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PERSPECTIVES ON CALIFORNIA WATER SUPPLY: CHALLENGES AND OPPORTUNITIES

OVERSIGHT FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND POWER

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

Monday, January 25, 2010, in Los Angeles, California

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OVERSIGHT FIELD HEARING ON "PERSPECTIVES ON CALIFORNIA WATER SUPPLY: CHALLENGES AND OPPORTUNITIES."

Monday, January 25, 2010
U.S. House of Representatives
Subcommittee on Water and Power
Committee on Natural Resources
Los Angeles, California

The Subcommittee met, pursuant to call, at 1:00 p.m., in the Boardroom, The Metropolitan Water District, Los Angeles, California, Hon. Grace Napolitano [Chairwoman of the Subcommittee] presiding.

Present: Representatives Napolitano, Costa, and McClintock.

Also Present: Representatives Chu and Calvert.

STATEMENT OF HON. GRACE F. NAPOLITANO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mrs. NAPOLITANO. Good afternoon, ladies and gentlemen, and welcome to the Subcommittee on Water and Power's hearing. I now will call it to order.

The purpose of today's hearing is to hold an oversight hearing on "Perspectives on California Water Supply: Challenges and Opportunities," in Southern California.

I ask unanimous consent that Congressman Ken Calvert and Congresswoman Judy Chu be allowed to sit on the dais and participate in the Subcommittee proceedings today, and without objection, I so order.

Congressman Costa will be joining us shortly.

After my opening statement, I will recognize all other Members of Congress and the Subcommittee for any statement they may have, or they can submit it for the record, as they choose. Any Member of Congress who desires to be heard will be heard.

Additional material may be submitted for the record by Members of Congress, by any witness or by any interested party. The record will be kept open for 10 business days following today's hearing, and a five-minute rule, with a timer, will be enforced. Green means go, yellow indicates you have one minute, and the red means stop or I will gavel.

I certainly want to extend my thanks to Metropolitan Water for allowing us to use this beautiful facility and for the hospitality for the witnesses and for us in hosting today's hearing. It means a lot.

It is convenient and central. I also wanted to thank the Board members who are here. Board members, would you please stand up. I don't want to miss anybody. Members?

Water, ladies and gentlemen, is California's gold. Either we have too little or too much recently, and this past week we saw almost a year's worth of rain. Yet we are nowhere near filling our dams, our rivers, our lakes or aquifers. It does not mean that our concerns over drought and how water is managed in California are over; far from it.

We are in the midst of a real challenge: Increasing population, aging infrastructure, water supply restrictions, water quality concerns, environmental concerns, etcetera. The list goes on. It continues to grow with each year.

We are here today to continue a discussion, and this will not be the last of our hearings in Southern California, in an attempt to clarify California's water status, the water situation that over the past three years has been intensifying and reaching a dangerous and critical point. The dilemma we face in Washington is how can we work together to meet the challenge cooperatively and in a civil manner; that is, without litigation.

Management of water in California is a cooperative effort, balancing between State, Federal and local suppliers. The resulting plumbing system is managed to meet the needs of over 30 million citizens who expect and are used to having a good quality product to be delivered to them at a reasonable price.

Our desire today is to have a dialogue about how the water situation in Southern California factors into the state's wide approach to addressing the whole state's drought issues and concerns. Everyone here today has a story to tell, and many of you have asked to be heard, and we are asking that you submit something for the record. Likely, all of you have suggestions for some of those solutions. It is that dialogue about ideas and suggestions on how we can most effectively work together that we would like to have from you today.

The importance of this discussion and why we are in Southern California is that the issue of water requires us to hear from all parties and constituencies. Developing a logical and doable approach to addressing the California water crisis requires a statewide coordinated approach.

I believe we are seeing the manifestation of this in California's legislative efforts in November, the December Interim Federal Action Plan and last September's Memorandum of Understanding between the State and the six Federal agencies, or maybe it is seven. These are all good efforts to bring direction, and now we need consistent and dedicated leadership to be successful. Independent actions taken without commitment will not result in a long-term solution.

There is not one answer that will solve the hurt that many have felt and continue to feel under current water conditions. A couple of storms are of some relief, but they are a reflection of weather impact by variable ocean conditions. They are not the long-term solutions to address the issues that underlie our whole water dilemma.

There has been a great deal of conjecture and a lot of one-way dialogue that the current water problems are due to the current regulatory environment, and a lot of finger pointing in the past. While making interesting theatre, they do not provide action nor resolve the underlying problems.

In a December 2009 Congressional Research Service report, they concluded that, and I quote, "the current drought has created a fundamental shortage of supply. Regulatory or court-imposed restrictions, as well as the long-established state water rights system, exacerbate the effects of the drought for agricultural and urban water users."

The combined effect of drought, the state water rights system, the physical constraints of hydrologic plumbing system, carryover surface and groundwater supplies, changing dynamics of climate, and legally mandated regulations for water quality and the environment all affect the delivery of water to agricultural, urban and environmental systems of California.

It is very evident today, our water management in California is supply limited. The challenge of all water users is how to adapt and mitigate to live within our water means, and not to have a reduction in service or quality and have a loss in the critical environmental services for that water quality.

Some have questioned why we are having this discussion in Southern California rather than in the north. That is where the drought is hitting the hardest. The answer is simple. The drought is a statewide concern and demands that all portions of the state be heard from, especially when two-thirds of California's population is in Southern California.

When looking at the issue of water debate in California over the last few years—I would say three or more—there have been numerous meetings, hearings, and discussions in Northern California and in the Central Valley. Curiously missing was hearing from the people and the issues facing the citizens of Southern California.

Citizens in this area feel the drought from both imports from the Colorado River Basin and from Northern California. In Southern California, we are experiencing the near-perfect storm of reduced supplies, increased demand from rising populations, and the steadily increasing complexity of legal, environmental and administrative requirements. The recent court decisions regarding the management of the Colorado River and the Quantification Settlement Agreement potentially throws years of negotiations and cooperation in jeopardy, and with it water supplies for Southern California.

Water is a basic human right. How many of us think about the water source when we turn on the tap in the morning to make our coffee or drink our tea? How many of us think about the journey that the drop of water has taken as it moves from the Sierras or the Rocky Mountains to the reservoirs, the canals, the water treatment plants, the pipes in our houses or apartments? We all take it for granted. The reality is, as we are finding out, that quantity, quality, and real-time supply of water is critical to our health and well-being and to our basic economy. Every citizen in California deserves a clean and dependable source of water.

Today we are going to have three panels discuss three different aspects of the water issues in California. The first panel will

discuss the Federal and State approach to the current water solution. This will include a discussion of the State of California's state water plan, followed by a discussion of the November historic water legislation.

Last, we have asked the Department of the Interior to discuss the Federal-Delta water plan, the impacts of the recent QSA decision on the Colorado River water supply, and the role of water reclamation and reuse to supplies here in Southern California, and maybe even the support of the Administration's 2012 increase to $200 million to alleviate the $600 million backlog of Title XVI recycling projects.

I would appreciate it if the people behind you can see. Thank you so very much. Thank you for being here.

The second panel will focus on the issues associated with water delivery to the citizens of Southern California. This will include discussions associated with the water delivery reductions from the two primary water supply sources of Southern California, imports from Northern California and water supplied from the Colorado River system, and the impacts associated with recent court decisions and what constraints this puts on supplying water to the citizens of the southland.

The last panel will address the science and information needs that can help Federal, State and local water managers make better decisions, and identify specific local and regional impacts to the urban water users, to the fishermen, and to the farmers.

We will use today's hearing to discuss, listen and, hopefully, learn more about the water crisis in all of California, and the coordinated efforts to address it. This discussion needs to begin now, if we are to work together to implement real solutions and real change, not just talk. We have a challenge in front of us, and together I am positive we can begin to identify those solutions.

With that, I would like to now yield to the Ranking Member, to my right, of the Subcommittee on Water and Power, Congressman Tom McClintock, for his opening statement.

[The prepared statement of Chairwoman Napolitano follows:]

Statement of The Honorable Grace F. Napolitano, Chairwoman, Subcommittee on Water and Power

Water in California—either we have too little of it or too much. This past week has resulted in almost a year's worth of rain. While the increase in our water supply is appreciated, it does not mean that our concerns over drought and how water is managed in California are over. Far from it. We are in the midst of a real challenge—increasing population, aging infrastructure, water supply restrictions, water quality concerns, environmental concerns ". the list goes on and continues to grow with each year. We are here today to continue a discussion about the California water situation. A water situation that over the past three years has been intensifying and reaching a boiling point. The dilemma we face in Washington is how can we work together to meet the challenge cooperatively and in a civil manner.

Management of water conditions in California is a cooperative effort—balancing between State, Federal and local suppliers. The resulting plumbing system is managed to meet the needs of over 30 million citizens who expect a good quality product to be delivered to them. Our desire here is to have a dialogue about how the water situation in Southern California factors into the states-wide approach to addressing the larger drought issues and concerns. Everyone here today has a story to tell about how the drought has affected them or their constituents and likely all of you have suggestions for solutions. It is that dialogue about ideas and suggestions on how we can most effectively work together that we want to have today.

The importance of this discussion and why we are here in Southern California is that the issue of water requires that we hear from all parts and constituencies. Developing a logical and doable approach to addressing the California water crisis requires a statewide coordinate approach. I believe we are seeing the manifestation of this in the California Legislatures efforts in November, the December Interim Federal Action Plan and last September's Memorandum of Understanding between the State and Federal agencies. These are all good efforts to bring direction and now need consistent and dedicated leadership to be successful. Independent actions taken without commitment will not result in long-term solutions.

There is no one silver bullet that will solve the hurt that many are feeling with the current water conditions. A couple of days of rain are certainly a nice relief but they are a reflection of weather impacted by variable ocean conditions and are not the long-term solutions to addressing the issues that underlie our water dilemma.

There has been a great deal of conjecture and a lot of one-way dialogue that the current water problems are due to the current regulatory environment. While making for interesting theatre they do not help in resolving the underlying problems. In a December 2009 Congressional Research Service report, CRS concluded that "the current drought has created a fundamental shortage of supply. Regulatory or court-imposed restrictions, as well as the long-established state water rights system, exacerbate the effects of the drought for agricultural and urban water users".

The combined effect of the drought, the state water rights system, physical constraints of the hydrologic plumbing system, carryover surface and groundwater supplies, changing dynamics of climate, and legally mandated regulations for water quality and the environment all affect the delivery of water to the agricultural, urban and environmental systems of California. The issue is very simple—today our water management in California is supply limited. The challenge to all water users is how to adapt and mitigate to live within our water means and not have a reduction in service or have a loss in critical environmental services and water quality.

Some have questioned why we are having this discussion in Southern California rather than further north. The answer is simple—the drought is a statewide concern and demands that all portions of the state be heard from. When looking at the issue of water debate in California over the last 3 years, there have been numerous meetings, hearings, and discussions in northern California and the Central Valley. Curiously missing was hearing from the people and issues facing the citizens of Southern California.

Citizens in Southern California feel the drought from both imports from the Colorado River Basin and from northern California. In Southern California we are experiencing the near perfect storm of reduced supplies, increased demand from rising populations, and a steadily increasing complexity of legal, environmental and administrative requirements. The recent court decisions regarding the management of Colorado River water and the Quantification Settlement Agreement potentially throws years of negotiations and cooperation in jeopardy and with it water supplies for Southern California.

Water is a basic human right. How many of us think about it the waters source when we turn on the tap in the morning to fill that coffee or tea pot? How many of us think about the journey that the drop of water takes as it moves from the Sierras or the Rocky Mountains to the reservoirs, the canals, the water treatment plants and the pipes in our houses or apartments? We take it for granted. The reality is as we are finding out is that quantity, quality and real-time supply of water is critical to our health and well being. Every citizen in California deserves a clean and dependable source of water.

Today we are going to have three panels discuss three different aspects of the water issues in California. The first panel will discuss the federal and state approach to the current California water situation. This will include a discussion of California's state water plan, followed by a discussion of the November historic state water legislation. Lastly we have asked the Department of the Interior to discuss the Federal-Delta water plan, the impacts of the recent QSA decision on Colorado River water supply and the role of water reclamation and reuse to supplies here in Southern California.

