

# Law and Groundwater: California Water Law and Politics

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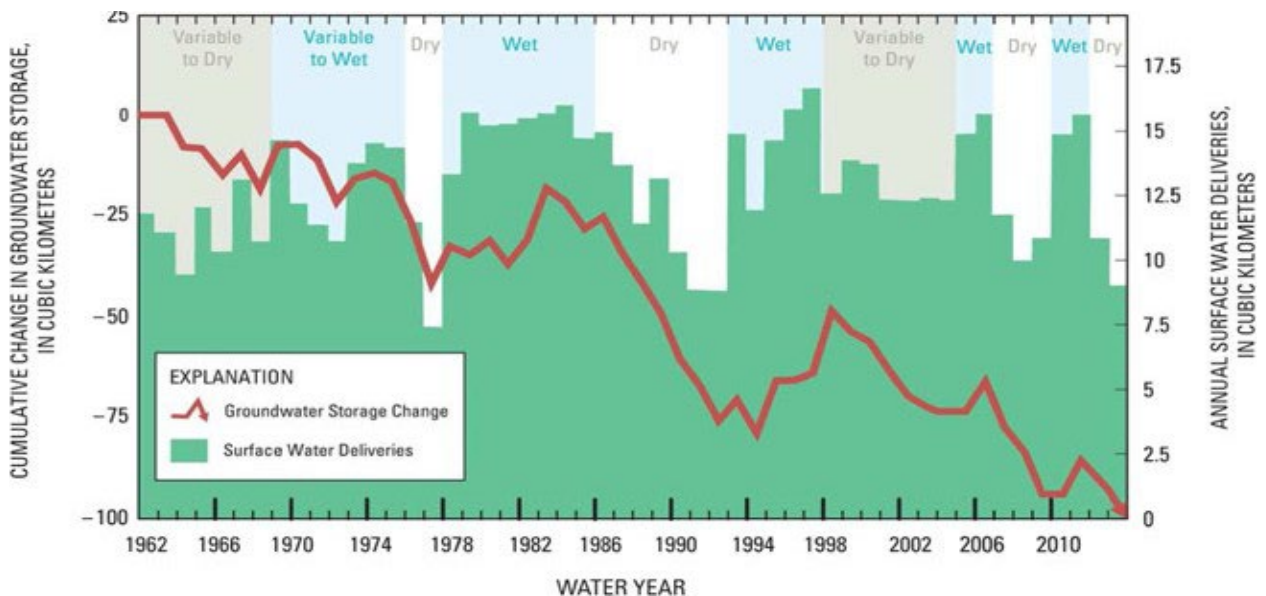
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This chapter argues that the development of California water law – both on the surface and underground—has been driven politically. And, this “fact” can help explain why decentralized markets have not prevented the developing crisis. The political foundation of water law may also, however, permit new opportunities (not the subject of the present chapter). Here is an outline of topics

1. Markets, law and politics
2. surface water law and politics
3. Groundwater law and politics
4. Theoretical reflections

But first, here is snapshot of the groundwater problem (described in previous chapters)

**Groundwater Storage and Surface Water Deliveries**



**Takeaway these things:**

- 1. Highly variable climate**
- 2. Surface water deliveries are correlated with climate**
- 3. Groundwater declines correlate to deliveries/climate**
- 4. Groundwater levels are declining and, without some significant change in regulation (or luck), seem likely to continue.**

**The following chapters turn to a history of US western expansion that leads up to the acquisition of the Mexican with a focus on property and water. As in this chapter, the emphasis is on presenting a political account of property and water. The political account proceeds at both high (political culture and economy), medium (geopolitical and national struggles), and low (specific political events and turning points) levels. The final section traces recent (20<sup>th</sup> and 21<sup>st</sup>) century efforts to address developing water problems with an emphasis on why each one failed or may be on a road to failure. Or. Maybe not. Again, the story I present is political (at various levels).**

## Markets, Law, and Politics

In principle, Californians might have been able to allocate groundwater use by allowing markets to direct assets to flow to those who value them most. Markets produce efficient allocations, however, only under certain conditions. It must be possible for people to make binding contracts: to exchange goods and services, and make investments, confident that agreements (however complex) can be enforced legally. If enforcement is impossible or too expensive, otherwise valuable trades and investments may not occur. But enforcement depends on the capacity of enforcing institutions to observe (or infer indirectly) the economic transactions that it is to enforce. We expect a functioning legal system to supply these conditions, at least approximately. For transactions that cannot be observed or verified markets may not produce efficient outcomes.

In addition, markets will only support efficient outcomes if the prices faced by contracting parties reflect all of the costs and benefits of the transaction – which Coase called the social cost.<sup>1</sup> That is to say, markets work well in the absence of externalities – costs or benefits incurred by third parties – or where parties can freely bargain over external effects.<sup>2</sup> Water, and especially groundwater, are examples of goods that characteristically generate external effects. And, for various reasons, bargaining over these effects is very costly; Coasian bargaining is not and likely path forward. One might expect (or hope) that governments would try to ameliorate this situation by making it possible for (or forcing) private parties to take more account of the external effects of their actions. But, if contracting parties or governments cannot observe or infer externality producing actions, governments may be unable to assist in forming appropriate incentives. Besides, governments may themselves have inappropriate motives.

For these reasons, regulating groundwater extraction is a hard problem that does not seem to be going away. But the problem is not merely that groundwater is hard to observe for technical reasons, powerful vested political interests have often limited efforts to increase the observability

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<sup>1</sup> Coase himself argued that, in the absence of what he called transaction costs, markets would take account of external effects, inefficient allocations would be bargained away. Ronald Coase, “The Problem of Social Cost” *Journal of Law and Economics*, 1960.

<sup>2</sup> Who, because of transaction costs, are unable to bargain with the transacting parties to get them to take the third party interests fully into account.

of groundwater transactions. As a result, it is very likely that the resource will continue to be overused unless public authorities find ways either to facilitate markets (as above) or to intervene directly in groundwater extraction.

Possibly out of worries about market operation in this area states have often asserted that, in the end, water – a least some kinds of water -- belongs to the “people” or to the state. To get access to water for various uses, one may need to get some kind of “permission” from the government. For example, people may be forbidden to drill a well on their own property or be required to register the amount of water taken. The government may also limit the way that water can be used: forbidding the bottling and export of spring water for example. Or, it may limit the number of days on which you are permitted to irrigate or water your lawn. Often these permissions are pro forma and simply aimed at reminding people that water is subject to regulation in principle. But sometimes, when activities can be observed at low cost, effective regulation of groundwater use might be possible.

Historically the state has often treated navigable waterways as public goods and of special importance to the sovereign. Navigable waters have traditionally been a chief avenue for commerce – especially of bulk goods—and of military defense too. The prospect such waters might be controlled by private actors and that owners of such waters, divert them for private use, or may charge tolls that stifle commerce and personal liberty has led states to treat the water as a “public trust” and impose strict requirements on access and infringement of such waters. Of course, the state may itself license a navigable waterway to private owners who may then be permitted to charge tolls for passage may gain from the tolls though pricing the license (with the provision that the state may revoke the license or restrict its terms). Such arrangements therefore work only in the shadow of the state, which may revoke the deal for whatever reason it chooses.

With respect to groundwater however, property owners are traditionally thought to be entitled to use the water on their land as they want, as long as that use does not negatively impact on others. As we shall see, however, it is not always clear when a negative impact has occurred. Those who want to use water freely have reason to minimize such impacts and third parties may be motivated to exaggerate harms as a way to extract concessions. Such disagreements naturally

draw in the state and its laws. As shall see, judges and legislators have increasingly imposed requirements on water use that channel some of these disputes into peaceful resolution. For example, courts have sought to require that water must be used reasonably or in ways deemed beneficial. The meanings of these terms have shifted over time as water scarcity issues have become more common.

## Water Politics on the Surface

Governments differ in how access to and use of water in their jurisdictions is regulated. Americans have always had predilection for private rather than public ordering of water and to let private parties settle their disputes through force or law or under their shadow. Historically, moreover, the federal, state and local governments often had little capacity to identify problems with water use or to restrain or redirect usage, and especially unable or unwilling to regulate the activities of powerful individuals and organizations. Until fairly recently, therefore, the existence of governmental jurisdiction over water has not prevented streams, ponds, wells, and wetlands from being owned, exploited, and traded privately, and being put to use as the owner wants, even if those uses may adversely impact others. That the state could intervene to correct inefficient market outcomes, however, does not mean that it will do so with respect to water pollution and overuse. State institutions can be underfunded, captured, or misdirected in various ways that make it ineffective in intervening in or improving market processes.

This situation has been especially vexed in California where, from the very beginning, government (state, federal or local) lacked the presence and force to guide or even much influence the powerful economic events taking place either in the goldfields or in the fertile valleys of the new territory. People on the ground invented, found ways to take possession of land, or try to, hoping to turn possession into rights. Miners in gold country invented, on the fly, mining codes: the rules, norms, and institutions they needed. "...the miners formed districts, embracing from one to several of the existing "camps" or "diggings," and promulgated regulations for marking and recording claims."<sup>3</sup> Such codes had already been invented elsewhere; they permitted the miners to organize their efforts and (as we shall see) limit abuses.<sup>4</sup> In both fertile valleys and the goldfields, possession was the priority and the basis of right.

The codes universally adopted the priority principle with respect to mining claims; the first to stake a valid claim, was entitled to keep it against all comers as long as he satisfied the code

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<sup>3</sup> Charles W. McCurdy, "Stephen J. Field and Public Land Law Development in California, 1850-1866: A Case Study of Judicial Resource Allocation in Nineteenth-Century America," *Law & Society Review*, Vol. 10, No. 2, (Winter, 1976), p. 236.

<sup>4</sup> "... the miners' codes defined the maximum size of claims, set limits on the number of claims a single individual might work, and established regulations designating certain actions-long absence, lack of diligence, and the like-as equivalent to the forfeiture of rights.." McCurdy, op cit. p. 236.

provisions. This idea was rooted in older American practice, grudgingly accepted by federal and state governments, of pre-emption (squatting) of public domain lands. A pre-empter could hope to gain title, eventually, to public domain lands by taking (first) physical possession of a piece of property, making improvements (buildings, fences, planting crops), preventing trespassers, and (perhaps) paying a nominal fee to the government. And private land was vulnerable to pre-emption too, if the trespass was notorious and public and maintained. The priority principle may have had a more powerful immediate effect in the gold rush because, for the most part, claimers had no intention of staying on the land and improving it in the ways that pre-empters did. Their interest was purely possessory: they held a right to their claim only as long as they actually worked it. This was enough for the miners: miners came to the goldfields to find and take out the gold they could get and move on. And, because water was essential to mining, the priority principle was immediately extended to water claims as well. As with mining claims, the interest in water is possessory: a person has a right to her appropriation only so long as she was actively using it.

While the early codes may have been seen as merely local norms without force of law, this situation soon changed, as judges often used code norms as indicative of community practices and expectations when deciding disputes over claims. Judicial practice was recognized by the second elected California Legislature in 1851, when it adopted the *Code of Civil Procedure*, which provided that “In actions respecting ‘mining claims,’ proof shall be admitted of the customs, usages, or regulations established and in force at the bar, or diggings, embracing such claim; and such customs, usages, or regulations, when not in conflict with the Constitution and Laws of this State, shall govern the decision of the action.”<sup>5</sup> It is important to recognize that there were hundred of codes and that their terms varied widely. A judge was to look to the particular mining code that was in force in the area of the dispute before the court and not to mining codes generally. If a mining code, for example, forbade the sale of accumulation of claims – which some did – someone jumping a sold or excess claim would be entitled to keep the claim, at least insofar as some other legal principle was not violated. Under another mining code jumping such a claim would be illegal. The mining codes may not have been the law, but they were regular sources of law insofar as they could be made to fit with other legal sources. Courts

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<sup>5</sup> McCurdy, op cit. p. 239.

needed to ask in the context of each case, what were these other sources? What were the “laws of this state?”

Mexican law having been abolished in 1850 (with exceptions), Peter Burnett, California’s first governor, asked the legislature to decide whether to continue to apply civil law in the new state (by adopting Louisiana’s civil code for example) or instead to adopt the common law as the foundation for California’s law. No doubt adopting the common seemed much less daunting to the lawyers who had arrived with gold seekers than the prospect of creating, de novo, a whole new legal code that would actually work in the immense new state. The common law presented itself to the first legislature as a kind of “off the shelf” legal apparatus that judges could apply to local conditions and make adaptation and adjustments as needed. Moreover, a major motivating consideration in favor of the common law is that it contained a right to trial by jury – a right of special importance to Americans from the start of the republic --while civil law systems did not.<sup>6</sup> In that context, it was probably not a surprise that the legislature decided to adopt common law as the “rule of decision” during its first session.<sup>7</sup>

But, as noted above, the very next legislature, under the tutelage of Stephen Field (future Chief Justice of California and long serving Associate Justice on the US Supreme Court), adopted the *Code of Civil Procedure*, which was modeled on the *Field Code* which had been created by his older brother, David Dudley Field over the previous decade. The new code did not prevent the operation of common law in various legal domains. But it did permit a way to treat civil actions that arose from mining and agriculture differently insofar as the code directed judges to take account of local practices and to such statutes as the legislature might enact. It’s safe to say that the state’s political leaders went back and forth on the issue of what law was to govern California.

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<sup>6</sup> Edwin W. Young, “The Adoption of the Common Law in California,” *The American Journal of Legal History*, Vol. 4, No. 4 (Oct., 1960), pp. 355-363

<sup>7</sup> *California Civil Code Section 22.2*: “The common law of England, so far as it is not repugnant to or inconsistent with the Constitution of the United States, or the Constitution or laws of this State, is the rule of decision in all the courts of this State.”



It is not clear, moreover, that California legislators in 1850 were actually aware that the common law (at that time) included the *riparian doctrine* for determining water rights. That seems disputed among historians. While there had been early American court cases favoring riparianism, the content of the doctrine was not yet settled.<sup>8</sup> The creation of *Riparian* rights doctrine in the United States is generally attributed to a federal judge, Joseph Story, who, in *Tyler v. Wilkinson* (24 Fed. Cas. 472 (No. 14,312) (C.C.D.R.I. 1827), established the principle that a riparian had a right to a reasonable use of the water. In fact however, riparian doctrine was in still in flux in 1850 both in England and the United States and remained so until the end of the Century (at least). In *Tyler v. Wilkinson* "...Justice Story considered only such uses as caused harm, but, for example, in *Hendrick v. Cook*,<sup>7</sup> 6 the Georgia Supreme Court in 1848 argued that any invasion of riparian rights was itself injury, even if it did not cause damage." Moreover, "In *Clinton v. Myers* ... the New York Court of Appeals held that a lower riparian who did not sustain any injury could enjoin a mill owner from damming the surplus water of the stream in the wet season for future power use..."<sup>9</sup> This idea – that mere invasion implied harm -- was promulgated by Chancellor James Kent in his treatise, *Commentaries on American Law*, published in 1828. In addition "Both Story and Kent [actually] drew heavily upon civil law in promulgating the reasonable use doctrine. Kent cites in his *Commentaries the Code Napoleon*, which had become the law of France in 1804; and although Story's opinion cites no civil law source directly, it is strongly flavored with the approach suggested by the Code Napoleon."<sup>10</sup>

The situation was similarly unsettled in England in 1850. T. E. Lauer writes, "It must ...be kept in mind that these American jurists did not simply adopt an English common law doctrine. The reasonable use test was decidedly not English in its origin. Indeed, it was 1851 before the *Court of Exchequer* <sup>8</sup> adopted the riparian doctrine, and in so doing it cited both Kent and Story as authority."<sup>11</sup> As it is now understood riparian doctrine attached water tightly to adjacent land.

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<sup>8</sup> Riparian doctrine is traceable to Roman law and, elements of it were present in many European systems of law, though mostly they were eventually superseded by administrative systems -- in which the state allocates water rights -- on the Continent. In any case, riparian doctrine became part of the common law in England and the United States only in the 19<sup>th</sup> Century.

