

Finding a “Commons” in Roman Law (Water Rights)

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Abstract

Common Pool Resource theory is built on comparative analysis of how communities with different political and social structures manage natural resources in diverse natural and cultural environments (Ostrom 1990). To better understand and develop this model it is worth while taking into account historical manifestations of the commons, as argued by Cox (1985). The Roman case is of particular relevance to modern environmental policy because lawyers and economists invoke Roman legal categories as the basis for the use of property rights to manage the environment (Cole and Ostrom, 2012). In this paper, I examine three case studies from the Roman world that illustrate the use of property rights to manage local water supplies: the purely private property regime of servitudes, a small civic aqueduct (public), and an irrigation community that something of a public/private hybrid. For each system, I evaluate ownership, access, community and enforcement to reconstruct the interplay between law and social relationships in these local water communities. I draw on modern scholarship on common pool resources to fill in the gaps where the ancient evidence is incomplete and to assess the likely outcomes of the legal regimes. Just as modern communities have implemented various strategies for managing common pool resources, so too at Rome there was no unified concept of the commons, but many salient features of successful CPR management operate in both public and private property regimes in the ancient Roman world.

When we think of water and ancient Rome, we might first imagine their aqueducts, and while they are spectacular, engineering was not enough. Civic aqueducts primarily served the public fountains and baths enjoyed by urban residents. Rural residents depended on local sources for agriculture, industry, and domestic use. In both environments, competition over water was a common: in fact, the English word “rival” is derived from the Roman word *rivalis*, or “a person who shared a canal.” The Romans did not have sufficient technology to manage this competition because they were unable to measure and meter the volume of flow accurately (Bruun, 1991, pp. 51-5 & 213-7).¹ Instead, they relied on legal institutions buttressed by social norms and economic incentives to manage the water supply at the local level--and this is the topic of my paper today.

¹ On the mechanism, see Trevor Hodge, 1995, pp. 175-6 & 273-303.

In this paper, I examine three case studies from the Roman world that illustrate the use of property rights to manage local water supplies: (1) the private property regime of servitudes, (2) a small public aqueduct in Venafrò in south-central Italy, and (3) an irrigation community on the Ebro river in Spain that is a public/private hybrid. For each system, I evaluate ownership, access, community and enforcement to reconstruct the interplay between law and social relationships in these local water communities. I draw on modern scholarship on common pool resources (CPR) to fill in the gaps where the ancient evidence is incomplete and to assess the likely outcomes of the legal regimes. Just as modern communities have implemented various strategies for managing common pool resources, so too at Rome there was no unified concept of the commons, but salient features of successful CPR management operate in both public and private property regimes. Further, I will suggest that water rights, whether public or private, were most socially adequate when they were integrated into local communities. By "socially adequate" I mean that these legal institutions minimized the problems of free-riders and defection. In studying Roman water rights, I hope also to contribute to the broader discussion of Common Pool Resources by providing a long view that corroborates the research on contemporary communities by showing that CPR solutions worked across historical eras. The Roman case is of particular relevance to modern environmental policy because lawyers and economists invoke Roman legal categories as the basis for the use of property rights to manage the environment.

The Roman empire was neither small nor homogenous: it stretched from Gibraltar to the Euphrates, Mauretania to Hadrian's wall in England, and across this territory there were various environmental and cultural contexts. My paper today is part of a larger study of local water communities across the Roman Empire, and the case studies that I will present come from two comparable regions, central Italy and the Ebro basin in north-eastern Spain. In both regions, climate and patterns of rainfall are similar: abundant water during fall rains and spring snow melts, low water during mostly rainless summer months (Al Mudayna 1991, p. 16; Horden & Purcell, 2000, p. 14). Culturally, there are also significant correspondences between Italy and Spain because both regions had a long history of contacts with Rome and adopted Roman cultural

practices early. Roman law is one of these cultural practices and, as we will see, it was used to manage natural resources such as water. In fact, studying water rights lends insight into Romanization or the cultural negotiation between Romans and the peoples that they conquered, in which locals shaped their relationship with the dominant political culture, took from it what was useful, adapted it to their own interests--but that is another paper.

Before I get into the case studies, I want to briefly introduce Roman property law and the nature of the Roman evidence.

Sources from the Roman world are less complete than what we usually have for later historical eras. For example, two of my case studies are based on inscriptions, that is, Latin texts written on stone or bronze for public display and/or archives. From Venafro, in south-central Italy, there is a decree about the local aqueduct written on stone (*CIL* X.4842), while from Spain, the irrigation community recorded its by-laws on bronze tablets (Beltrán Lloris 1996, pp. 153-6). Neither inscription survives in full. The Venafro decree was discovered on a block of marble built into a church and subsequently removed to a museum. Only its heading and about 70 lines survive; its original length is unknown (Mommsen, 1850).² The Ebro law was written on a large bronze tablet, originally with a heading and 152 lines in three columns (Beltrán Lloris, 1996, p. 151). Pieces of the tablet were found in a late antique house, probably waiting to be melted down for reuse, and parts of the text are missing (Beltrán Lloris, 1996, p. 149). Sources for reconstructing the historical contexts of these inscriptions are patchy, too: there are few references in Roman literature to Venafro and few inscriptions or architectural remains from the site (Capini, 1991). For the Ebro law, the evidence is even more circumstantial because the location of the community can only be guessed at based on the place names in the inscription and its find spot. Latin literature comes with its own bias and silence because it was written mostly by and for elites. Finally, the legal literature is fragmentary in a different way.

² A second copy of heading of decree was also found, *CIL* X.4875, with Pantoni, 1960-1.

The biggest source of legal opinions from the Roman world is the *Digest of Justinian*, a sixth century A.D. compilation of legal writings by Roman legal experts or jurists of the preceding seven centuries. When Justinian's legal office created this compilation, picking and choosing excerpts from earlier legal literature, fortunately they made note of the source of each excerpt so that we have some idea of the original context. Although the *Digest* is a compilation, scholars generally agree that it is a reliable source for the law of the early Empire, roughly 27 BC to AD 300, the same historical era to which the inscriptions belong.

