Bay Delta: A Grand Bargain?

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Greg Dalton: Welcome to Climate One, a conversation about America's energy, economy and environment. To understand any of them, you have to understand them all. I'm Greg Dalton.

Today, we're discussing the future of freshwater in California. The heart of the state's water system is the Sacramento-San Joaquin Delta, which hydrates more than 23 million people and millions of acres of farmland. For decades, there's been wide agreement among water agencies, politicians, farmers, fishermen and environmentalists that the delta's water system is in dire need of repair but there's little agreement on how to fix it and who should pay. The specter of floods and droughts driven by climate disruption are adding greater urgency to the latest chapter in California's legendary water wars.

Over the next hour we'll look at whether the long feuding interest groups might come together for a grand bargain to secure California's water supply as it prepares for rising population and volatile rainfall patterns. We're joined by a live audience in Sacramento where Climate One is holding its first program, thanks to the support of the Stephen Bechtel Jr. Foundation and the Pisces Foundation. We're pleased to have with us four experts deeply involved in shaping the story of water in California.

Bettina Boxall is a reporter for the Los Angeles Times; David Hayes is former deputy U.S. Secretary of the Interior where he was deeply involved in California water issues; Jay Lund is director of the UC Davis Center for Watershed Services; and Kip Lipper –

Jay Lund: Sciences.

Greg Dalton: Sciences. It was too hard to say watershed sciences. And Kip Lipper is chief councilor for Energy and the Environment, the Office of the Senate pro Tem Darrell Steinberg. Please welcome them to Climate One today.

[Applause]

Greg Dalton: Jay Lund, let's begin with you. Can you tell us – outline for us the major interest groups that have a claim on the water from the San Joaquin – the Sacramento-San Joaquin Delta?

Jay Lund: The Sacramento-San Joaquin Delta is really central – this major hub in California's water resource system. Probably about 45 percent of all the water used in California either comes directly or indirectly from the Delta. About 15 percent of all the water used in the state comes directly out of the delta and so it effects people from the very northern part of the Sacramento Valley who take water out of the delta by extracting water, diverting it for their farms and cities, all the way down to Southern California which takes exported water out of the delta.

Greg Dalton: And what are the main groups? So there's people in the south that use the water, outline the main groups that are sort of the battle lines over the water from the delta.

Jay Lund: So there are – to me, there are upstream users that take a lot of the water. Two-thirds of the water that does not flow out of the delta that would have is diverted upstream for the Bay Area

and the agriculture users for the most part in the Sacramento, San Joaquin and Tulare basins. There are urban water users in Southern California that take water out of the delta via the state and federal water projects, certainly a lot of Bay Area water users. The area gets about 30 percent of its water directly out of the delta, about 70 percent of its water directly or indirectly out of the delta with the Hetch Hetchy Aqueduct, Mokelumne Aqueduct. There are also a lot of environmental interest in both the fish and the birds in the delta that migrate through the delta. And of course, a lot of people live in and around the delta, and the landowners in the delta that all have interests.

Greg Dalton: Great. That's helpful. Bettina Boxall, there's often it sounds like a complicated formula. Do you think that there's any opportunity, any light for an agreement for those groups to agree on how to move forward on the delta or is it deadlock as it has been for the last number of years?

Bettina Boxall: Well, I think I only hear from people such as David that there is a consensus but I think the consensus is still among maybe three quarters of the state is, "Let's try to get – continue to get as much water out of the delta as we always have." I think that's the consensus. Nobody really wants to give up.

And as Jay pointed out, every part is often, "Oh, big bad Southern California and big bad agribusiness in San Joaquin Valley is taking all the water from the delta and more water is diverted upstream from the delta than it is exported south." And I think all of the constituencies that Jay mentioned are basically interested in continuing to get the same amount of water out of the delta as they have. Nobody wants to give up anything.

And so I think that it's an unfortunate consensus and it creates a log jam that maybe the delta project can open that up and undo it but I don't know because we still very much have, I think, most of the state wants to maintain the status quo when it comes to the delta.

Greg Dalton: So David Hayes, what could break the status quo? There seems to be deadlock for over many years, these powerful and trench interest groups that both want more or the same amount of water, what could break that?

David Hayes: I think, Greg, the consensus actually is not that the traditional amount of data of water that folks are getting out of the delta can continue, rather I think the emerging consensus actually is that the status quo was unsustainable and things have to change. There has to be a move and it's because of the 20-year, 30-year history we've had of trying to fix the delta problem.

Hundreds of millions of dollars and huge efforts like the CALFED program in the 90s have been devoted to trying to fix the delta and work around the fundamental problem which is these huge pumps that pull six million acre feet of water a year through the delta changing river flows. You've got a highly engineered system. You've got these islands that are artificial with seismic risk as soon as there's an earthquake and there will be one. They will turn to soup and we will have saltwater rushing in and then climate change which is a huge new factor that folks are realizing as the flows get more unpredictable, more seismic, more risk to the levees et cetera.

I actually think there is a consensus that the status quo can't continue. I also think there's a growing understanding by a number of parties that their traditional expectations have to go out the window and they have to go out the window for a number of reasons, including climate change and they're at risk of any reliable water supply in many respects. So there is a chance I think with the governor's leadership and he's extremely interested in this with the Obama administration's leadership in potentially forging a solution but the next couple of years will tell the tale of whether it happens or

not.

Greg Dalton: Kip Lipper, do you agree there's a window right now that is open but could shut in a year or two?

Kip Lipper: Well, there's a window open because the governor and the political leadership in Sacramento to some extent is pushing the project forward. But as what's pointed out, this is a 20 and 30-year endeavor. In fact, I think, Jerry Brown, the younger, when he was in office back in the 1970s and 1980s, made an ill-fated effort at the time to address the delta situation.

So the issue of water policy in California, I think too, is the delta, there's no question that the status quo whether you live in the delta and are worried about the levees and the need for better water quality or water supply or whether you're south of the delta and are looking at the water exported, the status quo is not acceptable. At the same time, the question of focusing that entire discussion on the delta itself I think misses the fact that other regions of the state increasingly have the tools and the ability to rely on their own regional solutions and at least, to some extent, manage their water destiny better than simply relying on a pipeline or a canal that runs 400 miles down the Central Valley.