The second panel will focus on the issues associated with water delivery to the citizens of Southern California. This will include discussions about impacts associated with water delivery reductions from the two primary water supply sources of Southern California, imports from northern California and water supplied from the Colorado River system and the impacts associated with recent state court decisions and what constraints this puts on supplying water to the citizens of the southland.

The last panel will address the science and information needs that can help Federal, State and local water managers make better decisions, as well as help to iden-

tify specific "local and regional "impacts to urban water users, fishermen and farmers.

We will use today's hearing to discuss, listen, and hopefully learn about the water crisis in California and the efforts being made to address it. This discussion needs to occur now if we are to work together to implement real solutions. We have a challenge in front of us, and together I am positive we can figure out solutions.

With that said, I am pleased to now yield to the Ranking Member of the Subcommittee on Water and Power, Congressman Tom McClintock, for his opening statement.

[NOTE: The Congressional Research Service report entitled "California Drought: Hydrological and Regulatory Water Supply Issues" dated December 7, 2009, has been retained in the Committee's official files. It can also be found at: http://www.crs.gov/Pages/Reports.aspx?ProdCode=R40979

STATEMENT OF HON. TOM McCLINTOCK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MCCLINTOCK. Thank you very much, Madam Chairwoman. First, I would like to express our appreciation for putting the Central Valley into its busy schedule so that it can hear firsthand of the economic damage and human misery that has been caused by the Federal Government's decision to shut off 200 trillion gallons of water to Central Valley farms in order to indulge the environmentalist tech project, the Delta Smelts.

In the absence of the Committee's cooperation, the Minority Republicans just held such a hearing under our own auspices this morning in Fresno. I can tell you that Secretary Salazar's statement to the Committee last year in which he admitted the government had the discretion to turn the pumps back on but would not do so because, quote, "that would be like admitting failure," did not sit well with the people there, and the Administration's absence was also noted.

This disastrous folly has destroyed a half-million acres of the most fertile farmland in America and destroyed the livelihoods that supported 30,000 struggling families. The prices on grocery shelves here in Southern California are directly affected by the loss of 500,000 acres of Valley agriculture due to this decision, and on behalf of the people of the Central Valley, from whom I have just heard this morning, I again renew the Minority's urgent plea that this Committee come to the Central Valley to see firsthand the suffering that this policy has caused.

Today's hearing is about challenges and opportunities on California's water supply. I found the questions raised in the witnesses' invitations indicative of a concern that this Congress has lost perspective on creating abundant water supplies. Today, this Congress and this Administration seem to have adopted the position that government's principal objective should not be to create abundance, but rather to ration shortages.

The Majority's questions to witnesses failed to mention the need for more water storage or the costs and benefits of all water supply infrastructure options. I must again remind the Subcommittee of the obvious reality, that managing a water shortage is not the same as solving a water shortage.

Having read some of the testimony presented to the Committee today, I believe that we need to measure all water proposals against the simple and obvious alternative of renewing our commitment to the construction of new dams and reservoirs. One of the last great dams was the Oroville Dam which cost roughly $600 million to construct in 1968. Due to the inflation adjustment, that is about $3.5 billion in today's money. That dam produces 3.5 million acre-feet of water.

In other words, the modern-day, inflation-adjusted cost of the Oroville Dam, including its massive power plant, comes to about $1,000 per acre-foot, and yet this Committee has ignored new dam construction in favor of such things as water recycling projects that cost upwards of $18,000 per acre-foot. That is insane.

In my district, it is the site of the Auburn Dam which began construction some 40 years ago. The most complex part of that dam, the giant footings cut into the surrounding bedrock, were completed in the early 1970s, but then the objections of the environmental left brought the project to a halt. That dam today could be providing 2.3 million additional acre-feet of water storage, 800 megawatts of the cheapest and cleanest electricity available, and 400-year flood protection for the Sacramento Delta, and all that is lacking is the political will to proceed.

I think that this Congress has forgotten the policies of the Pat Brown generation of builders, the visionaries who created the Central Valley and state water projects. Instead, we now write off any ideas of new storage and ignore the plight of our nation's bread basket in the San Joaquin Valley. So while valley communities—again, the bread basket of the nation—run food lines with food imported from China, we seem content to accept rationing as the way to resolve our water crisis. I believe we can do a lot better than that. Thank you, Madam Chairwoman.

Mrs. NAPOLITANO. I am sorry, but the audience will please refrain from any emotion of any kind. This is a hearing. No, I am serious. We will ask you to be escorted out. Simply, we need to proceed. We need to move forward and, yes, we agree with a lot of things. So please, please, bear with us.

Mr. Costa.

STATEMENT OF HON. JIM COSTA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. COSTA. Thank you very much, Madam Chairperson, for this hearing this afternoon. I think it is important that Southern California clearly understand, as the people do in the San Joaquin Valley that I represent, that their water supply is at risk as well. I represent Ground Zero where the worst impacts of the drought have been felt over the last three years—not just because of below-average rainfall, but because of regulatory constraints that make it extremely difficult for the Federal and state water projects to provide water for the intended purposes for which they were created.

The fact of the matter is that last year, while the Governor and the Legislature were able to—and I want to commend them for passing a very important water package that we hope the voters will approve this November—those are longer-term solutions, and

they are far from being achieved. We hope that they will be implemented but, in the meantime, California is living on borrowed time.

Our water system is broken. The plumbing system and the Sacramento-San Joaquin River delta system is broken. Initially developed to provide water supply for the entire state, approximately 20 million people. Today, we have 38 million people living in California, with the prospect that in the year 2030 we will have maybe 50 million people—another 12 million people. The water supply that we have today is already being maxed out with all of the demands that are being placed upon it.

The projects, when they were created in the Thirties, Forties and Fifties, were intended to provide a sustainable water supply for every region of California, but in 1992 we passed the Central Valley Improvement Act. Good, bad or indifferent, we now require those same projects not only to provide a sustainable water supply for every region of California, but we now ask them to restore fisheries and water quality, primarily an ecosystem, which is commendable, to a level that existed in the 19th Century.

The problem is, as you know, people point fingers, and they are accusatory about what people shouldn't farm here. Well, I take umbrage with that. Everybody likes to eat, and frankly, we take for granted the food supply in this state and the food supply that is provided in the most productive region in the entire country, in the San Joaquin Valley that I represent, that has been the hardest hit by this drought.

God forbid that Southern California faces the impacts that we are feeling in communities like Firebaugh and Mendota and down to Delano where you have unemployment levels from 41 percent to 36 percent to 32 percent, and they have food lines with some of the hardest working people you will ever meet in your lives, that normally would be working to put food on America's dinner table, in food lines, in the richest country in the world. Unacceptable.

So, ladies and gentlemen, this hearing in Southern California is important, because the water supply for our entire state is at risk, and what we are feeling today in the San Joaquin Valley, if we don't correct and fix these problems, will be felt in Southern California, and the boon of California, the golden dream of California for a bright prosperity, economic prosperity in the 21st Century, will be erased. That is how serious this crisis is today.

So let's be clear. While the Administration has attempted to provide some solutions in the last year, much more needs to be done. We cannot have another year of a 10 percent water allocation to the San Luis Unit. It simply will not work, and the Administration needs to wake up and understand this.

We need to do everything we can to think out of the box. We have a unique situation, and I will close on this point. As a result of the biological opinion which went into effect yesterday or today, we now—even though we had record rainfalls last week, as you noted, Madam Chairwoman—we can't pump because of the turbidity. We don't have enough water. We can't pump because of the impacts on the species. We have too much water; we can't pump because of the impact on the species.

Ladies and gentlemen, when are we going to use common sense, and when will we be able to pump water to provide for the San

Joaquin Valley and for Southern California? That is what we are talking about. So I, Madam Chairwoman, appreciate this hearing. We have a lot of work that we have to do, and we have to do it through cooperation. Politicizing the issue of water, as we have noted for over a century, is not going to solve these crises.

We have been fighting over water resources in the West and in California all the way back to the days of Mark Twain when he noted whiskey is made for drinking, and water is made for fighting. Let us put the fighting behind us. Let us get some practical solutions this year. My constituents cannot live without some solutions this year. Thank you.

Mrs. NAPOLITANO. Thank you, Congressman Costa, and we agree with a lot of what is being said, and this is the first hearing in Southern California. There have been at least 16 hearings in Central and Northern California in the last few years since I have been in Congress. So allow us to be able to hear what is going on.

May I add to your comments, Congressman Costa, that L.A. County has, what, almost 14 million people. That is more than a third of the state's population. L.A. City alone has almost 4 million. So, you understand, we recognize many of our water agencies have done what they needed to do to address the water shortage before we reached the proportions that some of the other cities that don't have water meters in Northern California.

Mr. Calvert?

STATEMENT OF HON. KEN CALVERT, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. CALVERT. Thank you, Madam Chairwoman, and thank you for allowing me to sit on the dais with the Committee, and Mr. McClintock for giving me this honor to do that. Typically, I am happy to have a hearing focusing on important water challenges in Southern California but today, I must admit, I have mixed emotions.

The reason that I am conflicted is because, as I understand it from Mr. McClintock and other leaders in the water world, this group has been trying to get a hearing in the Central Valley for folks there to talk about the suffering of what is going on with this—one of the most devastating water shortages of our lifetime.

The Minority Members of this Committee, as I understand it, repeatedly request field hearings in the Central Valley to hear from these folks. I would recommend that we do that soon, and I would be happy to join in that hearing to listen to the people who are suffering in the central part of our state.

Last year, Senator Feinstein said, quote, "Our state's water crisis is seriously impacting the San Joaquin Valley and its communities, which depend on agriculture for their economic survival. A lack of water threatens to decimate the Valley economy, and some cities are already struggling with unemployment rates between 25 and 45 percent. This crisis is something that requires action and decisiveness."

That was several months ago and, obviously, the problem has only grown worse. Unfortunately, it appears to the people that we continue not to acknowledge the crisis in the Valley. With the current economic conditions throughout our state, we cannot afford to

ignore the water challenges before us. In addressing the challenges, I believe there are some areas where increased Federal involvement can be helpful. However, I also believe there are other areas where California would be better off if the Federal Government just simply got out of the way.

One matter that has emerged is a good example where Federal involvement can be helpful. The uncertainty caused by the recent judicial decision affecting the Quantification Settlement Agreement, the QSA, is something, I believe, the Department of the Interior must take an active role in dealing with. An active participant in the QSA negotiations, as I was, I can testify to the immense challenges and tough decisions involved in that agreement. Strong leadership by the Department of the Interior will be needed to ensure that the stakeholders are able to maintain the stability and certainty that is currently provided by the Quantification Settlement Agreement.

In Congress, the Water and Power Subcommittee has, on a bipartisan basis, even if they are expensive, Tom, authorized Federal funding for water recycling, other important water projects that have helped California water districts stretch the most out of our limited water supply.

The Federal Government should also play a role in the development and exchange of technological advancements in water supply infrastructure. However, as we are aware, Federal assistance will continue to be limited due to our poor financial condition. That being said, there are a number of things that we can do on the Committee and through the Administration and Congress to improve water in California and the economic conditions that will not cost the American taxpayers a single dime.

I firmly believe that it is the responsibility of this Committee and Congress to exempt the Delta pumping operations from the failed Endangered Species Act restrictions until the Bay-Delta Conservation Plan is complete, and a comprehensive solution for managing the Bay-Delta is in place.

The smelt population this past summer fell back to a historic low set in 2005, and now is well below the high points recorded in the late 1970s. Given these findings, I don't know how anyone can say the Delta pumping restrictions are benefitting the Delta Smelt. Meanwhile, the devastating economic impacts are undeniable. As Mr. Costa pointed out, even if we have significant rainfall and snow pack in the Sierras, because of the interpretation of the biological opinions, pumping can't take place. That is, I think, ridiculous.

Looking beyond the Delta, there are steps Congress should take to reduce the regulatory load placed on water districts constructing new water supply projects. If water districts are going to invest local rate funds to reduce their dependence on Federal water projects and other resources, we should not artificially inflate the cost of these projects by imposing unnecessary requirements. In other words, let us get the Federal Government out of the way, and make it easier for districts to provide an affordable and reliable water supply in California for small businesses.

