

GK: Good afternoon. On behalf of the Center for Sustainable Systems, the School of Natural Resources and Environment, and the Office of the Vice President for Research, I wish to welcome you to the Second Annual Peter M. Wege Lecture at the University of Michigan. My name is Greg Keolian. I serve as Co-director of the Center for Sustainable Systems. And I'm joined at the podium by Jonathan Bulkley, who also serves as Co-director of the Center. This lecture series focuses on critical issues of sustainability. Dean Rosina Bierbaum of the School of Natural Resources and Environment presented the inaugural address last year.

Today we are fortunate to have Professor Joseph Sax present the second Peter M. Wege Lecture. This lecture is also being held in conjunction with the University of Michigan Great Lakes Symposium. This lecture series honors Peter M. Wege for his many outstanding contributions to the Center for Sustainable Systems and the environmental field. Jonathan Bulkley, the Peter Wege Professor of Sustainable Systems, will now highlight a few of Peter Wege's many achievements.

JB: Well, thank you very much, Greg. And first, let me join together with Greg and welcome each of you to the Second Annual Wege Lecture here at the University. Peter Wege is not able to be with us this afternoon. But I do want to share with you some information on Peter and his life and contributions to environmental and sustainability issues. Peter came to the University as a freshman in 1940 in the School of Architecture. He served as a pilot in the Army Air Corps from 1942 to 1946. He is an environmental leader and innovator in the City of Grand Rapids, the State of Michigan, and is well recognized for his support of key environmental initiatives at the national and international level as well. He authored an environmental history book entitled, *Economicology* in 1998. Peter Wege provided the impetus to initiate the Muskegon River Watershed Partnership that includes faculty and students from key universities, including the University of Michigan, working together to research critical problems in the Muskegon River Watershed. He founded the Economicology Collaborative Conferences that now include fourteen colleges and universities from throughout the country, and the University of Michigan is an active member of this conference. He is Chairman Emeritus of the External Advisory Board of our Center for Sustainable Systems. Among the many honors Peter Wege has received for his leadership in sustaining the environment are the Virginia Bull Founder's Award from the National Wildlife Federation and the Helen and William Milliken Distinguished Service Award from the Michigan Environmental Council. Let me now introduce Ellen Satterlee, the Executive Director of the Wege Foundation. Ellen.

E: Thank you very much. I am here with a few comments from Peter Wege, and he first of all wants to thank everyone and welcome everyone to this lecture series. He first and foremost says that Joseph Sax was one of his early heroes in the Environmental Movement. He wants you all to know that the Wege Foundation is committed to supporting the work at the School of Natural Resources and Environment. We believe in collaboration of the deans in solving common problems, and as a result, students will be motivated in the understanding of the

balance between economics and ecology, and as Peter Wege has coined and calls it, Economicology. Thank you.

JB: Thank you. Now I call upon Dean Rosina Beirbaum to introduce Joseph Sax.
Dean Beirbaum.

RB: Thank you. This is indeed a pleasant task. When I asked Professor Sax how he wanted to be introduced, he said briefly, and only for someone of the stature of Joe Sax really will a brief statement work. Usually you have to heap together a list of achievements to convince the audience this is someone you ought to want to listen to. That's clearly not necessary with this man. In fact, I could simply say, as so many have said to me, "I give you Joe Sax, the father of Environmental Law" and sit down. But I will stay a bit longer (light laughter).

Environmental Law is a discipline that has greatly deepened and broadened over the last 30 years and Joe Sax has been there all the way. He has contributed much to the discussion and the analysis of problems and the evolution of this field as society has recognized problems to the environment and thought about how its treatment should mature.

Joe was born in the Midwest, born in Illinois, received his JD from Chicago. Spent time teaching at Colorado and Berkeley before he ended up here in 1966 at the University of Michigan, and he stayed here 20 years and became the Philip Hart Distinguished University Professor. He then joined the University of Berkeley Law School and is now the Emeritus James H. House and Hiram H. Hurd Professor of Environmental Regulation.

And probably first and foremost, Joseph Sax would want you think of him as a scholar and as a teacher. He has educated and trained many students in Law as well as in Natural Resources, and many of those students now are leaders in very important positions of trust and responsibility, carrying forward his fine tradition. He also though served as an advisor to I think over 19 different environmental public service organizations, including the Environmental Law Institute, the Council of Environmental Quality, the National Academy of Sciences. He's also won a lot of awards, and let me just mention a few: Audebon's Conservationist of the Year Award, the William O. Douglas Legal Achievement Award from the Sierra Club, and from the U.S. Environmental Protection Agency, their Environmental Quality Award.

Joe is also a statesman. He has served as an advisor on environmental policy here in Michigan to both Governor Milliken and Governor Blanchard. For Governor Milliken, Joe drafted the executive order that created the State of Michigan's Environmental Review Board, which function very effectively since its inception until it was terminated by Governor Engler. For Governor Blanchard, Joe drafted the Great Lakes Charter, which as you know is a voluntary agreement among the governors of the eight Great Lakes States and that is in place today. Joe also served in a national capacity. We were privileged to serve together in the previous administration where Joe Sax was Counselor to the Secretary of Interior and also the Deputy Assistant Secretary for Policy from 1994 to 1996.

