing inorganic." It is as though the machine had become part of the garden. Similarly, Sheeler naturalizes the turbine, portraying this mechanical object with tones that reflect organic morphologies. The turbine becomes like a heart, a type of "cyborg", as Donna Haraway (1991, 1) would claim, embodied in the core this hydraulic organism. The hydropower machine as an industrial component was not just iron and steel, but the body itself; the mechanical artifact was not just part of the landscape, but the landscape itself.

Figure 22. George Innes' *The Lackawanna Valley* (c. 1856) (Courtesy of National Gallery of Art, Washington DC.)

[55] Wolfgang Born (cited in Marx 1964, 220) points out that Innes revolutionized the technique of painting, especially luminosity, so that the mechanical elements would seem like features of the landscape.

Sheeler's turbine possesses another ideological component fundamental for the integration of the machine into the Republic. The mechanical artifact not only had to be useful, but aesthetically pleasing, according to Ralph Waldo Emerson, an American poet, essayist and philosopher. Of the machine, Emerson claimed that "all is useful, all is beautiful" (cited in Kasson 1976, 139), meaning that just like everything else in nature, the machine had to have use and aesthetic value. Emerson was influenced by the Kantian ideology of nature that separated Reason and Understanding. Whereas Kantian Reason observed the sublime, beauty, and order of nature, Kantian Understanding saw the useful, the capacity, and the utility (White 1995, 34). According to Richard White (1995, 34), Emerson "reconciled nature with the busy, manipulative world of American capitalism. He reconciled utilitarianism with idealism; he reconciled the practical and the spiritual." The mechanical artifact, such as Sheeler's turbine, became a powerful symbol that could represent sublimity, utility, and beauty to the American public.

Dams such as Hoover, Grand Coulee or Bonneville epitomize Sheeler's aesthetic. They have been envisioned as well as Emersonian machines (see figure 1), as artifacts, as White (1995) claims, that have been vital for the remaking of nature. Dams have been hailed as eternal artifacts that regulate wild rivers, but at the same time are admired as sublime structures. With over one million people visiting it per year, Hoover Dam is an American icon (U.S. Bureau of Reclamation (2011)). Through dams such as Hoover, the hydropower machine has become omnipresent in the American energy landscape.

However, the hydropower machine is currently experiencing one of the deepest transformations in its physical-engineering construction and ideological representation to occur in the last two centuries in the United States, a change, I argue, which reflects, as

seen with dam removals and electric transmission systems in previous chapters, the production of a new energy landscape in the United States. If the hydraulic artifact, especially the dam, has represented the materiality of the machine in the landscape, this chapter argues that the hydraulic machine is being dematerialized, that is, eliminated from the environment. Demonstrating this dematerialization are the many dams throughout the country that are either in the process of being removed or proposed (see also chapters I and II). Removing dams entails deep changes in our modes of imagining the landscape and could be understood as one of the purest acts of dematerialization because it means the elimination of some of the most crucial foundations in the construction of the American energy landscape since the colonial period.

Furthermore, because of increasing opposition to dams and traditional hydroelectric facilities, pro-hydroelectric agencies are planning new ways to construct facilities that consist of hiding the machine rather than hailing it as a sublime part of the landscape. Small run-of-river hydroelectricity, a type of hydro that is making its mark in the Pacific Northwest, British Columbia, and southern Alaska (see also chapter IV), is one of the main strategies that reflect this dematerialization of the machine. Its reduced size and isolation in headwater areas of mountain streams and creeks facilitates the invisibility of the machine. These pro-run-of-river hydro agencies, moreover, have formulated an ideology that emphasizes their machinery's invisible and almost antiseptic qualities, promoting it through narratives that dwell upon the *damlessness* or *reservoirlessness* of the new technology, further advancing the disappearance of the artifact from the landscape.

A similar maneuver is happening in the hydrokinetic sector, a type of hydroelectric technology that transforms the flow of rivers, tides and other hydrological processes into electricity. With the installation of submerged turbines or the reconversion of non-powered dams into hydroelectric facilities, hydrokinetic artifacts are largely removed from the public eye. Moreover, hydrokinetic advocates extol a language of "out of sight" in the description of their projects, demonstrating an extraordinary zeal to reduce the physical and visible presence of the machine from the landscape.

In other cases such as pumped-storage hydroelectricity, the hydraulic machine is deprived of that historical prestige and omnipresence that it has had for more than two centuries. In order to continue in the commercial business of energy generation, pumped-storage advocates are promoting this machine as a complementary artifact, a type of server that works simply to facilitate the expansion of renewable energies such as wind and solar energies. Finally, the electric transmission sector is similarly advancing a strategy of dematerialization. The last section of the chapter shows how some electric corporations such as Sea Breeze or Tres Amigas LLC not only manage technologies (e.g. HVDC Light) that facilitate the physical elimination of the transmission machine, but also emphasize their projects' invisibility. In this chapter, I demonstrate that the hydroelectric and power transmission machine is no longer under the influence of Jeffersonian and Emersonian paradigm; dams no longer have to exhibit the useful grandeur of Sheeler's turbine. On the contrary, the machine is exiled from the garden, causing an astonishing dematerialization of the energy landscape.

2. The Expulsion of the Machine from the Garden

The Tate Museum of Modern and Contemporary Art in the Bankside district of London has an austere and elegant appearance as if it were constructed during the Soviet Constructivist era. In fact, it was built much more recently, begun in 1952 to provide oil-fired power for the metropolis, which it did until 2000 when it was converted into one of the most visited museums in the world. Its straight and monotonous outlines sing a sort of song to Euclidean geometry; on the inside an enormous cavity beckons, reminiscent of the smooth, hollow space of Sheeler's *Suspended Power*. During the summer of 2011, the Tate hosted Mitch Epstein's photographic collection, a bizarre and provocative set of photos showing power plants across the United States. Like Sheeler had done seven decades earlier, Epstein, a New York City-based photographer, travelled between 2003 and 2005 throughout the country in quest of the artifacts that power the United States. Wandering from BP Carson Refinery in California to the Amos Coal Power Plant in West Virginia, Epstein obtained an extraordinary photographic collection published later in his book *American Power* (2009). Like Sheeler, Epstein wanted to capture the energy and industrial machine in the landscape. However, Epstein was surprised when he discovered that the machine could not be easily portrayed *in situ*. Representing these artifacts became almost an odyssey, as Epstein understood (Kennedy 2009), and on some of his visits, Epstein was physically prevented from seeing the energy source.

When Epstein and his assistant were photographing the coal power plant in the Ohio River Valley town of Poca, West Virginia, a group of police officers approached them to investigate (Kennedy 2009). The local police in Shippingport, Pennsylvania, ordered him to leave town when Epstein was taking pictures of the nuclear power plant

there (Kennedy 2009). Unlike Sheeler who was commissioned and encouraged by entities such as *Fortune* to illuminate the machine to the American public, Epstein has been discouraged from photographing the energy artifact publicly.

Authorities justify these restrictions in the name of national security after September 11th, 2001. Thus, for example, the Elwha dam power plant Chief Manager who belongs to the U.S. Bureau of Reclamation prohibited me from entering the facilities, because I am not a U.S citizen. However, there is something else behind these stories. What these episodes seem to demonstrate is that the landscape through which Sheeler and Epstein have travelled in quest of the machine has radically changed. If in Sheeler's epoch the energy artifact was exhibited to structure the landscape, the exhibition of the machine in public is now seriously restricted, making it seem as if the landscape should be understood without it.

