



Property rights and the public trust doctrine in environmental protection and natural resource conservation*

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We examine the implications of the public trust doctrine in natural resource protection and conservation. A model of litigation and settlement among disputing parties suggests that the public trust doctrine introduces more costs and is more time consuming than would be the case with alternative approaches, such as the purchase of private rights through market transactions or application of eminent domain powers to reallocate the resource. Because the doctrine allows for uncompensated redistribution, it is resisted by current resource owners. Furthermore, by providing open standing to members of the public in challenging existing uses, public trust disputes encourage excessive demands, increasing the incidence of trial over settlement. This outcome is exacerbated if the plaintiffs derive utility from the ‘cause’ and provide litigation services at below-market rates, leading to greater investment in litigation. The costs of the public trust doctrine appear to have limited its application beyond the level anticipated by proponents. We present a case study of Mono Lake, part of the well-known 1983 litigation, *National Audubon v. Superior Court* to illustrate our arguments.

Key words: xxxxx, xxxxx, xxxxx, xxxxxx, xxxxx.

More often, the situation is one in which a court seeks to deal with the ramifications of a private property system in relation to resources which have the element of commonality. . . . In such circumstances courts are inclined to scrutinize with great care claims that private property rights should be found to be superior to the claim of continued public regulatory authority. (Sax, 1970, 562–30)

1. Introduction

In 1970, at the time of the rise of the modern environmental movement, Professor Joseph Sax argued that the public trust doctrine could be employed

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1 as a powerful tool for 'effective judicial intervention' on behalf of environmental
2 protection and natural resource conservation.¹ His overarching concern
3 was that 'diffuse public interests need protection against tightly organised
4 groups with clear and immediate goals.'² According to Sax, the judiciary
5 could play a vital role in directing public policy for protecting 'resource
6 interests which have the quality of diffuse public uses' and hence would be
7 underrepresented against the demands of more narrow private interests.³
8 The courts could intervene to reorient legislatures and administrative
9 agencies in environmental and natural resource regulation.⁴ They could
10 retrospectively 'read into patents or grants implied conditions, such as
11 servitude in favour of the public trust.'⁵ Public resources could be reallo-
12 cated from narrower to broader uses. Under those circumstances, there would
13 be no takings of private property improperly granted in the first place. The
14 article energized legal scholars to outline new applications of the doctrine
15 and environmental advocates to petition for judicial intervention in the name
16 of the public trust.⁶

17 As a legal principle, the public trust doctrine historically had applied
18 narrowly to the right of the public to access navigable waterways without
19 being impeded by private riparian owners. Although there had been con-
20 troversial, limited extension of the doctrine in the 19th century to public
21 ownership of some tidelands and subsurface lakebeds, the notion that the
22 public had superior rights to non-navigable waters, wildlife and other
23 natural resources that were held in trust by the state, as suggested by
24 Professor Sax and others in the late 20th century, represented a profound
25 expansion.⁷

26 The most celebrated incorporation of the public trust doctrine came in
27 1983 when the California Supreme Court in *National Audubon Society v.*
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29 ¹ Sax, *The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention*,
30 68 MICH. L. REV. 471 (1970).

31 ² Sax (1970, 556).

32 ³ Sax (1970, 557).

33 ⁴ Sax (1970, 558–9).

34 ⁵ Sax (1970, 563).

35 ⁶ Examples of the enthusiastic application of the doctrine include Slade *et al.*, *Putting the*
36 *Public Trust Doctrine to Work: The Application of the Public Trust Doctrine to the Management*
37 *of Lands, Waters and Living Resources of the Coastal States* (1990); Meyers, 'Variation on a
38 *Theme: Expanding the Public Trust Doctrine to Include Protection of Wildlife*' *Issues in Legal*
39 *Scholarship*, Joseph Sax and the Public Trust (2003): Article 7. [http://www.bepress.com/ils/iss4/](http://www.bepress.com/ils/iss4/art7)
40 *art7*; Robert Fischman, *The National Wildlife Refuge System and the Hallmarks of Modern*
41 *Organic Legislation*, 29 *Ecology L. Q.* 457, 581–82 (2002); Kristen Carpenter, *A Property Rights*
42 *Approach to Sacred Sites Cases: Asserting a Place for Indians as Nonowners*, 52 *UCLA L. Rev.*
43 1061, 1120 (2005); Alison Rieser, *Ecological Preservation as a Public Property Right: An Emerging*
44 *Doctrine in Search of a Theory*, 15 *Harv. Envtl. L. Rev.* 393 (1991); Michael Blumm, *Public*
45 *Property and the Democratization of Western Water Law: A Modern View of the Public Trust*
Doctrine, 19 *Envtl. L.* 573 (1989); Charles Wilkinson, *The Headwaters of the Public Trust:*
Some Thoughts on the Source and Scope of the Traditional Doctrine, 19 *Envtl. Law* 425 (1989).

⁷ See James L. Huffman, *A History of the Public Trust Doctrine: A Tilting at Modern*
Myths, Lewis and Clark School of Law, 2006 for summaries of modern public trust arguments
and criticisms of their legal precedents.

1 *Superior Court* 685 P.2d 709 stated that the ‘core of the public trust doctrine
2 is the state’s authority as sovereign to exercise a continuous supervision and
3 control over’ the waters of the state to protect ecological and recreational
4 values.⁸ This ruling had the potential to greatly enlarge the coverage of the
5 doctrine and the role of the police power of the state in regulating allocation
6 and use of water and potentially, other natural resources. As a result of the
7 ruling, the public trust doctrine was seen as a new mechanism that could be
8 applied by the judicial system to force water users and the state (legislature
9 and administrative agencies) to directly consider the values of alternative,
10 often neglected water demands in allocating access and use.

