

AN ABSTRACT OF THE THESIS OF

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Oregon's coastal communities grew from the booming logging and fishing industries of the 19th century, but in recent decades have faced not only major declines in both timber and fish resources but also an increasing reliance on tourists and retirees and the resultant glut of seasonal service-sector jobs. As a burgeoning new industry, wave energy development promises not only a renaissance of family-wage jobs for coastal residents but also the opportunity to fulfill the mandate of the state's Renewable Energy Portfolio Standard (RPS) of 2006. However, not all coastal residents express enthusiasm for wave energy, and some feel directly threatened by specific development proposals. This study examines public perceptions of the wave energy development process among six categories of coastal stakeholders including local government, commercial fishing, tourism enterprises, recreation, environmentalists, and general citizenry (including retirees and residents not included

in the above categories). Forty-seven residents across three coastal counties facing potential development were asked a set of questions during semi-structured interviews to assess: 1) an emic definition of the concept of “community well-being,” 2) the nature of residents’ knowledge and understanding of wave energy technology, and 3) the perceived potential impacts of wave energy technology on community well-being. Impacts were organized into five categories (environmental, economic, aesthetic, vocational, and psychological) utilizing an opportunity-threat analysis framework. The degree to which impacts were viewed as either threats or opportunities primarily reflected individuals’ cognitive orientation toward near-term effects in local systems or long-term effects in global systems, respectively. Findings suggest that proponents should focus outreach efforts through local newspapers and online resources to dispel unrealistic expectations of potential benefits and exaggerated predictions of potentially negative community impacts.

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Public Perceptions of Wave Energy on the Oregon Coast

by
Daniel Hunter

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Daniel Hunter, Author

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CHAPTER 1: INTRODUCTION

Surely anthropologists have a role to play, and that role is...to ascertain the balance of benefits and costs in the local communities which are the bottom line, and final recipients of the consequences of [development] projects. Anthropologists, among all the disciplines, are best equipped to speak up for the locals. (John W. Bennett, 1996)

Developers of wave energy seek to capture the vertical component of ocean wave kinetic energy and convert it to electricity using various technologies, including specialized surface buoys tethered to the seabed. Multiple buoys wired together into large arrays and connected to electrical substations onshore posed serious questions regarding federally regulated privatization of near-shore waters, the potential loss of productive fishing grounds, possible obstruction of key shipping lanes, and myriad unknown environmental impacts. On the other hand, proponents of wave energy promised to reduce dependence on both fossil fuels (both imported and domestic) and hydroelectric dams while harnessing local and renewable energy, but also to claim regional and global leadership in wave energy development and green-collar job-creation (Bedard, 2007). This study examined perceptions of wave energy among residents of coastal communities in close proximity to proposed wave energy project sites. I explored the ways in which they have interpreted information about the technology, framed the development process as either an opportunity or a threat, and formed adaptive strategies based on personal value systems.

Oregon's Governor Ted Kulongoski has taken an active role to ensure that wave energy contributes to the continued economic development of the Oregon coast (Executive Order No. 08-07), and development companies as well as county entities

have already attained preliminary project permits from the Federal Energy Regulatory Commission (FERC). While the intended purpose of ocean wave energy is to yield a carbon-free renewable supply of electricity both locally and regionally, the potential social impacts of wave energy, like the technology itself, on surrounding resource-dependent coastal communities remain largely unproven.

At the time of this writing, the communities in this study were experiencing a significant economic transition. Given the uncertain nature of regional fishery dynamics, exemplified by the 2008 collapse of the spring Chinook Salmon run, ocean wave energy could have spelled either relief or disaster to resource dependent communities (NOAA, 2008). People in coastal communities had to weigh key socio-economic factors in order to evaluate the appropriateness of wave energy for their community. The aims of this study were to provide a detailed conceptual framework guided by three key research questions: 1) How do residents of coastal communities define community well-being? 2) To what extent do they understand wave energy technology and the development process? and 3) How is wave energy perceived in terms of its potential impacts on their community's well-being?

Unlike public perception studies of proposed nuclear waste sites, offshore oil platforms, and other industrial development projects, residents' support for wave energy technology did not necessarily reflect their understanding of technological specificities, per se, but rather their particular social constructions of wave energy as a source of either green renewable energy and job creation or of hazardous marine debris and job loss. Interview data from three coastal Oregon counties (Tillamook,

Lincoln, and Douglas) demonstrate conflicting assessments of the requirements and feasibility of the technology, the degree to which it influences ecological dynamics of the marine environment, and the socio-economic value of historic and competing ocean uses. These assessments lead residents to frame issues regarding wave energy development as either opportunities or threats (Gramling and Freudenburg, 1992) to one or more economic, political, or social dimensions of community well-being and serve as the basis for key decisions regarding both the role of government as well as the sources of funding for the wave energy development process on the coast of Oregon.

The goal of this research project was to inform a broad array of stakeholders including existing and future ocean resource users as well as state and federal policy makers and regulators regarding coastal zoning in Oregon by exploring how people in coastal communities perceive the human dimensions of ocean wave energy development. In assessing stakeholders perceptions toward proposed wave energy projects, I discovered understandings of both the possible opportunities and potential threats to community well-being. By exploring the dimensions of cognitive understanding regarding wave energy technology, I examined both the relationship between knowledge and perception as well as the nature of the information gathering process in coastal communities regarding wave energy.

Chapter 3 explores the theoretical framework I have used to analyze and interpret the data collected for this project. I begin by discussing the nature of resource dependency in rural communities strategies for adapting to change. I continue with a

discussion on Bennett's concept of socionatural systems (Bennett, 1996). Finally I discuss opportunity-threat analysis (Freudenburg, 1992) using a spatio-temporal framework (Lasersohn, 1990) for interpreting perceptions of the impacts of wave energy development.

Chapter 4 explains the methodology behind the design of the project as well as the particular methods and materials utilized during the data collection process. Open-ended semi-structured interviews were taken from forty-seven participants across three coastal counties who were selected for participation using purposive, snowball, and convenience sampling methods.

Chapter 5 discusses the concept of community well-being as defined by the people themselves that live and work on the Oregon coast. Participants were asked what the concept meant to them, and were probed regarding ways in which well-being was seen to have changed over the years and ways in which it would likely change in the future. Responses were varied and numerous, and aligned with two primary dimensions: political-economic and socionatural. Each of these themes is explained in greater detail using major sub-themes which arose from the data. These concepts are factored into the interpretation of perceptions of wave energy impacts in chapter seven.

In order to inform the analysis and interpretation of interview data regarding public perceptions of the potential impacts of wave energy development on community well-being, chapter 6 first explores the nature of the actual knowledge and understanding elicited by interview participants regarding both wave energy

technology as well as the wave energy development process. Of key concern were: quality and quantity of technical knowledge regarding wave energy devices and their correlated on-shore and off-shore infrastructure; sources of information and knowledge; whether, when, and where wave energy would likely be developed first; opinions regarding the composition of major players in the development process; familiarity with the federal permitting process; and, the role of the government in the development process. This chapter served as a basis for exploring individual preferences for wave energy in relation to particular understandings of the technology and its effects on community well-being.

Chapter 7 explores responses given to questions specifically regarding the potential impacts of wave energy on community well-being. Participants were asked to explain both the positive and negative impacts of wave energy, who might be affected the most and in what ways, who would bear the costs of developing wave energy, and the implications of wave energy development for community well-being in general. I discuss the ways in which residents of coastal communities frame wave energy in terms of either opportunities or threats and how these interpretations help to guide both general strategies and specific tactics for adapting to the potential changes to coastal communities brought about by wave energy development projects.

In chapter 8, I discuss the potential relationship between cognitive spatiotemporal orientation and value predictors of adaptive strategies to development change and the behavioral tactics associated with each. I conclude with a brief

assessment of the limitations to this project as well as recommendations for future studies.

CHAPTER 2: HISTORICAL CONTEXT

A total of 47 coastal Oregonians participated in this research study—17 from Tillamook County, 18 from Lincoln, and 12 from Douglas—over a period of four months from July to November of 2008. The historical significance of this particular time period was marked by several noteworthy events that likely helped to shape or at least influence the nature of participant responses during the interview process. Moreover, the validity of the interview protocol, as a data collection instrument, will have been significantly defined by the particularity of this period's historical context. In this chapter I will describe several seminal events that likely played a large part in how participants formed cognitive understandings of wave energy and its potential impacts on community well-being.

Governor Ted Kulongoski

First elected as Oregon's 36th governor in 2002, Theodore "Ted" Kulongoski set forth an ambitious agenda promoting the development of renewable energy in a wide array of forms and applications throughout the state. Having won a consecutive gubernatorial election in 2006, his second term office ends in January 2011. Pursuing a national leadership role in renewable energy development, Kulongoski issued a press release on March 27, 2006 in support of a national "Wave Energy Research, Development and Demonstration Center" to be located on the Oregon coast. He requested a federal earmark for \$3 million toward the establishment of the center, and framed his support in terms of both job creation and energy independence:

This remarkable technology is part of my vision for energy independence and renewable energy in Oregon. I want Oregon to be the

national leader in renewable energy production, consumption and independence. Generating electricity from the motion of ocean waves is a critical aspect of that goal. This is the kind of progress that creates long-term prosperity and great new jobs for Oregonians, while reducing our dependence on fossil fuels from overseas.

I am committed to doing everything I can to locate the Center in Oregon, and I intend to work at both the federal and state levels. This kind of clean, renewable technology is the future of Oregon and our nation. Oregon has the opportunity to lead the transformation of energy consumption on a national and global scale, and we must make the most of that opportunity.

Over the next several years developers, researchers, and local and state leaders worked aggressively toward crafting a framework for developing wave energy in Oregon, and by October 2007, seven applications for preliminary permits to explore wave energy resource potential in Oregon's Territorial Sea had been filed with the Federal Energy Regulatory Commission (FERC). As coastal communities became more aware of both the aspirations of the governor and the technologies proposed by various national and international developers, residents on the coast began to voice their concern over the apparent vulnerability of existing ocean uses, in particular the commercial fishing fleet (Chambers, 2007a):

"Those ocean areas already have an existing use, from border to border... They should be coming to us," Merz continued, noting that the companies or organizations moving ahead with the wave energy parks should be talking to existing users of the ocean: commercial fishermen, recreational fishermen, commercial shippers.

On November 1, 2007 Kulongoski met with a group of representatives from the fishing industry at the request of Coos Bay State Senator Joanne Verger, which provided an opportunity for "unfiltered dialogue between the fishermen and the

governor” (Chambers, 2007b). While several fishermen at the meeting were quoted as not feeling they had achieved much of anything productive, the governor’s office may have actually learned a great deal about the depth of concern regarding the implications of wave energy for coastal communities. On March 26, 2008, shortly before I began the data collection process for this project, Kulongoski issued Executive Order 08-07, “Directing State Agencies to Protect Coastal Communities in Siting Marine Reserves and Wave Energy Projects” (Kulongoski and Bradbury, 2008). In it, Kulongoski formally recognized the value of coastal communities and existing ocean uses:

Oregon’s coastal communities are comprised of distinct local economies that share a common connection to the ocean and its resources. Coastal communities and ocean users have a wealth of knowledge about maintaining near shore marine resources and their input is essential to developing informed recommendations for marine reserves, wave energy development and other new uses of the ocean.

While making a significant effort to accommodate and include residents of coastal communities in the development process, Kulongoski, likely to the chagrin of Oregon fishermen, stopped well short of abandoning wave energy development in favor of alternative forms of renewable energy such as wind, geothermal, or nuclear. Thus, while many of the participants I spoke to viewed Kulongoski as a kind of harbinger of potentially threatening forms of ocean use and the eventual decline of Oregon’s commercial fishing industry, others seemed proud of the efforts Kulongoski had made in pushing his renewable energy agenda and gaining Oregon both national notoriety and financial investment.

The Chinook Salmon Collapse

On May 1st U.S. Secretary of Commerce Carlos Gutierrez made the decision to close the 2008 Chinook salmon season under section 312(a) of the Magnuson-Stevens Act, declaring a total collapse of the Sacramento River salmon returns. The Sacramento River has historically provided one of the largest Chinook salmon runs on the west coast, but as early as February 28th the Pacific Fisheries Management Council was already forecasting an all-time low for salmon returns during the 2008 season. By August 15th, the entire west coast of the United States was closed to salmon fishing. According to one fisherman I spoke with, Oregon anglers enjoyed only one full day to fish for salmon in 2008:

Our one commercial salmon season that we had out in front here in front of Garibaldi was September 1st, a couple days ago. That was the only day we got to fish this year out in front here, and we were allowed five hundred fish. As soon as that five hundred fish quota was done...for the entire coast of Oregon. I think we've got over five hundred salmon boats in the coast of Oregon. They just said, "As soon as that five hundred limit is caught, you'll be over." I said, "You think we'll get more than one day?" when I called him. He says, "I doubt it very seriously." All that salmon is spread out from Garibaldi all the way down to the California coast—whatever port got them—the fish checkers will check them. That was our salmon season. That's what thousands and thousands of dollars of salmon gear, boat, maintenance, licenses, permits was good for: one day. That was our season this year. (Fisherman)

The fall Chinook run constitutes a major commercial and sport fishery in Oregon each year, with the value of annual landings averaging close to \$6,000,000 over the last ten years (Franklin, 2008). When asked to talk about the wave energy development process, many with whom I spoke were understandably less than enthusiastic about discussing what they perceived as further limitations on an already

struggling industry. As in the case of marine reserves, the salmon collapse of 2008 is but one of a series of hardships that have seemed to plague west coast fishing communities over the last decade. It is reasonable to assume that a certain degree of bias among participants was a direct result of the lost salmon season. Attitudes against wave energy development may have been more pronounced. The collapse may have also aroused sympathy for the plight of the fishing community in general.

The United States Presidential Campaign

2008 witnessed the longest and most highly publicized presidential election campaign in U.S. history. While the outgoing president Bush arguably served to both polarize an already partisan political playing field as well as fragment a previously coherent republican base, the run up to the Obama election was marked by high levels of partisan rhetoric regarding the economic recession, the path to recovery, and the proper role of energy and development. The Republican mantra, “Drill, baby, drill,” helped galvanize a skeptical conservative electorate toward pushing for further expansion of fossil fuel extraction and consumption as an effort to stem rising oil prices and failing economic systems. The Democratic campaign countered with proposals advocating “clean coal” and renewable energy resources such as solar, wind, and geothermal, and argued for the creation of thousands of new “green-collar” jobs. However, each side, though employing vastly different strategies, targeted the same primary goal of energy independence.

While political affiliation was not asked of any of the participants in this study, there was a distinctively political tone to many of the responses given during the interview process. Whether or not this was a reflection of media portrayals of the

political process, it is impossible to know. But, there is a strong likelihood that, given the political climate, pre-existing attitudes toward development may have been uniquely heightened during the interview time period.

Record Oil Prices

The summer of 2008 also saw the price of oil skyrocket to its highest levels on record, causing gasoline prices to spike to over five dollars a gallon. Crude oil hit an all time high on July 11 at \$147 per barrel. As a result, consumer demand for gasoline fell to historic lows as automobile owners drove less often and for shorter distances. This event had several consequences on coastal Oregon communities. Like the rest of the country, and indeed the world, residents suddenly found household budgets compromised by unforeseen additional expenses at the pump. However, in addition, there was also a notable decline in the activity of recreational vehicles (RV) at campsites up and down highway 101, the primary transportation artery for the coasts of Washington, Oregon, and California. Summer is considered the high season in terms of economic activity in the tourism and recreation markets on the coast, and RV customers comprise a significant, reliable, and integral part of that industry. While some of the largest most expensive RVs remained active, numerous participants in this project did not observe very many of the smaller more modest RVs.

I did notice that there were still the big RVs this summer with the gas prices, but it just seemed to me there were a lot less of the B-C classes than we usually see. And I'm sure that's because for the type of folks maybe that have the big ones, the pushers, they can still afford it, but a lot of people can't. I know a lot of people did stick around. I don't know what the figures were for the local businesses and how they changed, but for the future, I don't know. (Retiree)

While direct impacts to the tourism and recreation industries were observed, the overall impact on public perceptions regarding world energy markets, energy independence, and sustainability may have been even more profound. As issues regarding energy consumption and economic constraints became increasingly relevant to the everyday lives of coastal residents, attitudes toward renewable energy sources, including wave energy, may have experienced significant and sudden augmentation or amplification prior to the interview process.

The Lost and Found Finavera Test Buoy

Finavera Renewables, a Vancouver-based energy development company, launched an AquaBUOY 2 experimental test buoy on September 6, 2007 off the Oregon coast just north of Yaquina Head north of Newport. The buoy was 70 feet tall and weighed almost 40 tons. The company felt that the size of the device made it inherently safe for large marine mammals such as whales. Unfortunately, the day before the buoy was scheduled to be retrieved, just six weeks after it was deployed, it sunk to the bottom and remained lost for over nine months. It was eventually found, and recovered, having broken in half on its decent to the bottom. While the company labeled the buoy's deployment and retrieval a success, many coastal residents viewed it as a technological failure and evidence that wave energy could not be viable in Oregon. Known to many locals as "BOB" (Buoy on Bottom), the Finavera test buoy came to symbolize the shortcomings of wave energy developers unfamiliar with the harsh ocean conditions of the Oregon coast. To be fair, the buoy did in fact survive one of the worst winter storms on record, but then filled with water later as a result of a faulty pump. That BOB became the butt of jokes in communities up and down the

coast no doubt served to discredit the nascent technology. Had the buoy not sunk, it is possible that people might have shown Finavera more respect as a bargaining partner than scorn as an interloper.

Ocean Power Technology's Extra Zero

Ocean Power Technologies (OPT), a wave energy development firm based in the U.K. with corporate offices in New Jersey, had been working with the Reedsport community in putting together an application for a preliminary permit to the Federal Energy Regulatory Commission (FERC) for an experimental wave energy buoy array of up to 20 devices. However, on March 7th, just prior to final submission, OPT made a major revision to the application without consulting community stakeholders: they changed the maximum potential number of buoys requested from 20 to 200.

Overwhelming public outcry has resulted in a stalled development process, ongoing bitterness, widespread distrust, and outright resentment among people in coastal communities, mostly fishermen, familiar with the case. While OPT has been working to mend fences and foster relationships with community groups and local leaders, the damage to the public trust was clearly demonstrated in a number of participant interviews. The incident probably biased many people against wave energy developers and, by association, with the technology itself.

The Push for Marine Reserves

As Oregon's state government and utilities have sought alternatives to carbon-based energy production, local marine environments within two to three miles from Oregon's coastline stand to be significantly impacted by the construction of off-shore

wave energy electrical infrastructure such as buoys, moorings, and cables.

Communities on the coast have developed around the commercial fishing industry and are often directly impacted by fluctuations in the ecological and economic systems associated with natural resource management, especially seafood production (Glazier et al, 2006). As of late, commercial fishermen have been forced to operate within a tightly regulated resource-extraction system, involving innumerable restrictions on when, where, and how fishing can take place. Nonetheless, they rely on relatively unencumbered access to specific sites in near-shore waters (within three miles from shore) for harvesting high-value target species such as Dungeness crab, salmon, and various rockfish (Glazier et al, 2006; FINE, 2008).

By summer 2008, numerous marine reserves had been proposed in Oregon for rocky-bottom habitat where species biodiversity were thought most plentiful and ecosystem dynamics most critical (FINE, 2008; PISCO, 2007). While numerous marine protected areas had already been established in Oregon's near shore waters, during the course of my fieldwork multiple environmental groups were busy putting together major proposals for specific areas to be considered by state agencies for the establishment of a series of marine reserves. The Partnership for Interdisciplinary Studies of Coastal Oceans defines marine protected areas as, "ocean areas that are fully protected from activities that remove animals and plants or alter habitats, except as needed for scientific monitoring" (PISCO, 2007). The World Conservation Union defines marine reserves as "sites in the ocean where legal or regulatory mechanisms

limit or restrict human activities to protect natural, historical, or cultural resources” (Dalton, 2005:1392).

While wave energy developers seek to provide what they see as a highly valuable and renewable product—in the form of carbon-free electricity—to both local communities and to the region (Bedard, 2007), wave energy projects will likely exclude fishing activity from their immediate vicinities. To the extent that wave energy parks exclude fishers from near shore fishing grounds, they will share certain key characteristics of both marine reserves and marine protected areas (Murray, 1999). Developers have generally sought sandy or soft-bottom areas where buoy-anchoring systems can be most efficiently installed and maintained. This soft-bottom habitat is home to Dungeness crab, an Oregon fishery worth almost \$12 million annually in Lincoln County alone, and is therefore critical to Pacific Northwest crab fishermen (FINE, 2008) as well as the communities to which they belong. Wave energy zoning regulations may pose a lasting threat to crab fishermen whose range is limited to certain marine sea floor environments. While some in the fishing community believe certain commercial harvesting methods, such as salmon trolling and crabbing as well as recreational salmon, halibut, and crab fishing, should be allowed under certain circumstances within proposed wave energy buoy arrays (FINE, 2008), the feasibility of such practices remains highly uncertain, as the risks of damage to buoy anchoring systems and electrical infrastructure as well as to expensive fishing gear remains very real (Glazier et al, 2006).

The hypothetical success of marine reserves depends on their ability to increase the value of the commercial catch outside reserve boundaries enough to compensate for lost access to historical fishing grounds (Halpern and Warner, 2003), and studies of existing marine protected areas in the Florida Keys demonstrate short-term increases in net earnings by locally impacted fishermen (Leeworthy, 2001). However, the perception of no-take ocean zones as sources of successful fishery regeneration, and of increased fishery profitability, could further galvanize wave energy proponents in favor of displacing commercial fishermen from wave energy parks. Suman et al studied the perceptions of stakeholder groups regarding proposed marine protected areas in the Florida Keys. Among recreational dive operators, commercial fishermen, and environmental groups, they found that commercial fishers felt uniquely alienated from the planning process and were more likely to oppose the formation of no-take zones. Their study employed the combined use of personal interviews and standardized survey instruments among an overall sample of 700 residents of Monroe county Florida, and strongly recommended conducting similar surveys to determine both the primary concerns of the stakeholder groups as well as their specific priorities regarding marine reserves (Suman et al. 1999:1037).

Conclusions

It is unproductive to discuss the implications of wave energy development on coastal communities without first understanding the broader economic and regulatory context in which wave energy is a relative newcomer. Recent attitudes toward potential incursion upon historic and existing ocean uses have no doubt been formed and challenged by, at the very least: marine protected areas, proposals for marine

reserves, interactions with industrial development companies, record oil and gasoline prices, protracted political campaigns, and a devastating salmon fishery collapse. I have tried to situate my research on public perceptions of the wave energy development process and the interviews I obtained to do so within their particular historic context. Similar interviews conducted before or well after this context could quite conceivably yield subtle differences in qualitative response due to changing historical circumstances.

CHAPTER 3: THEORETICAL FRAMEWORK

I have taken an applied anthropological approach to researching historically natural resource dependent communities, and have identified for this project three communities of place—Tillamook, Lincoln, and Douglas counties on the coast of Oregon—in which to explore public perceptions of wave energy technology in a socionatural region susceptible to potential impacts from proposed wave energy development projects. An exercise in environmental and development anthropology, this thesis will explore cognitive reasoning and adaptation to technological change. As such, I have utilized a theoretical framework built upon principles of human systems ecology, natural resource dependency, community well-being, opportunity-threat analysis, and spatiotemporal orientation. Below is a brief overview of the literature I have used in this process.

Human Systems Ecology

Sheldon Smith and Ed Reeves (1989) advocate a *human systems ecology* approach to the study of human adaptation, which emphasizes the role institutional systems play as mediators between human communities and their environments, and argue for the use of *socionatural region* as the most appropriate unit of analysis in community studies and development anthropology:

We feel that an important new unit of analysis for anthropologists will be the region. A region is an interdependent set of communities and sub-organizations which humans develop in adapting to temporal-spatial conditions which originate in the institutional as well as in the biophysical environment. As a unit for scientific study the region is heterogeneous and dynamic rather homogenous and static...But, although the region is more comprehensive and heterogeneous than a

community, it is not so large that anthropological field research becomes out of the question (1989:12)

I consider the three communities (counties) in this thesis project to constitute a single [coastal Oregon] socionatural region, and have analyzed and interpreted responses from all three counties as a regionally defined aggregate. Smith and Reeves defined the *region* as a means of spatiotemporal adaptation to both institutional and ecological conditions, and have built upon John W. Bennett's body of work involving *socionatural systems*. Wave energy development constitutes a human endeavor to systematically convert a natural phenomenon into an economic resource, and therefore represents what John W. Bennett terms a *socionatural system* (1996).

The particular socionatural region that is the focus of this thesis project has traditionally been a means by which human groups and institutions have entered into historical patterns of natural resource dependency and later into the current state of economic (and ecological) transition. According to Bennett's definition, there would appear to exist a multitude of socionatural systems at work on the Oregon coast, including the commercial fishing fleet, the recreational fishing fleet, the timber and wood products industries, shellfish aquaculture operations, and various recreation and tourism related industries such as surfing, kayaking, and whale watching. It is the very nature of the current economic transition from extractive to non-extractive industries that now defines the region's struggle for identity and adaptation.

Wave energy generation represents yet another possible socionatural system, and is characterized by a complex set of institutional relationships mediating between human technology and marine ecosystems. Bennett proposed the socionatural system

as an heuristic alternative to the dualistic nature of classical environmental philosophies and traditional theoretical approaches to human ecology which Bennett viewed as focusing too narrowly on either locally confined specificities or macro-scale institutions. Taking a more interdisciplinary approach, often disparaged by critics including Marvin Harris as “eclectic” (Harris, 1979), Bennett sought rigorous scrutiny of the broader systems that linked micro-level decision making with complex institutional socioeconomic processes. In this thesis I have avoided the classical case-study approach to individuals within a discrete community, and instead have attempted to apply a broad micro-level interpretation of cognitive understanding to policy-relevant macro-level decision making processes.

In his earlier work, Bennett (1976) illustrates his theory of the *ecological transition* in technological, sociological, ecological, and philosophical terms, each of which characterize the increased pressures exerted on natural systems by cultural defined material need satisfaction. Because human systems have tended to exhibit ever greater capacities for energy consumption, network communication, materials transportation, and socio-biological dominance over natural systems, Bennett argues that only “a return to the consideration of value in things and in human actions” will suffice to redirect human imagery back to a more sustainable or otherwise less ecologically destructive philosophy. This thesis examines perceived technological impacts on natural systems at both local and global levels, and calls into question Bennett’s admonition to retire the concept of development as progress “which implied

that human proclivities worked more to the good than the bad whatever the context” (1976:8).

Natural Resource Dependency

Wave energy technology captures the vertical component of ocean waves and converts it to electricity. It removes kinetic energy from swells, but not the material vehicle upon which that energy is carried. One might ask, then: Is it extractive, or is it renewable? Different people, especially in the historically natural resource dependent communities along the Oregon coast, often answer this question differently. Force et al. (2000) define resource-dependent communities in explicitly economic terms (for comparative purposes) based on relative levels of employment in natural resource industries, and identified local resource production of timber, fishing, and tourism¹ (all of which exemplify Oregon’s coastal region) as “resource systems composed of various practices of extraction, processing, and distribution.”

