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The Role of Law in Engineering "Natural" Disasters

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Abstract

What people perceive as "natural disasters" typically take place when extractive industries operate at levels high enough that the ecological systems from which they draw resources lose their ability to buffer transient shocks, whether of environmental or technological origin. Legal institutions whose purpose it is to prevent such disasters from taking place may in fact encourage them, insofar as they must also broker competing demands for greater access to resources. Legal institutions may adapt to ecological instability in the wake of such disasters, "learning" from the experience more or less successfully depending on the conditions under which the disaster takes place. This paper will develop these ideas in the context of a number of noteworthy disasters, including the sinking of the *Deepwater Horizon* in 2010.

Key words

Law; history; disasters; law and society; legal history; California; United States

Resumen

Lo que se percibe como "desastres naturales" suelen ocurrir cuando las industrias extractivas operan a niveles tan elevados que los sistemas ecológicos de los que extraen los recursos pierden su capacidad para amortiguar las sacudidas transitorias, sean éstas de origen ambiental o tecnológico. Las instituciones legales, cuya finalidad es prevenir que ocurran estos desastres, puede en realidad promoverlos, desde el momento en que tienen que negociar las demandas de las partes interesadas en obtener un mayor acceso a los recursos. Las instituciones

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legales pueden adaptarse a la inestabilidad ecológica como consecuencia de tales catástrofes, "aprendiendo" de la experiencia de forma más o menos exitosa, dependiendo de las condiciones bajo las que ocurre el desastre. Este artículo va a desarrollar estas ideas en el contexto de una serie de desastres destacados, entre ellos el hundimiento de la plataforma petrolífera *Deepwater Horizon* en 2010.

Palabras clave

Derecho; historia; desastres; derecho y sociedad; historia del derecho; California; Estados Unidos

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1. Introduction

The law takes particular interest in disasters, whether of the "environmental" or "technological" kind, because they involve society at large in a way that personal accidents or, indeed, trees falling in forests with no one to hear them do not. Lawrence Friedman and Joseph Thompson (2003, p. 251) noted that the distinction between man-made and "natural" disasters is an artificial one because what counts is the harm to people rather than the source: we reserve the term "disaster," moreover, for events so large as to require some kind of organized social response. Legal agencies concern themselves at different times with preventing disasters that might happen, with preparing for ones that seem certain to happen, with responding to them when they do happen and, finally, with assessing the effectiveness of whatever responses society makes to them once they have passed. Less obvious, perhaps, are situations in which legal agencies themselves contribute to conditions under which disasters (technological or natural) take place. The notion is a little odd because we usually think of the law as dedicated to the public good, however imperfectly. Still, if legal agencies – singly or collectively, inadvertently or by design – generate circumstances that precipitate catastrophe, the ways in which they do so might be worth investigating.

There is a well-developed literature that analyzes the ways in which the legal system *responds* to disasters, whether "natural" or anthropogenic. Friedman and Thomson (2003) compared different kinds of disasters, from the Johnstown Flood of 1889 to the attacks of September 11, 2001, to show how patterns of attributing causes to disasters and of government's willingness to relieve victims changed over time. Michele Landis (1999) analyzed the way in which the New Deal administration overcame political resistance to poor relief by rhetorically equating the Great Depression with a "natural" disaster for which unemployed workers and displaced farmers were not at fault. Fiona Haines (2009) showed how the socio-political contexts in which different disasters take place (in her case, an industrial accident, a financial collapse, and a series of terrorist attacks) can influence regulatory responses to them and, therefore, the system's relative ability to prevent similar incidents from taking place in the future. All of these studies pointed to the important influence that legal institutions and legal culture have over the ways in which society responds to disaster.

A related question is the role that legal agencies can play in permitting disasters to occur in the first place. The "disasters" in this group are usually though not necessarily of the technological kind. A report to the Governor of West Virginia on a deadly explosion at the Upper Big Branch coal mine in 2010 criticized the government agencies for their less-than-diligent oversight of the facility, but concluded that "responsibility for the explosion [lay] with the management" for its egregious disregard of worker safety (McAteer *et al*. 2001, p. 108). At the other end of the scale, the distinguished commission that analyzed the loss of the Space Shuttle *Columbia* ascribed blame for the loss to "the failure of NASA's organizational system" (Columbia Accident Investigation Board [CAIB] 2003, p. 195). NASA had failed to correct the institutional problems that had led to the *Challenger* disaster in 1986. Indeed, in her contribution to the *Columbia* report, the sociologist Diane Vaughan concluded that the *Challenger* accident had actually enhanced political pressures that had from the beginning encouraged NASA officials to discount known risks. At the same time, NASA had done nothing to reform long-standing practices by which the agency "normalized" potential risks over time so that "[a]nomalies that did not lead to catastrophic failure" became "valid engineering data that justified further flights," rather than drawing attention to potentially dangerous problems with the orbiters (CAIB 2003, 99-102, 195-197). The commission that investigated the *Deepwater Horizon* oil spill in 2010 analyzed its subject in similar terms: it cited the *Columbia* report to the effect that "complex systems almost always fail in complex ways" and went on to describe the interaction between the inherent complexity of the oil rig itself, British Petroleum's

