Patria Fugáz: The Troubled Birth of Hydraulic Populism on Sonora's Río Mayo, 1910–1934

Jeffrey M. Banister

The Caminos of Mexico have no beginning and are without end.

—Howard Scott Gentry (1995:135)

Beginning in late 1933, the American naturalist Howard Scott Gentry made extensive explorations of Northwest Mexico's Río Mayo drainage, recording his observations in unusually poetic prose (Yetman and Martin, 1998). His book, *Río Mayo Plants* (1942), might have offended the dispassionate sensibilities of his contemporaries. Today, however, its nomadic musings seem far less worn for wear than the arid accounting that typifies "Royal Science" of the period.[1] Writing before construction of the Mocúzari Reservoir, in the lower drainage, Gentry described the Río Mayo as a powerful living organism. Flowing from the deep canyons of the western side of the Sierra Madre Occidental, in a robust rainy season the Mayo could float giant boulders as if they were small pebbles. Dropping in elevation, moving through the semi-tropical *tierra caliente* of the foothills and then onto the coastal plain, the Mayo's waters brought with them coarse mountain gravels, shaping them into narrow bars that pushed westward with the rushing stream. As it neared the Sea of Cortéz, in some places the river disappeared altogether, moving underground, replenishing aquifers, while along other portions of the journey bedrock forced its waters to the surface, forming narrow pools stretching for a mile or more and reaching 30 feet deep. In good years, overflow from heavy rains deposited pockets of fresh sediment in the low-lying *vegas* of the coastal plain.

Jeffrey M. Banister *is assistant research social scientist and assistant editor in the Southwest Center, and in the School of Geography and Development, University of Arizona.*

Journal of the Southwest 57, 1 (Spring 2015) : 103–144

In Gentry's words, here was a small "Nile river, enriching the adjacent agricultural lands" (1942: 2–5) of a landscape that is known today as federal Irrigation District 38–El Valle del Mayo, comprising nearly 100,000 cultivable hectares. *Río Mayo Plants* speaks eloquently to a moment in time just before that river would succumb to the twin objectives of "maximum yield and maximum profit" (Kalin 2006: 13). This was also before water would become abstracted and extracted as "resource," as a measurable quantum, and, largely, as naturally "scarce" or, in the case of floods, naturally "disastrous." Regardless of how one views the legacy of agricultural development and federal hydraulic control on the lower Río Mayo, it is indisputable that most of what Gentry saw in the lower watershed no longer exists.

This essay, a historical and political geography of that profound environmental transformation, explores the tensions created by some of the earliest and most aggressive attempts to develop a federally controlled irrigation territory, beginning with the 1910 Mexican revolution. It ends with the mid-1930s, on the eve of President Lázaro Cárdenas's sweeping agrarian reforms, which would further and even more profoundly transform the Mayo Valley's social and physical geography. They did so by breaking up most of the remaining large landholdings, redistributing them across nearly thirty newly formed *ejido* communities.[2] In many cases, only the bones of these communities remain, for in any given planting season their lands are, of economic necessity, rented out to large agribusiness firms or to smaller-scale private growers. Indeed, these operations now largely control irrigated production in the lower Mayo watershed (Banister 2011).

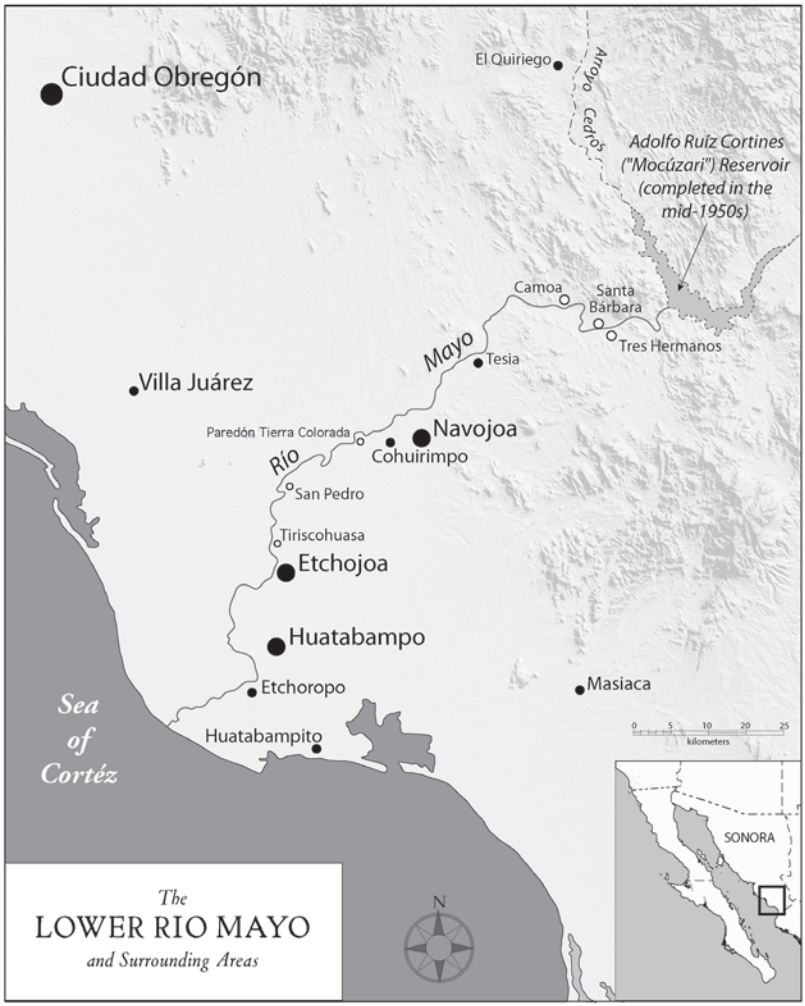
Understanding the reasons for such disparity requires knowledge of the history and geography of federal irrigation during the politically transformative years following the 1910 Mexican revolution—that is, during the 1920s and early 1930s, when military men from the state of Sonora controlled Mexico's presidency. One of those men, Álvaro Obregón Salido, was a garbanzo farmer from the Mayo Valley. The sweeping agrarian reform program of the Cárdenas years would not have been possible without the institutionalization of centralized water control and the infrastructural and human-organizational groundwork laid during the previous two decades. In other words, the Sonorans' vision of what I am calling here "hydraulic populism" (waterworks coupled with land colonization schemes and modest redistribution) created the political and physical means by which to tie irrigation landscapes to the rhythms and flows of new federal resource bureaucracies, such as the National

Irrigation Commission (Comisión Nacional de Irrigación [CNI]), created in 1926. The 1917 constitution, which nationalized land, surface waters, and subsoil rights, allowed the Sonorans to hold out the offer of unprecedented social protections for laborers and the peasantry in exchange for political loyalty (Lomnitz 2001). Nonetheless, the combination of centralized water control and hydraulic populism also fueled the very antagonistic forces of social revolution that they were meant to contain.

The lower Río Mayo basin is also the ancestral home of the Yoremem, or Mayos, an indigenous group for whom hydraulic infrastructure and agricultural production would mean a further loss of control over the Río Mayo and the complex weave of tributary arroyos feeding into it. Tied to this development was a steady influx of outsiders into the valley, a process that had begun in the mid- to late-nineteenth century. New federal laws adopted during the late 1800s had allowed the Ministry of Development (Secretaría de Agricultura y Fomento) to grant water concessions to capitalist irrigation companies (Compañías Agrícolas and Compañías Irrigadoras). The possibility of securing a concession along with new irrigation technologies drew non-Indian mine-owning and business elites from the wealthy silver mining town of Alamos, in the Sierra Madre, westward onto the coastal plain (see map). On the eve of the 1910 revolution there were close to twenty such firms, each made of a small group of shareholders. Each company held a federal water concession (oftentimes, these concessions were subject to intense negotiations and litigation), and had built primary and secondary hydraulic infrastructure (Banister 2011).

Following the 1910 revolution and into the early 1930s, government policies encouraged the migration of hundreds of landless peasants ("colonists") into the valley (Almada Bay 2001, 2009; Gobierno del Estado de Sonora 1985).[3] These *colonos* were to become an economically self-sufficient and politically loyal (to Mexico City) class of small- to medium-scale farmers. As set forth in federal laws, these farmers were to benefit from (mostly) government-funded waterworks and, after a given amortization period, were to be granted control of the hydraulic network (Aboites 1998).[4]

The effects of federal policies and legislation, nevertheless, diverged considerably from this original intent. Understanding the reasons for and implications of this divergence, and its relationship to changes in the lower basin's material landscape for post-revolutionary politics, is the focus of the pages that follow. Archival documents from Mexico



City's Archivo Histórico del Agua (AHA) and the Archivo General del Estado de Sonora (AGES), in Hermosillo, show that hydro-climatic conditions in the Mayo basin have always fluctuated wildly, constituting a powerful motive force of historical and spatial transformation in the valley. It is clear that the river's oscillation between moments of epic flooding and periods of protracted drought rendered federal (i.e., centralized) hydraulic-social control far less stable or comprehensive than the vision set forth in official documents.[5] Cyclonic winter rains in particular consistently exposed flaws in the water-control network developed since the late nineteenth century.

Hydro-climatic forces coupled with agrarian and hydraulic politics thus consistently eroded the already precarious substrate upon which the Sonoran generals hoped to *forjar patria*—that is, to rebuild the "fatherland" in the wake of a destructive social revolution and civil war.[6] As geographer David Harvey writes, "Created ecosystems [such as irrigation landscapes] tend to both instantiate and reflect . . . the social systems that gave rise to them, though they do not do so in noncontradictory (i.e., *stable*) ways" (1996: 185, italics in original). In part because of the unpredictability of combined social and hydro-climatic forces, even quintessentially modern hydraulic landscapes like Distrito de Riego 038–El Valle del Mayo develop dependencies on and become deeply reworked in the engagement with the less-than-modern world of the 1920s and 1930s.

The "Sonoran Triangle"

During the immediate post-revolutionary years, Mexican irrigation became tied to the political fortunes of Sonora's revolutionary generals, who assumed the presidency following the overthrow and assassination of President Venustiano Carranza in 1920. Most centrally, this group included Adolfo de la Huerta, from Guaymas; Álvaro Obregón Salido, from the Mayo Valley; and Plutarco Elías Calles, who had strong familial ties to the northern border region and had also grown up in the port city of Guaymas. These were men of the middle class or upper middle class, relatively well educated, and they were both products of and frustrated by the closed nature of politics in late-nineteenth-century Mexico, a period known as the Porfiriato (for the near thirty-year dominance of President Porfirio Díaz). To greater and lesser degrees they participated in and benefited from the rapid social, economic, and political transformation of the times, and shared with their contemporaries the classical Liberal values then in vogue. Historian Ignacio Almada captures the period's frenzied mood, writing that

> [t]he people of the region know of change, of mines that open and close, and open once again, of *ranchos* that change hands and whose boundaries shift, of crops and metals for export . . . of locomotives that come and go, carrying with them humans, animals, minerals, grains, and news. This is now a "frontier of steel whistles." (1993: 479)

Plutarco Elías Calles had been particularly charged by the ideals of nineteenth-century positivism, adopting the values of the so-called

Científicos, a group of well-connected men occupying positions of power during the Porfiriato. Like the Científicos, Calles believed that politics should be the exclusive domain of men with professional training, and that direction should come only from "the top," from a select group of urban, educated men, rather than through popular process. In other words, what Mexico needed was to follow the old Porifirian dictum: "less politics, more administration" (Buchenau 2007:15).

