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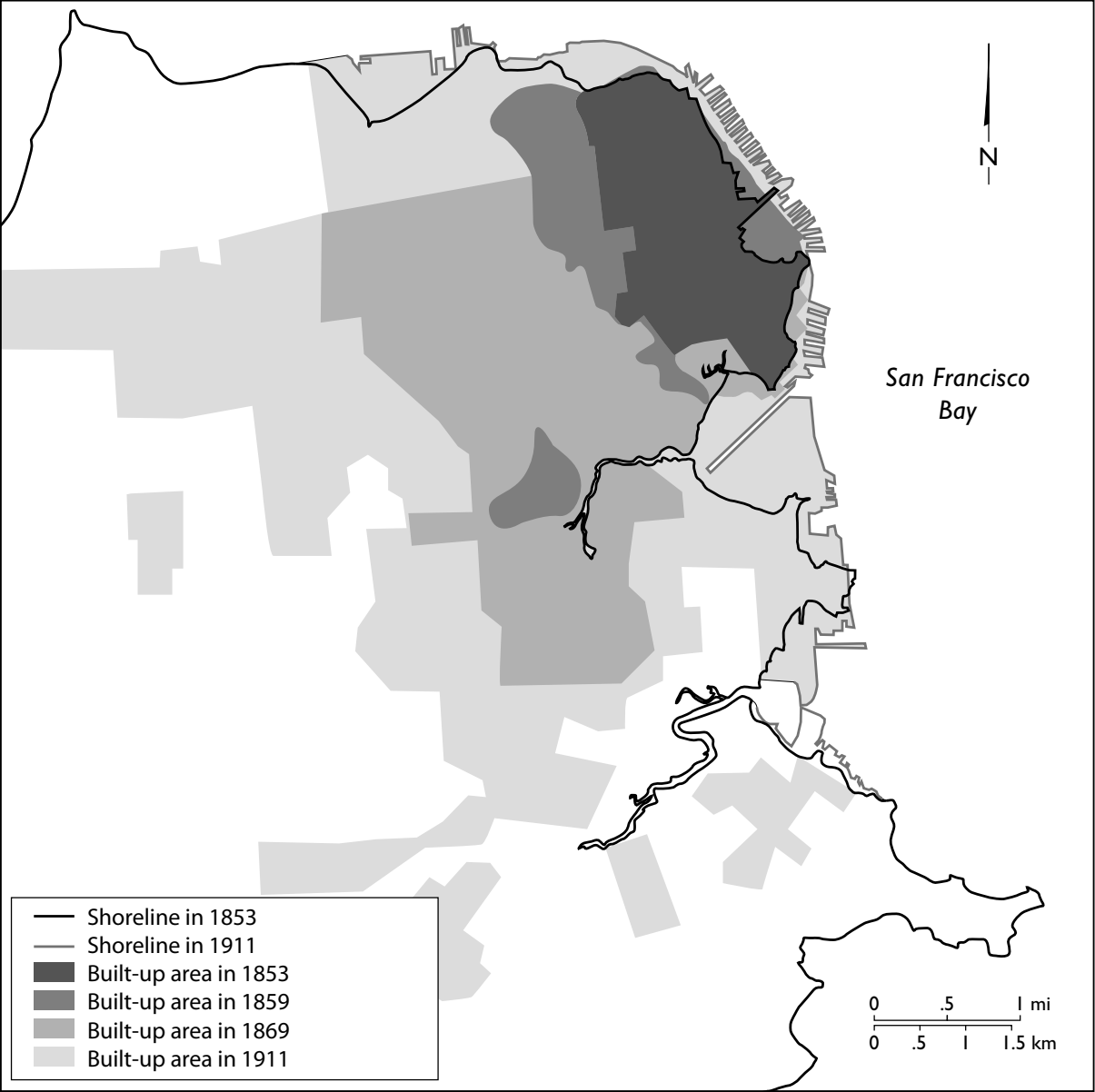
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Map 3. Bay fill and growth of San Francisco, 1853–1911.

## TWO Ghost Tidelands

A traveler walking south of San Francisco's Market Street on any summer or fall day in 1869 would have seen something both very odd to modern eyes and yet typical of that time. Men slowly rowed an open boat along the waterfront, pausing every few yards to record the depth of the water. On the beach, another group of men equipped with chains and poles traced the meanders of the shoreline, their boots squishing through sticky mud, spongy pickleweed, and knee-high cordgrass. Later, the data from the boat and the sketches from the shore were combined into a map. The map depicted the shoreline and bottom of San Francisco Bay, divided into perfect rectangular blocks broken by rights of way for streets. The map showed real estate where there was water and mud. These men worked for the state of California, and they were making property.<sup>1</sup>

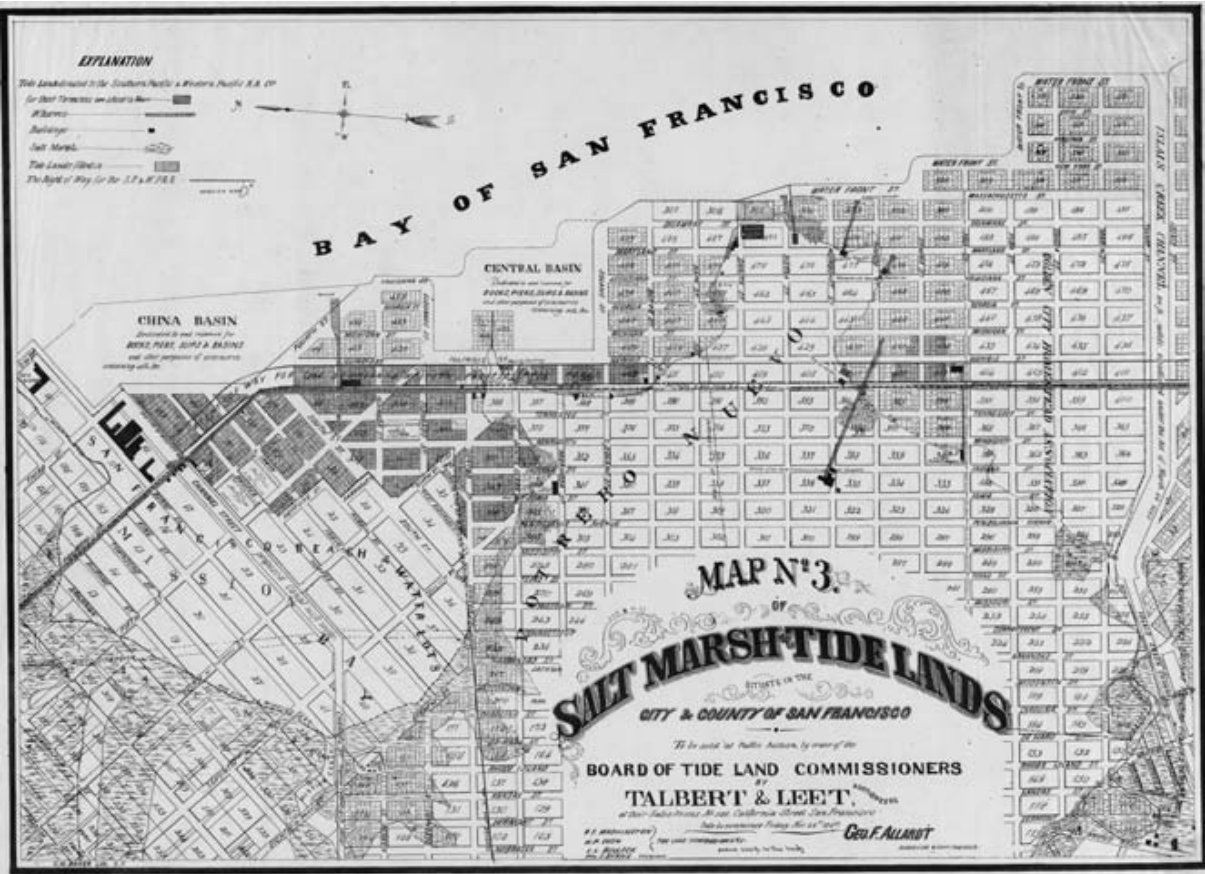


Figure 2. Nature made property. Tide Lands Commission, Map No. 3 of Salt Marsh & Tide Lands, 1869. David Rumsey Map Collection, [www.davidrumsey.com](http://www.davidrumsey.com).

The story of the surveyors and their map reminds us how the present often hides its past. We think of San Francisco as a city built on hills by the ocean. In fact, San Francisco was first built on muck and mud. Nineteenth-century San Franciscans built their city on the mudflats and salt marshes that once ringed the shoreline of its namesake bay. To build the city, they reshaped the bay’s tidelands both materially and legally. They transformed the land physically to make it more productive. But this quest had unintended consequences both for their time and for our own.

The making of San Francisco’s waterfront illustrates how Americans struggled with unstable nature and uncertain property as they made a nineteenth-century harbor city. Instability is a shared problem of both property law and natural habitats like tidelands. Uncertainty of legal title to property, like ever-changing landscapes, blocked the development of

American society toward the world of republican freeholders and commercial progress championed by Thomas Jefferson and Henry Clay. While these men found much to disagree about, they shared a fundamental vision of the United States as a nation built on improved land. The nineteenth-century American project was to improve the Western wilderness and to construct a productive society. But standing in the way were American society's own contradictions, including a common-law legal heritage sometimes at odds with progress, and a natural world whose rich and fecund landscapes were not yet adapted for human industry and commerce. Instability, whether in law or nature, was a problem for nineteenth-century Americans. The search for stability gave birth to some of the young nation's most influential and enduring institutions: the General Land Office (which surveyed and sold the public lands); the Department of Agriculture; the U.S. Coast Survey (which charted the nation's coasts for commerce); and the Army Corps of Engineers, which drained, dammed, diked, and dredged, improving nature for American commerce.

