A Place to Stand For Environmental Law and Economic Analysis?
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1.0 Introduction[2]

In doing normative environmental economics economists usually use WTP figures for losses when WTA figures are correct. We puzzle over moral issues involved in using discount rates and worry about equity effect not normally considered in benefit cost analysis. We wonder if individuals who will never use an amenity should have their existence values counted and if so if then we should also count existence values for non-environmental goods. We even wonder if persons can suffer harm from environmental degradation or can gain from environmental improvement even if they never know about it. This essay attempts for provide a framework for thinking about these sorts of issues centered around the concept of economic standing.

Ronald Coase (1988) pointed out that law and economics can involve two different sort of tasks: economists taking into account the institutional structure in economic analysis or economists using economic theory to consider what efficient law would be. He thought the former was the more neglected area. The tasks are, however, intertwined; economics and law inform each other. This is nowhere better illustrated than in environmental law and economics. Benefit cost analysis of environmental problems

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requires a grounding in legal rights so that benefit cost analysis is informed by the law and economics can improve legal efficiency.

2.0 The Concept of Standing In Economics

In recent years the concept of economic standing (Whittington and Maccrae 1986) has been introduced into the literature. The notion concerned who had economic standing to have their values counted. This was an important and indeed radical change from the prevailing if unarticulated notion under Kaldor Hicks (KH) that every person has standing to have their values counted in an economic analysis. KH is the standard measure of normative efficiency in economics. An action is said to be KH efficient if the sum of the willingness to pay (WTP) to acquire a good or a right exceed the sum of the willingness to accept payment (WTA) in exchange for giving up a good or a right. Anyone affected by a proposed action would have either a WTP or WTA so that implicitly all affected were to be included in the economic efficiency analysis. The issue of excluding certain people or sentiments did not come up.

Except that KH didn't work this way in practice. A notable example has been the treatment of foreign persons in the context of benefit cost. Typically benefits and costs imposed on foreigners were ignored. So in practice foreigners did not have economic standing in benefit cost analyses. The standard best practice was to conduct a benefit cost analysis from a national perspective. But in practice when one jurisdiction, a city or a state was conducting its own benefit cost analysis, it ignored effects on other jurisdictions unless they were strong enough to involve consequences for the original jurisdiction although such a restriction to less that a national jurisdiction would not be acceptable to some economists.

An even more notable example of an implicit standing issue was the treatment under KH of those affected by distributional changes. Under KH distributional effects did not have standing to be counted. The KH assumption was that compensation effects and income distribution effects were to be ignored as part of efficiency analysis. As Kaldor explained where a policy results in an increase in aggregate income,

> the policy is quite unaffected by the question of the comparability of individual satisfaction, since in all such cases it is possible to make everybody better off than before, or at any rate to make some people better off without making anybody worse off.

Kaldor goes on to note (1939, p. 550) that whether such compensation should take place "is a political question on which the economist, qua economist, could hardly pronounce an opinion." If equity was considered at all, and usually it wasn't, it was to be considered separately from of efficiency. Unfortunately this has lead to an artificial separation between efficiency and equity effects.

As economic analysis has been extended to a broader variety of subjects and a broader array of values, issues of standing have grown apace. In a policy affecting the costs of abortions, for example, we can ask whether the costs to fetuses be counted-i.e. should they have standing? Should the benefits the children of illegal aliens receive from public education in the U.S. be included in an analysis of the educational policies? Should the benefits criminals receive from crime be counted in considering policies affecting criminal behavior? Should existence value of environmental amenities be counted? Should harm to animals receive economic weight. Should even trees have standing?

In the environmental area in particular standing issues have arisen as the range of values considered has expanded fueled by changes in technology and in sentiments. This expansion of values is well shown by comparing the original benefit cost evaluation of building dams on the Snake River in Idaho and Washington, with those recently done by the Corp of Engineers (XXXX). The original analyses, conducted in the 1940's are uncluttered by mention of the value of ecological concerns, of free flowing rivers, salmon tribal benefits, species or habitat preservation (Zerbe and Graham, 1999, p. 766). That is standing was denied to these values presumably on the grounds that they were not important at the time. Yet now in considering the possibility of dam removal such concerns are among the most important (Zerbe and Graham) .

3.0. Principles for Standing

The start of an answer to the question of economic standing, I have suggested (Zerbe, 1991, 1998), is to be found in legal rights. Legal rights will determine both legal ownership and generally psychological ownership of goods. Thus legal rights will determine generally the sense of ownership, the psychological status quo, which will in turn define economic losses and gains as a negative or positive change from this position (Kahneman and Tversky 1979). The determination of gains and losses will in turn decide whether the correct measure is a willingness to pay (WTP) for gains or a willingness to accept (WTA) for losses. In what follows I will expand this concept of standing.

An approach that takes into rights into account in the course of economic evaluation, and that meets other requirements, I have called KHZ

(Zerbe 2001). KHZ is just a modification of KH based on the following assumptions (Zerbe, 2001a). Under KHZ an action or decision is efficient if:

(1) there is a positive sum for the willingness to pay (WTP) for gains and the willingness to accept payment (WTA) for losses,

(2) gains and losses are measured from psychological reference points (Kahneman and Tversky, 1979), which will mean that they are in the main to be measured from established legal rights,

(3) all goods for which there is a WTP are economic goods, as long as legal title to them can be held.

(4) the transactions costs of operating within states of the world are included in costs for purposes of determining efficiency, but the political transactions costs of changing from one state of the world to another are not to be included.[3]

Adoption of the psychological reference point to define the status quo from which gains and losses are measured, means that psychological losses have more weight than psychological gains (Kahneman and Tversky, Thaler). This is reflected in the traditional analysis use of the WTA to measure losses and the WTP to measure gains. It is well established that the WTA will exceed or equal the WTA (Hanneman, etc.)