The so-called Sonoran *caudillos* (political strongmen) thus saw entrepreneurialism, bureaucracy, and individualism as civic virtues (Knight 1990, 2: 500–527), and in their hands, "The Revolution" would bring to irrigated Mexico the kind of modernity that their pre-revolutionary predecessors, the Porfiristas, had only dreamed about. In the Mayo Valley, this included the development of large-scale infrastructure such as a port and railroad spur line to move agricultural goods, and the organization of production within agricultural associations, the development of which Calles and Obregón saw as a critical feature of modernization (Almada Bay 2001). The immediate post-revolutionary years likewise brought a raft of laws and regulations, as well as new official organizations targeting among other things agrarian reform, hydraulic infrastructure, road construction, and rural development more generally. The coast of southern Sonora was to become a showcase of modern irrigated production carried out across hundreds of small-scale farming operations tied together through producer associations (Almada Bay 2001; Gobierno del Estado de Sonora 1985).

These three powerful men—Obregón, Calles, De la Huerta—oftentimes referred to as the "Sonoran Triangle," thus held strong ideas about the proper social and political organization of rural space, and how to control that space from a distance. Their bonds of kinship, friendship, and political ties made southern Sonora the perfect place in which to test their ideas. As I discuss below, however, the methods and mechanisms of modern irrigation did not constitute a full turning away from the historical ("indigenous"[7]) practices of water control and landed cultivation that they were meant to replace. The uneven and often quite divergent results were a perennial and at times quite personal frustration for hydraulic bureaucrats, for large landowners, and for the nation's leaders attempting to remake the nation, to forjar patria, in their image.

The Sonorans' control of the presidency (through both direct and indirect means) lasted from 1920 to 1934, a time of reconstruction following revolution and civil war. Especially in the beginning, the period

was marred by assassinations and regional rebellions, and is characterized by constant shifts in political loyalties as the new leaders struggled to capture and contain the anarchic energies let loose during the previous decade.

Obregón's single term in office lasted from 1920 to 1924, and it was Calles, his successor (1924–1928), who would leave the deepest imprint on Mexico's political structure. Calles was elected after Obregón successfully quashed an uprising led by his predecessor in the presidency and former friend and comrade-in-arms, Adolfo de la Huerta, whose term ended in 1920 and was followed by Obregón's election that same year. A generally unpopular candidate, Obregón achieved victory through a combination of military support, promises of agrarian reform, and brutal violence. He was elected for the second time in 1928, but was assassinated just a few months before taking office. Emilio Portes Gil then became interim president until February 1930, when Pascual Ortiz Rubio, winner of the 1929 elections, took office. Rubio resigned in 1932, objecting to Calles's heavy-handed intervention in national politics, and was succeeded by a Sonoran loyal to Calles, Abelardo Rodríguez. The period following Obregón's assassination, known as the "Maximato," in reference to Calles's continued (overt and covert) domination, was for Sonorans a time of unparalleled prosperity. For others, it was a period of crushed political desires.

Many of the development policies and practices of the Obregón and Calles years were quite contradictory, and would prove increasingly divisive as time went on (Walsh 2008). Calles, for example, was obsessed with the idea of creating a new revolutionary man. This would be a productive and loyal patriot who would identify with and owe his well-being to the state. He referred to the early phase of his program as the "psychological revolutionary period" (Bantjes 1998: 9), and his policies to achieve this end, imposed with little popular support, often collided dramatically with Mexico's intricate tapestry of regional cultures. His vision of secular religion called for supplanting Catholic traditions and locally rooted beliefs—"superstition and idolatry," as he saw them—with new sets of state-centered rituals.

In Sonora, as in other places, such policies had the effect of closing and sacking churches, exiling priests, and burning religious iconography. They also created a backlash in the form of a revived sense of regional exceptionalism and independence from Mexico City, sentiments that had long characterized relations between the north, "La Frontera Nómada," the Nomad Frontier (Aguilar Camín 1977), and the seat of

federal government, Mexico City (see also Almada Bay 2009; Tinker Salas 1997). In Sonora, Calles's rule was a time of "concealment" and "clandestine" practices (Almada Bay 2009: 266). Combined, these practices would constitute an increasingly organized force of resistance. This force weakened the Jefe Máximo such that Lázaro Cárdenas, erstwhile Calles loyalist, was able to break free of his mentor's control when he became president in 1934 and implement a radically transformative land redistribution program. Resistance to Calles, however, also meant resistance to Mexico City and federal control more generally. This, too, would determine the direction of the Cardenista land reforms from 1934 to 1940, ultimately leading to a turning away from agrarianism as official policy by the end of Cárdenas's term and a return to parts (though by no means all) of the Sonorans' vision for modern irrigated agriculture dominated by small and medium-scale private farms.

Hydraulic Populism: Institutionalizing the Irrigation Revolution, Transforming Rural Space

The Sonoran period was critical for intensifying and in many ways formalizing the Porfirian focus on direct government involvement in irrigation development and management. By adding a new pillar, land colonization (and a pragmatic agrarian reform), to the water policy platform, however, the Sonorans also diverged from the previous trajectory. The 1917 constitution, a direct product of the 1910 revolution, sets forth a series of fairly radical social rights, linking these to a vision of broad federal powers over land and territorial waters.[8] Article 27 states: "The property of all land and water within the national territory is originally owned by the Nation, which has the right to transfer this ownership to private parties [*particulares*] . . . private property is a privilege created by the Nation." Calles in particular was able to turn this language into law and practice. Whereas the Porfiristas had approached waterworks and federal water concessions mostly as a way to consolidate the power of landowning elites (*latifundistas*), Calles's critical piece of legislation, the 1926 Ley sobre Irrigación con Aguas Federales (Law on Irrigation with Federal Waters), envisioned federally managed (centralized) irrigation and government-funded waterworks as a way to challenge this power and broaden the regime's political base (Aboites 1998). At the same time it would weaken the old-guard elites' hold on land regional politics.

According to the 1926 law, the National Irrigation Commission (itself a creation of the law) could step in and develop new waterworks wherever and whenever private landholders lacked the ability to do so. In exchange, private-holders could be forced to sell to the federal government a portion of their land that the new waterworks would service, at pre-infrastructure prices. The law states that "the irrigation of private agricultural properties" was a matter of "public utility," a determination that could be made "whatever their size and whatever is under cultivation" (cited in Aboites 1998: 108). In other words, federal officials now enjoyed the authority to transfer ownership of land based on a notion of public interest that they were empowered to define. The expropriated parcels could then be granted to landless "colonos" by virtue of the irrigation law and its companion legislation, the Federal Colonization Law of 1926. The law covering land colonization, in turn, specified that colonos would be eligible for between 8 and 100 irrigated hectares.[9]

Together with the 1917 constitution, therefore, the new legislation granted the federal government unprecedented authority to define the "public interest" and, most importantly, to put that notion into practice. As Aboites suggests, the most enduring effect of these early reforms was less the outright destruction of private property than it was the creation of a powerful new legal tool giving federal officials the ability to define the "public interest." This ability became post-revolutionary officials' primary source of authority (Aboites 1998: 111) and turned the federal government into a powerful force shaping rural social relations and rural space. Expanded federal authority, then, is one of the great paradoxes of the Mexican revolution.

Within the Calles's vision, now codified in law and public policy, the ideal citizen would be undyingly loyal to the "Revolutionary State," a true patriot whose ownership of a modest but productive piece of irrigated land would make him eager to support his government, personified in the form of a powerful president. The revolutionary farmer would approach agricultural production in a systematic, indeed scientific way, maximizing the use of surface water for commercial crop production and, thereby, identifying with the larger official ideal of remaking national rural space. He would refrain from the production, sale, or use of alcohol, and he would seek no solace from the Catholic Church.

The Callista reforms express a moral geography as well as a regionalized understanding of the politics and economics of production and land reform. Officials' publicly stated desire was to come as close as possible to developing a capitalist agrarian society from the ground up. For this

purpose, the largest and most sparsely populated areas of Mexico were the arid northern border states, where mining, industry, and agriculture already enjoyed intimate ties to US markets. And, in contrast to Porfirian colonization schemes that favored foreign nationals, the new reforms were meant to attract landless Mexicans, and in particular the many seasonal laborers who had migrated to the US Southwest (Walsh 2008).

One of the earliest issues of the CNI's official journal, *Irrigación en Mexico*, published in 1930, includes an editorial defending the new irrigation and colonization policies and illustrates the Callista approach to rural space, agrarian reform, and irrigation.[10] In the editors' estimation, Mexico's central plateau would prove too complicated a region within which to launch the colonization and irrigation experiment. It was quite populous and its communities too old and too set in their ways; a modern approach to production would be difficult to employ there. Instead, the CNI would focus its efforts on those "regions that were clearly arid," where "the benefit of irrigation would stand out the most, as it [irrigation] would convert portions of desert, and, as a consequence, desolate, zones, into populous centers of prosperity."[11] Corollary to this vision of rural society and space was the idea that federal bureaucracies would drive social transformation, reducing the great ethnic and cultural diversity of rural Mexico down to a single class of "campesinos." The editorial continues: "invariably . . . . there will also be conquests realized in the social order: a class of campesinos that is superior in terms of its technical preparation, its self confidence, and perseverance . . . [It will be] the owner of the soil that it cultivates and for this reason the primary support of national economic stability and of institutions."[12]

In practice, of course, irrigation combined with colonization as an answer to revolutionary demands for agrarian reform hardly conformed to the Callista ideals. As Walsh (2008) and Aboites (1998) have found, the laws and their implementation produced highly uneven and contradictory outcomes. In theory and to a great degree in practice, Calles's predecessor, Obregón, had approached agrarian reform with kid gloves, generally preferring the laissez-faire tack of late-nineteenth-century economic liberalism to aggressive, state-directed developmentalism (Walsh 2008). Nonetheless, the garbanzo farmer from Huatabampo intervened directly and heavily in the development of the Mayo Valley, investing federal funds in several bold infrastructure projects, and playing a personal role in attempts to settle conflicts over water and land, as I discuss below. It was during the Maximato, however, that the role of the

state in development would become most clear and, at the same time, most bedeviled by contradictions.

Here again the pages of *Irrigación en México* offer some illustration. In the same commentary on the proper role of the state in irrigation, the editors note that the Porfirian (late-nineteenth-century) experience with irrigation companies showed that while such enterprises had been rather poor stewards of hydraulic resources, they had nonetheless performed well as "dispensers of water," and in a "more or less licit" way. (The ambivalence expressed here is likely quite intentional, for the legality of such enterprises, particularly in the area of water allocation, became a source of contention after the revolution.) In line with this view, the 1926 irrigation law contained provisions for the creation of so-called Associations of Irrigators and *organismos cooperativos* (cooperative water organizations). After the initial investment in waterworks had been amortized, the state was to fully turn over the operation of these associations to local irrigators.[13] As time went on, the federal irrigation and agrarian reform apparatus grew in size and complexity, and this envisioned devolution grew increasingly difficult and politically threatening to the bureaucratic status quo.

It was not until the early 1990s, with changes to both the 1917 constitution and to water laws, that irrigation management became decentralized within federal policies. According to the editor-engineers, the CNI, the "organ of the State for the implantation of [national irrigation policy], does not believe itself to be endowed with the magic power to violently modify the precarious conditions of Mexican agriculture."[14] Moreover, the engineers assumed that elite landowners would be impressed enough with the successes of the federal colonization program that they would decide for themselves to subdivide and sell their own holdings.[15] The editorial states that such was the case in Aguascalientes and elsewhere. The Callista legislation thus created fertile ground for the growth of powerful water bureaucracies, while at the same time sowing the policy and political seeds of their dismantling down the road.