By 1847 large portions of the twenty-nine United States were already well on their way to stabilization. The states along the Atlantic coast seemed "built up" to many Americans. Land prices were high, and much of the usable farmland was already in production or had begun to lose its fertility due to decades of intensive agriculture. The question that consumed the nation was what to do with the new western territories recently taken from Indian nations, European empires, and the Republic of Mexico. Southerners and northerners alike agreed that these lands were integral to the future of the nation. In 1847 the western territories remained only partly settled and their future was uncertain. Most crucial was the fate of California. This massive Mexican province had just been seized by American soldiers and sailors in a war fabricated by an American president publicly and privately determined to possess the Pacific coast of North America. The Mexican-American War succeeded in making California into American property.

*Property* is one of those words, like *nature*, whose meaning at first seems straightforward, even obvious, but turns out to be complicated and untidy. Like many complicated and contested things in our time, the meaning of *property* is usually left to lawyers, not historians. Yet property

is not a timeless fact but a historical process, one that has significant influence on society and on the nonhuman world that society depends upon and interacts with. Property is neither easily constructed nor simple to wrest from changeable nature. In the modern United States, property in land—what we know as “real estate”—is the source and symbol of wealth, security, and stability. It is also the preeminent tool that Americans wield to organize and modify the world around them.<sup>2</sup>

*Private* is as complicated a word as *property*, and the joining of the two deserves discussion. Raymond Williams has traced the development of the English word *private* to the Latin verb *privare*, to bereave, a term later applied to members of separatist religious orders. This meaning is still echoed faintly in the English word *deprive*. By the sixteenth century, *private* had acquired a sense of secrecy, concealment, and privilege, a sense we associate with the word *exclusive*. This sense of privileged privacy was developed specifically in opposition to *public*, so that we speak of private education, private clubs, and private property. As Williams puts it, “Private . . . is a record of the legitimation of a bourgeois view of life; the ultimate generalized privilege . . . of abstraction and seclusion from others (the public), and lack of accountability to them.” In the modern period, *private* has become closely associated with individual freedom and personal independence.<sup>3</sup> This etymology is a reminder of the fluidity of words and the things they stand for. *Property* is no exception.

*Private property* is a paradox in that it is defined in opposition to but dependent upon the larger society. Securing private property requires two things. Individuals must recognize other people’s exclusive rights to property, and they must agree not to steal or damage it. Property is inherently public in that the community grants and enforces rights. It is a kind of grant from the public to individuals. Legal scholar Robert Ellickson points out that informal property agreements may be as common and certainly as effective as formal, legal agreements, precisely because whether formal or informal, property is only as private as the community is willing to permit.<sup>4</sup>

Effective ownership of private property also requires a cooperative natural landscape. A dynamic natural world must be made static. This is more difficult in some places than others, and San Francisco’s waterfront



was one of the more difficult places to make stable and secure. In the nineteenth century, few places in North America were more valued or more modified than San Francisco Bay's tidal margin. The tidelands, one of the most modified yet most productive environments in North America, also have one of the most complicated legal histories on the continent.

San Francisco Bay's edge was valuable because of its location and vulnerable because of its nature: part of the ocean and part of the continent, the mudflats and marshes could be made into water by dredging, or into land by filling. This was a landscape that, with effort, could be made into waterfront real estate or ship channels. In this sense it was a blank slate for Americans to write upon. Yet the tidelands also had a dense cultural history. Tidelands had been common property in English tradition and for more than a century American Englishmen had exercised commons rights to the salt marshes and tide flats of the Atlantic coast of North America. Law and custom marked these places as distinct. Now, in a newly conquered province, the law was not so clear. The tidal margin was as unstable legally as it was unruly physically.<sup>5</sup>

Tidelands were a unique legal space. Mexican law followed Spanish custom (in turn based on Roman practice) in declaring the area between high and low tide to be the sovereign property of the nation as a whole. Theory became practice in California when in 1835 Mexican official Francisco de Haro laid out a new pueblo on Yerba Buena Cove, the future eastern edge of the city of San Francisco. De Haro instructed the surveyor, naturalized Mexican citizen William Richardson, to reserve two hundred varas (yards) inland from the water's edge as the property of the federal government. The town of Yerba Buena began uphill from that line, and no individual could own or occupy the shore. As his surveyor's payment, Richardson took the lot closest to the water, but his property remained far from the water's edge.<sup>6</sup> Mexican insistence on the sovereign status of the shoreline meant that tidelands, unique among the lands near the bay, were not transferred into private hands in the frenzy of land grants. Instead they remained inviolable, intact, the property of the nation and therefore of no single individual.

Mexico was not alone in claiming tidelands by virtue of its sovereign status. In the early years of the American republic, jurists held that the

individual states inherited sovereignty from the British crown. The states were literally the people. Thus states rightfully possessed those lands formerly held by the king, most notably the beds of rivers and the tidelands of the ocean shore. American law differed from Mexican law in assigning sovereignty and therefore possession of tidelands to the states, not to the federal government. But seeming clarity vanished in the face of American occupation. What exactly was California's legal status between the de facto end of Mexican rule in 1846 and statehood in 1850? Did Mexican law remain in effect? Should officers of the U.S. government impose federal laws on the conquered province as if it were a federal territory? Or was California in fact a nascent state, with military officials merely guardians of its future lands? The temporary interregnum, the absence of a sovereign, confused the legal status of property. American officials in early California contributed to the legal confusion by acting in arbitrary ways, sometimes claiming authority under Mexican law and sometimes under U.S. law. Legal uncertainty was abetted by greedy and hasty city officials and real estate speculators in San Francisco who took advantage of the absence of state authority to sell as much of the tidelands as possible without regard for its legal status. The result was decades of conflict in the courts and on the waterfront between competing claimants.

The waterfront was also physically unstable. Superficially, the salt marsh and mudflats that made up the shoreline of the future city in 1846 were entirely wiped away within a few short years. First by constructing buildings on long wooden poles pounded into the mud, and later by filling in the bayshore with sand, garbage, and rubble and placing buildings on top, San Franciscans obliterated most evidence of the tidal landscape. Yet the material landscape was not gone; it was merely covered up. The domesticated surface hid an unstable and unreliable mix of water and mud.

#### CITY ON THE MARGIN

In building their city on tidelands, San Franciscans built on a peculiar part of the earth. At high tide, these lands are covered with water and appear to be part of the ocean. At low tide, they are exposed and thus



visibly land. Storm surges, deposition of eroded soils, and long-term sea level changes make defining tidelands even more complicated. They are fuzzy landscapes, hard to pin down. San Francisco Bay in the nineteenth century was wider, deeper, and far less defined than it is today. The edge between land and sea was blurred by vast tide flats that merged into salt marshes and brackish wetlands filled with reeds. Tidal channels wound far up into the land. Water was everywhere. In what is now the city of San Francisco, rocky points bracketed curving bays with sandy beaches, brackish lagoons, and wide swaths of salt marsh leading off into mudflats and finally deeper water.<sup>7</sup> This was a landscape in which sea graded into land almost imperceptibly. This extensive tidal shoreline contrasted starkly with the land above high tide. On shore, sand dunes marched down from the ocean, miles to the west. Strong winds kept the dunes in ceaseless motion, making the city site a land of shifting sands broken by occasional rocky heights. A worse place for a nineteenth-century city can scarcely be imagined.

But San Francisco offered other advantages, advantages so significant that they would give the tiny settlement a boost over its rivals and make it one of the great port cities of the nineteenth century. For those with vision, the shallow waters and tidal wetlands fronting on Yerba Buena Cove were filled with latent possibility. The tidelands could be made into real estate and that real estate would front on the West's greatest harbor. The problem was simply to fill in the water and create land. Nineteenth-century Americans believed that they not only could but also should remake complicated natural places into productive landscapes. Within a few years those who carried this vision would unrecognizably alter the Mexican town of 1846.

Placed at the junction between navigable rivers and the ocean highway, San Francisco became the port and hub of a waterborne transportation network that linked mines in the Sierra Nevada, farmers in the central valley, and investors and consumers in Asia, Europe, and Europe's overseas colonies. San Francisco Bay was merely one shore in a Pacific world, a littoral society that stretched from Chile to China, Alaska to Australia.<sup>8</sup> The great city had its humble beginnings as a depot in the trade that sent California cowhides on Boston ships to New England

workshops to be made into shoes for southern slaves. In 1835, when a young Harvard dropout named Richard Henry Dana visited the settlement on Yerba Buena Cove, it consisted of little more than a handful of ramshackle huts serving as storehouses.<sup>9</sup> Just one home was visible from the bay, that built by the expatriate English trader William Richardson and his Californio wife on their surveyor's lot. But the youthful Dana recognized the settlement's bright future. In 1841 his prediction was confirmed when the Hudson's Bay Company established its California warehouse at Yerba Buena Cove.

As late as 1844 only fifty people lived in Mexican Yerba Buena.<sup>10</sup> Fueled by the hide trade and whale processing and outfitting business, Yerba Buena became the only settlement on the Pacific coast where Americans outnumbered natives or citizens of other imperial powers. A year after the American seizure in 1847, the sleepy village was turbocharged by the rush to mine gold in the Sierra Nevada. The gold rush, remarked one of San Francisco's early historians, was exactly what the first generation of land speculators had hoped for and expected; it confirmed the merchants' wildest speculative dreams.<sup>11</sup> The key to all of this hoped-for wealth was the great harbor of San Francisco Bay. That harbor required a great deal of "improvement," in the language of the day, in order to support the city's economic dreams.