The Roman jurists sorted law into three basic categories: persons, property, and obligations or contracts. Modern discussions of property law sometimes take their cue from the Roman categories. A representative example is Cole and Ostrom's discussion in "Property Systems and Rights in Natural Resources" (2012, pp. 42-3, table 2.2). They note the imperfect match between the modern and Roman categories and dismiss the confusion by remarking that the Roman categories themselves were not entirely straightforward. Now, I would be the last persons to insist that the Roman jurists were perfectly systematic in their treatment of anything, but eliding inconsistencies in their categories of property misses an opportunity to better understand the legacy of Roman law in our discussion of common pool resources. A broader diachronic perspective is useful, even though it may not remove all confusion, because our sources for Roman law are not monolithic. They span about a thousand years from the *Twelve Tables*, Rome's first written law code (ca. 450 BC) to Justinian's compilation (AD 530-3).

The categories of public and private property exist already in the *Twelve Tables*: public property in the rules for the width of public roads, private ownership in some form of land and water rights in the form of servitudes (on which more shortly). Throughout the Republican period, roughly 509-27 BC, public property, in the form of land seized by conquest or *ager publicus*, was a hot-button issue in political debates because some of this land was appropriated by Roman citizens and some was used to create Roman colonies or settlements of Roman citizens. The infrastructure of Rome itself was public property, and by the mid-Republic, the Romans had built the first aqueduct (Aqua Claudia, 312 BC). Soon after, conflicts arise over public and private access to the aqueducts: when Cato was censor in 184 BC, he cut off illegal private taps on the city aqueducts (Livy 39.44.4). Natural source also generated conflict, and also in the second century

BC the Romans created a legal remedy called an interdict to protect access to public rivers. The interdicts provided an expedited administrative hearing to decide about possession; in some cases the judgment was final while in other cases the interdict judgment preserved the *status quo* until a full trial could be held to decide the issue. There were a number of interdicts, several concerning water rights, at first protecting access to public water sources and later broadened to cover some private water rights. The interdicts are only tangentially related to my case studies today, but they are an important site of intersection of public and private in the Roman water rights, and they are one of the earliest topics that generate discussion about the distinction between public and private property in Roman legal literature; the other topics that generate a lot of discussion of public and private property are the seashore and river flooding.

In the *Digest of Justinian*, when the jurists invoke public or private property, they are usually engaged in a casuistic discussion of actual or hypothetical legal cases. But there is some attempts to systematize the categories of property in the ancient textbooks: first Gaius's *Institutes* (2.2, 9-11), a 2nd century AD textbook sets out categories that prefigure those in Justinian's *Institutes*. Justinian (*CJ* 2.1.pr-2) classifies all water sources were classified as common property. This is a development of post-classical law, though it probably reflects the ideas of Marcian, a late Classical jurist, who in turn repackages Gaius' categories and adds the category of common property, *res communes* (D. 1.8.2, with De Marco, 2004, pp. 17-8 & 23; Zoz, 1999, pp. 89-90). In most Roman legal writings before Justinian, common property means private property that is owned by more than one individual, not an open access, common pool resource, expressed by Gaius and Marcian as *univeritas* (De Marco, 2004, 17-8). Open access property or common pools resources was just one kind of public property; some public property some was owned by the Roman state or another civic community (Zoz, 1999, pp. 35-7). To explore how these concepts worked in practice, let's look at the three case studies, starting with private water rights.

Water as Private Property

In some cases, the legal status of water followed the status of the property, so that water from springs or streams on private property was classified as private property (Fiorentini 2003, pp. 72-5). Already in the fifth century BC, a private water right could be arranged in a servitude or a right of use, similar to modern easements. A servitude was a property right that gave its holder (the owner of the dominant estate) a right to use water that belonged to a neighbor (the owner of the servient estate). Access and ownership were articulated in the legal rules governing servitudes. First, a rustic servitude could be established only on adjacent property (*D. 8.3.7.1 Paul. 15 ad Plaut.*).³ The second rule prohibited informal sharing of water, that is, if a landowner had a servitude for water, he could not share it with anyone else (*D. 8.3.24 Pompon. 33 ad Sab.*).⁴ These two rules limit access to the And third, a servitude was conceived as an indivisible right that was permanently attached to a property and was transferred with the land in sale and inheritance. But, while the legal right was indivisible, the resource itself might be divided so that more than one landowner held a servitude to the same resource. Where there were multiple servitudes, their legal rights could be further regulated by schedules for use (Bannon, 2009, pp. 83-99). These legal rules limited access in a way that conserved the water and secured the water supply for both property owners (Bannon, 2009, pp. 48-57).

Servitudes were exercised within a small community where normative behavior reinforced and helped to define the legal right to water. A servitude was a one-sided arrangement in that there was no fee for use, but the legal rules for servitudes imposed reciprocal rights and duties on both the servitude holder and the property owner. The legal right was informed by social norms that are expressed explicitly in one legal opinion by the jurist Celsus about right of way: the holder of the servitude must exercise his right

³ *D. 8.3.7.1 Paul. 15 ad Plaut.: in rusticis autem praediis impedit servitutum medium praedium, quod non servit.* Other cases about the restriction to adjacent property include: *D. 8.4.7.1 Paul. 5 ad Sab.*, and *D. 8.3.5.1 Ulp. 17 ad Ed.* (on which see also below, p. X)., and for two cases that assume a neighboring farm, cf. *D. 8.3.3.1-2 Ulp. 17 ad Ed. (in vicini villa)* and *D. 8.3.23.1 Paul. 15 ad Sab. (ad fundum vicinum)*, *D. 39.3.17.4 Paul. 15 ad Plaut.* (tuus proximus). Urban servitude with an intervening property, e.g. right to obstruct a view may be held by someone whose house is at a distance, *D. 8.5.4.8 Ulp. 17 ad Ed.*, or the right to have an unobstructed view, *D. 8.5.5 Paul. 21 ad Ed.*

⁴*D. 8.3.24 Pompon. 33 ad Sab.: Ex meo aquae ductu Labeo scribit cuilibet posse me vicino commodare: Proculus contra, ut ne in meam partem fundi aliam, quam ad quam servitus acquisita sit, uti ea possit. Proculi sententia verior est.* See Grosso, *Servitù Prediali*, 98-99 and 104-108; Capogrossi Colognesi, 1966, pp. 158-72.

respectfully, *civiliter modo*: the adverb *civiliter* echoes the Latin term for private law, *ius civile*, the law for Roman citizens, implying inherent values shared by this community, as he writes “for certain things are assumed tacitly in the term” (D. 8.1.9 Cels. 5 *Dig.*, with Bannon, 2009, pp. 103-16).⁵ The examples cited in this opinion show that servitude holder was expected to respect the rights of the property owner, e.g. by not building his watercourse through a building or vineyard. In turn, the property owner had to allow the servitude holder access to his infrastructure for maintenance.