KHZ suggests that expands this to recognize a hierarchy of legal and associated economic rights. Since KHZ is based on rights, it relies on the law to determine standing in important cases and on prudential considerations. Some rights are so important to society at large that they are inalienable.   One can not, for example, legally sell oneself into slavery. For purposes of economic valuation these sorts of rights may be regarded as

trumps, as infinitely valuable, except in the case in which the right itself is the subject of consideration.   Other rights or goods are alienable, are recognized through ownership and are to be valued by the WTA.   Other goods or rights are to be acquired and are to be valued at the WTP. Some goods are illegal and no value should be assigned to them unless the issue is itself the desirability of the law assigning illegality. Similarly in some cases values can not be determined or, in cases of compensation, compensation might not be possible. On this basis I suggest the following:

Rules for Standing

1. in the absence of legal requirements all goods and individuals have standing.

2. the law determines ownership generally and for purposes of economic analysis.

3. where the law denies legal title, the person illegally possessing the good has no legal standing. (the goods have no value in the hands of the thief).

4. if however, the value of the law that determines standing is being considered, then all affected have economic standing

5. prudential and practical considerations may deny standing in economic analysis as well as in the law

6. thus if the value of goods can not be appropriately measured, this value will have no economic standing. By reasonably measured I do not mean "measured" but measured sufficiently for the decision purposes for which the value is being used.

7. if a valuation will not change the outcome of a decision it is practical to ignore it.

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[3] In seems obvious that to require economists to include the costs of persuasion in their

This essay considers the KHZ approach with respect to the following three questions:

1. How are moral and abstract sentiments to be treated?

2. Can harm arise when it is unknown

3. How are benefits and costs to be counted when rights are unclear?

The consideration of these questions in light of KHZ form the basis of this article.

4.0 How Should Moral Sentiments Be Valued?

The short answer is as any other sentiments. Moral sentiments are those that concern the positive welfare of others. I call such sentiments the "regard for others" (Zerbe 2001).[4] In economic analysis, uninformed by law, in principle no distinction is made among types of sentiments. Moral and immoral sentiments are equally regarded. The values of atrium are one with the pleasures in pulling wings from flies. Abstract and concrete sentiments both count. Sentimental values and market values are on a par. In deciding whether or not particular sentiments should be included, the analyst relies not on her own moral sentiments but on the guidelines provided by society

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pronouncements of what is efficient would be stupefying at best.

[4] I argue that regard for others should count as well as any sentiments in economic valuation. An objection might be raised that in general third parties do not have legal standing to bring suits on behalf of others. This appears rather to arise rather from the courts' desire to avoid interfering with the other branches. Third party complaints tend to be more of the "generalized grievance" sort and may very well involve "ideological grievances." (Examples are many, see Sierra Club v. Morton 405 U. S. 727 (1972), Lujan v. Defenders of Wildlife, 504 U. S. 555 (1992). That said, the Supreme Court has allowed third party standing in limited situations, such as in the First Amendment area (these are called "overbreadth" attacks, meaning that one clearly subject to a law and who personally has no First Amendment rights to avoid enforcement is allowed to attack the law on its face because of potential unconstitutional application to a third party). The rationale is that the Court wishes to avoid the "chilling" effect of unconstitutional laws on First Amendment rights. Consequently, it is clear that third party suits are not unconstitutional as a violation of Article III since someone has an actual case or controversy.

through the law (Zerbe, 2001, 1998). That is KHZ makes moral distinction but does so only on the basis of what is socially sanctioned through the law.

Beyond issues of legality, the distinction among individuals and among sentiments that needs to be drawn both in law and in economics is between values that are reasonably measurable and those that are not. We make this distinction often in both legal and economic analysis. Consider the value of property which the government proposes to take. The value of the property to the owner is taken to be its market value both in law and in economics. (Posner 1986) . In principle, however, the correct economic measure ,as with any loss, is the owner's WTA. As a practical matter this will be difficult to determine and in many cases will be at or close to market value. To offer WTA measures will encourage holdup and unverifiable assertions of value. Thus, the panel of experts[5] (Arrow et al, 1992, p. 4601-4614) suggests that the "willingness to pay format should be used instead of the compensation required because the former is the conservative choice."(p. 4608), and this is the rule that is followed in practice. It is arguably true that the WTP measure should be used as a matter of practicality, not because it is the conservative choice but because measurement problems are liable to be more severe for the WTA.

Prudential Limitations

The law explicitly denies standing on the basis of prudential limitations and economic analysis must do the same as a matter of practice. Although the particular details of the law of standing can be arcane and complex, I suggest that these prudential rules can be understood as arising in instances where measurement of injury or of value is too difficult or speculative, or

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[5] See also Arrow 1996.

where there is a strong likelihood that such measurement will be insufficient to prevail.

4.1 Sentiments About Compensation

No criticism of the KH criteria is more widespread than the one that the KH criteria neglects distributional effects. In the modern era, the views of the former Solicitor General of the United States, Charles Fried (1978, p. 93f) are representative. He sees the economic analysis of rights as using a concept of efficiency that is removed from distributional questions. He holds that economic analysis does not consider whether the distribution is fair or just. He then concludes from this that the fact that a given outcome is efficient does not give it "any privileged claim to our approbation" (1978, p. 94). The view that efficiency is unconcerned with distributional issues, or with fairness, (e.g. Posner 1981). is widespread in both law and economics; however, such a view is not based on logic