notoriously risk-insensitive culture, and significant shortcomings in regulatory oversight of the enterprise (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling 2011, p. viii).

Insofar as law regulates the ways in which people develop natural resources, it plays a role in the collapse of ecological systems as much it does of mechanical ones. The Dust Bowl of the 1930s, for example, was as much a creature of public policy as it was of the cyclical droughts that have visited the Great Plains since long before people did. From public land law to military procurement, government at all levels had for nearly a century encouraged farmers to harness the Plains to high-yield agriculture, with the result that when drought did arrive it did incalculably more damage to nature and economy than it likely would have otherwise. "The Dust Bowl," wrote the environmental historian Donald Worster, "was the inevitable outcome of a culture that deliberately, self-consciously, set itself [the] task of dominating and exploiting the land for all it was worth." The disaster, Worster concluded, "came about because the culture was operating in precisely the way it was supposed to" (Worster 1979, p. 4). The legal historian J. Willard Hurst told a similar story of the nineteenth-century Wisconsin lumber industry, which cleared thirty million acres of timber in the space of a generation and left in its wake a depauperate waste of sand farms and cutover land (Hurst 1964). Hurst showed how people at all levels of the legal system – from judges and legislators to entrepreneurs and landowners – used law deliberately, inventing new institutions as they went and making new rules where necessary, to increase the flow of resources into the market: to "release creative economic energy," as Hurst (1956, p. 5) put it. Development trumped whatever normative obligations government might have had to manage the resources for long-term public benefit: "We would realize the greatest present production we could from the land," Hurst concluded, even if "this meant throwing away much that a broader future development could use" (Hurst 1956, p. 70).

Just as there is no such thing as a "natural" disaster in which people are not involved in some way (if only as casualties), there is no such thing as economic development without law: from common-law rights to property and contract to government-funded research and development to intensive environmental and safety regulation. This paper discusses three instances in which people used law and legal institutions to engineer natural disasters, however inadvertently, by intensifying the development of resources to the point where catastrophic failure became sooner or later inevitable. The examples – chosen for illustrative value rather than statistical significance – all come from the state of California, although they took place at different times and involved different resource industries. The first is the collapse of the California sardine fishery in the 1940s, which, in terms of sheer value lost, ranks as one of the great natural disasters in our history. The second concerns the Sacramento Valley floods of the late nineteenth century, which grew out of the interaction between law, gold mining, the hydrology of the Sierra Nevada, and changing weather patterns. The last and most recent took place along the Southern California coast in 2005 and had to do with interactions between weather, coastal geology, real estate, avocados, and water law. All three examples involved interactions between natural and economic forces, but in each case people used legal agencies and legal tools to drive those interactions to the point of catastrophe.

2. The California Sardine Fishery

My first story of engineered disaster concerns the fishery for sardine that developed off the coast of California early in the twentieth century and collapsed, spectacularly, in the years following World War II. At its peak in the 1930s, this was the most intensive fishery in the world and one of the few profitable industries in Depression-era California; its collapse is one of the great environmental calamities in the nation's history although its loss has not been much remarked, perhaps

because the sardine is an uncharismatic animal whose fate played out underwater. A fishery is a renewable resource, to be sure, and its relevance to petroleum exploration might not seem obvious at first glance. It is also true, for one thing, that this fishery was entirely a creature of fossil fuels: it became feasible only when gasoline engines became available for small boats and it grew into a major industry only when the energy-intensification of farming in the Midwest generated a demand for the fish as feed for livestock. More important, the sardine fishery became part of a complex, tightly-coupled, high-flux food system and succumbed to cascading failure once it grew beyond its capacity to buffer random fluctuations in its environment (Ueber and Macall 1992, McEvoy 1986).