11 Because of its recent prominence, the public trust doctrine has received
12 considerable attention from legal scholars, both advocates and critics.⁹
13 Economists, however, have largely been absent in this debate, despite the
14 doctrine’s implications for property rights, provision of public goods,
15 regulation, investment, and the allocation and use of water and other natural
16 resources.

17 In this paper we analyse one aspect of the public trust doctrine – its costs
18 in addressing disputes over competing resource (water) values. Judicially
19 mandated reallocation of water and other public trust resources is one
20 method of reassigning use. Other methods are market exchanges, where
21 property rights are clearly recognised, and the use of eminent domain, where
22 their condemnation requires compensation. Even though we recognise that
23 market exchange of property rights may not always be possible, we argue that
24 of these three methods, judicial use of the public trust doctrine for achieving
25 public environmental benefits and resource conservation is likely to be the
26 most costly and contentious. Accordingly, alternatives should be given
27 careful consideration.

28 Our primary contribution is that we present a model to show why litigation
29 under the public trust doctrine is more apt to go to trial than to be settled
30 privately. The data are not available to directly test the hypotheses regarding
31 settlement vs. trial. But the model shows how emphasising the public nature
32 of certain natural resources increases the costs of resolving debates over
33 resource use and allocation.

34 As the model demonstrates, use of the public trust doctrine tends to be a
35 less effective mechanism for the efficient redistribution of property rights for
36 several reasons. Broad entry is invited for multiple constituents to sequentially
37 assert trust claims against defendants and for administrative agencies to
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39 ⁸ *National Audubon Society v. Superior Court*, 685 P.2d. 712. See also Blumm and Schwartz
40 (1995) and Sax (1990, 270) for discussion of subsequent cases in California that expanded the
41 public trust doctrine. See also Gray (1994, 262–69). For public trust application to wildlife, see
42 Meyers (1989).

43 ⁹ For instance, see Epstein, *The Public Trust Doctrine*, 7 *CATO JOURNAL* 411 (1987). Blumm
44 and Schwartz (1995), Fischman (2002), Kearney and Merrill, *The Origins of the American*
45 *Public Trust Doctrine: What Really Happened in Illinois Central*, 71 *U. CHICAGO L. REV.* 799
(2004) Carpenter (2005) and Huffman (2006).

1 extend regulatory mandates. Accordingly, settlement agreements between
2 defendants and plaintiffs are difficult to reach because once they are con-
3 cluded, new plaintiffs can appear. Plaintiffs (some with below-market wages)
4 invest in efforts to redirect the resource toward uses they value. At the same
5 time, the property rights of incumbent owners as defendants are subordi-
6 nated and subject to reallocation without compensation. Accordingly, rights
7 holders strongly resist such efforts. The results are lengthy conflicts that raise
8 costs and delay resolution of important allocation questions. Furthermore,
9 by weakening existing property rights, public trust rulings may reduce private
10 incentives to invest in the conservation and wise use of the resource. Public
11 investment may or may not offset lost private actions.

12 We illustrate these points by briefly discussing the conflict over Los
13 Angeles' water rights to the Mono Basin, the empirical case underlying the
14 *Audubon* ruling. The dispute took nearly 20 years to resolve with multiple
15 court cases and involvement by various constituent groups and government
16 units. In the end, Los Angeles lost its ability to divert Mono Basin water,
17 which provided about 15 per cent of the city's total water supply, without
18 compensation.¹⁰ Our intention in discussing the *Audubon* case is not to assess
19 the resulting redistribution of property rights. Rather, our effort is to explore
20 the incentives that are inherent in the public trust doctrine that hinder timely
21 and economical dispute resolution.

22 We conclude with brief discussion of other public trust cases, noting that
23 the doctrine has been applied less than advocates had anticipated after
24 *Audubon*. The costs associated with the doctrine appear to have limited its
25 application. We consider the other mechanisms for the reallocation and
26 management of key natural resources.

27 28 29 **2. An overview of the public trust doctrine**

30 The public trust doctrine asserts that the 'public' has the legal right to utilise
31 certain resources, such as tidewaters or navigable rivers without restriction by
32 private owners.¹¹ These resources are so inherently common in their nature
33 that their permanent assignment to exclusive, private ownership is inappropriate.¹²
34 To insure group values are respected, the rights of the public are vested in the
35 state as trustee of the resource. As such, the state through its administrative
36 agencies has a duty to administer, protect, manage and conserve the resource.
37 Any existing private users have only usufruct rights that can be withdrawn
38 whenever the state deems that they are inconsistent with the public
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41 ¹⁰ Gary D. Libecap, *Owens Valley Revisited: A Reassessment of the West's First Great Water*
42 *Transfer*, Palo Alto: Stanford University Press, 2007, 138.

43 ¹¹ David H. Getches, *Water Law in a Nut Shell*, St. Paul, West Publishing Co. 217, 224-8,
44 1997. See also, James L. Huffman, *A History of the Public Trust Doctrine: Tilting at Modern*
45 *Myths*, Lewis and Clark College, School of Law, 2006.

¹² Common means common property as described by Ostrom (1990).

