



## METHODS

# Property rights, ecosystem management, and John Locke's labor theory of ownership

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### Abstract

This paper examines John Locke's labor theory of ownership from an ecological perspective, and explores its role in western US property rights disputes. The labor theory of ownership describes how an individual, through application of labor, can justifiably acquire a private property right to the yield of commonly-held natural resources. The presence of ecosystem processes and services beneficial to humans, coupled with equity and no-harm principles, places limits on the extent to which strong labor-based rights can be justified. Property claims to areas that have not undergone physical transformation due to human labor are less-strongly justified. Rather than continue in its inappropriate role in support of strong private property rights in the western US, the labor theory can play a new role in justifying and limiting ecosystem management regulation of private and government-owned lands and who should pay. If ecosystem management regulations prevent, reduce, or eliminate harms to ecosystem services and processes, the costs of such management can justifiably fall on private landowners and private users of public lands. If such programs augment existing ecosystem services and processes, costs should fall on the government.

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### 1. Introduction

Three hundred years after its publication, John Locke's labor theory of property, with its emphasis on strong individual rights of ownership, still lives in the social consciousness of industrialized nations, influencing beliefs and behaviors of individuals as well as property-related policies adopted by governments. Locke's arguments that

(1) claims to private ownership can precede the establishment of civil society and are therefore not beholden to the whims of civil government, and (2) the appropriate role of government is to protect private ownership rights against the behavior and interests of other citizens have empowered political and social movements that desire to restrict the role of regulatory government. Hargrove (1989) recognizes the centrality of Locke's theory both to property rights philosophy and to contemporary attitudes about property, especially among rural dwellers. Epstein (1985, p. 13) characterizes Locke's position: 'Private property represents the

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sum of the goods that the individual gets to keep outside of the control of the state.’ Locke’s agenda, according to Epstein, included protecting private property holders from the rapacity of centralized government. Locke’s theory buttresses the ‘takings’ clause of the fifth amendment to the US Constitution, which reads ‘nor shall private property be taken for public use, without just compensation,’ in support of claims by private landowners to strong rights against government intervention in their use of land.

Over the past few decades, changing social values combined with developments in ecological sciences, environmental and ecological economics, law, and other fields have led to the identification and justification of new claims for public intervention in private land-use decisions and for reconsideration of existing uses of public lands. One expression of these new claims, ecosystem management, calls for an active human role in the preservation of the biodiversity, complexity, resilience, productivity, and sustainability of wildlands. Ecosystem management adopts a landscape-level perspective on land management that Geisler and Bedford (1998, p. 133) believe implies ‘a radically new and expanded geography of conservation’. Definitions of ecosystem management typically take explicit account of the human role in wildland management, such as the Ecological Society of America’s Committee on the Scientific Basis for Ecosystem Management’s statement that ‘management strategies must deal constructively with such growing concerns as the rights of private property owners and local loss of jobs’ (Christensen et al., 1996, p. 665). But the extent to which ecosystem management is justified in terms of the existing rights of land owners and public-land users remains contested.

In the US, there are numerous property-related public-policy flashpoints in rural regions. They encompass the nature and extent of property rights applied to privately-held lands in rural regions, the property rights of inholders whose privately-held lands are surrounded by federally-owned preserves, and the use rights and extent of control over federal lands extended to local dwellers and their regional governments (Jacobs, 1998; Brick and McGreggor Cawley, 1996; Hage, 1994). One

reason for the rising friction involves the federal interest in applying ecosystem management concepts that often provide justifications for reducing human use of and impacts on regions identified to have significant ecological qualities. Many rural and private-sector interests have joined together under the banners of the Wise Use Movement and the Property Rights Movement to challenge environmental regulations and other federal land-use policies that appear to threaten rural livelihoods and corporate profitability. The movements argue that existing property rights associated with land ownership and use are substantial. Therefore, new ecosystem-management regulations impose unfair and possibly illegal burdens on land owners and public land users. Hargrove (1989, p. 69) counters that advocates of strong property rights are promoting amoral and asocial attitudes that can be traced back to Locke’s ‘general contempt’ for the quality of the natural products of the earth. Since John Locke’s insights lie at the heart of the argument, a careful investigation of Locke’s labor theory from an ecological perspective is warranted.

