UNIVERSITY OF CALIFORNIA
SANTA CRUZ

OLD SAWS AND NEW LAWS:
REGULATORY FAILURE AND OWNERSHIP TRANSFORMATION IN THE NORTH COAST REDWOOD TIMBER INDUSTRY

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

ENVIRONMENTAL STUDIES

by

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September 2015

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ABSTRACT

Old Saws and New Laws: Regulatory Failure and Ownership Transformation in the North Coast Redwood Timber Industry

Sarah G. Carvill

American environmental politics has long been bedeviled by the popular belief that protecting ecosystems inevitably leads to the devastation of primary industries, but the relationships among public policy, industry change, and environmental outcomes are complex and not well understood. This dissertation examines these interactions using the North Coast redwood timber industry as a case study. Though regulations governing timber harvesting on private land in California are considered some of the toughest in the nation, sediment pollution from forest management is the leading cause of impairment in the rivers and streams of the North Coast. I analyze the reasons state Forest Practice Rules failed to protect aquatic resources; the drivers of recent changes in both timberland ownership and public policy; and the strategies new redwood timber companies are using to manage regulatory obligations and avoid direct targeting by activists. I argue that both regulatory failure and policy change are best understood as products of an ongoing struggle over whether regulation of the timber industry should be based on firms' compliance with prescriptive rules or on the actual environmental outcomes of forest management. Divestment from the region was

driven by restructuring in the U.S. forest products industry— not the cost of compliance with environmental policy.

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the unwavering support of my committee, Daniel Press, Tim Duane, and Greg Gilbert. Daniel sent (or maybe pushed) me out of the Environmental Studies nest to do my first research interview nearly ten years ago; he believed in me then and has ever since— and, importantly, he told me so on the bad days. Tim seemed to grasp why I had come to graduate school when I took his class in my second quarter in the program, and he used that understanding to point me back in the direction I wanted to be going whenever I got turned around (which was often). Greg got me into the lab and into the forest, and patiently guided me to an appreciation of ecology that I didn't anticipate I would gain in the process of getting a Ph.D. It has been a privilege to work with each of them, and a lot of fun, too.

I am also indebted to other members of the Environmental Studies faculty— and three in particular who provided a lot of guidance and support along the way. Jeff Bury is unquestionably the chair of this "shadow committee": He taught me methods and Marx and listened to me describe, in excruciating detail, everything that I did wrong at every stage of my research (somehow managing never to appear either shocked or dismayed). Zdravka Tzankova gave me a job my first two years in grad school and also did more than her share of listening in the last two— usually over really good food. Andy Szasz brought social theory to my reading list (and eventually even my iPod) and provided lots of encouragement and good conversation.

I am grateful to my fellow "Presslets", particularly Peter Brewitt and Annie Drevno, who overlapped with me for five and four of my six years in the lab (respectively), and were also my officemates during that period of time. They have given me much to think about and much to laugh about, be it flying the big plane of environmental politics or running in the campus pool. I will always be grateful for their friendship and deft tortilla chip-boring skills— #plbl. All my labmates in the Press, Gilbert, and Tzankova groups have provided thoughtful and constructive feedback on many very long and very rough drafts (despite "outliney bits"). The Environmental Studies staff— especially Lisa Birney, Kathy Harley, Marissa Maciel, Maria Ruby, Terry Seehart, and Lin Weyers— have helped me avert countless small disasters over the years, and deserve a lot of credit for making the department feel like home.

Of course, many people helped me with my research. Lucia Orlando dug up everything from forty year old Senate committee reports to historic stock price data to discontinued census tables— and never once made it seem as though doing so was anything other than a pleasure. My research assistant, Caitlin Jetter, was equally cheerful about going through literally years of Regional Board meeting minutes and (on one occasion) spending the better part of a day shut in an office park in San Luis Obispo, Xeroxing hundreds of pages of Region 3 staff reports. Barry Nickel and Aaron Cole did things with maps that would have taken me years to figure out how to do on my own; Sandy Dean, John Corbett, and John Laird and his staff helped make crucial

interview contacts; Richard Stone, Max Holvik, and Chip Pyfer gave me a crash course in alternative investments; Bill Stewart at U.C. Berkeley read my excessively long prospectus and made sure I knew enough about forestry that I wouldn't get laughed out of any of my interviews; the North Coast Regional Water Quality Control Board staff was endlessly patient with my requests for documents and old cassettes. My best running buddy, Melanie Michalak, was kind enough to get a job at Humboldt State and then let me stay at her house in Arcata, rent free, for what probably added up to a period of several months. I am also indebted to the many people allowed me to interview them for this project— for their time and especially for their candor. Out of respect for the latter, I cannot name them individually, so I will simply say that I am deeply appreciative, irrespective of whether or not our perspectives align.

I also acknowledge— with immense gratitude— the U.S. Environmental Protection Agency Science to Achieve Results Fellowship and the UCSC Environmental Studies Department, which provided funds for this research.

And of course, I am thankful for the support of my family and friends. In particular, I would like to acknowledge Veronica Yovovich and Sara Lewis— colleagues who became my best friends as soon as I met them here, and who have managed to make even the most grueling aspects of graduate school into some of my fondest memories (see, e.g., Norway, parrot piñatas, and "sunsets" at all hours of the day). The Santa Cruz Track

Club— especially Hallie Carl, Greg Hales, Trinity Magas-Barnard, Rob Mullis, Arturo Rodriguez, and the aforementioned Melanie— has been an integral part of my life since I stumbled onto the Soquel High School track in college.

Most importantly, my parents, Jane Gardner and Wynne Carvill, have been phenomenally supportive despite my best efforts to discourage them at every turn. It should also be mentioned that my dad both let me use his house in Mendocino, and watched my puppy while I was doing fieldwork in Humboldt. In addition to being one of the kindest and most patient people in the world, my mom found at least ten dropped articles and several embarrassing misspellings in what would otherwise been the final draft of this manuscript. And of course, my thanks to Juneau, whom I am looking forward to taking on more frequent and much longer walks.

CHAPTER 1

"THIS IS THE DEEP NORTH": AN INTRODUCTION TO CALIFORNIA'S NORTH COAST AND THE REDWOOD TIMBER INDUSTRY

Introduction

The redwood forests of the Pacific Coast are a world-renowned example of natural beauty and the inherent worth of biotic communities; they are also a valuable timber resource that has made California's northwestern counties the leading producers of lumber in a major timber-producing state. In the 1990s, the intrinsic and use values of *Sequoia sempervirens* collided spectacularly in the protests of the Redwood Summer, the "Timber Wars" over logging in Mendocino County, and, later, direct actions aimed at saving Pacific Lumber Company's (PALCO) Headwaters Forest— one of the last large, privately-owned stands of old growth redwoods in the world. Following on the heels of the spotted owl controversy and the adoption of the Northwest Forest Plan, which dramatically curtailed harvest on federal timberland in Oregon, Washington, and Northern California, these protests raised the specter not only of wrecked ecosystems, but also of out-of-work loggers, as industry argued that protecting old growth would lead to reduced cut and more mill closures (see Harris 1997; Widick 2009). In 1996, the federal government began negotiating with the owner of PALCO's parent company, Maxxam Inc., to purchase the ancient trees of Headwaters, and the issue faded from the news cycle, leaving behind the open question of whether and how industry and ecosystems might coexist in the redwood region as a whole.

Beneath this controversy lay two assumptions about the role of public policy in natural resource management. First— and most overtly problematic— was the assumption that increasing regulation of forest practices would fatally undermine the economic viability of the North Coast timber industry. A second, and perhaps equally troubling assumption was that such regulation, if adopted, would actually safeguard the attributes of coastal forest ecosystems that advocates sought to protect. This dissertation examines the evolution of both the redwood timber industry and public policy affecting private timberland in California in relation to these two expectations, demonstrating that neither one accurately characterizes the relationships among industry, government, and environmental outcomes that have emerged on the North Coast since the adoption of major state and federal environmental statutes in the early 1970s. Though changes in the redwood timber industry in the late 1990s and early 2000s were superficially consistent with simplistic models of how environmental regulation affects regional economies, ownership turnover and declines in production were actually driven by restructuring of the timber industry at the national level— not efforts to protect ecosystems through public policy. Meanwhile, the notorious extensiveness of regulation affecting private timber harvesting on private land has not translated to desired environmental outcomes in the past— and may fail in this respect again in the future— because the design of both timber and water quality regulatory programs have tended to emphasize compliance with best management practices over environmental performance. This has happened in part because policy outcomes are genuinely

difficult to measure in the timber context, but the result— an exhaustive list of requirements for private industry— has often worked to the benefit of timber companies politically.

Background

The linked stories of industry change and policy failure in this particular region are relevant beyond the redwoods; they also speak to a popular narrative that has emerged to characterize the drivers and consequences of linked economic, demographic, and ecological changes in the rural U.S. West. This storyline, bolstered by media accounts of prominent environmental controversies, holds that as an increasingly affluent, urban American public has recognized the ecological and amenity values of the region's vast open spaces, concern about environmental quality has been institutionalized through regulation of primary industries that have historically dominated rural areas— spatially, economically, and culturally. As these regulations are implemented, operating costs for industry increase, making it more difficult for firms to compete with producers in areas where environmental regulation is absent, minimal, or unenforced. The story ends in the decline and eventual disappearance of primary industries, often accompanied by social dislocation in resource-dependent communities, and conflict between long-time residents and new migrants attracted by now-protected environmental amenities (Hays 1989; Smith and Krannich 2000; and see, e.g., Egan 1994; Turque et al. 1991).

It is reasonable to expect that the recent history of the timber industry and its associated communities in California's redwood region would follow these contours. Fast-growing, rot-resistant redwoods have high commercial value, but they are also a "charismatic" species that can reach superlative proportions over lifespans measured in centuries. Activists have defended them since the turn of the 20th century, with some early preservation associations operating continuously from the 1900s to the present day (Pincetl 1999, 41-46; Schrepfer 1983). In recent decades, groups of residents in the major timber-producing counties of northwestern California have organized to monitor and vocally protest harvest activities they regard as excessively damaging.[1] Critics have long claimed that the state's timber regulators are controlled by the industry, but landmark court cases in the 1970s led to a restructuring of the Board of Forestry, the establishment of comprehensive Forest Practice Rules (FPRs), and requirements for environmental review of Timber Harvest Plans (THPs). Those rules have been expanded significantly over the last forty years, and industry representatives have long insisted that California's FPRs are more stringent than those in other major timber-producing states (Emmerson 2011; Gasser 1996; Melo 1984; Pincetl 1999, 164-168, 202; Thompson and Dicus 2005). More recently, the federal Endangered Species Act has been deployed as a brake on old-growth logging, and the state legislature has

[1] Examples include major environmental groups such as the Environmental Protection Information Center (EPIC), based in Arcata, as well as a number of smaller, watershed- and community-based groups such as Albion River Watershed Protection Association/Friends of Salmon Creek, the Campaign to Restore Jackson State Redwood Forest, Coast Action Group, Friends of the Gualala River, the Mattole Restoration Council, and the Mad River Alliance. Umbrella organizations that network these smaller

expanded the authority of water quality control agencies to regulate the timber industry.

As the 20th century drew to a close, harvest levels in the redwood region did drop, mills closed, and employment in the timber sector declined, but Humboldt County continued to cut the most board feet of timber in the state, and California maintained its status as one of the top producers of softwood lumber in the country (Morgan et al. 2012, 5). Two major, vertically integrated forest products companies divested their North Coast forests and mills, and another large landowner in the region filed for bankruptcy, but the properties were purchased by other timber companies and are still used for timber production. Even the fate of the Headwaters Grove fails to align with simplistic stories about the rise of environmentalism and the fall of extraction: The trees were spared when Congress and the state government paid to purchase them—not because cutting them down would have crossed newly-established regulatory lines.

The persistence of California's timber economy— and of redwood logging particularly— diverges in many ways from expectations about primary industries in the Western U.S., but it is consistent with the findings of existing studies of economic change in the region (Beyers and Nelson 2000; Robbins et al. 2009; Smith and Krannich 2000; Winkler et al. 2007). Throughout the West, "new" economies based on the amenity value of rural areas exist alongside natural resource industries that are changing, and in

some cases shrinking, but which are also far from gone. And while popular discourses continue to pit ecosystem protection against rural livelihoods, it is also broadly clear that the relationship among environmental values, environmental regulation, and economic change is not as straightforward as many observers claim or assume it to be (Freudenburg, Wilson, and O'Leary 1998). How these forces actually do interact is less well understood.

Overview of the Study Area

For the purposes of this dissertation, the term "North Coast" refers to the four northernmost coastal counties of California— Del Norte, Humboldt, Mendocino, and Sonoma— while the "redwood region" refers to the trees' range as a whole. *Sequoia sempervirens* are found along the western flank of California, from forested canyons in Monterey County to the Oregon border, about as far inland as the coastal fog penetrates (Figure 1.1).[2] The San Francisco Bay Area interrupts this narrow band of big trees, effectively isolating the significant timber endowment of the North Coast from the patchwork of redwood parks and small, privately held forest plots— commonly referred to as "nonindustrial" timberlands— that comprise the southern reach of the redwood range. Commercial timber management still occurs on the periphery of a few urban counties in the Bay Area, and also on the Central Coast, where nonindustrial ownerships concentrated in the Santa Cruz Mountains feed Big Creek Lumber

[2] The exact nature of the relationship between the redwood range and fog extent is still a subject of study (see Burgess and Dawson 2004; Dawson 1998).

FIGURE 1.1 REDWOOD FOREST EXTENT

Source: FRAP 1986 via Steve Norman

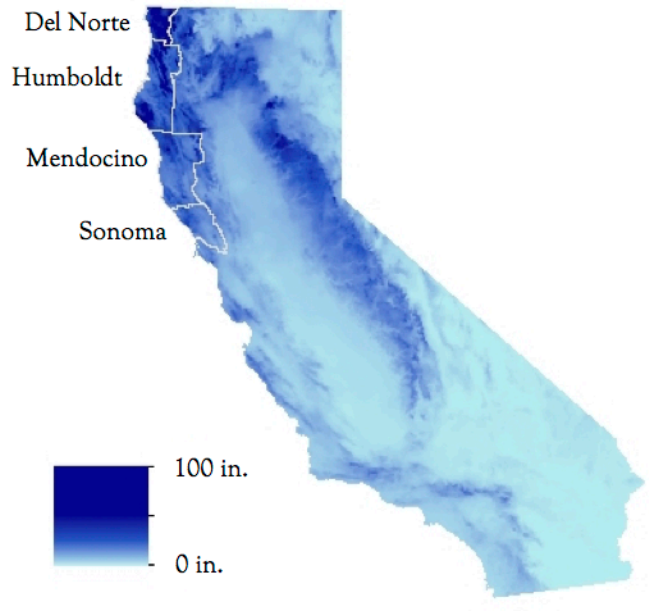
Company's Davenport mill— the only remaining redwood processing facility south of San Francisco (California Board of Equalization [BOE] 2015; California Forestry Association and Paul F. Ehinger Associates 2013). Taken together, however, the Bay Area and southern portions of the redwood range contributed less than 1% of the state's total timber harvest in 2013 (BOE 2015).

In contrast, Del Norte, Humboldt, Mendocino, and Sonoma Counties contain 2.7 million acres of private timberland, 556,000 of which are primarily redwood or redwood/hardwood forest type (Waddell and Bassett 1996, 17-18). Harvest from the area in 2013 amounted to nearly 394 million board feet, or 24% of the total harvest for the state. Since redwood logs command a high price relative even to other softwoods, those four counties accounted for a third of the value of the statewide harvest that same year (BOE 2015).

Geography, Population, and Employment on the North Coast

The North Coast is rugged and rural. Three tectonic plates converge on the northern Mendocino Coast, contributing to the dramatic pitch of the Coast Ranges in the area, as well as high seismicity— even for California. Geologists consider Humboldt County's King Range notable for its rate of uplift (Merritts and Bull 1989), while heavy rains accelerate erosion. Annual precipitation averages around 41 inches for the entire hydrologic region (California Department of Water Resources 2015), but along the coast, it is not uncommon for weather stations to log rainfall rates more than double that amount (Figure 1.2). California's famed Route 1, which hugs the Pacific shore from San Diego to Mendocino, turns inland just north of Ft. Bragg and joins U.S. 101; it is often said that the California Department of Transportation deemed the next

FIGURE 1.2 ANNUAL AVERAGE PRECIPITATION IN CALIFORNIA, 1981-2010



Source: PRISM Climate Group

eighty miles of coastline too rugged for a highway.

Remoteness may have been as much of a factor in this decision as ruggedness, however. The unrivaled population center of Del Norte, Humboldt, and Mendocino counties is Eureka, a city of 27,000 situated on the edge of Humboldt Bay— five hours from San Francisco by car. If one were to leave Eureka in the other direction, it would take seven hours to reach Portland, Oregon. The Bay Area is thus the North Coast's only obvious metropolitan reference, and the four counties reflect an almost perfect gradient of urban influence (Table 1.1). Furthest to the south, Sonoma is technically considered part of the Bay Area. It is the only North Coast county with a higher median income

TABLE 1.1 KEY CHARACTERISTICS OF NORTH COAST COUNTIES

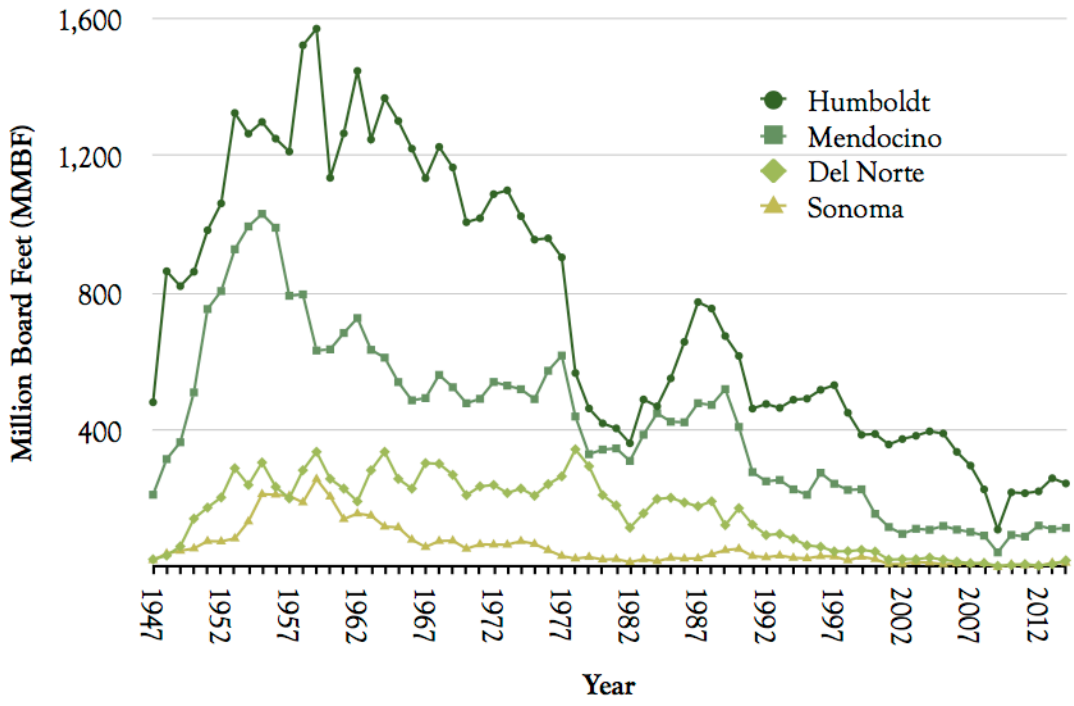
	Del Norte	Humboldt	Mendocino	Sonoma	California
Population*	28,610	134,623	87,841	483,878	37,253,959
Percent rural*	33.7%	29.8%	45.2%	12.4%	5.0%
Percent change, April 2010 – July 2013*	– 2.6%	– 0.1%	– 0.7%	2.3%	2.9%
Persons per square mile*†	28.4	37.7	25.1	307.1	239.1
Population of largest city*	7,643 *(Crescent City)*	27,191 *(Eureka)*	16,075 *(Ukiah)*	167,815 *(Santa Rosa)*	3,792,621 *(Los Angeles)*
Median household income*‡	$37,909	$41,426	$43,469	$63,356	$61,094
Percent below poverty level*‡	21.8%	20.4%	20.0%	11.9%	15.9%
Median price of existing homes sold, 2014§	n/a	$250,000	$307,000	$445,000	$457,255

All data 2010 unless otherwise noted. * U.S. Census Bureau 2010a-c; 2013a-b; 2014 † California Department of Finance 2009; U.S. Census Bureau 2010b ‡ 2009-2013 average § California Economic Development Department 2014

and lower poverty rate than the state as a whole, and the only one that did not lose population between 2009 and 2013. Its county seat, Santa Rosa, is the largest city between San Francisco and Eugene, Oregon. Both median income and population growth rate drop as one moves north into Mendocino, Humboldt, and finally Del Norte County, where nearly 22% of the population lived below the poverty line in 2010 (U.S. Census Bureau 2013b).

Timber harvesting was historically the leading industry in Del Norte, Humboldt, and Mendocino Counties, but harvest levels peaked in the late 1950s (Figure 1.3). By 1970 services had eclipsed employment in the natural resource industries and

FIGURE 1.3 NORTH COAST HARVEST VOLUME BY COUNTY, 1947-2014



manufacturing, and the proportion of the workforce in the latter sector has continued to decline (Figure 1.4); the education, health care, and social assistance sector now employs the greatest share of the civilian employed population in all four counties (Table 1.2).

Timberland Ownership in the Redwood Region

Timberland ownership patterns in the redwood region differ from California's interior in two important respects.[3] First, most of the coastal forest is privately owned. In 1994, 20% of the timberland on the North and Central Coasts was managed by public agencies. For the rest of the state, the figure is closer to 65% (Waddell and Bassett 1996, 17). Logging on North Coast public lands had been in decline even before the implementation of the Northwest Forest Plan in 1991, and dwindled further in the late 1990s (BOE 2015). Now public land typically accounts for less than 1% of the annual harvest volume in the North Coast counties (BOE 2015).

The redwood region is also relatively unique in the proportion of private timberland controlled by smallholders (Table 1.3). On the North Coast, the Forest Service estimated that "nonindustrial owners"— defined as individuals or businesses holding

[3] Timberland is defined by the U.S. Forest Service and the California Fire and Resource Assessment Program (FRAP) by growth potential (20 ft^3 or more of industrial wood per acre per year) and by its administrative status; it does not include land in reserved status (e.g., federally-designated wilderness, National Parks, and National Monuments) or that is not available for timber production "by statute, ordinance, or administrative order" (see, e.g., FRAP 2003, A-17; Laaksonen-Craig, Goldman, and McKillop 2003, 1; Christensen, Campbell, and Fried 2008, 102).

FIGURE 1.4 NORTH COAST EMPLOYMENT (SELECTED SECTORS), 1970-2010

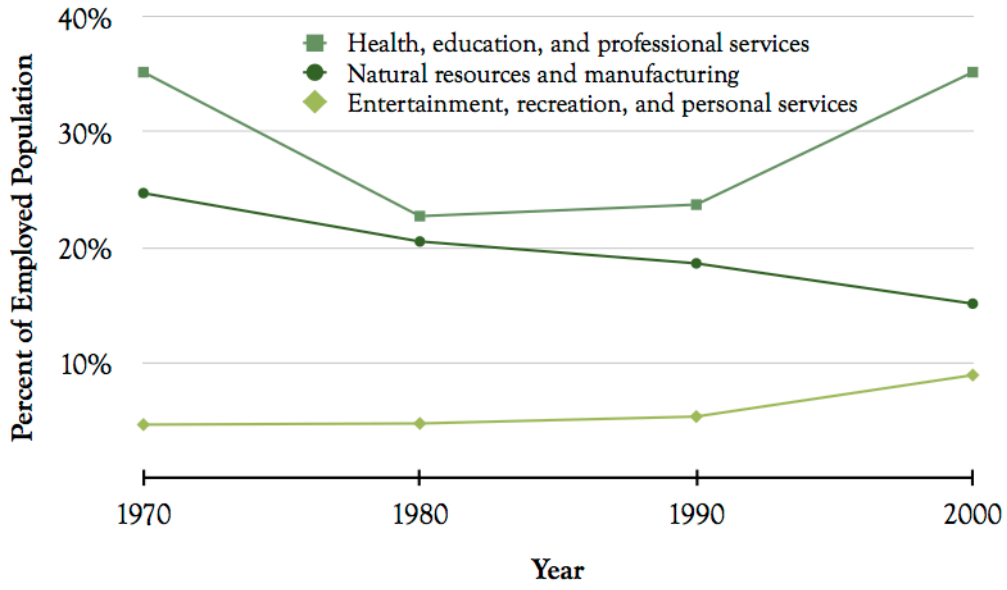


TABLE 1.2 EMPLOYMENT AND CHANGE BY SECTOR ON THE NORTH COAST

	Del Norte	Humboldt	Mendocino	Sonoma	California
*Percent of employed population in sector, 2009-2013**					
Agriculture, forestry, fishing, hunting, and mining	4.0%	4.1%	6.1%	3.1%	2.3%
Education services, health care, and social assistance	26.3%	25.3%	21.6%	20.9%	21%
Change in employment, 1990-2010[†]					
Logging and mining[‡]	– 67%	– 43%	– 71%	– 60%	– 26%
Leisure and hospitality	– 12%	24%	12%	49%	36%
Harvest volume[§] *(MBF)*	6,680	218,651	94,724	8,902	1,160,588

* U.S. Census Bureau 2013b [†] California Employment Development Department [‡] Data for logging only (i.e., independent of mining) is only available at the state level; the percent decrease over the same time period with mining excluded would be 65%. [§] California State Board of Equalization

less than 5,000 acres and no milling facilities— manages nearly half of the region's private timberland. In contrast, nonindustrial smallholders own less than 38% of private timberland in the state's interior (California Department of Forestry and Fire Protection [CALFIRE] 2003, 5; Waddell and Bassett 1996). In 2002, 143,529 acres of North Coast forests were managed under 313 Nonindustrial Timber Management Plans (NTMPs)— California's alternative timber harvesting permit for smallholders. These numbers make up 68% and 67% of the statewide NTMP program totals, respectively (CALFIRE 2003, 16-17).

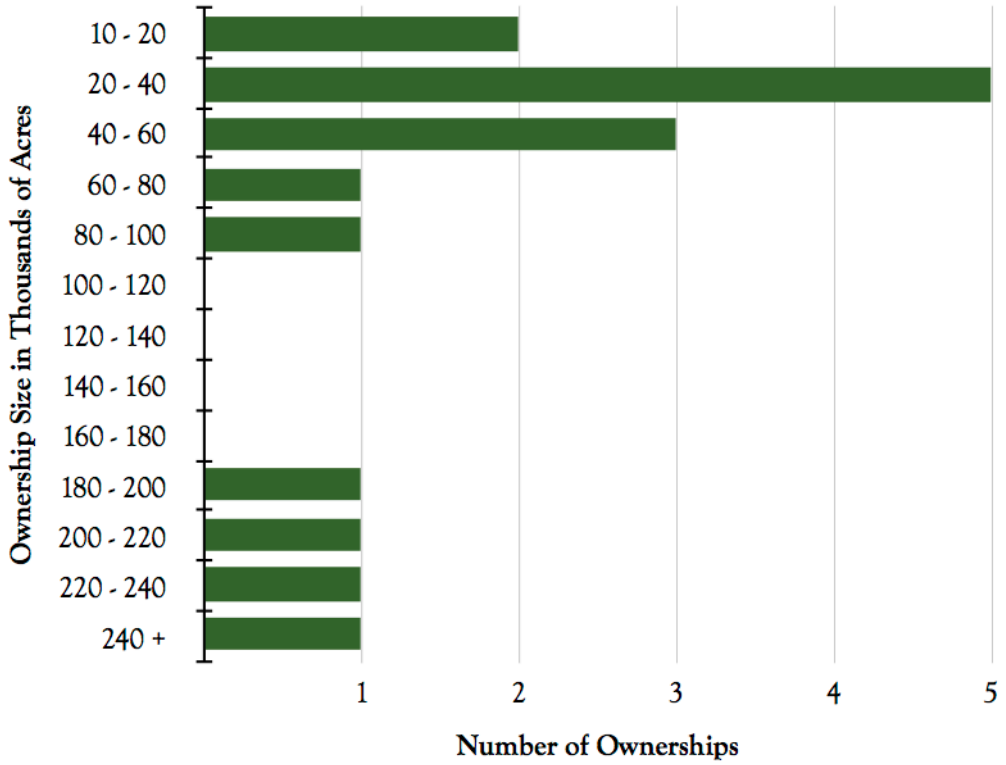
On the North Coast, large ownerships primarily fall into two distinct size classes (Figure 1.5). As of 2004— the most recent year for which complete data could be obtained by the author— four companies controlled holdings in excess of 100,000 acres. The smallest of these ownerships was 194,000 acres, and the next largest holding in the region was half that size. Only two companies' ownerships fell between 100,000

TABLE 1.3 PRIVATE TIMBERLAND OWNERSHIP BY REGION, 1994*

	Industry		Nonindustrial		Total
	Acres	Percent	Acres	Percent	
North Coast	1,402,000	51.2	1,336,000	48.8	2,738,000
Central Coast	22,000	9.0	223,000	91.0	245,000
Redwood Region	**1,424,000**	**47.7**	**1,559,000**	**52.3**	**2,983,000**
Northern Interior	1,717,000	24.6	559,000	24.6	2,276,000
Sacramento	911,000	45.2	752,000	45.2	1,663,000
San Joaquin/South	146,000	71.7	369,000	71.7	515,000
Interior Forests	**2,774,000**	**37.7**	**1,680,000**	**37.7**	**4,454,000**
California Total	**3,239,000**	**43.6**	**3,239,000**	**43.6**	**7,437,000**

* Data from Waddell and Bassett 1997

FIGURE 1.5 LARGE TIMBER OWNERSHIPS ON THE NORTH COAST BY SIZE CLASS, 2004



and 50,000 acres, while seven entities controlled ownerships in the 50,000-20,000 acre range. This study focuses on the four "major" ownerships, all but one of which changed hands between 1998 and 2008. Companies and individuals with smaller redwood investments are more numerous, so their preferences and practices are more amenable to quantitative analysis— which is perhaps why smallholders in particular have been the subjects of detailed survey research (see, e.g., Stewart et al. 2012). In contrast, large landowners have received little attention in the social science literature— despite the fact that their strategic and management decisions have landscape-level effects.

The North Coast: A Place By Many Measures

The four counties of the North Coast are the focal area for this study because in this region, industry, ecological, and jurisdictional boundaries overlap more closely than they ordinarily do, facilitating the definition of a single case "place" that is meaningful in interdisciplinary analysis. The northern coastal forests are economically interconnected: Historically, large volumes of raw logs have been moved across county lines for milling within the four-county area, and facilities in the region were specially calibrated to accommodate giant trees that are rarely found further east, outside the redwood range (Hiserote and Howard 1978, 20-23; Howard 1974, 24-27; 1984, 15-17; Howard and Ward 1988, 17-19; 1991, 14-16; Thompson and Dicus 2005, 9; Ward 1995, 15-17; 1997, 13-15).[4] Harvested redwood logs are smaller now, and mills have had to retool to accommodate this transition, but most of the facilities now operating in the northern coastal counties are either self-identified redwood specialists or specialists in redwood products (i.e., decking and fencing), or originated locally to capitalize on the supply of sawdust, trim ends, and other waste from redwood sawtimber processing. California timber giant Sierra Pacific Industries (SPI) has a mill

[4] Beginning in 1968, periodic Forest Service reports on the timber industry in California tracked the source county of the timber milled in each county in the state (see, i.e., Hiserote and Howard 1978; Howard 1974, 1984; Howard and Ward 1988, 1991; Ward 1995, 1997). Since 1997, however, consolidation within the timber industry has made it impossible to report at this level without disclosing proprietary information. More recent reports (i.e., McIver et al. in production; Morgan et al. 2012) combine data from the North and Central Coasts, providing a picture of the redwood region.

in Arcata[5] and owns some timberland in Humboldt County, however all the major industrial forest landholders in the northern redwood region operate either exclusively on the North Coast or have all their other significant timberlands outside of California.[6] As of 2012, over 92% of the timber harvested on the North and Central Coasts was also milled within the redwood region (McIver et al. in production, 19). Though the forests in the redwood range are not entirely composed of *Sequoia sempervirens*, and yield other commercially valuable species such as Douglas fir (*Pseudostuga menziesii*) that are also harvested further inland, the industry they support is distinct from timber operations in the interior forests of the Sierra Nevada and the adjacent Klamath Mountains and Southern Cascades.

The ecological and economic isolation of the northern redwood region is reflected in jurisdictional boundaries. The USDA Forest Service's (Forest Service) Forest Inventory Analysis (FIA) defines Del Norte, Humboldt, Mendocino, and Sonoma as its "North Coast Resource Area"— a designation that is also significant because California's own forestland tracking and characterization project, the Fire and Resource Assessment Program (FRAP), uses FIA resource areas as a unit of analysis. California's nine water

[5] An additional signifier of SPI's minimal economic engagement with redwood timbering is the fact that its Arcata mill specializes in Douglas fir (*Pseudostuga menziesii*), ponderosa pine (*Pinus ponderosa*), and sugar pine (*P. lambertiana*)— not redwood (SPI 2015).

[6] Humboldt Redwood Company and Mendocino Redwood Company are entirely California-based. Green Diamond owns forestland in Oregon and Washington, and Humboldt, Del Norte, and Trinity Counties (California Timberlands Division Office, personal communication, May 24, 2012). Hawthorne Timber Company, LLC, is managed by Campbell Global, however Hawthorne itself owns land only in Mendocino County.

FIGURE 1.6 NORTH COAST COUNTIES AND WATER QUALITY CONTROL REGION 1

quality management regions were designated to encompass whole watersheds, so they do not generally conform to county or resource area boundaries, but the jurisdiction of the North Coast Regional Water Quality Control Board (Region 1) corresponds roughly to the North Coast resource area: It includes all of Del Norte, Humboldt, and Mendocino counties and most of Sonoma County, in addition to portions of several adjacent counties (Figure 1.6). The North Coast can thus be used as a rough proxy for the relatively discrete industry and forest ecosystem that share its boundaries— and, to a lesser extent, for the area affected by Region 1 timber policy. Of course, neither an industry nor a forest type can be said to have the clear, precise boundaries that characterize a government-established district or physical jurisdiction, but the

particulars of the redwood range and timber industry make such delimitations more realistic— and the delimited entities more commensurable— than they are in most cases.

Land ownership in the redwood region also makes the North Coast timber industry especially amenable to analysis. Unlike elsewhere in California and the interior West, timber management on the North Coast is not in effect the product of two distinct policy regimes— one, for public land, designed by the federal government and implemented chiefly by the Forest Service, and another, for private land, developed mostly at the state level. Though other factors, including local land use planning and the indirect impacts of changes in Forest Service policy (i.e., on the market for timber in California and the West), certainly have bearing on trends in timber management on the North Coast, the relative unimportance of federal timberland clarifies the role of state policy in industry change. Put differently, in this system, public lands governance functions less like an independent variable and more like a constant.

Forest Management in the Redwood Region

The First Hundred Years: Mining the Big Trees

Commercial timber production in the redwood region began in earnest during the Gold Rush, prior to the advent of technologies that would ultimately enable near-total

liquidation of the region's old growth (Carranco and Labbe 1975; Melendy 1959).[7] Before the introduction of the steam donkey— essentially a steam-powered winch commonly used to haul logs— and the widespread use of railroads in the 1880, crews used oxen or horses to drag massive sections of redwood trunk along "skid roads" made by laying small diameter logs side by side to form a relatively clean surface, and then greasing their tops to minimize friction. The skid roads were typically short; long-distance transportation of timber was by water (Raphael 1981, 6-8). Early timber companies built splash dams that were opened in winter, when flows were high, to send logs down to mills at the river mouth (Carranco and Labbe 1975, 29-30). Finished lumber was typically loaded onto schooners and shipped to San Francisco. Since the northern California coastline is exceptionally rugged and affords few decent ports, mill owners built elaborate wooden chutes to deliver their product over coastal bluffs and offshore rocks to points where a ship could safely anchor. At least sixty such landings— nicknamed "dog-hole" ports for their poor quality— are known to have existed between Bodega Bay in Sonoma County and the entrance to Humboldt Bay near Eureka (Carranco and Labbe 1975, 33-40).

[7] The first sawmill constructed on Humboldt Bay went up in 1850, one year after the gold discovery, though it was a few years before its owners were able to figure out how to handle giant redwood logs, and decades before the technology was refined (Melendy 1959, 60-62). According to historian H. Brett Melendy (1959), the development of appropriate milling technology after the first quarter-century of redwood logging was what drove the use of rail and the invention of the steam donkey: The slow pace of animal-powered logging matched the demand of the low capacity, unreliable mills.

In the early days of redwood logging, clearcutting was the harvest method of choice, and both skidding and log drives damaged stream channels and caused serious erosion problems (Lowell 1990, 4-5), but the difficulty of moving logs more than a few miles to a significant waterway or over steep terrain limited early timber operations to the immediate vicinity of relatively large rivers (Lowell 1990, 4; Raphael 1981, 7-8; 22). Steam donkeys and railroads expanded logging's geographic reach and economic efficiency in the late 19th century (Carranco 1974, 53), while the high cost of capital forced smaller operators out of the business and gave rise to vertical integration of larger firms (Raphael 1981, 14-16; see also Melendy 1959, 67-68). However it wasn't until the advent of tractor logging— also called "Cat logging" after the popular tractor brand— in the 1920s and the widespread use of trucks in the 1930s that North Coast timber companies were afforded virtually unlimited access to the wealth of the redwood region (Carranco 1974, 53-54; Raphael 1981, 22-23). By making it much easier to move trees after falling, tractor logging also facilitated the development of selection harvesting, which became the favored prescription in the 1940s and '50s (Arvola 1976, 58; Lowell 1990, 5). The predominance of the practice was short-lived, however. The housing boom following World War II created an insatiable demand for lumber, pushing the harvest rate on the North Coast to its all-time peak of 2.8 billion board feet in 1955 (Standiford 2012). The state's "ad valorem" timber tax provided an additional and powerful incentive to log as quickly as possible, as landowners were taxed annually on the value of their *standing* timber (Gienger 2010; Mendocino

Redwood Company 2008; Interview #105a). Foresters on the North Coast grew increasingly reluctant to leave good timber standing— and increasingly eager to emulate their counterparts in the Douglas fir country of Oregon and Washington, who were reseeding post-harvest moonscapes from the air. One by one, the redwood region's timber companies turned back to clearcutting in the 1960s (Arvola 1976, 58-59).

As the reseeding scheme suggests, in the far northwest, the impending exhaustion of private old growth was evident as early as the 1960s, and (in addition to developing restocking technologies) timber companies began relying increasingly on public lands for large-diameter trees (Raphael 1981, 23). The consequences of this shift for Oregon and Washington's timber economy would strike home painfully in the early 1990s, when loss of old growth on public forests threatened the survival of a certain diminutive, rodent-eating raptor— the northern spotted owl (*Strix occidentalis caurina*). But as former Forest Service Chief Jack Ward Thomas put it, "We didn't run into the spotted owl; we ran into the Pacific Ocean" (quoted in Duane 1999, 63); old growth depletion would have remade the Northwest timber industry sooner or later with or without the owl (see Freudenberg, O'Leary, and Wilson 1999, 341-345; Hirt 1994). On the California coast, meanwhile, private land remained the engine of the timber industry, and in the 1960s, the renewed emphasis on clearcutting there would seed

more than second-growth redwood; it would also raise opposition to the industry that reverberates to this day (Arvola 1976, 61).[8]

Environmental Impacts of Redwood Timber Harvesting

The most obvious environmental impact of timber harvesting is direct loss of forest habitat as a result of tree removal. This was the implicit emphasis of controversies on the North Coast in the early and later 1990s, when the last old growth redwoods on privately owned industrial timberland were facing the chainsaw. It was also the issue at the center of the Northwest Forest Plan controversy, since the spotted owl is dependent on late successional forests in the northern portion of its range.[9] While this now-infamous bird is probably the highest profile species imperiled by forest habitat loss due to logging in the West, other terrestrial animals in the redwood region also depend on relatively undisturbed or older stands (Table 1.4). Most notable among these is the

[8] As historian Susan Schrepfer details in her 1983 chronicle of early battles to establish redwood preserves, concern about the impacts of logging on the North Coast is nearly as old as the redwood timber industry itself. Prior to the 1950s and '60s, however, preservation groups like the Sempervirens Club and, most notably, the Save the Redwoods League were very much creatures of the elite classes; they were neither critics of industry nor foes of capital. Accordingly, they emphasized the purchase of small, showpiece groves from willing sellers. They favored the use of private and state resources— not those of the federal government— for park acquisition and subsequent management. The accelerated logging of the postwar era and the return to clearcutting on the North Coast dovetailed with rising national interest in the environment, and a new understanding that natural resources were finite and subject to exhaustion; the result was a new antagonism between the timber industry and the general public that was not limited to the question of where and whether additional redwood preserves should be established (see also Fairfax et al. 2005; Schrepfer 1980).

[9] NSO's dependence on late seral forests has been clearly established in the Douglas fir forests of Oregon and Washington (see review in Thomas et al. 1990, 142-170). Its habitat requirements are generally thought to be less restrictive in the redwood forest type due to the rate at which redwood forests regenerate after harvest and develop the structural features necessary to support its primary prey in the region, the dusky-footed woodrat (*Neotoma fuscipes*) (Diller and Thome 1999; Folliard, Reese, and Diller 2000; Thomas et al. 1990, 165).

TABLE 1.4 SPECIAL STATUS SPECIES ON NORTH COAST TIMBERLANDS

Special Status Codes E = Endangered PT = Proposed threatened T = Threatened CT = Candidate threatened D = Delisted SSC = Species of Special Concern	**Federal**	**State**	**California Fully Protected Species**	**CALFIRE Sensitive**
Mammals				
Pacific fisher (*Pekania pennanti*)†	PT	CT SSC	–	–
Sonoma tree vole (*Arborimus pomo*)†	–	SSC	–	–
Birds				
Bald eagle (*Haliaeetus leucocephalus*)	D	E	Yes	Yes
Bank swallow (*Riparia riparia*)	–	T	–	–
Golden Eagle (*Aquila chrysaetos*)	–	–	Yes	Yes
Marbled murrelet (*Brachyramphus marmoratus*)†	T	E	–	Yes
Northern spotted owl (*Strix occidentalis caurina*)†	T	CT	–	Yes
Osprey (*Pandion haliaetus*)	–	–	–	Yes
Peregrine falcon (*Falco peregrinus*)	D	D	Yes	Yes
Snowy plover (*Charadrius alexandrinus*)	T	SSC	–	–
Fish				
Chinook salmon (*Oncorhynchus tshawytscha*)†				
California Coastal ESU	T	–	–	–
Upper Klamath/Trinity Rivers ESU	–	SSC	–	–
Coastal cutthroat trout (*Oncorhynchus clarkii clarkii*)†	–	SSC	–	–
Coho salmon (*Oncorhynchus kisutch*)†				
Southern Oregon/Northern California Coast ESU	T	T	–	–
Steelhead (*Oncorhynchus mykiss*)†				
Northern California DPS	T	SSC	–	–
Klamath Mountains Province DPS	–	SSC	–	–
Tidewater goby (*Eucyclogobius newberryi*)	E	SSC	–	–
Amphibians				
Foothill yellow-legged frog (*Rana boylii*)	–	SSC	–	–
Northern red-legged frog (*Rana aurora aurora*)	–	SSC	–	–
Southern torrent salamander (*Rhyacotriton variegatus*)	–	SSC	–	–
Tailed frog (*Ascaphus truei*) †	–	SSC	–	–
Reptiles				
Western pond turtle (*Emys marmorata*) †	–	SSC	–	–

E = Endangered PT = Proposed Threatened D = Delisted
T = Threatened CT = Candidate Threatened SSC = Species of Special Concern

† Denotes taxa for which timber harvesting are considered a primary factor in decline, per agency listing documents.

* Data from the California Department of Fish and Wildlife (CDFW 2015a-b).

marbled murrelet (*Brachyramphus marmoratus*), which shares the spotted owl's threatened status under the Endangered Species Act (ESA); more recently, the Center for Biological Diversity has pushed both the federal government and the state of California to list the Pacific fisher (*Pekania pennanti*)[10] under their respective biodiversity protection statutes, earning the mustelid double "candidate" status (California Department of Fish and Wildlife [CDFW] 2015b; McCamman 2010).

In addition to removing forest habitat through the actual harvesting of timber, commercial timber management causes disturbance in the course of intermediate treatments (i.e., pre-commercial thinning) as well as during site preparation and regeneration after harvest. Use of herbicides is not uncommon, since shrubs and undesirable hardwoods can outcompete young redwoods in post-harvest light gaps. By the late 1970s, aerial spraying was a routine component of forest management on the North Coast, prompting concerns about water supply contamination and pesticide drift (Kendall 1979; see also Raphael 1981, 49-52; 86-89). But management can err in the opposite direction, as well: Where redwood timberland owners have failed to restock cutover areas, the native hardwood tanoak (*Nolithocarpus densiflorus*) may become dominant, diminishing the commercial value of the forest (Tappeiner, McDonald, and Roy 1990).

[10] The fisher has long been known as *Martes pennanti*, however recent research on the phylogeny of the Mustelidae (see, e.g., Koepfli et al. 2008; Sato et al. 2012) have prompted many in the research and practitioner communities to refer to the species as member of the genus *Pekania* (Facka 2012; U.S. Fish and Wildlife Service [USFWS] 2014, 8).

In northwestern California, however, the most pernicious environmental consequences of industrial timber management accrue from neither the growing nor the cutting of trees; the real problems come from *moving* them, and the effects register not in terrestrial ecosystems, but in aquatic ones. Both historically and under modern forest management, transporting logs from the remote locations where they are felled to a mill generally requires the construction of skid trails, landings, and stream crossings. These features disturb forest soils and cause erosion— during their construction, during their use in harvest, and (if they are not subsequently maintained or "put to bed") for decades afterward. Skid roads built in the days of animal-powered logging were sometimes constructed directly in the channels of ephemeral streams, and early cable yarding systems towed logs from one end, allowing the other to drag on the forest floor (Raphael 1981, 14). The advent of modern logging equipment in and of itself did little to soften the industry's footprint; by most accounts, it worsened it (see, e.g., Carranco and Labbe 1975, 133; Raphael 1981, 21; Sawyer et al. 2000, 29; Wilson 1966, 1120). Tractors compact the soil (see, e.g., Cambi et al. 2015; Dyrness 1965; Reid 1993, 41; Steinbrenner and Gessel 1955), and they can operate on slopes and in streams. Most importantly, logging with tractors means building roads— thousands of miles of them, on large ownerships (Sawyer et al. 2000, 29); in deep ravines and over watercourses. Unlike rail lines, tractor roads were cheap to construct, even for a single use, so there was little incentive to build them to last several seasons or entries (Raphael 1981, 22). "Humboldt crossings"— made by piling small-diameter logs, slash, and fill into a stream

channel until it is even with the roadbed— are a stark example of the kinds of practices that prompted the first prohibition on blocking streams on the North Coast, which was adopted by the state legislature in 1951 (Arvola 1976, 43); though less dramatic, running roads directly through watercourses, or passing them over undersized culverts that failed in storms, were also common and similarly damaging (Bramhall 1989; Weaver, Hagans, and Popenoe 1995).

Regulations governing the construction and maintenance of roads, crossings, landings, and skid trails have been in place since the 1970s, and modern forest practices have indisputably reduced sediment loading in North Coast waterways, however, complete hydrological disconnection of these features is, in the best case, extremely difficult to achieve (Interagency Mitigation Monitoring Program 2008, 26). In the steep, remote, and highly erosive canyons of the Coast Ranges, roads and crossings generally deliver more sediment to streams than any other features associated with forest management, including (for example) clearcut areas (Best et al. 1995; Furniss et al. 2002; Klein, Lewis, and Buffleben 2012, 136; Reid and Dunne 1984; Short 2010, 19-20); an experienced field inspectors say that most of the timber-related sediment sources that actually result in water quality impairment are located within 200-300 meters of places where a road crosses a stream (Interview #125). Meanwhile, legacy sources— e.g., road cuts, Humboldt crossings, and landslides associated with historic logging or poor practices on more recent, retired plans— remain in the woods, slowly bleeding sediment

or waiting for the storm that will cause them to give way (Harris, Gerstein, and Cafferata 2008; Interview #106).

The upshot— in the colorful words of one long-time Humboldt County rancher— is that "every time it rains around here, a whole lot of real estate changes hands" (Myers 1979, quoted in Raphael 1981, 75). Dirt-laden runoff turns creeks cloudy, impairs water supplies for coastal communities downstream from working forests, and, over time, has changed the very shape of the area's streams and rivers, raising their beds and clogging their channels with fine sediment. In particularly wet years— December 1955, December 1964, and the winter of 1996-1997 all saw major flooding on the North Coast— debris torrents tear through minor drainages, scouring them out and delivering mud, cobbles, and even whole trees to the main stem (Interview #125; Madej 2001, 2266-2267; see also Madej 2010, 265). Geomorphologists are still tracking the "slug" of sediment that has been moving slowly down Redwood Creek since the legendary flood of 1964 (Madej and Ozaki 1996; 2009). These physical changes alter the behavior of subsequent floods, as well as habitat for aquatic species— particularly anadromous fish, which lay their eggs in nests, called redds, dug by female fish in exposed gravel. The loss of spawning grounds due to sediment pollution is considered a major factor in the precipitous decline of coastal chinook and coho salmon, as well as the North Coast's native steelhead (CDFW 2002; National Marine Fisheries Service 1998; 64 Fed. Reg. 50394); studies have also demonstrated that juvenile fish avoid turbid streams (Everest

et al. 1985; Lloyd et al. 1987). Research in Mendocino County suggests that sediment runoff from logging roads particularly affects the feeding efficiency of young salmonids (Reid 1998; see also Suttle et al. 2004).