The efforts of federal bureaucrats to contain, control, or redirect surface flows could destabilize as much as shore up subjects' loyalties to the emergent revolutionary regime, for controlling water is rarely as simple as opening a valve or closing a floodgate. Because of this fundamental fragility within hydraulic-social relations, the intimate relationship between "private" production and the "public" governance

of water, which the Sonorans did much to promote, came as a result of complex and constant political maneuvering.[16] Aboites (1998) thus argues that the federal control of water did not generally lead to the complete "statization" of hydraulic resources in Mexico. The result was in most places quite the reverse: the entrenchment of private control and consolidation of private capital. The simultaneous centralization of federal authority and centralization of water-resource control was never a *fait accompli.*

There is then little question that during this period significant parts of the old irrigation and agricultural company structure remained in place, albeit in modified form. However, because of this and the evolution of government intervention, the archival record of water conflicts suggests that federal hydraulic governance along the Mayo River was quite unstable. Indeed, the more aggressive the federal interventions became, the more destabilizing they were to regional politics. And in some cases, the conflicts stemming from authorities' attempts to control hydraulics could send regional politics into bouts of outright violence. From the seemingly simple acts of shoveling earth into berms and weaving cottonwood branches into fencerows to the brashness of agrarian activism, securing land with a reliable water supply was growing ever more difficult and increasingly bureaucratic. As a tool for creating loyalty to "the center"—that is, to Mexico City—the management of irrigators and infrastructure always came with a dangerous double edge.

The Constitutionalists and River Federalization

To understand the politics and land and hydraulic control during the Obregón and formal and de facto Calles years (1920 to 1934), requires at least some knowledge of the years just following the outbreak of the revolution, in 1910. To control water is also to control territory. In the Mayo Valley of the 1920s, federal territorial control came through an increasingly diverse array of hydraulic works and social-organizational forms. Particularly in the years immediately following the revolution, moreover, centralizing the management of rivers constituted a political weapon of internecine warfare, and this partly explains the rather quick progression of federal claims over whole river basins. In 1919, for example, President Carranza nationalized the Río Sonora drainage (northeast of the Mayo) in an effort to weaken Obregón's political strength in his home

state (Knight 1990, 2: 492), while the Río Mayo had already been "nationalized" in 1918 (Gobierno del Estado de Sonora 1985, IV: 276). One by one, then, Mexico's hydrographic basins were brought into the emergent federal hydraulic order. As of 1920, nearly 230 river basins across the country fell under at least nominal government control.[17]

In theory, the act of nationalizing a river basin meant that surface waters could be accessible only via government concessions (this included surface waters in tributary arroyos as well). Nonetheless, de facto control of the Mayo was from the start a highly conflicted political process. The idea that water, the most vital source of life and livelihood, should be managed from Mexico City would take some time to settle in. That is, if it ever truly did settle in at all: federal hydraulic governance in the lower basin continues to be a periodically tested claim (see Banister 2010, 2014). For several years after the revolution, many of the area's most critical waterworks remained under the dominion of irrigation companies formed during the Porfiriato. As the federal reach expanded into river basins like the Mayo, intense acrimony resulted, politicizing access to and governance of water and land (Aboites 1998). This was particularly true as "federalization" (Aboites 1998) spread outward from the confines of the river channel as waterworks were constructed at ever-greater distance from the floodplain.

Modern (i.e., federal) irrigation was presented as a rupture with the "rustic" Indian past, and the fixed-cement waterworks and new regulations put in place since the 1880s were an attempt to rationalize and bring a rigid order to what had been mostly localized and informal irrigation practices. Yet this hoped-for divergence from ancient tradition failed to constitute a complete break with long-standing practices. Hydraulic *genius loci* remained in high demand. Much of the Yoreme population, meanwhile, had lost access to the rich riparian bottomlands that historically had sustained it. Many of those same people had indeed fought in General (later President) Obregón's army against federal forces. These *veteranos*, as they came to be called, generally did not desire small, fixed, irrigated plots within one of the federal government's proposed new agricultural colonies. Instead, what these indigenous veterans of the revolution wanted and would continue to demand for years to come was the *restitution* of their old village lands and territories. Fighting the "institutional revolution" in the fields and agricultural colonies and ejidos of the Mayo Valley, they would find, proved nearly as dangerous as combat on the field of battle.

Because of such resistance, the struggle of the 1920s and early 1930s

to create a federally managed Mayo River basin took on new as well as old cultural overtones, with the Yoremem demanding restoration of lands and waters. In 1918, with the constitutionalists in power, landowners and officials commonly leveled charges at the Indians for violating the 1910 national water law by "invading" and altering a "federal zone."[18] From several kilometers east of the Sud-Pacífico railroad line, at the Mayo pueblo of Camoa, downriver all the way to Huatabampo and the coast, over twenty canals and canal companies were then still in operation at this time. Irrigation works built during the previous two or so decades had significantly fragmented the coastal thornscrub landscape, and for those whose access to hunting grounds, water sources, and even fields had been blocked, mere subsistence now might require either breaking the law or running afoul of an irrigation company foreman. One time-tested method of farming, known locally as "*hacer tierra*" (literally, "making earth"), was particularly at odds with laws and irrigation company practices. It involved lining the river bottom and tributary arroyos with fencerows and diversion weirs made of rock and woven tree branches. These structures would cause water to pool and in some places flow above grade level to fields at some distance from the general flood zone. The technology was also designed to capture and deposit onto fields the nutrient-rich organic matter carried by the flowing stream.

With the modern infrastructure, however, creating cultivable surface areas for subsistence or a small plot of cash crops required more mobility than ever, as some parts of the river were cut off or now drained by canals and bisected by new roads. While such practices had always required subtle negotiation with farmers and communities downstream—cultivating a dryland riverbed even under the best of circumstances is a delicate dance[19]—now more than ever such practices could also draw one into the realm of federal bureaucracy. In many cases, moreover, there was often no way to distinguish between these two realms: landowners could just as easily be government officials or politicians, and vice versa. Or, as likely, the latter might be blood relations. The primary complaint, usually made to the Ministry of Agriculture and Development (Secretaría de Agricultura y Fomento [SAF]), was some version of the vague charge that the Yoremem were creating a "profound disequilibrium" in the zone.[20]

Indeed, during periods of extremely heavy runoff the living fencerows could alter the river's course, generating the unpredictability (and threat to the bottom line) that officials and landowners were labeling "disequilibrium." By referring to certain people and practices as backward, such rhetoric effaced the direct connections between modern irrigation

development, federal water control, and negative environmental feedback. Similarly, the assumption that equilibrium was achievable at all tended to support the experts' assertion that they alone possessed the knowledge to judge the difference between mere improvisation and a legitimate, systematic approach to water control. The Yoremem, with their "pernicious custom" of "invading" a federal zone, simply had to be stopped.[21] In the words of SAF minister Pastor Rouaix, the zone did "not belong to them."[22] But then, to whom *did* it belong?

The SAF's agent in Hermosillo, Mayo Valley landowner and renowned engineer Flavio de S. Palomares, believed that the Indians' irrigation practices were altering the river's overall pattern little by little, and were also jeopardizing irrigation company canals and lands with their "multiplied obstacles."[23] The Huichaca and General Otero canals, for example, could no longer draw water because the Indians had caused the river to shift 100 meters away from their primary intake gates.[24] Still less palatable to landed-elite bureaucrats like Palomares, over time and with their profusion of fencerows, Indians might actually increase their floodplain surface area and, thereby, grow the size and number of their "little estates."[25] Put differently, with the totality of their diminutive makeshift fields, they might inch their way back into controlling prized riverbank land. The anxieties of landowners and bureaucrats finally reached Minister Rouaix, who then called upon President Carranza to order the military destruction of fencerows throughout the entire lower basin. Indians who broke federal regulations by altering a watercourse without permission would, Rouaix stated, suffer reprisal.[26] As post-revolutionary irrigation development and colonization evolved, practices like hacer tierra would nonetheless continue if not expand in scale. (I saw archival evidence of this even into the 1960s and 1970s, well after the Mocúzari Reservoir was completed.) So, too, did the interrelated ethnic, class, and political tensions expand, and these continued to bedevil federal water-control efforts.[27]

"The Revolution": A New Social Order?

The Sonoran caudillos' close associations with large-scale capitalist agriculture forced them into an ambiguous approach when it came to dealing with irrigation companies and demands for land reform. For them, the Bureau of Reclamation's successes in the US Southwest represented a kind of gold standard, notwithstanding the arguments of

detractors like the famed anthropologist Manuel Gamio, who had pointed out that Reclamation's projects had mostly benefited large landholders.[28] As I discussed above, for these landowner-administrator-generals agriculture was to be a largely private enterprise run by farmers who might fit the profile of someone running a mid-sized operation in southern California's Imperial Valley (Gobierno del Estado de Sonora 1985). Public and privately funded waterworks together would support these operations.

Yet, just as it was elsewhere in the republic (Walsh 2008), during the 1920s and early 1930s Mexico's approach to private agricultural development and agrarian reform created a series of fatal contradictions. Troubling the federal vision was an extant social and political geography and, especially in Obregón's case, it was a geography to which federal authorities had direct connections. The Sonoran caudillos exerted personal influence over (and their fates were in part tied to) powerful regional alliances of bankers, planters, industrialists, and officials (Gobierno del Estado de Sonora 1985). From Obregón through the extended period of Calles's formal and de facto reign, the leadership was at times pressured to curb the most egregious abuses of the old-guard, landowning elite. Therefore, when they did use the new agrarian reform policies—set forth in the agrarian law of January 6, 1915, and, later, in Article 27 of the 1917 constitution—to break with the *status quo ante,* it was often in cases within which they perceived some sort of political advantage, or where the political pressure was just too intense to ignore. Obregón perhaps expressed the official pragmatism best when, in one of his public discourses, he said, "we should not destroy large holdings before we create *pequeña propiedad* [small-scale property holdings], as this could produce a state of disequilibrium that would drive us into misery. I am of the opinion that we need to proceed with caution."[29]

Of course, particularly since the emergence of irrigation companies at the turn of the twentieth century, there had never existed a state of equilibrium. How, moreover, could a new agrarian propertied class emerge in a place like the Mayo Valley, where most of the irrigable land was in the hands of elites and their irrigation companies? New waterworks provided a partial response, for they allowed for the opening of new areas to cultivation. But here, too, existed another barrier in the form of the river's highly erratic flow.

The Sonoran leaders' approach to reform, therefore, was often rather surgical and quite tactical: land distribution, yes, but mostly in areas of purportedly unused or uncultivated wasteland (*terrenos baldíos*). Provisions

in Article 27 of the 1917 constitution allowed such lands to be brought under government control. There was also technical and financial support, mostly for private operations. This included irrigation, credit, seeds, and assistance of an oftentimes quite personal sort to a growing number of producer associations, such as the Río Mayo Agricultural Chamber of Commerce. With all of the connections and direct political support, by 1930 southern Sonora had become one of the—if not *the*—most productive and lucrative agricultural regions in the nation (Gobierno del Estado de Sonora 1985). This was despite the growing aches and pains of federal water control, though partly as a result of the heavy government investment.

As Héctor Aguilar Camín has written, "expropriation was unleashed [mainly] against the enemies [of revolution], not against property-owners" as a class. The list of enemies included the most notorious of the old-guard patriarchs, men with connections to ex-Porfirian governor Luis Torres: Ángel García Peña, to whom President Díaz had granted vast tracts of land in southern Sonora; an aging veteran of the nineteenth-century Yaqui and Mayo wars, General José Tiburcio Otero; perennial old-timer *cacique* Jesús Morales; and even the valley's earliest irrigators (and Obregón's kin), the Salidos (Aguilar Camín 1977: 429–445).