The first decade of the twentieth century was an opportune time to fish sardine in California. Boats, workers and cannery gear had fallen idle as overfishing and mining pollution destroyed the once-bountiful Central Valley salmon fishery; gasoline engines became practical about the same time, as well, which made it possible to harvest a schooling fish like sardine in coastal waters. Oceanographic data indicate that the biological productivity of California coastal waters, which could vary significantly over time, was also very high at the time: fish were visibly abundant and, once people matched the right tools to the resource, easy to catch (Soutar and Isaacs 1969, Smith 1978). The problem was the limited market for canned sardine; even export markets in Asia could support only part of what the fishery could produce. Military procurement generated a substantial burst of demand during World War I, but disappeared as soon as the war was over. Chronic overproduction thus kept everyone in the industry teetering on the edge of bankruptcy almost from the beginning (McEvoy 1986).

One problem that limited the potential growth of an industrial fishery for sardine was the enormous volume of waste that canneries produced. California processors sold the waste to Chinese gardeners for use as fertilizer or, more typically, dumped it at sea. Pressed to remove water and oil and then dried, cannery waste was a high-value, easily transportable feedstock for animals, and the U. S. Department of Agriculture began promoting it for poultry and hogs during World War I (Turrentine 1915, Weber 1916, US Department of Agriculture [USDA] 1922). It caught on in California soon thereafter; canned fish for food rapidly became a sideline and fishmeal the industry's main product (Thompson 1919, Scofield 1921). Like sardine fishing, intensive hogs and poultry were new industries at the time, made possible by electric power for farms and gasoline trucks for distribution. Fishing, then, became coupled not only to the marine ecosystem and to the market for food but also to the gigantic, increasingly energy-intensive US food industry. As such it became impossible to regulate, the demand for industrial by-products overwhelming any influence that conservation officials, much less the fishery's ecology, might have had on management of the resource (McEvoy 1986, Ueber and MacCall 1992, Scofield 1938).

Sardine harvests grew in pace with energy-intensive agriculture until by the mid-thirties the fishery, now spread as far north as Vancouver, landed more than 700,000 metric tons each season. Biologists working for the State of California grew concerned about the size of the harvest; some recommended limiting the catch, perhaps to 250,000 tons, while others recommended prohibiting the reduction of whole fish to by products so as to insulate the stock from demand pressure (Greene 1927). Neither policy made much headway, particularly as agribusiness firms effectively resisted such efforts in the state legislature. Catches began to come up short in the late 1930s, as the harvest bumped up against the fishery's capacity to produce and as the favorable marine conditions of the turn of the century gave way to a less stable, less productive regime overall (Clark 1935, Murphy 1966).

Scientists had observed irregular fluctuations in the harvest since the beginning of the fishery; California had established a State Fisheries Laboratory in Los Angeles in

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1917. State scientists, whose responsibility it was to conserve the resource, pointed to overfishing as the likely cause and recommended both that the state impose limits on the catch and prohibit the reduction of whole fish to by products, so as to insulate the stock from demand pressure. Scientists working for the United States Bureau of Fisheries, who had better ties to the industry and no responsibility for conserving the fishery, traced the observed anomalies to "environmental" causes independent of fishing pressure (Radovich 1982, Clark and Marr 1955). Processors and their allies in agribusiness, meanwhile, made sure that the state biologists' increasingly urgent warnings about overfishing made no headway in the state legislature, whose responsibility it was actually to regulate commercial fishing. The result was a policy stalemate under which pressure on the stock continued unabated (McEvoy 1986).

The fishery collapsed suddenly, in a cascade, in the late 1940s. A few unfavorable seasons after 1945 wiped out several generations of new fish, while overharvesting stripped the population of the older fish that normally would buffer such shocks to the population. The stock began to decline steeply, first at its northern edges and steadily southward into its spawning area off the coast of southern California and Mexico. Boats and workers followed the stock southward until the entire fishery packed into the waters off Los Angeles; there they made short work of what remained of the harvest until by the mid-1960s sardine became statistically undetectable in California waters. Demand for fishmeal remained strong, however, and to meet it California sardine processors moved their plant and equipment to Peru, where by the early 1970s they had colonized, developed, and ultimately destroyed an even larger fishery for the biologically-similar Peruvian anchoveta. Research in the 1960s indicated that, while environmental fluctuations might have disrupted the sardine harvest temporarily, the enormous harvests of the thirties and forties so depressed the stock's natural resilience that collapse became inevitable (Murphy 1966, MacCall 1979, Radovich 1982).