This tendency to discourage the image of the machine is manifest in the hydroelectric sector. Whereas federal dams such as Hoover became national and technological icons of American society, hydroelectricity is now experiencing a deep reformulation in its way of representing hydraulic artifacts, displaying a tendency to eliminate, hide, or marginalize the machines from the landscape. This new ecological-political discourse tries to dematerialize the artifact, the matter per se, in a way that is strangely reminiscent of the arrival of thermodynamics in the first half of the nineteenth century, a scientific current that understood energy as the supreme element that moved the universe and deemphasized the importance of matter. The English romantic painter Joseph Mallord William Turner portrayed this dematerialization magisterially.

Recuperating Leonardo Da Vinci's *esfumato* technique, Turner's paintings show amorphous, diluted and blurred forms rather than the sharp profiles and edges that characterize Euclidean geometry (Serres 1982, 62). Water, rocks, clouds, even machines such as steamboats or trains, in short, all that is material loses its consistency in a fractal-like atmosphere. Turner began to outline in paintings such as *Upper Falls of Reinchenbach* (1802) (see figure 23) a model that would prompt an ideological resistance to the aggressive materialism that has predominated until this day. If Michel Serres (1982, 56) claims the Industrial Revolution was "a revolution operating on matter," Turner chose to open an alternative that visualized the universe in a way that anticipated the dominance of energy over matter. Energy, or *Kraft*, was conceived as an "indestructible" and "invisible" element (Rabinbach 1990, 48), and all of nature was transformed into a gigantic dynamo that had to be exploited to nurture industrialization and articulate the incipient bourgeois economic and political system. The French thinker Gaston Bachelard (1984, 69) defines this primacy of energy in the early nineteenth century as "dematerialization of materialism." It is as though matter were melted; as though materialism "became, in a word, "transcendental"" (Rabinbach 1990, 49). Matter, as in a Renaissance painting, disappeared through the *vanishing point* in the horizon of the landscape. In the following four sections, I draw on a series of examples to argue that there is a similar dematerialization process currently occurring in the hydroelectric and electric transmission sectors. The most obvious example of this dematerialization is the dam removals, which I will not review, since I have amply discussed the phenomena in previous chapters. Dam removal is only the most visible sign of a trend towards

invisibility in the hydro industry. In what follows, I show how slowly all hydroelectric machines are being erased from the American landscape.

Figure 23. *Upper Falls of Reinchenbach*. Painting by Joseph Mallord William Turner (1802). Graphite, watercolor, and gouache, 320 x 475 mm. Collection Courtauld Institute Gallery, London, Tate Museum (Courtesy of Tate Britain Museum 2012)

3. Shrinking the Machine: The Small Run-of-River Hydro Revolution

If removing dams represents the most obvious example of an alteration in the energy landscape, shrinking the hydraulic machine is perhaps the most misunderstood. This may be because these new projects have been so well integrated into a discourse that excoriates global warming and welcomes renewable energies that few people bother to ask questions about their sustainability. Hydropower corporations, hungry to develop a new niche at a time when their traditional technologies are under scrutiny only add to the confusion. In this section, I show how one of the newest trends in hydropower design, the small run-of-river hydro, represents a diminishing of the machine in the American landscape and how that shrinkage is promoted by hydropower advocates.

The small hydro revolution erupted in the 1990s, with one of the early indications of a new outlook occurring at the first conference of the Water Power & Dam Construction held in Frankfurt, Germany in September of 1994 (McCully 2001, 274). At this conference keynote speakers pronounced a change in private investment patterns due to the fact that promoters were much less interested in investing in hydropower than they had been in the past (McCully 2001, 274). They went on to cite the reasons: initial construction costs, cost overruns, the long time period to payback, and "environmental risks" such as the resistance to the human resettlement and anti-dam campaigns, and recent environmental laws (McCully 2001, 274). The best way for the hydroelectric business to continue, they speculated, would be by investing in the building of small and medium run-of-river hydro projects (McCully 2001, 274). Scott Spahr, a senior engineer working for the Snohomish PUD (Public Utility District), puts the sentiment of the meeting most succinctly: "I think the days of building big dams like you see on the Columbia (River) are over" (Sheets 2011).

A second indication that the hydro business is going through a change of heart surfaced during a conference that took place in December of 2009 in Washington DC. Here, the Federal Energy Regulatory Commission (FERC) exposed a surge in the number of proposed small hydro projects by reporting that they had received more than 150 requests for a license to construct such projects--that is, double what they got in 2008. One could argue that the hydro business has no alternative but to develop small projects because the best sites had already been taken up by larger projects during the boom years of dam building; however, they seem to be responding to more than just territorial constraints.

Although small run-of-river technology has been in existence for decades, it is currently experiencing a sort of golden age, especially in areas such as British Columbia, the Pacific Northwest, and southeast Alaska (see chapter IV). The seven dams that have been constructed in the state of Washington since the 1980s are all very small (4 meters or less in height) (Sheets 2011). These hydroelectric projects are located in streams and creeks in remote mountain areas (figure 24). Managing a small dam, these facilities divert part of the stream flow to a pipe or penstock, represented by the red line on figure 24, through which water is conducted at a high speed from headwater areas to small powerhouses located various kilometers downhill. Because small run-of-river hydro requires a great difference in height between the reservoir and the powerhouse, it is often constructed in abrupt topographies.

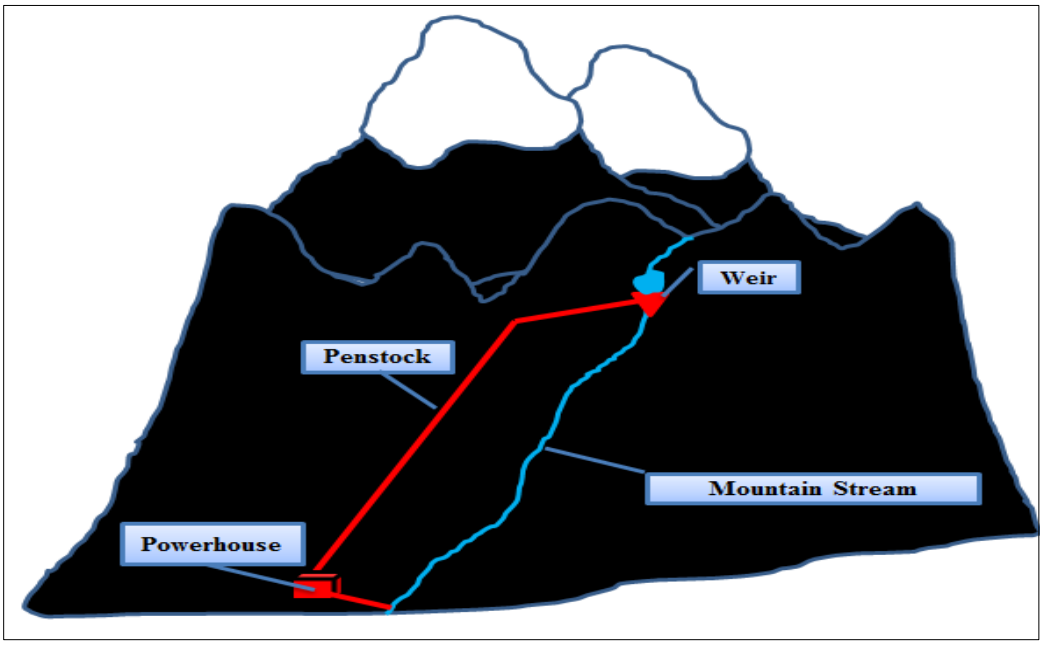

Figure 24. Scheme of a small run-of-river hydro project

If the shrunken size of this type of hydroelectric facility and its geographical remoteness contribute to the reduced visibility of these projects, at the same time, their