As every visitor from Captain Vancouver to Richard Henry Dana noticed, San Francisco Bay was magnificently suited to be the center of transportation and therefore of settlement in California. San Francisco Bay, alone among Pacific embayments, offered safe year-round moorage with access to the interior via the Sacramento and San Joaquin Rivers. Less obvious was which site within the bay would come to dominate the region's trade. Geographer Jay Vance argued that Yerba Buena Cove, the closest protected harbor to the open Pacific, was destined to become the warehouse for American California.<sup>12</sup> Vance noted Yerba Buena's geographical advantage, but he ignored the site's many disadvantages. Other fine port sites existed around the bay, and some, like the later cities of Vallejo and Oakland, seem like better choices than the windswept sand dunes at the Golden Gate. Both Vallejo and Oakland had better access to water, pasture, and firewood, and both enjoyed better weather.

Harbors on the continental side of the bay were better situated for the eventual terminus of a transcontinental railroad. Most of all, almost any other site around San Francisco Bay offered more and better buildable land than the pinched confines of Yerba Buena. But Yerba Buena possessed something that no other site had. At the time of the American takeover, of the possible harbor sites within the bay only Yerba Buena was a pueblo, a legal entity capable of granting land. Only at Yerba Buena, then, could American citizens buy and sell building lots. Beyond geography, property in land—real estate—helps explain this site's subsequent growth.

#### PUEBLO AND PORT

Yerba Buena, the settlement that would later be renamed San Francisco, was the northernmost pueblo or secular settlement in California. Pueblos were ancient Spanish legal entities possessing the legal right to grant land to citizens. A basically medieval construct, the pueblo retained large common areas for residents to graze cattle and to cut wood. The mayor (*alcalde*) and council were empowered to grant small town lots to full-time residents, but residents could not own multiple lots, were required to improve and live on their property, and were forbidden to sell their land; pueblo lots could only be inherited. The pueblo created great legal and social stability, but it restricted urban growth. While rancheros received enormous grants, thousand of acres in size, applicants within the pueblo of Yerba Buena received only small lots, typically either 138 or 275 feet square. These were spaces just large enough to contain a house or shop.<sup>13</sup>

Americans coveted San Francisco Bay as a great harbor in the Pacific for more than a decade before war brought California into the United States. In 1835 President Jackson ordered the head of the American delegation in Mexico to try to buy the port of San Francisco, reportedly for five million dollars. In 1842 Commodore Thomas ap Catesby Jones, believing war had broken out with Mexico, sailed into Monterey harbor, marched marines into town, raised the American flag, and claimed

possession of California before realizing his mistake. Mexicans were not amused.<sup>14</sup> President Polk made acquiring San Francisco a major aim of his presidency. At first he, too, sought to purchase Mexico's far-northern provinces, for as much as forty million dollars. But a month after war began in May 1846, Polk told his cabinet that he hoped to seize all of Mexico north of the twenty-sixth parallel, but that "in any event we must obtain Upper California." The American military in the form of a naval squadron arrived in Monterey in July 1846, just in time to annex California for the United States before internal rebellion led to an independent republic.<sup>15</sup>

In July 1846 American troops occupied Yerba Buena Cove, with its cluster of buildings used mostly by smugglers and inhabited by a few dozen deserters and sailors. When early in 1847 Captain Joseph Libbey Folsom proclaimed that the United States would establish its supply headquarters at Yerba Buena, not Monterey, the settlement received its first, critical federal aid. The historian John Hittell explained that the federal presence spurred commerce: "Although Monterey was still the political capital of the territory, and had twice or thrice as many people as San Francisco, the latter was the point where the enterprise and surplus money of the American population collected."<sup>16</sup>

During nearly three years of occupation, U.S. military commanders left Mexican laws substantially in place in California. The major exceptions had to do with harbors, commerce, and the ownership of waterfront property. Commodore John Drake Sloat's initial proclamation from the customs house at Monterey, in addition to declaring California a part of the United States, promised lower revenue charges in the port and an increase in the value of real estate. Sloat's successor posted a detailed list of customs charges and appointed customs inspectors, matters of urgent interest to commerce.

With the exception of customs, Mexican law continued to govern California between military conquest in 1846 and Mexico's cession of California to the United States in 1848. Indeed, until the new California legislature officially adopted English common law in 1850, Mexican laws continued to be the basic standards of the territory.<sup>17</sup> In San Francisco, swollen with newcomers from the United States, this created a peculiar

situation in which American civilians were ruled by American military officers acting under Mexican law that no one understood. Special agent T. Butler King reported to the U.S. secretary of state on this anomaly when he visited California early in 1849: "As our own laws, except for the collection of Revenue, the transmission of the mails, and establishment of post offices, had not been extended over that Territory, the Laws of Mexico . . . necessarily remained in force; yet, there was not a single volume containing those laws, as far as I know or believe, in the whole Territory, except, perhaps, in the Governor's office, at Monterey."<sup>18</sup>

King urged Congress to intervene, noting that the lack of consistent legal doctrine was particularly damaging to the development of the territory. King grimly reported that no one in California could be sure who owned what, since "the greatest confusion prevailed respecting titles of property." Because U.S. law was not in force, King wrote, "the sale of the Territory by Mexico to the United States had necessarily cut off or dissolved the laws regulating the granting or procuring of titles to land; and, as our land laws had not been extended over it, the people were compelled to receive such titles as were offered to them, without the means of ascertaining whether they were valid or not."<sup>19</sup>

The series of American military governors who controlled California from 1846 to statehood in 1850 might have directed local officials as to what legal standards to enforce. But the governors in fact changed their minds and applied whichever law seemed appropriate to meet their goals in each situation. As a result, the legal instability that so worried King continued to plague California's most important land titles, those to the tidelands of the growing port of San Francisco.

#### UNDERWATER LANDS

One particularly arbitrary decision serves as a case study in miniature for the legal transformation of the tidelands in the nineteenth and early twentieth centuries. In March 1847, General Stephen Watts Kearny, military governor of a conquered province of Mexico, granted tidelands belonging to the future state of California to the town of San Francisco.



More than a simple grant, Kearny's action was an assertion of control over land. It was a declaration of authority, and it had immediate and far-reaching material consequences. It was also the opening salvo of a war over control of the tidelands that has never really ended.

The American merchant community in the city attempted to gain this critical space shortly after Americans conquered the town in 1846. In October, three of Yerba Buena's prominent American merchants wrote to then-military governor Robert Stockton. The three merchants announced their intent to form a "Yerba Buena Wharf Company" to build the town's first commercial infrastructure. They requested that Stockton grant "a piece of land, fifty Yards wide, and extending out to the Channel, being at some convenient place, on the Sea Side of Montgomery Street," upon which the company could build its private wharf.<sup>20</sup> Stockton, however, rebuffed the attempt to grant waterfront lands to a private firm.

But in March 1847, powerful forces began to line up behind Yerba Buena. The steamer *Oregon* arrived, carrying a commission of army and navy officers who would select the sites of permanent forts and military warehouses in California. Federal money would flow to these places. They would become real and lasting, and those towns not chosen would wither. Hoping to sway their decision, the Yerba Buena town council changed the town's name to San Francisco, forever identifying their settlement with the famous bay. A contemporary observed: "These officers, after a most careful study of the whole subject, selected Mare Island for the navy yard, and Benicia for the storehouses and arsenals of the army. The Pacific Mail Steamship Company also selected Benicia as their depot. Thus was again revived the old struggle for supremacy of these two points as the site of the future city of the Pacific. Meantime, however, San Francisco had secured the name. About six hundred ships were anchored there without crews, and could not get away, *and there the city was, and had to be.*"<sup>21</sup>

Armed with this fact, San Francisco's merchants tried again, sending town *alcalde* Edwin Bryant to convince Stockton's successor, Stephen Kearny, to grant the city its "beach and water lots." The grant would give the cash-strapped community a financial foundation and provide

buildable property. Kearny made a point of doing very little as governor. His most important act would now be to grant, without precedent in American or Mexican law, all of the waterfront and tidelands lying in front of Yerba Buena Cove to the town of San Francisco. Kearny approved the sale on March 10, and it was announced on March 16, 1847. A few months later the town council of San Francisco, a Mexican city occupied by American troops, surveyed and sold 219 underwater lots belonging to the people of the future state of California.<sup>22</sup>

Kearny may have known that he lacked the authority to grant away the tidelands. It is possible that Bryant convinced the governor that the development of an American port in the Pacific—necessary for defense, as well as in the public interest—required private investment. Granting the waterfront to the town promised to accomplish several goals shared by Kearny and San Francisco's leading men: attracting immigrants, prompting improvement of the port, and heading off future squatters or litigation over the waterfront. But Kearny's action was at odds with his own and other military governors' policies toward public lands. In his official notice, published in the Monterey paper on March 16, 1847, Kearny claimed that his authority to grant San Francisco its waterfront and beaches came from the president of the United States, with himself as local representative. His grant renounced the United States's right to the tidelands. But Kearny must have known that the president of the United States had no claim to nor right to dispose of public lands. Congress disposed of federal lands. And he might have known that even Congress could not grant away tidelands, which were not federal land at all, but belonged to the future states.