By contrast, restoring lands and waters to previously dispossessed indigenous pueblos was a far less pressing concern. By the late 1920s, fewer than 500 heads of family (a basic census category) in Navojoa had received parcels of five or less hectares as promised to them by officials. In the communities of San Pedro and Moroncárit, downriver near the Sea of Cortéz coast, 278 and 143 family heads, respectively, got similarly sized plots.[30] It is true that some of these early *repartos* did indeed return land to aggrieved Indian communities (as I discuss below). Most important for the Sonoran generals, however, was that land and water resources made it into the hands of a new (and to some degree old) generation of civic- and business-minded elites. These were men with whom they shared the new revolutionary ideals, and in some cases, experiences on the battlefield. Likewise, it was common for them to have relations of kinship (Knight 1990, 2: 510–511).

Still, there were also cases of irrigation company abuses so egregious, their victims so numerous, that officials were compelled to act. In these cases, expropriation and new ejidos could result, though even here the process could be painfully slow and bureaucratically cumbersome. The Río Mayo Agricultural Company (Compañía Agrícola del Río Mayo [CARM]) fit squarely within this category. What began as a battle over

the company's dismantling quickly turned into a proxy for the larger war between the Sonoran generals and the comparatively conservative President Carranza, whom they would finally overthrow in 1920.

CARM in many respects had represented the vanguard of agricultural development. Taming the river and the wilds of the ostensibly underutilized coastal thornscrub would, its supporters had argued in the early 1900s, convince the rebellious Indians to lay down their arms and once and for all partake in the benefits of hard work (García y Alva 1907). This was indeed a favored theme of Sonora's business and civic leaders (Almada Bay 2001), and dates back to the reforms of José de Gálvez in the 1760s (Martin et al. 1998). But these older modes of understanding, the historical frames of socio-spatial distinction, were being challenged by the new post-revolutionary circumstances. Many Mayos, the veteranos in particular, felt emboldened by their close relationship to some of their fellow Sonorans in the highest levels of government. They would push hard and consistently for restitution of village waters and lands, much of them stolen while they were away at war, supporting Obregón.

Around 1918 it seems, many of the veterans began to complain that CARM, and in particular its founder, Ángel Almada, had committed "infinite abuses," including withholding water from Indian villages and fields. Within archival documents, officials and landowners alike are seen portraying the Yoremem from the community of San Pedro as "colonos," a juridical distinction that authorized the company's appropriation of their lands and waters. Those who remained in place thus witnessed their crops wither and die and, when they did manage to grow a full crop, they were bilked for as much as 25 percent of the harvest in payment for what little water they received. All of this took place on land that, for as long as anyone could remember, had been under Yoreme control.[31] At 5 pesos per 1,000 liters, the "usurious" water rates were in fact five times higher than those charged by the American-owned Richardson Construction Company of the Yaqui Valley.[32]

CARM's machinations had certainly included outright appropriation of land and water, and most of this had occurred under the auspices of Mexico's nineteenth-century military mapping and survey commissions (Banister 2010). But they also illustrate the kind of pragmatic liberalism practiced by the Díaz regime, which the Sonorans had witnessed and participated in throughout their lives. The title for the "pueblo" (village) of San Pedro—consisting of four different but contiguous "ejidos"—had been officially recognized as far back as 1867. This was during one of the earliest waves of liberal government–backed disincorporation and

privatization at the direction of President Benito Juárez. On August 28 of that year, Ministry of Development officials had produced a formal resolution that consolidated San Pedro's lands and protected them from expropriation and redistribution as so-called terrenos baldíos, or unused lands. Subsequently, in 1873, Sonora underwent a territorial reconfiguration, during which time the prefect of the Alamos district (which included the lower Mayo drainage) confirmed San Pedro's existence as a "native" pueblo, comprised of both an ejido commons and a legal town site (*fundo legal*). The title was confirmed once more in 1880, when the Díaz government acknowledged the Yoremem as the original inhabitants of the area.[33]

This final designation would not stand, however. SAF officials and CARM's lawyer in Mexico City, Alberto Ramos, represented the claimants as colonos, using the language of an 1883 federal colonization decree within which they would be considered individual private property holders.[34] According to a 1919 SAF report, the people of San Pedro were, of course, ethnic Yoremem whose lands the company had appropriated through various legal and illegal means, starting in 1903, when CARM landed its federal water concession, and again in 1912, just after the outbreak of the revolution. The primary mechanism for the appropriation, the report continues, was the federal land redistribution program carried out by the Porfirian Sonoran Scientific Commission.[35] The commission had surveyed and subdivided the valley's choicest floodplain lands, as well as several areas beyond the flood basin (Banister 2010). Indeed, CARM had been the most successful of the valley's twenty or so irrigation companies at taking advantage of this kind of federal support.

Ultimately, CARM's shareholders were able to capture nearly 5,000 hectares of San Pedro's lands, occupying some of the best floodplain cultivation sites in the valley. Critical to this process all along were the Sonoran Scientific Commission's surveys, maps, and documents, which consistently refer to San Pedro as a "colonia" rather than an indigenous "pueblo." Clearly, this was not a case of dispassionate scientific discovery but rather of outright colonial appropriation.

As colonos (settlers) rather than "*naturales,*" or Indians with long-standing claims to the area, the surveys showed that these choice lands were now just so many individual pieces of an official cartographic puzzle. At the stroke of a pen, preexisting spatial networks of pueblos, villages, hunting grounds, water sources, and fields had been removed from what was now considered to be a landscape that the government could legally

turn over to "private" interests. Paralleling this cartographic erasure was of course also a quite concrete reality. Those nineteenth-century surveyors had constantly expressed anxiety over what they perceived to be Indians' lack of interest in securing titles for their small plots (Hernández Salomón 2006).[36] Subsequent investigations suggest why this was so: It seems that numerous Mayo petitions for the 3- to 4-hectare lots that the Scientific Commission had offered to each "head of family" had either been overlooked, or, more likely, discarded. The entire CARM operation, therefore—and by extension most if not all of the other agricultural and irrigation companies—was the result of an original sin of land and water fraud.

CARM had not stopped there, however. It also went after the very town site of San Pedro. Its lawyers tried to convince SAF officials that acquiring the fundo legal was necessary to protect company investments from the valley's seemingly constant floods. In exchange, the company offered a small portion of the lagoon at Choacoray, which it had likewise acquired by means of "legal" dispossession before the outbreak of the revolution.[37] Examples of such abuse were manifold and, it seems, fairly well documented. The company had undeniably grown at the direct expense of San Pedro, and even if one takes into account the revisionist rhetoric reflected in archival sources following the revolution, they are difficult to ignore.

Once in power, Obregón, Calles, and others might publicly rail against this sort of aggressive resource monopoly. Privately, they both tolerated and participated in it, seeking pragmatic solutions that stopped short of breakup and redistribution. But again, and for reasons often not entirely clear in the archival documents cited here, they were at times compelled to act, and act swiftly. In 1918, then governor of Sonora Plutarco Elias Calles moved against CARM. He was working on and would soon have a new state-level agrarian-reform law, which he had conceived, as his wedge. The 1919 Ley Agraria del Estado de Sonora was structured around the idea of creating pequeña propiedad by breaking up holdings larger than 50 hectares in zones designated as "*ejidos de los pueblos*," and irrigated landholdings greater than 100 hectares. On *temporales*, or areas of rainfall-dependent agriculture, 300-hectare holdings were subject to division, while 10,000 hectares was the maximum for pasturelands (Almada Bay 1993: 283–284).

Using the 1919 law, the local agrarian commission ruled in favor of the pueblo of San Pedro, and Calles's government, against the wishes of President Carranza, soon began taking over control of canals and

other works. Two irrigation canal "gatekeepers" were ordered to stay on duty day and night to ensure that water actually found its way to San Pedro's fields, an area that Calles declared to be in the interest of "public utility."[38] Calles also installed a new *juez de aguas* (water judge). CARM quickly had the man incarcerated for diverting water away from company fields.[39] Complicating matters, heavy runoff from the previous season had parked a large bank of sand directly in front of San Pedro's intake canal. Governor Calles gave CARM thirteen days to remove the obstruction. In the case of inaction, the governor ordered a group of Mayo volunteers from the nearby village of Chúcarit to destroy the embankment, and then subtract the expenses from debts they owed to the company.[40] By January 1920, using similar maneuvers, Sonoran government apparatchiks were able to take over operation of the Rosales and Orrantia canal systems, which irrigated fields in and around Navojoa; the Otero canal, which provided water to the pueblo of Citavaro; and the Santa Bárbara canal upstream. They thus might not have been breaking up many irrigation companies' holdings, but irrigation infrastructure was becoming an important tool of federal control.

CARM's associates and lawyers had fought fiercely to maintain the operation, "putting up every kind of resistance" available to them. Their struggle speaks volumes about the ways Porfirian oligarchy had for decades stabilized its territorial base.[41] While the threat to cut off water to any "colonos" who openly supported restitution of village lands had proved a useful tactic, the company was also allegedly committing desperate acts of "terror" to get its way. All the while its lawyers argued that the original federal concession included no legal obligation to provide water to those who were not formally part of or paying fees to the enterprise. This was true in the strict sense, for a public water provision was not technically part of the federal concession.[42] They argued that doing so (even if only during times of "excess") was a sign of the company's generosity.[43]

In a last ditch effort to control Calles and the Sonorans, the Carrancista Ministry of Agriculture and Development demanded precise information on the "intervened" canals in the Mayo Valley, presumably to launch a counteroffensive against the state government.[44] As officials quickly discovered, there existed no true vantage point, however: the Mayo district was a confusing knot of interventions in the waterscape, many reshaped or even scoured over by floods whose velocity seemed to increase with each new addition to the network of canals. Such a fragmented physical and social geography did not correspond well with the information

on file in Mexico City—at least not with the archived remains of that information. Countless actions in and on the "federal" landscape, it turns out, had over time gone on without authorization. San Pedro, meanwhile, would not gain definitive possession of lands until 1929.[45]

In places throughout Mexico like the Mayo Valley, such cases of open defiance of Carranza's constitutionalist government in their totality would weaken and overload the administration's political circuitry, leading ultimately to his assassination in May 1920. That June, Guaymas native Adolfo de la Huerta became the first member of the Sonoran triumvirate to assume the office of president. He quickly ordered the breakup of CARM, nominally restoring lands, waters, and canals to the village of San Pedro. This act created one of Mexico's earliest post-revolutionary agrarian-reform ejidos. Of broader importance, however, Calles's intervention in the valley's waterworks surely must have demonstrated to him and others the potential utility of using hydraulic infrastructure to mediate regional agrarian politics.

Federal Hydraulic Control and the Many Lives of Sonora's Oligarchs

Following De la Huerta's short occupation of the presidential seat, Obregón came to power in 1920. Quickly, the pace of planning and landscape transformation in the Mayo Valley accelerated. Obregón moved quickly and decisively, in may ways turning southern Sonora, and the Mayo Valley in particular, into a laboratory in which to test his vision for a modern agrarian democracy. He approved 5 million pesos from the federal treasury for construction of a port at Yavaros. An all-weather rail system that linked Navojoa to the agricultural hinterland also came on line.[46] And there was a variety of new "secondary" works including roads put in place to create the basis for what later became a farm-to-market network. Such high-level political engagement turned the valley into a pole of attraction for regional investment. It also began to stir the hopes of those within and outside of the area who had no access to land, and certainly not to irrigated land. Indeed, the ability to generate hope for an irrigated parcel of land would provide successive post-revolutionary administrations with ample political opportunities.