Then one last thing, Madam Chairwoman. I would be remiss if I failed to express my condolences on the passing of two legends

in the California water world, former ACWA Executive Director Steve Hall, and former Orange County Water District Director and MWD Board member Wes Bannister.

Like many of you here, I had the pleasure of working with both Steve and Wes to address major challenges to our local area and state, like CALFED and the Quantification Settlement Agreement. Steve and Wes were true leaders, consensus builders who worked tirelessly to improve our state. To say they will be missed is an understatement, not only as leaders but as friends. Thank you, Madam Chairwoman.

Mrs. NAPOLITANO. Thank you, Mr. Calvert, and I now will call on Ms. Chu.

Mr. COSTA. Madam Chairwoman. I would just like to join with Mr. Calvert.

Mrs. NAPOLITANO. All of us, I think, would like to join with that.

Mr. COSTA. They were both wonderful individuals.

Mrs. NAPOLITANO. Yes, I knew them both.

Mr. COSTA. Steve's service is going to be on Friday in Sacramento.

Mrs. NAPOLITANO. Ms. Chu?

STATEMENT OF HON. JUDY CHU, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Ms. CHU. Well, thank you, Madam Chair Napolitano and Ranking Member McClintock, my colleagues on the Water and Power Subcommittee. Thank you for allowing me to participate and provide this statement at today's very important hearing on California's fragile water supply.

Two great issues face our state. First, many of our districts have been so hard hit by the economy and double digit job loss. Second, California faces such a dire water supply shortage, we are approaching our third year of an ongoing drought, and our economy is made up of many different sectors which are impacted either directly or indirectly by the availability of water. With the economy and water supply so inextricably dependent on each other, it is imperative that we start working together with a shared regional strategy to look for solutions to help adapt and mitigate our state's water supply.

I am proud to have a number of local and municipal water districts in my district of the San Gabriel Valley who have not only worked toward innovative water systems for clean-up, reuse, recycling and storage, but have also waged a campaign to raise awareness and educate businesses and residents about the importance of water conservation. As a result, there has been a significant reduction of water usage.

My hope is that we no longer look at our fragile water aquasystem and supply as an issue of Southern California versus Northern California, but that we come together as one state to work together to ensure that we have a quality and dependable water supply for our businesses, our farmers, our fisheries, and our communities for many generations to come.

In Southern California alone, we have been able to use Title XVI funds to help develop local water supplies and augment and replace imported water. Consequently, we have been able to reduce our

water usage in Southern California by 18 percent, even in light of an increasing population. Imagine what we would be able to do is we could come together and deal with this crisis with a statewide approach and, of course, include the important piece, which is active and engaged participation from our Federal agencies.

We in Congress must be fully engaged, and with the leadership of Chairwoman Napolitano, I look forward to working together with my colleagues and our delegation on how Congress can continue to stay engaged and bring better resources to deal with this ongoing water supply source that our state is facing.

I thank the witnesses who have traveled from near and far to provide their expert testimony, and I look forward to hearing your perspectives on the challenges and opportunities of California's water supply.

Mrs. NAPOLITANO. Thank you, Congresswoman Chu. Thank you for being with us and being part of this, because it affects everybody in Southern California as well as those in Northern California.

We move on to our witnesses. We have three panels, as stated before, and witnesses will be introduced before they testify. After we hear from a panel, we will have a question and answer period. All your submitted prepared statements will be entered into the record, and all witnesses are asked to kindly, please, summarize the high points of your testimony, because they will be on the record, and limit your remarks to five minutes, and the timer before you that will be used to enforce the rule.

It also applies to the question and answer period, a total of five minutes for questions, including responses, applies to our Members of Congress. If there are any additional questions, if time permits, we may have a third round, but don't bank on it. We have 13 witnesses.

The first panel, we have The Honorable Michael Connor, Commissioner, Bureau of Reclamation, Department of the Interior, from Washington, D.C. The second witness is Honorable Anna Caballero, Assembly Member of the California State Legislature, representing the 28th Assembly District in Sacramento, and the third panelist is The Honorable Lester A. Snow—congratulations, sir, on your recent appointment as the new Director of the California Department of Water Resources in Sacramento.

We are very thankful that you were able to find the time to be with us today. So we will begin with The Honorable Mike Connor.

STATEMENT OF HON. MICHAEL CONNOR, COMMISSIONER, BUREAU OF RECLAMATION, U.S. DEPARTMENT OF THE INTERIOR

Mr. CONNOR. Thank you, Madam Chairwoman and members of the Subcommittee. I am Mike Connor, Commissioner of the Bureau of Reclamation. I am pleased to summarize my written statement and give the Department's perspective on California's water supply.

Again, I am here with guarded optimism that the recent storms, which I do understand have brought some local flooding here in Southern California, have at least on the positive side brought water supply improvements for reclamations in major reservoirs in California, but this recent storm between January 15th up to Janu-

ary 20th started at Shasta, Folsom and Trinity and New Melones Reservoirs improved by about 361,000 acre-feet in total.

More rain followed this past weekend. A week of rain, however, does not make up for three years of drought. Notwithstanding improvements, the major CVP reservoirs still only range from 60 percent to 77 percent of average storage for this time of year. Nonetheless, we are hopeful that, as we move through the rainy season, the positive trend will continue.

I should note for the record, though, in response to the initial statements, that right now we are pumping from the Federal facilities, the Jones Pumping Plant. In total, the combined state and Federal pumps are pumping approximately 6,000 CFS. The Smelt Working Group did meet this morning, and there were no recommendations to restrict the pumping at this point in time. So that is where we are currently. There is a restriction in place as a result of the NOAA Biological Opinion that is currently the basis for the 6,000 CFS but, nonetheless, there is substantial——

Mrs. NAPOLITANO. Commissioner, would you restate that? We have Mr. Costa who wants to hear you. You are not coming in loud enough.

Mr. CONNOR. Oh, I am sorry.

Mrs. NAPOLITANO. The last statement that you just made.

Mr. CONNOR. So in response to the comments earlier, with respect, I just wanted to provide the Subcommittee a status update on where we are with respect to pumping from the combined state and Federal water projects. We are presently pumping about 6,000 CFS from those facilities. The Smelt Working Group did meet this morning to review the conditions. There were no recommendations for any restrictions on the pumps. Currently, there is a limitation provided by the NOAA Biological Opinion that limits the negative flow in the Owens and Middle Rivers to -5000 CFS. So currently that is what is operationally keeping the pumping at 6000 CFS.

Mr. CALVERT. Madam Chairwoman, just a technical——

Mrs. NAPOLITANO. Can you wait until the questions later.

Mr. CALVERT. All right.

Mrs. NAPOLITANO. Please continue.

Mr. CONNOR. I should also note that recent rains have helped storage in the Lower Basin of the Colorado River watershed. Fortunately, Lake Mead has gained a little bit of elevation this past week as less water was being used downstream as a result of the wet weather. Overall, the current trend is one of improvement from the water supply's perspective.

It goes without saying, though, that drought impacts California uniquely due to its large population, reliance on imported supplies, and the intense competition for the use of limited supplies.

At the end of the last California drought, which lasted from 1987 to '92, California's population was just over 31 million. Today, there are roughly 7 million more Californians, all of whom need water, and the agricultural production and other economic activities supported by water. In this setting, the Subcommittee's focus on water conservation is right on point. Other means of enhancing supply are also appropriate to consider.

One of the most successful Federal programs for water conservation is the Reclamation's Title XVI program. In Southern California

this program has enabled reclamation to support 26 water recycling or groundwater projects which at full build-out will provide over 392,000 acre-feet of water per year to communities in Southern California.

Last year, President Obama signed the American Recovery and Investment Act, and this has provided an opportunity to make meaningful progress in addressing the backlog of Title XVI projects, and it will help reduce dependence on the increasingly fragile Bay-Delta in the long term. All told, more than 400 million, roughly 40 percent of Reclamation's Recovery Act funding, has gone to California projects, significantly more than any other reclamation state.

We are applying this funding to a mix of projects to promote not just traditional water supplies but also restoration efforts to improve the ecosystem and stabilize Reclamation's own ability to delivery water. Still, concerted efforts of water conservation cannot erase the fact that Southern California depends on imported water for the majority of its total annual water supply. Using 2004 as a reference, within the Metropolitan Water District Service Area where we are today, 1.8 million acre-feet came from the state water project from the Sacramento-San Joaquin Delta. Another 700,000 acre-feet came from the Colorado River to the east. The remainder of that imported supply, roughly 200,000 acre-feet, comes from the Owens Valley.

As California continues to diversify its water supply and promote conservation and efficiency, it is imperative that we continue to improve conditions in the Colorado River Basin and the Bay-Delta region. Notwithstanding drought, the Colorado River apportionment to California this year will be the full 4.4 million acre-feet. Reclamation in the seven Basin states and a number of partners have made great progress in the last 10 to 15 years in adjusting operational issues in the Colorado River Basin and preparing for the day when demand exceeds available water. This effort continues to be a work in progress——

Mrs. NAPOLITANO. Please continue. You have a minute left.

Mr. CONNOR. Thank you, Madam Chairwoman. And we look forward to continuing our efforts to use water more efficiently and to conserve storage, wherever possible.

With respect to the QSA, that is a matter that is currently in litigation, but I will say that the Federal Government believes it has valid agreements with the parties to the QSA, and we intend to stand by those agreements.

Parts of the Bay-Delta are less certain at this time. The importance of the Bay-Delta to Southern California's water supply was starkly evident in 2009.

To address the issues associated with restricted water supply and environmental conditions in the Delta, the Department released an Interim Federal Action Plan for the California Bay-Delta on December 22, 2009. In this document we have detailed plans for a new path forward in the Bay-Delta region.

Specifically, the Federal Government reaffirmed its partnership with the State of California and its commitment to coordinate a range of important actions with those of the state. Most important is our joint work to produce the Bay-Delta Conservation Plan. The

BDCP is the most significant effort underway to address long-term water issues in California generally and in the Bay-Delta specifically. The Federal Government is fully committed to the BDCP process and is now more fully engaged than ever before.

We will ensure that Federal actions in this area complement recently enacted California water legislation, with the ultimate goal of being able to deliver water on a reliable basis without continued harm to the Bay-Delta ecosystem.

In the meantime, we will continue to implement actions in the near term to shore up water supplies for those water users suffering significant shortage. In 2010 we will facilitate final permitting construction of the Delta-Mendota and California Aqueduct Intertie, which will allow greater flexibility in operating the state and Federal pumps and allow for recovery of water between the two systems. We expect to initiate construction in June of this year and to complete that in the fall of 2011.

Ultimately, the project is anticipated to restore approximately 35,000 acre-feet annually of project water to the CVP. We will also continue to work closely with the state to facilitate voluntary water transfers, building on the 600,000 acre-feet of transfers that occurred in 2009. Maximum operational flexibility will also be pursued in the scheduling guidelines and water contracts.

Thank you again for the opportunity to testify on this important subject. I will be happy to answer the questions at the appropriate time.

[The prepared statement of Mr. Connor follows:]

Statement of Michael L. Connor, Commissioner, Bureau of Reclamation, U.S. Department of the Interior

Madam Chairwoman and members of the subcommittee, my name is Mike Connor, Commissioner of the Bureau of Reclamation. I am pleased to provide the perspectives of the Department of the Interior (Department) on the California water supply as we move into what may prove to be a fourth year of drought in California. I will also address some of the subcommittee's specific interests in water conservation, reuse and recycling.

Last year, the water supply conditions confronting the Bureau of Reclamation (Reclamation) and its customers in California, particularly south of the Delta, brought about one of the most difficult years in our history. This year may prove to be no less severe. Next month, Reclamation's Mid-Pacific Region will announce its initial forecast of agricultural, municipal and industrial water supplies from the Central Valley Project (CVP), which will likely feature very low water allocations. The actual numbers are still being determined by our Central Valley Operations office using the latest snowpack and streamflow data. Here in the Lower Colorado Region, a drought persists on the Colorado River, but all states in the Lower Basin will receive their full apportionments under the Annual Operating Plan (AOP) for the Colorado River which was published by the Department on January 5th.