Struggles over ownership of tidelands were central to American urban growth. In both New York City and Boston, filled tidelands formed the heart of the port districts and were among the cities' most valuable real estate. "Water lots," as New Yorkers called the tidal lands along their shore, were the city's most disputed and important public property in the eighteenth century.<sup>23</sup> Assumptions about ownership and even fill techniques in San Francisco were probably learned in these two great eastern port cities. In Boston, from the seventeenth century forward, private and municipal authorities "gained ground" by extending wharves

into shallow tidal waters and then filling in between the wharves with garbage, building debris, and other waste.<sup>24</sup> This precise method of filling in the bay to create buildable land was followed in San Francisco in the 1850s. Ownership of tidelands was uncertain, since they possessed certain characteristics of both sea and land. This liminality often led to disputes over ownership of tidal areas, particularly in lands won from nations with their own traditions of landownership. Americans wrestled with the disposition of public lands in new states taken from other nations. The states of Louisiana, Florida, Alabama, and Mississippi had all entered the union in the decades before California and had all witnessed contests over their tidelands.

The questions Kearny faced had recently been addressed by the United States's highest court. In 1845, following years of confusion over land titles in the new southeastern states, the U.S. Supreme Court heard a tidelands case. In *Pollard's Lessee v. Hagan*, the high court ruled that the federal government held tidelands in trust for future states; the federal government's only legal role in the tidelands was the right to safeguard navigation and regulate commerce. The United States, ruled the court, held no jurisdiction over tidelands, whether in existing states or in newly acquired territories. The court affirmed the "equal footing" doctrine: since the original thirteen states inherited their tidelands upon admission to the Union, new states should also own their tidelands.<sup>25</sup> By the clear decision of the Supreme Court, General Kearny's action was illegal under existing U.S. law.

Kearny's decision was also out of step with decisions by California's other military governors. Colonel Richard Mason, who took over from Kearny in May 1847, cited U.S. law in refusing to grant land to individuals. When James Marshall discovered gold at a mill site early in 1848, Marshall and his employer, John Sutter, sent an emissary to Mason. The two men asked Mason to apply Mexican mining law, which permitted discoverers of precious metals to own the land. But Mason refused them the title, saying that U.S. law permitted only Congress to grant titles to land in the territories.<sup>26</sup> Kearny himself had previously shown little respect for Mexican law. As conqueror of New Mexico in 1846, Kearny presided over the creation of a "Kearny Code" in which Mexican laws were

modified to conform to U.S. constitutional law and to the law of the model state of Missouri. Kearny rushed to declare New Mexico a territory of the United States, despite the fact that only a treaty with Mexico—which would not occur for more than two years—could transfer territory.<sup>27</sup>

Whatever Kearny's reasons, the sale of the water lots had a lasting impact. The sale led to the first modification of San Francisco Bay on a large scale and the expansion of the actual port and city of San Francisco. Within weeks of the sale in July 1847, men and machines went to work to pound pilings and dump sand and garbage into the mudflats. An 1849 map of San Francisco was outdated within a year because of the speed with which the city authorities surveyed and sold the land lying under Yerba Buena Cove. By 1850, all 444 lots surveyed three years previously had been filled. A second survey in 1850 platted another 328 lots, which sold immediately. These lots were as much as thirty-five feet underwater and already in use as anchoring grounds. Five more public sales took place before the new California legislature stepped in to stop the sales.<sup>28</sup>

There is nothing surprising about the frenzy of land speculation that gripped San Francisco after the U.S. takeover. Speculation, particularly in western lands, was a long-standing American tradition dating from the Atlantic colonies' break from Britain.<sup>29</sup> Foreigners and even some Californios speculated in land in Mexican California too. But those speculations were in farm or grazing land, not in urban real estate. They derived from a simple calculus that increasing population would drive prices of wheat and beef upward, and therefore also the value of productive farm or ranch land. What sets San Francisco's water lots apart from land speculations of the Mexican era was the commodity being valued. The water lots produced no wheat or cattle hides nor any saleable product. They returned nothing to those who might work on them, except perhaps some shellfish readily available anywhere on the bayshore. San Francisco's water lots were totally worthless in and of themselves. What made tidal frontage valuable, as speculators knew full well, was its *potential*. Water lots represented a new kind of productivity in California in which the value of land derived from its future use, not its present use. Speculators bought and sold a future vision in which the mudflats would



transform into waterfront real estate in the commercial capital of California.

Historian Bruno Fritzsche argues that *property* in the modern sense of the term—as a freely traded commodity whose value is based not on use but on the expectation of future demand—developed in San Francisco only after the American conquest. Fritzsche notes that during the eleven years that Yerba Buena was a Mexican pueblo, only a dozen real estate transactions occurred. There was no need to buy land when it was available for free. Under Mexican law, any Mexican citizen could apply for a grant of land from a pueblo in which he planned to reside. Up to 1846, only a few dozen citizens applied for building lots in Yerba Buena. The settlement was, after all, a fairly miserable place from the perspective of a grazing economy. The sixty-four applications for lots in Yerba Buena before 1846 were all granted, with the only payment a nominal fee.<sup>30</sup> This lackluster interest in Yerba Buena during the Mexican period contrasts sharply with the frenzy of the following year.

In the year and a half between the U.S. takeover in July 1846 and Mexico's cession of California by treaty in March 1848, San Francisco's city government sold 780 building lots. Many of these were sold and resold repeatedly during that period.<sup>31</sup> Bruno Fritzsche argues that many of these lots sold for little more than the original pueblo fee and therefore were not strictly speculative. Real speculation began with the survey and auction of underwater real estate during the summer of 1847. Between July and September, San Francisco's town government sold more than two hundred of these "beach and water lots" at public auction. These lots, comprising the most valuable waterfront real estate in western North America, became the focus of a raging speculative land market.<sup>32</sup>

San Francisco's path to wealth and power may have been clear to the merchant community in 1847, but it turned out to be slow going. Legal confusion plagued San Francisco's waterfront for decades, making the work of improving the harbor tedious. The confusion sown by Kearny's illegal grant was exacerbated by city officials who, between 1847 and 1850, sold the same water lots several times, sometimes innocently and sometimes, as in the case of Justice of the Peace G. Q. Colton, for personal gain.<sup>33</sup> The legal heritage of Kearny's illegal grant constantly dogged the



city's land sales. Because the water lots were under city control, but the state had never released its title, owning tidelands became a risky business encouraging speculation but discouraging long-term investment. Furthermore, as the city's most valuable properties, the tidelands were constantly under attack by San Francisco's many creditors. In 1851, Peter Smith, who was owed \$64,000 for caring for the city's indigent sick, won a judgment against the city. Smith's claim was a relatively trifling amount considering the great value of the remaining city properties, and the city was expected to raise the money easily by auctioning a few tideland lots. But when city officials bitterly and publicly stated that lands sold in this manner would have no legal title, only a few speculative buyers attended the auctions. Poor attendance kept bids low, and speculators bought for a song some of the most valuable city tideland properties remaining, including a six-hundred-foot strip along the outer waterfront. Eventually courts ruled that titles to the so-called "Peter Smith" sales were legal, and buyers resold the undervalued lots for huge profits.<sup>34</sup> Most of the city lots auctioned in 1851 had never been intended for sale. They were to be public spaces. The auctioned tidelands included rights of way for future streets and moorage space for vessels tied up at existing wharves.<sup>35</sup>

Contemporaries often remarked that real estate was both rewarding and risky in early San Francisco. William Tecumseh Sherman, later a Civil War general and commander of the U.S. Army, witnessed the city's speculative frenzy in his four-year career as a San Francisco banker. Sherman arrived in April 1853 in the midst of a real estate boom. His journey had been difficult, capped off by not one but two shipwrecks. Sherman's first sight of San Francisco came as he clung to the side of an overturned lumber schooner drifting through the Golden Gate. He recalled the moment in his memoirs: "Satisfied she could not sink, by reason of her cargo, I was not in the least alarmed, but thought two shipwrecks in one day was not a good beginning for a new, peaceful career." The shipwrecks were in fact good preparation for life as a San Francisco banker in the 1850s. "At the time of my arrival, San Francisco was on the top wave of speculation and prosperity," wrote Sherman. Speculators gladly borrowed money at high interest rates, plowing the money back into tidelands real estate in the booming city. As Sherman put it,

"Everybody seemed to be making money fast; the city was being rapidly extended and improved; people paid their three per cent a month interest without fail, and without deeming it excessive."<sup>36</sup> But the high tide of financial good times was regularly interrupted by panic when money flowed uncontrollably out of Sherman's bank. The young banker was left literally gasping for air with stress-related asthma. Real estate was volatile, and no one, least of all newly arrived Sherman, knew where the city's growth would go. The city paid scrip to fund projects to plank the streets and extend the wharves; the scrip became a favorite collateral for bank loans, enabling further speculation. When much of the scrip turned out to be forgeries, nervous depositors demanded cash and many banks failed. Sherman pulled out of San Francisco for good in 1858, after real estate prices plunged by more than 50 percent from 1853.<sup>37</sup> Later in life, Sherman remembered his time in speculation-mad California. Recalling his capture of Atlanta during the Civil War, Sherman wrote, "I can handle a hundred thousand men in battle, and take the City of the Sun, but am afraid to manage a lot in the swamp of San Francisco."<sup>38</sup>

It took nerves of steel to weather the vagaries of waterfront development in San Francisco. But for those who had the requisite patience and capital, the rewards were great. Creating a deepwater port city on the Pacific required improving the characteristics of Yerba Buena Cove as it existed in 1846. The goal was to have access to deep water yet have dry land to build upon. Options included building a beach levee, as was done in the area subsequently known as Leidesdorff Street;<sup>39</sup> suspending structures over the water on wooden pilings, as were many of the warehouses in the 1850s;<sup>40</sup> building on top of beached sailing ships, which became basements;<sup>41</sup> or filling in the marshes and mudflats with sand and earth, the eventual fate of the shallows of Yerba Buena Cove. Fill was the final answer to the need for access to deep water from stable, solid ground. Fill seemed to solve the problems of building a city on pilings over the water.