Greg Dalton: We'll get to some of those other issues around the state in a moment but let's talk first about the contours of a grand bargain. What would it look like, what would the rough shape of an agreement among all these water interests to move forward? Kip Lipper, what would it look like?

Kip Lipper: Well, if I knew that, I would be making a lot of money. I actually don't know and I think Bettina's comment about a group of parties in this discussion that will never embrace sort of a comprehensive solution I think is a valid point. But I do think, again, starting not so much with how much water can we ensure is coming out of the delta, although that's obviously an important question for the exporters, but starting with the fact, for example, an again forgive me for returning to it, that the state of California has a lot that it could in terms of recycled water, water conservation, storm water capture, a lot of the new or perhaps not so new opportunities to manage water locally and regionally would relieve that stress on the delta. And the 2009 laws that Senator Steinberg has worked on, a centerpiece of that was essentially ensuring ecosystem restoration and water supply reliability, the two elements of which can be achieved both through fixing the delta but also through managing water in other parts of the state more efficiently.

Greg Dalton: David Hayes, what would a deal look like if you could draw it?

David Hayes: I think to Kip's point, a key part of the deal is it's not just about the delta. I mean if we've learned anything it is that California has massive water challenges all across the state. Arguably, a particular reason why the Bay Delta is even more important now than it was 10 years ago was that California had to get off the Colorado River. It was over relying on the Colorado River and now you got more attention on the delta.

I think that the Bay Delta solution has to be nested in a broad state plan that looks at conservation that is smart about how water is treated that looks at groundwater as a key part of the system. As for the delta itself, there is tremendous suspicion that the exporters, the big bad L.A., San Diego axis with the agriculture interest south of delta that if they're going to pay for separating what the water through tunnels from the delta that they will only do it if they get a guarantee that they will get the amount of water they want. That will not fly.

Greg Dalton: Will the federal government guarantee a volume of supply to the south?

David Hayes: No. That has become clear in the last couple of years. Now let me step back for a minute. I think certainly the California proposal that will come out publically within a month or two is going to suggest the basic infrastructure the delta has to change that you can have those pumps on the cell side of the delta pulling that water to get to the south because it just screws up the ecosystem. If you're a salmon trying to head for the San Joaquin or even the Sacramento, good luck.

What the scientists suggested in the 2000 period – it would be interesting to get Jay's view on this – is that the best chance for some reconciliation, as you call it Jay, to the delta is to remove that water that is now being sucked all the way through to take it out at the robust Sacramento River up here and tunnel it underneath the delta so that the delta back and forth a natural flow or at least semi-natural flow returns and you have a chance for improving the delta. You've got to make the delta better. That's the 2009 law requirement and you've got to also provide maybe a more reliable water supply through the tunnels but no guarantee on quantity.

And the scientists cannot be sure if this will work and there's going to have to be a commitment to science and a commitment to uncertainty and that's the question. Will this large investment be made primarily by the water users, south of the delta, in the face of some scientific uncertainty and quantity uncertainty as a result?

Greg Dalton: I'll get Jay Lund on the tunnels and then Kip Lipper. Jay Lund?

Jay Lund: We'll I think we're always going to have a lot of uncertainty about this problem. We're really launching into a noble ecosystem. We're trying to reconcile a lot of different kind of interests. It's going to be very difficult. It's going to be very uncertain.

However, I think we should not lose sight of the certainties. The certainties are this is not a sustainable system. This is a system that's declining literally in terms of with land subsidence and with sea level rise. It's a system in which we have more invasive species, continued decline in resetting of ecosystem to something that's not favorable to the endangered species and several other – many other species that are sort of lined up to become endangered if the ecosystems continue on this current path.

We also have sort of growing economic value for a lot of that water. We'll be seeing a lot of water conservation, waste water reuse like storm water recapture in some of the urban areas but the urban withdrawals from the delta of the direct withdrawals from the delta; they're only about a third of the withdrawals from the delta. So we're going to have a considerable problem in reducing demand enough to resolve all of the problems and that's not the only problem. We have a lot of other problems in the delta for the ecosystem and for the levees and the landowners than just the water exports and tunnels.

Greg Dalton: Kip Lipper, should the tunnels be built and will the voters have a say in how they're built and how they're paid for perhaps looking at the ballot in 2014?

Kip Lipper: A couple or just a moment I want to touch on Jay's point about the uncertainties and I want to add too to the list. One is the uncertainty that David mentioned about climate change is not a binary uncertainty. In other words, there's going to be more water or less water. The snowpack changes, the changes in water, the hydrograph are going to have multiple and different effects on the delta and on the state as a whole. And so that's an uncertainty that's hard to model on a 50-year permit or on a facility that's going to exist for a long time.

The second uncertainty and the one that we're seeing more and more in government these days is of course the financial uncertainty and the cost of these facilities. I think the latest figures on the BDCP on the $25 billion range and unlike the 1950s and 1960s when the large state water projects were built and the federal water projects were built, this is an era when state and federal governments are not as flush in funds, if I can put it that way, as they have been in the past and no one knows that more than Governor Brown who's pretty frugal with the penny when it comes to the expenditure public funds.

As to your question, I think the question about the tunnels themselves I think, again, is really something is going to be determined by the permitting process and this is after all BDCP is a permit process.

Greg Dalton: That's the Bay Delta Conservation. It's a plan for conserving the delta.

Kip Lipper: Right.

Greg Dalton: Okay.

Kip Lipper: And I think that's going to be determined I mean, as David mentioned, that we'll see in a few months, perhaps even as soon as a month the draft DIRs and the IS that come out for the project and we can take a look at those and sort of see how it's configured in terms of the actual project itself.

Greg Dalton: But could there be something on the ballot that regulates how much water goes through the tunnels?

Kip Lipper: Could there be? Yes. Will there be is an open question. I mean under current law, the voters of California do not have a direct say, yay or nay, on the project itself. One of the ideas that Senator Steinberg floated last spring was perhaps to the extent that we are going to the voters to ask for their approval for a water bond which is currently on the 2014 ballot and being discussed in the legislature to be extended to a different date and greatly downsize and modernize and change from a 2009.