Extractive industries have long represented high levels of income in rural areas where few other economic opportunities were present, but because of dramatic changes in both extractive technologies as well as fundamental socio-environmental relationships, extractive industries have often lead instead to a form of regional *economic addiction* (Freudenburg, 1992a). Natural resource addiction occurs when a rural community becomes so entirely reliant upon the extraction of a single resource

¹ Based on participant responses and personal observations, I have treated the tourism industry on the Oregon coast as subdivided into 1) conventional tourism activities, such as unique shopping, dining, entertainment and gambling opportunities, and 2) eco-tourism which are those regionally specific ecological attractions which form the base of outdoor recreational activities like kayaking, surfing, fishing, birding and whale watching. Eco-tourism, rather than conventional tourism, is a primarily natural resource dependent industry.

that it proves difficult if not impossible to shift the economy toward more sustainable, even if temporarily less profitable, means of production (such as eco-tourism). A heightened condition of natural resource dependency is often a significant barrier to economic diversification in rural communities, and the tourism industry, both conventional tourism and eco-tourism, often poses a significant threat to the personal and collective occupational identities of resource dependent community members abandoning the only way of life they may have ever known (Petrzelka, 2006).

In as much as wave energy is perceived to exhibit the potential to displace existing resource dependent ocean users, it too represents a regional threat. However, as I shall discuss in later chapters, wave energy contains aspects within it of both extractive and non-extractive industries, as even the tourism industry was seen as potentially threatened by the potential aesthetic impacts of industrial development.

Opportunity-Threat Analysis

In his research on the Chesapeake Bay, Michael Paolisso constructed cultural models of crab fishermen's reasoning about existing fisheries management practices. In as much as his methodology relied on identifying subjective perceptions and ecological and cultural knowledge, he used a cognitive anthropology approach to help resource managers understand, communicate, and more productively interact with blue crab fishermen (Paolisso, 2002). Similarly, one of the goals of this research project was to inform natural resource management policy decision makers regarding coastal zoning in Oregon by exploring micro-level cognitive understanding in coastal communities regarding various human dimensions of the ocean wave energy development process. However, wave energy had not yet been developed on the

Oregon coast during the time I conducted fieldwork, and as such had only been experienced by coastal communities within a pre-development context.

Gramling and Freudenburg (1992) argue for a longitudinal perspective of community impacts of technological change, and note that besides the period of intense activity during a development project little attention has been paid to the periods immediately before and after. They view the process as consisting of three distinct phases: 1) opportunity-threat, 2) development, and 3) adaptation. I assert that in exploring various cognitive properties of knowledge, perceptions, and attitudes regarding wave energy technology and the development during the pre-development stage, participants in my thesis project viewed wave energy development in terms of opportunities and threats to community well-being while tacitly and explicitly implying possible adaptive strategies to mitigate potentially negative impacts.

Freudenburg and Gramling (1992) further outlined five systems within which opportunities and threats to human/environment relationships are most effectively understood: 1) physical, 2) cultural, 3) social, 4) political, 5) economic, and 6) psychological. Each of these systems is affected uniquely depending on its temporal position in the stages of development. While the extent to which these six systems reflect the political dimensions of community impacts I later describe in chapter 8 (vocational, environmental, economic, aesthetic, and psychological) could be argued, I would hope that the usefulness of opportunity-threat analysis as an heuristic device for exploring cognitive perceptions of potential development impacts is unmistakable.

Community Well-Being

I chose to use community well-being as a measure of participants' cognitive perceptions of wave energy development as either an opportunity or a threat, and, as a kind of calibration exercise, asked each participant to describe to me their own concept of community well-being in terms of the components they would most likely include in its definition. The concept of community well-being has been the subject of many studies, and has often gained audience from political spheres seeking direction in setting forth matters of public policy. However, little research on social well-being indicators related to growth and decline in rural communities has addressed the opportunity-threat (pre-development) phase of periods of rapid economic expansions.

Smith et al. (2001) conducted a longitudinal study of energy-related development in four communities in the western United States, and found that economic disturbances resultant from development projects were generally characterized by sharp declines in well-being in the short term but eventual recovery and stability in the long term. While these findings may hold promise for wave energy developers intent on securing leases of 20-50 years or more, they address nothing significant regarding pre-development impacts on well-being. Indeed, Smith et al. recommend further research into pre-development (as well as what they refer to as “pre-boom”) conditions of well-being.

Interestingly, Helliwell and Putnam (2004) note that while subjective well-being can be reliably measured by self-rating questions about “happiness” and “life satisfaction,” these two dimensions tended to yield spatiotemporal variations in response. Those regarding happiness are generally characterized by cognitive

descriptions of the response moment; those regarding life satisfaction are more closely associated with longer term projections of relatively stable life conditions. Both may be philosophically consistent, but there are clearly important distinctions to be made between different levels of subjective well-being varying with both the spatial location and the temporal occasion at which they are defined.

Much of the research on well-being has focused on either objective measures, such as economic indexes and household income (Osberg, 1985) or subjective measures, such as personal feelings and “hedonistic” perceptions (Kahneman, 2000). Dolan and Peasgood (2008) suggest that while previous accounts of well-being constructed for the sake of “philosophical dialogue” may have been intuitively accurate, the effectiveness of a subjective measurement of well-being for the sake of policy relevance rests on the degree to which the dimensions of that measure meet three criteria: 1) appropriate conceptual brevity based on that which is good for the individual, 2) predictive validity (that it measures what it is supposed to), and 3) empirical applicability based on unbiased assessments and sensitivity to changes in levels of well-being (2008: 4-5).

While my own analysis of community well-being may tend more toward the philosophical and offer little in the way of such pragmatic rigor, I nonetheless have attempted to set forth an initial framework for beginning an analysis of the public values under-girding dimensions of coastal community well-being. Future research is needed to evaluate the policy relevance of the social, economic, and political

dimensions of community well-being I describe in chapter 5 against the three criteria Dolan and Peasgood have set forth.

Spatiotemporal Orientation

I suspect that differences in perception during wave energy's opportunity-threat stage may be related to variations between particular socionatural systems with which participants seek to belong. Some of these systems are experienced in relatively close spatial and temporal proximity (e.g. impacts on the view of the sunset over the ocean), while others are experienced more distantly (e.g. remediation of global warming). Peter Lasersohn studied the linguistic relationships between expressions of group action and spatial and temporal proximity. He asserts that "it appears to be cognitively 'natural' to regard participation in the same event as analogous to location in the same area, or action at the same time," and suggests as one possible explanation "fundamental constraints on the structure of human cognition" (1990:204). I have sought to explore those constraints, and in several of the above sections I already have made reference to aspects of spatiotemporal factors involved in the process of cognitive reasoning and human adaptation. To what degree do people on the coast perceive themselves as participating in the wave energy development process?

The degree to which development impacts are subjectively framed as either opportunities or threats may in part be related to what I have termed an individual's [*cognitive, or perceptual*] *spatiotemporal orientation*. That is, the exact manner by which a particular impact is perceived to occur may in fact be secondary—in terms of determining an adaptive strategy—to the spatial and temporal proximity at which it occurs. For example, Griffis and Kimball (1996) advocate an ecosystem

approach to managing high value ocean resources, and argue for “broader perspectives of time, space and human needs when defining goals” as an alternative paradigm to what they view as dangerously short term benefits from proximal resource exploitation. The authors argue for participation in long term processes across wide ranging locations. Their central premise disassociates them with participants in other groups characterized by short term processes of resource extraction.

In contrast, Michaud et al. (2004) measured NIMBYism and environmentalism as alternative reasons residents gave for opposing off-shore oil drilling in close proximity to California homes. While environmentalism was more positively related to oppositional responses, the study’s theoretical achievement most relevant to this project may have simply been parsing the two rationales, NIMBYism and environmentalism, in terms of spatiotemporal proximity: *proximal* orientation yielded NIMBYist responses while *distal* orientation yielded environmentalist responses. NIMBYism was viewed as an indicator of self-interested *localized* opposition to development, while environmentalism indicated more a general interest in protecting *all* natural environments.

In the case of off-shore oil drilling in California, both NIMBYism and environmentalism were sources of development opposition, but this does not prove to be the case regarding wave energy development in Oregon. I will explore the degree to which participants in this project expressing proximal spatiotemporal orientation described community well-being in terms of local resources (e.g. navigable ocean space) and historical socionatural systems (e.g. the commercial crabbing fleet) while

those expressing distal spatiotemporal orientation described well-being in terms of global resources (e.g. climatic stability) and futuristic socionatural systems (e.g. wave energy technology).

CHAPTER 4: METHODOLOGY, MATERIALS AND METHODS

As the anthropological research component of a multidisciplinary research program studying the human dimensions of wave energy development in Oregon, this project complimented the concurrent works of colleagues from the fields of marine resource management, environmental science, and public policy, and represents the first known anthropological assessment of wave energy technology. Major portions of the funding for this project were generously provided by the Oregon Wave Energy Trust (OWET) and Oregon Sea Grant. OWET is a non-profit group established by Oregon's governor Ted Kulongoski, and was "charged with making Oregon a national leader in wave energy – from harnessing the ocean power to the responsible development of projects along the coast of Oregon" (OWET, 2009).

Because the development of wave energy facilities would comprise a significant shift in existing natural resource use paradigms for coastal Oregon communities, this project utilized humanizing evaluation methods in hopes of ensuring that any changes resultant from large-scale energy project implementation remain person centered, attentive to the needs of unique individuals, and that the development process itself remain as important as its outcomes (Patton, 1990). Because qualitative ethnographic research involves the description of not only what people say but also what they do and the environments in which they operate, I moved myself and my family to a house on the Oregon coast in the community of Otter Rock, a few miles north of Newport, the county seat of Lincoln County. As a resident of Otter Rock, I was able to gain a more emic understanding of both the social and ecological contexts

within which coastal residents operate as well as the economic realities they face as members of resource dependent communities (Brabant and Gramling, 1997).

Although it was not the goal of this project to generalize from the findings to the broader coastal population, the research methodology I employed borrowed techniques from the grounded theory approach where ethnographic data are gathered, analytic categories coded, and major themes exemplified through targeted interview quotes (Bernard, 2006:492). As a result, data can be systematically interpreted in such a way as to allow for the discovery of particularly policy-relevant theory (Glaser and Strauss, 1980). Similarly, exploratory inductive analysis of the data included the identification and definition of both indigenous and sensitizing concepts in the construction of descriptive typologies and conceptual models (Patton, 1990:390-398; Bernard, 2006:497-503). Conceptual models were used to demonstrate the linkages and interrelationships between and among major themes, and were constructed from fields notes taken during data collection and memos written during the coding process (Bernard, 2006:497).

This project utilized applied research methods toward helping contribute to an accurate and functional set of decision making considerations for policy and industry actors. As such, interview data were analyzed with a *utilization-focused evaluation* method (Patton, 1990:121), and evaluation of the findings was carried out using *cross-case analysis* such that the interview guide itself provided a useful template with which to organize data by issue (ibid:376-377).

The primary objective of this project was to describe communities of place in terms of public perceptions regarding the wave energy development process. I recruited key informants from three coastal Oregon counties including Tillamook County, located on the northern coast, Lincoln County on the central coast, and Douglas County on the southern coast. At the time fieldwork began each county was not only located along various stages of the wave energy development process timeline but was also engaged in reviewing proposals from several different wave energy developers employing distinct forms of device technology.

Because I sought to include a broad array of participants for this study from various socioeconomic groups within each county, participants included people involved in local sport and commercial fisheries, community organizations, small businesses, environmental groups, local governments and institutions, as well as retirees and second-homeowners. I used a combination of purposive, chain-referral, and convenience sampling methods to contact and interview participants. Initially, key informants were selected from among community leaders or other high-profile agents in each county, and were selected based on prior knowledge of the groups and individuals themselves. Further sampling was conducted using a chain-referral method, or snowball sampling technique (Glaser and Strauss, 1967), beginning with key informants known to us in each community. Snowball sampling was a useful way to quickly generate a sizable sample frame from which to contact potential participants, but was not meant as a representative or random sample (Bernard, 2006).

It was not the goal of this project to exhaust existing contact lists, but, rather, to create new ones by extending the opportunity of public participation to those within each community whose opinions we have not yet documented. As such, each key informant was asked to nominate others from within their communities (defined as residents of their respective counties) whom they believed would be able to contribute to the study. Participants were not required to provide referrals, and there was no limit to the number of people they could refer. If an informant chose not to refer anyone to be contacted about the project, I started the process over with another community member known to myself or my advisors. Finally, some participants were selected using convenience sampling. These included acquaintances from within my coastal neighborhood as well as stakeholders with whom a chance encounter at their workplace resulted in an unanticipated interview. Because each of these were residents within the broader sample frame from which I selected participants, each represents a distinct stakeholder group (Bernard, 2006).

In all, a total of 47 people participated in this study—17 from Tillamook County, 18 from Lincoln, and 12 from Douglas—over a period of four months from July to November 2008. It was not critical to this study that equal numbers of participants be included from each county, and it should be noted that totals for each county do not represent proportional populations of residents for each community. Certain key informants were selected for inclusion in this study based on prior knowledge by myself and my advisors. This had the potential to introduce an element

of bias into the participant selection process which was, for the most part, participant-driven. See Table 1 below for participant demographic information.

Table 1 - Participant Demographic Information

Variable	Categories	Sample Size (n)	% of Sample*
County	Tillamook	17	36.2%
	Lincoln	18	38.3%
	Douglas	12	25.5%
Gender	Male	34	72.3%
	Female	13	27.7%
Sector	Fishing	9	19.1%
	Retired	5	10.6%
	Government	11	23.4%
	Tourism	7	14.9%
	Recreation	7	14.9%
	Environmental	5	10.6%
	Civic	3	6.4%
Total Sample		47	100.0%

*Note: Columns may not total 100% due to rounding.

I conducted semi-structured interviews with these 47 participants. Semi-structured interviews followed a standard interview protocol, and encouraged informants to 1) define the concept of *community well-being*, 2) describe their understanding of wave energy technology and the sources from which they gain knowledge regarding wave energy, and 3) articulate their perceptions of the potential effects of wave energy development on the well-being of their communities. In order to allow informants to offer as much information as they were comfortable providing, I asked open-ended questions. Interviews lasted 30 to 90 minutes, and took place at a time and location convenient to each participant. Participants were free to ask questions to me at the end of the interview, and often this was a time of fruitful

discussion and exchange helping me to gain further insight into their particular cognitive domains. Interviews were recorded using a handheld digital recorder, transcribed on a personal computer, and coded for thematic content using NVivo8 software. In order to both ground-truth information gathered during interviews as well as contextualize the lifeways² of key stakeholders (and understand the technical and policy aspects of wave energy development), I attended various public meetings, planning sessions, and an annual industry conference to gain a more salient understanding surrounding the issues and concerns of residents, community leaders, and industry operators.

Each completed interview was transcribed and coded for thematic content such that participant identity remained confidential. I used the NVivo 8 software platform to manage the analysis of the qualitative data documented in each transcribed interview. Using both the contextual and the thematic content from the qualitative data and the ethnographic experience, I identified and organized the major themes upon which various community groups appeared to base their attitudes and perceptions in response to each interview question. While some interview questions require only a simple yes or no code, others required more complex conceptual referents. After all transcriptions were coded, I ranked codes assigned in response to simpler questions

² I use the term lifeways to include all of the various and interrelated strategies [that participants] used to earn a living, establish family and community relationships, express spirituality, relate with the natural environment, and participate in the political process. It is distinguished from the concept of lifestyle in that lifeways are more closely associated with modes of productions and strategies for self-provisioning. Lifestyle describes a pattern of choices in the ways a person desires to live and be perceived by others. There a greater sense of permanency and consistency associated with the concept of lifeway.

according to the number of participants having cited them during the interviews. For other more open-ended questions I grouped codes according to general thematic relevance and selected or assigned themes which incorporated multiple sub-themes within their conceptual context.

Living on the Oregon coast, conducting personal semi-structured interviews, and attending public meetings and industry events I observed first-hand how the behavior and decisions of residents of coastal communities affected both their individual and collective senses of identity and value as well as the ways in which their actions were either supported or contradicted by informant responses regarding stakeholder attributes. A conceptual framework grounded in experiential data thus helped inform my interpretation of the interview data. Finally, I selected exemplar quotes from informants that poignantly represented the major themes of the project encapsulating key participant perspectives.

CHAPTER 5: LOCAL DEFINITIONS OF COMMUNITY WELL-BEING

The goal of this project is to explore the potential impacts of wave energy development on the lives of people that have been living in closest proximity to the proposed sites of the actual development projects themselves. Because wave energy projects are generally sited within three miles of the shoreline, residents of coastal communities stand to be impacted to a far greater extent than non-coastal communities. It is, nonetheless, often argued that both coastal and non-coastal communities would share equally in the benefits of electricity consumption derived from wave energy projects. However, because impacts of development projects of this nature can be perceived as either benefits or risks (Kates, 1971; Thomas, 1981; Lee, 1987), the perceptions of people living in closest proximity to the actual development sites themselves are of utmost relevance to those charged with developing not just the technology behind the development but the regulatory framework and economic distribution regimes that govern it as well (Bennett, 1996).

In order to more accurately gauge the potential impacts of wave energy on coastal communities, I have used here the concept of “community well-being” as an analytic device to describe aspects of both personal and collective lifestyle preferences. While numerous studies address various aspects of social well-being (Overdevest and Green, 1995; Smith et al, 2001; Helliwell and Putnam, 2004; Stedman et al, 2004), my goal was to establish a model of community well-being grounded in public perception data collected from the community itself, and rather than ask participants to rate community well-being on predetermined dimensional

scales, I sought to allow the definitions of those very dimensions to emerge from the data with an *emic* interpretation of first hand experience with coastal residents. Thus, the goal of this process was not to rate various aspects of well-being and perform a comparative analysis but rather to allow the most salient aspects of well-being to percolate to the surface and potentially build a relevant dimensional scale with which to measure the potential impacts of proposed industrial development projects, in this case wave energy generation facilities. To begin, I asked 47 participants to respond to a set of questions including:

What does the term “community well-being” mean to you? What are some of the components would you factor into this concept?

How has well-being in the community changed over the years?

How do you expect community well-being to change in the future?

While a number of participants indicated a general unfamiliarity with the concept of “community well-being” and some even expressed disapproval with the term itself as an analytic device, responses nonetheless varied in both content and duration, and coalesced around 1) economic, 2) political, and 3) social dimensions. Each of these dimensions was supported by several major themes, and this chapter will lay out some of the relationships among them and their broader implications for attitudes toward development projects in established socionatural regions (Smith and Reeves, 1989).

Economic Dimensions of Community Well-Being

The major economic dimensions of community well-being as described to me by residents of coastal communities included 1) job creation, 2) growth, and 3) transition.

Job Creation

Coastal communities, historically dependent on natural resource extraction, are struggling to adapt to resource depletion and increasingly more stringent regulations limiting the take of both timber and fish (Wissmar et al, 1994; Conway and Opsommer, 2007). According to the participants in this study, natural resources have become increasingly scarce, and once plentiful opportunities for employment aboard fishing vessels and on logging crews have correspondingly dwindled (along with a great deal of the accompanying industrial infrastructure that supported them). Seafood processors and lumber mills have steadily been going out of business for years, and with them job losses have been, and continue to be, significant to coastal residents. Job creation thus remains a key component to community well-being, especially in its capacity as a restorative process, a means by which to get back to “the good old days.” By far, what participants describe as lacking is the past prevalence of the so-called “family wage jobs” that once would allow a young man just out of high school to take a position on a boat or in the woods and make enough money to support himself and his family comfortably.

In the early sixties, International Paper Company, which is a paper mill and sawmill and plywood mill they had over in Gardiner, was the driving force of the economy around here along with logging and fishing. So those would have been the leading industries, and someone

coming out of high school could probably get a job at any of those places without any education and make good money. In the nineties—well, I guess it was the late eighties—the sawmill shut down in Gardiner and then several other sawmills and processing plants closed down. And then in '98 the pulp and paper mill in Gardiner shut down. It was sort the last of that whole IP industry here. So it's gone from being a place where people raise families to a retirement community, it feels like in a lot of ways. (Merchant)

The loss of family wage jobs was frequently mentioned in the interview data, and their presence is no doubt sorely missed in coastal communities once booming with salmon, spruce, and fir. One participant explained this concept in terms of the long-term impacts of continued job loss on the character of a community:

The other thing is having jobs available to keep the young kids here and not having them move away, which also goes back to keeping a viable community. You've got to be able to create jobs that are livable by payable means, and to be able to afford to buy homes and things like that to kind of keep it going. Without that, the young kids move away to other opportunities. So if you don't have that vitality and growth in the community, you're going to lose that, and it becomes a retirement community, the people that have been here forever and really have no intentions of leaving or can't even afford to leave. (Park manager)

Economic Growth

Likewise, economic growth, in its capacity to attract investment and generate development, is viewed as an essential component to regaining the economic well-being of days gone by. Growth is often seen as categorically good, and is generally envisaged as taking the form of either industrial or private development. Industrial development involves establishing and promoting various forms of light industry by way of attracting and retaining the requisite professionals and field experts persuading them to relocate to coastal communities.

With Reedsport, community well-being is growth. That's just a real simple answer, I think, for that. But, we have been going backwards for any number of years, and anything that could provide growth for us would help a great deal. Growth helps our schools; obviously it'll help us economically with an increase in business; and I think all up and down the coast it's just a real necessary ingredient. (Retiree)

Although coastal Oregon communities are often highly sought after as vacation destinations due to their amenable climate and renowned scenic vistas, there are other less-publicized aspects that make them undesirable to prospective in-movers. These include declining budgets for the support of education, infrastructure, and housing. Economic growth is therefore seen as a means by which to provide coastal communities the appropriate incentives with which to attract in-movers with skill sets beyond or in addition to the capacities of local residents.

Economic Transition

The decreased production in logging and fishing has been marked by an upsurge in new forms of regional economic activity. Participants described several ways in which change is occurring in their communities, and each of these involves the growth of non-extractive sources of revenue.

I think we're in that transition to change what the economy is based upon, but I think that's a slow transition because you have all kinds of factors, especially when you have things like generational poverty--when you have different generations that have a very difficult time with economic prowess. And it could be for a lot of different reasons, but a lot of it comes from a change in--culturally--what they know to make a living and what's not available any more. There's a lot of things to talk about fifty years ago if you had a college degree. Fifty years ago if you had a high school diploma it meant something where you could go out and get a job pretty easily. Now those same jobs require a bachelor's degree, and what required a bachelor's degree is requiring more of a master's degree. And while sometimes it's hard to derive a direct connection from a higher educational degree to a profession, it's

becoming more and more commonplace. When this was a booming place, it was based upon the natural resources. I don't think there was a lot of forethought in regard to, "What if this isn't there anymore?"
(School principal)

Perhaps the most visible indicator of the economic transition has been the rise of the tourism industry which enjoys significantly higher levels of overall employment rates than either fishing or logging but does so at the expense of "family-wage" rates of pay.

I've lived here fourteen years, and during that time we've had some pretty significant changes. At the beginning of that fourteen year period, we had already moved away from a forest products based economy into a more tourism based economy. Although if you look at the study that was done by the Oregon Coastal Zone Management Association on the coast and its economy and breakdowns by county, you'll find that the fishing industry actually generates more into our economy, just by a few million, than the tourism economy does, but the tourism economy provides far more jobs, the difference being the fishing jobs pay much better than the tourism jobs. That really hasn't changed much. (County planner)

The tourism industry encompasses both the service and recreation industries, and contributes nearly as much to the economic activity of coastal communities as the fishing industry and slightly more than the timber industry (OCZMA, 2006). Some people expressed a concern for the loss of fishing and timber jobs, and lamented the transition to a predominately tourism based economy. Others frame the growth of the tourism industry as a defense mechanism against further industrialization of coastal ecologies.

I think it would be, personally as an individual, a mistake to invite industry in looking for that. I would be more keen towards going ahead and expanding the tourism-based, the beauty of the lower Umpqua area. I would feel tourism alone could support and create a much greater economical stride forward if only local people would embrace

that idea, and at this point I think that the main bulk of the people are fearful of that idea. And so the natural norm is throwing down a big industry and putting everybody to work. But, like I say, my vision is put plans to basically show the visitors the year round atmosphere that we have that's tourism oriented and take advantage of that dollar as it comes to town. So there's a little bit of a division there. I think that's one of our number one divisions in this town, which is: Which way are we going to go? Are we going to embrace tourism or are we going to keep seeking industry. (Merchant)

However, local government officials note that both tourism and fishing contributions to county economies fall far short of those made by taxes on transfer payment income from out of state accounts to predominately retired coastal residents. While the full implications of transfer payments on local government administrations remains ambiguous, it could explain a certain demonstrated acceptance of the ongoing transition from natural resource extraction to non-extractive industries. Coastal communities confronted with the limitations of timber extraction, seafood production, and agricultural land-use, are seeking new ways to support future economic growth.

I think we're a natural resource based county. We're not necessarily a natural resource based economy. Our largest income source in this county comes from transfer payments, which is: retirement, social security, stocks, and bonds. So that tells you that [a lot of money that flows into this county comes from those sources [the elderly population]. Even though you might think it's the Creamery Association or the mills or those kinds of things. So that's the flow of money in. So, has that changed? I would say it has changed. Our fishing industry has gone down over time. I think there's only like two charters left in Garibaldi right now where there used to be a lot more. The commercial fleet in Garibaldi has declined over time. The dairy industry is still very strong, but I wouldn't say it's strong from the standpoint of local farms. It's strong because we ran out of land to raise cows on. (County official)

Of all the aforementioned economic dimensions of community well-being, transition is perhaps the most powerful explanatory concept because both job creation

and economic growth appear to be uniquely guided by the very transitional forces which are concomitantly the sources of both job loss and economic decline. Because this economic transition is yet to be fully played out, there remains a high degree of uncertainty among people in traditionally resource dependent communities who understandably perceive such dramatic change with trepidation. However, for others I spoke to, the changes implicit with economic transition imply opportunity and a chance to create a more sustainable socionatural system. Ironically, both viewpoints would strive to maintain the economic prosperity of the region, but adopt dramatically different strategies for doing so. These strategies will be the focus of a later discussion in chapter seven.

Political Dimensions of Community Well-Being

Interview participants in this project provided a significant amount of data that encompass political dimensions of community well-being. I have organized them into five major sub-themes including 1) infrastructure durability, 2) planned change, 3) administrative transparency, 4) regulatory justice, and 5) green politics. Participants demonstrated a wide range of personal political affiliation, from conservative to progressive, although no one was directly asked to provide such information for this study.

Infrastructure durability

A surprisingly more pressing issue than I would have expected it to be, infrastructure durability figured prominently as critical to the well-being of coastal communities. In as much as public works are a civic responsibility provided and

maintained by local and state governments, I have framed infrastructure issues as political issues. They are the professional domain of elected officials, and, like government salaries, are funded with taxpayer dollars. Participant responses included components of infrastructure durability involving basic services like crime prevention and sewer systems as well as those involving the built environment such as "good roads" and the ability to connect coastal communities with one another and those in the Willamette Valley. Sewer systems, in particular, including waste water treatment plants and sewage outflow facilities, were mentioned on seventeen separate occasions, and appear to constitute a major challenge to local governments. Difficult and shifting geological conditions make the expansion of existing sewer systems on the coast exceedingly costly for local administrations. Several large projects in both Oceanside on the north coast and in Salmon Harbor on the southern coast were well under way at the time I was conducting interviews, so perhaps the relevance of the issue was overstated for this reason.

Crime prevention also emerged as an important basic service in providing retirees and others a general sense of safety in the midst of a well-publicized methamphetamine epidemic in coastal communities.

Being a community of retired folks, we have a number of older people here, and safety's a big factor for them. It's not like living in a ghetto, but some people just feel that with the increase in drug use in outside areas that it lends to robberies in our community. And, if you looked at our crime sheets compared to other communities it's almost laughable. The most the sheriff goes out to do is talk about a barking dog. We don't have a lot of home invasions here, but it's in the back of people's minds with older folks. I think that it'll get better. (Retiree)

The built environment was also cited by a number of local government officials as a key component in the psychological well-being of residents. According to one Tillamook County planner, "A lot of times, the physical make-up of the buildings downtown has an influence sometimes on the well-being of the feelings you have." It is perhaps expected for local government officials involved in local planning and development projects to emphasize the built environment, but non-governmental residents also noted its importance.