Our knowledge of the complex relationships between fishing and environment continues to develop, although significant controversy persists. Some authors observe that populations of sardine-like fishes fluctuate both over wide geographical areas and far back into the geological record and discount the significance of fishing pressure (Baumgartner *et al*. 1992, Jacobson *et al*. 2001, Chavez *et al.* 2003). Others maintain that fishing pressure interacts with environmental change: some claim that exploited fish populations respond more dramatically to fluctuations in climatic conditions because harvesting alters the age composition and the geographic distribution of the target stock (Hseih 2005a, 2008, Anderson *et al*. 2008). In a similar vein, others argue that harvesting exerts a disproportionately larger impact on depleted fisheries, thus exacerbating their decline (Myers *et al*. 1995, Hutchings 2000, Shertzer and Prager 2007). These scientists urge a more precautionary approach to managing such fisheries (Hutchings 2001). Sardine stocks off the Pacific Coast of North America began to recover in the 1980s: fishing, which California had put under moratorium in 1967, began again under tight control by U.S. and Canadian agencies (Wolf 1992, Hill *et al*. 2007). Continued differences in scientific opinion notwithstanding, the sardine disaster seems to have triggered a shift in the regulatory regime, at least.

A sardine boat might not at first blush seem to belong in the same class of technology as a Space Shuttle or a deep-water oil rig. What they have in common, however, is that they all represent significant capital investments put to work in unstable, imperfectly knowable environments, subject to legal regimes that, in the last analysis, discounted environmental risk in favor of development. The sardine fishery was an integrated system made up of the ocean environment, agribusiness, and government: the system collapsed when random climatic disruption cascaded through it in ways that people foresaw only dimly but which the high intensity of the harvest, relative to the volatility of the resource, amplified to the level of disaster. Courts, legislatures, and administrative agencies charged with managing

the industry not only failed to prevent the collapse but hasted its coming, even if by default, by permitting the uncontrolled expansion of the harvest in spite of the economic waste and the scientific risk that it entailed. The fishery left a significantly damaged natural system in its wake. The last, ominous lesson of the sardine fishery is that it continued its campaign of destruction, sustained by prices that reached as high as a dollar each for what few fish anyone could find, until the business withered away entirely. Meaningful control over the industry, in this case, became possible only when there was no longer any capital invested in it.

3. The Sacramento Valley Floods

The same dynamics of intensive development, tight coupling to a volatile ecology, and catastrophic failure played out in the Sacramento Valley floods of the late nineteenth century. The floods, which struck the valley in the 1870s and 1880s, inundated cities, destroyed newly-developed farmland, and polluted fisheries as far away as San Francisco Bay. They triggered a significant change in California's political economy, as mining yielded its hegemony to agriculture. The immediate cause of the floods was excessive rainfall, to be sure, but what made a particular level of precipitation "excessive" in this case was the way in which the mining industry, using legal tools, had transformed the hydrology of the Central Valley in the decades after the Gold Rush of the late 1840s and early 1850s.

People who came to California to mine gold in the late 1840s and early 1850s encountered a climate that was on the whole stable and benign (U.S. National Oceanic and Atmospheric Administration [NOAA] 1988). There were a few very rainy seasons during the Gold Rush, and the geology of the Valley is such that floods are very common to the region; seasonal flooding was, indeed, the main source of the Valley's tremendous agricultural productivity (Thompson 1960). The floods did little damage during the first few years of Euro-American settlement because business activity in the region consisted mostly of placer mining and its supply, none of which required much in the way of construction or other capital investment. Working only with hand tools and the natural flow of the streambeds they prospected, placer miners displaced tons of gold-bearing rock through the 1850s but without causing a great deal of damage to the system. A significant flood in January 1862 washed a decades' worth of mining debris down into the Sacramento Valley and out into San Francisco Bay, flooding the new capital at Sacramento and covering what few riparian farms there were with a concrete-like mixture of sand, mud, and gravel known as "slickens", but the region seems to have recovered without too much trouble (Gilbert 1917). Miners had depleted most of the easy placer deposits by then, so that damage to the industry itself was negligible.

The mining industry was not yet finished with the Sierra, however. Because most of the Gold Rush took place during dry years, early California law concerned itself primarily with the problem of getting scarce water to the mines in the lower foothills. This required legal engineering as well as the civil kind: in 1855 the California Supreme Court ratified the miners' informal practice of appropriating rights to use water by diverting it from its natural course; thus inventing, for the benefit of miners, the system of water rights that would come to dominate the western half of the United States. The state legislature even authorized miners to exercise the power of eminent domain, allowing them to ditch across private land as they needed to deliver water to their works. In 1859 the state made appropriation rights transferable, which made it possible for corporations to accumulate water in the amounts needed for high-intensity mining (Pisani 1992, McCurdy 1976, Kelley 1959).