4.2 Is Efficiency Equitable?

The basic problem, as Hammond (1985, p. 427) notes, is the difficulty of determining "what constitutes a good distribution of income." But KHZ has an answer to that problem. A good distribution of income is that distribution which people are willing to purchase, in benefit-cost terms. It is true that the KH and KHZ criteria is applied as if every dollar is weighted the same (in utility terms) regardless of who receives it, *by the person who receives it.* Yet the KH criteria implicitly, and the KHZ criteria explicitly, do not require that each dollar received by one person *be weighted the same by other people*. The KHZ criteria require that the valuations *others* place on a change in income for others be included, since the distribution is itself one

of the goods being valued. Under KHZ, income distribution is to be considered as just another good.[6]

4.3 The Municipal Incinerator

Here, I am concerned with the compensation effects of particular projects. For example, consider a benefit-cost analysis of the efficient location of a municipal incinerator. The decision to locate the incinerator in the poorest neighborhood on the grounds of economic efficiency will typically raise in issues of environmental justice. It may then be said that KH leads to an unjust result.   A typical simplified analysis may look as follows.

Table 1. A Standard Benefit Cost Analysis

	LOCATION A (poorer neighborhood)
Cost Of Land	$500,000
Present Value Of Operating Costs	$100,000
Costs Of Incinerator	$1,000,000
Costs from Environmental Damage	$200,000
Benefits (Savings From Not Using Other More Expensive Locations)	$2,000000

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[6] In speaking of income distribution, I speak in three senses. First, there is the matter of the general distribution of income, in which the identity of the people does not matter. Second, there is income distribution in which the characteristics (aside from income) of the people matter (non-characteristic autonomy). Third, there is specific compensation, in which the names or identities of individuals matter (no autonomy). For an expanded discussion of how these can be treated see Zerbe 2001.

Total Benefits	$2,000,000
Total Costs	$1,800,000
Benefits - Costs	**$200,000**

But this result typically arises because the analysis has not taken into account the sentiments of those who care about the equity effects but are not otherwise involved. That is no standing is give to the regard for others. We might give standing to these sentiments of justice in the table below by considering the moral objection that others have to the imposition of costs onto the poor. This is shown in Table 2.

Table 2: Benefits and Costs When Moral Sentiments are Taken Into Account

	Traditional Analysis	KHZ analysis
	LOCATION A (without compensation)(poorer neighborhood)	Location A -with compensation
Cost Of Land	$500,000	$500,000
Present Value Of Operating Costs	$100,000	$100,000
Costs Of Incinerator	$1,000,000	$1,000,000
Environmental Damage	$200,000	$200,000
Benefits (Savings From Not Using Other More Expensive Locations)	$2,000000	$2,000000
WTP for Compensation	? no standing	X standing

Total Benefits	$2,000,000	$2,000,000+X
Total Costs	$1,800,000	$1,800,000
Benefits - Costs	**$200,000**	**$200,000+X**

The project with compensation will be superior as long as the transactions costs of carrying out compensation are less than the value of the redistribution to others. This is shown in Table 2. As long as long as others (those not compensated) care sufficiently about the compensation, as long that is as they care sufficiently about environmental justice, then the project with compensation is superior. Since these sentiments about equity are part of KHZ, they should in principle be taken into account. I call such sentiments "the regard for others" (Zerbe, 2001a). Hence under KHZ a project to locate the incinerator in a poor neighborhood without compensation of those residents who will suffer is different from the same physical project when the residents are to be compensated. That is, under KHZ but not under KH, a project that involves compensation can be a different project from one that does not. [7]

4.4 Standing and The Discount Rate Problem

Prominent among the criticisms of KH are those that point to its failure to put a value on compensation or on the income distribution (e.g. Fried, 1978),[8] and the practice of discounting the values of future generations. In benefit-cost analysis, future benefits and costs are discounted

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[7] Elsewhere (Zerbe, 1998) I have shown that moral sentiments concerning the justice of who pays will also affect the economic analysis of a project's viability.

[8] For example, Fried, 1978, a prominent attorney and former Solicitor General of the United States, dismisses KH entirely as a result of its failure to include income distribution effects.

using an interest rate referred to by economists as the discount rate. A widespread criticism of the use of the discount rate and of benefit-cost analysis is that the use of a discount rate is unethical because it discounts the benefits to be gained and the costs to be borne by future generations (e.g., Parfit 1992, 1994; Schultze et al 1981). It is said that the utility of future generations should count equally with the utility of the present generation (Schultze et al. 1981; Pearce 1989). For example, Parfit (1992, p. 86) argues that "the moral importance of future events does not decline at n % per year. . . . ." This sort of criticism has been noted with favor by economists (e. g. Schultze et al 1981; Pearce et al 1989), lawyers (Plater et al. 1998, pp. 107-109), and philosophers (Parfit 1992, 1994). Similarly Brown (1991)notes that ". . .discounting imperils the future by undervaluing it.".[9]

Consider the following example of the sort of problem with which these critics are concerned:

A nuclear project is being considered that produces benefits of about $65 billion at a cost of about $30 billion but, in addition, produces a toxic time-bomb that will cause enormous environmental costs sometime in the far future.[10] (I remove questions of uncertainty from this example). Suppose that current waste-disposal technology will contain this waste for 500 years after which it escapes its sarcophagus but will remain toxic for 10,000 years.. The estimated cost of the future environmental damage in constant, year 2000 dollars will be

[9] Shrader-Frechette has argued that both the decision and the process by which it is made require informed consent. This is not possible when decisions affect future generations. See Ahearne (2000)

[10] Cases in which this sort of issue has risen include *Baltimore Gas & Electric v. Natural Resources Defense Council, Inc.* 462 U.S. 87, 1983, and *Pacific Gas and Electric Co et*

about $16 trillion, about the size of the current U. S. GDP. The
present value of these damages discounted at a 3 % real social rate of
time preference (SRTP), assuming the waste escapes at the first
opportunity 500 years from now, is about $12 million, not
insignificant, but far far less than the damage that will occur in 500
years and far too small to affect the results of the benefit-cost analysis.
Discounting these damages then results in the project going forward.
The benefits are said to exceed the cost by almost $35 billion.