Delivering on promises made, however, was a source of endless conflict and disappointment, for particularly in the Mayo Valley there has never been sufficient flow to supply the large number of water concessions

granted. As several federal water officials have reminded me, the Mayo Valley Irrigation District has historically been *sobredimensionado* (literally, "overdimensioned"). In other words, the district's large size (close to 100,000 hectares, on paper) is extremely difficult to reconcile with the river's highly erratic flow. Average annual flow volume for the river is about 1,000 cubic meters per second. During the torrential downpours of December 1914, however, workers for the Sud-Pacífico railroad in Navojoa recorded a flow of 3,800 cubic meters per second, while gauges placed 30 and 35 kilometers upriver registered a raging 6,800 (Bond 1928: 22). This would be 240,000 cubic feet per second (CFS). By comparison, the greatest flow ever recorded on the Colorado River was in 1884, at 384,000 CFS. But I digress.

With their man Obregón in the presidency, the Mayo veteranos initially held out high hopes for recuperating their village lands, or at least gaining access to some of the colonization parcels beginning to open up. This was, after all, their primary reason for joining the revolution to begin with (Figueroa 1994: 118). They also saw the restitution of San Pedro (on paper, at least) under De la Huerta as a hopeful sign of better days to come. Much to their disappointment, however, most of their petitions went unanswered or at least failed to produce reasonably quick results. Moreover, with the Great Depression, the 1920s collapse of mining in the Sierra Madre was pushing laborers westward, toward the booming coastal plains, while *bracero* farm laborers were returning to Mexico from the agricultural fields of the US Southwest, swelling the ranks of hopeful smallholder farmers and thus competing with the veterans and further diminishing their chances of regaining control over lost floodplain territory. Navojoa's 1921 population, around 5,500, grew to 13,000 by 1933.[47]

Equally significant for resource politics was the process of "ruralization." The number of Navojoenses living outside the bounds of the city in 1921 outnumbered those living inside by 2.5 to 1. This was a dramatic demographic reversal from the late nineteenth century. Non-Indians were thus beginning to both infiltrate and surround what were formerly majority Yoreme communities (Almada Bay 1993: 123). New ties also began to emerge between villages, towns, and the three municipal seats—Navojoa, Etchojoa, and Huatabampo (see map). The American consul in Guaymas was impressed by how swiftly Navojoa had gone from being a "drowsy Mexican farm town to a center of no little consequence." Most of this transformation, he noted, resulted from Obregón's "prestige" and "political influence." But the consul also worried about the caudillo's "sometimes arbitrary mastery."[48]

Had the Mayo Valley not been bolstered by direct support from Obregón and the federal government, much if not most of the prosperity that it saw during the late 1920s, when southern Sonora became one of the nation's primary agricultural producers, likely would not have occurred, or at least not so swiftly. For example, extremely favorable federal trade concessions on garbanzos, pushed through by the president, had played a critical part in the region's economic prosperity during most of the decade.[49] Sonorans might have indeed been an exceptionally hardworking people, as the historically important dominant narrative suggests. But their agricultural, banking, and to some degree industrial elite classes benefited handsomely from their direct access to federal officials. Between 1902 and 1916, the Mayo's overall yearly surface area under irrigation hovered between 20,000 and 30,000 hectares. In a top year, garbanzo production might claim close to 25,000 hectares, or about 85 percent of the surface area. Between 1917 and 1930, the figure for chickpeas dropped somewhat to an *average* of only 20,000 hectares, yet the overall yearly irrigated average stayed at close to 30,000. Other crops included wheat, at 4,000 hectares; corn, 2,500 hectares; and beans, 3,700 hectares.[50] In the 1929/1930 production cycle, Sonora led Mexico's "North Pacific Region" in the production of cereals and forage. With a total of 127,133 hectares in production, it made up over 20 percent of the total agricultural value produced in that region (Gobierno del Estado de Sonora 1985, V: 31).[51]

Yet the high level of land concentration, coupled with the Mayo's unpredictable flow, also made the valley a volatile place not only for local producers, but also for agrarian and hydraulic politics. During the middle to late 1920s, 96 percent of the properties in southern Sonora's two valleys were larger than 500 hectares. The remaining 4 percent were in holdings of between 50 and 500 hectares (Gobierno del Estado de Sonora 1985, V: 29). Given the disparities, therefore, conflict was always a possibility, and it was frequently catalyzed by the floods that continued to strike the valley during the immediate post-revolutionary years.[52]

Documents in Mexico City's Archivo Histórico del Agua (AHA) contain numerous cases of flood-triggered conflict. In April 1928, for instance, members of the Río Mayo Agricultural Chamber of Commerce telegrammed Obregón and the SAF to complain about the perennial problem of living fencerows planted in the riverbed, a technology that was at odds with the modern vision of irrigation works. Once merely a subsistence practice, it might now be considered an act of open defiance against the federal government. The telegram's tone was urgent. Summer

rains drew near, and past experience showed that the planted willows could dangerously alter flow, destroying pricey waterworks and fields, even risking lives. The introduction of modern irrigation had long since politicized the fencerows. The fence builders, of course, were mostly Mayos who were quickly losing ground on the floodplain and, more and more, in the tributary arroyos feeding the river. Their need (and resolve) to produce both subsistence and cash crops directly threatened the territory that private landowners had appropriated from them.

The language of the conflict glimpsed in the documents draws critical distinctions between ethnic background, types of landholding, and different livelihood activities in and around the river. Obregón had previously ordered construction of "defense-works" to protect towns and canals, and the makeshift works of "riverbank small-farmers" purportedly threatened these as well. In some places, the "*pequeños agricultores*" (Indians, mostly) had allegedly choked the river's primary channel down to less than a third of its normal size.[53] Cases like this make it clear that the Sonorans' professed love for the independent smallholder clearly came bound in a twine of caste and class. On the one hand, elites often (and quite conveniently) lauded Mayos for their "uncommon intelligence . . . for manual labor and mechanics."[54] Many Yoremem also enjoyed intimate historical ties with landowning families that extended well beyond the realm of labor. On the other hand, private production had appropriated most of the lands and waters necessary for sustaining Indian communities and, by extension, for reproducing the "uncommon intelligence" and labor power so critical to capitalist agricultural production. Many of the same people who might be approached as true "pequeños propietarios," therefore, at one and the same time were likely to be laborers for the agricultural companies, working their own plots for cash and subsistence, and, finally, ethnic Yoreme, with their "backward" irrigation and now, from the elites' standpoint, chaotic and dangerous irrigation technologies. On paper, the officially declared federal river basin looked more and more like an exclusive preserve of the privileged, even if its perimeter has always remained in flux (a condition of the politics of water and agricultural production).[55]

Members of the agricultural chamber insisted on the complete clearing of the offensive willows. In a handwritten note scrawled over the original telegram, however, an SAF official expressed doubt about whether the Río Mayo enjoyed federal status at all.[56] Obregón, who had just been reelected but had not yet taken office, decided to personally intervene, telegramming the SAF with direct orders. The willows were a "transcendental problem," which he knew all too well, and he ordered

the ministry to reassert the federation's authority over the river, because the particularly vulnerable farmers on the left bank needed immediate protection.[57] The SAF finally sent in an engineer from Mazatlán to study the problem. CARM's Ángel Almada led him on a tour of the area in question, where they spoke with fellow landowner Francisco Terminel about the difficulty of finding "*peones*" to clear the riverbed. The cotton harvest was then in full swing, employing laborers and paying comparatively high wages.[58] The engineer did manage to oversee the clearing of a small stretch of river, but members of the chamber went on to demand federal permission to launch a river-wide campaign to eradicate, once and for all, the pernicious fencerows.[59] It is quite significant that they asked for such permission at all.

Then, in mid-July, before the ministry could render a final decision, José de León Toral shot President Obregón dead at a banquet in Mexico City's tony San Ángel neighborhood. Events turned 1929 into a tumultuous year for Mexico, and especially for the valley, where uncertainty reigned. An irreplaceable bond between the region and the center had been severed. Worse still, floodwaters that year once again washed out the Sud-Pacífico's railroad bridges and tracks, leaving US-bound winter vegetables to rot in fields and packinghouses. The proliferation of canals and the expansion of monoculture had amplified the reach and effects of the flooding. Estimates placed economic losses for southern Sonora at an astonishing (for the period) 4 million pesos. There were also other problems typical of irrigated agriculture, which were already abundantly apparent in the district: salt penetration of soils, plagues of insects, crop diseases, and silted infrastructure.[60] These exacerbated the economic devastation that season. And yet, ironically, it is likely that one of the few landscape features checking the progression of floodwaters was the maze of willow fencerows, creating a matrix across the floodplain that would have reduced the erosive power of the currents.[61]

Obregón's death created a political vacuum within which the already supercharged electrons of national politics buzzed wildly. Plutarco Elías Calles seized upon the confusion to secure his role as Jefe Máximo of the revolution, including control over the National Revolutionary Party (PNR), the original proposal for which had come from Calles himself (Gobierno del Estado de Sonora 1985, V). In Sonora, meanwhile, Calles's kin stepped into the political fray to promote the president's vision, particularly in the area of irrigated agriculture. The first to do so was Francisco Elías, the president's nephew, who assumed the governorship

in 1929, followed in that post by Calles's own son, Rodolfo Elías, in 1931. By that time, the US stock market had collapsed. Garbanzo sales were down. Migrants and braceros, faced with economic downturn and unemployment in the United States, poured into the valley, "seeking bread, a roof, and work" (Almada Bay 1993: 276–277). Of course, all of this generally presupposed the availability of land and the water to make it produce. But while the destructive floods of 1929 could not have come at a worse time for landowners, they also presented irresistible political opportunities for authorities, especially for those promoting the idea of federal hydraulic control.

Institutionalizing Federal Water Authority

Alan Knight writes that Obregón's assumption of the presidency marked the end of "violent revolution" and the beginning of its "institutionalization" (1990, 2: 517, 527). It was not until Calles's de facto reign (1928–1934), however, that the Sonorans' neo-Porfirian ideals took on their clearest institutional expression, as I suggested in the historical overview above. In southern Sonora, though this was also a time of pointed resistance to the imposition of centralized governance, many of Calles's efforts prospered nonetheless. Recall that one of his most important legislative victories came with the promulgation of the 1926 irrigation law, which created the National Irrigation Commission (Comisión Nacional de Irrigación [CNI]). This step pushed a considerable distance toward consolidating the vision of federally centralized water management that had emerged during the Porfiriato. Under Calles, one of the state's most critical roles was as arbiter of irrigation conflict. In theory and now also in law, this was to ensure that public waterworks reached beyond the narrow remit of a few private irrigation companies to benefit a broader egalitarian society rooted in agrarian activities. This agrarian society would also be a modern hydraulic society, and toward this end Calles understood the idea of "public benefit," set forth in the constitution's Article 27, to mean that national lands and waters should go toward the "formation of a new agricultural class" of colonos. In theory, then, CNI and SAF officials could count on a politically loyal sector of smallholders to help check the influence of *terratenientes* (Aboites 1998: 110).