Timber harvesting impacts these species in other ways, too. One of the more obvious examples is that removing trees from the riparian zone reduces or eliminates shade, leading to increases in stream temperature that harm coldwater fish species and the invertebrates on which they feed (Mellina and Hinch 2009; Nislow and Lowe 2006; see also Henley et al. 2001). Harvesting these trees also means that they will not fall into the channel at the end of their lives. In the early days of salmonid restoration on the North Coast, the importance of what is called large woody debris to aquatic ecosystems was not well understood: In the 1980s, several million dollars in state funds were dispensed to remove large wood from streams, based on the belief that fallen trees in the channel were barriers to fish passage (Wooster and Hilton 2004). The proponents of these projects were not entirely wrong: Severe flooding coincident with the heyday of post-war logging in the 1950s and '60s left in its wake an abnormal number of debris jams that did indeed block salmonid migration. Even as the "stream cleaning" projects of the early 1980s were being implemented on the North Coast, however, scientists were beginning to apprehend that some large wood is necessary to create and maintain the pools, riffles, and other complex features that collectively form the basis of a functional aquatic habitat (Bilby and Likens 1980; Bryant 1983; Lisle 1983).

The anadromous fish populations of the North Coast— along with several other aquatic species imperiled by the environmental impacts of timber harvesting— are now protected under varying combinations of state and federal law (Table 1.4); support of cold freshwater and spawning habitat for fish — along with the drinking water supplies that timber-related sediment pollution can also impair (Holmes 1988; see also Piper 2003)— are among the most sensitive beneficial uses of water that state and federal water quality controls are designed to protect. As such, sediment pollution creates a strong nexus between forest practices and two other, major areas of public environmental policy, and has increased the importance of institutions other than the Board of Forestry and its implementing agency, the California Department of Forestry and Fire Protection (CALFIRE)[11] in timber regulation over time.

Significance of Change in the Redwood Region

The new paradigm in the redwoods— including a smaller but still-significant, highly regulated timber industry, and an emphasis on water quality control and conservation on working lands— may well be the future for other parts of the West. It has often been said that California is on the leading edge of the West, and the state has frequently been the first to confront trends that later transformed the region. Exurban expansion, anti-tax revolts, and the state budget crisis provide prominent recent examples (Duane

[11] Once known as the California Department of Forestry, the agency formally changed its acronym from CDF to CALFIRE in 2007. Many of the other state agencies referenced in this dissertation have also been renamed or changed their official acronyms during the time period covered by the analysis. For clarity, I consistently refer to all government entities by the names and acronyms that are current at the time of this writing and mention changes in footnotes.

1999; Schrag 2004), but it is also relevant to note that California has been a historic center of natural resource development in the West, and of conservation in the nation as a whole; the confrontation between those two interest groups— a focus of much scholarship on the West as a region— has been playing out here for more than a century.

This is certainly true of the redwood region in particularly: Humboldt and Mendocino Counties have been the site of some of the more searing clashes between industry and environmentalists in recent history. As one treesitter told *Mother Jones* magazine, "This is the deep North, and it hasn't been desegregated yet" (Harkinson 2008). Since California has also been highly regulated relative to other states, the place makes for a "most-likely" case— one in which claims about the role of regulation and environmental activism in eroding primary industries, generally, are most-likely to be true (George and Bennett 2005, 121). Research based in the redwoods is therefore relevant to the much broader literature on rural change in the U.S. West.

Finally, the recent prominence of water quality in the environmental critique of the timber industry reflects the consensus among environmental advocates and scholars that the promise of the Clean Water Act is not being realized (Andreen 2004; Andreen 2013; Press 2015). The failures of water quality control regimes for the timber industry in California and within the redwood region illuminate problems that are characteristic

of U.S. water quality policy— and indeed, the U.S. pollution control system— as a whole. With respect to the former, the Federal Water Pollution Control Act of 1972 has been reasonably successful in reducing pollution from traditional point sources, such as factories and municipal sewage treatment plants, but its record on pollution with spatially diffuse origins, such as that from forestry, agriculture, and urban storm water, leaves much to be desired (Andreen 2004, 592-593; Press 2015, 87-123). Even more broadly, federal pollution control policy has been faulted for cultivating an emphasis on implementing (and reporting on the implementation of) so-called end-of-pipe mitigation measures, and neglecting the ultimately more meaningful question of whether these practices are resulting in cleaner air and water and recovery of imperiled species and ecosystems (Davies and Mazurek 1998; Kettl 2002; Press 2015). Such critiques of the system as a whole raise questions that the specific case of timber regulation in California brings into focus— namely, how might policymakers facilitate the adoption and implementation of policy that is responsive, on a meaningful timescale, to the environmental outcomes of economic activities?

Methods Overview

All components of this study use process tracing to reveal the key independent variables in each case and the causal mechanisms linking those variables to the outcomes of interest. As developed by political scientist Alexander George (1979; see also George and McKeown 1985), process tracing involves using a variety of data types

to construct a historical narrative that explains the causes of an outcome. The primary advantage of process tracing is that it yields nuanced, information-rich pictures of how things happen that reflect the complexity of causal processes. Explanation is not contingent upon the practicability of simplifying a case or cases so that the number of relevant variables is less than the number of observations. As such, process tracing is particularly useful where theory is underdeveloped (i.e., when it does not define independent and dependent variables), and for research that aims to build theory rather than to test it. Process tracing is also particularly useful when the goal of the research is to explain a single outcome that arises from the interaction of a number of factors. Explaining the persistence of redwood timbering on the North Coast and the evolution of regulatory regimes affecting the industry falls into this category.

The primary analytical work of process tracing is using diverse data to account for every link in the chain of causation that produced the outcome of interest (George and Bennett 2005, 222). Some of these "links" will necessarily be revealed in the research process; others can be anticipated from preliminary research on the system or in the relevant literature. Triangulation among diverse data sources enhances the validity of process narratives (Jick 1979).

Constructing a detailed account of a causal process means constructing a theory of cause for a particular case. In order to determine whether such qualitatively developed

theories represent valid causal inferences, political scientists King, Keohane, and Verba (1994) direct qualitative researchers to be attentive to the observable implications of their theories. In this project, identification of additional observable implications of emerging causal theories drove data collection, but the primary method was identifying and evaluating the role of potential intervening variables, as described by George and Bennett (2005, 170-179). The advantage of this approach is that it maintains a focus on the original dependent variable of interest and identifies the explicit steps by which it is connected (or not) to key independent variables (George and Bennett 2005: 177).

For all components of this research, interviews with key and specialized informants from industry, regulatory and resource agencies, and environmental and other public interest groups figured centrally in data collection. The scope and structure of the interviews varied depending on the informant and the particular information sought, but in general I began with open-ended questions and used follow-ups and probes to solicit informants' perspectives on particular factors that have been raised by other informants, documents, or scholarly literature. This approach provided opportunities to uncover factors whose importance I did not predict *a priori*, and reduced the chance that informants' emphases would reflect my emerging theories of cause as opposed to their understanding of why events occurred. This is an internal validity problem with the interview method that is mitigable but not entirely eliminable— hence the importance of triangulation with other types of data. Repeat interviews were conducted

when warranted by time constraints on the first interview or the emergence of new, important variables later in the study.

It is also important to emphasize that the archival record of ownership change, corporate management, and the development of environmental regulation pertaining to California's redwood timber industry is extensive, and in this research I utilized it extensively. Almost without exception, the events analyzed in this inquiry sparked a great deal of public interest at the time they were occurring— certainly on the North Coast, often statewide, and sometimes nationally. As such, my data included news coverage in local papers like the *Mendocino Beacon*, the *Anderson Valley Advertiser*, and the *Ukiah Daily Journal*; major West Coast dailies, including the *San Francisco Chronicle* and the *Los Angeles Times*; the *Wall Street Journal* (which tracks the major, publicly-traded players in the forest products industry); and trade publications like *Timber/West*. Regional Board policies and permits, bill files and analyses, and other policy documents (e.g., Habitat Conservation Plans) are readily available, usually in draft and final form; regulatory agencies also retain meeting minutes and agendas, staff reports, and public comment letters for public review. While interviews were an essential component of this project and in many cases yielded insights that could not have been developed from the written record alone, documents provided the bulk of the data used in this research.

Dissertation Overview

This dissertation begins with an examination of the changes in the structure of the redwood timber industry over the last twenty years. The most salient feature of this transformation has been the complete departure of publicly traded companies from timberland ownership on the North Coast between 1998 and 2008. Chapter 2 accounts for this shift by placing it in the context of change in the U.S. forest products sector during the same period of time; it also addresses local factors that favored these properties' remaining in commercial timber production.

This analysis demonstrates that environmental regulation was not a primary factor in the divestment from redwood timberland that occurred between 1998 and 2008; however, it is perceived as one. The seeds of this perception were sown in the late 1960s and early 1970s, when widespread public concern about environmental degradation led to a raft of new legislation at both the state and federal level. These laws vested authority over timber operations on private land in California in multiple agencies with differing mandates— an awkward arrangement that fostered tension among regulators and provided them with opportunities to skirt statutory obligations. Chapter 3 traces the development of this convoluted policy landscape, emphasizing the ongoing struggle between timber and water agencies and the deficiencies in the timber regulatory regime that eluded agency control from the 1970s to the mid-1990s: Cumulative effects analysis and outcomes monitoring. In the late 1990s, environmental

activists took advantage of increasing attention to water quality at the state level to push legislation expanding the authority of the Regional Water Quality Control Boards (Regional Boards) in the timber regulatory process. This was a significant institutional change, and its causes and consequences are analyzed in Chapter 4.

By 2008, a new suite of timberland owners were managing the commercial forests of the North Coast under a new set of regulatory policies, in the wake of a social movements condemning the environmental impacts of redwood harvesting— movements that brought national attention to the region in both the early and late 1990s. These companies meet the terms of multiple, resource- and medium-specific regulatory regimes— their "regulatory license" to operate, in other words— but they must also maintain their "social license" to operate (Gunningham, Kagan, and Thornton 2003, 35-38). Firm approaches to satisfying these imperatives vary surprisingly, even among the most high-profile redwood timberland owners, but most go beyond what public policy requires in some respects. Firm-specific, property-wide permits that tier off other permits and agreements are also becoming increasingly common, providing potential models for regulatory streamlining, landscape-scale management, and feasible outcomes monitoring programs. Chapter 5 compares the environmental management strategies of the three largest timber companies on the North Coast, with a focus on the drivers of "beyond compliance" behavior and its potential for addressing longstanding deficiencies in the forest regulatory regime. An

epilogue explores traditional public regulation as it currently stands, in light of the foregoing analyses.

These inquiries are interdependent; industry change, public policy, and firm behavior are mutually constitutive— but in more complicated ways than is generally understood. The goal of this research is to provide a clear portrait of their relationship at a particular time and in a particular place.

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CHAPTER 2

FINANCIALIZATION TASTES LIKE SPOTTED OWLS: UNDERSTANDING INDUSTRY CHANGE IN THE REDWOOD REGION

Introduction

This chapter explores the transformation of timberland ownership on the North Coast between 1998, when Louisiana-Pacific Corporation (Louisiana-Pacific) sold its redwood region properties, and 2008, when Pacific Lumber Company (PALCO) was dissolved in bankruptcy court. During this period of time, Georgia-Pacific Corporation (Georgia-Pacific) also divested from redwood, leaving Green Diamond Resource Company (Green Diamond) as the only major, pre-1998 landowner still present in the region as the first decade of the 21st century drew to a close.[1]

The transition that took place in those ten years is one example of the complex changes in primary industries that have unfolded across the rural Western U.S. over the last 40 years. It is also part of a reconfiguration of industrial timberland ownership in the United States that began in the 1970s and gained traction in the mid-1990s and early 2000s. I first review the literatures on these two transformations; existing research on the latter also informs the subsequent description of the drivers of timberland

[1] For the purposes of this study, a "major landowner" is defined as a corporation or individual with fee title holdings in excess of 100,000 timberland acres in 2004— only year in the vicinity of the ownership transition for which the author was able to obtain complete data from regulators. Of the four North Coast firms meeting this criterion, the *smallest* ownership was 194,000 acres at the time of the ownership transition. The next largest private landowners in the region hold 98,000 and 68,000 acres, respectively. No other private interest owns more than 50,000 acres of North Coast timberland. While ownership sizes fluctuate with some frequency on the North Coast, for the last two decades these four major ownerships have been significantly larger than the next (i.e., fifth) largest.

ownership change in the United States from the 1970s to the 2000s. Next, I turn to Louisiana-Pacific and Georgia-Pacific— the two integrated, publicly traded companies that chose to exit redwood production in the late 1990s. I show how these divestments— announced at the same time as enforcement of the Endangered Species Act (ESA), the Clean Water Act (CWA), and the state Porter-Cologne Act (PCA) were profoundly changing regulation of timber harvesting in California— were regarded in the financial sector as part of general trend toward consolidation and reorganization in the forest products industry. Sales of redwood timberland units were justified not by increased operating costs associated with environmental policy change, by rather by strategic restructuring and other firm-level imperatives. Though the primary focus of this chapter is explaining these two companies' divestment decisions, I conclude with brief discussions of other important processes reshaping the forest products industry during the same period of time and factors that likely helped keep the large industrial ownerships of the redwood region in timber production after the ownership transition.

These analyses put the tumult in the North Coast redwood timber industry at the turn of the last century into perspective. Though major land transfers during this period of time coincided with the implementation of the federal Endangered Species Act and major changes in water quality policy, the departure of publicly traded firms from redwood timbering was not driven by increasing regulation. In demonstrating this, this

work also shows the importance of industry-focused analyses in explaining the transformation of primary industries— both in the redwood region and beyond.

Relevant Literature

The persistence of primary industries in new configurations, alongside other land uses associated with "new"— that is to say, non-extractive— economies has emerged as a phenomenon of interest in the wide-ranging and often inchoate-seeming literature on economic, demographic, and ecological change in the rural U.S. West. This body of research is partially rooted in inquiries in rural sociology that aimed to ground-truth (or debunk) popular associations between intensive resource development and economic wellbeing in nearby communities (see, e.g., Freudenburg and Gramling 1994; Humphrey et al. 1993; Machlis and Force 1988). The "resource dependence" literature of the 1980s and early- to mid-1990s illustrated that the economic and social effects of extractive booms on rural residents varied considerably (Fisher 2001), in effect presaging the findings of the more disciplinarily diverse scholars who in the late 1990s and early 2000s began to test popular assumptions about the relationship between primary industry decline, amenity migration, and conflicts over land use in the rural U.S. West. These latter studies were in many ways driven by an interest in understanding the drivers and consequences of pitched conflicts over land use and environmental issues, and the relationship of such conflicts to population growth in rural counties— all of which were evident in the West in the 1990s. The reality or

perception that the region was undergoing a transition from "old" (i.e., extraction- and agriculture-based) economies to "new" ones fed by environmental tourism, mobile tech workers, and transfer payments to retired urban refugees figured centrally in these dynamics— especially after economist Thomas Michael Power (1996) produced an exuberant indictment of single-industry "base" economies, prescribing tourism-emphasizing "amenity" economies as a socially and ecologically sustainable alternative for the rural West. Power was taken to task on the substance of his argument, and other researchers used his claims as premises to test against real-world cases (Beyers and Nelson 2000; Carruthers and Vias 2005; Cawley and Freemuth 1997; Charnley, McLain, and Donoghue 2008; Eichman et al. 2010; Hunter, Boardman, and Saint Onge 2005); the resultant discussions relied on the dualism between "old," "base," or extractive economies, on the one hand, and "new" or "amenity" economies on the other (see also Winkler et al. 2007)— as well as on the widespread perception that the transition Power prescribed was well underway.

The popularity of these theoretical concepts in turn prompted empirical inquiries into the extent to which they reflect the reality of economic, demographic, and ecological change in the rural West. In a recent review, Robbins et al. (2009) identify the relationship between "old" and "new" economies as one of four foci of scholarship concerning the "New West," and studies in this focal area have shown that mining, timber, and ranching are still of great economic importance in the region. Riebsame

(1997, 108) documents the continued economic dominance of extractive industries in many rural western counties, while Winkler et al. (2007) find that communities with demographic and economic characteristics that mark them as highly "New West" are outnumbered by "Old West" towns. By combining analysis of secondary quantitative data with in-depth interviews in four western counties undergoing rapid population growth, Beyers and Nelson (2000) illustrate the persistence of "old" economies even in communities increasingly identified with tourism and amenity migration.[2] Robbins et al. (2009, 363) offer one potential explanation for the phenomenon, citing numerous examples of extractive industries using new technologies and discourses to sustain production alongside neighbors who may be new to the region or increasingly concerned about the environmental impacts of resource development; whether the technologies are effective and whether the discourses are sincerely deployed, it is clear that a number of mechanisms exist to facilitate the persistence of these industries alongside new neighbors, competing land uses, and changing values.

As this discussion perhaps implies, existing research in the "New West" literature has been relatively more attentive to the changing nature of community-industry relations over time, and relatively less attentive to the factors impinging upon industry at larger-than-local scales. That there exists a lacuna here is unsurprising: Given the disciplinary

[2] No analyses of this type have been conducted since the 2008 recession. Driven by a housing boom— and followed by plummeting demand for new home construction— the downturn particularly impacted the timber industry in the West. However, research indicates that the region did not suffer marked losses in pre-2006 production capacity (Keegan et al. 2011).

roots of the "New West" literature, one would expect that individuals, communities, and the corresponding scales of governance (e.g., towns, and counties) are the most common units of analysis— not industries. One consequence of this emphasis, however, is that how and why resources extraction evolves and persists in particular rural areas is not well understood (Beyers and Nelson 2000; Robbins et al. 2009). Robbins et al. (2009) highlight this gap in their review, noting, "Promising research would explore the ways in which these diverse economies and communities interact." Specifically, they encourage analyses that address why investment in (and divestment from) industry happens in particular regions and how industries in particular places are shaped by state and federal regulation and international trade (Robbins et al. 2009, 364). Beyers and Nelson (2000, 460) draw similar conclusions, citing a need for mixed-methods research that gives in-depth attention to transformations in individual places by leveraging both secondary quantitative and qualitative information.

This analysis is designed to answer these calls. To do so, it draws not only on primary data, but also on academic studies of change in the U.S. forest products sector in the 1990s and early 2000s. At the same time as the near complete replacement of the major timberland owners was underway in the redwood region, the organization of commercial forest ownership was undergoing a seismic shift nationwide. Integrated forest products companies were divesting their timberlands on an unprecedented scale;

in their place, a new suite of ownership structures, designed and controlled by institutional investors, was rapidly expanding.

Gunnoe and Gellert (2010) argue that the growth of timber investment management organizations (TIMOs) and real estate investment trusts (REITs)[3] alongside what Bliss et al. (2010) aptly dubbed the "disintegration of the U.S. industrial forest estate" is best understood as one consequence of a still-broader process of financialization that is transforming the entire U.S. economy (Krippner 2005). In essence, financialization is said to have occurred when strategic movement of capital (i.e., into and out of financial instruments to maximize future returns) outstrips trade and commodity production as the major source of profit and locus of activity in an economy (Arrighi 1994). This shift is strongly associated with over-accumulation under monopoly capitalism (Gunnoe and Gellert 2010, 270-271). Put simply, the presence of surplus capital drives the development of financial instruments and investment structures. Gunnoe and Gellert (2010) highlight three specific ways that this macro-level process influences decision-making at the forest products industry- and firm-levels. First, the existence of large capital surpluses gave institutional investors clout and propelled the development of the specific structures through which they invested in timberland (i.e., TIMOs and

[3] Technically, the term "real estate investment trust" refers to a broader class of investment vehicles, including both public and privately traded companies that acquire and manage a diverse array of properties. True timber REITs hold only commercial timberland, and they represent a small subset of the general category. As such, they are sometimes called "TREITs"— particularly in publications oriented to finance audience. In this dissertation, however, I follow the convention in the forest economics and forestry literature and use the more general acronym.

REITs). Second, the dominance of the financial sector facilitated the deregulation of obscure financial instruments through federal policies that also influenced industrial timberland owners to sell and institutional investors to buy. Finally— and arguably most significantly— financialization fundamentally altered the logic of governance in large corporations, including major forest products firms. These companies once managed a variety of risks by controlling their supply chains and integrating horizontally— a strategy Gunnoe and Gellert dub "retain and reinvest". In contrast, financialization prompted a singular focus on "maximizing shareholder value"— which often meant divesting peripheral units to emphasize "core competencies" (Fligstein and Shin 2007; Gunnoe and Gellert 2010; Lazonick and O'Sullivan 2000).

If the New West scholarship is overly attentive to the community scale, the research on the transformation of the U.S. forest products sector somewhat neglects them. Analyses of individual firms' divestment decisions and their regional implications are also few and far between. To date there have been only a handful of attempts to empirically examine the local and regional effects of changing forest ownership. Irland, Hagan, and Lutz (2010) tracked and classified major timberland sales in the Northeast, where the number of acres that changed hands between 1980 and 2005 is, by one estimate, equal to more than 90% of the entire region (Hagan, Irland, and Whitman 2005).[4] Initially, most of transfers there were *among* U.S.-based industrial owners; it wasn't until 1999

[4] Hagan, Irland, and Whitman (2005)'s count of acres sold (23.8 million) counts the same physical acres of land multiple times when those properties were sold more than once in the 1980-2005 period.

that private investors and TIMOs became significant transactors. More striking than broad changes in the buyers and sellers, however, were the effects of these sales on ownership patterns across the region: Between 1980 and 2005, more than a quarter of timberland sales broke up large, single-owner holdings (Irland, Hagan, and Lutz 2011, 5). In the Northeast, the authors write, "the days of single ownerships exceeding one million acres are virtually over" (Irland, Hagan, and Lutz 2011, 17). Jin and Sader (2006) observed that high rates of turnover in Maine ultimately put more timberland in the hands of the owner classes that tended to manage most intensively, namely TIMOs and short-term investors. Working in South Carolina, Hatcher et al. (2012) use U.S.D.A. Forest Service (Forest Service) Forest Inventory and Analysis (FIA) to confirm that timberland ownership change in the area follows the national trend. They note that at least one industrial owner is engaged in real estate development on former timberlands, but this discussion is brief and anecdotal.

As these examples indicate, the existing literature is largely focused on the Northeast, where the shift away from industrial control of private timberland has proceeded most rapidly (Irland, Hagan, and Lutz 2010), and the South[5], where institutional investment in timberland is most prolific (due in part to the relative lack of publicly owned forests) (Clutter et al. 2005). The major timber-producing regions of the United States have

[5] Private commercial timberland in the United States is concentrated in the old farmland regions of New England ("the Northeast"), the pine plantations of the Southeastern states ("the South"), and the Doug fir forests of Western Washington and Oregon. The redwood region of California and non-federal timberland in the interior west tend to get grouped into the "Pacific Northwest", though distinctions between the coastal states and the interior West are sometimes drawn.

experienced restructuring differently, however— which is unsurprising, considering that the land use and forest management histories of these areas also vary considerably: Ownership is more fragmented in the hardwood forests of the Northeast, and rotations tend to be shorter in the southern pine region, where intensively managed plantations are often harvested for pulpwood within 20 years (Fox, Jokela, and Allen 2004; Pienaar and Rheney 1996). Additionally, the financial literature shows different return/volatility relationships for timberland in the Northeast, Pacific Northwest, and South (Binkley, Washburn, and Aronow 2005; Washburn and Binkley 1993). For all these reasons, additional studies of the process of timberland ownership change in the West are necessary to obtain a complete picture of the local and regional effects of transformation of forest products industry under financialization.

Of course, ownership transition also proceeds unevenly within regions. Work by Kelly and colleagues in Oregon highlights cases in which the decline of industrial timberland ownership has facilitated new tenure arrangements, including tribal, community, and new state forests (Kelly and Bliss 2012; Kelly and Gosnell 2014). The new owners manage for a variety of objectives outside the purview of traditional, "productivist" forestry (Kelly and Bliss 2012). "Multifunctional forests" have also emerged on the industrial timberlands of the redwood region, but to a lesser degree, and they have taken a narrower range of forms. Therefore, this study presents opportunities for

comparison with other research on the effects of the national shift in timberland ownership in Western states.

In summary, much has been written on how rural Western communities perceive local economic change, and much has been written on how macroeconomic and institutional changes have led to a major shift in the organization of private timberland ownership nationally. This analysis brings the literature on these two subjects together to provide a descriptive, hypothesis-generating account of the evolution and persistence of a primary industry in a particular region.

Industry Change

Background: Vertical Integration, Cost Control, and Hidden Assets

U.S. forest products companies began acquiring timberland in the 19th century. At its peak, their collective holdings would total an estimated 75-80 million acres (Kirk 2001).[6] This accumulation was driven by the widespread perception that vertical integration was necessary to success in the sector (Clephane and Carroll 1980). The most frequently cited reason for this perception is also the most obvious: Firms that own their own timberlands are insulated from fluctuations in the market for their primary raw material input, and claim a significant advantage over less self-sufficient

[6] The U.S.D.A. Forest Service, in contrast, manages a little over 183 million acres, disincluding federally-designated wilderness (5.75 million acres) and National Grasslands (4 million acres) (U.S.D.A. Forest Service 2013; 2014).

competitors (Hungerford 1969; O'Laughlin and Ellefson 1982; Yin et al. 1998). A less-well-noted benefit of vertical integration is that it allows companies to use income from timber sales to meet cash flow targets in cyclical downturns or following expensive upgrades or expansions in their manufacturing units. The tendency of firms to use the former tactic often resulted in an influx of logs to weak markets, which further depressed prices, but it was considered an advantage nonetheless (Binkley, Raper, and Washburn 1996). The latter strategy was beneficial because wood products manufacturing is capital-intensive relative to the business of growing trees (Ha 1997).

In part because of these practices, the growth of the industrial forest estate was accompanied by growing confusion about the worth of the timberlands owned by integrated forest products firms. For many years, these companies did not report income from their timberlands separately from that of their manufacturing operations, which made it difficult for industry observers to evaluate the contribution of these assets to firms' overall performance (Zinkhan 1988). Additionally, Generally Accepted Accounting Principles (GAAP) tended to underestimate the value of timberland properties because they did not permit publicly traded companies to increase the book value of their holdings— even though the value of timberland increases naturally as unharvested trees mature (Binkley, Tarver, and Collins 2001; Binkley, Washburn, and Aronow 2005; Harris and Reddick 1986; Healey, Correiro, and Rozenov 2005). And GAAP guidelines for incorporating depletion costs provided no mechanism to account

for *increasing* values of timberland as a result of growth and management (Binkley, Washburn, and Aronow 2005). In an era when corporate decision-making was still dominated by the logic of "retain and reinvest", these potential discrepancies were worth the advantages vertical integration conveyed to firms. On Wall Street, however, they fed a belief that the value of forest assets was not well understood. When analysts attempted to estimate timberland returns using tax records, they found that these units generally performed very well, and began referring to timberlands as a "hidden asset" (Binkley, Washburn, and Aronow 2005, 234-235; Lönnstedt and Sedjo 2012; Zinkhan 1988).

This reputation would persist in financial circles as focus on shareholder value eclipsed the old "retain and reinvest" strategy, ultimately contributing both directly and indirectly to mass divestment from timberland by industrial owners. Most analyses place the start of that transition in the '70s, but data on actual sales indicate that the transfer of land from industrial to institutional owners really became noticeable in the 1980s and took off in the 1990s (Binkley, Raper, and Washburn 1996; Browne 2001; Healey, Correiro, and Rozenov 2005, 65). Industry and academic observers distinguish between push factors (why industrial owners sold their timberland) and pull factors (why there was anyone willing to buy) (Gunnoe and Gellert 2012, 273). I review both in the following sections.

The Push: Tax Reform, Hidden Value, and the Pressure to Monetize

The 1980s brought changes in both the market and in the tax code that motivated integrated forest products companies to rethink the strategic value of timberland ownership. Prior to the passage of the Tax Reform Act of 1986 (TRA), earnings on timberlands were taxed at the capital gains rate (20%)— a substantial discount from standard corporate tax rates, which ranged as high as 50% (United States General Accounting Office [GAO] 1995). In practice, the favorable rate was often applied to significant proportions of forest product firms' incomes, not just the value realized from timber management (McIntyre 2006). In 1977, for example, the forest products industry (i.e., inclusive of both paper and allied products and lumber and wood products) reported 2.6% of corporate taxable income and over 16% of corporate capital gains in that same year; a 1969 analysis suggested that over half of the industry's capital gains claims were made by just five firms (Senate Budget Committee 1982, 78). Timberland owners were also permitted to deduct most management-related expenditures from their taxable income (GAO 1995). Taken together, these benefits afforded integrated forest products companies a tax advantage of such absurd proportions that it eventually caught the attention of lawmakers in Washington. The TRA raised the capital gains rate to 28%, bringing it more in line with regular income tax rates, and capped management-related deductions (GAO 1995). From the late 1980s to early 1990s (when capital gains rates were again adjusted), the effective tax rate for many integrated forest products companies was almost double what it had been

prior to 1986 (Seneca Creek Associates 2005).

On the market side, the uptick in hostile takeovers that so characterized the 1980s fundamentally changed the meaning of timberland's "hidden" value (Binkley, Washburn, and Aronow 2005, 234). Corporate raiders targeted firms whose shares traded at a low price relative to the value of their underlying assets. Companies with large timberland holdings therefore presented an opportunity for such investors to make a quick profit after acquisition (Binkley, Raper, and Washburn 1996; Binkley, Washburn, and Aronow 2005). In the words of one career investment analyst who specialized in the forest products industry, the timberland owned by integrated forest products companies began to look like "a cash hoard" (Kirk 2001).

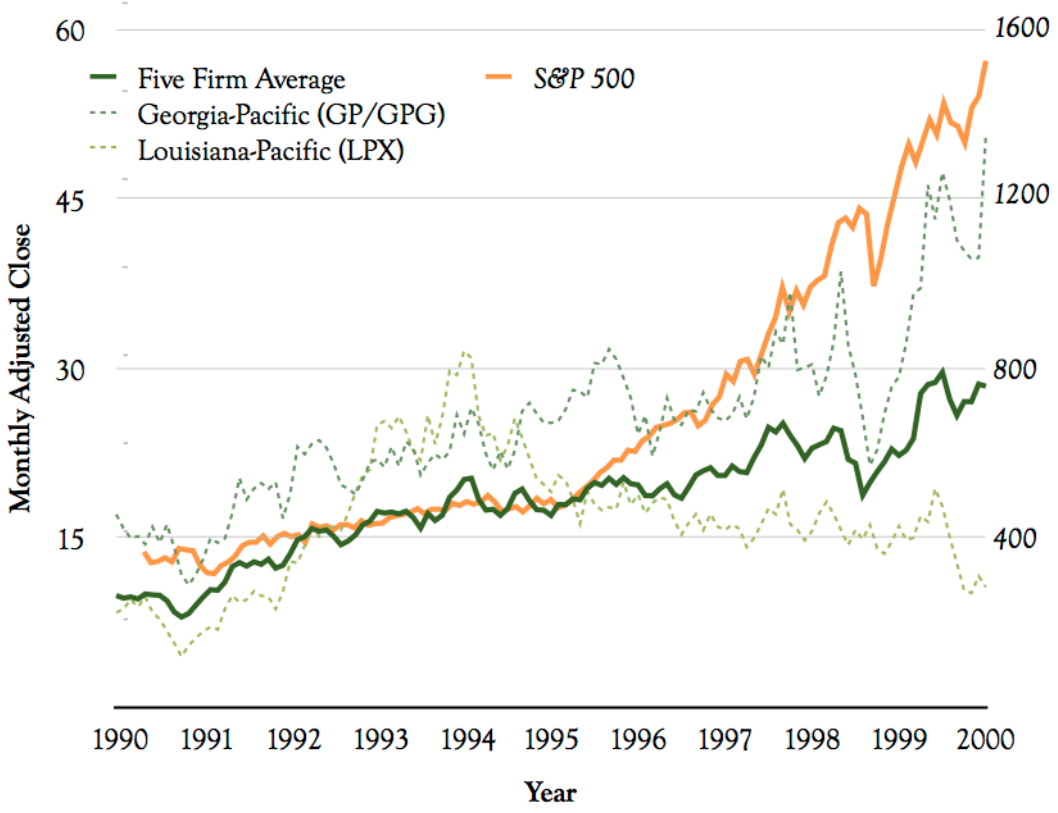
With their tax advantages wiped out and new concerns that their "hidden assets" made them takeover targets, some integrated forest products companies began looking at ways to "spin off" their timberlands. Master limited partnerships (MLPs) were initially attractive because of their legal status as flow-through entities: When profits (and losses) "flow through" a company to investors, only the latter's profit is taxed. MLP shareholders thus avoid the "double-layer" taxation investors in traditional corporations face (Harris and Reddick 1986).[7] Because companies can only be organized as MLPs if their assets are primarily in natural resources, real estate, or

[7] In a corporation, firm profits are taxed, but individual investors also pay the government a percentage of their gain.

commodities, integrated firms had to loosen their grips on their timberlands to reap this benefit. By acting as general partners in the new MLPs, however, they could still hold the reins. And with their timberlands disentangled from cyclical, capital-intensive manufacturing concerns, integrated companies could expect MLP share prices to better reflect the book value of their timber assets. That shift, in turn, was expected to reduce takeover risk (Harris and Reddick 1986). Complex initial public offerings and tiered securities allowed firms like ITT Rayonier and International Paper to retain even more control over their timberlands while further reducing the risk of hostile takeovers (Harris and Reddick 1986). Along with Masonite and Pope and Talbot, whose spinoffs were slightly more straightforward in structure, these firms represented the early adopters of forestry MLPs. The complexity of the conversion process likely deterred other companies from pursuing similar arrangements, however (Harris and Reddick 1986).

These were the first rumblings of the change to come in the 1990s. In that decade, multiple years of poor returns in the forest products sector made large-scale timberland ownership much more difficult to justify (Figure 2.1). Demand for both paper and building products has always been strongly cyclical, but during this period of time, excess capacity depressed returns even when the overall economy was performing well (Bleakley 1997a; Sandler 1997). In the early 1990s, many paper companies invested in new equipment that sped up production (Chipello 1997a); they also expanded facilities

FIGURE 2.1 FOREST PRODUCTS STOCK PERFORMANCE VERSUS THE S&P 500, 1990-2000



The five firm average was compiled by the author using stock price data from major integrated forest products companies for which data for the entire time period are available (i.e., Georgia-Pacific, International Paper, Louisiana-Pacific, Weyerhaeuser, and Kimberley Clark). As such, the trend shown represents companies that were not acquired and did not merge during the wave of restructurings that swept the industry in the late 1990s; generally, it is biased toward the largest and most successful firms— a fact which makes the flat returns relative to the S&P 500 after 1995 more notable. All data from Yahoo! Finance historic pricing records or Mergeant Online. Note that Georgia-Pacific adjusted data are for the close on the last trading day of the month, whereas Yahoo! Finance provides close at first trading day of the month.

in hopes of serving emerging markets in Latin America and Asia, but manufacturers in those regions ended up meeting more of the new demand than U.S. producers had anticipated (Sandler 1997). Increases in productivity coupled with the unnecessary new

capacity led to chronic oversupply in the U.S. market. When prices for paper and packaging materials began to recover in 1995, customers quickly filled their inventories, leading to a demand crash in 1996 that persisted into the following year (Peltz 1997). In early 1997, housing starts and the Canandian Softwood Lumber Agreement raised prices for lumber, buffering companies with significant building products divisions from an "exceptionally poor" first quarter in the paper market (Peltz 1997). Stock pickers began to express confidence in the industry again around the middle of the year, but it would be only a few months before the Asian Slump softened demand for both lumber and paper (Bleakley 1997b; Chipello 1997b; *Wall Street Journal* 1998f). As a result, 1998 would be the "third straight dismal year for the industry," in the words of one *Wall Street Journal* commentator (Chipello 1999). It wasn't until the second quarter of 1999 that forest products stocks began a lasting recovery (Carlton 1999a; 1999b).

The financial sector's take on these events was clear: Forest products companies were spread too thin. Improved performance would require both consolidation in the sector and disciplined refocusing at the firm level (Yin et al. 1998; Binkley, Washburn, and Aronow 2005). Analysts believed that fewer, larger firms would be better able to track inventories and reduce output before the market was glutted, and Wall Street rewarded even small steps in this direction (Cody 2000). When James River and Fort Howard announced a merger in May 1997, the entire sector got a boost (Welsh 1997a). Around

the same time, Champion International (Champion) put its corporate estate on the market, and the *Wall Street Journal* saw blood in the water. Analysts floated the expectation that Champion, along with outfits like Boise Cascade and Stone Container would "come under increasing pressure to merge" (Sandler 1997). Later that year, Champion announced a major restructuring, and Stone Container and Louisiana-Pacific quickly followed suit (Welsh 1997c; *Los Angeles Times* 1997). Restructuring would not be enough for Stone and Champion, however: The former joined forces with Jefferson Smurfit in 1998, and in 2000 International Paper acquired Champion. Along with other industry giants like Georgia-Pacific and Weyerhaeuser, International Paper facilitated consolidation in the late 1990s by scooping up smaller players (Chipello 1997b). Though acquisitions brought substantial revenue increases to the company in 1997, the *Journal* noted that it showed no efficiency gains for its trouble (Sandler 1997)— an indication of just how tough the operating environment had become, even for large firms. Apparently undiscouraged, International Paper took over Union Camp the following year, making it the leading producer of uncoated printing paper nationally and significantly increasing its share of the containerboard market (Welsh 1998b).

The wave of mergers, acquisitions, and restructuring announcements that swept the forest products sector in the late 1990s was unprecedented. As the decade drew to a close, the editor of *Pulp and Paper* observed that compiling the publication's annual

rankings of firms now meant "starting a new list every year"— because so many of the companies in the previous year's Top 50 were no longer operating under the same names (Cody 2000). By the time the 2000 list went to press, several of the year's ranked leaders had already been gobbled up by larger entities (Cody 2000).

This massive, industry-wide reorganization helped "push" timberland out of the hands of industrial owners in a few different ways. According to Kirk (2001), reorganization resulted in three types of timberland sales. First, pressure to "trim the excess" *generally* drove strategic reassessments that sometimes prompted sales of timberland. Some of these transactions involved unconventional separations of timberland properties from associated mills. Second, the prolonged slump helped popularize the idea that underperforming forest products companies needed to reinvest in "core" product lines— usually high margin paper products and manufactured wood products. This is exactly the rhetoric Champion deployed when it announced its 1997 restructuring, for example (Welsh 1997c). Finally, the acquisitions driven by Wall Street's push for consolidation were often financed in cash, and timberland sales became a way to generate the requisite funds or pay down debt incurred in purchases (Kirk 2001). For forest products companies that still worried about putting themselves at the mercy of the market for their inputs, long-term supply contracts with the entities that purchased their timberland became a popular option (Irland, Hagan, and Lutz 2010; Lönnstedt 2007; Yin et al. 1998).

Input control became less of a concern as timberland divestitures accelerated, however. Vertical integration had always been attractive to forest products companies in part because any standing timber they owned was timber that their competitors did *not* own. When institutional investors entered the timberland market, this was no longer necessarily so. The breakup of the industrial forest estate in most areas meant a movement away from log markets dominated by a small number of suppliers; more competitive markets made it less essential for forests products firms to secure their input supply through timberland ownership (Lönnstedt 2007).

The Pull: Pension Reform and the Low-Risk, High-Return, Inflation-Hedging Investment

Most accounts of the rise of institutional investment in U.S. timberlands begin with the Employee Retirement Income Security Act of 1974 (ERISA). ERISA encouraged private pension funds to diversify their portfolios, and some states went on to adopt similar legislation targeting public funds and endowments (Binkley, Raper, and Washburn 1996; Binkley, Tarver, and Collins Gunnoe and Gellert 2010). These reforms increased institutional interest in so-called "alternative" investments, of which timberland is just one type. The policy changes of the 1970s did not immediately lead to many actual purchases of timberland by pension funds and endowments, however. In order for that to occur, forests had to be rendered legible to the financial sector. The structures of timberland investment— including both the legal arrangements for holding the land and the capacity to manage it— needed to be refined, and investors

needed to be able to understand the performance of timberland in the same terms that they used to evaluate traditional stocks and bonds (Binkley, Raper, and Washburn 1996; Rinehart 1985; Zinkhan 1988; see also Wessel 1984). When experience and research began to erode these barriers to investment, institutional portfolio managers discovered many benefits to timberland ownership.

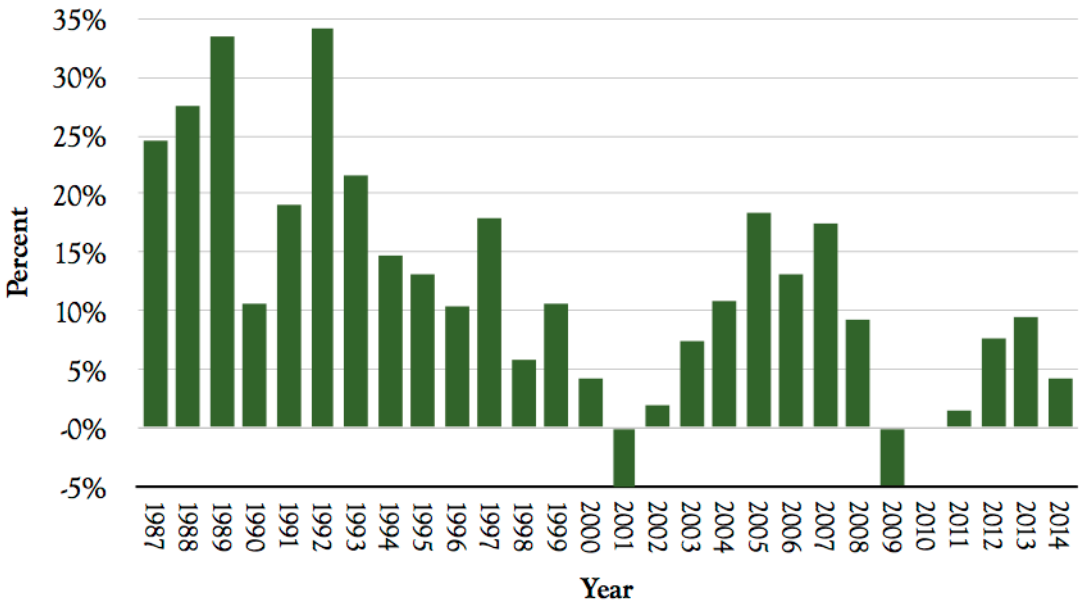
Insurance companies and commercial banks played an important role in this transformation. The very idea of timberland-as-investment originated with the latter, which came into forest ownership through agricultural lending. Since American farms tended to include woodlots, banks often acquired forest plots in repossessions of agricultural properties. When the woodlots turned out to be the most lucrative components of these farms, banks began using timber as collateral. Insurance companies caught on, seeing an opportunity to generate high returns on premiums through timberland ownership (Binkley 2007). As these finance-savvy entities developed in-house forestry expertise, they found themselves well positioned to advise other institutional investors on timberland acquisition and management (Binkley, Raper, and Washburn 1996).

This is how timber investment management organizations were born. Though often grouped with REITs— they are the two most popular arrangements for forest investing— TIMOs differ from trusts in that the term does not refer to a legally defined structure

for organizing ownership and investment; rather, TIMOs are companies that provide services to timberland investors. These services can include acquiring timberland properties, setting up the legal entities that will hold them, conducting annual hold/sell analyses, and managing the forest itself (Binkley, Washburn, and Aronow 2005). Because many would-be investors lack the specific expertise required to evaluate and manage forested properties, the presence of TIMOs helped facilitate large-scale institutional investment in timberland (Binkley, Raper, and Washburn 1996).

In order for institutional investors to seriously consider including timberland in their portfolios, they also needed to be able to describe its historical performance and project its likely risks and returns in the future as they would for any other investment (Harris et al. 1989). Since timberlands are not traded on a single and ongoing market, there is no obvious way to accurately reconstruct historical returns. Beginning in the 1980s, growing institutional interest in timber, along with the longstanding "hidden asset" perception, prompted extensive research in this vein (Binkley, Raper, and Washburn 1996). These studies provided quantitative confirmation of the conventional wisdom on timberland returns— namely, that they were very strong (Binkley, Washburn, and Aronow 2005; Healey, Correiro, and Rozenov 2005; Zinkhan 1988). Later, as they accumulated multiple years of data from their own properties, institutional investors compiled indices that tracked the performance of timberland investments (Figure 2.2). According to one such index, timberland returns averaged nearly 15% annually

FIGURE 2.2 ANNUAL TIMBERLAND RETURNS, 1987-2014



Data from NCREIF (National Council of Real Estate Investment Fiduciaries) Timberland Index, generally regarded as the benchmark within the industry. For a discussion of its derivation and limitations, see Healey, Correiro, and Rozenov 2005, pp. 65-66 and footnote on p. 73.

between 1987 and 2005 (Healey, Correiro, and Rozenov 2005, 66; see also Binkley, Tarver, and Collins 2001, 24; Binkley, Washburn, and Aronow 2005, 236). But returns are only part of the story: Studies also revealed that timberland tends to present low risk generally and especially relative to its rate of return (Binkley, Washburn, and Aronow 2005; Block and Sample 2001). It also appears to be counter-cyclical, and an effective hedge against inflation— particularly inflation that is not expected (Binkley, Washburn, and Aronow 2005; Healey, Correiro, and Rozenov 2005; Washburn and Binkley 1993; Zinkhan 1988). In short, timberland seemed likely to hold its value well in conditions where traditional investments would perform poorly. This made it highly attractive to institutional buyers particularly, since their objective is not securing high

returns per se, but rather to balance risk and return across a portfolio by investing in a diversity of assets.

It is important to note that for institutional investors, "owning" timberland generally does not refer to a fee simple arrangement (Browne 2001; Harris et al. 1989). For tax-exempt funds, proceeds from timber management would likely count as unrelated business taxable income. As such, institutional investors typically own a stake or share in an entity formed to hold timberland properties. Many different kinds of legal structures can serve in this capacity, including funds, partnerships, limited liability corporations, trusts, and group annuity contracts with insurance companies (Browne 2001). Several of these are also flow-through entities, which means that when tax benefits for integrated forest products companies evaporated in 1986, institutional owners were left in a comparatively advantageous position.

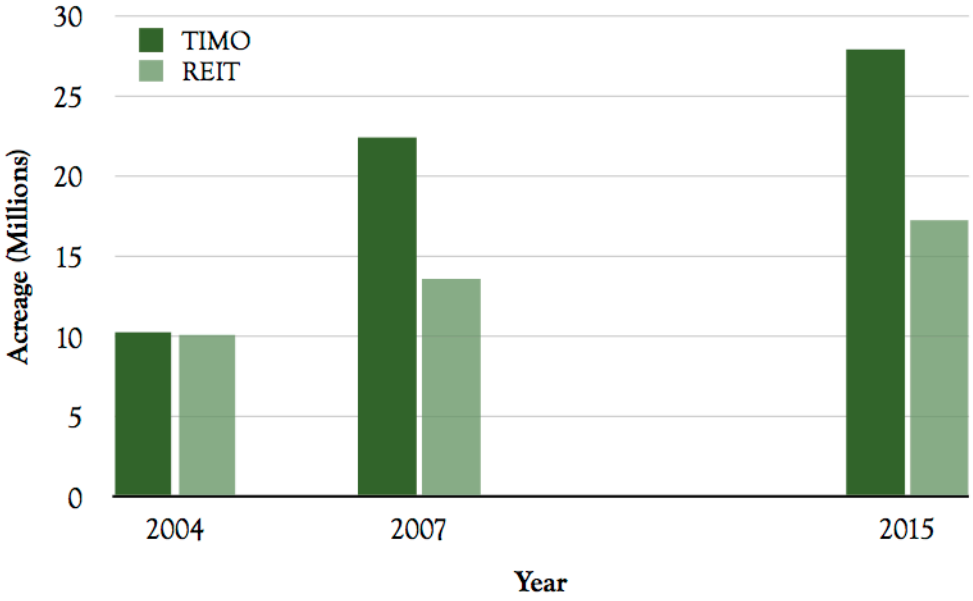
As a result of these changes, institutional investment in timberland accelerated throughout the 1990s and into the 2000s (Block and Sample 2001; Browne 2001; Binkley, Washburn, and Aronow 2005). Publicly traded REITs were developed to give individuals access to the benefits institutional investors hoped to realize from timberland, much the way mutual funds allow investors with small amounts of capital to compile diverse portfolios (Interview #126; #127; #128). By the late 1990s, they had displaced MLPs as the preferred issuer for publicly traded timber securities (Binkley,

Washburn, and Aronow 2005). The forest products industry tracker RISI estimates that over 40 million acres of timberland are now managed by TIMOs and REITs— an area over half the size of the industrial forest estate in 1987, when a survey of institutional investors found widespread lack of awareness of timberland as an investible asset class (Bob Flynn, pers. comm. 2015; Gunnoe and Gellert 2010; Harris et al. 1989). While the growth of TIMO and REIT holdings seems to have slowed in the wake of the recession (Figure 2.3), since 2007 total acreage in these ownership types increased by 24% and 27%, respectively (Bob Flynn, pers. comm.; Harris 1997).

From Input to Asset Class: The Financialization of Forest Ownership

The seemingly diverse drivers of timberland ownership change at the end of the 20th century present clear links to the financialization of the U.S. economy as a whole. With respect to federal policy changes, neither ERISA nor the TRA was explicitly intended to deregulate the financial sector, but the former opened the door for large amounts of investment capital— itself a signifier of financialization (Gunnoe and Gellert 2010)— to flow into a cornucopia of new financial instruments, including timberland investment vehicles. Though the TRA actually raised the tax rate on capital gains— hardly a pro-finance move— its effects on timberland owners illustrate the broader patterns that now confer advantage to institutional investors: When flow-through entities structured for investment escape taxes regular businesses face, the tax code preferences the financial sector over productivist activities.

FIGURE 2.3 U.S. TIMBERLAND MANAGED BY TIMOS AND REITS, 2004, 2007, AND 2015*



* Years for which data are available. 2004 data from Forestweb via Harris 2007; 2007 data from RISI via Harris 2007; 2015 data from RISI via Bob Flynn, pers. comm.

Changes in corporate governance demonstrate this connection more obviously. Though timber's tendency to retain value in downturns and its liquidity relative to milling and manufacturing equipment had once made it attractive to integrated forest products firms, these attributes prompted a different response in the 1990s. Companies with low-performing manufacturing units and high-value timberlands were regarded as mismanaging their assets (Binkley, Washburn, and Aronow 2005, 234; Gunnoe and Gellert 2010). The new logic of Wall Street required that timberland be held by the entities positioned to return the greatest dividends to their investors. That this logic trumped the strategic interests of integrated forest products companies is evidence of financialization's meso-level effects.