Theories of property rights provide systematic explanations of how and why property is created and allocated. Bromley (1989) emphasizes the tripartite nature of property rights, involving relationships between individuals with respect to things owned. Property theories can account generally for why property rights are needed at all (e.g. Becker, 1977). They can also explore categories of ownership, or property regimes, which are broad subsets of rights that share important general characteristics (e.g., Bromley, 1991; Ostrom, 1990). Further, theories can provide a detailed definition of what the elements of property rights are; their relationships to similar rights and duties as well as their relationship to other social institutions (e.g., Honorè, 1961; Hohfeld, 1917, 1913). And they can account for dynamics: why and how property rights change as well as justifications for change (e.g., Haddad, 2000; Sax, 1993, 1990; Bromley, 1989; Epstein, 1985; Demsetz, 1967). This paper examines Locke’s theory from the first and final perspectives since careful consideration of the why and how of property-rights creation and evolution can inform the current gridlock in policy making for rural

land management. The primary focus here is on the meaning of privately-held rights to land in rural regions and wildlands: what relationships do such rights imply between an owner, nearby neighbors, interested parties who do not live nearby, and public authorities? What kinds of interventions and restrictions in the use-rights of owners are justifiable? Are these property rights comprehensive and absolute, or are some ‘sticks in the bundle of property rights,’ such as the right to engage in uses that degrade natural systems occurring on the land, subject to public oversight and approval? Some of the discussion can be extended to individuals with use-rights (grazing, mineral extraction, recreation, agricultural, timber harvesting) on public lands: to what extent can public authorities justify the modification or revocation of such rights without triggering compensation?

This paper next examines the specific justification for the acquisition of private property presented by John Locke in his *Second Treatise of Civil Government* (1690). The common historical critiques of this much-analyzed work are then presented, followed by ecological critiques and implications, including a perspective on how ecological and social dynamics influence the establishment of property rights in Locke’s system. These new insights are then contrasted with property rights perspectives emerging from the Wise Use and Property Rights movements. The paper’s concluding section offers suggestions on how to move toward resolution of philosophical differences over rights to use public lands in the western US.

## 2. Labor as justification for ownership: the basic theory

Locke published his *Two Treatises of Government* in 1690 (Locke, (1690) 1988). In the second treatise, he presents his labor theory of property acquisition, which was fundamentally different from the widely-practiced approaches of divine right, royal patronage, or traditional limited access to common property. It attempts to justify the establishment of private property outside of

social context (i.e. without approval of one’s peers or neighbors) and governmental regulation. Today, many of the same arguments are used to justify resistance by existing owners of private property and users of public property to governmental interventions in their rights of ownership.

The labor theory proceeds as follows (see also Bromley, 1989, pp. 195–7). Using the example of a ‘wild Indian’<sup>1</sup> gathering acorns, Locke makes three arguments for the acquisition of property rights. The first, as Becker (1977) points out, involves the prior existence of a right to one’s own body and therefore to one’s own labor. Given these rights, by mixing one’s labor with natural resources that are subject to a common-property or free-access regime of ownership, the resources are joined or ‘annexed’ to something already privately owned and therefore are transferred into private ownership. The act of labor, ‘removing them out of that common state they were in,’ establishes the property right (§ 27).

The second justification emerges from Locke’s conception of a God-given mandate to humans to develop and utilize the earth’s bounty. The application of labor adds value to the thing held in common. The effort of laboring and the result of added value distinguish a labor justification from a ‘first occupancy’ justification. Locke considers commonly owned property to be ‘of no use’ without the application of labor (§ 27); adding value to the commons validates its acquisition as private property. Locke dwells on this bimodal ‘annexation’ approach, which he summarizes as follows:

(I)t is the taking any part of what is common, and removing it out of the state Nature leaves it in, which begins the property, without which the common is of no use. And the taking of this or that part does not depend on the express consent of all the commoners.

<sup>1</sup> Locke distinguishes the wild Indian from the commoner of England as one ‘who knows no enclosure, and is still a tenant in common’ (§ 25).

The third justification is a practical one. Locke first poses alternative events that could trigger new property rights: applying labor, transporting a good (acorns) home, cooking them, or eating them. Without confidence that application of one's labor will result in something owned, an individual would not have an incentive to labor, Locke argues. The alternative to a blanket rule that one's labor will yield property rights is to subject one's property claim to 'the consent of all mankind.' Locke continues, 'If such a consent as that was necessary, man had starved, notwithstanding the plenty God had given him' (§ 27). That is, if firm property rights are not established until after one goes to the effort to produce a good, the individual would have little incentive to undertake the effort. The transaction cost of securing the consent of all mankind is so high that property rights would never be established.<sup>2</sup> This is similar to Demsetz' (1967) notion that property rights evolve to provide least-cost arrangements to meet societal needs.