One idea that Senator Steinberg has put out there is perhaps while we're going to the voters, ask them whether they think the conditions under which this project that's being brought forward are sufficient to ensure the delta is protected and to ensure that the guarantees that are – the insurances that are provided are locked into law.

Greg Dalton: If you're just joining us on the radio, Kip Lipper is Chief Councilor for Energy and the Environment at the Office of the Senate pro Tem Darrell Steinberg. Our other guests today at Climate One are Jay Lund, Director of the UC Davis Center for Watershed Sciences; David Hayes, former Deputy U.S. Secretary of the Interior; and Bettina Boxall a reporter for the Los Angeles Times. I'm Greg Dalton. David Hayes, do you want to get in on that?

David Hayes: I wanted to get to the question of the ballot initiative perhaps indirectly. I think it's good to step back for a minute and talk about the structure of the potential plan that is going to emerge here in the next few weeks. The concept is that there will – it's called the Bay Delta Conservation Plan, which is a habitat conservation plan that is developed along the model of what's happened in San Diego and Orange County.

The idea is that the regulatory agencies that have to be worried about the endangered species

involved and that includes the California Department of Fish and Wildlife and the NOAH folks and the U.S. Fish and Wildlife Service. They have to approve a plan that overall will improve the livelihood of the endangered species affected. The idea is that you take some risk with the species that are already on the downhill slide but you have to have an upside as well.

And so they're going to make the decision of whether an overall plan of separating the water, adding habitat to the delta which has been the historic wetlands of which had been decimated, and developing an appropriate flow regime, which is a big uncertainty, will at the end of the day improve the species' health and help restore the delta. Under those conditions, decision will be made about how much water will go through. What you're going to have – what the public will have shortly is the governor's proposed plan, the Bay Delta Conservation Plan, put out for public comment alongside half a dozen or more. I think it's more like nine or ten alternatives, including a no action alternative, smaller tunnels, no tunnels and there will be a public process with vigorous science and vigorous input by the public.

So that the hope is that perhaps that public process, which already has begun in robust fashion in the last several months frankly, will lead to either a breakthrough consensus or not or potentially a desire to put some things on the ballot or whatever. Let's hope that it leads to a bigger middle than we've had traditionally here in this issue.

Greg Dalton: Bettina Boxall, who's going to pay for all this?

Bettina Boxall: Well, I mean this one is going to bring up? I mean I think the potential breaker of this project is who is going to pay and how much water is going to come out? And the fishery agencies have been very firm about, "No. We're not going to give you a guarantee." And the contractors that is the irrigation districts and the urban districts that will be to get water from the South Delta, the export system, have begrudgingly agreed to that but they still – and this is sort of going back to my first, they still basically want a certain amount of water. And if it becomes apparent that the flow requirements and a huge problem with the delta is the amount of water that flows out of the delta into San Francisco Bay is about half of what it was historically before dams and diversions and exports.

And so the fishery agencies are being pretty firm about, "We need a certain amount of flow," which means that means less water going south. And so particularly if agribusiness, if the big San Joaquin Valley irrigation district particularly Westlands which is the biggest irrigation district in California, if not the entire country. If they can't be reasonably assured that they'll get a certain amount of water, then it doesn't really become economically worthwhile for them to invest on this. This is a project that goes by the precept of the beneficiary pays.

So the contractors, urban Southern California, San Joaquin Valley agriculture, the Bay Area cities that get water from the delta that are part of the big government projects that get water from the delta are supposed to pay the bulk of this, and the habitat restoration is supposed to come from the federal and state taxpayers. And so you're looking at an enormous bill and that's going to push up the price of water, particularly for the irrigation districts that were built on vast amounts of cheap federally subsidized water. I mean the Central Valley project is what Westlands gets its water from doesn't pay. The contractors do not have to pay interest on that. It was an enormous infrastructure project and so they are effectively subsidized by the federal taxpayer.

So I think the make or break question really is, are the contractors, who were supposed to pay the biggest bulk of this, are they going to stay in? And if this falls apart because it's going to be because they decide that they can't get enough water to make it worth their while and the participants are

just going to say, "You know what? It's not worth our while. We can't afford this water."

So I think that's going to be a very, very interesting question. And in the public comment period, I think there's going to be all kinds of sort of negotiations of will – I mean there's talk now of buying – the possibility has been raised of buying water from the upstream irrigation districts, the senior diverters who have senior rights to enormous quantity of water to increase the outflow.

So they're the taxpayer, the federal and state taxpayers would basically be subsidizing that. The water would be bought. The government wouldn't just be saying to the upstream diverters, "Okay, you know what? It's time to give up some of your water and let it go through the delta."

I mean one thing that has struck as a Southern Californian, the whole debate about water in California and the delta is so often simplified into, "Oh, it's all going to lawns and swimming pools in Southern California," and that's simply isn't true. Most water that comes out of the delta or is diverted from the upstream delta from the San Joaquin basins and San Joaquin Valley goes to agriculture and far more water is diverted from the delta upstream. It never ever gets to the delta and never ever gets within miles of delta. It's diverted upstream in Sacramento Valley and the San Joaquin Valley. It's not going south.

And in terms of conservation, yes, all of California can become more regionally self-sufficient but Southern California has actually done a much better job than you all up here have in terms of conservation. And the population of Southern California has grown by about four million people in the past 20 years and Southern California is using the same amount of water. The population of Los Angeles has grown by more than a million people in the past 20 years and it is using the same amount of water. Los Angeles is using less water than it did 40 years ago and its per capita water consumption is far lower than the per capita water consumption of Sacramento, which is just beginning to get meters.

Greg Dalton: Bettina Boxall, if you're just joining us, is a reporter for the Los Angeles Times. Kip Lipper, she mentioned agricultural use. Governor Schwarzenegger didn't go after sort of mandated restrictions on agricultural use as we put some restrictions where conservation goals were put on urban users. Is Governor Brown willing to touch and go after agricultural use and put some mandated reductions or restrictions?