The financial sector also encouraged the industry to sell off its timber and invest the capital in core functions— usually product lines in which particular firms enjoyed significant brand recognition or market share (Gunnoe and Gellert 2010; see, e.g., Gomes 1997; Martinez 1999; Welsh 1998b). This emphasis reflects the larger shift from a "retain and reinvest" emphasis to the "shareholder value" paradigm that is characteristic of financialization (Gunnoe and Gellert 2010)— and, as we have seen, timberland divestitures were rationalized in exactly the terms theories of corporate governance predict (see, e.g., Ha 1997; Los Angeles Times 1997; Welsh 1997b; 1997c). Under the old model, controlling a variety of complimentary businesses provided the parent company with a means to balance its cash flow, protect itself from input price increases, and reduce exposure to market fluctuations. In contrast, maximizing shareholder value demands monetizing assets for the benefit of the core company. In effect, the financial sector had asserted that balancing risk, exposure, and return should occur at the institutional portfolio level, as opposed to at the firm level through vertical and horizontal integration.

In the "dismal" '90s, the forest products sector complied with Wall Street's directives by selling timberland. Institutional investors generally allocated only small proportions of their funds to this asset type, but given the immense amounts of capital they controlled, even tiny percent allocations translated to significant acreages— and a robust market for forest products companies looking to divest (Browne 2001).

Since these firms' timberland holdings had stretched across the country, the effects of ownership restructuring reverberated from the pine plantations of the South to the fog-shrouded redwoods of California's North Coast. All three of the major timberland transfers in that occurred in the redwood region between 1998 and 2008 evince clear links to the dynamics driving change in the forest products sector nationally. PALCO, in fact, became one of the industry's object lessons after Texas-based Maxxam Corp. acquired the company in a junk bond-financed stock raid in 1986. Along with its generous pension fund, PALCO's well-stocked, sustainably managed timberlands were what made the company look like a steal for its stock price (Harris 1997; Interview #112a). The ensuing controversy over PALCO's forest practices was often portrayed in the national media as the latest front in the battle between rural jobs and biodiversity, but with that controversy now nearly a decade off the stern, the industry and regulatory communities seem to have converged on the position environmentalists maintained all along: PALCO's bankruptcy did not arise from the ordinary market imperatives of a forest products company burdened by excessive regulation. Rather, the firm's aggressive management— in which regulators were compelled to intervene— was driven by Maxxam's need to service the sizeable debt it incurred in the takeover (Interviews #107, #111, #112a; Jani 2009). As one regulator recalls, the state's large timber companies and the industry lobby group supported PALCO publicly, but "if you could get them with a little alcohol in them, they would agree that what [the company was] doing wasn't good" (Interview #107).

While PALCO provided a cautionary tale to other timber-rich companies in the late 1980s and early 1990s, the changing structure of the forest products industry nationally affected Georgia-Pacific's and Louisiana-Pacific's redwood divestments in more predictable ways. These dynamics will be described in detail in the following two sections.

Georgia-Pacific Corporation

Georgia-Pacific is a diversified and vertically integrated forest products firm. A giant in the paper sector, it ranked in the top ten North American pulp and paper companies by a variety of metrics from the 1980s to the 2000s (Cody 2000; Lönnstedt 2007; Yin 1988). Its interests included tissue, packaging material, pulp, building products, and distribution (Cody 2000). The company was also rich in timberland: In 1987, only International Paper and Weyerhaeuser topped Georgia-Pacific's 4.6 million commercial forest acres (Yin et al. 1998). Only a fraction of these were located on the California coast, where Georgia-Pacific had started acquiring redwood timberland in the years following World War II (California State Parks 2011; Irvine 1997). Some of this land went to Louisiana-Pacific when that company was split off of Georgia-Pacific by antitrust regulators in 1973; Georgia-Pacific also sold a portion of its redwood forest to the Coastal Conservancy and the Trust for Public Land in 1986, after environmentalists sued to stop logging in the area that would become the Sinkyone Wilderness State Park (California State Parks 2011; Clifford 1998). That left Georgia-

Pacific with nearly 200,000 acres of redwood property going into the 1990s, nearly all of which was in Mendocino County (*New York Times* 1999b).

Georgia-Pacific's strength in paper would make it vulnerable to pressure to refocus in that decade, but the company was a latecomer to the forest divestiture trend, relatively speaking. While International Paper and Weyerhaeuser began backing away from timberland ownership in the late 1980s and early 1990s, Georgia-Pacific actually increased its holdings by 1.4 million acres during that period of time, surpassing the other two companies in total acreage by 1994 (Yin et al. 1998). But the oversupply crisis in the paper market brought bumpy returns in 1995 and 1996 (Georgia-Pacific 1998; 2000; Peltz 1997; Welsh 1997c), and by 1997 Georgia-Pacific was engaging in strategic divestitures to reduce costs (*Wall Street Journal* 1997b). The company's Martell, California, manufacturing facilities and timberland in the Sierra Nevada were an early cut.[8] In part because of those sales, while the rest of the industry languished in the first quarter of 1997, Georgia-Pacific was able to post gains (*Wall Street Journal* 1997d). For the rest of the year, the company's remaining building products concerns and ongoing efforts to cut costs helped bolster net income while pulp and paper prices recovered (Bleakley 1997c; *Wall Street Journal* 1997e; Welsh 1997c).

[8] These included a sawmill and particleboard plant (*Wall Street Journal* 1997b. The particleboard plant is now owned and operated by Sierra Pine, a national, privately-held composite company specializing in MDF and particleboard (California Forestry Association and Paul F. Ehinger Associates 2013; Sierra Pine 2015).

A Hidden Value Problem

Georgia-Pacific's performance in the middle-1990s was relatively solid, and the company was too large for hostile takeovers to be much of a concern. However, its vast timberland holdings registered a problem when it became clear that their full market value was not reflected in the company's stock price. Discrepancies between book value and market value and between market value and stock price were nothing new in the forest products sector, but by 1997, corporate reporting had become more transparent (Kirk 2001). With new information, industry analysts had developed a number of ways to estimate what share prices for integrated firms would be if the value of their timberlands were fully taken into account, and the numbers they came up with were sometimes shockingly different from where a firm's stock was actually trading at the time of the calculation. For example, when analysts pegged Bowater's value between $78 and $81 per share in September 1997, the going rate was closer to $53. The gap between the trading price and the estimated, timberland-inclusive value of Georgia-Pacific shares was thought to be around $37 (Ha 1997). The *Wall Street Journal* reported these numbers on the occasion of Bowater's decision to consolidate its North American timberlands into a single operating division, distinct from its manufacturing concerns. Bowater leadership made no secret of the fact that this reorganization was a precursor to some kind of timber-specific spinoff. In deciding what legal form this new entity would take, the company said it was keeping an eye on U.S. Timberlands Co., which planned to manage 601,000 acres of timberland it acquired from Weyerhaeuser

in 1996 as an MLP (Ha 1997). REITs were also coming into vogue around this time (Binkley 2007), and presented another possible approach.

Georgia-Pacific faced the same pressure to tap the hidden value of its timberland that Bowater was grappling with, but it was reluctant to do so through an MLP or REIT spinoff or an outright sale. Though pulp, paper, and even building products were more central to the company's identity and reputation, the cyclical, capital-intensive nature of these industries made them tough places to turn a profit; Georgia-Pacific's vast swaths of timberland, on the other hand, were a "predictable high-margin business with a promising outlook" (Greising 1998; see also Caddell 1998). The company's performance in 1996 illustrates how dramatic the disparity could be: That year, Georgia-Pacific reported $150 million in profits, of which $127 million came from its timber business (*Wall Street Journal* 1997f). Georgia-Pacific needed a way to force the stock market to separate the value of its profitable timberlands from the value of its other concerns without actually separating its assets into two distinct companies.

Having Their Timber and Trading It, Too

The solution Georgia-Pacific proposed to shareholders in Fall 1997, shortly after Bowater's announcement, was to list its timberland division on a separate "tracking" stock (*Wall Street Journal* 1997f; 1997g). In theory, tracking stocks maintain a parent company's control over a subset of their businesses while allowing the stock for those

concerns to (hopefully) rise and (potentially) fall on their own merits. Though Georgia-Pacific's move would be a first for the forest products sector, tracking stocks had been used before, and they were increasing in popularity in the late 1990s (Mulligan 1999).[9] Institutional investors prefer spinoffs— in large part because of the conflict of interest issues that arise when one board of directors and management team are required to act in the interest of two separate sets of shareholders in their management of two interdependent companies— but the market still generally rewards tracking stocks, both at the time of announcement and following the actual split (Caddell 1998; Hamilton 1997; Sandler 1998).

Georgia-Pacific CEO Pete Correll did face criticism for promulgating a timberland tracking stock (Greising 1998; Lowenstein 1997). Of particular concern in the Georgia-Pacific proposal was the fact that executive compensation would be based primarily (75%) on the performance of the company's manufacturing arm and only secondarily (25%) on the fortunes of the timberland division. This arrangement gave Georgia-Pacific's leadership an incentive to put the interests of the former over the interests of the latter. Additionally, the timber division was contractually obligated to sell 80% of its logs to Georgia-Pacific at the average price paid by the firm to other sellers. Since Georgia-Pacific was one of the largest buyers on the market at the time, it was able to

[9] As old companies launched online divisions in the late 1990s, tracking stocks were seen as a way to capitalize on the market's enthusiasm for ebusiness. If the (new, exciting) division is not profitable, the losses can be written off the more stable division's gains. In contrast, spinoffs typically result in a higher tax bill for the selling firm (Mulligan 1999).

secure some of the lowest prices— a fact which made this agreement a poor one for timber shareholders (Greising 1998).

Correll responded to these complaints by claiming that tax penalties for a spinoff were prohibitive (Greising 1998; see also Georgia-Pacific 1998, 4). Evidently that was all the assurances shareholders required, because Georgia-Pacific's tracking stock was approved in December 1997. The corresponding division would be called the Timber Company (Timber Co.) and trade under the symbol "TGP", while the main company was renamed Georgia-Pacific Group (GPG). Timber Co. made its NYSE debut on December 17 at $25 per share (Brannigan 1997; Mollenkamp 1998).

After the Split: Curtailments, Refocusing, and Recovery

Georgia-Pacific's manufacturing businesses continued to struggle after the tracking stock split (*Wall Street Journal* 1998b). By February 1998 both Timber Co. and GPG stocks were down— a fact Georgia-Pacific blamed on poor lumber prices and weak export markets (Caddell 1998). Oversupply was also a problem in the lumber market around this time, leading Georgia-Pacific to close several West Coast and Southern mills briefly in the fourth quarter (Parkinson 1997). This move was part of a raft of short-term mill shutdowns announced in October 1997, which succeeded in boosting lumber futures on the Chicago Mercantile Exchange (Gogoi 1997; Parkinson 1997).

Georgia-Pacific also drastically reduced its production of market pulp in mid-1998 in response to the Asian slump (*Wall Street Journal* 1998f).

Other changes were more permanent. In March of 1998, Georgia-Pacific eliminated the third shift at its Ft. Bragg, California mill— a move that cost Mendocino County 65 jobs (*Pulp and Paper* 1998). It also started to back out of millwork fabrication and building products distribution, announcing plans to sell eight and thirteen facilities, respectively (*Wall Street Journal* 1998a). Around the same time, Georgia-Pacific acquired corrugated sheet producer CeCorr, paying half the $190 million price in cash (*Wall Street Journal* 1998d). Taken together, these moves suggest a strategic shift away from building products and into paper and packaging.

Georgia-Pacific's fortunes began to improve in mid-1998, mostly on the strength of the housing market (Hagerty 1999a; *Wall Street Journal* 1999a; Welsh 1998a; see also *Wall Street Journal* 1999e; 1999g; 1999h), and when GPG expanded its holdings significantly the following year, it did so almost across the board. The division's acquisitions and new construction included facilities for manufacturing cardboard boxes, drywall, and engineered particleboard, and also in office paper distribution. (Hagerty 1999b; Tejada, Hagerty, and Quintanilla 1999; *New York Times* 1999a; *Wall Street Journal* 1999b; 1999c). But GPG's big investment during this period of time was in tissue products.[10]

[10] E.g., paper towels, toilet paper, and paper napkins.

In May 1999, Georgia-Pacific announced a stock split and a $90 million investment to increase capacity at a Port Hudson, Louisiana tissue plant by 80,000 tons per year (Starkman 1999; *Wall Street Journal* 1999f). The next month, the company committed to a joint venture with Chesapeake Corp. in commercial tissue production. The *Wall Street Journal* described this move as "part of a strategy to beef up both its commercial- and consumer-tissue operations" (Starkman 1999). The company was moving to increase its presence in markets for higher-margin products and grades, and it would continue to do so in the coming year (Cody 2000).

The Timber Company: Whittling Away the Woods

For all the fanfare about timberland's hidden value and despite some promising gains early on, Timber Co. did not perform well in its first year, and analysts were disappointed when its stock lost nearly $3 per share off the opening value in the first eight months (Mollenkamp 1998). In 1998, the division began reviewing its properties to assess their "strategic fit," and a handful of divestitures followed (Georgia-Pacific 2000b, 9). The first came in March of 1998, but the assets in question were real estate development operations, not timberland— "tactical land sales," as the division described its divestitures of smaller and nontimber properties (Georgia-Pacific 2000b, 8-9; *Wall Street Journal* 1998c). In October, Timber Co. announced the sale of 61,000 acres of West Virginia forest— property whose value the *Wall Street Journal* estimated to be about $18 million (Georgia-Pacific 2000b, 9; *Wall Street Journal* 1998g). As the

tracking stock wallowed in early 1999, the division shed 390,000 acres of timberland, this time in New Brunswick (McGough and Buckman 1999; *Wall Street Journal* 1999d). The *Wall Street Journal* reported that Timber Co. was "reviewing its land holdings and selling properties that [weren't] considered to be of strategic importance"— the language of Kirk's (2001) strategic management reassessment-type divestiture (*Wall Street Journal* 1999d).

It was in November of 1999 that Georgia-Pacific announced the sale of its 194,000 acres of redwood timberland for $397 million. The news was a very small blip on the *New York Times*' radar and no reasons for the divestment were given (*New York Times* 1999b), but Kirk (2001) classifies Timber Co.'s New Brunswick and California sales both as strategic management reassessment, and the division later classified the sale as part of its strategic land sales program (Georgia-Pacific 2000b, 9). The purchase was undertaken jointly by Campbell Group— an established TIMO— and a brand new limited partnership known as the Hawthorne Timber Company. Campbell has a policy against disclosing the identities of its clients, but an employee of the Washington State Investment Board (WSIB) told the *Ukiah Daily Journal* that the property was his organization's investment (Poole 1999). WSIB now manages nearly $107 billion in assets for various Washington public employee retirement funds (WSIB 2015), and Hawthorne exists only as a legal container for its redwoods (Poole 1999).

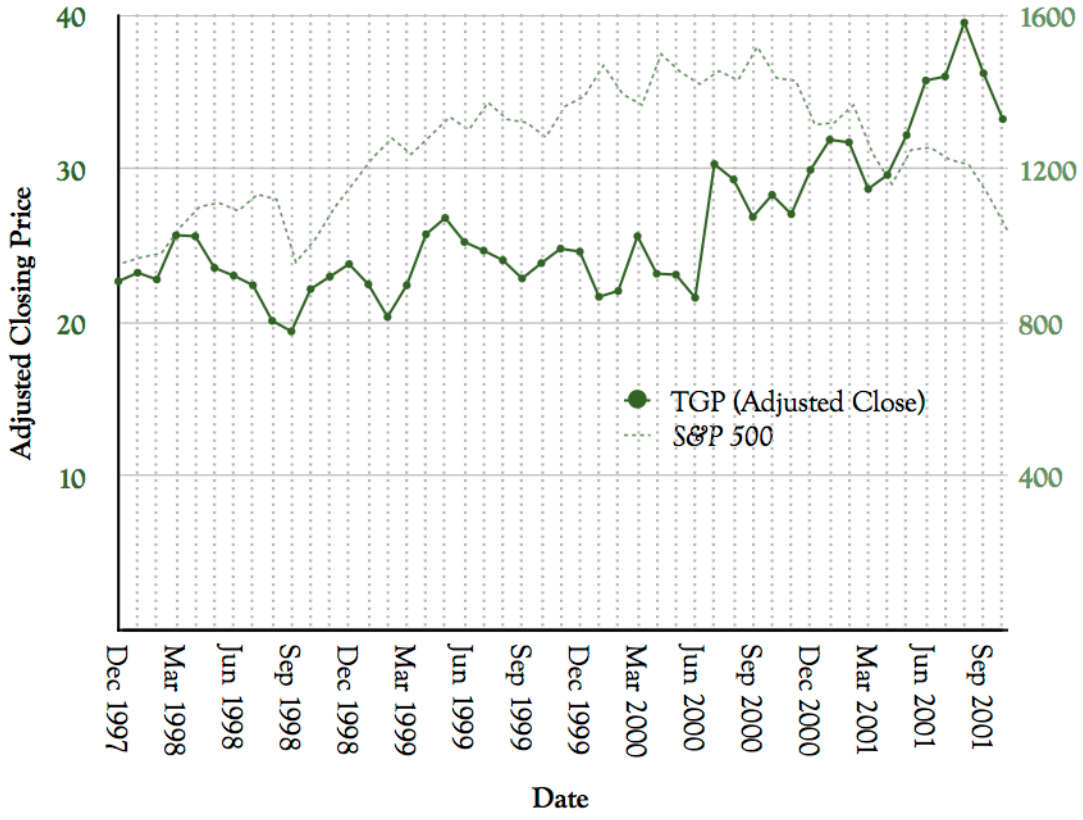
Endgame: Timberlands as a "Crutch"

Eight months after Timber Co. unloaded its California holdings, Georgia-Pacific sold the division to Plum Creek Timber Company for $3 billion in stock (*Los Angeles Times* 2000). Since the tracking stock split, Timber Co.'s parent company had been satisfying an increasing proportion of its fiber demand through market transactions— not from its own timberlands, in other words. "The Georgia-Pacific Group is now buying timber on the open market cheaper than it ever has relative to benchmark prices," the company's 1999 annual report crowed, five months before the sale of Timber Co. was announced. The company additionally bragged that it had "eliminate[ed] the crutch of owned timberlands" (Georgia-Pacific 2000a, 24). The original impetus for large forest holdings had been securing a low-cost fiber supply, but in the late 1990s, Georgia-Pacific discovered that it could do that just fine without owning the land and growing the trees itself. In this context, it is hardly surprising that the Timber Co. was sold even as tracking stock prices finally began to climb (Figure 2.4).

The division's buyer was also a spinoff— from Burlington Resources, which was cleaved from Burlington Northern Railroad (BN) in 1988. Plum Creek was formed a year later as an MLP and converted to a REIT in 1999. Its acquisition of Timber Co. made it the second largest private timberland holder in the country (*Los Angeles Times* 2000). Georgia-Pacific went on to purchase Fort James for $7.4 billion in 2000 (*Los Angeles* Times 2000). Formed in 1997 by the merger of Fort Howard and James River Corp.,

Fort James was North America's third largest paper company at the time of its acquisition. Since the company was also the continent's top manufacturer of tissue, Georgia-Pacific had to divest some of its capacity due to anti-trust concerns (Cody 2000). High returns on tissue products were what made Fort James attractive to the company, and industry observers saw Georgia-Pacific's sale of Timber Co. as part of the financing strategy. Sources told *Pulp and Paper* that Georgia-Pacific was also expected to sell nearly all of its market pulp capacity, its chemicals business, and some building

FIGURE 2.4 THE TIMBER COMPANY (TGP) TRACKING STOCK, 1997-2001



S&P 500 (values on the right axis) provided for comparison. Data from Mergeant Online and Yahoo! Finance.

products interests. The trade magazine situates both Georgia-Pacific's sale of its timberlands and those market pulp divestitures as part of an effort to distance itself from commodity products, capture profits by focusing on higher margin grades, and avoid cyclical losses (Cody 2000). In short, it was a continuation in the direction the company had been moving, little by little, since the bumpy years of the middle-1990s.

Louisiana-Pacific Corporation

Louisiana-Pacific's experience in the tumultuous 1990s was shaped by a formidable chief executive and an emphasis on one of the products he developed, which made the company's fortunes but ultimately backfired (Gomes 1997; Peltz 1997). As a building products specialist, Louisiana-Pacific was insulated from oversupply problems in the paper sector, but ultimately autocratic leadership and anemic middle management more than made up the difference in hardship. Mismanagement of the company led to faulty product claims, environmental violations, and, on the North Coast, notorious overharvesting, all of which undermined Louisiana-Pacific's businesses and overall returns, exacerbating cyclical downturns. The company ultimately faced pressure to recover its core competencies and resolve outstanding disputes, and timberland sales were the result.

Bad Management and Bad Siding: The Roots of Trouble

Louisiana-Pacific CEO Harry Merlo has been described as "a throwback to a different era"— a "timber baron" and even "the ultimate cowboy" who "lived an imperial lifestyle" and ran Louisiana-Pacific "like a fiefdom" for more than twenty years (Jaquiss 2013). He took control of the company immediately following its split from Georgia-Pacific and became known for pushing the development of new products. His most successful innovation was oriented strand board (OSB), a plywood substitute that could be made with low-quality wood from small diameter trees (Schine and Marks 1995).[11] Louisiana-Pacific introduced OSB for floor and roof sheeting applications in 1980, amidst mounting concern in the industry that the supply of large-diameter logs necessary for plywood manufacturing would soon lag behind demand for the product (Pollack 1991; Schine and Marks 1995). In this context, OSB was a tremendous success, but in 1985, Merlo developed a version for exterior siding that began to fail within a few years. The product became waterlogged in moist climates, and in the warm, humid South, some homes built with OSB siding sprouted mushrooms. The first lawsuits cropped up in 1990, and though 1994 was a record-breaking year for Louisiana-Pacific (with income of $347 million), the size of the company's settlement payouts were also increasing: OSB failures cost the firm $22 million in 1992, and by

[11] Plywood, in contrast, is made by layering uniform sheets of wood from "peeler logs," which must be relatively straight and larger in diameter even than those commonly used for dimensional lumber. OSB was considered "an environmental breakthrough" when it was introduced because it provided a use for scrap wood (Lublin 1996).

1995, industry observers were anticipating that total payouts could exceed $300 million (Schine and Marks 1995).

There were other problems, too. A former employee filed a sexual harassment suit against Merlo in August 1993— alleging, among other things, that executive assistant positions were reserved for "young, strikingly attractive" women "likely to acquiesce to sexual advances by the CEO" (Schine and Marks 1995). In June 1995, the company was indicted for inspection fraud and environmental quality violations at a Colorado plant. The board at this time was mostly composed of Merlo's close friends, but as the lawsuits and indictments piled up, a relative newcomer persuaded the rest of the directors to launch an investigation of company practices. Their findings painted a picture of a demanding, autocratic leader who did little to cultivate management beneath his two seconds-in-command— a recipe for weak controls and cut corners (Schine and Marks 1995).

Merlo suspected nothing when he was summoned to a regular board meeting the following month. He was shocked when the directors asked for his resignation (Schine and Marks 1995). His two top executives were also ousted. With lawsuits pending, interim CEO Donald Kayser denied that the allegations against Louisiana-Pacific were the reason for Merlo's dismissal, instead attributing the firing to the problems with the former CEO's management style that were uncovered during the investigation (*New*

York Times 1995). In early January 1996, the Board announced that International Paper executive Mark Suwyn would take over leadership of the company (Lublin 1996).

Cleaning Up After the Cowboy

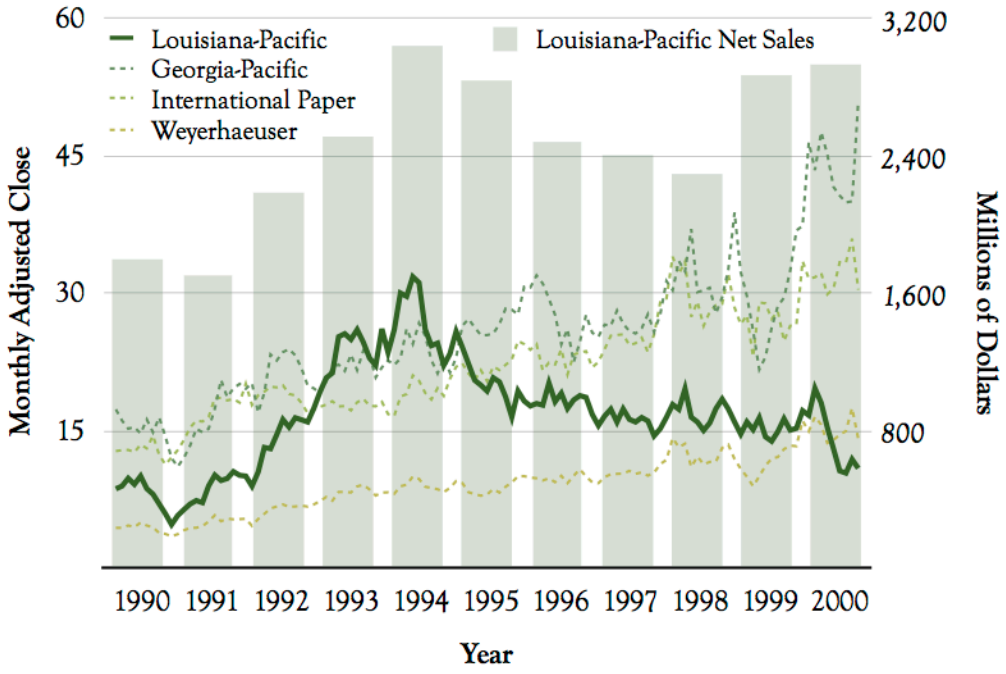
The lawsuits and management shake-up did not leave Louisiana-Pacific well positioned to weather the 1995-1997 slump in the paper and wood products sector, and its stock price would decline steadily during that period of time (Figure 2.5). Kayser and later Suwyn faced the task of quickly settling Louisiana-Pacific's outstanding legal disputes and— along with nearly everyone else in the industry— refocusing the business on its most profitable components (Bloomberg News 1997; *Los Angeles Times* 1997). A raft of deals followed: Louisiana-Pacific paid an estimated $375 million to settle customer suits in Fall 1995, and in early 1996 announced a $1.86 million payment to Oregon and Washington in exchange for a close to their pending consumer fraud investigations related to OSB failures (McCoy 1996). The company posted a loss of $14.7 million in the fourth quarter of 1996— compared to an earning of $26.8 million the previous year— blaming "sharply lower construction-board prices and several mill closings" (*Wall Street Journal* 1997c).

Building products were still Louisiana-Pacific's obvious strength— the *Wall Street Journal* called it "the industry leader" in 1997 (Gomes 1997)— and Suwyn told reporters that the company hoped that by 2000 a quarter of its offerings in that category would be

new or "significantly improved" (*Los Angeles Times* 1997). In January 1997, it acquired GreenStone Industries, Inc., a Bethesda-based business specializing in insulation made from wood fiber "and other building products" (*Wall Street Journal* 1997a).

Louisiana-Pacific began the process of shedding its redwood interests that same month, with the sale of a lumber planing and drying plant in Ensenada, Mexico. The facility had been used for redwood fence boards headed for sale in Southern California (Kraul 1997). A company spokesperson told the *Los Angeles Times* that "the scarcity of redwood [had] gradually reduced the flow of lumber sent south for processing" (Kraul 1997).

FIGURE 2.5 LOUISIANA-PACIFIC STOCK AND NET SALES, 1990-2000



After a record-breaking year in 1994, Louisiana-Pacific's net sales and stock prices declined for four years— the latter even more dramatically than other companies in the industry. Data from Mergeant Online and Yahoo! Finance.

That "scarcity" was widely attributed to Merlo's aggressive exploitation of the company's timberland— often in defiance of his own forester corps (Geniella 1997c; *Press Democrat* 1997). As early as 1990, local staff warned that Louisiana-Pacific's frenzied cutting on the North Coast would lead to timber shortages and undermine its redwood business, but Merlo had ignored them. His relentless push on the division ultimately brought about the end of the Ensenada facility— as the editorial board of the Santa Rosa *Press Democrat* quipped in a headline, "Lesson no. 1: It isn't easy operating a mill without wood"— and by the end of the decade, the former leader in redwood lumber production was unable to keep up with PALCO and Georgia-Pacific in the market (Geniella 1997a; *Press Democrat* 1997). According to one of the company's own executives, by 1997 Louisiana-Pacific had "become a bit player in the redwood industry" (Geniella 1997c).

Not longer able to command a large market share, Louisiana-Pacific announced the sale of the timberlands themselves, along with associated lumber concerns and the pulp mill in Samoa, Humboldt County, in October 1997. The move came in the midst of the wave of restructuring announcements by paper companies that made headlines that fall (Bloomberg News 1997; *Los Angeles Times* 1997). Louisiana-Pacific was said to be planning additional divestitures, and Suwyn stressed the strategic motivations for the California sales, writing in a statement, "The assets we are selling are good businesses that simply do not fit our strategy" (Bloomberg News 1997). Years later, an industry

source who had worked with the company affirmed that this was not mere bluster. Suwyn wasn't trying to put a gloss on an underperforming company; rather, he said, Louisiana-Pacific "liked these businesses and did not want to part with them." Kirk (2001) cited this redwood divestiture as a classic example of a "refocusing" sale, and indeed, Suwyn's comments discursively reinforce this. The industry source (who elected to participate in this study with full anonymity) had a slightly different take, however. Louisiana-Pacific, he said, was generally reluctant to trim assets: They were the kind of company that "hung onto their businesses." Parroting the industry line about "refocusing" was an easy way for Suwyn to avoid publicly acknowledging the truth: Louisiana-Pacific's leadership did not know how many more OSB lawsuits were coming down the pike, or how many millions it would take to settle them. The company needed cash, and monetizing redwood timberland was a quick way to get it. When asked directly if Louisiana-Pacific's decision was influenced by the prospect of endangered species and water quality policy enforcement on the North Coast, the industry source emphatically stated, "It had *nothing* to do with environmental regulation."

At the time of the announcement, Louisiana-Pacific anticipated that the sale of its California businesses would take six months to a year, and the estimate turned out to be right on target— at least for the timberland (Bloomberg News 1997). Simpson Investment Company purchased the 74,000 Humboldt County acres, and upstart

Mendocino Redwood Company (MRC) took the remaining 235,000 acres. The former was a family-owned forest products company headquartered in the Pacific-Northwest that would later split its California operations into a separate operating division— the Green Diamond Resource Company that remains a leading timberland owner on the North Coast. MRC was a subsidiary of Sansome Partners, the investment vehicle of the Fisher family, known for founding the Gap clothing store chain. The companies declined to state who paid what in the $615 million deal, which brought Louisiana-Pacific's recent gains from asset sales to $750 million. Suwyn took the opportunity to reiterate to the press that "the California properties were 'good regional properties' but didn't fit with its goal of becoming a national building products supplier" (*Wall Street Journal* 1998e).

Louisiana-Pacific's fortunes improved in the second quarter of 1999, when earnings exceeded forecasts on a strong market for building products. Along with the rest of the industry, the company reported a good third quarter, too. As Suwyn told the *Wall Street Journal*, "a couple of years getting rid of old… mills and businesses" was serving Louisiana-Pacific well (Carlton 1999b).

Beyond Financialization: Other Factors in Industry Change and the Persistence of Redwood Timbering

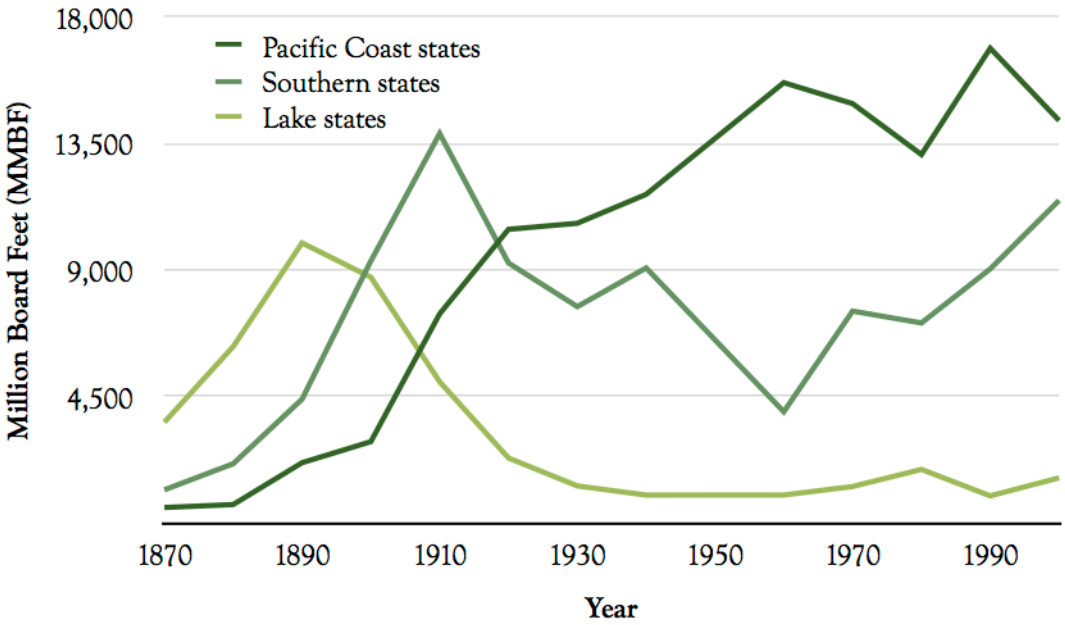
The mid-1990s were hard on the forest products sector, and as a major market player, Georgia-Pacific faced intense pressure to reorganize in a way that maximized shareholder value. At the same time, the bill for years of reckless leadership was coming due at Louisiana-Pacific, and the company had to generate cash and demonstrate to investors that it was serious about turning around. Situated in the context of these challenges and the transformation of timberland ownership nationally, the fate of those firms' redwood properties does not stand out as exceptional: In the late 1990s, big forest products companies generally, and Georgia-Pacific and Louisiana-Pacific particularly, were shuffling their assets around, and timberland was relatively likely to be shed in the process.

This is not to say, however, that all timberland was *equally* likely to be divested, and it does not explain why the North Coast's commercial redwood forests ended up where they did after these sales— still managed for timber production, but held in large part by family-owned companies. This concluding section addresses the inter- and intra-regional dynamics that mediated national changes in the forest products sector, shaping the specific outcomes of the ownership transition in the redwood region: Geographic re-centering of the timber industry, old growth depletion in the West, and competing land uses.

Geographic Re-Centering: The Shift to the South

Even before the transition to institutional ownership got underway in earnest, geography was playing a role in integrated forest products firms' choices about *where* to retain and reinvest. Since the 1960s, the U.S. South has contributed an increasing share of the nation's annual timber output, surpassing the West on multiple metrics by the current decade (see, e.g., Figures 2.6-2.7; see also Haynes 2001, 96; Power 1996, 137). This shift to the South was facilitated in part by the advent of intensive plantation forestry there— a process that began around 1950. The region's earlier timber boom, which occurred at the turn of the century, reaped naturally seeded forests; in its wake, university-, government-, and industry-funded research developed improved seed, fertilizers, and other technologies that, by the 1980s, made it possible to produce fiber extremely efficiently, on very short rotations (Stanturf et al. 2003). During the same period of time— and in anticipation of the exhaustion of the Northwest's supply of big trees— major forest products companies developed manufactured wood products that could be constructed from small diameter logs (Pollack 1991; Prudham 2005). As they ran through the remaining old growth of the far West, timber companies began looking to the pine plantations of the South, which also recommended themselves with their flat land and cheap, nonunion labor (Prudham 2005; Ricks 1983).

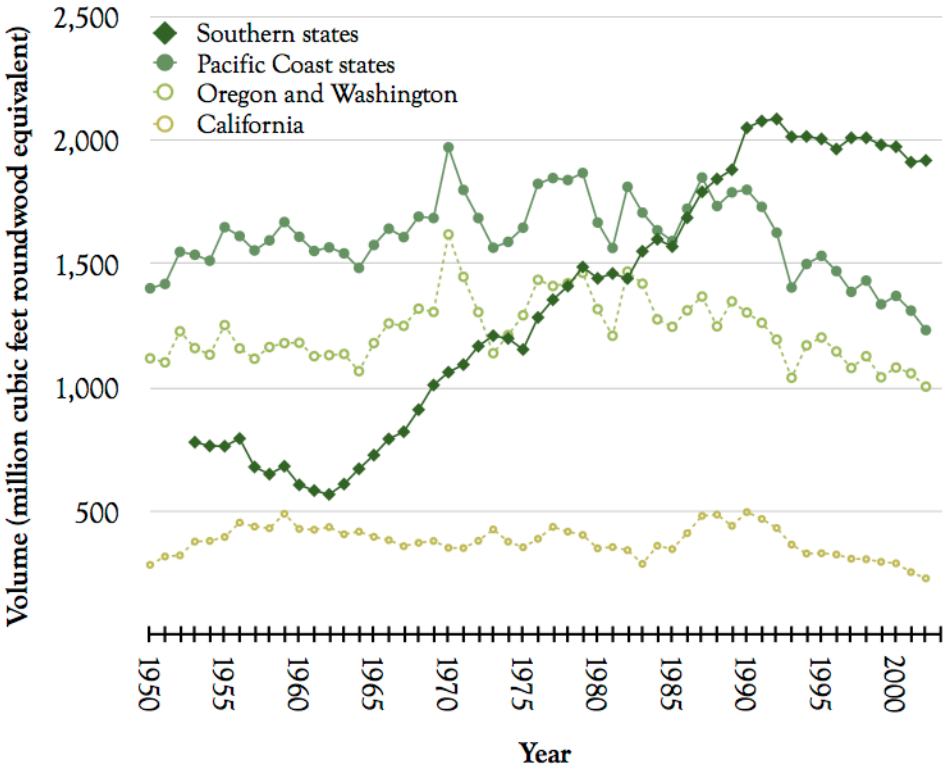
FIGURE 2.6 U.S. LUMBER PRODUCTION IN THREE MAJOR TIMBER-PRODUCING REGIONS, 1870-2000



Data from Steer 1948; U.S. Census Bureau 1962; 1972; 1982; 1991; 2001. Not all data were available at the state level for all years. States and years were selected for inclusion to provide the most consistent categories for each region, however, government data for states with very low production levels are often presented in regional aggregates in some years and then not at all in later years, precluding perfectly consistent regional categories. For example, Pacific Coast states include California, Oregon, and Washington, except in pre-1950 data, in which Nevada's data are aggregated with California's. Southern states include Alabama, Arkansas, Georgia, Kentucky, Louisiana, Tennessee, and Texas because data are unavailable in some years for other southern states. Lake states include Michigan, Minnesota, and Wisconsin, however Minnesota data are aggregated with data from Iowa, Kansas, Missouri, North Dakota, and Nebraska in 1970 and 1980.

Georgia-Pacific and Louisiana-Pacific were no exception to this trend: In 1982, the former moved its corporate headquarters to Atlanta, Georgia, from Portland, Oregon, while the latter began investing in manufacturing facilities in the South— for the most part in lieu of the West (Ricks 1983). Since the vast majority of the South's timberland

FIGURE 2.7 VOLUME OF INDUSTRIAL SOFTWOOD TIMBER HARVEST IN THE U.S. SOUTH AND PACIFIC COAST STATES, 1950-2002



Data from Adams, Haynes, and Daigneault 2006.

has historically been privately owned (Butler 2008, 7-12), the only limit on industrial (and, eventually, institutional acquisitions) was the number of owners willing to sell.

As the South has grown more important in the U.S. forest products industry, the West has suffered. In the troubled mid-1990s, the *Wall Street Journal* observed that the cyclical mill shutdowns— long a fact of life in the West's timber-towns— were giving way to permanent closures as firms moved to centralize operations in the industry's emerging geographic hub (Opdyke 1998). This trend has continued in the wake of the

Great Recession, and around the same time, the South lapped the West in softwood *lumber* production for the first time in over half a century (Keegan et al. 2011).

Neither geographic distance from other businesses or loss of supporting infrastructure were specifically cited as reasons for divestment (or, in PALCO's case, bankruptcy) by the firms exiting the redwood region between 1998 and 2008, either in public statements or interviews. However, the investors that followed in their wake— Green Diamond, the Fisher family, and WSIB— all have strong ties to the Pacific Coast states, suggesting that redwood timberland may have been less attractive to national entities as the geographic center of the forest products industry shifted. More generally, it is safe to state that the re-centering of the industry in the South was reshaping timber production in the West at the same time as these ownerships changed hands, and that this shift is part of a broader pattern in the sector— a pattern that, while closely tied to environmental conditions, long predates modern environmental regulation.

Old-Growth Depletion and Patient Money

The U.S. forest products industry has always been something of an itinerant, moving westward across the continent as it exhausted the old growth endowment of the Eastern seaboard, the Great Lakes region, the Interior West, and finally the Pacific Coast (Power 1996, 136-137). Changes in U.S. timberland ownership at the end of the 20th century coincided with the exploitation of the last virgin forests in the 48

contiguous states; like the fir empire of coastal Oregon and Washington, the redwood belt was running low on big old trees. The Forest Service had long anticipated that the transition from virgin timber to second growth in the Pacific Coast states would prompt a steep drop off in harvest levels— as much as 83% from 1970 production by the year 2000, according to a report published in 1975 (Gedney, Oswald, and Fight 1975). While industry sources interviewed for this project indicated that Georgia-Pacific and Louisiana-Pacific's redwood properties were still highly profitable at the time of divestment (Interview #119; #130), it is widely acknowledged that the era of old growth mining on the North Coast closed on those companies' watch, and the region's timberlands could no longer support the harvest levels they had in the decades following World War II (Geniella 1997b).

As such— and as will be discussed further in Chapter 5— it is unsurprising that the properties once managed by PALCO and Louisiana-Pacific, and part of the Georgia-Pacific ownership, ended up in the hands of family-owned companies. Even more so than institutional investors, these entities are able to make large investments in their timberland properties (e.g., landscape and Habitat Conservation Planning) while foregoing short-term profits. The "patient money in private hands" approach— a term that is often used in reference to the Fisher companies (see, e.g., Jani 2009)— is a logical fit for forests that are fast-growing and high-value, but need some time to recover.

Highest and Best Use Development

Theory on the transformation of rural Western places and economies anticipates that as extraction-based enterprises shutter or relocate, the land they leave behind will be broken into smaller parcels that can be developed according to their differing "highest and best" economic uses (Bliss et al. 2010; Duane 1999; Robbins et al. 2009, 367-370). Since these properties tend to be scenic and remote, the last twenty-five years have brought growing attention to the prospect that the West's farms and ranches will be subdivided for the construction of second homes and resorts (see, e.g., Brunson and Huntsinger 2008; Compas 2007; Egan and Luloff 2000; Gosnell and Travis 2005). As large integrated forest products companies retreated from timberland ownership in the 1990s and early 2000s— and, in many cases, transferred their land to investors who have no strategic interest in holding forestland for its potential to produce timber particularly—conservation groups with interest in the preservation of forested ecosystems became increasingly concerned about the long-term outlook for timber production on these lands (Block and Sample 2001; Gouras 2002; Johnson 2007; Robbins 2005).

The North Coast is no exception to this trend. Tourism is a significant industry in some parts of the region, signaling the area's attractiveness as a site for second homes, and since many parcels predate the state's major planning institutions, subdivision is relatively easy under California law (Dean Runyan Associates, Inc. 2009; Stewart 2007;

The Conservation Fund 2005: 117-118). Additionally, the western front of California's famous wine country is moving further into Sonoma and Mendocino Counties, transforming the historically diverse agricultural landscape of the interior Coast Ranges (Merenlender 2000; Sahagun and Huffstutter 2011). In a lengthy report on conservation prospects for the North Coast, an environmental nonprofit noted that the value of Mendocino County wine grapes eclipsed the value of its timber for the first time in 2001 (TCF 2005: 123). Shortly after that symbolic threshold was crossed, Premier Pacific Vineyards— essentially a TIMO for vineyard properties— announced development plans for 19,300 Sonoma County acres owned by the California Public Employee Retirement Program (CalPERS). The proposed project— which, ironically, was to be called "Preservation Ranch"— called for the conversion of 1,600 acres of redwood timberland to winegrapes, along with construction of upscale residences (or, as one environmental activist took to calling them, "mini-mansions attached to vanity vineyards") (Chamberlin 2002; Sahagun 2013; Weiser 2007). Preservation Ranch was eventually defeated by community and environmentalist opposition, and the property was sold to a conservation organization in 2013, but the episode stoked fears that the North Coast's working forests would be "retired" to other, potentially even more intensive uses as the timber industry faded (Rose 2008; Sahagun 2013; TCF 2005: 118-123).

Formally analyzing the extent of fragmentation of large ownerships on the North Coast was beyond the scope of this project and the available data. However, interviews and archival research have provided no evidence to indicate that the major properties formerly held by integrated forest products companies have been reduced by subdivision and conversion to non-timber uses— either during or since their sales. Anecdotally, it seems that where fragmentation has occurred, parcels chipped off the main ownership have gone either to the state for parkland (e.g., Soper 2005) or to nonprofit conservation groups intending to establish preserves or community forests (e.g., A'Dair 2004; Fimrite 2011; Reiterman 2007; TCF 2006; 2009; Wang 2000). Kelly and Bliss (2012) document a similar pattern on the timberlands of Central Oregon, emphasizing the interaction of national- and global-scale restructuring, ecological degradation, and community capacity in their analysis of the outcomes of ownership change and fragmentation. In a particularly relevant case study, they find that a tract of former industrial forestland emerged as a potential community forest because (1) the timber had been depleted (rendering it unattractive to industrial owners and institutional investors); (2) the property still had significant ecological and amenity values (making it attractive as a conservation acquisition); (3) it was located within the viewshed of the thriving community of Bend, which sparked the interest of real estate developers (that in turn drove the community's desire to preserve the forest); and finally (4) because the community had the capacity to resist the proposed development

and mobilize resources in support of an alternative vision (Kelly and Bliss 2012, 1092-1093).

These factors suggest a set of conditions whose presence or absence on the North Coast may at least partially explain post-transition timberland ownership there. Particularly, it is worth noting that much of the timberland that has recently changed hands in the redwood region meets the second condition— ecological and amenity value— simply because it is dominated by this iconic species. However, because redwoods are also fast growing and can command a premium on the market, redwood timberland is likely to be considered commercially valuable even in a relatively depleted state. It is therefore unsurprising that the North Coast's new timberland owners appear to be interested in keeping their properties forested— either for timber production, conservation and recreation, or some combination thereof. Additionally, the impetus for residential conversion in the Bend case— i.e., proximity to a booming real estate market— is absent on most of the remote North Coast. Only Sonoma County— the location of the proposed Preservation Ranch development— is within easy driving distance of a major city. There, much as in the Bend case, demand for luxury second home development correlated with the capacity to stave such development off.

Further north, the long history of conflict over forest management has endowed the region with one component of community capacity: A network of well-organized and

politically savvy environmentalists. It was these advocates, in collaboration with former forest products industry workers, who formed the nonprofit Redwood Forest Foundation, Inc., and secured funds to purchase 50,600 acres of the former Georgia-Pacific ownership from Hawthorne in 2007. The global renown of the world's tallest trees has also provided a subsidy to local conservation efforts. For example, the Preservation Ranch property was rescued from development by The Conservation Fund— a national nonprofit that, by the time of the acquisition, had already secured title to two generous helpings of former industrial redwood forest.

In Del Norte, Humboldt, and most of Mendocino County, however, the simplest explanation for the apparent lack of post-transition forest conversion is that there is little demand for other potential uses of the land.

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CHAPTER 3

LOGJAM: PUBLIC POLICY CHANGE AFFECTING TIMBER HARVESTING ON PRIVATE LAND IN CALIFORNIA, 1969-1994

Introduction

Ownership transition in the redwood region was not driven by regulatory tightening, but the two occurred contemporaneously: The 1990s brought two separate waves of policy change efforts— an early one, which failed in the state legislature, centered on forest policy; the later one, which was more successful in Sacramento, centered on water quality institutions. Though strong state and federal statutes adopted in the late 1960s and early 1970s gave the state's nine Regional Boards Water Quality Control Boards (Regional Boards) sweeping authority to set water quality standards and impose conditions on polluters, it was not until 2003 that the Regional Boards were clearly empowered to block timber harvest plans that threatened water quality. The immediate cause of the shift was a pair of bills adopted by the state legislature in 1999 and 2003 and the changes in regulatory policy they prompted. As a result of these statutes, Regional Boards now operate their own timber regulatory programs that run parallel to the timber harvest permitting process established by the Board of Forestry and its implementing agency, the California Department of Forestry and Fire Protection (CALFIRE).

The following two chapters explore the drivers of these new institutional pathways for controlling the water quality impacts of timber harvesting on private land in California.

Venue-shopping by environmental activists was one important factor: Though well organized regional and national advocacy groups have pushed on the courts to enforce strong movement-era policies on the California timber industry since the 1970s, in the late 1990s, water quality was rising on the state political agenda, and Democrats controlled both the legislature and the governorship. In this context, environmental groups used the legislature to lever the strong resource protection mandate of the 1969 Porter-Cologne Water Quality Control Act (Porter-Cologne) against the Regional Boards' caution and lack of resources. However, this evolution was shaped by a long history of struggle between state water and timber regulatory agencies arising from their conflicting mandates and overlapping jurisdictions. Despite the recent emergence of the Regional Boards as a strong and arguably independent force in the timber policy landscape, these problems continue to frustrate both sets of agencies, as well as stakeholders within industry and the environmental community. The following two chapters treat the proximate causes of policy changes and the longer arc of which they are a part, providing an analysis of policy outputs of political processes that continues in Chapter 5.