### 2.1. *The state of nature*

Locke's theory of property acquisition begins with logic and justification for a transition from humans living in a 'state of nature' to humans living in civil society. This approach is similar to that taken by Thomas Hobbes (1588–1679). Hobbes' state of nature, expressed in his masterwork *Leviathan* (Hobbes, (1651) 1997), is characterized by the familiar phrase, 'the life of man (is) solitary, poor, nasty, brutish, and short.' In the absence of society, there is a perpetual state of war 'where every man is enemy to every man.'

Locke takes a more optimistic view. His state of nature, as interpreted by Mabbott (1973), is one of egalitarian political structures in which no one is politically superior to another. Humans by and

large behave responsibly since they are beholden to 'the law of nature:' a series of self-evident moral obligations such as 'common equity' and an obligation not to harm another person's life, health, liberty, or possessions. Correlated with moral obligations are natural rights to live and to the enjoyment of individually owned property. Locke's state of nature is therefore not a condition of humans existing without laws but rather humans existing without well-defined laws and without politically hierarchical laws that can be used by a group of individuals to compel another's behavior. Mabbott points out that while Hobbes' barbaric state of nature leads him to focus on the protection of human life as a motivator for establishing civil society, Locke's interest lies in the protection of property. His definition of property includes peoples' 'lives, liberties, and estates' (§ 123). Private property as it is understood today is only part of Locke's conception of property.

Waldron (1988) also notes theological underpinnings to Locke's state of nature. Drawing from Genesis 1:26-9, Locke describes the bounty of nature as being given to men by God for their support and well-being, and that man has a right to use the creatures of the earth by the will or grant of God. There is general consistency between human instincts, human reason, and God's commands when it comes to human use of the earth's bounty. Natural law coincides with Divine law and Divine guidance. In Locke's arguments, there is an emphasis on themes of food acquisition and cultivation and ways to implement God's command to humans to be fruitful and multiply.

The state of nature, for all its benefits, cannot be sustained, Locke argues. Individual rights are threatened in pre-civil society not due to the side-effects of competition over natural resources or concern over how land-use choices affect ecosystem services and processes<sup>3</sup> but rather due to individuals' moral deviation from mutually rein-

<sup>2</sup> Locke's practical sense of the links between commercial value, economic institutions, and commercial infrastructure emerges again in § 48 in which he argues that, when appropriating a commons, the extent of territory one claims should be directly related to the potential to participate in broader commercial exchange. Without such potential, one should claim no more land than she needs for subsistence.

<sup>3</sup> This paper distinguishes between ecosystem services that provide benefits to humans without human intervention, and ecosystem processes that provide benefits upon the application of human labor.

forcing Natural and Divine Law and subsequent difficulties in enforcing its tenets. While the laws of nature are self-evident and should be followed, there are humans who do not do so either by intent or by accident. Locke writes:

(T)hough in the state of Nature (the owner) hath such a right (to property), yet the enjoyment of it is very uncertain and constantly exposed to the invasion of others; for all being kings as much as he, every man his equal, and the greater part no strict observers of equity and justice, the enjoyment of the property he has in this state is very unsafe, very insecure. This makes him willing to quit this condition which, however free, is full of fears and continual dangers. . . . (§ 123)

It is logical, therefore, for individuals to abandon their state of nature and join in civil government. Locke writes that the ‘great and chief end. . . of men uniting into commonwealths, and putting themselves under government, is the preservation of their property’ (§ 124). Civil government provides established, settled laws, indifferent judges, and the power to enforce settlements and penalties, none of which is available in the state of nature. In uniting in civil society, humans give up both the right to act unilaterally for self-preservation as well as the right to exact private justice against offenders; these rights are subsumed by an impartial state. The inherent desirability of this trade-off, Locke believes, explains why there are so few examples of people living in a state of nature compared to people living in civil society.

## 2.2. *Acquiring private property through labor*

The discussion thus far describes a hypothetical context in which individuals have established private property rights in advance of and exclusive of their participation in civil society. It is, in fact, a desire to protect such pre-existing rights that motivates individuals to form and to join civil society. This way of understanding social organization accounts for the role of government. It is a

judicial role aimed at protecting individuals’ rights to their lives, liberty, and possessions.