Joe is also an author of some 130 articles and eight books, beautifully written books, that include *Mountains Without Handrails*, *Defending the Environment*, and *Playing Darts with Rembrandt: Public and Private Rights in Cultural Treasures*. I was reading some of Joe Sax' writings last evening while the election drama played on, and his thoughts gave me great hope. In the particular essay I was reading, he built on the words and ideas of John Muir and Aldo Leopold and Roosevelt and concluded that the challenge for public lands recreation is to provide a provocative and unfamiliar setting where one is made aware of the beat, the geological and biological complexity and the sparseness of life, rather than as a place where one can go from air-conditioned room to roadside scenic overlook to an irrigated golf course, a valley where the sounds of the birds and the water rather than of motors predominate, a place where if dangerous wildlife lives, it is the visitor who must accommodate. - *Mountains without Handrails*.

I give you Joe Sax, teacher, scholar, author, statesman, and the Father of Environmental Law.

[applause]

JS: Thank you very much, Dean Bierbaum. I'm sure all of you share with me a sense of relief that that was the brief version (laughter) and can hardly imagine what the long version would be like. It is a great pleasure for me to be able to deliver the Wege Lecture and to have the opportunity to be back in Ann Arbor which was my home for a long time and is still in my heart my home. Although I've been away now for nearly 20 years, I spent nearly half of my adult life and all of my youth living within the Great Lakes Basin. Nonetheless, it's been some time since I've worked on Great Lakes problems, and for the last 15 years or so, my work has concentrated on the water problems of our most arid region of the country, and in particular the Colorado River Basin in the Southwest part of the country.

While in some respects the settings could hardly be more different, in one case a vast, largely intact fresh water chain of lakes, and in the other an over-appropriated river that commonly trickles into nothingness before reaching its mouth at the Gulf of California, there are also some parallels that may offer useful insights to you who wisely want to think ahead about avoiding the mistakes other regions have made as you plan for the future of the Great Lakes. Like those lakes, the Colorado is both an interstate and an international resource. Each region experiences demand from growing urban centers, each faces the challenge of incorporating modern environmental concerns into an existing pattern of uses and learning to accommodate concerns that were unknown or ignored in an earlier period.

Surely you're prudent in thinking about the Basin and its needs as the primary focus for the uses of the Great Lakes. The acknowledgement of the ecological and social damage wreaked by a century of unconstrained removals of California's waters and those of other places in the West to distant places has demonstrated the wisdom inherent in traditional riparian thinking of the Basin as a single resource and its focus on the watershed of origin. That idea I believe sets an

appropriate baseline for water management. However, as I shall suggest in a few minutes, it can be imprudent to exalt this fundamentally sound principle into an inflexible rule, the not-one-drop school that one sometimes encounters in the water world.

To a distant observer of Great Lakes issues, to someone from California, for example, it appears that the dominant concern of those who live in the Great Lakes States is a demand from outside the region, creating a draft on the Lakes that would be harmful, or at least that would set a precedent that could become harmful if withdrawals from the system grew to substantial levels. Several decades ago, there was concern about tapping Great Lakes water to serve proposed cold slurry pipe lines in the Upper Great Plains. A perennial topic of discussion has been moving water down the Mississippi River to recharge the Ogallala Aquifer in order to serve western irrigated agriculture. And more recently, I've read of proposals, not currently active apparently, to take water and tankers, or perhaps with ships towing giant balloons filled with water, to be shipped to water-short distant regions in Asia or in the Middle East.

It might comfort you to know that you're not alone in having such ideas put before you. Just this year, a man filed an application with California Department of Water Resources to remove 30,000 acre feet of water each year -- that's about ten billion gallons -- from the Albion and Gualala Rivers in northern California, about an hour's drive north of San Francisco, and to pump it into what newspapers call battleship-size plastic bags and to tow it to San Diego. While this baggie project, as I think of it, could be economic, it is very small potatoes compared to Southern California's current shortfall which is about 800,000 acre feet as opposed to the 30,000 acre feet in that proposal. Conversely, the much larger grandiose long-distance plans, like those I mentioned just a moment ago, usually founder on economic feasibility grounds long before they encounter legal or policy reservations. Back in the 1960s, we regularly heard of schemes, such as tapping the Yukon River in Alaska to increase flows into the Colorado Basin, or running water in plastic pipes from the mouth of the Columbia to Southern California. Suggestions are periodically made to tow icebergs from the polar regions down south, and I guess leaving them offshore Los Angeles where local officials would chip off pieces as they needed them. (laughter)

In any event, such schemes have not simply been the dreams of self-appointed visionaries. In 1947, to go back a-ways, a study known as the United Western Investigation was begun by the U.S. Bureau of Reclamation pursuant to a House of Representatives Resolution to examine the prospects for diverting surplus water from other basins, to Southern California in the Colorado River. One suggestion made by the study was to divert from the Columbia River system a minimum of ten million acre feet per year. I want to remind you, those of you who don't think in terms of acre feet, an acre foot of water is 326,000 gallons, so that's a lot of water. A gigantic series of pumps, lifts, canals, tunnels and reservoirs would deliver the water into the Sacramento Valley, the so-called Central Valley. This and similar plans were in those days considered technically feasible and economically justifiable under the then-applicable reclamation principles which had their own economics.