promoters have launched an ideological campaign to capitalize upon this near invisibility. Their best weapon is the expression itself, "run-of-river." According to Hydropower Reform Coalition (2006), run-of-river refers to a hydropower mechanism that "generates at the rate of inflow without change as a result of storage in a reservoir" (Hydropower Reform Coalition (HRC) 2006). That is, the same amount of water arrives to the dam as leaves it without creating any accumulation or alteration of that current. This concept implies the non-existence of a dam, weir or obstacle in the current. In fact, these electric corporations insist that their projects are *damless* artifacts. As the Independent Power Producers Association of British Columbia (IPPBC) (2008), the principal agency projecting and constructing these projects in British Columbia, points out on its web page: "run-of-river encompasses small-scale hydroelectric projects that require no dam." They include run-of-river together with hydrokinetics, tidal or wave power generation in that category known as *damless* technology. Ledcor Power Inc. (2009) Corporation, a Canadian Company based in Vancouver, says on its web page that in one of its run-of-river projects, the Ashlu Creek Project (today developed and owned by Innergex Renewable Energy Inc.) "a dam will not be constructed." Corroborating this ideology, Sarah Mitchell, a Sea Breeze Power Corporation representative, claims, "I am in favor of small and run-of-river plans…They don't have dams that create impacts in the environment" (personal communication 2009).

The reality of these projects, however, is different. The typical run-of-river project has a small dam that is often a few meters high (figures 25a and b). Corporations refer to this small dam as a "weir" to reduce the bad press. Thus, for example, the Plutonic Power Corporation's dams proposed for the East Toba and Montrose hydro

projects were 6 meters high (Watershed Sentinel 2007).[56]

But, perhaps the most interesting aspect of these weirs is that they are neither fixed nor permanent hydraulic structures, but removable artifacts formed by inflatable materials such as rubber (e.g. Plutonic Power Corp.'s Rutherford Creek Project) or Coanda screens[57](e.g. Plutonic Power Corp.'s Brandywine) (see figure 25a and b). These inflatable mechanisms are anchored to small concrete foundations that can be easily removed from the current (see figure 25a and b). This lack of permanence as part of the hydraulic machine reflects a drastic change in the traditional conception that dams

Figures 25a and b. Coanda-screen dam (weir) and view of a head pond (Courtesy of Elgin Equipment Group (EEG) (2010))

have had in our culture, having been often represented as permanent features of the landscape, and as in the case of the Hoover Dam, hyper-permanent, almost eternal. Dams have therefore become historical identities forming part of our energy-cultural landscapes. These corporations propagate, on the contrary, that this machine is a

[56] Some projects are much larger; for example, the McGregor/Herrick Project has a 77 meter-dam (Caldicott 2007).

[57] The Coanda screen was developed in the United States more than 20 years ago (International Water Power and Dam Construction 2012a). Installed in the downstream side of the weir, the Coanda structure consists of a type of geometrical-tiled screen designed to permit the passage of part of the water flow.

temporary artifact, almost without any contact with either the waterscape or the local communities.

In addition, these companies claim that their run-of-river projects are a type of *reservoirless* hydroelectricity. Thus, for instance, the Independent Power Producers of British Columbia (IPPBC) (2008) characterizes the small run-of-river project as a technology that does not need a reservoir or flooding area to generate power. Steve Davis, president of the IPPBC, indicates that "we do not have big reservoirs…in fact, the typical headpond is only the size of a soccer field" (see e.g. figure 25a and b) (*International Water Power and Dam Construction* 2008). Supporting this notion, the World Bank says that it possesses "no or little impoundment" (Caldicott 2007).

Furthermore, these corporations have designed strategies to remove the penstocks from sight, perhaps the most visible component of the small run-of-river project. Thus, for example, the penstocks that the Innergex Renewable Energy Inc. (2010) has installed in the Rutherford Creek Project for the Bute Inlet Plan in British Columbia have between 1.1 and 3.05 meters in diameter and between 3 and 5.5 kilometers in length. Because these new run-of-river projects have very small reservoirs, their main advantage is to build up long penstocks that increase the head or the difference in height between the reservoir and the turbine located inside the powerhouse downhill. The higher the reservoir is in relation to the turbine, the greater the amount of mechanical energy that will be generated. Although the power generation capacity also depends on the flow of the river and the reservoir volume, the best places to install a hydroelectric facility are those with a high head that either has been created through a high dam or a steep slope.

For this reason, these corporations construct long penstocks to bring water from where snow has been melting to the bottom of the valleys.

But a 2-meter wide pipe that runs between forests, fields and slopes for more than 5 kilometers can be an eyesore. Penstocks, then, represent one of the greatest aesthetic impacts of this type of power generation. To solve this type problem, most of the run-of-river corporations bury them. Thus, for example, the Canadian corporation Innergex Renewable Energy Inc. (2010) shows in its website several photos that display the installation of the penstocks of Rutherford Creek hydroelectric project. Whereas in various photos the pipe together with the machinery is visible, several weeks later, there is not any sign of it, as depicted in other photos. A hiker would never know that tens of cubic meters per second of water was running under her/his feet.

These pipes, moreover, do not run close to the stream, but are always totally separated from the river (see figure 24). Yet the separation between the river and the secondary water current that will turn turbines downhill is not discernible on the surface. Part of the river is diverted at the dam site to these penstocks separating some of the stream discharge from the main current, becoming, as I denominate it, a type of "hydraulic abduction." Water is, in fact, sequestered from the main current over a long period of time. For this reason, these projects should not be defined as "run-of-river" because the waters do not flow freely either above or through the dam, but "out-of-river", "beside-river," even "really-close-to-river," as Arthur Caldicott defines it (2007).

The Independent Power Producers Association of British Columbia (2008) claims that this diversion does not have negative consequences because although a portion of water from these streams is diverted to the penstocks to be conducted to the powerhouses,

it returns “to the river leaving enough of the waterway’s existing flow so environmental values are protected.” Even though these companies construct mostly their small run-of-river hydro projects in inaccessible sections or beyond “impassable barriers” of the river above falls or steep and narrow canyons through which not even the fish can pass and the amount of water extracted from the main stream might seem insignificant, this diversion is likely to affect the whole riparian ecosystem. The extraction of part of the natural flow means that the main stream will lose not only some of its water, but also nutrients, oxygen and other essential components that are vital for these mountain ecosystems.

Finally, the powerhouses of these facilities are small compared to traditional hydroelectricity, and are strategically hidden in the landscape. Moreover, the whole structure is insulated to buffer the noise created by the turbines and generators, so that nobody can see or hear anything from the distance. Ledcor Power Inc. (2009) indicates that its powerhouse at the Ashlu Creek Project not only will not be audible from outside, but also the lights will not be visible from the Squamish Valley where this facility is located.