1 trust.¹³ Because there are no private property rights, there is no basis for
2 taking challenges in such reallocations. Furthermore, the legislature cannot
3 alienate trust resources, which must remain with the state.¹⁴

4 The public trust doctrine therefore provides for a powerful regulatory and
5 supervisory role for the state with regard to the resources that are covered.
6 Accordingly, extension beyond navigable waterways to include other natural
7 and environmental resources as envisioned by Professor Sax represents a
8 potentially far-reaching extension of the police powers of the state.¹⁵

9 Within this context, the *Audubon* ruling in 1983 set several precedents
10 regarding the public trust as noted in Blumm and Schwartz (2003).¹⁶ First, it
11 enlarged the geographical scope of the trust by ruling that the doctrine
12 applied to water diversions of tributaries adjacent to navigable waterways as
13 opposed to just the navigable waterways themselves. Second, the court ruled
14 public trust values are transient and that as values changed, the state was
15 obligated to reallocate the public trust resource to be consistent with those
16 changes. Third, use rights to trust resources, such as water, were non-vested,
17 subject to reallocation without compensation if they were applied in a manner
18 inconsistent with trust values. Fourth, the court identified a major adminis-
19 trative obligation for the judiciary and state agencies in overseeing water and
20 other trust resources. Finally, the court affirmed a previous decision that
21 granted open standing to parties in public trust cases. In *Marks v. Whitney*
22 the court 'expressly held that any member of the general public has standing
23 to raise a claim of harm to the public trust.'¹⁷

24 Although, the *Audubon* ruling emphasised the relevance of the public trust
25 doctrine as an environmental and natural resource management tool, the
26 case has been controversial because of its potential to undermine the existing
27 property rights structure.¹⁸ Its costs in impeding dispute resolution over
28 public and private values in natural and environmental resources, however,
29 have not been addressed directly. To illustrate them, we now turn to a model
30 of litigation and settlement under the public trust doctrine.

35 ¹³ Richard A. Simms, *A Sketch of the Aimless Jurisprudence of Western Water Law*, in
36 Kathleen Marion Carr and James D. Crammond, eds., *Water Law: Trends, Policies, and Prac-*
37 *tice*, Chicago: American Bar Association, 321, 1995.

38 ¹⁴ Sax (1990, 264, 269), Michael C. Blumm and Thea Schwartz, *Mono Lake and the Evolving*
Public Trust in Western Water, 37 *Arizona Law Review*, 709–11, 1905.

39 ¹⁵ Huffman (2006, 73). He disputes the asserted linkage between this view of the public trust
40 doctrine and Roman law or English common law. See also, Kearney and Merrill, *The Origins*
41 *of the American Public Trust Doctrine: What Really Happened in Illinois Central*, 71 *U. CHICAGO*
42 *L. REV.* 799 (2004) for arguments that proponents have misread the American legal history.

43 ¹⁶ Blumm, Michael and Thea Schwartz. 'Mono Lake and the Evolving Public Trust in
44 Western Water.' *Issues in Legal Scholarship. Joseph Sax and the Public Trust*. Article 3. 2003.

45 ¹⁷ *Marks v. Whitney*, supra, 6 Cal. 3d 251, pp. 261–62.

19 ¹⁸ See Huffman, *A Fish out of Water: The Public Trust Doctrine in a Constitutional Democracy*,
19 *ENVTL. LAW* 527 (1989).

3. A model of litigation and settlement under the public trust doctrine

In this section we develop a more formal model of the incentives to settle or go to trial in public trust litigation.¹⁹ The model shows that use of the public trust doctrine heightens the incentives of the respective parties to push for trial rather than settling, all else equal.

3.1 Trial

As discussed in the preceding section, the publicness of certain resources as proclaimed under the public trust doctrine provides for broad legal standing for multiple constituencies. That is, any member or agency of the public potentially can enter as plaintiff in challenging current natural and environmental resource use. Let the number of potential plaintiffs be indexed by i where $i = 1, \dots, n$ and let T_{pi} be the subjective expected benefit to plaintiff i of bringing suit against a defendant. This benefit will be a function of two factors: First, it will be increasing as the probability of winning the lawsuit rises, where p denotes the plaintiff's probability of success. Second, it will be increasing as the expected size of the damages rises, where D represents the expected size of the damages. Therefore, $T_{pi} = p_i D_i$.

Among potential plaintiffs, the one with the maximum subjective expected benefit of bringing suit will challenge the defendant, where the relevant plaintiff's subjective expected benefit is $T_p = \max_i T_{pi}$, where $i = 1, \dots, n$. There are three determinants of T_p : First, T_p increases in the number of potential litigants, n . Second, T_p increases in effort invested by the plaintiff, where e_p is the effort expended by the plaintiff. Hiring more qualified lawyers, soliciting expert witnesses, or engaging in more concentrated research, makes it more likely that the judge will side with the plaintiff and increase the expected size of the damages awarded. Third, T_p declines with the effort expended by the defendant, where e_d denotes the effort expended by the defendant. Accordingly, it follows that:

$$T_p(e_p, e_d, n) = \max_i p_i(e_{pi}, e_{di}) D_i(e_{pi}, e_{di}), \quad (1)$$

where $i = 1, \dots, n$.

Similarly, the subjective expected *loss* of going to trial for the defendant is T_d .

¹⁹ The model developed below is similar that developed in Robert D. Cooter and Daniel L. Rubinfeld, 'Economic Analysis of Legal Disputes and Their Resolution,' *Journal of Economic Literature*, 27 (3): 1067–97, 1989. One of our primary departures from their model is that we allow for open standing of plaintiffs.

$$T_d(e_p, e_d) = p(e_p, e_d)D(e_p, e_d).^{20} \quad (2)$$

The plaintiff can use two types of effort: w_p , standard labourers who work for market wages and z , non-standard labourers who work for below market wages. The latter are those who derive utility from participating in the case.²¹ In many environmental disputes, the defendant, with less emotional or popular appeal, in general can use only w_p .²² As a result, $e_p(w_p, z)$ and $e_d(w_d)$ and the plaintiff's and defendant's labour costs are $c_{ip}(w_p, z)$ and $c_{id}(w_d)$.