How much did San Francisco's tidelands matter to the city in 1851? The little settlement's first official survey, drawn in 1849 by William M. Eddy of the U.S. Navy, was dominated by a curving red line that showed the *former* shoreline of the city as it had been in 1847, before filling began.

Beyond the sinuous red line was a blocky, geometric line showing the extent of the surveyed water lots. San Francisco's leaders in 1851 understood that what mattered to those who might want a map of the city—potential investors, merchants, or future residents—was the city's waterfront, and the Red Line Map was a map of the city's future waterfront, its economic engine and most valuable real estate.<sup>42</sup>

By the 1850s San Francisco had become a humanized landscape, but the city remained inescapably tied to the natural world. Its location on the tide flats of San Francisco Bay gave access to the ocean highway and, once filled, provided the city with the large areas of water frontage that commerce demanded. Yet turning tidelands into the infrastructure of a city made San Francisco both profitable and dangerous for its inhabitants. Infectious diseases were a daily threat. San Francisco was a microbial breeding ground where sewers, if they functioned at all, discharged beneath the streets into the former bay edge, now deep within the advancing city. Even walking was perilous in a city built on stilts. San Francisco in 1851 was an uncommonly hazardous place for pedestrians. Numerous persons drowned after falling through the city's unfinished and treacherous plank streets and wharves. An unsuspecting walker might suddenly find the sidewalk giving way, or a sailor weaving drunkenly back to his ship would slip and plummet to his death through a gap in the planking.<sup>43</sup>

Many of those who came to San Francisco in these heady days described the odd town built over the bay margin. Among these was Mrs. D.B. Bates, a new arrival in April 1851. Mrs. Bates was terrified by the prospect of walking through the city's commercial district, with its unfinished plank streets doubling as wharves for ships. Describing the scene of her arrival years later, she recalled that "the interstices between some of these streets were not yet filled. I grow dizzy even now, thinking about it." Her first day in San Francisco included a terrifying walk above water. "In our haste to reach Happy Valley, and avoid, as far as lay in our power, those interminable sand-hills, it was proposed to cross one of those interstices on a hewn timber, which, at least, must have been nearly one hundred feet, and at a height of twelve feet, I should think, from the green slimy mud of the dock." Halfway across the forbidding gangway,

Bates found herself clinging to the plank for dear life. "After much crying on my part, and coaxing and scolding on the part of the gentleman, I succeeded in reaching the terminus of the timber. That was my introduction to the town of San Francisco in 1851."<sup>44</sup> Mrs. Bates's experience was a daily part of living in a city suspended in air above the soggy edge of the sea.

Property itself seemed as tenuous and insecure as sidewalks in early San Francisco. Bates arrived in San Francisco just before the destructive fires of 1851, when the planked streets and sidewalks burned along with most of the rest of San Francisco. Bates noted the destruction and loss of life, but she emphasized a curious thing: merchants seemed more concerned about the security of their immobile, rubble-strewn building lots than their piles of goods lying scattered about the streets. Early in the morning after the fire, she observed, some property owners "had already commenced fencing in their lots, although the smoldering ashes emitted an almost suffocating heat. These hasty proceedings were at that time expedient, to prevent their lots from being jumped; for these were the days of squatter memory, when possession was nine-tenths of the law."<sup>45</sup>

Bates saw that the fire of 1851 threatened not just movable property, but the essence of property itself: the control of useful space. To modern Americans this seems improbable, even bizarre. How can real estate be made insecure? Isn't it by definition permanent, unchangeable, real? In fact, both land and its meaning in nineteenth-century San Francisco changed dramatically between 1851 and the end of the century. The landscape was transformed as grading smoothed the steep hills, and the city grew bayward as soil taken from the hills filled the waters of its neighboring bay. What had once been uncertain, even communal, space—the tidelands fronting Yerba Buena Cove—became speculative real estate and ultimately the heart of the American West's most powerful city.

The paradox of this construction was that while title to the tidelands became more certain, these lands gained legal stability but not physical stability. As Bates had noticed, the filled tidelands sprouted impressive and solid-looking structures. But appearances were deceptive. The new



buildings sat on a thin layer of sand and garbage dumped onto the mud and marsh grasses of the bay edge. Over time, buildings settled and listed. Beneath the fill the earth was made of as much water as soil and was prone to liquefaction, a process by which soil particles consolidate and water floats upward.<sup>46</sup>

The fire of May 1851 marked the fourth time in just eighteen months that California's largest city lay in ashes. Yet as the editor of San Francisco's *Daily Alta California* predicted, the city's favored location, with its access to trade and oceanic shipping, would cause the city to rise again.<sup>47</sup> It would also burn again. The rising and the burning were related. Each time the city was rebuilt it would extend its control further over the tidelands, and each time it was destroyed, the tidelands were part of the reason for the destruction.

Wooden San Francisco, resting on pilings driven into the bay, was also vulnerable to voracious burrowing marine animals. Collectively called "shipworms" by nineteenth-century English speakers, these animals were in fact not worms at all but rather several species of mollusks.<sup>48</sup> The shipworms burrowed into pilings and weakened the wharves. In 1856, the *San Francisco Daily Herald* despaired that the wooden waterfront was rapidly being eaten to bits: "The dilapidated condition of the lower part of the city is known to every dweller within the corporation limits. Man-traps everywhere abound, and a general caving in cannot by any means be regarded as an impossibility. The worms have hastened the work of destruction. The piles in every part of the city which formerly was under water, have been completely honey-combed by these indefatigable insects, and so extensive has been the work of destruction, that it is a wonder that a general caving in has not occurred before now."<sup>49</sup> Shipworms menaced the daily workings of the city by consuming its structures nearly imperceptibly, burrowing from within. Their menace was invisible and slow moving, and it required constant maintenance.

Another even more terrifying kind of danger threatened suddenly to obliterate the wooden city. When San Franciscans built streets on top of wooden pilings, they erected supremely combustible structures that functioned like wind tunnels. Flames were fed by oxygen sucked in from below the streets, and the very streets themselves were flammable. The



effect was something like a sideways chimney with a combustible flue. This wood and brick city built over water was prone to catastrophe. Fires in 1848, 1849, 1850, and 1851 collectively did more than sixteen million dollars in damage and forced the continual rebuilding of the city. The worst of these was the conflagration that swept the city in May 1851.

On May 4, the sun rose through clouds of black smoke billowing from the city of San Francisco. Smoke from the burning city was so dense that residents could not see the waterfront from five blocks away, yet others claimed to see the reflection from the towering flames in Monterey harbor, nearly one hundred miles to the south. Pushed eastward by a powerful wind, fires swept through tightly packed canvas tents, wooden warehouses, shops, and banks, jumping from one flammable structure to another, heading for the bay. Fire consumed stacks of goods recently unloaded onto the wharves, and sparks showered over the ships anchored offshore. Heat radiated from the elevated wooden sidewalks and plank streets as they burned and collapsed. Hundreds of people, awakened from sleep by the roar of the fire, fled in their nightclothes. Although handicapped by lack of water and equipment, volunteer firefighters managed to keep the fire from burning uphill past Dupont Street, but they could not protect the more densely built waterfront and business districts. The fires burned all night. By 5:00 A.M., when a reporter for the city's surviving newspaper described the spreading blaze, the conflagration had already consumed a thousand buildings and killed at least seven persons. "It is sufficient to say that more than three-fourths of the business part of the city is nothing but smoldering cinders," the reporter wrote, listing as casualties the U.S. Custom House, the Wells Fargo building, all of the city's newspapers save his own, and nearly all the banks in the city.<sup>50</sup>

The next day, May 5, 1851, chaos ruled. Over eighteen city blocks had been entirely destroyed, five or six more blocks partially so. Charred and smoking planks poked from heaps of rubble. Unidentifiable bits of twisted and melted iron lay among the ashes. Disconsolate shopkeepers, suddenly homeless laborers, and ruined bankers all sifted through the ruins for some residue of their property. Streets and public squares were nearly blocked by heaps of furniture rescued from burning buildings.

Open spaces were jammed with piles of merchandise saved from the doomed warehouses along the water's edge. The all-important waterfront was badly damaged. Looking eastward from San Francisco's social and financial center at Portsmouth Plaza, one saw thousands of charred stumps marching out into the waters of the bay—all that remained of the Pacific West's great commercial and port city. The very tip of the city's longest wharf perched on its unburned pilings, separated by ash-strewn waters from the devastated city.<sup>51</sup>

The destructive fires helped accelerate the transformation of a city built on stilts to one built on fill. San Francisco moved from being largely a city of wooden planked streets and one- or two-story wooden warehouses and rooming houses suspended on pilings over the bay's edge to one built on filled water lots on apparently more solid foundations. The fire created land for the new city by producing a vast quantity of garbage and rubble to fill the bay.<sup>52</sup> The process of filling in the bay had begun even before the fire, in the areas closest to land, and usually in the rights of way set aside for streets. Rights of way became piers. Buildings covered piers, and then streets were filled up to the level of the buildings resting on piles around them. The *Daily Alta California* commented favorably on the trend in April 1851, mentioning another benefit of the process: "FILLING IN.—Sansome Street, between Jackson and Washington Street, is being filled in with stones and earth. This is a much better plan than piling and planking, as it entirely destroys the disagreeable smell which rises from the flats at low tide."<sup>53</sup>