It is said that this siting would be unfair to future generations and on this
basis it is argued that the use of discount rates is immoral.

A commonly proposed solution to the problem of unethical harm to
future generations is to use low, or even negative, discount rates (e.g.,
Schulze et al. 1981) or not to use discount rates at all (Parfit 1994). This sort
of argument is, I believe, a moral plea about what our sentiments should be
towards future generations, but not an effective statement about what or
whether discount rates should be used. The proposed solution of using no or
low discount rates is *ad hoc* and, if generally applied, will lead to other
ethical problems – for example, the adoption of projects that give less
benefit to both present and future generations.

To arrive at a correct approach, consider why some find the result in
the nuclear plant example unacceptable. This argument for unacceptability is
not based on the preferences of future generations, which we cannot know
exactly, but on our own preferences, based on our empathy with future
generations. The moral sentiments of future generations have not been

al. v. State Energy Resources Conservation and Development Commission et al. 461
U.S. 190, 1991.

given standing. Rather the argument is to be based on the moral sentiments of current persons.

Under the suggested rule we can give standing to the moral sentiments about future generations as long as these can be reasonably measured.. This allows a solution to the ethical dilemma of the discount rate problem that acknowledges ethical concerns as ethical concerns, and seek an ethical solution, while acknowledging the values that commend use of a discount rate. To not use the discount rate is simply to ignore a fact arising from the productive aspect of Nature. To use a discount rate that is below the rate at which people will trade off present for future consumption, i.e., a rate of time preference, will lead to economic inefficiency by justifying investment with insufficient returns. To use a rate that is too low attempts to cope with inequity by adjusting prices. The result is that an inequity appears to be an inefficiency.

The critic of the use of the discount rate have failed to give standing to their own sentiments or to those that hold similar values. The current generation will have a WTP or a WTA to prevent this unfair result. The missing moral values incorporated in the regard for others can be expressed in terms of the willingness to accept (or pay) and are, therefore, a required part of a KHZ analysis if these sentiments are reasonably measurable..

The economic efficiency of the project will then depend on the sentiments of the present generation. For example, the present generation may feel that future generations should be free of problems caused by the current generation. Evidence from Kunreuther and Easterling (1992, p. 255) and from Svenson and Karlsson (1989) suggests that, at least as regards nuclear waste disposal, individuals tend to place a high weight on future consequences. On the other hand, the present generations may find that

compensation for the environmental harm is unwarranted, given a likelihood that future generations will be richer than the present, or for other reasons.

The KH value of the project is $34.988 billion whether or not future generations are compensated.[11] KHZ departs from KH in this respect in that it requires us to consider two projects, one in which future generations are compensated and one in which they are not. KHZ requires that we consider whether or not the current generation cares about compensation and harm to future generations.

The value to be attached to the current generation's consideration of harm to future generations will depend first on whether the present generation cares about future generations and second on whether or not the provision of compensation is a gain to the current generation, in which case the WTP is to be used, or whether the failure to provide compensation is regarded by the current generation as a loss, in which case the WTA, which could be infinite, should be used.[12]

Table 3 shows the KHZ solution to the discount rate problem. Where the current generation cares about compensation, the relevant choice set includes a project, A, with compensation and one, project B, without compensation. For project B there will be a WTP (or WTA) associated with loss to the current generation from providing no compensation. This figure is the X of Table 1 and it is entered as a loss.[13] Where people care nothing about providing compensation, the same two projects now labeled C and D should be considered. In this case it is unclear if harm to future generations

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[11] For a discussion of the practicality of compensation see Lind (1999)

[12] This issue lies outside this paper, but see Zerbe (1998).

[13] The X might be determined by a contingent valuation survey.

should be counted at all--this is the issue of economic and legal standing to have one's values counted and is not discussed further here.[14]

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[14] But see Whittington and Macrae (1986).

Table 3: The Discount Rate Problem Resolved

	When People Care About Harming Future Generations		When People Don't Care About Harming Future Generations	
	A	B	C	D
	The Project **With** Compensation (billions)	The Project **Without** Compensation (billions)	The Project **With** Compensation (billions)	The Project **Without** Compensation (billions)
Present Value of Benefits	$65	$65	$65	$65
Present Value of Costs	-$30	-$30	-$30	-$30
Present Value of Harm to Future Generations	-$0	-$0.012	-$0	-$0.012 (standing) $0.00 (no standing)
Present Value of Compensation for Future Generations	-$0.012	-$0	-$0.012	-$0
Present Value of Ethical Harm to Present Generation	0	-X	0	0
Net Present Value (billions)	**$34.988**	**<$34.988**	**$34.988**	**≥$34.988**

Project A will be superior to B as long as people care about the future

generation. Where people do not care, Project D will be equal or superior to

C depending on whether the harm to future generations is counted.[15] That is, when the current generation cares about the harmful effect of the project on future generations, the project without any compensation is never superior. When the current generation cares nothing about future generations then the project without compensation is never inferior and could be superior. The moral issue is not the discount rate or the use of benefit cost analysis, but what people care about. Ethical concerns are better incorporated directly. This keeps the accounting clear.

Note that we are not required to determine the magnitude of the WTP of the current generation to compensate future generations. We are instead only required to determine that there exists some WTP for it. For if there is some WTP then the project with compensation is superior to the one without harm. Thus, we are justified in extending standing to the moral sentiments of the current generation about the future generations.