<sup>9</sup> Ludwik A. Teclaff, "What You Have Always Wanted to Know about Riparian Rights but Were Afraid to Ask," *Natural Resources Journal*, Vol 12 (1972), pp. 41-42. 42.

<sup>10</sup> T. E. Lauer, "Common Law Background of the Riparian Doctrine," 28 *Mo. L. Rev.* (1963), 62. He remarks that the new doctrine was rapidly adopted by American judges and soon spread to England.

<sup>11</sup> Lauer, 62. Lord Parke ... defined the rights of the riparian proprietor in *Embrey v. Owen* "The right to have the stream to flow in its natural state without diminution or alteration is an incident to the property in the land

A riparian landholder acquired the right to use water touching her property when she bought it, and she could use it more or less in any way she chose. And riparian rights could not be forfeited by nonuse.<sup>12</sup> “Riparian law viewed the watershed as an integral natural unit. Exportation out of the watershed was prohibited or disfavored. Water was valued as an amenity that added considerably to the worth and beauty of all parcels of land along the watercourse.”<sup>13</sup>

It is important to emphasize that riparian water rights are not transferrable to nonriparian properties; they attach only to the smallest property appurtenant to the water.<sup>14</sup> What that means is that if the property is divided, riparian rights only attach to those parts of the property that remain adjacent to the water. Riparian rights, unlike appropriative rights are *correlative*: the rights holder is not entitled to a fixed quantity of water but his use must be correlated or balanced with the rights of other riparians. Many other ambiguities concerning the limits of riparian rights have been litigated over time. But the basic idea remains: riparian rights are anchored inflexibly to land and cannot easily be moved without resort to some superior legal claim.<sup>15</sup> A riparian might, for example, contract not to use her right.<sup>16</sup> Riparian rights can also be *condemned* by eminent domain or taken by *prescription*, which permits a trespasser to establish a right by an “adverse” diversion as long as he maintains the diversion continuously for at least five years.<sup>17</sup>

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through which it passes .... that all may reasonably use it who have a right of access to it, that none can have any property in the water itself, except in the particular portion which he may choose to abstract from the stream and take into his possession ....” 155 *Eng. Rep.* 579 (Ex. 1851), at 585.

<sup>12</sup> It is sometimes said that appropriations doctrine is more pro-development than riparian doctrine. The argument is that appropriative rights are well defined compared with riparian rights, and the can be alienated (sold or rented) by the rights holder as a commodity. The view is that by permitting easy transfer of water rights development will not be impeded by crusty riparians. As we shall see below (in *Lux v Haggin*), in cases where litigation favored riparian over appropriative rights, the interested parties often managed to bargain to agreement. If the stakes are high enough, riparian claims turned out to be no barrier to bargaining.

<sup>13</sup> Charles F. Wilkinson, “Western Water Law in Transition,” *Journal (American Water Works Association)*, Vol. 78, No. 10, Water Law in the West (OCTOBER 1986), p. 34.

<sup>14</sup> Teclaff notes that “In addition to the requirement that riparian land must abut the stream or comprise the bed of the stream, it is generally accepted that the riparian character is confined to land owned in one piece and contained within the watershed of the stream..... The rule, however, is not quite uniform, and in California, when riparian rights are explicitly reserved for a strip detached from the riparian land, though not abutting on the stream, the strip retains its riparian character. In Oregon, contrariwise, riparian rights extend to the added parcels.” *Op cit.* 44.

<sup>15</sup> *People v. Shirokow* (1980) 26 Cal 3<sup>rd</sup>. For example, if a riparian buys adjacent land away from the river, is she entitled to water that land from the river? What purposes are considered beneficial and reasonable. These and other questions have been answered in various ways. Another, possibly deeper, question is whether under riparian doctrine water is property at all.

<sup>16</sup> California’s Department of Water Resources has entered into many such agreements with Delta farmers.

<sup>17</sup> Prescriptive claims resemble appropriations except they are made against someone who already holds the right rather than against the public domain. The applicable legal doctrine is that of adverse possession and requires

These limitations limit to some degree the reach of riparian as opposed to the appropriation rights created in the goldfields and other public domain lands. These features of riparian rights had the effect of exposing riparians to endless claims, requiring vigilance in preserving their rights. Occasionally, they were forced into political deals among claimants or else run the risk of losing their rights to the vagaries and whims of judges.

By the time California entered the union in 1850, water rights in the mines were already regulated by priority or, what is called the *appropriations principle* (first in time, first in right).<sup>18</sup> Gold was discovered in early 1848 and within a year thousands of (mostly) men descended on the mountains in search for the precious metal. Appropriative rights originated in the goldfields as a principle by which mining claims could be established and kept. The first person to stake a claim had the right which he held as long as he continued to work the claim. This notion was adopted in hundreds of local mining codes and soon became a source of legal doctrine as both courts and the legislature were forced to recognize. The first in time first in right principle was soon extended to the first person to divert a stream for use in working a claim. Appropriative water rights exploded as miners diverted streams to work their claims (which were often many miles away from the stream). Under the appropriations doctrine, the use of water for mining was rights-conferring as long as use continued: appropriative rights could lapse if not used “continuously.”

Conflicts among the miners took place in a kind of legal state of nature. There was no effective law governing mining claims at the start of the gold rush (1848) under California’s early military government. The military government had abolished or refused to enforce Mexican civil law and there was nothing to take its place. In that context, people simply asserted prescription (as many had earlier in the century in the Midwest and southern states). Someone would claim a prescriptive right to public domain land or waters merely posting a sign either at

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notorious and hostile trespass for a certain time period (five years) and like appropriations such rights can be forfeited by nonuse or use for a nonbeneficial or unreasonable purpose.

<sup>18</sup> The appropriations idea was not invented by the miners in 1848. Settlers on public domain lands of the United States had been successfully asserting a similar right – pre-emption, which is established by the first to make the claim – at least since the 1830s and, in some places, well before that. “**preemption**, also called **Squatter’s Rights**, in U.S. history, policy by which first settlers, or “squatters,” on public lands could purchase the [property](https://www.britannica.com/topic/preemption) they had improved.” <https://www.britannica.com/topic/preemption>.

the site of the claim. If the person continued to make the property for a sufficient period of time his claim might ripen into legally recognized title (or, what the government called a patent). Thomas Hobbes argued that rights-claims of this kind were dangerous and unstable and likely a for civil strife. In Hobbes' state of nature there is cacophony of such claims: in nature, each person can assert her rights and has the right to enforce her claims with force -- if she can. The establishment of a sovereign, he said, was necessary to resolve this anarchic babble by conferring on the sovereign the monopoly to say and enforce what each person's rights and duties are.<sup>19</sup> There was, of course, a sovereign in 1848 – at least once the treaty with Mexico was signed. But the sovereign's agents – the military governors -- were hundreds of miles away and stretched too thin to affect what happened in the gold fields. Miners were forced to invent their own rules and their own devices for enforcement. This was what the mining codes achieved. Miners tried their own disputes either by a camp meeting or by the operation of an appointed jury. Some codes created a governing committee or person (and Alcalde) to enforce code rules. In any case, the code's responses roughly followed Hobbes' advice. People were not to make up their own rules or take matters into their own hands as individuals but to refer disputes to an authority.

In California's early days it seems that there was already a kind of agreement that if an appropriator gave notice as to his diversion, any rights claimant (either riparians or earlier appropriative rights holders) would presumably "know" (in the sense that they had notice in that there was a posting somewhere along the river or in an office) of the diversion and could object before it ripened into a right. In fact, appropriation was recognized in federal law in a statute of 1866,<sup>20</sup> and a few years later (1872) in the *California Civil Code* as well.<sup>21</sup> But formal recognition of came long after the "fact" however. Indeed the 1851 *Civil Code* had already recognized the mining codes as a source of law and those already contained the appropriations principle. The 1872 codification seemed mainly to formalize the procedures for appropriation. "The 1872 law required would-be appropriators-whether farmers, or manufacturers-to post notice of their claims at the intended point of diversion and notify a local county recorder. The

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<sup>19</sup> *Leviathan*, 1651. See Benjamin B. Lopata "Property Theory in Hobbes," *Political Theory* Vol. 1, No. 2 (May, 1973), pp. 203-218.

<sup>20</sup> *14 stat. L. 253. U.S. Rev. Statutes sec 2339* (July 26, 1866).

<sup>21</sup> *California Civil Code secs. 1410-1422*, which codified mining practices prior to that time. Wells Hutchins, *The California Law of Water Rights*, Sacramento, 1956.p 43.

law set no limit on the amount of water that could be claimed, even if that amount was more than the user needed, and even if his claim conflicted with established rights. Moreover, though the 1872 law required claimants to begin constructing diversion works within sixty days of claim, it provided no administrative machinery for confirming that work had been done.”<sup>22</sup>

An appropriative right trumped any downstream rights as long as it preceded those claims in time. Someone could not buy up river frontage in order to invalidate prior upstream (or downstream) appropriators’ rights.<sup>23</sup> A miner, if he got there first and used the stream for a long enough period, could divert all the water for his use leaving none for downstream use by later riparians as long as he continuously put the water to beneficial use. But if riparian rights were held first, an upstream appropriator was limited in what he could take by what is called the “no injury” standard.<sup>24</sup> Once a riparian has gotten ownership, new appropriations – upstream or downstream – the “no injury” standard gave the riparian a veto over any subsequent appropriations.<sup>25</sup>

Then there is also the question of wetlands, seasonal streams, and meanders will support riparian rights (this issue will arise below in the *Lux v Haggin* case). While a watercourse could support riparian rights even if its flow was seasonal (and was dry some of the time), courts still required that water appeared regularly, so that if a stream dried up permanently it would not support riparian rights. “This was nonsense to the utilitarian miners who flooded to the gold and silver-bearing deposits of the West in the middle of the nineteenth century. They were there on business, not in pursuit of amenities. Water was the linchpin of the miners' operations, whether

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<sup>22</sup> Donald J. Pisani, “Water Law Reform in California: 1900-1913,” *Agricultural History*, Vol. 54, No. 2 (Apr., 1980), pp. 298.

<sup>23</sup> This implies that if someone diverts an entire stream before any downstream riparian rights have been established, riparian rights can no longer be claimed along the stream (unless the appropriator lets his right lapse through non-use.) In California, much of the riparian land would have been in the public domain at the time of conquest or statehood and so the federal government would have had riparian rights. The federal government generally did not, as far as I know, assert its riparian rights to underdeveloped public domain land. So, the issue is when a private party takes title to river frontage. If, at that time, the stream or part of it has already been appropriated, the riparian has no claim against the appropriators.

<sup>24</sup> Riparian rights acquired after appropriation did not limit prior appropriative claims but were good against later appropriators.

<sup>25</sup> It is also true that the riparian can veto impairments of her use by subsequent riparians or, for that matter, anyone who takes water in ways that interfere with her use, such as an upstream neighbor constructing a pond that lowers the stream flow.

they were washing river gravel away from the gold dust and nuggets with pans, sluices, or long toms; slashing away at hillsides with high-power hydraulic hoses used to blast out placer deposits; or transporting water 20 mi (31 km) or more to remote mining town...<sup>26</sup> In any case, most riparians were far downstream from the mines, and the miners mostly posted notice and diverted the waters at the source. If a riparian holder on the San Joachin river was required to object to a small upstream diversion of a tributary in the Sierras, it is not clear that the no injury standard protected the riparian in fact.<sup>27</sup>

Thus, water law, as it took shape over the next century, could arise from several distinct sources: from common law, from statutes or legal codes, or from people devising customary practices on their own. The mining codes were the best known example of customary practices, but settlers squatting on unoccupied land, or diverting water from streams or lakes, developed customary norms as well. These practices had already evolved since early in the 19<sup>th</sup> Century. Squatters, for example, asserted claims to ownership by putting up houses and fences, planting crops, or by building up levees or digging canals. Congress gradually recognized such actions as a legitimate means of getting title to property in a series of early Nineteenth Century pre-emption statutes, culminating in *The Preemption Act of 1841*.<sup>28</sup> In time title would be granted if the conditions were met. Needless to say, the atmosphere of weak or nonexistent police, few judges and lawyers, and a poverty of written records, often allowed arbitrary transfers of land and water.

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<sup>26</sup> Wilkinson, 34.

<sup>27</sup> In effect, this problem has been partly resolved by a presumption: if the waters of the river (the San Joachin) are fully allocated (to riparians and earlier appropriators) any upstream diversion is presumed to cause a harm.

<sup>28</sup> [27 Cong.](#), Ch. 16; 5 *Stat.* 453

Among other provisions, the *Act* permitted "squatters" who were living on federal government-owned land to purchase up to 160 acres (65 ha) for \$1.25 per acre (\$3.09 per hectare) before the land would be offered for sale to the general public. To qualify under the law, the "squatter" had to be the following:

- a "[head of household](#)";
- a single man over 21 or a widow;
- a citizen of the United States or an immigrant intending to become naturalized; and
- a resident of the claimed land for a minimum of 14 months.

To preserve ownership, the claimant had to accomplish specific things to legitimize the claim. One way was to reside on the land. Another was to work consistently to improve the land for at least five years. It was not necessary that the claimant have title to the land; living there and working toward improving the stake were enough. However, if the land remained idle for six months, the government could step in and take the property.

[https://en.wikipedia.org/wiki/Preemption\\_Act\\_of\\_1841](https://en.wikipedia.org/wiki/Preemption_Act_of_1841)

And violence threatened at every turn. But the courts were generally receptive to such claims after 1851.

Conflicts among water rights sometimes led to fights and there was a need for methods to settle disputes before things came to blows. People needed to settle their disputes without shooting each other and judges and magistrates were enlisted for that job. As it happened, law and judges were among the Californians' first inventions, even before statehood. The mining codes, the Alcalde (magistrate-judge), the sheriff, and the council appeared almost immediately and especially in gold country. The miners' fundamental "legal" principle, encoded in hundreds of mining codes, is the principle of *appropriation*. *First in time, first in right* soon governed the acquisition both of water and land. This principle could conflict with riparian rights – riparian lands and rights existed, for example, in the Spanish-Mexican land grants that the United States was treaty bound to respect -- and with policy and equitable considerations as well. With statehood there came a governor and a legislature as well as police and state and federal judges too. The ability of many of these officials to reach local or private action remained limited but state courts rapidly began playing a vital role however and, to a great extent, autonomously from the state itself. Judges immediately began to channel and settle disputes and effectively make new laws, often relying on the mining codes but sometimes on common law and equity as well.

Thus, while bottom-up means were soon found to settle disputes over mining claims and water, California's general legal and constitutional situation was also being driven by very different top-down, considerations. Law was shaped by the particular political situation facing California at the prospect of statehood – or maybe a bit before and afterwards. The breakaway from Mexico was a legal rupture that threatened established rights to landed property and water and many other legal rights as well. The Mexican legal system was based on civil law and the treaty ending the war between the United States and Mexico required that existing property rights be respected. When governor Burnett asked the legislature to decide on the rule of decision, the choice he offered was between the common law and the civil law (which operated at the time in the New Mexico Territory and Louisiana and, to some extent in Southern California). California's legal system therefore had to be capable not only of maintaining order,

it should also bear some resemblance to legal systems of other states, and it must fit with the *United States Constitution* and Treaties.

No one could have anticipated what a time bomb it would be for landholders in the state to have two competing systems of water rights. What if someone bought waterfront land on a stream that had already been diverted upstream? In the extreme, an upstream diverter might have left no water in the stream at all – at least, none in dry years. What then did the downstream landholder have a right to? Or, what if there was a prior diversion downstream and the riparian’s use of the water diminished the downstream flow? Would she be subject to legal action? Or not? The problem was not that there was no law. Rather, there was too much law. Under riparian doctrine, a person holding a riverfront property has the right to enjoin any upstream diversions made after the time the land was patented (the date at which her right to the property was perfected in legal title). But if the appropriator has diverted before her purchase, the riparian has no claim to relief.