While there have been more severe droughts, never before has drought fallen upon a state with so large a population, and so many competing uses for its water. At the end of the last California drought, which lasted from 1987 to 1992, California's population was just over 31 million. Today, there are roughly seven million more Californians, all of whom need water and the agricultural production and other economic activities supported by water.

Here in southern California, local governments and agencies like the Metropolitan Water District of Southern California (MWD) have responded by partnering with state and Federal agencies to achieve tremendous reductions in per capita urban water use. For example, the City of Long Beach has reduced its per capita water use from 138 gallons per day in 2000 to 103 gallons per day in September 2009. In addition to this tremendous reduction in water use through conservation, the City of Long Beach announced in September 2009 that water demand was 21 percent below the 10-year average water demand. While market forces and the price of water play a role in this dynamic, the region's inherently dry hydrology has in-

stilled an acute awareness of the value of water and its conservation in an arid region.

One of the Federal programs for water conservation is the Reclamation Wastewater and Groundwater Study and Facilities Act, Title XVI of Public Law 102-575. In southern California, this program has enabled Reclamation to help fund the planning or construction of 26 water recycling or groundwater projects which at full build out will provide over 391,650 acre-feet of water per year to communities in the greater Southern California coastal areas of Los Angeles, Orange County, San Diego and the Inland Empire. This amount of water is enough to serve the needs of approximately 391,650 five-person households, or approximately 1.96 million people. Before the enactment of the American Recovery and Reinvestment Act (ARRA), Federal investments in Title XVI overall totaled about $389 million through FY 2009 and resulted in an estimated 245,000 acre-feet of water made available in 2009.

The Title XVI program was established by Congress in 1992 to provide Federal funding of up to 25% of a project's construction costs, with all operations and maintenance funding provided by project sponsors. While the program has provided more than $392 million in funding for these southern California projects since its inception through Fiscal Year 2009, including ARRA, the number of Title XVI projects submitted to Reclamation for study and to this subcommittee for authorization continues to expand.

In view of this and the serious water issues facing California, the Obama Administration is taking actions that have brought and continue to bring substantial Federal investment in California's water infrastructure. As referenced above, last year President Obama signed the American Recovery and Reinvestment Act (ARRA). This law has provided an opportunity to fund many of California's water challenges and projects, will help maximize the continued and future delivery of water, and may reduce some of the demand placed on the Bay-Delta. All told, more than $400 million, roughly 40 percent of Reclamation's ARRA funding, has gone to California projects, significantly more than any other Reclamation state. We are applying this funding to a mix of projects to promote not just traditional water supplies, but also healthy fisheries and habitat projects to recover, sustain, and protect species' ability to reproduce and thrive. We understand our obligation to protect aquatic resources in California together with our state and Federal partners, and we know that the economic impacts of fishing season closures on salmon fishing communities are felt no less severely than in other sectors of the economy.

The Department effectively maximizes the value of its scarce resources for Title XVI projects and complementary programs like Water Conservation Initiative Challenge Grants. Challenge Grants, like Title XVI, leverage non-Federal dollars to effectively and efficiently manage water in communities where the need exists. Whereas Title XVI recycles and reuses otherwise unusable water supplies, Challenge Grants provide incentives for water users to actually use less water than would otherwise be the case. The Department's Water Conservation Initiative, which incorporates Title XVI and Challenge Grants, was a centerpiece of our 2010 budget request, and will be a continuing priority of this Administration going forward. In addition, last summer Reclamation announced 16 awards totaling $5.6 million as part of the 2009 CALFED Water Use Efficiency Grant Program. Even before the drought struck, Reclamation had been putting significant effort and resources into various initiatives intended to minimize the serious impacts from periods of dry hydrology. Since 2004, Reclamation has awarded over $40 million in cost-shared financial assistance for 67 projects in California under the competitive Challenge Grant Program referenced above. The improvements resulting from these grants are projected to create or conserve 177,000 acre-feet of water annually for agricultural and urban uses.

Still, concerted efforts at water conservation cannot erase the fact that southern California depends on imported water for the majority of its total annual water supply.[1] The amounts vary depending on the water year type. Using 2004 as a reference, within the MWD service area where we are today, 1.8 million acre-feet came from the State Water Project from the Sacramento/San Joaquin Bay-Delta in the north. Another 700,000 acre feet in 2004 came from the Colorado River to the east. The remainder of the imported supply, roughly 200,000 acre-feet, comes from the Owens Valley. About 1.6 million acre feet, or 38 percent of MWD's overall supply

[1] All figures in this paragraph derived from the November 2005 Regional Urban Water Management Plan of the Metropolitan Water District of Southern California, pgs. A2-1, and table A.2-1 http://www.mwdh2o.com/mwdh2o/pages/yourwater/RUWMP/RUWMP—2005.pdf

in 2004, came from local supplies, according to MWD's most recent Regional Urban Water Management Plan.

Notwithstanding drought, the Colorado River apportionment to California this year will be the full 4.4 million acre feet, with the potential for some surplus under the Annual Operating Plan (AOP) for the Colorado River. The Quantification Settlement Agreement (QSA), executed by the Secretary of the Interior and other parties in October 2003, was a major milestone on the Colorado River and is important to all who rely on the Colorado River. In short, the numerous Federal and non-Federal agreements reached in 2003 result in a more efficient management of the beneficial use of water in California under the Consolidated Decree in Arizona vs. California and other authorities. The QSA agreements help to ensure that California's long term use of the river is within the State's 4.4 million acre-feet annual apportionment under Federal law.

Validation proceedings relating to certain of the agreements reached in 2003 are currently pending in California state court. These are contested proceedings to which the United States is not a party. The litigation is ongoing in 2010, and the Department does not intend to comment on those proceedings. The Department has valid and binding agreements with the California agencies that are parties to the 2003 Colorado River Water Delivery Agreement and we intend to stand by that agreement.

The importance of the Bay-Delta to Southern California's water supply was starkly evident in 2009. To address the issues associated with restricted water supply and the environmental collapse in the Delta, the Department released an Interim Federal Action Plan (Action Plan) for the California Bay-Delta on December 22, 2009. In this document, this Administration has detailed its plans for a new path forward in the Bay-Delta. Specifically, the Federal government reaffirmed its partnership with the state of California and its commitment to coordinate actions with those of the state. Most important is that Federal agencies are working in concert with the State of California and local authorities in producing the Bay-Delta Conservation Plan (BDCP). The BDCP is the most significant effort currently underway to address critical long-term water issues in California generally and in the Bay-Delta specifically. Consistent with the Action Plan released in December 2009, Federal agencies are bolstering their active participation in partnership with the State and local authorities in the collaborative, long-term Bay-Delta Conservation Plan (BDCP) process.

Simply put, we are committed to work closely with the state of California, our Federal partners, water contractors, and all interested parties to encourage the smarter supply and use of Bay-Delta water. In 2010, we will facilitate final permitting and construction of the Delta-Mendota and California Aqueduct Intertie. The Intertie will be a pipeline and pump station connection between the Federal Delta-Mendota Canal and California Aqueduct. Connecting these two facilities will allow greater flexibility in operating pumping systems which each have their own export constraints, and allow for recovery of water between the state and Federal systems. The Intertie's operations are included in the new biological opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service for the Delta. Intertie construction effects on terrestrial species were addressed in a project-specific biological assessment in August 2009. We expect to initiate construction in June of this year, and complete construction in 2011.

Under the Action Plan released in December 2009, we will continue to foster water transfers between willing buyers and willing sellers, improve scientific knowledge of turbidity and Delta smelt, and use results from a pending National Academy of Science study on how to best balance water delivery needs with those of threatened and endangered species. The Federal agencies also will work closely with the state in developing mid and longer-term infrastructure options that can potentially address the chronic conflicts that led the Delta Vision report commissioned by Governor Schwarzenegger to conclude that current water supply strategies are unsustainable in the face of the Bay-Delta ecosystem collapse, climate change impacts and seismic risks.

Finally, we will work together to continue to deliver drought relief funding and ensure integrated flood risk management, including the prioritization of projects and activities for flood risk management and related levee stabilization projects and navigation. The Action Plan features participation from the Department, the Army Corps of Engineers, the Department of Agriculture, the Environmental Protection Agency, the Department of Commerce, and the Council on Environmental Quality.

Of course, groundwater will continue to be an essential water supply for many of California's coastal and inland communities. With the combined impact of the drought and environmental needs, existing groundwater sources are being significantly stressed. Within the Department, the U.S. Geological Survey is actively en-

gaged in expanding the range of information available to water users and policymakers regarding groundwater. The USGS developed the Central Valley Hydrologic Model to assess water resources in the Central Valley, which is an important tool to evaluate the impacts of drought on groundwater conditions. Reclamation has helped fund new USGS work to combine use of the Central Valley Hydrologic Model with new data collection to look specifically at potential subsidence impacts on water-delivery canals. This new hydrologic model can also be used by water managers to address water issues related to conjunctive water use, recognizing the interdependence of surface water supplies and groundwater.

According to the USGS, the San Joaquin Valley, which includes the San Joaquin and Tulare Basins, has experienced large changes in groundwater storage. In the early 1960s, groundwater pumping caused water levels to decline to historic lows on the west side of the San Joaquin Valley, which resulted in large amounts of surface subsidence. In the late 1960s, the surface-water delivery system began to route water from the wetter Sacramento Valley and Delta regions to the drier, more heavily pumped San Joaquin Valley. The surface-water delivery system was fully functional by the early 1970s, resulting in groundwater-level recovery in the northern and western parts of the San Joaquin Valley. Overall, the Tulare Basin portion of the San Joaquin Valley, the hottest and driest part of the Central Valley, is still showing declines in groundwater levels and accompanying depletion of groundwater storage. This fact will affect the overall water supply available to agriculture water users.

Reclamation remains focused on managing, developing, and protecting water and related resources in an environmentally and economically sustainable manner in the best interest of the American public. We know that an emphasis on water conservation is key to the sustainability of the state of California. I am committed to doing all I can to further this mission and, to the best extent possible, meeting the needs of our customers.

Thank you again for this opportunity to testify on this important topic. I would be happy to answer any questions the subcommittee may have.

Mrs. NAPOLITANO. Thank you, Commissioner.

Now we will hear from Assemblywoman Anna Caballero.

STATEMENT OF HON. ANNA CABALLERO, ASSEMBLY MEMBER OF THE CALIFORNIA STATE LEGISLATURE, REPRESENTING THE 28TH ASSEMBLY DISTRICT, SACRAMENTO, CALIFORNIA

Ms. CABALLERO. Good afternoon, Madam Chair and members. It is quite good to be here today. Thank you for the invitation.

As you heard, I represent the 28th Assembly District, which is primarily an agricultural community representing the Salinas Valley, San Benito County, Watsonville and Delroy. It is a major area where fruit and vegetables are produced, and I am here today because we really have an opportunity to work in partnership, and it is going to be absolutely critical.

I do apologize. I will make my comments very brief. I had expected to have 15 minutes to speak. I was prepared to talk about the recent legislation that was passed in Sacramento. I will refer you to the documents that have been prepared by the Water Resources Board to have detailed information, and so I won't go into that.

Mrs. NAPOLITANO. Ms. Caballero, would you just mention where they are so that the public and Members of Congress would know.

Ms. CABALLERO. Yes. The documents, Madam? The documents are the Safe and Clean Reliable Drinking Water Act of 2010, which is the water bond document, and then a Comprehensive Water Package, which is four bills that we adopted at the same time. You will see the Water Bond on the ballot, or you should, in November 2010.

I wanted to take a minute today to reemphasize the issue of the lack of water for the Central Valley, because it also impacts the 28th Assembly District, which is San Benito County. I apologize for reiterating the facts, but I think they absolutely have to be discussed here today, because the fact that we are not able to take care of the ecosystem and export water at the same time has had a tremendous impact, negative impact, on the Central Valley and San Benito County.