When Compensation is Not Possible

In the nuclear time bomb example, compensation may not be possible because the size of the future injury may not be knowable and because, even if it is knowable, there may be no mechanism that would reasonably insure the accumulation of funds to provide compensation so far into the future. In general there are three reasons compensation may not be possible: (1) the amount of compensation can not be reasonably determined (2) the injury is not and (3) there is not method to provide compensation even if the amount is known.

Nevertheless even when compensation is not possible, it is generally possible, at least in principle, to determine the WTP or WTA of "others"

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[15] It would be superior as long as future individuals have no standing. See Whittington

who have moral sentiments about the project. Thus in the case of the nuclear time bomb where compensation is not possible, we might have the following sort of analysis:

Table 3: Benefit-Cost Analysis When Compensation is Not Possible

Present Value of Ordinary Benefits	$65
Present Value of Ordinary Costs	-$30
Present Value of Harm to Future Generations	unknown
WTP of Current Generation to Avoid Potential Harm to the Future	-$20
NPV	**+15**

When data are presented as in Table 3, they force the public process to consider more clearly the actual issues and effects, the standing of future generations as well as the moral sentiments of the current generation. This sort of presentation requires that we ask whether it is likely that harm to future generations will exceed $15 billion.

In Table 3, the use of the WTP assumes that the avoidance of harm to future generation would be a gain to the present one of $20 billion. This assumes that those member of the current generation whose moral sentiments are affected have no right to stop the project. If the current generation has a right to prevent such harm, then such harm being allowed would be a loss to the current generation and its correct measure would be the WTA.

and Macrae (1986).

In cases involving moral sentiments, and frequently with environmental goods generally, the divergence between the WTA and WTP will usually be large.

5.0 Can Harm Occur When it is Unknown?

The question of standing is extremely important for those who claim non-use values for environmental goods. There are two major types of non-use value: the value placed on the very existence of a good (existence value) or the value placed on being able to passing the good on to others (bequest value). Two issues are relevant here. The use of existence values at all and their use to represent values for people who are unaware of the particular issue. The argument for use of existence values, following the rule suggested here will depend on whether or not they are capable of being reasonably measured. If the answer is yes, then the rule suggested here is that they should be included. I avoid this complex issue and address the second one of unknown harm.

It is probably true that non-use values mainly represents the value one places on the existence of the good for others to use, whether they are future or existing users.[16] Both court decisions and economic analyses have been inconsistent about who has standing with respect to non-use value. In the case of the Nestucca oil spill, the populations of Washington and British Columbia were used for estimating damages, while in the case of the Exxon Valdez spill, the population of the entire United States was held to be the potentially affected population (Dunford, et al. 1996). In a more recent case, *Montrose Chemical Corp. v. Superior Court*, the Trustees defined the

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[16] In this regard, it represents a type of altruism that is similar to the value one may give to distributional effects discussed earlier.

potentially affected population as the English-speaking households in California (Dunford, Johnson, Sandefur, and West, 1996).

The potential dam removal on the Elwha River on Washington's Olympic peninsula illustrates the importance of this issue.[17] Without including existence values, the costs of removing the dams on the Elwha exceed the benefits. When existence value for the general population is used, whether or not it is added to the other benefits, benefits far out weight costs. Nevertheless, a study showed that the majority of the population (71%), had never heard of the possibility of dam removal anywhere in the United States to improve fish habitat, and that (86%) had never heard of the possibility of dam removal specifically on the Elwha, and one might conjecture thata similar large percentage probably had never even heard of the Elwha at all (Loomis 1995). The contingent value survey nevertheless found that the best estimate of the WTP value of removing dams on the Elwha for the U.S. population outside of Washington State was about $6.3 billion per year, for 10 years (Loomis 1995). Most of this value is non-use value.

However it is argued that "(N)on-use values reflect the utility that people obtain from natural resources based solely on the knowledge that they have about the services of those resources..." (Dunford, et al. 1996). Dunford et. al (1996) argue that without specific knowledge of the injury or of the potential gain, there can be no loss. In this regard, use values and non-use values are thought to be fundamentally different. The reasoning is this: for a use good, one may miss an opportunity for what would have been available in the future, even though, if the opportunity is not there, one may never be aware that it was an opportunity missed. This cannot be true for a

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[17] See generally Elwha River Restoration (1995).

non-use good, because value arises solely from knowledge and not from use. Without knowledge of the good, the good has no value. Contingent valuation surveys, by their very nature, inform a sample of people about a possible event or decision which (having learned about it) they may then value. But, the reasoning continues, it is a mistake then to use their informed value to represent the value of those who are ignorant.

This is an argument to deny standing for non-use values to those who have no knowledge of the good. This argument is however insufficient as it ignores a counter argument based on the recognition of various levels of knowledge. First, individuals who lack knowledge now may gain it in the future and suffer a loss (or gain foregone) if they learn about some piece of environmental destruction or a gain if they learn about its preservation. So the lack of knowledge argument is insufficient for ignoring existence value completely for those without knowledge. Second individuals derive value from wealth even without knowledge of its specific components. People who care about salmon runs and free-flowing rivers care about environmental wealth. They care about the Elwha River as belonging to a class of goods that constitute this wealth. Those who put a non-use value on species preservation may not know about a particular species, but may be reasonably said to care about it as part of a genus or class they do care about. Even if people never hear about the Elwha, they have a sense of their environmental wealth, and have knowledge of what has happened to salmon runs and free-flowing rivers.

Consider the analogy of a rich man who owns many businesses that are run by others. We would say that he suffers a loss when one of his businesses suffers as a result of a poor decision, even if he never knows of the loss or of that decision, and even if he does not spend most of his wealth.