Under California’s system, appropriative rights holders risk losing their rights unless they actually use them “continuously” whether or not their use always makes economic sense at the time.<sup>29</sup> Before the big farms were established, gold miners had already made intensive use of water to work their claims, diverting rivers to faraway mines, and dumping immense quantities of waste downstream. As these claims were exhausted, some of the rights may have lapsed. But appropriative rights often had economic value to someone (if no longer to the miner) and so these rights were often sold. As settlers moved into central valley lands downstream from the mines, conflicts ensued between mining and agricultural land uses and most of these disputes had to do with water. Moreover, as we have seen, the large farms came into frequent conflict with one another – again usually over access to water. All sides appealed to the courts to settle their disputes. Therefore, courts have increasingly had to sort out conflicts over water rights.<sup>30</sup> Lacking coherent doctrine – or rather, having two incompatible doctrines -- the courts were forced to craft new law capable of resolving these conflicts. As we will see, the critical cases –

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<sup>29</sup> What counts as continuous use is construed legally in different ways.

<sup>30</sup> Mark T. Kanazawa, “Efficiency in Western Water Law: The Development of the California Doctrine, 1850–1911,” *The Journal of Legal Studies*, Vol. 27, No. 1 (January 1998), pp. 159-184.



the ones that came to form *California water doctrine* – mostly arose from disputes in the Southern CV.

### ***Early Political Struggles: Lux v Haggin***

The potential for fighting was evident and suits were often filed against appropriators who, it was said, were trespassing on riparian rights which could not legally be lost through nonuse. The case law went back and forth for a few years, but generally tended to favor the appropriators, at least in lower state courts. The appropriations doctrine was already well established practice in the mining areas which, from early in the gold rush, relied on expensive water intensive hydraulic mining techniques. Rulings favoring riparians could upset valuable mining operations. Small farmers often favored appropriation, especially if existing water sources had already been claimed. Moreover, appropriative rights had already been recognized in various federal and state statutes and in the new *California Civil Code*. So, perhaps it is not surprising that the more popular lower courts leaned toward this principle. Higher courts were, however, often more favorable to riparians. In 1886 the California Supreme Court sent shockwaves through the state when it decided for riparian rights, reversing a lower court ruling favoring appropriators in the famous case of *Lux v Haggin* (1886). The case was the outcome of a long struggle between two huge land monopolies and, in the event, the dispute centered on which of the two competing doctrines governing California water would prevail.

Miller-Lux was a huge ranching and farming operation that owned riparian rights to various watercourses in the Tulare basin (and many other places too). It faced threats from two sides: from small farmers on the west side of the valley who proposed to establish an irrigation district (the Westside District) to take over a failed private canal project that had sought to connect Tulare Lake to the San Francisco Bay. The other threat arose from a project led by James Ben Ali Haggin, to divert waters from the Kern River (upstream of the Miller-Lux holdings) which drains into Tulare Lake, to irrigate desert lands that the Haggin group had bought. Haggin claimed that, once he got control of water, he would subdivide and sell irrigated desert lands to small farmers. The hope and effect of this was to make a kind of alliance with prospective settlers (the mythical small farmer). Both schemes – the Westside canal and Haggin’s diversion --involved building large networks of canals and irrigation ditches to permit

irrigation of arid parts of the valley. Both projects threatened Miller-Lux water supplies. Even before the threat from Haggin ripened, however, the threat from the west side struggle took shape.

In 1876, in response to pressures from the *Granges* – a growing movement of small farmers -- the state authorized the formation of the *West Side Irrigation District*: The "...District included lands in Contra Costa, Alameda, San Joaquin, Stanislaus, Merced, Fresno, and Tulare counties, and extended from Suisun Bay, near Antioch, to Tulare Lake. It was formed 'for the purpose of providing for the irrigation of the land lying in said district, and furnishing the means of transportation, by a canal to be constructed from Tulare Lake on the south, and extending northerly along the foothills of the Diablo Range of ...to a point on the south shore of Suisun Bay.'"<sup>31</sup> Effectively, the district took over an earlier (failed) private scheme to build a navigable canal extending from Tulare Lake to the San Francisco Bay, a distance of more than 150 miles. The district was given eminent domain powers and was to hold elections to elect officers to exercise its functions. Henry Miller immediately saw existential danger to his water supply and got himself appointed to the governing board and also managed to lock up District's canal plans in the courts.<sup>32</sup> When the district failed financially Miller-Lux picked up the pieces. "Miller & Lux ... used its land and property rights to gain control of California's first major irrigation project, the San Joaquin and King's River Canal & Irrigation Company. Eventually Miller-Lux built a large part of the canal itself (though without its very costly navigation feature), as an irrigation project, allowing it not only to retain control of its water but postponing, for the time being, the threat that democratically controlled irrigation districts posed to their interests. The Miller-Lux empire was then fully engaged in the canal business through which they supplied water not only to their own lands but also sold water to many smaller farms and ranches in the area.

Haggin's diversion of the Kern, combined with a severe drought in 1877, led to the death of thousands of Miller-Lux cattle and in 1879, Lux brought suit, claiming that their riparian

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<sup>31</sup>Frank Adams, "Irrigation Districts in California," *Bulletin no. 21*, Reports of the Division of Engineering and Irrigation. p. 15.

<sup>32</sup> Iglar, p. 90.

rights had harmed illegally. There were two issues: one involved the relation of riparian to appropriative rights; the other was the issue of whether Miller-Lux had riparian rights to the watercourse leading to Tulare Lake (the Buena Vista Slough). The district court held, for Haggin, that the Slough was not a clearly defined watercourse and that Miller-Lux (therefore) were not riparians there. The judge also held that irrigation, by means of appropriations, was a natural necessity in California, presumably asserting that appropriations (for irrigation) were a superior to riparian rights. In 1884 the district court decision was overturned by the California Supreme Court in a sharply divided set of opinions. The Court accepted Lux's claim that riparian rights are superior to appropriations rights (at least outside of the mining districts) and that Haggin's diversion had impermissibly impaired Miller-Lux's (riparian) property rights. Haggin's people were disappointed with the result but they were rapidly able to bargain directly with Miller-Lux to share the waters of the Kern River. But the west side farmers and prospective settlers throughout the state were shocked and outraged by the victory of the Miller-Lux land monopolists.

After the California Supreme Court's ruling, William ("Boss") Carr, James Haggin's land agent, organized the initial political reaction against *Lux v Haggin*.<sup>33</sup> Based in Sacramento and Washington DC, Carr functioned as a "fixer" for the Southern Pacific Railroad and was the leader of the "Federal Ring," an organization of what Paul Gates has called "land pirates," who specialized in facilitating land acquisition by those able to afford his price. "Carr, aided by screaming, protesting farmers, helped to organize an anti-riparian convention in San Francisco in May 1886, and again pressured the state government to act against the court's ruling. Carr then toured the state and convinced a bare majority of state senators - and a vast majority of state assemblymen - to sign a petition that urged Governor George Stoneman to call a special session of the legislature to rewrite the state's water laws. Reinforced by a massive number of mint juleps and other drinks, the governor, in an advanced state of intoxication, signed the executive order to convene the legislature on July 20. The special session was a squalid affair. Votes were

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<sup>33</sup> Historian Donald Pisani described Carr as "the most powerful man in California politics during the late 1870s and 1880s." Carr had migrated to California during the gold rush and had made huge profits in the construction of mining ditches and levees. He eventually made important political and business connections in San Francisco and Sacramento where he met his future employers." Jeff, Bremer, "The Trial of the Century: "Lux v. Haggin" and the Conflict Over Water Rights in Late Nineteenth-Century California," *Southern California Quarterly*, Vol. 81, No. 2 (Summer 1999), p. 204.

reportedly bought and sold for outrageous prices.... Carr's men reportedly paid \$300 to each assemblyman who voted for the constitutional amendment abolishing riparian rights and another \$600 if the amendment passed the Senate” (Bremer 217) In the end however “...wagon loads of Miller's money, helped to destroy the chances to overturn the court's riparian ruling in the legislature.” (Bremer, 218)

This was not, however, the end of the matter. Boss Carr’s appeal to the “people” was soon to prove dangerous for the large farms as popular sentiment in the state ran heavily against the “monopolies” -- railroad, land, and water -- and their heavy reliance on immigrant farm labor. In fact, the Grange and other organizations, even if they especially focused their fire on riparian rights, sought to turn anti-monopoly sentiment against the big farms directly. In this calculus, Haggin fit the “land monopolist” description just as well as Miller-Lux did and, as time went on, it became harder to see how Haggin’s attacks on riparianism made him any different than Miller: both held immense cattle based empires and indeed both controlled large portfolios of riparian as well as appropriative rights. In any event, newly mobilized farm groups found common interest in enlisting state help in forming irrigation districts that could battle big landowner.

If Miller-Lux and Haggin (and their powerful railroad and mining allies) had the money, however, these other groups had the votes (or claimed to), and sometimes votes beat money. What the small farmers wanted was something that would allow them to form irrigation districts with the capacity to impose taxes and, crucially, to condemn interfering riparian rights unless those rights holders were willing to cooperate. The idea for these new creatures had long been urged by reformers as a way that smaller farmers could organize themselves cooperatively in order to compete with the larger firms.<sup>34</sup> The hope was that by imposing taxes on ranch land – a low valued use of land -- the monopolies would have an incentive to sell land to farmers who

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<sup>34</sup> Though there had been some earlier (unsuccessful) efforts to authorize irrigation districts, the model for the *Wright Act* districts, was the 1876 *West Side Irrigation District*, discussed above, which had been strangled in its crib by Henry Miller. “The original act is of great interest historically, however, because it set forth the framework and much of the verbiage of the general irrigation district legislation to follow in 1887.” Frank Adams, *Irrigation districts in California*, Sacramento, State Print Office, volume 21, 1929, p. 15.

would farm it more intensively.<sup>35</sup> To be useful to the small farmer, however, the new districts must be governed by majorities of people rather than by acreage. This feature made district proposals threatening to the interests of large farmers. Nonetheless, “The unpopularity of *Lux v. Haggin* ... helped to provide support for the passage of the *Wright Irrigation Act of 1887*, which authorized the formation of irrigation districts to distribute water to non-riparian lands.” (Bremer 219) *Wright* districts were exactly what the populists wanted: “...the act authorized the formation of irrigation districts as special units of local government. Fifty (or, in small districts, a majority) landowners in an area could secure organization of a district upon approval of the county board of supervisors and two-thirds of the electorate in the affected area. Once organized, the district had the power of eminent domain to obtain water through condemnation of the necessary riparian rights.”

It is no surprise that the *Wright Act* provoked intense opposition and polarized state and western politics. “One reclamation official considered the *Wright Act* a model for irrigation legislation in the west. Others claimed it was a good idea, but badly implemented. Future Reclamation Commissioner, then Wyoming State Engineer, Elwood Mead declared the *Wright Act*, ‘a disgrace to any self-governing people.’”<sup>36</sup> Large landowners, like Henry Miller, worried that the new powers given to the *Wright Act* commissions would allow local majorities to impose unwanted projects and assessments on them. A resident of the Sacramento Valley asked cogently “...is it right for the many men of small holdings who generally hang around those little villages and the men with no holdings at all, except a cigarette holder, to waltz up to the polls on election day, and cast their vote, and thereby become dictator to the man with his thousands of acres of land.”<sup>37</sup>

Large landholders were right to worry. California courts rapidly accepted, the “public” character of irrigation districts in upholding the *Wright Act*. In *In re the Bonds of the Madera*

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<sup>35</sup> “Given that bank credits in 1878 were not classified as taxable property, large land holdings held for speculation were taxed only lightly, and portions of railroad property were totally untaxed, small farmers objected bitterly to paying for the bulk of the state's operations and services through what, given the taxes on mortgaged property, they considered “double taxation.”” Lustig, op cit. p. 50.

<sup>36</sup> Gordon Miller, “Shaping California Water Law, 1781 to 1928,” *Southern California Quarterly*, Vol. 55, No. 1 (SPRING 1973), p. 24.

<sup>37</sup> From a Colusa newspaper, quoted in Donald Pisani, *Water, Land and Law in the West*, Lawrence: University of Kansas Press, 1996, p. 99

*Irrigation District*, 92 Cal. 296 (1891) which permitted the districts to choose their own voting rules. This made the big landowners even more determined to oppose them. Suits were soon brought in state and federal courts arguing that *Wright* districts were ‘taking’ property without compensation. The US Supreme Court, in *Fallbrook Irrigation District v. Maria King Bradley* however, rejected that challenge in 1896,<sup>38</sup> following the state courts in deeming reclamation a form of public use and arguing that the Commission procedures constituted adequate due process protection for property holders. It looked, by end of the 19<sup>th</sup> Century that the era of the big industrial farm operations may have ended and that the voters – either in local districts or in state and federal legislatures were about to place severe – and perhaps fatal -- limits on the “industrial” farmers in favor of the little guy.

Money has many ways of talking back however. Most of the *Wright* districts soon failed: “49 districts were organized of which 26 went beyond the point of organization and seriously attempted to function... only 8 of these have survived.... 6 of the 8 having...financial reorganizations.”<sup>39</sup> Of the 2,000,000 acres of irrigable land in the original districts, no more than 200,000 acres were put under the ditch by *Wright Act* districts. The flaw in the *Wright* scheme was that “The districts' encountered problems in selling their bonds, filling their reservoirs, and fairly allocating water.”<sup>40</sup> In effect, financial markets placed severe constraints on the potential damage, by refusing to loan money. The threat seemed to have been averted in the short run. Whatever the financial problems of the districts, however, the long term threat of the *Act* was clear to the big farmers: if area residents were given the power of the initiative to organize and run (by majority voting) local reclamation schemes, and also possessed eminent domain powers to condemn other water claims, what was to stop them from expropriating investors as well as

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<sup>38</sup> The district court in the case had ruled, among other things, that the Act was an illegal taking and violated due process under the Federal Constitution. The Supreme Court reversed: “Due process of law is furnished and equal protection of the law given in such proceedings when the course pursued for the assessment and collection of taxes is that customarily followed in the state and when the party who may be charged in his property has an opportunity to be heard. The irrigation acts make proper provisions for a hearing as to whether the petitioners are of the class mentioned or described in them, whether they have complied with the statutory provisions, and whether their lands will be benefited by the proposed improvement. They make it the duty of the board of supervisors, when landowners deny that the signers of a petition have fulfilled the requirements of law, to give a hearing or hearings on that point.” *164 U.S. 112 (1896)*

<sup>39</sup> Wells Hutchins, *Irrigation Districts, Their Organization and Financing: Technical Bulletin 254*(June 1931), US Department of Agriculture, p. 72.

<sup>40</sup> Eric A. Stene *The Central Valley Project – Introduction*, <http://www.usbr.gov/history/cvpintro.html>.

property owners? If the courts were unwilling to stop these unconstitutional entities or limit their powers, other steps had to be taken to limit the damage they could do. Therefore, once populist tempers cooled and people became sufficiently distracted, the large landholders would need to mobilize the legislature to find ways to neutralize the threat posed by the *Wright Districts*.

Ten years later an opening appeared. "Under pressure from large landowners, California amended the *Wright Act* in 1897, stopping the establishment of irrigation districts until the formation of the *Irrigation Districts Bond Certification Commission*."<sup>41</sup> The new *Commission* was given certification authority over bond issues, requiring that project benefits and assessments be allocated in proportion to acreage and requiring that project benefits exceed costs. While the districts were not required to get initial *Commission* certification for a bond issue, the state also did not guarantee the bonds. Importantly however, certification, if successfully sought, made it easier for a district to sell bonds. Moreover, once certified bonds were issued, it was thereafter illegal for the district to issue any further bonds without approval of the *Commission*. With this amendment, irrigation and other water districts began to take their place as central fixtures of California's water government. "In contrast [with the failed early *Wright Act* districts], the second wave of district formation (1909-1927) was to meet with long-term success. During this second wave, 112 irrigation districts were formed, several of which remain active up to the present... This period witnessed the decline of the private irrigation company as the irrigation works of many of the largest and most important private companies were acquired by irrigation districts."<sup>42</sup> This evolution was probably not coincidental.