From a property-regime perspective, Locke’s state of nature includes common property and free-access property with private inholdings interspersed. Common property here, in contrast to Hardin’s (1968) notion of no prior rules of ownership or use, means property with well-defined rules of ownership but owned by more than one individual. Locke indicates this prior ownership arrangement describing his focus on ‘commons, which remain so by compact’ (§ 27; see also § 25). But the compact includes certain undefined elements, specifically how property rights to goods derived from the commons can be established. Here, the original owner of the separable aspects of the common property is ‘Nature, the common mother of all’ (§ 27). In more detail:

all the fruits (the earth) naturally produces, and beasts it feeds, belong to mankind in common, as they are produced by the spontaneous hand of Nature, and nobody has originally a private dominion exclusive of the rest of mankind in any of them (§ 25).

Ownership by ‘mankind in common’ is a religiously mandated ownership granted to all people for their use by God. This amounts to a free-access regime governing the natural bounty of commonly held land or resource systems. Again in contrast with Hardin, Locke frequently associates commonly held property with uncultivated, underutilized property. He distinguishes between regions with and without monetized economies.

(T)here are still great tracts of ground to be found, which the inhabitants thereof, not having joined with the rest of mankind in the consent of the use of their common money, lie waste, and are more than the people who dwell on it, do, or can make use of, and so still lie in common; though this can scarce happen amongst that part of mankind that have consented to the use of money. (§ 45)

### 3. Common critiques and limitation of the labor theory

Locke's era in English history is notable for the capriciousness of government as exemplified by the repeated turnover of English regimes; the perspective that there are regions of the world where little or no government exists except ever-present divine authority; the seeming limitlessness of land in its natural state available in the new world; and an on-going social transition away from medieval lineage-based hierarchies that defined economic roles and property rights toward modern conceptions of labor and capital allocated through markets. These perspectives on the late 17th century help to bring some of Locke's arguments into intellectual focus.

Numerous critiques and limitations have emerged. Hargrove ascribes Locke's strong endorsement of private property rights in part to his attempt to justify transferring ultimate rights to property from the monarchy to individual owners. Locke's *First Treatise* was primarily concerned with this question; the *Second Treatise* pursues issues related to individual ownership. Hargrove (1989, p. 70) points out that in seeking to discredit a monarch's 'ultimate and absolute' rights to property, Locke focused less on the validity of ultimate and absolute rights and more on an effort to justify that such rights should be held by individual property owners, laying the groundwork for today's attitudes that favor strong private rights to property.

The large literature on the correlative, or triadic, nature of rights, established by Hohfeld (1917, 1913), and elaborated by Bromley (1991, 1989), provides a conception of rights that is fundamentally at odds with the notion that private property can exist in the absence of social context. Hohfeld pointed out that all forms of rights (rights, privileges, powers, and immunities) have meaning insofar as they impose limits on the freedom of others (duties, absence of rights, obligations, and absence of power). Without recognition and acquiescence by others in relationships with respect to an individual's rights, a right cannot be said to exist. The process of sorting out which rights claims to honor (and to what extent) and

which to reject is the process of establishing civil society. Private property rights cannot, therefore, pre-date the establishment of civil society.

Becker (1977) explores the notion of 'mixing' human labor with a thing in nature. While one can grant that ownership of one's body can be extended to ownership of one's labor, the next step—ownership of that to which one's labor is applied—is not obvious. While one develops a unique relationship to that on which one has labored, it does not necessarily have to be recognized by society as an ownership relationship. Society could instead honor the laborer or offer gratitude. No logical step exists to link one individual's act of labor to the establishment of a new duty on other individuals to honor the laborer's new property claim. A more defensible claim, Becker argues, is that sometimes labor yields a property right and sometimes it does not. But this restatement effectively removes labor from its status as a 'fundamental' idea that can drive a justification for property rights.

Kramer (1997) takes another path in critiquing the labor theory. He notes that the definition of labor shifts part way through the chain of argument. Before labor is mixed, it is understood to be an activity, capacity, or flow of energy. After it is mixed, it is understood to be the transformation of the thing to which labor was applied. If a single definition of labor is used all the way through (such as activity), the theory becomes a tautology that simply affirms an ownership right to one's labor. When the two definitions of labor are employed, Locke's theory loses its universal nature: the linkages between labor-as-activity and labor-as-transformed goods must be thoroughly explored and could reveal instances where ownership rights in labor-as-activity are not justifiably transferred to (in Marxian terminology) materialized labor.

To maximize the logical resiliency of the labor theory, its scope of applicability must be narrowed inter-temporally, with respect to types of property, and in terms of the extent or concentration of property rights. Locke maintains that his theory provides a general mechanism for the acquisition of private rights to land out of common property. But once all of the commons have been appro-

priated, future laborers will no longer be entitled to invoke the same justification to acquire property. In this sense, the labor theory describes and justifies a temporary, transitional process.