I doubt very much that any such giant-sized engineering schemes are where the action is likely to be today, either for the arid West or for the Great Lakes, within any planning horizon for this or the next several generations -- both because of economic feasibility and because of the environmental compliance hurdles that such projects would have to surmount.

It is true of course that demand in the West is growing and supply is, at least for the present, essentially fixed, and with global warming even shrinking or at least changing in seasonality, which with the limited capacity of reservoirs could be...would be tantamount to a reduced supply. The most arid part of the country is also the fastest growing in terms of population.

The three fastest growing places in America are Nevada, Idaho and Arizona. Western states are growing at nearly double the national average. Colorado, for example, expects 40 percent increase in the next eighteen years, from about four to six million people. California anticipates an additional 15 million people in about the same time span. There are also important unmet demands to restore in-stream flows to serve fish and riparian ecological needs, and some Indian water claims that still need to be honored.

Now where will those new needs, especially the urban and suburban residents, get their water in these arid and semi-arid states? Well, the answer is that almost certainly the great bulk of it will come from agriculture through voluntary transfers. Urban resident can pay more to install efficient irrigation technologies on farms and thereby obtain the saved water. There'll be movement to less water consuming, higher value crops, and there will be fallowing of some agricultural land, some of which needs to be retired simply because it's become non-arable as a result of mineralization caused by decades of irrigated agriculture.

Even though agricultural use of water has been diminishing somewhat in recent decades, it still constitutes more than 80 percent of consumption in the arid states. The Bureau of Reclamation estimates, for example, that about 20 percent of the current agricultural use in the lower Colorado Basin, and that's Arizona, Nevada and California, or about a million acre feet per year will be reallocated in this way through these voluntary transfers. At an average use rate of 175 gallons per person, per day, a million acre feet would serve about five million people, which is the equivalent of nearly six times the projected growth of San Diego over the next two decades. In other words, even in water-stressed southern California, we are finding that water to support urban and industrial demand is available in the market from agricultural sellers at relatively model prices, far before the cost, the current cost of de-salted water or what water transported long distances over newly built facilities would cost.

It is worth keeping in mind that a great deal of water in the arid west is still in economically value forage crops such as alfalfa, Bermuda grass and Sudan grass, as well as cotton. In the imperial irrigation district for example, which is at the very southern end of California, right on the Mexican border, a desert area which gets about three inches of rain a year, and which is probably the largest agricultural water user in the world, using over a trillion gallons a year, of the nearly 500,000 acres in cultivation in the Imperial Valley, about 300,000 are in

these forage crops, not in fruits and vegetables. So there's lots of water that's available to be moved all through the west to meeting growing demand.

Just to give you a casual sense of the economics of western water supply and demand, in the Imperial Valley, farmers pay four cents per thousand gallons for Colorado River water. Urban users in Los Angeles pay a dollar and forty cents per thousand gallons, thirty-five times as much. While de-salting of sea water or brackish ground water, whose full real cost is not easy to determine because published figures rarely include salt disposal or transportation costs, is not likely, desalted water is not likely to be important except as an emergency supply for the foreseeable future. Its price now is at least two times and probably closer to four times the current retail cost, and three to ten times what agricultural water sells for.

There are also other promising sources. There's still considerable opportunities for conservation in urban areas in the west. *California Water Plan*, which is the official publication of the Department of Water Resources, says that reduction in outdoor landscape use, lawn watering and related uses is where the greatest urban conservation savings can come from. And in southern California, that involves a lot of water, though there are no good statistics on exactly how much urban use that is...how much...what a percentage of the urban use that constitutes. Some such uses of course, such as golf course watering and city park irrigation, is already being done with so-called gray water -- non-potable recycled water. Some important additional supplies at reasonable cost will also be achieved through conjunctive use, that is, storing water underground in high flow years to recharge depleted aquifers, and by raising existing dams somewhat to increase their storage capacity, which can also help in adapting to the seasonal flow changes resulting from potential climate change which I mentioned a few minutes ago.

The point of all this is simply to spell out with some detail that western agriculture can't afford Great Lakes water under even the most optimistic cost estimates of shipping it, and urban industrial users west of the hundredth meridian, west of Kansas City, in the arid regions, can find and will continue to find cheaper and less environmentally disruptive sources.

What then are likely to be the most pressing real problems facing Great Lakes decision-makers, insofar as quantity issues are at stake? Now, this is only about water supply, not...not about lake level fluctuations caused by natural variation or shoreline land use management, as important as those issues are. My sense is that the issues that will predominate are localized impacts on in-Basin tributary sources. And what to do about out-of-Basin demands for water by relatively nearby Basin-state communities that are experiencing significant growth? And how to deal with important localized adverse impacts caused by drafts and other water resources, if those demands are prevented from being met by access to the waters of the Great Lakes?