The value to the plaintiff of trial, V_{ip} , is the benefit less the costs incurred or

$$V_{ip} = T_p(e_p(w_p, z), e_d(w_d), n) - c_{ip}(w_p, z). \quad (3)$$

The defendant's total expected loss, L_{id} , of going to trial will be the *sum* of the subjective expected loss and the costs of trial or²³

$$L_{id} = T_d(e_p(w_p, z), e_d(w_d)) + c_{id}(w_d). \quad (4)$$

The net value of trial, V_t , which is the difference between the plaintiff's expected value and the defendant's total expected loss or

$$\begin{aligned} V_t &= V_{ip} - L_{id} \\ &= T_p - c_{ip} - T_d - c_{id} \\ &= T_p - T_d - (c_{ip} + c_{id}). \end{aligned} \quad (5)$$

3.2 Settlement

Let S_p and S_d denote the plaintiff's subjective expected benefit and the defendant's subjective expected loss from settlement.²⁴ Let c_{sp} and c_{sd} be the costs incurred by the plaintiff and defendant, respectively, of reaching a private solution.

²⁰ With symmetric information about the trial outcomes, the expected benefit to the plaintiff of going to trial would equal the expected loss to the defendant of going to trial. It is more flexible and realistic to relax the assumption of symmetric information and allow the expected benefits and losses to be subjective. Consequently, in general, T_p will not equal T_d .

²¹ These individuals are often referred to as devoted, passionate, or dedicated, and environmental cases particularly may involve such participants.

²² We have limited the model here to only allow the plaintiff to use below-market wage labourers. We impose the asymmetry for illustrative purposes as the asymmetry more accurately reflects the resources available for plaintiffs and defendants to employ in environmental disputes. The implications we derive later are not driven by the asymmetry. On the contrary, if the defendant can also employ non-standard workers, as presumably could happen, it reduces the defendant's costs of trial and makes trial even more likely occur in place of settlement.

²³ It is the sum because L_{id} is the defendant's total expected *loss* of trial.

²⁴ Ex ante, uncertainty exists as to what the final settled amount will be. Thus in general, it is reasonable to assume that S_p and S_d are not equal. With settlement, S_p and S_d are not a function of effort as in litigation because neither party is attempting to persuade an outside entity to empathize with their respective causes. In settlement, the expectation is taken with respect to uncertainty over facts about the dispute and the subsequent bargaining outcome. In litigation, the expectation is taken with respect to uncertainty over the facts and the third-party's decision process.

1 In the special case of the public trust doctrine, there are multiple potential
 2 litigants, so that any settlement reached by the defendant with one plaintiff
 3 may be thwarted by the entry of another plaintiff. Therefore, we can write
 4 $c_{sd}(n)$, where c_{sd} is increasing in n .

5 The net expected value of settlement to the plaintiff, V_{sp} , will be the subjective
 6 expected benefit of settlement minus settlement costs, or

$$7 \quad V_{sp} = S_p - c_{sp}. \quad (6)$$

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 10 The net expected loss of settlement to the defendant, L_{sd} , will be the subjective
 11 expected loss of settlement plus settlement costs, or

$$12 \quad L_{sd} = S_d + c_{sd}(n). \quad (7)$$

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 15 The net value of settlement, V_s , the difference between the net expected
 16 value of settlement to the plaintiff and the net expected loss of settlement to
 17 the defendant is

$$18 \quad V_s = V_{sp} - L_{sd} \\
 19 \quad = S_p - c_{sp} - S_d - c_{sd} \\
 20 \quad = S_p - S_d - (c_{sp} + c_{sd}).^{25} \quad (8)$$

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3.3 Trial and settlement together

Because trial is more costly than settlement, in natural and environmental
 resource disputes we are concerned when trial will be observed. This will
 occur whenever the net value of trial, V_t , is greater than the net value of
 settlement, V_s , or comparing Equations (5) and (8), when

$$T_p - T_d - (c_{tp} + c_{td}) > S_p - S_d - (c_{sp} + c_{sd}) \\
 T_p - T_d - (S_p - S_d) > c_{tp} + c_{td} - (c_{sp} + c_{sd}).^{26} \quad (9)$$

3.4 Implications

Several implications emerge from this discussion regarding the settlement of
 disputes under the public trust doctrine. First, because the doctrine requires

²⁵ If we assume that there is perfect information in settlement – perhaps an assumption that both parties know the degree of damage caused – then S_p will equal S_d . If this is the case, then Equation (8) simplifies and $V_s = -(c_{sp} + c_{sd}(n))$.

²⁶ If we assume perfect information in settlement, then S_p will equal S_d and Equation (9) will become $T_p - T_d > c_{tp} + c_{td} - (c_{sp} + c_{sd})$. Furthermore, if we assume perfect information in both trial and settlement, then Equation (9) simplifies to $c_{sp} + c_{sd} > c_{tp} + c_{td}$. This implies that trial will occur if the total costs to trial are less than the total costs to settlement. In many general models of litigation, it is assumed the costs of trial are greater than the cost of settlement. Therefore, if perfect information exists, parties will always opt for settling the dispute instead of going to trial.

1 no compensation to the defendant, the plaintiff will benefit more from going
 2 to trial. A higher T_p raises V_{ip} and V_t . In contrast, private negotiated settlements
 3 are not affected. Equation (9) shows that increasing T_p while holding S_p
 4 constant, raises the relative value of trial to the plaintiff, the net value of
 5 trial, and ultimately the likelihood of trial.