Kip Lipper: I think it's a very good question and it's kind of one of the central questions about putting together this grand bargain that you referred to earlier. What we do know is in 2009 we set a target of 20 percent water conservation by 2020 for the urban areas of the state. Agriculture resisted that. We've put in place a requirement that agriculture develop plans for conserving water but they're not subject to the same numerical requirements that the urban areas are as Bettina points out.

And so the notion – the obvious question here is if in 2013 we've already met a 20 percent by 2020 water conservation target for all urban areas of the state that that law subjected it to, why couldn't we do more? And if Los Angeles and Southern California have already exceeded that, God bless them and let's keep going. And if Northern California needs to do more, they should do more as well.

But the point is that there are there other much as we talk about it in our energy area. The cheapest kilowatt of electricity is the one that's saved or not used. The cheapest water, in this case, is the water that's going to be conserved.

Greg Dalton: Jay Lund, what are some real success stories in terms of areas of the state that have

wisely, prudently started to more efficiently manage their water resources?

Jay Lund: Well I think, again, I'd come back to what Bettina mentioned of Southern California. They've done a tremendous job over the last couple of decades of reducing their per capita water use. So water conservation, a lot of wastewater reuse and storm water capture and things like that. They also pay a lot of money for water. When they're down there, I think the wholesale price of water is S800 to $1,000 in acre-foot for finished water – treated water. We haven't got into that point up here in the north.

But I think we spend a lot of time talking about urban aspects, urban water use but we have to understand that only about 20 percent, 15 percent to 20 percent of all the managed water use in California is urban. If you want to talk about real water conservation, real water use reduction, you have to talk about agriculture but that's a very different process. If you take a city or a house in California and you compare it to a house on Australia that just underwent a 12-year drought, they'll be using maybe 30 percent less, 50 percent less water. If you take a tomato grown in California and a tomato grown in Australia, they take the same amount of water.

So all the people in California, when you talk about reducing agricultural water use, they're talking about trying to make the farms as very efficient in terms of making sure that all the water that's applied to the plant evaporates off the plant. But we rely a lot on some of that excess water in the Central Valley to recharge the aquifers, which is our major source of drought storage.

Greg Dalton: But what incentive is there for agricultural conservation if there's no specific mandates, David Hayes?

David Hayes: Well, the missing part of our discussion here is water marketing and the –

Greg Dalton: Which is what? What is water?

David Hayes: Which is Bettina referred to it in a way I find interesting where potentially a water-short agricultural district buys water from a water-rich agricultural district. Let's just keep it in the ag side because this is where the play in the system is. And if you have a robust water market, the water-rich water user up in the Sacramento Valley, for example, which has not have an incentive to reduce its water use by investing in drip irrigation or whatever may now have an incentive. Because if they need less water for their crops, they may be able to sell the excess water to the ag district south of the delta or even south of the delta among the exchange contractors and others.

And in fact, in 2009, when Ken Salazar and the Obama administration came in, California was in the third year of a very bad drought that the water delivery south of the delta were 25 percent of the contract amounts and we got through that collectively by water transfers. And the water transfer market continuous to expand and I think holds great promise of helping ratchet down over inappropriately, if you will, over use of water by some agricultural districts. I think it has to be part of the solution.

I think it may be one of the reasons why potentially the south of delta ag users may be more amenable to not expecting to have their traditional export supplies if there's a robust water market. So it's a very important play and of course there's a potential for groundwater banking as well to also provide some grease to the system.

Greg Dalton: David Hayes is a former deputy U.S. Secretary of the Interior. Our other guests today at Climate One are Bettina Boxall, a reporter for the Los Angeles Times; Jay Lund, Director of the

UC Davis Center for Watershed Sciences; and Kip Lipper an adviser to Senate President Darrell Steinberg. I'm Greg Dalton.

Let's talk about desalinization. Jay Lund, what role does desalinization play in California's water future? One of the, I think, the largest project in the country is now under construction in San Diego. What's the future of desal in California?

Jay Lund: I think for urban areas there is some potential for brackish water desalination because it costs about $400 an acre foot. It's all about economics. It's mostly about economics. And so we're seeing over time some improvements in desalination technology, which are getting better.

For ocean desal, the cost today depends on who you talk to and ranged between $2,000 and $3,000 an acre-foot. That's very expensive. That's three times – two or three times the wholesale cost of water in Southern California today.

Greg Dalton: And an acre-foot is how –

Jay Lund: Enough water for about two households in Southern California, two or three households.

Greg Dalton: So $1,000.

Bettina Boxall: You need to get one up here.

[Laughter]

Jay Lund: That's what they used to say but now they say two.

Greg Dalton: So okay so about $1,000 per year per household?

Jay Lund: It's fairly pricy, especially when you have other alternatives. So I think it will become a little more attractive over time but there are actually some physical limits to how much energy it takes to desalinate seawater and that normal prices that's still going to be, even if you had 100 percent efficiency, the thermodynamics of it, it will still cost you about $600 to $800 an acre foot.

Greg Dalton: That serves a lot of energy that goes into that. Bettina Boxall, do you see a future for desal in California?

Bettina Boxall: I see a limited future. I do not see it as the silver bullet that many people think. They just think, "Oh, just put 20 desal plants along the coast and we all be fine." Because it is very expensive, it is very energy intensive. And as Jay said, I mean there are just certain thermodynamic basic amounts of energy that have to be used.

And another issue is that the whole water infrastructure system is designed the exact opposite ways desal it's all designed. The big, big pipes are coming down from the Colorado River, the aquifers or whatever, and they get smaller and smaller and smaller and smaller as they get to the coast. So all of a sudden the pipes just aren't big enough, the infrastructure is not big enough to accommodate big amounts of water coming up from the coast because the system is designed for the opposite way and rebuilding that infrastructure is very expensive. I forget exactly how much San Diego County Water Authority is going to be paying to build the conveying system that takes the water up from the diesel plant that's under construction but it's quite a bit of money.

So I think there is a limited future. It's part of water digs. They love to talk about portfolio of water. So I think it's part of the future portfolio of water sources in California but it's not the answer.