I want particularly to emphasize this second concern. That is, it is important to keep in mind that the Great Lakes are by far the biggest water resource in the region, and that insofar as their waters are ruled out as a source for nearby but out-of-Basin economically realistic demand, *the risk arises of those*

needs being met by smaller and more vulnerable out-of-Basin sources, so that what is designed as a protective scheme ends up being a means of increasing damage to a Basin state's other water resources.

Under the Water Resources Development Act of 1986, as well as the approach taken in several recent out-of-Basin diversions that have been made from the Great Lakes, you have a system that sets up a...sets up quite strong obstacles that must be overcome to allow out-of-Basin uses. That is, the existing system in the U.S. at least is pretty much designed to discourage such uses. I have to say as an outside observer, that this strikes me as very limiting, at least if one gives significant weight to:

- 1) the importance of growing demand in the urban industrial sector; and
- 2) to the fact that for several Basin states the area within the watershed boundary of the Great Lakes is very small; and
- 3) that realist...what the realistic alternatives are to meet that demand.

While the Water Resources Development Act, federal act, wisely embraces both the lakes and their tributaries, as contrasted with the Boundary Waters Treaty, it does not take account of the alternative sources, vulnerable non-tributary waters near but not within the Great Lakes Basin. Apparently, it's not clear whether it covers tributary ground water. If not, the problem I am describing is especially to be attended to.

In short, one must be alert to the fundamental fact that restrictions of one sort always drives demand to the next available unrestricted source. If a nearby, out-of-Basin demand cannot be met from Great...from Great Lakes Basin water, it is likely to be met from a lower visibility, higher impact, non-tributary source. I'd like to underline the...the often ignored fact that problems don't go away simply by making a law about them. If, for example, a growing urban area needs additional water and drafts from the Great Lakes are denied to it, it will search out other sources to meet its needs.

I want to say a word about urban growth in this context. To be sure, denying water as a means of controlling growth is eminently familiar to us in the arid west. But I believe any detached observer would have to conclude that such efforts have almost always failed. Urban growth is a powerful force, and places that are, for whatever reason, experiencing growth, seem to find water one way or another. Interestingly, a new just-issued draft by the California State Water Resources Control Board involving a proposed transfer of agricultural water to San Diego made the following statement, and I'm quoting, "To the extent that historic patterns indicate future trends, reduced water availability is unlikely to affect growth in urban areas. Water is one of many factors that may influence growth in a region but does not by itself cause the growth of a region. Economic, legal and societal factors all play a role in growth and water shortages have rarely done more than slow the progress of adequately financed development proposals."

One excellent example of this point is Clark County, Nevada, where Las Vegas is located and which is a real desert by any definition. Though Nevada has used up its full allotment of Colorado River water which is essentially its only source, that hasn't slowed growth one bit in Clark County. What it did was

generate an aggressive and ultimately successful search for additional water, which Nevada now has. A relevant question, therefore, as to out-of-Basin, Basin-state communities, that is, the riparian states of the Great Lakes and provinces seeking additional water is what alternative is available to drafting on the Great Lakes and what the relative adverse impacts are. It is commonly true, if not universally the case, that the smaller the source, the greater the impact of a draft upon it. Thus, if demand is thrown upon groundwater aquifers, or smaller streams, particularly those sources not tributary to the Great Lakes and not part of the Basin, which are likely to be the path of lesser resistance, the more Great Lakes use is restricted one needs to ask what stresses will be put upon those sources, compared to the stresses that would be put upon the alternative of a draft upon the Great Lake Basin.

Certainly it is an appropriate general approach in the face of any proposed use of water to ask what alternatives are available and whether those alternatives will be less harmful. Or which of those alternatives will be less harmful. It may well be in many situations that removals from one of the Lakes itself is preferable either to an out-of-Basin, in-Basin state diversion from a smaller source, or from an in-Basin tributary, surface or underground. So it's not simply a question of whether a request is from an in-Basin or an out-of-Basin source, or that ought not to be the question, but how much adverse impact filling that need will have on the various locations from which the water could and likely would be taken. Such an approach I would suggest is likely to be more productive and more protective for a basin state than a flat rule prohibiting or strongly discouraging *a priori* out-of-Basin uses.

To emphasize the concern that I'm noting, I'd like to call your attention to the recommendations regarding removals, that is, out-of-Basin uses, found on page 47 of the IJC report of February 22nd, 2000. Among its five protective provisions, none speak to consideration of adverse impacts and out-of-Basin resources, as far as I can tell. Indeed, it sets as a condition that "there are no practical alternatives for obtaining the water," which seems to invite applicants to look to non-tributary sources. An alternative formulation, which would be less inward looking and more in the state-wide interest of the Basin states would say something to the effect that whether there are no less harmful practical alternatives. I must say, I'm also dubious about the known net loss standard, which strikes me as very rigorous, and doubtless justifiable in some circumstances, but awfully harsh as a fixed limit on consumptive use.