6 Second, trial is more likely to occur than settlement because the public
 7 trust doctrine allows open standing for numerous plaintiffs. Equation (5)
 8 shows that

$$9 \quad V_t = T_p - T_d - (c_{ip} + c_{id})$$

$$10 \quad V_t = T_p(e_p(w_p, z), e_d(w_d), n) - T_d(e_p(w_p, z), e_d(w_d)) - (c_{ip}(w_p, z) + c_{id}(w_d)).$$

11 As the number of potential litigants, n , increases, so does the relevant plaintiff's
 12 subjected expected benefit of trial, T_p , and hence the value of trial, V_t .²⁷
 13 Furthermore, from Equations (7) and (8),

$$14 \quad V_s = S_p - S_d - (c_{sp} + c_{sd}(n)).$$

15 Increasing n raises the costs of settlement for the defendant, implying that
 16 the value of settlement, V_s , is decreasing in the number of potential litigants.

17 Third, trial is more likely when the plaintiff can invest in low-cost labour,
 18 as is often the case in resource and environmental disputes. Returning to
 19 Equations (5) and (9), recall that Equation (9) shows that when V_t increases
 20 relative to V_s , trial is more likely, and recall from Equation (5) that

$$21 \quad V_t = T_p - T_d - (c_{ip} + c_{id})$$

$$22 \quad V_t = T_p(e_p(w_p, z), e_d(w_d), n) - T_d(e_p(w_p, z), e_d(w_d)) - (c_{ip}(w_p, z) + c_{id}(w_d)).$$

23 Differentiating V_t with respect to both z and w_p will show their relative
 24 impacts on V_t .

25 The

$$26 \quad \frac{\partial V_t}{\partial z} = \frac{\partial T_p}{\partial e_p} \frac{\partial e_p}{\partial z} - \frac{\partial T_d}{\partial e_p} \frac{\partial e_p}{\partial z} - \frac{\partial c_{ip}}{\partial z}. \quad (10)$$

27 The

$$28 \quad \frac{\partial V_t}{\partial w_p} = \frac{\partial T_p}{\partial e_p} \frac{\partial e_p}{\partial w_p} - \frac{\partial T_d}{\partial e_p} \frac{\partial e_p}{\partial w_p} - \frac{\partial c_{ip}}{\partial w_p}. \quad (11)$$

29 The key comparison is to see how Equation (10) relates to Equation (11).
 30 If the marginal product of labour is the same for non-standard and standard

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 43 ²⁷ Recall that $T_p(e_p, e_d, n) = \max_i p_i(e_{pi}, e_d) D_i(e_{pi}, e_d)$, where $i = 1, \dots, n$. If we array litigants
 44 from lowest expected benefit to highest expected benefit, adding additional potential litigants
 45 to the current pool of litigants will increase the right hand side of the equation above. This
 implies as n increases, so does the subjective expected benefit of the relevant plaintiff.

1 labour, the first two terms on the right hand side of Equation (10) will be
 2 equal to the first two terms on the right hand side of Equation (11), respectively.
 3 Second, $(\partial c_p / \partial z) < (\partial c_p / \partial w_p)$ because non-standard labourers work for below
 4 market wages. The above two points together imply that $(\partial V / \partial z) > (\partial V / \partial w_p)$
 5 or that the value of trial rises when non-standard workers are used for labour
 6 rather than standard labour.

7 Fourth, when more below market labour is available and when there are
 8 more potential litigants, trial outcomes will be skewed more heavily in favour
 9 of the plaintiff, increasing the likelihood of trial. Recall Equation (1), which
 10 states that

$$T_p(e_p, e_d, n) = \max_i p_i(e_{pi}, e_d) D_i(e_{pi}, e_d).$$

11 Expanding this equation yields,

$$T_p(e_p(w_p, z), e_d(w_d), n) = \max_i p_i(e_{pi}(w_{pi}, z_i), e_d(w_d)) D_i(e_{pi}(w_{pi}, z_i), e_d(w_d)). \quad (12)$$

12 Equation (1) shows that the subjective expected benefit to the relevant
 13 plaintiff of trial is the product of the probability the judge will side with the
 14 plaintiff and the expected size of the damages awarded. Taking the derivative
 15 of the left hand side of Equation (12) with respect to z yields,

$$\frac{\partial T_p}{\partial z} = \frac{\partial T_p}{\partial e_p} \frac{\partial e_p}{\partial z}. \quad (13)$$

16 The first partial derivative on the right hand side of Equation (13) is strictly
 17 positive, as increased effort induces a greater expected benefit, and the second
 18 derivative is strictly positive when the marginal product of labour is positive.
 19 This indicates that the subjective expected benefit of trial to the plaintiff is
 20 strictly increasing in the number of low-wage workers. Furthermore, by
 21 examining the right hand side of Equation (12) the plaintiff is able to increase
 22 both the probability of winning and the expected size of the award with more
 23 low-cost effort, which is not available to the defendant. Furthermore, as indicated
 24 in Equation (12) when the number of potential litigants, n , increases, both the
 25 probability of winning the case and the expected damages rise for the plaintiff.

26 As outlined by the model, the public trust doctrine raises the costs of private
 27 settlement relative to trial in natural and environmental resource disputes
 28 making trial more likely. The goal of any reallocation mechanism should be
 29 to redistribute resources to their highest valued uses as efficiently as possible.
 30 In general, trial is lengthier than settlement and tends to be more costly. As
 31 the legal system works through its process, the controversial trust resource
 32 remains in its current use, potentially remaining suboptimally allocated.

33 We cannot directly test the model's implications because of a lack of data
 34 on settlement vs. trial, but we can illustrate how the costs of dispute resolution
 35 are affected by examining the conflict over water for Mono Lake.