This chapter begins by introducing the major public policies regulating timber harvesting on private land in California as established in the late 1960s and early 1970s. These include state-level forest practice and environmental assessment statutes and two tough water quality laws— one state, one federal— which collectively bestow

authority for regulating the environmental impacts of timber harvesting on both timber and water agencies. This description lays the groundwork for a section exploring a decade-long struggle between state timber and water regulators to share that authority in a manner that satisfied their differing mandates. The failure of these efforts prompted the first stab at reform, in the early 1990s, which is briefly treated. Chapter 4 turns to the later part of that decade, when ongoing concerns about the deficiencies of state timber policy dovetailed with the rise of water quality and nonpoint pollution on the state political agenda. I describe how these events gave water quality regulators greater authority in the timber regulatory process, both in terms of the statutes themselves and how they were implemented. Though this shift has brought clear improvements to the timber regulatory process, the deficiencies in state forest policy that became evident in earlier conflicts remain largely unaddressed. I highlight these deficiencies throughout, emphasizing the problems of cumulative effects analysis and outcomes monitoring, as well as the fundamental aspects of state timber and water quality institutions that perpetuated conflict and frustrated workable solutions for over forty years.

Ultimately, I argue that the failures of state timber policy— though often attributed to the scale at which the bulk of these requirements are implemented— are actually a predictable consequence of policy design: The regulatory system privileges firm compliance with an exhaustive suite of mitigation measures over regulation based on

the environmental outcomes of these activities. While this tendency is due in part to legitimate difficulties with monitoring the outcomes of concern (namely sediment runoff from managed timberlands), the "compliance-based" approach was adopted and has prevailed for forty years, in both timber and water quality regulatory regimes, for a simple political reason: It relieves timber operators of the burden of demonstrating that their practices actually protect forest and aquatic ecosystems. In this chapter, I show that while the timber industry has long complained about the lengthy and expensive Forest Practice Rules and what they often describe as a redundant or otherwise unnecessary water quality regime, this was exactly the approach that industry and the Board of Forestry supported in the 1970s and 1980s.

As the above outline suggests, this analysis is largely concerned with state-level policy change in the context of state and federal law. The North Coast remains in many ways at the center of the story, however. As the chapter will show, environmental activists based in Humboldt County, redwood timber firms north of the San Francisco Bay Area, and the North Coast Regional Water Quality Control Board (Region 1 Board)[1] have played an outsize role in the development of state policy at the timber-water interface relative to their counterparts elsewhere in California— from the 1970s to the present day.

[1] CALFIRE also operates in part through administrative regions, however they named by geography (i.e., "Northern Region" and "Southern Region"). In this dissertation, numbered regions refer to the water quality regulatory boards and the areas within their jurisdictions.

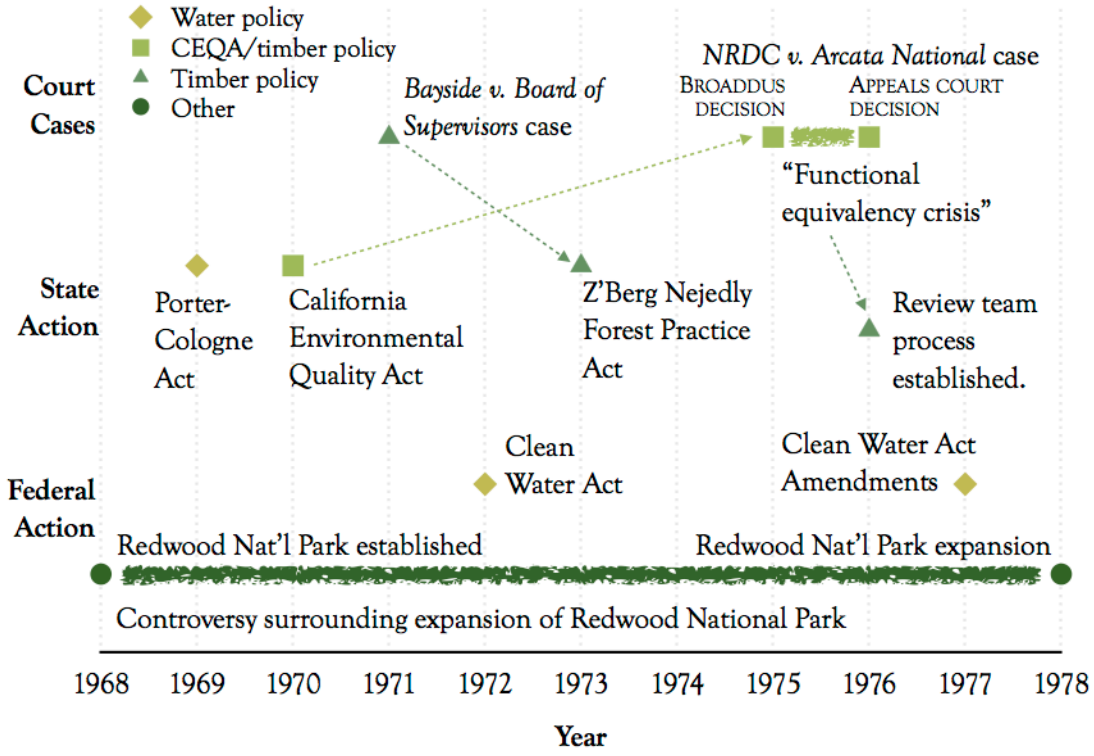
Origins of the Regulatory Landscape

The Forest Practice Rules, CEQA, and Multidisciplinary Review

Forest practices on privately owned timberlands in California are governed by the rulemaking Board of Forestry and its separate implementing agency, CALFIRE. The former was established in 1919, and its structure reflects the political philosophy of then-ascendant Progressives, who envisioned regulation as a technical exercise best undertaken by experts in the regulated area. In practice, however, Progressive institutions tended to place the people with the greatest financial interests in the outcomes of regulatory policy in charge of designing and enforcing those rules (Pincetl 1999). This particular shortcoming of the Progressive vision became starkly evident in the 1971, when a state appeals court overturned the entire corpus of California forest policy based on the finding that, under the Board's procedures, "the content of the rules under which private logging operations are conducted is decreed exclusively by persons pecuniarily interested in the timber industry" (*Bayside Timber Company* v. *Board of Supervisors* 1971; Figure 3.1).

The decision pitched the forest industry into legal limbo, and the legislature scrambled for a fix. For nearly two years, logging would continue under the old regulations, which the Board re-adopted on a temporary basis after the legislature authorized it to do so in

FIGURE 3.1 MAJOR STATUTES AND COURT CASES ESTABLISHING CALIFORNIA'S MODERN TIMBER REGULATORY REGIME, 1968-1978



1972. According to unofficial CALFIRE historian Toivo F. "Tobe" Arvola, timber companies behaved themselves in this interregnum, cowed by the shock of the ruling and trepidation about what new order Sacramento might impose. From the industry's perspective, it was deeply unfortunate that the courts had ordered a wholesale revision of state timber policy when public interest in environmental issues was at an all-time high (Arvola 1976, 70).

Finally, in 1973, the legislature passed the Z'Berg-Nejedly Forest Practice Act, which charged a reconstituted Board with developing new regulations for the timber

industry— regulations that would protect the public interest in the state's forest land, and encourage its management for sustained yield of timber over the long term. Specifically, the Act declared,

> … It is the policy of [the] state to encourage prudent and responsible forest resource management calculated to serve the public's need for timber and other forest products, while giving consideration to the public's need for watershed protection, fisheries and wildlife, and recreational opportunities alike in this and future generations (Z'Berg-Nejedly Forest Practice Act [FPA] 1973, Cal. Pub. Res. Code [CPRC] §4512(c)).

This language skirts the question of exactly how much "consideration" the state intends non-timber values receive in the regulatory process relative to the imperatives of industry (Lundmark 1975, 152-154), but the Forest Practice Act also mandated some specific changes that would help ensure the protection of fish, wildlife, and water. The act required restocking after harvesting (FPA 1973, CPRC §4561), and it addressed the court's complaint about the composition of the Board, specifying that five of its nine members be drawn from the general public. Of the remaining four, one would represent rangeland and livestock concerns, leaving three seats for the forest products industry (FPA 1973, CPRC §730-731.1). Finally, to increase transparency and ensure that timber operators adhered to Forest Practice Rules (FPRs) written by the Board, the law also specified that a Timber Harvest Plan (THP) be prepared by a registered professional forester (RPF) and approved by the director of CALFIRE before any commercial cut could take place on private lands in the state (FPA 1973, CPRC §4571, §4581-4582; see also Duggan and Mueller 2005; Lundmark 1975).

As the havoc wrought by the *Bayside* decision was being resolved, another legal crisis for the forest industry was brewing— one with equally far-reaching implications for timber policy in the state. In 1971, a group of homeowners in the resort community of Mammoth Lakes, California, sued the local planning commission over its decision to permit the construction of a high-rise condominium complex. The residents argued that under the California Environmental Quality Act (CEQA), the proposed development must undergo environmental review. CEQA was, at that time, less than a year old, and the Mammoth Lakes case raised a fundamental question about its scope: Did the law apply only to projects directly undertaken by public agencies, or was it intended to include the activities of private entities, like real estate developers, that required approval from state or local governments? In 1972, the California Supreme Court sided with the residents' group, writing in the landmark *Friends of Mammoth* decision that CEQA applied to any project receiving a discretionary permit (*Friends of Mammoth* v. *Mono County Board of Supervisors* 1972). When the new Forest Practice Act went into effect in 1974, the Natural Resources Defense Council (NRDC) attached an additional complaint to a pending suit against three timber companies harvesting in the vicinity of the recently established Redwood National Park: In addition to the public nuisance of which the defendants were already accused, NRDC pointed out that the THPs under which they were operating were, in fact, discretionary permits. Since the companies had not prepared Environmental Impact Reports (EIRs) as part of the

THP process, logging those plans was a violation of CEQA (*NRDC* v. *Arcata National Corporation* 1976).

The timber industry was "stunned and unhappy" when then-Attorney General Evelle Younger issued a formal opinion siding with the NRDC on the CEQA question, but according to Arvola, "the lawyers for the defendants were confident that the NRDC and the Attorney General were clearly wrong and they expected to win the contest" (Arvola 1976, 80; see also *Times-Standard* 1975a). Their confidence was misplaced: In January 1975, Mendocino County Superior Court Judge Arthur B. Broaddus[2] ruled that THPs are indeed "projects" under CEQA (*NRDC* v. *Arcata National Corporation* 1976; *Times-Standard* 1975a). For the second time in four years, the state of California found itself with a forest regulatory program that its courts had declared illegal.

The uproar was enormous: In early February, 1,300 loggers decked out in flannel and hardhats streamed into Sacramento, some protesting on the steps of the Capitol while others circled the block in log trucks, blaring their horns (Associated Press 1975; *Times-Standard* 1975b; see also Arvola 1976, 80; Behr 1988;[3] Lundmark 1975, 187); in

[2] The case was tried in Humboldt County Superior Court, where Broaddus was temporarily assigned (Times-Standard 1975a).

[3] Arvola pins the date as March 3, but cites the numbers from Associated Press coverage of the February 3 protest, suggesting that the March 3 date was a typographical error. The February protest occurred before Brown and Dedrick implemented their first temporary fix in the middle of that month; as such, the loggers who attended the February protest still could not legally harvest timber, and were presumably both more available and more outraged than they would have been in March. Peter Behr— the state senator representing most of the redwood region at this time— initially misremembers the specifics of the

Arcata, forest industry workers hanged an effigy of one of the local plaintiffs, Humboldt State University natural resources professor and city councilman Rudolf Becking (*Times-Standard* 1975b). The situation was particularly alarming for the industry because the decision came in the midst of an economic slump, and at a time of the year when companies are preparing and submitting THPs for the summer harvest season; any delay in plan processing might restrict their ability to log when doing so would be most crucial to their profits (Lembke 1975). Newly elected Governor Jerry Brown was equally displeased: Arvola writes that a few weeks later, "with only nine minutes advance notice" Brown stormed into a Board of Forestry meeting and "told the members in plain words that as he understood the law [they] had both the authority and responsibility to clean up the mess" (Arvola 1976, 83). (Industry lore, as reported in interviews, specifies that the Governor pounded his fist on the table, and that his "plain words" included a "now" after the word "mess" and an expletive before it.)

Brown had a keen interest in environmental issues, and his nominations reflected that fact: Both his Resources Secretary, Claire Dedrick, and her deputy had formerly worked for the Sierra Club. Brown and Dedrick initially supported having all harvest

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controversy in his 1988 oral history interview, but vividly recalls the derision with which he was greeted by the loggers at the Capitol protest. Though Behr was a Republican, he had come up through the political ranks in Marin County, not the North Coast proper. He was a staunch conservationist, credited with writing the Wild and Scenic Rivers Act of 1972 and organizing the effort to establish Point Reyes National Seashore. Appearing before a crowd of irate forest industry workers in the heat of the functional equivalency crisis, he matter-of-factly informed them that he was a card-carrying member of the Sierra Club. Then he said, "Now, here's the good news: You seem to have me outnumbered" (Behr 1988, 205).

plan submitters complete a full EIR, but industry protested vigorously, arguing that the long public comment periods and intricate analyses were impractical in the context of the time-sensitive THP process, and would frustrate timber operators' legitimate need to tailor harvest to market demand (Arvola 1976, 81-82; *NRDC* v. *Arcata National Corporation* 1976). To resolve the conflict, Brown issued an Executive Order empowering the Resources Agency to develop a more efficient review process that would be "functionally equivalent" to what CEQA required. Then Dedrick— not the Board—adopted two sets of emergency rules that added opportunities for public review and appeal to the THP process. The new rules also required that the state Department of Fish and Wildlife (CDFW[4]) and the relevant Regional Board assist in the evaluation and inspection of THPs, with CALFIRE acting as the "lead agency"— a structure paralleling that of CEQA's multidisciplinary review process (Arvola 1976, 82).

These modifications were a temporary solution of questionable legality, however; the Board still needed to act to "fix [the] mess" permanently. In response to Brown's demand, it established a committee to study the problem, and for several months, representatives of industry, the Resources Agency, and the review team agencies— CALFIRE, CDFW, and the Regional Boards— wrangled over the question of what it would take to make the THP process functionally equivalent to CEQA. According to

[4] CDFW was known as the California Department of Fish and Game (DFG) until January 1, 2013. A bill changing the name of the department was signed in September 2012— by none other than Jerry Brown, in his third term as Governor.

Arvola, the disagreement was centered on the question of "just how far the rules should go to protect non-timber values." CDFW asked for and received an opinion from the Attorney General in April of 1975, but that didn't settle the dispute (Arvola 1976, 83). Another CALFIRE historian, Edward F. Martin, attributes timber's recalcitrance at this stage to the pending appeal of Broaddus' ruling: Having apparently learned little from their experience with the Superior Court judge or Younger before him, industry leaders still "devoutly believed" that they would be spared from CEQA— in the legislature if not in the courts. Martin explains, "The law was so obviously burdensome in their opinion that exemption was sure to come soon" (Martin 1989, 2).

Despite the ongoing stalemate, deliberations shifted from the committee to the Board of Forestry in May, touching off a series of negotiations between the Board on the one hand and Dedrick and Brown on the other. While the Administration pushed for the inclusion of strong environmental protections in the new rules and greater agency discretion in the review process, the Board resisted— advocating on behalf of industry in effect, whether or not this was also the intention. The matter was essentially resolved when the Board approved new rules on June 30 and July 1[5]— with one telling

[5] It would take an act of the legislature to unequivocally establish the legality of the "functional equivalence" approach under CEQA— and one had been in the works since the Broaddus decision was announced. A statutory exemption from CEQA for timber operations was, of course, the preferred alternative within the industry, and its representatives clung to the prospect even after it had become clear that nothing of the sort would happen on Brown's watch (Arvola 1976, 94; Martin 1989, 2). Instead, as the Board adopted its new rules in mid-1975, the legislature provided short-term statutory cover: S.B. 476 gave the forest industry a six-month reprieve from CEQA with the stipulation that all THPs approved during that period of time would expire on or before May 31, 1976. The ultimate fix,

exception: The two sides had not been able to compromise on watercourse protections in the Coast District. That issue was deferred in the interest of cementing a CEQA-equivalent THP process for the entire state through proper rulemaking (Arvola 1976, 86). A year later, an appeals court upheld the Broaddus decision, dashing the industry's hopes of an exemption from the law (*NRDC* v. *Arcata National Corporation* 1976).

Also to the chagrin of California timber companies, the multidisciplinary review process Dedrick had established survived both rounds of negotiations at the Board, and— in another development that foreshadowed future policy battles— contention among review team agencies became an issue almost immediately and in Region 1 particularly (Arvola 1976, 88-89; see also Martin 1989, 8-9). At the root of this problem is the fact that the Regional Boards and CDFW had strong resource protection mandates that prompted them to impose requirements on timber operations beyond those in the FPRs; in contrast, CALFIRE and the Board were only additionally (and, in effect, secondarily) concerned with the preservation of non-timber values, and even when they were inclined to curtail harvest plans for the benefit of fish, wildlife, and water quality, they lacked CDFW and the Regional Boards' broad authority to do so. Since they were, ultimately, the parties legally responsible for THP oversight and

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S.B. 707, amended CEQA to exempt processes that were certified by the Resources Secretary as being functionally equivalent. Neither industry nor environmentalists liked leaving so much to the discretion of a political appointee, and industry still hadn't given up the hope of a free pass from the courts or the legislature, but S.B. 707 was passed, signed, and chaptered over their misgivings (Arvola 1976, 93-94). When the legislation expired in 1977, A.B. 884 was passed, renewing it permanently (Martin 1989, 2). After extracting some additional rule changes from the still-reluctant Board, Dedrick certified the FPRs on January 6, 1976 (Arvola 1976, 95).

approval, the limits of their interest in and authority to compel environmental mitigations presented real challenges— both to the development of a THP review process that achieved the aims of CEQA and to the Regional Boards' ability to execute their statutory obligation to prevent logging-related pollution.[6]

From the 1970s onward, these agencies' overlapping but conflicting missions have driven mistrust and frustration— tempered by the parties' mutual interest in avoiding needless duplication of effort or exposure to lawsuits. To understand how these tensions developed, it is first necessary to review how state and federal water quality policy were implemented in California after the passage of key statutes in the late 1960s and early 1970s.

Porter-Cologne and the Federal Clean Water Act

The wave of environmental concern that facilitated the adoption of CEQA in 1970 and— indirectly— the Forest Practice Act in 1973 also buttressed water quality policy in California. Since 1949, the State Water Resources Control Board (SWRCB) had

[6] The relationship between Board and CALFIRE, on the one hand, and the CDFW, on the other, during the time period covered by this analysis in many ways parallels that between the timber and water agencies (see, e.g., Terzian et al. 1994, 29-35, and for a more recent treatment, Public Employees for Environmental Responsibility 2000), although it is complicated by the fact that the federal government retained independent authority to enforce its own wildlife statute, the 1973 Endangered Species Act (ESA), and delegated implementation to not one but two federal agencies: The U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries (formerly known as the National Marine Fisheries Service, or NMFS). The role of state and federal wildlife agencies in timber regulation will be referenced in this chapter and discussed in more detail in the next, which describes the significant role of the ESA in driving long-term, ownership-wide planning that has had implications for the way large firms achieve compliance with water quality policy.

managed water quality problems in conjunction with the nine Regional Boards (SWRCB 2011). The SWRCB was responsible for developing overarching water quality policy— and, later, administering water rights[7] — while the Regional Boards implemented those policies for watersheds within their jurisdictional bounds. By the late 1960s, however, it was broadly clear that the type and extent of the state's water quality problems exceeded the regulatory tools in place to control them— particularly when it came to enforcement. In 1968, Assemblyman Carly V. Porter (then the chair of the Assembly Water Committee) suggested that the SWRCB review existing water quality policy, prompting a nine-month study and a report to the legislature. Most of the report's recommendations were incorporated into the groundbreaking Porter-Cologne Act— named for Porter and his Senate counterpart, Gordon Cologne— which was signed into law by Governor Ronald Reagan in the summer of 1969 (Robie 1970, 3-4).

Porter-Cologne preserved the general organization of the water boards, but the law significantly extended the authority of the SWRCB and, particularly, the Regional Boards— most obviously through two major requirements.[8] First, it compelled Regional

[7] The 1949 Dickey Act— which was the state's key water quality policy statute until the adoption of Porter-Cologne— did not merge water rights and water quality control functions into one agency; the SWRCB as we know it today emerged as a result of reorganizations that took place between the passage of the Dickey Act and Porter-Cologne (SWRCB 2011).

[8] Porter-Cologne also included a number of other, smaller provisions that expanded the Regional Boards' authority. It permitted them to specify areas where no waste, or no waste of a particular kind, could be released at all (Porter-Cologne 1969, CWC §13243; see also Robie 1970, 15), and it clearly positioned permitted discharges as a privilege, not a right (Robie 1970, 9-12). In the Dickey Act,

Boards to write legally-binding Regional Water Quality Control Plans (basin plans) specifying the beneficial uses of each water body in the plan area, the standards those water bodies must meet to support their designed beneficial uses, and a plan for meeting those standards (Porter-Cologne 1969, Cal. Wat. Code [CWC] §13240). Second, Porter-Cologne empowered Regional Boards to directly regulate individuals, agencies, and firms whose activities could result in the degradation of water quality. Under the new law, such entities were required to obtain Waste Discharge Requirements (WDRs) from the relevant Regional Board before releasing waste into state waters. Both legally and in effect, WDRs are conditional permits to pollute, and they give Regional Boards a mechanism for achieving basin plan objectives (North Coast Regional Water Quality Control Board [NCRWQCB] 2011, 1-3.00). The SWRCB was required to approve basin plans and could hear appeals of WDRs (Porter-Cologne 1969, CWC §13320), but much of the actual work of crafting and implementing water quality policy would fall to the Regional Boards.

When the U.S. Congress moved aggressively to address water pollution in the early 1970s, it looked to California's strong water quality statute as a model (SWRCB 2011).

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definitions of several key terms (e.g., pollution, contamination, and nuisance) had required Regional Boards to prove that a discharge had caused concrete, identifiable harms, or was the result of unreasonable practices, before it could extract a penalty from the responsible party or even order it to stop polluting; Robie argues these standards had made portions of the act effectively unenforceable (Robie 1970, 13-14). To address these problems, Porter-Cologne revised the definitions. The WDR program also helped rectify the enforcement problems associated with the Dickey Act: Under Porter-Cologne, Regional Boards did not have to prove that a discharger was causing a nuisance or even "polluting," strictly speaking; they could issue cease and desist orders based on any evidence that the permittee was operating in violation of its WDR (Robie 1970, 13).

As a result, the structure of two of the major regulatory programs in the Federal Water Pollution Control Act of 1972— commonly known as the Clean Water Act (CWA)— roughly parallel the WDR and basin planning provisions in Porter-Cologne. The National Pollutant Discharge Elimination System (NPDES) program controls point sources of pollution by requiring dischargers to obtain a permit; Section 303(d) directs regulators to work up the pollution stream from ambient conditions, identifying impaired water bodies and then setting pollutant limits, called total maximum daily loads (TMDLs), for the substance(s) causing their impairment. As in Porter-Cologne, these limits are pegged to beneficial uses, but the TMDL program goes a step further, requiring regulators to divide the allowable load for a particular pollutant in a particular body of water among upstream activities that contribute to the pollution stream, including both point- and nonpoint sources. Two other CWA programs were also potentially relevant in the timber context: Section 404 requires a permit for the discharge of dredged or fill materials, which could be interpreted to apply to most construction activities in or near watercourses, including the construction of logging roads; Section 208 calls for the development of industry-specific best management practices (BMPs) to control nonpoint sources. BMPs can include non-regulatory elements, such as outreach and education initiatives, but they must be certified by the U.S. Environmental Protection Agency (EPA) to satisfy Section 208.

With the exception of Section 404, which is administered by the Army Corps of Engineers (Army Corps), states have a central role in implementing these programs: They issue NPDES permits on behalf of the federal government and they are responsible for carrying out the requirements of Sections 208 and 303(d). Soon after the CWA was passed, the SWRCB and the Regional Boards became California's federally designated implementing agencies— a role that gave them direct responsibility for the NPDES, TMDL, and 208 programs. WDRs thus do double-duty as NPDES permits for polluters who are required to obtain them by the federal CWA; Regional Boards write, issue, and enforce the federal permits under the auspices of their own WDR programs. Regional Boards also set beneficial uses for waters under their jurisdictions and identify impaired water bodies to comply with both Porter-Cologne and Section 303(d) of the CWA. When federally-required TMDLs are completed, they are written into the relevant basin plan as amendments (SWRCB 2010).

Timber and Water and Trouble

By the early 1970s, then, California's Regional Boards were vested with legal authority to implement two ambitious water quality statutes; between Porter-Cologne and the CWA, they had the tools to address virtually every type of water pollution within state borders. From the start, however, many of these tools were not applied to the timber industry. In 1973, the EPA penned a rule exempting timber-related discharges from the

NPDES program; the "Silvicultural Rule,"[9] as it is called, has survived multiple legal challenges (see, e.g., *Decker* v. *NEDC* 2012; *Environmental Protection Information Center [EPIC]* v. *Pacific Lumber Company [PALCO]* 2007; *Natural Resources Defense Council* v. *Costle* 1977; *Northwest Environmental Defense Center [NEDC]* v. *Brown* 2010).[10] Section 303(d), meanwhile, was hardly used at all for almost twenty-five years. In his chronicle of this stunning failure to implement, legal scholar Oliver Houck drolly observes, "303(d) was… ignored for no more complex reasons than (1) compliance was hard, and (2) ignoring seemed possible" (Houck 2002, 75; see also U.S. General Accounting Office [GAO] 1989). In Region 1, 71 water bodies are currently listed as impaired, but the first TMDL was not set until 1995 (NCRWQCB 2012). As for Section 404, initially it seemed that it would apply to timber operations in and beside watercourses, but the Army Corps would not be a proactive regulator of the industry in California: It simply issued a blanket permit for timber-related discharges until 1977, when the first set of major amendments to the CWA directed states to address the water quality impacts of timber and agriculture under Section 208, not 404 (Martin 1989, 98). The

[9] In forestry, the term "silviculture" has a specific meaning; it indicates the aspects of the field narrowly related to cultivation of trees. There is a tendency among pollution control agencies, however, to use the word in reference to all activities related to commercial timber management (e.g., "silvicultural BMPs"; "…address silviculture under Section 208…"), due to the fact that terms like "timber harvesting" and "logging" isolate the ultimate harvest of logs for processing at a sawmill— excluding, by implication, intermediate steps in the cultivation of timber that also contribute to pollution from managed forests, such as site preparation and thinning. In this work, the term is used as it would be used in forestry except when a proper name (i.e., devised by pollution control agency) warrants a departure from this convention.

[10] Irrigated agriculture is also exempt from the NPDES program, but that reprieve is written into the original statute (CWA 1972, §402(l)(1)).

die was cast: For some time, Section 208 would be the best hope in the federal arsenal for controlling the water quality impacts of timber harvesting.

The Regional Boards still retained extensive authority to address logging-related pollution under the Porter-Cologne Act, but these tools would also go underutilized. Unlike the federal CWA, Porter-Cologne maintains no distinction between "point" and "nonpoint" sources: Pollution is pollution, and if an entity discharges it into state waters, Regional Boards can impose WDRs. However, Porter-Cologne also allows Regional Boards to waive WDRs, either for individual polluting operations or for an entire industry (Porter-Cologne 1969, CWC §13260; §13269). The latter type of waivers are called "general" waivers, and they were deployed almost immediately in the wake of Porter-Cologne to cover the same types of discharges that were exempted from the federal NPDES program. Waivers typically either did not expire or were renewed automatically, which meant that they were never reviewed.

Regional Boards also moved quickly on basin planning, but those with significant timber harvesting in their jurisdictions did not take the opportunity to tackle the water quality impacts of logging.[11] In 1972, amidst concern about timber operations on the North Coast particularly, the SWRCB initiated a review of Region 1's regulation of

[11] There was no ambiguity about the legal status of these discharges: In 1956— even before the adoption of Porter-Cologne— the Attorney General's office issued an opinion classifying them as pollution under state water quality law (Office of the Attorney General 1956).

logging-related discharges and found its newly-approved basin plan wanting (SWRCB 1972a). The state board then amended the plan by order, adding language barring the discharge or placement of soil, slash, sawdust, or similar materials into watercourses in "deleterious quantities" (Lee et al. 1987; SWRCB 1972b). Almost in the same breath, however, the SWRCB dismissed another petition from the North Coast— this one initiated by future Region 1 Board member John Corbett, then an EPA intern, who argued that Region 1 should regulate timber operations with WDRs. The SWRCB held that the new prohibition in the basin plan mooted Corbett's entire claim (SWRCB 1972c). For the time being, the state board had gone as far as it was willing to go.

Region 1 would also use the basin plan to authorize general waivers for timber harvesting (Reichmuth 2002). The logic behind this decision was mainly that the labor- and time-intensive WDRs were unnecessary when forest practices on private land were already regulated under an extensive process administered by the Board and CALFIRE— one in which, thanks to CEQA and Dedrick, Regional Boards soon had a say (Wiley 2002, 2). Moreover, Porter-Cologne contained language limiting Regional Boards' ability to "specify the manner of compliance" in their policies, so SWRCB and the Regional Boards may have been cautious about attempting to control timber-related discharges under their own authority— despite its apparent breadth (Interview #112b; Martin 1989, 95). Restrictions on specifying Basin plans could and generally

did include specific, performance-based standards, however. For example, the SWRCB's amendments to the Region 1 plan required that for inland surface waters, "turbidity shall not be increased more than 20 percent above naturally occurring background levels"— a stipulation that remains to this day (NCRWQCB 1972; NCRWQCB 2011, 3-3.00). The Regional Boards were compelled to review THPs with these rules in mind. However, many staff members quickly discovered that review team membership did not provide them with the leverage they needed to ensure that every proposed THP was consistent with either the relevant basin plan or the broader goals of Porter-Cologne: They could recommend additional mitigations to the plan submitter, or recommend that CALFIRE deny the plan, but they lacked the ability to either require mitigations or deny the plan themselves (Arvola 1976, 88; Craven 2003, 3; Duggan and Mueller 2005, 113-125; Martin 1989, 4-5; Wiley 2002, 11).

Despite these problems, however, revoking timber waivers does not seem to have been seriously considered in the 1970s. Staffing limitations were likely part of the problem. Regional Boards have always struggled to send personnel out on pre-harvest inspections and to review team meetings— a situation to which they adapted by "triaging" THPs, prioritizing plans located in particularly sensitive watersheds or employing particularly high-risk practices for on-the-ground assessment (Interview #112a, #131). Initiating a more time-intensive permitting process would only have worsened that problem— especially since some degree of participation in the review team process would still have

been required in addition to WDR administration. And in a decade already marked by two major disruptions to state forest policy, an attempt by the Regional Boards to again rework the timber regulatory process by withholding waivers would probably not have been received graciously in Sacramento. Environmentalists did little to pressure the cautious boards directly. After the Broaddus decision, CEQA challenges were the advocates' main stage; Porter-Cologne was, relatively speaking, a sideshow.

Though the SWRCB and the Regional Boards were not prepared to push their authority to issue their own permits to timber operations, they did appear to have a plan for better addressing their CWA and Porter-Cologne obligations with respect to the industry, and it centered on Section 208. The Regional Boards could not make the timber agencies serve their mandate by being review team gadflies, but they could conceivably get to the same outcome— and fulfill their responsibilities as a federally-designated state water pollution control agency for the CWA— if the FPRs themselves were certified by the EPA as timber harvest BMPs per Section 208. To get there, the Board of Forestry would have to beef up the environmental protections in its rules; once the certification was obtained, the Regional Boards would relinquish their CWA authority over timber-related discharges to the Board and CALFIRE.

Having state forestry agencies implement the timber provision of Section 208 was not unusual nationwide: In contrast to California, most states lacked their own water

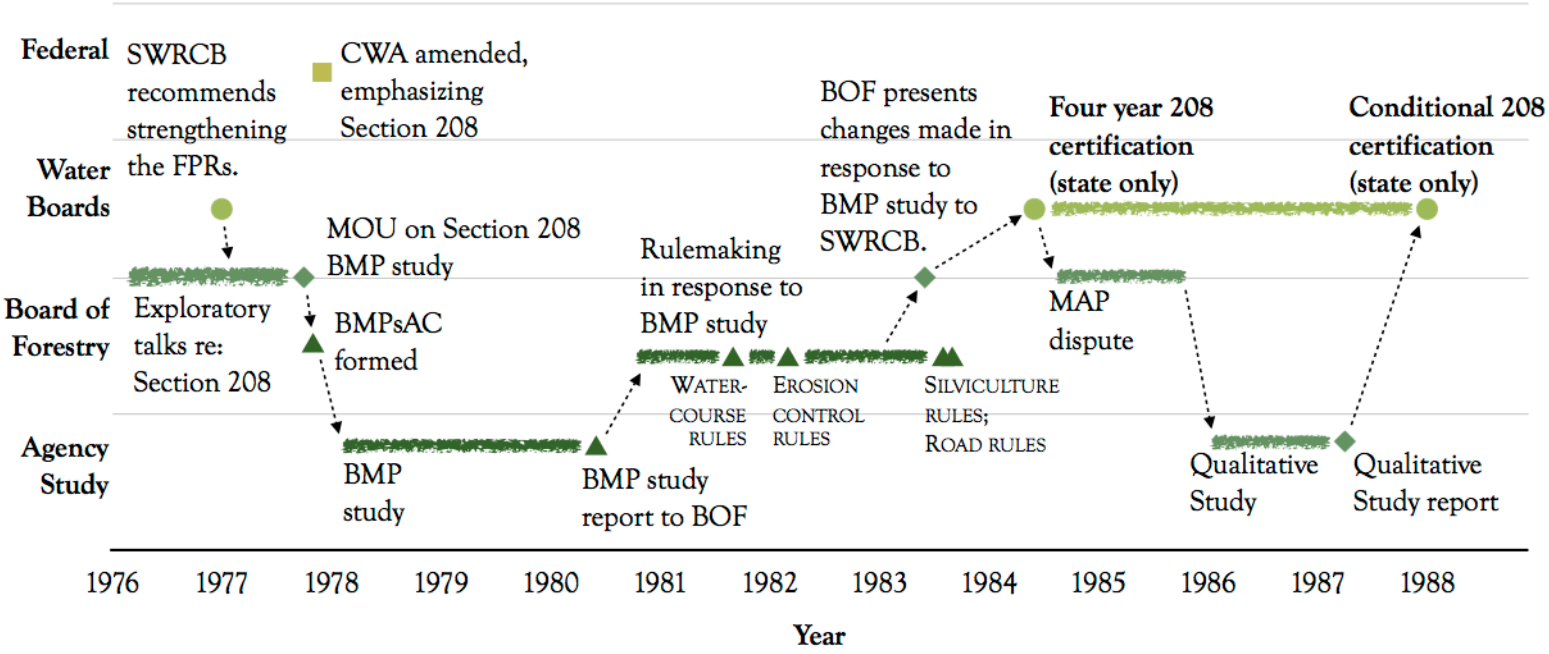
quality control agencies when the CWA was passed, so the EPA dealt directly with their timber regulators to certify existing forest practice rules as Section 208 BMPs (Martin 1989, 95). After the EPA and the SWRCB had addressed more pressing CWA rulemaking obligations, the pollution-control leader attempted to follow the laggards (Martin 1989, 95). The result would be a stalemate between water, timber, and the EPA that left the Regional Boards stuck awkwardly in the timber regulatory process—not clearly absolved from enforcing Porter-Cologne and the CWA against the timber industry, but not empowered to protect water quality from it, either.

From Statutes to Stalemate: Regulation at the Timber-Water Interface, 1976 - 1995

Pre-Z'Berg Redux: BMPs, Redwood National Park, and Capture

In early 1976, the SWRCB initiated discussions with the Board of Forestry about Section 208 certification, proposing that its staff would work with CALFIRE on a study of what would be necessary to include in the BMPs (Figure 3.2). By November, however, the two agencies were stuck: According to Martin, the SWRCB "apparently heeded the oft repeated accusations by many environmental activists that [CALFIRE] favored the timber industry" and it "became impossible to agree upon a separation of overlapping responsibilities" (Martin 1989, 95-96). Martin himself is sympathetic to CALFIRE, and takes what would become the standard forestry jab at the water boards when describing their subsequent attempt to develop BMPs for timber harvesting on their own, noting that "an obvious lack of forestry expertise on [the water boards']

FIGURE 3.2 TIMELINE OF EVENTS RELATED TO THE CERTIFICATION OF CALIFORNIA'S FOREST PRACTICE RULES AS BEST MANAGEMENT PRACTICES UNDER SECTION 208 OF THE FEDERAL CLEAN WATER ACT



staffs" subverted the effort (Martin 1989, 96-97). The Board of Forestry, meanwhile, established its own committee to study the issue, and its decision to appoint respected environmental activist David Pesonen as chair was apparently enough to rekindle the SWRCB's interest in collaboration. With the water quality authority back at the table, Pesonen developed an approach that satisfied all parties: A BMP study would be conducted by a special staff composed of individuals who did not work for CALFIRE, the water boards, or CDFW, and supervised by both SWRCB and the Board of Forestry (Martin 1989, 97; see also Lee et al. 1987, 2-9).[12] A 1977 memorandum of understanding (MOU) formalized this agreement and secured $100,000 in EPA funding for the project; the Board of Forestry established a committee to oversee the work (SWRCB 1977b). The BMPs Advisory Committee (BMPsAC)[13] would also be chaired by Pesonen, and was immediately populated with the very people who had been explicitly excluded from the study staff: Representatives of all the review team agencies, environmentalists, and industry lobbyists (Martin 1989, 98).

The episode underscored a crucial fact— one that would continue to frustrate policy implementation at the timber-water interface for decades. The Forest Practice Act had changed the composition of the Board of Forestry, increased the professionalism of the state's forester corps, and brought more daylight to harvest practices, and the Broaddus

[12] It appears from Martin's account that arrangement became one in which the study staff were supervised by BMPsAC, which was supervised by the Board of Forestry, which would then report to the SWRCB (Martin 1989, 101).
[13] Pronounced "bump-sack," naturally.

decision introduced more agency oversight and opportunities for public involvement into the THP review process, but within the environmental community, the perception that state timber agencies served the timber *industry* was alive and well (see also Best Management Practices Effectiveness Assessment Committee [BEAC] 1991, 2-2; 3-1; A-1; Martin 1989, 13). While neither all water board members nor all water board staff took or take the same position, suspicion of the Board of Forestry and CALFIRE has persisted to some degree in the SWRCB and the Regional Boards— and also in CDFW (Interview #106; #107; #125; PEER 2000; Interview #131).

Meanwhile, timber regulatory personnel and industry employees have continued to complain that Regional Board members and staff are not well-versed in the timber regulatory process enshrined in the FPRs, and would not be so concerned about CALFIRE's ability to protect water quality if they really understood the rules and the responsibilities of an RPF (Interview #108; #110; NCRWQCB 2002; 2003). After surfacing in the negotiations leading up to the establishment BMPsAC, this critique has been pressed with such tenacity that some on the water quality side seem to have been won over to the timber perspective: At Region 1 Board meetings in 2013 and 2014, members and staff have often noted with pride that they keep the current FPRs on hand as a desk reference. At a "historic" joint meeting of that board and the Board of Forestry in 2014, the newest Region 1 appointee joked that she was disappointed at having not yet received her copy of the rules; to the delight of the audience, she was

immediately presented with one by a representative of the timber agencies. Bureaucratic theatrics aside, the timber critique reflects an uncomfortable reality of both the flawed Progressive idealism that birthed the Board of Forestry and the maligned phenomenon of agency capture: Effective regulation is facilitated by independence from the regulated industry and deep familiarity with it— two nearly incompatible characteristics.

It is not hard to imagine why the water boards were skeptical of the timber agencies in the mid-1970s, given the Board of Forestry's stance in the functional equivalency crisis, and— perhaps more significantly— the role both timber agencies were simultaneously playing in another high-profile controversy over timber harvesting in California. By the time the SWRCB was ready to explore the prospect of BMP certification for the FPRs, Redwood National Park was making national headlines for the second time since its establishment in 1968. The timber industry had bitterly opposed the federal government's purchase of richly-stocked private forest to create the 58,000 acre preserve, but the design of the park left its streams and its largest trees vulnerable to the effects of continued logging on surrounding commercial timberlands (Agee 1980; Fairfax et al. 2005, 166; Schrepfer 1980; 1983). Lawsuits bloomed in the wake of the deal— *NRDC* v. *Arcata National Corporation* among them— and environmentalists began pushing for an expansion (Schrepfer 1980, 76-77; 1983, 186-203). In both phases of the two-act saga, landowners within the park's proposed bounds were accused of

attempting to thwart the preservation effort by rapidly harvesting the trees that had made the area attractive for protection in the first place (Interview #112a; #105a). Brown supported the park expansion and, in the interim, increased oversight of operations on adjacent land— a preference Dedrick conveyed to the timber agencies— but the Board of Forestry was not responsive to the governor initially, and CALFIRE approved all but one of the THPs proposed in the area of concern (Martin 1989, 71; Schrepfer 1983, 195-196).

In the meantime, environmental groups turned to the Region 1 Board, petitioning its efforts to regulate the controversial plans under individual WDRs on the grounds that the permits, as written, would not meet the discharge standards in the basin plan (Interview #112b; SWRCB 1977a). While little substantive progress was made on the issue there (mainly due to the fact that the water boards lacked confidence in the extent of their authority to regulate timber operations) the proceedings helped buy time for the federal government to approve funding for the park (Interview #112a).[14] The tide

[14] Much like the fight over PALCO's old growth two decades later, the saga of the establishment and expansion of Redwood National Park brought timber politics on the North Coast to a boiling point and then kept them hot for more than a decade. The floods of 1955 and 1964 almost perfectly bracketed the year of peak timber production in Humboldt County, 1959 (Waddell and Bassett 1996, 47-48), resulting in sediment discharges far exceeding the norm— even for the highly erosive watersheds of the North Coast (Leithold et al. 2005; Warrick et al. 2013). Increased sediment inputs raised streambeds, prompting changes in channel geometry and the water table that expose trees in the alluvial plain to more frequent inundation and increasing bank erosion (Kolipinski et al. 1975; Madej and Ozaki 1996; see also Agee 1980, 411-412; and, for a review of disturbance regimes and their affects on old growth particularly, Lorimer et al. 2009). These processes were of particular concern in the wake of the mid-century floods given that many of the tallest and most spectacular old growth trees are found alongside streams (Sawyer et al. 2000, 90-91), and were therefore vulnerable to ongoing damage resulting from stream aggradation.

seemed to turn at the timber agencies in 1977, when a critical mass of Brown appointees to the Board of Forestry facilitated plan denials (Martin 1989, 74; Schrepfer 1983, 222), but not before the water boards were pulled into a major environmental battle because both the Board of Forestry and CALFIRE were reluctant to restrict what has since been characterized as liquidation logging (Interview #112a).

Cumulative Effects: First Rumblings

Another issue that would bedevil private forest regulation at the timber-water quality interface particularly also emerged during this period of time. The 1977 amendments to the CWA required that 208 BMPs address the cumulative effects of individual

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The area around Redwood Creek was particularly notable in this regard. Located forty miles north of Humboldt Bay, it was not subject to intensive logging until after World War II; the watershed was well stocked with virgin timber and, accordingly, of high value to the companies who owned land there; some of the world's tallest known trees lined its banks (Agee 1980, 407; Schrepfer 1983, 118). The original 1968 Redwood National Park was an awkward archipelago of acquisitions that filled the spaces between existing state parks along the coast, however the southernmost unit extended awkwardly inland, up the Redwood Creek drainage to capture the spectacular streamside groves immediately adjacent to the channel. An ascendant environmental movement warned that protecting this one-half-mile-wide bight of forest— pejoratively known as "the worm" (Janda 1977, 5; Martin 1989, 68)— while leaving the bulk of the watershed vulnerable to continued logging would ultimately result in the loss of the trees the park was established to protect (Schrepfer 1980; 1983). On the other side of the fight, some maintained that this had been intentionally done to provide park supporters with an argument for an expansion that was cost-prohibitive at the time (Martin 1989, 68). Much of the debate after 1968 concerned the respective roles of logging and underlying geology in sediment delivery. An industry group, the California Forest Protective Association (CFPA), commissioned a study of the Redwood Creek watershed which concluded that increased logging was associated with *decreases* in sediment discharge there; in a subsequent hearing, one Regional Board member recalls that a CFPA lobbyist was confronted with a memo in which he had asked the consultants if there was any way to "massage the data" on the relationship between logging and sedimentation: "He was just stunned into silence for almost two minutes. And I don't know whether you've ever had a big room that was silent two minutes? That's like… an eternity. And then he busted out in hysterical laughter!" (Interview #112a). The report was soon discredited (see, e.g., Janda 1977; Wahrhaftig 1976), and in 1978, President Jimmy Carter authorized a 48,000-acre expansion of Redwood National Park. Both the physical transformation of Redwood Creek and the political struggle over the bounds of the park have since been documented extensively by researchers (see, e.g., Agee 1980; Fairfax et al. 2005, 163-169; Hudson 1979; Schrepfer 1980; 1983).

polluting activities on a watershed over time (CWA 1977). A discussion of the cumulative effects of proposed projects (including but not limited to watershed effects specifically) had also been required under CEQA since 1972, but the THP process still contained no provision for any such analysis. Section 208 ensured that cumulative effects assessment would become a focal point of BMPsAC deliberations, but the CEQA mandate meant that the Board of Forestry and CALFIRE would have to wrestle with the issue in the interim.

And wrestle they did. CALFIRE, the Board, and its district technical advisory committees (DTACs) began discussing cumulative effects analysis in 1976— and again, it was logging in the vicinity of Redwood National Park that forced the issue (Martin 1989, 29). The National Park Service wanted more information about the long-term plans of the companies operating in the Redwood Creek watershed, and CALFIRE relayed to the Board of Forestry its own concerns about how new roads in the area would be maintained after the term of the THPs for which they were constructed (Martin 1989, 29). The agency actually requested new rules to direct its assessment of the potential for cumulative effects, and the Board of Forestry kicked the question to the DTACs. Responses varied from uncertainty (i.e., about how such a complex assessment could even be approached) to outright opposition. The Northern DTAC in particular maintained that strong rules at the THP scale would prevent cumulative effects (Martin 1989, 29), making this one of the earliest cases in which timber

regulators and industry supported requiring individual plan submitters to demonstrate compliance with extensive BMPs. The DTACs' composition reflects that of the Board of Forestry, with "public" members appointed by Republican governors tending to come from the non-timber business community (Martin 1989, 52); the Northern unit's support for a compliance-based approach is not difficult to comprehend when one considers that the alternative it considered was ownership-specific harvest rate limitations pegged to watershed conditions (see Martin 1989, 31). As we will see, the latter approach became a third rail in state timber policy, while the idea that more rules would be effective in preventing cumulative effects would have tremendous staying power over the next several decades— even as the conditions of Northern California's coastal streams and anadromous fish populations rendered it increasingly implausible.

The Board of Forestry declined to act on cumulative effects in 1976, but the issue was far from settled. Just a few years later, in March 1979, CALFIRE again expressed concern about the cumulative effects of THPs that called for the construction of permanent access roads. Echoing NPS's earlier complaints, CALFIRE felt it needed information about firms' long-term management strategies to evaluate the potential for cumulative effects, and firms were disinclined to provide it (Martin 1989, 29-30). Later that same year, the Sierra Club petitioned the Resources Agency to revoke the functional equivalency certification it had bestowed upon the THP approval process in 1976; along with complaints about public noticing of THPs, the fact that plan

submitters were not required to analyze the potential for cumulative effects was a cornerstone of the Club's critique (Martin 1989, 21; 42). In November, Resources Secretary Huey Johnson issued a response, indicating both that he shared the group's concerns and that he believed the Board of Forestry would address them as part of its effort to obtain 208 certification for the FPRs. According to Martin, the petition was a source of "grave concern" for the Board, which discussed it at length in two separate meetings in late 1979 (Martin 1989, 21; 42; 97).

In response to the Sierra Club's scrutiny and CALFIRE's persistent concerns, Board Chairman Henry Vaux convened a conference at UC Berkeley on the cumulative effects issue, but the only clear conclusion to emerge from the 1980 gathering was that too little was known about the subject to make reliable predictions in the timber context. The Board of Forestry could not simply shrug its organizational shoulders and walk away, however— at least not yet: The ongoing effort to develop BMPs under Section 208 demanded cumulative effects analysis. Vaux's next move, in 1981, was to farm the matter out to a subcommittee, which after a year of deliberations arrived at the same conclusion as the Northern DTAC had six years earlier: Effective watercourse protections at the THP level were the best way to prevent cumulative effects at the watershed scale. The Board accepted this recommendation— but apparently with the understanding that the FPRs as they stood at the time would not be adequate to prevent cumulative effects in all circumstances (Martin 1989, 30-31).

Unsurprisingly, disputes over cumulative effects continued— and they were centered in the redwood region. In 1984, CALFIRE, the Board of Forestry, and lawyers representing the state, Santa Cruz County, and a Central Coast timber company clashed over the extent of the timber agencies' authority to deny THPs likely to contribute to cumulative effects in the Soquel Creek watershed in 1984 (Martin 1989, 31-33). The following year, an appeal of an unsuccessful suit to thwart old growth logging in the remote northwestern corner of Mendocino County yielded a major victory for environmentalists: In *EPIC* v. *Johnson* (1985), the court ruled that there was no documented assessment of the cumulative effects of the contested plan by either the preparer (a subsidiary of Georgia-Pacific Corporation) or CALFIRE, and affirmed that such assessment was required under CEQA. Writing for the unanimous panel, Judge Harry Low specifically addressed the Board of Forestry position (as presented in court by CALFIRE) that "if… adverse effects are minimized to the maximum on each individual operation, then the total effect in the surrounding area will also be minimized to an acceptable level," writing that "this statement is at odds with the concept of cumulative effect" (*EPIC* v. *Johnson* 1985).

In the wake of *EPIC* v. *Johnson*, the Board again established a group to study the issue.[15] The task force spent two months interviewing staff at other agencies about their

[15] The group consisted of a CALFIRE lawyer, a forest industry lobbyist, a practicing RPF with a planning background, and another lawyer— this one from the Pacific Legal Foundation, a public interest legal group that advocates for conservative causes, including private property rights and "a balanced approach to environmental protection" (Martin 1989; Pacific Legal Foundation 2014).

approaches to cumulative effects analysis under CEQA before formulating a set of recommendations that the Board would later adopt. Key among them was a "checklist" that would be used by both RPFs and review team members to guide cumulative effects analysis (Martin 1989, 35-36). All the checklist did in practice, however, was identify seven areas in which cumulative effects might be found (watershed, soil productivity, biological, recreation, visual, traffic, and other) and direct RPFs to declare whether such effects (a) will not occur, (b) will occur, but can be mitigated, or (c) will occur even after mitigation (University of California Committee on Cumulative Watershed Effects [UCCCWE] 2001, 18).