Dams (or weirs), reservoirs (or headponds), penstocks and powerhouses, in short, the whole structure known as run-of-river hydroelectricity is shrunken to conform with modern sensibilities. If during the last century, the hydraulic machine became a sublime technology integrated in the landscape, this new alternative offers a more sophisticated and subtle commodification and production of nature. Its remoteness and reduced size have transformed the hydropower machine into an artifact located in a type of scale that I define as a “latent geographical scale,” that is, a geographical dimension where the machine continues working attached to the electric grid, but is invisible. This new

hydropower machine is no longer worshipped as a symbol or a monument that identifies local communities, regions or even nations.

4. Hiding the Machine: Hydrokinetics

Despite a chilling rain, thousands of people waited anxiously, lining up on both sides of the road on November 26th, 1966 in the Cotes-du-Nord. Amidst shouts and salutes, a tall figure stepped forward; he was Charles de Gaulle who had come to this Northwest region of France to inaugurate La Rance power plant, the first tidal power station constructed in the world (Ina.fr 2011)[58]. De Gaulle wanted to display to the public the importance of this hydraulic work that would transform the mechanical energy of the tides into electricity. He said that this construction was a step that "transforms the economy of France. Today's ceremony appears as an episode certainly exceptional . . . all of it [the project] is an enormous technical victory. . . France is loyal to herself in the march to the progress. Vive la Republique, vive la France" (my translation) (Ina.fr 2011). With much fanfare, De Gaulle showcases the machine as an artifact that represents national pride, progress, and technology. Like the Hoover Dam, La Rance is a powerful draw for tourists. The facility attracts more than 70,000 visitors annually, and is the most visited industrial place in France (British Hydro Association (BHA) 2009).

Approximately 30 years after La Rance was inaugurated, on February 10, 1996 Wayne Kroise, the chairman and CEO of Hydro Green Energy Corporation, explained in a short video the characteristics of a new hydrokinetic project that was being installed in the U.S. Army Corps of Engineers hydroelectric lock and dam No. 2 facility close to the

[58] With a dam of approximately 330 meters in length closing the estuary of La Rance River (British Hydro Association (BHA) 2009), this tidal plant is unique in its class because it demonstrates the enormous energy potential embodied in the planetary movement of the oceans. The largest tidal power station was inaugurated in August 2011 in Lake Shihwa, close to Seoul in South Korea (PennEnergy 2011).

town of Hastings, Minnesota, on the upper Mississippi River (Hydro Green Energy, LLC 2002-2011). Despite the extreme cold and the absence of an audience, Kroise appeared proud of his project: "Behind me is the nation's first hydrokinetic power station," Kroise stated, "It is approximately 7:15 in the morning and in the next 40 minutes we'll be expecting putting the first electrons from a hydrokinetic power station to the U.S. power grid in history...and getting ready to make history" (Hydro Green Energy, LLC 2002-2011). Indeed, this hydraulic power station was the first hydrokinetic project constructed in the United States. It is a pioneering project, which shows that many existing dams could be either empowered with more hydroelectric capacity or converted into hydroelectric facilities in the coming years to generate more electricity. In fact, Steven Chu, Obama's Energy Secretary, claims that simply by improving turbine technology in existing dams and adding turbines to non-hydroelectric dams, the country could generate 70,000 additional MW (Jossi 2011). According to Ed Abrams, Deputy Director of the Office of the Hydropower Licensing at the Federal Energy Regulatory Commission (FERC), most of this additional energy could be generated from existing federal dams (Ray 2011).

However, unlike De Gaulle's inauguration of La Rance in the 1960s, Franklin Delano Roosevelt's celebration of the Hoover Dam in the 1930s, or even the South Korean President Lee Myung-bak's commemoration of the 2011 completion of the largest tidal power station close to Seoul, (PennEnergy 2011), Kroiser's enthusiasm was expressed only in front of the camera. Although this new project was a historical episode for the expansion of hydrokinetics in United States, there were neither anxious crowds nor the typical national fanfare of such inaugurations. This artifact was not constructed

to be admired and contemplated in the landscape as an engineering and patriotic monument, but just attached, practically hidden, to an existing facility of the U.S. Army Corps of Engineers to transform the mechanical energy of the river into electricity.

This sort of marginalization of the hydraulic machine has become a common denominator in all types of in-river hydrokinetic projects such as fluvial and tidal plans. Thus, for example, the NYC-based company Verdant Power Corporation inaugurated the first phase of the Roosevelt Island Tidal Energy (RITE) Project, an in-river hydrokinetic project located in the East River, between Roosevelt Island and Queens County in New York City (see figure 26) (Verdant Power Corporation 2012a). This company anchored a

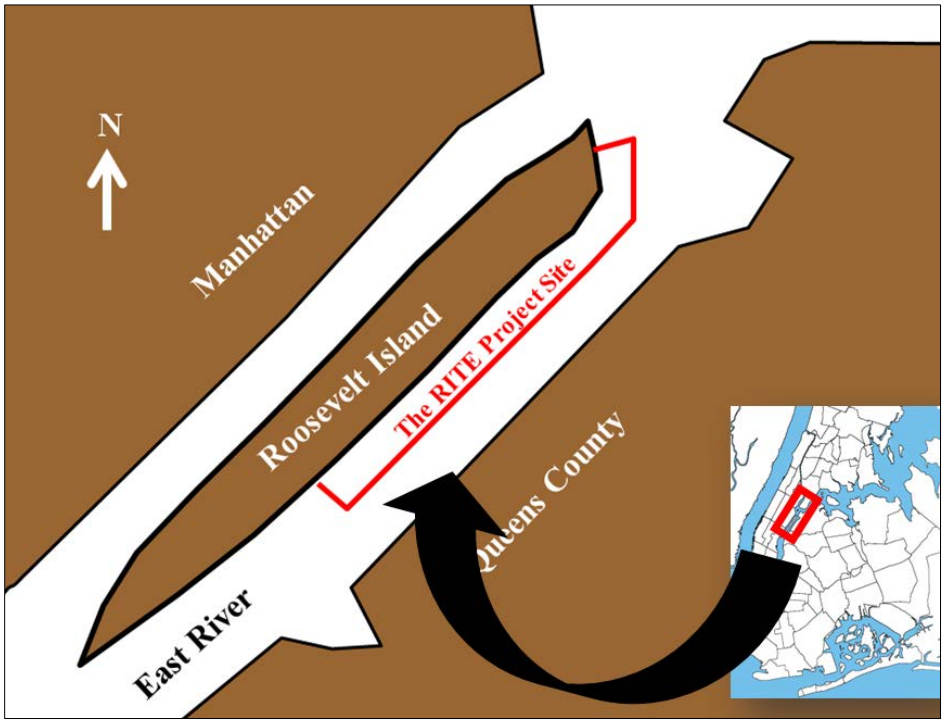

Figure 26. The RITE Project (adapted from Verdant Power Corporation LLC 2012a)

group of turbines on the bottom of the river to transmute the tidal flow that circulates in the East River into electricity. The whole hydraulic machinery appears hidden under the waters. Ironically, the most visible feature in the area is another power station, 2,400

MW-Ravenswood-gas power station, that is operated by the well-known TransCanada Corporation[59]. Whereas the renewable-hydraulic technology has disappeared, the gigantic chimney-structure of Ravenswood plant appears as one of the main elements that articulates this urban milieu.