Greg Dalton: Kip Lipper, Governor Brown recently basically told the Water Board to hurry up and come up with some standards on reusing water, recycling water. That's some of the cheapest water we have is to reuse the water rather than these other areas. So tell us about the future of reusing water and who's doing it well.

Kip Lipper: Well, again, these are tools in the toolbox that help meet the broader objectives of California water needs. And again, as Bettina mentioned, I think Southern California in particular has pioneered recycled water. At one point some folks referred to it as toilet to tap. I think that was a bit unfair. But the idea is that even if you're taking water that is non-potable and using it in other uses that are displacing the water that you could use for drinking water, that's a benefit. So I do think the Southern California water agencies, the wastewater treatment agencies and others have pioneered a lot of that sort of thing.

The issue of storm water manage – I mean, the system of managing flood control in California is calibrated to move the water through urban areas and out to the sea as quickly as possible. And that's a very good thing for protecting public safety and it should be maintained. At the same time, in some areas, and you often in Southern California or in Arizona or elsewhere where you have these flash floods and you have a huge pulse of water that's available for a short period of time. And increasingly, water agencies are looking at trying to capture that water and to basically hold it back and then use it later on when it's needed for water purposes. And so I think there's sort of a rethinking of the flood management system that could be part of this discussion as well for a more efficient use of the water that is available in areas outside of the Northern California Delta Region.

Greg Dalton: San Francisco encourages people to have barrels to catch rainwater. So it sounds like we're moving toward a less centralized, more decentralized water system just as it happened in computing, it's happening in energy. So it's a less centralized, more nimble system to get ready. Jay Lund, is that accurate?

Jay Lund: I think that will be true to a limited degree. Certainly on the strong water side we'll be trying to infiltrate a lot more of the water. But we're in a dry state. In much of the state, you couldn't capture – if you captured all the water that rained on you, it wouldn't be enough for all of the water you're using. And then the farming areas, if you put a map of the state of where the water run off occurs and where their farming is, they're in completely different places.

So I think we'll get some benefits out of strong water capture and some of these efficiencies, local works but we're still going to have probably 60-80 percent if our water that, in many places, comes from elsewhere.

Greg Dalton: David Hayes.

David Hayes: Just to put a fine point on that. I agree with Jay. I mean, the coastal plain of Southern California, which Bettina is very proud of, the water use of and rightly so, still about a third of the water for the 19 million folks in Southern California comes from the Colorado River. At the end of the Colorado River, a highly engineered importation of the water across the Southern California, a third comes from the Delta, a third is indigenous, and there are some room there. Certainly the recycling has been terrific and storm water and all that but there are limits. As long as we have 19 million people in Southern California, on that coast, there's going to need to be imported water.

And it's remarkable. Three quarters of the water that is available to California is available in the north. Three quarters of the need for the water is south. And that's the basic problem and that's why this issue of how to deal with the Delta is so important. It is not the only issue but it is an indispensable piece of the big puzzle I think. And so the attention that is being delivered to the Delta, and a lot of it with Kip Lipper and the leadership of California in the 2009 bill that was passed is appropriate, and in fact should do a quick shout out to the Delta Stewardship Council that Phil Isenberg chairs, very thoughtful nesting of the fundamental problem of bringing water north to south around a larger set of principles that include some responsibilities for those who are drawing water on the delta to demonstrate that they are drawing as little as they need to recognize the Delta as a historic and special place that needs to make sure that its identity is maintained and other important principles.

Greg Dalton: Would you agree that the future of water in California is higher prices at higher uncertainty? David Hayes.

David Hayes: Absolutely. I think the higher uncertainty; the climate change piece is a huge part of that. The loss of the natural reservoir that the Sierra Snowpack has provided means that you're going to have the water not sort of nicely delivered over the spring into the receptacles of the infrastructure, but instead have a much more uncertain system.

Greg Dalton: Jay Lund, higher prices, higher uncertainty?

Jay Lund: Oh, I think so. We're in a place where we have growing populations, we have growing – we don't have really growing agriculture but we have growing value of agriculture, a lot more tree crops, nut crops, fruit crops, vegetable crops than we had in the past. So the value of our demands is increasing. And we're probably going to have less water. So what happens when you have growing demands and less supply with gasoline, with housing, with labor? Prices go up. We're going to see that in water. It will be actually like everything else.

Greg Dalton: Are we going to continue to grow cotton, rice and alfalfa in California, water-intensive crops?

Jay Lund: Probably less, and we'll probably follow them in dry years.

Greg Dalton: We're going to go to audience questions in a moment. First, I want to ask each of you what you are doing to manage your own personal water consumption [laughter] as well as your carbon footprint. David Hayes, you recently returned from Washington. So tell us about your water and carbon footprint.

Kip Lipper: From an airplane [laugh].

David Hayes: I'm proud of my footprint. I have moved from a large house in Northern Virginia to a 1,200, perhaps, square foot two-bedroom condominium. It's on Stanford University's campus. So I'm doing my part. And I can't control the irrigation things that come on at 6:00 AM on this condo but maybe with some tough negotiation. No, I can't win against Stanford University [laughter]. Anyway—

Greg Dalton: Bettina Boxall.

Bettina Boxall: Well, I have to say I'm very proud that I do not have a blade of grass in my property. I live on a small hill and I have terrace backyard and I used to have a little bit of water at

the top, which drove me crazy. It was half in the sun, half in the shade. I got rid of it. I have decomposed granite and [0:40:56] and succulence in my front yard, a small front yard. I put in native California plants. My peak water consumption has gone down by half. During the winter, I'm really not irrigating at all. I have high-efficiency water appliances. There was one water bill, I think last year during the winter when I wasn't irrigating at all, it was down to 25 gallons per day and I went "Yes!" [Laughter]

Greg Dalton: Top that, Kip Lipper.

Kip Lipper: I'm going to be the quintessential Northern Californian. [Laughter]. I rely on the rain in the winter to do the irrigation like Bettina. We have landscape with low impact landscaping. And we have do our best to both in terms of energy efficiency in our house and the whole house retrofits as well as water. We've tried to install the latest technology to make sure that we conserve water.