He knows the magnitude of his wealth, even if he does not know each project that adds to or subtracts from it. He knows about changes in his wealth. As a result of a decision he knows nothing about, he suffers a psychological loss associated with the decline in wealth. So, also, does one who regards the environmental wealth of the nation as partly her own suffer a psychological loss from the deterioration of this wealth, even when she has no knowledge of the particular event that decreases it.

The benefit cost analyst would say that insofar as a particular loss leads to a loss of environmental wealth, and insofar as environmental wealth is valued, there is a psychological, and therefore an economic, loss. The analyst would point out that non-users who do not know about the particular loss at the time of the contingent valuation survey may know about it later, and suffer a loss in environmental wealth that is linked directly to it. The loss to non-users from destruction of particular environmental amenities is real and important. The implication is that what non-use users value is not the specific environmental good, but the benefits for others that flow from this class of good.

No agreement has been reached in either law or economics on this sort of matter. Recently there was completed a benefit cost study by the Army Corp of Engineers of dam removal on the lower Snake River in response to an Endangered Species Act requirement. Sen. Gorton of Washington blocked the implementation of the contingent valuation survey study that had been designed by Colorado State University professor John Loomis. It appears that standing will only be determined by the march of time and events.

6.0 Valuation When Rights are Uncertain or Do Not Exist

6.1. Uncertain Rights

In the examples of the Snake River dams and the Elwha dams the rights of non-users to have their existence value counted for the free flowing river is unclear. In most cases of interest there is uncertainty about rights of which standing may be a part. In most cases rights and/or standing are unclear. (For purposes of this discussion, I assume for now that legal and psychological ownership correspond.) Legal uncertainty has led some to reject KH in particular circumstances (Posner, 1985) and others (Baker 1980)[18] to reject it more generally, and yet others (Hovemkamp, 1991) to suggest modifications. Such modifications or rejections are not warranted. Consider a simple approach.

Suppose that both parties A and B have a sense of psychological ownership with respect to some property. This sense of ownership may be less than 100 percent. One may be uncertain about one's moral or legal claim. There may be uncertainty about ones right to standing.

A way to approach this is to recognize that ownership, both psychological and legal may be partial or incomplete. As a formal matter we can then attach a partial ownership to the WTA measure for losses and attach a WTP measure to the extent the good is not psychologically owned.

Let Pa and Pb represent the subjective sense of psychological ownership by A and B, respectively. Economic analysis suggests that the

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[18] Elsewhere (Zerbe 2001a) I treat Baker's objection. This objection applies to the common situation in which a right is in dispute and the parties together have more than 100% sense of ownership, as when each believes with 60% probability, that she owns it. Baker notes that in this case, no potential compensation test is possible as the believed value of ownership is less that the property value. I show that the relevant

entitlement should go to the party to whom it is worth the most, which is correctly determined by considering both the WTP and WTA. The gains to A and B are measured by the WTP, and their losses are measured by the WTA (but it should be understood that the regard for others offers a definitive sentiment, (a WTAc) in favor of recognizing the legal owner). Ignoring the regard for others, the right should go to A when the following condition is satisfied:

$$\text{WTPa} (1-\text{Pa}) - \text{WTAb} (\text{Pb}) > \text{WTPb} (1-\text{Pb}) - \text{WTAa} (\text{Pa}) \qquad (1)$$

where Pa and Pb represent the subjective probability of ownership by A and by B. The gain to A is A's WTP, weighted by the extent to which A does not have psychological ownership. Similarly for B. The loss to B is B's WTA, weighted by the extent to which she does have psychological ownership. The right goes to A when the gain to A from having the right is greater than the loss to B from being deprived of his expected right.

Equation (1) can be expressed as

$$\text{WTPa} + \text{Pa}(\text{WTAa} - \text{WTPa}) > \text{WTPb} + \text{Pb}(\text{WTAb} - \text{WTPb}) \qquad (2).$$

This is an interesting result, because it says that the *divergence* between the WTA and WTP is relevant to the decision concerning whom should receive the entitlement. Consider a contest between two parties over an entitlement, in which the first is willing to pay more than the second, but the second is willing to fight to the death for it. Equation 2 suggests that, without huge differences in WTP between parties, the one who is willing to fight harder should get the right.

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comparison, however, is between different regimes for allocating property and that in this case, the KHZ criteria does satisfy a potential compensation test.

Consider the Headwaters Grove in Northern California, which is the last major privately owned stand of ancient redwoods. For about ten years, the Pacific Lumber Company has been trying to cut the trees, filing logging plans with the California Forestry Board. The value of these trees as timber has been estimated at between $100 and $500 million.[19] The company's efforts have been thwarted by environmental groups.[20] This seems to be an example in which the WTP of the environmental groups is less than the WTA of the timber company, but in which the WTA of the environmental groups is much higher than Pacific Lumber's WTA, so that the divergence between the environmental groups WTA and WTP is also much higher. The probability that the WTA is a better measure of the psychological effect of the loss of the redwoods to environmental groups (and to others) suggests that some recognition of property rights on their behalf is appropriate, and that, as shown by their ability to delay the cutting of this timber, the courts have recognized this.

In Cornwall, England near the village of Magwan, there is at this writing a dispute between Mr. Jed Trewin and Sir Ferers Vyvyan over use of a path across Vyvyan's property.[21] Mr. Trewin believes that public use has established a right of public use. Sir Ferers believes that no such right exists as he has always closed the path for six months each year. Suppose that each believes with 100 percent probability that he has the right—to use the path in Mr. Trewin's case, and to close it in Sir Ferers's case. In this situation, the KH criteria suggest that the right should be allocated solely on the basis of the WTA.

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[19] *N. Y. Times*, Sunday, April, 21 (1996).
[20] *N. Y. Times*, Sunday, April, 21 (1996).
[21] New York Times International, Wednesday, October, 22, 1997, at A4.