Verdant Corporation contributes to the marginalization of the machine, claiming its project will "operate silently and automatically, fully underwater and out of sight from shore. This aspect of the technology reduces the visual disruption and "NIMBY" issues related to other sources of renewable energy, especially wind farms" (Verdant Power Corporation 2012b). Curiously, some New Yorkers are becoming conscious of this area of the East River not through the RITE project, but through the plans of New York City Mayor Michael Bloomberg who has envisioned together with Cornell University and the Technion - Israel Institute of Technology a future macro-technological project that will transform Roosevelt Island into a high-tech center (Jaffe 2011), a second "Silicon Valley." Whereas Bloomberg highlights Roosevelt Island as a symbol that will transform New York City into a technological pole in the 21st century, neither Bloomberg nor Verdant Corporation announce the RITE Project using populist discourses, but emphasize the latent aspect of its machinery, as a useful artifact located in an invisible and marginal scale of the landscape.[60]

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[59] Ravenswood is a steam turbine, combined cycle and combustion turbine power plant that provides approximately 21 percent of the New York City demand (TransCanada 2012c).

[60] A similar example is Free Flow Power Corporation's projects in the Mississippi River. This company has designed the construction of 25 hydrokinetic projects that would have a total power generation capacity of 3,303 MW, consisting of the installation of submerged turbines on the bottom of the Lower Mississippi within the states of Kentucky, Arkansa, Tennessee, and Missouri (FFP 2011). Each of these projects could have approximately 5000 submerged 10-kW-turbines that would be situated in units separated by 15.24 m (50 feet) under the water (Thapaliya 2008). This would mean that approximately 1200 turbines would be anchored in a riparian section of around 3.2 km (2 miles) (Thapaliya 2008). Despite this hydropower project's extraordinary size, the whole facility, in reality, would be practically submerged.

There are hundreds of sites that have been identified by federal agencies to install thousands of turbines along the tunnels, canals and other irrigation structures of the US at the present (Profita 2011). A U.S. Bureau of Reclamation study estimates that approximately 373 Bureau Reclamation-owned canals could be converted into power generation machinery by the end of this year (U.S. Bureau of Reclamation 2012).[61] Other government agencies are interested in these prospects as well. For instance, the Colorado Department of Agriculture has awarded the engineering firm Applegate Group and the Colorado State University with $50,000 to research the possibility of developing hydropower along the irrigation ditches and canals in a 3 million-acre irrigated area in this state (Katims 2011). This recent interest in this type of hydro is demonstrated in how the Obama administration is encouraging these types of projects through economic incentives (*HydroWorld.com* 2011). In fact, the government recently awarded $17 million to agencies such as Sacramento Municipal Utility District of California, which received more than a third of this amount, to encourage the development of hydropower technology over three years (*HydroWorld.com* 2011).

What most of these tidal and fluvial hydrokinetic developments suggest is that the mode of constructing and representing the hydraulic machine has experienced a radical reformulation over the past few decades in the United States. La Rance, as Hoover Dam, epitomized national and technological pride, the visibility, the sublimity and utility of the machine in the energy landscape. The Hastings and RITE projects, or the small scale developments along irrigation canals, on the contrary, appear deprived of any type of triumphalism. The new hydrokinetic machine has not been constructed to be worshipped,

[61] These canals could generate a total capacity of around 103 MW (U.S. Bureau of Reclamation 2012).

but simply to be useful. The hydraulic machine disappears in the landscape and loses its traditional leading role as an articulator of nationalism.

5. Storing Renewable Energy: Pumped-Storage Hydroelectricity

Martin J. Pasqualetti (2000) begins *Morality, Space, and the Power of Wind-Energy Landscapes* on interstate highway 10 crossing the San Gorgonio Pass, between the San Bernardino and San Jacinto Mountains in southern California. After leaving a nasty Los Angeles traffic jam, Pasqualetti (2000) narrates how the desert ecosystem of this area changed radically when the barren ground covered with xerophytic vegetation suddenly sprouted hundreds of "glinting, whirling machines" (Pasqualetti 2000). Each square meter of surface became occupied by a wind turbine, reflecting, as Pasqualetti claims, how the American energy landscape is being rapidly transformed. Wind turbines have become "America's most famous landscape of power" (Pasqualetti 2000). In fact, the country has increased its wind generation from 2,472 MW in 1999 to 43,635 MW in 2011 (U.S. Department of Energy 2012). Furthermore, the U.S. Department of Energy (2012) has projected that 20 percent of total energy consumed in the country will come from the wind by 2030. Because of this increasing use of wind power and thus the spatial expansion of wind machinery, the public has become more aware of the presence of energy sources in the landscape.

Moreover, as Pasqualetti (2000) points out, a crucial factor that has contributed to this new collective awareness of wind energy is that whereas conventional energies such as fossil fuels or nuclear power plants spread out their generation processes (e.g. the coal mining area and the coal power plant) and can be far apart, renewable energies such as wind or solar anchor the process of extraction and generation to a specific place. This

spatial concentration contributes to their visibility, increasing public awareness of these energy sources, and in some cases, creating local resistance to their aesthetic impact in the landscape (Pasqualetti 2000). This visibility is more pronounced in countries such as Denmark, Germany or Spain where the landscapes are saturated with blades and poles.

What Pasqualetti's article does not mention, however, is the connection currently being forged between hydroelectricity and wind energy. Some pro-hydro entrepreneurs see the money to be made with the expansion of renewable energies and have figured out a way to connect their hydroelectric projects to wind as well as solar interests. One of the main arguments furnished by the energy sector is that the expansion of renewable energies cannot be carried out without complementary infrastructure because wind and solar energies are not reliable sources. As HDR Corporation (n.d.- b) says: "What happens when the wind doesn't blow? Or when it blows most powerfully at off-peak hours? It's the same with solar power. The sun shines intermittently, at best, even in the most hospitable of climates." Coal, natural gas or hydroelectric power plants can generate more or less electricity depending on the demand at any time. These corporations (e.g. HDR Corporation, Symbiotics LLC) highlight wind and solar's lack of flexibility as a type of constraint, calling it a "missing link," (Williams 2012), that prevents renewable energies from becoming the prime energy generators in the country.

Storing electricity could be a way to replace the "missing link." Various storage technologies currently exist, such as hydrogen, batteries, flywheels, compressed air storage, superconducting magnetic energy storage, thermal energy storage, ultracapacitors, or the integration of the electric vehicle into the grid; nevertheless, all of them are expensive or not feasible on a large scale to reserve electricity. Another

possibility could be to expand the electric grid to interconnect and distribute the energy surplus to a more extended network, and there are plans underway to interconnect the three regional electricity grids on a national scale in order to integrate these wind and solar facilities.

But hydro companies claim that they possess the panacea to facilitate the expansion of renewables in the American electricity network: pumped-storage hydroelectricity or the reversible dam system. This type of hydropower consists of a hydroelectric facility composed of two reservoirs situated at different heights.[62] Using this difference in height or head between these two bodies of water, water is transferred from the upper reservoir to the lower reservoir and vice versa (see figure 27). When the demand for energy is high, overall during the day, part of the water stored in the upper reservoir is brought down through penstocks to move the turbines and generate electricity, storing the water in the lower reservoir. During the night or in non-peak periods when the demand decreases, water is pumped back from the lower reservoir to the upper reservoir where it is stored again.[63] This capacity to flexibly store and transfer energy, as Mathias Zuber (2011) insists, is the ideal system to be attached to the wind energy network because although there exists a lack of synchronization between wind and high demand of electricity, that energy can be easily stored in pumped-storage systems, contributing to the expansion of wind and sun energies. In other words, hydroelectric companies see an enormous opportunity to integrate their business into the

[62] The first pumped-storage hydro plant was constructed in Shcaffhausen, Switzerland, in 1909 (Symbiotics LLC 2008).
[63] Part of the energy generated in nuclear plants and large-coal fire plants in Europe and the east of the United States is stored in pumped-storage facilities.