Around the same time as these directions were being developed, the Forest Service's approach to predicting cumulative watershed effects in California was attracting the attention of environmentalists and state regulators. Essentially, the agency had developed a formula that predicted the likelihood of cumulative effects by weighting the impact of factors such as silvicultural method, roads, and site conditions (i.e., slope, soil type, precipitation) (U.S.D.A. Forest Service 1988; see also Martin 1989, 38-39; Reid 1993; 1998, 118). Industry opposed this type of approach because of the implications for disclosure of long-term management plans, and because the system got too close to "allocations of cutting rights." These concerns were echoed by the timber agencies, which would have had to justify objectionable disclosures or allocations and, in all likelihood, answer for them in court. Martin explains, "For the Board of Forestry,

the political implications are enormously complicated. To delay cutting by owner 'Y' because owner 'X' in the same watershed arrived first would require extraordinary justification" (Martin 1989, 38). He raises a valid point in the sense that it would be imprudent to incent timberland owners to harvest more rapidly than their neighbors, but Martin's line of argument seems less an indictment of using a Forest Service-style index to predict the risk of cumulative effects than an indictment of the more fundamental premise that timber harvesting on private property may be restricted based on the potential for cumulative effects. The latter question was, of course, not for the Board of Forestry to decide, but the political implications apparently decided the question nonetheless: The index was not seriously considered; the checklist stood (Martin 1989, 39).

Cast in the best light, this approach allowed RPFs to utilize their professional judgment and take site-specific factors into consideration when analyzing the potential that their plans will contribute to cumulative effects (Reid 1993, 31-32; 1998, 118). A more realistic characterization— and one which has since been proffered by a wide range of observers in government and the scientific community in the years since the Board of Forestry devised its approach to cumulative effects analysis— is that by allowing RPFs ample discretion in making a determination that has implications for how closely their plans will be scrutinized by regulators and the public, the Board of Forestry has removed any incentive to find that the potential for cumulative effects exists

(UCCCWE 2001, 18-28; Reid 1998, 118).

The Board compounded this problem by providing little direction to RPFs on how to decide which boxes to check. Evaluating this state of affairs in 2001, a scientific review panel noted: "A process with such limited guidance is vulnerable to arbitrary interpretations, political forces, enthusiasm for timber harvest or for the implications of species listings, traditional attitudes that have developed within agencies, or traditional competition between agencies for influence" (UCCCWE 2001, 21).[16] Indeed, the most striking aspect of the checklist in the decades since it was first introduced is how rarely it leads an RPF to conclude that a plan will have cumulative effects. As the review panel concluded, "In practice… virtually no one filing a THP admits to the presence of *any* [cumulative watershed effect]" (UCCCWE 2001, 22).

The Road to Certification: Rocky and Paved with Rules

As the cumulative effects issue simmered and occasionally boiled over in the late 1970s and early 1980s, the 208 certification effort under BMPsAC jerked along, stalled by controversy at every step. A draft BMP study— the product of the independent staff—

[16] UCCCWE's conclusions are based on a detailed (and at times amusingly wry) critique of the inadequacy of early cumulative effects guidelines (18-21). The authors note that with respect to cumulative *watershed* effects particularly, CALFIRE directed RPFs to classify downstream channel conditions based on an array of variables, evaluation of which "would require a certain sophistication in the fields of fluvial geomorphology and habitat analysis that we have not encountered in our reviews and interviews" (19). Other instructions err in the opposite direction, asking RPFs to render determinations about the likely effects of their plans based on their "awareness" of other problems in the watershed. Noting this, the authors wonder, "What is the required level of effort in becoming 'aware'?" (19).

was circulated among the timber and water agencies in 1979, and formal hearings for public comment were held in 1980. Unsurprisingly, few were pleased, and as the agencies attempted to figure out a way forward, consensus ruptured along the usual fault lines: Environmental groups and the water boards wanted stronger rules, while the timber industry and agencies were more inclined to combine rules with voluntary approaches; environmental groups and the water boards charged that the timber agencies were captured by industry, and the timber agencies accused the water boards of failing to understand the law (Martin 1989, 99-100).

Again, conflicting and limited agency mandates frustrated a workable compromise: The water boards were required protect water quality, but were prohibited from specifying the manner of compliance; the Board of Forestry had much more leeway to dictate specific practices in its rules, but it insisted that the Forest Practice Act didn't justify the use of that authority in service of the water and wildlife agencies' mandates (Lee et al. 1987, 11-4; Martin 1989). While it is perfectly likely that, in some cases, the issue was actually that the Board of Forestry did not *want* to use its authority against the industry, after the passage of A.B. 1111 in 1979, its reluctance to do so was effectively backstopped by the Office of Administrative Law (OAL) (Arvola 1976, 88; Martin 1989, 84-94; 105-16; 110). A.B. 1111 aimed to limit regulatory overreach by requiring OAL to review agency rules, and many of the Board of Forestry rules were not to the new office's liking. For example, when the Board proposed new watercourse protection

rules in December 1981, OAL batted them back, and the Board revised— a dance they spent much of 1982 repeating, weakening the environmental safeguards in the rules with each circuit (Martin 1989, 105-106). The legislature did not move to rectify the situation by statute— a fact that is not entirely surprising given the anti-government zeitgeist of the early 1980s: Lawmakers were not clamouring for opportunities to empower agencies to adopt additional regulations (Martin 1989, 84; 101). Importantly, the "manner of compliance" language in Porter-Cologne was a concession to agriculture— an industry that has used its tremendous political clout at both the state and national levels to duck most water pollution control obligations— and so not targeted for amendment (Interview #112a).

The new watercourse rules were just one component of the 208 certification process. The carefully-designed BMP study had recommended changes in a variety of areas, including the rules governing construction and maintenance of roads and landings, erosion prevention, clearcutting, and alternative prescriptions (Martin 1989, 106-113; 123-126), and though the Board of Forestry worked on all these changes concurrently, they grouped the modifications topically and approved them in several packages. Most of the rulemaking activity took place between 1980 and1983. Water board staff had no formal authority in the process, but they were "forceful" participants nonetheless, testifying frequently at hearings; Region 1 was "particularly active" (Martin 1989, 136).

In June of 1983, the Board of Forestry submitted a final report to the SWRCB outlining the changes it had made to the FPRs in response to the BMP study. The two boards spent the last months of that year and the first half of 1984 arguing about whether or not the former had addressed all of the concerns raised by the latter in review of earlier drafts. Again, the Board asserted that it lacked the authority to make rules that served the water boards' mandate, but this time, the parties elected to pursue the obvious solution: In an agreement signed in June of 1984, the Board promised to support legislation that expanded its regulatory powers. In return, the SWRCB would certify the FPRs for a fixed, four-year term. As part of the same agreement, the two boards would also cooperate on a Monitoring Assessment Plan (MAP)— a study of the FPRs intended to prompt further improvements to the rules; inform the design of a monitoring program targeting both rule implementation and rule effectiveness; and, ultimately, facilitate a permanent certification (BEAC 1991, 1-2; Lee et al. 1987, 2-10; Martin 1989, 140).

Almost immediately, the two boards fell into conflict over which was actually in charge of the MAP. Their respective chairs negotiated, but made little progress. Martin's account begins to evoke a contested election in a corrupt, war-torn state when he tersely notes, "EPA sent observers" (Martin 1989, 141). He also asserts that MAP ultimately expired for a reason far more mundane: It was going to cost way too much money. After estimates placed the total between $2-4 million, "it quickly became

apparent that no legislature would appropriate that kind of money for a study that surely would satisfy no one when finished" (Martin 1989). However, another agency account of these events alludes to an "inability to focus on the specific documented water quality problems" revealed by the earlier investigation and "lack of agreement on the design of the program" as other factors in MAP's demise (Lee et al. 1987, 2-10). These details raise the possibility that not wanting to know how the rules were working may have been as much of a factor as the cost of finding out.

Rather than abandon a study of monitoring entirely, the boards compromised: They would pursue a year-long, *qualitative* assessment of the FPRs to evaluate the need for the more involved study (Lee et al. 1987, S-1; 2-11; Martin 1989, 141). The assessment team— which was composed of one representative each from the Board of Forestry and CALFIRE (jointly), CDFW, the SWRCB, and a nongovernmental group explicitly representing the interests of the industry, the California Forest Protective Association (CFPA) (Lee et al. 1987, 3-3)— found few obvious impacts to beneficial uses of water in THPs that conformed to the rules, but they also observed that the rules were often implemented incorrectly or incompletely. In the words of the team,

> Widespread and often severe noncompliance with applicable rule and THP requirements were [sic.] found. This was true even where requirements were clear and enforceable. Noncompliance was a major contributor to the observed adverse effects of timber operations and often obscured our ability to determine the adequacy of the rules themselves. Noncompliance was the single most important impediment to achievement of adequate resource protection. Thus, the team

> concludes that implementation of the rules is generally not adequate even though many of the rules appear adequate to protect water quality (Lee et al. 1987, S-4).

These findings formed the basis of a general understanding of the adequacy of the FPRs that persists to this day, repeated in subsequent reports and taken almost as an article of faith among some industry and timber regulatory agency personnel: The FPRs protect water quality when they are properly applied (see, e.g., Cafferata, Hall, and Gentry 2007, H-42; Monitoring Study Group 1993, 12).

Some important detail is lost in that abbreviation of the assessment team's actual conclusions, however. For starters, the qualitative study was based on one-time visual observations of 100 THPs located throughout the state (Lee et al. 1987, S-1); no quantitative measurements of water quality parameters were taken (Lee et al. 1987, S-2), and the team had no pre-harvest baseline data against which to compare post-harvest stream conditions (Lee et al. 1987, 11-10). Sites were visited at different times of the year, and in the midst of a drought— both of which likely impeded observation of operational impacts on watercourses, since these generally become manifest during or in the wake of severe storms, when BMPs are most likely to fail (Lee et al. 1987, S-2; more). These limitations of the assessment prompt the team's conclusion that the rules "appear" adequate, not that they *are* adequate— a distinction which is further underscored by the fact that the assessment team highlighted several areas in which they felt more rules were necessary to protect beneficial uses of water. For example, the

team recommended that the Board propose additional regulations addressing site preparation activities, the construction of roads and landings near watercourses, and the alternative practices THPs can propose in lieu of standard rules (Lee et al. 1987, S-3-S-4). It also pointed to the need for better documentation in THPs of threatened resources and the likely effects of proposed mitigations, based on the recognition that review team agencies use these descriptions to decide which plans should be prioritized for inspection (Lee et al. 1987, S-4).

Though the qualitative study report largely avoided use of the term "cumulative effects," the authors did not shy away from pointing out the essential conflict between cumulative effects analysis and the structure of state timber policy; they also noted the nexus between cumulative effects and monitoring. Presaging the conclusions of subsequent reports, the team wrote:

> Surveillance monitoring and database development are natural supplements to a watershed planning program designed to track the condition of ecological systems and beneficial uses within a watershed. This cannot be done by reviewing single THPs. The team recommends that industry and agencies work together to develop watershed management plans. Such planning is the most feasible way to economically and efficiently control nonpoint source pollution from timber operations (Lee et al. 1987, S-8).

In other words, meaningful assessment of the water quality impacts of timber operations cannot be made from THP-level snapshots, and more comprehensive analysis requires long-term monitoring of watershed conditions. The report also

emphasized other flaws in timber regulatory processes (i.e., as opposed to gaps in or shortcomings of the rules): Responsibilities of review team agencies needed to be clarified (Lee et al. 1987, 11-4; 12-5); improvements to the RPF licensing process and ongoing training were also needed (Lee et al. 1987, 12-5-12-6); CALFIRE enforcement was weak; and RPFs were not required to check on how their roads, skid trails, and erosion control structures held up after the term of the THP in which they were originally proposed (Lee et al. 1987, 11-8-9)

After receiving these critiques, CALFIRE got to work on THP enforcement and RPF training. The Board made good on its 1984 commitment to secure greater rulemaking authority from the legislature, working with Byron Sher— a Democratic Assembly member with an interest in forestry and environmental issues— to develop legislation that was easily adopted in 1987. The resultant bill, A.B. 1629, allowed the Board to regulate site preparation activities and require ongoing maintenance of erosion control infrastructure after the term of individual THPs (Martin 1989, 146). It did not address monitoring or cumulative effects.

By this time, the SWRCB's temporary certification of the FPRs was nearing its expiration date. Industry was advocating for an unconditional, permanent certification, while environmentalists argued certification should be withheld until all the needed improvements to the rules had been finalized and approved by the Board (Martin

1989, 146). The stakes were high: Under legislation that had been adopted nearly a decade earlier, the Regional Boards would be statutorily bound to waive WDRs for timber operations once both the SWRCB and the EPA certified the rules (Senate Bill 667 1979). According to Martin, however, the expectation among the agencies had always been that the MAP (and, later, the qualitative study) would identify specific improvements to the FPRs that the Board would pursue as a condition of the SWRCB's transfer of its 208 authority; permanent certification contingent upon further rule changes— i.e., the thing neither industry nor environmentalists wanted— was essentially preordained (Martin 1989, 140).

So in 1988, in spite of the unresolved issues with the FPRs and the implications for water quality oversight, the Board of Forestry, CALFIRE, the SWRCB, and the Regional Boards signed a Management Agency Agreement (MAA) transferring the water agencies' authority over timber operations under Section 208 of the CWA to the timber agencies. The terms of the MAA were essentially a formal adoption of what had by then become the status quo: CALFIRE would be the lead agency regulating the water quality impacts of timber harvesting on private lands; to satisfy CEQA's requirement for multidisciplinary review, Regional Boards would review and comment on THPs; and— as S.B. 667 had already specified— once the EPA certified the FPRs, the SWRCB would require Regional Boards to issue waivers to timber operations in lieu of WDRs (SWRCB, Board of Forestry, and CALFIRE 1988, 5; Wiley 2002, 2; see also

Wiley 2002, 6). In exchange, the Board would take specific actions to improve the FPRs.

Per tradition, the boards would disagree after the fact about exactly what improvements were required (Wiley 2002, 6). Perhaps anticipating this, the EPA was not comfortable with the fact that the state's certification was contingent upon unfinished business— nor with the fact that monitoring was one of those unfinished things (Best Management Practices Effectiveness Assessment Committee [BEAC] 1991, 1-2-1-3; Duggan and Mueller 2005, 650-652).

The Meaning of Monitoring: Policy Design and the Challenge of Performance-Based Regulation in the Timber Context

It is not surprising that these issues became sticking points for Section 208 certification. The water and timber agencies' authorizing statutes' invoke different approaches to regulation and, particularly, to permitting, which in turn have important ramifications for the roles they envision for monitoring— and even what they mean when they use the term. The FPRs are a set of prescriptions— to protect X, do Y— and in the early days of the Forest Practice Act, THPs themselves resembled a checklist: RPFs aver that the prescriptions in the rules will be followed and then receive a permit. The perceived compatibility of the FPRs with Section 208 of the CWA reflects the fact that the latter also assumes that placing the right controls on polluting activities will

prevent pollution. But the objectives of water quality policy at both the state and the federal level are clear: The water actually needs to be clean. Further, Porter-Cologne explicitly situates the discharge of waste into state waters as a privilege; a permit does not convey a long-term right to pollute, and can be revoked if water quality is being impaired by the permittee's discharges. As one Regional Board member explains, "A Timber Harvest Plan is like a building permit: You go in, there's specifics, you comply with it, you have a right to do it— period.... Water quality is more performance-in-the-stream-oriented" (Interview #112a). This fundamental difference in the design of state forest and water quality policy was amplified in 208 negotiations in part because it resonated with an internal contradiction of the CWA— a statute that demands actual improvements in water quality, both in its broad goals and in Section 303(d), but prescribes mitigation and abatement practices for nonpoint sources in Section 208 in lieu of employing performance standards.

As the Board member's comment implies, "monitoring" will look very different depending on whether one's permitting process is pegged to front-end abatement and mitigation practices or water quality outcomes. In the forest practice context, several types of monitoring are relevant (Table 3.1), and two are particularly important: Implementation monitoring, which simply seeks to establish that the rules have been followed (i.e., that required practices are being implemented properly), and effectiveness or outcomes monitoring, which tracks the on the ground effects of forest

TABLE 3.1 COMMONLY REFERENCED MONITORING TYPES*

Trend	Long term monitoring at regular intervals for the purpose of identifying long-term trends.
Baseline	Similar to trend monitoring, but with the explicit goal of characterizing conditions prior to a particular activity or project (e.g., timber harvest; restoration) in order to determine its effects.
Implementation	For determining whether or not planned actions were taken (i.e., BMP implementation monitoring; FPR implementation monitoring)
Effectiveness	For determining whether actions worked as intended (e.g., did BMPs fail)
Project	For determining the overall outcome of a particular project (e.g., water quality monitoring above and below a THP).
Validation	Usually monitoring to validate a model or a water quality standard
Compliance	Monitoring to determine whether or not water quality standards are being met (i.e., is the THP in *compliance* with water quality standards?)
Forensic	Systematically looking for (and, generally, reporting on the discovery of) a sediment source based on indications from downstream monitoring; can be visual or grab-sample based.

* Adapted from the generally cited typology in MacDonald, Smart, and Wissmer (1991, 6-8), which includes all of the above except forensic monitoring. The latter is included because it would become an important component of monitoring programs implemented both on the Central Coast and on the Pacific Lumber Company ownership in Humboldt County (Cafferata, Coe, and Munn 2008, 10-11; see also Press 2015, 105).

practices under the rules (MacDonald, Smart, and Wissmar 1991, 6-7; see also Cafferata, Coe, and Munn 2008; Ice et al. 2004).[17] Within the second category, an additional distinction is often made between "hillslope" and "instream" approaches. The former, which is also called "upslope" monitoring, involves measuring sediment pollution in the places where it originates: Erosion features associated with haul roads,

[17] Within the timber agencies, "effectiveness monitoring" is the term routinely used; per MacDonald, Smart, and Wissmar (1991), the term refers to programs that aim to determine whether individual BMPs have served their intended purposes. The authors contrast this with project monitoring— which evaluates, for example, the collective performance of a suite of BMPs used on a particular harvest plan— and compliance monitoring, which is geared toward evaluating whether or not water quality standards are being met (MacDonald, Smart, and Wissmar 1991, 6-7). Strictly speaking, then, effectiveness, project, and compliance monitoring are all forms of outcomes monitoring— the term commonly used in the environmental policy literature. This account primarily follows the latter convention, in large part because (as MacDonald, Smart, and Wissmar themselves acknowledge) the definitional boundaries among of the various types of outcomes monitoring are, in practice, somewhat porous. In this writer's own experience, that observation remains true fifteen years after the publication of their oft-referenced monitoring typology. However, the names of committees, studies, reports, and proposed rules and policies will often reflect the forestry terms, and those references remain in this text.

landings, watercourse crossings, skid roads, and harvest areas. This can be done quantitatively using silt fences, erosion troughs, or erosion pins, all of which measure the amount of sediment displaced over a particular period of time, but the category also includes qualitative approaches to evaluating whether sediment discharge is occurring or has occurred, such as visually checking for erosion over the entire harvest area or among a subset of features; photo points are commonly used to document results of visual upslope monitoring. In contrast, "instream" monitoring measures change in properties of a watercourse, such as temperature and sediment (Cafferata, Coe, and Munn 2008).[18]

In practice, hillslope monitoring often means checking to confirm that BMPs have not failed after a harvest or a rain event. This is a step beyond employing BMPs and assuming that they will work, just as implementation monitoring is a step beyond requiring BMPs and assuming that they will be employed, but both are far more in keeping with the "building permit" view of operator responsibility than with the outcomes-orientation of water quality regulators. As the Board member previously quoted explains,

> Industry, when they talk monitoring, [is] usually talking [about] upslope monitoring. And their viewpoint is, "If the upslope monitoring conforms to the plan and the plan protects water quality, therefore water quality is protected, therefore *what is your problem?*" And water

[18] The term can also be applied to properties that aren't measurable continuously, such as channel characteristics.

> quality's always said, "Well, we like to put a dipstick in the stream or creek every once in a while to verify that it's working." … Monitoring's unsettling [for industry] for this reason: Monitoring means you can undo the permit. So they get their permit, and they're going along, and something disastrous happens, and water quality comes in and just beats the shit out of them and fines them, and they're going, "How can this be? I followed the rules!" So it takes away certainty from industry, and it's an expectation of certainty built upon a really older conception in natural resource law that's never changed. So they're very, very attached, and that's how they think (Interview #112a).

Scholars of environmental policy are fully aware of the tension this regulator describes. Klyza and Sousa (2008) point out that movement-era policies facilitating environmental protection did not replace prior policies designed to promote natural resource development; in most cases, new institutions were just overlaid on top of the old ones. Thus industry's claims to a property right to harvest is simultaneously legitimated and limited by bodies of policy that do not talk to one another— except when the courts are forced to balance them (see also Houck 1995). These observations reflect a deeper ambivalence in the American legal tradition: The common law protects individual liberty largely by protecting individual property; starting in the New Deal, however, we have witnessed the emergence of statutory policy that seeks to safeguard the public interest by limiting individual property rights (Sunstein 1990).

These larger resonances help explain California's longstanding difficulty reconciling its timber and water quality policies— both generally and with respect to monitoring particularly. From the perspective of industry and the timber agencies, a good

monitoring program at the THP level will be a compliance monitoring program that insures that plan submitters play by the rules; if the rules themselves don't protect water quality, it is the Board of Forestry that has erred— not the plan submitter. For the water boards, however, outcomes matter, and so does water quality, so instream monitoring is the gold standard.

Unfortunately, instream monitoring poses its own serious challenges— especially when the pollutant of concern is dirt. Fine sediment, which can easily become suspended in the water column, is considered a short time-response parameter: While heavier, "bed load" materials can take decades to move through a watercourse after a disturbance, fines will often show up in the next storm (Interview #109; Lewis 1996). For both reasons, the most precise, policy-relevant, and ecologically meaningful way to detect sediment pollution in a waterway is to measure the amount of fine particles it carries (Interview #109; Lewis 1996; MacDonald, Smart, and Wissmar 1991, 104-105). This "suspended sediment load" is difficult to quantify, however: Grab samples must be dried, then weighed, and standardized for variation in flow. Turbidity— a measure of how much light can penetrate a sample of water— is often used as a proxy for suspended sediment load, and unlike the latter it can be measured quickly and inexpensively. The relationship between the two variables depends on the particulars of the watershed and conditions, however, so paired samples must periodically be taken to

develop watershed-specific correction factors for turbidity data (Lewis 1996; Lewis and Eads 1996; MacDonald, Smart, and Wissmar 1991, 104).

The timing of sediment deliveries further complicates measurement: Erosion features do not steadily "bleed" sediment into streams; discharges peak during storm events (Interview #116; MacDonald, Smart, and Wissmar 1991, 105). Watercourses running through steep ravines deep in forests accessible only by dirt roads are not only difficult to reach in storms; they can be dangerous to access (Interview #116; Press 2015, 104). And assuming that ones manages to collect data in these conditions, detecting a pollution "signal" amidst the noise of natural sediment runoff requires either a baseline (i.e., long-term data from the same stream, pre-disturbance) or a reference (i.e., a comparable, undisturbed stream) against which the data can be compared, or measurements from both above and below the project (MacDonald, Smart, and Wissmar 1991; see also Harris et al. 2007, 532). To give a meaningful sense of natural runoff, baseline data must include measurements from wet, normal, and dry years (Interview #114; #116). In California, it could easily take ten years of monitoring to get one of each.

These difficulties are not insurmountable. In the 1960s, long-term studies were initiated on Caspar Creek in Mendocino County and Redwood Creek in Humboldt County. The former was a paired watershed study that facilitated comparison of

sediment runoff in logged and unlogged areas (Cafferata and Reid 2013); the latter tracked the effects of intensive logging and flooding in the 1950s and 1960s through study of long-term response variables like bed load and channel morphology and— since the Redwood Creek watershed was fully protected in Redwood National Park beginning in 1978— provided a potential reference for short-time response variables like fine sediment going forward (Madej and Ozaki 1996, 915). Furthermore, by the turn of the century, innovations in automated monitoring equipment and analytical techniques suited to the data they produced would make continuous turbidity measurement with appropriate load sampling a reality (Lewis and Eads 1996; 2001). None of these developments have made water column sediment monitoring easy, cheap, or politically popular, but in 1988, the *technical* challenges were far more daunting than they are today.

One way to understand the parade of studies and reports that would follow the MAA is as an attempt to reconcile divergent agency perspectives on what type of monitoring should be done by doing a little of both on a small number of plans: If it could be demonstrated through hillslope and instream monitoring at the state level (i.e., by sampling from the total population of plans) that the FPRs protected water quality, there would be no need to do so at the THP level; relatively cost-efficient implementation monitoring, which introduces less uncertainty to timber operators, would suffice.

Most of the effort to undertake statewide outcomes monitoring and develop approaches to implementation monitoring would be pursued either by or in conjunction with the Monitoring Study Group— an interagency task force formed in 1989 to address the monitoring issue, per the EPA's critique of the FPRs. Technically an ad hoc committee of the Board of Forestry, the Monitoring Study Group included all the usual suspects— the Board, CALFIRE, SWRCB, CDFW, and nongovernmental groups representing the industry and the state forester corps— with a couple of notable additions: The EPA and the North Coast Regional Water Quality Control Board. The group's efforts would yield a study of public perceptions of monitoring program needs in 1991 (BEAC 1991) and, later, a series of monitoring programs based on those findings (Table 3.2). These projects generally arrived at conclusions similar to the one popularized by the qualitative study of the FPRs in 1987— i.e., the rules work well when properly applied— but they were received with skepticism by environmentalists and the general public. Critiques emphasized the design of the projects, particularly the fact that random sampling and even stratified random sampling are unlikely to capture the relatively small number of harvest plans that are thought to contribute disproportionately to sediment pollution in timbered watersheds (Interview #112a). Erring in this direction would potentially overstate the effectiveness of the FPRs as a whole (Longstreth et al. 2008, 3-4). However, regulators also attributed public skepticism to *who* carried out those studies (Longstreth et al. 2008, 4)— echoing a finding of the 1991 assessment of stakeholder perceptions of monitoring needs. The

TABLE 3.2 MONITORING PROGRAMS IMPLEMENTED WITH OR BY THE MONITORING STUDY GROUP, 1991-PRESENT*

Program	Term	Goal	Location	Sampling	Type	Done by:
BMP Effectiveness Assessment Program (BEAP)	1991	Assessment of stakeholder perceptions of what a statewide FPR water quality monitoring program should entail	N/A	N/A	N/A	Mixed Committee
Pilot Monitoring Program	1993-1994	Designed based on BEAP recommendations; intended to inform the development of the LTMP (below) using a smaller sample of THPs (n=30).	Hillslope Instream	Stratified	E,I, P,T	Multi-Agency
The Long Term Monitoring Program (LTMP) includes the following three programs:						
Hillslope Monitoring Program (HMP)	1996-2002	Effectiveness and implementation monitoring of FPRs using a sample of completed THPs (n=295) that had been through at least one winter since close-out.	Hillslope	Stratified in 1996, then random	E,I	Third Party
Cooperative Instream Monitoring Program	1997-	Turbidity and channel characteristic monitoring in streams (n=4) by landowners. Two participants are timber companies; the Caspar Creek experiments in Jackson Demonstration State Forest and a study on Cal Poly's Swanton Pacific Ranch are also participants.	Instream	Voluntary	B,T	Industry
Modified Completion Report Monitoring	2001-2004	Monitoring of THPs (n=281) at the time of completion report and after 1+ winter periods; focus on roads, crossings, and watershed and lake protection zones. Originally intended to sample 25% of closed out THPs, but included only 12.5% due to staffing limitations. Funding constraints ended the program in 2004; FORPRIEM (below) continues it.	Hillslope	Random	E,I	CALFIRE
Interagency Mitigation Monitoring Program	2005-2008	Develop an easy-to-use method for assessing the effectiveness of crossing BMPs, since these are the features most likely to result in water quality impairment. Multiple agency partners to increase credibility of findings; high-risk plans selected. The recession and participant fatigue precluded a second phase.	Hillslope	Purposive	E	Multi-Agency
FPR Implementation and Effectiveness Monitoring (FORPRIEM)	2008-2013	Resumed MCR monitoring program with the goal of sampling 10% of plans undergoing completion inspections (actual n=126).	Hillslope	Random	E,I	CALFIRE (w/Region 1)

Key to monitoring types: B = Baseline, E = Effectiveness, I = Implementation, P = Project, T = Trend. Table content developed from BEAC 1991, Brandow and Cafferata 2014, Brandow, Cafferata, and Munn 2006, Cafferata and Brandow 2010, Cafferata and Munn 2002, Lee 1997, Longstreth et al. 2008, Monitoring Study Group and William M. Kier Associates 1993, Rae 1995, Spittler 1995, and Tuttle 1995.

latter had noted that, due to widespread mistrust of state timber authorities, the involvement of multiple agencies in project design and implementation would be necessary to secure public confidence in the findings of monitoring programs (BEAC 1991).

The Monitoring Study Group has endeavored to respond to these critiques in the design of its subsequent programs, but its efforts have often been hobbled by fluctuations in funding (Cafferata and Brandow 2010; Interview #129)— a particular challenge when multiple years of data are needed to assess outcomes and the state budget is about as flashy as the hydrographs for coastal streams. California's feast-or-famine budgeting also affects other agencies' ability to collaborate in the group's initiatives, and industry cooperation has also been variable. Importantly, efforts of the Monitoring Study Group's have always emphasized hillslope and implementation monitoring. The group has only conducted two instream monitoring projects, one of which (the instream component of the Pilot Monitoring Project) involved no continuous turbidity or suspended sediment measurements (Rae 1995), and the other of which has relied on voluntary participation by timberland owners who select which streams to monitor (Cafferata and Brandow 2010) and, ultimately, own the data they generate (Interview #129).

After the MAA: Ignoring in Lieu of Fighting

As for the other conditions of the MAA, a report issued by the California Senate Office of Research in 2002— nearly fifteen years after the MAA was adopted— found widely varying perspectives on how many of those actions were ever actually completed. The most generous assessments place the figure between 60 and 70%, but that same year, environmental groups argued before the SWRCB that *no* substantive changes had been made as a result of the MAA (Wiley 2002, 5). Analyses undertaken by other agencies in the 1990s and early 2000s lent support to their claim that the Board of Forestry and CALFIRE's water quality protections failed to meet their responsibilities under the agreement (Wiley 2002, 5; more).

So disagreement over the necessity of further changes to the FPRs persisted, and monitoring was on ice— at least as far as the Board of Forestry was concerned. As a result, EPA continued to withhold its approval of the rules. That fact should have taken the SWRCB's promise of an unconditional, guaranteed timber waiver off the table irrespective of whether or not the Board of Forestry had fulfilled its obligations to improve the FPRs: The WDR exemption in the MAA was, after all, contingent upon EPA certification.

And yet, this is not what happened. As far as the industry was concerned, the MAA was a binding document: The waiver wasn't just on the metaphorical table; it was nailed to

it. The water boards for the most part declined to question this interpretation— a phenomenon which long frustrated at least one Regional Board member. "Industry, [SWRCB], and the [Regional Boards] couldn't seem to read the memo. There was no waiver until such time as the EPA approved it, and they never approved it," he explained, "but everyone acted as though they did." In 2003, when the tide finally began to turn in favor of WDRs, "industry would wave [the MAA] at every [Region 1] meeting, and at every meeting you'd say, 'It's not effective,' and they could not hear the message— they were that convinced. Self-convinced" (Interview #112a). Like 303(d) before it, the absence of a 208 certification and its implications for the water boards' authority would go virtually ignored for fifteen years— and probably more or less for the same reasons Houck cited with respect to TMDLs: *Not* waiving WDRs for timber operations would be politically difficult for the Regional Boards, and ignoring the fact that they had the option seemed possible.

Failure Here, There, and Everywhere

In 1990, environmental groups sponsored two forestry-related ballot initiatives. Proposition 128, known as "Big Green", was a broad and ambitious environmental reform package, addressing issues from greenhouse gas emissions to offshore oil drilling to agricultural chemicals. With respect to timber particularly, Big Green proposed a moratorium on logging unentered stands of ancient redwood, a $300 million bond for old growth acquisitions, and a statewide ban on clearcutting. Timber-specific

Proposition 130, called "Forests Forever", went further, calling for an even larger bond measure, as well as changes in the composition of the Board of Forestry that would have increased environmental representation thereon and loosened the Governor's grip on nominations. Industry responded with its own initiative: Proposition 138, or "Californians for a New Forestry". Quickly dubbed "Big Stump" by its critics, Proposition 138 included more modest restrictions on clearcutting and aid to timber smallholders for reforestation (Stammer and Paddock 1990; Stetson Freeman 1990). All three initiatives failed. Two attempts at a legislative fix followed, but Governor Pete Wilson vetoed the environmentalist-backed "Sierra Accord" of 1991, and an industry-friendly revamp the following year failed to make it out of the legislature. The Board of Forestry made an effort to address some of the critiques of state forest policy articulated in the bills, with limited success (Terzian et al. 1994, 36).

That these issues precipitated on the state political agenda in the early 1990s was, in some sense, hardly surprising. This would be the decade where old growth depletion— such as might have been retarded by rate of harvest restrictions in the 1970s and 1980s— caught up with the California industry. The editorial board of the *Los Angeles Times* pointed out that the Sierra and Grand Accords "seem[ed] designed to protect the timber companies from themselves as much as to protect the trees from the timber companies," adding, "One important reason for the over-cutting was that Sacramento— under both Democratic and Republican management— let it happen" (*Los Angeles Times*

1991). Viewed through this lens, it is also unsurprising that neither the ballot initiatives nor the bills passed: Restrictions on clearcutting were workarounds for direct restrictions on rate of harvest— and too aggressive for an industry that was still dominated by national, publicly-traded companies with little incentive to prioritize the long-term productivity of any given timberland parcel.

Though compromise eluded would-be reformers of state forest policy in the early 1990s, a consensus did emerge on one salient point: The FPRs were not serving either the timber industry or the environment particularly well. For its part, the industry complained that as the rules proliferated, compliance had become increasingly time-intensive and costly. The CALFIRE regional office in Santa Rosa went so far as to measure THPs submitted in various years, and found that between 1989 and 1993, the average thickness of a plan jumped from a quarter of an inch to one and one third of an inch, or well over 300 pages. The state estimated that the bloated 1993 THPs together represented an industry expenditure of $10-18 million (Terzian et al. 1994, 36). The growing list of requirements also posed problems for review team agencies, where timber program staffing was not keeping pace with the expansion of agency responsibilities (Terzian et al. 1994, 31-35; Interview #112a; #131). On the environmental side, the North Coast "timber wars" were in full swing by 1990, and the concerns of protesters in Mendocino and Humboldt Counties resonated in the content of the proposed reforms: Timber companies were cutting too many old trees too

rapidly, and existing policy— extensive though it had clearly become— offered forest advocates little recourse. Though this may seem paradoxical at first blush, it is hardly surprising when one considers the political context in which the FPRs were originally developed: Extensive rules at the individual harvest plan level were the Board of Forestry's way of avoiding politically unpalatable restrictions on rate of harvest. Little wonder that, fifteen years later, environmentalists were protesting rate of harvest, and industry was complaining about burdensome regulation.

Discussion

Failure for Whom? Capture Theory and the Forest Practice Rules

In contrast to environmental groups, industry agreed to extensive BMPs as the template for state forest policy— either directly in Board hearings, or by proxy of its representatives on the Board and the DTACs. Thus it is not surprising that the compliance-based regulatory approach enshrined in the FPRs actually served the California timber industry in more ways than one. First, and as previously discussed, it displaced alternative approaches to regulation (e.g., rate of harvest restrictions) that would likely have been more burdensome in some watersheds than the FPRs. While many such approaches would likely have been *less* burdensome than the FPRs in *other* watersheds, from an industry perspective, any regime in which permissible practices are contingent upon watershed conditions is still undesirable relative to a BMP-based regime— even a notoriously extensive BMP-based regime. To paraphrase the Regional

Board member quoted above, the industry wants harvest permits that resemble building permits— and it wants them more than it wants just about anything else.

Second, the extensiveness of the FPRs *and their cost* have each allowed the timber industry to argue that it was being overregulated— particularly in comparison to other states. For example, in 2011, the CFO of a major California timber company told an audience at UC Berkeley that getting a harvest plan approved in Washington, where his firm also operates, typically takes fewer than 3 months, costs about $6,000, and involves about thirty pages of forms. In California, he claimed the same process would take six months to two years and cost $40,000. Echoing the CALFIRE Santa Rosa office's informal study nearly twenty years prior, the executive indicated that the documentation requirements for THPs had become so extensive that "pages" were a less relevant unit of measure than inches in thickness of the binders containing them. The executive then described asking a forester from Arkansas "what you have to do to cut down your trees." Unaccustomed to regulation of private forestry, the Arkansan didn't understand the question; he asked the Californian if his company had chainsaws (Emmerson 2011). More generally, complaints that regulation is "squeezing" the industry— that is, increasing operating costs (i.e., from environmental review) and reducing revenues (i.e., by restricting allowable cut)— are the first rhetorical recourse of timber company representatives, foresters, and industry organizations in public hearings and press releases. Such rhetoric frustrates scientists and regulators working

under more environmentally oriented statutes. In 2002, when a CALFIRE representative opined on the expanding girth of the FPR rulebook before the SWRCB, a NOAA Fisheries biologist testified, "I don't really care how thick the book is. What I care about… and what we are obligated to care about [is] '[Is] what is in that rule book doing the job?' And, candidly, it's not doing the job" (Blum, quoted in Wiley 2002). However, the industry narrative about overregulation tends to resonate politically irrespective of whether or not the regulation is actually working.

The fact that regulation can be made to serve the regulated industry is an old idea in American politics: In 1971, the economist George Stigler used a rational choice framework to describe how agencies become captured by the industries they regulate. Stigler argued that firms *seek* regulation because, in contrast to other forms of government support (e.g., direct subsidies), regulation may be designed to prevent other firms from entering the market as competitors— a development that subsidies would only encourage (Stigler 1971, 4-5). Stigler's theory obviously applies to "traditional regulations" (Wilson 1980) in transportation and broadcasting, in which agencies determine which firms gets to offer which services (and, perhaps, at what prices). Its relevance to public-interested regulation— a category that includes environmental policy— is less obvious, but California forest policy under the Board of Forestry demonstrates that, though the mechanisms may vary, the same basic framework applies. In this case, regulation can be said to serve industry because it

precludes other forms of regulation— by taking up the regulatory space created by agency mandates to protect natural resources, and by providing industry with ammunition against those who would argue more regulation is required to achieve those public-interest goals.

Style, not Scale: The Importance of Policy Design

These observations underscore the importance of policy design in determining whether or not policy achieves desired outcomes— or, perhaps more accurately, whose desired outcomes it achieves. As emphasized throughout this chapter, the FPRs consist of BMPs designed to reduce the impacts of timber harvesting and a THP process that requires documenting where and how BMPs are being applied. The system enshrined in the Forest Practice Act makes industry responsible for mitigation and compliance— not the environmental outcomes of these efforts. This tendency is prevalent in U.S. pollution control policy, and its shortcomings have been well documented in the environmental policy literature (Davies and Mazurek 1998; Kettl 2002; Press 2015).

Due to the demands of CEQA (i.e., cumulative effects analysis) and the limits of the Board of Forestry's mandate, rate of harvest restrictions pegged to resource conditions in a given watershed were the unsavory alternative considered when the FPRs were being developed. As we've seen, however, the Porter-Cologne Act nudges Regional Boards in a third direction: Conceivably, state timber policy could have been based on

a system in which the right to harvest *at all* was made contingent upon resource conditions. Such an approach would likely have been even more repellant to the timber industry than restrictions on rate of harvest; either, however, would have done a superior job of accounting for the cumulative effects of forest management on private land in California.

Spurred by apparently comprehensive dissatisfaction with state timber policy, in 1994 the Milton Marks Commission on California State Government Organization and Economy (informally known as the Little Hoover Commission) conducted a study of the issue and produced a lengthy report in support of several recommendations. In the first paragraph of its cover letter to Governor Wilson and the legislature, the Commission described the FPRs as being overly focused on process and inattentive to outcomes. Though the report embroiders on this policy design critique throughout, the most oft-quoted takeaway of the analysis emphasizes a slightly different point. Two paragraphs down, the Commission wrote, "Despite the hoops that timber operators must jump through and the barriers erected by the planning process, the environment is not being effectively protected because of the flawed concept that the Timber Harvest Plan process is based on— namely that ecology can be addressed on a parcel-by-parcel basis" (Terzian 1994, 1).

This conclusion was referenced in subsequent government reports (see, e.g.,

UCCCWE 2001, 6; Wiley 2002, 7; see also Interview #123)— particularly in the later 1990s and early 2000s, by which point multiple studies had also shown the FPRs to be inadequately protective of water quality and threatened species (Lippe and Bailey 2001; Ligon et al. 1999; Terzian et al. 1994; UCCCWE 2001). *Scale* of regulation, not style, had been identified as the political problem to be fixed.

The next chapter describes how the Region 1 Board designed its own timber regulatory program after the legislature (and eventually the courts) affirmed the water boards' independent authority to regulate timber harvesting under Porter-Cologne. Despite the performance orientation embodied in this strong environmental statute, Region 1 also stumbled over the technical and political difficulties of assessing policy outcomes at the timber-water quality interface. The result was a program that, though successful in some notable respects, reproduced the basic design of the FPRs— and suffered from similar shortcomings. These difficulties helped prompt the new generation of redwood timber firms to take on the problem identified by the Little Hoover Commission— scale of regulation— with the support of the Region 1 Board, which is covered in Chapter 5.

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CHAPTER 4

RISING WATER: THE EXPANSION OF REGIONAL WATER QUALITY CONTROL BOARD AUTHORITY OVER TIMBER HARVESTING, 1995-2005

Introduction

By the mid-1990s, hope for 208 certification had faded. Questions about how to incorporate an effective monitoring program into the FPRs and account for cumulative watershed effects of timber harvesting had been farmed out to study groups and committees. Regional Board staff participated in review team meetings and inspections— sometimes holding their ground, sometimes not. At around the same time, however, water quality impairment was rising in prominence on the state policy agenda. This shift facilitated the adoption of S.B. 390 (1999b), which forced Regional Boards to engage in more active oversight of classes of polluters that had traditionally received waivers, and S.B. 810 (2003) which empowered them to deny permits or waivers to timber operations that threatened water quality in sediment-impaired streams. This chapter describes the drivers of these new policies and their effects on timber regulation in the redwood region.

The Resurrection of Nonpoint Source Pollution as a Policy Problem, 1995 - 1999

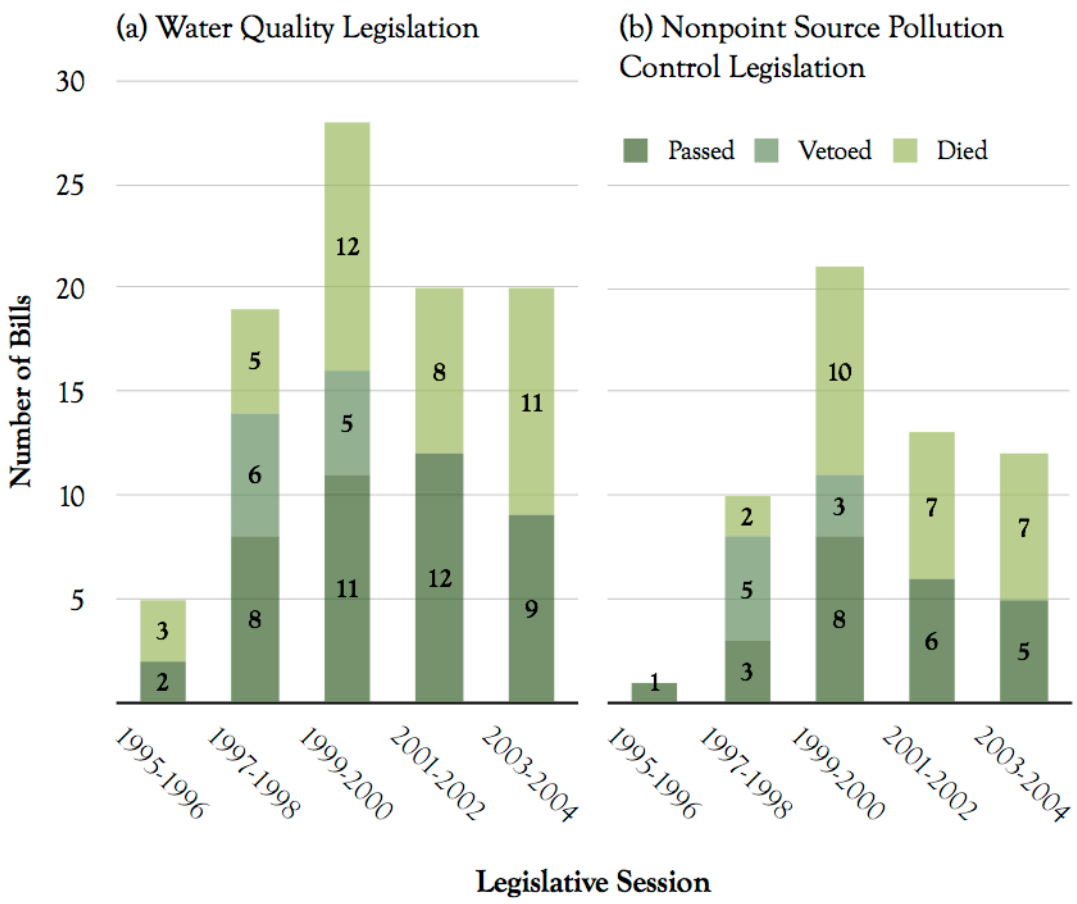
In the late 1990s, California state lawmakers took increasing interest in water quality policy. In the 1995-1996 session, five bills on the topic were proposed; by 1999-2000,

the number had risen to 28 (Figure 4.1).[1] The relative increase in nonpoint source pollution control legislation was especially marked: While only one piece of legislation addressing the issue was considered in the 1995-1996 session, more than twenty nonpoint source bills were numbered in 1999-2000 session, and more than half of those were ultimately passed by both chambers.

Former lawmakers cite two key reasons for the growth of the issue at that time: Democratic control of state government and growing awareness within the legislature of compromised water quality and its consequences. In 1998, after sixteen years of Republican governorship, Californians elected Democrat Gray Davis. The party controlled the Senate and the Assembly, as well, so there was a sense among legislators

[1] Data were generated by reviewing all legislation proposed in both chambers of the California legislature in five consecutive sessions beginning with 1995-1996. To identify within these five sessions all the bills potentially concerning water quality, I searched the index of proposed legislation for each year for all bills containing "water" in the title. I omitted bills concerning groundwater, fluoridation, water transfers, water district formation and dissolution, recycled water, graywater, and drinking water standards; water quality bills narrowly focused on marine sources of marine water pollution (e.g., ballast water, ocean cruise ships); and legislation responding specifically to contamination of drinking water supplies by particular hazardous chemicals most commonly diffused through groundwater, such as hexavalent chromium and MTBE. These two pollutants received a great deal of public attention in the late 1990s in connection with discoveries of contamination not linked either substantively or in the press to traditional nonpoint sources. Legislation committing funds from large water-related bond measures to water programs with the all of the above foci were likewise omitted. Bills proposing procedural changes to the administration of Regional Water Quality Control Boards were only included in the analysis where the implications of the proposed change for Boards' ability to regulate water quality in the state were clear and substantial in the analysis, and generated significant opposition or support from environmental groups, the regulated community, or other interests not including the SWRCB itself. For the purposes of this analysis, "nonpoint sources" include any discharges into surface waters not subject to NPDES permit requirements, including "legacy" sources such as polluted sediments and historic mine sites. The exception to this decision rule is storm water runoff. Since California cities have struggled to come into compliance with the federal requirement to regulate municipal storm water runoff as a point source, such runoff remains a major source of pollution in the state. Since increased pressure to control stormwater runoff in the Los Angeles late 1990s likely influenced attention to nonpoint, diffuse, and under-regulated sources of water pollution more broadly, I intended for this analysis to capture state efforts to control it.

FIGURE 4.1 WATER QUALITY LEGISLATION INTRODUCED IN THE CALIFORNIA SENATE AND ASSEMBLY, 1995-2004



that they could make progress on popular environmental issues like nonpoint source pollution control (Interview #101; #102).

Increasing awareness of water quality problems resulted from a combination of factors. Representatives of coastal districts were receiving complaints about beach closures from their constituents (Interview #101; #102). In many cases, the surfers and other residents who expressed concerns about water quality understood that the pollution they were observing arose from multiple, diffuse, and difficult-to-regulate sources, and

that new approaches to controlling it might be necessary. At the same time, advances in storm water regulation at the federal level and lawsuits challenging the slow pace of TMDL implementation had brought increased legislative attention to the shortcomings of the state-federal water quality regulatory regime as a whole: The 1987 amendments to the Clean Water Act broadened the definition of "point sources" to include municipal and industrial storm water runoff (Water Quality Act of 1987), but it wasn't until the summer of 1999 that NPDES permits for storm water went into effect for many cities in Southern California (Cone 1999). Though this event reached further into the lives of more urban Californians than water quality regulation previously had— requiring, for example, the use of drip pans to catch oil in auto shops, as well as public outreach and education campaigns— many doubted that the new regulations were equal to the magnitude of the runoff problem (Cone 1999; Craig 2006).