Suppose that no such right of public right of way existed. Then Mr. Trewin would have no expectation that he had a right, and thus the KHZ criteria would compare the WTP of Mr. Trewin with the WTA of Sir Ferers. Clearly, the understanding of the law and custom itself will determine in many cases the sense of ownership.

If both parties possess full psychological ownership, then efficiency requires that the right go to A only if:

$$WTAa > WTAb \qquad (3),$$

and otherwise goes to B. This says that now the WTA is the relevant measure, the one case in which Hovenkamp's (1991)incorrect general assertion is correct.

If neither party possess psychological or legal ownership, then the right should go to A when:

$$WTPa > WTPb \qquad (4).$$

That is, the right should be auctioned.

When ownership is clear, as when say A owns the right, equation 3 reduces to:

$$WTAa > WTPb. \qquad (5).$$

This is just the usual condition that says that the right or good remains with A unless B buys it from her.

I have assumed to that psychological and legal ownership correspond so that to determine psychological ownership one need simply to determine legal ownership. Of course legal ownership may be unclear so that it is necessary to estimate the extent of legal and hence psychological ownership.

But psychological ownership may not correspond. One may believe they have a right which they do not have or have a right of which they are unaware.

Where the psychological reference point is widespread persistent longstanding and different from the law, then there will be an economic efficiency presumption that the law itself should be reexamined.

This follows from my assumption that on average losses are more heavily weighted than gains. Suppose for example that both Ronald and Richard believe that a piece of property belongs to Richard. They discover, however, that Ronald has legal ownership while Richard has none. Ronald experiences a gain and Richard a loss. On the average then this transfer is likely to be inefficient, ignoring all third party effects.

Just as equation (4) shows that the right should go to A as long as

$$WTPa > WTPb \hspace{4cm} (4)',$$

so should the law the assign the right to A when A is the psychological owner and B is not, again third party effects aside. For example Ellickson (1991) studied a change in the law in Shasta County, California. In one half of the county, ranchers were liable for straying cattle; in the other half, farmers bore any damage under the law. In fact, however, this change did not alter the time-honored custom enforced by social norms, by which ranchers were liable for damage caused by their cattle. The psychological reference point was one of liability by ranchers for their straying cattle. Thus, in Shasta County, efficiency would suggest a change in the law, to place liability on the owners of straying cattle. In a sense, this has long been recognized. This does not necessarily mean that the law should be changed so that ranchers are liable, though it suggests it; liability rules are not ownership rules. It is possible that the efficient rule is for the farmer to bear the costs of the damage from straying cattle, but the psychological reference point of rancher liability makes this conclusion unlikely, since a change imposes a loss properly measured by the WTA on farmers. In considering

whether or not to change the liability rule, the calculation of gains and losses of the change should reflect the psychological reference point.

The law attempts to conform to – or to recognize – the discrepancy between measures of value for benefits and costs.[22] In this respect, the law is correct in recognizing the primacy of the psychological basis for valuation. Cohen and Knetsch (1992) point to six classes of legal rules that are consistent with recognizing the valuation disparity between gains and losses.[23] Evidence suggests that restoration of environmental health following an environmental injury is viewed at times as the restoration of a loss, whereas monetary compensation for the same injury is viewed as a gain. Under the common-law measure of natural resource damage, as well as some new environmental statutes, there is implicit recognition of the asymmetry between gains and losses, in the sense that restoration of environmental health following an environmental harm is given a different status from market measures of damages. The generally accepted common law measure of damages is the lesser of either the cost of restoration of the natural resource or the diminution in market value attributable to the injury to the resource. This is not an *absolute* rule, however. The law in some cases recognizes restoration as an appropriate measure of damage if the cost of restoration is reasonable in comparison to the diminution in the value of the land.[24] Since restoration costs may be recognized as reasonable that are greater by 50 percent or more than the diminution in market value,

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[22] See Levy and Friedman (1994) for a discussion of the concept of ownership in federal environmental law.

[23] *Id.* These are the rules of adverse possession, limitations on recovery of lost profits, contract modifications, gratuitous promises, opportunistic behavior, and repossession. To these I would add limitations on recovery of property from theft.

[24] *See Heninger v. Dunn*, 101 Cal. App. 3d 858, 162 Cal. Rptr. 104, 106-07 [1980]; *Newsome v. Billips*, 671 S.W.2d 252, 255 [Ky. App., 1984]; *Trinity Church v. John Hancock Mutual Life*

restoration clearly may be afforded special status. Recently a number of environmental statutes have been interpreted by the courts or by regulatory agencies to state a preference for restoration costs—including variation of replacement, rehabilitation, and the acquisition of equivalent resources— over diminution of economic value.[25] Regulations first adopted by the U.S. Department of the Interior (DOI), in response to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), held that the public trustee was required to select the lesser of either restoration costs or diminution of value of the resources at issue. New parallel regulations giving greater weight to restoration were, however, adopted by both the DOI and the National Oceanographic and Atmospheric Administration (NOAA) in response to *State of Ohio.*

There are also a number of areas in which some sorts of public rights to ownership are recognized in the law. For example, the concept of public rights in federal land remains basic common law today in non-environmental cases and is not irrelevant in environmental law.[26]

In some cases psychological ownership may involve an idiosyncratic belief. I may believe that I own the Brooklyn bridge having paid Dancing Dan for it. One may believe they one is exempt from income taxes because one disagrees with government policy, and so forth. The courts do not, and economists should not, give standing to such beliefs. The reason is found in third party effects. An assertion of ownership where not generally nor legally recognized would cause losses to the legal owners who we may

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Ins., 502 N.E.2d 532 [1987].

[25] *State of Ohio v. U.S. Department of The Interior*, 880 F.2nd 432 (D.C. Cir. 1989).