When Locke attempts to extend his theory from renewable resources to land, the theory breaks down. Locke considers land ownership to be ‘the chief matter of property’ (§ 31) and addresses it separately, following the general presentation of his property theory in paragraphs 24–30. His primary claim is that ‘it is plain’ that land should be treated the same way as renewable, harvested resources: applying labor to land establishes a property right. Locke’s theory cannot make this leap: it commences with the assumption that the land is already owned in common and then focuses on establishing property rights to the renewing products of the land. Locke assumes that property rights to the yield of these systems have not yet been established so that any claim on them constitutes a new claim; the same cannot be said of commonly-held land resources.

In terms of limits on property rights, ownership in the state of nature is not equivalent to fee simple ownership. Fee simple ownership gives property holders wide latitude to take actions that can degrade larger-scale natural systems occurring in part on their land. By assuming the pre-existence of private holdings interspersed in a commons, the labor theory does not address how they came into being, which could have been by mutual agreement between the owner/managers of the commons and the private landholders. The state of nature, although described as a ‘state of perfect freedom to order (peoples’) actions, and dispose of their possessions and persons as they think fit’ (§ 4), clearly requires mutual obligations among its adherents: ‘all the power and jurisdiction is reciprocal’ (§ 4); ‘though this be a state of liberty, yet it is not a state of license’ (§ 6). That is, for people living in the State of Nature, there are limits and obligations on how one may dispose of one’s property. The mutual obligations among owners of property are a form of civil society; the primary difference between this initial state-of-nature form and the subsequent forms of civil society is the need for effective enforcement mechanisms.

Locke recognizes the importance of both punishment of harms having already occurred as well as actions to deter future harms from occurring (§ 8). The primary obligation is that ‘no one ought to harm another in his life, health, liberty or possessions,’ but there are additional obligations not to destroy one’s self ‘or so much as any creature in his possession, but where some nobler use than its bare preservation calls for it’ (§ 6). Under a fee simple ownership regime, none of these restrictions would apply.

In the state of nature, each person serves as a combination judge, jury, and executioner of justice who should rely upon ‘calm reason and conscience’ to determine punishments (§ 8). The potential for generally inconsistent applications of justice, as well as an individual acting with leniency in self-judgment or judgment of a friend, threatens the goal of fairness in the enforcement of the law. For Locke, the needed institutional innovation is clear: ‘I easily grant that civil government is the proper remedy for the inconveniences of the state of Nature’ (§ 13). Civil government is not, therefore, heavily restricted in what it can demand of holders of pre-existing private property rights. Its role is to protect individuals’ life, health, liberty, and possessions from harm imposed by the behavior of other individuals, including harms resulting from how they dispose of their own property. In carrying out that role, it has a right to regulate the use of private land and use rights on public land.

Mabbott (1973) further points out that the labor theory provides justification for the acquisition of property but not its transfer. A new owner, whether an heir, gift recipient, or purchaser, has not applied labor to the thing owned, and so cannot invoke the labor theory to justify the new ownership claim.

#### 4. Ecological perspectives on the labor theory

Although Locke’s work preceded the rise of ecological research by over two centuries, he did not ignore issues associated with resource scarcity and preservation of what is today called ecosystem services. A fundamental property rights friction

involves the incompatibility of fee simple ownership of land with the public goods nature of ecosystem services originating on private land.

#### 4.1. *Ecosystem services degradation*

Locke indirectly addresses the issue of ecosystem services. He uses the following examples of things that can be annexed to labor: fruit, venison (§ 25); acorns, apples, grass, turf, ore (§ 27); meat, water running in a fountain (§ 28); ocean fish, amber-gris,<sup>4</sup> and hare (§ 29). With the exception of ore,<sup>5</sup> every one is a renewable resource that depends for its generation on underlying physical and biological systems. The ecological integrity and common property status of the underlying systems are not threatened by the harvesting process. The labor theory does not recognize an individual's right to take action that would reduce the productivity of the underlying systems. Such a right would fall either under the purview of the owner/managers of the commons or, with respect to private property, under the Natural Law principles enjoining harm to others. Locke provides no context in which individuals can unilaterally undertake actions that degrade shared beneficial resources.