Soon California courts found a way to permit the use of a property-based franchise to elect representatives in reclamation districts: "Six years after the *Madera* judgment, reclamation districts were found not be municipal corporations like irrigation districts, but quasi-corporations, 'part of a scheme for conducting a public work, and not for self-government.' (*People ex rel. Sells v. Reclamation District No. 551*, 117 Cal. 114 at 123 (1897)).... no one is a voter therein in the sense of section 24 of Article I, and section 1 of Article II of the constitution;

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<sup>41</sup> <http://www.usbr.gov/history/cvpintro.html>.

<sup>42</sup> Edward McDevitt, "The Evolution of Irrigation Institutions in California: The Rise of the Irrigation District, 1910-1930," *The Journal of Economic History*, January 1966.

nor is their organization rendered invalid because votes for the trustees of the district are allowed to be cast in proportion to the ownership of property therein. . . ."<sup>43</sup> The California Supreme Court eventually (unanimously) approved property qualification for reclamation districts in *Barber v. Galloway*, U95 Cal. 1 (1924). By then, the legal basis for the capture of irrigation districts by large farms was complete – at least until the Warren Court began to turn things upside down again.

Not surprisingly, these new districts increasingly fell under the control of the larger landowners, a situation that continues to today for the most part. Not surprisingly, Donald Pisani was able to date the actual surge in district formation to the post World War One period when, driven by increased demand for agricultural products, immense new acreage came under irrigation, driving up property values and cementing California's domination of agriculture. Westlands, heir to the flagship water district illustrates what happened in new modeled property apportioned water districts. "In the *Westlands Water District* ... a district which comprises 597,778 acres and has more than 3,000 landowners, ten landowners account for 43 percent of all the land in the district. This situation, coupled with assessed valuation voting, means that a handful or so of corporations and individuals effectively controls district elections...." The same thing was replicated throughout the Valley. "In the *Tulare Lake Basin Water Storage District*, four corporations farm nearly 85 percent of the district's land, and the J. G. Boswell Corporation alone, with its vast landholdings, commands 37,845 votes, enough to determine who is elected to the district board of directors."<sup>44</sup> Indeed, "capture" of the irrigation districts by big farmers may well have been the key to their success in managing water conflicts peacefully. Of course, small farmers lost control (as expected). Moreover, as an immediate consequence of this surge in irrigation districts and irrigated acreage, water tables begin to fall rapidly, especially in the Southern and Western parts of the Valley.<sup>45</sup>

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<sup>43</sup> David Martin, "'One Person, One Vote' and California's Water Districts," *Natural Resources Lawyer*, Vol. 8, No. 1 (1975), p. 10.

<sup>44</sup> Until the early 1960s California statutes tended to feature property qualifications in all kinds of water district elections. The situation at that point (when 'one person one vote' jurisprudence commenced) was striking: "Nominating petitions for the 1971 board elections in *Westlands* indicate how trusts and corporations relate to political influence. In that year a current board of directors member signed a nominating petition in the following manner: in his own name; as vice-president of one corporation; as president of another; and as trustee of a children's trust." Merrill R. Goodall and James B. Jamieson, "Property Qualification Voting in Rural California's Water Districts," *Land Economics*, Vol. 50, No. 3 (Aug., 1974), p. 293.

<sup>45</sup> Donald Pisani, *From Family Farm to Agribusiness*, Berkeley: UC Press, 1984. Chapter eleven.



Nevertheless, at the start of the 20<sup>th</sup> Century, California courts were still not yet persuaded to set aside common law (riparian) doctrine. Appellate courts ignored the *Wright Act* or interpreted it and other legislative enactments very narrowly with regard to water rights. The new districts generally controlled only appropriative rights and, for the most part, riparians already controlled downstream bottom lands and were fiercely protective of their rights. State courts regularly supplied injunctions against diverters under the ‘no injury’ standard even if actual injury had not been established, or even alleged, in court.<sup>46</sup> The trespass itself was considered presumptively injurious. Over the forty years following *Lux v Haggin* California courts repeatedly held that appropriators were mere trespassers with respect to riparian rights holders and appropriators were unable legally or political to diminish the force of these rights. In 1909 the state Supreme Court stated quite brutally: “As against an appropriator who seeks to divert water to non-riparian lands, the riparian owner is entitled to restrain any diversion which will deprive him of the customary flow of water which is or may be beneficial to his land. He is not limited by any measure of reasonableness.”<sup>47</sup> This last phrase is key: it meant that the court understood the riparian right to be essentially absolute. The rights holder could use her water for any purpose or whim and could freely waste it or pollute it if she so chose. As one can imagine, what had been a license to extort upstream appropriators, became even more valuable because now it applied downstream as well as upstream.

### ***Codification Politics***

The struggle between the courts and the legislature that followed *Lux v Haggin* came to head with the rise of *Progressives* in California early in the 20<sup>th</sup> Century. “In his inaugural address to the legislature in 1911, Governor Hiram Johnson ...told the legislature that ‘the great

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<sup>46</sup> The *Madera Canal* holding turned out to be a kind of Trojan horse in some ways. By ruling that riparians were entitled to sue trespassers the court held that any appropriation is adverse to the riparian whether or not she has taken any formal notice of it. This permits someone asserting a prescriptive claim against a riparian to start the clock on her adverse possession claim prior to any actual complaint from the riparian. This greatly simplified subsequent litigation from the prescriber’s viewpoint as she would not need to prove her trespass was counter to the interest of the riparian.

<sup>47</sup> *Miller and Lux v. Madera Canal and Irr. Co.*, 155 Calif. 59, 64 (1909). Limitations were sometimes placed on riparian rights however. Congress passed a statute in 1870 requiring appropriations on federal lands. And there were restrictions on exporting water outside the watershed even if rights to it were founded on riparian claims. Moreover, courts accepted the doctrine of “adverse diversion,” permitting an appropriative right – a prescriptive right technically speaking -- where a diversion has existed publically for five years.

natural wealth of water in this state has been permitted, under our existing laws and lack of a system, to be misappropriated and to be held to the great disadvantage of its economic[al] development.’ The legislature responded with an act creating the California State Conservation Commission. It was authorized to investigate the water resources of the state and to make recommendations for reforming the laws with a view to promoting a fuller development.”<sup>48</sup> The commission returned with a recommendation to establish a new state agency and to reformulate California water law based on the appropriations doctrine. The new water commission would be led by experts and would replace existing methods of establishing rights with an administrative process, which would not require frequent resort to the courts. “... the vagaries of the state’s water law and the inconclusive manner of determining water rights necessitated an excessive amount of adjudication. The result was that the ‘longest purses’ could ‘indefinitely harass and annoy those whose purses’ were ‘not so long.’”<sup>49</sup>

The legislature rapidly adopted these proposals in a statute which soon triggered powerful opposition. This was not very surprising as on its face the *Water Commission Act* not only undercut many existing water rights but also removed procedural protections for those rights that remained in place. The landmark 1913 law established an administrative body – a state water board – with the authority to establish and record water rights. The Act declared “... all unappropriated waters, and riparian waters not ‘reasonably needed for useful and beneficial purposes,’ to be ‘public waters of the State of California.’ These waters, including riparian waters not ‘beneficially’ applied within ten consecutive years following passage of the act, were declared subject to appropriation.” In other words, the Water Commission was empowered to redistribute water rights unless water users took steps to comply with the new legal impediments on their traditional rights. In effect, virtually all water rights in the state were vulnerable to the new agency.

Under the 1913 Act, appropriated rights could be established only by conforming to an administrative permitting processes (now lodged in the *State Water Resources Control Board*,

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<sup>48</sup> Gordon Miller, “Shaping California Water Law, 1781 to 1928,” *Southern California Quarterly*, Vol. 55, No. 1 (SPRING 1973), p. 27.

<sup>49</sup> Op cit. 27.

SWCB, under various provisions of the *California Water Code*). Appropriated rights can be lost if they are abandoned or not used for a period of time. And they can be transferred as long as the transfer does “no injury” to other entitled users.<sup>50</sup> The first appropriator has rights “senior” to those of later appropriators (“*first in time, first in right*”): a senior rights holder is entitled to her full water allocation prior to making water available to a rights holder junior to her. Riparian and pre-1914 appropriated rights are called *senior* rights; others (either acquired later or in some other way) are *junior* to those rights (and, of course, seniority among those junior rights is further regulated by the first in time principle).

In 1913 when Governor Johnson signed the *Water Commission Act*, into law, the political response was immediate. Signatures were rapidly gathered for an initiative overturning the *Act*. In the end the initiative campaign failed and the statute went into effect the following year, marking 1914 as a critical moment in California’s water history. The *Act* made – or sought to make -- appropriations doctrine paramount over riparian rights. It effectively converted pre-1914 riparian rights to early (first in time) appropriations rights which were limited by “reasonable” and beneficial use standard.<sup>51</sup> Just as important, the act established procedural requirements for establishing an appropriative right: such rights were no longer to be established merely by posting a public notice on the stream or filing in a local land office and simply diverting the water. From this time forward, surface water rights would be determined by a state agency, which could refuse to grant a right or impose conditions. At least that applied to new appropriative rights. The older ones, as happens in many compromises, were grandfathered. But probably not forever.

It is important to see what was at stake in legal struggles over whether a use had to be reasonable. If a right is qualified by reasonable use then it is possible to challenge its use in administrative proceedings. That is, of course, the purpose of imposing the reasonableness criterion. The state water agency was now authorized to consider the effects of how water is used and specifically to inquire as to the value for which it is used. The reasonableness standard

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<sup>50</sup> I am not sure how the 1913 Act changed the strict no injury standard that courts had been using, prior to passage. Possibly the agency established a process to construe injurious use.

<sup>51</sup> Catherine Miller, “Riparian Rights and the Control of Water in California, 1879-1928: The Relationship between an Agricultural Enterprise and Legal Change,” *Agricultural History*, Vol. 59, No. 1 (Jan., 1985), pp. 1-24.

invites litigation and empowers courts to resolve water conflicts, and the considerations that can be considered by a court are fairly open ended. As social values change, as new people move in, or as the composition of the courts or the legislature changes, the notion of reasonability is up for reinterpretation. As momentous as these new considerations may have been for those holding rights to surface waters, the consequences have turned out to be even more profound for groundwater rights for reasons that we will see below.

By requiring that new appropriations be granted by the agency, and by keeping centralized records of those (post 1914) rights, the new agency had an immediate effect beyond establishing a system to allocate water rights. The Water Commission was also meant to develop state expertise that could be useful in future litigation as well as water planning. The effort to eliminate riparian rights – or at least to put them on the same footing as appropriations rights -- did not really succeed. At least not immediately. Because riparians could only use “their” water on adjacent lands, riparian rights did not permit interbasin transfers. Moreover, riparians held the right to block new appropriations under the no injury standard. This imposed severe disadvantages for rapidly growing cities because it required them to buy up both riparian and appropriations rights in order to get new water. This is what Los Angeles had done with the Owens River. Notoriously, the city (or its agents) had acted deceptively in acquiring water rights but, under existing law, riparians could have held up any water transfer by invoking the “no injury” standard. Faced with this prospect, Los Angeles had no choice but to acquire – one way or another – riparian as well as appropriative rights to the Owens. To prevent a holdup, in fact, they needed to buy up the entire riverfront. Deception was necessary and probably politically inevitable if Los Angeles was to acquire water from outside its own basin. San Francisco managed to sidestep this problem by building Hetch Hetchy on federal lands, where the government was the riparian and did not exercise its no injury rights.

The legislative fight over the *Water Commission Act* was finished once the 1914 initiative campaign failed, but the *Commission* still had to run the judicial gauntlet to see which parts, if any, of the new statutory regime would stand. The state Supreme Court gave its answer in *Herminghaus v Southern California Edison Company* (1926), in which the riparian rights holder challenged SoCal Edison’s proposal to impound overflow in the San Joaquin for purposes of

power generation. In that case the California Supreme Court set aside the portion of the *Water Commission Act* that permitted an appropriation infringing riparian rights. The court essentially reasserted its 1909 holding in *Madera Canal* that riparian rights were not subject to a reasonableness limitation and that, notwithstanding the legislature's efforts, the riparian could enjoin any impoundment that threatened his usage.

The legislative reaction was quick and came only two years later (1928) and this time, it stuck. The reaction took the form of a constitutional amendment that established that the doctrine of "reasonable use" applied to all waters in the state (riparian and appropriative; surface and groundwater). The amendment settled legal matters as both the California and US Supreme Courts eventually accepted this doctrine in repeated rulings (though, in the case of the state courts, there was still further hemming and hawing). While the amendment did not technically abolish riparian rights, the reasonableness standard had the effect of putting all rights under a similar regulatory standard and establishing 1914 as a critical division between senior and junior rights, giving the Water Commission plenary authority to regulate rights allocation thereafter.

Gradually (if grudgingly), therefore, courts accepted important limiting principles on water use. Water use must be reasonable and beneficial, and therefore subject to regulation. What uses count as beneficial and reasonable use has fluctuated over time: it has always included domestic use and (in California) use for mining operations (though, not for disposal of mine wastes after 1884); it has come to include irrigation, recreation, and eventually habitat preservation, etc. Importantly however, reasonable and beneficial categories have increasingly been shaped by state and federal statutes as well as by evolving legal doctrines (especially the *public trust doctrine* as we shall see).<sup>52</sup> At more or less the same time, courts have moved toward widening the principle that all water rights are essentially *correlative*.<sup>53</sup> Under common law, riparian rights, while not subject to a reasonableness standard, are subject to some kinds of

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<sup>52</sup> Note that mining has lately been losing its beneficial status: the court, in *Joslin v. Marin Mun. Water Dist.*, 429 R2d 889, 895-96 (Cal. 1967), held that it was not reasonable to use water to carry and deposit sand and gravel for commercial purposes. Surely, such a use would have been reasonable a century earlier.

<sup>53</sup> The requirement is now embedded in the state constitution which requires that "...the water resources of the State be put to beneficial use to the fullest extent of which they are capable . . . and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. *Cal. Const, art. X, § 2.*

regulation. A riparian could not, for example, impound water for more than 30 days and, traditionally, could not use water for irrigation. While the notions of reasonable or beneficial use permit regulation of the kinds of *uses* that water can be put to, the notion of correlativity also places limits in *how much* water can be taken and for *how long*, independently of how the water taken is used.<sup>54</sup> This is in sharp contrast to appropriative rights which were not, traditionally, considered to be correlative at all. An appropriator could take any amount of the water as long as she put it to reasonable use continuously (if she was first in time) and need not return it to the stream at all. Indeed, miners often diverted whole streams, taking the water miles from its original course, leaving the original stream empty. More recently appropriators have sometimes decided to bottle and sell appropriated water to sell it in distant cities, As long as there were no prior riparians downstream to claim injury, such a diversion would stand. Forever.

Obviously, courts and agencies under the 1913 Act, which was aimed at putting all the state's waters under a common framework, had to work out ways to harmonize these conflicting doctrines and control them through administrative means. This required that courts and agencies regard water rights in California not as "ownership" rights but as use rights (usufructuary rights) which are subject to regulation. When you own a water right what you own is a place in line to receive water for a reasonable use. When water needs to be rationed (as it does during droughts and late in almost every growing season), junior rights holders may not expect to receive water at all; indeed, if the drought is sufficiently severe even senior rights holders may not get what they are "entitled to" either. Rights of this kind are valuable but they are not the same as water. Rights holders are ranked according to various principles but this ranking does not resolve all conflicts and it remains necessary to invoke further regulatory principles. And in any case, shifting social values lead to changing ideas as to what uses are reasonable or beneficial.