Fill came from rubble and garbage, but the major source remained the sand that blanketed the peninsula. The shifting sand dunes, impossible to build on and source of the blinding sandstorms that daily scoured the city, turned out to be a nearly inexhaustible material for filling the mudflats and shallows of the bay edge. Getting the sand to water's edge was the hard part. The possibility of profit spurred great effort. The first railroad in California, brought in by ship and reassembled in San Francisco, ran on temporary rails from the retreating sand hills to the expanding waterfront. The *Elephant*, the West's first steam shovel, tore down the sand hills as it loaded carloads of dune sand to fill the mudflats and shallows.<sup>54</sup> Remembering his first view of the city, one writer recalled the

shovel in action in 1864: "A little beyond, at the corner of Third Street, is a huge hill of sand covering the present site of Claus Spreckels Building, upon which a steam-paddy is at work loading flat steam cars that run Mission-ward." As the steam shovel excavated new building spaces in the dunes it simultaneously "made ground" from marshes.<sup>55</sup>

California philosopher and historian Josiah Royce noted that fill was a part of daily life in San Francisco throughout the nineteenth century. "Scurrying rail-cars" toted loads of sand to fill in the water lots. Royce thoroughly approved this remaking of the city's shoreline: "The city meanwhile transformed the appearance of its most important parts by rapidly carrying on the work of extending its water-front towards deep water, through the filling in of the old Yerba Buena Cove. This was done by carrying sand over temporary tracks, in cars drawn by small engines. . . . From the 'Happy Valley,' which lay to the south, the railway track, in July 1851, ran along Market and Battery streets, transporting the sand to the rapidly filling water-lots."<sup>56</sup> California's first railroad carried sand, not passengers or freight. It accomplished two tasks at the same time: filling up the unstable tidelands while removing the unstable dunes. Fill seemed a perfect solution to the problem of making land for real estate while avoiding the hazards of the wooden city built on stilts.

But San Franciscans soon discovered that making land from the bay created new problems. As heavy brick and stone buildings pressed down on the newly filled marshes and mudflats, they compressed the soft soils and depressed the level of the streets. Sags in the street could be temporarily remedied by simply adding more sand to the surface, but the buildings also pressed down on the bay mud beneath the city front. This mud squeezed away from the advancing city like toothpaste from a tube, creating a submarine wave of mud that slowly pushed out into the bay. The mud wave filled up the spaces between piers and filled in the deep-water approaches to San Francisco. This aggravated another threat to navigation. Bay currents deposited sediments against the web of wooden pilings that supported the city's wharves. The pilings acted as a kind of net, trapping the sand that shifted constantly with the current along the bay bottom. Ships began to run aground just offshore, beyond the reach of the wharves. Engineers and water lot owners argued about how best

to solve the problem, with some advocating a bulkhead, a solid stone jetty that would create a kind of retaining wall that would protect the city, on the one hand, and prevent mud from leaving, on the other. The bulkhead, or seawall, as it came to be known, would fix the unstable edge of the city and preserve the city's natural advantages, its waterfront real estate and its access to the ocean highway. Inside the wall would be dry land, a space for work and rest. Outside would be water, safely banished. Human labor and engineering facilitated the exchange of goods across the filled tidelands. The seawall would maintain the city's control over the shoreline.<sup>57</sup>

#### HOLDING BACK THE BAY

The new seawall fit easily into the established pattern of scraping San Francisco's sand hills and dumping them into the bay. Transportation of stone and sand was easiest and cheapest if the materials were taken from nearby. When the municipality graded new streets in the sand dunes or flattened the hills of the city, the displaced sand and rock provided abundant fill material. In the early years this displaced matter helped fill in Yerba Buena Cove, San Francisco's downtown core. Later, the seawall too became a major consumer of material from San Francisco and from islands around the bay. As the city expanded, it became more difficult to extract fill material from an already densely built-up city. Telegraph Hill, one of the few sources of stone close to the waterfront, was a favorite quarry site. In 1885 the state labor commissioner noted \$30,000 in damage to homes and property from quarrying on Sansome Street between Filbert and Green. "Property owners, in fear of their lives, were driven from their little homes and firesides," he wrote, due to "the blasting and tearing down of said Telegraph Hill." The seawall contractors defended their right to take stone from the hill, citing an 1884 city resolution granting them material excavated during construction of several streets on the hill. William English, the subcontractor for the project, reported that his men had blasted the hill down by between 110 and 150 feet. The dynamite demolished homes and workshops to get at the underlying rock.



California's state labor commissioner condemned the contractors for "taking poor peoples' property, without compensation, driving and carting it down to and dumping it into the Bay of San Francisco." The investigator observed that constructing the seawall benefited the public—indeed, it made an unusable part of the bay into solid land—but this benefit came at the expense of great suffering by a few property owners.<sup>58</sup>

In 1878 San Franciscans completed the first section of the seawall that they fervently but incorrectly hoped would forever settle the tidelands issue. That same year the city's Pioneers Club published the first comprehensive history of their town. In his *A History of the City of San Francisco*, which he subtitled "and Incidentally of the State of California," John Hittell lauded the contributions of individuals and families in transforming a desolate, sandy peninsula into a vibrant and powerful city whose story overshadowed that of the rest of the state. Dedicated to the American merchant pioneers of the town, Hittell's book singled out the community's ongoing domination of its shoreline as the key to its success. The seawall was only the latest in a string of efforts to beat back the tide and convert the tidelands into real property. In Hittell's telling this was a story of triumph, leavened only by his castigation of a speculative impulse—a tendency toward avarice—among the citizens of the city.<sup>59</sup>

But Hittell neglected the real costs of the remaking of the waterfront, both in terms of a simplified landscape of power and wealth and also in terms of the lost ecological complexity that ultimately undergirded all human presence in the region. Most of all, Hittell missed the point that Americans, like the earlier Ohlones and Mexicans, depended on what nature provided. The tidelands directed human settlement in San Francisco as surely as location and legal accessibility made it the destination of Americans in the first place. San Franciscans did not dominate tidelands, as Hittell claimed, but instead displaced them. Americans constantly destroyed real intertidal wetlands, but the new waterline retained the tidelands' role as the edge between land and sea. Though transformed, the waterfront remained a transitional place between the terrestrial and oceanic realms.<sup>60</sup> And in human terms it was still a place of labor, where people worked and in working gained their livelihood.



The tidelands offered a kind of devil's bargain to nineteenth-century San Francisco. In 1864, a perceptive American wrote that his countrymen, having gained control over the forests and valleys of the entire continent, would next seek to exercise their dominion over the "unstable waters" as well. George Perkins Marsh gave as an example Venice, the ancient city on the marshes, forever struggling to stay above the waves. But Marsh's reference to Venice exemplifies the promise and peril that San Francisco Bay's tidelands held for Californians. On the one hand, the bay shallows offered potential real estate and access to deep water that allowed a small and scruffy village to imagine itself as a new Venice of the Pacific Ocean. The tidelands could make San Francisco into a great port city and center of commerce. On the other hand, the tidelands were "unstable waters" indeed. Filling in the bay created new perils for San Francisco.

San Franciscans, like all city dwellers, continually replaced old buildings with new ones. This process of tearing down to build up was particularly dramatic in the nineteenth century, when private developers and city officials alike saw the city's landforms as a blank canvas upon which to paint their city. San Francisco's sand dunes, rocky eminences, and marshy shores resembled the city walls that graffiti artists constantly repaint today. Temporary buildings spotted the few flat areas during the gold rush but were quickly razed by fire or by more ambitious construction. The city extended roads and building blocks through its high places more slowly. Rincon Hill, in the 1860s the fashionable home to bankers and political figures, was partially leveled in the following decades, its rock carted away to fill the bay. By the 1880s the area around the flattened hill had shifted to working-class residences.<sup>61</sup>

By the turn of the twentieth century, San Francisco's waterfront finally appeared legally secure and physically stable. Decades of lawsuits, state and federal legislation, and acrimonious public debate ensued before ownership of the waterfront was finally resolved. The material waterfront had been no less difficult to construct. In 1906, the seawall was already the single most expensive engineering construction in California history, and still a dozen years from completion. Decades of fill had been required to make the former tidelands and shallows the sites of buildings