I think a community's well-being is first of all I'm going to say its residential population and then its business population, or its peoples. But, I think community well-being is also about the infrastructure of a community, its buildings, its streets. (Merchant)

Run down or abandoned buildings were seen as sources of depression or even anxiety. The ability to construct modern buildings and preserve historic ones was often posited as essential to attracting new residents and investments as well as retaining existing ones.

The school over in Gardiner, they disposed of. They sold it. One of the saddest meetings I've ever attended, to watch them finally to get rid of it. They kept it open—you know how long and how many teachers—and finally they voted to close it and to sell it. And a school is quite often an identity for the community. (Events planner)

Thus, even though certain structures may have, without question, outlived their practical utility, the impact of their obsolescence on the community's collective psyche may be just as painful as its impact on the local economy (not to mention the politicians often held to blame for such things).

Planned Change

One county planner was careful to point out that his responsibility was not simply to promote economic growth or unabated development but rather to judge the need for and ensure the appropriate execution of planned change. He put it this way:

Community well-being means to me something that occurs in the interest of the health, safety, or welfare of the citizens of a specific or given area. Proper adequate public services, safe and sound place to live, opportunity for employment, economic opportunity and planned or managed change. I don't want to say growth, because growth isn't always what happens. It sometimes is a reduction in services, being a guide to change for the community. (County planner)

Although we find here what seems to be a rare exception to the broader perception of growth as inherently good (see Economic Dimensions above), the concept of planned change was nonetheless well-supported by additional interview data. Aspects of (a) responsible development, (b) successful adaptation, and (c) balance emerge as complimentary to the aforementioned concept of growth.

Responsible Development

Subsequent to providing the "real simple answer" in the above passage regarding growth as inherently good, that participant later described ways in which anticipated efforts at growth did not always turn out the way they were intended or expected:

There have been a series of things that the Chamber has done to try to promote the area. In recent years they've had probably twice as many events as we've had in the past, and it really is a matter of just trying to attract people here. We thought that we had a great deal with American Bridge coming in, but that has not panned out as well as we thought they would because they did not really become much of a partner with the community. Many of the jobs they offered, people in Florence or

people in Coos Bay got. It hasn't been a real user-friendly community thing. In my perspective, they're not benefiting the community. It really has been a white elephant from the community's perspective. (County planner)

Thus, while growth is still seen as predominately good in most instances, it was also acknowledged that perhaps there are right and wrong ways to go about achieving it. In the case of American Bridge, the community expected a number of jobs to be filled either by local residents or by people from out of town that would then relocate to Reedsport, thus strengthening the local tax base. They were instead filled by people from communities further north and south that had no real need to relocate and simply commuted to work. This meant no new home sales, no property taxes, and no lasting engagement with the community at large. It's easy to imagine that this experience may have lead some in the Reedsport area to begin to approach proposals for large scale industrial development projects with a great deal more scrutiny and suspicion than perhaps they once would have. If a company that wants to do business on the coast promises jobs, people now want to know more pragmatic information than simply whether there will be any jobs created. In the case of a proposed wave energy development project of the southern coast near Gardiner, one participant put it this way:

I think there's going to be some pretty major resentment if things don't go as they're presented. Truth is the most important thing. The presentation for the company that wants to come and do it had better tell the exact truth, and have a number, and have documentation or a study or something to show: how many people are going to move into town; how many people are going to be required to maintain and manage those buoys; are they going to be hired locally; are they going to be brought in from out of town? And I'm sure they'd have to be because it's not like you're going to find the people with the knowledge

or the training or the schooling or the education to do it out of this local economy. You'd just hope that maybe they would move here.
(Merchant)

He goes on to compare the things he's heard about wave energy development projects (to which he is opposed) to projects he feels both serve a more beneficial role to the region and he believes are being carried out with a greater degree of transparency. He mentions a project to his south in the city of Coos Bay involving the completion of a deep water port project:

I'm wondering who's having these conversations, and this has been kind of a long term conversation for a certain small group of people within this community that have tried to invite this wave energy plant in here and I haven't really seen anything good with regard to data. In a way I could compare this to the deep-water port over there in Coos Bay, and I could find some really strong data. When they're trying to put something like that deep-water port in they have a specific number of jobs lined up long term. They'll be able to present that data. They can really paint a clear picture of what effect that will have. This thing is not clear whatsoever. (Merchant)

Successful Adaptation

Because significant social or economic change involves a collective departure from the status quo, a critical component of planned change includes maintaining sufficient control over the very process of change itself so as not to disturb or lose those portions of culture that communities cherish or otherwise don't want to change. In resource dependent communities, dramatic alterations in the socionatural system can jeopardize not just a community's modes of economic production but its cultural identity as well. A fisherman I spoke to described the concept of successful adaptation in terms of weighing what kinds of changes are acceptable and which are not:

Well-being probably pertains to holding on to parts of the community that we value, and keeping some things the same, to some degree: key valued parts—values—related pieces, being able to retain those things in a larger environment that, of course, is changing like crazy, spinning and spinning. At least as important is the dynamic part of well-being which has to do with successful change, I guess, hopefully, without completely losing that which we most value or being able at least to maintain those values as they change and disappear. The activities around them might change or disappear so successful adaptation is the second part—the non-static part—of community well-being, what it means to me. (Fisherman)

Balance

There also is a balancing act of sorts that takes place when local governments in coastal communities try to steer economic development in directions it may not otherwise take of its own accord but that in their estimation will ensure the greatest positive impact on the well-being of their communities. Balance, then, emerged as a key concept in developing strategies for adapting to the potential changes that wave energy development could bring about. It is the careful weighing of risks against benefits and threats against opportunities that defines the discourse of wave energy on the Oregon coast.

What you've got is you've got a very rich community in its natural resources and opportunity for activities in this region, in our community, the south coast. And then you've also got to balance that with...I support looking at alternative energy sources and looking at something that will make us less dependent on petroleum products, and more green, and leaving less of a carbon footprint, but not at the expense of some of the wealth of our community...If something's done without enough research and development into potential issues that could impact the environmental area physically and the people and the people's activities you have a potential for a horror story that can backfire big time. There's little room for middle ground. (Surfer)

Administrative Transparency

Over one-third of the participants interviewed included aspects of administrative transparency among the political dimensions of community well-being. Major themes included (a) participatory democracy, (b) political autonomy, and (c) resisting corruption.

Participatory democracy

Perhaps because of the relatively small populations of coastal counties, there seemed to be a notable degree of intimacy among the general public with current events regarding planning and policy considerations by local government bodies. There was at least a noteworthy degree of concern that the public keep a watchful eye on the machinations of city and county proceedings to make sure their voices were heard, that their elected officials were doing what they said they were and not doing what they said they weren't. In this sense, one participant addressed both the prerequisites and the limitations of transparency this way:

So, that kind of balance, of being able to have the population, but people that have a good understanding of what's happening, with very minimal risks to opportunities that are present in this area. That deals with open and transparent information and communication. Really, when we talk about environmental studies, we're talking about a lot of things, but a big portion of that is dealing with community, with people, living in the area. And it is if it's part of the format, but sometimes things can not be as transparent as possible. (School administrator)

Here, this participant argues that development projects, in particular those that pose potential hazards to the local environment, should be carefully scrutinized not just by experts but also by the people of the community themselves. Until then, large

projects may have to wait for broader public appeal before proceeding. The question of how to gauge public input and whether it is being fully taken into account would seem to depend on the extent to which local governments are sensitive to the voices within their communities.

However, "open and transparent information and communication" implies the additional process of public outreach in order to empower people with the information needed to formulate opinion, reach consensus, and ultimately form a coherent voice. Thus, transparency in this sense applies not only to broadcasting proposed policy decisions but also allowing the freedom and capacity to access public records and key historical information relevant to land-use legislation and development protocols.

Political Autonomy

Not only did participants seek to know what their representatives in government were doing, but also that their representatives understood and carried out the will of their constituencies. Compounding the frustration of resource dependent community members was the complexity of governmental hierarchies. I gathered they found it difficult enough to hold captive the attention of their own local government, let alone those at the state or national levels. The idea of the importance of having a voice in the policy decision-making process was a recurring theme.

We live here, and we rely upon this patch of land. And there's people that are three thousand miles away that have the ultimate say in what happens to this patch of land. So a community that can stand up for itself and communicate to the powers that be what really needs to happen, because they know better than anybody else because you're here and you rely upon it, what the best thing to happen for this area is, that's a community with well-being. You're not only supporting yourself physically with resources or whatever, but being able to steer

the land-use or the way the community works, your schools or your regulations, whatever it may be. That's the ultimate well-being I guess, if you want to put it that way. It seems like voices heard just kind of falls on deaf ears anymore. You can say all you want, but you've got to be able to make something happen. (Fisherman)

Resisting Corruption

Having experienced the ups and downs of industrial development projects in the past, several of the participants I interviewed expressed skepticism and even suspicion regarding the influence over government officials that large corporations often enjoy at the expense of stakeholder representation. There did not appear to be a generalized fear that local governments risked inherent corruption, but rather that because they are indeed so akin to the people they represent, they are also fallible human beings and equally subject to the pressures of temptation and greed.

Big business has a way of trying to dictate how things happen and they have the money to make those demands. So, local government would have to be on their toes at all times. You also have to worry about somebody being in the back pockets to maybe look the other way. Wherever there's big money, there's always corruption. That's a bad thing. (Hotel manager)

Regulatory Justice

In as much as coastal communities express concern over the transparency of their local government, they reflect the intimate relationship that exists between natural resource extraction practitioners and the regulatory framework that governs their practices. Several people told me that regulation has made traditional fishing and logging practices untenable, and many blame government intervention for the decline of natural resource economies on the coast. Though local governments often have very

little to do with the actual drafting of such regulations, they are easy targets for assigning blame locally.

People have to be willing to accept that sometimes it's going to cost them but that the upside benefit is worth it. So it's a matter of building confidence at all times because it's constantly being eroded. We get the results. We get the outfall, if you will, of disdain with the federal government and with the state government. It is tough to maintain confidence of your population when the perception is that government at higher levels, and therefore probably government at this level, isn't worth anything, or is only worth picking on you. "They just want more and they aren't willing to give you anything." So that's what we try to do: balancing a variety of needs. (County official)

Indeed, while state and federal agencies claim to use the best available science to help write resource regulations, the resource users themselves may already feel adversarial toward the scientific community, and by proxy, their colluders in the state and federal governments. In one instance, a member of the fishing community in Tillamook County described the apparent over-regulation of a particular species of rockfish deemed endangered by research biologists yet incidentally caught in profusion by local recreational fishermen. The consequences of the ensuing regulation placed significant stress upon the entire recreational fishing fleet by forcing them to restrict their activities nearer to shore.

Fishermen, well, they won't have areas to fish in. And they've already taken away so many of our areas, with rockfish conservation areas and everything else, that we're down to the very last that we can do. They just brought us into twenty fathoms. I don't know if you know that or not, but the recreational fleet—because we've got the Yellow-eye up there, the big orange one, that is endangered; however, we're seeing more and more of them. The effort's down, but it's the black box that we get stuck in where we're catching more of them so it counts against our quota and that shuts us down. (Fisherman)

And, as another participant added:

Now they won't let us fish more than three miles out anymore because of Yellow-Eye. One fish is ruining it for the rest of them. That one's endangered so you can't take any fish because you might catch that fish. I'm talking about ground fish. Ling cod and stuff, and all that; you can't because, I think it's the Yellow-Eye that's endangered, and they won't allow it. (Fisherman)

Thus, we find that even isolated judgments made by the scientific community regarding singular marine species can entail wide-reaching impacts, both politically and economically. The degree to which these judgments are deemed accurate and economically beneficial to the region greatly influences the perceived relationship between scientists and governments and the degree to which regulations and limitations are construed as fair and just by resource users. Frequently, however, the science-government relationship is viewed with high levels of frustration and suspicion.

The fishing is—well, they've got their problems too. We have been having problems with the fishing industry for a long time. Simply put, I think the bulk of the fishermen feel like systems like our wild fish policy and things is a forty-year failed experiment. It's a golden calf; you can't give it up. You've got to hang onto it no matter how much it's failed and still failing. (Fisherman)

By making express efforts to work with existing ocean resource users local governments have helped foster their trust and cooperation. As noted above, access to information and political autonomy figure prominently in building a community's sense of regulatory justice.

Well, I kind of like the way our county government's doing it. They have asked the fishermen to look into it and have their input at all phases of it and to try and not harm the fishing industry, which is a true heritage of Oregon. We do provide fresh food, and tourism and everything else. We have tourists from all over the world because of our fishing. It's famous. (Fisherman)

Not only did regulatory justice figure prominently as a major theme regarding then current natural resource extraction practices, they also emerged around the issue of federal county timber payments, often referred to as "safety-net funds" by project participants. After the Clinton administration passed the Secure Rural Schools and Community Self-Determination Act of 2000, many coastal communities were able to receive federal dollars to help transition from logging to other industries. The bill, which was scheduled to last until 2006, had been renewed several times, but during the interview phase of my fieldwork, the United States Congress acted to allow the legislation to expire at the end of the 2007-2008 fiscal year. While it was later renewed as a last-minute addition to the financial bailout package (HR 1424, October 2008), the interim was a period marked by grave misgivings over the loss of future revenues.

It's been a difficult transition to go from a secure logging town to transfer into tourism because of the cuts in logging. It's very difficult to do, very hard, and it takes a lot of time to do that sort of thing, to transition into that. And it takes a lot of money. And the federal government cutting out the safety net hasn't been reauthorized or anything else like that, and I think the federal government did that a little too soon and didn't give the rural communities an opportunity to diversify, at least not enough time to diversify. So, it has put a strain on them. (Park manager)

"Green" Politics

While traditional industries like fishing and logging remain crucial to coastal communities, there appears to be a growing sense that the future of the coast may depend on its ability to capitalize on alternative resources and institutions. In this

sense, the political concerns of certain participants represent a more progressive agenda than simply preserving historic patterns of resource use.

While the sustainability of certain fishing and logging practices has been widely debated (Fluharty, 2000; Nakamura, 2003), there is a growing debate over the meaning of the concept of sustainability as people on the coast seek to ensure long-term economic prosperity. The debate appears to stem from differences over the perceived sustainability of current resource extraction regimes versus [proposed and existing] non-extractive ones. Many view existing practices and regulations for Oregon's Dungeness crab and pink shrimp fisheries as highly sustainable. Only male crabs are allowed to be taken and only once they've reached a certain size, and mandatory by-catch reduction devices are used when trawling for shrimp. The statement from the following participant includes crabbing and fishing in a list alongside other more generally progressive practices:

Our first and foremost reason for being here was that we came down as family in 1989...and have continued to work at its ability to the regulatory, resource-based, and sustainable opportunities, whether it's eco-tourism, whether it's crabbing, whether it's sight-seeing, or whether it's being able to fish on a healthy run of fish. (Merchant)

Likewise, there is a persistent notion that because trees and fish can and do sexually reproduce, they represent both a sustainable and rational economic resource. However, as one fisherman noted, human population growth may have indeed surpassed the carrying capacity of local ecosystems:

Coos Bay is where I was raised—and the logging and the commercial fishing industry, when it was booming back in the seventies, things were unreal. Now, it's sustainable, but it sure has shrunk it seems like, what goes on around here on the west coast. It won't support the

population and the businesses that we had here in the seventies, but I guess it's corrected itself towards the population. (Fisherman)

On the other hand, the more progressive rationale typically demonstrates a higher degree of environmental sensitivity toward both marine and forest ecosystems.

Well, me personally, I tend to look at the true meaning of sustainability. It's a word that's tossed around quite a bit these days. Community well-being is specifically about the humans, but from my point of view the human community can't be well, or exist, irrespective of, or away from, or aside from, the health of the local environment nor the local economy. Everybody needs to eat. Everybody needs shelter. Everybody needs clothes, and we need clean air, and we need clean water, and we need systems—economic systems and natural systems—to sustain us. So, community well-being, to me, can't not mean anything [sic] but a sustainable symbiotic relationship with everything around us. (Fishing guide)

I do not take this to mean that fishing and logging are inherently unsustainable, but rather that they, along with every other economic endeavor on the coast, must be not be practiced in such a way so as to ultimately bring about their own collapse.

Most people realize what is good for our community, maybe a shift from more extractive-based industry to industries that are more sustainable, or at least extractive industries that are kind of brought in to more sustainable methods and harvest regimes and so forth. I think it'll change. Timber and fishing are probably the two that are out of whack right now. And, of course, dairy is a large industry in Tillamook County, and I don't have a good enough grip on the industry to say whether that's sustainable. Some of their practices I know are hard on the environment and certainly have compromised other industries through water quality and habitat degradation. (Environmental researcher)

The question of what actually constitutes sustainability, and who ultimately is allowed to define its dimensions, may have the greatest impact on what sorts of economic regimes take precedence for coastal communities in the future. As human

populations continue to grow and the ecological constraints on coastal economies become better defined, progressive politicians will likely seek to develop community well-being by promoting "green" alternatives to conventional products and services, including renewable energy. Strategies toward achieving energy independence include (a) promoting alternative modes of transportation, (b) increasing energy efficiency, and (c) producing renewable energy.

Alternative Transportation

While Oregon has gained national recognition for its numerous bicycle-friendly communities, the coastal region has not figured prominently in those statistics.

And now that gas prices are rising, it's starting to show some folks here that there's alternative transportation and you don't have to be considered a tree-hugger to do it. We have folks that you wouldn't normally think—our demographic target is so wide, that it's working. And I think that's important, to mold that into the community, to where they accept that it's not just some tree-hugging hippy that's riding a bike to work, that everybody else does it now. I think it's going to get bigger and bigger as we get into our fuel starvation. (Merchant)

Energy Efficiency

A number of participants mentioned energy efficiency and energy conservation as significant and underutilized resources for addressing energy dependency. As one community biologist put it:

I think there really needs to be a rate structure that conserves, and then: do we need more electricity? Well, as soon as the gas went down, prices went up and we conserved. It was amazing how much people conserved. So I really believe that pricing doesn't reflect values in the environment, and I think we should do that first...So, I'm not a technology fan, especially since we're not doing anything we can to

conserve. If we really needed it, I think I'd be a lot more interested in it. I don't think we need it. I think we're wasting so much. We still haven't even weatherized our homes. It's crazy. (Biologist)

Renewable Energy

The Pacific Northwest has long been the nation's leading source of hydroelectric power, with the Bonneville Power Administration supplying power to Oregon as well as surrounding states. However, due to concerns over recent salmon collapses there is a renewed push among coastal communities to develop sources of renewable energy other than from large-scale dams. Commercial scale wind turbines have been, and will likely continue to be, constructed along the Columbia River gorge and all across the high desert east of the Cascade mountain range. Moreover, with the price of gasoline reaching record levels, especially during the time in which I conducted interviews, there was a strong desire by participants to reduce this nation's dependence on fossil fuels, both foreign and domestic.

Social Dimensions of Community Well-Being

A wide array of components was provided by participants which constitutes myriad aspects of the social dimensions of community well-being. Encompassing a range of issues included environmental and economic, I have grouped them into three broad categories including 1) topophilia—defined as love of place, 2) social change, and 3) quality of life.

Topophilia

Participants in this project indicated a number of reasons why they live on the Oregon coast, many of which described the concept of topophilia: the affective bond

between people and place or environmental setting (Tuan, 1999; Ogunseitan, 2005).

Contributing factors to topophilia include (a) scenic beauty, (b) environmental health, (c) population scarcity, (d) pride of place, and (e) an overall affinity for coastal culture.

Scenic Beauty

The Oregon coast is renowned for its spectacular scenic beauty. The ecological diversity of the Oregon coast has contributed to both its commercial successes and its broad aesthetic appeal. A lifelong resident on the southern coast said to me regarding his hometown:

I think that this community's going to continue to do well. It's probably one of the more desirable communities to live in up and down the coast largely because of its natural beauty, the sand dunes, the lakes, the ocean, and the rivers, and the mountains. We have a very special place here. So that draws a lot of people, as well as tourists, in the summer time. I see it being good. I'm an optimist, and I think that good things are going to come around. (Environmental advocate)

Environmental Health

The participants in this study routinely cited the health of the natural environment as one of the key factors contributing to well-being on the Oregon coast. The natural environment, while dramatically exploited commercially for timber and fish, remains a source of pride and fulfillment for many of the participants I spoke to in this study. While it is often difficult to separate the environmental from the economic when analyzing participants' responses from historically resource dependent communities, there is nonetheless a shared sense of what has and hasn't worked in the past and what communities must do differently to ensure future prosperity.

There's been more interest in public services to ensure that there is kind of an environmental ethic along with development. And, there has been a move toward an interest in more ways to develop in a green fashion, in a fashion sensitive to climate, sensitive to conservation of resources, sensitive to human needs. (County official)

In addition, it became clear from the interview data that while communities can and do become stratified along lines of support or opposition to various policy proposals regarding new or existing ocean uses, almost every issue of contention, from marine reserves to wave energy, was viewed as at least contributing to a greater sense of what people called ocean awareness. Too often, it seems, developments occur without the critical evaluation of communities, and anything to get people engaged in the debate is a worthwhile topic of conversation. As one fisherman described the ways in which publicity about wave energy had already begun to elicit change in his community:

It's been pretty cool actually how it's affected us so far as it's kind of riled a bunch of people up, and that's a positive effect as far as I'm concerned, just to get people talking. Start the discourse to get people to think about what's going on in their community to realize that you can take a stand to make a difference, hopefully. That's the first speck that I've seen. And other than that, let's see, it kind of made everybody laugh when the buoy sank. (Fisherman)

I believe environmental health perceptions among the participants of this project were comprised of two types, one passive the other active. Put another way, the theoretical concept of environmental sensitivity leads to the practical application of applied stewardship.

I think that there is kind of this emerging awareness amongst the different ages of people. Here we've had some really great success in our watershed conservation efforts with restoration and taking on a different approach in trying not to do as much clear-cut logging and

giving more respect to soil and water quality and species habitat needs. So I think that in a lot of ways we have been somewhat of a model for success in collaborative efforts in our watershed stewardship. (Conservationist)

Participants expressed a clear understanding of the correlation between the health of local river systems and the practices of resource industries further inland. Timber harvesting and dairy farming were both seen as detrimental to river health and thus to the health of estuaries, bays, and near-shore marine environments.

Over the last maybe five years there's been lots of concerted efforts to re-establish fisheries and streams, to fence the banks so the cows won't go into the river, and to increase riparian efforts to restore clean water and passage ways for salmon. So we've had lots of efforts in last five years, but I'd say overall in the last fifteen to twenty years there's been tremendous destruction of the environment. Look at the hillsides. All you have to do is drive your car around and look up into the hillsides and you will see hillsides completely bare, which some argue that it doesn't matter. But, I think clearly it has implications for all the silt that's flowing into Tillamook Bay. Tillamook Bay is filling up with silt. It's getting shallower every year—shallower and shallower: where does it come from? This is topsoil from the mountains washing into the rivers and depositing in the bay. That certainly changes the marine habitat. The shallower the water gets, the warmer it gets. And the warmer the water, the less accommodating it can be to salmon. (Fishing guide)

In Tillamook County, on the northern coast, dairy cows were perceived as a major ecological threat, in particular to recreationally harvested shellfish, and there was a keen sense that something had to be done to protect the rivers and streams (and estuaries and bays) from the organic compounds in the runoff from dairy farms.

I think probably the more cows are one of the biggest problems by ruining what we have. Because of my clam situation, I have three filter systems out in the bay, and because of more cows we're closed down a lot and so the deterioration of keeping the well-being of what we have here, which Tillamook County is known for is cows, the cheese.

Control over that has deteriorated, and I think the good old boys are still in control when it comes to that. (Merchant)

Population Scarcity

Coastal Oregon counties, and their constituent communities, are technically classified as "rural," and their respective population densities are notably less than more urban areas in the state. According to the Oregon Office of Rural Health, "'rural' is a geographic area ten or more miles from a population center of 40,000 or more" (ORHA, 2009). While smaller populations translate to smaller tax-bases for local governments, they also serve as a refuge for many from the rush of life in large cities.

The Oregon coast is a real resource-driven economy, which is changing to being less resource-driven, whereas a lot of other coastal areas are simply tourism-driven. We have this two-sided component here, and both of them are controversial at times. In my business, we don't really necessarily like seeing so many tourists because it gets crowded, but on the other hand that's kind of counter intuitive for our business. So, there's that kind of a delicate balance. (Merchant)

Participants also sometimes referred to the "village character" of certain coastal communities, noting that while supporters of the concept include retirees and second-home owners, long-time residents and working families prefer development of modern amenities.

It has to do with the cost of basic services—electricity, water, sewer, paving—that costs and how that relates to the tax structure and the expenses to businesses and individuals. Is this an environment that's friendly to a growing economy? Or, is the environment, "Stop the world. I want to get off. I want this to be a village like it was in 1920 or 1925." There's those kinds of things, and is progress—however it's defined—opposed or supported or tolerated? (City official)

Finally, a participant from a long-time fishing family described the capacity for finding a kind of psycho-social refuge in rural isolation:

We have a lot of people moving in from other parts of the country. I don't want to name any one state or anything like that. But people are moving in to retire or because they want to get out of the rat race from where they're living. They like the semi-isolated small communities that we have here, and they want them to stay that way. (Retiree)

Pride of Place

In as much as project participants articulated their affinity for their communities, other contributing factors to the concept of topophilia included pride of place, value integrity, and population permanence. Communities adjacent to the Pacific ocean are uniquely bestowed with natural resource opportunities, and the ways in which past generations of Oregonians have taken advantage of these is a source of pride for many. Noting the relatively thriving fishing fleet in the Port of Newport, one participant put it this way:

Yaquina Bay is one of the largest commercial fishing fleets on the west coast and we're proud of it. Their ships go all over the Pacific and Alaska, and I think most people probably consider the fishing industry as being a good industry without a lot of environmental issues compared to say the logging industry. (Merchant)

Coastal Culture: Value Integrity and Population Permanence

The concept of coastal culture emerged as an important component to what makes life enjoyable on the Oregon coast. The most notable quality of this particular culture is its capacity to maintain a healthy commercial fishing industry.

We have a regional culture that separates us from a lot of other coastal areas...here you've got plenty of locally caught fish in the supermarkets, and that I think is kind of an indicator of how this hasn't

changed all that much. But, it's always in contention, particularly the fishing industry with all the catch limits, and that in fact for Newport in particular the commercial fishing industry is probably the largest component of the cultural character of this community, I think, because it's historically been such a large player. (Merchant)

As coastal communities have begun to adapt to the demographic changes concomitant with lost resource-extraction jobs and the recent influx of retirees and second-home owners, a key facet of coastal culture that certain participants emphasized was a sense of maintaining collective value integrity.

Tourists are come and go, but it's brought in a lot of people that didn't grow up here, the outside community members. You have an influx of retirees or whatever, and they have, in this little community like Otter Rock, they don't have the roots feeling. They haven't lived there their whole lives, so their ideas, they're bringing in their other ideas. So I think that's kind of diluted the well-being of Lincoln County a little bit. Growing up, it was a lot of people that had lived here their whole lives. (Fisherman)

Social Change

Participants frequently mentioned that while many aspects of coastal communities should remain constant, other aspects may be worth changing. A dramatic demographic transition is taking place on the Oregon coast, as tourists, retirees, and second-home owners have gradually and increasingly morphed the character of the region from rugged frontier to luxury destination.