Beyond the two parties, the broader local community had a role in regulating servitudes (Bannon, 2009, pp. 16-9 & 113-7). Other landowners could be involved when the servitude holder did repairs on his canal because he was allowed to approach his canal by the shortest route across anyone’s property. In addition, when long-standing use of a water source was recognized as a servitude, witnesses might be drawn from this broader community. Finally, the rule for loss of a servitude depended on community involvement. A servitude was lost if it was not exercised within a prescribed period (2 years), but anyone in the servitude holder’s household could exercise the right. To prove the rule, the neighbors would have to know not only the landowner but also his slaves and tenants. Moreover, the implementation of this rule assumed informed and self-conscious social practices, because the person using the water had to believe that he was exercising a servitude, that is, he had to know the legal status of the water and his own legal rights.

When these social controls failed, the parties to a servitude could use remedies from Roman private law to enforce their rights. The holder of a servitude could claim ownership through *vindicatio*, and win compensation for damage to his property caused by interference with his water supply (Grosso, 1969, pp. 279-301; Bannon, 2009, pp. 159-66). In turn, a landowner could contest the exercise of a servitude if he believed that his land was not a servient estate (Grosso pp. 301-3). And if the exercise of the right cause damage to his property, he could use the *lex Aquilia* to sue for compensation.

⁵ D. 8.1.9 Cels. 5 *Dig.*: *Si cui simplicius via per fundum cuiuspian cedatur vel relinquatur, in infinito, videlicet per quamlibet eius partem, ire agere licebit, civiliter modo: nam quaedam in sermone tacite excipiuntur. non enim per villam ipsam nec per medias vineas ire agere sinendus est, cum id aequae commode per alteram partem facere possit minore servientis fundi detrimento. verum constitit, ut qua primum viam direxisset, ea demum ire agere deberet nec amplius mutandae eius potestatem haberet: sicuti sabino quoque videbatur, qui argumento rivi utebatur, quem primo qualibet ducere licuisset, posteaquam ductus esset, transferre non liceret: quod et in via servandum esse verum est.*

Private water rights were fully integrated into both the social and legal practices of Roman landowners. Servitudes were a familiar institution that was used widely to support agriculture and generally the economic interests of Roman landowners. They provided a framework for articulating community norms for sharing water resources, and they were reinforced by the legal system, which itself was shaped by social practice. This combination of legal and social institutions is characteristic of successful common pool resource management. Another feature of servitudes that contributes to their success, is that those who used the water were also empowered to set the rules and enforce them. Although there is some bias towards elites in most Roman private law institutions, there is some evidence that, when servitudes were enforced, challenges to wealthy landowner were given a fair hearing. Servitudes embodied a basic equity among landowners, both in their reciprocal rights and in the social values that supported them, in particular, the belief that the whole community benefited when all the landowners had successful farms (Bannon, 2009, pp. 105-16). These social expectations do not carry over to public water rights, as we will see now in considering the aqueduct at Venafro.

Water as Public Property

Civic aqueducts were fairly common in cities and towns across the Roman empire, such as Venafro in south-central Italy where the aqueduct brought water from the springs at Volturno to the city.⁶ The administration of this water supply is documented in a long, partially preserved inscription. The heading of the inscription shows that the emperor Augustus financed the aqueduct's construction in 16-10 BC, probably in connection with his settlement of veterans there (Capini, 1991, pp. 29-31; Mommsen, 1850, pp. 287-90 and 325-6). For this reason the aqueduct and its water were public property as was its water.⁷ The aqueduct was managed by Venafro's town officials, with

⁶ For the route of the aqueduct, see Mauri, Cimorelli, & Frediani, 1938; Galli and Naso, 2009, pp. 142-3.

⁷ It was public property in the sense that it was owned by the Roman people or possibly by residents of Venafro collectively (depending on the reconstruction of line 8: *Venafranorum nomin[e] . . . ius sit lice[atque]*): Zoz, 1999, p. 94; Mommsen, 1850, pp. 295-6.

significant parallels to the administration of Rome's aqueducts.⁸ Comparison between Rome and Venafro reveals the typical features of civic administration as well as its limitations in terms of creating institutions adequate to manage a local water supply.

Access to water from the Venafro aqueduct can be divided into three types. There was open access from public fountains for residents in town.⁹ Outside the town, some landowners along the route of the aqueduct probably had a right to divert water before it reached the town, as suggested by the mention of pipes attached to it (Il. 43-4).¹⁰ Also in town, some residents had individual water rights for delivery to their property. Arrangements for individual access to the water were managed by the *duoviri* (a pair of executive officials like mayors), who were empowered to:

1. divide and allot the water in order to sell it, *distribuere describere vendundi causa* (Il. 37-38)
2. impose or establish a fee for use, *ei rei vectigal imponere constituere* (Il. 38-39)
3. make a contract governing these allocations, *legemque ei dicere . . .* (Il. 39-43)

In short, the *duoviri* made a contract with individuals providing access to water in exchange for a fee. Although the decree refers to "selling" the water (*vendundi causa*), the contract is not a true sale because ownership is not transferred to the individual, only a personal (that is, not property) right to use the water that lasted for a period of time (Mommsen 1850, pp. 314-5). There may also have been records of these grants kept in the town archive and a crew of public slaves to do maintenance (Mommsen, 1850, p. 297-8). In addition to the legal contract, access was also limited by rules about the physical structure of the water system. For example, when water was conducted from the aqueduct in pipes, the pipes could be no longer than fifty feet (Il. 43-4). This rule limits access in much the same way as the restriction of servitudes to adjacent property, revealing a structure to servitudes, (Cursi, 2007, pp. 124-5).¹¹ But it also restricts the flow of water by preventing circumstances that would cause the Venturi effect, which would increase the volume of flow (Rodger, 2004, p. 295). There were also boundary stones along the route of the aqueduct identifying it as public property. That these stones were intended to deter free riders is inferred from their

⁸ The Venafro decree represents to some extent a model for the imperial system in Rome since it predates Augustus' reforms to aqueduct administration in Rome (Cursi, 2007, p. 122).