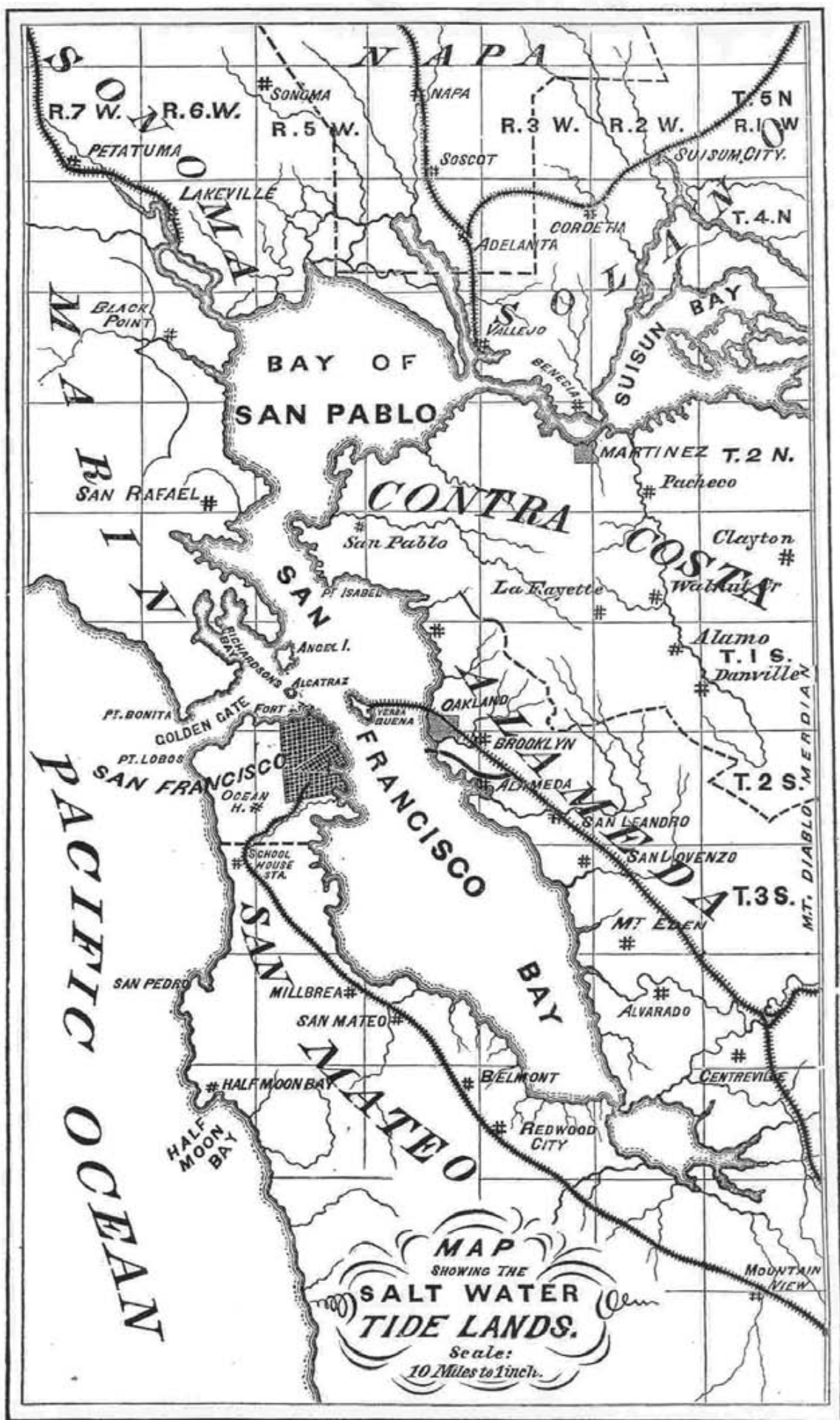


Figure 3. San Francisco, capital of the tidelands. U.S. Department of Agriculture, 1873.

and warehouses. Real estate and commerce had triumphed in San Francisco, capital of the tidelands.

The city's great fame and wealth rested on its commercial success as a port and on the power of its financial district. Both rested on the tidelands, now vanished beneath increasingly permanent and magnificent buildings. In 1880 California had nearly a million residents, eight times the population of 1850. More than a quarter of the state's population lived in the four square miles of San Francisco.<sup>62</sup> The city's harbor commission radiated the optimism of the times when it predicted in 1899 that the city's port would soon pass both London and Liverpool in tonnage. "The commercial future of San Francisco cannot be overestimated," the commissioners boasted. "The increase in trade that will surely follow the completion of the Nicaragua Canal, and the greatly enlarged traffic . . . that now seems assured, will in the near future advance this port many points on the list of the great commercial marts of the world's commerce."<sup>63</sup> Maps of San Francisco emphasized the city as the port for the entire region, an open doorway carrying California's bounty to the world. All of this success and optimism rested on almost nine hundred acres of filled tidelands.<sup>64</sup> What had been an impediment to navigation and a legal quagmire for decades was now, at the close of the nineteenth century, the economic engine of the West's great port. The finished nature of the waterfront, which was buried beneath layers of fill, seemingly offered a stable basis for a bright future.

#### GHOST TIDELANDS

The shaking lasted just two minutes, but the destruction caused by the earthquake in the early morning of April 18, 1906, was just beginning.<sup>65</sup> All along San Francisco's former shoreline, buildings shuddered, swayed, and sank into the suddenly liquid ground. Sewer, water, and gas lines snapped, spewing their contents into the soil and air. Broken gas lines burst into flames in at least two locations, joining dozens of smaller fires caused by overturned lamps and cookstoves, collapsed chimneys, and ruptured furnaces. Within minutes after the shaking had stopped,



sixteen fires were reported in to the central fire station. Smoke billowed over the waking city.<sup>66</sup>

Charles Cullen was one of the first to confront the fires. As the captain of the San Francisco Fire Department's Company Number Six, Cullen was on duty at their firehouse at Sixth and Howard Streets. His company guarded the area south of Mission Street, an area of densely packed wooden rooming houses built on marshy and filled ground near the mouth of the former Mission Creek. Captain Cullen later testified about the harrowing next two days for an insurance commission, providing a first-person view of the earthquake and fires of April 18 to 23, 1906.

Like most buildings south of Market Street, the firehouse at Sixth and Howard was a multistory wood-frame building. As the earth shook, the back wall sank more than three feet into the ground and the floor cracked down the middle. The men inside were instantly deprived of the use of their heavy fire engine. "Immediately after the first shake," Cullen recalled, "the doors of our engine house shook open and our horses ran into the streets and escaped. It was with great difficulty that we got our apparatus out of the station." Rushing into the street, Captain Cullen and his six-man engine crew saw that most of the wooden buildings on their street had collapsed. The firefighters responded to the cries of trapped people all around them. The company's first rescues were of five adults and three children from the building next to the fire station. At the end of the block, a three-story hotel had sunk two full stories into the filled marsh. The firemen desperately chopped downward through the exposed roof of the hotel toward screams from deep within the soggy earth. "At this time my crew helped rescue a man and a woman from the Corona House," Cullen recalled, but "approximately forty people were killed by the collapsing of this hotel. The two survivors rescued were pinned on the top floor near a sky-light."<sup>67</sup>

Quake damage was most severe in the filled tidelands and paved-over salt marshes along the former shoreline. Marshes and tidal channels that had been invisible for decades suddenly reappeared. The area devastated in 1906 had experienced subsidence before. Earthquakes shook the city in 1865 and 1868, damaging buildings on the made ground and requiring further fill of sand boils and sinkholes.<sup>68</sup> In 1868, earth

movement created a depression near Sixth and Howard Streets dubbed “Pioche’s Lake.” This reappearance of the former Mission Creek estuary was filled in and built up, only to reopen again in 1906 with terrible loss of life. At least fifty people died near the intersection of Sixth and Howard Streets within two hours of the earthquake.<sup>69</sup> An expert observer later compared the quake’s effect on such filled areas to “shaking a bowl filled with jelly.”<sup>70</sup>

The earthquake disproportionately affected some San Franciscans and spared others. Destruction was concentrated in the waterfront areas and the tenements built on marshy ground south of Market Street. The wealthy residential districts perched on the rocky heights experienced little damage. At first, the earthquake seemed almost a lark to the better off. Eleanor Watkins, wife of the San Francisco physician James T. Watkins, reported her initial relief that her “Buhl furniture, Louis XIV chairs and cabinets, rarest bric-a-brac” escaped unscathed. Leaving instructions for their servants to sweep and dust, Mrs. Watkins and her husband decided to go downtown to breakfast and see the excitement. They had a thrilling, adventurous trip from their home on the slopes of Russian Hill to the Saint Francis Hotel, where they were forced to serve themselves coffee and rolls, the waiters being “too excited” to offer breakfast.<sup>71</sup>

Disaster underscored the geography of class difference in San Francisco. Wealthy San Franciscans lived on the relatively stable terrain of the hills, and the poor lived on the filled mudflats and marshes south of Market Street. As she sipped her coffee, Mrs. Watkins slowly began to notice suffering: “Union Square was full of poor people, who had fled from the fire south of Market Street, where the poorest people lived. Around them were piled trunks and bundles, parrots and babies. A woman had fainted at the corner and was lying on the grass in the crowd.” The coffee helped brace her, Mrs. Watkins wrote, “for I was on the verge of tears over the homeless people in Union Square, little thinking that I should soon be one of them.”<sup>72</sup> Eleanor Watkins would flee with the crowds of poor as the fire from south of Market devoured the tony Saint Francis Hotel. Her exclusive neighborhood, barely damaged by the earthquake, would be utterly destroyed by the raging fires.



In the first hours after the earthquake, fires burned out of control in several parts of the city. Eventually a number of fires joined in one huge conflagration spreading southward from the city's center. By the third day after the earthquake, towering flames had not only consumed San Francisco's business and financial core but had gutted most of the residential city. Fires burned a huge, nearly circular path south, then west, then north again, destroying everything between Van Ness Avenue and the waterfront. Ironically, the filled tidelands where the fires began were largely spared. The waterfront, while hit hard by the earthquake, was protected from fire by a combination of favorable winds, abundant seawater for those fire engines able to use it, and wealthy landowners who provided their own firefighting forces.<sup>73</sup>

Past transformation of the tidelands yielded other ironies. Perhaps cushioned by bay mud, the city's docks were largely unaffected by the temblor. As a result, much of San Francisco's transportation infrastructure survived the initial destruction that so crippled firefighting efforts. When the earthquake began at 5:12 A.M. on that Wednesday, the morning rush hour had not yet begun. The ferries that daily brought tens of thousands of passengers from the suburbs of Sausalito, Berkeley, Alameda, and Oakland—mostly professional and “white-collar” employees who worked in the financial and commercial districts—had not yet begun discharging people onto the wharves at the base of Market Street. These ferries instead carried people out of San Francisco, perhaps saving the lives of tens of thousands of people trapped by the fires. The ferries were free to evacuate the city and to bring in National Guard and U.S. Army troops to fight the fires and prevent mayhem. As a result, San Franciscans could leave their burning city. Ferries participated in the largest maritime rescue in American history, an event comparable to the evacuation of British troops at Dunkirk during World War II. Almost thirty thousand people trapped by the fire were rescued by boat from wharves and docks between Lombard Street and Fort Mason. Another 225,000 escaped the burning city on Southern Pacific Company ferries from the lightly damaged ferry terminal at the foot of Market Street and on Southern Pacific trains from the terminal built on filled tidelands at Third and Howard Streets.<sup>74</sup> Between ferries and

trains, more than half of the city's population of 410,000 left San Francisco as it burned around them. It was perhaps the single largest evacuation in American history, and it was made both necessary and possible by filling in the tidelands.