In the long term I think that what I perceive as the Old Guard or the Old Boys network or an older mentality where we're loggers and we're fishermen, or we're farmers and that's all we are. And that's clearly eroding. I believe Tillamook County is growing in population about ten percent a year, and ten percent is immigration. I don't know if I have that term right, but people moving into the county or migrating into the county. They're outsiders, they're second-home owners. So, the people are changing, the demographics are changing. (Tour guide)

The Retiree Community

Overwhelmingly, participants indicated that one of the biggest changes to have taken place in coastal communities over past generation has been in the explosion of the retired population. Most people I spoke to believe the majority of these people to be newcomers from California or Portland. I do not have data to support those assumptions, but the characterization of retirees as outsiders has contributed to a narrative of resentment and distrust. Long-time residents believe wealthy outsiders unwilling to help pay for city services or school improvements, and feel increasingly powerless to determine the future of their communities. I include the following passages because they so clearly illustrate this point.

So we have more of a divide in the population between basically folks that have lived here all their lives, or multi-generational, and new folks that don't have that history but have some sort of idea of what they want and they don't want to spend any more money for it because a lot of them are retired, maybe on fixed incomes. I've seen the fixed income dilemma, which I can understand. (Retiree)

Probably the biggest changes have been probably in the last twenty, and that's with the influx of a lot of people from out of state who seem to like the community and want to move here. And then they find out they don't like it and got to change it to make it like it was where they came from, and they move away. That's been an ongoing thing in a community like this. We've had that happen a lot. Some people are all for a lot of growth, bringing in a lot of big housing developments or apartment houses, low income housing, just various things like that. And, we've had our share of unscrupulous developers who've come in for the big fortune and leave flat broke, but that's a common thing. (Fisherman)

In the past, all of that big opposition to anything like that that was moving the community forward was coming from the people that were writing those newspaper articles. Well, they're all older people, and sickness and moving away kind of put a damper on that. Someone

always used to say that what this community needed was a few good funerals. And seriously, in a way, that is what's happened, not that you would wish that on anyone, but people with fresher ideas may be coming to live here, I would hope. (Merchant)

This last passage reflects the parallel concept of attracting professionals from outside the community to bring their skills and expertise to the coastal region. The desire to replace an aging generation with a younger one was expressed from opposing viewpoints as well. On the one hand certain long-time residents hoped that their children and grandchildren would remain in the region perhaps to carry on the family business. On the other, other residents sought to imbibe the region with a new vitality based on young families from more cosmopolitan areas.

Redefining Local

As the demographic composition of coastal communities continues to shift, the concept of who is or is not a local has likewise come under question. Some participants noted that, although they believed that they had lived on the coast long enough to consider themselves local, they were still cast as outsiders by certain multi-generational residents. The perception of discrimination was expressed by one Douglas County resident this way:

I'm viewed as a newcomer. I think if I lasted another hundred and forty, maybe fifty years I'd become an Oregonian, and it's not sure. In my mind there's an arrogance that comes with some of the ignorance that these people have—"these people" meaning some of the old timers that if you haven't been born again here then you don't have any validity and your opinion doesn't count. I try not to come from the east coast. (Merchant)

Another participant indicated as much, but seemed not to perceive any personal slight as a result of discrimination:

I've been here quite a while, but if you didn't graduate high-school here you're not a local, in some sense. You have an address here, so that's kind of the next closest step, so we're equals. (Planner)

Ironically, however, there is also a younger generation of so-called locals whose parents were once newcomers as well. One participant noted the distinction between long-time residents and locals such as himself:

Growing up, it was a lot of people that had lived here their whole lives. Of course, my parents were coming from the outside, and my friends' parents had come from other communities, but they all kind of converged in this area, it seemed like, for a reason: to start a closer knit community after coming from places like Sacramento or Washington D.C. or Seattle or whatever. And they did a really good job. (Fisherman)

Quality of Life

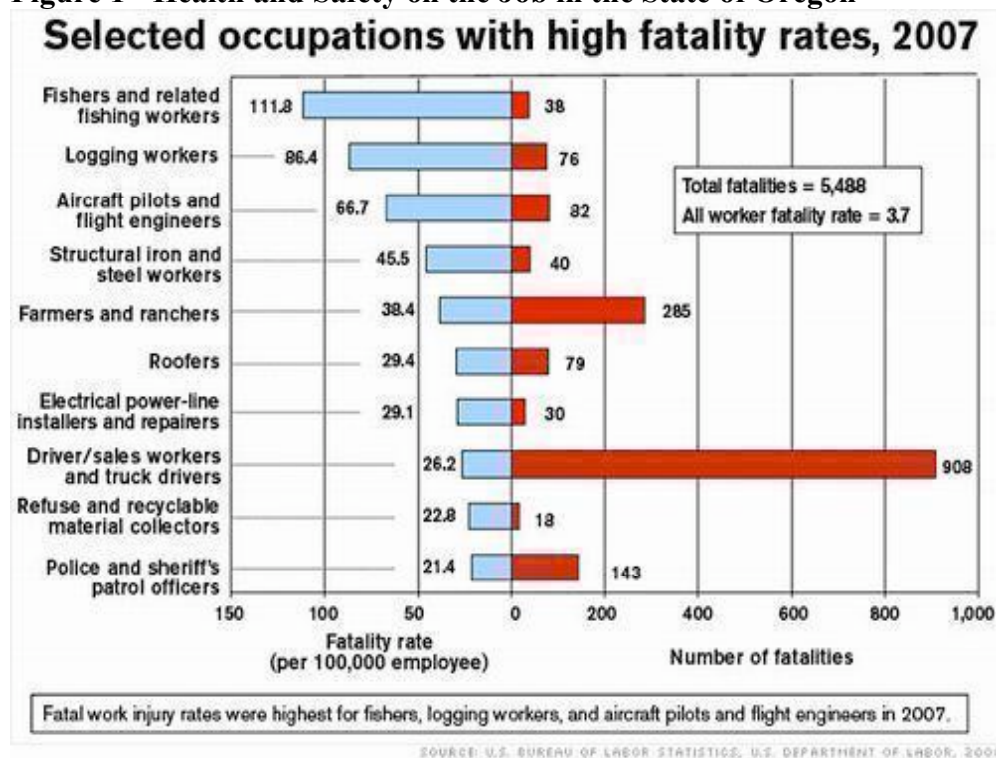
I have identified four main themes that emerged from the interview data which together support the concept of quality of life for residents in coastal communities. They center on issues regarding (a) healthy and safety, (b) a sense of community, (c) raising children, and (d) standards of living.

Health and Safety

Not surprisingly, participants frequently cited such basic abstract qualities as hopefulness, happiness, health, safety, and security as key factors in contributing to the overall well-being of a community. The fishing and timber industries that have historically driven the economic engines of coastal communities, have also in many ways contributed to some of its greatest hazards. Although injuries and fatalities on

fishing vessels and logging crews have no doubt impacted coastal communities for generations, targeted safety measures have greatly reduced these numbers in many areas. That being the case, even as recently as 2007, fishing and logging posted the highest fatality rates of all occupations in the United States (See Figure 1).

Figure 1 - Health and Safety on the Job in the State of Oregon



The Coast Guard was repeatedly praised by interview participants as having made the coast a much safer place to live and work. One participant described in morbid detail some of what these new safety measures meant to her:

When I was growing up we had no Coast Guard. Up in Nehalem I gave mouth-to-mouth to thirty-eight people, and only three of them lived. I saw a baby go straight down. We dove for it, but it was crab bait. But, the Coast Guard, my parents let them have moorage and a trailer and put boats in for a dollar a year. And if they would just be there--because it was up to my father and my mother and I to go out on the boat and

save people, and it wasn't cool. So we have the protection and were provided wonderful safety by the United States Coast Guard. It didn't used to be that way. Now I think they have forty-one people at that station, and those boats have changed so much and they're so sophisticated and can do so much more and the helicopter, of course, too. So that's been a huge change that I've seen, but that's been over a period of many years. It's something I'm sure everybody takes for granted, but it didn't if you lived in the world of having to save people and then you got to sit at the dinner table that night and everybody just looked at one another but nobody could eat. No matter how many times you wash your mouth out with whatever it doesn't go away. (Merchant)

Thus, it would seem, in areas where survival itself was never a given, health and safety could not easily be taken for granted, and the individual experiences of workplace tragedies may have helped to develop community cohesion and a collective sense of shared identity. This was made increasingly clear by participants who stressed the importance of maintaining the capacity to cultivate a sense of community and to raise their children in a healthy and happy place.

A Sense of Community

Participants cited the importance of feeling connected with one another, of working together to get things done, and of nurturing relationships with friends and neighbors. They also indicated to me that in coastal communities, where financial and municipal resources are less plentiful than more urban areas, it becomes imperative for people to commit to community involvement such as volunteerism with groups and organizations to help both the needy and each other. When asked what community well-being meant, one operator of a recreational fishing charter company simply said:

Well, it would be that the community is economically viable, for one thing, and that people can work together to get projects done.
(Fisherman)

An environmental advocate reflected those sentiments by adding:

Community well-being would be maybe how the community interacts with each other, the ability to work together as a community to achieve common goals and just the overall health of the community, which may be realized by different benchmarks that the community is at...But if you're just looking at the basic premise it would be if the community's polarized or if they seem to be mostly aligned with each other and how well they work to achieve common goals. (Environmental worker)

While the two above participants would likely not agree entirely over political or economic issues like catch restrictions or marine reserves, they nonetheless find common ground in their shared interests in working together to define and achieve "common goals," whatever those might be.

A merchant I spoke to also viewed the capacity to maintain long-term well-being as a function of the community's overall level of public engagement:

So you have to be involved in your community. You have to support your schools, libraries, arts and crafts, and sports. They're all things that need to be involved in a community...You have to be involved in the community to be a community, is kind of what I'm getting at. You can't move into a locked-gate community and think, "I'm part of Newport," if you never come out and play the games that Newport offers and get to know the real folk that live here...We have a very good community base. Lots of people in our town are very committed to our town, so I see us growing in a healthy way. (Merchant)

Echoing this desire for community involvement, a fisherman I spoke to observed the perceived differences between ethnic groups regarding the capacity to form interpersonal relationships and work together:

It's funny: people really complain about the influx of Latino people, and you hear both sides of it. Some people don't care, and other people are like, "I wish these people would go home." But, they have more of a community going on in Newport more than Newport does. That little community is pretty tight knit. Everybody knows each other, and

everybody gets together and plays soccer and takes their kids to school and helps out. Every weekend they're doing something. (Fisherman)

He goes on to talk about ways in which he would like to become more involved in his community. He is a successful fisherman, and frequently donates catch to local schools for fundraising events. A few days before we met, he attended a funeral service for a local veteran of the fishing fleet and was struck to learn just how involved his old friend had been. It was a pivotal moment for him, as he described:

This fisherman passed away a couple of weeks ago. He was only forty years old, and he'd just adopted a little girl. And I knew him fairly well, but I didn't know anything about what he'd done in the community. And we went to his funeral, and the people that talked, there was—Chris Martinson, you probably saw a thing [in the paper] about his wake, but—I went to his funeral and it was standing room only in the high school gym. I think they said they had half the bleachers out, and they said it seats like six hundred and ninety people on both sides. So it was four hundred people or something that were there just to say goodbye to this guy, and they talked about all the things he did for his community. Whether you like it or not, he was a part of the Elks, and he was a high school girls basketball coach and volleyball coach, and he worked for the boosters for the high school and the middle school. And he did all these things, and there was just this list of stuff that went on. And that kind of was encouraging to me. I mean, I haven't really done anything like that. But, it's got to happen at some point because the next generation's got to dig in. (Fisherman)

Raising Children

In evolutionary terms, the apex of biological success is the capacity to pass on one's genetic heritage to the next generation. For many of the people I interviewed, children represent far more than physiological reproductive health; they embody a sense of hopefulness that many on the coast struggle to maintain. One retiree I spoke with raised his two children in the house where we met. He described decades gone by

when children could be seen and heard playing all throughout the neighborhood. In contrast, most everyone in the neighborhood these days is retired or on vacation. He put it this way:

When we were raising our children, there were a lot of children. I know you've got a child. There just aren't as many families with small children as there used to be in the seventies, late sixties, early seventies when we moved here, and through the eighties. And because of the children here there were more community activities. We used to have holiday parties, Christmas parties and things up in the community hall, and it was really because of the kids...I think that the community does lack a little bit because there aren't families with small kids here. My daughter growing up had friends here. She'd still make a lot of trips into Newport to see other kids because that's where most of her classmates were. My son's the same way. Within two blocks of here his two best buddies lived, and there were more kids than that. I think that really helped to build—there were more families like that and so more community activities and things that helped draw people together. There were still retired people here, but it was more of a balance. And now it seems to be people that have raised kids that have moved here from different areas or some of us that still live here but our kids have moved on. (Retiree)

An environmental researcher even noted the importance children play in guiding the planned and development decisions of local authorities:

Without young families it changes the context of the community. There's no need for parks. There's no need for things that kids do. And so it ends up being kind of lop-sided as far as activities that are either encouraged or built. When the housing changes from a rental to a re-build for resale, then when the rentals go away so do people that are on either limited income or a working poor income. You're going to see them move into apartments in Tillamook. (Environmental worker)

Several themes emerged around improving the conditions under which children are raised in coastal communities. These included ensuring opportunities for education, opportunities for recreation, and youth retention.

Education and recreation figured most prominently as key factors in raising healthy and happy children. Coastal counties have faced declining school enrollment for years, as young families move out of the area and retired people move in.

We're not economically deprived. We do have a good influx of people, but one of the things that makes our community a little unusual is that we don't have very many school children and every year that goes by we have fewer school children. So, the long term trend is not looking real good for us. (Retiree)

As such, funding for education has faced drastic cutbacks and the consequences have only seemed to make it that much more difficult to begin to regain the *educational opportunities* so recently lost.

It's tough right now in our schools. I'm on the school budget committee, and every year it just takes a big cut. It takes a hit every year, and has for years. And now it's down to the point where we used to have three schools—an elementary, a middle school, and a high-school—and now we took the middle schools and split it between those two and condensed it down into just two schools. The high school, because the enrollment is so small, they have a hard time providing the electives and options that a lot of students need and want and a lot of parents want for their kids. And that's another thing. If you don't have good schools, a lot of professional people don't want to move here and have their kids go to a sub par school. It's tough. (Merchant)

Here we learn that while good schools may serve to attract and retain professionals with young families from out of town, it is precisely those professionals that are needed to help improve the condition of the schools in the first place. Thus, it would seem a vicious cycle has begun where past economic decline and the subsequent out-migration of families and young adults have resulted in an unsustainable educational infrastructure. Unfortunately, it would seem that for many in coastal communities there exists a persistent and troublesome conflict between

balancing the ability to support retirees with the ability to raise children. The participant above goes on to describe a \$10 million school bond measure for building maintenance and repairs that had recently been passed in Reedsport:

They passed [the bond] this past year, much to my surprise because in past years that has gone down every year. It's a bond to do repairs on the schools—new roofs, new heating systems, windows, infrastructure for computer wiring, and that sort of thing—a lot of maintenance issues that have been deferred over and over. It was really a close vote, and I attribute the fact that it passed to that there was no really organized effort against it. And so it just sort of quietly passed. [The money] will come from property tax revenue from this school district. It'll show up on our taxes. It's a tax that's levied against the property-owners. So it's based on property taxes in Reedsport and anyone in the school district. So it'd be Reedsport, Gardiner, Winchester Bay, and some of those outlying areas. So it is coming out of their pockets, so that would be one reason for them to oppose it. [Retirees] don't feel the big tug to keep these schools in top form. (Merchant)

The perceived opposition of retirees to school funding was a recurring theme during participant interviews. Although no retiree I spoke to indicated an unwillingness to bear a tax burden on behalf of their school district, others I spoke with seemed highly suspicious of the intentions of the coasts many new retired citizens. The perception was that because they had no children in the school districts and no significant ties to the local economy, they would vote on local tax measures according to strategies based on maximizing the utility of their presumably fixed incomes. On the other hand, participants also mentioned ways in which retirees in coastal communities were contributing their skills and wisdom by volunteering at libraries and after-school programs.

In addition to educational resources, participants also cited *recreational opportunities* as important areas of investment for communities especially in regards

to raising healthy children and encouraging safe and family friendly environments for residents--both historic and prospective--to enjoy. While the coast offers a uniquely wide array of outdoor recreation options, an interesting example of successful recreation planning was the community skate park. In contrast to giant sand dunes, remote mountain trails, or expansive surf spots, skate parks offer an additional sense of security and peace of mind to parents and safety personnel. One participant praised her community's efforts to provide a safe and fun option for their youth:

I think education is very vibrant in Reedsport. They have a very fine educational system, and Reedsport has also got a beautiful idea of how they want their young people to be. They put their skate park in the center of town instead of on the outskirts so that the boys and girls moving through that era in their lives are right in the center of town where everybody can watch them, and that's nice, you know?
(Merchant)

Additionally, another participant took a special pride in her community's work to provide skate parks to their youth as well:

Skateboard parks have been a big priority, and one of the country's gnarliest is up in Lincoln City. Newport has one. Waldport has one. Toledo has one. So there's definitely an emphasis on youth. (County planner)

The flight of rural youth to urban areas is one of the hallmarks of resource dependent communities worldwide (Hamilton and Syfrit, 1994; Hamilton et al, 2004; Alston, 2004; Bjarnason and Thorlindsson, 2006; Drozdowski, 2008), and has characterized coastal communities in the Pacific northwest since the mutual decline of the fishing and timber industries beginning in the 1970's. Like many resource dependent communities, *youth retention* in coastal communities has over the years been exceedingly difficult. I talked to a young skipper on a fishing vessel who grew up

in Newport. He takes pride in supporting local businesses and giving back to the community in which he was raised. But, he is careful to point that he is very much an exception to the rule, most of his childhood friends having left the coast for more urban areas like Portland and Eugene. He experiences the effects of this process in this way:

I walk in the store now and I don't really see anybody I know. My generation, the twenty to thirty year old generation, is all from out of town, and all the kids that I knew and I grew up with left town. I don't know if I can think of a single person from my graduating class that's in Newport right now. [They're in] Portland, Eugene, a lot of them. They're still in the state, but they're just in the city. I would be really comforting to me if I knew some people that were my age that were having kids and starting families and doing all that. I'd kind of know what our generation was going to do with the community, but I don't. I don't know any other people. I hope it's good. You've got the big community in Newport, and you've got the fishing community [which] is pretty tight knit. But there's a huge gap, from forty years and under. I think there's probably less than six of us that are forty and under that are operating boats in Newport. There's a lot of deckhands, but they come and go. They're in and out, moving. At some point there's going to be generation that's going to stay, or there's going to be people that come back to fill the void or whatever. (Fisherman)

Again, while the truth of the matter is that youth are not yet coming back or staying in the area, he is positive nonetheless that "at some point" they will. This sense of optimism was not universally demonstrated, but I did receive a number of responses from participants who reflected it.

Well, right now I'm optimistic. So, it will change. The kids will be more willing to, you know, come back and create jobs themselves because there's no jobs here. The economy I think has got to improve. We will have a resurgence. (Events planner)

So anyways, I think in the long run we're going to see a pretty substantial—you know, we're going to have young folks moving here because they want the lifestyle of kayaking or the lifestyle of surfing or

wind-boarding. They're going to move here, and then the industries will follow. (Fishing guide)

However, as with education, there also emerged an economic dualism between the elderly and the youth.

The logging industry and the fishing industry were the ones that drove the county, and now they're diminishing and other things have taken their place. Because of that, a lot of the younger people have moved out and the retirees that have the money—that can afford the houses, that enjoy seeing the ocean, those type of things—have moved in. So we're seeing a lot more of the older population than probably would have been here 20-30 years ago. (County official)

Are young people staying here after school? Are they staying in the community? And they're going to look at it as, "Can I find a job? Is this a good place to live?" And, I would say, a lot of them are leaving. But, on the other hand we have a lot of senior citizens, an elderly population that moves here for the community well-being. They like the beach, they like the climate, they like the rural lifestyle, they want to be here. (County official)

Standards of Living

Finally, with regard to quality of life issues, having a good standard of living was describes by participants in terms of access to affordable housing, affordable healthcare, and an overall low cost of living.

While "affordability" is technically an economic concept, the impact of *affordable housing* on peoples' ability to enjoy living on the coast helps define it as essentially social as well. With the dramatic influx of retirees and second-home owners over the last several decades, property values and home prices have consistently risen, many well out of reach of existing resident, as developers seek to

capitalize on the increasing desirability of coastal areas as vacation and retirement destinations.

The other thing that I think we ebb and flow on—the realities the we have—for example, we have had a transition occurring where we’ve had over time, over history, many vacation homes, many cottages, many beach cabins. The beach cabin of today is a \$250,000-\$500,000 single family home sitting on a hill looking at the ocean or the bay, and that’s a secondary home. One of the problems with that, of course, is that it puts additional pressure on working folks in a lot of our society here because what it does is it drives the price of housing up. And pretty soon what you wind up is a lot of folks working in the service industry or commuting from out in the sticks or over in Toledo or down the coast to Seal Rock or as far north as Lincoln City. (City official)

Compounding the difficulties many working families face with home prices are the similarly rising costs of health care and the relative lack of available *affordable healthcare* facilities in coastal communities. Given the level of danger entailed in both the fishing and the logging industries, one might expect a high level of social services geared at helped people pay for hospital expenses. However, because hospitals are relatively large institutions that require a great deal of financial and human capital to sustain, many small rural counties find themselves unable to attract health professionals to staff them.

We’re on the coast and not next to I-5. I just don’t think that we’re ever destined to ever have a big industry here again. A lot of people don’t want to come live in such a rural community. That’s a problem for the hospital here too because they can’t get doctors and medical staff. (Merchant)

However, there is an interesting transition taking place with regard to hospitals and healthcare as a result of the growing retiree community. It would appear that at the same time hospitals are hiring more staff to handle the growing numbers of elderly

patients, healthcare costs are also going up making it more difficult for working families to afford.

We have this huge senior population, as do all coastal communities, because it's really inexpensive to live here and especially people from California find this to really be an ideal place. It's really interesting: Reedsport's population might even be a little bit greater than it was thirty-five years ago, but the senior population has just absolutely exploded. The hospital is currently the largest employer in town, and they have almost two hundred positions. (Merchant)

In response to some of the existing difficulty some in his community have had finding affordable healthcare, one participant praised his community's new clinic:

There's now a clinic in the town where people can go to. If you don't have health insurance, that's a really good place to go because they don't charge you a whole lot. I think it's like twenty bucks a visit. Things like that have not been available at one point so things have certainly changed for the better. (Hotel manager)

Retirees and vacationers drawn to the Oregon Coast for its beauty and charm have prompted the creation of many new jobs in the services sector, but may have also contributed to rising home prices, increased healthcare costs, and an overall jump in the cost of living. Demographic shifts from working families to retired couples characterizes many communities on the coast as transitional, uncertain of the economic underpinnings of the future and not entirely willing to let go of those of the past.

Conclusions

Community well-being was defined by project participants in terms of political, economic, and social dimensions. Each dimension reflects—and is overlapped by—the other two. For example, the economic impacts of political

decisions have social consequences. Over the course last several decades, environmental and regulatory constraints have initiated a multi-faceted transition in communities on the Oregon coast, the dimensions of which can be defined by community well-being as described above. As a result, a “well” community would appear to be one whose economy on the one hand retained those components of traditional industries in which people still take pride, while on the other hand sought to capitalize on emerging markets and sustainable enterprises. It would be one whose political systems were just, transparent, and democratic as well as creative, timely, and pragmatic. It would be a place where young people were given the skills, protection, and guidance to grow successfully, and where retired people could expect to derive satisfaction from their lifestyle as they grew old. Moreover, environmental conditions would likely influence the perceived quality of each of these facets of well-being, as each would remain, in some way, dependent on the natural resource abundance of the Oregon coast.

CHAPTER 6: COMMUNITY KNOWLEDGE AND UNDERSTANDING OF WAVE ENERGY TECHNOLOGY

In order to inform the analysis and interpretation of interview data regarding public perceptions of the potential impacts of wave energy development on community well-being (discussed in detail in the Chapter 7), this chapter explores the potential linkages between individual preference in coastal communities for wave energy technology and the particularity of both knowledge and personal understanding of wave energy technology and the ways in which it was being developed on the Oregon coast up to and during the time I was conducting fieldwork. As it turns out, what people knew or did not know about wave energy had as much to do with their perspective of it as a form of renewable energy and economic development as it did with their degree of professional engagement with the development process as members of local governmental agencies and organized community interest groups. I begin each section below by first presenting the actual questions from the interview protocol posed to participants during each interview. What then follows is a brief discussion of the answers I subsequently received. Of key concern during this line of enquiry were: 1) quality and quantity of technical knowledge regarding wave energy devices and electrical infrastructure; 2) sources of technical information and anecdotal knowledge; 3) whether, when, and where wave energy technology would likely be developed; 4) opinions regarding the composition of the group of major players within the wave energy development process; 5) the preferred and/or anticipated role of the government in the development process and, 6) levels of personal familiarity with the federal permitting process. In each of the figures and tables included in this chapter,

coverage percentages associated with participant responses indicate the proportion of the 47 participants that cited a particular issue as a free response to an open-ended question.

Knowledge and Understanding of Wave Energy Technology

“Describe your understanding of the technology behind ocean wave energy. Tell me about your knowledge of how wave energy technology works.”

I asked each participant to tell me about what they knew about wave energy technology in an effort to 1) examine the ways in which communities within the coastal socionatural region formed cognitive understandings of the technology and its related infrastructural requirements and to 2) to provide a material context in which to interpret how each person thought wave energy might ultimately impact their community. Implicit was the assumption that disparate cognitive concepts of the nature of the technology could result in disparate perceptions of its unintended effects on both society and the environment.

Participants in this study demonstrated a wide range of knowledge and understanding regarding wave energy technology, from highly informed to completely uninformed. Given the open-ended nature of the question, responses exhibited a high degree of qualitative and quantitative variability. It was not the purpose of this particular line of questioning to generate an exhaustive catalog of each participant’s knowledge of and experience with wave energy technology, but rather to examine which kinds of issues and topics participants chose to mention in the interviews and which kinds of people in particular within each community were more exposed and

familiar with technological aspects of wave energy. While I cannot assume that participants told me everything they knew about wave energy, I can at least assume they told me either 1) what they most recently learned or 2) what seemed particularly relevant to them at the time we spoke. In my analysis of the data, I organized the responses to this question into three categories: 1) specific forms of wave energy device technology, 2) general issues and observations related to device technologies and 3) ancillary or technology-indeterminate issues.