Appropriation and transferability made it possible for mining to enter a new and more destructive phase. So-called "hydraulic" mining collected great quantities of water under high pressure and washed entire hillsides of mud and gravel into placer

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sluices in order to get at what gold there was to be had (Kelley 1959). During the mostly dry years of the 1860s, hydraulic mines loaded millions of cubic yards of debris into the watercourses of the lower Sierra. Canyons that earlier would have contained floodwater and buffered its flow now had so much of the concrete-like debris in them "that a railroad track might be laid upon their beds for 75 miles or more", as one court put it. In 1884 the bed of the Sacramento River was in some places twenty feet higher than it had been in 1860. Towns like Marysville, where the riverbed rose above street level, had to protect themselves with ever-more complicated systems of dikes and sloughs. Mining, agriculture, and town life became tightly coupled to Sierra Nevada hydrology and correspondingly vulnerable to random perturbations in the flow of water.

The rains that came to the Sacramento Valley in 1875 and 1881 were unremarkable: at 24 and 26 inches, respectively, they were just over one standard deviation from the historical mean but far less than the 36 inches that fell in 1862, for example. So degraded was the Sacramento watershed's capacity to buffer floodwater, however, that the floods of '75 and '81 did far more damage than their larger precursors. Many more farmers and town dwellers occupied the Central Valley than in the 1860s, moreover, and the precarious stopgaps that they had built up to protect them from flooding were unequal to the task (Kelley 1959). In 1882 Edwards Woodruff, who had some 1,700 acres under wheat near Marysville, sued the largest of the Yuba River mines for nuisance. The permanent injunction that came down two years later, in *Woodruff v. North Bloomfield Gravel Mining Company*, ended the mining industry's hegemony over California business and politics.[1] The case now famously stands for the proposition that nuisance law shifts entitlements between competing economic interests in response to changes in their relative contributions to net social product.

Legal agencies played a crucial role in bringing hydraulic mining to an end, just as they had from the beginning created the industry, sustained its growth, and encouraged its socially destructive habits. Prior appropriation predominated in the Sierra, not because it was peculiarly adapted to the California environment but because it made large-scale corporate mining convenient and it enabled the mines to collect the ever-increasing volumes of water they needed to draw out what remained of the Sierra's gold. Mining debris flushed out of the Sacramento River system in a gigantic, slow-moving wave over the decades following the industry's demise (Gilbert 1917). In its place, though, California farms and cities re-engineered the Sacramento-San Joaquin system to a level of intensity higher than the most ambitious mining executive could have imagined. Today, indeed, there are few more tightly coupled, high-intensity, disaster-prone resource systems in the world than the Central Valley watershed (Reisner 1993, Glennon 2009).

4. La Conchita

My third exemplar is a relatively small one: a landslide that took place in the coastal Southern California town of La Conchita in 2005. The La Conchita slide left few traces behind it, except on the lives of people who lost homes or loved ones and in the pastiche of scars that mark the landscape behind the tiny beach town. It did not catalyze significant social change, as did the oil blowout that took place just up the coast at Santa Barbara in 1969. Nor did La Conchita enable regulatory reform by destroying the capital investments hitherto impeding it, as did the California sardine collapse of the 1950s. Despite the nationwide press coverage that attended it, the La Conchita slides ultimately generated little more than a handful of lawsuits and – despite their significance for the parties – despite their significance for the parties B not ones important enough to make anybody rethink the structure of property entitlements in that little neighborhood. What makes the story useful here is that, as in the other two cases, what turned ordinary events into disasters

[1] Woodruff v. North Bloomfield Gravel Mining Co., 18 F. 753 (C.C.Cal. 1884).

was people's insistence on getting in the way and staying there, using every available legal mechanism to do so.

There are two ways in which we can usefully consider the La Conchita slide, however. One is as a species of "normal accident", in the sense that the sociologist Charles Perrow (1984) used the term: the kind of catastrophic failure that seems to be endemic to highly-engineered, intensive technologies like nuclear reactors, offshore oil rigs, or the Space Shuttle. In this case, California's more-or-less integrated schemes for managing land and water use make up just the kind of high-flux, disaster-prone system that Perrow described, with the interesting difference that in this case legal agencies rather than technicians did the engineering. We can also think of the La Conchita slide as a control case, in which we can see the law working in its everyday capacity to allocate environmental risk. As such, La Conchita is an interesting study in the ways in which the law, in its workaday mode, uses abstract principles of property and tort to do that allocation. It offers a peek at what Willard Hurst called the "working principles" of our legal order: principles "defined and expressed primarily by action"; principles of law "not so much as it may appear to philosophers, but more as it ha[s] meaning for workaday people and [is] shaped by them to their wants and vision" (Hurst 1956, p. 5).