#### 4.2. *Scarcity-triggered land rights policy*

Locke recommends scarcity-triggered limits on the creation of private property. Acorns, fish, and other units can be privatized 'at least where there is enough, and as good left in common for others' (§ 26). He would further limit the quantity one can harvest to what can be used before it spoils (§ 30). The admonitions are phrased as moral duties on the harvester. As moral principles, they presage values expressed under today's theme of sustainability. Locke avoids, however, addressing situations of scarcity when there simply cannot be enough and as good left for others. In part, it is immaterial to his purpose. Locke believes his theory applies to regions with vast underutilized resources either at 'the beginning and first peopling of the great common of the world' (§ 34) or at least prior to the extensive European peopling of America. The logical extension of his position is

that in times of scarcity resource users would scale back their use in a manner similar to riparian doctrine rules covering water use during droughts. In such cases, all users scale back their uses to minimum quantities necessary for domestic purposes. As the drought recedes, allowable uses increase.

The two *Treatises* were published more than a century before Thomas Malthus's *Essay on the Principle of Population* (1798) warned of the inevitability of conflict over scarce resources when human population growth outstrips available resources (Malthus, (1798) 1998). Hargrove (1989, p. 68) considers Locke's belief in the abundance of land to be an 'obvious problem' in relationship to the theory's current applicability. Locke's explanation of how society should handle competition over non-renewable resources either ignores the issue of scarcity or connects it to moral obligations emerging from Natural and Divine Law. Lockean philosophers have labored unsuccessfully to repair the problem of what happens when all land held as common property and available for appropriation is used up, especially how one can live up to the admonition to leave enough and as good in common for others (Kramer, 1997, p. 143). With nonrenewable resources in general, the logic of the labor theory is consistent with an equal and ongoing opportunity for others to appropriate portions of the commons, in other words for infinite divisions of a finite resource. In the long run, this is theoretically and practically impossible. In the short run, it could lead to rapid draw-down of finite natural resources as adherence to a principle of equal access results in a regime of open access similar to Hardin's pastures.

#### 4.3. *Land ownership*

Removal of land from the commons could violate a tenet of Natural Law—to do no harm to others. Removal of fish, acorns, and other renewable resources from a commons does not necessarily disturb the ongoing functions that generate the renewable resources on which others depend. But when land is privatized, it often creates an institutional context that entitles the

owner to disrupt that land's contribution to ecosystem processes and services. This is potentially harmful to all who use the commons. Indeed, Locke argues against his labor theory for the establishment of private property rights to commons remaining in England because it would be harmful to remaining commoners (§ 34). It appears again that the extent to which Locke feels his theory applies is a function of the underlying scarcity of the resource in question.

Epstein (1985) argues that the no-harm doctrine is based on the Natural Law underpinnings of Locke's theory, and such underpinnings are not crucial to the basic occupancy logic of the theory. He argues that if property claims were based solely on original occupancy, there would be no basis for civil intervention into private property due to harm arising from one's use of one's own land. Yet insights from paleobiology and anthropology date original human occupancy of some North American lands to 10 000 years ago. Since identifying an original occupant and his or her heirs would be impossible on practical grounds, Epstein's system requires a social process of identifying an original occupant, and then defining and acknowledging private property rights, which would defeat his goal of ending social scrutiny of private property. More generally, the decision to honor original occupancy with a property right is itself a social one; other basic claims to property can be made and justified.

A different issue concerns those elements of a landscape that do not contribute to a production process (i.e. require the application of labor). If the production process is farming, can a farmer lay claim to inert rocks or a rocky outcropping adjoining or surrounded by agricultural fields? If the farmer chooses to retain some trees that do not provide productive benefit, can the farmer make an ownership claim based on his labor on adjoining or surrounding plots? In neither case has the farmer applied labor to the objects. Boundary issues in general arise when the focus turns from discreet units (acorns, fish) to systems (land, surface water, groundwater). Unless all aspects of 'land' are fully utilized in a production process, the labor theory does not appear to justify a geographically comprehensive, ultimate, and ab-

solute claim to property. The importance of property rights to undeveloped pockets of an agricultural landscape continues to grow since such pockets may serve as reservoirs of biodiversity or rare species. If private claims to these areas cannot be justified on labor or original occupancy grounds, resulting claims of exemption from regulation of these areas also cannot be justified.