4. Property rights to water and the public trust ruling in *Audubon*

4.1 History

Between 1930 and 1940, the Los Angeles Department of Water and Power (LADWP) acquired riparian water rights to the four tributaries that feed Mono Lake, an alkaline and hypersaline lake situated in the eastern side of the Sierra–Nevada mountains, roughly 300 miles north-east of the city.²⁸ The agency applied to the State Water Resources Control Board (SWRCB) in 1940 for permits to appropriate the water, and in 1941 finished constructing an aqueduct and began diverting the water for urban use. In 1963, to further augment urban supplies, construction began on a second aqueduct, which was completed in 1970.²⁹ While between 1940 and 1970 an average of 57 067 acre-feet was exported to Los Angeles, with new aqueduct capacity exports increased to 100 000 acre-feet or more through 1975.³⁰ At the time, water for urban consumption was viewed as the highest and best use of the water.³¹ Indeed, the Mono Basin alone accounted for about 15 per cent of the city's water.³²

Over time, however, these water exports had substantial adverse effects on Mono Lake and its surrounding environment. The tributaries dried up below the diversion points and the level of Mono Lake began to decline about 1.6 feet a year.³³ Between 1941 and 1981 the lake's level fell about 46 feet, with one-third of that decline occurring after 1970. The surface area of Mono Lake receded from 90 to 60 square miles, and its salinity increased from 50 to 90 g/L.³⁴

4.2 Public trust ruling

As Mono Lake levels declined, the National Audubon Society, Friends of the Earth, the Sierra Club, and a new coalition of environmental activists, the Mono Lake Committee that had formed in 1978, brought suit under the public trust doctrine in May of 1979 to curtail Los Angeles' export of water. Referring to *Marks v. Whitney* 6 Cal. 3d 251 (1971) which held that the public trust doctrine applied not only to navigable waterways but to streams used for recreation, wildlife habitat and ecological study, the plaintiffs charged that Mono Lake was being harmed and that the diversion was not a reasonable

²⁸ For discussion, see Libecap (2007, 132–7).

²⁹ <http://wsoweb.ladwp.com/Aqueduct/historyoflaa/aqueductfacts.htm>

³⁰ *National Audubon v. Superior Court* 33 Cal. 3d 429. See also Libecap (2007, 138).

³¹ 'The use of water for domestic purposes is the highest use of water.' Stats. 1921, ch. 329, §1, p. 443 now codified as Water Code § 1255.

³² Jones and Stokes (1993, S-1); Dunning (1990, 20); Hart (1996, 56–8). Currently, due to various environmental requirements, including those cited in the Mono Lake ruling, the Aqueduct supplies only around 34 per cent. Page 3-3 2005 Urban Water Management Plan, City of Los Angeles, DWP, <http://www.ladwp.com/ladwp/cms/ladwp007157.pdf>. For discussion of Owens Valley, see Libecap (2005).

³³ Kahrl (1982, 429–30).

³⁴ Botkin *et al.* (1988, ix).

1 and beneficial use as required by the state's appropriative water rights system. This
2 public trust argument posed a clear challenge to Los Angeles' water rights.³⁵

3 On 17 February 1983 in *National Audubon Society v. Superior Court* 33 Cal
4 3d 419 the California Supreme Court held that exercise of appropriative
5 water rights is subject to limitation by the state in order to protect public trust
6 values, including those of wildlife habitat: 'Thus, the public trust is more than
7 an affirmation of state power to use public property for public purposes. It is
8 an affirmation of the duty of the state to protect the people's common heritage
9 of streams, lakes, marshlands and tidelands . . .' (33 Cal 3d 441).

10 According to the court, public trust regulatory responsibilities applied *ex*
11 *post* to existing water rights, and these rights were use rights only that could
12 be reconsidered in light of changing perceptions of the trust. The court
13 charged the SWRCB with monitoring water use and re-allocating it in a
14 manner consistent with the public trust: 'Thus, the function of the Water
15 Board has steadily evolved from the narrow role of deciding priorities
16 between competing appropriators to the charge of comprehensive planning
17 and allocation of waters.' (33 Cal 3d 444).

18 Because the ruling not only signalled the mostly uncompensated loss of
19 valuable water rights, but also the value of Los Angeles' past fixed investments
20 in the aqueducts, dams, reservoirs and hydroelectric facilities, the LADWP
21 filed a petition for certiorari with the U.S. Supreme Court on the basis that
22 the California court misinterpreted the public trust doctrine and that the
23 decision deprived Los Angeles of vested property rights without due process
24 of law (a takings).³⁶ The Department of Interior's Regional Solicitor for
25 California supported the appeal, but it was denied,³⁷ 7 November 1983.³⁸

28 ³⁵ Duane Georgeson, Chief Engineer of the Los Angeles Aqueduct, said 'If you can over-
29 turn that kind of right (granted by the state) in order to protect environmental values, this
30 could be used in varying forms against all water rights in California.' Steve Hinderer, DWP
31 director of public affairs, said 'We see the Mono Lake suit as a threat not only to 20 per cent
32 of Los Angeles' water supply but also to all water rights in California.' *Los Angeles Times*,
33 May 22, 1979, 'DWP Sued on Mono Lake Water Issue,' Joan Sweeney, pg. SD_A10.

34 ³⁶ LADWP was supported in appealing to the U.S. Supreme Court by the Metropolitan
35 Water District of California, the Association of California Water Agencies, and the states of
36 Idaho and Wyoming, all of which filed friends-of-the-court briefs. These entities were similarly
37 worried that the California Supreme Court ruling could have a potentially serious effect on
38 water law in California or even throughout the West. *Los Angeles Times*, November 8, 1983,
39 'Supreme Court Declines Mono Lake Hearing,' Jim Mann, pg. 1.