⁹ Mommsen 1850, p. 310. for parallels in other towns.

¹⁰ Parallels of civic aqueducts also tapped for irrigation outside town: Wilson, 1999.

¹¹ For the development of servitudes from a combination of right of way with ownership of the source to a unified right of use, see Capogrossi Colognesi, 1966, pp. 52-106.

location at places where people would be likely to attempt to puncture the aqueduct and divert its water (Mommsen 1850, p. 293).

The mechanisms for controlling access at Venafro are paralleled in the administration of Rome's aqueducts, as described in a treatise by Frontinus, a Roman senator who was in charge of Rome's supply under Nerva and Trajan (ca. AD 100). The contracts for access in Venafro are the same as Roman practice during the Republican period, when various magistrates (censors or aediles) made arrangements for private delivery of water on a limited basis and for a fee, *ius dandae vendendaeve aquae* (Front. *Aq.* 94). In this period, individual water rights were limited to three categories of users: baths, fullers, and honorary recipients (Front. *Aq.* 94.4-5; Bruun, 2000, p. 589). Whereas individual grants lasted only as long as the user owned the property, baths and fullers had perpetual rights, probably because they served the public good (Front. *Aq.* 107-8, cf. 95). By the time Frontinus was writing, individual grants were made only by the emperor and were implemented through the city water administration (Front. *Aq.* 99, 105-6). The city aqueducts also had structural limits similar to those at Venafro, both boundary stones and the fifty foot limit on pipes (*Aq.* 105-6, cf. *Aq.* 109.6) as well as additional safeguards: individual grants specified the size of the pipe fitting to control the volume of water, and private taps were allowed only on reservoirs (*castella*) not directly into the channel of the aqueduct, though this rule may be aimed as much at preventing damage and costly repairs (Front. *Aq.* 106.3; Rodger, 2004, p. 290).

Despite the regulations, Frontinus laments depredations on the city aqueducts, blaming both individual landowners and the *aquarii* or water men, lower level officials of the imperial water administration. Landholders along the aqueducts tap them illegally (Front. *Aq.* 74.3, 128.2), and the water men create false accounts and sell water off the books when individual grants expire (*Aq.* 76.3, 109.2, 114). In recounting contemporary corruption, Frontinus praises the old days when Roman administrators privileged the public good over private interests (*Aq.* 95). Frontinus' emphasis on corruption in the system is in part self-serving because his treatise was aimed at both advertising his integrity as an administrator and also at justifying his energetic enforcement of the rules as directed by Nerva (Peachin, 2004). Even allowing for rhetorical hyperbole, there was clearly a problem with defectors and free-riders on the city aqueducts, and the problem was not new in Frontinus' era (Front. *Aq.* 76.1, 97.3). It is thus likely that there were similar problems with Venafro aqueduct, although part of its route lay underground (*per quem*

locum subve quo loco specus eius aquae p[er]ve[n]it, ll. 17-8) where it may have been more difficult if not impossible to break in and diver the water. In an attempt to prevent such interference, the decree instructs owners of private property traversed by the Venafrò aqueduct to do nothing to prevent the water's arriving in town (*quominus ea aqua ire fluere ducive possit*, l.20, again at ll. 33-6). The decree also provided legal remedies against those who violated the rules, more evidence that both free-riders and defectors were anticipated. The likelihood that the rules would be broken can be explained in part by the way the community was defined by the rules in the decree. Venafrò aqueduct system would not work properly. the nature of the community served by the Venafrò aqueduct exacerbated the threat

The Venafrò aqueduct is situated in a community that was diverse geographically, socially, and economically. It may help to conceive of the community as a series of intersecting circles like a Venn diagram. At its broadest, the community included all the residents of the town (*colono aut incolae*, l. 64). as well as landowners along the route of the aqueduct. Residents of the town enjoyed pretty much unregulated open access, a true commons, because in town water would have been distributed in free-running fountains as it was in Rome. As noted previously, the decree anticipates conflict between users in town and those along the aqueduct's route. But the townspeople were also divided into those with individual contracts and those without, based on their economic status (the ability to pay the user fee) and possibly also political and social connections: the *duoviri* could have used their position to sell the water to friends or those who could return the favor in some way, much as the Roman watermen did, creating a black market in water. Corruption aside, the individual grants decreased the supply to public fountains, though presumably the *duoviri* were supposed to balance these two competing claims, another area of possible corruption. There is some accountability in the system, however, because the *duoviri* and their administration of the aqueducts was subject to a law enacted by the *decuriones* or town councilmen (ll. 41-2). This law was to be passed by a two thirds vote of the town council (ll. 39-40) assuring that the system was not blatantly coopted by a minority. Yet, the *decuriones* were drawn from the social and economic elite, and some of the *decuriones* doubtless had individual contracts for use, so the wolf was to some extent guarding the sheepfold. At Venafrò water supply was thoroughly embedded in the power hierarchy of the town, so that there was more incentive and opportunity for individuals to break the rules than for the community to stick together and enforce the rules of the system. The divisions within the water community at Venafrò insured that those who controlled access and enforcement were not coterminous with the community of

water users. In addition, the procedures for enforcement added an additional layer to the power hierarchy surrounding the Venafrum aqueduct.