Greg Dalton: Jay Lund.

Jay Lund: We have no outdoor sprinkler system at all. We hand water everything we do outdoors. And I ride my bicycle to work everyday.

Greg Dalton: I guess I'll confess. I have a small patch of grass that doesn't get watered very much. They probably should come out. I think it may after this program [laughter].

Bettina Boxall: I'll be watching.

Greg Dalton: Yes because you can see it on Google Earth. We recently installed a recirculation pump, two hours a day that keeps water when the kids are taking showers. It re-circulates the water so it doesn't go down the drain.

Jay Lund, quickly, what's the most important thing the average consumer could do listening to this to reduce their water impact? Is it on outdoor landscaping? Is it on the food they use, water embedded in food, meat, et cetera? Where is it?

Jay Lund: In Sacramento Valley, it would be to not water your lawn.

Kip Lipper: No lawns.

Jay Lund: Don't water your lawn.

Greg Dalton: Let's go to our audience questions. Welcome to Climate One. Welcome.

Steve Hopcraft: Thank you. I'm Steve Hopcraft with Restore the Delta. And there certainly is no consensus. We're more than 15,000 people that oppose the BDCP. And my question is, and I'll let you choose who should answer it, the Governor is refusing to analyze the true cost, a comprehensive cost-benefit analysis of the tunnels and who would pay, and more particularly is refusing to seriously analyze the no-tunnel alternatives. The University of Pacific Economist has just come out with a report showing that all the benefits and much less cost of there without the tunnels, two thirds of that exported water goes to west lands and current, growing cotton and pistachios and almonds, mostly for export. And I wanted to ask you, you decide which panelist, what can we do to get the Governor to actually follow the law and DWR's requirements to provide a full comprehensive cost-benefit analysis of the no-tunnels alternative?

Greg Dalton: Kip Lipper.

Kip Lipper: Thank you [laughter]. Steve, we have this thing in a democracy called elections. And the Governor is up for election next year. And he's certainly paying attention to the public in terms of their concerns about these kinds of issues. We also have other branches of government including the legislature branch. Senator Wolk who represents the Delta area and the counties and cities in that area has been very aggressive and active in pushing the Governor to get this kind of information out.

So I think public oversight, public information, using a legislative process which we often do to get this information out. I think our Natural Resources and Water Committee has had serious and very good hearings not just on BDCP but on other financing mechanisms like the water band. And I think, at least in the political branches of government, those are the ways to accomplish what you've described.

Greg Dalton: Jay Lund, is the no-tunnel scenario getting due consideration in the process?

Jay Lund: I think that's what people are using as their sort of no-action alternative. So I think, in that sense, it is. Now, there's a lot of different ways you can make a no-tunnel alternative just like there's a lot of different ways you can make a tunnel alternative. It's never possible to look at all possible alternatives but I do think that the proposals are going to have to change; any proposal will have to change substantially in order to be useful in the long term.

Greg Dalton: We're talking about the future of California's fresh water system at Climate One. Let's have out next question. Welcome.

Rita Schmidt Sudman: Hi. Rita Schmidt Sudman, Water Education Foundation. I've been observing these issues for a few years now. Yes, thank you. And I wanted to bring up the issues especially for the audience that's listening. Could it be a matter of trust? I mean, really, water issues are a bit like a marriage. If you don't really trust that other person, it doesn't matter what you say. Don't we need, in the Delta, when we talk about these tunnels or whatever we're going to do back to the peripheral canal, don't we need assurances for the folks in the Delta who have long time water rights, who essentially get their water for free, who work with keeping the levies propped up and get some state funds for that but they need assurances that that water is going to stay fresh and they're going to have an amount they want, that it's not going to be salt water intruding.

Don't they need somebody like the Governor to go down there, split a vein and write in blood "I will make sure that your water isn't affected by these tunnels"? Would that be the kind of trust that we could have so that we could go forward?

Greg Dalton: Thank you. Who would like to answer that? Kip Lipper.

Kip Lipper: I think in one respect, the issues here, as you've heard, are uncertainties but also trust. And I think there's body of opinion that under no circumstances will trust the State of California and the federal government to issue 50-year on duration permits for huge new facilities that may or may not be operated within the parameters that the law might require if the Fish and Wildlife Agencies have their way. David mentioned this earlier. This is both the beauty and also the complexity and uncertainty of the multi species habitat planning process that the BDCP is. But then there's the political trust here. And I do think that the voters of the state and the voters who are affected by these kinds of decisions have to feel that their government institutions are making the right decisions. And I think that it's a valid point that the Governor needs to convince folks that that's the

right way to go, and those in the legislature that support this kind of policy making need to do it too.

I do want to make one point. I didn't use the occasion earlier, which I should have when Greg asked the question. All is not lost here. There's a lot of goodwill in this discussion. There's a group of parties, including environmental groups, urban water agencies, business groups and others who have come forward with what they call a portfolio approach.
It's not something that I think the Governor and his agencies have embraced but at least there's a conversation going on about different approaches to advancing water policy forward including the Delta discussion. And I do think that there are opportunities to exchange those points of view but I do think you've nailed it on the head when it comes down to it. It's about trust and it's about political trust, it's also about legal and the kinds of the statutory assurances that people get going forward that in 50 years time their children or grandchildren who are living in the Delta are going to have the same kinds of access to water and into the fifth and sixth generation farming operations that they've had down there as well.

Greg Dalton: Kip Lipper is an advisor to the California State Senate President, Darrell Steinberg. Let's have our next audience question. Welcome.

Peter Rivera: Hi. My name is Peter Rivera with the California Energy Commission and formerly with Fish and Game in their Oil Spill Office. My question relates to groundwater. And when I was in Fish and Game I know that a number of our basins are in overdraft condition. And the economists talk about tragedy to come in the sort of first come, first served. And a lot of the regions around the planet are over-drafting their groundwater. And so part of the problem I think is lack of information and how much do we know about the conditions of groundwater levels are at, who's taking how much. How can we get a better handle on managing groundwater in California?