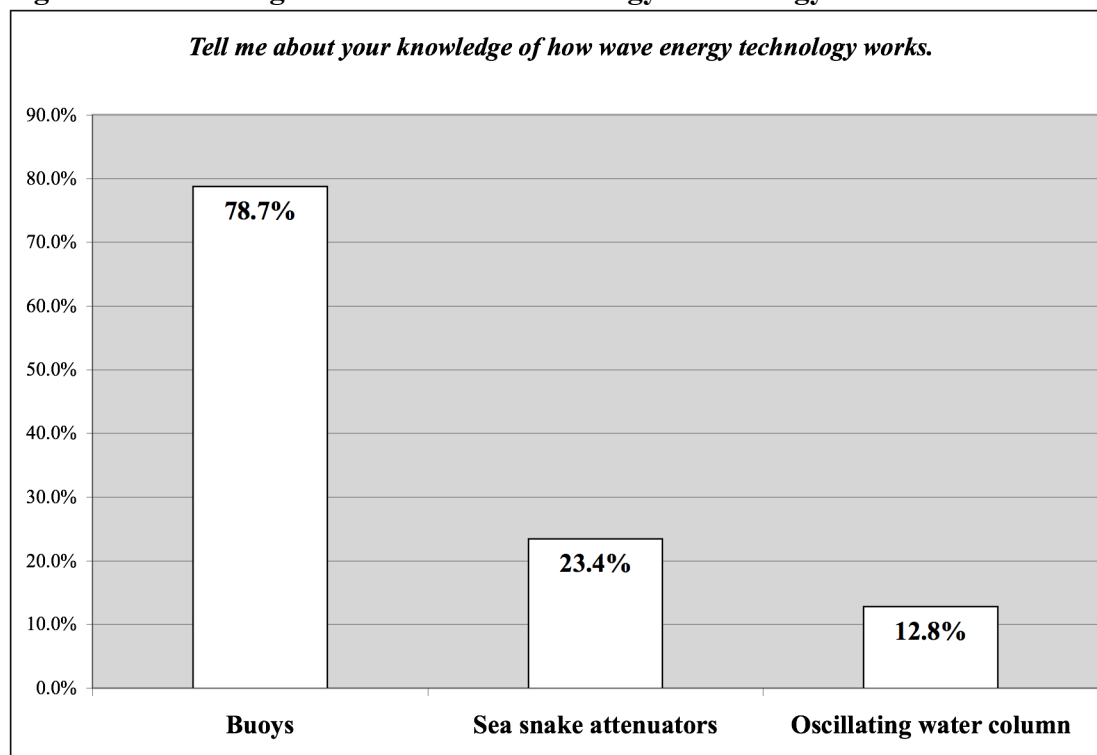
Forms of Technology

During the summer of 2008, there were generally considered four leading types of devices for generating electricity from ocean waves on a commercial scale: 1) *point absorbers*, or buoys, such as those by Finavera, Ocean Power Technologies (OPT), and Oregon State University (OSU); 2) *oscillating water columns* (OWC), such as those by WaveGen and Energetech; 3) *attenuators*, or “sea-snake” devices, such as the Pelamis by Ocean Power Delivery (OPD); and 4) *overtopping devices* like the Wave Dragon™. Of these four, only the first three represented forms of technology then under consideration for implementation off the coast of Oregon. The last had enjoyed some success in Europe, and others, such as the Anaconda (which captures “bulge” wave pressure) have also emerged as commercially potential wave energy devices since this project began. Of those that had been proposed locally, only one project (a collaboration between WaveGen and Douglas County) involved the use of an OWC device. Of the remaining projects up and down the Oregon coast, all

involved the implementation of arrays of buoys, numbering anywhere between 10 and 200, located between 2-3 miles offshore.

I asked each participant to describe their understanding of how wave energy works, or at any rate is *supposed* to work. I did not specifically ask them to list as many different kinds of technology as they could nor to limit their explanation to only form of technology, but rather allowed them to freely describe wave energy technology as they understood it. When coded for knowledge regarding specific forms of wave energy device technology, most participants (78.7%)³ demonstrated at least a modest understanding that buoys were involved in wave energy technology. A somewhat surprisingly large number of participants (23.4%) mentioned the “sea-snake” device, and only a few mentioned either WaveGen or OWC technology specifically. See Figure 2.

³ All percentages included regarding participant responses are based on N=47, the total number of participants in the study. For example, $78.7\% \times 47 = 37$ participants.

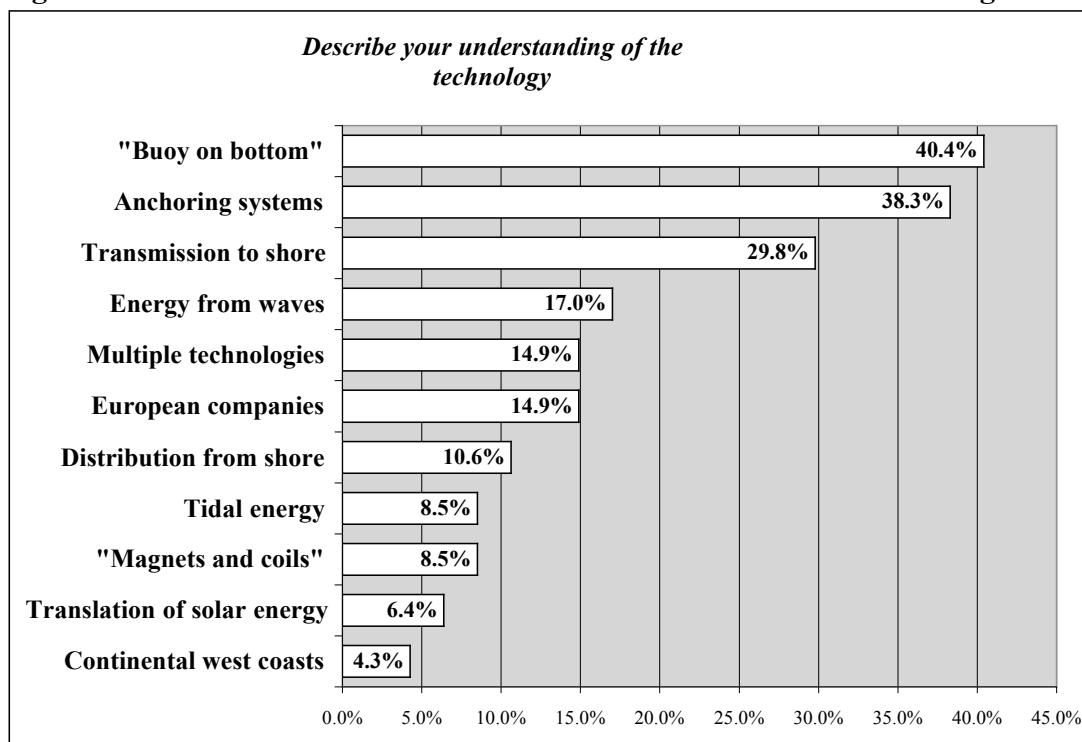
Figure 2 - Knowledge of Forms of Wave Energy Technology

Issues and Observations

Besides making reference to the four main types of wave energy devices, participants also mentioned various other salient aspects of wave energy, as they understood it. A significant number of participants mentioned some of the technical aspects of buoy technology, including that buoys require both anchoring systems (36.2%) as well as a means of transmitting power back to shore (29.8%), and a few even observed that electricity is generated inside the buoy from the action of magnets and coils (8.5%). Roughly half of the people that mentioned buoys (surface-level infrastructure) also mentioned the use anchoring systems (bottom-level infrastructure). Interestingly, of those, only about half were aware that anchors are actually required for point absorber technology. However, the most frequently mentioned issue

regarding the various forms of technology was the then infamous “buoy-on-bottom,” or “BOB,” as it was playfully referred to during my conversations on the coast (see Chapter 2). Of the 47 participants I spoke to, 40.4% made some reference to BOB. See Figure 3 below for a list of the most commonly mentioned aspects of wave energy. Percentages do not total 100%, as participants were not limited to one response and often mentioned several.

Figure 3 – General Issues and Observations Related to Device Technologies



BOB represented a major milestone in coastal communities regarding the nature of wave energy development and its credibility as a viable energy generation tactic. Finavera’s sunken test buoy was offered up in interviews as evidence that wave energy technology could not survive the Oregon oceans, that the engineers that built it

didn't know what they were doing (or should have at least consulted with local fishermen first):

Stuff disappears in salt water really fast. Seeing that wave buoy, we were kind of, "Well, shoot. These people are not coming and saying, 'Hey, you've been building steel boats for fifty years that are working all over the world in water. Help us build something else that's going to sit in salt water.'" I haven't heard anything like that. So stuff like that: if you walked down there and it was built better than it was, you might have some more confidence in it. But to walk around this thing and see how poorly it was put together, in my opinion, it's kind of like, "Okay, how are you going to trust these people with putting in fifty of these things?" (Fisherman)

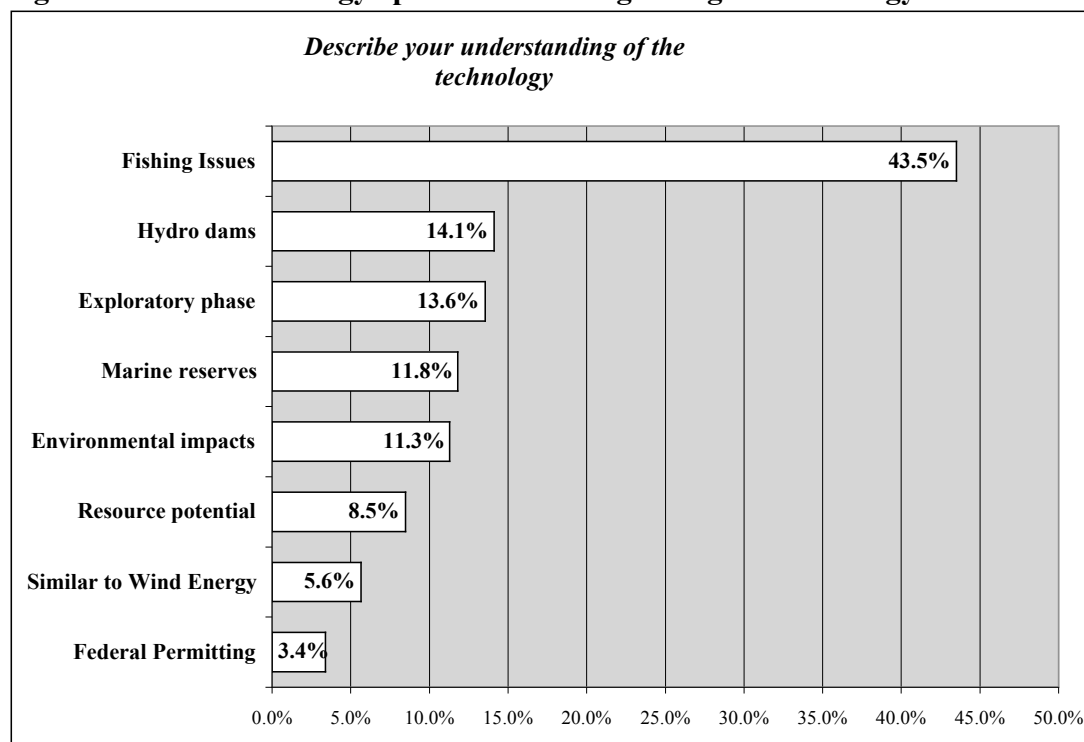
BOB also indicated to some that development companies had clearly not anticipated such a device sinking (much less ever needing to plan and execute a costly retrieval mission):

Everybody promised that that first buoy wouldn't sink. It's going to make the Salvage Chief a lot of money. Now we got to start learning if they can recover these buoys if they go deeper in the water. A lot of fishermen say, "Oh, you need to go deeper." But, what they don't realize: there's no technology to recover these buoys. Luckily, this one's still shallow enough that it can be got with a gas diver. If they'd had four fathoms shallower it could have been gotten with standard scuba gear. If they go five fathoms deeper, divers won't be able to get them at all. So then, how are you going to recover these and pick these up? ROVs? Yeah, there might be some ROVs around that can do a little bit, but they're super expensive. And it takes a tremendous ship to run one. We're talking millions and millions. I'm questioning now, as I get more involved in it, whether this is a practical location because of the depth problems and the weather problems we have here. (County official)

BOB signaled to many that the physical risks to boats, surfers, beachcombers, and marine life, posed by such large and hazardous industrial debris at the mercy of the Pacific ocean, were not worth the supposed benefits (to whomever they were intended to go).

Technology-Indeterminate Issues

In addition to knowing about and understanding—to greater or lesser degrees—some of the more technical aspects of various forms of wave energy technology, participants also raised certain other topics of discussion unrelated to the technological requirements specifically. Chief among these was the potential conflict with the interests of local fishermen inherent with development projects of this nature. In fact, more people mentioned issues regarding the fishing industry (43.5%) than about Finavera's sunken test buoy (40.4%). This would appear to support the idea that although people in coastal communities may not know or understand a great deal about how the technology works, they intuit to a proportionately high degree the threat such industrial projects could pose to existing commercial ocean users. See Figure 4 for a list of the most frequently cited ancillary issues raised by participants regarding community knowledge and understanding of wave energy technology. Again, percentages do not total 100%, as participants were not limited to one response regarding wave energy technology. These were simply the most commonly mentioned.

Figure 4 - Non Technology-specific Issues Regarding Wave Energy

Information Sources

“How did you first learn about wave energy? When? How do you learn more about it now?”

Whatever participants knew and understood about wave energy technology, or at least what they believed they knew at the time of our interview, was in part a reflection of the information sources from which they had learned about it. In the previous section, I explored (a) cognitive understandings of wave energy technology to help me situate (b) participants’ particular perceptions of wave energy’s potential impacts on community well-being. Here I seek to situate (a) participants’ cognitive understandings of the technology by exploring (c) the sources of information from which they claimed to have learned about wave energy. In this chapter I examine 1)

where people first learned about wave energy and 2) where they gain new knowledge and information now. See Table 2 below for a comparison. As with Figures 1 and 2, percentages do not total 100% as participants were not limited to one response and often mentioned several sources from which they acquired information. These were simply the most commonly mentioned.

Table 2 - Sources of Information Regarding Wave Energy Technology

Information Source	First Learned		Now Learn	
	N	%	N	%
Newspaper	8	17.0%	18	38.3%
Internet	0	0.0%	13	27.7%
Public meetings	13	27.7%	12	25.5%
Word of mouth	11	23.4%	11	23.4%
Presentations	6	12.8%	5	10.6%
OSU outreach	5	10.6%	3	6.4%
TV news	4	8.5%	3	6.4%
Workplace	5	10.6%	2	4.3%
FERC website	0	0.0%	2	4.3%
Industry conference	4	8.5%	0	0.0%
Popular Mechanics	3	6.4%	0	0.0%
Note: All % based on n=47 participants.				

When asked to list all sources of information from which participants first learned about wave energy, public meetings were cited most often (27.7%). On the surface that seems plausible enough, but it begs the question: What drew them to that meeting in the first place? My interpretation is that perhaps, having somewhere recently received a vague description of something called “wave energy,” they then attended a public meeting at which they learned about it in specific detail—how it works, what it’s supposed to do, and the like—and gained a more durable cognitive understanding of wave energy. Given that “word of mouth” was only slightly less frequently cited (23.4%) as the original source of information, it is reasonable to assume that the “vague description” I just mentioned above (which would have technically been the actual initial source of information they had received) came by word of mouth or at any rate some form of interpersonal communication. Regardless,

public meetings being merely a kind of organized and collective word of mouth event, it would seem that, at least in coastal communities, news of wave energy first spread more quickly among interpersonal communication networks (involving *collective consumption* of information media) than from mainstream media sources intended for *individual consumption*. Whether this is because people on the coast were more generally interested in or concerned about wave energy than people further inland, whether interpersonal networks in general were a more widely utilized wave energy information source in coastal communities, or whether mainstream media on the coast had insufficiently covered the wave energy development process prior to the summer of 2008 was not clear from the findings in this research project.

I have organized the various information sources cited in the interview data into two main types: 1) collective and 2) individual. The first type is characterized by sources involving interpersonal communication wherein people exchange information together as a group. The second type is characterized by sources intended for individual consumption such as mainstream media like television, newspapers, and magazines. I have not here addressed forums such as online chat rooms or message boards (which may be considered both individual and collective), as none of the participants in this project cited these as sources of information regarding wave energy.

In comparison, when asked how participants gain new information on wave energy now, both newspapers (38.3%) and the internet (27.7%) were more frequently referenced. Interestingly, the internet had not been previously mentioned at all as an

initial source wave energy information. Given the nature of the internet (typically accessed in interpersonal and spatial isolation), this should not be of any great surprise. I believe this simply reflected the ways in which people predominantly used the internet to [actively] search for specific kinds of information as opposed to [passively] receiving it from more mainstream media or interpersonal conversation. However, it would appear possible that once people on the coast first learned about wave energy and began to contemplate its potential ramifications for their lives, the internet proved to be a widely sought after tool for gaining new information, more so than either public meetings or word of mouth.

Nonetheless, local newspapers (including The Portland Oregonian, though not generally cast as “local” by people on the coast) were cited as the most reliable and available sources of new information on wave energy, almost doubling in terms of the percentage of participants interviewed, from 17.0% as an initial source to 38.3% as an ongoing source. This tends to reinforce the dominant pattern noted above, namely that of participants actively seeking information on wave energy through sources of individual consumption after first learning about it through collective or interpersonal communication. This pattern is by no means absolute, and further research could provide greater clarity as to its validity.

As a side note, while the interviews progressed from the summer of 2008 into the fall, it seemed I kept hearing people mention that they had first learned about wave energy, not from any contemporary story about the Oregon wave energy development process, but instead a long time ago from an article in Popular Mechanics:

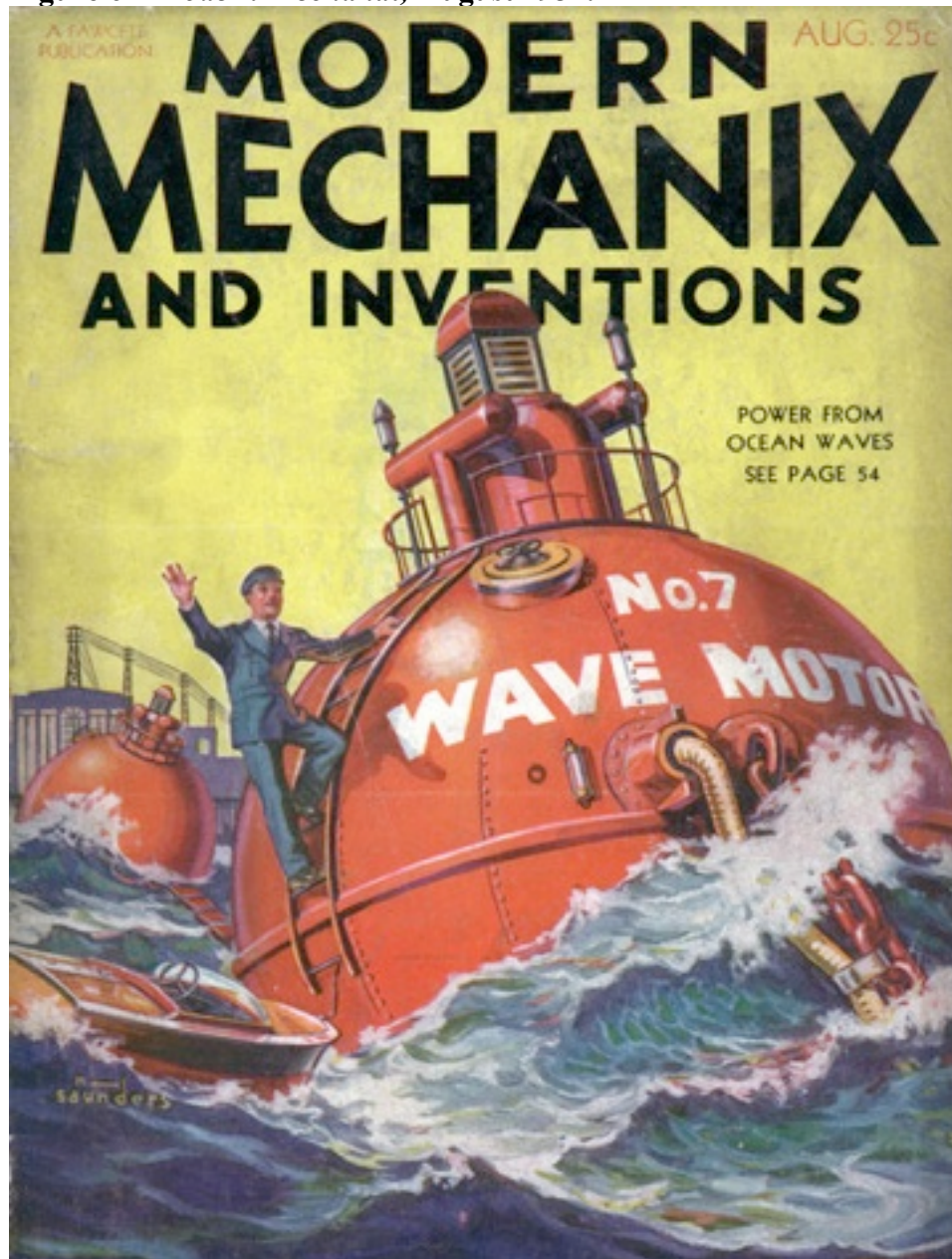
“I remember reading about it in the fifties as a teenager or younger—maybe it was in the late forties—in Popular Mechanics.”

“Years ago I saw something in Popular Mechanics a long time ago, but it was futuristic and stuff.”

While I was unable to confirm the existence of such an article appearing in an issue of Popular Mechanics, I did come across a cover story from the August 1932 issue of *Modern Mechanix* entitled “Power from Ocean Waves” (See Figure 6).

While this may or may not be the actual article to which participants had made reference, it is clear that the idea of wave energy is not a new one, at least to engineers and technology enthusiasts. However, it does raise the question as to why it hasn’t been developed already. Perhaps our historic national dependence on cheap sources of fossil fuels made the decision a simple economic one. But, contemporary political forces driving environmental protection and energy independence may now be providing the necessary economic incentives to push the development of renewable energy sources in all directions, including toward wave energy on the coast of Oregon.

Figure 6 – *Modern Mechanix*, August 1932.



Feasibility Prediction

“Do you think wave energy technology will be developed commercially on the Oregon coast? If YES, when do you think it will likely occur? Where? If NO, why not?”

I have assumed so far that coastal communities will inevitably be impacted more directly by the development of wave energy than non-coastal communities. I have further assumed that because people living in close proximity to the ocean are likely to possess a more intimate understanding of traditional ocean uses, seasonal ecological factors, and local political affiliations, they may also be able interpret the general feasibility of wave energy projects, as proposed, with a geographically unique degree of scrutiny and insight. To explore this, I asked people to: 1) appraise the feasibility of the technology, based upon their cognitive understanding of it; 2) predict the most likely location (within Oregon) for its initial commercial implementation; 3) propose a theoretical timeline for reaching full implementation; and, if they appraised feasibility negatively, to 4) indicate why wave energy would not be developed in Oregon. Of particular significance was that the extent to which people appraised the feasibility of wave energy greatly influenced the degree to which they felt it represented either an opportunity or a threat to the well-being of their community.

Most participants (59.6%) indicated that wave energy would, in fact, be developed commercially on the Oregon coast, and most of those felt that the development of wave energy was inevitable. In contrast, only 10.6% said they believed wave energy would not be developed. Of the remaining 12.8% who suggested that the feasibility of wave energy “depends,” most of those (42.1%)

indicated that it “probably” would, 31.6% indicated that they hoped it would be and only 5.3% hoped it would not be developed. The concept of development inevitability was based on the perception of a deterioration of local political autonomy and a growing condition of being subject to the unswerving agenda of the broader political economy:

I think that, to a large extent, what happens here is going to be politically driven, and it doesn't really matter what people say. And I think that to the degree that it is politically driven, we're going to make some major mistakes. Those that are going to pay for it are going to be small business on the Oregon coast. (Retiree)

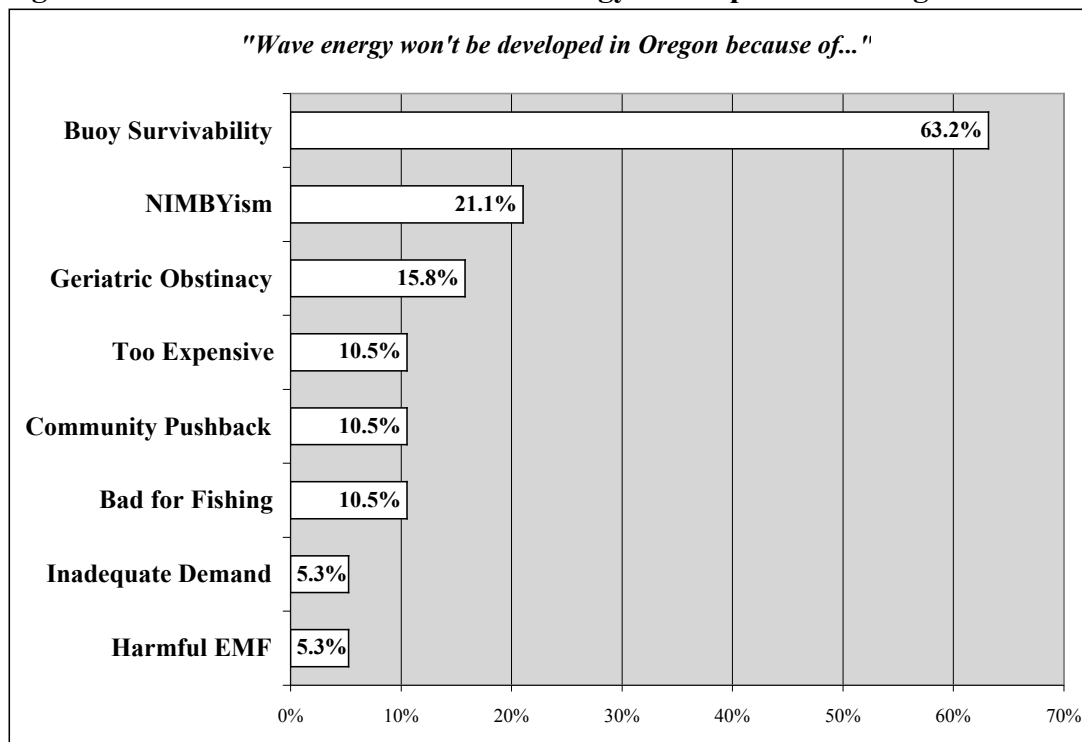
Of particular importance to developers and policy actors may be the reasons participants gave for describing why they believed wave energy development was not feasible in Oregon. Of those reasons, by far, the one most commonly cited was buoy survivability (63.2%). The ability for wave energy buoys (as well as the electrical infrastructure to support them, like anchors, mooring lines, and power transmission cables) to withstand the harsh ocean conditions of the Pacific, especially during winter storms, seemed highly doubtful to several participants.

When you start talking about expensive equipment that's anchored in water two-hundred feet deep, there'll be months that you won't be able to service it [if] something goes wrong. Last year we had a nice storm that lasted for four days. And for four days—typical, you know?—we had almost 80-90 mile and hour winds solid for four days, day and night. It was knocking all the power out. If something went wrong with the buoys out there, are they going to be able to maintain them? You'd be sending people to their death to go out and work on those. I think that the roughness of the Pacific Ocean during our winters is going to make it highly suspect. (Retiree)

People don't understand the ocean. They take it for granted. They think you can just put a buoy out there and it's going to generate electricity and I think it's going to end up on the beach or it's going to sink. The

ocean conditions are just terrible out here. It's okay if you're in a more predictable ocean condition. The northwest is just very unpredictable. Unless they have some kind of super-duper anchorage system that they think is going to work, an impenetrable buoy that can last through a winter, it's going to be tough. I really think it is. I mean I've been on the ocean a lot. I was in the Coast Guard and you just don't take it for granted: very powerful and very strong. (County official)

A number of other factors emerged as significant themes regarding wave energy unfeasibility. Some people who said wave energy would not be developed suggested that coastal communities would overwhelmingly press a NIMBY argument (“not in my backyard”) to their political representatives in an effort to preserve the aesthetic and ecological status of existing near shore waters. Michaud, et al (2008) described proximity as the key to NIMBYism at the local scale, and identified environmentalism as an alternative explanation for opposing projects on a more regional scale. The proclivity for people to express NIMBYism opinions reflects what I describe as a personal identification with spatiotemporally proximal values; NIMBYist participants expressed primary concern with immediate impacts on local ecologies while environmentalist participants expressed primary concern with more long-term impacts on global ecological systems. I shall explore the role of spatiotemporal proximity as an indicator for NIMBYist opposition toward wave energy in the following chapter. See Figure 7 for a list of the most frequently cited factors regarding wave energy unfeasibility. Percentages do not total 100% as participants were not limited to one response and often mentioned several sources from which they acquired information. These were simply the most commonly mentioned.