The system of enforcement can be reconstructed only in part because of gaps in the inscription. It may be that some claims were handled in the local courts in Venafrum, but the text picks up with instructions for bringing a legal action in Rome in the court of the *praetor peregrinus*. The title *praetor peregrinus* means "praetor for foreigners" but this magistrate had broader duties, one of them was jurisdiction for legal matters relating to the water supply (Serrao, 1954; Brennan, 2000, 100 & 218-9). The *praetor peregrinus* held a preliminary hearing to grant a legal remedy and, following the procedure used in Roman private law, to appoint a board of arbiters (*recuperatores*) who would serve as judges in the trial (ll. 66-70). The legal action seems to have been brought by someone delegated by the town, on the town's behalf (*is cui ex decreto decurionum . . . negotium datum erit, agenti*, ll. 65-6). There may have been an official specially assigned to the water supply, as happened in Rome under Augustus, or these could be ad hoc appointments. Unfortunately, the decree breaks off here, but a few observations can be ventured about enforcement. First, while private law procedures were used, claims could be brought on behalf of either private individuals or on the public. Second, the use of *recuperatores* along with the limited number of witnesses (10 only, ll. 67-8) point to an expedited process, the need to decide quickly because water was a critical issue. Third, changing the venue to Rome imposed costs on potential litigants that could have exacerbated the bias towards the wealthy and powerful that was already institutionalized in the rules of the system. Venafrum is 159 km from Rome, nearly 100 miles--Google Maps estimates 1 hour 46 minutes on the A1--by the ancient via Appia, which takes almost the same route as the A1 it would take somewhat longer travelling on foot or by horse or mule cart. In addition, holding trials in Rome added another layer of power structure, as those with contacts in the capital would have an advantage both in convenience and possibly also in navigating the legal system itself.

Overall, in terms of efficient water sharing systems, the public system was less effective than private law because it created a centralized administration separate from the community of users. Because the Venafrum aqueduct was regulated by the powerful people in the community, rather than by those who used the water, the system lacked the kind of social cohesion that characterized servitudes and made them an effective mechanism for managing a local water supply.

Public/Private Hybrid

The third case study is based on an inscription, the *lex rivi Hiberiensis (lrH)*, which also known as the Bronze of Agón from the town near where it was found in north east Spain (*AE* 1993, 1043).¹² The decree dates to the reign of Hadrian, approximately 120 years after the Venafro decree, but a place and time similar in political administration to Venafro. Like the Venafro decree, the *lrH* is only partially preserved, but enough survives to reconstruct the irrigation community it regulated. The community diverted water from the Ebro river into a main canal, the *rivus Hiberiensis* as it is called in the inscription (*lrH* para. 1, I.1). The water was then distributed by gravity flow to subsidiary canals serving individual properties along the main canal.¹³ The *lrH* was enacted to resolve a dispute between upstream and downstream irrigators. It describes the administration of this irrigation community, rules for repairs and allocation of water, and legal mechanisms for enforcement (Beltrán Lloris, 2006, pp. 162-3 & 186-7). The *lrH* combines elements of private law with public administration. In effect, the decree creates an autonomous community that makes its own rules and enforces them--two key elements in successful management of local resources (Ostrom, 1990, pp. 59-61).

The Ebro community was a public/private hybrid in terms of ownership and legal mechanisms. Because the Ebro was a public river, its water should have been public property, even when diverted onto private property (Ulp. *D.* 43.12.1.8).¹⁴ In fact, the *lrH* resembles other public laws (Nörr, 2208, 116-8), that is, laws regulating groups that fit Gaius' category of *universitas*, and then the water would be owned by the community. In the *lrH*, the legal status of the water is not specified as public or private and the language is ambiguous. Each member of the irrigation community had a right to water, *ius aquae* (*lrH* para 1a, I.8), a phrase that in other sources may refer to either servitudes (that is, private property rights) or grants to use

¹² The *lrH* is dated by the name of the provincial governor in its sanction, paras. 15-66, III.44-8, with Beltrán Lloris, pp. 162-3 & 186-7.

¹³ *lrH* paras 1a, 3a, 3c (I.1-2, I.27-31, I. 42-4) with Beltrán Lloris, 2006, pp. 166-70. On Roman irrigation works in the Ebro river basin, see Arenillas and Castillo, 2003.

¹⁴ Because the Ebro flowed year round (Al Mudayna, 1991, pp. 15-16) it would be classified as a public river in Roman law: Fiorentini, pp. 68-99; Zoz, 1999, 110.

public water supplies (that his, personal rights as at Venafro).¹⁵ In the water rights have features congruent with servitudes, for example, they were based on long-standing use (Nörr 2009 pp. 119-20). Since ownership of public property cannot be acquired in this way, it is likely the *lrH* assumes private property.¹⁶ The best parallel for the water rights in the *lrH* comes from a municipal law from another Roman community in Spain, Caesar's colony at Urso. There, landowners had right to divert water from public sources, and these rights are best understood as servitudes (private rights) although the water seems to be public property.¹⁷ The arrangements at Urso have been interpreted as an early stage in the development of servitudes in which ownership of the land was separate from the private legal right to conduct the water (Capogrossi Colognesi, 1966, p. 82). Instead, both at Urso and in the *lrH*, private water rights are accommodated to a public water system: the legal institution of servitudes is adapted to a new context, a public water supply. The evidence from Urso shows that the *lrH* is not innovative in this regard; in fact, it probably reflects a typical legal mechanism for organizing shared natural resources, an alternative to the lease system used for the aqueduct at Venafro.

In the Ebro irrigation community, access and ownership were bound together as in servitude. The right to water was allocated in proportion to the land it irrigated, based on comparative evidence from Roman North Africa and also from later Spanish irrigation communities (Beltrán Lloris, 2006, 170). The allocations were converted to a schedule, with each landowner diverting water from the main canal at a specific day and time (Beltrán Lloris, 2006, pp. 176-7). Such arrangements are known from elsewhere in the Roman world. For example, at Tusculum, in the Alban hills near Rome, landowners shared water from a stream called the Crabra. As Frontinus describes it, "all the villas along its course draw water allotted in turn

¹⁵ The phrase *ius aquae ducendae* is first attested in Front, *Aq.* 106.1: Capogrossi Colognesi, 1966, p. 81 n.150. Within the *lrH*, the phrase *ius aquae* appears in the rules for voting in the assembly: each member's voting rights are in proportion to his right to water, *ius aquae* (*lrH* para 1, I.8).