La Conchita is a little unincorporated area of maybe 160 houses on the coast below Santa Barbara, just across the Ventura County line. Anyone who has driven north from Los Angeles on the 101 freeway has passed by it, likely without noticing it. A Los Angeles Times article (Saillant 2008) described La Conchita as "a place where working people could find a little slice of coastal paradise – a haven for surfers, fishermen, construction workers, retirees and assorted oddballs." R.W. Jibson of the US Geological Service, on the other hand, marked La Conchita as one of the most unstable bits of real estate on the continent, packed as it is into an 800-foot wide strip between the highway and a 600-foot high, 35° bluff of porous marine sediment with an active seismic fault running across its face (Jibson 2005).

Developers first built houses on the parcel in 1924. Before then it belonged to the Southern Pacific Railroad, whose tracks run along the coast here. The SP had some buildings on the site, but after a landslide destroyed one of its trains and killed four of its workers in 1909 the railroad levelled the parcel and sold it off a few years later. What started out as a collection of weekend homes became a permanent community during the post-World War II southern California boom. The "surfers and oddballs" of La Conchita share their little slice of coastal paradise with the La Conchita Ranch Company, which in the mid-1970s began irrigating avocado and lemon trees at the top of the bluff, which had formerly been given over to lima beans and other dry-farmed crops. By the 1990s there were some 40,000 trees on the bluff (Johnson 1999, Kelley and Saillant 2005a, 2005b). The company had a permit from the California Coastal Commission to build the ranch, conditioned on its promise to implement a drainage and erosion-control plan that apparently never took form. Indeed, in the early 1980s the ranch apparently replaced its drip irrigation system with a more water-intensive one as the avocado trees planted in the 1970s reached maturity. The company restructured itself as a limited partnership in 1991, allegedly to insulate itself from liability for landslides (Polakovic 1998a, 1998b).

Rainy season along the Southern California Bight typically runs from October through May; records going back to the 1860s show a seasonal mean of a little more than 18 inches. January and February are the wettest months, averaging about four inches each per year (Santa Barbara Flood Control District 2012) In 1909, the year a slide killed four railroad workers, annual rainfall exceeded 36 inches. More than 15 inches fell in January of that year alone. The heaviest single month on record is January, 1995, which had almost 22 inches. In March of that year 600,000 tons of earth broke away from the bluff and destroyed nine houses.

2004-05 was another wet year, just under 37 inches in all; this was Santa Barbara's third-highest total on record. On January 10, after 15 days of moderate-to-heavy rain, part of the 1995 slide remobilized and slid down the bluff, in a few seconds as opposed to the several minutes that the 1995 slide had lasted. This time, the slide took 36 houses and 10 lives with it (Jibson 2005).

Rainstorms and unstable landscapes are nothing new in Southern California, although the South Coast has had more above-average rainy seasons in the last ten years than in any comparable period since World War I. The period from 1945-1975, on the other hand – the period during which Southern California experienced its most rapid development – was one of the calmest, driest climatic episodes in the region's history. Volatility is the norm here. Extreme volatility also characterizes the market for La Conchita real estate: houses whose assessed value had gone nearly to zero in the wake of the 1995 slide – as lenders and insurers refused to touch them – brought half a million dollars or more ten years later (Reed 1997, Garvey and Kelley 2005). Homeowners who might have left in the wake of 2005 slide reported that the size of their mortgages prevented them from taking advantages of federal relocation loans that were available to them.

Throughout, the law – legislatures, agencies, courts both state and federal – has worked assiduously to maintain the Southern California land market at high levels of flux, tightly coupled to ancillary systems for water supply, fire suppression, and so on. Legal agencies like the Coastal Commission and the State Department of Water Resources do their best to accommodate competing uses like housing and agriculture, favoring no one interest over another but allowing them all to generate as much wealth as possible. To keep the town operating after the 1995 slide, for example, Ventura County rebuilt the street that runs along the bottom of the bluff and put up a retaining wall to hold back debris from the slide. The county also secured waivers against future liability from people who owned homes in the slide area (Kelley and Saillant 2005a). For good measure the county declared La Conchita a "geological hazard area" and required homeowners to post "Enter at your own risk" signs on their buildings.