California's peculiar doctrinal contradictions forced courts into taking a central role in resolving disputes among claimants. But, as there was no overarching principle to reconcile the contradictions, court decisions have often turned more on specific facts (as the result in *Lux v Haggin* did), or, if they attempted more, amounted to judicial legislation. Courts, however,

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<sup>54</sup> Sidney J. Strong, "Application of the Doctrine of Correlative Rights by the State Conservation Agency in the Absence of Express Statutory Authorization," 28 *Mont. L. Rev.* (1966).

eventually began to recognize another type of right as water has become scarce is already fully allocated (ie. In overdraft) – an increasingly common circumstance in California’s arid conditions. A *prescriptive* right can be claimed against existing rights holders only when water rights are fully allocated, and not against the public domain.<sup>55</sup> “Prescriptive groundwater rights are not acquired by taking surplus or excess water.... taking of groundwater that is not surplus is wrongful, and may ripen into a prescriptive right [only] when the use is actual, open and notorious, hostile and adverse to the original owner, continuous and uninterrupted for the statutory period of five years, and under a claim of right. (See, generally, *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.)”<sup>56</sup> A prescriber, in such a situation, necessarily trespasses on someone’s existing right. For such a claimant to establish a prescriptive right, her trespass must be publicly notorious and survive for a considerable period of time without challenge by the current rights holder. Prescription is especially important in allocating groundwater but, in some circumstances prescription is available for claiming surface waters as well.<sup>57</sup>

Increasingly, as we have seen, the legislature and state agencies have played a much more important roles in regulating water. For example, the construction of the Central Valley and State Water Projects has created what are called *contractual rights*. *Contract water* is created when a federal or state reservoir controls water that would otherwise flow to the sea (“surplus water”) and is allocated to contractors who purchase it from the state.<sup>58</sup> Users then purchase contract water from a water contractor who allocates it according to the established priority of rights. Those who hold “senior” water rights can normally expect to receive their nominal allocations from the natural flow of the rivers from the federal and state water projects from

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<sup>55</sup> If there are any remaining, nonallocated, public domain waters, the conditions for prescription fail.

<sup>56</sup> There are other kinds of rights as well that I do not discuss. *Pueblo* rights are held by some towns that were established under Mexican rule. And A Summary of the California Law of Surface Water and Groundwater Rights, (memo posted by the Sacramento law firm, BARTKIEWICZ, KRONICK & SHANAHAN at [http://www.norcalwater.org/wp-content/uploads/bks\\_water\\_rights.pdf](http://www.norcalwater.org/wp-content/uploads/bks_water_rights.pdf)).

<sup>57</sup> *Brewer v. Murphy* C.A. 5th; April 3, 2008; F051700. In this case the court held that “...lower riparian owners can acquire prescriptive water rights by adverse use, and the acknowledgment of an upper riparian owner's water rights through failed negotiations does not destroy a lower riparian owner's claim to adverse possession.” Brownstein Hyatt Farber Schreck, “Priority in Vested Water Rights Survives Nevada Statutory Conflict,” Brownstein Hyatt Farber Schreck, *Journal (American Water Works Association)*, Vol. 100, No. 9 (September 2008), p. 20.

<sup>58</sup> Bureau of Reclamation, “Mid-Pacific Region, Central Valley Project - Water Contracts,” May 2017, <https://www.usbr.gov/mp/mpr-news/docs/factsheets/cvp-water-contracts.pdf>.

contractors whose job it is to allocate *contract water*. Junior rights holders may not receive anything in most years and must either purchase water from more senior rights holders or rely on their own groundwater. Obviously, in dry years, the price of contract water – whether it is purchased from a contractor or is resold by a senior rights holder -- will tend to be high and junior rights holders will be forced to rely more on groundwater.

While state-created contract water has been accepted by water users, state regulatory efforts have often been strenuously contested (both politically and legally). Local interests – especially big farms – have seen state agencies as threats to their traditional rights (even if their rights claims are incoherently situated in conflicting doctrines). Public entities also had claims to water that were not easily situated in the riparian-appropriative duality. Indeed, public claims are often regarded as superior to private rights of either kind. Some municipalities (Los Angeles for example) held traditional “pueblo” rights which had been conferred by the Spanish and Mexican government. A city holding a pueblo right could assert claims superior to private rights over water (though the reach of these claims had to be litigated), and even to water outside the city/pueblo boundaries.<sup>59</sup> Evidently then, *public* could claim priority over water that could be expanded and elaborated as water became more scarce and valuable. We will see later that the evolving “*public trust*” doctrine – which has served as a legal basis for environmental claims – finds support in this legal/political fact.

An important feature of water rights is that there are many more water rights than water: a lot more. The over-allocation of water rights is a consequence of the fact that water flows in California are highly variable both within and between years. Water rights are essentially a political creation. The agency that issues rights tends to grant water rights relatively easily as a way to minimize short run conflicts; after all, what is being given out is merely a place in the back of the line for water. Moreover, water users routinely overestimate their own usage – presumably to retain their hold on their rights by showing that they are using all of their available water. But, as these routine practices have cumulated over time, the “...over-allocation of available supplies, coupled with uncertain water use by individual water right holders, has become a significant handicap for water policy and management reform. As regional drought and

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<sup>59</sup> Los Angeles was able to make very creative use of its pueblo rights in getting control over Owens River water.



growth reduce available supplies, inaccurate water use accounting has also intensified conflicts over water.” (ibid, p.2.) The results are seen in a recent survey conducted to estimate the relationship between water rights and water supplies concluded “...that water right allocations total 400 billion cubic meters, approximately five times the state’s mean annual runoff. In the state’s major river basins, water rights account for up to 1000% of natural surface water supplies, with the greatest degree of appropriation observed in tributaries to the Sacramento and San Joaquin Rivers and in coastal streams in southern California.”<sup>60</sup>

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By the turn of the 20<sup>th</sup> Century while private investment had been sufficient to drain swamps, channel rivers, and provide some water for irrigation, there were problems that individual farmers could not solve. Repeated irrigation depleted and polluted the soils, reducing productivity and profit. Moreover, in the lake bottoms, periodic floods could wipe out years of expensive irrigation works and prolonged droughts would render them useless. Lots of the land had also been ruined by excessive irrigation from the Tulare and Buena Vista lakes. Productive irrigation needed a better and fresher water supply, from higher in the mountains or further north. It also required upstream dams to control periodic floods that could destroy expensive canals and levees. These jobs were too big or too costly for even the largest private enterprises. Moreover because resolving these upstream issues would provide benefits to many farmers, each was tempted to free ride on the efforts of others. Eventually therefore, the big farms began to put political pressure on the state and federal governments to find ways to smooth and stabilize flows: to make the rural economy a more efficient industrial machine. In effect, they sought to use government to solve the collective action problem. The big farms had, in fact, already built large lobbying operations and were not reluctant to plant their agents in Sacramento, San Francisco and Washington D.C. and use them to build the political backbone for government

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<sup>60</sup> Theodore E Grantham and Joshua H Viers, “100 years of California’s water rights system: patterns, trends and uncertainty.” *Environ. Res. Lett.* 9 (2014). These data are tricky to interpret as water is normally used more than once. The authors are careful to remove water rights for hydropower from their calculations (all of that is available for re-use except for what evaporates). But irrigation water often runs off to a river or to an underground aquifer. Moreover, the authors only considered post 1914 water rights – those under the jurisdiction of the water board. These two effects seem to offset each other qualitatively. The authors, who wrote while at UC Davis, are now with USGS and are widely respected. They are convinced that there is massive overpermitting despite these data problems.

water projects. As we shall see however, this could not happen until Washington and Sacramento had become less receptive to popular anti-monopoly sentiment – manifested in the reactions to *Lux v Haggin* -- which prevailed in the late 19<sup>th</sup> Century west.

The principal federal agency with the competence and mission to deal with water resources – the Army Corps of Engineers – had long been guided by an austere view of the mission of an agency of the federal government. The Corps originated in an 1802 statute that authorized the agency to build a military academy at West Point. It soon expanded in building fortifications, lighthouses, jetties, piers and harbors – all of which had obvious military value. But soon enough the Corps’ responsibilities spilled into projects that beneficial to civilian interests. However, the Corps operated in a federal system where states and localities tended to be suspicious of innovations from the national government. Traditionally (before the 20<sup>th</sup> Century), therefore, the Corps mission had mostly been restricted to enhancing the navigability of the “waters of the United States,” which was understood to limit the Corps to constructing works with public rather than private purposes. This placed two kinds of restrictions on Corps’ activities. First, a Corps project had to be placed on waters that had some connection to navigation.<sup>61</sup> Second the navigability requirement was understood restrictively in the sense that the Corps was constitutionally prohibited from constructing works for the (primary) purpose of flood control because such projects would have the (primary) effect of protecting specific private properties. As a public agency, the Corps did not have the authority to direct benefits to some private interests rather than others. That did not mean that the Corps did not build projects that had a secondary effect of controlling flooding. However, such projects, if they were built by the Corps, had to be for the purpose of enhancing navigability. Any flood control benefits had to be incidental to navigability. Or at least, that had to be the way the project was proposed to Congress and presented publicly. Thus, the Corps could and did build levees along the Mississippi and its tributaries and sometimes even built upstream dams that would limit flood damage and assure adequate water levels throughout the year. But constitutional and ideological

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<sup>61</sup> The definition has evolved over time; this is how it stood in 1986. “General definition Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity.” 33 *CFR Part 329 Definition of Navigable Waters of the US AUTHORITY: 33 U.S.C. 401 et seq. Section 329.1*

constraints limited what the Corps could do either directly or by means of the prudential caution of its leaders. The anti-monopoly sentiment manifested in the *Wright Act* episode, moreover, played directly into Corps' conservatism. Any provision of impounded waters to large farms, even if incidental to a legitimate Corps project, was viewed with suspicion by small farmers and politicians.

Obviously, the prospects of sanctimony and charade were abundant in the Corps austere posture. While attractive in many ways, the Corps' efforts at self restraint was put under pressure politically and economically by the turn of the 20<sup>th</sup> Century. For one thing, the population grew and spread into flood plains and arid areas and there were increasingly devastating floods that caused immense economic damage and loss of life. The "navigability" constraint prevented the Corps from dealing effectively with this problem. Part of the reason is that because the Corps had long rejected building large dams – which are not necessarily useful for maintaining navigability – it had not developed the relevant engineering skills was not really competent to do it. Besides, dams and levees constructed to limit floods, can conflict with the Corps' core mission of maintaining navigability. So, by the turn of the century, Congress began creating other agencies with dam building competence – potential competitors for the Corps.

The most important of the new federal agencies were created in the context of an institutional power struggle between the Agriculture and Interior Departments, each of which had a claim on what was called "reclamation" policy. Interior Department bureaus controlled much, but not all, of the public domain including mineral resources, tribal and other public lands. Its bureaus had primary authority for surveying the West, including especially its water resources. The Department of Agriculture controlled the national forests as well as having jurisdiction over farm issues and, because of that, developed extensive expertise concerning irrigation. And, as with land distribution, the laws delegating authority to these bureaus usually (virtually always) contained acreage restrictions that limited who could receive federal irrigation waters. Typically, project benefits were to be restricted to holdings of 160 acres or perhaps some small multiple of that (depending on the specific statute). In deserts and forests the permitted acreage might be larger but, in any case, the limits were restrictive. In the case of water in the arid western states – flood control or irrigation -- these restrictions were no more realistic than

they had been with land. This was especially the case in California where most of the best public land had already been sold and was largely in private hands – often in holdings of thousands of acres. It was Quixotic to think that reclamation or flood control programs could avoid benefitting private landowners, many of whom owned large farms and ranches.

In any case, federal agencies gradually got into the business of flood control and irrigation. The Corps, itself was able to get into the flood control more directly – as a primary project purpose -- and to build more and more dams. The waters impounded in the reservoirs however, raised a new a more vexing problem for the Corps but it also pointed a way for the leaders of the Corps to reconsider its mission. Its root was the demand by Western Senators – representing newly admitted states -- that the Federal government find ways to address the specific problems of the arid West and, specifically, to provide water for irrigation. In fact, by the beginning of the 20th Century new laws and state and federal agencies had been created with the purpose of harnessing water for the purpose of reclaiming swamps and irrigating deserts. The Corps therefore faced prospect of competition from new agencies on a new front. It was already competing to build dams; now it had to compete to provide irrigation benefits. The competing agencies had been created with powerful congressional support and the Corps seemed to face significant headwinds in this struggle. From the standpoint of Western senators, however, it was probably a matter of indifference which federal agency built dams and reservoirs as long as they were willing to make that water available for irrigation. The Corps was forced to expand its mission or become irrelevant. As it turned out, the Corps had significant advantages in this struggle.

For more than half a century new projects made new (unclaimed) water available at cheap (federally subsidized) prices. The lingering effects of acreage restrictions usually melted away too. Eventually the states got into the same business. By the end of the 20<sup>th</sup> Century however, new water was largely allocated and other conditions began to operate in ways that began to reverse supplies of cheap water. Farmers, and municipalities, were forced to look to new water sources.

## Groundwater Politics

When California became a state everyone believed that a person who owned land had an unrestricted right to use the water underneath. That was reflected in common law and in ordinary common sense. Until the 20<sup>th</sup> Century, anyway, it was too costly to rely much on wells, at least not for ranching or farming the low value crops commonly grown in California. Digging and pumping were too expensive and ineffective at reaching water in the quantities needed. Dry farming, and spontaneous by seasonal floods, were cheaper and more practical ways to raise crops. By the end of the 19<sup>th</sup> Century however, drills and pumps became more powerful and more cost effective and the economic calculus began to change. More and more wells were dug and they went much deeper than existing wells. In some parts of the state, water tables began sinking rapidly. Digging deep wells remained expensive however, and so it was attractive only if the resulting crops could command high prices. The new agricultural economy therefore pushed a crop cycle, in which high valued crops replace lower ones. At least this would be the case as long as the marginal cost of water was equal to the marginal cost of groundwater.

With more and deeper wells, moreover, external effects of groundwater extraction became more pronounced. People increasingly resorted to courts and legislatures to try to put limits on groundwater extraction. Most of the early disputes were argued in courts and, as a result, legal doctrines evolved to reflect the underlying conflicts. Even so, regulatory intervention by outsiders (courts and agencies) provoked political resistance and evasion. For many the preferred way to preserve their rights was to keep drilling and extraction private. The struggle was not only between farmers and legislatures and courts; it was also between municipalities and water companies and big and small farms. In the countryside, small farmers were often unable to win a water war on the ground or in the courts and so their organizations (the Granger movement stands out) tried to enlist the legislature in efforts to get some access to groundwater. Still, the big farms were mostly able to adjust to this strategy and were able to keep water. Even if farmers' movements may have the votes, big farms were usually able to control local governments and districts and they usually had the ear of state and federal officials too. In cities the struggle was often between municipalities and water companies seeking supplies to growing populations, in addition to farmers. More recently, however, environmentalists have succeeded in enacting environmental laws that push state and federal governments to limit the use of both

surface and groundwater in order to restore stream flows. However wealthy they may be, the fight to keep control of groundwater is one that the big farms may not be able to win in the long run. Still, I would not discount their chances to succeed for a long time.

Groundwater rights have traditionally been much less regulated than surface water rights for practical as well as legal reasons. Until recently, such regulation as there has been, was mostly driven by courts rather than by legislatures. But judicial interventions have not been able to put an end to the groundwater crisis or even to slow it down. Surface water disputes can often be settled satisfactorily by courts because the interested parties can usually observe the behavior of violators and have incentives to challenge them. Disputes are often bilateral: an upstream diverter reduces the flow of the river and he is sued by a rights-holder downstream who alleges an injury. If the diversion was illegal according to the doctrine, an injunction can issue. Groundwater disputes are more complicated. The water level in a well is reduced but it is often not clear whose action caused the reduction nor that that action is wrong. A harmed party may not have means to find relevant facts or to act on them. Often groundwater disputes have the feature of a common pool – in which a multitude of parties are drawing water from the same source. For the past century, courts have treated groundwater rights as *correlative* which means that the overlying landowners are considered to share the groundwater beneath their land as jointly held: a common pool. If the common pool is sufficient for their needs it is considered to be *in surplus* and this surplus may be appropriated in the same way that surface waters may be. If the common pool is insufficient for the demands of overlying interests it is considered to be in *overdraft* and anyone who takes water in overdraft is doing a wrong (or trespass), which can be enjoined by a court. In principle, courts are competent to resolve such disputes if they could find the relevant facts.