#### 4.4. *The contribution of ecosystems to production*

Locke failed to appreciate the importance of ecosystems, believing that humans contribute the lion's share to the realization of the bounties of the earth. Referring to benefits for humans, he writes:

(L)and that is left wholly to nature, that hath no improvement of pasturage, tillage, or planting, is called, as indeed it is, waste; and we shall find the benefit of it amount to little more than nothing. (§ 42)

The expanding literature on ecosystem services and ecosystem processes challenges this viewpoint, arguing that humans are completely dependent upon natural and physical systems, that the systems are not replicable by humans, and that human intervention can damage the ability of ecosystems to provide vital services (Daily, 1997). Locke has a clear opinion:

(If we will rightly estimate things as they come to our use, and cast up the several expenses about them—what in them is purely owing to Nature and what to labour—we shall find that in most of them ninety-nine hundredths are wholly to be put on the account of labour. (§ 40)

That is, since productive output results almost exclusively from human labor, labor-based property rights to what is produced are justified. Ecologists would reach different conclusions on relative effort involved in production. If based on energy fluxes, they might include the energy required for soil formation; evaporation, cloud formation, and transport; biomass production; pollination; and other ecological processes that

eventually result in the availability of an acorn on the forest floor. The human energy of gathering and transporting acorns out of the forest, which to Locke is sufficient to establish a property right, could be less than 1% of the total energy expended to generate, acquire, and deliver an acorn to one's home. If based on elapsed time or magnitudes of nutrient fluxes, similar results might obtain. This ecological perspective recasts the role of human labor in the production process to one that is essential but not encompassing. It renders less compelling the claim of labor yielding rights over the underlying natural systems, and underscores the importance of the no-harm doctrine in protecting other users' rights to beneficial physical and ecological processes.

Concerning the process of establishing boundaries of ownership, if human labor is but a minor player in a profoundly larger ecosystem-based productive enterprise, the choice to set property boundaries based on the location of the labor input becomes arbitrary. Property boundaries should either encompass all of the ecosystem services involved in the production process (i.e. since systems cannot be separated without loss of function, application of labor to one aspect of a system annexes the entire system) or should be justified on some other grounds. On practical as well as equity grounds, only the latter possibility is realistic.

### **5. Private property justifications in the wise use and property rights movements**

The Wise Use Movement and Property Rights Movement encompass a wide range of public advocacy surrounding land rights in rural regions of the United States, primarily in the west. Arnold (1996, p. 15) focuses the movements' regions of interest as rural areas that are neither completely segregated from human development (e.g., national or state parks), nor completely developed (intensively-farmed land or cities). This 'middle ground' supports rural livelihoods yet is subject either to environmental regulation (if privately owned) or conditions on use/entry (if publicly owned). Nearly a quarter of the population of

the 15 western US states (excluding urbanized California) live in rural regions. Schrepfer (1980, 1976) offers a philosophical dichotomy concerning the role of humans in the middle ground. Either they are the prime movers of a teleological evolutionary process consistent with technology-driven progress, or they are co-equal species subject to and dependent upon an ecologically-driven evolutionary process. The former (Wise Use) perspective welcomes industrial transformation of rural and wild landscapes through mining and timber harvesting, seeing it as an inevitable byproduct of enlightened progress. The latter perspective argues on aesthetic and biological grounds against the development of wildlands and claims that a broad, enforceable public interest exists with respect to the management and use of privately-held lands.

Epstein (1985) believes that the only valid public intervention on private property is through the exercise of fully-compensated eminent domain; any form of uncompensated regulation of private land cannot be justified. Marzulla (1996, pp. 54–5) builds on this claim, describing the movements as 'a fight for freedom and individual rights' hinging on 'broad rights to all forms of and interests in private property.' She continues, 'The environmental ethic is based less on environmental protection and more on the false pretense that people should have only limited rights to own and use their property.'

Marzulla presents three main justifications for strong property rights: (1) they buttress civil freedoms; (2) property ownership is consistent with a 'natural human impulse' to own things and to protect ownership rights; and (3) private ownership is comparatively superior to public ownership in terms of environmental stewardship due to increased accountability for degradation on private land. Leaders in the Wise Use and Property Rights Movements consistently stress Marzulla's first justification, the importance of the links between strong property rights and the defense of individual freedom from central authority (Jacobs, 1998). This perspective emerges directly from the *Second Treatise*. Likewise, an appeal to natural human impulses with respect to private ownership is consistent with Locke's presentation

of humans in the State of Nature. Only Marzulla’s third argument regarding the comparative superiority of private-property incentive structures for environmental stewardship moves beyond the Labor Theory. Borrowing Bromley’s conceptual framework (1989, p. 144) it is concerned with policy instruments (i.e. property regimes) needed to achieve the utilitarian policy objective of environmental protection.