40 ³⁷ The U.S. Supreme Court denied LADWP's request for a hearing because it felt the case
41 presented no constitutional concerns; rather the case was based solely on issues of California
42 water law. It decided federal judges should generally 'defer to the courts of California on ques-
43 tions of water law that affect only California water users.' Despite refusing to hear the case,
44 U.S. Department of Justice officials criticized the California Supreme Court ruling calling it 'a
45 significant and unwelcome development in the contours of California water law.' The federal
46 court also said it 'shares [Los Angeles'] concern that the California court's decision creates the
47 potential for disruption of what were justifiably thought to settled water rights.' *Los Angeles*
48 *Times*, November 8, 1983, 'Supreme Court Declines Mono Lake Hearing,' Jim Mann, pg. 1.

³⁸ Conway (1984, footnote 108). *City of Los Angeles Department of Water and Power v. National Audubon Society et al.* No. 83-300, 464 U.S. 977, November 7, 1983.

1 The public trust ruling in 1983, however, did not resolve the conflict over
2 Mono water. Various parties claimed standing in the debate, including
3 environmental and sports groups, as well as state and federal agencies. It
4 took over a decade of a complex series of subsequent court rulings, appeals
5 and case consolidations before the SWRCB published a final Environmental
6 Impact Report in September 1994, which called for a target lake level of
7 6392.6 feet.³⁹ To achieve this level, there could be no water diversions by the
8 LADWP from the Mono Basin until the lake reached 6377 feet. After that
9 various benchmarks were set allowing for small diversions. Once the lake
10 level reached the objective, Los Angeles would be allowed to export only
11 about one-third the amount it had diverted in the early 1970s.⁴⁰

12 In the end, it took nearly 20 years from the initial effort to reduce
13 diversions from the Mono Basin until the SWRCB handed down its final
14 decision. All the while, Mono Lake's environment continued to worsen,
15 streams remained dry, and riparian and aquatic habitats remained
16 unrestored.

17 18 19 **4.3 The Mono Lake case's relationship to the model**

20 A natural question to ask is why the Mono Lake case took so long to
21 resolve? As the model indicates, a major reason settlement was not reached
22 was the expansive nature of the dispute. Open standing for plaintiffs, as
23 provided in the *Audubon* decision, essentially made the Mono Basin water a
24 common pool. Accordingly, the conflict exhibited many of the difficulties
25 characterised by common-pool resources with multiple entrants. Each new
26 plaintiff brought new demands on the defendant.

27 Table 1 describes some of the organisations involved and their, respectively,
28 desired lake levels. Progressively higher levels required greater limits on Los
29 Angeles' diversions.

30 **6** As it can occur with common pool resources and as the model implies,
31 each of the claimants had an incentive to overstate its true demands in order
32 to receive a more favourable allocation. Table 1 shows that in general there
33 was a progressive rise in water level demands. Each successive recommen-
34 dation created momentum for both new and existing parties to augment their
35 claims.

36 Indeed, there was a gradual increase in demands to limit Los Angeles'
37 rights. In March 1983, just after the initial public trust ruling, Sanford
38 Wohlgemuth, Conservation Chairman of the Los Angeles Audubon Society
39 wrote to the Los Angeles Times,

42 ³⁹ For a more comprehensive summary of the various legal conflicts and events that
43 occurred after the *Audubon* decision see John Hart, *Storm Over Mono: The Mono Lake Battle*
44 *and the California Water Future*, University of California Press, 1996.

45 ⁴⁰ Pages 3–5 to 3–7, 2005 Urban Water Management Plan, City of Los Angeles, DWP,
<http://www.ladwp.com/ladwp/cms/ladwp007157.pdf>.

1 **Table 1** xxxxxxxxxxxxxxxxxxxx
 2

3 Year	4 Organisation	5 Preferred lake level (feet above sea level)
6 1978	7 Mono Lake Committee	8 6378
9 1979	10 Inter-Agency Task Force	11 6388
12 1979	13 Mono Lake Committee	14 6388
15 1988	16 Community and Organisation Institute	17 6382
18 1988	19 U.S. Forest Service	20 6377–6390
21 1993	22 U.S. Fish and Wildlife Service	23 6390
24 1993	25 State Lands Commission	26 6390
27 1993	28 Department of Parks and Recreation	29 6390
30 1993	31 U.S. Forest Service	32 6390
33 1993	34 Great Basin Unified Air Pollution Control District	35 6392
36 1993	37 CA Department of Fish and Game	38 6405
39 1993	40 Mono Lake Committee	41 6390–6405
42 1994	43 State Water Resources Control Board Final Decision	44 6392.6

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18 ‘The DWP [LADWP] is saying that, in order to fill Mono Lake to 10
19 per cent above its present level, all water from the area will have to be
20 cut off for 15 years. No one is asking for that. We all realise the necessity
21 of maintaining this water source for the city. We are simply asking for a
22 fair share of the water to save the lake and eventually restore its former
23 health. By reducing diversions by, say, 20 per cent, Los Angeles will
24 have its water and Mono Lake will begin to resume its original size
25 and beauty.’⁴¹

26
27 Even as late as November 1984, David Gaines, head of the Mono Lake
28 Committee stated that ‘We’re not advocating a cutoff of Mono Basin water
29 to Los Angeles. And we’re not interested in returning Mono Lake to its pristine
30 state. We just want more water for the lake in wet years, when water for LA
31 is available elsewhere.’⁴² But as predicted by our model, these demands would
32 soon be raised by other parties.⁴³ In the end, the final ruling was skewed
33 against Los Angeles.⁴⁴

34 An additional reason why the case took so long to resolve was the non-
35 vested nature of property rights under the public trust doctrine. In 1993, the

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37 ⁴¹ *Los Angeles Times*, March 8, 1983, ‘Letters to The Times: Court’s Decision on Mono
38 Lake,’ pg. C4.