Figure 7 - Perceived Barriers to Wave Energy Development in Oregon

Wave Energy Players

"Who do you think is involved in the ocean wave energy development process?"

I utilized an opportunity-threat analytical framework (Gramling and Freudenburg, 1992) to examine perceptions of wave energy development projects on the Oregon coast, assuming that participants in this socionatural region would view wave energy as either a threat or an opportunity to the well-being of their communities. I wanted to know who participants perceived as the players behind the threats or opportunities of wave energy in order to explore the degree to which people on the coast support or oppose development projects and its relation to the perceived political economic drivers behind it. If blame or credit were assigned, to whom would it go? I asked participants to talk about who they thought was involved in the wave

energy development process, and received an admittedly long list of names. See Figure 8 for the most frequently given responses.

Figure 8 - Perceived Players in the Wave Energy Development Process

Perceived Player	N	% Total Sample	Non-coastal	Coastal
Private developers	19	40.4%	X	
Local PUDs	19	40.4%		X
Oregon State Univ.	16	34.0%		X
Federal regulators	14	29.8%	X	
The state of Oregon	14	29.8%	X	
Local governments	13	27.7%		X
Venture capitalists	9	19.1%	X	
Universities	7	14.9%	X	
Governor Kulongoski	7	14.9%	X	
Fisherman's organizations	7	14.9%		X
Dr. Annette von Jouanne	6	12.8%	X	
*% based on total N=47 participants citing multiple development players.				

Some of the more commonly referenced players in the wave energy development process were People's Utilities Districts (40.4%), private developers (40.4%), Oregon State University (34.0%), federal regulators (29.8%), and the state of Oregon (29.8%). The entire list consisted of over 40 different entities, and I have organized them, in terms of opportunity-threat analysis, into coastal and non-coastal players. Because my unit of analysis was the coastal community, it was important to determine whether participants perceived the wave energy development process to be driven (or at any rate controlled) by either local or distant agents or institutions. I wanted to know the extent to which they viewed wave energy as something emerging from within their community or being pressed upon them from outside. Participants

perceived most of the players in the wave energy development process (67.5%) as operating from non-coastal communities. In light of this, I will now explore the political implications of coastal versus non-coastal agency.

Government Role

“What should be the role of the local, state, and federal government, if any, in the development process?”

In the above section dealing with the perceived feasibility of wave energy technology, I began with an assumption that residents of coastal communities stand to be more directly impacted by the development of wave energy technology than those in non-coastal communities. I return to that assumption in this section as I explore what people on the coast believe the role of the government should be in the development process. According to Bennett, “the best case for the existence of something called cultural ecology can be made on the grounds of public policy” (1976:2). In the following chapter I will distinguish between four dimensions of adaptive strategies to “rational or purposive manipulation of the social and natural environments” (Bennett, 1976) which I purport will likely result from the development of wave energy in Oregon. But first, this section demonstrates some of the dominant ways in which the public believes the government should be taking part in (or taking leave of) the wave energy development process.

When I asked participants what they thought the role of the government should be in the wave energy development process, many participants wanted to know which of their respective governments I was referring to. I was obliged to further probe for responses regarding each of three levels of government: federal, state, and local

(meaning county, or both county and city), and participants generally designated distinctly different roles for each the three levels. For the most part, people felt that the federal government should be 1) allocating funding toward the development of wave energy technology, 2) regulating the development process, or 3) staying out the process altogether. In general, the preferred role of the state government was as an intermediary between the federal and local levels of government, serving to 1) shield the state from overreaching federal agency, to 2) speak out at the federal level on behalf of local governments and communities, and to 3) aid and assist in conducting critical research studies on the feasibility and practicality of wave energy technology in the state of Oregon. The local government was generally viewed first and foremost to represent [coastal] communities, and many participants felt that local governments should have the greatest authority over the development process. Some, however, viewed their local governments as well-meaning yet insignificant actors on a dangerously large stage. It seemed that for these participants in particular, the concept of developing wave energy technology and delivering renewable energy to the power grid was a matter of national urgency; local governments would only increase inefficiency and get in the way:

I would think that not the local government but the federal government should have some type of—I don't know what you'll call it—safety guidelines, issues, something to govern what happens. Local, city, and county, I don't see—considering that it's out in the ocean—I don't think that they...sure, you could say that we don't want whatever it is out in the ocean, but it's the ocean. You don't have any right, as a local.
(Park manager)

For the purposes of this project, I have examined the responses to this line of enquiry not along lines of government levels, but rather whether the government—as a system—should serve to either 1) protect coastal communities or 2) promote wave energy development. These two seemingly disparate themes emerged as productive descriptors for the ways in which participants described the ideal role of the government (see Table 3).

Table 3 - Preferred Government Roles in the Development Process

Protection Functions	n	%*	Promotion Functions	n	%*
Protect communities	26	55.3%	Find compromise	15	31.9%
Regulate development	17	36.2%	Finance projects	11	23.4%
Conduct research	15	31.9%	Expedite permitting	10	21.3%
Protect environment	14	29.8%	Spearhead development	6	12.8%
Empower locals first	13	27.7%	Promote wave energy	6	12.8%
Site projects	7	14.9%	Empower feds first	5	10.6%
Monitor projects	5	10.6%	Try something somewhere.	4	8.5%
Advise development	5	10.6%	Generate revenue	4	8.5%
Empower feds last	4	8.5%	Empower states first	4	8.5%
Stay out of it	3	6.4%	Why not wave energy	2	4.3%
No federal role	3	6.4%	Distribute power	1	2.1%
Disseminate information	3	6.4%			
Lower taxes	2	4.3%			
Comprehensive planning	1	2.1%			
Total Protection	118	63.4%	Total Promotion	68	36.6%
*% based on total N=47 participants citing multiple government roles.					
Note: Total % based on combined number of responses n=186 (118+68)					

The first role, to *protect communities*, emerged as a major theme in its own right with 55.3% of participants citing it directly as a crucial government role, but also served to classify many others salient themes. The second, to *promote wave energy* development, was a far less often cited theme (12.8%), but again served helpfully to

classify other more commonly cited themes such as “financing projects” and “expediting the permitting process.” With 63.4% and 36.6% of all responses respectively, protection functions far outpaced promotion functions.

Permitting Familiarity

“Are you familiar with the [federal energy] permitting process? What’s your sense of where your county is in the permitting process?”

In an additional effort to gauge both the level of public engagement in the wave energy development process as well as the degree to which public outreach has effectively raised public awareness about wave energy and the roles of local, state, and federal governments, I examined levels of familiarity and degrees of understanding of the federal [energy] permitting process involved in wave energy development projects. For the most part, the Federal Energy Regulatory Commission (FERC)—historically charged with regulating Oregon’s hydroelectric dam projects—has been the primary governmental entity authorized to grant preliminary permits within three miles of the shoreline allowing applicants to “conduct investigations and secure data necessary to determine the feasibility of the proposed project” (Guey-Lee, 2008). During the course of collecting data for this project, and from various conversations and public meetings, it became clear to me that both FERC and the Minerals Management Service—historically charged with overseeing and regulating hydropower and off-shore oil drilling projects, respectively—each claimed authority over the wave energy permitting process. To several people I spoke with, the motivating factor driving the dispute was purely economic:

Newport's willing to work with people. The federal government's just, "We make money on a lease for Minerals Management Services for these buoys if it's outside [three miles]." State Lands makes money on a lease and they don't care about the local community. Both—they're basically saying it's all about the permits and the licensing and the money. (County official)

The irony that the federal government seemed to not even know how to go about regulating this nascent technology was not lost on residents in coastal communities. Indeed, it reflected poorly on governmental bureaucracy in general and the federal government specifically. Nonetheless, each of the three coastal counties in this project was, at the time I conducted fieldwork, at different locations along the permitting process timeline.

Douglas County had experienced the highest level of initial developer interest, and had been involved in several applications to FERC "for carrying out informal consultation, pursuant to section 7 of the Endangered Species Act, section 305 of the Magnuson-Stevens Fishery Conservation and Management Act, and section 106 of the National Historic Preservation Act" (Bose, 2007) (in other words: to figure out, within three years, how to develop a site-specific wave energy development project). Two notable permits were granted in March and April of 2007 to Oregon Wave Energy Partners (in association with Ocean Power Technologies) and Douglas County (in association with WaveGen) respectively.

Lincoln County had attempted to file a preliminary permit with FERC for the sole rights to explore wave energy potential off the entire coastline of Lincoln County. Finding the scope of their application too ambitious and impracticable, FERC denied Lincoln County their permit, and the county has been left in a kind of limbo state.

Some within the county feel betrayed, confused, and frustrated at their inability to control the permit regulating development in what they perceive as their coastal waters:

State and federal government have written local government off. We injected ourselves there. They want everything from us, but they don't want us to be a partner, which discourages me because the state of Oregon line goes to three miles. In my opinion, county line goes to three miles. We should be involved with anything that has to do with the management inside three miles, more or less. Siting should be part of the county's process. State doesn't feel that way. State wants all the revenue [from any permits], and basically tells the county to stuff it. (County official)

Tillamook County, taking note of both Douglas and Lincoln County's successes and failures, drafted an application to FERC similar to Lincoln's but with a greater degree of geographic specificity than the entire coast. The county commissioners in collaboration with the Tillamook People's Utilities District (PUD) together formed the Tillamook Intergovernmental Development Entity (TIDE) on February 28th 2007 to:

...study, design, permit, construct, own, operate and maintain a wave energy network facility...for the benefit of the people of Tillamook County...Immediate action being necessary to carry out the TIDE IGA public purposes with a timely filing of an application for the project with the Federal Energy Regulatory Commission... (TIDE, 2007)

Having attended several working meetings of both TIDE and the Tillamook PUD, it appears that Tillamook County has, to a large extent, successfully obtained primary control over the development of offshore energy resources at six key locations along their coastline. Their permit was granted on May 23, 2007 and they have three years until it expires. In the words of one county official:

The role that we want to play is, we don't want this to happen to us, we want to be part of it. And the reason that TIDE was formed was so that we could have a say in what happens off of our coastline. Now, that doesn't mean that we have veto power by any means because state and federal agencies are going to have a role in this thing too. But, we want to have a clear say in what happens to us rather than a developer coming in and just filing for a FERC permit, and then it happens to us rather than us being involved in it from the very ground up. (County official)

I asked participants in this project to describe their familiarity with the permitting process in their county (as briefly described above). Based on their own self-descriptions, I classified them as 1) not familiar, 2) somewhat familiar, or 3) very familiar with the permitting process (see Table 4). By far, most people (68.1%) did not consider themselves very familiar with FERC or the permitting process. Of the remaining 31.9% who claimed to be very familiar with the permitting process, all were either local government officials or members of organized local interest groups.

Table 4 - Familiarity with the Permitting Process and its Status

Variable	Category	n	%*
Familiarity with process	Not familiar	20	42.6%
	Very familiar	15	31.9%
	Somewhat familiar	12	25.5%
Knowledge of permit status	Uninformed	24	51.1%
	Very Informed	16	34.0%
	Somewhat Informed	7	14.9%

When participants answered that they were either somewhat or very familiar with the permitting process, I asked them to describe to me their understanding of their county's situation in that regard. Based on their objective responses, I subjectively classified them as either 1) uninformed, 2) somewhat informed, or 3) very informed.

With participants unfamiliar with the permitting process, I skipped this second part of the question altogether and classified them as uninformed. For the most part (87.2%), participants' self-assessments regarding their familiarity levels were in line with my subjective judgments of their levels of knowledge, with only 4.3% knowing more and 8.5% knowing apparently less than they had previously claimed.

The significance of the results of this question, however, lie not in how much participants know about the permitting process, but rather which ones did and which did not. Clearly, there is a direct relationship between holding a coastal government office or belonging to a coastal organized interest group and familiarity and knowledge regarding the permitting process. While holding a government office or being an interest group member does not correlate 1:1 to permitting familiarity and knowledge, there was nonetheless a significant 80.9% probability rate in my particular interview sample.

Conclusions

In this section I deduce from the interview data that while most participants in this study, having learned something about buoy technology (first from group interactions then later on their own) but little if anything about the federal permitting process, felt that wave energy would, in fact, be developed within the next ten years in the state Oregon and that private developers and local PUDs constitute the primary driving forces behind that process, it nonetheless falls upon the government, at all levels, to ensure that state and local interests are not compromised or neglected by non-coastal development entities along the way. In this chapter I have examined the ways in which coastal residents formed cognitive understandings of both the

technology and the development process involved with wave energy. In the next chapter, I shall use this information to examine in further detail the ways in which coastal communities perceive specific potential impacts on aspects of community well-being and the strategies they appear to utilize to adapt to social and economic changes from wave energy development projects.

CHAPTER 7: PERCEIVED IMPACTS OF WAVE ENERGY DEVELOPMENT ON DIMENSIONS OF COMMUNITY WELL-BEING

In the previous two chapters I used a detailed analysis of coastal community interview data to outline dimensions of community well-being and public understanding of wave energy technology and the development process. In this chapter, I examine the critical relationships that exist between the two. Some of the people I spoke to for this project were quite enthusiastic about wave energy, and did not seem to indicate much of a perception of the potential drawbacks to its development on the Oregon coast. For these participants wave energy development represented a series of opportunities well worth exploiting.

It would be a good thing, obviously. To get something like that in the area would be wonderful. Whether we do or not remains to be seen. Overall, what I would see is: new jobs, more money to the area, hopefully cheaper energy because the energy doesn't have far to go—it's just right off shore. All of these things are definitely a big plus. It's a win-win for everybody involved. I think all in all, it's like I said: all of these are great things that could happen for the community.
(Hospitality provider)

In contrast, others had difficulty finding anything positive to say about wave energy development whatsoever, and viewed it as primarily a threat to various aspects of community well-being.

You can't take anything out of our system without it affecting anything else. The National Estuary down here, I was a part of it when they first came in, and it was so wonderful to hear about dredging and what you kill and what you do when you put something in. That's why I keep saying that the wave thing is an invasive product, and I don't want to see it in. Nothing is always great. There's always bad turns to—no matter what you touch, if you put something in or take something out of nature, something happens because of it, not always good. No matter how great somebody says it's going to be, there's always the other side of it too. (Merchant)

The goal of this chapter is to examine "the other side of it." For every public proclamation of some potential opportunity presented by wave energy, there has been a proportionate degree of community response about the corresponding threats it presents as well. Just as the public discourse on the social impacts of wave energy has been characterized by this proponent/opponent back-and-forth, so here I will discuss the ways in which participants described each of the various dimensions of potential impacts first as an apparent opportunity to some and then as a perceived threat to others. In order to contextualize these dimensions, I begin by first examining public perceptions of 1) which groups of people participants thought would impacted *the most* by wave energy and 2) who they thought would most likely bear *the costs* of developing wave energy on the Oregon coast.

Then I 3) explore specific ways in which participants perceived the relationship between wave energy development and well-being by defining five dimensions of community impacts: vocational, environmental, economic, aesthetic and psychological. Each is comprised of both positive and negative potential impacts of wave energy on community well-being as perceived by project participants, and as such I have framed each as an issue of both political discourse and policy relevance. To illustrate this, I will demonstrate the ways in which participants perceived wave energy as either a threat or an opportunity regarding community well-being.

Differential Effects of Wave Energy Development

In an effort to help contextualize the potential impacts of wave energy development on community well-being, I wanted to know whose lives participants

believed would likely be affected the most as a result. I asked each participant the following interview question:

"Whose lives do you think might be affected the most from large-scale implementation, and in what ways?"

Participants cited several key groups as facing the greatest degree of potential impact from wave energy and included recreational ocean users, beachfront property owners, low income residents, the tourism industry and the fishing industry. While fishermen were overwhelmingly cited as the group likely to be most affected by wave energy, other groups also figured in the interview data. With the fabrication, installation, and maintenance of commercial scale industrial infrastructure 2-3 miles from shore, it is no surprise that participants felt that those likely to be affected included surfers, property owners, and ports.

Fishing Interests

While the domains of recreation and tourism often overlap and can appear at times as a single larger industry, by far the most commonly received response to the above interview question was the fishing industry. As noted in the previous chapter, a thorough understanding of the technological aspects of wave energy was not necessarily required for participants to be able to make some early assumptions as to how existing ocean uses could be impacted by near shore development projects⁴.

⁴ It should also be noted that participants expressing limited understanding of wave energy technology frequently argued for a "win-win" scenario where both wave energy and fishing could both co-exist as well as thrive. Moreover, groups such as Fishermen Involved in Natural Energy (FINE), well-informed as to the wave energy development process, have also argued for a system of shared use of ocean space by wave energy infrastructure and limited fisheries practices.

Perhaps this was due to an implicit assumption of the mutual exclusivity of natural resource extraction practices and industrial energy generation practices, but for many of the people I interviewed, the two simply cannot, or should not, occupy the same space at the same time.

Commercial and sports fishing: each of these buoys is going to take—each of whatever it is, whether it's buoys or some other kind of technology because there's some worm-type things that are floating devices, none of which I'm aware have a zero-impact, that is to say they all require—some kind of territory. And because they require territory that means that some other uses will be excluded from those territories, and that's basically it in a nutshell. (City official)

However, participants who were somewhat better informed about wave energy and who clearly understood a good deal more about its technical requirements also reflected a concern over potential conflicts with members of the fishing industry, including their potential to become serious navigational hazards.

Even in their most benign form—an array of wave energy buoys creates a hazard to navigation. It's a reef. It's another object that a fishing vessel, or a pleasure vessel, or a ship has to avoid, doesn't want to lose power and drift through. Where it's open ocean today, it'll be a hazardous place. In all the time I've spent at sea there have been many, many days having to alter my course, being out there in say 70 knot winds and 25 foot seas; having to drive around a reef that wasn't there before is something that we'll notice. It's just a new factor, and that's in the most benign form. It's at least that to a person operating a boat, if they're perfect. They're still a reef. (Fishermen)

Of all the fisheries off the coast of Oregon, Dungeness crab was viewed as the most vulnerable to the threats posed by commercial scale wave energy development. The prevailing opinion among those I spoke to was that wave energy buoys were most easily and cost-effectively anchored in soft or sandy bottom areas within 2-3 miles of shore. This describes precisely the type of habitat most suitable to Oregon's

Dungeness crab. Tightly regulated catch restrictions have helped the Dungeness crabbing industry to become relatively sustainable and, as a result, one of the most highly profitable fisheries in the state. According to the Oregon Dungeness Crab Commission, Dungeness crab landed values ranged from \$5 million to \$44 million over the last ten years, and represents “the most valuable 'single-species' fishery in Oregon” (ODCC, 2009).

The Tourism Industry

Because so much of what draws visitors to the Oregon coast involves the Pacific Ocean and its productive capacities, both recreational and commercial, the tourism industry was also seen as facing a significant amount of change as a result of wave energy development. Participants described both positive and negative ways in which wave energy could impact the tourism industry, and mentioned whale watching and charter fishing as drivers behind much of the hospitality industry on the coast.

People come. They stay in local hotels that employ local people. I don't know how many charter boats there are in Newport, but on any given day in the summer there's a lot of sport boats. I don't know what an average daily is, but I know that there have probably been over ten days in the last two months that there have been over three hundred sport boats leave Yaquina Bay on one given day. And I know that seems crazy, but it's true. And all those people, they're buying local gas, they're staying at local places, they're buying local. (Fisherman)

In as much as marine environments stand to be affected by near shore electrical infrastructure, tourism-related recreational ocean uses will likely require the use of adaptive strategies in order to continue to enjoy a relatively thriving business. It would appear from the interview data that the potential and as yet unknown interactions between wave energy devices and marine mammals--especially charismatic mega-

fauna such as migratory grey whales and orcas--and on target fish species for recreational anglers such as rockfish all but ensure a significant impact on the tourism industry in the future.

There were also those I spoke to who raised the very real possibility that wave energy technology could serve to attract tourist attention as well. In as much as wave energy was conceived as "green," cutting edge, or "the next big thing," it could also draw regional, national, or global attention to Oregon's rural coastal communities. However, this argument for notoriety seemed usually to be tempered also with caution against too high a degree of physical infrastructure visibility.

It could be tourists just coming to see them. They come to see whales. They come to see waves. I would hope that they wouldn't be so visible out there that people would just want to stand and look at them. But, it doesn't sound like they're going to be very tall, and they're not going to be within the first mile I don't think. Maybe they are. It wouldn't look natural. People come to see nature. They want to see waves and birds and whales. (Hospitality provider)

It could be something that does serve as a tourism attraction. People like to go see the hydroelectric dams and those types of facilities. But, again, it depends on whether people have the interest or again what may be the visual impact, or it may not have an impact. If it's just a bunch of buoys it may not be that exciting. (City official)

As I will discuss later in this chapter, perceptions of the potential for wave energy technology to either gain exposure and attract investment, or create an eyesore and diminish views of the ocean, are related to valuation differences among coastal residents of both proximal and distant impacts on the perceptions of the coast. In essence, the differences of perception among coastal communities would appear to lie in the discrepancy of asking either, "What do we think about this?" as opposed to,

“What do they think about us?” The former pertains to local cognition of aesthetic change, the latter to non-local cognitions of the character of the Oregon coast.

Beachfront Property Owners

Likewise, as participants made note of the potential for arrays of wave energy buoys to alter the aesthetic experience of the western horizon line across the Pacific ocean, they inferred the eventual negative financial impact on the monetary values of large numbers of beachfront properties, including hotels and restaurants, but primarily homes and second homes.

I'm thinking that if I've lived here for twenty years and I have a house on the beach—let's say that I have a house on the beach—and whatever goes up in the ocean, me as an individual might go, “Well, I don't want to sit there and look at that everyday anymore. I mean I had a nice beautiful ocean and now I'm looking at this?” and turn around and say, “I'm out of here.” I might be that type of person that's been here forever. I could see that. (Hospitality provider)

A number of people mentioned that as wealthy second-home owners increasingly populate beachfront properties, home values throughout communities have tended to rise. The value of these homes seems to be significantly linked to their access to an open and "pristine" view of the Pacific Ocean. In as much as wave energy infrastructure could diminish the character of the view from beachfront properties, it could also serve to devalue high-end homes. Owners of these homes, as the reasoning follows, might be inclined to sell their property and leave the area. While regional home prices could lower as a result, property tax revenues for counties would also decline, negatively affected local governments' capacity to provide basic services.

Low-Income Residents

While there exists the potential for greater housing affordability for low income residents should high-value beachfront properties face potential devaluation from diminished or otherwise industrialized view sheds, some of the people I spoke with also mentioned several ways in which wave energy could significantly affect the price of electricity, a key commodity for coastal residents, especially those on fixed incomes, including retirees, but especially low-income residents. What the ultimate affect of wave energy on power rates will be remains to be seen, but some believe they will go down while others believe they could go up.

I don't know if it would make energy less expensive, but if it did that would really help low income people. And, it might also encourage other businesses to be attracted to the area if there was lower energy costs. I know we don't produce oil or gas around here so it wouldn't affect us that way. I don't know. I guess the main thing would be, I think, it would make it cheaper although I don't know if that's true. There might be start up costs that keep that from happening. (Librarian)

You just can't come in and jam something like that down somebody's throat and expect them to accept the situation when the public perception is, "You guys are just coming in here, you're taking away our ocean, and you're just going to make a ton of money and we're going to get no results from it except higher power rates because you're dumping this on the grid which then brings the overall average up. And, whoa, whoa, whoa! What's going on here?" with no jobs to back it up. (Merchant)

A significant degree of confusion and incongruence existed regarding public perceptions of the impact of wave energy on local electric rates. The degree to which people believed their rates would change may have greatly affected their personal

preference for, and willingness to pay for, wave energy development in their community.

The Surfing Community

The surfers that I spoke to seemed well aware of the potential impacts of various wave energy technologies on their ability to enjoy their local surf spot, and many credited Oregon Surfrider Foundation, a local non-profit environmental group, with having gone to great lengths to keep their members informed regarding wave energy development. One surfer mentioned the potential for wave energy buoys to attenuate incoming swells by removing energy from passing waves. Another mentioned that the oscillating water column (OWC) project proposed by WaveGen for the south jetty at Winchester Bay could easily cause sand and sediment to shift into such a way as to fatally alter the quality of the swell.

The biggest concern I have about this is that, one, obviously, that it'll totally manipulate the way the jetty is, and that'll change the way the surf spot looks. It's not like the Army Corps of Engineers put the jetty in for a surf spot, but it created a surf spot, one of the best in the world, so it'll totally manipulate that. And the other piece is that the whole liability aspect of it would go on Douglas County, not the Army Corps of Engineers. So, if they fuck up, if something doesn't work out right, I could see it going, "Oh, we don't really have the money to fix this." The Army Corps of Engineers will probably take it over and try to tweak it, but the damage would have been done. Douglas County doesn't have deep pockets. (School administrator)

It would appear that a significant proportion of people living and working and raising families in coastal communities do so because of the particularly excellent opportunities for recreational ocean use that exist throughout the socionatural region, especially in regards to the surfing community. At a public meeting I attended in

Reedsport, many voices from the community were raised in concern over the proposed WaveGen project. Almost all were surfers, and while many were long-time residents of the area others had driven over four hours to attend the meeting and express their deep appreciation for what they characterized as a “world-class” surfing location at the south jetty of Winchester Bay. Several of the sponsors of the meeting indicated to me that they had previously been unaware of just how potentially critical prized surf spots could be to local communities and their economies.

Differential Costs of Developing Wave Energy

Having identified the people and industries most likely to be affected by wave energy, I then explored public perceptions of those believed to be most financially responsible for developing it, and asked each participant to respond to the following question: *Who will bear the costs of developing wave energy technology?*

In examining which groups of people participants believed to be most heavily invested in wave energy technology, I asked participants to identify who they believed would most likely bear the costs of developing it. When asked, the open-ended nature of the question above led many to immediately ask me what kind of “costs” I indeed meant: the financial costs of starting up a major engineering project or the opportunity costs of losing access to key geographic areas of economically productive existing ocean use? While I made sure to specify the former, I generally encouraged people to also answer the latter if they so desired; answers regarding opportunity cost were then coded in terms of potential impacts, and proved helpful in identifying both those who stood to be affected, such as rate-payers, and in what ways, discussed in both the previous and the following sections of this chapter, respectively. The current section

will therefore focus primarily on which groups of people participants believed would most likely provide the financial capital needed to develop wave energy. Participants predominantly cited 1) state and federal governments, 2) private developers, and 3) public-private partnerships as most likely to bear the majority of the development costs.

State and Federal Governments

People often suggested that state and federal governments should play an active role in helping to fund wave energy development projects, and several primary reasons emerged to support this view including the government's role in 1) protecting communities from rising energy prices, 2) providing incentives to attract industrial job opportunities, and 3) leading the world in innovative renewable energy development. To the extent that wave energy was viewed as a potential source of locally consumed electricity production, it seemed to fall upon the government to help protect coastal communities from the economic pressures of skyrocketing energy costs by providing tax incentives to development companies.