Here again, of course, the divide between policy and practice loomed

large, and many landowners still had good reasons to celebrate their future. With the government's help, wrote engineer Domingo Diez in 1932, "there will be no doubt . . . of our well being."[62] Landowning elites nonetheless had to organize in novel ways to secure this future. The primary reason for doing so was to avoid a government-led redistribution of lands, which they had witnessed to some degree with CARM and San Pedro. Texts published at the time to promote investment in the region, such as the *Album de los Ríos Yaqui y Mayo* (1933), suggest that elites saw irrigation development and colonization schemes as a way to force the Yoremem to assimilate the values of hard work that full participation in "society" required. Joaquín Mange, founding member of the Mayo Valley Agricultural Chamber, was fond of quoting Porfirian general Bernardo Reyes:

> I have believed that the majority of those people [Yoremem] is susceptible to civilization . . . making them taste the benefits of social life, they would participate in it, and that more than a war of extermination . . . [we] should simply occupy the lands that they inhabit . . . giving the rest of them possession of some part of the lands distributed.[63]

The contemporary iteration of Reyes's paternalistic ideal of civilization took the form of a commission to "solve" the valley's "Agrarian Problem." In the early 1930s, landowners began to pool profits from their harvests to purchase land and, with help from the Sonoran government, initiated construction of major waterworks, including the canal La Unión, just outside of Huatabampo proper. With it they hoped to irrigate the 4,000 hectares purchased and set aside for "campesinos" who had petitioned for but not yet received irrigable parcels. A commission of engineers had studied the feasibility of incorporating other pueblos into the scheme, such as the largely Yoreme village of Tesia, east of Navojoa, whose residents had grown impatient with the government's unresponsiveness to their petitions for land.[64] In a 1932 letter to the SAF, Tomás Robinson Bours Jr., Ángel Almada, Trinidad Rosas, and other valley patriarchs asserted their understanding that the state should play a direct role in helping to dodge the bullet of a full-blown agrarian movement. The construction of a diversion dam and large-capacity, 16-kilometer canal at Tesia, they believed, would allow for the colonization of 20,000 hectares on the river's right bank, and another 10,000 on the left. This, they urged, would bring a full "regional transformation" and solve the overall "problem of colonization" for the valley's smallholders.

They also noted, quite accurately, that the latter had been caught between terratenientes and their "large properties on the one side" and non-indigenous campesinos, with their tiny ejidal parcels, on the other. But the true smallholders were beholden to irrigation companies for land and water, while *ejidatarios*, whose numbers and demands were growing by the day, had other means of support, including ties to federal infrastructure and programs.[65] Some of these smallholders, including many in Tesia, hoped that the SAF and agrarian commission would consider them as ejidatarios in matters of water allocation. That way, they could secure water at the lower, government-guaranteed ejido price.[66]

This largely indigenous class of smallholders, including many still loyal Obregonista veterans, was caught between what many perceived to be a carpetbagging ejidal sector and the region's latifundistas. But, even if at times it made more sense to throw their support behind the ejidos, the veteranos often enjoyed long-standing, close relations with landowners, who in some instances might even be godparents to their children. Valley elites, meanwhile, sometimes supported them, if not on ideological grounds as part of the middle-class yeomanry, then at least as a bulwark against a creeping agrarianism and the burgeoning demands of ejidatarios. Landowners were also benefiting significantly from government-financed waterworks built during the Sonorans' reign. With these works they enjoyed greater and more reliable access to water, and they also saved on labor costs for canal construction. For instance, the state-financed lengthening of the Santa Rosa canal, originally built with private monies, had allowed its owner to sell water directly to ejidatarios and smallholders "without conditions."[67]

The high-water mark of the Mayo Valley's immediate post-revolutionary transformation, however, came in the summer of 1932, when, under a broiling Sonoran sun, a Sud-Pacífico "special convoy" pulled into the Navojoa railroad station carrying the now minister of agriculture and development, Francisco Elías Calles, and minister of communication, General Miguel Acosta. Queued up to receive them was the *crème de la crème* of Sonora's political establishment. This included Governor Rodolfo Elías Calles, state and federal legislators, justices of Sonora's Supreme Court, and members of the Río Mayo Agricultural Chamber of Commerce. The greeting committee was also joined by scores of agrarian activists there to welcome these illustrious and powerful men.[68]

The contingent had come to inaugurate waterworks and celebrate a new era of peace, cooperation, and prosperity. Everyone from the most enterprising man of "effort and initiative" down to the most humble

day laborer, so the official story went, would shoulder the burden and benefit from the bounty of this rational scheme of irrigation development. The revolutionary government was to act as a point of convergence for this egalitarian vision, and in the self-congratulatory air of the moment civic leaders marveled at the "solution" they had devised for the valley's "Agrarian Problem." Cabinet ministers toured the valley to inspect new infrastructure. At Compuerta del Once (Sluice Gate 11), they "baptized" the new works with a bottle of champagne, drank cold beer, and ate sandwiches while water "trickled" past. Stopping to rest under the shade of a gallery forest of cottonwood trees in the pueblo of Jupateco, they spoke in reverential tones about the Caterpillar tractors now moving earth for canals. "Here," the ministers noted, "they are solving the Agrarian Problem on the basis of work and cooperation, without the malefic influence of the . . . politicos." For Robinson Bours Jr., La Unión illustrated how he and his contemporaries had managed to "erase the hated inequality . . . that in so many other places breaks [the unity] between the campesinos and the *terrateniente* . . . here we are sincerely feeling like brothers."

On the return, the party stopped in Huatabampo to pay its respects at Obregón's tomb, then proceeded to inaugurate a new canal for the ejido San Ignacio Cohuirimpo, near Navojoa. The day ended with a feast of *barbacoa*, followed by a "sumptuous dance" in Huatabampo that lasted until dawn. As one of the attendees pontificated, "The Revolution" had instilled in its "men . . . talent, patriotism, and civic virtue," all on display for the nation to observe in the Río Mayo.[69] The "Agrarian Problem," they firmly believed, called for a modern agricultural (as opposed to an overtly political or social) solution, and that is precisely what these "men of effort and work" thought they had devised. The US consul in Guaymas wholeheartedly agreed: "the agrarian problem in the Mayo Valley . . . has been terminated."[70]

By 1934, a few important ejidos had indeed won definitive presidential decrees. The ejidos of Navojoa received 1,117 hectares of irrigated land, along with San Pedro (2,500), San Ignacio Cohuirimpo (1,198), Moroncárit (250), and El Padre (5,065). Many Yoremem were in fact among the beneficiaries of these decisions and, crucially, most of these decisions were for the restitution of ancestral pueblos, lands, and waters. The redistribution also came with 22,496 hectares of pasturelands that, ejidatarios hoped, new hydraulic works would ultimately reach.[71] The vast majority of the lands distributed during the Sonorans' tenure derived from areas still uncultivable for lack of irrigation—most of it, in other

words, was pastureland (*agostadero*). With the exception of the CARM at San Pedro and a handful of other *compañías*, the terratenientes' core holdings remained generally unaffected (Almada Bay 1993; Lorenzana Durán 2006).

Several Mayo veterans thus continued on in their resistance. Residents of Mochipaco, describing themselves as landless Indians in their petitions to federal authorities, for example, berated the Calles government for its "systematic negation" of Indian demands. These once proud revolutionaries now felt spurned, left to molder in the "shadows of oblivion." Some trained their sights directly on the terratenientes. A group in Huatabampo charged, quite correctly, that ersatz agrarianism was little more than protectionism for landed elites. Rodolfo Calles responded aggressively, however, threatening to suspend all irrigation works if the Indians failed to recant their position (Lorenzana Durán 2006: 33–34).

Making matters worse, the Callistas had been engaged in a nationwide religious "defanaticization" campaign, which had the effect of stripping priests of their clerical privileges and at times even their vestments. In the northwest, the campaign also took on severely racist overtones in the form of an official "Anti-Chino" campaign, which saw the deportation of Asian merchants and business owners, and their families, and the closure of cantinas and gambling facilities.[72] But for the Yoremem, the Callista government's most unpardonable transgression was burning their village churches and destroying countless religious icons (Almada Bay 2009; Crumrine 1977). Such a raw, frontal attack on belief and practice cut across lines of class and ethnicity. Beyond the dramatic changes in the valley's social and hydraulic geography, this policy hit Mayos squarely and with special force. In the early 1930s, anthropologist Ralph Beals made the dismal assessment that the Mayo's indigenous governing structure, which, he believed, had been fairly intact at the beginning of the Porfiriato, had collapsed altogether. While Indian authorities continued to oversee religious processions, they enjoyed little or no say in matters of village politics (Beals 1932: 34–35). With the appropriation of the floodplain and channelization of most of the river, the fabric of their daily lives was badly frayed. Now, the federal government was going after some of their last preserves of autonomy: their religious practices and spaces of worship.

Then, in December 1932, yet another dramatic flood scoured the valley, further opening the wounds of ethnic and class tension, and exposing the flaws, contradictions, and gaps in the Sonorans' modern

technological and infrastructural approach. An engineer from the agrarian department wasted no time in blaming the Mayos at Tesia for damages to the Rosales canal. Of course, accusations of this nature were hardly novel. Now, though, officials understood their authority to extend well beyond the riverbed itself, claiming not only prominent water features, but their tributaries as well. In this case, gleaning firewood in the arroyo Yorentamegua was taken as a direct threat to the river's modern *raison d'être*. In their "accustomed form," the engineer charged, "year after year the natives of the place destroy it for firewood." The deforestation had purportedly led to the washing out of a defense-works, in this case a conduit for water to travel over or under the main arterial road. This, in turn, led to the canal's clogging. At least five other arroyos bisected Rosales, each a narrow ribbon of green in the otherwise Spartan thornscrub. Yet, the arroyo Yorentamegua was one of the few sources of sizable logs in the area, and the Tesia Mayos had likely harvested the area for decades.

Making use of these arroyos was a well-established pattern of everyday life.[73] Now, these practices of territory fell within the domain of federal law. They were not merely quaint; in the eyes of officials and landowners, they were dangerous. Federal irrigation was for many becoming a juggernaut. Weary of the assault on their religious beliefs and subsistence practices, many Mayos would soon begin shouting "long live religion" and "down with agrarianism!" (Almada Bay 1993: 373). The defiance of federal officials and programs implied by such statements did not bode well for Calles's reform-minded successor to the presidency, Lázaro Cárdenas.

Conclusion

Despite significant organizational and legislative reforms and investment in infrastructure, in the Mayo Valley at least the Sonorans' irrigation system remained a mongrel assemblage of old and new, of modern and antiquated works and practices. Such an assemblage limited the kind of expansion that might have, at least temporarily, assuaged demands for land.[74] In so many cases of water conflict, federal territory (and territoriality more broadly) would seem to have been in a constant flux of expansion and contraction. On balance, though, it was becoming entrenched, its boundaries pushing outward solidifying by virtue of the quotidian machinations of bureaucrats, the *trámites* (procedures) involving paperwork and formal requests for water, and the interminable

conflict these produced and that officials were called upon to arbitrate. Waterworks were becoming part of the federal-bureaucratic fold—either through outright expropriation, as Calles's decisions in 1919 illustrate, or through more positive means, such as new construction projects. This meant that in the wake of the agrarian reparto private landowners would have to interact with the valley's ejidal sector. Federal hydraulic works thus became increasingly important if contested sites of cultural and political contact, as nodes in the expanding networked geography of state-driven agricultural development. True, the Sonorans' contradictory approach to land reform and irrigation had also crippled or completely arrested the development of the very smallholder sector they professed to support. Yet, as a rationale for private landholding, the "pequeña propiedad" ideal was firmly in place, rooted within a now broadly held regional imaginary and embedded in the very foundation of post-revolutionary policies and politics.