Courts, however, lack the capacities that legislatures have to seek and establish facts. Courts normally must rely instead on the parties before them (and interested amici) to get information concerning the disputes they are asked to settle. Judicial respect for due process requires that factual claims by a party must be contestable by others. Failure to permit such challenges can be grounds for appealing the decision to state or federal courts. The process is always cumbersome but that is a price we pay to have our rights respected. Moreover, until

recently there have been no definitive statutes relating to groundwater— as had been enacted for surface waters in 1913. The massive federal and state water projects also did not make any special provisions regarding groundwater. Courts were left to regulate groundwater disputes as they arose. If they arose: after all, the observability problem implies that only a fraction of impairments will be noticed by harmed parties or be worth litigating. Courts distinguished what was called *percolating* water (water that moved in aquifers only by means of gravity) from *flowing* groundwater which ran underneath or beside streams (or other bodies) along predictable channels. Flowing water was treated legally the same way as surface water. If someone drilled a well into a flowing underground channel to use the water for some “unreasonable” purpose such as exporting it to another basin, that use could be legally restrained (if discovered) by injunction or damages. There were few restraints, however, on the use of percolating water unless (as we will see) the aquifer in question was in overdraft.

As recently as 2002, Joseph Sax could sum up the situation this way: “...while California extensively regulates surface water by an administrative permit system, groundwater is effectively unregulated. People who have access to groundwater can just pump it. They need no one's permission, and no one regulates their use. Water users like it this way; groundwater is a sort of an ace-in-the-hole. When surface water supplies are restricted, they can pump groundwater as a substitute, and so it functions as one form of insulation against both drought and increasing regulation.”<sup>62</sup> California did not then and still does not, as a state, regulate groundwater extraction legislatively, though there have been recent efforts to induce localities to undertake the job. Court intervention has been more successful in some parts of the state. Some water basins, as we shall see, have successfully used courts to regulate groundwater usage. The state water board has played a role in assisting such efforts, though it has limited authority to impose or to initiate regulation on its own. Still, these (few) basins remain exceptions and litigation is costly, slow, and incomplete in its effects.

It is not surprising that groundwater has been largely unregulated. There are almost too many explanations. Common law courts traditionally treated groundwater as real property,

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<sup>62</sup> Joseph Sax, “We Don't Do Groundwater: A Morsel of California Legal History,” 6 *U. Denv. Water L. Rev.* 269 (2002)

similar to their treatment of minerals or oil or coal. Water was part of what you purchased when you bought land and it could be used at your discretion. The owner of overlying property could sell mineral or water rights. But unless these rights were severed, groundwater went with the overlying ownership. Until the turn of the 20<sup>th</sup> Century courts accepted the doctrine of *absolute ownership*: the overlying interest (the landowner) could take groundwater for any purpose. There was no requirement that the owner take any account of the effect of his use of groundwater on his neighbors, and certainly not that his use needed be reasonable or beneficial. And, there were also no restrictions on exporting pumped water.<sup>63</sup> Until the last century, in fact, it was hard to take much water from wells: drills and pumps were expensive, unreliable, and weakly powered. Until the 20<sup>th</sup> Century, by attaching water rights to land, groundwater rights resembled riparian rights in some respects. But there was a significant difference: groundwater rights were not then considered to be *correlative* to surface waters as riparian rights were but were, instead, absolute. “The seminal English case involving groundwater was *Acton v. Blundell*, handed down in 1843,<sup>64</sup> which established what has been known as the *absolute ownership rule* for groundwater. In *Acton*, the defendant dug a coal mine that cut off water from the plaintiff’s well, which was being used to operate a mill. The court found for the defendant, arguing that groundwater “falls within that principle, which gives to the owner of the soil all that lies beneath its surface...” Kanazawa pointed out that the *Acton* holding implied that there was an essential difference between ground and surface waters: “...*Acton* was based on the fact that surface-water flows were obvious and observable to claimants, while groundwater movements were not. Consequently, surface-water rights could be based on the “implied assent and agreement” of various claimants to the same surface source... In effect this... physical difference permitted the courts to assume that surface-water claimants had entered into a valid implicit contract regarding use of the water source, while the same did not hold for groundwater claimants.”<sup>65</sup> *Acton* held specifically that “[i]n the case . . . of [groundwater], there can be no ground for implying any mutual consent or agreement . . . between the owners of the several lands beneath which the underground springs may exist, which is one of the foundations on which the law as to running streams is supposed to be built; nor, for the same reason, can any

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<sup>63</sup> Mark Kanazawa, “Origins of Common-Law Restrictions on Water Transfers: Groundwater Law in Nineteenth-Century California,” *The Journal of Legal Studies*, Vol. 32, No. 1 (January 2003), p. 159.

<sup>64</sup> (12 Mees and W. 324 [1843]; 152 Eng. Rep. 1223 [Ex. Ch. 1843])

<sup>65</sup> Kanazawa, *op cit.* p. 160.



trace of a positive law be inferred from long-continued acquiescence and submission, whilst the very existence of the underground springs or of the well may be unknown to the proprietors of the soil”<sup>66</sup>

Until the beginning of the 20<sup>th</sup> Century, feeble and costly drills and pumps made it reasonable for courts to assume that one person’s actions would have only limited effects on others’ rights and that, for legal purposes, such effects were presumed to be negligible. Any attempt to control external effects, it was thought, would needlessly discourage productive investment. Kanazawa showed that early American cases from Connecticut and Pennsylvania, explicitly immunized overlying users from taking account of external effects.<sup>67</sup> It is difficult for courts to resolve disputes about things that are hard to observe or verify and these difficulties tend to make litigation very expensive and, therefore, infrequent. He wrote that “*Roath* and *Wheatley* went on to make the argument, reminiscent of *Acton*, that groundwater differed from surface water in that its movements were unobserved and, therefore, that pumpers should not be legally accountable for their effects on others.”(162) Ignorance of underground connections and flows led courts to presume, for legal purposes, that the water did not in fact move unless a plaintiff could actually prove that it did; a very high burden of proof given the hydrological knowledge at the time. The presumption that underlying water did not move was always known to be a fiction but it made work much easier for courts and simpler for people to foresee what would happen if a dispute went to court. It worked also to support the absolute ownership doctrine and weakened the capacity of groundwater law to deal with externalities.<sup>68</sup> In some cases this burden could be met as when, for example, the lands were adjacent and where the effect of an action could be proved, or where the intention of a person taking water is alleged to be malicious which would only make sense if the waters were connected.<sup>69</sup> There were

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<sup>66</sup> *Acton v. Blundell* (12 Mees and W. 324 [1843]; 152 Eng. Rep. 1223 [Ex. Ch. 1843], p. 350.

<sup>67</sup> “Each owner has an equal and complete right to the use of his land, and to the water which is *in it*” (italics in original), the Court held. “Water combined with the earth, or passing through it, by percolation, or by filtration, or chemical attraction, has no distinctive character of ownership from the earth itself; not more than the metallic oxides of which the earth is composed” *Roath v. Driscoll* 20 Conn. 540 (1850). *Wheatley v Baugh* 25 Pa 528.

<sup>68</sup> This situation is further complicated when attention is paid to imported waters. In a series of cases, Los Angeles successfully asserted its rights to return flows from waters imported from the Owens Valley. The imported water had been used for irrigation and the excess percolated into the basin. The decisions established that the return flow was owned by the City and not the overlying landowner.

<sup>69</sup> “To put the concrete case, may one landowner intentionally (that is, with foreknowledge of results,) cut off a neighboring landowner's water supply by thus intercepting, collecting or monopolizing the percolating waters that

exceptions to this presumption in cases where the underground water was flowing along a defined course: courts were willing to accept that water flowed beneath rivers, for example, or that some rivers disappeared below ground to re-emerge “downstream” and that such waters should be treated the same as river water.

The absolute ownership doctrine was abandoned in 1903 in a landmark Southern California case, *Katz v. Walkinshaw*.<sup>70</sup> “*Katz* addressed a dispute over priority to a limited groundwater supply between an overlying landowner and an appropriative groundwater user. While *Katz* abolished the rule of absolute ownership as against public policy, [it] ... did not abolish overlying rights in favor of a pure prior appropriation rule (as other western states have done). Instead, *Katz* analogizes the rights of the overlying groundwater user to the common law doctrine of riparian rights and established the *correlative rights* doctrine. The court ... required that groundwater be used reasonably and shared equitably by the overlying landowners in time of shortage. Once the reasonable needs of overlying landowners are met, however, non-overlying users may appropriate the surplus according to priority in time...”<sup>71</sup> It is not clear that *Katz* really changed much. By rejecting the absolute ownership doctrine, it turned groundwater disputes into factual matters and someone who claimed a trespass against her rights would still bear the burden of proving harm and that it was the defendant’s extraction that caused the harm. Still, the *Katz* decision opened the door to the possibility that subterranean disputes might be peacefully settled judicially.

Evolving knowledge about hydrology and new measurement techniques formed part of the basis for *Katz*. Joseph Sax argued that, in addition to rejecting absolute ownership as doctrine “*Katz* essentially determined the resolution of conflict between contending water users should be based on the impact of one use upon another, rather than upon some ex-ante classification of the source. This change was calculated to bring the legal rules into congruence with hydrological

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feed the neighbor's well or spring? The answer given to this question in the leading American case is that he may do so if he collects the water for his own use, but not if he collects it for the sole purpose of injuring the neighbor. If he collects it for his own use it is immaterial that he also entertains hostility toward the neighbor. The right should not, however, be exercised from mere malice. Ernest W. Huffcut “Percolating Waters: The Rule of Reasonable User,” *The Yale Law Journal*, Vol. 13, No. 5 (Mar., 1904), p. 222

<sup>70</sup>, 141 Cal. 116(1903).

<sup>71</sup> Peter J. Kiel and Gregory A. Thomas, “Banking Groundwater in California: Who Owns the Aquifer Storage Space?” *Natural Resources & Environment*, Vol. 18, No. 2 (Fall 2003), pp. 26-7.

realities; and in doing so, to replace the legal fiction that groundwater movement was unknowable with case specific factual inquiries. Was the water's movement known or practically determinable? If so, what were the impacts? And if there were impacts, were they legally redressable?"<sup>72</sup> At the same time that it accepted correlativity, the court also adopted the reasonable use doctrine – a doctrine that was flexible enough to permit courts to take account of how the water was used. By 1936 an authoritative survey of water law could say "... there are few American jurisdictions today that have not taken over the 'American rule' limiting the taker of groundwater to 'reasonable use, of one's own land.'"<sup>73</sup>

The "reasonable use" standard for groundwater appropriation is weaker in some respects than the "no injury" standard for surface water appropriation.<sup>74</sup> The no injury standard would give veto power over new appropriations to incumbent water users. Fear of veto power was expressed explicitly in the *Acton* holding and offered as a reason justifying the absolute ownership rule. In practice however even a no injury standard may itself be toothless in the case of groundwater, as the burden of proving damage and causation are so onerous. As we saw above however, the no-injury test may, in some important circumstances, be supplied by legal presumptions rather than by actual measurement.<sup>75</sup> Courts often assume, constructively, that if groundwater is fully allocated (ie. If the aquifer is in an *overdraft* condition), any new taking must cause injury to some user, whose identity need not be discovered. In this case, a court could issue an injunction against the taking. Alternatively, if the new claimant draws water publicly

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<sup>72</sup> Sax, op cit. p.282.

<sup>73</sup> Samuel C. Wiel, "Fifty Years of Water Law," *Harvard Law Review*, Vol. 50, No. 2 (Dec., 1936), p. 276.

<sup>74</sup> "The "no injury" rule originates in the common law, and also is reflected in *Water Code* provisions intended to protect legal users of water from injury from a water transfer. (See, e.g., *Water Code* sections 1702, 1706 and 1725.) Under the no injury rule, a water transfer would not be authorized to the extent that it reduced the availability of water for downstream users, regardless of the water priority of those users. Under the no injury rule, only "new water" is transferable, i.e., water that is added to the downstream water supply as a result of the transfer." *A SUMMARY OF THE CALIFORNIA LAW OF SURFACE WATER AND GROUNDWATER RIGHTS*, (memo posted by the BARTKIEWICZ, KRONICK & SHANAHAN law firm in Sacramento at [http://www.norcalwater.org/wp-content/uploads/bks\\_water\\_rights.pdf](http://www.norcalwater.org/wp-content/uploads/bks_water_rights.pdf)). The memo continues that the effect of the no injury rule is to protect junior rights holders: ". . . California water law protects senior water users (those with the oldest water rights) from junior diverters while protecting junior water right holders from the expansion of senior water rights. Junior water right holders would be harmed if seniors could increase the amount of water they divert under their senior priority. Likewise, juniors could be hurt if seniors could change their point of diversion, place of use or purpose of use in a manner that reduces the quantity or quality of water relied upon by juniors for their diversion. The 'no injury' rule protects junior right holders against this kind of harm from senior right holders." (See *A Guide to Water Transfers*, July 1999, pages 3-7 and 3-8, published by the State Board.)

<sup>75</sup> For example, courts assume that if groundwater is fully allocated (ie. Is in an overdraft condition), any new taking will be presumed to cause injury (to some user).

and notoriously, and if the existing users do not contest the taking in a reasonable time, a court may recognize a hostile trespass and may rule for the taker. Either way, the overdraft presumption limits the burden of proof.

In any case, the difference between the treatment of ground and surface water seems based mostly in practicality. In principle, groundwater and surface water rights have been subject to similar standards since *Katz* (or, perhaps, a quarter century later when the courts finally accepted the reasonable use doctrine with respect to surface waters). This is a consequence of the fact that both surface and groundwater are in overdraft conditions. But, as a practical matter, important differences remain which can mostly be attributed to difficulties of observation and legal proof of damage and causation. Overlying interests remain able, in fact, to draw on groundwater fairly freely despite the existence of reasonableness doctrine to the contrary. It remains difficult for those possibly affected by someone's use of groundwater to know whether she is affected, if she finds that she is adversely effected, to prove damage and causation in court.

### **Judicial Management**

The above examples show that groundwater is subject to *prescription* as well as to appropriation in ways similar to surface waters. In *Peabody v City of Vallejo* the California Supreme Court stated that "...the appropriator may use the stream surface or underground or percolating water, so long as the land having the paramount right is not materially damaged."<sup>76</sup> In other words, an appropriator can only take water when the aquifer is not in an *overdraft* situation.<sup>77</sup> Prescriptive rights – those established by notorious and adverse trespass (ie. Where the overlying interest suffers harm) -- are especially important for groundwater and so

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<sup>76</sup> The court goes on to note that "Any use by an appropriator which causes substantial damage thereto, taking into consideration all of the present and reasonably prospective recognized uses, is an impairment of the right for which compensation must be made either in money or in kind..." *Peabody v. City of Vallejo*, 2 Cal.(2d). While this standard appears, in *Peabody*, to limit the rights of appropriators, it was interpreting the 1928 Constitutional amendment which subjected riparians to the reasonableness standard. In effect, it put both appropriators and riparians into the same correlative rights regime. The California Supreme Court's majority opinion concludes "... the rule of reasonable use as enjoined by section 3 of article XIV of the Constitution applies to all water rights enjoyed or asserted in this state, whether the same be grounded on the riparian right or the right, analogous to the riparian right, of the overlying landowner, or the percolating water right, or the appropriative right."