With these concerns in mind, that is, that -- just to reiterate very briefly -- that Western...Western demand for the water is not likely to be the practical problem, but the practical problems are localized urban growth in...in the Basin states themselves. With these concerns in mind, I'd like to turn to the legal status of out-of-Basin, in-Basin state uses. I'm going to say some things that will surprise you I think regarding the legal situation.

It is an interesting but little-noted fact that the law of interstate rivers in the United States grants entitlement to all uses within Basin states and not just to in-Basin uses. At the same time, it doesn't not grant any use rights in such waters to out-of-Basin, non-riparian states. Thus, to take an example, but the same can be

said of every interstate river in the United States, the water of the Colorado River has been allocated among all the seven riparian states, but each such state may use its allocated share anywhere within the state, whether it's in-Basin or out-of-Basin. In fact, the biggest uses are almost all out of basin.

All the California southern coastal cities which use Colorado River water, such as Los Angeles and San Diego, are out-of-Basin, as are most of the agricultural users in California. So too are Phoenix and Tucson in Arizona and Denver in Colorado, among the biggest uses of Colorado River water. They're all out of the watershed. Thus, it would be consistent with American interstate water law if the water of the Great Lakes was to be allocated for use anywhere within the Basin states and provinces and denied to any uses in non-Basin states. This fact may come as a surprise to many people who are focused on and always hearing about the so-called Dormant Commerce Clause principle, that there may be no discrimination against out-of-state uses. Interstate water law is a dramatic exception to this principle. Interstate water law, which of course is federal law and thus trumps the Dormant Commerce Clause in any event, allows all the water of a system to be apportioned among the riparian jurisdictions, which necessarily includes any non-riparian or out-of-Basin state from using the water. To be sure, this point has never been explicitly tested in the courts, in a suit by a non-riparian state. Any such apportionments [sic.] must be made by the national government, either in a Supreme Court decision or in a congressional statute, or through a congressionally approved interstate compact or treaty.

The interesting legal question is whether the riparian states are legally entitled to have such an apportionment as against the claim of non-riparian state. That's the question that's never been tested, although everybody assumes that the non-riparian states don't have any such rights. The fact that Congress enacted the Water Resources Development Act in 1986 provides some evidence that it is supportive of such a view, that is, of keeping the water within...within the Basin states, since it keeps it within the Basin. And all the existing interstate apportionments seem to make the same assumption. I see no reason in the light of equitable apportionment law, why it couldn't extend such a law from protection of the Basin to protection of the Basin states exclusively -- and provinces, of course. To be sure, the Basin states would presumably have to make some showing that they need or at some time will need all the water, whether for withdrawals or diversions out of the lakes or tributaries, or for use within, as by navigation and recreation and so forth.

In the Great Lakes context, such a showing would presumably rest in significant part on issues such as navigation and ecosystem protection, and not just on the diversion or abstraction of water out of the system. One might well imagine a situation in which economic feasibility defined an area well within the Basin states and provinces, but to some extent beyond the Basin where there was a practical demand for Great Lakes water. And I assert that I think that is the real situation we face. And where the quantity needed within the Basin states could comfortably be met without adverse impact on the system, limited of course by appropriate regulatory constraints, which is restrictions on locations from which drafts could be made, diminution during low water cycles, arrangements for

treated water to be returned the system, et cetera. Obviously one had a regulatory scheme that assured protection.

For the reasons I've just stated, such uses might well legally be permitted solely to the riparian jurisdictions, and as I indicated a few minutes ago, significant out-of-Basin state uses are probably not very threatening anyway. To extend from a Basin to a Basin-state approach would also put the Basin states on a somewhat more equal footing, than does their in-Basin areas, in terms of the usability of the Great Lakes water. That would also be more in line with the posture taken by the U. S. Supreme Court in interstate water cases, where allocation reflects state needs, both present and projected, rather than in-Basin needs. *In saying this, I want to emphasize as strongly as I can the protection of the basin as a hydrological and ecological resource should under any management scheme be the primary concern, and that there ought not to be any entitlement as such as against those values, take any water for either in-Basin or in-Basin state use. And that the question is always what uses are permissible and under what limitations consistent with that primary responsibility.*

Having spoken about the interstate situation, I want to turn to say something about the international situation. The international dimension has a parallel to the observations that I've just made about domestic interstate rivers. Just as water in the Colorado River has been apportioned among the Basin states as a domestic matter, it has been allocated between the United States and Mexico by treaty. And while I'm not expert on the NAFTA and world trade issues that have been raised, and that I know have been extensively considered by international law experts, note that it's always been assumed that the water in the Colorado River could be allocated entirely between the two riparian nations, the U.S. and Mexico, and that each nation could utilize the water allocated to it solely for its own domestic purposes and had no obligation to share the water with any other nation. While the Colorado River is not accessible internationally because passage up through the Delta is not navigable anymore, I don't know of any suggestion that's ever been made that any interstate and/or international river, like the Columbia for example, might have to share with another nation that might come up and seek to take some of it's water away on a tanker.