It is carving a huge depletion of groundwater reserves in that area, and it is anticipated to create a significant loss of land as the property starts to subside and you lose the opportunity to store groundwater. But more importantly, 500,000 acres of farmland has been idled due to the lack of water. Over 21,000 jobs have been lost at a time when we can least afford to lose those jobs, $1 billion in economic loss in the agricultural sector.

Small businesses are at risk, and there are long food lines, and you will hear today that many farmers are at risk of losing their property. I have recently heard of farmers that have been multi-generation farming that have lost their property, absolutely unacceptable in one of the richest agricultural valleys in the world and in our country.

You have heard that small communities in the west side of the Valley, Mendota and Firebaugh, have faced 40 percent unemployment and that people are standing in long food lines. These communities can't survive another year with minimal allocations, and we have heard this year that the allocation will be five percent. While we are hoping that the region range will change that. Five percent allocation means that there will be no farming.

It is absolutely imperative that we work together, the state government and the Federal Government, to do everything we can to work collaboratively, and let me give you an example of one of the frustrations. As we were negotiating the package of bills, the water bills, in the fall, I had an opportunity to travel to Washington, D.C., where we discussed with the Administration the opportunity to invest in the Two Gates Project, which would provide an opportunity for us to see if we could separate the Delta-Smelt from the turbid pumps in the Delta.

We understood that that was a high priority for the Administration. We, therefore, put into our package of bills $28 million in state funding and moved ahead very quickly on that, because we wanted to see that project come to life. We understood that the Federal Government had put up $10 million, and recently learned last week that that project is off the table.

It is very frustrating to have worked so hard to create an opportunity to create a solution and then have it eliminated without any discussion about why that happened and what our next plan is.

So to wrap up, it is absolutely imperative that we come up with some vigorous discussion about how we can solve this water problem, how we can get water immediately to the Central Valley at a time when we have such high unemployment here in the state to put people back to work, which could make a big difference and could show that, in fact, we are working together, the state government with the Federal Government, to try to solve a problem that has been created.

So I thank you for the opportunity to be here today and look forward to continued discussions, and I want to recognize the Chair. She has really been an advocate of a water solution, and I appreciate the opportunity to testify.

Mrs. NAPOLITANO. Thank you so very much for being here and for your kind words. It is my understanding that Two Gates is not off the table. It is just delayed because of certain issues. So we look forward to hearing more on that.

[The prepared statement of Ms. Caballero follows:]

Statement of The Honorable Anna Caballero, Assemblywoman, California State Legislature

Madame Chair Napolitano, my name is Anna Caballero and I represent the 28th District in the California State Assembly. Thank you for convening this hearing here in California on our water supply challenges. We appreciate your drawing the attention of the Congress to some of the difficulties we have experienced—and continue to confront—on ensuring reliable water supplies for our state's agricultural, urban and environmental needs.

While we benefited from a good amount of rain all over California last week, our water challenges remain. This year's State Water Project initial water delivery allocation was 5% of contract entitlements—the lowest in history. Last week's rain and snow helped, but we will need a substantial amount more than average to refill our water storage reservoirs. The Sacramento-San Joaquin Delta remains in crisis, for both its ecosystem and water exports. The recent drought has led to depletion of our groundwater reserves. We have many challenges ahead and, hopefully, with the State and the Federal Government working together, we will take advantage of the opportunities that arise.

Last year, the Legislature stepped up to address some of the critical water challenges California faces. We took important first steps on several issues, but they are only the first. We need all agencies, stakeholders and communities to step forward to make some difficult decisions in the years ahead. The Legislature has set some new directions, a path forward, but we need all critical players to move forward on that path.

The Federal Government is one of the most important players in California water. It holds the largest block of water rights in California—about 7 million acre-feet. It has broad authority—and responsibility—to address water and aquatic ecosystem problems, particularly in the Delta. While the Congress has shown a "consistent thread of purposeful and continued deference to state water law," the Federal Government has a long history of leadership in California water issues. We need the Congress and the Obama Administration to step forward to contribute to resolving some of our most pressing water issues.

In last year's Delta/Water Legislation, we invited the Federal Government to participate and offered contributions to facilitate that participation. The best way to start the discussion of how we might work together is a summary of the legislative package:

- **SB 1 (Simitian)/Delta Legislation:** Reforms state policies, programs and governance for the Sacramento-San Joaquin Delta (Delta), and establishes guidelines for developing a new Delta Plan. Appropriates $28 million for the federal "Two Gates" project in the Delta.
- **SB 2 (Cogdill)/Water Bond:** Authorizes an $11.14 billion water infrastructure bond for the November 2010 ballot. Funding categories include drought relief, the Delta, water storage, integrated regional water management, watershed conservation, groundwater quality, and water recycling.
- **SB 6 (Steinberg)/Groundwater Monitoring:** Creates a statewide groundwater elevation monitoring system, relying on local agencies in all basins to report the depth to groundwater.
- **SB 7 (Steinberg)/Water Conservation:** Establishes a statewide water conservation program, in a new "Sustainable Water Use and Demand Reduction" part in the Water Code (Part) and reauthorizes the Agricultural Water Management Planning Act. Sets an urban water conservation target of 20% reduction in per capita water use by 2020, allowing flexibility for local agencies to determine how best to accomplish that reduction.
- **SB 8 (Steinberg)/Water Reporting & Appropriations:** Deletes water diversion reporting exemptions for diverters in the Delta. Appropriates funding from

bonds and a special fund for increased State Water Resources Control Board enforcement staff and other Delta/water projects.

As a package, these bills address several of California's water challenges, but I wish to draw your attention, in a bit more detail, to the Delta bill—Senate Bill 1 by Senator Joe Simitian. The Delta is where we need the Congress and the Federal Government to engage the most. The operation of the federal Central Valley Project translates into several federal agencies taking action in the Delta—the Bureau of Reclamation, the Fish and Wildlife Service and the National Oceanic and Atmospheric Administration—and federal courts intervening in those activities.

We structured the Delta bill to invite the Federal Government to engage with us in setting a new direction for Delta policy. In enacting this legislation, we exercised the State's authority over the control, appropriation, use, and distribution of water generally. In structuring the development of a new Delta Plan, we required state agencies to take actions that would engage the Federal Government, including requiring:

- Delta Stewardship Council to consult with federal agencies in developing the Plan.
- Development of the Delta Plan consistent with federal laws, including the Coastal Zone Management Act, the Clean Water Act and the Reclamation Act of 1902.
- Delta Stewardship Council to submit the Delta Plan to federal agencies for approval, if the Delta Plan is adopted pursuant to the federal Coastal Zone Management Act.

This last requirement, in particular, invites the Congress to engage in thinking about a new federal law to improve federal and state agency cooperation in the Delta. Section 85300(d) of the California Water Code allows submission of the Delta Plan to any federal official assigned responsibility for the Delta pursuant to a new federal statute, anticipating that Congress may enact a new law in response to the State's new statutory framework for the Delta.

Let me be clear: We invite you to work with us in the Legislature in crafting a new legal relationship between the state and federal governments in the Delta. Our legislation sets a new course, but requires many decisions in the years ahead. It establishes a framework for structuring the federal-state relationship, but only Congress can enact laws to require federal agencies to work with us and follow our State's leadership. We hope to have the opportunity to work closely with you on the challenges we all face in the Delta

We need to craft an enduring relationship that ensures federal engagement regardless of who sits in the White House. For eight long years, the Bush Administration ignored its responsibilities in the Delta. When Secretary Salazar showed up for a Delta helicopter tour last year, we were delighted to welcome him to one of our greatest water debates—the first time a Secretary of the Interior had visited the Delta since Secretary Bruce Babbitt visited several times in 2000, during development of the CALFED Bay-Delta Program. Bureau of Reclamation Commissioner Mike Connor also has visited our state on several occasions. We need to find a way to institutionalize that level of federal engagement in protecting the Delta to achieve the co-equal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem."

Our two legislative bodies working together to fashion that enduring relationship between our governments offers the best opportunity for our State of California to overcome the challenges it faces in water policy.

Mrs. NAPOLITANO. The Honorable Lester Snow.

STATEMENT OF HONORABLE LESTER A. SNOW, DIRECTOR, CALIFORNIA DEPARTMENT OF WATER RESOURCES, SACRAMENTO, CALIFORNIA.

Mr. SNOW. thank you, Madam Chair and members. I appreciate the opportunity to talk about California's water issues. I submitted a statement, but I will hit a few other points, not directly within that statement.

I first want to indicate that both documents that Assembly Member Caballero brought in are available on the Department of Water Resources website for anybody who would want to access them.

First, let me put a finer point on what I will call the water supply update. As has already been mentioned, in 2009 we finished that. That was the third drought year in California. Last year, the State Water Project stood at a 40 percent allocation. The West Side CVP was at a 10 percent allocation. Water Resources started this year with a preliminary allocation for our contractors of five percent. That is the lowest in the history of the State Water Project.

Fortunately, the storm track that has already been referenced—our snow pack is about 115 percent of normal to this date. The reason I stress this date is, if this is the snow pack we had at the end of the season, it would only be a 64 percent of average supply. We will do the snow survey on Friday, and new updated appropriations on the 20th of February.

If the storm track holds, we will do a little bit better, but actually, the fact that we are talking about a storm track and whether it will bail us out is actually a symptom of the problem that we have, and that problem is a water management system that is no longer keeping up with our needs. As a result of climate change, environmental degradation, and lack of sustained investment in the system, our water system can no longer meet the needs of the state.

We need a long-term, comprehensive solution. In order to have a sustainable water resource system, our water management system must permanently change to a diversified approach. That means we have to look at energy, water and environmental issues.

The Governor has consistently promoted the comprehensive approach that ranges from conservation, recycling, habitat restoration, to new reservoirs and new conveyance facilities in the state. We are long past the point that a single project or strategy can bail us out. Some might like to say, all we need to do is more conservation. Some might like to say, all we need to do is build one more reservoir. The fact of the matter is we have to implement all of those options. The Governor has consistently proposed an infrastructure investment strategy that attempts to fund all of those activities, a diversified approach.

Let me hit just a few points along those lines. Our entire system is based around development and use of surface water and the development of groundwater supplies. It is the stable foundation of our water system. If we are conserving water, we are conserving surface and groundwater that has been developed. Therefore, recycling water, it is dependent on surface and water supplies. We must reinvest in our surface and groundwater systems in order to make it through this problem and deal with the century to come.

Conservation is a great opportunity. There is much to be saved and provided in terms of stability through our conservation efforts. In terms of urban areas of California, there is approximately 9 million acre-feet that is used in urban California. Well over half of that is used outdoors. There is great conservation potential to save outdoor water use in urban areas, with little, if any, impact to lifestyle in the state.

We estimate that somewhere in the neighborhood of 2 million acre-feet of additional conservation savings is available in urban areas without affecting lifestyle. The Governor has pushed and committed to achieving 20 percent reduction in use by 2020, and

the Legislature passed for the first time ever a conservation bill. Implementing that conservation bill not only will save water, but will actually reduce CO_2 by 1.4 million metric tons.

Recycling water use: Today we recycle about 250,000 acre-feet. There is a potential for as much as 2 million acre-feet. Today we have about 160,000 acre-feet of desalination capacity, with another 400,000 on drawing boards.

Now let me close very quickly with a couple of fundamental points. Our future lies in fixing the Delta. That means restoring habitat, changing conveyance, and addressing the other stresses that are affecting the species beyond the water system. It means passing the water bond. The water bond funds new storage, conservation, recycling, local conveyance, and habitat. We need to reinvest in our water future.

Finally, let me reiterate the point that the Commissioner has already mentioned, the state's commitment to QSA. No matter what the Judge has done, whether through appeal or whether through a change in the contract, QSA will stay together, and we will meet the needs of those agreements. Thank you.

Mrs. NAPOLITANO. Thank you, Director Snow.

[The prepared statement of Mr. Snow follows:]

Statement of Lester A. Snow, Director,
California Department of Water Resources

Introduction

Chairwoman Napolitano, and members of the Subcommittee, I appreciate the opportunity to appear before you today to discuss the challenges and opportunities facing California's water supply.