Agribusiness elites in other regions had, just as in the Mayo River valley, organized themselves within agricultural chambers of commerce, and sought a similar *modus vivendi* with agrarian radicals (see Falcón 1977: 84). Conditions in the countryside, nonetheless, were far from harmonious, and such maneuvers generally failed to prosper. Across Mexico, more than 2.3 million peasants remained landless. By 1930, 15,488 individuals with plots larger than 1,000 hectares dominated almost 84 percent of the workable land base. Sonora boasted a meager 38 ejidos, which together controlled 188,055 mostly agriculturally marginal hectares, and on which toiled 4,071 ejidatarios. Meanwhile, 919 latifundistas held nearly 90 percent of the state's properties, here again generally in plots greater than 1,000 hectares. A 1937 article published in the newspaper *El Pueblo* claimed that four people controlled 60,000 hectares in the Mayo Valley alone, a figure that, in the abstract, simplified matters but still roughly underlined the deep disparities. A day's pay in the campo had also dropped from 2.33 pesos in 1929 to 1.56 in 1935. Despite or because of this dismal news, however, even the modest reforms achieved under Obregón and Calles did produce one important effect for the emergent ruling political party: they had hoisted the horizon of people's expectations for a piece of irrigated land, and this was a lesson that no bureaucrat or party politician could afford to ignore.[75]

In 1934, the new president, Lázaro Cárdenas, stepped onto this tumultuous stage with what might be described as an uncommon (for a president) appreciation for the depth of Mexico's economic and social

troubles, and a keen sense of the nation's political mood after years of a heavy-handed Callismo. His ties to high-profile agrarian radicals helped shore up support among workers and "campesinos" and allowed for an abrupt turning away from the policies of Calles, El Jefe Máximo, his mentor. Any new political strategy would have to restart the stalled engines of economic growth and toward this end Cárdenas went straight to work strengthening programs for inputs, credit, and waterworks. He also aimed to weaken large landowners' position through a far-reaching agrarian reform and land distribution, as well as through new waterworks tied directly into ejidos. The Cárdenas approach to reform, unlike his predecessors, was thus directly if also strategically refracted through the prism of social struggle and class conflict, rather than by the idea of striking a delicate balance between old and new interests.

Cárdenas nonetheless shared with the Sonorans a vision for strengthening central government's role as "arbiter of class conflict in civil society," which meant reacting to as well as inciting class tensions (Sanderson 1981: 104). The chief novelty of the new regime would be the emergence of a broad array of organizations and institutions installed over the Sonoran caudillos' terrain of more locally rooted social and political relations. This older terrain never completely vanished, however, even as the new technocrats of revolution and the official party began to replace the old-guard men of the military. The Sonorans' legacy would be to dramatically alter the horizon of possibility for the Cárdenas agrarian and hydraulic reforms to come, deeply shaping the political and physical landscapes of the Mayo Valley and the rest of irrigated Mexico along with them. ✣

Notes

1. See Deleuze and Guattari (1987: 101–110) on "Royal" or in this case, colonial, "Science."

2. The ejido system was established following the 1910 revolution through a series of far-reaching agrarian reforms. Ejidos in theory are collective farm units, though in many cases cultivation is at the individual level, while marketing of products can occur collectively. Ejidos are often coterminous with agrarian towns and villages, but not always.

3. It is perhaps easy to overlook the importance of this migration, as the numbers of new immigrants accelerated rapidly with the Cardenista agrarian reform and new ejido structure (cf. Almada Bay 1993, 2009).

4. However, this vision of localized irrigation management was not seriously

put into practice until 1992, when legislators promulgated new water legislation coupled with changes made to the 1917 constitution.

5. Such documents range from technical reports, maps, and plans to cases of water conflict involving decisions on the part of federal authorities. Archival documents for this paper come from the Archivo Histórico del Agua (hereafter, AHA); the Archivo General del Estado de Sonora (hereafter, AGES); Records of the United States Department of State; the official bulletin of the National Irrigation Commission, *Irrigación en México*; and interviews conducted in the Mayo Valley between 2007 and 2013.

6. The term "*forjar patria*," to forge the fatherland, comes from Manuel Gamio (1916; cited in Aboites 1998: 113).

7. I use this term with some trepidation, for all knowledge is "indigenous" to somewhere. It is somewhat useful, however, as a way to suggest the existence of an approach to or technology of water control that responded to local circumstances, as opposed to much of the modern technology being brought into the region.

8. Portions of the 1917 constitution were amended in 1992, especially in the areas of land reform and water management.

9. The 1917 constitution set forth the 100-hectare ceiling.

10. "La Política de Irrigación del Gobierno Federal," *Irrigación en México* 1 (2): 5–14, 1930.

11. Ibid., p. 12.

12. Ibid.

13. Ibid., p. 11.

14. Ibid., p. 12.

15. Ibid., p. 12.

16. Here, it is important to keep in mind the differences in the political effects of control of surface water versus groundwater, which can be quite striking. The latter, taken from a point source, is generally more easily appropriated and privately controlled than water running across a broad surface area, which usually requires some form of public management process. Nonetheless, groundwater exploitation has always been relatively small scale in the Mayo Valley, at least compared with other irrigation districts in Sonora, and the close articulation of aquifers with surface flows means that even groundwater is not so easily rendered a "private" good.

17. Letter to the Gobernador de Sonora from Ing. Jorge Escalona, Secretaría de Agricultura y Fomento (hereafter, SAF) agent in Hermosillo, September 29, 1939, AGES, Ramo: Irrigación, expediente 412.8 "39"/35.

18. The 1910 Ley sobre el Aprovechamiento de Aguas de Jurisdicción Federal, signed by Porfirio Díaz not long before his ouster, established federal dominion over a large variety of water features, including rivers and tributaries that crossed over or constituted a border between states (see Aboites 1998; see also *Evolución de la Legislación de Aguas de México*, Colegio de México, undated and unpublished PDF, author's files).

19. Doolittle (1988, 2003) and Sheridan (1988) have studied the historical practice of living fencerows in significant detail on the Río Sonora and the Río San Miguel, respectively. Doolittle (2003) suggests that such practices, despite the claims of researchers, environmentalists, and farmers, often produce problems for downstream water users by increasing river velocity and, thereby, exacerbating the effects of flooding and causing erosion. This was also true for the Río Mayo, even before the advent of waterworks during the mid- to late-nineteenth century.

20. Flavio de S. Palomares, Agente General de la SAF in Hermosillo, to Dirección de Aguas, April 29, 1918, AHA, caja 665, expediente. 9668, foja. 4. Hereafter, 'caja,' 'expediente,' and 'foja' will be abbreviated as c., e., and f. (or ff., in the plural), respectively.

21. Ibid.

22. "Acuerdo" from SAF minister Pastor Rouaix, reproduced in a letter from Ignacio López Bancalari, Dirección de Aguas, to the SAF's agent in Hermosillo, AHA, c. 665, exp. 9668, f. 8.

23. Ibid.

24. Roberto Arriaga, Jefe de Sección de Tramitación, SAF, to Subsecretario, June 18, 1928, AHA, c. 665, exp. 9668, ff. 6–7.

25. Ibid.

26. Indices, Dirección de Aguas, AHA, c. 665, exp. 9668, f. 9.

27. As I discuss further on, however, it also increasingly involved non-Indians as the dynamics and boundaries of land and water monopoly shifted.

28. Gamio's critique was published on April 21, 1930, in *Excélsior*. The editors of the Comisión Nacional de Irrigación's publication, *Irrigación en México*, published a rebuttal. Both are cited in Aboites (1998:113).

29. Cited in Reyes Osorio et al. (1974: 17, fn. 26).

30. These figures are taken from Figueroa (1985: 366). The same source reports that for 1940 a total of 23,000 Mayos were resident in Sonora.

31. This fee often included ground rent. Dirección de Aguas, Dpto. de Concesiones, SAF, to Director Auxiliar of the Comisión Nacional Agraria, July 29, 1919, AHA, c. 4589, exp. 61094; f. 194; Informe from SAF agent in Hermosillo to Ignacio López Bancalari, Dirección de Aguas, June 11, 1919, c. 280, exp. 6783, f. 8.

32. "Informe sobre CARM," from SAF agent in Hermosillo to Ignacio López Bancalari, Dirección de Aguas, June 11, 1919, AHA, c. 280, exp. 6783, f. 9.

33. This discussion is taken from Adolfo de la Huerta's presidential decree restoring San Pedro's lands and waters. Reproduced in Jefe del Dpto. Técnico, Comisión Nacional Agraria, to Director de Tierras, Colonización, Aguas e Irrigación, SAF, October 21, 1920, AHA, 4589, exp. 61094, ff. 24–45.

34. Decreto del Ejecutivo sobre Colonización y Compañías Deslindadoras, 15 Diciembre de 1883. The decree provided for the survey and subdivision of land by "commissions of engineers" to be purchased or in some cases granted by Fomento, either to Mexican citizens or foreign nationals. Colonos could also be part of land companies. Source (consulted 11/27/2014): http://www.

biblioteca.tv/artman2/publish/1883_182/Decreto_del_Ejecutivo_sobre_colonizaci_n_y_compa_a_88.shtml

35. "Informe num. 269," from Jefe de División, Dirección de Aguas, Dpto. de Concesiones, SAF, to Director, Aguas, September 6, 1919, AHA, c. 4589, exp. 61094, ff. 12–18. The SAF agent had actually traveled to San Pedro and listened to community members' complaints.

36. Jefe del Dpto. Técnico, Comisión Nacional Agraria, to Director de Tierras, Colonización, Aguas e Irrigación, SAF, October 21, 1920, AHA, 4589, exp. 61094, ff. 24–45.

37. CARM had paid a mere $1.80 per 3-hectare lot when the official government price had been set at $6.60. The company had also surpassed the government's 16-lot limit, now with 376 parcels in its possession. Worse still, in 1912 CARM had finally wrangled Baresuqui lagoon from the Indians and, by its members' own admission, forced the deal through "artifice and pressure" (Jefe del Dpto. Técnico, Comisión Nacional Agraria, to Director de Tierras, Colonización, Aguas e Irrigación, SAF, October 21, 1920, AHA, 4589, exp. 61094, ff. 24–45).

38. "Informe sobre CARM," from SAF agent in Hermosillo, to Ignacio López Bancalari, Dirección de Aguas, June 11, 1919, AHA, c. 280, exp. 6783, f. 9.

39. Ramón Corral, Agente General of SAF in Hermosillo, to Ignacio López Bancalari, Dirección de Aguas, September 3, 1919, AHA, c. 280, exp. 6783, f. 26.

40. "Informe sobre CARM," from SAF agent in Hermosillo, to Ignacio López Bancalari, Dirección de Aguas, June 11, 1919, AHA, c. 280, exp. 6783, f. 8.

41. Ibid.

42. "Contrato Celebrado entre el C. Leandro Fernandez, Secretario de Estado y del Despacho de Fomento, en Representación del Ejecutivo de la Unión y el Lic. Ernesto Peláez en la del Angel Almada para Aprovechamiento Como Riego de las Aguas del Río Mayo del Estado de Sonora," April 3, 1902, AHA, c. 4589; exp. 61094, ff. 57–58.

43. "Informe sobre CARM," from SAF agent in Hermosillo, to Ignacio López Bancalari, Dirección de Aguas, June 11, 1919, AHA, c. 280, exp. 6783, f. 13.

44. A. R. Guzmán, Agente en Hermosillo, SAF, to Director de Aguas del Agente Gral., Hillo, January 15, 1920, AHA, c. 663, exp. 9626, f. 2.

45. For the case of CARM not honoring the presidential decree, see letter to Director from Jefe de la IV División, SAF, January12, 1925, AHA, c. 4885, exp. 68105, f. 3. On San Pedro's definitive possession, see "Relación de Superficies Resueltas y Posesionadas en Definitiva," AHA, c. 2195, exp. 32599, f. 40.