Meanwhile, environmental groups around the country had grown frustrated with states' failures to make progress on setting TMDLs for 303(d) impaired water bodies. Beginning the 1980s, this frustration resulted in a series of lawsuits against the U.S. Environmental Protection Agency (EPA) for failing to "backstop" non-starter state TMDL processes (EPA 2009; Houck 2002, 49-74). California was among the states targeted by activists, and in 1997 and 1999, the EPA agreed in two separate settlements to hold state regulators accountable to a pre-set timeline for TMDL development— increasing the pressure on the state (EPA 2009; Polakovic 1999). As one senate staff

member explained, the sense in the legislature was, "If we've largely regulated the point sources, and we're still seeing impairments in these water bodies, we're going to start losing [federal] money" (Interview #101). The looming deadlines in the settlement lent urgency to the widespread recognition that water quality problems persisted in California despite tough regulations on common point sources imposed by the CWA and the Porter-Cologne Act.[2]

A third factor driving attention to nonpoint source pollution and water quality at the state level was increased attention to the decline of anadromous fish. In 1989, the winter run of Sacramento River Chinook Salmon (*Oncorhynchus tshawytscha*) dropped suddenly from a diminished but reliable 1,200-3,900 individuals to an estimated 550 returning fish, triggering status reviews under both the federal Endangered Species Act (ESA) and its California equivalent (CESA) (National Marine Fisheries Service 1990); though the state chose not to act, the federal government listed the run the following year. In 1993, both the state Fish and Game Commission and NOAA Fisheries received petitions to include the Coho Salmon (*O. kisutch*) in their respective endangered species policies, and by 1994, the federal agency was reviewing the status of all West Coast anadromous fish populations (California Fish and Game Commission 2007; National Oceanic and Atmospheric Administration [NOAA] 1993; 1994). In the

[2] While federal law provided a legal hook for activists interested in advancing water protections and ultimately increased pressure on state government to take additional action to control the discharge of pollution, however the nexus to S.B. 390 is entirely indirect: Neither the TMDL backstopping suit nor the substantive requirements of the settlement had direct implications for waivers of WDRs.

second half of the decade, the CESA and ESA listings for California salmonid populations began to stack up (Table 4.1).

At the same time, marine conservation was also garnering policy attention. Former California Assembly Member Fred Keeley, who sponsored multiple bills on marine resource protection and conservation between 1996 to 2002, noted that because these laws extended to anadromous fish species, the responsibilities they placed on state resource management agencies in the late 1990s created a lever for those agencies and

TABLE 4.1 CALIFORNIA SALMONID LISTINGS, 1989 - 2002

Year	Event	Species	ESU
1989	Endangered status granted under CESA	Chinook	Sacramento River winter run
1990	Threatened status granted under ESA	Chinook	Sacramento River winter run
1994	Endangered status granted under ESA	Chinook	Sacramento River winter run
	NOAA Fisheries Northwest and Southwest Fisheries Science Centers begin publishing status reviews of West Coast anadromous fish species.	All	All
1995	Endangered status granted under CESA	Coho	Central Coast
1996	Threatened status granted under ESA	Coho	Central Coast
1997	Threatened status granted under ESA	Coho	Southern Oregon/Northern California
	Threatened status granted under ESA	Steelhead	Central California Coast
	Endangered status granted under ESA	Steelhead	Southern California
	Threatened status granted under ESA	Steelhead	South-Central California Coast
1998	NOAA Fisheries and the Board of Forestry sign a Memorandum of Agreement to improve the FPRs to prevent steelhead listing.	Steelhead	All
	Threatened status granted under ESA	Steelhead	California Central Valley
1999	Threatened status granted under ESA	Chinook	California Coastal
	Threatened status granted under ESA	Chinook	Central Valley spring run
	Threatened status granted under CESA	Chinook	Central Valley spring run
2000	Threatened status granted under ESA	Steelhead	Northern California
2002	Threatened status granted under CESA	Coho	Southern Oregon/Northern California

environmental groups to use in appeals for increased regulation of pollution in coastal streams and rivers (Figure 4.2). Keeley believes protections for marine fish species combined with public outcry over beach closures elevated the issue of nonpoint source pollution on the legislative agenda (Interview #118). As these factors directed legislative attention to water quality issues, the attention itself may have become a driver for further action. Some of the work on nonpoint source pollution seemed "new and different" to staff, and it was popular with coastal voters (Interview #101).

S.B. 390: Waivers in the Crosshairs

The Proposal and Its Supporters

It was in this context that the San Francisco-based BayKeeper approached State Senator Dede Alpert about writing a bill to eliminate waivers of WDRs entirely (Interview #101). The nonprofit was part of a national network of water quality advocacy groups, whose umbrella organization, the WaterKeeper Alliance, would incorporate that year. In the late 1990s, WaterKeeper groups in California had been increasing their visibility and becoming more proactive in their advocacy style (Interview #101).

It also happened that BayKeeper was connected to the North Coast environmental groups that had been pushing on the Resources Agency, the Board of Forestry, and CALFIRE for going on thirty years. The organization's Executive Director, attorney Michael Lozeau, had spent two years as an associate at the San Francisco office of

FIGURE 4.2 NORTH COAST REGIONAL WATER QUALITY CONTROL BOARD JURISDICTIONAL BOUNDS AND SPECIAL STATUS SALMONIDS

(a) Steelhead Distinct Population Segments

(b) Chinook Evolutionarily Significant Units

(c) Coho Evolutionarily Significant Units

As these maps illustrate, the impacts of salmonid population listings in California fell disproportionately on the coastal portion of the state, and then mostly within the jurisdiction of the North Coast Regional Water Quality Control Board (Region 1). This is due in large part to the fact that major dams on the western slope of the Sierra Nevada act as barriers to fish passage, limiting these species' ranges elsewhere in the state. Thick gray lines highlight Region 1; other water quality regions are indicated by thin lines.

Earthjustice (then the Sierra Club Legal Defense Fund) after graduating from law school in 1989. It had been Earthjustice lawyers who worked with staff at the North Coast-based Environmental Protection Information Center (EPIC) on the several timber-related cases in the late '80s in which EPIC and the Sierra Club were co-plaintiffs. Lozeau knew Joseph Brecher— the legendary environmental lawyer behind the Sierra Club's 1979 petition to revoke the FPRs' functional equivalency certification— and the two strategized together. As one North Coast environmentalist put it, Lozeau, Brecher, and a handful of other California attorney-activists "sort of [had] their own little think tank." And in the late 1990s, the think tank was thinking about water, timber, and waivers of WDRs. Specifically, according to another activist, they were thinking: "Those old waivers [of WDRs] are a pile of shit!" (Interview #104a). To observers in Sacramento, the fight over S.B. 390 would play out as a showdown between Central Valley farmers and a San Diego Senator, but it was rooted in the redwood forests of the North Coast— and in environmentalists' recognition that the timber agencies were neither the best nor the only venue from which to extract protections for those forests.

Alpert's distance from all this made her an ideal champion for the bill. Her district included most of San Diego and some of its suburban fringe. The area is generally conservative, and though Alpert was on the Environmental Quality Committee, her focus was on education policy. The environment was not "her issue" when she came to

the legislature in 1990, and she considered herself a pragmatist in her orientation toward it (Interview #102). She was, however, a Democrat, and her constituents had economic, recreational, and aesthetic interests in improving water quality. As Alpert aide Nora Lynn explained, "Even if [you] lean conservative, if you're on the coast you know that your property values are tied to water quality, beach quality, all that kind of stuff" (Interview #101). There were also pronounced water quality problems in Alpert's district— it included one of the first beaches in the state to regularly post notices that water was polluted and unsafe for surfing (Interview #101)— and it had a well-organized environmental constituency, including groups like the Surfrider Foundation, whose interest in water quality emphasized the public health component of the issue along with more biocentric concerns (Interview #101; #102). Lynn summarizes, "[Alpert] clearly had a stake in the whole thing. Her beachline was the point of discussion. Her surfers were getting sick. She had a dog in the fight, to a degree."

Though Alpert's coastal district included many who suffered the impacts of the permissive waiver program, it included few members of the regulated community (Interview #102). Waivers have traditionally gone to rural industries— including timber but also agriculture. Urban sources of water pollution, including stormwater, urban runoff, and manufacturing, had long been or were then beginning to be regulated under either the NPDES program or the federal Clean Water Act's secondary treatment standards, which cover municipal wastewater treatment plants. As a

representative of an urban and suburban district, Alpert not only stood to benefit politically from addressing un- and under-regulated dischargers; she was also politically insulated from interests who would face increased costs if S.B. 390 passed.

Alpert was not the only legislator acting on water issues from this position in the late 1990s. Senator Byron Sher, who was then Chair of the Environmental Quality Committee, sponsored bills to designate the South Yuba River as Wild and Scenic (S.B. 496 1999) and promote dam removal (S.B. 1540 2000) despite opposition from rural representatives interested in protecting economic uses of Sierra Nevada rivers.[3] Sher represented a wealthy suburban area just south of San Francisco; his constituents utilized the state's rivers and coastline recreationally, indirectly, or not at all. Those whose habitual activities would be restricted as a result of Sher's action on Wild and Scenic Rivers, dam removal, and ultimately waivers for the most part did not reside in his district.

For both Alpert and Sher, district composition allowed them to advance water quality legislation in a time when the issue was moving up on the political agenda. In 1999,

[3] There was strong support for environmental legislation of this type in some parts of rural California. The Wild and Scenic designation was actually sponsored by the Nevada County Board of Supervisors, however neighboring Yuba County's Board of Supervisors opposed it (Senate Rules Committee 1999a). The salient fact is that representatives of rural districts are far more likely to face countervailing pressures from their constituents on legislation of this type than would an urban representative whose constituents are generally sympathetic to environmental positions— and who are also less interested in the complex constellation of costs and benefits that a dam removal or a Wild and Scenic designation would confer to adjacent communities.

Alpert did so, with encouragement from an increasingly effective water quality lobby, by proposing legislation in Sher's committee that would substantially change the options for what were then the least-regulated polluters in the state: Nonpoint dischargers covered by waivers of WDRs.

Debate, Amendments, and Adoption

S.B. 390 faced stiff opposition from Republicans on the Environmental Quality Committee, who were in turn responding to the concerns of a number of industry groups. Organizations representing mining, building, municipal utility, petroleum, manufacturing, and timber interests, as well as the state port authorities association formally registered their opposition to the proposed law (Jennings 1999; Senate Rules Committee 1999b). However, it was agriculture and related industries in the Central Valley— not timber— that were the most vocal and influential opponents of S.B. 390. They dominated the official lists of its registered adversaries, and the California Farm Bureau Federation (Farm Bureau) and the California Cattleman's Association conducted most of the lobbying in opposition to the legislation (Interview #101; see also Kay 2000).

The challenge for Alpert would be getting the bill out of the Environmental Quality Committee. She feared that Republicans would find support from her side of the aisle, specifically with Senators from Central Valley districts. "This was enough of a sea

change that it made moderate Democrats nervous, too," Lynn says. "They were hearing from their farms and from their timber companies and dairies" (Interview #101). But the opposition was not holding all the cards: As successful lawsuits against the EPA over its slow progress on TMDLs stacked up, both in California and nationwide, Alpert suspects that agricultural interests saw the writing on the wall. The apparent necessity of eventually addressing 303(d)-listed bodies is, in her opinion, what drove them to the negotiating table. "They realized they had to make some kind of progress" on water quality or they would feel the full force of the CWA in a way that could be economically painful (Interview #102).

Instead of eliminating waivers, the version of S.B. 390 that the Committee passed preserved the waiver program with three major changes. First, all waivers would be subject to conditions specified by the relevant Regional Board. Second, waivers would be required to be "in the public interest." Third, waivers would be subject to a renewal process, including a public hearing, at regular intervals of no more than five years. To allow Regional Boards time to transition to the new, "conditional" waivers, the legislation set a uniform January 1, 2003 expiration date for all pre-S.B. 390 waivers (S.B. 390 1999a). The Senate passed the bill with a four-vote margin in early June of 1999. The "ayes" included a single Republican, Senator Bruce McPherson, who represented a coastal district in Central California. S.B. 390 took minor amendments in Assembly and passed with 55 votes in early September. Two days later, the Senate

voted to approve the Assembly version of the bill 22-12, and on October 6, Davis signed it (California Legislative Information 2015).

Conditional Waivers on the North Coast

In the world of state timber regulation, S.B. 390 is now regarded as a "game-changer" (Interview #105; #106; #107; #131), but it took a while to actually change the game— in part because it did so indirectly. Though the timber agencies perceived the Regional Boards as "forceful" and "activist" in the negotiations over 208 certification, in California it is much more common to hear them described as "cautious" (Martin 1989, 101, 137; Interview #112a; Daniel Press, pers. comm. 2010; Thompson 2002). Regional Boards are backed by two tough statutes, but they are aware that the political consequences of exercising their powers to the greatest possible extent might be worse for water quality in the long run than regulating with a lighter touch in the short-term (Interview #112a; #132; see also Press 2015, 101-120). Another, and arguably more important, factor in water quality policy implementation is that broad powers are difficult to use in the absence of budgets to match. The Regional Boards have limited funds— and, thanks to the mandatory waiver sunset date, in the case of S.B. 390, they also had limited time.

In the case of the North Coast timber waiver particularly, there was another issue: By the time S.B. 390 worked its way to the top of the agenda— around the end of

December 2001— Region 1 was on the verge of a momentous confrontation with what was by then the most maligned timber firm in the West: Pacific Lumber Company (PALCO). The conflict would drag on until PALCO's bankruptcy in 2007 (and continue in the courts for several years after that), but by 2002 tensions had reached a boiling point— not only between the PALCO and the Board, but also between the Board and its staff. The tumult of the waiver revision would bring matters to a head on both fronts.

Round One: Old Arguments and a Cautious Fix

Initially, Region 1 interpreted S.B. 390 as having given them explicit authority to do what they were already doing. With respect to timber, the existing waiver was "conditioned" on compliance with the basin plan and the FPRs. The board had had no process or protocol for ensuring that waiver-covered operations complied with their de facto conditions, but with the passage of S.B. 390, "following up" with recipients to see if they had met their waiver obligations would be a duty (Warner 2001). Since the renewal process would provide the public with opportunities to force the compliance issue if the Boards were not making headway, the five-year shelf life of the new waivers— not the conditions— seemed to be the "key" distinction between the pre- and post-S.B. 390 regulatory landscape (Freeman 2001; see also Kor 2002, 8).

Though staff appeared sanguine about the extension of their authority, they expressed concern about meeting the deadline— particularly in the absence of new funding (Interview #106; see also Freeman 2001; Warner 2001). The idea of shifting from waivers to general WDRs for timber harvesting came up in the earliest phases of S.B. 390 compliance planning: Because Regional Boards were authorized to extract a filing fee from permittees but not from waiver recipients, it was explicitly proposed as a means for addressing the gap between funding and function that the new legislation had introduced (Warner 2001).

By early 2002, Board staff was operating on the expectation that general WDRs would edge out a revised general waiver as the preferred way to address timber-related discharges in Region 1. In March, staff prepared a report outlining recommended revisions for all Region 1 waivers. Specifically, the report considered whether the waiver should be revised and re-adopted or eliminated in favor of an alternative regulatory regime (i.e., individual waivers, or general or individual WDRs). The preliminary recommendation for the timber waiver was to remove it from the list of general waivers, "pending further recommendations to be developed under Region 1's lead" (North Coast Regional Water Quality Control Board [NCRWQCB] 2002b). As an outcome of the March update, the Board directed staff to develop alternatives for the waivers they recommended against renewing (NCRWQCB 2002a). Given the comparative impossibility— both for timber operators and for fiscally stressed

regulators— of issuing custom waivers or WDRs for every THP on the North Coast, a general WDR for timber was the likely destination of any move away from the general waiver approach. That is not to say it would have been a popular choice, however. "Waste Discharge Requirements were like mutually assured destruction in the sense they were very expensive and time consuming," explained one Board member. "So [that was] the last thing industry wanted to do" (Interview #112a).

By the next S.B. 390 update, in June 2002, Region 1's strategy had changed. Following the Board's recommendation, staff divided existing waivers into two categories: Those that would be replaced with new, revised waivers written into the basin plan as amendments, and those that would be replaced with a different type of regulatory program.[4] The waiver for timber harvesting— along with a new category of timber operations that had not been explicitly covered by the pre-S.B. 390 waiver, harvesting under Nonindustrial Timber Management Plans— was placed on the former list (NCRWQCB 2002d).

Region 1 held S.B. 390-mandated hearings to review its existing waivers in September 2002. Only the timber waiver was given its own proceeding— a clear indication of its

[4] Options within the latter category included general or individual WDRs, storm water permits, or individual waivers. "Waiver termination"— a.k.a., without explicitly identifying an alternative regulatory pathway for dischargers in the category— was also cited as a means of "waiver replacement." In the absence of a waiver option, previously-covered dischargers would have the option of either seeking an individual waiver or WDR from the Regional Board, or operating without agency sanction (and facing all the legal exposure doing so would entail). In effect, then, waiver termination would likely result in the replacement of a categorical waiver by an individual waiver or individual WDRs.

relative significance within the region. Public participation was energetic, but general. Rather than offering specific critiques of the existing waiver or suggesting conditions for its replacement, comments focused on the role of waivers in regulating the impacts of timber harvest— in effect reenacting the debate over S.B. 390 in a regional and industry-specific context. Before the board, environmental groups argued that timber waivers should be replaced by WDRs; some noted that these could be watershed-specific, providing a logical venue for analyzing cumulative effects (Interview #104a; NCRWQCB 2002e). On the other side, employees of the region's large timber companies, contract loggers, and representatives of statewide industry groups expressed their preference for the pre-S.B. 390 arrangement (permanent waivers without conditions, enforcement, or fees), reiterating the claim that the FPRs provide adequate water quality protections and that any additional regulation by Region 1 would be redundant and an unwarranted burden to industry (NCRWQCB 2002e). In a pattern that would repeat itself consistently in Regional Board deliberations on timber issues, the question of whether or not the FPRs provided adequate water quality protections became the axis of divergence between industry and environmental groups. It was, in essence, the same old fight in a different place: By now, environmentalists had ample evidence to support their claims that North Coast streams would never meet basin plan objectives without additional intervention by the Regional Board (e.g., EPA 1998; Ligon et al. 1999; NOAA 1998, 13357-13358; Terzian et al. 1994; UCCCWE 2001),

and timber interests could always respond that they were already being regulated by another agency, under a uniquely comprehensive and exacting set of rules.

Behind the Scenes: PALCO, the Board, and the Staff

While stakeholders recapitulated the decades-old debate over the adequacy of the FPRs, the fight over the North Coast timber waiver was not without novelty. The first policy to be approved in Region 1 was a temporary fix— an interim waiver to cover currently active and new THPs after the January 1, 2003 sunset date until such time as a fully-developed waiver could be prepared for public review and Board vote. This waiver was actually written by two Board members after staff failed to submit a draft by the Board's appointed deadline. The Board then told the "infuriated" staff that they'd write the CEQA analysis for the waiver, too. Staff declined the offer and quickly spit out a negative declaration— a document declaring that the proposed policy would not significantly impact the environment and therefore did not require a full environmental impact report (Interview #112a). The waiver was approved by the Board on December 10, 2002, and almost immediately petitioned by two North Coast environmental groups, which argued that the waiver was invalid for three reasons. First, it was not in the public interest (a requirement of S.B. 390). Second, the environmental groups argued that the waiver should have been subject to a higher level of review under CEQA. Finally, they claimed that discharges from timber operations were point sources under the federal CWA, and should therefore be required to obtain a NPDES

permit (SWRCB 2003). In a hearing on the petition before the SWRCB, Region 1 staff then testified *against* the waiver— including the CEQA analysis they themselves had written (Interview #112b; #113).

Regional Board members do not typically draft policies or CEQA analyses themselves, and staff does not typically testify against its own Board before the SWRCB; as one Board member later explained, "This stuff is very extreme. This is not normal" (Interview #112b). But in the years following the 1999 Headwaters Agreement, the extreme was becoming normal in Region 1. The deal between PALCO and the federal and state governments is widely known for transferring the contested Headwaters Forest and other old growth forest into public ownership, but the company also agreed to a Habitat Conservation Plan (HCP) and a Sustained Yield Plan (SYP) that imposed restrictions on the management of its remaining properties. For its part, the government agencies that signed on to the agreement vowed to require nothing further from PALCO: If the company adhered to the terms of the HCP and SYP, it would receive the permits it needed to log (summarized in Bureau of Land Management 2003; Lippe and Bailey 2001, 389-390; NOAA 1999). The signatories included state timber regulators, CDFW, and both federal entities with Endangered Species Act responsibilities— but not the SWRCB or the Region 1 Board (Interview #111; #112a; NOAA 1999).

Ironically, the reason for this omission— which had tremendous political consequences for both PALCO and the Region 1 Board— appears to have been staffing shortages at the agency: Initially, the Region 1 Board had sent a staff member to participate in the negotiations, but he became ill shortly thereafter. A former PALCO executive recalls, "He had to go off staff, they didn't really have anyone to take his place, so the process kind of went forward without him." In 1998, the water boards attempted to get involved again, but by that point the company had made extensive commitments to habitat protection; it was wary of bringing in another agency with another set of concerns that would doubtless translate to another set of restrictions and— as the water boards made clear in its offer— expenses (Interview #111). The company declined, and when the agreement was finalized, it continued to move logs at a frenzied rate— including from the "five watersheds" in southern Humboldt County that the state had declared cumulatively impacted in 1997 (Gertstein and Harris 2003, 3; Interview #136). Repeatedly, local environmentalists and downstream residents appealed to the Region 1 Board for relief (Interview #112a; #136; Lippe and Bailey 2001, 395-396; Lundborg et al. 2013, Appendix 2C; NCRWQCB 2000, 3; 2003, 5; Quarles 2003, 1).

Faced with the prospect of additional regulation, PALCO publicly argued that it was satisfying its obligations to the state under the Headwaters Agreement, by way of its groundbreaking HCP and SYP; that the mitigations in the HCP would prevent additional water quality impacts; and that the water boards lacked independent

authority to impose WDRs or monitoring and reporting programs on the industry in the first place (Interview #111; NCRWQCB 2002c; *PALCO* v. *SWRCB* 2006). Addressing the Region 1 Board in April of 2000, a PALCO manager suggested that its members "regulate within the framework of the [HCP] to create a collaborative working relationship" with the company (NCRWQCB 2000a, 1602; 2000b).

Sources of the antagonism between the Board and its staff over the timber waiver revision are discernable in the roughly contemporaneous fight between the Board and PALCO. In early 2000, a local environmental group, the Humboldt Watershed Council, petitioned the Board to take action on sediment pollution in the five watersheds. Staff investigated the council's claims, and in April submitted a report to the Board indicating that the design and content of the HCP made it exceedingly unlikely that Basin Plan objectives, TMDL requirements, or the terms of the state's anti-degradation policy would be satisfied without additional regulatory action by the Regional Board (Lundborg et al. 2013, 2; NCRWQCB 2000b). Notably, staff emphasized the importance of instream water quality monitoring— and PALCO's reluctance to implement it even under prior Regional Board orders— at this juncture (NCRWQCB 2000a; 2000b). The Board noticed and then delayed hearings on the question of whether or not to impose WDRs on the company for more than a year (Lundborg et al. 2013). In the meantime, the Board's executive officer ordered turbidity monitoring in early 2001— prompting PALCO to petition the decision to the

SWRCB (Lundborg et al. 2013). The latter upheld Region 1's authority to require instream monitoring generally, and turbidity monitoring particularly, in October 2001 (NCRWQCB 2001; SWRCB 2001). The case would go on to the state court system, culminating in a major victory for the water boards in the California Supreme Court in 2006 (*PALCO* v. *SWRCB* 2006).

In the short term, however, things got ugly. Two months after imposing turbidity monitoring on PALCO, the executive officer resigned— "to pursue other interests," officially (SWRCB 2001). The *North Coast Journal*, a Humboldt County alternative weekly, accused a Davis appointee to the Regional Board of having "engineered [his] firing" for political reasons (Easthouse 2003). Two months after that, in early July of 2001, that same Board member vacated the long-delayed hearings on WDRs for PALCO (Lundborg et al. 2013). In interviews, sources stated that— whatever the actual reasons for the executive officer's departure— many people in the water quality regulatory community *believed* that PALCO was to blame. The retirement of his replacement less than two years later also provoked suspicions, and in 2005, the Board's then-chair said the ongoing conflict between the agency and the company had "burned out" three executive officers. Significantly, she made these remarks en route to lambasting PALCO for allegedly threatening to have the then-current executive officer fired (Interview #112b; #113; #131; NCRWQCB 2005b).[5]

[5] Whatever the true reasons behind the leadership changes at Region 1 in the early 2000s, it is evident

The Humboldt Watershed Council continued to lean on the Board, however. A January 2002 petition did yield at least a WDR hearing, but the proceeding, held in Eureka that Spring, provided little more than spectacle. Spectacle, however, was provided in spades. So many people showed up to the hearing that the city's fire marshal disbanded it after a half an hour, citing the need for a larger venue. After a quick move, the Board heard from the usual suspects— i.e., industry representatives and advocates with the leading environmental groups— but also downstream residents whose properties were flooding, 22 of whom had brought their own suit against the company (NCRWQCB 2002c; Easthouse 2002). PALCO employees also took to the podium, expressing their belief in the HCP and their fear for their jobs; a lawyer for the company denied the Regional Board's right to regulate timber harvesting at all. One woman "donated" two of her three minutes of mic time to a period of collective silence— moments many participants probably wished they could reclaim as the testimony dragged on past 5 p.m. on the hearing's second day. After retreating to closed session in the late evening, at 11:31 p.m. the Board approved motions to move

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that the Davis Administration conveyed its expectations regarding PALCO to the agencies that *were* signatories to the Headwaters Agreement— and that it didn't always trouble itself to be delicate about doing so. In 2000, Public Employees for Environmental Responsibility (PEER) reported that managers at CDFW, CALFIRE, the U.S. Fish and Wildlife Service, and NOAA Fisheries were called into a meeting with company representatives and there ordered by the Governor's Deputy Chief of Staff to "bend over backwards" to get PALCO's THPs approved quickly. "According to several sources," PEER wrote, "the meeting and [the Administration's] message served to embolden PALCO executives to push state agencies harder" (PEER 2000). The report also pointed out that PALCO's complaints against agency personnel "often turn personal, as company officials attack the qualifications of state employees they consider obstructionists" (PEER 2000)— an allegation that mirrors the assessment of one water quality regulator, who stated that PALCO "had a directive to trash [Region 1] staff" (Interview #112b). Referring to major timber companies' well-formed habit of circumventing agency processes and going straight to high-ranking Administration officials, one CDFW biologist dryly noted, "The tire tracks on people's backs are well- formed" (PEER 2000).

forward with a mediation it had planned in advance of the hearing, and to have the staff prepare status reports on monitoring requests at the next meeting and "consider" cleanup and abatement orders for the company going forward. The Board would not be moving forward with WDRs. As this realization sank in, a Board member asked the executive officer to read his letter of resignation out loud to the assembled crowd. In the last moments of the proceeding, regulators were pelted with derision: One activist called the hearing "a sham"; another audience member called out, "This Board was the public's only hope and now it is shattered"; still another demanded a vote on the WDRs— a request the Board declined. The only positive comment came from the Vice President of PALCO, who thanked the Board just before it moved to adjourn the meeting— at 12 a.m. (NCRWQCB 2002c).

In the months that followed, the Board faced mounting pressure to act— not only from environmental groups, but from the state legislature, which wanted it to stand up to PALCO. Backed by its contractors, employees, and local chambers of commerce, the company would increasingly rely on the argument that further restrictions on its operations posed a serious threat to its financial solvency (see, e.g., Abate 2005; NCRWQCB 2005a; 2005b; Sims 2005).[6] Many in the regulatory and environmental communities believe that PALCO was simultaneously exerting its political clout with

[6] If trotting out the old saw that protecting the environment would bankrupt the firm seems a little unimaginative, PALCO should never be faulted for lack of creativity. In 2005, the company actually succeeded in persuading the Superior Court of Humboldt County to issue a temporary restraining order enjoining the Region 1 board from holding hearings on WDRs (NCRWQCB 2005c).

the Davis Administration to create favorable conditions on the Board. Turnover was high there, too, and a Board source says not all departures were elective. That individual recalled an occasion when a colleague was removed for bias after trying to support staff members in a hearing in which PALCO representatives had berated them— a regular occurrence in those days (Interview #112b). As one staff member explained, "We were the only nail standing up, and [we] got continually pounded"— not only by PALCO, but by the rest of the industry, which closed ranks behind the company, and ultimately even the signatory agencies, which had signed a common defense agreement as part of the Headwaters deal (Interview #107; #112b). The result was "deep, long-lasting hurts" and profound mistrust— between Region 1 and the industry, between the Region 1 and other agencies, and between the Board and its staff (Interview #107).

In this context, when staff read the interim waiver— apparently "conditioned" on compliance with all the bodies of policy on which it had been conditioned prior to S.B. 390— they saw it as more of the same. But a Board member maintains that it had teeth: The language includes multiple "kick-outs"— clauses that explicitly reserve the Regional Board's authority to revoke waiver coverage when water quality is threatened by waiver-covered operations (Interview #112a; #112b). Significantly, the waiver stipulates that it "shall not apply to timber operations on non-federal lands that the Executive Officer determines… [that] cumulative impacts, special hydrographic characteristics, or Total

Maximum Daily Load standards warrant further regulation" (NCRWQCB 2002f, 5). The author of this condition says that he wrote it with the five PALCO watersheds in mind (Interview #112b). These provisions were only good, however, if the Board used them, and staff evidently did not believe that the Board would. So when environmental groups petitioned the waiver, staff directly lobbied the SWRCB to hear their case— in effect informally petitioning their own waiver out from under their own board (Interview #112a; #112b; #113).

The Waiver Before the State Board (and After)

The key issue in the petition— and the subtext of both the public interest and the CEQA claims— was that the "conditions" in the interim waiver were more or less the same as the terms Region 1 had attached to waivers (and thought of as conditions) before S.B. 390 explicitly authorized conditional waivers; they protected water quality by requiring waiver recipients to comply with other, existing regulatory programs— namely the FPRs and the basin plan. All told, the interim waiver didn't appear to be much of a departure from a status quo, and both staff and the environmental groups that submitted the petition objected to it because the status quo was plainly not protective of water quality (SWRCB 2003).

The State Board agreed with them: Though its draft order (unsurprisingly) rejected the argument that timber operations should be regulated as point sources under the CWA,

it supported the environmental groups' first two contentions. Significantly, the SWRCB criticized the lack of specificity in the waiver, noting that similar, general conditions under the pre-S.B. 390 waiver had resulted in significant adverse effects on water quality from timber harvesting. They wrote:

> A waiver of waste discharge requirements that is based upon the assumption that [CALFIRE] and Board of Forestry will establish an improved water quality regulatory program provides no assurance of adequate water quality protection. The record contains substantial evidence of significant water quality problems related to timber harvesting under the previous waiver. In the absence of more specific conditions to protect water quality, we conclude that the provisions of the present waiver applicable to timber harvesting on nonfederal land are insufficient to provide a reasonable assurance of water quality protection and are not in the public interest as required by [S.B. 390] (SWRCB 2003).

The SWRCB took a clear position: The timber agencies and the FPRs could not be counted on to protect water quality, and the Regional Boards would have to take on a greater role.

And then the SWRCB mooted its own order. The Regional Board member who authored the waiver asserts that the State Board reversed because its members realized— or, perhaps, were made aware of— the position in which the industry would find itself if the order were filed: There would be no way to legally harvest timber on the North Coast. If the water boards allowed this to occur, the industry would pillory them in the press, and if the affected firms retaliated with a regulatory takings case, the water boards would have to answer for their decision in the courts, as well. As the Regional Board member summarized, "It would have been disastrous if our old waiver expired,

and we had no way for them to comply with the law. I thought that put us in a politically, almost death zone. And, again, our staff just didn't seem too aware of it" (Interview #112b).

Round Two: New Legislation, New Leadership, and a New Waiver Strategy

By the time the petition was settled, several other things had changed for the Regional Boards. S.B. 923, which required monitoring as a condition of waivers, was adopted in October 2003. Monitoring programs could be individual, group, or watershed-wide. Though the bill also provided exceptions to the requirement, it further clarified the Regional Boards' authority to develop robust waiver programs. It also provided a means by which such programs might be at least partially paid for, authorizing Regional Boards to collect permit fees from waiver recipients (S.B. 923 2003).

Two days after signing S.B. 923, Davis— who had lost an historic recall election less than a week prior, and would cede his office to Republican Arnold Schwarzenegger the following month— signed a second piece of legislation with major ramifications for water quality policy as it related to timber harvesting particularly. Introduced by Democrat John Burton, S.B. 810 expressly forbid CALFIRE from approving a THP if the relevant Regional Board found that the harvest would result in further pollution of a sediment-impaired waterway. The bill also clarified that the exemption of timber harvesting from water board regulation that had been amended into the Forest Practice

Act more than two decades prior was contingent upon *both* the EPA and the SWRCB certifying the FPRs as Section 208 BMPs. It included language empowering Boards to delegate more of their THP review and approval functions to staff— a move that facilitates close scrutiny of timber operators, since Board Members themselves meet only monthly and are not full-time employees of the state. Taken together, these measures significantly bolstered Regional Boards' authority and ability to regulate timber harvesting within their jurisdictions (S.B. 810 2003).

Like Region 1's first conditional waiver, the development of S.B. 810 was shaped by the PALCO conflict. Burton and three members of his staff wrote the legislation after taking a "listening tour" on the North Coast. There they heard from Sonoma County residents who had had their drinking water supplies damaged by sediment pollution, but also from residents of the five watersheds (Interview #137). Burton's group also paid a visit to Region 1 headquarters in Santa Rosa, where they learned that the board was interested in preventing sediment runoff from timber harvesting, but "kept getting rolled" in their attempts to do so by the timber agencies. "We learned how many fights they had had with [CALFIRE]," an aide recalled, and the bill they drafted when they returned to Sacramento was an attempt to clarify that the legislature intended the water boards to have regulatory authority over timber harvesting under their own statute— not simply as subsidiary expertise in the review team process (Interview #137).

Burton was the Senate's pro tem— and a powerful one. A member of his staff described him as "a take no prisoners leader," adding, "Everything he wrote, he won" (Interview #137; see also Salladay and Lucas 2002). His position helped him extract commitments and votes from other members, and since he also cared personally about environmental issues, he used that leverage to disrupt the timber status quo. The Burton aide who agreed to be interviewed for this research has also had a long career in the Capitol, with a focus on natural resource policy, and S.B. 810 was one of the only votes he could recall that the timber industry lost (Interview #137).

Opinions vary on how successful it was, however; agency personnel in most cases say that the turning point in the Region Boards' relationship with CALFIRE and the Board of Forestry was the 2006 Supreme Court case that affirmed the water boards' independent authority to regulate timber operations (Interview #106; #107; #131; #137). What is clear is that as the PALCO controversy heated up, the legislature wanted the Region 1 board to stand up to the company (Interview #112b; #137); Burton attempted to secure this outcome by giving the agency a clearer mandate to regulate timber operations specifically than had been provided by S.B. 390 and 923— neither of which were industry-specific.

Around the same time as these new laws were adopted, Region 1 hired a new Executive Officer. Cat Kuhlman had already worked for the EPA on water quality issues in

California for more than twenty years when she joined Region 1 on an Intergovernmental Personnel Assignment, and she was prepared to take full advantage of the authority granted to Regional Boards by the legislature and the SWRCB. The Burton aide (who had discussions with Kuhlman during the development of S.B. 810) credited her with "reconstituting" the Region 1 staff and pushing them to focus on timber (Interview #137) and she was also able to work with the Board (Interview #112a). Kuhlman felt strongly that WDRs were preferable to waivers, for three reasons. The revenue issue was one of them, but even after S.B. 923 authorized the assessment of waiver fees, Kuhlman favored WDRs because of their long duration. As she explained in an interview, "If you're going to spend the blood sweat and tears [developing a waiver], why not try to get it done and let it last until you need to come back and fix it as opposed to automatic [review] every five years?" Waiver renewals, as she saw it, were an occasion for "everybody [to have] the same fight all over again," and with major budget cuts looming, that repetition was untenable for Regional Board staff. "We had layoff notices to people at that point," Kuhlman explained. "It was clear the general fund was going to go on a big diet." Finally, she felt that a WDR for timber "was just simply the right thing and it was an idea whose time had come."

Kuhlman pushed the Board to adopt a general WDR that would be used to regulate most THPs, but Region 1 staff also developed a timber waiver that was adopted in 2004 (along with the general WDR). The new waiver included strict and specific eligibility

requirements that limited its applicability to THPs whose water quality impacts were likely to be relatively minimal. Kuhlman recalled that this move provoked "surprisingly" little resistance from industry, but then added: "That may not be fair. It could be that they pushed back hard and I just didn't pay any attention. It was sort of like, 'You can keep complaining, but I'm no longer listening to you'." Another long-time timber program staff member echoed Kuhlman's perception that strong backing from the legislature and the SWRCB empowered Region 1 to make the shift to a WDR in spite of industry opposition (Interview #106).

Waiver and WDR: A Two-Tiered Timber Program

The final Categorical Waiver of Waste Discharge Requirements For Discharges Related to Timber Harvest Activities On Non-Federal Lands in the North Coast Region applies a set of eleven general conditions to all six types of timber-related activities it covers, including small projects with a non-commercial purpose, such as tree removals for fire safety or harvests that qualify as emergencies under the FPRs. The general conditions mostly concern procedural and notification requirements. The conditions specifically for THPs (Categorical Waiver F) are in the same vein. The waiver does make substantive demands on timber operators, but it does so through eligibility criteria. To qualify for a waiver in Category F, a THP must meet fourteen requirements, twelve of

which prescribe particular practices or controls to protect water quality during harvesting.[7] These measures include:

- Sediment Prevention Plans (SPP) when THPs call for the use of ground-based heavy equipment on steep slopes (greater than 50%) or construction of skid trails on steep slopes (greater than 40%) or near streams (within 200 feet);
- a geotechnical report and overstory and understory retention requirements for activities on slides and unstable areas; standards for both the report and canopy retention are fairly specific;
- new road construction must be "explained and justified" in an SPP, and the discharger must obtain a Streambed Alteration Agreement (SAA) from CDFW for construction or reconstruction of crossings;[8]
- restrictions on heavy equipment use within a watercourse or lake protection zone (WLPZ), however exceptions are permitted for use and maintenance of existing permanent roads and bridges, and maintenance of existing culverts and drainage facilities (an SPP is also required for some equipment and activity types);
- uneven aged management or 75% canopy closure post-harvest in the THP area;

[7] The first criterion simply requires that the project have been approved by an authorized lead agency (in this case CDF); the last stipulates that any non-concurrence between CDF and the Regional Board must be resolved in order for the project to be eligible for a waiver.
[8] New roads of less than 1000 linear feet are allowed without additional justification.

- for Class I waters, overstory canopy retention and composition requirements in a 75' buffer zone and the remainder of the WLPZ;
- in watersheds that are listed for temperature impairment or "with threatened and impaired values," overstory canopy retention and composition requirements for the WLPZ of Class II waters;
- no harvesting in the channel zone of a Class III watercourse;
- limitations on winter operations;[9] and
- limitations on heavy equipment use and timber hauling during measurable rain events[10] (NCRWQCB 2004a).

The Board felt it could require this suite of practices because Porter-Cologne's prohibition on specifying the manner of compliance was restricted to WDRs. That limitation had been a source of frustration for the Board for many years, but at some point, they realized that the waiver gave them a workaround. "If you don't like the waiver, there's no reason to sue," explained a Board member, "Just file for a WDR" (Interview #112b).

The General Waste Discharge Requirements For Discharges Related to Timber Harvest Activities On Non-Federal Lands in the North Coast Region (GWDR) are arguably less

[9] Prohibited activities include log hauling, ground based yarding, road construction, road reconstruction, and road rocking; falling, cable or helicopter yarding, and maintenance of erosion controls on existing features are permitted.

[10] A "measurable rain event" is defined as one in which rainfall exceeds ¼" in 24 hours. Activities that are permitted in wet weather under a Category F waiver include "timber falling, fuels treatment such as hand piling and burning, hand fire line construction," and "maintenance of existing roads and watercourse crossings" (NCRWQCB 2004a).

restrictive than the waiver in that they do not prescribe management practices or proscribe the use of particular types of equipment or management actions under various conditions (e.g., steep slopes, rain events); they do require the preparation of an Erosion Control Plan (ECP) covering *all* controllable sediment sources in the THP area. The first step in preparing an ECP is an inventory of sources. The plan itself must describe the method or model by which the inventory was conducted, and an estimate of the sediment delivery from each source. A schedule describing in detail how and by when each source will be controlled is the other main component of the plan. The ECP provides the basis for THP inspections, which must be carried out by an RPF three times a year: Before November 15, again after 10 inches of cumulative rainfall, and again between April 15 and June 1. This schedule ensures that BMPs for controlling sediment delivery are in place before the start of winter, that they withstand at least the first serious rain events, and that new sources have not developed by the end of the season (NCRWQCB 2004b).

The requirements were also fairly specific compared to what the Board had ordered in prior general waivers and individual WDRs, but they did not go as far as the new waiver in delineating the manner of compliance, and many of the actions required of permittees could be justified as monitoring— a necessary component of any performance-based regulatory program.

Taking Stock of the Region 1 Timber Program

New Requirements and Changed Dynamics…

There is much evidence to support the conclusion that Region 1's paired waiver and WDR were a major step forward in water board regulation of timber harvesting. Two Regional Board staff members agreed that the key achievement of the post-S.B. 390 timber program is that it requires operations within the region to identify, address, and monitor *all* sediment sources in most proposed harvest plans (Interview #106; Klamt 2007a; see also Klamt 2007b). As one explained:

> I think the biggest bang for the buck we get [from the new program] is the fact that [timber operators] have to go out identify sediment sources, they have to prioritize them based on the threat, basically, and they have to fix them by the end of the THP. That's the biggest bang for the buck that we got out of this whole thing, and that I'm pretty confident gets done because we do a termination inspection on many of them (Interview #106).

This requirement comes through the GWDR only, but the eligibility conditions for the waiver were designed to ensure that only THPs already under relatively low-impact management regimes would escape the GWDR's strict sediment source controls. Put another way, the waiver was not intended to incentivize timber companies to meet its conditions; rather, the expectation was that the conditions would filter out THPs employing relatively light-touch harvesting, allowing the Regional Board staff to focus on the plans most likely to cause harm (Interview #106).

The inventory-mitigate-inspect strategy enshrined in SPPs and ECPs also encompasses legacy sources of pollution— i.e., those that exist in the project area as a result of

management activities that predate the GWDR-covered THP. In contrast, failure to address legacy sources has been cited as a major weakness of the FPRs (Ligon et al. 1999; Interview #108). Another advantage of the program is the ease of enforcement: If staffing shortfalls prevent the agency from participating in pre-harvest inspections or the three reviews of erosion control BMPs, Regional Board personnel can go out on post-harvest inspections and check to see if BMPs for inventoried sources are still in place and have held up well through the rainy season. These inspections are relatively expeditious, and it is sometimes possible to visit two or three THPs in a day (Interview #106). If agency personnel find that a controllable source on a GWDR-covered THP has not been included in the inventory, mitigated, or scheduled for mitigation, or if a BMP has failed and the permittee has not corrected the problem, they can refuse to terminate the GWDR. This provision was designed to incentivize industry compliance: At the time the program was adopted, timber operators were required to pay annual WDR fees ($875/year) until termination was approved.[11]

Region 1 also filed fewer nonconcurrences with CDF following the adoption of GWDRs— a shift staff attributed to the fact that the new timber program provides opportunities for timber companies work with Regional Board staff to "address issues out in the field" (Klamt 2007a). However, new legislation and the Supreme Court

[11] In 2012, A.B. 1492 eliminated fees associated with timber permits, instead imposing a 1% retail-level tax on lumber and wood products sold in California. This assessment funds enforcement activities and timber-related environmental programs (A.B. 1492 2012; see also California Natural Resources Agency and California Environmental Protection Agency 2014).

decision were likely a major factor in the decline, as well. As one staff member explained, if she could tell a forester that her Board would not issue a WDR for his or her plan as-proposed, there was no need to file nonconcurrence on the THP with CALFIRE (Interview #131). Whether industry liked it or not, they understood that a permit or a waiver from the Regional Board was necessary, and would not be given freely (Interview #119). Of course, for the most part, timber companies did not like it at all, and many were willing to make this clear to Regional Board staff, but they were also willing to alter their plans to get water quality approval (Interview #131).

On a more fundamental level, the fact that Region 1 required anything substantive in its timber program at all constituted a significant improvement over the pre-S.B. 390 status quo in the region— and the *post*-S.B. 390 status quo in some other parts of the state. One agency employee— who tended to be quite critical of Region 1's efforts to empower its field staff— had an opportunity to compare industry's response to regulation in Region 1 and Region 5 (Central Valley) when she was involved with the review of a large THP that spanned the two jurisdictions. The Region 5 side had domestic water supplies, landslides, and badly maintained roads, but going into the pre-harvest inspection, the plan submitter had done very little to address any of these issues. In contrast, she says that on the Region 1 side, *where no domestic water supplies were threatened*, "They cleaned up the roads. They re-patched their culverts. They had it just buttoned up so that I basically didn't have a recommendation." When the staff

member asked the forester why he had done less to address the more serious situation on the other side of the plan, he told her— right in front of the Region 5 inspector, without any apparent compunction— "Because I get a waiver over here" (Interview #131).

… Same Old Design

While Region 1's post-S.B. 390 timber program clearly provides regulators with tools and leverage to better protect water quality, it is important to acknowledge that it deploys both within a framework that mirrors the design of the FPRs. The conditions of both the waiver and the WDR the are essentially BMPs; rather than imposing performance standards on harvest plans or restricting the rate of harvest based on watershed conditions, they dictate measures plan preparers must take to mitigate impacts to downstream water quality. This may have been part of the reason industry accepted the Region 1 timber program. As one participant in the design process acknowledged, the waiver and WDR "gave [industry] certainty" because they hinged on BMPs, and BMPs align with the way industry views its regulatory obligations: "I follow the rules [so] I'm good, whether I trash the creek or not" (Interview #112b). While there is nothing wrong with providing certainty to industry per se, tying regulatory obligations to environmental performance tends to undermine that certainty; as such, increasing certainty for the regulated entity often comes at the expense of the resources regulation is intended to protect.

Because the Region 1 timber program follows the same basic pattern as the FPRs, it has many of the same vulnerabilities. Most notably, there is no research underpinning the assumption that the required BMPs will actually mitigate water quality impacts, and the only requirement for assessing outcomes is visual monitoring of upslope features. The absence of instream monitoring makes it difficult to evaluate the ultimate effectiveness of the mitigations required by the waiver and WDR.

Of course, and as discussed in the previous chapter, the particulars of the timber context make meaningful performance monitoring an elusive goal; even if all parties *wanted* to know whether or not water quality BMPs were working— and it is far from clear that they do— the question is legitimately difficult to answer. The experience of another Regional Board in the wake of S.B. 390 illustrates this starkly. Region 3, which covers the Central Coast, includes in its jurisdictional area the southernmost tip of the redwood belt, where a patchwork of small, nonindustrial ownerships support a single remaining mill. These forests fill the ridges and ravines separating the San Francisco Bay Area from the Monterey Bay, so urban and suburban development abut and even intermix with working timberlands, and local residents are environmentally conscious and politically active. Forest management in the area has long been even more closely scrutinized than it is elsewhere in the state (Interview #107; #117; #118). These factors helped empower the Region 3 Board to seriously consider imposing instream monitoring on THPs as a condition of its revised waiver (Press 2015, 104). As one

regulator theorized, "The rhetoric [around waiver revision] was much hotter on the North Coast than in Region 3 because Santa Cruz has for a long time had a really good program. So the rest [of the counties in the area] kind of get, I think, shamed by [Santa Cruz], whereas, the North Coast, PALCO kind of set the tone, and PALCO was the worst of the worst" (Interview #107).

The Board reasoned that, for the data gathered from such monitoring to yield information about the performance of environmental controls on individual plans, measurements would have to be taken above and below logging sites. The problems with such a requirement soon became evident, however. For starters, no baseline data existed for the majority of streams, which meant measurements would have to be taken above and below each THP to determine whether a given harvest plan was causing sediment pollution. In order for this strategy to work, however, there must *be* an "above"— a condition that cannot be met when a THP encompasses the uppermost, usually seasonal reaches of tributary streams, as plans in the Santa Cruz Mountains often do (Interview #117). Additionally, a forest hydrologist from Cal Poly San Luis Obispo testified before the board that, since turbidity peaks during or immediately after rainfall events, measurements would have to be taken during storms to detect management-related increases (Interview #116; Press 2015, 104). Since turbidity is only a proxy for suspended sediment load (usually the more biologically relevant variable), and the relationship between the two varies among watersheds, turbidity measurements

would also have to be correlated with suspended sediment load using periodic paired samples— in each stream (Dietterick 2012; Interview #116; #117). While researchers at the Forest Service's Redwood Sciences Research Lab had by this time developed automated systems capable of taking both near-continuous turbidity measurements and the suspended sediment grabs, the start-up cost for a single station ran in excess of $17,000, with additional reoccurring costs of around $5,500 annually (Lewis and Eads 2006). A large timber company can afford to install several such stations across an ownership tens of thousands of acres in size, but expenses of that magnitude were clearly beyond the reach of the average plan submitter in Region 3. Even on a large ownership, installing research-scale turbidity threshold sampling systems above and below *every* THP would be cost-prohibitive.

An environmental activist in the area recalls that, by the end of the Regional Board's deliberations on the matter, even he opposed instream turbidity monitoring. Given the unpalatable and seemingly inevitable tradeoff between what data could feasibly be obtained and what data would actually provide regulators and the public with useful information about the effects of timber harvesting on water quality, he preferred that the Board focus its extremely limited resources elsewhere. He recalls:

> I kept saying to the regional board, "Look, you have a really important responsibility to be a member of the review team." ...It's the conduct of the logging plan that matters, not after the fact monitoring it. Who gives a shit [about turbidity data] if the [BMP] has already failed because it wasn't conducted properly in the first place or somebody didn't notice that there was an active landslide right under your road or something like that (Interview

#117).

Region 3 ultimately abandoned instream monitoring in favor of a system in which industry self-monitored its BMPs by taking photographs of a subset of features selected in cooperation with Region 3 staff— when someone from the Board's San Luis Obispo office can make the five hour round trip to Santa Cruz County (Higgins and Kunz 2012; Interview #117).

If the absence of a workable monitoring program increases the importance of boots on the ground, it is important to highlight the fact that staffing levels for Region 1 also remain inadequate relative to what would be required to fully implement the timber program (Klamt 2007b). Unable to participate in all site visits, Region 1 staff have tended to prioritize mid-winter and especially post-harvest inspections, but in doing so, the agency fails to provide the crucial function the Santa Cruz activist identified: Negotiating appropriate controls for sediment sources— and what should be considered a controllable source in the first place.