Recognizing the critical importance of a reliable water supply to our economy and our environment, Governor Arnold Schwarzenegger's administration has focused unprecedented resources and leadership to address the state's water issues. Those efforts culminated this past November with the passage of a comprehensive water package and bond proposal that will reform, rebuild and restore California's water system. At the federal level, focus and support from our California Congressional delegation and the Obama Administration has been vitally important in dealing not only with our current water crisis but also the steps necessary for our long-term water reliability and security.

There is no single approach to managing California's water resources or the entirety of our state's natural resources in the face of ecosystem needs, the needs of a struggling economy, and the impacts of climate change. However we have the opportunity to implement programs and make management decisions based on strong science that achieves a new level of sustainable and integrated resource management. This may not be easy, but a sustainable resource management approach is the only way we can move forward in the 21st century.

Today I would like to discuss current water conditions and how that relates to Southern California's water supply. I would also like to provide the Subcommittee with an overview of the comprehensive legislative package I just mentioned, and finally discuss the importance of a strong federal-state partnership to address the Delta and other statewide water issues.

Water Supply Conditions

As you know, 2009 was a third straight year of drought in California. We saw 500,000 acres of farm land fallowed or pulled out of service. There are more than 60 water agencies with mandatory conservation requirements. We have seen significant and alarming over drafting of groundwater basins. Going into this winter, the carryover in the state's major reservoirs was one-third to one-half below normal. The latest Fall Midwater Trawl by the California Department of Fish and Game, which measures fish populations, has the lowest indices on record for delta smelt and longfin smelt. This is further evidence that the Delta, through which much of the water supply for Central and Southern California is conveyed, is an ecosystem in peril and in desperate need of restoration.

Last month, the Department of Water Resources announced the lowest initial allocation on record for the State Water Project—just 5% of contractor requested amounts. The initial allocation is a very conservative estimate of what we expect to deliver in 2010 as a percentage of SWP contractors' initial requests for water deliveries. At that time, our Sierra snowpack levels were well below normal. Over the past 10 days, we have seen a marked improvement in conditions. But even if we end this year with normal levels of snow and runoff, our water supply outlook will not improve significantly. Regulatory restrictions on Delta exports in the spring and early summer will make it difficult to deliver water to Southern California, the Central Valley, the Bay Area and coastal cities, even if it is available in our reservoirs. Hopefully the current "El Niño" track of storms will improve our water supply conditions without causing significant flood damage.

Climate Change

Many factors contribute to our current water crisis. From recent regulatory ecosystem protection measures to a multi-year drought, combined with an overlay of climate change that is not only affecting current conditions but will increasingly impact our water systems. Climate change impacts, including less snowpack, higher flood peaks, and sea level rise, create new uncertainties. By 2050, scientists project a loss of at least 25 percent of the Sierra snowpack with more of our precipitation occurring in the form of rain because of warmer temperatures, increasing the risk of flooding. More variable weather patterns may also result in increased dryness in the southern regions of the state.

Many of the effects that could occur due to climate change can be mitigated, in part, with the same water management strategies one would employ when dealing with an extended drought.

DWR's strategy to mitigate the combined effects of climate change and a decrease in the snowpack is multi-pronged and diverse. We are building a diverse and comprehensive "portfolio" of water management strategies that are effective in combination with each other, both in the short-term and long-term.

In the short-term, DWR is promoting and financing programs which increase public education and awareness about water use and improve and increase water conservation and water recycling throughout California. We are striving to improve our emergency response to both flood and drought conditions. Of particular note, we activated our Drought Water Bank program last year, and a Water Transfers Program for this year to help alleviate statewide drought conditions. The Drought Water Bank serves as the "broker" between parties seeking to market or sell some or all of their legal water supplies to buyers who have critical water needs such as orchard growers. DWR staff responsible for the day-to-day operations of the State Water Project work closely with operators of the Central Valley Project and staff of the National Weather Service to optimize the efficiency and effectiveness of joint water project operations in tandem with forecasted weather conditions.

Regional Planning, Research and Technological Advances

For the longer-term, DWR continues to be involved in funding research and advising on the development and advancement of new technologies such as desalination and water recycling, developing better climate change modeling capabilities and the administration of regional water use efficiency programs such as the Integrated Regional Water Management Program.

DWR utilizes and continues to develop a variety of tools to forecast water supply dynamics. One of our significant efforts involves collaboration with NASA (National Aeronautical and Space Administration) to incorporate satellite imagery data into our assessments of snowpack extent and depth using different radar technologies. We are also developing detailed models of individual watersheds, within the larger Bay-Delta watershed, which can predict amounts and timing of snowmelt runoff, as well as runoff temperature.

In an effort to better balance the needs for protection of potentially catastrophic flooding and a dwindling water supply in Central Valley reservoirs, new Forecast-Coordinated Operation partnerships are being developed among the reservoir operators and hydrologic forecasting agencies to improve decision support systems and to take advantage of improved meteorological forecasting to better optimize real-time reservoir management.

Colorado River

Another major source of water supply for Southern California is the Colorado River. The Quantification Settlement Agreement—or QSA—is particularly important to ensure California preserves stability in its Colorado River supplies. The State Superior Court's recent tentative ruling invalidating key elements of the QSA agreements threatens California's water supply reliability; however, it is important

to stress that the QSA parties, including the State of California, intend to work together to deal with issues raised in the court's ruling and jointly, will preserve this important agreement.

Policy Priorities and Funding

We have a serious and complex water crisis looming in California, but this is also a time of great opportunity. It is a time for creativity, a time for new ideas, and most importantly, a time for action to ensure that future generations have a clean, reliable water supply that we've enjoyed for decades in this state.

The legislative package that was passed in November with bipartisan support, and signed by Governor Schwarzenegger, recognizes the importance of solving California's complex water problems. It signals a commitment to the co-equal goals of water supply reliability and ecosystem restoration, a workable Delta governance structure and a clear path for the Bay Delta Conservation Plan. And it includes, for the first time, statewide conservation requirements for urban and agricultural water users as well as groundwater monitoring.

We now have a policy framework for moving forward and a proposed $11 billion bond that will be on the November ballot. The bond is essential, providing funding for virtually every water management project that we can conceive of. This includes funding for water supply reliability, drought relief, surface and groundwater storage, Delta restoration, water recycling, conservation, watershed restoration, and groundwater protection and cleanup. Every region in the state will benefit from these funds. A portion of funding is guaranteed to each of the hydrologic regions, and all regions are eligible to compete for additional funding to help finance water management projects and programs with local, regional and statewide benefits.

The South Coast region, which includes parts of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties would receive $856 million for water supply reliability projects and be able to tap into a share of $6.3 billion in other regional and statewide funding from the bond.

The Sacramento-San Joaquin Delta

The Delta is not just the hub of California's water supply system, but a dramatic and critical manifestation of complex resource conflicts. It is, in many respects, the canary in the coal mine and the mine in this case is, "How will society deal with complex resource conflicts at a statewide and national level?" How do we find that balance between our economy and our environment as we move forward?

The answer to that question lies to a large degree in a process we and numerous other government and non-government entities are currently engaged in known as the Bay Delta Conservation Plan or BDCP. BDCP represents a completely different approach to dealing with water problems. In the past, we would propose a project, and commit to mitigation of that project. In the case of BDCP, we've actually proposed developing recovery plans, a Habitat Conservation Plan (HCP) under federal law and a Natural Community Conservation Plan (NCCP) under state law, and we are looking at conveyance as a component of that strategy. It is a different approach but it is essential to moving forward and dealing effectively with California's future water needs. It is imperative that we continue on that path and it is imperative that we meet critical deadlines before the end of this year.

That leads to the importance of the state-federal partnership. Active and committed federal involvement to solving California's water issues is essential. Having the high-level commitment from Secretary of the Interior Salazar and Secretary of Commerce Locke is essential to us carving out this new frontier on how we are going to resolve problems. Everything that we are trying to do and every approach that we are trying to make in terms of achieving co-equal goals and a balance in the Delta is dependent on federal decisions and the federal agencies being part of the solution. We cannot do it on our own.

Fixing the Delta means real-time commitment and real-time decision making over the next 11 months. We have to make major accomplishments on flows, on conveyance, on extent of habitat, and a failure of us to make progress in 2010 prior to a transition to a new Governor taking office means, in the best case, delays. In the worst case, it means starting over. We cannot afford that either—for the economy or the environment.

In December, the federal agencies issued an Interim Federal Action Plan for the Delta. In that document, federal officials strongly commit to work with California on a coordinated plan by February. That plan will identify our most important initiatives and near term action items deserving progress during 2010. Many forces—including old challenges and new leadership—converged to make this new state-federal partnership both necessary and possible. It represents a new era of unprecedented, close collaboration—a federal-state partnership that is absolutely essential

to fixing the Delta and will represent a new frontier of problem-solving complex resource conflicts.

The work plan provides an overview of key activities needed to make progress in the Delta and on wider water challenges in California. Among the major issues are development of a public draft of the Bay Delta Conservation Plan, action on water transfers for drought response, and coordination of state and federal Delta monitoring and research facilities. On water project operations, the plan calls for providing scientific information and working with the National Academy of Sciences on its current review of smelt and salmon biological opinions. Expedited action is contemplated on infrastructure projects including an Intertie linking the Delta-Mendota Canal and the California Aqueduct, providing more flexibility for state and federal water system operations and deliveries. Habitat restoration is also a major priority including a project to achieve flood control and ecosystem restoration benefits in the North Delta.

Making it work probably means pushing harder than we have in the past, including tough calls and going outside our comfort zone. But there is no doubt that we need a collaborative approach to take advantage of the window of opportunity we have to change the way that we manage natural resources in California.

Conclusion

We stand at a critical juncture in dealing with California's water issues. Our new reality is that we must manage a resource that is characterized by uncertainty and vulnerability due to climate change and changing ecosystem needs. The past is no longer an accurate indicator of the future.

What we need is a roadmap of strategies for sustainable water use in California. We hope that the Congress and the federal government will continue to recognize the severity of this issue to our state and our nation, and work with us to make the changes and investments necessary to improve our water future.

Thank you for the opportunity to testify before this Subcommittee. I would be happy to answer any questions.

Mrs. NAPOLITANO. I will now start with the questions and answers. I have many questions, and it would take the whole day for me to pose them, because there are so many issues, as we all know.

Part of it is, Director Snow, have you thought of using the California Channel to educate the public on conservation, on the issue on—all those—the California Channel could be a perfect vehicle, if it is used. Then you have all the cities that have public access and government access channels that are free channels.

Mr. SNOW. Yes. You are talking about the public education. there have been different efforts to try to get that message out, both in the schools as well as advertising campaigns. Metropolitan Water District has been a leader here in Southern California, trying to get that message out.

Mrs. NAPOLITANO. No, I am talking about utilization of California Television Channel out of Sacramento that usually tapes—or actually runs the hearings in Sacramento, and it gives that information and all of that, but it is a perfect channel. It goes to many TV viewers. You need to think out of the box here, and that is what I am alluding to, is that have we done everything we possibly can to educate our general public. I am afraid the answer for me is no.

Also, you mentioned the drought water bank in your testimony is a potential short term goal. What challenges did you face in facilitating the water transfers, and are east to west transfers possible under the current statute?

Mr. SNOW. Two parts to that. One, probably the single biggest issue we had with the drought water bank last year was the ability to move water across the Delta. Traditionally, in California the greatest source of water to move in drought situations is in the

Sacramento Valley, typically with some of the rice growers up there. That means the water has to move across the Delta, meaning you have to have pumping capacity.

So at different periods of time, we did not have the capacity because of restrictions, regulatory restrictions, to move the water across the Delta during certain periods of time, which increased the cost of water. There is the opportunity to move water from the east side of the valley, the San Joaquin Valley, to the west side of the San Joaquin Valley. Some of that actually has to flow through the pumping plant, because there is limited conveyance capacity across the Valley.

Mrs. NAPOLITANO. Well, there are many other areas that I would like to question, but I want to give my colleagues a chance. But, Commissioner Connor, thank you for being with us today. I told you, you would be on the hot seat today.

There's a lot of questions that cross our mind, and I want to convey the thanks to Secretary Salazar, because you have been able to put—what?—seven agencies to work on the issue on Northern California. He visited it, the first time that the Secretary of the Interior has visited Northern California and talked, listened, maybe not acted to the extent that people want him to immediately, but you have only been here how many months?