I'm thinking the State and federal [governments]. There's got to be some tax incentives provided. I mean, there is for everything else, especially since this is like so on the forefront, politically, right now. I would think that there would be a lot of incentives for a private company to be developing alternative energy, whether that's in the form of tax credits or breaks or grants or whatever. It seems like that is a natural. (Merchant)

Others in support of local energy production felt that wave energy technology represented too large a single endeavor for private industry alone to spearhead—on the order of jetties and hydroelectric dams—and that governments were obliged to step in

and help kick start the development process by providing both financial and bureaucratic assistance for preliminary project developers.

I think you've got to get the state and federal government into it too. I think that monies have to be invested in the process. They've got to step up and say, "Listen. There's something desirable here, at least as far as we can see now. We can't predict every issue. We'll never be able to accurately quantify every risk, but we've got to try to." They need to be willing to try, and I think part of the reason is that if they don't step in then those first companies down the line do all the heavy lifting; they're the ones who are cutting down the permitting weeds; they're the ones who are setting the path of, "this is how you get to it." (School teacher)

Similarly, others viewed wave energy as an opportunity for Oregon and the United States to take the lead in developing an innovative and "green" technology that could prove both highly profitable for local economies and environmentally critical to future global energy resource stability.

Hopefully the government will put money in there too because in the long run that could be something—I'd like to see America lead in some way, you know? Japan went and made all these great cars, and they're kicking our butt all over the world. We should go after the stuff like this, because they need this all over the world. There is waves all over the world, some places better than others, but we should go after it tooth and nail, I think, to be the leaders in it and have all these countries coming to us saying, "We want to buy 200,000 of those wave generators," you know? We should go after it hard—that's what I believe—and be the leaders in it, and be the Toyota of wave energy. (Merchant)

Additionally, there were also responses indicating that, regardless of who *ought* to be paying for wave energy, taxpayers would inevitably bear many the costs in the form of government subsidies and tax incentives for developers.

Right now, of course, if the technology were deployable today, the taxpayers as a whole are going to underwrite a certain portion of that because there's subsidies in the form of tax credits, primarily, just like

there is for wind development. And you see this big rush towards wind development, that I don't think most people I've talked to have said, "The market won't support that by itself." So, the subsidy's spread among all tax-payers for renewable energy development. (County official)

Again, citing precedents from both the wind and hydroelectric energy industries, people seemed to indicate that states generally operated under the tacit mandate to develop new and promising renewable energy industries when and if at all possible.

Private Developers

Most participants viewed wave energy development as, first and foremost, an entrepreneurial endeavor that, like any other, required a sufficient investment of private capital up front in expectation of profitable returns.

We use energy. It's a product. We pay for it just like food, just like anything. We use it. We consume it. It's business. It's nothing but business. So if there's going to be wave energy development it has to be done at a profit. And if it's done at a profit, that has to benefit local communities. And if it gets extremely profitable we need to have some really tight controls on further development of it. If it's not profitable it's not going to happen. (Merchant)

I sensed in this participant's response a subtle degree of blame being assigned to electricity consumers themselves for creating the additional demand on the market for additional energy resource exploitation thus driving exploration of alternative energy sources such as wave energy technology. Moreover, this passage reflects what other participants indicated, namely that if there were money to be made then those who stood to gain the most should be those who assumed the greatest investment burden. Because development corporations were perceived as standing to gain the

most from wave energy, they were targeted as the ones upon whom the bulk of project financing should befall. This would seem to beg the question: If there were profits to be made from wave energy, why wouldn't communities have sought to capitalize on an apparently underexploited local natural energy resource? One potential explanation involves the fact that many people often also viewed wave energy as not only highly risky, but altogether unnecessary—due to Oregon's already substantial annual production of hydroelectric power—which they were not willing to share additional tax dollars to finance.

I, as an individual, would be very opposed to any government subsidies to create it. I don't feel like we the taxpayers should have to pay for something that we already have. So I would hope that the cost would be burdened primarily by the private company that's putting it in place so that they can reap benefit as I would if I went and built a restaurant and hoped that I could turn a profit. So the private person that builds the situation and puts in place should have to pay the whole entire amount getting it in place, and if all their buoys rust and fall apart they take the loss. (Restaurateur)

Willingness to pay has historically been used as an indicator in social science research of development projects (Li et al., 2007, Davis 2004, Thayer, 1981) and the interview data from this question reflect similar theoretical assumptions. Those who viewed wave energy as an opportunity were apparently more willing to contribute their tax dollars to state and federal governments in order to help fund development projects. Those who viewed it primarily as a threat felt that private developers should bear the financial costs of starting up projects, but also acknowledged that developers should be the ones to reap any of the profits produced by wave energy. It should be of no great surprise that coastal residents opposed to wave energy would not want to

sponsor its development, and one possible explanation for so easily foregoing any of the potential economic benefits of wave energy may be the apparently low expectations people often held for wave energy technology's capacity for successful commercialization in Oregon's temperamental ocean. As an investment opportunity, to some it was simply not worth the risks.

There could be some upside to it, but again, the uncertainty of changing a lifestyle that goes back generation[s]—when a guy's dad owned a boat, his grandfather owned a boat—asking these guys to quit fishing to start becoming electrical workers for an industry that may only be around for one or two seasons is more risk than they want to take. (Retiree)

Indeed, several of the fishermen I spoke to echoed this refrain, indicating a perceived absence of democratic process or political voice.

I think this is the kind of community that, given the chance to vote on something like that, for a tax increase on their already dwindling paycheck, they'll never get it passed. (Fisherman)

Well, that's where I think it should be private. It's going to be a private enterprise so it should be private money. I don't know. That's where it should come from. It shouldn't come from the taxpayers is what I'm saying. (Fisherman)

It would appear that precisely who people believed should bear the costs of developing wave energy had a great deal to do with the extent to which people perceived wave energy as either a promising opportunity or a potential threat to community well-being.

Public-Private Partnerships

Still others in this project viewed the funding of wave energy development as ideally constituting a shared obligation between governments and industries, taxpayers and stockholders.

It would nice to have the federal government take an active role in sharing the costs with the industry. The energy industry should be the ones bearing the costs because it'll eventually benefit them, but I don't see why it can't be a partnership of the energy industry, a federal agency of some kind, and whatever state entity that can help with that. I'm sure people don't have a problem with sharing in the cost if they can share in the benefit at the other end. (Hospitality provider)

The concept of public-private partnerships formed a major theme in the data analysis, and often served to qualify what might otherwise have been more typically polarized responses toward totally public or totally private subsidization.

Who knows? If they're successful, maybe you'll be able to buy public shares at some point, people can buy into them. I think it's far enough out there, these are some questions that I think will have to be asked and answered over and over again because people are still skeptical about how wave energy will work or if it will work. This is not a short-term development. I think it's a long-term development. (County official)

Likewise, just as the costs could be shared among governments and corporations, so too could the revenue streams generated by wave energy facilities.

I think we'll see these combined partnerships where you'll have a developer, you'll have investors, and you'll have one or more utilities that enter into a contractual arrangement to basically share in those revenues. We would have a stream that would represent our operational costs of cables, inverters, and substations to get the power onshore. The developers would probably form a sales arrangement with PacifiCorp, PGE, Idaho Power, or somebody to move the excess power onto the transmission grid and sell it to other utilities. And then investors, they need a return on what money they put into the capital investment. So

there's going to be some interest payments to investors, that revenue stream, or tax credits, one or the other. (County official)

Again the concept of investment and return emerged among those who saw wave energy as both an environmental and an economic opportunity, but this time without the presumed degree of risk so repellent to those who felt directly threatened by wave energy.

Dimensions of Community Impacts from Wave Energy Development

"How might the well-being of your community be influenced by wave energy? What are the potential benefits of wave energy technology, and to whom?"

In assessing the potential impacts of wave energy development on the community well-being of coastal counties, I have organized both positive and negative responses to the above questions into five broad categories including 1) vocational, 2) environmental, 3) economic, 4) aesthetic, and 5) psychological. In as much as each category represents a particularity of the discourse on wave energy, it represents a uniquely political dimension wherein public opinion and public policy played key roles and where answers to difficult questions remained unanswered.

Vocational Impacts: Job Creation or Job Loss?

Perhaps the most commonly cited positive impact of wave energy development has been the prospective employment opportunities it would offer residents of coastal communities. Given the nature of the historically declining natural resource extraction industries on the Oregon coast, unemployment has been a source of economic and social anxiety for at least the last forty years throughout the socionatural region (Freudenburg, 1998; Carroll et al., 1999). Given the chance to develop a promising

new industry, many on the coast expressed a willingness to decrease unemployment rates by promoting wave energy as a source of much needed job creation.

On the positive side of life, the positive impact would be pretty straight forward. If you really do have a farm of these devices, they require daily attention. There is going to be painting, welding, anchoring-system monitoring, electrical facility inspection, and upgrading and maintenance and invertors and substations and transmission lines and structures. So you have this whole base of labor that's needed, and it's all going to be skilled labor. So you're going to have welders, you're going to have electricians, you're going to have journeyman-linemen, you're going to have relay-techs, you're going to have specially trained divers that can work around this stuff, and that spells, to us, some type of a base of jobs in the area. We have been told by a couple of sources that the fabrication and the work cannot come out of Portland. It's too far. It has to be built in shops, and supporting facilities have to be placed here, and Garibaldi's the first choice because it's got a harbor and a jetty and a way to get in and out and docks, the dock-structure. (County official)

Clearly, there is good reason to believe that wave energy will result in the creation of an array of skilled jobs in relatively close proximity to the projected project sites alongside coastal communities. The strength of the argument however, from this participant's perspective, was based on the apparently indeterminate veracity of "a couple of sources" regarding the industrial capacity of fabricators such as those in Portland. While I do not know who these sources were, it nonetheless stands to reason that large well-connected fabricators in more urban areas could potentially apply political leverage to procure manufacturing contracts for wave energy devices, regardless of transport costs. Given the recent economic downturn of late 2008 and early 2009, subsequent to my interview data gathering process, it is also reasonable to expect that all regional fabricators will be seeking to both retain job positions for their employees as well as minimize financial losses by all available means.

An implicit assumption by those who argue that wave energy will create jobs is that the most likely candidates for these jobs are precisely the ones that will—and already do, to a great extent—need them the most. The potential for wave energy to create a new industry also inspired some to envision growth in regional college education as well.

So, the hope is, from an economic development standpoint, that it will be a source of jobs or, potentially, work for fishermen between seasons. [We] talked about having them ready and able to haul the devices and have their boats be paid for that and have the fishermen trained to do the repair. The community college has also proposed a wave power technician program. Columbia Gorge Community College has one right now, primarily for wind, and their graduates are doing very well. But, because they found wind was too limiting, they're actually making it a two-year program in alternative energy. So we're hopeful that there will be jobs and economic spin-off, definitely. (County official)

The argument for job creation was often supported by assumptions on the historic decline—and, though rarely, the eventual demise—of both the timber and fishing industries. In this context, wave energy was often seen as “the next big thing” for many of those workers and a way forward to economic growth on the coast.

Obviously, the timber and fish industries in the area are not going to be what they used to be in the past. Their hay-days are done. The timber industry's the same way, not that it'll ever be gone, but there are a lot more people that will be looking for jobs, that won't be able to find jobs in the timber and fish industries, which this industry would then be able to absorb more of those workers if they were retrained to do whatever, because obviously those machines or turbines or whatever equipment that's out there is going to need maintenance. And obviously people living in the area would certainly be the first ones to go, “Hey! We don't mind getting retrained if we're going to get the jobs. After all, this is where you've set up the turbines or whatever. The equipment is here. We live here. You don't have to find housing for us. We are here. You can call on us at a moment's notice to do whatever.” So, that's how people's lives would be affected. (School teacher)

Aspirations for both job creation and educational opportunity characterized the positive aspects of vocational dimensions of the impacts of wave energy. However, equally as vocal were those who argued that while there might *some* jobs created in association with wave energy, they would far from offset those lost as a result of its development.

Now the port has looked at wave energy parks as a potential source of economic development. If they use our facilities to build these things or launch these things or rent space from us and that kind of thing, if they can employ people in our community to help with these things, that's fine. But, really: how much economic benefit is that when you're looking at a tradeoff with the fisheries? (Retiree)

Aspects of perceived vocational opportunity remained characterized by a great deal of speculation and disagreement among residents of coastal communities. Again, it would appear that the degree to which wave energy was perceived as a source of job creation it represented an opportunity for long term economic sustainability. But, to the extent that it was perceived as leading to more short-term losses of jobs, especially in the fishing industry, it was cast as a potential threat to existing ocean use and community well-being. I will address further aspects of potential impacts on job opportunity in the section below on economic impacts.

Environmental Impacts: Ecological Disturbance or a Greener Alternative?

Wave energy technology had never been commercially developed in Oregon at the time I conducted my fieldwork, and it should be noted that all opinions regarding how it might impact the environment were purely speculative. In terms of the potential impacts of wave energy on the environment, participants generally made reference to the effects it could have on local marine ecosystems and global climate patterns. There

was no clear consensus on precisely how wave energy might impact local ecosystems, nor would I have expected there to be, as little if any relevant empirical evidence was available at the time. And, I contend that while opinions varied as to the extent of its potential environmental impacts, the domain within which wave energy was understood to be effective reflected—either locally or globally—in large part the degree to which it was perceived as either a threat or an opportunity.

It still comes back to wildlife. I think a lot of people are concerned of what's going to happen with five square miles of all these buoys hanging in the water. What's going to happen to marine mammals that migrate through the area? What's going to happen to non-target species, the species that nobody catches but they feed the fish we do want to have? So there may be some impacts that we don't know about. Of course, if we don't do the studies, we're not going to learn about them. But again, it's more like there's a lot of unknown factors about them. (Retiree)

Besides a seemingly universal recognition of the need for further scientific testing of the technology's environmental impacts, we also find a disproportionately larger degree of concern over primarily local ecosystems and their relationship with coastal economies. In contrast, others viewed the potentially negative impacts of wave energy to be fairly minimal at the local level, yet significantly positive on a broader global scale.

Well, it's a renewable resource so it's always there because the waves are always...they're not stopping, hopefully. It seems like it's pretty innocuous, what little I know, that it wouldn't harm the environment. So: environmentally friendly. It just seems a little more in harmony with how we live than burning oil or gas. So hopefully there would be less pollution. (Librarian)

Here we find the perception of wave energy as both locally benign and globally beneficial, especially in regards to its ability to displace fossil fuel combustion

as an energy resource. In as much as wave energy was perceived as able to reduce local and regional levels of production, consumption, and dependence on coal or petroleum, it was expected to serve an important role in protecting the planet from the effects of pollution and climate change.

Something's got to happen. They're bringing back coal, which I never thought I would see again, and there goes all the air pollution...I know a lot about what coal does. But that's coming back full blast now and they're saying it's cleaner now. We'll see how that works. But, I can't think of anything dirty about wave energy at this point. I'm excited about it. (Librarian)

We can't keep polluting. Global warming is a real issue, and mankind is involved in it. It isn't just out there. I'm not a believer in "this is just a cyclical thing." So, if we don't start today, we're just another day behind. If we don't start tomorrow, we're two days behind. So, somewhere along the line we are going to have to lessen our use of all these expensive toys and things that we have, and adding one more source of power that is as clean as maybe it can be would work. (County planner)

While the fishing community was identified above as likely being affected the most from wave energy, specifically as a result of lost or degraded fishing territory, many of the fishermen I spoke with fully grasped the broader implications wave energy could have upon on existing national and global energy resource systems.

What we did right away was had a discussion and found an area for experimentation, found an area for doing some testing and threw out the welcome mat. That's very different from what you might think a fishing community would do, which is fold their arms and shake their heads from side to side. We might feel like folding our arms and shaking our heads from side to side, but I think there's enough knowledge, particularly about this issue [renewable energy], that opposing renewable energy would be like opposing children. It's not going to be very popular. (Fisherman)

You know, if you look into it deep enough, if people realize that if the wave energy concept really works for all citizens in Tillamook County, there'll be a realization of a shift toward a more renewable source of energy than energy sources we currently have. So I think that would contribute to the better well-being of the community in an effort to become more sustainable. (Fisherman)

Clean energy: I mean, that's a huge thing. I'm all for alternative energy. I wonder, have they done a carbon analysis of what it takes to produce a wave energy buoy and deploy it? Ethanol's a joke. I don't know how many people know that, but it takes more energy to put into the corn than you get out of it. If it's like that we shouldn't even waste the time or the money talking about it. But, if it could be a viable resource, that's awesome. (Fisherman)

Other responses from the fishing community (including from those participants quoted above) clearly demonstrated a perception of wave energy as potentially posing a significant threat to their occupation and their way of life, and helped illustrate a curious theoretical right within the environmental community regarding wave energy.

We're in an unusual position in the commercial fishing industry relative to this, because we are the conservationists far more than the so-called environmental community. We want to be more careful than they do. They are a little more enamored with the concept of renewable energy. That's my impression. I would hope I'm wrong. That's my impression so far, is the fishing community is more cautious on this issue. I've never seen that before. It's called being part of a working landscape and caring about it. The landscape is a verb to those of us that are in there interacting with it. That's kind of what I see in renewables. (Fisherman)

In contrasting his level of a conservationist ethic to that of environmentalists, this participant highlights an important spatiotemporal distinction between environmental positions with regard to wave energy. Some participants pressed an environmental argument for preserving local marine ecosystems from harmful industrial infrastructure, but others argued that renewable energy was essential in

protecting the [global] environment from the effects of fossil-fuel driven climate change. The result would appear to be that, to the extent that wave energy was perceived as a threat to local marine ecosystems, the positions of certain environmentalists in coastal communities have begun to resemble those of many of the fishermen who consider themselves, as stated in the passage above, a fundamental component of local marine ecosystems as well.

Although some fishermen perceived wave energy as a threat to local ecosystems on the Oregon coast while others viewed it as an opportunity to improve global environmental conditions, most seemed to acknowledge that both were probably true to a certain extent. Few on the coast denied the need to develop a more benign energy resource regime than one based primarily on fossil fuel combustion. Interestingly, some participants, not just fishermen, even speculated as to the potential for wave energy to actually benefit the fishing community—and coastal communities in general—by offsetting the need to restrict the flow of water through the hydroelectric dam system thus protecting young salmon headed downstream and eventually helping to reconstitute regional salmon stocks.

Well, again, keeping in mind that my mind is always working in the capacity of fish, if we were able to lesson our dependence on hydropower and coal-fired plants with a more sustainable use of wave energy, there would be less demand for hydropower. We could operate the hydro power system so that it is more fish-friendly. Some of the clearest examples of how that would benefit fish-friends on the Columbia River are being experienced right now, seeing record returns of sockeye salmon and record numbers of steelhead. It's all really come from proper operation of hydropower projects on the Columbia, the proper flow and spill to push the juveniles down stream. So if we reduce our energy dependence on hydropower and get our needs met through wave energy buoys then I think it would be a better case for

dam-breaching, in some cases, and just proper operation of hydropower projects that would be more fish-friendly. (Fisheries expert)

Wow. Can you imagine what would happen? If you could take this concept and make it work and just take one eighth of the electrical needs away from Bonneville that it has to generate to please so many folks—technology and industry up there—they can probably flood a lot more water. They wouldn't have to dam up so much water. More water could flow through. That would really provide for more fish. That would be awesome. (Merchant)

I should also point out that none of the participants I spoke to that were associated with city or county governments made mention of this “fish-friendly” dam concept. However, that does not mean that they had not considered it. Indeed, it could be the case they have already ruled that possibility out entirely. As I did not specifically include a question to this regard in my interview protocol, I cannot say with certainty how realistic a concept it is or how much it may affect public policy decisions in the future. Thus, while the Pacific Northwest has long been considered a major source of renewable energy by way of its extensive system of hydroelectric dams, many in the region questioned their designation as “renewable” and actually considered them environmentally harmful to both fish species as well to the people that operate them.

I think the costs and the effect of generators—I worked at Hoover Dam for many years, and those generators down there, they're big; and they're huge generators, but they emit a certain amount of magnetic field that affects you. There was always these cautions when we worked down there about that sort of thing, being next to it when it's running, or how close you are to power lines and transformers. They don't know. There was all these studies about how electromagnetic fields from these power plants or whatever, these hydro plants or the power lines causing cancer. (Park manager)

[Wave energy] is not something that is a finite resource that's going to run dry in fifty to a hundred years. If the impact to the environment is low, then there could be a lot of benefits to it. We thought that hydro power was one of the greatest things, and we kind of went a little bit overboard with it and changed our rivers substantially. And, as a result many of our salmon stocks are listed as endangered because of it or in association with those. So, it's not like it's just because it's renewable it's a great thing. We gotta think about the environmental impacts. That's one of the biggest concerns, really. (Biologist)

Still, the potential for wave energy to both harm local ecosystems and to diminish incoming swells constituted major threats to community well-being for many of the people I spoke to. Ecological harm was described in terms of 1) electromagnetic fields (EMF), 2) noise pollution, 3) industrial debris, and 4) habitat disruption. Fishermen were particularly aware of the potential threats posed by EMFs, and many have for years gone to great length to minimize their effects on fish species in the gear they employ.

Crabs are extremely, extremely sensitive to electricity, as are a lot of fish and marine mammals and marine life in general. You can take a zinc out of a crab pot and set it next to a pot that has a zinc in it, and it has a little more electrical field to it and it will catch half as much or none at all. They hate electricity. They absolutely hate it. Salt water and steel creates electricity. Tuna is not really an issue because the tuna are farther off shore, but just as an illustration of how sensitive fish can be—salmon also—you can go and drag around as many jigs as you want in the ocean and never catch a fish if your boat's not grounded properly. It's kind of like this voodoo thing. (Fisherman)

Especially fishermen long familiar with the particular habitat requirements of fish, crab, and non-target species also mentioned EMFs in parallel with other forms of habitat disruption.

There are a lot of things we want to learn about. I'm sure you're familiar with some of the issues such as electromagnetic fields. How great are they? There's a lot of knowledge about electromagnetic fields

per se, Daniel, but there isn't that much knowledge about how it will affect specific animals that are important in this ecosystem. And when it affects one, it's going to affect another. It's not necessarily that simple environmentally, that we're going to put structures in the water. They'll probably attract certain kinds of fish. That's not necessarily all that good. Changing predator/prey relationships is just not necessarily a good thing. In particular, because the initial locations, depths, and bottom types they want to build these on, the most valuable commercial species—i.e. the most valuable food species to the public that owns that space—is Dungeness crab. And, Dungeness crab, unlike rockfish [or] many sea animals, isn't one that seeks structure or hard bottom. It likes mud and soft bottom, the same kind of bottom that they want to anchor these devices in. So, even if it attracts fish, crabs don't want to live there anymore. You have a problem. (Fisherman)

The potential for wave energy devices to sink, drift, or otherwise break free from their fixed moorings was also cited by several participants as posing a significant industrial debris hazard, both to offshore ocean users and inhabitants as well as people and marine life along the shoreline.

I see that there could be some problems too as far as: what if they break free (the buoys)? It gets pretty rough out there, and I imagine that that's all factored in. They've had an instance where one broke free, I think. So I think there's probably a lot more to learn about it. (Merchant)

Well, the crabbing folks will say that the places where you want to locate these, which is zero to three miles out, a lot of that's crabbing ground. And, we have a very strong crabbing industry out of Garibaldi. The other commercial industry, the salmon fishing, they say they troll through these areas and they're worried about the impact it could have in terms of fouling gear. What happens if one of these breaks loose and floats around? They're worried about pollution, those kinds of things. (County official)

Besides the physical impacts of malfunctioning devices, several people also mentioned the potential for properly functioning wave energy devices to create a

significant amount of industrial noise pollution, even to the point of driving marine mammals from their habitat or diminishing the quality of life for coastal residents.

My guess is anything that is required to make the amount of electricity that that's going to do has got to have some hum to it. So it's probably going to be humming away, and we'll probably be hearing it at the beach especially when it's a calm day. Things are flat, sound travels across the water. So that might hurt the tourism. We'll just see.
(Commercial dive operator)

Noise could affect onshore property owners actually. This one kind of wave generation operation that I've seen, they're like these big blowers. The wave energy creates a pressure—a vacuum and a pressure—and that's used to generate the power. But, as I understand it, they're noisy. It's surprising, but when we do wind energy—when somebody wants to put in a wind energy turbine—out in the middle of nowhere, it's not big deal. But, when they want to do it in a rural residential neighborhood, the swoosh-swoosh, or whatever the noise may be, next door becomes an irritant. And let's just go put a wind energy facility off the spit at Salishan. You've got a whole bunch of really high value homes with influential people. And it could be noisy. I'm just trying to give you an example. (County planner)

So, negative effects on beachfront property would appear to potentially arise not just from the visual impacts of wave energy systems but also from secondary audible impacts of their proper operation.

As noted previously, the surfing community feels particularly and uniquely threatened by the capacity for wave energy—as it extracts energy from passing swells—to attenuate wave height thereby reducing swell quality and recreational desirability.

Surfers: alterations in sediment transport, attenuation of wave height, basically interference with the quality and size of the swell...It's kind of hard to understand in a way, but...one of our only places to surf is here at the jetties...and that's why you saw a lot of concern last week with people that go to that area. And so it's like, if you screw that up, then what have you got, you know? So I've never seen any socio-economic

studies on the value of waves and their quality to local surfers, but I think it actually raised some eyebrows. I know that amongst my friends and the people I enjoy this activity with, a lot of them, that's why they live here. (Biologist)

Ultimately, the ability for wave energy technology to benefit coastal communities, or even global communities, was viewed as a desirable option only in as much as it could be shown to be both locally benign and generally more efficient than more polluting energy sources.

Well, I think the benefits, potentially—I don't know the details or what kind of environmental impacts it's going to have, and of course those environmental impacts have to be balanced and compared to: How much energy is that going to produce? And, if we can not produce that much energy via fossil fuel, what is the net reduction in environmental impact? While I fully believe that there will be some type of environmental implication, what is it in respect to the impact of fossil fuel generating that much? If it can displace the need to produce that energy in other ways which are more destructive, then I see it would be a net reduction. So the main benefits could be environmental. I'm hoping they are. (Tour guide)

Economic Impacts: Growth or Myth?

Several major themes emerged regarding the potential impacts of wave energy on the local economies of coastal communities. While some mentioned the potential for economic growth through industrial development, others expressed doubt over the viability of wave energy technology and the resource potential itself. In terms of economic growth, participants described the ways in which wave energy development could help 1) revitalize coastal ports, 2) increase county and state tax revenues, 3) provision for better schools, and 4) enrich wave energy investors.

Ports along the coast have struggled to maintain services after historic declines in both recreational and commercial fishing. Several people in Douglas County even made specific mention that Salmon Harbor, an historically vibrant recreational salmon fishing port just south of Reedsport, had recently been removing unused docks altogether. Wave energy development, in its presumed capacity to employ a multitude of deck hands and dock workers, was expected to bring a significant amount of new business to the ports.

The Port gains as much as anybody, because here comes a new revenue source for all the boats they need and all the equipment they need, staging. If we could get to where we were doing the construction of the buoys, that'd do a lot. (County official)

There's several people around Newport that are really gung ho to get it going because there's no doubt there'll probably be added business to the ports and things like that when you get moving that much equipment and things around. There's bound to be quite a bit of money flowing. (Fisherman)

While it was generally conceded that the ports would stand to gain from the increased industrial activity involved in the construction, transport, deployment, and maintenance of wave energy buoys and infrastructure, there were also a number of participants who skeptically viewed any potential economic growth for ports as minimal or otherwise insignificant in comparison to the economic decline that could result from wave energy harming local ecosystems and displacing existing industries.

I think the ports will benefit, and the ports are not, in my mind, ecologically friendly. The Port of Newport will probably make additional revenue from docking space for the maintenance fleet and whatever. I don't think there's jobs generated. I think it'll be minor jobs. (Biologist)

Participants also seemed to believe that state and county governments would also benefit from wave energy by receiving tax revenues from the sale of electricity generated in their region.