46. American Consul, Guaymas, to the Secretary of State, July 21, 1928, US Department of State, Records of the Department of State Relating to Internal Affairs of Mexico, 1910–1929, 812.00 Sonora/1, roll 94. The rail line was not connected to the northern border region until the 1950s.

47. The former figure is from Almada Bay (1993: 123), while the latter is drawn from the *Album de los Ríos Yaqui y Mayo* (1933: 211; hereafter, *Album*). *Album* does not distinguish between the municipal seat and the broader municipality, but I am confident that the 13,000 total is only for Navojoa proper. Almada Bay's data come from the Navojoa municipal archives.

48. American Consul, Guaymas, to the Secretary of State, July 21, 1928, US Department of State, Records of the Department of State Relating to Internal Affairs of Mexico, 1910–1929, 812.00 Sonora/1, roll 94.

49. Ibid.

50. *Album*, p. 56; *Sonora en Cifras* places the total at 30,000 for 1926 (1960: cap. VI).

51. There were around 480,000 hectares harvested in the Pacífico Norte region that year (Gobierno del Estado de Sonora 1985, V: 31).

52. Torrential rains in the winter of 1914/1915 brought some of the most destructive flooding in the region's recorded history, particularly in the Mayo Valley. Heavy runoff had left canals clogged with silt, and parts of the train bridge spanning the river at Navojoa, the valley's principal urban hub, had vanished. In some places, the raging floods rearranged or completely erased waterworks put in place over the previous five decades.

53. Telegram to SAF from Cámara Agrícola y Comercial del Río Mayo (hereafter, Cámara), April 9, 1928, AHA, c. 296, exp. 7024, ff. 2–3.

54. *Album,* p. 232.

55. This idea originally comes from Aboites (1998: 119), who, in the context of government irrigation subsidies, views irrigation districts as exclusive "zones of privilege."

56. Telegram to SAF from Cámara, April 9, 1928, AHA, c. 296, exp. 7024, ff. 2–3.

57. The terms "left" or "right" bank are used to distinguish the sides of a river, facing downstream. Telegram to Dr. José G. Parres, Sub-Minister in Charge, SAF, from President Obregón, April 9, 1928, AHA, c. 296, exp. 7024, ff. 7–8.

58. Domingo Diez to SAF, June 12, 1928, AHA, c. 296, exp. 7024, f. 23. Because of their heavy demand for laborers, cotton harvests remained critical to the region's economy until the commodity's decline in the 1960s and 1970s (Ignacio Almada Bay, personal communication 2007).

59. To Gumaro García, SAF, from Cámara, July 4, 1928, AHA, c. 296, exp. 7024, f. 26.

60. Gobierno del Estado de Sonora (1985, V: 27).

61. I thank David Yetman for this insight.

62. *Album*, p. 69.

63. Ibid., p. 152.

64. Ibid., pp. 164–172.

65. Letter to Santiago Espinosa Loza, SAF agent in Hermosillo, from the Comité Pro Irrigación del Río Mayo, October 1932, AGES, Ramo Irrigación, caja 5, 412.6 "32"/26.

66. The Mayo smallholders on the Rodolfo Elías Calles and Rosales canals wanted to pay the same as ejidos for water: 4 pesos per irrigation turn. They presented themselves as family men with hungry mouths to feed. Letter to Rodolfo Elías Calles from the Pequeños Agricultores de la Margen Derecha del Río Mayo, July 31, 1932, AGES, Ramo Irrigación, caja 5, 412.6 "32"/49.

67. In *Historia Contemporánea de Sonora, 1929–1984* (1988: 167–168).

68. *Album,* p. 182.

69. *Album*, pp. 151–186.

70. "Enclosure to Dispatch No. 78 from the American Consulate at Guaymas, Mexico, January 31, 1933," US Department of State, Records of the Department of State Relating to Internal Affairs of Mexico, 1910–1929, 812.00 Sonora/1158, roll 18. See Almada Bay (2001: 156) on how the representation of ethnic or class differences, purportedly leveled out by hard work and entrepreneurialism, forms part of an enduring, idyllic epistemology in Sonora.

71. "Relación de Superficies Resueltas y Posesionadas en Definitiva," AHA, c. 2195, exp. 32599, f. 40.

72. The campaign produced a rebellion known as the Cristero Wars (or "La Cristiada") that grew particularly strong in the pious Bajío region, as well as in Tabasco, Sonora, and Veracruz, where religious persecution had been the most dramatic. The "Anti-Chino" campaign had the effect of stripping Asian merchants (who had gained considerable economic power as mid-level merchants and purveyors of goods and services) of their wealth and forcing them into exile, either north of the border or in Nogales, Sonora (*Historia Contemporánea de Sonora, 1929–1984*, 1988).

73. Letter to Inge. Mouro Ruíz Ayala, Banco Nacional de Crédito Agrícola, from Inge. Auxiliar del Departamento Agrario, Manuel de la Torre, January 1933, AGES, Ramo Irrigación, 412.6 "34"/17.

74. In 1942, CNI engineer Aurelio Benassini noted that the Mayo Valley contained around 54,000 hectares of irrigable land, but its dilapidated waterworks could, on average, service at most about 20,000 hectares per year (1942: 102).

75. The data, cited above, are taken from Sanderson (1981, chap. 5).

Works Cited

Aboites, L. 1998. *El Agua de la Nación: Una Historia Política de México (1888–1946)*. México, DF: Centro de Investigaciones y Estudios Superiores en Antropología.

Aguilar Camín, H. 1977. *La Frontera N*ómada*: Sonora y la Revolución Mexicana*. México: Siglo Veintiuno Editores.

Almada Bay, I. L. 1993. "La Conexión Yocupicio: Soberanía Estatal, Tradición Cívico-Liberal y Resistencia al Reemplazo de las Lealtades en Sonora, 1913–1939." Unpublished dissertation, El Colegio de México.

Almada Bay, I. L. 2001. *Breve Historia de Sonora*. México, DF: Fondo de Cultura Económica.

Almada Bay, I. L. 2009. *La Conexión Yocupicio: Soberanía Estatal y Tradición Cívico-Liberal en Sonora, 1913–1939.* México, DF: Colegio de México.

Banister, J. M. 2010. "Río Revuelto: Irrigation and the Politics of Chaos in Sonora's Mayo Valley." Doctoral dissertation, University of Arizona.

Banister, J. M. 2011. "Deluges of Grandeur: Water, Territory, and Power on Northwest Mexico's Río Mayo, 1880–1910." *Water Alternatives* 4 (1): 35–53.

Banister, J. M. 2014. "Are you Wittfogel or Against Him? Geophilosophy, Hydro- Sociality, and the State." *Geoforum* 57 (2014): 205–214.

Bantjes, A. 1998. *As if Jesus Walked on Earth: Cardenismo, Sonora, and the Mexican Revolution*. Wilmington, DE: Scholarly Resources.

Beals, R.L. 1932. *The Comparative Ethnology of Northern Mexico before 1750.* Berkeley: University of California Press, Ibero-Americana 2.

Benassini, A. 1942. "Potencialidad agrícola de la region costera de los estados de Sonora y Sinaloa." *Irrigación en México* 23(5): 89-103.

Bond, J.B. 1928. *Informe acerca del proyecto del Río Mayo, Sonora, Rendido por Luis P. Bolde*. NP.

Buchenau, J. 2007. *Plutarco Elías Calles and the Mexican Revolution*. Lanham, MD: Rowman and Littlefield.

Crumrine, N. R. 1977. *The Mayo Indians of Sonora: A People Who Refuse to Die*. Tucson: University of Arizona Press.

Deleuze, G. and Guattari, F. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Trans., Brian Massumi. Minneapolis: University of Minnesota Press.

Doolittle, W.E. 1988. *Pre-Hispanic Occupance in the Valley of Sonora, Mexico*. Anthropological Papers, University of Arizona, no. 48.

Doolittle, W.E. 2003." Channel Changes and Living Febcerows in Eastern Sonora, Mexico: Myopia in Traditional Resource Management? *Geografisker Annaler A* 85 (3-4): 247-61.

Falcón, R. 1977. *El Agrarismo en Veracruz: La Etapa Radical (1928–1935)*. México: El Colegio de México.

Figueroa, A. 1985. "La revolución Mexicana y los indios de Sonora." *Historia General de Sonora, IV (Sonora Moderno: 1880-1929)*. Hermosillo: Gobierno del Estado de Sonora.

Figueroa, A. 1994. *Por la Tierra y Por los Santos: Identidad y Persistencia Cultural entre Yaquis y Mayos.* México: Consejo Nacional para la Cultura y las Artes, Dirección de Información y Estudios Culturales.

García y Alva, F. 1907. *México y Su Progreso: Album-Directorio del Estado de Sonora.* Hermosillo. NP.

Gentry, H. S. 1942. *Río Mayo Plants: A Study of the Flora and Vegetation of the Valley of the Río Mayo, Sonora.* Washington, DC: Carnegie Institution of Washington.

Gobierno del Estado de Sonora. 1985. *Historia General de Sonora*, vols. I–V. Hermosillo: Estado de Sonora.

Harvey, D. 1996. *Justice, Nature, and the Geography of Difference.* London: Blackwell.

Hernández Salomón, M. (2006). *Navojoa: Cronología y Testimonios, 1533–1915.* Self published.

Kalin, M. 2006. "Hidden Pharaohs: Egypt, Engineers and the Modern Hydraulic." MA thesis, Wolfson College, University of Oxford.

Knight, A. 1990. *The Mexican Revolution*, vols. 1 & 2. Lincoln: University of Nebraska Press.

Lomnitz, C. 2001. *Deep Mexico, Silent Mexico: An Anthropology of Nationalism.* Minneapolis: University of Minnesota Press.

Lorenzana Durán, G. 2006. "Tierra y Agua: Una Historia Política de los Valles del Mayo y del Yaqui (1934–1940)." *El Tejabán: Cuadernos del Instituto de Investigaciones Históricas de la Universidad de Sonora* (6).

Martin, P., Yetman, D., Fishbein, M., Jenkins, P., Van Devender, T. R., and Wilson, R. K. 1998. *Gentry's Río Mayo Plants: The Tropical Deciduous Forest and Environs of Northwest Mexico.* Tucson: University of Arizona Press.

Montaño, R.E. y Gaxiola, Octavio, P. 1933. *Album del Mayo y del Yaqui. Directorio Comercial 1933.* Navojoa: Imprenta Montaño.

Reyes Osorio, S., Stavenhagen, R., Eckstein, S., and Ballesteros, J. 1974. *Estructura Agraria y Desarrollo Agrícola en México: Estudio Sobre las Relaciones entre Tenencia y Uso de la Tierra y el Desarrollo Agrícola de México.* México: Fondo de Cultura Económica.

Sanderson, S. E. 1981. *Agrarian Populism and the State: The Struggle for Land in Sonora.* Berkeley: University of California Press.

Sheridan. T.E. 1988. *Where the Dove Calls: The Political Ecology of a Peasant Corporate Community in Northwestern Mexico*. Tucson: University of Arizona Press.

Gobierno del Estado de Sonora. 1960. *Sonora en Cifras*. Hermosillo: Gobierno del Estado.

Tinker Salas, M. 1997. *In the Shadow of the Eagles: Sonora and the Transformation of the Border during the Porfiriato*. Berkeley: University of California Press.

Walsh, C. 2008. *Building the Borderlands: A Transnational History of Irrigated Cotton along the Mexico-Texas Border*. College Station: Texas A&M University Press.