Greg Dalton: We can't see it. We don't know what's going on. Jay Lund.

Jay Lund: If you look at groundwater, where does groundwater come from? It eventually has to come from surface water. There's no almost no place in California where groundwater doesn't eventually come from surface water unless it's being over-drafted. There's an awful lot of water that's not flowing in streams because it's pumped out of groundwater some place. As the system gets tighter and the prices get higher, we're going to have to manage groundwater more tightly just like almost every other western state does.

Greg Dalton: Should we measure the extraction of it?

Jay Lund: I think eventually we're going to have to do it just like we do with surface water. In fact, we will be glad of it because we'll avoid problems. It'll be much easier to know how much water you have a right to use than to always be fighting with your neighbors about it.

Greg Dalton: Kip Lipper, how could that happen? Has it been tried to be done to measure extraction of groundwater?

Kip Lipper: It has been tried. And part of the 2009 Comprehensive Water Package that David referred to, included new requirements for owners of groundwater basins to report the elevations of those groundwater. If I can use the analogy, was tiptoeing into the water on the groundwater issue. This is a resource that provides between 30 and 40 percent of the water for the state. And as Jay mentioned, it's not as if it's something separate from surface water. It's all part of the same system. And so having a better handle, having better information on what is happening in those groundwater aquifers and using them, not exploiting them but using them for water storage and for other

capacities are part of making our system work better. And so we've got a first step. We need to do more.

Greg Dalton: David Hayes.

David Hayes: This is a very important and it goes back to the original point that many of us made which the Bay Delta issues have to be seen in the broader context. The Governor is preparing a new state water plan that he expects to come out by the end of this year. And it's something that, frankly, the federal government and the state government were working together on because the Obama administration has invested a lot of money in, for example, water recycling, water transfers, and realizing you need all these tools. The state has been very good, at least in the south on water conversation. But groundwater is got to be part of the picture. There are other western states that are way ahead of California on this. Arizona was an early leader with Bruce Babbitt when the state recognized that you cannot continue to pump groundwater without impact. I think we should all be expecting and hoping that the Governor will come out with an aggressive plan for bringing California into the 21st Century when it comes to groundwater use.

Greg Dalton: It will be hard. Let's have our next question at Climate One at the Commonwealth Club.

Brett Baker: Yes. Hi. You have to forgive me for being a little colloquial. My name Brett Baker. I'm a sixth generation farmer from the Delta. I just wanted to ask you, Mr. Hayes, if I were to tell you, just for example, I had a big pile of, let's say, gold outside for the folks at home, and I was going to sell it to you, wouldn't you want to know exactly how much was there? In saying that, continuing to subsidize surface supply for our state, strapping out taxpayers and the ratepayers with this huge debt as BDCP. Jay said earlier this is all about economics. Aren't we, in effect, disincentivizing, if that's a word, those efforts to conserve, clean up groundwater, recycle, do things of that nature, if in fact we are going to invest a significant amount of capital in a project such as the tunnels?

Greg Dalton: David Hayes.

David Hayes: I think the assumption, as Bettina mentioned, an appropriate assumption is that the water beneficiaries of such tunnels would pay the capital cost associated with the tunnels. This would not be subsidized by the federal government. Now, there is a notion that the entire Delta in terms of the habitat restoration piece of it, is a societal cost we have engineer at Delta, we have agricultural islands that are artificially maintained with levies, et cetera. So there is some arguable societal dollars that should be put into the pot but the very vast majority would have to be a paid for by the agricultural districts and the urban water districts to get the benefit of those tunnels. That's new. That's to Kip's point that the days of the 60's in terms of broad public investment by all taxpayers in these huge projects, those days are over.

Greg Dalton: But that's how we paid for the state water project too. We didn't do that for CDP [crosstalk].

Brett Baker: That's the tradition on California state projects.

Greg Dalton: Okay. Good point [laughter]. Let's have our next audience question. We're talking about the future of California's fresh water system. Hello.

Gordon Vecker: Hi. My name is Gordon Vecker. I'm affiliate with a number of fish and wildlife organizations and some stream organizations. It's very dismaying for me to hear that people in

California don’t even know where the Delta is or what it is and they're not aware that we have the largest estuary on both coast of the Americas. We have one of the last sustainable fisheries in salmon that exist on the planet. And I'm wondering if you guys have advice for how the environmental community can influence this monumentally important decision that's about to be made to get the best outcome for water going out the Delta and keeping our ecosystem alive.

Greg Dalton: Kip Lipper.

Kip Lipper: Well, I think you make a really good point which is the Delta is not just a canteen to supply water to the rest of California, it's also a place. It's a geographical region of the state on a map. But more importantly, it's a place that people live and it has recreations values, it has enormous environmental values, as you mentioned, and it's a place that a lot of people live and work and call home. And so it's a very special place. Again, not to give you kind of a standard answer. One of the things that we did in this 2009 Water Package was to create a Delta conservancy, an entity in the delta with delta representation to help promote things like eco-tourism to promote the Delta as a place, both economically and environmentally so that it becomes known in the same way, for example, that some of the national parks might be known or other national designated areas.

There have even been movement by California legislatures to ask the Congress to designate the delta as a national estuary. So there's a lot of interest in doing that. And I agree with you, the story is not told. And in this kind of a discussion, often times it's reduced to the delta just being this place where pipes or canals are going to be built. And there's just so much more there than meets the eye in the water debate.

Greg Dalton: And David Hayes, it's now a state law that human uses and environmental uses for water have an equal basis. That's something that fairly novel and new.

David Hayes: Yes, it is. And I will say that even the traditional approach to environmental protection has been an extremely important player backed by very effective efficacy by the environmental community in California. You make two points. Number one is let's be reminded of the environmental richness of the delta, and we do need to be reminded of that, and we need to tell others about that and make it more public. I will say that the environmental community in California has been very effective in keeping the system honest for many years.

One of the reasons why the parties are at the table now is because year after year the environmental community has brought lawsuits and ensured that biological opinions that regulate how much water can come through take into account the endangered species’ requirements of the Delta. And that's why this last year we had the pumps turned off largely around the turn of the year when the water was available. And then the water stopped, and now we’re in a bad situation but that's because the system – there's been integrity in the legal system.