**6. Implications for the justification of private ownership**

Until a broadly-accepted property-rights theory emerges that links general and specific justifications for land ownership in the western US, conflict over land rights will continue. Locke’s labor theory can play a constructive role here. The labor theory does not offer private landowners protection from ecosystem management-based restrictions when the threatened ecosystems provide beneficial services to other people. It includes these points:

- If the earth’s physical and biological systems are held as common property, then a right to privatize new property emerging from the commons is justifiable.
- Such a right exists only if the property in question occurs in abundance.
- As relative abundance changes, so too will the right to privatize.

The labor theory applies to the sustainable yield of commonly-held productive systems, such as fisheries or forests, during times of abundance. Attempts to generalize it to nonrenewable resources and land falter. The main stumbling blocks involve equity for other current users of ecosystems occurring on the private property, equity for future generations who have not yet applied their labor to the commons, and the duty not to harm other users of potentially-impacted ecosystem processes and services. The concept of uniformly strong rights throughout one’s private holdings also is not justified by the labor theory. The nature and extent of rights to land that falls

Table 1  
Application of the labor theory to contemporary property rights issues

Individual rights to...	Applicability of labor theory
Renewable resource harvesting on public lands	Strong—act of harvesting establishes a property right to what is harvested
Non-renewable resource harvesting on public lands	Moderate—theory does not scale up effectively as the number of harvesters grows and the availability of the resource declines
Establishing private land rights out of common property	Weak—(a) origin of existing private property not explained; (b) new land rights are justified by faulty analogy to renewable-resource ownership
Degrading or destroying ecosystem services originating on public or private land	Weak—if the ecological processes provide benefits to other humans, the no-harm and equitable apportionment principles apply
Reject environmental regulations imposed by government	None—if regulations prevent, reduce, or eliminate harms to other people or inequitable allocation Strong—if regulations augment existing ecosystem services

within recognized property boundaries is as varied as uses to which the land is put, as well as the land’s unprompted contribution to human well-being through ecosystem services.

Table 1 provides land-use scenarios and the extent to which the labor theory can be applied. It reveals how the labor theory contextualizes ownership rights in terms of equity considerations, ecological circumstances, and no-harm principles. Equity in the utilization of wildland resources calls for coordination among users and sensitivity to changing patterns of scarcity and abundance. Equitable use has a temporal component in that today’s utilization should not compromise the ability to utilize the resource in future years. The applicability and scope of the no-harm principle hinges on the nature of the ecosystem processes and services involved. When an intact ecosystem provides benefits to a wide range of interests, such

as an upland forest providing flood mitigation and reducing sedimentation in rivers and reservoirs, thereby benefiting water quality, fish spawning habitat, and reservoir capacity, the labor theory would not justify a private owner's removal of the forest. The absence of such potential harms would strengthen an owner's claim to a right to significantly alter the landscape of privately-held land. Further, a regulation that imposes costs to augment existing ecosystem services, such as monitoring for the establishment and spread of harmful invasive species, would not necessarily fall under equity and no-harm categories, and may be considered an unjustifiable burden. Practical distinctions between protection, restoration, and augmentation should be clarified in order to provide a clear basis for assigning costs incurred in ecosystem management.

Epstein correctly explains that the no-harm principle cannot be excised from the labor theory without it collapsing into either a current-occupancy or original-occupancy theory of ownership. Occupancy-based justifications are theoretically problematic and socially undesirable. They are consistent with Hobbes' bleak vision of human society at war with itself and are supportive of such behaviors as the destruction of ecologically-valuable public lands by off-road vehicle enthusiasts, the so-called 'radical recreationists' (Emerson, 1996, p. 127). Enforcement of the no-harm principle calls for coordination and authority. The obvious candidate for enforcement duties, as Locke points out, is a civil authority, but it need not be a centralized authority. The circumstances of the resources used and the harm caused should guide the decision of which level of authority is most appropriate, from local to federal, and which regulatory instrument is used (Lockwood and Haddad, 2002).

Although Locke's labor theory plays a central role, the philosophical basis of rifts over land rights and management in the western US extends even further. Unfinished business remains in many areas. A deeper understanding is needed of how utilitarian justifications of property rights overlay labor-based concepts. This enquiry could shed light on the contradiction between what labor-based and utilitarian-based philosophies prescribe

to deal with the growing scarcity of land and other natural resources relative to demand. As described here, the labor theory on equity grounds would curtail the establishment of new private rights. Utilitarians, arguing on efficiency grounds (Demsetz, 1967), would advocate for the expansion of private rights as scarcity increases. Utilitarian analysis can also complement the labor theory's focus on anthropocentric use-rights by accounting for existence values, other non-use values, and biocentric values.

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