<sup>77</sup> 'overdraft' is a condition where the "safe yield" of the aquifer has been exceeded, resulting in permanent lowering of the water table or land subsidence. In overdraft more water cannot be taken without interfering with the rights of some rightful user.

prescription is possible in any overdraft situation. This was the finding of a court in the *Raymond Basin Reference*, which permitted the City of Pasadena to divert water from the underlying basin in ways that adversely affected the rights of other users.<sup>78</sup>

Pasadena had long been recharging water into the Raymond Basin aquifer through spreading basins that caught runoff from the San Gabriel mountains, but much of the water ended up under Alhambra, which claimed an appropriative right to water under their land which, if valid, would have limited Pasadena's supply. In *City of Pasadena vs City of Alhambra*<sup>79</sup> Pasadena asserted prescription to water to settle its rights to a share of that water. Having abandoned absolute right for overlying interests (in *Katz v. Walkinshaw*) courts were reluctant to mechanically satisfy appropriators merely in the temporal order of their appropriations. Nor did they wish to give free reign to aggressive trespassers seeking prescriptive rights. Instead courts began to allocate rights on a different basis altogether.<sup>80</sup> After hearing claimants and experts in civil engineering in a large and complex adjudication a court might decide the cases based on a new (judicially created) principle of *proportionality*. The court might refuse to give priority either to the landowner (overlying interest) or to the prior appropriator but instead divvy things up in a way that seems just or, in legalese, equitable. Then the court would appoint an administrator, or "watermaster," to implement its ruling and settle disputes.<sup>81</sup> A watermaster might be an individual or a public agency, such as the state water board. Alternatively a court

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<sup>78</sup> "The *Raymond Basin Court Reference* was the first instance of the adjudication of conflicting water rights of many owners of ground water in California. On September 23, 1937 the city of Pasadena initiated litigation in the Superior Court of Los Angeles to quiet title to groundwater rights within the Raymond Basin. Specifically involved were the rights to divert water from the groundwater basin." (295) ...prescriptive rights were established by the later appropriators against both overlying owners and prior appropriators and that the latter also obtained or preserved rights by reason of the water they pumped. (296) J. Herbert Snyder, "The California Court Reference Procedure: Economics and Law in the Allocation of Ground Water" *Land Economics*, Vol. 33, No. 4 (Nov., 1957), pp. 286-303

<sup>79</sup> **33 Cal.2d 908**

<sup>80</sup> "California has broadly interpreted legal powers implicit within the correlative rights doctrine. This has been done whether the actions were instituted by local initiative under a state enabling act for groundwater districts or by judicial action in a private or state initiated adjudication. As a result, the power to manage groundwater, whether in an aquifer or in a basin of hydrologically interconnected aquifers and surface waters, has been broadened to a plenary degree." Earl Finbar Murphy, "THE POTENTIAL FOR LEGISLATIVE CHOICE CONCERNING GROUNDWATER AND AQUIFERS," *Journal of Land Use & Environmental Law*, Vol. 4, No. 1 (Summer 1988), p. 34. This seems a bit optimistic to me.

<sup>81</sup> The watermaster (zanjero) was a fixture of Hispanic rule in Alta California possibly borrowed from native American practices. Abraham Hoffman and Teena Stern, "The Zanjias and the Pioneer Water Systems for Los Angeles," *Southern California Quarterly*, Vol. 89, No. 1 (Spring 2007), pp. 1-22

might "...appoint a committee to serve as watermaster for an adjudicated area and can give that watermaster greater powers than those given the state department when acting as watermaster.... watermasters have the power to require pumpers to file periodic reports, levy a pump tax, replenish water in an aquifer, import water for spreading and replenishment of aquifers and control storage within the basin."<sup>82</sup>

These ideas were fleshed out in the proceedings concerning *Raymond Basin*. The trial court "...referred the matter to the Division of Water Resources of the Department of Public Works for a determination of the facts, and the ensuing report of the division was received in evidence. On the basis of this report all of the nondisclaiming parties, with the exception of the defendant California-Michigan Land and Water Company, a public utility and the sole appellant herein, entered into a stipulation for a judgment allocating the water and restricting total production to the safe annual yield. The court, after hearing evidence presented by appellant in opposition to the report, rendered a judgment substantially enforcing the terms of the stipulation against all parties, including appellant."<sup>83</sup> On the basis of finding that the *Raymond Basin* was in a sustained condition of overdraft, the court imposed a new doctrine of *mutual prescription* in which each party was treated as having equal priority to its (historical) claim and usage, in effect fixing rights among the parties administratively. Once Pasadena had asserted its right to prescription, the rights of all other parties (whether based on riparian, appropriation, or overlying interest) were put at the same priority as Pasadena's trespass-based claim, in effect treating all parties as prescriptors. By this construction, harm was inflicted by any withdrawal in the overdraft condition which implied that every withdrawal (by any of the parties) amounted to a trespass and the court was to determine allocations on this equal basis.

But perhaps more significant than the mutual prescription doctrine was the use of the reference procedure in a way that effectively permitted a state agency not only to find facts but, effectively, to guide and coordinate the parties to a settlement.<sup>84</sup> Even though the agency's

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<sup>82</sup> Op. cit p. 34.

<sup>83</sup> Ibid. at 27.

<sup>84</sup> Eleanor Ostrom emphasizes the fact that private negotiations played a role in producing the settlement. Chapter 4 of Elinor Ostrom, *Governing the Commons*, Cambridge Press, 1990. This seems misleading. The more significant event was the reference itself and the acceptance by the court of the findings of the *Water Commission*. Negotiations among private parties took place under the shadow of authoritative determinations by the state. And in

findings were not accepted by two of the parties, the trial court imposed the settlement anyway and its ruling was upheld on appeal. The Supreme Court found that the "...trial court properly concluded that the production of water in the unit should be limited by a proportionate reduction in the amount which each party had taken throughout the statutory period."<sup>85</sup>

The decision was not unanimous. One dissenter wrote "...it is apparent from the recent decisions of this court that virtual abdication of the judicial process of the courts in favor of the administrative process of the division [agency] has not only been sanctioned, but has been imposed by this court upon the trial courts in cases of this character....It is obvious that principles of water law were disregarded, that the division made a determination based upon the quantity of water available and the requirements of the respective parties, and divided the water accordingly, *regardless of prior appropriations, prescriptive rights, or rights of overlying owners*. They accomplish this unique result by evolving a new and novel theory of each user acquiring a right against the other by prescription or adverse use, thus *destroying all priorities* and placing each user upon an equal footing with the other, regardless of the time of origin or bases of his right. This is certainly a "new look" in the field of water law. *We have indeed come a long way from the rugged individualism of the riparian right "rocking chair" doctrine as expounded in Lux v. Haggin.*"<sup>86</sup> While the dissent contains a dose of nostalgia, it described accurately what had been accomplished in *Raymond Basin*. When the US Supreme Court declined to review the settlement, these new procedures and the court's reliance of agency findings, were fixed in place.

Pasadena's success in this case seemed an open ended invitation to trespassers to infringe incumbent rights elsewhere. The reach of *Raymond Basin* was, however, soon modified in *City of Los Angeles v. City of San Fernando*,<sup>87</sup> which made it more difficult to establish overdraft conditions and ruled that a public entity (a city or country for example) could not be subjected to

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fact, the actual amounts that cities and other entities could withdraw was strictly limited by their historical withdrawals.

<sup>85</sup>

<sup>86</sup> Ibid at 37.

<sup>87</sup> 14 Cal. 3d 199, 537 P. 2d 1250, 123 Cal. Rptr. 1 (1975).

mutual prescription without its consent. Nothing in *City of Los Angeles*, however, changed the procedural innovations in Raymond Basin.

These Southern California conflicts illustrate a long standing ambivalence in California water regulation: when water rights come into conflict they can be resolved according to two different procedures. The older procedure of establishing rights under existing water law had long been conducted according the standard rules of judicial procedure. This is often very costly and cumbersome because facts must be established in an adversarial setting. When *City of Pasadena* was filed, these traditional court procedures might have been what was expected by the parties as well as by the water law bar. “The *Court Reference Procedure* ... evolved from a water law setting characterized and determined by court decisions more than by statutory provisions.... Until 1914 court action alone provided for the adjudication of water rights. The courts in arriving at their decision relied heavily upon the then currently accepted doctrines relating to the use of water.”<sup>88</sup> In 1913, however, California’s *Water Commission Act* established an alternative *statutory adjudication procedure* – it might better be called an administrative procedure -- which could be invoked on the initiative of any disputing party, by petitioning the Commission, or possibly by the Commission itself on its own initiative. Until 1933 however, this new procedure explicitly excluded groundwater conflicts.<sup>89</sup> As late as 1957 Herbert Snyder complained that “The statutory adjudication procedure has, so far, been restricted by statute to the adjudication of water rights concerning other than percolating ground water.” (Snyder, 291)

In 1935 moreover, two years after the statutory procedure became applicable to groundwater disputes, the legislature explicitly removed the authority of the Commission to initiate adjudications on its own. “This portion of the 1935 legislation was designed to

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<sup>88</sup> “The statutory adjudication procedure is instigated by the action of one or more claimants to the use of water who petition the State Water Rights Board to determine the rights of the various claimants to the water. It is in these two respects that the adjudication procedure differs markedly from the court reference procedure.” J. Herbert Snyder, “The California Court Reference Procedure: Economics and Law in the Allocation of Ground Water,” *Land Economics*, Vol. 33, No. 4 (Nov., 1957), pp. 291.

<sup>89</sup> “The Statutory Adjudication Procedure. The Terms of the *Water Commission Act* of 1913 permitted statutory adjudication of water rights, excluding percolating ground water" either upon the initiative of the water commission or upon petition of one or more claimants to the use of water from a particular source. The procedure outlined for the adjudication of water rights in the 1913 act was not sufficiently precise and proved to be unsatisfactory. The procedure was revised and clarified by amendment to the *Water Commission Act* in 1917.” (289)



accomplish two objectives, the first being to eliminate [Commission] authority to initiate adjudications. It was conceived that such power was so broad that it was resented by the public affected...”<sup>90</sup> The main avenue for adjudication then necessarily reverted to the *Raymond Basin* style court reference procedure in which the State Board plays at best a supporting role: providing expert advice and sometimes administering the court’s order in the role of a watermaster. By referring the issue to the Water Commission, and letting that agency fix facts administratively and effectively guide the settlement, the trial court had created a hybrid model which was situated between the judicial and administrative model. That is what *Raymond Basin* and *City of Los Angeles*, actually stand for. While the reference procedure had long been used to resolve both ground and surface water disputes it was brought to a much larger scale in these complex multi-party disputes. As groundwater conflicts became more widespread the role of courts continued to expand. Soon after *Raymond Basin*, courts began to “adjudicate” more and more groundwater basins – I think there are more than 20 adjudicated by now.<sup>91</sup> As in *Raymond Basin*, there were often hundreds of conflicting claims; each had facially plausible arguments for rights based in an overlying interest or a prior appropriation. More importantly many asserted prescriptive rights to the water by pumping it in ways that notoriously and adversely affected incumbent users which (they argued) had not been challenged in a timely fashion.<sup>92</sup> These asserted rights could not all be satisfied. *Raymond Basin* turned out to be a powerful invitation to trespass, as many basins in Southern California were often in overdraft.

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<sup>90</sup> “...the elimination of the provision that the State Water Commission (now State Water Rights board) might undertake water rights adjudication procedures on its own initiative. This was done by legislative amendment in 1935....” (289-90)

<sup>91</sup> Ostrom, drawing extensively on unpublished work of William Blomquist, surveyed several such adjudications in the Los Angeles area, each modeled more or less directly on *Raymond Basin* in Chapter 4 of Elinor Ostrom, *Governing the Commons*, Cambridge Press, 1990. In all of the cases she discusses some of the parties had to be coerced to limit their withdrawals and so it seems inaccurate to characterize the settlements as voluntary. What happened in each case is that most of the parties followed the advice of the State Water Board, got the judge to impose the settlement, and the holdouts were forced to sue. And they lost.

<sup>92</sup> “An important element in the decisions of the *Raymond Basin* court reference was the earlier established principle that rights to the use of percolating ground water may be acquired by adverse use- *prescription*-as against the rights of overlying land owners. In all instances, however, it has been consistently recognized that the court may regulate and apportion use of percolating ground water in accord with relative rights. Thus, the courts have the power to adopt and enforce a physical solution even if the parties cannot agree upon one.” Snyder, 289.

While a watermaster (administrator) has been widely used in these adjudications, there are serious limits to the watermaster as a regulatory institution. While watermasters have significant powers, their methods of proceeding are slow and costly to use and, lacking budgetary authority. They are likely to take the amount of water available as fixed rather than to contemplate ways to improve supplies. And a watermaster's authority is (mostly) limited to the litigants before the court. But others in the hydrological basin may be affected by court and watermaster rulings and their interests or actions may fall outside the authority of the court. Even so, the legislature has continued to be reluctant to move to an administrative "statutory" procedure, fearing that remote state agencies would run roughshod over local interests.<sup>93</sup> In any case, Judges undertaking an adjudication may create and rely on a watermaster agreed to by the parties rather than referring to determinations by the state Commission. This situation seems to have been the aim of the 1935 statute cited above.

Continuing political resistance to regulation is reflected in the *California Water Code* which states for example, that "This article shall not be construed to authorize the board to regulate groundwater in any manner."<sup>94</sup> While something resembling the "use it or lose it" rule attached to appropriative surface water rights may apply to groundwater, the traditional regulatory principle remains in place: the overlying interest has first claim on water underneath.<sup>95</sup> But if landowner isn't using her rights, someone else can (publically) assert a claim to it which may over time ripen into a right. This does not imply that the overlying interest automatically forfeits her rights (as she would with an unused appropriation) but that someone could assert a (prescriptive or appropriative) claim on the water that might (if unchallenged)

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<sup>93</sup> Southern California has made the most extensive use of court appointed watermasters for managing groundwater. The method has, however, recently been promoted by the state legislature for managing streams in the northern part of the state and: "In November 2009, the California Legislature passed several bills regarding water legislation. Senate Bill X7 1...included a provision requiring the appointment of a "special master" for the Delta, who would be 'granted specified authority'. The Delta Watermaster's authority extends to diversions of water in the Delta, and for the monitoring and enforcement of State Water Resources Control Board orders and license and permit terms and conditions that apply to conditions in the Delta." The problems in the Delta mostly concern surface water though, as in the Southern California basins, there are many claimants, large fluctuation in flows over times, and difficult problems of observation and measurement. But apparently, the state needed to step in to provide a third party – a court or state agency – to find and administer a compromise.

<sup>94</sup> CWC, Section 1221 (West Supp. 2003)

<sup>95</sup> But see Joseph Sax, "We Don't Do Groundwater: A Morsel of California Legal History," *U. Den. Water L. Rev.*, vol 6 (2002), who argues that despite what the Water Code says, groundwater is subject to state regulation.

stick. Even if the overlying user objects, a court might nevertheless award the trespasser an equitable share. If the right to surface water is often said to be allocated by a first come first served principle (first in time, first in right), groundwater is governed more by physical action: “she who drills deepest” is entitled to the water. Or at least gets to keep using it unless and more persistent and alert claimant comes along.

While basin wide adjudications have taken place in populated parts of the state, the big players in the Central Valley have mostly been left on their own. In fact, state intervention in groundwater management would be anathema in the Southern Central Valley. This is partly because it is hard to measure quantities, locations, and flows in underground aquifers. But the deeper reason is a political resistance by overlying interests to subject groundwater to administrative regulation.<sup>96</sup> As we have seen, large farms dominate the area and might have much to lose if courts or agencies were to intervene, especially if the procedure gave the chance for small cultivators and local residents to press their claims. While there have been various attempts to mobilize state or federal attention there has been little political receptivity for such action. The big farms are major donors to both parties and so far neither is eager to oppose them. The absence of toothy state legislation in the area has had important consequences for Central Valley groundwater issues. Big farms might choose to self regulate if they want either by bargaining or use the water districts, which they mostly control, to manage matters. The best example is the development of *Kern Water Bank*, which is largely controlled by Paramount Farms (now, the Wonderful Company) and its various tentacles. Though people may deplore the distributional effects of this system, in many ways the *bank* has been successful not only in serving the interests of its owners but also in ameliorating the groundwater crisis in some respects and, in developing water markets too.

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<sup>96</sup> In his rather sanguine 1984 article “[Zachary]...Smith cited five reasons for local opposition to groundwater management. These reasons include: 1) farmers in nonoverdrafted areas find groundwater regulation unnecessary; 2) true costs of overdrafting may be hidden or mitigated by other trends; 3) farmers fear that groundwater management rules will shift control to urban bureaucrats less sympathetic to agricultural needs; 4) farmers fear reduction in irrigated acreage, and 5) new surface water supplies will offset the overdraft before overdrafting becomes uneconomical. Id. Given these political realities, Smith advocated that state control should be kept at a minimum.” Zachary. Smith, “Rewriting California Groundwater Law: Past Attempts and Prerequisites to Reform,” 20 *Calif. Western. L. R.* 223, 255 (1984) at 252.