Oregon seems, from what I hear, to be doing well with creating electricity. We sell the surplus to other states. So it would be a money-generating opportunity to bring profits into the state—taxes and stuff like that. (County planner)

I don't know if there's any kind of tax or something that we could locally tap into to help with our own issues here in town or something. I don't know. I haven't really thought about that too much or read anything about it, if there would be some sort of local revenue tax [or] just based on the energy that comes in or something. (Merchant)

While the technical details of an energy tax revenue stream for counties was never clearly articulated in the interviews, there were at least supporting statements from county leaders regarding their intentions to help translate wave energy development into a profitable enterprise for the benefit of local public services.

Beneficially—and we are doing it for the financial side—we're probably going to do a franchising of some kind—a fee. We'll take a cut of the power produced, but that's quite a ways down the road. But, if it's our permit and we're helping guide it, then we're probably going to want a piece of the action. Other counties are doing that with wind power so we're probably going to do the same thing. (County official)

As noted in the previous chapter, most people I spoke to on the Oregon coast viewed wave energy development as the result of non-coastal agency, from industries external to the culture of the coastal socionatural region. Thus, the concept of generating local revenue, as observed in the above interview passage, would seem to reflect the tendency for some coastal residents to seek to exert control over the

development process in an effort to transform a perceived threat into a potential opportunity.

There just isn't enough money to repair all the roads, but if something like this were in place right now, it's like what happens in Alaska right now: every Alaskan gets a certain amount of dividend from the state's oil-related funds. The state gets a certain chunk of money for land-lease, or whatever, done to the...well, it's the same idea for the shoreline. If we had that kind of a thing for the cities or whatever areas that they had it set out for. If the state has a fund like that, the monies then that are dispersed to the communities would obviously allow for a lot more. Again, that, the infusion of money into the area would obviously bring about a lot more changes in the area: better roads, better schools. The money going to the schools would be phenomenal! Because, now all of a sudden you're able to say, "We have the funds. We don't have to tax anybody to get that fund for the schools." Senior services: we're not just talking our little town at this point. We're talking about statewide. (School teacher)

Several other participants also compared the potential to generate state revenues from wave energy development to the current Alaskan policy of dispersing annual dividend checks to its citizens based on profits from oil and mineral extraction in the state. Citing the Alaskan "kicker" as a model for local empowerment, several participants made the case for local governments to at least leverage their natural resource potential for the greatest economic benefit of coastal communities.

I don't see why local businesses and homeowners can't have free energy to exist on, and have these little communities have a little relief for once. And that could either be in the direct energy or in the forms of cash assistance. You look at Alaska and every resident gets how much? How many thousands of dollars per head because the oil is being drilled in Alaska? So we've seen this before. We know this model is in effect. And somewhere in the world—actually right here in the United States—we've made it so before in other places. Why can't we make it so here now? If I were a leader, I'd be going and saying, "Well, how did Alaska negotiate this with the oil companies? What does that look like? What is the process? What does the paperwork say?" So, I think that we need some really strong advocates out there, involved full time.

Whoever's on TIDE or PUD needs to be very, very steadfast about making sure that we benefit greatly from this. (Tour guide)

While the economic impact debate could be construed as a simple difference of opinion over whether or not jobs or tax revenues could be capitalized upon by coastal communities, the degree to which wave energy was pressed as a potential source of economic growth seemed to reflect the degree to which it represented a potential threat, environmentally, vocationally, or otherwise.

I'm basically an optimist. There'd be some level of negative impact on the fishing fleet but not enough to change its essential character. And, hopefully, a larger level of benefit to the larger community, helping promote knowledge and technology toward renewable energy sources that we could use around the planet, a little more research from our facilities at Hatfield, and perhaps a handful of jobs in servicing. But most important wouldn't be the industrial type jobs. It would be the knowledge to help the planet to keep producing the energy it needs to consume. And if we do have high numbers of generators, they better be efficient. If anybody wants bang for the buck, it's the people who are losing the ground that has had fish on it for eons. (Fisherman)

Indeed, while fishermen may have generally expressed opposition to wave energy development, they nonetheless seemed hopeful that if it were commercialized in Oregon it should be as cost-effective as possible producing the most electricity from the smallest area of ocean required.

The concept of technological viability was also called into question by participants who viewed wave energy as more of a threat than an opportunity. Wave energy's resource potential, often lauded by proponents, was called into question by fishermen and others whose working relationship with the ocean shaped their perceptions of reliability of waves as an energy resource.

Well, they say it's renewable energy, and that's neat. I'm not sure it's as viable as solar energy or wind energy. I think those are a little bit more practical because that ocean changes every day and it can get really nasty out there. And some days it can look like a lake, and if it's a lake then they're not going to get their waves, are they? And if they're thirty foot [waves], I think with the water-snake they shut everything down when it gets over a certain height (which is smart). But you're not generating electricity then either. So, I don't know how sustainable it is—I guess would be the word—how reliable it is.
(Fisherman)

Aesthetic Impacts: Gaining Recognition or Ruining the View?

There were both literal and figurative dimensions that emerged from the interview data regarding the potential aesthetic impacts wave energy could have on aspects of coastal community well-being. The first involved the visual impact on the horizon line of the Pacific Ocean as viewed from the shoreline and beachfront properties. The other involved the potential impact on the perceived image of coastal communities by the rest of the world as innovative, progressive, and flourishing.

Besides the aforementioned potential impacts of wave energy systems on beachfront property values, participants also thought that tourism might suffer should the view of the Pacific be significantly industrialized or otherwise altered by the installation of arrays of wave energy generating buoys. People noted that many visitors are drawn to the coast for its scenic beauty.

One of the things that Oregon has going for itself is that 101 falls very closely along the coast, whereas in the state of Washington that's not the case. So the aesthetics of keeping this pristine view of the ocean is probably an economic issue as well as an environmental issue.
(Conservationist)

The down side would be this place would be really screwed up. If there was a wall of buoys out there it would be crummy. And I assume that tourism might suffer. Nobody likes tourists here. But, if you come to the ocean—because Oceanside has only three hotels—so there's not a lot of capacity for people to come here and stay other than, like these folks rent their house out. The people that own that, they don't live there really. So tourism, if you were going to the beach because you wanted to dig holes in the sand you'd have a good time, but if you came to look at the serenity of a peaceful ocean and you see a wall of bobbing buoys you would be sort of un-inclined to come to the beach, right? And so I think it could affect tourism. I have no idea how much, but tourism is a terrific industry. In places like Lincoln City where it's just a wall of motels such, and people go there, and if the ocean was full of bobbing things I don't know if anybody would be that enthusiastic. They'd probably still go, but it wouldn't be as good an experience. (Beachfront property owner)

Likewise, beachfront property owners felt far more personally invested in the Oregon coast than tourists or temporary vacationers and expressed deep concerns over the potential impacts wave energy could have on both their property values and their quality of life.

I can't imagine it would impact the tourist industry I wouldn't see how that would happen, but for those of us that live along the coast it wouldn't impact our source of income but it would seem to have an impact on our quality of life. It's what you're used to. You're used to looking out the window and seeing the ocean. It's just hard to imagine what that might look like, a farm or whatever. So the dollar impact would be attached to the industries that are in place and have been, but the impact of a quality of life—some people don't care about that. They can basically live any place and they don't—it doesn't bother them. But other people it does. (Beachfront property owner)

On the other hand, others I spoke to felt that Oregon could gain national and international recognition as a world leader in developing renewable energy. To the extent that wave energy technology could help to publicize coastal communities as

vibrant and innovative, gaining notoriety on the global stage could lead to future investments of both financial and human capital into otherwise struggling economies.

People are going to come! A “field of dreams” type of deal: they build it and people will come because it’s going to be new. Somebody’s going to come to look at it, and when they come to look at it they’re going to say, “And, this is in Reedsport, Oregon,” and people are going to go, “Wow! I want to see Reedsport, Oregon.” So I think that when you put this in, there’s a spin off for a while because you’re going to get some attention and that attention is generally going to be positive. People are going to want to see that. People are going to see a coastal community as progressive and want to be a part of that I think. If there’s an economic component to it, if jobs are created, then you get somebody coming in to bring their business here. So you kind of get that dual nature of economic growth to the economy going: this is good for the economy and then it brings other people in who create jobs as well. (City official)

It would seem that visual impacts on local viewsheds and superficial impacts on the reputations of coastal communities, represented dimensional polarities along a spatiotemporal proximity continuum: impacts in close proximity to the coast were perceived as threats to both property values and aspects of quality of life, while impacts on global perceptions of coastal communities were seen as opportunities for gaining exposure and attracting investment.

Psychological Impacts: Energy Security or Social Disruption?

Much of what constituted well-being for residents in coastal communities had to do not just with the actual social, political, or economic conditions of the region but with the perceived associations between these conditions which help people to construct both their sense of community and sense of place. The psychological impacts of wave energy development upon the social constructions of community well-being emerged along dimensions of 1) the economic anxiety of increasing

dependence on foreign or unsustainable energy sources and 2) the eventuality of increased social anxiety and intracommunity conflict as traditional lifeways were displaced by newer industries. Each seemed to reflect both the uncertainty surrounding global energy supplies as well as the threats posed to communities by foreign interests beyond their control.

The price of oil reached an all time high of \$147 during the summer of 2008, and its impact was immediate on Oregon's fishing fleet, which had to quickly learn to adapt to paying over twice what they were accustomed to paying to fuel their vessels. As anxiety over fuel prices escalated, energy independence appeared to become a critical component to community well-being on the Oregon coast. The idea that outside forces could exert so much control over local economies was seen a severe disadvantage to protecting the integrity of coastal communities.

If you allow absentee ownership and control over your vital industries, then you've allowed someone to have power over you directly—political, social power—social control. I think we can see this with the big oil companies—Exxon, Mobil, Shell—they've really got us in a stranglehold because we have allowed huge corporations to control vital components of our economy. So locally, what I don't want to see is a huge corporation coming in and, yeah, okay, they invest the money and they should reap the rewards. Yeah, okay, there's some logic in that. But it's still not their waves and it's still not their community.
(Field guide)

As people on the coast reckoned the global oil crisis into their calculus regarding the potential impacts of wave energy development on local control over natural resources and the political limitations of the democratic process, skepticism toward multi-national corporations emerged to symbolize foreign sources of economic greed and social oppression.

It has a lot of potential dark side to it. That's what concerns me is the profit motive. To me it's kind of a dichotomy because you need the profit motive for it to go, but if it gets too profitable then there's all the corruption and greed potential that gets us where we are today in this country pretty much with the oil industry. It's all energy. I have a hard time separating them. (Merchant)

In a sense, wave energy development came to represent a source of resistance to the multi-national petroleum oligarchs, and, given the proper oversight and regulatory due process, could serve to establish a more locally controlled and politically transparent energy generation system. However, while economic and political oppression from outside agencies were of great concern to some, others I spoke to expressed a more targeted skepticism over wave energy technology itself viewing it as a poorly designed exercise in futility that would only result in greater social strife and economic insecurity.

Well, it'll create a fight and a division. I don't know that it'll ever really come to a vote. I don't think the community feels as though they have any opportunity to change their minds. Whoever has that buck to come in here and force that through, I feel that it would create a little bit of animosity, and it'll take some years to get through that. It could take a whole generation. It's similar to the situation we talked about earlier; when IP leaves, it may take one or two generations to get through the adjustment and to embrace the next step. (Merchant)

To the extent that wave energy could displace existing ocean users, some participants expressed a deep concern over the fear that such a possibility might instill in people as they seek to prepare for a worst case scenario.

Near future to me, it's just going to be a bunch of wrangling and arguing and a lot of stress for the people that are involved. And, of course, there'll be a whole lot of people that are just like, "Oh, what's going on? I didn't hear about that." But, in the long term, hopefully it can be a win-win situation. Otherwise, the small communities, it will roll over them. They'll get scared. They'll run, and they'll just become

a burden somewhere else in the state. These folks will just become social services burdens. (Merchant)

A preference for alternative forms of alternative energy also emerged as people concerned with energy security sought to simultaneously protect existing ocean uses. Even oil came to be viewed as less invasive and less destructive to community well-being on the coast.

None of the renewable stuff is [reliable]. Oil is not renewable. It is, but over such a long time-span that we're not going to see it. So you're not using up your other resources, right? (Fisherman)

For me, as an individual, if we were doing it ideally we would go nuclear power, and we would forget all this stuff. We wouldn't have to go do all this. We wouldn't have to take up so much space. To me the tradeoff would be worth it. I think they've got it figured out. (Merchant)

This particular mode of logic reflects a perception expressed to me by a number of participants regarding what they saw as a deluge of environmental propaganda aimed at building public opposition against both potential and existing ocean users.

Down in Yachats here just last week they passed a marine reserve and their total intention was not to preserve fish but to protect their viewshed because they were afraid wave energy buoys might distract their view. Well, bunk. You can't even see them from three miles if you're standing on the beach. They haven't got [a marine reserve], and I doubt they ever will get it. But that's what they were handed a bill of goods. In reality they don't have a clue. They haven't contacted any fishermen. They haven't talked to anybody yet. So there's some people that are pretty well pissed that Yachats went that way, but it was two or three environmentalists that tried to backdoor everything. (County official)

Regardless, a large number of participants felt that wave energy could nonetheless provide coastal communities with an independent and reliable source of

electrical energy, both filling a growing public need and providing for economic stability and resource self-sufficiency.

Energy is one of our top needs, so from that perception I think things would be better assuming in fact that Tillamook County residents could utilize the energy that's generated from wave energy buoys. (Biologist)

Having an electrical generating source that's close to us has got to be a benefit. The closer to the source, the cleaner the electricity. I'm more of a fan of having lots of small electrical companies servicing their small area instead of one big monster sending it all down the line and people paying to get it off because what happens when you have a giant machine rolling, when they giant machine fails it's a bummer for everybody. Let's look at Fannie Mae. (Merchant)

Conclusions

In this chapter, I have described public perceptions regarding the potential impacts of wave energy development on various dimensions of community well-being. It was generally accepted that fishermen would be most affected by wave energy development, but that other groups also stood to be significantly impacted as well, including beachfront property owners and low-income residents. While private developers were most nominated as the appropriate sources of financial support for wave energy development projects, governments—by way of taxpayers—and public/private partnerships were also seen as likely playing a critical role in getting the industry started on the Oregon coast. Once developed, participants viewed wave energy as having significant ramifications for either job creation or job loss, habitat disturbance or environmental remediation, economic growth or economic decline, aesthetic blight or international fame, and energy security or socio-psychological distress. While there was little evidence of broad consensus among any of these

dimensions, each seemed to be clearly associated with spatiotemporal value qualities. In the next chapter, I will examine the perceptions of wave energy development as either a threat or an opportunity based on spatiotemporal valuations. I will also examine potential adaptive strategies cited by study participants for dealing with the effects of wave energy development. By examining the relationship between spatial and temporal perceptions of the impacts of wave energy, I hope to provide policy actors with a means of finding social, economic, and environmental balance when making the difficult decisions wave energy may present.

CHAPTER 8: PUBLIC PERCEPTIONS AND ADAPTIVE STRATEGIES

In the previous three chapters, I discussed some of the ways in which residents from three counties on the Oregon coast have 1) defined community well-being, 2) understood wave energy technology and the development process, and 3) perceived the possible impacts of wave energy on community well-being, respectively. In chapter 3, I described the theoretical framework by which I have analyzed and interpreted the data collected from participant interviews. This chapter presents a conceptual model of adaptive strategies described by participants based on a theoretical framework combining opportunity-threat analysis and spatiotemporal orientation and centered around the five dimensions of wave energy impacts: psychological, vocational, economic, aesthetic, and environmental. These dimensions of impacts also appear to map onto previously discussed dimensions of community well-being—social, political, and environmental—as will be demonstrated below.

Spatiotemporal Orientations Toward Opportunities and Threats

Gramling and Freudenburg (1992) identified three socially relevant phases in the development process of large scale projects: the active development phase, the post-development phase, and the often lesser studied pre-development, or “opportunity-threat” phase, so named as the period during which adjacent communities begin to form perceptions of projects as either opportunities or as threats. While direct observation of environmental and economic changes during active and post-development stages had generally dominated the field, they asserted that critical social changes begin taking place as soon as developers and local leaders make their

project proposals known to the public. Wave energy development is currently in the pre-development phase. Proposals for preliminary projects continue to be discussed and debated in numerous public forums including administrative meetings, industry conferences, and newspaper editorials.

Participants in this research project viewed wave energy development as either an opportunity or a threat to community well-being, and I believe that the ways in which they perceived wave energy were influenced by their particular spatiotemporal orientation regarding the various potential impacts of wave energy on community well-being. Some people expressed *proximal* spatiotemporal orientation by describing wave energy's impacts on community well-being in terms of *local* resources and historical or *current* socionatural systems, which were positively associated with the perception of wave energy development as a *threat*. Others expressed *distal* spatiotemporal orientation by describing wave energy's impacts on community well-being in terms of shared *global* resources, the need for alternative energy sources, and *futuristic* socionatural systems, and tended to view the wave energy development process chiefly as an *opportunity*.

It does not, however, follow that participants ignored or devalued issues or objects of alternate proximities. For example, while participants were as likely to express equal *concern* with aspects of both local and global environmental health, their spatiotemporal *orientation* regarding wave energy may have framed their perception of it as either more of an opportunity or a threat. Of course, some participants, regardless of concern or orientation, may nonetheless have been unable or

unwilling to fully commit to framing wave energy as either opportunity or threat due to a perceived lack of information. Regardless, participants from both viewpoints described adaptive strategies which corresponded to each of the five dimensions of potential impacts of wave energy on community well-being, thus resulting in ten distinct adaptive strategies, each with corresponding tactics for achieving strategic goals.

Adaptive Strategies to Wave Energy Development

Participants described both the strategies and the tactics for adapting to wave energy development in terms of the various potential impacts on community well-being, including environmental, aesthetic, economic, vocational, and psychological impacts as described in chapter 7. It should be noted that participants in this project did not necessarily describe specific strategies that they themselves would take or that they would necessarily advocate, but rather some of the possible strategies that could be taken to adapt to technological and social change. Each of the *adaptive strategies* described in this section corresponds directly to a perceived opportunity or threat, as illustrated in Table 5 below.

Table 5 - Adaptive Strategies by Opportunity-Threat to Dimensions of Community Impacts

Dimension	Opportunity Perception	Threat Perception	Adaptive Strategy (O)	Adaptive Strategy (T)	Behavioral Tactic (O)	Behavioral Tactic (T)
Environmental	Greener alternative	Ecological disturbance	Prevent carbon-related climate change	Preserve marine habitat	Endorse renewable energy projects	Oppose marine industrial development
Aesthetic	International recognition	Scenic blight	Gain media exposure	Protect beachfront property value	Establish press and web presence	Petition local leaders to relocate projects
Economic	Economic growth	Media skepticism and developer distrust	Attract professionals and investment	Critique environmental propaganda	Provide incentives and subsidies	Endorse wave energy alternatives
Vocational	Job creation	Lost jobs in fishing and related industries	Promote wave energy development projects	Defend existing ocean use	Expedite permitting process	Control development process
Psychological	Energy security	Social disruption	Produce locally consumed energy	Support community networks	Cultivate public-private partnerships	Endorse existing ocean use

The *behavioral tactics* described here are neither representative of any single dimension nor mutually exclusive of one another, but are rather more loosely associated with a variety of participant perceptions as some behavioral tactics may apply toward achieving multiple adaptive strategies, but are listed here and in Table 3 simply as *exemplar* concepts within each category. For example, “opposing marine industrial development” is described as a behavioral tactic toward achieving the adaptive strategy “preserve marine habitat.” But, because of the conceptual and practical overlap between environmental and aesthetic impacts, the tactic “opposing marine industrial development” may also serve to further a strategy to “protect beachfront property value” from the threat of scenic blight.

Environmental Impacts

Participants viewed potential environmental impacts of wave energy both locally and generally. On the one hand, some people perceived industrial development in near shore waters as a direct threat to critical marine ecosystems, and sought to implement a strategy of preserving marine habitat by opposing wave energy on the grounds of biophysical preservation.

Others viewed wave energy as an important alternative form of renewable energy production, and have adopted a strategy of preventing the effects of carbon-related climate change by endorsing renewable energy development projects aimed at displacing fossil-fuel energy systems. As described in chapter 3, aspects such as topophilia (love of place) and a healthy environment were associated with the social dimensions of community well-being, and threats to these social values were perceived from a proximal spatiotemporal orientation. In contrast, environmental opportunities from wave energy were perceived at a more distal or generalized level, with global locales and future climate systems forming the basis of key positions.

Aesthetic Impacts

Several participants viewed wave energy as an opportunity for rural coastal communities to achieve international recognition as technology leaders, and sought to gain media exposure by establishing and expanding their presence in both the mainstream press and on the internet. For these participants, it was important to cultivate an international aesthetic of progressivism and innovation.

For others, the aesthetic dimension of wave energy was perceived as a direct threat to local scenic beauty and to the appreciation of adjacent beachfront properties. To protect the value of these properties, participants sought to mitigate and diminish the aesthetic impacts of wave energy facilities by petitioning local leaders in such a way as to prevent project development in close proximity to popular residential and recreational beachfront areas. The aesthetic dimensions of wave energy impacts overlapped and incorporated both environmental and economic dimensions of the concept of community well-being.

Economic Impacts

The tendency for wave energy to be perceived as an opportunity for economic growth was positively associated with the description of a strategy aimed at attracting talented engineering professionals and technical experts as well as financial investments from around the world. This perspective reflected a desire to provide incentives and subsidies to wave energy developers as a means of encouraging national and international companies to expand their business interests to the Oregon coast.

However, the flow of economic benefits from wave energy described in the narratives of mainstream media sources were often viewed with high levels of local skepticism, and were framed as either “environmental propaganda” or simply as deliberate misinformation aimed at enriching only a small number of powerful vested interests. These participants viewed claims of economic growth through a lens of developer distrust, and countered with an emergent strategy offering a rational critique

of the perceived economic and environmental propaganda by endorsing renewable energy alternatives to wave energy including wind power, nuclear energy, and even other more allegedly benign forms of wave energy such as oscillating water-column technology.

Despite passionate differences of opinion over the economic ramifications of near-shore development projects, there appeared to be fairly widespread agreement on the potential economic benefits of expanding Oregon State University's academic research presence in communities on the coast. Even if never commercially implemented locally, wave energy technology research and testing could still serve to provide the coast with a rich source of academic, financial, and social capital. More importantly, this is perhaps the clearest example of an exception to the opportunity-threat perception trend noted throughout this and other chapters: academic research is an opportunity for local institutions now and in the near future.

Vocational Impacts

Many participants viewed wave energy as a critical opportunity to create jobs in coastal communities at a time when jobs seemed to have been especially scarce due to declining natural resource extraction industries. Because the bureaucracies associated with the federal permitting process were often perceived as cumbersome and expensive—even if only marginally understood in detailed technical terms—proponents offered strategies for promoting wave energy development projects by expediting the permitting process and otherwise minimizing the political obstacles slowing the development process. Several development companies had successfully

filed for preliminary permits in Douglas County, and were in the process of negotiating settlement agreements with community leaders.

Other participants, especially those with historic associations with sport and commercial fishing families in Oregon, viewed wave energy development as a direct threat to what they viewed as the single most important sector of local jobs on the coast in its capacity for creating both navigational hazards and adverse environmental conditions for target species such as Dungeness crab. Fishermen and local leaders described strategies for defending historical and existing ocean uses from what they had been experiencing as fast-tracked development initiatives in an exceedingly loosely regulated political process. They therefore sought to control the development process instead, and filed for preliminary permits from FERC in advance of developers' attempts to do so. Lincoln County's initial application was denied as too broad in geographic scope, but Tillamook County's application to explore wave energy resource potential in key locations was approved. Both sought to leverage wave energy's vocational potential to their constituency's advantage, unwilling to fully trust private developers and federal regulators to sufficiently provide family-wage jobs to locally impacted communities.

Psychological Impacts

When wave energy was perceived as an opportunity to achieve long term energy security from distant and unpredictable market forces, a strategy emphasizing localized energy production to fill local energy demand encouraged the cultivation of partnerships between public entities and private developers. Alternately, wave energy

was sometimes perceived as a threat to the social fabric of coastal communities and as a source of divisive confusion over the actual drivers behind and potential localized effects of wave energy development. In these instances, a strategy emerged focusing on bolstering community networks by endorsing historic and existing ocean uses, in particular recreational and commercial fishing enterprises.

Perceptions of the psychological dimensions of wave energy impacts reflected degree to which community well-being was defined in social terms. To the extent that social dimensions of community well-being were framed in terms that included achieving energy independence from unseen foreign entities, wave energy development was seen as an ameliorative process, an opportunity. At a more proximal spatiotemporal orientation, the potential for wave energy to locally disrupt existing social networks represented a threat to the social dimensions of well-being.

Limitations and Recommendations

This project relied solely upon data gathered from semi-structured interviews over five months in three coastal Oregon counties. While providing rich qualitative data during a distinct historical period, my findings were not representative of coastal communities. Given the limited amount of time and resources with which I collected data, I no doubt excluded many other insightful public perceptions, which could have helped inform and refine the interpretation of the findings. On more than one occasion, a potential participant who had been highly recommended by others as capable of providing unique insight or perspective on the subject, declined to participate for any number of personal or professional reasons.

Future research would do well to incorporate additional methods of data collection, both qualitative and quantitative. Focus groups could help verify and clarify assertions of correlation between perceptual spatiotemporal orientation and opportunity-threat perception. Participant observation could help further articulate critical distinctions between and similarities among participants of differing particular orientation.

Conclusions

Although participants for this study were sampled on the basis of stakeholder group, such categorizations did not serve to predict or characterize particular perceptions or attitudes regarding wave energy. For example, government officials from up and down the coast expressed distinct and independent positions based on strong community ties and personal experiences. Retirees differed greatly as to their level of support for wave energy, and gave divergent reasons as the bases for their opinions. Likewise, there was no evidence to support there being any significant differences in attitudes between counties along the Oregon coast. Again, the high levels of heterogeneity among participants in each county resulted in relative homogeneity across counties. Differences that did arise among stakeholder groups or among counties appeared to fall along the opportunity-threat divide. All participants expressed a deep concern for the well-being of their communities. However, some were more oriented toward local systems which could potentially be affected by wave energy in the near term while others were predominantly oriented toward larger-scale systems which could potentially be influenced by wave energy in the long term.

I assert that this aspect of personal orientation, more than any other factor measured in this study, is directly related to the degree to which residents in coastal communities perceive wave energy as either an opportunity or a threat. There is yet insufficient empirical evidence to fully support a theory of perceptual spatiotemporal orientation as a determinant of public perception in the opportunity-threat stage of wave energy development projects. But, there is ample reason to explore its policy relevance through continued qualitative and quantitative research initiatives. Impacted communities may differ internally regarding particular perceptions of projects during the pre-development stages, but opportunities were most often described in terms of future impacts involving global systems while threats were generally associated with immediate impacts to local systems.

Local and state governments must balance key policy decisions regarding wave energy by weighing immediate impacts against future outcomes, and it is my hope that this study has provided a snapshot of public perceptions of locally impacted communities during a portion of the opportunity-threat stage of wave energy technology. Policy makers are expected to navigate between the spatiotemporal poles of both opportunity and threat perceptions, and stand to gain valuable perspective from a richer appreciation of the human dimensions of wave energy. By acknowledging the significance of the spatiotemporal orientations of both themselves and their constituencies they can continue to administer just representative governance and develop effective natural resource policies.

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