Conclusion

Together with Chapter 3, this chapter illustrates how both the Board of Forestry and the Region 1 Board achieved limited success with their timber regulatory programs. Though these regulators are authorized by different statutes and employ what appear to be very different approaches to protecting water resources from the deleterious effects

of timber management, both are compelled— at least on paper— to consider the environmental outcomes of their programs. For the Board of Forestry, this requirement comes through CEQA, which insists that the THP process evaluate the potential for cumulative effects. For Regional Boards, the concern with ultimate outcomes is subtler, but also more pervasive: Porter-Cologne, basin planning, and the federal TMDL program all demand clean water— something environmental assessment policy does not do. In practice, however, both the timber agencies and the water boards have failed to measure the outcomes of their timber programs, or to require industry to do so in their stead. The consequences have also been somewhat similar. When functional equivalency forced the Board of Forestry to address the environmental efficacy of the FPRs, the Board responded to its own information problems (and the attendant political problems) by simply piling on more rules. While the mechanisms were slightly different at the Regional Board, failure to implement performance-based policy has also led to proliferation of BMPs— and undermined the legitimacy of Regional Board regulation. Because it operates under a strong environmental protection mandate and the watchful eye of a well organized, legally savvy community of environmental advocates, the agency faces pressure to err on the side of the resource in the presence of uncertainty. However, when the Regional Boards impose costly mitigations that they can't justify on the basis of research, technical analysis, or monitoring data, they render themselves vulnerable to charges that they are unscientific or overly zealous about

environmental concerns— both criticisms alluded to in interviews (Interview #108; #110; #112b; #131).

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CHAPTER 5

AGAINST THE GRAIN? ENVIRONMENTAL MANAGEMENT IN THE NORTH COAST REDWOOD TIMBER INDUSTRY

Introduction

We have seen that divestitures from redwood timberland in the late 1990s and early 2000s follow a national trend of restructuring and re-centering in the forest products industry, and were not driven by increasing environmental regulation— either in California or at the federal level (Chapter 2). The broad industry and macroeconomic changes that prompted Georgia-Pacific and Louisiana-Pacific to sell their North Coast timberlands also facilitated the hostile takeover of Pacific Lumber Company, resulting in aggressive logging of old growth forest and vehement protests. This outcry dovetailed with growing attention to the decline of Pacific anadromous fisheries, increasing awareness of the failures of the federal Clean Water Act, and the rise of nonpoint source pollution control on the state's political agenda, prompting policy evolution at the intersection of timber and water in California and— ultimately— a greater role for Regional Boards in the regulation of timber harvesting on private land (Chapter 4). The effects of these changes were particularly pronounced on the North Coast— the only major timber-producing region in the state where dams have not created a physical barrier between protected salmonids and working forests.

Despite the high-profile controversy and regulatory tightening that occurred in the 1990s and early 2000s, however, redwood timbering persists in far northwestern

California, for the most partly quietly, under the management of three companies— two of which had no presence in the region when Julia "Butterfly" Hill began her famous Humboldt County treesit in December of 1997. Hawthorne Timber Company and its forest manager, Campbell Global, operate nearly 112,000 acres[1] of the former Georgia-Pacific estate, while most of Louisiana-Pacific's holdings were acquired by the Fisher family— founders of the Gap, Inc.— in 1998 and reorganized as the Mendocino Redwood Company (MRC). When PALCO landed in bankruptcy court nearly a decade later, the Fishers saw an opportunity to expand their redwood business and made a successful bid for PALCO's assets. This second timber venture, called Humboldt Redwood Company (HRC), remains legally distinct from MRC due to the particulars of the settlement, but the two companies are managed jointly and treated as a single firm for the purposes of this analysis. The combined holdings of HRC and MRC total 437,000 acres— slightly exceeding the approximately 400,000 acres controlled by Green Diamond Resource Company (Green Diamond), a subsidiary of a family-owned company that has been a major redwood timberland owner since 1956.

This chapter asks how this new class of major redwood timberland owners meets its regulatory obligations and, in general, avoids the sort of activist direct targeting the previous cohort of North Coast firms routinely faced. Case studies of HRC/MRC, Green Diamond, and Hawthorne demonstrate that redwood timber companies have

[1] Down from 194,000 acres at the time of purchase.

adopted varying strategies for managing both public scrutiny and the requirements of public policy. These strategies have been shaped by each firm's operating environment, however they are similar in that they mix efforts to comply with traditional public regulation with voluntary efforts and private regulation. Moreover, the largest firms are converging on similar environmental management strategies: Both Green Diamond and HRC/MRC are now relying on long-term planning covering large spatial scales as a way of simultaneously achieving regulatory certainty, reducing costs of compliance, and showcasing their stewardship activities.

This shift appears well suited to addressing popular critiques of the Forest Practice Rules, which have tended to emphasize the connection between poor environmental outcomes and the scale at which regulation is implemented (see Chapter 3; see also, e.g., Terzian et al. 1994, 1; UCCCWE 2001, 6; Wiley 2002, 7). While recognizing that this longer-term and larger-scale approach to environmental management is likely to provide some clear and important benefits for forest ecosystems, this chapter builds on the argument of the prior two chapters, which contend that what policy actually requires (i.e., compliance with rules versus environmental performance) is more important than the scale at which those requirements are applied. While Green Diamond and HRC/MRC's management strategies have been successful in reducing compliance costs and softening public sentiment, whether or not they succeed in reducing the impact of timber harvesting on water quality will ultimately depend upon

the extent to which firms measure the outcomes of their practices and adapt management accordingly.

The chapter begins with a brief review of some relevant concepts in the literature on corporate environmental management strategies. This is followed by detailed case studies of HRC/MRC, Green Diamond, and Hawthorne, which cover the development of each firm's approach to managing its environmental obligations—including those imposed by public policy and those imposed by the public directly. The case studies illustrate how factors such as firm structure, firm tenure in the region, historic management intensity of major timberland ownerships, and the practices of other firms in the industry intersect to produce variation in firm environmental management strategies. A discussion section summarizes these dynamics and accounts for convergence on other management tools, such as ownership-scale permitting and private regulation.

Literature Review

This chapter is broadly concerned with the drivers of firms' environmental performance, including the circumstances under which corporations exceed regulatory requirements and how the direct demands of the public influence those dynamics. These questions all fall within the purview of the extensive literature on corporate social responsibility— a thorough review of which is well beyond the scope of this

chapter. Instead, I briefly identify some concerns and emphases of this literature that are useful for understanding environmental management among the new class of major redwood timberland owners on the North Coast.

Sociolegal and political scholarship draws a distinction between "regulatory" and "social" licenses to operate: The former term refers to the suite permits that a firm must obtain to conduct its operations legally, and the activities it must undertake to receive those permits and remain in compliance with them. In contrast, the concept of a "social license" highlights the fact that a firm may meet all the conditions imposed upon it by public policy and still be legitimately hindered in its operations if the public withholds support for its activities (Gunningham, Kagan, and Thornton 2003, 35-38).). This distinction has become important following a shift within the business community itself: While regulation was once considered a proxy for public preferences, political scientists now recognize that civil society often makes demands on firms and industries that differ from or exceed what the law requires. The gap between regulatory and social license pressures is thought to drive "beyond compliance" behavior by firms (Gunningham, Kagan, and Thornton 2004, 308).

Differences between what society demands of business and what government technically requires are among the many factors that have prompted nongovernmental organizations to develop standards, codes of conduct, and certifications that organize

firms' extra-regulatory practices and make them visible to the public; since these systems share many of the characteristics of regulation established by public policies, these programs are often referred to as private regulation (see, e.g., Bartley 2003).[2,3]

Sustainability certifications are one of the most oft-cited examples of private regulation, and firms' decision to pursue them are one of the most obvious examples of "beyond compliance" behavior. Their popularity has exploded in the last twenty-five years, and they have been a focus of extensive research. Since forestry was one of the first industries in which certification was applied, much of the research on social license pressures and environmental management within the timber industry has focused on the role of certification in shaping firm practices and public perceptions thereof (see Auld, Gulbrandsen, and McDermott 2008). As we will see, certification plays an important role in MRC's efforts to earn a social license to operate on the North Coast, and the company's pursuit of certification had implications for other redwood timber firms. However, the complex history of public regulation and environmental protest on

[2] There has been much debate in the literature on the relative importance of different hypothesized drivers of private regulation (see Büthe 2010); consequently, potential causal pathways among key variables have been mapped with a degree of nuance that is (again) beyond the scope of this review. One notable example, however, is Bartley's (2003) contention that the rise of green consumerism did not prompt the development certification schemes in the forestry products and apparel industries; rather, the rise of certification (spurred on by activist pressure) built the constituency for green products. This distinction highlights the diversity of actors within the broader category implied by Gunningham, Kagan, and Thornton's "social license" concept— a diversity that is reflected in this chapter's case studies. References to "what society demands of business" are not intended to imply that such pressure is exerted exclusively through the market; rather, the terminology is intended to encompass a broader political process and, in Bartley's terms, an institution-building project (see also Bartley 2007, 298-299).

[3] These arrangements are also referred to as "civil regulation" (see, e.g., Vogel 2006) and "private authority regimes" (see, e.g., Cutler, Haufler, and Porter 1999).

the North Coast has given rise to a diverse constellation of firm practices that address both regulatory and social license pressures. This chapter uses the broader concept of an "environmental management strategy" to encompass efforts to comply with both public and private regulation, as well as "beyond compliance behavior" that is not specified by an explicit private regulatory scheme.

Humboldt and Mendocino Redwood Companies

MRC and HRC were born in 1998 and 2008, respectively, and are in many ways the product of the same dynamics that pulled industrial timberland into the hands of institutional investors during that same period of time nationwide. According to the *Wall Street Journal*, at the turn of the century the Fisher family's investment portfolio was worth about $12 billion— less than, but still comparable to the capital controlled by major private equity funds and university endowments[4] (Waldman 2000). Most of that fortune was parked in traditional investments (most notably the Gap clothing retail chains, in which the Fishers held a 34% stake) against which timberlands were increasingly viewed as an excellent hedge— especially over the long term (Martin 1999; Waldman 2000).

[4] For comparison, Harvard University's endowment broke $19 billion in 2000 (Powell 2000); the California Public Employee Retirement Fund (PERF) controlled $172 billion at the close of the 1999-2000 fiscal year (California Public Employees' Retirement System 2001, 12).

The Fishers looked at properties far beyond U.S. borders before deciding to invest in the North Coast. Green Diamond's parent company, Simpson Investment Company (Simpson) went in on the purchase of Louisiana-Pacific's timberland with the family, keeping the 74,000 acres of Humboldt County property acquired in the $615 million deal, which encompassed more than 300,000 acres of land in three counties (*Wall Street Journal* 1998). The Fishers, for their part, walked away with three mills and 235,000 acres of redwood timberland, most of it in Mendocino— a mere three hours north of San Francisco, where both the Gap's corporate headquarters and the family's investment arm, Sansome Partners, are based (Waldman 2000; *Wall Street Journal* 1998). They established MRC shortly thereafter, with Sansome's Sandy Dean as company President (Marten 1999).

The Fishers and MRC leadership have long maintained that the former's decision to invest in commercial forests was not driven solely by pecuniary interests. The family is a major supporter of the Natural Resources Defense Council (NRDC). One of Donald Fisher's sons, Robert, is on the organization's Board; another son, John, who manages the family's money, also considers himself an environmentalist (Marten 1999; Martin 1999). The brothers never intended to create a forest preserve, however; they wanted to be an example for the California timber industry as a whole. To do that, they had to prove that sustainable forest management could also be profitable. As Dean told the *San Francisco Chronicle* in 1999, "I really believe we have to make it if sustainable

forestry is going to have a legitimate future… It's up to us to show people that you can harvest sustainably on large acreages, and make a profit at the same time" (Martin 1999).

Fear and Loathing in Mendocino County

What Dean and the Fishers found in Mendocino differed starkly from the forests of post-war Humboldt and Del Norte Counties that had once attracted timber companies to the North Coast, however. Louisiana-Pacific had managed its holdings intensively; the *Chronicle* reported that forest ecologists familiar with the ownership generally agreed that that it had been "severely overharvested" (Martin 1999; see also A'Dair 1999; *Press Democrat* 1998; Waldman 2000; Williams 2000). Many residents in the small communities adjacent to company land felt Louisiana-Pacific had been a miserable steward of the forest and a troublesome, dishonest neighbor, and they saw no reason to expect that the new owners would conduct themselves any differently (Interview #130; *Ukiah Daily Journal* 1999b; Zuckerman 2000). Some theorized that the Fishers would only want such a badly depleted forest if forestry were not at the center of their plans for the property. Former Mendocino County Supervisor Norman de Vall told the Santa Rosa *Press Democrat* that the MRC ownership encompassed 1,200 distinct parcels, rendering it ripe for development. "After the trees are gone," de Vall warned, "They're going to sell it off piece by piece" (Geniella 1998). Dean responded by disclosing the details of MRC's inventory (two billion board feet of redwood and

Douglas fir) and its plan to harvest 40 million board feet a year— about 60% of the forest's annual growth rate (R. Anderson 1999; Dean 2000; McClure 1999; Mendocino Redwood Company 2000a).

Still, the perception that MRC had acquired something not truly worth having— along with more generalized distrust of the industry— dogged the company in its early years. MRC inadvertently fueled this suspicion by continuing to log where Louisiana-Pacific had left off— on THPs that called for even aged management, or were particularly controversial because of their location on the property (Norman 1999c; Williams 2000). From MRC's perspective, there was no real alternative: A THP is a comprehensive environmental document that costs thousands of dollars and can take from six months to two years to prepare[5]; if MRC had waited to log until it could do so under its own plans, it would have had to pay its crews to do nothing or not pay them at all (Interview #130; Williams 2000).

The deeper, underlying problem was that Louisiana-Pacific's management had left MRC with very little to log— and the well-stocked stands were concentrated around the Albion River and in the Greenwood Creek watershed near the town of Elk (Jani 2009). This was no accident: The Albion had been a destination for back-to-the-landers and

[5] In 1998, the cost to prepare an average-sized THP in the coastal forest was about $20,000 (Thompson and Discus 2005). While regulators are attentive to the importance of moving THPs through the approval process as quickly as possible, preparing the document for agency review requires a considerable investment of time and company resources (Emmerson 2011; Terzian et al. 1994).

refugees from the Haight-Ashbury and Berkeley's People's Park in the 1970s. Several communes were established on cutover land on the ridge above the river's mouth, and many of the migrants stayed, embracing environmentalism and bioregionalism. They called themselves the "Albion Nation"[6], and when Louisiana-Pacific filed a THP in their territory, they resisted with dogged protests and legal challenges (Jani 2009; Jarvie 2001; Winslow 2012). Greenwood area residents also tussled frequently with their corporate neighbor (Norman 1999c). The result was that in 1998, both watersheds still had plenty of mature timber. When Louisiana-Pacific put its redwood ownership up for sale, proposing THPs in those watersheds was a way to showcase the value of its inventory (Williams 2000). After MRC took over, logging those plans seemed like a way to bring in revenue while giving the rest of the property more time to recover (Jani 2009).

For a small cadre of local residents, however, this decision confirmed their fears about the new owners.[7] They responded swiftly, attacking MRC at public meetings and in the local press. Borrowing tactics from anti-PALCO protests then underway in Humboldt County, the residents organized treesits and blockades on company land (Martin 1999; Norman 1999b; 1999c; 1999d; 2000). They also tapped into a broader network of

[6] Lest the reader doubt residents' identification with this moniker and the sense of community solidarity it represents, the author feels compelled to point out that the Albion Nation currently maintains a Facebook presence.

[7] Martin (1999) pegs the number at thirty, but a source close to MRC claims it was even less that (Interview #130). What is clear is that a handful of Mendocino County residents based in and around Elk and Albion provided most of the impetus for the protests against MRC, both locally and nationally.

forest and labor activists to telegraph their concerns far beyond the Albion Nation. The "Save the Redwoods/Boycott the Gap" campaign was the brainchild of Mendocino County environmentalists, but in MRC's first year of business, it gained national reach, drawing protesters to 44 distinct actions across the country— most of them at Gap-brand stores (Carlton 2003; Geniella 1998). Activists welcomed a three-story, 102,000 square foot Old Navy flagship store to San Francisco's downtown shopping district by donning conifer costumes and tottering up and down Market Street on stilts; handmade signs declared "GAP KILLS ANCIENT REDWOODS" (Colliver 1999). As one MRC executive recalled, "There was this one group that had a stump of a tree that was about this big—" Here he raised one arm so that his hand was about level with his shoulder, indicating a five-foot distance from the ground, "—that they would roll around in big major cities of the United States, chaining themselves to the front doors of Gap stores and accusing us of cutting the last of the old growth in Mendocino County" (Jani 2009). The protests illustrated MRC's unique vulnerability to direct targeting: Most California timber companies are not so clearly connected to well-known, easily-boycotted retail operations. Combined with the social legacy of Louisiana-Pacific's management— i.e., distrustful and organized locals— this exposure amplified the company's early missteps.

Of course, the property's former owner also shaped the forest itself, and the material legacy of Louisiana-Pacific's management posed another set of problems for its

successor. Much of the MRC ownership was heavily stocked with tanoak (*Notholithocarpus denisflorus*), a native hardwood that can become dominant in coastal forests when more commercially desirable species (i.e., redwood and Douglas fir) are removed (R. Anderson 1999; Jani 2009). Tanoak is generally considered a "junk tree" that crowds out more valuable species; it grows quickly in high light conditions and can re-sprout from the stump (Tappeiner and McDonald 1984; Tappeiner, McDonald, and Roy 1990). The standard technique for restoring conifer cover in tanoak-dominated stands is targeted application of herbicide, usually triclopyr, sold by Dow under the brand name Garlon (Cafferata and Yee 1991; Dow AgroSciences 2015; Piirto et al. 1997). Mendocino County residents had battled timber companies over aerial spraying in the 1970s[8]; many had a zero tolerance stance on chemical inputs and would not accept MRC's claims that localized application of Garlon was an essential tool for restoring the forest (Brazil 2000; Colliver 1999; Jarvi 1999; Marten 1999; Williams 2000). The company responded with a study of herbicide alternatives, including manual control and naturally-derived chemicals, such as eucalyptus oil and acetic acid (Zuckerman 2000); at the same time, it announced an initiative to mill and market

[8] After an incident in which phenoxy herbicides drifted from industrial timberlands onto neighboring communities, Mendocino County voters adopted a ban on aerial spraying of these chemicals (Kendall 1979; see also Taylor 1979). A trial court later found the ban illegal, but was reversed by the state Supreme Court in 1984 (*People ex rel. Deukmejian* v. *County of Mendocino*). When Louisiana-Pacific began using Garlon to reduce hardwoods in the mid-1990s, the Mendocino County Board of Supervisors twice considered banning even local application of the herbicide (Callahan 1994; Geniella 1996a).

tanoak as "California Chestnut Oak Flooring"— a move which also required $1 million in upgrades to its Willits sawmill (G. Anderson 1999; Zuckerman 2000).[9]

Still, these criticisms and the Gap boycott fueled a perception that the Fishers had gotten in over their heads— a charge the family publicly denied. As John Fisher told the *Chronicle* in 1999, "We knew the North Coast had been overharvested when we bought this, and we knew there were a lot of concerned people up here" (Martin 1999). A decade later, however, an MRC executive admitted that in those first years, he had been "very nervous" about "whether or not the family had the intestinal fortitude to continue" in their redwood venture (Jani 2009). Behind the scenes, MRC leadership decided that, just as they would have to wait to see returns on their timber investment, so too would they would have to "play the long game" with the local residents (Interview #130).

The Making of an Environmental Strategy

The recognition that it would take time to win over local residents prompted commitments that would form the foundation of MRC's environmental management strategy. Company leadership began to emphasize transparency and following through on commitments— both of which were institutionalized in the firm's corporate culture

[9] MRC ultimately invested $8 million in this venture, only to scrap the project after a few years. Jani attributed its failure to a surfeit of similar products on the market, which made it difficult for tanoak flooring to compete (Jani 2009).

through a variety of specific practices, and beginning very early on (R. Anderson 1999; Interview #130). Within three months of its establishment, MRC had a website where it posted management plans, information about stocking levels, and both positive and negative press coverage (Waldman 2000)— an archive the company maintains to this day. The company's offers to take concerned and curious members of the public on tours of its property form a steady drumbeat in press coverage of its activities (R. Anderson 1999; Dean 2000; Martin 1999; Norman 1999a; Potter 2001). As Dean told one Mendocino County publication in 1999, "We return phone calls, we answer letters, we take people— friends, critics, you name it— on our land to look at what's actually going on in the forest, which we think is the most important way to talk about these topics" (R. Anderson 1999). To make sure the company kept its promises, however, MRC had to be careful about what promises it made. Rather than hiring a public relations specialist unfamiliar with forestry or the intricacies of the company's business plan, Dean became the firm's sole spokesperson (Interview #130).[10]

MRC also made specific commitments regarding its forestry. After taking over management of the property from Louisiana-Pacific, it quickly instituted a moratorium on harvesting old growth trees (Dean 2000; Interview #130). To ensure that rank and file fallers— most of whom were used to working for Louisiana-Pacific— took this edict

[10] Dean backed away from this role quickly, as MRC's management plan and key policies were ironed out and publicly disseminated. Once it was clear how the company would enact its environmental commitments, there was less chance that an employee would make an error that might later be construed as willful deceit. Now, "anybody can talk to anybody," says one company employee. "We don't have a wall up that says, 'This is the only person that communicates on any big issues'" (Interview #132).

seriously, crews were told that if they accidentally cut an old growth tree, they had to leave it on the ground; if they cut an old growth tree on purpose, they would lose their jobs (Interview #130). In 1999, MRC began backing away from clearcutting, proposing plans that instead called for variable retention— a silvicultural method in which a minimum 15% of trees are left standing— and individual selection, under which about 60% of the trees are typically retained (R. Anderson 1999).

In addition to instituting these policies internally, MRC leadership made two related and strategic choices that they hoped would bolster their credibility with critics. First, they began pursuing a sustainability certification through the NGO-initiated Forest Stewardship Council (FSC). Though FSC certification is common in the California timber industry today, and many large, traditional companies see it as a virtual requirement, in 1998 only two relatively small firms in the state were certified, and the fact that MRC was even attempting to gain the FSC seal was enough to get some skeptics' attention (Brazil 2000; Williams 2000).[11] Second, the company hired Mike Jani as its chief forester. Jani had previously worked for Big Creek Lumber Company in Santa Cruz County— a small, family-owned concern known for outstanding

[11] The first two California timber companies to gain FSC certification were Big Creek Lumber Company, which operates in the Santa Cruz Mountains, and Collins Pine, whose land and mills are concentrated in the north eastern corner of the state (Brazil 2000). Both Big Creek and Collins are family-owned, and came to the FSC process with sterling environmental credentials. Importantly, both firms have harvested on the same properties for generations, so their operations have not been hobbled by the legacy of prior owners' management to the extent that MRC's were when they pursued certification (Zuckerman 2000).

environmental stewardship.[12] Big Creek was at that time the only timber company in the redwood region that had obtained FSC certification (Brazil 2000), and MRC hoped to benefit both from Jani's sterling reputation and his experience with the FSC process (R. Anderson 1999; Geniella 1999). University of California forest extension specialist (and future North Coast Regional Water Quality Control Board Member) Greg Guisti clearly apprehended both of these prospects in 2000, when he told a journalist from *Fly Rod and Reel*, "They've got a guy who can get them [certified]. His name is Mike Jani. He walks the walk; he is the best of the best" (Williams 2000). Within the industry and regulatory communities, Jani's recruitment was received as a sign that the company was serious about pursuing a different approach than its predecessor (Geniella 1999; Interview #122).

Within a month of hiring its new chief forester, MRC had instituted a policy prohibiting the harvest of trees over 48 inches in diameter or over 250 years old (Martin 1999; Norman 1999c; *Ukiah Daily Journal* 1999a)— a specification of the initial old growth logging ban, and part of the company's longer effort to develop a definition of "old growth" that was both ecologically based and enforceable (Budge 2001; Interview #130). MRC also voluntarily disclosed its Option A plan— one of three documents large timber companies can submit to the Board of Forestry to demonstrate

[12] Big Creek is not without critics: Neighbors and environmental activists in the Santa Cruz Mountains often express dissatisfaction with the company's practices (Interview #117; #118). Within the timber industry and the broader environmental community, however, it is more common to hear Big Creek described as "one of the most exemplary forest managers anywhere" (Williams 2000; see also Thornburgh et al. 2000).

that their management will maintain the long-term productivity of their forests— to the Mendocino Forest Council, which advises the Board of Supervisors on timber policy. Both Guisti and the county forester praised the contents of the plan, which pledged that annual, property-wide harvest rates would not exceed 2% of inventory for the next 100 years, allowing MRC's holdings to increase to more than six billion board feet over the same period of time (A'Dair 2000).

MRC and FSC: The Importance of Certification

The controversy— and the boycott— continued, however (Interview #130). When MRC's first bid for certification failed in August 1999, activists claimed the company's shortfall as vindication of their complaints (Bull and Pjerrou 2000; Save the Redwoods/Boycott the Gap 2000). Per FSC policy, these auditors' report was not released to the public, but Jani outlined the team's concerns to the press (Williams 2000). By his account, the certifiers' objections reflected a milder version of residents' complaints. Variable retention was one problem: Both the trees that are left standing and where they are positioned in relation to one another affect the ecological value of the forest that remains after harvest; the first audit pushed MRC to add additional specifications to its variable retention policy, and to abandon variable retention altogether in mature stands (Zuckerman 2000). Tanoak management was another issue, so in addition to its alternative control methods study and marketing initiative, the company promised to reduce its herbicide use by 60% over four years (Zuckerman

2000). The auditors' comments also bridged the chasm between local residents' perceptions of the new company's management intensity and MRC's own claims that they were cutting far more conservatively than Louisiana-Pacific had: Since MRC was taking a significant proportion of its (greatly reduced) harvest volume from the Albion area, the company agreed to conduct watershed-specific inventories, and hold its cut at or below a sustainable level for each individual watershed in addition to the commitments it had already made at the ownership scale (Zuckerman 2000).[13] The certification team was "impressed" by MRC's efforts to respond to criticisms (Williams 2000; Zuckerman 2000), and after a second audit, the company was certified in November of 2000 (Brazil 2000).[14]

It is plausible that MRC would have improved its practices in the absence of FSC— because of its local discontents and the national boycott they launched; because of its founders' intentions to be a model of sustainable forestry; or due to some combination of those factors. By the late 1990s, however, the certification itself had growing

[13] Prior to certification, Dean told the press that the company was considering harvest rates within watersheds as well as across the entire property, however, those rates were calculated using relatively old data from Louisiana-Pacific inventories (McClure 1999).

[14] MRC's certification was also significant for FSC. At the time, most certified companies were more like Big Creek— small, "showcase" operations whose reputations for environmental stewardship preceded the FSC's establishment in 1993; the fact that a large, new company had apparently been driven to improve its practices by the goal of obtaining the group's seal set it apart. As one journalist noted, MRC provided the first strong evidence that certification would actually incentivize change in the industry (Zuckerman 2000). This prospect was probably not lost on FSC, either: An MRC source believes the organization wanted the company to "try, fail, and persevere" before earning the certification; its initial shortfall proved that FSC was setting the bar high (Interview #130).

instrumental value. In 1999, Home Depot announced that it would give preference to lumber from FSC-certified operations, pushing Lowe's to announce its own sourcing reforms (Brooks 2000; Carlton 2000; Hagerty 1999). By 2002, Home Depot was pushing $250 million in FSC-certified products through its stores each year. Though this was less than 10% of the company's total lumber sales, it was more than sixteen times the value of FSC-certified wood it had sold just three years prior. As one environmental activist told the *Wall Street Journal*, "You [could] see the industry moving" (Morse 2003). Part of MRC's— and later HRC's—success in redwood manufacturing would come from the relationships it formed with big-box retailers (Brazil 2000; Jani 2009; Walters 2015), and certification gave the company access to what would become a very important market for its lumber (Jani 2009).

Certification was also important in bolstering MRC's credibility. According to one company insider, FSC's approval gave the press some evidence that contradicted critics' allegations. Before that, the only thing they could report were MRC's own counterclaims, which did not inspire much public confidence (Interview #130). This source claims that MRC used FSC as a means of self-evaluation, as well: The company was new to the redwood timber business, and it had quickly become clear that its predecessor's practices did not provide much of a yardstick for sustainability. Having a third party to identify good forestry was therefore helpful to MRC (Potter 2001; Interview #130). For all of these reasons, MRC never seriously considered pursuing

certification through the industry-initiated Sustainable Forestry Initiative (SFI): That certification would not have signified what the FSC seal did to retailers, the media, or the company itself (Interview #130; Williams 2000).

In the Albion, the Tide Slowly Turns

The environmental community's reaction to the certification was mixed. While the World Wildlife Fund, California Trout, and the National Wildlife Federation congratulated MRC in a December 2000 full-page ad in the Western edition of the *New York Times* (Forest Stewardship Council 2000), the Sierra Club remained on guard. A spokesperson for the group told one journalist that it would have preferred to see the company certified after it had transitioned to more sustainable practices rather than on the basis of commitments to do so in the future (Zuckerman 2000). And the certification did little to appease MRC's detractors in the Albion watershed. In August 2000, the Save the Redwoods/Boycott the Gap campaign had purchased its own spread in the *Times* and accused the Fishers of engaging in "liquidation logging" on the former Louisiana-Pacific ownership; when the FSC certification was announced in November, the group re-ran the ad with only slight changes (Mendocino Redwood Company 2000b, 2000c; Save the Redwoods/Boycott the Gap 2000).

Still, a company insider recalls that FSC certification "changed the conversation" about MRC (Interview #130). Save the Redwoods/Boycott the Gap continued to deride the

firm's practices, provide talking points to activists, and encourage actions on its website— under the domain "gapsucks.org"— until about 2004; in late 2000, however, the focus of letters to the editor and press coverage on MRC shifted to the company's success with FSC, as well as its nearly-simultaneous decision to relinquish logging and development rights to a forested parcel near the Mendocino community of Comptche— also in the controversial Albion watershed. Residents had entered negotiations with Louisiana-Pacific in the late 1980s, but credited Dean with moving the process along quickly after MRC's acquisition of the property (Meadows 2000; Wang 2000). When the core group of MRC detractors in the Albion continued their protests in 2001— this time over a THP in a riverside area called Enchanted Meadow, which had been the focus of protests and litigation against Louisiana-Pacific's practices in the early 1990s (Cattalini 2001; Jarvie 2001; *Mendocino Beacon* 2001; Van Pelt 2001)— the leader of the successful effort to preserve Comptche's forest wrote a letter to the editor of the *Mendocino Beacon* scolding the activists for what she regarded as their needlessly adversarial approach and general incivility (Garratt 2001). Her concerns were echoed a month letter in a letter to the editor of another local paper, this one submitted by Helen Libeu— a venerable Sonoma County environmentalist and long-time advocate for forest practice reform.[15] Libeu wrote:

[15] Once described by the Santa Rosa *Press Democrat* as "the grande dame of the North Coast environmental movement" (Geniella 1997b), Libeu was a key figure in the push to incorporate cumulative effects analysis into the THP process following *EPIC v. Johnson*. In 1986, she sued Louisiana-Pacific over two proposed harvest plans in Sonoma County, alleging that the company had failed to consider the long-term effect of intensive logging in watersheds already impacted by erosion; a district court ultimately ruled in her favor (*Libeu* v. *Johnson* 1987; Martin 1989, 36-37). Known for, in her words,

> I prefer a timber economy [in Mendocino] to massive enclaves of well-to-do city folks— or more vineyards than we will be cursed with as it is— which is what we would have more of if there were NO logging. If the remnant timber economy in Mendocino County dies the death of a thousand cuts, you all up there might just as well move to Sonoma County. If there IS to remain a timber economy, Mendocino Redwoods is in the best position to help that happen… I certainly hope they make it, in general, and because they are adjoining owners on one side of the timberland I co-own. I don't want to wake up one day to learn that my new neighbor is Sierra Pacific Industries, which has announced plans to clearcut over a million acres [in California's interior forests]… And when SPI says "clearcut," they *mean* clearcut— the classic kind, all vegetation removed (Libeu 2001; emphasis in original).

Locals also continued to pepper the opinion pages with negative letters about MRC (see, e.g., Cattalini 2001; Morse 2001; Myers 2001; Van Pelt 2001), but those critiques were matched by comments urging environmentalists to consider the alternatives and adopt a different posture toward MRC. As another Albion resident suggested, "We should not lose interest in what they are doing, not just blanketly [sic.] approve of every move they make, but I think it's time we start treating them as the friends they've been trying so hard to become." He concluded, "Please, people, just because they have stores to picket… does not mean they are a more worthy target for our ire than [Hawthorne] is showing itself to be" (Parrish 2001).

Coho Restoration and Land Preservation

MRC's early environmental initiatives also included significant investments in restoring fish habitat and setting aside land for public access and recreation. These

"torturing" regulatory boards (Geniella 1997b), Libeu once registered her dog, Iggy, as a professional forester to make a point about the laxity of the Board of Forestry's licensing system (*Press Democrat* 2014).

endeavors were somewhat removed from the issues at the heart of the public controversy, and initially they were overshadowed by debates over logging intensity and old growth preservation. By the early 2000s, however, they had begun to garner increasing attention both in the media and locally.

The fisheries work began in 1998, when the national non-profit Trout Unlimited (TU) approached Dean with a proposal to restore habitat for coho salmon (*Oncorhynchus kisutch*) on the Garcia River (Williams 2000). Already one of the state's most renowned steelhead (*O. mykiss*) fisheries, the Garcia once supported robust coho and chinook (*O. tshawytscha*) populations, as well. Chinook were long-extinct by 1998, while the coho population had slumped to about 200 returning adults (*Trout* 1998; Williams 2000). TU had successfully restored coho to Marin County's Lagunitas Creek, however, and when Dean was told about that project, he became "genuinely enthusiastic" about the idea of doing the same thing on the Garcia. MRC committed $150,000 to the plan. It also gave TU access to the property, road maintenance and fish population data, and use of company equipment (Williams 2000). Perhaps most significantly, MRC was willing to look at restoration opportunities upslope, such as road removals and stabilization, in addition to in-stream projects (Marten 1999; *Trout* 1998). TU drummed up another $320,000 in state agency and private foundation grants[16], and

[16] In the late 1990s and early 2000s, several ballot initiatives along with new legislation provided state funding specifically for restoring anadromous fish habitat in California. In 2001, the nonprofit Coastal Conservancy Association estimated that the public California Coastal Conservancy and CDFW together

brought in a local restoration consultant, Craig Bell, who had both worked in the timber industry and protested its excesses— once even going so far as to chain himself to the gates of a PALCO mill (Williams 2000; Zuckerman 2000). Bell's efforts to engage MRC's predecessors in salmonid restoration had followed a less adversarial template, but they met with little success: Bell told reporters that in ten years, Louisiana-Pacific had contributed about $200 to his in-stream projects, and had shown zero interest in collaborating on sediment source control (Bowen 2001; Patterson 2001; Williams 2000.) "They let me put in log structures to form pools, but the real problem was sediment coming off the roads up the slope," he told *Trout* magazine in 2001. "They knew it, but they didn't want to talk about it" (Patterson 2001).

MRC, in contrast, supported Bell in identifying priority projects that collectively reduced sediment inputs to the watershed by 70%. Consultants trained MRC employees on erosion prevention techniques and the company pledged $3 million to improving its road network in 1999 (Interview #130; Marten 1999; *Trout* 1998; Zuckerman 2000). Between these improvements and its collaboration with TU, MRC estimates that by 2009, it prevented 775,000 cubic yards of sediment from running off into streams on the property (Jani 2009; Norman 1999a). Both TU and MRC expressed hope that the Garcia restoration would inform similar projects on other parts of the property— and, in TU's case, in the coho's range throughout the state (Geniella

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disbursed over $30 million per year to NGO partners for salmon restoration projects (Bowen 2001, 19-20).

2000; Marten 1999). The North Coast Coho Project (Coho Project) has since grown to include $9 million worth of restoration projects in thirteen North Coast watersheds. Much of this work has been conducted in partnership with private landowners, including other timber companies (Trout Unlimited n.d.).

As the Coho Project's successes accumulated, MRC was also setting aside land for conservation and public access. The company's sale of 3,373 acres in Sonoma County to the state in 2005 garnered press attention because it expanded Sonoma Coast State Beach— then California's fifth most-visited State Park— to over 8,000 acres (Soper 2005). More significant for the Albion Nation, however, was the fate of 104 acres in the Enchanted Meadow area. MRC transferred the property to forest activists to settle legal disputes dating from Louisiana-Pacific's ownership. Arguing for approval of the deal, Jani told the Mendocino Board of Supervisors that the property was mostly tidal grassland, and the saleable timber would be very difficult to harvest without negatively impacting coho habitat. Then he added, "In my heart, I believe seeking resolution of this matter would be in the best interest of the community, and would put to rest something that has bothered people for a long, long time" (A'Dair 2004).

Obtaining a Regulatory License Through "Social Forestry"

Of course, to actually harvest timber, MRC had to comply with both the Forest Practice Rules and evolving Regional Board requirements. The company began to

engage in long-term, property-wide planning fairly early on, and it has certainly leveraged this investment to meet its regulatory obligations. However, MRC was not driven to this approach primarily by a desire to obtain long-term certainty or to reduce costs. Instead, the company's efforts to convince its critics that it intended to be a good steward paved the way to its regulatory compliance strategy.

The landscape plan MRC released in 2006 is illustrative of this dynamic. The plan built on the watershed-by-watershed timber inventories the company had undertaken as part of the certification process, but Jani had then gone further. He wanted to be able to visualize the results of his forestry prescriptions across both space and time— and to make that landscape visible to the public. So MRC built a spatially explicit model that used stand-level data to project out stocking over time. The forest management plan was based on this model, and it incorporated the assessment of sediment sources that MRC had initiated in partnership with TU. As the North Coast Regional Board and MRC leadership came to grips with the picture that emerged from this process— and particularly the condition of the property's 2,400 miles of legacy roads— both acknowledged that there was too much work to be done all at once. Instead, MRC devised a prioritization system and gave the Regional Board completion timelines (Jani 2009). The management plan helped the company demonstrate to the skeptical and the curious that the company was serious about its effort to "build value into the property" (Jani 2009), but it also provided a basis for organizing regulatory compliance.

According to Jani, the National Marine Fisheries Service (NMFS) suggested that the company prepare an ownership-wide Habitat Conservation Plan (HCP) for aquatic species— specifically the coho and chinook salmon— in 1999, *after* MRC had already started its landscape scale planning and stream restoration initiatives (Jani 2009). The HCP is still in progress; the company expects that it will be finalized in late 2015 (Interview #132). This is slow progress even by the standards of large firms in the region, but the lag is due in large part to the fact that MRC brought all the other relevant agencies, including state authorities, to the negotiating table (Jani 2009; Interview #132). The products of this process will include an HCP for five additional terrestrial and aquatic species (A'Dair 2006; Interview #120), as well as several other agreements and permits satisfying other regulatory obligations— all at the ownership scale, and tiering off the HCP (A'Dair 2006; Interview #132).[17]

[17] These include an ownership-wide Natural Community Conservation Plan (NCCP); Waste Discharge Requirements (WDR) and memorandum of understanding with the Region 1 Board; a long-term Lake and Streambed Alteration (LSA) Agreement with the California Department of Fish and Wildlife (CDFW); a forest management plan explaining how the company will maintain the productivity of its lands over time; and a Programmatic Timber Environmental Impact Report (PTEIR) (A'Dair 2006). NCCPs are California's answer to the jeopardy-based, single-species biodiversity protection strategy enshrined in both the state and federal Endangered Species Acts (CESA and ESA, respectively); it attempts to identify and protect natural communities at a regional level, facilitating economic development while preventing individual species from declining to the point where protection under ESA or CESA is required. Unsurprisingly, this approach has proven difficult to implement, and currently only nine NCCPs have been approved and implemented; another thirteen, including MRC's, are in the planning phase (CDFW 2015). LSA Agreements are also known as 1602 permits, after the section of state Fish and Game Code that requires a permit from CDFW for any activity that involves alteration of the bed, bank, or channel of a lake or stream. A PTEIR provides CEQA-equivalent review at the program level, reducing the documentation required for individual THPs that conform to the overall management plan for the property.

In its first eight years in business, MRC developed a comprehensive environmental management strategy: Its prohibition on old growth harvesting was backed by a definition that was both grounded in science and unambiguous on the ground; it had a silvicultural strategy that facilitated stand regeneration without relying on even age management; the company's partnership with TU taught it how to identify, prioritize, and fund sediment source mitigation projects; and it had developed a method of inventorying standing timber and modeling future growth that captured watershed-specific detail but could be implemented across a large property. This approach to management met the company's regulatory obligations and was informed by forest science, but it was developed primarily in response to the concerns of local residents and the environmental groups. As Jani told an audience at the University of California, Berkeley's College of Natural Resources in 2009, "This was social forestry. This was not scientific forestry. We made these changes because we felt as though they needed to be changed to address social issues in Mendocino County" (Jani 2009).

Humboldt Redwood Company: Calling a Truce in the Timber Wars

When PALCO filed for bankruptcy in 2007, MRC seized the opportunity to expand its redwood timber business. They had already come close to acquiring the beleaguered company's 210,000 acres of Humboldt County timberland in 2005, but Charles Hurwitz, the CEO of PALCO's parent company, balked at the last minute; the Chapter 11 filing gave MRC a second chance (Jani 2009). Dean "quarterbacked" the deal,

wooing stakeholders from rural Humboldt County to Sacramento to Wall Street. He made a plan for PALCO's unsecured creditors and organized public meetings; he vowed to lower the harvest rate on the company's forests and protect both its old growth trees and the employee pension fund. MRC also promised that it would honor the terms of the Headwaters Agreement by adding them to the deed as a first order encumbrance (Interview #130). It included a PALCO creditor, Marathon Structured Finance Fund (Marathon), in the proposal as a co-owner, allotting them a 15% stake in the proposed new company (Tuna 2008).

In preparing its proposal, MRC tried to make clear commitments in "measurable" areas, like annual harvest rates. After the Maxxam takeover, PALCO was harvesting around 300 million board feet per year from the property; by the time the company went into bankruptcy, annual cut had dwindled to less than a third of that amount. Dean and Jani thought they could "reliably and sustainably work" at 55 million board feet— about half the estimated annual growth on the property— and committed to do so for their first decade in business. "We think it will slowly ramp up," Jani said in 2009, "But the land needs a rest" (Jani 2009). MRC leadership believed the company could succeed under these restrictions based on their experience with the original Louisiana-Pacific property, and the more political support their bid garnered, the more confident they felt that what they had done in Mendocino would be exportable to Humboldt (Interview #130). Ultimately, MRC was endorsed by six environmental groups,

Mendocino County's left-leaning Board of Supervisors, all of the review team agencies, the U.S. Department of Justice, and California's Republican Governor Arnold Schwarzenegger, who, in one insider's words, "wrote a letter [of support] that would make you cry" (Interview #130; Schwarzenegger 2008). Judge Richard Schmidt awarded MRC and Marathon PALCO's timberland and mills in June of 2008. In August, Mike Jani came into the forest, the remaining treesitters came out of the trees, "and I think Mike hugged one of the treesitters, or the treesitter hugged Mike," another MRC executive recalled in an interview. (The *Los Angeles Times* attributed the hug to Jani.) An Earth First! activist told reporters, "[There is] this amazing sense almost of, 'The war is over'" (Bailey 2008).

Then, about a month later, "the whole world collapsed" (Jani 2009). The subprime mortgage crisis boiled over in September 2008, paralyzing capital markets and pushing major investment banks to the brink of insolvency.[18] Jani readily acknowledges that having owners who were able to put money into the company during this period of time was a tremendous asset, but he also avers that the experience launching MRC gave HRC a "template" that helped them make changes efficiently. Jani said, "We just plain and simple overlayed that template right onto our new Pacific Lumber Company holdings" (Jani 2009).

[18] In a poetic twist, when Lehman Brothers filed for bankruptcy, it became the largest financial institution to fail since the 1990 collapse of Drexel Burnham Lambert— the firm that financed Maxxam's takeover of PALCO.

And for the most part, this approach worked. HRC moved logs— albeit at about a third of rate it had planned before the crash (Jani 2009)— avoided protests, and was certified in 2009. It inherited PALCO's HCP and Sustained Yield Plan, initiated an inventory of the property's 1,800-mile road network, and partnered with TU on restoration (Interview #132; Jani 2009). The old growth policy proved to be less appropriate on the PALCO ownership than it had been in Mendocino, however. On the hammered Louisiana-Pacific property, old growth trees have a distinctive, top-heavy form: They stick out above the rest of the canopy and spread their branches there, where there is little competition for light; their crowns often appear flat and their overall shape is irregular. They are, in other words, easy to pick out visually. PALCO's careful management under the Murphy family relied heavily on selection harvesting, and left plenty of big, old trees to recruit into and maintain the valuable old growth age class. Increased light from nearby harvesting released these trees to grow quickly and more uniformly, giving them the classic, conical shape that generally characterizes younger trees. Misclassifying these redwoods as harvestable second-growth was, as Jani put it, "probably the biggest unexpected bucket we stepped in" on the HRC property. To address this, HRC started boring trees to confirm their age before harvesting them (Jani 2009). In an interesting twist, environmental activists— "the very same people that were sitting in the trees when PALCO owned the property," Jani notes— accompany HRC foresters into the woods on a voluntary basis to "validate" their age determinations. "We didn't expect that kind of help, but it does, I think, for me, prove

that if you take the right steps forward, it will be greeted in such a way," he says. "It gives me a little bit of hope" (Jani 2009).

Environmentalists are also hopeful. Forest advocates with the Arcata-based Environmental Protection Information Center (EPIC) say that the group was optimistic about the Fisher's acquisition of the PALCO property because they felt good about MRC's environmental policies. "The ownership of [the former PALCO land] sort of changed the landscape and changed our approach a little bit," one says. Rather than battling HRC outright, he explains, "The responsibility on us over the years has been to keep HRC honest" (Interview #133). The companies, for their part, seem happy to have environmental groups playing this role. "I find most of our environmental stakeholders to be pretty valuable," explains a member of HRC and MRC's sustainability staff. "They're checking in— 'Are you still doing what you say you're going to do?' You know, kind of just [being] an outside set of eyes. It's good to have that feedback" (Interview #132). As of 2014, she says Albion- and Greenwood-area residents are still attentive to MRC's activities, but the Save the Redwoods/Boycott the Gap Campaign is all but deceased; the website remains, promoting in large type at the top of its landing page an "International Day of Action Against the Gap"— in 2004 (Save the Redwoods/Boycott the Gap 2015). Driven to improve its environmental practices by dogged activists focused on popular issues of the day (i.e., clearcutting and old growth protection), it appears that HRC and MRC have, at least for the time being,

achieved the unwritten sanction that has been more important to them than any regulatory permit: a social license to harvest redwood timber on the North Coast.

Green Diamond Resource Company

Unlike the other major timberland owners of the North Coast, Green Diamond has had interests in the area since before the tumult of the 1990s. The firm is a subsidiary of the Simpson Investment Company (Simpson), which began harvesting timber in 1890, in the southern reaches of the Puget Sound. Simpson expanded outside of Washington State after World War II, sending representatives as far away as Alaska and Latin America before deciding to invest in the remote and rugged territory of far northwestern California (Spector 1990, 93). Due to the ease of transporting logs and milled lumber by ship, the area around Humboldt Bay had been a timber mecca since the 1850s (Carranco 1975; Melendy 1959), but valuable, unentered stands were still plentiful in Del Norte and northern Humboldt Counties, where harbors and rail connections had not yet been developed (Spector 1990, 93). Simpson planned to slowly acquire timberland in the area and, initially, to log it only minimally, as company leadership remained reluctant about integrating into redwood manufacturing. Within a few years, however, Simpson was presented with the opportunity to purchase a tract in the Klamath Basin that would facilitate access to their original holding there, and the selling firm insisted that its old growth redwood mill be included in the deal.

Unable to say no to the timberlands, Simpson acquiesced to the purchase of the mill (Spector 1990, 95-97).

Now fully committed to Northern California, in 1954 Simpson formed a subsidiary to run its operations there, and brought in leadership with redwood experience (Spector 1990, 104, 109). The Simpson Redwood Company proceeded to scoop up three North Coast firms in 1956, significantly expanding both its timberland and its milling capacity (Spector 1990, 104-107; more). Simpson later lost a little over 52,000 acres to the creation and expansion of Redwood National Park in 1968 and 1978. The company was compensated with cash and federal land, expanding its holdings in Del Norte County (Spector 1990, 197).

Simpson had long been held almost entirely by the descendants of its founder, Sol Simpson— most of whom bore the surname of Sol's son-in-law and eventual business partner, Mark Reed. In 1970, various Reeds controlled 85% of the company, and Simpson began buying back the non-family shares (Spector 1990, 205). With total family ownership as its goal, Simpson was able to make timberland acquisitions based on properties' long term potential. In the late 20th century, when public companies were disinclined to hold or purchase young second-growth redwood, Simpson retained and bought (Spector 1990, 197; 211). As it ran through its old growth stands, the company upgraded mills to accommodate smaller diameter logs (Spector 1990, 184).

By the time Simpson spun off Green Diamond Resource Company to manage its timberlands in 2006, those assets included just over 451,000 acres on the North Coast.[19]

The Road to Ownership-Wide Planning

In contrast to social license-driven HRC and MRC, the decline of the spotted owl was the catalyst for the development of Green Diamond's environmental management strategy. The company initiated an owl research and monitoring program at the suggestion of a staff biologist in 1989, even before the U.S. Fish and Wildlife Service finalized its determination on the bird's status (Interview #120; Simpson Timber Company 1992). The data they gathered informed Green Diamond's Northern Spotted Owl Habitat Conservation Plan (NSO HCP)— the first such plan approved for owl habitat on private land (Interview #113; #120). By the time the NSO HCP went into effect in 1992, several cold water fish species were being discussed as candidates for protection under the Endangered Species Act (ESA), so Green Diamond began monitoring water temperature, channel morphology, and fish populations (Green Diamond Resource Company 2006; Interview #120). These measurements would provide the baseline data for an Aquatic HCP (AHCP) approved in 2007 and covering

[19] Ownership size from 2004 data obtained by the author from CALFIRE; according to the company's 2014 Forest Management Plan, Green Diamond currently holds 383,970 acres of redwood timberland in Humboldt and Del Norte Counties, along with around 9,000 acres of conifer forest dominated by other species (Green Diamond Resource Company 2014, 9).

six species.[20] Green Diamond staff agreed that the company's experience with the NSO HCP influenced the decision to begin a fisheries program with the ultimate goal of securing Incidental Take Permits for aquatic species, as well (Interview #113; #120).