[26] Levy and Friedman (1994, pp. 517-519).

generally suppose are also psychologic owners and losses to all of those with a stake in the legal system.CASE HERE

These results illuminate a number of longstanding problems. Consider one.

6.2 No Ownership

KHZ provides a straightforward solution to the case of no ownership: auction the right.[27] Yet the case of no ownership, where the WTA of each party exceeds the WTP of the other party, is widely seen as rendering the KH criteria indeterminate in some circumstances.[28] For example, Posner (1985, p. 92) says in the case of no ownership, in which the initial allocation determines the outcome, "I don't know how to solve this particular problem." He (1985, p. 92) goes on to say that "cases of this kind—where wealth maximization provides no guidance to the initial assignment of property rights . . . —are rare; they reveal a limitation to an ethics of wealth maximization." Posner (1985, p. 94) suggests also that such cases "are rare," and that "with natural resources, the initial assignment of property rights is not critical, because, presumably, whoever gets the rights will sell or rent them to those who can get the most value out of them."[29] It is for just such important goods, however, with poor substitutes and with a sense of public ownership, that the divergences between the WTA and WTP are largest, and

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[27] The approach of KHZ shows that both the efficiency and invariance claims of the Coase Theorem are incorrect for reasons that have nothing to do with transactions costs. See Zerbe 2001b.

[28] For example, see Kennedy (1981) and Coleman (1980, p. 509). However, Heyne (1988, p. 53) furnishes a sufficient counter argument.

[29] This is only true for those natural resources whose value lies purely in their commercial exploitation and is profoundly untrue for others, such as the Grand Canyon and Glacier National Park. If the owner of a natural resource values it purely for commercial exploitation, it would be a commercial good, and the owner's WTA and WTP would not differ.

for which, contrary to Posner, the initial assignment is critical. That such cases are not rare may be seen immediately by considering virtually any important natural resource, such as Glacier National Park, the Grand Canyon, the Elwha River, or the redwoods in the Headwaters Grove. For those who care about the environment, the divergence between the WTP and WTA for these sorts of goods is very large.

The results here are also at variance with those of Hovenkamp (1991, pp. 225, 229-234), who suggests that whether or not an entitlement is currently owned, wealth is maximized when the entitlement goes to the person who has the highest WTA. He (1991, p. 229) asserts, for example, that "if for any given entitlement, WA* is significantly greater than WP*, then wealth is maximized only when the entitlement is held by the person who has WA*" (By WA* and WP*, Hovenkamp means what we have called WTA and WTP). This cannot be correct, however, if we assume with Posner (1985, pp. 88-89, 1986, pp. 12-13, 1987, p. 16, 1992) that by wealth maximization we mean application of the KH criteria. The reason is that a rule based on the WTA does not meet KHZ or KH efficiency. In KH terms such a rule may not insure that a potential compensation test is passed. For example, if an entitlement to a piece of land is taken from Ronald and given to Richard, on the grounds that Richard has the higher WTA, no compensation test is passed, since the value of the gain to Richard must be measured by his WTP, which may be lower than Ronald's WTA. In KHZ terms, the use of the WTA alone can not be justified on the grounds that the

gains to each person will be the greatest as the rule does not recognize the fact rooted in human psychology that gains and loss are different.[30]

7.0 Conclusion

This paper combineseconomics reasoning with institutional considerations. To do this I suggest a modification of KH efficiency. I define an action or decision as efficient if (1) there is a positive sum for the willingness to pay (WTP) for gains and the willingness to accept payment (WTA) for losses, (2) gains and losses are measured from psychological reference points (Kahneman and Tversky, 1979), which will mean that they are in the main to be measured from legally established rights, (3) all goods for which there is a WTP are economic goods, (4) the transactions costs of operating in states of the world are included in costs for purposes of determining efficiency, but the transactions costs of changing to a new state of the world are not included. I call an approach based on these axioms KHZ. This approach resolves a number of issues and answers a number of criticisms that have been made of the definition of economic efficiency.

This approach lends itself to the introduction of the concept of economic standing which combines valuation with a specification of legal rights. I introduce the following rules of standing:

1. in the absence of legal requirements all goods and individuals have standing.

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[30] Hovenkamp (1991; p. 229), however, essentially defines wealth maximization as the attainment of the higher of WTP or WTA. Since for normal goods the WTA will be higher than the WTP, Hovenkamp's propositions supporting the use of WTA are essentially definitions, not proofs. The criterion of maximizing WTA may or may not be desirable,[30] but maximizing WTA is not what the KH criteria dictate. In addition, no one has yet provided a compelling ethical or economic basis for a pure WTA standard.

2. the law determines ownership generally and this should be ownership generally used in economic analysis

3. where the law denies legal title, the person illegally possessing the good has no legal standing. (the goods have no value in the hands of the thief).

4. if however, the value of the law that determines standing is being considered, then all affected have standing

4. prudential and practical considerations may deny standing in economic analysis as well as in the law

5. thus if the value of goods can not be appropriately measured, this value will have no economic standing. By reasonably measured I do not mean "measured" but measured sufficiently for the decision purposes for which the value is being used.

6. if a valuation will not change the outcome of a decision it is practical to ignore it.

It is suggested that these rules make clearer long standing problems in normative economic analysis including the how equity effects might be treated, the moral problem of using discount rates, the treatment of exisstence values and how allocations are to be made when rights are uncertain

As a practical matter it is not efficient for benefit cost analysis to consider all relevant goods and affected individuals so any analysis will fail to meet the requirements of theoretical perfection whether for KH or KHZ. Yet, it is desirable to have in mind the better theoretical template so that decisions about practice can be well considered and not ad hoc. My purpose has been to contribute to this template.

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