The courts, also, worked to accommodate competing claims to this ephemeral property in the wake of the '95 slide, fine-tuning the allocation of risk while allowing different uses to continue unimpeded as much as possible. La Conchita residents sued the ranch in 1996, alleging that its irrigation had caused the previous winter's slide. Most of the plaintiffs settled for undisclosed sums and waivers against future liability (Reed 1997). A few went to trial, wherein the Ventura County Superior Court found for the ranch on the ground that excessive rainfall, not irrigation runoff, had caused the slide.[2] The ranch's lawyer characterized the slide as "part of a natural geologic progression that had long plagued the area and the rest of the California coast"; "a continuation of a geological progression that had been ongoing for eons". "I feel bad for the people, but then again, I don't live under a 500-foot bluff, either" the lawyer told reporters. "It's a risk you take" (Polakovic 1998a, 1998b). The slide, as the Los Angeles Times paraphrased defendants' argument, "was a natural disaster –unfortunate, but no one's fault" (Alvarez 1999). Much of the testimony, then, consisted of experts advocating one side or the other of the question of "whether negligent irrigation practices or natural processes caused the disaster," as the Times characterized it (Polakovic 1998b, 1998c). Posing the question in this way – Nature or negligence – elided the causal significance of the ranch's activity in that particular environment, thus shifting risk onto the residents. The decision did, however, allow both residential and agricultural uses to continue unabated for the time being.

[2] Bateman v. La Conchita Ranch Co., Civ. No. 156906 (Superior Court, Ventura County); see also Federal Home Loan Mortgage Corp. V. La Conchita Ranch Co., 68 Cal. App. 4th 856, 80 Cal. Rptr. 2d 634 (Cal. App. Dept. Super. Ct. 1998.

A more likely explanation for the slide is that excessive rainfall and overwatering were jointly responsible for triggering the slide. It turns out that avocado trees require a great deal of water: the University of California Extension Service reports that it takes 36 acre-inches of water per acre per season to irrigate mature avocado trees; in only four years for which we have records has that much water fallen naturally onto that bluff (Takele *et al*. 2002). Irrigation, moreover, takes place during the growing season, which is normally dry. Geological Service photographs from September 2004 show clearly that the section of bluff that gave way six months later was already saturated with water, at the end of the dry season (Jibson 2005).

Victims of the 2005 slide sued again. They tried the case to a jury this time, but under a causal theory very different from the one that had lost in 1996: this time the 36 plaintiffs alleged that the ranch had negligently failed to provide adequate drainage from its property, without specifying whether it was rainwater or tailwater that had actually caused the slide. Plaintiffs won their verdict in August, 2008: under California's comparative-fault system, which allows juries to discount plaintiffs' awards to the extent that they contributed to the harm, the jury in Alvis *et al*. v. La Conchita Ranch split their verdicts more or less evenly between the ranch and individual plaintiffs. The jury held some plaintiffs who were landowners liable to their renters; at the same time the jury exonerated both the ranch manager and Ventura County.[3] Two months later defendants settled the case by turning over $5 million in insurance proceeds and the keys to the ranch (Saillant 2008, Hernandez 2008a).

Defendants did not suffer greatly in the outcome, inasmuch as the ranch had consistently lost money and the company had been trying, unsuccessfully, to sell it for the past 15 years. Defendant's attorney "wished the plaintiffs luck in trying to sell this piece of property," he said, because the place was uninsurable: "so to the extent that [defendants] were able to give this ranch to the plaintiffs with all those problems and walk away from future problems, they [defendants] are actually very happy" (Hernandez 2008b). The plaintiffs ultimately sold the ranch "as is" to a buyer from Carpenteria, another town just up the beach from La Conchita, for $2.5 million (Hernandez 2008c). The new owner continued to operate the ranch for citrus and avocado, although the Ventura County Star reported in 2010 that he had "done a lot to divert water from the landslide area, making it much safer" (Barlow 2010).

The La Conchita story lacks the moral punch of the California sardine collapse, much less that of the C*hallenger* or the *Deepwater Horizon* disasters. One thing that stands out, however, is the interesting role that private law – in this case the law of causation in tort – played in discounting the risks of land- and water use at La Conchita. The 1995 plaintiffs lost their case because they could not successfully argue that human forces interacted with "natural" ones to generate risk; the 2005 plaintiffs, for their part, won not by registering the fact of synergy on the legal system but by finessing the issue. That causal synergy seems to be hard to argue in court suggests a persistence in our law of the nature-culture dichotomy that lots of people have written about, long after we all know better. The practical effect of this difficulty seems to be to privilege developers who would off-load the environmental risk of their activities to the public at large. Where the sardine fishery died out and left something of a vacuum for regulation to fill in its wake, however, at this writing people are still using state water to flood the cliff at La Conchita.

[3] Alvis *et al*. v. La Conchita Ranch Co. Superior Court for Ventura County, Case No. CIV 238700 (filed August 19, 2008).