The two systems of rights allocation therefore have largely remain distinct even if ground and surface water are very closely related in both in supply and use. Surface waters rise from springs and percolate into the ground or sink to become underground flows beneath river bottoms. Neither is, therefore, a closed physical systems; they interact in various ways. More importantly the use of these waters is connected in that each is a substitute for the other. Those who lack access to sufficient surface waters to irrigate – which commonly occurs in the dry season and in droughts -- can use groundwater to make up for shortfalls in water deliveries. Surface water is used for irrigation when it is abundant/cheap and excess can be percolated into the water table. This substitution is regulated mostly by the (rising) cost of extracting groundwater (relative to getting surface supplies), the prices of products and other inputs, and (over time) by regulatory requirements on groundwater use.

## **Theoretical Reflections**

Economists often argue that competitive forces will tend to drive legal institutions in the direction of efficiency. As Adam Smith taught us, efficiency will tend to be a consequence or side effect of individual people seeking profits or private satisfaction. While this may be true in certain circumstances, when stated unconditionally, as an iron law, it may fail because of the existence of externalities or certain scale economies. Moreover, while efficiency is important, it needs to be weighed against other values -- such as equity, equality, due process, etc. – and not simply asserted as an ultimate end. It is little solace to the pauper that the economy is operating efficiently. Maybe it is true, as Martin Luther King said, that the long “arc of the universe bends toward justice,” but I doubt that it bends very quickly on its own. That law may have found its prophet, but it has not yet found its Adam Smith.

Groundwater exploitation may generate external effects on others but these effects are hard to observe. If you dig a deep well, it may affect the water supply to some of your neighbors and, under existing law and legal practices, you may not have an incentive to take these effects into account. Such external effects might, in principle, be ameliorated by *negotiation* among all affected parties if that is feasible. The farmers and other users in an area (sitting over an underground basin) could come to some joint agreement as to how water should be allocated. Those negotiations could take place in an institutional context: in a market or an assembly or an

agency. But negotiating to an agreement requires that the actions of each party can be sufficiently well observed that all those affected can be identified and permitted a voice. Negotiations are particularly difficult over groundwater as information about use and underground flows are difficult to obtain and certainly not commonly available. People may not know how or if the actions of someone else affects the water available to them. And even if they did know, they may not be able to prove it to others (a court for example). nevertheless, despite these issues, negotiations have sometimes worked to resolve disputes over groundwater.

The prospect of negotiated solutions is an idea commonly associated with Ronald Coase and more recently, with Eleanor Ostrom. Coase treated the possibility of negotiating to an efficient outcome as a kind of limit case that would be reached if there were no transaction costs. Ostrom offered empirical examples of successful bargains solving externality and collective action issues. Negotiation has the virtue that farmers and other water users have localized information concerning valuations and production and other costs. In that sense they may be well positioned to bargain to reasonable results. But negotiation around an externality is tricky when information is incomplete and the parties have incentives to conceal or mislead. This can prevent beneficial compromises from being found or agreed. Moreover it is usually not enough that information about effects is understood by the parties, it must also be verifiable to others (ie courts) if the negotiations either break down or don't even get started. The value of Coasian and Ostromian analysis is that they place the analytical and descriptive focus on bargaining in imperfect contexts and emphasize the importance of the discovery and transmission of information. Ostrom and Coase each have things to tell us about when or under what conditions do negotiations are likely to succeed in solving such problems by creating norms to guide behavior. But where do successful institutions or norm come from? Their creation is itself the collective action problem that needs to be resolved. Regress threatens.

One answer is that someone or some group finds a way to profit by inventing an institution and that others take advantage of the invention. They may need to pay a price for this. but there may be advantages to the innovator. One sided bargains can result from the assertion of one party of a right, leaving other parties to struggle over the remainder. One sided bargaining is embedded in California's water law. Divert an unclaimed stream, or dig a well,

and use the water continuously and it becomes your property. When there were fewer people around, this system may have seemed fair and effective in promoting the development of water resources. Nowadays, however, such one sided solutions can seem unfair and arbitrary, even if they might be efficient.

Of course bargaining may fail; government might intervene – or be invited in by participants themselves to impose a *regulatory* regime. Part of this regime might require the installation of monitoring and enforcement technology. Similar information issues arise in this case as well as the private parties may have incentives to conceal their actions or other information relevant to a regulatory regime. Governments will naturally tend to resort to forceful means to get information, making regulations and the regime itself politically controversial. Alternatively, a quasi-public solution may be sought by constructing a cartel. Farmers or other water users might somehow *merge* into a single economic entity which might be able to internalize externalities. This would sidestep the monitoring issue as a merged firm would have aligned incentives. Such a merger might be effected by acquisition of smaller users into single firm; or it might be effected by means of legal – ie. State sanctioned -- cartel of some kind. While such a cartel might be organized and enforced by government, a cartel might instead rely on private actors to punish defectors, or find a way to enlist courts to use judicial powers to organize and enforce cartel agreements. All these methods have been tried in one place or another.

While it may be true that, in certain contexts, economic competition would tend to move law toward efficiency, politics does not generally leave things alone. People competing in markets have powerful incentives to seek advantage – fair or unfair -- and politics sometimes offers opportunities get or keep such advantages by shaping laws or regulations that favor their interests over others. This is so in any political regime. In a democracy the people may be able, collectively, to create or destroy legal institutions with the purpose of advancing justice, the advantage of the majority, or even efficiency. But even if people, acting politically, wished to make law more efficient, there is little reason to believe that they will see how to do that or be able to coordinate their actions to advance that goal. They will sometimes make choices guided by powerful interests or make mistakes; and mistakes cannot always be corrected. Political

choices are, of course, constrained not only by physical possibility (geology, technology, etc) and economic forces, but also by the consequences of earlier legal and economic choices. History matters in this sense. This implies, that legal change is path dependent. Even if, in the long run, it tends to efficiency, the set of efficient outcomes is very big so there is no reason to think one particular efficient outcome is more likely than any other.

The current crisis in groundwater – the fact wells are still getting deeper, water tables continue to recede, and land is subsiding -- seems to be evidence that external effects may be getting worse and that the common methods to regulate it have not worked. Or, at least that none of these approaches have worked well enough to restrain groundwater mining. Why? Here are some options: (1) the *technology* of drilling and pumping has been improving, making deeper wells increasingly cost effective at least for producing high value crops (almonds); (2) organization means of controlling the externality are too costly; (3) both actions and external effects are hard to observe and agents have incentives and rights to conceal and misrepresent their actions and knowledge and can use *law* to protect their right to conceal information; (4) *law*, even if used creatively by judges and other officials, provides only weak incentives to take adequate account of external effects; (5) there is strong and effective *political* resistance by property owners to statutory changes which would have any effect on reasons (1)-(4), and particularly to any statute that would impair their ownership of underlying groundwater. At least so far.

It is not as though efforts have not been made to solve externality problems in arid areas. Elinor Ostrom and Arthur Maass (and others) have provided many examples of successful “self imposed” water management schemes from around the world.<sup>97</sup> But Maass’s cases (from Spain as well as various Western American states) concern organizations devised to control surface water in which irrigators could observe each other pretty easily and could make use of formal or informal institutions to monitor and enforce compliance. Ostrom’s book summarizes a number of studies of what she calls *common pool problems*, of which groundwater is an example. The most famous successful efforts to regulate groundwater, which she reports, involved court-centered

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<sup>97</sup> Elinor Ostrom, *Governing the Commons*, Cambridge: CUP, 1990. Arthur Maass and Raymond Anderson, *And the Desert Shall Rejoice: Conflict, Growth and Justice in Arid Environments*, Cambridge: MIT Press, 1978.

adjudication of groundwater basins in Southern California. There was certainly a voluntary aspect to these adjudications in the sense that, in the end all (or nearly all) of the parties initiated legal actions, negotiated with each other, and (most of them) agreed to the settlement. In this sense, the parties themselves played active parts at various of stages of the negotiation. Courts cannot, after all, initiate action but must be asked. However, it needs to be emphasized that courts played indispensable roles in these negotiations.

The resort to lawsuits happened because negotiations among private parties and associates were not able, by themselves, to resolve their conflicting demands (and the resulting race to the bottom). In the basin adjudications, courts played extremely active roles. They not only provided the coercive force to give effect to any final agreement – which was necessary to motivate negotiators -- but they also structured the negotiations in ways that induced the parties to propose relatively narrow and (more or less) feasible options. Judges usually (always?) created relatively unattractive defaults that would be imposed on the parties if no agreement was reached. As important as the courts were in structuring and motivating negotiations, however, the availability of accurate groundwater monitoring may have been even more important to the settlements. As it happened, there were state agencies with substantial expertise in engineering and hydrological that could be called upon by the parties and enlisted by courts to provide common information to the parties. These agencies also played a role in enforcing any settlement as agents of the court. Such agents are called watermasters in the California context but have other names in other proceedings. Their important feature is that they have access to coercive resources to use against defectors. In addition, according to Ostrom, the agencies (and engineering consulting companies) provided public information – information that became common knowledge to the parties – which often convinced potential players that they could tell if anyone was cheating under the settlement. This gave each player (these were local water companies) reasons to comply with the settlement. In addition, in most of Ostrom's cases, new institutions were created in subsequent legislation in order to formalize the enforcement regime. Ostrom's examples were not, therefore, cases of private parties simply coming together voluntarily to resolve their common pool problem. Each involved powerful state actors using or threatening legal coercion to induce parties to come to the table and try to find common ground and to stick to their agreements. Or else!



Even in the successful cases described by Ostrom, moreover, negotiation costs were initially, quite high as the parties had divergent interests, and each sought to introduce evidence favorable to their cause (and to restrict the others from doing the same thing). However, California's water agency, offered public estimates to the parties (and to the court) of what kind of reductions would be necessary to stabilize water tables and this provided the court with a baseline for a possible injunction. These estimates became the threat or reversion point that then guided the negotiations. Still there were holdouts – as I said, the parties had diverse interests and some might have thought they would do better to keep arguing – and to appeal any settlement imposed on them to higher courts. The whole thing took years. The success in Pasadena provoked nearby water districts to try the same model – enlist the coercive powers of courts to force parties to the table and get them to engage in serious negotiations. In the end, for several large southern California water basins, the result was a success. A new regulatory system was created that stabilized water tables and provided an institutional structure for further bargaining as conditions changed – as they surely would.

Ostrom is right to see this outcome as more than a local success and in suggesting that lessons that can be exported to other places. And she is right to emphasize the importance of voluntary actions taken by the various private interests. As I read her work, however, and those of her students and colleagues, there has been an overemphasis on the voluntaristic aspects of adjudicated solutions. Local water companies did form associations, they talked to each other and bargained, each was motivated to seek a long term solution, the associations were mostly led by sensible people, and they were able (somehow) to acquire the capacity to monitor each other. Still, I think Ostrom has downplayed the public or governmental pre-conditions for negotiated solutions to common pool problems. She recognized the two key public players; courts and agencies but really did not focus on the crucial role of coercion. Crucially, courts and agencies provided carrots (subsidized information, subsidized monitoring, court-structured negotiation incentives) and sticks (enforcement by watermasters and courts; the threat of injunctions and legal liability, the threat of imposing an unattractive default regime, etc). Courts also provided the forum for negotiating, scripted bargaining protocols, and finalized agreements all by using legal force or the threat to do so. All these devices were constructed from standard legal

procedures and had the normative sanction of accepted legal processes. Without these, as far as I can see, it is not clear that any voluntary solution could have been found or, if found, be enforced in ways that directed the parties to conform their behavior to the settlement.

Ostrom's emphasis on "voluntary" actions by the stakeholders also may have led some uncritical readers to underplay additional options that public actors can take in addressing groundwater issues in other water basins. For example, in some of her cases Ostrom emphasized the importance of physical boundaries. But law can create artificial boundaries too, at least if the technical capacity for monitoring is available. Public agencies or legislatures can do this as well. Moreover, while courts are passive in the sense that they cannot act without being asked, once a litigation has started, courts do not necessarily remain passive. That seems a big lesson from the adjudicated basins. Moreover, agencies tend not to be passive at all. They can reach into a situation and create incentives for parties to take "voluntary" actions, either under the agencies own shadow or that of public opinion as reflected in elections. However they came about, it is important to recognize that negotiations among private parties to solve a common pool problem did work in the Southern California water basins. And perhaps they have worked elsewhere as in the case of fisheries for example. But, as Hobbes reminds us, such things don't tend to happen without the assistance of state institutions. Ostrom herself was careful to emphasize limits to voluntarism: the problems get harder as the number of participants rises and in the absence of borders around the common pool to keep potential invaders out. But there are other limits that she took too little account of.

In the context of the prolonged drought from 2011 to 2017, the Brown administration saw the importance of state action to resolve groundwater problems. In 2014 it (finally?) managed to put through the state legislature a substantial bill aimed at regulating groundwater. That bill made many concessions to local interests. For example, it requires that each of xxx critical groundwater basins would have xxx years to develop a plan to regulate groundwater. If they failed to do this (in a way acceptable to the state) the water department would step in to develop a plan on behalf of the basin. There is no question that local farmers and other users will have a lot of input on the plans if they choose to negotiate a local plan. If they are not able to agree, however, the state water agency will step in and impose its own solution which may not reflect

local interests as well. I imagine that locals will also have some input on any state developed plans if it comes to that but probably not what they would have had had they agreed to their own plan. Of course, many of these organizations are already very deeply politically engaged in supporting candidates of both major parties as well as to local candidates (of any party) supportive of their cause. But they were not powerful enough to forstall the enactment of the Groundwater plan in the first place.

It is easy to be pessimistic about likely outcomes. It is clear that the state and the federal government have recently gotten more concerned and active as public pressure to deal with shortages as escalated. It is also evident that heightened public and official concern occurred only after several years of severe drought. Will it be sustained when that drought is over? Maybe. In fact, in 2021, we are already in year two of the next drought. Others will follow; we all know that by now. Droughts seem to be getting more frequent, more intense, and lasting longer. Maybe that possibility will sustain political concern. In any case, governments can't move all that much faster than their constituents. Once hoses and faucets are flowing, one expects people to move on to other concerns. Not everyone of course. Farmers who depend on more and more expensive surface water will still recognize that their capacity to succeed over the medium and long term depends on controlling the water under the farm. They won't sleep on this even if the rest of us do.

But there are grounds for optimism too. Technological innovations have made possible long distance monitoring of ground water extraction. The GRACE satellite and various modeling techniques offer a kind of "end run" around the measurement and monitoring issues that have always plagued groundwater regulation. It is impossible (for me) to say how precise and targeted these new techniques will become in the future, but it is clear that governments have a much better handle on groundwater outcomes than ever before. Maybe they will never be able to tell when you turn on your faucet in the kitchen but I would bet that they can or will soon to know if you are watering your lawn.

Moreover maybe groundwater externalities will turn out to be fairly local in extent. Water tables are not falling everywhere. Declines are concentrated in particular places; and even

in those places, sometimes water tables have been replenished to some degree, either from precipitation or surface water imports. And sometimes, conservation measures and prices have worked too, either restricting the demand for groundwater, or getting people to act politically. We ought not to expect that political reactions to local crises will be uniform or that all will fail. I will present evidence below for the “local problem” thesis and argue that there are reasons to think that local solutions have often worked pretty well. There is no doubt that prices – both in product and water markets – have shaped behavior too. In some places, groundwater users have successfully resorted to courts to create and implement agreements. In others, firms have grown large enough that they can internalize external effects pretty well. And In the future – maybe the near future – the state water agency may regulate groundwater either directly or indirectly. Some of these local solutions may be more or less objectionable on distributional grounds of course, even if they succeed in stabilizing groundwater levels.

Regulation of one kind or another has certainly become more intrusive – whether imposed by court orders or legislative delegation to water agencies -- and fights over water allocation have mostly moved away from fisticuffs and gunfights to legal and political fora. Still informal and sometimes violent means are sometimes employed as well. People often have powerful economic incentives to push against the lines drawn by the law, especially where law (re) produces inefficiencies or sustains inequities or simply hard feelings. Changing technology also shifts the scenes of battle and the resources of combatants. But aside from these factors, political struggles have intervened directly and indirectly in water conflicts. Fighting has been especially intense in the California where water was badly located, unpredictable in its arrival and departure, and where law has often been slow to change.