¹⁶ Other phrases that suggest private ownership include a genitive of possession, *ei cuius aqua fuerit* (*lrH* para. 12a III.17), and possibly a dative of possession, *quibus rivus Hiberien[sis ---] / fuerit* (*lrH* para 6bis, II.25-6). Another parallel to servitudes emerges from requirement of notice about repairs begiven house and slaves—so irrigators not necessarily on site, others exercise their right (*lrH* para. 2a I.16-21).

¹⁷ Municipal law from Urso, *CIL* I².599, ch. 79: *erit, ad eos riuos fontes lacus aquasque sta-/gna paludes itus actus aquae haustus iis item/ esto, qui eum agrum habebunt possidebunt, uti/ |4| iis fuit, qui eum agrum habuerunt possederunt./ itemque iis, qui eum agrum habent possident ha-/bebunt possidebunt, itineris aquarum lex ius-/que esto.* See Capogrossi Colognesi, 1966, p. 82.

by day and delivery gauges” (Front. *Aq.* 9.4-5)¹⁸ There are also inscriptions documenting schedules for small local systems (for example, from Tivoli, a map of the channel and schedule of deliveries, *CIL* 14.3676).¹⁹ For the Ebro community, the *lrH* does not explicitly lay out a schedule but it can be inferred from the instructions for annual maintenance of the main canal. Before this maintenance, the canal had to be emptied, but this may not be done before the ides of July and not before the last irrigation turn, *imam sortem aquationis* (*lrH* para. 3c I. 44-6).²⁰ The date in mid-July insures that water will not be cut off before the period of the Ebro’s lowest flow (Al Mundayna, 1991, p. 15). The rules for access recognize this environmental constraint, insuring that all the irrigators have a turn at the water supply regardless of their location along the canal (Beltrán Lloris, 2006, pp. 176-7). While the *lrH* imposes equality of location, its system of proportional allocation has a more complicated impact. On the one hand, access based on property ownership creates an advantage for the wealthy because it replicates the economic hierarchy of the community. On the other hand, proportional allocation sets an objective standard that applies to everyone equally. Furthermore it promotes agricultural productivity because each property has the same access to water and, consequently, generates if not economic equality at least some protection for irrigators of modest means against coercion by the wealth and an opportunity for them to make their land productive. This economic incentive could also help to deter defection by aligning individual interests with the broader common good of the community.

The *lrH* itself created the irrigation community as a means of settling a dispute among landowners who lived in the territories of two Roman *municipia*, Cascantum and Caesaraugusta (Zaragoza) (Beltrán

¹⁸ Front. *Aq.* 4-7: *Praeter caput Iuliae transfuit aqua quae vocatur Crabra. (5) Hanc Agrippa omisit, seu quia improbaverat, sive quia Tusculanis possessoribus relinquendam credebat. Haec namque est quam omnes villae tractus eius per vicem in dies modulosque certos dispensatam accipiunt. (6) Sed non eadem moderatione aquarii nostri par[tem] eius semper in supplementum Iuliae vindicaverunt, nec ut Iuliam augerent, quam hauriebant largiendo compendi sui gratia. (7) Exclusa ergo Crabra et tota iussu imperatoris reddita <est> Tusculanis, qui nunc forsitan non sine admiratione eam sumunt, ignari cui causae insolitam abundantiam debeant.* Pipes associated with many of the villas near Tusculum have inscriptions showing that they were supplied from a local reservoir: Bruun, 1991, 281-2.

¹⁹ A similar inscription from the Augustan era, found in Rome on Monte Maria (*CIL* VI.1261), may depict the system at Tivoli or Tusculum or someplace else: Mommsen, 1850, 307. There is also an inscription from Lamasba in Roman North Africa recording allocation of water in a local irrigator community, see Shaw, 1982.

²⁰ The adjective *imus* (from which the oblique form *imam* in the text) means “lowest,” but here it refers to the land farthest down, that is, downstream, lowest in terms of gravity flow

Lloris, 2006 pp. 165-6).²¹ Because the members belonged to different political communities, they could not simply rely on civic institutions, and the *lrH* creates for them a public entity with its own administration and institutions that are drawn from Roman public administration. The irrigation community took the form of *pagus*, a flexible administrative framework used in various parts of the western Roman empire (Beltrán Lloris, 2006, pp. 195-7; Tarpin, 2002, pp. 232-3). The decree mentions *curatores* with some role supervising maintenance (*lrH* para.2, I. 17)) as well as two executive officials called *magister pagi*, “master of the *pagus*,” to preside over assemblies (*lrH* para. 3), to manage finances, and to supervise enforcement of the rules (*lrH* para. 1 a, I. 1-8, 2a I. 16-21, para. 3c I.38-46, para. 4 I.47-II.3?, para. 6bis, 11a, with Beltrán Lloris, 2006, pp. 174-6). The *magistri pagi* may have belonged to the local elite, like the *duoviri* at Venafro, but unlike the *duoviri*, they were probably elected from among the irrigators.²² The only civic official named in the *lrH* are the *publicani*, often private contractors who fulfilled a variety of financial duties in Roman cities including tax collection. In the *lrH*, the *publicani* collected fines and handled property pledged to guarantee appearance by litigants (*lrH*, paras. 8-10 II.43-III.14, with Beltrán Lloris, 2006, 180). In addition, there were probably lower level administrators, mentioned in a fragmentary passage: a freedman, *libertus*, and a “scribe” (?), *tabellarius*, who may have been in charge of the records for the community (*lrH* para. 7 II.35; Beltrán Lloris, 2006, 179).

While these public officials helped to implement the *lrH*, the irrigators themselves had collective responsibility for governing the community (Beltrán Lloris, 2006, 190). The Ebro community had no central location, but the irrigators met in assemblies at various locations, including private property (e.g. the villa of one of the irrigators, Valerius Avianus, para. 4 I.49). At the assemblies, they arranged maintenance (*lrH* para. 1a, I. 1-8, para. 3C I.31-2 and 38-46), to decide about allocation of the water and other matters (*lrH* para. 4 I.47-II.1).²³ Each man’s opinion was measured in proportion to his right to water right, *dum*

²¹ On the status of the two communities, see Pliny, *NH* 3.24, with Beltrán Lloris, 2006, pp. 160-2 & 178-9, 189-90; . Nörr, 2008, pp. 119-20.