Though anticipated world trade restrictions are exactly the concern of those in the Gualala River in California that I mentioned earlier. I don't see any reason to think that that would change the treaty law of international rivers that we...that I just described. A strategy to forestall such efforts, if they were to be made, that is, to forestall efforts by some external nation coming in and seeking the water, assuming that the amounts aren't so minimal as to be insignificant anyway is, as I just noted, full apportionment among the riparian jurisdictions, both state and international.

In observing the long-standing assumption that interstate and international rivers could be entirely apportioned among the riparian jurisdictions, I should add, and this is an important point, that those apportionments need not reflect existing uses. Remember I said, you probably have to make some showing that you need the water. But it does not have to reflect existing uses. Water can be and has been

apportioned to jurisdictions to meet their projected future needs. And the entitlement to that water is held for the riparian jurisdiction as long as need be.

For example, the upper Basin states on the Colorado were apportioned seven and a half million acre feet of water by interstate compact in 1922. Now, three-quarters of a century later, the upper basin still only uses about four million of its seven and a half acre foot allotment, yet the balance of that apportionment is available to it whenever it may need it and nobody else can come in and get it. No eighth state, no non-riparian state, can come in and claim any of that water.

Interestingly, there has never been an apportionment of an interstate or international lake, which doesn't have annual flows that come and go each year. But as a stock of water, more or less in place, or movement through the system is measured in decades or centuries as is the case with Great Lakes. Nor equally interestingly has there ever been an apportionment of an interstate or international groundwater aquifer in American law, which would be more comparable to a lake or a chain of lakes.

Still, based on what I've just described to you, I see nothing in theory to prevent such an apportionment, and I would urge upon those who work on the Great Lakes issues to think about these analogies in developing long-term strategies for the...for the Great Lakes. I know of nothing in our jurisprudence to prevent having what might be the best of both worlds. The Great Lakes system could be fundamentally managed as an integrated...as an integral Basin with the health and uses within the Basin as a primary precept. But at the same time it could be made available for non-intrusive, out-of-Basin uses solely within the Basin states and provinces, thus protecting other potentially vulnerable water resources within those state that might otherwise be threatened by future growth. At the same time, the Basin could be insulated from unlimited demands around the nation and around the globe, even assuming that economic feasibility isn't a sufficient deterrent. I would think the United States and Canada might well find common cause in a program such as this. Thanks.

[applause]

JB: Well, first, thank you very much, Professor Sax, for a very interesting, stimulating and challenging presentation of the Second Wege Lecture. At this time, we have a roving microphone and it's in the audience with Helaine, and this is an opportunity to address questions to Joe, and he's graciously consented to respond to them. So please get Helaine's attention and we'll go from there.

M: This is not for me. I'm from the School of Natural Resources and I've enjoyed your talk very much. You made the point that the demand for water for urban users will be met by the transfer from agricultural use to urban use, and of course the urban use is more highly valued. But there's another major need, and that's the environmental use of water and there, there's not money to draw it in the same degree. What do you think will be the ways in which water will be partitioned to environmental uses?

JS: Yeah.

M: Hopefully to a greater degree than they have been in the past.

JS: That's a very important question, and I should have said something about that. At the present time, the primary means for re-allocating water to environmental uses is our legal constraints, most familiarly the Endangered Species Act. And, I mean, as you read about the controversies going on in places like the Klamath River Basin in the Oregon-California border area, that and oth—and Indian demands, which are often consistent. The Indians often...the Indians have treaty rights to water that are unfulfilled. They often want in-stream flows that are consistent with environmental needs. They sometimes have fishery interests. That's the way things are going now. There is...there is a law in Oregon -- it's the only state I know of that has such a law -- which imposes a kind of water tax on transfers. That is, to make...in order to make these transfers, which are usually added to urban transfers, a certain percentage of the water, let's say 20 percent or 25 percent is supposed to be left in-stream. My understanding from talking to people who work on Oregon water problems, is that that...that hasn't functioned very much. But I mean that...that's another device which is to simply skim off some of the agricultural profits and put the water in-stream. And, I mean, we're effectively doing that. We're just in the process of making a trans-of effectuating a transfer from the Imperial Valley to Southern California urban water. And there are some demand...The drainage for that agricultural water is the Salton Sea and the environmental demands on the Salton Sea are a constraint on that transfer and so protecting those uses in the Salton Sea has been a price that they've had to pay because there are some listed species, and in order to get a clearance from the Fish and Wildlife Service, so-called the Biological pinion, they have to leave some water for the Salton Sea, and that's being done at the present time by fallowing some land and just letting fal-taking some land out of production and just letting that water flow in. So those I think are the two primary mechanisms.

RB: Question on this side.