Mr. CONNOR. Personally, I have been on—it seems longer than it actually has, but I think it is about seven months.

Mrs. NAPOLITANO. Seven months, and we are trying to write eight years of policy that has been ignored in Washington. So I am sorry, but I am very, very concerned about the direction. Some people want to point fingers, and that just really irks me, because I know that you have been trying. I know we have dialogued with you. I know you have been responsive to a lot of Members, and we hope to continue to move on that.

In August we provided Secretary Salazar suggestions on how to create 1 million acre-feet of water through water reuse, reclamation, conservation. Not only has the prior administration not wanted to consider Title XVI, which it only wanted in the toolbox to addressing water shortages in Southern California and, hopefully, in Northern California, also, but what has the Department done to address this, and will the Department address supporting our request for 200 million to address the 600 million backlog that the Bureau has on Title XVI?

Mr. CONNOR. Well, thank you for your comments, Madam Chairwoman. First of all, I would be the first to acknowledge that, although I think we have done a lot—I have personally been out to the Valley and met the farmers on three occasions; twice, I have been out there with the Secretary of the Interior, Secretary Salazar—I think we would be the first to acknowledge that we need to do more, absolutely.

The situation calls for action at the highest levels. We have tried to coordinate the Federal Government's activities through the Interim Federal Plan, and implementation of that plan and building on that plan are the highest priorities for this Administration.

With respect to the notion of creating the 1 million acre-feet of additional supply through Title XVI and other conservation efforts, I think we have also done a lot in that area. I think we have made

effective use of the Recovery Act funds that the Bureau of Reclamation received.

Approximately $950 million was provided Bureau of Reclamation, of which we have allocated approximately $405 million of that funding to California. Of that, $134 million has gone to Title XVI recycling projects in California, and that is a good start in addressing the backlog, but even after that $134 million investment, we still have a $646 million backlog.

Mrs. NAPOLITANO. But you have reduced my budget.

Mr. CONNOR. Yes. Well, I think on the positive——

Mrs. NAPOLITANO. And I didn't take kindly to that.

Mr. CONNOR. Well, we will be—I think you can expect that there will be more support for Title XVI from this Administration, in addition to moving forward, getting those funds out of the gate and getting those projects—that money onto the economy to do its intended effect of providing jobs, as well as providing water. I think you will see a follow-up support for the Title XVI program.

We are also looking at other aspects of the water conservation initiative, those being the challenge grant funding that we have. We allocated $40 million of Recovery Act money for water conservation efficiency activities, and $24 million of that funding went to the State of California to facilitate conservation projects, some of that—I think, a majority of that in the San Joaquin Valley. That was on top of another $6 million in CALFED water efficiency grants.

So we are building up to the level that you suggested in your letter last fall. We are not quite there, but we will continue to follow up those efforts with the resources we have this year, in 2010, as well as 2011 and beyond.

Mrs. NAPOLITANO. Well, thank you, and I hope that you can help us convince the Administration that this current thrust into jobs, of development, recycled water and some of the other water projects can be exceedingly beneficial in providing those job development and putting people back to work.

Mr. CONNOR. Absolutely.

Mrs. NAPOLITANO. Thank you. Mr. McClintock.

Mr. MCCLINTOCK. Thank you very much, Madam Chairwoman.

First, Mr. Connor, in your testimony you point out that at the end of the last California drought, which lasted for five years, California's population was just over 31 million. Today there are roughly 7 million more Californians, all of whom need water in the agricultural production and other economic activities supported by water.

My question is: With that increase in need, why in the world are we still dumping 200 billion gallons of fresh water into the Pacific Ocean for the enjoyment and amusement of the Delta Smelt, a population which, as Mr. Calvert pointed out, continues to decline even with these massive water diversions?

Mr. CONNOR. Well, we have limitations based on two biological opinions, one involving the Delta Smelt and one involving a number of salmon species, and there have been restrictions in place at some level for sometime. Those restrictions were enhanced this last year with the new Biological——

Mr. MCCLINTOCK.——Restrictions, which the Secretary of the Interior himself admitted to this Committee last year that they could suspend because of the severe economic damage being done to the Central Valley. However, they chose not to do so because that would be like admitting failure. But I put to you the question again. Given the dire need of this state for additional water, why in the world are we continuing the diversion of that enormous volume of water into the Pacific Ocean?

Mr. CONNOR. I am not aware that that statement was made, and I don't understand, given the obligation to follow the Endangered Species Act——

Mr. MCCLINTOCK. The statement was made. In fact, I played a video tape of it this morning in Fresno. It did not go over well.

Let me continue. You also say, notwithstanding drought, the Colorado River apportionment to California this year will be the full 4.4 million acre-feet, and there is a chance for some surplus under the annual operating plan for the Colorado River. It seems to me, if this is the third year of the severe drought and they are still able to deliver the full 4.4 million acre-feet on the Colorado, not that much of a drought.

Mr. CONNOR. The Colorado River has had the benefit of 15 years of cooperation and negotiation amongst the seven Basin states the Federal Government and a number of water management agencies that have restructured the management of that system, that have led to a lot of cooperation in dealing with the Endangered Species Act issues that exist in the Upper Basin as well as the Lower Basin, and upon those cooperative efforts and the agreement to coordinate management operation of the reservoirs in that system, we have been able to maintain deliveries consistent with the Colorado River Compact.

Mr. MCCLINTOCK. Because we are not dumping 200 billion gallons of water from the Colorado River into the Pacific Ocean. We are only doing that on the Sacramento, which directly impacts the Central Valley and the agricultural heart of this state.

Mr. CONNOR. We are not releasing water at that level, but there is certainly water being provided in the Upper Basin and the Lower Basin for environmental purposes to help mitigate the impacts of the Endangered Species.

Mr. MCCLINTOCK. Oh, so the difference between the drought, which on the Colorado River allows full delivery of the water plus maybe some surplus on top of that, and the Sacramento is the water diversions of the Sacramento.

Let me go to Mr. Snow. What is the percentage of annual precipitation that we have seen in the past year compared to a normal year on the Sierra?

Mr. SNOW. Well, from memory I believe last year we ended up with about 67-68 percent of normal.

Mr. MCCLINTOCK. Of normal precipitation?

Mr. SNOW. For normal runoff.

Mr. MCCLINTOCK. Normal runoff?

Mr. SNOW. Right.

Mr. MCCLINTOCK. What about precipitation, because the figures I saw were 90 to 96 percent of normal, and you have just testified that we've got 115 percent of normal for this point in the season.

Mr. SNOW. Normal precipitation to this point: Precipitation and runoff. When you have drought, you have a drier watershed, your precipitation percentage does not result in the same level of runoff because of a dry watershed.

So for the last three years we have had a slightly higher precipitation from a percentage of normal than runoff, because the watershed takes up so much of the water. So in a year like this, if we ended up with normal precipitation, it would be slightly below normal runoff.

Mr. MCCLINTOCK. My point is in far more severe droughts than the one that we have experienced over these past three years, we have made far greater water deliveries to the San Joaquin Valley, the difference being we weren't dumping all of that water into the Pacific Ocean, the way we are today.

Mr. SNOW. There's two things that are responsible for where we are right now. One, there is a fundamental shift in the weather patterns, and so we have drought that is providing water in a different pattern, but we have—and I think this is, obviously, your point—much more strict regulatory standards that we have to meet in terms of when we can pump water.

Mrs. NAPOLITANO. Thank you. Mr. Costa.

Mr. COSTA. Thank you very much, Madam Chairwoman. On that point, on the restrictions, Mr. Snow, give me your take on it as the person who ran the state water project. Last year, it was my understanding, even with the constraints of the Biological Opinion, and it gets into a complicated mathematical formula, that the 10 percent allocation that was left available while other regions for 100 percent, could have been as much as 30 percent allocation and still been with the Biological framework. Is that your view?

Mr. SNOW. I am not sure I followed that.

Mr. COSTA. The allocation to the San Luis Unit, by the x2 factor in terms of how much water could be made available and still be within the framework of the Biological Opinion on smelt, that additional water could have been made available last year. Do you support that view?

Mr. SNOW. Not within the restrictions, no.

Mr. COSTA. You don't? Because some estimates are as much as if they had been using the criteria, that additional water could have been provided. Let us move on then.

As it relates to the issue of the other stress factors involving the Delta, 120,000 gallons of ammonia by tertiary treatments in Sacramento and Stockton, 2000 pumps that have riparian lights to water that are unscreened and sometimes pump as much water as is exported, the quadrupling of the population at Pittsburgh, the Antioch, Lodi, all those areas that have runoff of the streets and fertilize their lawn and garden, all of those impacts, including predatory species that are non-native, why are they not taken into account in terms of how we manage the two water projects?

Mr. SNOW. Well, one of the—I would call it—limitations of the Endangered Species Act is that it has to focus on the permit that is in front of them, and so one of the problems that we have is, despite the fact we might say that our diversions are not as significant—are not the sole cause of the problem, it doesn't help that we

point out that it may be the discharges that is a bigger problem than the pumps. We are still regulated on that.

Mr. COSTA. So you are saying that the other factors cause stress?

Mr. SNOW. Absolutely, and that is——

Mr. COSTA. The refineries, the discharges?

Mr. SNOW. That is the reason we have attempted to move from a fairly narrow Section 7 type of permit to a habitat conservation plan that allows you to look at those other stresses.

Mr. COSTA. Well, sooner rather than later, Mr. Snow. It is unfair that we put the entire burden of the fishery and the water quality on certain regions of California, when we don't impact the water supply, for example, in the City and County of San Francisco that normally would provide water that would go through the Delta.

Mr. Connor, are you familiar with "Listen to the River?"

Mr. CONNOR. Of the CVPIA?

Mr. COSTA. Yes, the report that was done in 2008 by the Department of the Interior.

Mr. CONNOR. Yes, sir.

Mr. COSTA. And to your knowledge, has the Department and the Bureau implemented any of these recommendations?

Mr. CONNOR. Well, we are certainly looking at a number of the recommendations right now, particularly the notion that we have to have a more integrated approach to managing some of the environmental issues, the fisheries issues, etcetera.

Mr. COSTA. Well, it is unfortunate that we have to have the second round with the National Academy of Science, because they clearly indicated here the problems that exist within the efforts to implement CVPIA 16 years after it was implemented. This is 2008. It said problems of determining how salmon and steelhead may benefit from the management actions and search for solutions aren't peculiar to the Central Valley. The Pacific Northwest and elsewhere have also learned that the complex life cycle of these fish and of the range are poorly understood. The potential environmental concern includes that these fish make it almost nearly impossible to assign the casualty to specified protection or mitigation action.

Then it goes on to talk about the other information, the lack of trustworthy population estimates. It goes on to the inability to separate the effects of both natural and anthropodic confounding influences. It talks about the minimum CVPIA monitoring and evaluation, precisely the questions that you are trying to derive. It talks about few qualitatively rigorous evaluations in your program. It talks about a more formal assessment hypothesis is required.

It goes on and talks about the problems with monitoring and evaluation. To our knowledge, no integrated database or management system exists to how to manage environment in biological and monitoring opinions.

Mr. CONNOR. I agree with you.

Mrs. NAPOLITANO. I would like to point out, that was under the prior administration.

Mr. COSTA. Oh, no, no, no. They have had a chance. There is no response to this.

Mr. CONNOR. The response is that we have——

Mrs. NAPOLITANO. Can we please move on? I would like to move on. Your time is up.

VOICE. We need to have it.

Mrs. NAPOLITANO. You can have a copy of it from them. OK? Please, we need to move on. I think all of us need to be able to be part of the solution, not the problem. One of the things that the state assemblywoman—we didn't ask any questions of you, and I don't want you to go away feeling neglected. Does the state have a Plan B, if the water bond does not pass?

Ms. CABALLERO. Well, with all due respect, Madam Chair, I think part of the challenge is that that water bond discussion was really a negotiation that took a great amount of time. If you are asking me, if it doesn't pass, will we be back at it, looking at another alternative, absolutely. There is no question, we need to invest in our infrastructure, and we will do whatever we need to do.