²² Beltrán Lloris, 2006, 174, infers their election from their annual term of office, but the *lrH* does not mention an election explicitly.

²³ This assembly may also have elected the *magistri pagi*,

proportione quan/tum quique aquae ius habent sententiam dicant (*lrH* para. 1, I.8).²⁴ Because water rights were indexed to land-holding, this rule privileged the wealthy, as we might expect in Rome's hierarchical society. But since their contributions were also in proportion to water rights, the rules insured a equitable distribution of rights and duties, *omnes pa/gani pro parte (vacant 4) sua quisque praestare debe/ant* (*lrH* paras. 2b, I. 24-6, cf. I.21-33). In addition, each irrigator was responsible for maintaining diversion dams and bridges on his own property so as not to block the main canal, *quominus aqua iust per/fluat* (*lrH* para. 3b I. 37-8, cf. 34-8). Thus, the Ebro irrigators are like servitude holders, who were responsible for the infrastructure that made possible the exercise of their individual rights.²⁵ But the rules about repairs also align individual and collective interest, because neglect of the main canals threatens everyone's water supply. Thus, the rules about repairs, like the rules on access, address the problem of social inequality among the irrigators and attempt to redress it with a careful balancing of rights and duties, exploiting the same social expectations that grounded servitudes. And as with the law of servitudes, the *lrH* anticipates challenges to its rules and establishes a system for their enforcement.

The *lrH* prescribes fines to punish violations of the rules of the community, for example, for failing to provide funds and labor for repairs (*lrH* para. 1b, I. 9-15) or to perform maintenance *id adsidue/ fieri debeat quod ipsius dolo malo non fiat* (*lrH* para. 3a I.32-30). Repair was required as well as a fine, when upstream irrigators block the canal (*lrH* para. 2b, II.24, 32; Beltrán Lloris, 2006, pp. 178-9); the same rule applied for the city aqueducts (*Front. Aq.* 129). It is clear that these rules were critical to insuring access to water for all the irrigators, because the decree acknowledges their negative impact on downstream irrigators in partially preserved passage: *quibus aqua in rivo defecerit . . . / misve merentur rivos paganico[s? . . .] / purgare sarcireque debeat in . . .* (*lrH* para. 6 II.22-4, cf. II. 22-34). The irrigators also held the *magistri*

²⁴ This is the passage (*lrH* para. 1, I.8) where the phrase *ius aquae* appears, so nothing in the context indicates whether it is a property right or if that right is attached to the property

²⁵ Incidentally, this duty may provide indirect evidence that a property right is involved. Comparison with maintenance of public water supplies is not uncomplicated. In the Venafro decree, it is not clear how maintenance was done. The key phrase is interpreted by Mommsen as evidence for a public slave gang to do repairs, on the model of what was done in Rome in the imperial era. But there is suggestive evidence that landowners along the route might have been responsible for repairs--or at least shared in the responsibility--even in the city system they have to provide materials, which are paid for by the state. It is possible that in small communities, that public water supply was maintained in the same way as public drains and roads, that is, the owners of abutting property had to do repairs (*lex Mamilia*).

pagi accountable and assessed them fines when they broke the rules or failed to prosecute violation by one of the irrigators (*lrH* para. 11a III.8-14, 23-8). For all these offenses, the fines are low (25 denarii per violation), and paid to the community (*lrH* para. 1b, I.9-15), or in case of a violation by a magister *pagi*, the prosecutor took half the fine (*lrH* para. 11a III.8-14). The fines may be set low in recognition of normally high rates of compliance, or to allow irrigators to game the system, choosing to pay a fine when the costs of performing maintenance on time exceed the costs of neglecting other work on their land (Ostrom, 1990, pp; 75-6). On the other hand, the *lrH* sets a high fine (250 denarii = HS 1,000) for blocking the canal with debris, if this is the best way to interpret a fragmentary passage that mentions debris, *stercus* (*lrH* para. 4 II.7, cf. II.3-11). The more severe penalty marks truly deviant behavior, from the perspective of the community standards, possibly intentional harm rather than careless or calculated disregard.²⁶

To implement the rules and fines, the *lrH* adopts public and private Roman legal procedures. For example, the legal mechanism for pledges is typical of public administration in Roman cities and town (*lrH* paras. 8-10 II.43-III.7; Beltrán Lloris, 2006, p. 181; Nörr, 2008, 166-9). In contrast, the standard private law process was used for claims arising from violations of the rules in the *lrH* (the formula appears in *lrH* para. 15, III.38-43). All of these claim were subject to local jurisdiction (*lrH* para. 10, III.4-6 and para. 14, III.29-37; Nörr, 2008, 124-33).²⁷ Local jurisdiction not only facilitates access to legal remedies but also insures involvement of the irrigators in resolving their own conflicts.

Conclusions

The three case studies in private and public water rights have illustrated the variety of legal arrangements that the Romans used to manage local water supplies. They substantiate the legal classification of water as public or private property, to the extent that some different legal mechanisms apply to public water (such the

²⁶ Compare the high fine (HS 100,000) for damage to the city aqueducts carried out by a slave (*Front. Aq.* 129); again the presumption of *dolus* (Rodger, 2004, 328).