There is a recognition though that that can't do it, that we need to – and look when the drafts come out within a few weeks, I think. You're going to find the environmental community has put into the Bay Delta conversation plan and alternatives the notion that not only do we have to deal with the issue of the water, but we have to show with biological goals that there are going to be metrics to make sure that the delta is getting better if there are tunnels.

Greg Dalton: David Hayes is former Deputy U.S. Secretary of the Interior. Let's have out next audience question. Welcome.

Craig Miller: Thank you. Craig Miller, Science Editor, KQED in San Francisco. As we go around

reporting on water issues in the state, we hear two narratives consistently. One is we have a storage problem in this state. We need more reservoirs, more surface storage. The other one we hear is we don't have a storage problem in this state. We get plenty of storage. We have a distribution problem. Who's right? [Laughter]

Greg Dalton: Jay Lund.

Jay Lund: To some degree they're both right. We would always like to have more storage but I'm not sure it's worthwhile paying for as always. And we would always like to have more conveyance to redistribute water. And I think tend to think people will be willing to pay for that more but they're not willing to pay in for that amount, that's for sure.

Greg Dalton: Bettina Boxall.

Bettina Boxall: Well, I think storage is going to become an increasingly important issue with climate change because what's going to happen with climate change is we're going to have more precipitation falling as rain in sudden events and not in snow that…

Greg Dalton: Gradually melts.

Bettina Boxall: …trickles down, it's that natural reservoir. And the operation of our dams and our reservoirs now is very programmed, and it's programmed according to old climate models.

And so that has to change but it's a very, very tricky balancing act because you let too much water out thinking that you're going to get an atmospheric river and 15 inches of rain, something like what happened to Bolder, and it doesn't come and then you don't have the water to release later in the year. You keep the water in and then you can have an enormous flood. Another item with storage is that there is an enormous amount of storage available underground. I mean, the Central Valley is greatly over-drafted. And Southern California I think has about 3 million-acre feet of unused groundwater storage but getting it in there and getting it out is complicated.

So there's a debate. Most environmentalists will say, "We don't need more dams. We don't need more reservoirs. Put it in the ground. Particularly agricultural interest will say, "No. We need more surface reservoirs." I mean, there's been long time proposals to expand Millerton Reservoir and Rayshasta, which is probably going to happen, and also create an offsite reservoir off of Sacramento in an area called Sites.

Greg Dalton: You have a chance for one last question. Welcome. Yes.

Jane Wagner-Tyack: Thank you. I'm Jane Wagner-Tyack with Restore the Delta. And I'd like to get back to the issue of delta levies turning to soup in an earthquake. I want to mention, for one thing, that the whole state is subject to earthquake throughout transfer system and whatnot. But also under the Bay Delta conservation plan, the primary conveyance being considered right now, 51 percent of the time water would continue to flow through the delta, not in the conveyance. And so levies in the delta will be necessary for that.

Under the 2009 legislation, the Delta's Protection Commission was required to produce an economic sustainability plan which found that levies in the Delta can be reinforced for $2 to $4 billion much less in the cost of conveyance. And because there are so much infrastructures in the delta, in fact it calls it a mega region, something like $20 billion of energy and transportation as well as water infrastructure in the delta that needs to be protected. And so I would like one of your guests to

address the question of what we will do to protect that infrastructure in the Delta and get pass the idea that it's just a big bathtub or a place that will turn to soup.

Greg Dalton: Who would like to take? Jay Lund.

Jay Lund: The Delta is a very large place. The islands are actually very different than many places. Certainly some of them have a lot of infrastructure, some of them don't, some are very valuable, some are less. So I think we're going to have to take — this is a very serious issue. The state really needs to get serious about how we're going to prioritize our limited amount of money for these different islands, decide on which to protect, which not to whether you have Delta tunnels or not. The speaker is right. We're going to have to maintain quite a few of those levies. And certainly before any tunnels would be built, we're going to have to continue for a 7 to 10 to 15, however long the lawsuits last, maintain quite a few of these levies.

Greg Dalton: Before we wrap up, we have not talked about fracking which a whole topic unto itself. But fracking in California and its impact on fresh water supply as well as contamination concerns. David Hayes.

David Hayes: My experience with fracking in other parts of the country, certainly other water short parts of the country, in the Northern Plains, for example, is that fracking uses quite a bit of water both in terms of pushing the pressure down, it's mostly water injection. And then when the water comes up, there are serious issues of water quality often with the water coming back.

I think the issue for California is going to be this potentially could be another competitor for limited water. And so it certainly got to be part of the conversation.

Greg Dalton: Anyone else on fracking? Kip Lipper.

Kip Lipper: I just want to comment too that there's — and we haven't touched much on this topic but the issue of water quality is a key one, particularly in the Central Valley, the same areas of the state that both have very significant aquifer groundwater storage capabilities, and at the same time have communities that are so heavily impacted by poor water quality that the folks who live there can't even drink the water or bathe in it. And so fracking presents a new and, as yet, uncertain challenge both on the water supply side as David mentioned. And California is unique. It's different than South Dakota in the sense that we have the water resources underground that we have. It also presents a water quality challenge. And I think our state water quality agencies need to step up to the plate a little bit because the chemicals that are being injected into the ground to frack are often times chemicals that are the same things we would prohibit if they were discharged into the ground water via a leaking underground storage tank.

Greg Dalton: We have to end it there. We've been talking about the future of fresh water in California. Our guests had been Bettina Boxall, a reporter at the Los Angeles Times, David Hayes, former Deputy U.S. Secretary of the Interior, Jay Lund, Director of the UC Davis Center for Watershed Sciences, and Kip Lipper, Chief Counselor for Energy and the Environment at the Office of the Senate Pro Tempore, Darrell Steinberg. I'm Greg Dalton. Thank you all for coming to the special meeting of Climate One today in Sacramento. And thanks to the Stephen Bechtel, Jr. Foundation and the Pisces Foundation for making this possible. Thank you.

[Applause]

[END]