M: _____, _____ Office of the International Joint Commission. I'm...you mentioned the Boundary Waters Treaty. I'm wondering if you think that that ought to be opened up in any way. That's question number one, to look at more than just the boundary waters. But the other question I had was from the very beginning of your talk, you were talking about how cheap the water is for agriculture out there in California. And from the context of sustainability, is there anything from your perspective on environmental law that can be kind of moving things a little faster towards sustainable use of water? We had a lecture here by Norman Myers here this last spring, and he said his, one of his premises was that pervasive subsidies are kind of getting in the way of doing things right. So I'd like to...be interested in your points of view on that.

- JS: Let me respond first to the first thing you asked, about the Treaty. Whether opening up the Boundary Waters Treaty or not is a good idea, I don't know. It would just seem to me that if...if somebody...if you wanted to follow the strategy that I've been describing and in effect allocate all the waters of the Great Lakes Basin between the United States and Canada, that is, in effect divide up the property and the water between those two nations, however...and that could be done any one of a variety of ways without knowing exactly what the ultimate allocations would be, but presumably you'd have to do that by treaty. I mean, I don't know any other way that you could do that. So in that sense, it seemed to me, if this is the right strategy, then you would want to have a treaty. As to the other point, I'm not sure I followed you. If the concern that was being expressed was that we subsidized agriculture too much, is that...irrigated agriculture, is...?
- M: No. In that sense, not the best use for water.
- JS: I think...I think today just about everybody regrets some of the subsidies that have generated the use of water in...in the desert to grow the so-called low value crops. I mean, I have nothing against alfalfa, but, you know, without a subsidy you wouldn't be growing it in the Imperial Valley. But as it turns out, I mean, here's the irony of it. As it turns out, it's become...it's become—with water marketing, which is what this is, these transfers, it's turned out to be a good thing, because the farmers, the water...the farmers have all this cheap water, which is not worth very much to them. I mean, because they're growing these low value crops. So the opportunity to sell the water, you know, into this much higher valued use, as long as you take care of environmental problems, turns out to be sort of the perfect arrangement. I mean, it's one of those odd situations in which the rich are the people you want to get the water, you know, to move it from agriculture to the cities. And the fact that they're rich in this sense turns out to be a good, a good thing. It turns out to be a positive thing. But people are so unused to anything working right, you know, they think they're got to be something wrong with this. But it's actually...The only thing that's wrong with it is that the farmers are making out like bandits, because this water, this Imperial Valley water for which they pay thirteen dollars an acre foot and they're selling for nearly \$300 an acre foot, and they're pocketing all that money, they got the water as a subsidy from the taxpayers. So if you want to speak about it in terms of the sort of, you know, pure justice of the situation, they shouldn't be getting all those profits, they don't deserve them. If you want to move the water to meet urban use and get out of these low-valued uses, that's what...I mean, that's the price you have to pay, because politically you're never going to get that water away from them without buying it. I mean, I've spent, you know, most of my adult life dealing with that problem. I'm as sure of that as I am, you know, of anything that isn't a matter of pure faith. And so that's where we are.
- JB: Further questions? There's one in the back.

F: Here in Michigan over the last couple of years there's been a lot of concern about a project up in Mecosta County in which Perrier is pumping ground water and bottling it for shipment around the country or whatever. And I wonder if you have any thoughts about the legal precedents or problems with a commercial operation taking water out of the Basin?

JS: Yeah. Well, first of all, in terms of the system as a whole, the amount of water you take out of the Basin in bottles is not likely to be a very important problem, although you might have...you know, you might have some localized effects, and to the extent that you have localized effects, it doesn't make any difference whether they're bottling it or they're use—you know, using it for municipal use or industrial cooling or anything else. So the fact that they're taking it away, I mean, because if you pump water and take it aw[ay]—take it to a city, you're probably taking it out of the small watershed anyway. So I don't think...I don't think that's an issue...the issue as such. The traditional notion is, you know, that even take water, pump the water and, I mean, in the west it's not a problem to take it out of the watershed. I mean, that's what people do all the time. But I don't...I must say, I guess what I really want to say is I don't think that bottled water is...ought to be very high on your list of priorities. Now there may be some very special circumstances in which this is creating serious problems, but...

M: I'd like just like to point out that at the current time, the Great Lakes Basin imports 14 times more bottled water than we take out of it (laughter).

JS: And you get bubbles too so...(laughter)

JB: I think there's another question pending.

M: I have two questions, and you can choose whichever one you want to answer. I always like when my professors give me a choice so. The first one, I sort of...I was intrigued by...by your statement about letting the water be distributed within the state, rather than within the basin. I mean, at the...from environmental managers, you often hear about the importance of...a watershed approach and letting the watershed manage. And politically, we know there are political boundaries and you have to take those into consideration. At the other extreme though you have an economic approach which says let it go to the highest valued user. And that, in a purely economic sense shouldn't matter where...where the user is, if it's within the state or out of the state. If people in Imperial Valley want to sell to consumers in Las Vegas, then that would be the highest value. So you have sort of the two extremes, and then what you were saying about letting the state distribute within the state its waters how it seems fit seems sort of a third way or maybe a middle way. And if you could comment on sort of the three approaches and why you feel that the middle way might be most appropriate.

JS: Yeah.