²⁷ The highest fine may have been set at 25 denarii = HS 1,000 in order to retain local jurisdiction, because this is the typical limit for local jurisdiction in Roman municipal laws.

lease contract at Venafro). Arguably, the jurists are concerned with property classification primarily in a functional way for choosing appropriate remedies (cf. De Marco, 2004, 184). Ordinary Romans--administrators, landowners--were likewise more concerned with the practical use of law than abstract legal categories. All three case studies show that Romans saw law as an important tool for regulating the water supply. In all three, legal rights were used to manage access to the water, and the system of access to some extent reflected the social and economic hierarchy of the community. While there are some differences in the legal mechanisms used in each case study, the main difference among the case studies was the degree of local control. In the purely public system at Venafro, city officials managed the system, legal claims were heard in Rome, and community was divided by conflicting interests in the water supply: open access fountains versus individual contracts, city residents versus rural landowners. In both servitudes and the Ebro community, the water system was controlled by the people who used the water: access, allocation, repairs, enforcement. How well did each system work? Outcomes can be evaluated only for servitudes on the basis of legal disputes reported in the *Digest of Justinian*, and this evidence supports the efficiency of local control to counter destructive effects of private interest (Bannon, 2009). Unfortunately, evidence is lacking for Venafro and the Ebro community. But, because *lrH* expresses the principles of common resource management, it stands to reason that the Ebro community was successful in providing equitable access to water and a robust system for dealing with defectors and violations to the rules because it embodies many features of the successful Spanish irrigation communities analyzed by Elinor Ostrom (1990, pp. 69-81). In the Ebro community, the “hybrid”, institutions of public and private law were combined seamlessly in an apparently paradoxical way: an open access river was managed by private property rights. Thus, the Roman world offers a new perspective on modern discussions about the role of property rights in environmental goods. If Roman law offers models for modern law, then these case studies present a more dynamic and flexible role for law in local water communities.

Works Cited

- Al-Mudayna. 1991. *Historia de los regadíos en España (. . . a.c.-1931)*, Madrid: Ministerio de Agricultura, Pesca y Alimentacion.
- Alburquerque, J. M. *La Protección o Defensa Del Uso Colectivo de las cosas de dominio público*. Madrid: Dykinson, 2002.
- Arenillas, M. & J. C. Castillo. 2003. "Dams from the Roman Era in Spain. Analysis of Design Forms." S. Huerta, J. de Herrera, A. E. Benevuto, F. Dragados (Eds.) *Proceedings of the First International Congress on Construction History* (pp. 243-57).
- Bannon, C. J. 2009. *Gardens and Neighbors: Private Water Rights in Roman Italy*. Ann Arbor: The University of Michigan Press.
- Beltrán Lloris, F. 2006. "An Irrigation Decree from Roman Spain: The *Lex Rivi Hiberiensis*." *JRS* 96, 147-97.
- Brennan, T. C. 2000. *The Praetorship in the Roman Republic*. 2 Vols. Oxford: Oxford University Press.
- Bruun, C. 2000. "The Roman World." O. Wikander (Ed.) *Handbook of Ancient Water Technology* (pp. 575-604). Leiden: Brill.
- Bruun, C. 1991. *The Water Supply of Ancient Rome: A Study of Roman Imperial Administration*. Helsinki: Societas Scientarum Fennica.
- Capini, S. 1991. "Venafrò." In *La romanisation du Samnium aux IIe et Ier siècles av. J.-C.*, AAVV, pp. 21-33. Naples: Bibliothèque de l'institut français de Naples.
- Capogrossi Colognesi, L. 1966. *Ricerche sulla struttura delle servitù d'acqua in diritto romano*. Milan: Giuffrè.
- Cole, D. H. and E. Ostrom. 2012. "The Variety of Property Systems and Rights in Natural Resources." In *Property in Land and other Resources*, edited by D. H. Cole and E. Ostrom, 37-64. Cambridge: Lincoln Institute of Land Policy.
- Cursi, M. F. 2007. "L'Edictum Augusti de Aquaeductu Venafrano e l'amministrazione delle acque pubbliche." *Samnium*, 80(20), 121-32.

- De Marco, N. 2004. *I loci pubblici dal I al III secolo. Le identificazioni dottrinali, il ruolo dell'usus, gli strumenti di tutela*. Naples: Satura.
- Fiorentini, M. 2003. *Fiumi e mari nell'esperienza giuridica romana*. Milan: Giuffrè, 2003.
- Galli, P. A.C., & J. A. Naso. 2009. "Unmasking the 1349 earthquake source (southern Italy): Paleoseismological and archaeoseismological indications from the Aquae Iuliae fault." *Journal of Structural Geology*, 31, 128-49.
- Grosso, G. 1969. *Le servitù prediali nel diritto romano*. Turin: Giappichelli.
- Holden, P., & Purcell, N. 2000. *The Corrupting Sea: A Study of Mediterranean History*. Oxford and Malden: Blackwell.
- Mauri, A. Cimorelli, V. & Frediani, F. 1938. L'Acquedotto Augusteo di Venafro. Riassunto e rilievi a cura dell'Ente Volturno." *Campania Romana: Studi e Materiali* [Vols. 1] (pp. 169-85). Naples: Rispoli.
- Mommsen, T. 1850. "Römische Urkunden" *ZRG* 15.3, 287-371 = *Gesammelte Schriften* (3.75-124). 8 vols. Berlin: Weidmann, 1907.
- Nörr, D. 2008. "Prozessuales (und mehr) in der *lex rivi Hiberiensis*." *ZRG* 125, 108-88.
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.
- Pantoni, A. 1960-1 "L'editto Augusteo sull-acquedotto di Venafro e una sua replica alle fonti del volturno." *RPAA*, 33, 155-71.
- Peachin, M. 2004. *Frontinus and the Curae of the Curator Aquarum*. Stuttgart: Steiner.
- Rodger, R. H. (Ed.) 2004. *Frontinus de Aquaeductu Urbis Romae*. Cambridge: Cambridge University Press.
- Serrao, F. 1954. "La 'iurisdictio' del pretore peregrino." Milan: Giuffrè.
- Shaw, B. D. 1982. "Lamasba: An Ancient Irrigation Community." *Ant. Afr.* 18, 61-103.
- Tarpin, M. 2002. *Vici et Pagi dans l'occident romain*. Rome: École française de Rome.
- Trevor Hodge, A. 1995. *Roman Aqueducts and Water Supply*. London: Duckworth.
- Wilson, A. 1999. "Deliveries *extra urbem*: Aqueducts and the Countryside." *JRA* 12, 314-31.
- Zoz, M. G. 1999. *Riflessioni in tema di res publicae*. Turin: G. Giappichelli Editore.