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5. Conclusion

The La Conchita landslide, then, was as much a legal artifact as it was a natural event. As in the other disasters catalogued here – the sardine collapse, the Marysville floods – otherwise unexceptional natural perturbations led to human misery when people intensified production from natural systems to the point where disaster became more or less inevitable. In each case people used law to sustain development at as high a level as possible: through research and development if need be, by rescue and rehabilitation at times, and always by adjusting a delicate balance between competing development interests. Sustaining production and profits that their highest possible levels was the job of the legal system: indeed, the measure of its commitment to liberty and progress.

Committed as our culture remains to economic individualism, our legal system does most of its pro-development work invisibly, much as it did in the nineteenth century, by adjusting the ground rules through which people do business. Even in the environmental area, those rules work best – we think – that most resemble speed limits and least interfere with the substantive choices that people make about how actually to use their property. Public efforts to balance human affairs with the natural order are a good bit clumsier. Government research responds better to interest groups in temporary crisis than it does either to economic rationality or to the long-term good of the community. Government provides rescue and rehabilitation to the victims of crisis, but only if the particular event qualifies as a disaster through some calculus of politics, empathy, and causal attribution. Others, if they get noticed at all, are left to their fate and private insurance. In its overt activity as well as in its more hidden, systemic role, our system works mainly to balance power by means of a steadily rising economy, even when increased output intensifies pressure on resources and couples their natural fluctuations more tightly to public risk.

Indeed, in our own day much government resource allocation takes the form of shifting burdens of risk: of accident, illness, unemployment, or natural calamity. Were nuclear utilities left to the private market for insurance, for example, they would likely be unable to operate: the industry exists only because federal law since 1957 has limited the utilities' total liability for nuclear accidents to a set amount ($12.6 billion since 2005) and assigns any liability above that to the government.[4]In the 1970s and 1980s the D. C. Circuit Court of Appeals allowed nuclear utilities to discount the risk of catastrophic accidents to zero because the utilities themselves deemed such accidents as so unlikely as to be immeasurable.[5] An even more subtle form of risk allocation, which may have contributed to the *Deepwater Horizon* disaster, was the Reagan Administration Council on Environmental Quality's decision, later upheld by the Supreme Court, to repeal its requirement that environmental impact statements discuss "worst-case" impacts of projects under review.[6] On a more local level, struggles over risk allocation between public and private agencies did much to determine the pattern of land use in La Conchita, California. The political scientist Jacob Hacker (2006) has argued that the systematic, downward transfer of risks of all kinds in the United States since the 1970s has amounted to a significant redistribution of wealth and power in the society as a whole.

The word "disaster", then, is a conventional term rather than a scientific one. It is easy enough to claim that people generally do not notice that the rain comes and goes, sea bluffs collapse, wildlife populations rise and fall unless they have investments at stake. It is a little more of a stretch to claim that development

[4] Energy Policy Act of 2005, PL-109-58, 42 U.S.C. §§2210 et seq.
[5] Carolina Environmental Study Group v. United States, 510 F.2d 796 (D.C.Cir. 1975); see also San Luis Obispo Mothers for Peace v. NRC, 751 F.2d 1287 (D.C.Dir.1984), *vacated in part,* 760 F.2d 1320 (D.C.Cir. 1985).
[6] 40 CFR 1502.22(b); see Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989).

intensifies natural events themselves, though there is good evidence that changes in harvesting pressure triggered the collapse of the California sardine, that hydraulic mining magnified the flood potential of rainfall in the Sierra, and that irrigation destabilized the bluff at La Conchita. Best hidden, perhaps, is the systematic role that law plays in creating these disasters at every level. The law, indeed, works hard to disguise its instrumental role, as it shifts burdens and benefits from hand to hand in the abstract generalities of individual rights and public welfare.

Natural disasters, so-called, take place when people, deliberately or no, build or invest themselves into situations in which otherwise ordinary natural events, like drought or flood, have catastrophic social consequences. All three of the catastrophes noted here – the collapse of the sardine fishery, the Sacramento Valley floods of the late nineteenth century, and the La Conchita landslide of 2005 – manifested themselves as "disasters" not because of any intrinsic quality of the natural forces that set them in motion but because people intensified their use of the resources to such a degree that random fluctuations in the environment cascaded disastrously through the tightly-coupled environment-economy system. Intensive development, in turn, was only possible because people used legal devices to overcome obstacles to growth and to shift the risks of enterprise onto future generations and society at large. Disasters are thus both social and environmental phenomena: They may be less an exogenous source of instability in human affairs than they are their manifestation and measure.

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