M: Um, I'll leave it at that actually.

JS: Well, I might...I give you a practical, what I think is a practical answer. It seems to me that the number one priority is that you want to protect the resource, okay. Protect the resources, you want to make sure that you don't have so much draft on the resource that you're going to destroy it as an environmental value. That's what I meant when I talked about the...the history of the west and the lesson that was in there. I mean, we just let people take...you know, dry up the streams. I mean, there's a lot of streams in the west who don't have any water in them at the end of the summer. Because you can take all the water out that you want. Or you traditionally could take all the water out that you want. But that seems to be, you know, to me to be a mistake. And the notion that the water ought to go to whoever, you know, is the highest bidder opens you up to that mistake. It seems to me as a practical matter, you could...you could meet, as long as you regulate it appropriately, you could meet the demands of the basin states adequately, consistent with protection of the resources, and at the same time come within an appropriate legal framework that we have developed that I think has not really been thought about in this area. So it seems to me that there is...there is an alternative there which gives you the opportunity to meet...to meet these, the realistic needs within the region and at the same time protect the resource and not violate the legal constraints about, you know, discriminating against other states. My footnote to that is, you know, most of these big plans take the water, you know, away, hundreds and hundreds or thousands of miles, I don't think are much of a threat anyway. But even if you think it is a threat or it's going to be a threat, here's an alternative that I think gives you essentially everything you need. And I want to...I want to re-emphasize one of the things I said in my talk, which is, if you don't meet regional growth within the Basin states, you know, out of...out of the Great Lakes waters, you have a risk that they're going to go elsewhere where you might have greater damage. So you at least want to take that into consideration, that, you know...because otherwise you're driving people to another resource, haven't got any place else to go, so you have...you have...at least you want to have some choices to say, here are the alternatives, you know, here's the menu of possibilities by which we could meet this. What's the least damaging, most environmentally sound way to do it? And I wouldn't draw the line right at the Basin. I don't think that's...that's good management. Or that it's going to give you ultimately, you know, the best environmental outcome, because not all your water resources in the Basin states and provinces are in the Great Lakes Basin.

JB: We have another question. Yes, down...Helaine...

M: Hi. Tom Gladwin from the School of Natural Resource and Environment. At the recent World Summit on Sustainable Development in South Africa, the world's leaders deemed fresh water scarcity the most urgent, the most pervasive problem likely to be confronting the planet, with estimates that 40 percent of the humanity might be living in a severe fresh water conditions within the next 25 years. You

have all these institutional arrangements and possibilities in this advanced Canadian-Mexican-U.S. situation. But what do you advise a poor country in northern Africa or the Middle East or South Asia to do about this forthcoming scarcity crisis?

JS: That's kind of a surprise question, and...(laughter)

Side 2:

JS: ...very serious water problem in which you had all these water rights that had already been allocated to whites, and not at all to blacks and because they didn't want to drive all the whites out, they wanted South Africa to continue to be a...an attractive place, you know, for investment and so forth, they're trying to figure out how to do this. You had blacks...you had blacks didn't have water even for the most basic, you know, consumption—human consumption, washing and so forth. And, I mean, as I understand it, what they did was to, you know, re-allocate some water for these basic needs in the context of some of these, you know, these urban redevelopment. So, and I mean, I think you have to take the problems, you know, piece by piece like that. I mean, there you have a problem of people who are poverty stricken and don't have any water rights, and you've got to figure out how to change some water rights. Seems to me that's a problem of a whole different dimension than let's say the pro—the Israel-Lebanon-Syria problem. You know, I mean, that's a different kind of problem that's...So I just don't know how to give a...a answer to that. I mean, my own view would be of course...and that's the reason I thought of the South African example, I mean, first things first, right? I mean, that...that's a pretty good policy. So the first thing is to make sure that, you know, people's basic human needs are met. Then you turn to the, you know, the basic environmental requirements to try to maintain the system or to restore a system that's been deeply regraded...degraded, and then turn to, you know, to meet the economic problems in a way that permits some kind of a flourishing economy and do the best you can with those things. And I mean we're so...I mean, even in a place like California that's a semi-desert, we're so rich in water, compared to, you know, to some of these places in the Middle East. I mean, you've got a different problem with Turkey, which, you know, with the GAP project has been damming up the Tigris and Euphrates Rivers and saying to the Syrians, like, well, you know, you're downstream (laughter), you know, come and get it. You know, so these are all...I mean, these are problems of...they're grave problems and they're all very different I think.

JB: I think at this moment we should bring the formal portion of the lecture and the question-and-answer period to a close, but cordially invite all of you to join us for a reception immediately outside the theater that will begin as soon as you all are outside the theater. But please join Greg and myself in acknowledging our appreciation to Joe Sax, friend of University of Michigan, colleague, a very fine gentleman and I think challenged us all. Thank you, Joe.

[applause]

M: I would just like to have Ellen Satterlee, executive director of the Wege Foundation, please convey our thanks to Peter for enabling us and inspiring us to create this lecture series of sustainability.

[applause]

The End