39 ⁴² *Los Angeles Times*, November 30, 1984, ‘Fate of Rush Creek Trout is at Stake in Court
40 Fight,’ Earl Gustkey, pg. E1.

41 ⁴³ This is especially true of the application of the public trust doctrine to the tributary trout
42 streams in Cal Trout I and Cal Trout II. In these cases, new plaintiffs, California fishing groups
43 joined the Mono Lake Committee in seeking additional constraints on Los Angeles. See *Los
44 Angeles Times*, August 15, 1986, ‘Mono Lake Group Wins Round, Slows Diversion of Creek,’
45 Ronald B. Taylor, pg. 3.

⁴⁴ John Hart described the ultimate decision by the SWRCB as ‘more favourable to the lake
than any of the [environmentalists] could have dreamed.’ John Hart, *Storm Over Mono: The
Mono Lake Battle and the California Water Future*, University of California Press, 1996, p. 3.

1 LADWP predicted that the long-term costs of replacing Mono water could
2 be \$1 billion.⁴⁵ This figure did not include the costs of stranded, non-
3 deployable capital in water export and hydro-electric generation.⁴⁶ Because so
4 much was at stake in the reallocation of the water without compensation, the
5 LADWP invested in efforts to advance its respective position in the all-or-
6 nothing battle over rights to water.

7 8 9 **5. Concluding remarks**

10 In 1970, Professor Joseph Sax argued that the public trust doctrine could be
11 used to reallocate resources on behalf of environmental protection and natural
12 resource conservation. A test case for his arguments arose with the filing of
13 the *National Audubon* case. As described above, however, it turned out to be
14 extremely contentious and costly to resolve. The costs may have limited the
15 application of the public trust beyond what had been envisioned by its promoters
16 following the *Audubon* ruling in 1983.

17 Indeed, a Lexus/Nexus search of public trust litigation for the period 1985
18 through 2004 reveals 32 court cases in 12 western states with three-fourths of
19 them in California, Colorado and Idaho. In general, the rulings have held
20 that state responsibilities under the public trust doctrine may extend to
21 maintenance of stream flow and water levels in rivers and natural lakes,
22 including groundwater systems linked to them in order to guard for health,
23 amenity values, and fish and wildlife habitat.⁴⁷ Even so, the range of the
24 issues addressed by the courts seems to be quite narrow. It does not involve
25 the broad sweep of possibilities for extending the doctrine to curtail private
26 appropriative water rights, to manage wildlife or to administer the federal
27 lands as has been proposed.

28 An alternative approach for addressing conflicting public and private values as
29 occurred in the Mono Lake case is a market-related response. In the case at
30 hand, rather than rejecting Los Angeles' water rights under public trust
31 claims, state and federal agencies might have purchased water to restore
32 Mono Lake's level to address public concerns. Where narrower private inter-
33 ests are involved, such as with individual stream fisheries, private fishing
34 groups could have bought or leased water from Los Angeles. Organisations,
35 such as the Oregon and Montana Water Trusts, regularly secure water from
36 farmers in those states to maintain riparian habitats for fish and other species.⁴⁸

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39 ⁴⁵ Hart (1996, 162).

40 ⁴⁶ In 1991, LADWP estimated that it had spent approximately \$12 million for outside law-
41 yers and consultants since 1979. John Hart, *Storm Over Mono: The Mono Lake Battle and the*
42 *California Water Future*, University of California Press, 1996, p. 176.

43 ⁴⁷ *Shokal v. Dunn*, 109 Idaho 330, 707 P.2d 441, 1985; *Mineral County v. State of Nevada*,
44 117 Nev 235, 20 P.3d. 800, 2001; *Golden Feather Community Ass'n v. Termlito Irrigation Dis-*
45 *trict*, 199 Cal. App. 3rd 402, 244 Cal Rptr. 830, 1988.

⁴⁸ See <http://www.owt.org/>. Libecap (2005, 19–23) describes some of the transaction costs of
such exchanges, including bilateral monopoly, valuation and third-party effects.

1 Reliance on market transactions would have the advantages of producing
2 more information about the relative values of water for current and proposed
3 uses and of reducing the conflict associated with uncompensated reallocations.
4 Extreme demands encouraged by open standing under the public trust would
5 have been tempered by the requirement to purchase. Where no voluntary
6 agreements on water transfers for public environmental or recreational uses
7 are forthcoming due to bilateral monopoly conditions, eminent domain with
8 compensation could be used for government acquisition of water.⁴⁹

9 All in all, the public trust doctrine appears not to have been an efficient
10 vehicle for timely protection of Mono Lake and its tributaries. This is an
11 important point because rising environmental and recreation demands for
12 water relative to traditional uses suggest that there will be many similar
13 reallocation efforts.⁵⁰ Climate change and the likelihood of greater drought
14 conditions in the south-west will only exacerbate the problem. The model
15 and case presented here suggest that a broad array of options should be
16 considered for the speedy and low cost resolution of these conflicting
17 demands for the West's scarcest resource.
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39 ⁴⁹ The uses and problems of eminent domain and just compensation are outlined in Fischel
40 (1998). Eminent domain has been used to acquire private holdings in National Parks. There is,
41 of course, potential for conflict in these compulsory exchanges, but since compensation was
42 provided as to little or no compensation under the observed reallocation, it seems likely that
43 there would have been less contention.

44 ⁵⁰ For example, consider the contentious effort to reallocate water from agricultural use to
45 the rewatering of the San Joaquin River between the NRDC and other parties and the Friant
Water Users Authority. The conflict began in 1988 and was not tentatively resolved until the
September 2006 San Joaquin River Settlement Agreement.

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