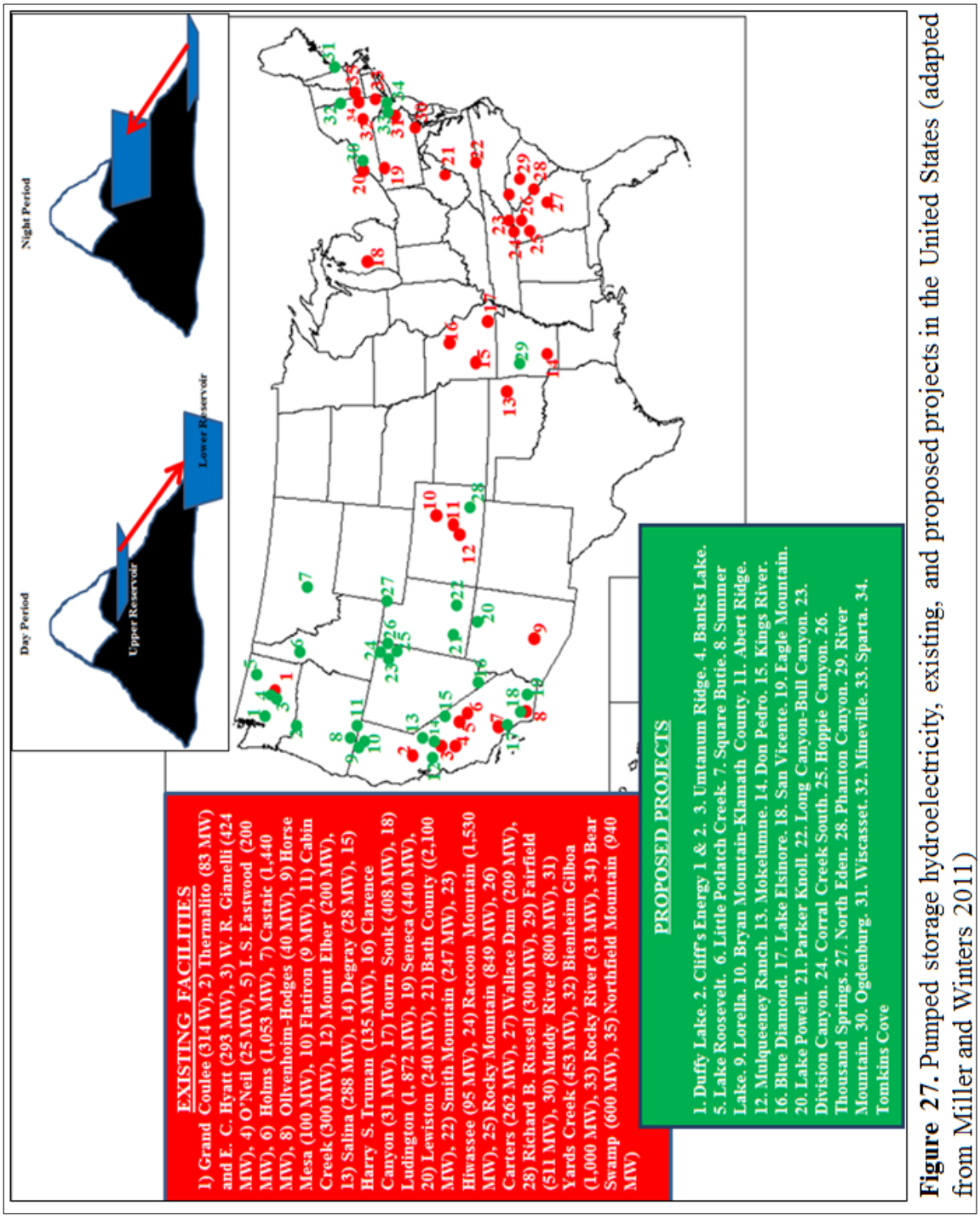

Figure 27. Pumped storage hydroelectricity, existing, and proposed projects in the United States (adapted from Miller and Winters 2011)

new expansion of renewables, highlighting pumped-storage hydro as the principal way to transform the current energy landscape into a green and renewable one.

This growing linkage between hydro and wind/sun energies is demonstrated in the number of pumped-storage projects proposed. At present, there are 40 pumped storage systems (e.g. 1000-MW Blenheim-Gilboa project located in the Catskill Mountains) in the United States, but more than 30 projects could be developed in upcoming years (see figure 27) (Miller and Winters 2011). The most significant case is the agreement reached by Canada-based Riverbank Corporation and enXco Corporation, a business deal that will construct 17 pumped-storage projects in United States (*Herald and News* 2012).[64]

Riverbank Power Corporation has designed perhaps the most sophisticated pumped-storage system, Aquabank, a new system that buries practically the whole hydraulic machinery underground. Aware of the negative connotations attached to dams and reservoirs, especially with the pumped-storage system that has two reservoirs, Riverbank Power Corporation has designed a type of pumped-storage hydro power that has almost completely dematerialized the machine.[65] Powerhouses, turbines, generators, penstocks and even one of the reservoirs would be buried hundreds of meters in depth. As Stanislav Pejovic, a mechanical engineering professor and hydraulic energy system expert at the University of Toronto, comments: "You'd only see transmission lines and a small building" (*Toronto Star* 2009).

Pumped-storage hydroelectricity displays profound changes in the attitude to the machine in the United States and elsewhere. Unlike the gigantic federal dam systems

[64]Some European countries such as Spain, Portugal, Germany, Switzerland, and Austria will increase the development of pumped-storage hydro in the next years (Zuber 2011). The North Sea countries have designed a future energy landscape that could transform Norway and perhaps Sweden into the largest pumped-storage system in the world. The main objective of this plan is to construct an enormous off-shore wind complex in the North Sea basin from where energy would be transferred to multitude of pumped-storage facilities in the Scandinavian Mountains. Norway and Sweden are highlighted like a colossus pumped-storage complex, like a vast battery where European wind energy could be kept.

[65] One of Riverbank Power Corporation's projects is Wiscasset in the state of Maine (International Water Power and Dam Construction 2012b).

such as Hoover, Bonneville or Grand Coulee, pumped-storage hydroelectricity is not presented as a prime motor through which the energy landscape is constructed, but merely as a storage mechanism that facilitates the subsistence and expansion of renewable energies such as wind and solar. In fact, Russell Ray (2010), an expert in energy issues and the senior associate editor of the magazine *Hydro Review*, claims that one of the principal points to come out of the POWER-GEN International meeting that was held in Orlando, Florida in 2010 was the importance of hydropower above all pumped-storage hydro and its "role in America's plan to boost the use of renewable energy." Hydropower's complementary role in the expansion of green energies is also recognized by U.S. Energy Secretary Chu who points out that "hydropower can be used to store energy to help utilities better integrate other sources of renewable energy like wind and solar into the grid" (Profita 2011). Thus, whereas the wind turbines and solar panels appear as the most visible features of the new energy landscape, these hydraulic machines are settled in a secondary corner of the landscape where energy is stored.