The AHCP presented a problem for Green Diamond, however— a problem that ultimately drove the company deeper into long-term, watershed- and ownership-scale environmental planning. Since logging roads and the features associated with them (e.g., stream crossings, culverts, road cuts) are a major source of sediment pollution in timbered watersheds (Best et al. 1995; Furniss et al. 2002; Klein, Lewis, and Buffleben 2012, 136; Reid and Dunne 1984; Short 2010, 19-20), the AHCP requires Green Diamond to identify and treat road-related sediment sources across the entire, 416,533-acre plan area[21], beginning with the sub-watersheds that are most likely to be compromised based on their biological and geologic characteristics and the condition of their roads. As sources are identified, they are prioritized for treatment based on how much sediment they are expected to deliver in the future and how quickly and effectively they can be controlled (Green Diamond Resource Company 2006). This program is substantively different from the traditional approach to sediment control, in

[20] These include Chinook and coho salmon, steelhead, coastal cutthroat trout (*O. clarki clarki*), tailed frog (*Ascaphus truei*), and the southern torrent salamander (*Rhyacotriton variegatus*) (Green Diamond Resource Company 2006, S-1; 1-9-1-11).

[21] The AHCP is intended to cover Green Diamond-owned land on the west slope of the Coast Ranges and Klamath Mountains (i.e., coastal watersheds), and therefore excludes some owned interior timberland. The plan area also incorporates property for which Green Diamond owns harvest rights but does not have fee title ownership, and anticipates some exchange of land within the target watersheds that might alter the plan area over the term of the agreement (Green Diamond Resource Company 2006, S-2; 1-4-17).

which source inventories and mitigation are undertaken as part of the THP process. It is also an improvement, since the THP-by-THP approach has the effect of prioritizing sites for treatment based on the maturity of the timber surrounding them— a poor metric from a pollution control standpoint.

The problem arises from the fact that treating sediment sources usually causes disturbance and pollution in the short term. As such, treating sediment sources requires a WDR from the Region 1 Board and an LSA Agreement with CDFW— both of which have traditionally tiered off of individual THPs. To implement its AHCP, then, Green Diamond would either have to permit each treatment individually (an option that was never considered seriously), conduct treatments in tandem with harvest operations (an option that was clearly out of step with the intent of the AHCP), or develop property-wide versions of those two permits (Interview #120).

While the Water Boards had long been interested in developing WDRs for larger areas, in 2007, it had never been done on the scale demanded by the AHCP. Watershed-wide WDRs were not without precedent, however— and Green Diamond was the company that had set that precedent, on 1,900 acres of land it owns on the south fork of the Elk River (Mangelsdorf et al. 2013; Lundborg et al. 2014).[22] The Elk is one "Five Watersheds" that was heavily impacted by PALCO's management in the 1990s, and as

[22] Not to be confused with the town of Elk, which is located near the outlet of Greenwood Creek on the Mendocino coast. The Elk River drains into Humboldt Bay just south of Eureka in Humboldt County.

conflict between that company and water quality regulators escalated in the 2000s, Region 1 worked with Green Diamond to develop a WDR specifically for the company's Elk River property (Interview #112a; #113).[23] The resultant 2006 watershed-wide WDR for Green Diamond benefited both the company and the Regional Board: In the midst of its very public war with PALCO, the latter was able to demonstrate that it was not hostile to the timber industry generally by collaborating with Humboldt County's other major forest landowner; by cooperating with regulators, Green Diamond could distance itself from the practices of its notorious neighbor (Interview #112a; #113).

The Elk River WDR forged working relationships between company and agency staff that facilitated the development of a Road Management WDR for the entire ownership in 2010 (Interview #113; #120; NCRWQCB 2010). Two years later, Region 1 approved a Forest Management WDR that covered all of Green Diamond's activities directly associated with timber harvesting— i.e., the road construction, thinning, yarding, landing, hauling, and site preparation work that would traditionally have been permitted under a THP-specific WDR or waiver (NCRWQCB 2012).

[23] Technically, Green Diamond's THPs in the Elk watershed were ineligible for coverage under the conditional waiver and general WDR (GWDR) for Region 1— per "kick-outs" originally authored by the Region 1 Board for the first post-S.B. 390 conditional waiver (see Chapter 4). The Board retained the language disqualifying THPs in cumulatively impacted watersheds from waiver and permit coverage in the final policies approved in 2004 (NCRWQCB 2004a; 2004b). Had the Board not supported the development of a watershed-wide WDR for the company, Green Diamond would have been forced to pursue individual WDRs for each of its THPs in the Elk. Instead, the Board made findings to support a watershed-wide WDR for the company in 2006 (NCRWQCB 2006a; 2006b).

To meet its requirements under Fish and Game Code, Green Diamond also developed a Master Agreement for Timber Operations (MATO) with CDFW in 2010. Unlike the company's ownership-wide WDRs, which treat road and forest management separately, the MATO covers activities that are traditionally undertaken as part of a THP as well as the property-wide road work required by the AHCP (CDFW 2010).

Sources of Criticism: Silviculture, Certification, and Short Rotations

While making major investments in ownership-wide permitting, Green Diamond has continued to rely on clearcutting— or, as industry now prefers to call it, "even-aged management"— as its primary silvicultural technique. Due to how and when the ownership was cobbled together, there is very little old growth left on the property, and much of the land base is made up of contiguous, even-aged tracts. The FPRs now limit the size of even-age units and contain restrictions on harvesting adjacent to recent clearcuts, and Green Diamond's HCPs require the company to buffer Class I and Class II streams, NSO habitat, and geologically unstable areas; they also set aside murrelet reserves, which include most of the remaining old growth stands. To meet these requirements without abandoning even-age management, Green Diamond mostly harvests small clearcut units (i.e., 20-40 acres depending on yarding technique; the company told the *North Coast Journal* in 2014 that the property-wide average is 15 acres (Stansberry 2014)) while selectively logging older stands in sensitive areas (Green Diamond Resource Company 2014).

The company has also mostly replaced traditional tractor-based yarding (in which each log is dragged to the landing site) with shovel loggers— machines with a jointed arm that grabs and "swings" felled logs to a point where they can be loaded onto a truck.[24] The switch was intended to reduce sediment runoff from skid roads: Shovel loggers have a high clearance, which enables them to maneuver over slash, reducing ground disturbance, and wheels with a high surface area distribute the equipment's weight, minimizing compaction. However, because the arm needs an open area to safely swing longs downhill, shovel logging is most compatible with clearcutting (Coatney 2013; Green Diamond Resource Company 2014, 64-65; Interview #120).

Green Diamond maintains that its small clearcuts will introduce valuable habitat diversity by creating a mosaic of different aged patches across the landscape (Green Diamond Resource Company 2014). For many environmental groups, however, clearcuts of any size are simply not acceptable. While Green Diamond was certified by FSC in 2013, many environmental advocates decried the decision as evidence that the organization was lowering its standards to meet the growing demand for certified timber, emphasizing that Green Diamond would not have cleared its bar had FSC not changed its rules to allow clearcutting in the Pacific Coast region in 2011 (Hughes 2013; Stansberry 2014).

[24] The company still uses traditional yarding methods for other treatments, such as thinning, but in general, as its logging superintendent told an industry publication in 2013, "We're really opposed to building skid roads here" (Coatney 2013).

Again in contrast to MRC, Green Diamond's California leadership has said that certification was driven by its desire for market access and reputation capital. Their willingness admit this freely is likely a reflection of the fact that the actual changes in practice instituted by the company in order to obtain certification— e.g., leaving more trees in clearcuts— were themselves largely cosmetic. Due to the requirements already in place under state law and the additional commitments to environmental research and species and watercourse protection embodied in the HCPs, WDRs, and MATO, the certification did not require much in the way of substantive changes to company practices (Interview #120). Leaving trees in clearcut units has made shovel logging more difficult, but the company claims that it has been able to work around the standing timber— literally (Interview #120; see also Green Diamond Resource Company 2014, 64).

Another concern about Green Diamond's forestry commonly cited by environmental groups is that the company's emphasis on clearcutting and short rotations has yielded an overall management strategy that degrades the quality of its product. Redwood lumber commands a premium on the market because of its tight grain, its resistance to rot and termites, and its distinctive, almost rosy color, but all of these properties are influenced by the conditions in which the trees that produced the lumber grew, and the age at which they were felled and milled. The older a tree, the greater the proportion of that high-quality, warm-hued heartwood it yields relative to young

sapwood. Trees that establish and spend their early life in the shade of giant neighbors grow more slowly, making tight-grained wood. Redwoods regenerate rapidly in high-light conditions, but fast growth produces coarse-grained wood. In addition to growing its trees quickly in sunlit clearcuts, Green Diamond harvests them early: The company considers a tract mature after 45 years of growth. Though clearcut size and adjacency restrictions will delay harvest of some stands past the 70-year age mark, Green Diamond projects that over the next century, the average redwood log coming off its California properties will have been about 50 years old at the time it was cut (Green Diamond Resource Company 2014, 36-37). To the company's critics, this is simply too young. As former EPIC Director Gary Hughes explained, "What we know is that if a redwood doesn't get to be at least 70 years old, the product— the quality of the product is inferior. Everyone knows it. The manufacturers know it; the carpenters know it; everyone knows it. But they're still pushing on this model to get immature redwood onto the market… That's totally economically unsustainable" (Interview #122; see also Stansberry 2014).

This concern is not merely speculative; it partly reflects events in Green Diamond's recent history. In the 2000s, Green Diamond developed a reputation for selling poor quality lumber from very young trees; accusations that the company dyed sapwood during this period of time live on in Humboldt County conversation and the comments sections of forestry-related articles in the local press. In 2013, the trade

publication *Timber/West* reported that the company had "put out whatever redwood they could" and that "as a result… customers were no longer excited" about the product (Coatney 2013). Some environmental advocates fear that, coupled with the declining commercial supply of old growth logs, incidents like these will undermine the value of redwood lumber. "You go anywhere and ask about redwood," one says. "People talk about what you used to be able to buy" (Interview #122).

To combat this problem— which has been compounded by the rising popularity of wood alternatives like composite decking— Green Diamond and HRC have collaborated with Humboldt County on a marketing campaign to promote redwood as a building product (Coatney 2013; Walters 2015). The value of this venture— and of Green Diamond's FSC certification— for HRC/MRC became all the more apparent when Green Diamond announced in April of 2014 that it was getting out of redwood manufacturing for good (Green Diamond Resource Company 2014). The company closed its mill on Humboldt Bay and its lumber finishing facilities in Ukiah and Woodland soon after the announcement; the Korbel mill was initially repurposed to process Douglas fir, but that venture foundered within a year (Walters 2014). Neal Ewald, a senior vice president at Green Diamond, admitted to the *North Coast Journal* that the company had not anticipated the growing role of big-box stores in lumber sales; while HRC had scaled up production and pursued direct relationships with

major retailers, Green Diamond had continued to sell through local distributors (Walters 2015).

Since the closure of the Korbel mill in early February 2015, Green Diamond has focused entirely on what it regards as its core strength: Managing its forested land to produce "high-quality" timber while preserving its conservation value (Green Diamond Resource Company 2014; Walters 2015). It is likely that many of its young, sun-grown, FSC-certified logs will be milled along the banks of the Eel River, at HRC's Scotia mill (Interview #122; Walters 2015).

In summary, then, Green Diamond's long tenure on the North Coast set the development of the company's environmental management strategy in a decidedly different direction than that taken by HRC and MRC. The company's success parlaying its NSO program into an incidental take permit directly influenced its approach to managing threatened aquatic species— which in turn prompted long-term, property-scale agreements with other agencies. Put simply, Green Diamond learned that it could make its own destiny through research. A federal agency employee who was involved with the AHCP negotiation explained:

> Green Diamond is way different than most of the timber companies we deal with. And I don't mean to over simplify their ethics or anything else, but one of the things that Green Diamond does is they're proactive. So instead of having the regulatory agencies tell them what they have to do based on whatever information is available from other people's property or from up northwest or wherever else, they do the research themselves upfront. And then present it as,

> "This is what we found on our property, so pay more attention to what we found on our property"... They're a privately owned company looking forward [and] they've realized by doing that they can steer what they're going to end up with in the end (Interview #123).

A singular investment in scientific staff followed from this approach. One Green Diamond employee estimated that the environmental management team at the company's California offices, including biologists and aquatic ecologists, exceeds forty people (Interview #120). (In Washington State, a staff of three serves the same function.) These people are for the most part not trained in forestry, and they bring a different set of values and interests to their work. In general, they are quick to point out the innovative aspects of Green Diamond's program and evince genuine excitement about what they stand to learn from the monitoring protocols they have established. Even regulators who have been tough on the company in the field express respect for its scientists. "Green Diamond is pretty careful about the type of people that they hire," one said, "and those guys are good people" (Interview #125). These observations evoke parallels to the theory that the National Forest Management Act of 1976 (along with other movement-era environmental policies) indirectly prompted more ecologically sensitive management of U.S. Forest Service lands by increasing the proportion of biologists, ecologists, and recreation management professionals in the U.S. Forest Service staff corps (Hirt 1994, 281-292; Sabatier, Loomis, and McCarthy 1995; Yaffee 1994).[25]

[25] Since expertise in these areas would be necessary to fulfill the agency's broadened mandate under the new statute, the Forest Service was expected to hire more individuals who were not trained as foresters after the laws were passed. Scholars anticipated that these employees would bring new values to the

Economies of scale conveyed by the size of Green Diamond's holdings are part of what makes the company's research investments possible, but the value of redwood is also an important factor. "If this was in fir country, [this] wouldn't happen," says one employee. "[We wouldn't] be able to fund the activities that we have" (Interview #120). This reality is exactly the reason that environmentalists like Hughes worry about the quality of the logs Green Diamond produces: In their view, declining quality undermines the redwood premium that makes conservation, restoration, and threatened species monitoring on California's industrial timberlands economically and politically viable.

In contrast to HRC/MRC, Green Diamond has made few concessions to environmentalists in their forest management: Though clearcutting has been roundly condemned by both local and national groups, even age management and short rotations are at the center of their forestry. This is partly a legacy of historic management on the two companies' properties. While Louisiana-Pacific's management pushed MRC to harvest in controversial areas and PALCO's famous endowment of old growth virtually guaranteed that HRC would be closely scrutinized, Green Diamond worked in relative obscurity. The land it initially purchased was remote, so it clearcut

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agency and disrupt its famously unified internal culture (Kaufman 1960), eventually breaking the emphasis on "getting out the cut"— from the inside. Whether and to what extent this actually occurred was an active area of inquiry and speculation in the natural resource policy community in the early- and middle-1990s— roughly coincident with the controversy over the northern spotted owl and the emergence of both Forest Service Employees for Environmental Ethics and agency diversity initiatives. Empirical research established that the Forest Service was more heterogeneous in the 1990s than in the 1950s, both in terms of the attitudes of its staff and their personal and professional backgrounds (Brown and Harris 1992; Mohai 1995; Sabatier, Loomis, and McCarthy 1995; Thomas and Mohai 1995), but the conversation tapered off before a clear consensus on the management impact of these changes emerged (see also Burnett and Davis 2002).

there freely; the properties it acquired later were in many cases sold because the previous owners had liquidated the virgin stands and had no interest in managing second-growth. By the 1990s, then, the company had very little old growth to spark public passion (Interview #122). Louisiana-Pacific was the first front in California's timber wars (Geniella 1996b; 1997a), and when the theatre of action shifted, it was to the PALCO property. Environmentalists were not looking closely at the practices of the giant to the north of both firms. As one observer explained:

> Green Diamond, in some respects, were the beneficiary of PALCO's problems, because the light was shining on all of PALCO's issues and Green Diamond was quietly out there— not with the same attitude, not with the same corporate structure, and not with the same people involved— but they were out there doing the same thing to the landscape. A clear cut looks the same whether it was done on PALCO land or Green Diamond land. (Interview #125)

Even as the PALCO debacle provided some degree of cover to Green Diamond, the notoriety it brought to both the redwood timber industry and its adversaries in state government— most notably the Region 1 Board— also provided an incentive for both Green Diamond and state regulators to collaborate on ownership-wide permitting.

The result is that Green Diamond has been able to secure regulatory certainty for a spatially vast redwood timber operation relying on short rotations and even-age silviculture— without the kind of transparency that quickly became a cornerstone of HRC and MRC's management strategy. Green Diamond does not publish its inventories or harvest rate projections; its detailed management plan is publicly available, but it is largely qualitative (Green Diamond Resource Company 2014). What

is nevertheless broadly clear is that in the 1990s and 2000s, the company became highly efficient on the forestry side of redwood timbering— now its sole concern on the North Coast.

Hawthorne Timber Company

The fourth and smallest major timber ownership on the North Coast is also the one whose story most closely parallels the national trend in forest ownership change at the close of the 20th century: The Hawthorne Timber Company was created by Portland-based Campbell Global on behalf of the latter's investor-client, a state pension fund, to hold 194,000 acres of Mendocino County timberland purchased from Georgia-Pacific in 1999 (Poole 1999). Pension funds are classic institutional investors; they acquire and manage timberland to balance the risk and return from other investments. Campbell, for its part is a classic timber investment management organization, or TIMO: It researches timber properties, manages timberland acquisitions, sets up corporate structures for holding timberland (i.e., to maximize tax benefits), runs hold/sell analyses, manages the forest itself, and markets the harvested logs on behalf of institutional investors who wish to incorporate timberland into their portfolios but lack the in-house expertise to manage the forest themselves (Campbell Global 2015). Founded by a Portland attorney in 1981, the company was an early promoter of timber as an investable asset, and by the time it brokered the Georgia-Pacific deal, it had acquired more than $1 billion in forested properties on behalf of its clients and was

managing over 600,000 acres in the Northwest alone (Campbell Global 1999; Poole 1999).

The structure of the relationship between Campbell and its client has fundamentally shaped Hawthorne's regulatory compliance strategy. Unlike HRC, MRC, and Green Diamond, Hawthorne has not pursued ownership-wide permits to satisfy its obligations under state and federal environmental statutes; instead it manages its environmental obligations on a THP-by-THP basis and under an Option A plan. The TIMO (Campbell) selected this approach in part because of the size of the Hawthorne property. Explains a Campbell employee, "We don't have so much property that we can do an HCP and say, 'Well, I'm going to do a lot of my protection over in this area.' We have to be able to make it work in the landscape that we have" (Interview #119). But he also notes that the upfront costs and uncertainties associated with long-term, large-scale negotiated permits are hard to defend to timberland investors: "[It has been] extremely difficult to tell a client, 'I'm going to be able to get you this in X time, and at X cost'" by pursuing an HCP or ownership-wide WDR. Though this individual made it clear that the long-term regulatory certainty such agreements confer is appealing, this benefit is, in Hawthorne's case, overshadowed by high costs and uncertainty about the eventual benefits on the front end of the planning process (Interview #119).

It is not clear to what extent this determination was influenced by the property owner's

near-term cash flow needs because Campbell keeps the identities of its investors— and their objectives— private (Poole 1999). And both this policy and the company's THP-by-THP compliance strategy are reflected in another aspect of Hawthorne's environmental management strategy— namely, how transparent the company is to the public. Because Hawthorne has no HCP, information that HRC and Green Diamond have made public through the planning process is not readily available from Hawthorne, and the company has not generally disclosed details of its management voluntarily. It maintains no website, and in 2000, when the Mendocino Forest Council solicited management plans from the county's three largest timberland owners (i.e., MRC, Hawthorne, and the publicly-owned Jackson Demonstration State Forest), only Hawthorne declined to provide the quantitative information requested by the county forester. "It has been difficult, at best, to get people [from Hawthorne] to respond," he told the *Willits News* (A'Dair 2000). And unlike other major timberland managers in the redwood region, Campbell can attribute its practices to its clients' needs and preferences. As the individual quoted above explains, "Each client is different. We manage per their objectives, and different clients have different objectives" (Interview #119). Since clients' identities are not disclosed, however, those objectives can remain shrouded in mystery. Because of this double layer of private governance, Hawthorne is able to muddy the question of ultimate accountability in a way that other owners are not.

For some environmentalists, these and other attributes set Hawthorne apart from the

new generation of North Coast timber firms. "[Sierra Pacific Industries] and [Hawthorne] are a different animal," says one, lumping the now-112,000-acre Hawthorne property together with the largest private landowner in the state, which owns 1.86 million acres of timberland, the vast majority them in California (Fay Ranches, Inc. 2014: 80; Speaker 2013), and has a reputation for secrecy. Part of the rationale for this comparison is that "[Hawthorne] just complies with base Forest Practice Rules" (Interview #133). As with Green Diamond, Hawthorne continues to use a mix of even and uneven age management on its property, and (though the latter uses more uneven age management than the former) this has been a point of friction with environmental groups. "Most of the entities have very strong things that they don't like, and one of them is evenage management," the Campbell employee explains, "So if you're doing any of that… We're not going to see eye to eye on a number of things" (Interview #119). Other environmentalists are more generous. "I would say that they're reducing the intensity a little bit, recognizing the validity of what public interest groups have been saying," says one (Interview #122).

And while Hawthorne has done less public, ownership-wide planning than HRC/MRC and Green Diamond, its environmental activities are not entirely dictated by the need to comply with public regulation. For example, the company is now a major partner in the North Coast Coho Project (Trout Unlimited n.d.) and claimed to be pursuing certification in 2014 (Interview #119). The latter move is a consequence of public

pressure on lumber retailers reverberating up the supply chain to producers. The Campbell employee explains, "If many of the people that we sell product to want a greater and greater percentage of [products] they put in the marketplace certified, then we have to be responsive to that" (Interview #119). But consolidation of the milling industry has also played a role: The closure of Green Diamond's manufacturing division leaves only two redwood specialist facilities on the North Coast; one is certified and the other is not. "We don't want to be selling to only one place," the Campbell source points out. Certification makes the log market more competitive for the timberland owner. Echoing his counterparts at Green Diamond, this employee notes that state forest policy has raised the regulatory floor so high that clearing the certification bar doesn't require much of a leap. The remaining gap, he says, is not due to deficiencies in forest practices relative to certification standards; rather it has to do with how the company documents those practices for the public (Interview #119). As such, Hawthorne's pursuit of certification may ultimately diminish the perception that it operates in "secrecy" relative to other firms in the redwood industry.

The Campbell source also points out that going "THP-by-THP" allows more opportunity for dialogue between the company, regulators, and the public, than Green Diamond's science-for-certainty approach:

> Their view might be, We monitor everything… We do the research… So as long as we can't see we're harming anything, we should be able to operate the way we want [if it conforms to the protection standards we negotiated]. We have a little bit different view. We know that there [are] concerns— multiple concerns. And

> we have other resource values that need to be maintained. So consequently, we adapt our management to deal with what we have (Interview #119).

Indeed, Hawthorne has been a more consistent participant in regulatory hearings than its counterparts in the region— and that is "part of the [THP-by-THP] model," the source explains, "We're kind of in the weeds… We write public comment letters. We do in-person, and try to be engaged in the discussion. We don't just sit back and listen" (Interview #119).[26] Though Hawthorne has been described as less transparent than HRC/MRC and Green Diamond in some respects, the policies that govern its operations are determined in public fora that are also well attended by local environmentalists— and the activists don't just sit back and listen, either. In contrast, the HCP process generally incorporates public comment only after regulators and the applicant have hammered out an agreement behind closed doors, and once approved, they make it more difficult for activists to challenge management decisions based on new information— a fact lamented by the same activist who criticized Hawthorne's THP-by-THP strategy (Interview #133). There is room for both critiques: By managing one harvest plan at a time, Hawthorne avoids articulating and committing to a long-term vision for its own management— at least in the level of detail that HRC/MRC and Green Diamond have; the other companies have made extensive commitments, but through a process that does not include forest advocates directly, and may limit their opportunities to challenge individual THPs going forward.

[26] Recently, for example, the company invested considerable time in the development of two of the Board of Forestry's major rule packages: An update to the existing road rules (adopted 2013; effective January 1, 2015) and the recent Anadromous Salmonid Protection Rules (adopted 2009; effective January 1, 2010) (Interview #119).

The Campbell employee also expressed satisfaction with the way regulation under both the Board of Forestry and the Regional Boards works in practice, noting that while some in the industry would still like to see the Regional Board authority over timber harvesting formally transferred to the Board of Forestry, he is past lamenting the loss of a blanket waiver. "If everybody wants to make it work, and you know, you do things in good faith, you follow the protocol, you notify them when you find a problem, you follow the time frames, you know, that process works," he says. Referring to the extensive regulations with which his company's THPs must comply, he added later, "We pride ourselves on figuring out a way to get through it. That's what you've got to do. Figure a way to get through it, and do it as cost-effectively as possible." These efforts have required— and received— extensive investment from the landowner (Interview #119).

As of this writing, the Hawthorne property is on the market. The pension fund's exit from redwood timbering, after sixteen years, is consistent with the dour predictions of researchers and environmentalists who expect institutional investors to be short-term owners rather than long-term stewards (Browne 2001, 19; Gunnoe and Gellert 2010, 277-278; Irland, Hagan, and Lutz 2010, 17). Of course, the environmental consequences of the Hawthorne sale will depend significantly on the buyer, and many assume HRC/MRC will acquire the property. However, sources in the forestry community on the North Coast indicate that if one of the Fisher family companies

does make a bid, there will be other competitive offers (pers. comm., July 2015).

Academic researchers and environmentalists have also predicted that institutional investment in U.S. timberlands will increase fragmentation of those properties because financial owners will be more attuned to prospects for highest and best use development than integrated forest products firms (Bliss et al. 2010; Gunnoe and Gellert 2010). Hawthorne's land base has indeed contracted in size since the 1999 acquisition from Georgia-Pacific, but over 80% of the 82,000 acres sold from the original property have gone to nonprofit conservation groups: In 2002 the Mendocino Land Trust purchased 7,334 acres in the lower Big River watershed which were later transferred to California State Parks (Circuit Rider Productions, Inc. 2005, xi; 2); in 2006 and with support from public partners, The Conservation Fund (TCF) purchased 16,100 timberland acres in the Big River and Salmon Creek watershed (TCF 2009); the following year, the Redwood Forest Foundation, Inc. (RFFI), backed by private capital, bought 50,000 acres in northern Mendocino County known as the Usal Tract (RFFI n.d.). Both TCF and RFFI intend to continue light touch selection logging on their properties alongside extensive road and stream restoration work; the ongoing timber sales are intended to bolster the region's timber economy and fund conservation projects (RFFI n.d.; TCF 2005; 2009; Usal Redwood Forest Company 2015). These transfers are consistent with Bliss and Kelly's (2012) observation that the rise of

institutional investment in U.S. timberlands may create novel opportunities for conservation.

Discussion

Varying Strategies

In the years since the "timber wars" and ownership turnover of the 1990s, the three major redwood timber firms of the North Coast have developed distinct environmental management strategies. Green Diamond's experience with the listing of the northern spotted owl drove it to invest in scientific monitoring programs as a way of obtaining regulatory certainty; for HRC and MRC, research and monitoring are an ancillary component of an effort to demonstrate to a critical public that they are serious about protecting non-timber values on their ownership. In other words, Green Diamond has focused on safeguarding its regulatory license to operate, while HRC/MRC have been driven by the need to maintain a social license to operate. Hawthorne, meanwhile, has obtained its regulatory license in the traditional way: THP by THP.

As the foregoing case studies illustrate, these differing approaches were shaped by the intersection of factors particular to each company, such as tenure in the region, environmental practices and reputation of previous owners (i.e., were they known as good stewards or not), forest stocking, and the new owner's goals. Green Diamond's emphasis on research grew out of experience it accumulated in the redwood region

before the founding investors of HRC/MRC and Hawthorne were even timberland owners. HRC/MRC's "social forestry" was seeded by the Fishers' vision of building a profitable business that was also environmentally responsible, then amplified by the scrutiny— and at times outright hostility— the company encountered when it acquired depleted properties from two of the most maligned timberland owners in history of the industry on the North Coast. Hawthorne's plan-by-plan compliance strategy derives from the relationship between its institutional investor owner and TIMO manager.

Additionally, having a notorious environmental villain in the neighborhood (PALCO) influenced both Green Diamond and HRC/MRC's management strategies, but in quite different ways. The mistrust that MRC initially faced from its neighbors in Mendocino resonated nationally in part because the narrative of a rapacious capitalist clearcutting old growth forests was broadly familiar from activists' battles with PALCO further to the north; in contrast, the Regional Board's ugly dispute with PALCO after the Headwaters Agreement gave both the agency and Green Diamond an opportunity to rehabilitate their respective images through collaboration on ownership-wide permitting. These and other differences between the two family-owned firms illustrate that while ownership structure matters, it does not begin to tell the whole story of how firms prioritize regulatory and social license objectives and design and manage their environmental programs.

The Rise of Certification

Despite differences among individual firms' experiences and strategies, environmental management strategies in the redwood region have also converged in some significant ways. Since MRC blazed the trail to FSC certification, earning the group's sustainability seal slowly became a de facto requirement for large timber companies operating in the region. This is due in part to the image value of attaining certified status; once it was clear that certification was possible for large firms in the redwood region, the companies that did not obtain it ran the risk of being perceived as environmental laggards. Access to markets and infrastructure seem to have been a more important driver in the shift, however. For MRC/HRC, certification paved the way to relationships with big box retailers that have been a critical part of their success (Jani 2009; Walters 2015); as smaller distributors suffered, other timber companies in the region needed access to those markets, as well. They also needed access to mills, and being able to sell to certified or non-certified facilities gave them crucial options as the North Coast has continued to lose the infrastructure and businesses that support its timber economy. As argued in Chapter 2, extensive public regulation at the state and federal levels was not primarily to blame for the loss of mills and distribution capacity in the redwood region, but it has helped redwood timber companies gain certification by bringing the regulatory "floor" closer to the bar set by FSC. By making that bar easier to clear for all firms, public regulation has helped the redwood timber industry weather the U.S. forest products sector's shift to the South and the North Coast's

transition to a post-old growth economy.

Scale as a Solution to Policy Design Problems (Redux)

Green Diamond and HRC/MRC's environmental strategies are characterized by two additional and significant commonalities: Both companies have made large investments in their environmental programs, and those programs are characterized by planning and permitting at greater-than-THP scales (both spatially and temporally). That these two qualities coincide is not surprising: It is hard to envision watershed- and ownership-scale planning for complex goals, such as sediment source control and species protection, without extensive data collection, and long-term agreements necessitate negotiation; both of these things require significant investment of staff resources. Still, the point is salient in the context of the broader questions posed by this research about the persistence of natural resource industries under robust environmental regulatory regimes. Green Diamond and HRC/MRC have been able to secure their regulatory and social licenses because they can undertake environmental programs with high up-front costs. This would have been much more difficult for the former owners of these properties simply because they were publicly traded firms. Industry representatives stressed the importance of this difference in interviews. "A lot of those companies were very quarterly profit driven entities," one explained matter-of-factly, "If you're a publicly traded company, that is your measuring metric" (Interview #119). Free from the pressure to win over investors every three months, Green

Diamond and HRC/MRC have been able to make the investments necessary to manage their regulatory obligations efficiently— and, in HRC/MRC's case, demonstrate their environmental credentials to the public.

It is also important to note that the size of HRC/MRC and Green Diamond make these investments more affordable. For example, a smaller firm would have difficulty supporting the corps of biologists, geologists, and other specialists on Green Diamond's scientific staff, and as the Hawthorne employee noted above, vast acreages make it easier to provide conservation value and produce timber simultaneously. To the extent that environmental regulation drives a need for specialized personnel and conveys advantages to owners of the largest properties, it may be serving industry as Stigler (1971) originally predicted— by creating barriers to entry that privilege existing behemoths. On the other hand, the largest firms with the deepest pockets and the greatest economies of scale may become labs for policy innovation that serve smaller operations: If regulatory agencies can draw lessons from HRC/MRC and Green Diamond's programs— something which one Board of Forestry member claims is already happening (Interview #135)— it may help them distinguish between superfluous BMPs and those that are actually important for securing environmental outcomes.

Green Diamond and HRC/MRC's convergence on ownership- and watershed-scale planning is also notable in the context of prior chapters' conclusions about the design

of both the FPRs and water board timber policy. As mitigations of questionable efficacy have piled up in those essentially compliance-based regimes, it is hardly surprising that long-term permits covering large areas have become attractive to firms. This approach allows them avoid duplicative aspects of the THP, WDR, and LSA processes, but it also helps them lock in one set of rules for several years— no small benefit, since the FPRs in particular have become notorious for their frequent changes (Interview #131; Terzian et al. 1994; Thompson and Dicus 2005). At the same time, the shift to permitting at larger scales has been welcomed by some regulators and environmental groups for essentially the same reason that the Little Hoover Commission's indictment of the THP process resonated in so many subsequent reports and analyses: Planning water quality controls at the watershed scale, or conservation programs at the landscape scale, seems more in line with "ecology" than the alternative embodied by the default regulatory regime. The foregoing case studies provide some examples of how planning and permitting at broader scales may indeed facilitate better environmental outcomes, however, the foregoing chapters indicate that *how* an environmental regulatory program operates will be crucial to its success or failure irrespective of the scale at which it is applied. Importantly, Green Diamond's emphasis on monitoring would seem to provide the conditions for a more performance-based approach to meeting regulatory requirements, and the AHCP uses performance metrics as triggers for ongoing adjustments (Green Diamond Resource Company 2006, S-17). The HCP that HRC inherited from PALCO utilizes an adaptive management framework in several areas,

including aquatic species conservation, and commits the company to designing[27] and implementing monitoring programs for a variety of resources; both hillslope and instream monitoring are explicitly required (Pacific Lumber Company 1999 61-62; 69-70). However, it is still early days to judge the extent to which MRC's HCP and associated permits will facilitate a performance-oriented approach on that property; Green Diamond and HRC have released limited analyses of instream turbidity data— for one hydrologic year from one watercourse pursuant to a water board-ordered monitoring program, in Green Diamond's case, and for three hydrologic years in HRC's (Green Diamond Resource Company 2013; Humboldt Redwood Company 2015).

If these data are not used to modify the mitigations in the plans, large-scale, long-term planning may end up replaying the failures of regulation at the harvest plan level— namely, busywork for industry with poor environmental outcomes. Without rigorous, honest assessment of the information it yields, ownership-scale management will become another "building permit". In contrast to THPs, however, regulators and environmentalists will be stuck with the inadequacies these plans for terms measured in decades.

[27] The PALCO HCP was a component of the Headwaters Agreement— approved by a tenuous coalition at the very last minute before federal funds to acquire the eponymous grove of old growth trees would have expired (see, e.g., Clifford 1999). Consequently, the HCP was rushed to the finish line with "a lot of details… left in the air", according to a source from the federal wildlife agencies (Interview #123). A slight 158 pages in length— Green Diamond's AHCP is more than 550 *excluding* appendices— it reads in some places less like a conservation plan than an agreement to develop a conservation plan.

Conclusion

This chapter has examined both the evolution and substance of firm environmental management strategies in the redwood region, demonstrating that large companies have successfully used a variety of strategies to shoulder extensive regulations. Future research will be needed to document the environmental outcomes of these strategies, however. The extent to which findings are incorporated into management plans and accessibility of performance data to the public over time are both crucial to ensuring that they serve forest ecosystems as well as they serve the forest products industry.

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EPILOGUE

SEEING THE FOREST FOR THE TREES

This dissertation has told two stories— one about the transformation of natural resource industries in rural communities that have historically depended upon them; the other about how the design of environmental policy shapes its successes, its failures, and ultimately its legitimacy. The two are connected by a popular narrative that blames the diminution of these industries in the U.S. West on the rise of environmental regulation— and by the fact that the experience of the redwood timber industry on California's North Coast contradicts this narrative.

I argue that divestitures and a bankruptcy among the North Coast's major redwood timberland owners (as well as declines in overall board feet harvested and mill capacity in the region) were driven by the restructuring of the timber industry nationally, as large, integrated forest products firms relinquished their decades-long hold on vast swaths of industrial forest. Old growth depletion and industry re-centering in the U.S. South put timberlands on the Pacific Coast at an additional disadvantage. The emergence of a new cohort of large timberland owners in the redwood region— including one with a notable commitment to sustainable forestry— is an additional testament to the fact that natural resources development is often profitable enough to sustain extensive public regulation.

Extensiveness should not be mistaken for effectiveness, however. California's notoriously exhaustive Forest Practice Rules are equally notorious for yielding poor environmental outcomes, and I argue that this apparent paradox is a predictable consequence of policy design. The FPRs require compliance with best management practices for sediment pollution control— not control of sediment pollution; the Board of Forestry intentionally chose to impose numerous BMPs in the 1970s because industry opposed the alternative: A system that made firms' right to harvest contingent upon actual environmental conditions. Unlike the "compliance-based" approach enshrined in BMPs, "performance-based" regulation is threatening to industry because it places no limits on the universe of actions that a firm may be required to take (or, more to the point, not take) to maintain its right to engage in its fundamental income-generating activity. It is hardly surprising, then, that emphasis on compliance and relative neglect of performance is not uniquely a timber problem. It is also characteristic of U.S. pollution control policy as a whole— a system which, in the words of one environmental policy scholar, "commonly do[es] its level best to preserve, intact, the way we produce energy, use land, manufacture goods, build structures and move ourselves around— provided the worst abuses of power are mitigated, reduced, or contained" (Press 2015, 1). As this critique implies, the alternatives to compliance-based regulation run afoul of fundamental elements of industrial capitalism. This politics of policy design helps explain why water quality authorities, which operate under a statute that prioritizes ends over means, nonetheless struggled to make effective

policy for the timber industry after they were explicitly empowered to do so by the legislature and the courts in the 2000s.

As the FPRs and Regional Board requirements have proliferated, redwood timber firms are increasingly taking matters into their own hands. Significantly, since 2008, all of the major timberland owners in the region have been privately owned, and this structure facilitates large up-front investments in conservation and restoration planning. When these efforts form the basis for Habitat Conservation Plans under the federal Endangered Species Act, firms secure regulatory certainty in exchange for making their environmental commitments legally binding. HCPs typically incorporate elements of performance-based policy, such as thresholds that, if crossed, trigger more protective requirements, and research-level continuous turbidity monitoring systems on a subset of property streams.

Additionally— and not unimportantly— elements of firm culture at California's two largest redwood timber companies suggest that they will be inclined to take their environmental commitments seriously. Green Diamond's scientific staff includes biologists and ecologists who are excited to be able to test the efficacy of environmental safeguards at the landscape scale; sources at both Green Diamond and Hawthorne spoke about their companies' environmental management programs with evident pride. HRC/MRC has been committed to sustainability and transparency since MRC was

founded.

Clearly, much has changed in the redwood region since the "timber wars" of the 1990s, and these companies deserve real credit for changing the practice of industrial forestry there over the last fifteen years. However, it would be a mistake to imagine that firm initiatives can stand as a replacement for public policy that can be depended upon to protect water quality and ecosystems— and, ideally, to do so more cost-effectively than California timber policy has tended to in the past.

For one, firm culture may be an important determinant of environmental performance (see, e.g., Gunningham, Kagan, and Thornton 2003), but ownership change can transform values within a company quite dramatically. This notion should not be a hard sell on the North Coast; the saga of Pacific Lumber Company illustrates it poignantly. Under the leadership of the founding Murphy family, PALCO pioneered sustainable forestry and stewarded its labor force; as a subsidiary of Maxxam Corp., it was, as *Mother Jones* put it, "easily the most despised lumber company in America" (Harkinson 2008); when the Fisher family won the company in bankruptcy court, the treesitters descended and embraced the new leadership— literally. More recently, HRC/MRC raised hackles on the North Coast by importing two high-level executives from Sierra Pacific Industries— a company whose foresters environmentalists do not hug (Parrish 2015). These individuals' tenure has been marked by increasing reliance

on out-of-area contractors to handle forest operations, prompting one Mendocino County logger to complain to the local alternative press that the new leadership "was sent here for one reason – to cut throats" (Parrish 2015). While the company's current interest in lowering costs (attested to directly by another source, who asked to remain anonymous) is no liquidation logging campaign, it does serve as a reminder that changes less seismic than outright sale can have real impacts on a company's social (or environmental) commitments. While firm initiatives can do a world of good, only public policy will hold the next Hurwitz in check.

The research-centered management approach exemplified by Green Diamond is also vulnerable to economic imperatives. As discussed in Chapter 5, monitoring data are only as useful as the adjustments to management made in response to emergent trends— and adjustments to management are costly to firms, particularly when the required direction of adjustment is toward increased resource protection. The incentive structure here suggests that robust agency oversight will be needed to ensure that species conservation and water quality goals are being met, but the technical challenges of measuring sediment runoff from timber harvesting complicate this proposal. For example, even a well-maintained, research-caliber turbidity threshold sampling system is vulnerable to periodic outages, creating "gappy" datasets that require sophisticated statistical work to smooth. Scientists can find their way to very different conclusions about suspended sediment loads depending on the assumptions made in these analyses

(Interview #114; #115; #121). In light of these factors, how and when monitoring data are shared with agencies, and the availability of these data to a broader public, would appear to be an important link in the chain between performance monitoring and improved environmental outcomes.

In practice, however, availability of some monitoring data is limited or ambiguous. Green Diamond staff state that they intend to publish findings from their aquatic monitoring programs in peer-reviewed journals; encouragingly, the company's biologists have shared findings from their spotted owl program in this fashion (see, e.g., Diller and Thome 1999; Folliard, Reese, and Diller 2000; Hamm and Diller 2009). However, peer review does not guarantee that the conclusions of company studies are valid. The North Coast supports a large community of academic, government, and independent consulting scientists whose expertise is relevant to evaluating the downstream impacts of timber harvesting, some of whom work with industry regularly. Others, however, have considered collaborating with timber companies on particular projects, and ultimately declined to go forward because they objected to industry terms regarding experimental design and disclosure (Interview #114; #115).

Finally, it is important that assessments of water quality trends that emerge from private monitoring programs be made with full understanding of the limits of the data that are currently being collected. Since TTS systems are costly, most large timber

companies have them installed on a subset of their watersheds, and scientists and regulators who are familiar with these ownerships have noted that some firms selected particularly clean and/or geologically stable watersheds for more intensive monitoring (Interview #114).

The bottom line is that recent firm initiatives are promising, but they are not a panacea. As one long-time environmental activist put it— immediately after describing his respect for particular individuals with high-level positions in the timber industry— "They're still trying to get the cut out. That's their job" (Interview #122). In keeping with this observation, restrictions on rate of harvest are still anathema to the industry— and even to its undisputed environmental leader. In 2014, Region 1 staff included rate of harvest limitations in the draft TMDL for the highly impacted Elk River in southern Humboldt County; they were met with vigorous protest from the major landowner in the watershed— one Humboldt Redwood Company, where employees "think they can't live with" the restrictions. In the face of HRC's strong opposition, the Board balked; the TMDL is being revised (Interview #114; #115; #129; #131; NCRWQCB 2014).

Attempting to control the water quality outcomes of timber harvesting by restricting the amount of disturbance that can occur in the first place does not fall under the rubric of "performance-based regulation"; it is more in keeping with what is known in public policy as a dirty input limit (DIL). As defined by Driesen and Sinden (2009),

DILs are quantitative restrictions on inputs to a polluting process. In the timber context, the pollutant (dirt) exists in the environment in the absence of the activity that mobilizes it, so it is not an input that can be restricted in the traditional sense. If *disturbance* is considered as the input, however, it can certainly be limited. In this sense, rate of harvest limitations are arguably as close as one can come to a DIL in the forestry context, and both are significant because they present an opportunity to avoid the pitfalls of both performance- and compliance-based regulation: If disturbance (i.e., the dirty input) can be reliably and efficiently correlated with sediment runoff (i.e., environmental performance), regulators and industry can dodge the monitoring challenges imposed by performance-based regulation without entirely giving up on the question of how well pollution controls actually work. And in 2012, a Redwood National Park hydrologist found that recent rate of harvest was a strong predictor of turbidity rates for 28 stream segments in Humboldt and Mendocino Counties for which continuous turbidity data could be obtained (Klein, Lewis, and Buffleben 2012). This research garnered considerable attention on the North Coast, in part because it contradicted industry claims that ongoing sediment pollution in the region is mostly due to legacy sources, not modern forest practices; of course, the study also indicated that rate of harvest restrictions could go a long way toward redressing the shortcomings of the current, BMP-based regulatory system. However— and as experience with the Elk River TMDL suggests— if this instrument is still politically untouchable, California forest policy is unlikely to reap the benefits that may be derived from its use.

The situation in the Elk watershed also underscores a troubling aspect of the industry's long-standing aversion to performance-based regulation— and harvest rate limitations as an alternative thereto: The TMDL program ultimately requires apportioning the titular maximum pollutant load among upstream sources. If measuring sediment contributions instream is considered too technically difficult and costly to be done in most cases, and using rate of harvest as a proxy for sediment contribution is too controversial to consider, it is difficult to imagine how Section 303(d) of the federal Clean Water Act will ever be implemented to control sediment pollution in forested watersheds.

In summary, then, there remain serious impediments to effective firm-led water quality control programs for the North Coast redwood timber industry. And beneath these endeavors is a public regulatory system whose environmental efficacy is, at best, not well understood. In the last several years, the Board of Forestry has adopted new rule packages (most notably the 2009 Anadromous Salmonid Protection Rules and a 2013 road rules update that went into effect just this year) which many observers view as a major step forward, but the development of systems for the assessing the effectiveness of the FPRs lags behind the development of new BMPs. Two particular problems can be distinguished here: First, information is needed on whether the BMPs enshrined in the FPRs are generally effective in protecting water quality in California; second,

monitoring requirements are insufficient to indicate whether these measures— as actually deployed across a variety of landscape conditions, by timber companies with varying capacities and levels of environmental commitment— are doing an adequate job of preventing pollution from any given THP.

The good news for timber companies is that a real solution to the first of these problems can reduce the burden of proof on individual plans, and in 2012 the state of California took an important step toward making program-wide assessment a reality. In that year, Assembly Bill 1492 eliminated fees for all timber permits, imposing instead a 1% assessment on retail sales of wood products in the state. The monies collected from this tax will be used to fund traditional regulatory activities as well as the development of ecological performance measures to assess the outcomes of forest management statewide— a requirement of the new legislation.[1] To this end, the Board of Forestry established the Effectiveness Monitoring Committee (EMC), perhaps best understood as a continuation of the Monitoring Study Group— with a statutory mandate, a budget, and perhaps even more importantly, a direct feedback loop to the Board. The committee's explicit goal is to support the development of an adaptive forest management program for the state by scientifically evaluating the effectiveness of the FPRs (Board of Forestry 2013; Henly 2014).[2]

[1] The assessment was intended to provide more consistent support for review team agencies' timber programs by divorcing their budgets from the whims of the general fund.
[2] Both the adaptive management approach and the EMC are modeled on Washington's statewide HCP for timber operations (Board of Forestry 2013; Henly 2014).

The second problem will be more difficult to address, however, and there is an irony to this— in the fact that a variety of monitoring programs are now underway on the state's timberlands. Even continuous instream turbidity monitoring is not uncommon, and many of these programs are old enough now to have accumulated several years' worth of data (Coe 2009; Harris et al. 2007). The problem is not that the data do not exist; it is that they are not collected in a consistent fashion and their availability is usually contingent upon firm generosity, agency resources, and/or agency confidence that the data are theirs to share. One obvious recommendation would be for the legislature to require that agencies establish clear and legally binding rules— for Regional Board monitoring and reporting programs, CDFW consistency determinations, and Monitoring Study Group cooperative instream monitoring programs, e.g.— about data ownership *before* these agreements are made.

Paired with a well-designed, statewide scientific assessment of BMP effectiveness, data from existing continuous instream monitoring systems in forested watersheds would provide valuable information about the condition and trajectory of rivers and streams affected by timber harvesting in California— and help inform the refinement of the FPRs. In other words, making better use of existing monitoring programs would help address the first problem, but not the second: Because continuous instream turbidity monitoring is still not underway on all streams (let alone all reaches), such a system

would still *not* establish that *all* timber harvest plans are meeting water quality goals. THP-level safeguards must be strong enough— and, more to the point, smart enough— to identify the areas in which more caution (and, probably, less harvesting) will be necessary to protect beneficial uses of water. A systematic method of cumulative effects assessment that predicts the likelihood that a given THP will actually harm beneficial uses of water would allow regulators to identify and impose a DIL or additional monitoring requirements on high-risk operations— without dragging the rest of the industry along for what would surely be a costly ride. This is exactly what the University of California Committee on Cumulative Watershed Effects recommended nearly fifteen years ago (UCCWE 2001)— and it is not that far from the model of cumulative effects assessment adopted by the Forest Service nearly thirty years ago (U.S.D.A. Forest Service 1988; see also Martin 1989, 38-39; Reid 1993; 1998, 118). The technical and scientific tools to have been in our hands for a long time; the choice not to use them has been, and remains, political.

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Appendix

List of Interviews

Due to the sensitive and political nature of the information discussed in these interviews, minimal information is provided to protect the identities of individuals who were willing to speak on the record.

101	Legislative staff
102	State legislator
103	Agricultural industry
104a	Environmental activist
104b	Environmental activist
105	Environmental activist
106	Regional Board staff
107	Regional Board staff
108	Research scientist
109	Federal agency staff
110	Timber industry
111	Timber industry
112a	Regional Board member
112b	Regional Board member
113	Timber industry
114	Research scientist
115	Research scientist
116	Research scientist
117	Environmental activist
118	State legislator
119	Timber industry
120	Timber industry
121	Research scientist
122	Environmental activist
123	Federal agency staff
124	Research scientist
125	CDFW staff
126	Financial analyst
127	Financial analyst
128	Financial analyst
129	CALFIRE staff
130	Timber industry
131	Regional Board staff
132	Timber industry
133	Environmental activist
134	Timber industry
135	Board of Forestry
136	Downstream landowner
137	Legislative staff