The fires of 1851 and the earthquake of 1906 marked the shifting physical and legal contours of San Francisco. In 1851 tidelands had just begun the transition into real estate. By 1906 that process was complete. But making property secure did not make the land stable. In 1851 fire destroyed the emerging waterfront and the flimsy structures along its edge, threatening a fragile landscape of property based on possession, not legal title. Landowners scrambled to defend their uncertain boundaries and ignored the threat of looting or loss of movable property. In 1906 earthquake and fire threatened personal but not real property; buildings fell, furniture burned, and people and animals were killed, but the property beneath the buildings remained legally secure.

In both 1851 and 1906 disaster struck unequally. The distribution of property insured that fire and death were not randomly distributed over the city. The disasters began in the same places, in the part of the city built over and upon the bay. In 1906 the fires following the earthquake burned far inland, but the damage from the earthquake itself was largely restricted to the filled marshes and mudflats along the former shoreline. When engineers later mapped the damage from seismic activity, the curved lines they drew closely followed the former shoreline.<sup>75</sup>

In these devastated areas, buildings rested on former tidelands long since filled in. These filled marshes were only superficially transformed. Made ground was a most unstable mixture of earth and water. A few feet of added garbage, sand, and burned brick rested uneasily on deep layers of loose mud. Disturbance could roil the mix of soil and water, like coffee with milk, making solid unstable. When the earth shook, as it regularly has in San Francisco, made ground literally dissolved, the surface layers settling into the earth and collapsing buildings above. San Francisco in 1851 was largely built *over* the tidelands, not *on* them. In 1906, however, hundreds of people were crushed, suffocated, and buried under rubble by buildings that sank and crumbled in the suddenly liquid soils south of Market Street. The same ground displacement cracked gas lines and

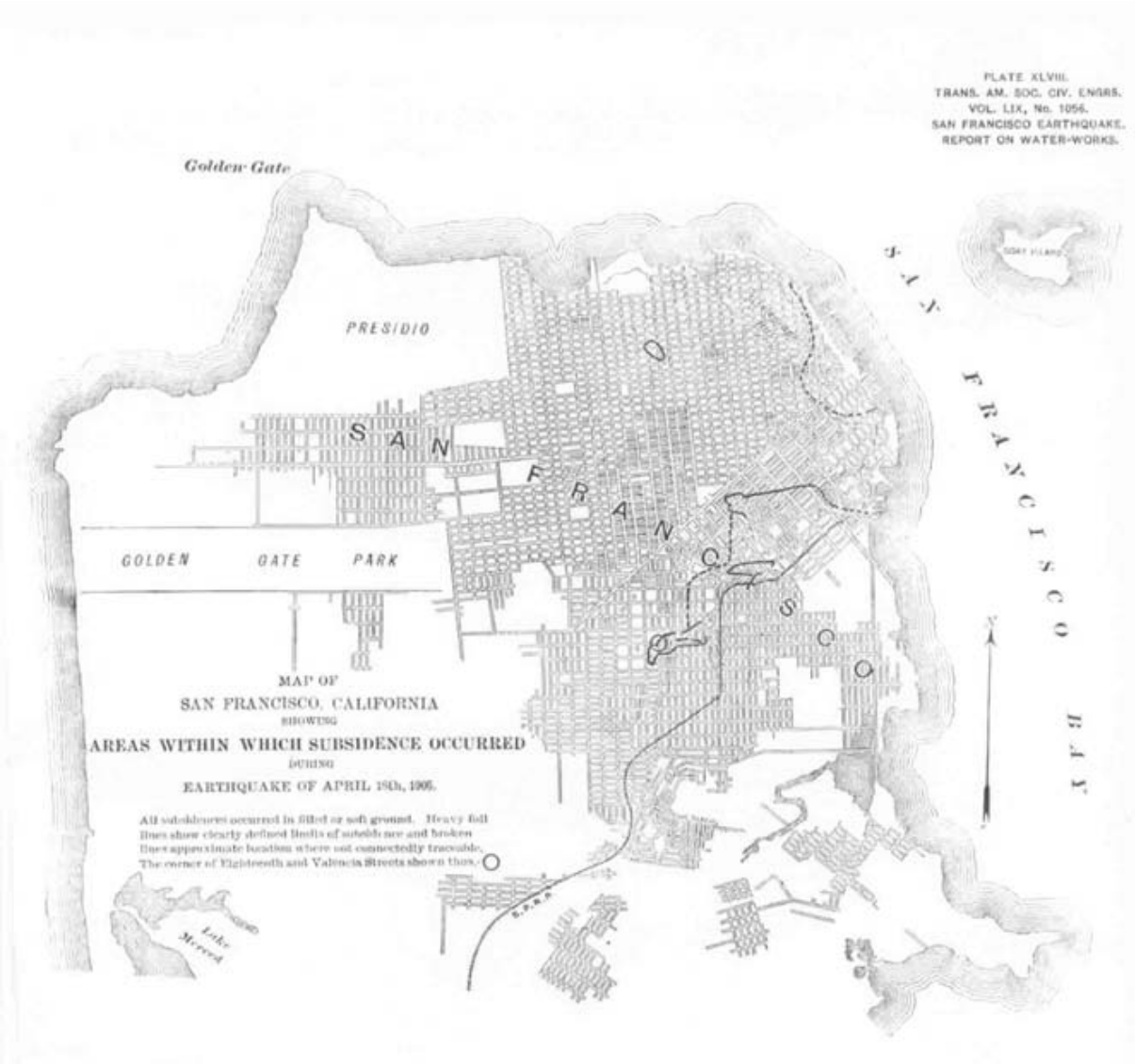


Figure 4. Fill and earthquake damage, 1906. California State Earthquake Investigation Commission, *Map of Portion of San Francisco, Showing 1906 Apparent Earthquake Intensity*.

knocked over furnaces and cooking stoves, sparking the fires that killed hundreds more in the following three days.

Disasters did not discourage San Franciscans from building on the tidelands after 1906 any more than they had after 1851. The shattered rubble of the old city provided solid matter to make yet more new land. During 1906 and 1907 thousands of carloads of burned brick and twisted steel were carted from downtown to fill in the last marshlands on the northern end of the city. The new neighborhoods built on filled shoreline near Fort Mason were rechristened the “Marina District.”

This made land too would face a reckoning. In 1989, when the earth shook again in the Loma Prieta earthquake, the filled marshes liquefied, as they had in 1906. Buildings collapsed and burned, people died, and property was destroyed.<sup>76</sup> Ghost landscapes returned to haunt the living.<sup>77</sup> Fires and earthquakes once again followed fill on the bay edge.

The 1906 disaster underscored that abstract legal property—real estate—in San Francisco was more secure than physical property constructed upon the land. Uses of tidelands were always temporary, even fleeting in the case of the gold rush city built over the water lots. The physical city constantly changed. But legal property came to possess extraordinary power, even the power to survive the total destruction of the physical space it described. While buildings rose and fell, lot lines drawn on city plat maps proved more durable. We generally take legal property for granted, just as we take physical reality for granted. The 1906 earthquake challenged both assumptions. The earthquake harshly reminded San Franciscans of the tenuous nature underlying their city. Physical property was destroyed. Legal property in San Francisco's waterfront survived because people maintained it with their belief and force.<sup>78</sup>

Two transformations made San Francisco into a waterfront city. The first was cultural: legal change in property. The second was material: physical fill of tidelands. Together these changes created the foundation for rapid growth and tremendous wealth. But they also led to unexpected consequences: environmental and physical instability were the by-products of efforts to create greater legal stability and to replace a complex watery margin with solid land. Drawing lines between water and land failed to guarantee separation.

Between 1847 and 1906 San Franciscans, in creating their city, had created a paradox. With their success in establishing legal title to the former commons, San Francisco's landowners were able to literally make new land from the sea's edge. They poured sand, garbage, and rubble into the mudflats to create stunningly valuable real estate. They could touch their new land, feel it, and see it, but it was less stable than the abstract boundaries originally laid over water and preserved on paper. Their very achievement in creating land led to the disaster of 1906, when fill failed. But by 1906 San Francisco was a formidable fact. The persistence of

marked space—legal property—meant that even when the city was destroyed it could come back in a similar form. The city was rooted in a set of social and economic arrangements that had the paradoxical effect of endangering the city but also insuring that it would rise again. The property was far too valuable to be abandoned and in the wake of each disaster was the possibility of new property from more fill. But with every effort at rebuilding, the property remained physically and environmentally unstable.

Thanks to the continuing transformation of the city's waterfront, those who controlled San Francisco's tidelands became very wealthy in the nineteenth century. They made the city's tidelands work by converting them into solid land. Fill made real estate from the wetlands that had once occupied the same physical space, and that new property produced enormous wealth. This process was at once mundane and yet revolutionary. Making tidelands into real estate changed both the physical and economic character of the land. Mud became solid, and land was valued for its potential rather than for what it actually produced. How this capital was put to transform the city's hinterlands is the topic of the next chapter in the bay's history.