6. Disappearing the Machine: Electricity Transmission Lines

Under a cobalt sky, buffalos grazed the scarce vegetation that covered the semi-steppe terrain of a Navajo Reservation in the Southwest. Moving slowly from one plant to the next, this group of ungulates was completely unaware of the hundreds of thousands of volts of electricity that flowed above their heads in the middle of this high-voltage transmission path. The animals, vegetation and the electric transmission infrastructures form part of the filmmaker Bo Boudart's *Power Paths* (2009), a documentary that demonstrates how some corporations are transmitting energy across Navajo land without transferring any benefits to the local community, a point which Boudart drove home by

filming some families' homes being lit by candlelight. Making visible these gigantic high-voltage structures, Boudart unveils to the spectator how the presence of a high-voltage line implies power, domination and ecological and visual impacts. These issues have become some of the main constraints in the construction of new power transmission lines.

But in the not so distant past, things were different: transmission lines were triumphantly visible in the skies of cities and towns across the country. In larger cities, such as New York, the sky was littered with wires, thousands of telephone, telegraph and electricity wires could literally black out the sky, as can be seen in an etching of Broadway at the turn of the 19th century in figure 28. Although there were critics, the

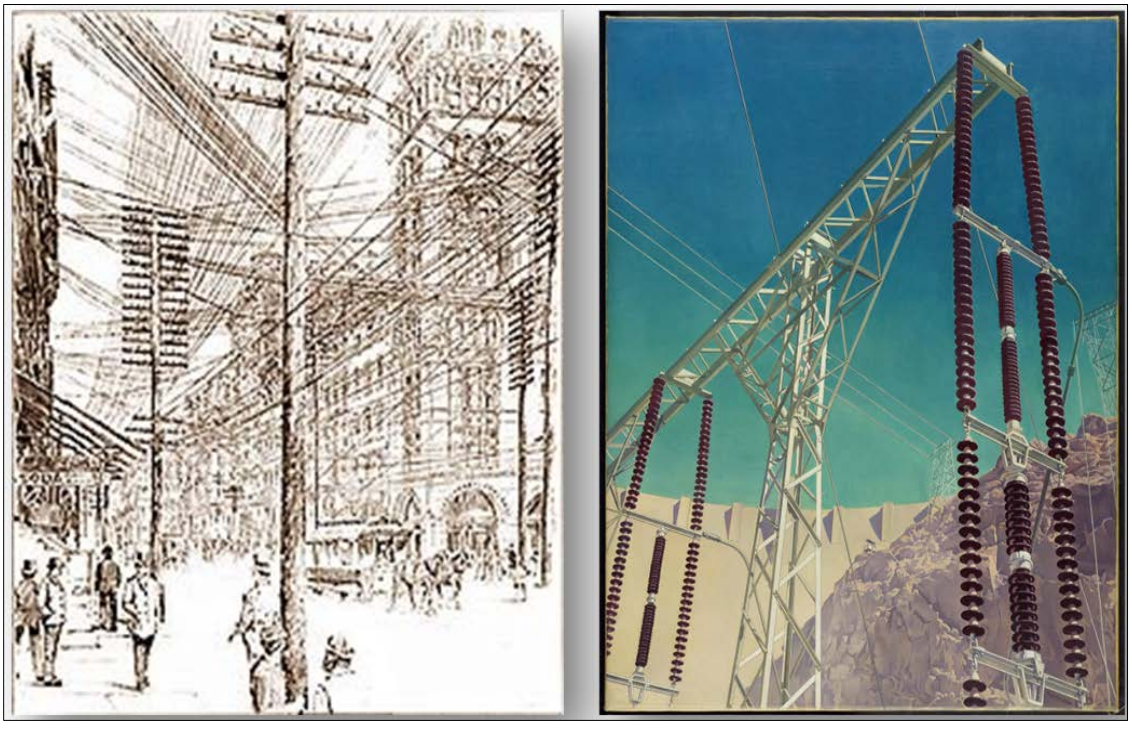

Figure 28. *Etching of Overhead Telephone and Telegraph Wires in Broadway, 1890* (unknown author) (from Henry Collins Brown's *Old New York* (1922), under public domain and *Conversations – Sky and Earth* (Sheeler 1940) (courtesy of Amon Carter Museum of American Art, Forthworth, Texas)

transmission infrastructure was generally accepted by the population as a symbol of modernity and power, an acceptance that, according to Eugene Levy (1997, 578) was caused by the "enthusiasm" for hydroelectric power plants. Moreover, some artists such as Sheeler glorified the electric grid, as can be seen in *Conversations – Sky and Earth* (1940), published and patronized by *Fortune*, in which Sheeler displays a high-voltage tower and cables that majestically frame the Hoover Dam (see figure 28). Through his painting, Sheeler wanted to generate awareness of how those energies flowed from dam and water to the public through high-voltage wires. He hid nothing from view: the tower, wires, even the insulating components that separate the 200,000 volt-cables from the metallic structure of the towers appear so neatly that it almost seems like a photograph. Sheeler, unlikely Boudart, celebrated the achievements of electricity infrastrustructure, facilitating the integration of the electricity grid into the landscape.

The general acceptance of electric wires changed radically in the 1960s with the arrival of the environmentalist movement. Thus, for example, when the Potomac Edison Company planned to extend a 500 kV power line from Pennsylvania to Maryland, people protested (Levy 1997, 584). *Life* called the expansion of the electricity grid "the march of the towers" and even commented that "everybody from the local zoning boards on up to Interior Secretary Steward Udall" was against it (Levy 1997, 584).

This growing resistance to power lines pushed electric companies to hire designers and architects in order to redesign facilities to more flexibly integrate them into the landscape (Levy 1997, 591).[66] Thus, for example, during the 1960s Edison Electric Institute hired the famous American industrialist designer, Henry Dreyfuss, to re-

[66] U.S. Steel's Joe Pohlman commissioned Peter Muller-Munk, an industrial designer, to elaborate new models called "power styling" for the transmission infrastructure (Levy 1997, 590).

elaborate the transmission machine (Levy 1997, 591). However, these new developments in the design of the machinery created a type of dilemma that Dreyfuss and the electric company managers observed: "Was the public, the "users," supposed to notice these structures or not?" (Levy 1997, 596). That is, should the strategy be to embellish the machine as an artistic piece or hide it? Before this question arose, most of the corporations decided to make the machine visibly modern, genuine, and useful (Levy 1997, 600), as Dreyfuss said: "We have accepted the fact that a tower is a 20th century art form and a necessity" (Levy 1997, 594). Millerbernd Manufacturing claimed that their new insulators "do it functionally! Compactly! Aesthetically!" (Levy 1997, 601). And A.B. Chance Company introduced an advertisement titled "Miss Beautility" (Levy 1997, 602). What these cases demonstrate is that the machine was articulated through the Emersonian ideologies, transforming the technological device into something useful and artistic.

If the Glen Canyon Dam meant a radical transformation in the mode of understanding dams and rivers in this country, the decade of the sixties was also a period of reflection about the visibility of power transmission machine in the landscape. Despite strategies intended to encourage public acceptance of power lines, resistance against them intensified. Even the Sierra Club, an environmentalist organization that had not initially criticized transmission lines in the 1960s, began to attack them (Levy 1997, 605).

Much more recently, environmental regulations have restricted the installation of these energy highways, and a multitude of social sectors that range from local communities to environmental groups and tourist businesses reject these facilities, especially when they cross national parks or populated areas. One of the main concerns

of any private corporation constructing a new small run-of-river project in the remote areas of the Pacific Northwest or British Columbia is the aesthetic impact generated by the high-voltage towers and wires crossing wilderness areas. The simple presence of wires and high-voltage towers, the noise generated by the cables and the transformers, and the increasing consciousness about the possible health risks caused by the electromagnetic fields of the high-voltage wires have become crucial factors in the critique of these infrastructures nowadays.

If Dreyfuss and other designers commissioned by electric corporations preferred to transform the power transmission machine into something aesthetic, and therefore, visible nearly five decades ago, at present many of these corporations have advanced new strategies that tend to dematerialize or minimize the presence of the transmission machine in the landscape. Thus, for example, the U.S. electric company American Electric Power (AEP), one of the largest generators of energy and the largest electricity transmission company in the country, has designed new high-voltage towers fabricated and painted with materials and colors that camouflage them. Turning away from the silver galvanized materials used in conventional structures, new towers have been covered with darkened and low-reflected materials, taking the shine off the once proud towers.

But, doubtlessly the most sophisticated strategy applied to dematerialize the power transmission machine is a type of high voltage direct current (HVDC) mechanism known as HVDC Light. Developed by ABB Company in 1997, this type of technology has been designed especially to transmit large amounts of electricity either underground

or underwater for long distances (ABB 2011).[67] Sea Breeze Power Corporation's Juan de Fuca Transmission Cable Project, and other proposed projects such as the West Coast and Triton cables discussed in chapters III and IV, offers this type of transmission technology, which has been deemed "invisible" technology. As Sara Mitchel, a Sea Breeze Corporation representative, (personal communication 2009) says: "The interesting thing about this 30-mile transmission plan is that not only is it DC, but also is invisible. Nobody can see the wires." Similarly ABB's website (2011), claims that this technology "offers numerous environmental benefits, including "invisible" power lines." Furthermore, HVDC Light technology is represented as having almost no effect on the landscape. Sea Breeze Power Corporation (n.d.- b) claims that this technology possesses "no ground current," "no electric fields," "no audible noise, unlike overhead lines." Even the submarine fauna and flora close to the cables are saved from any type of electromagnetic interferences created by this high voltage electric current flow. Because HVDC Light wires are attached in pairs, their DC currents flow in opposite directions, eliminating therefore their electromagnetic fields (Sea Breeze Power Corporation (n.d.- b). It is as if the machine existed outside of material space, as if it were some kind of virtual transmission line.

The Tres Amigas Superstation Project is yet another example that demonstrates the eradication of the electric transmission artifact. Tres Amigas is a facility that will unify the three regional electricity grids that articulate United States (see figure 29). This facility, which will be constructed in Clovis on the border of New Mexico and Texas, and will cover a surface of approximately 58.2 square km², will barely make a mark on the

[67] The first commercial HVDC Light Project was constructed in the Swedish island of Gotland in 1999 (ABB 2011).

landscape (see figure 29). In fact, the cables that will interconnect the three regional grids of United States will be underground DC superconductor cables (Tres Amigas LLC 2009). The only visible features of this infrastructure will be the three HVDC terminals where the DC and AC systems are transformed.[68] Moreover, Tres Amigas LLC, like the Sea Breeze and Verdant corporations, produces narratives of invisibility, claiming that its DC-high-voltage cables will be "out of sight" and therefore will not have aesthetic impacts.

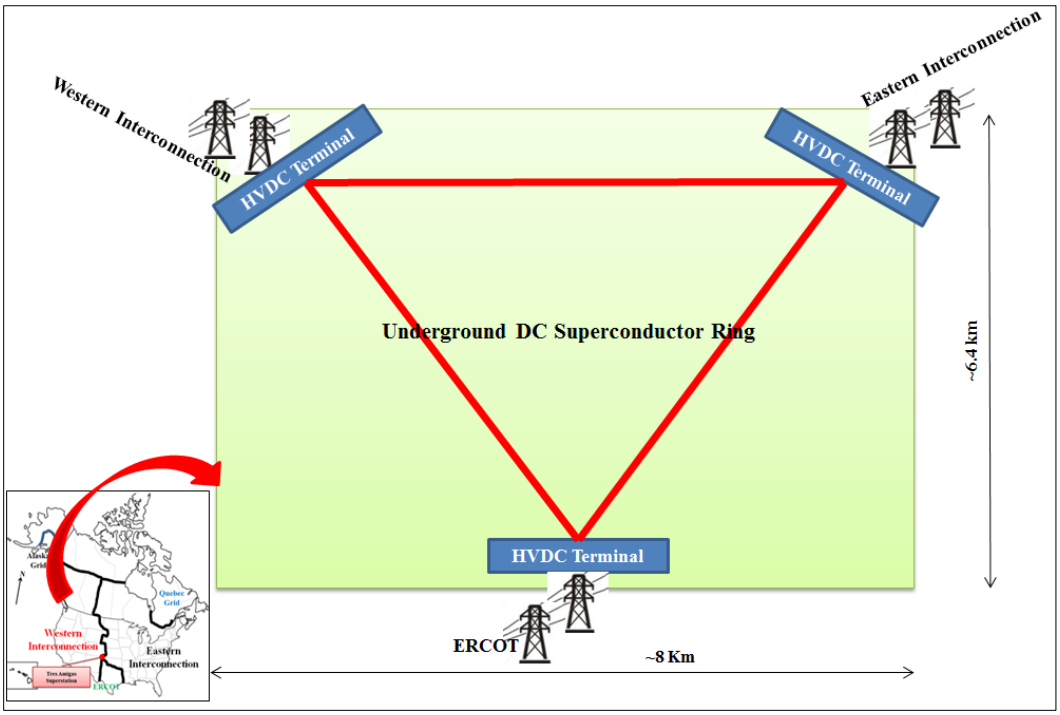

Figure 29. Scheme of the Tres Amigas Superstation Project (adapted from Tres Amigas LLC 2009)

Whereas these corporations publicize their projects as pioneering vehicles that bring together regions and ultimately the whole nation under a compacted electric grid that contributes to the expansion of renewable energies (see chapters III and IV), they do not desire to show the artifact that facilitates these jumps of the scale in the electric grid.

[68] The diameter of this DC superconductor will be of less than 1 meter (Tres Amigas LLC 2009).

The symbolism of the machine is erased in favor of narratives of "invisibility" and "out of sight," expressions that have become mantras of the companies. Power transmission projects such as Juan de Fuca Cable indicate a radical change in the way of constructing as well as representing the electric transmission machine in the last half of century in the United States. Because of the growing popular resistance to these "power paths," these corporations have elaborated an engineering and ideological apparatus to dematerialize the transmission of electricity, rendering the electric grid even more abstract.

7. Conclusion

During nearly two centuries the hydraulic machine has been depicted as a sublime, aesthetic and useful part of the American landscape. Within the past ten years, however, this representation has begun to change, as the material aspects of the machine have become less of an important part of the ideological apparatus surrounding the production of energy, and while energy itself has grown in importance, a process, which I call dematerialization. The removal of dams is the most obvious example of the dematerialization of the landscape, but the new hydro projects that are happening under the radar, such as small run-of-river hydro, hydrokinetic, and other new forms of power transmission projects, perhaps best exhibit the wide-spread nature of the new phenomenon. Pumped-storage hydroelectricity is also an interesting case because it is represented as a complementary to the expansion of renewable energies, demonstrating that renewables are what matters. From sublime, aesthetic, and utile, the machine has become subliminal, invisible, or useful only so far as it can serve green energy projects.

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