The real key about that bond is that it provides the opportunity to do the conservation we have been talking about, to do the reclamation projects that we have been talking about, to recycle water, to be able to really build the infrastructure to be able to take water from one side of the Valley to the other side of the Valley, to do the inter-connectivity.

Mrs. NAPOLITANO. I understand.

Ms. CABALLERO. Without that, we are going to be stuck with a system that continues to service——

Mrs. NAPOLITANO. Thank you. I just wanted to introduce that. I need to let Mr. Calvert have his comments, but I want to be sure that I thank the state for finally getting involved, because I have heard from a lot of my water agencies that they are totally dependent on other solutions instead of form the state, and I think the state finally stepped up to the plate. Mr. Calvert?

Mr. CALVERT. Thank you. Thank you, Madam Chairwoman. by the way, we can't blame the last three years of drought on the last eight years' problems, in spite of the politics here.

VOICE. That is right.

Mrs. NAPOLITANO. One more outbreak, and you are out.

Mr. CALVERT. And the purpose of the political comment—you owe one minute to Mr. Costa to get an answer to his question.

Mr. COSTA. Thank you very much, my colleague. Mr. Connor, could you respond, because this is very troubling in terms of what has or has not happened as a result of this.

Mr. CONNOR. I agree, it is troubling. I think there is a lot of work in implementing the provisions of the CVPIA as they were originally intended, and had they been implemented in that way with coordinated monitoring, understanding the fisheries' needs better, diversifying refuge supplies, that may, in fact, have alleviated some of the situation that exists today.

So a lot of the things that you have mentioned are part of the interim Federal work plan, and we understand that we need more aggressive implementation actions.

Mr. COSTA. Well, let me just make one final comment here, because it is critical to this whole report. It says, to increase the probability of success, the agencies need to redesign and implement an integrated program to improve the status of the Central Valley Project Improvement Act, and I don't know that you are doing that.

Mr. CONNOR. I think that is the whole point of the Federal work plan, the coordination that we are doing amongst several agencies and the aggressive science action that we have and the resources we are trying to apply.

Mr. COSTA. Thank you.

Mrs. NAPOLITANO. Does that include the state participation? I will give you extra time. Does that include state participation, Ms. Caballero? Mr. Snow?

Mr. SNOW. Of course. We have been working very closely on this, and expect to have a joint Federal Work Program, but fixing the Delta cannot be done, either by the Feds or the state alone. We both have to be working on it, and the same with building storage.

Mrs. NAPOLITANO. Would you be kind enough to allow the general public to understand what programs you are working on to help them, because apparently, a lot of people don't know that you are working to be able to find the solutions, and they are getting very upset. They feel the Federal Government nor the state is acting toward helping them out during this crisis, and I don't know what all you are going to do. But you need to tell them. All these agencies that are working to be able to reach consensus to move ahead, and not just talk about it, but formulate that action, and then put it into play. I am sorry. Mr. Calvert.

Mr. CALVERT. Thank you, Madam Chairwoman. Mr. Snow, obviously, you are very familiar with what is going on in the Central Valley and the impact that it has with the farming community. If this goes on another year because of the stress on the permanent crops in that area, will a significant amount of that production go out permanently?

Mr. SNOW. Well, I think, in talking with a lot of the members of the agricultural community, that is exactly what is happening.

Mr. CALVERT. So saying that, I met with Mr. Hayes, I think, a year ago, and we were talking about the Two Gates and the necessity of immediately putting the permitting on Two Gates where we could build it and, hopefully, had it built by now; because, as I understand it, Dennis Majors was ready to build that project on site and rapidly get it going. But as I understand it, the Administration has indefinitely delayed the Two Gates project. As I understand it, there is a letter from the San Luis Delta-Mendota Water Authority that accuses the Administration, and Mr. Connor maybe can answer this, of a scientific double standard, and apparently indefinitely delaying this project, which was some way to help mitigate this smelt issue and to get some additional pumping going on.

Are you aware of this letter? Are you aware of that issue, and why the Two Gates Project is not being able to be permitted?

Mr. CONNOR. Yes, sir, I am well aware of that letter and well aware of all the actions that have been taken with respect to Two Gates. Two Gates has been a priority from a permitting standard, absolutely. We have spent hours and hours trying to move forward——

Mr. CALVERT. Well, reclaiming my time from the gentleman, if it is a priority, why hasn't it been done? Right now, we are running out of time. We are talking about this water bond. Even if it does pass, and there is a question whether it will pass, quite frankly, because of the cost and the political climate that we are in, none

of these projects will be built for years. So we need to move on with some interim projects today in order to save the Central Valley.

We just heard testimony from Mr. Snow saying that in another year, much of the production in the Central Valley will be permanently out. They are not going to replant those trees.

Mrs. NAPOLITANO. Would the gentleman yield for a moment?

Mr. CALVERT. Happy to.

Mrs. NAPOLITANO. There will be additional time. The question then leads to: We know that there are farmers losing their land, their crops, going bankrupt, fallowing the farmland. Mr. Connor, have we worked with USDA, with Commerce, with all the agencies, SBA, to be able to help these individuals stay in the industry until the times get better, until—as he is pointing out—those projects come on line to be able to do the water delivery. Are we doing that? Thanks.

Mr. CALVERT. Well, the problem there, Madam Chairwoman, is that the trees will be dead.

Mr. CONNOR. Yes. The answer to your question, the Federal Work Plan identifies a range of actions, and I realize it is not popular to talk about the relief that we can provide financially, given the lack of water, but we do think it is appropriate, and we have worked closely with the Department of Agriculture who declared 57 or 58 counties a disaster last year. That made emergency loans available. That made other types of assistance available.

I know that is not a substitute for water. I know people want water, and they want to produce products, but that is one interim step, as well as figuring out the right projects that we can do in the short term that will help yield the water.

The fundamental problem with Two Gates, and I will be succinct, is not the bill reclamation, not the Fish and Wildlife Service, but the CALFED independent Science Panel found fundamental scientific flaws with the basis for the Two Gates Project which needed further investigation. That was one issue.

The second issue, costs escalated from somewhere in the $20 million range to $80 million, when all was said and done. That included some O&M costs. So the resources weren't immediately available for the project.

Third, there were over 1400 comments in the environmental assessment projects expressing strong concerns about the Two Gates Project from the citizens of California, not from the Federal agencies, that need to be evaluated and looked at as part of our environmental complaint activity.

Fourth, we did a design and did a construction view of Two Gates, and it raised nine significant issues about the technical foundation for the project. We have not shelved Two Gates. We are actively working on Two Gates, but those questions need to be answered to figure out if it is worth the investment of that kind of money and whether it really yields additional water.

In the interim, we are going to do projects like the Intertie, which we know is a good project, which we know has the capacity to generate additional water. We are going to move forward with conservation projects. We are going to diversify water supplies to refugees. Those, we know, will have some added benefit for the water supply for the Central Valley Project.

Mr. CALVERT. Madam Chairwoman, I have one question.

Mrs. NAPOLITANO. Last question.

Mr. CALVERT. During your opening testimony, you mentioned you are delivering 6,000 CFS a day into the Central Valley. If it wasn't for the biological opinion, the existing biological opinions, I should state, on the smelt and the salmon, what would be the delivery per day?

Mr. CONNOR. That is an excellent question, and I don't have the exact answer.

Mr. CALVERT. Could you supply that answer for the Committee at some point?

Mr. CONNOR. Yes. I will be candid. It is about 6,000 CFS, but I don't know the exact number, and we will provide that information as soon as possible.

Mr. CALVERT. Excuse me. Mr. Snow, do you know the answer to that question?

Mr. SNOW. I probably should say no instead of guessing. So we will follow up, but it is probably on the order of 10,000 CFS, given the storms that we have had.

Mr. CALVERT. Thank you.

Mrs. NAPOLITANO. Thank you. I would like to reiterate to Commissioner Connor that this Committee sent a letter to you in regard to the question that Congressman Costa sent, and we still don't have an answer. I would really appreciate an answer to all this Committee. Thanks.

Mr. CALVERT. Madam Chair, may I follow up?

Mrs. NAPOLITANO. We are moving on. We have already spent over an hour and 20 minutes.

Mr. CALVERT. Well, you took quite a bit of liberties here. I would like——

Mrs. NAPOLITANO. I am the Chair.

Mr. CALVERT. I would like to extend——

Mrs. NAPOLITANO. We are moving on to the next panel. We will continue to work on the different issues together and look forward to a lot more cooperation.

Mrs. NAPOLITANO. I would like to bring Mr. Jeffrey Kightlinger, General Manager of Metropolitan Water District of Southern California, Los Angeles. Again, thank you, Met, for hosting us in this fine facility; Mr. Brian Brady, General Manager, Imperial Irrigation District, Imperial California; Ms. Maureen Stapleton, General Manager, San Diego County Water Authority in San Diego; and Mr. Dan Parks, Assistant General Manager of the Coachella Valley Water District in Coachella.

Mr. Kightlinger, if you would be so kind, you have five minutes. Thank you, sir.

STATEMENT OF JEFFREY KIGHTLINGER, GENERAL MANAGER, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Mr. KIGHTLINGER. Thank you very much, Madam Chair, Members of Congress. I really want to thank you for coming to Southern California and getting an urban Southern California perspective on the issues and the drought we are facing and, certainly, welcome you to Metropolitan and appreciate your use of our facilities here, and glad we could play host.

I particularly want to thank the Chairwoman for all the tremendous work she has done and the support she has given for urban water over the years, and we appreciate this opportunity to speak here.

This has been a very challenging time. Metropolitan does straddle the area of California in the sense that we get our water supply—our imported water supply for Southern California comes from both the Colorado River, as my friends here and our partners, as well as the State Water Project in Northern California. This has been a very challenging time in that we have been hit on both supplies.

From 2000 to 2008, the Colorado River has gone through an unprecedented drought, and in 2003 when Secretary Gail Norton, Interior Secretary Gail Norton, cut back California from 5 million acre-feet of deliveries to 4.4, that hit fell on Metropolitan. Our Colorado River aqueduct which holds 1.2 million acre-feet and had been full for several decades was immediately cut in half to 600,000 acre-feet, and we had to make up those supplies elsewhere.

Then, certainly, as you are well aware, in much of the testimony in the last committee and the last panel, our State Water Project supplies have been severely impacted. So we have been dealing with loss of supply both on the Colorado River side and the State Water Project side.

Mrs. NAPOLITANO. Excuse me just a second. Commissioner Connor, I would like for you to hear the testimony, please. Thank you. I am sorry. Go ahead.

Mr. KIGHTLINGER. Thank you, Madam Chair. In addition to the drought in California for the last three years and the drought on the Colorado River, we have had to deal with the legal rulings on the QSA as well as the restrictions, the fishery restrictions that Commissioner Connor talked about. These are the most restrictive fishery restrictions ever seen in the Endangered Species Act that have cost Metropolitan over half a million acre-feet of supplies that we would have received over the last two years. That is the equivalent to the hole that we currently have in our Diamond Valley Lake reservoir that we would have filled if we had been able to access our State Water Project supplies.

So how have we survived these last couple of years here in Southern California? Two main areas: One is the Colorado River. Through good work and cooperation, after the passage of the QSA, after the enactment of that, as well as the Federal guidelines in 2007, we have managed to rebuild our Colorado River supply from 600,000 acre-feet in 2002 to over a million acre-feet last year, the first time we have passed the million acre-foot mark since 2002. So 2009 we delivered 1.1 million acre-feet of Colorado River water through cooperation with Nevada and Arizona as well as Imperial Irrigation District, Palo Verde Irrigation District and Coachella Valley Water District.

That has been a tremendous success, and it really is a sign of cooperation among the Basin states and the partners on the river.

The second main area we had to work on last year was conservation. Metropolitan, very reluctantly but had to do so—we put out mandatory conservation for 19 million people in Southern California, and we implemented 10 percent mandatory cutback across

the board, and the region responded with over 15 percent as a region. So it was a real success. But where do we go from here? How do we solve these issues going forward?

There are three main areas that we would like to focus on, working with our delegation, working with Congress, and working with this Administration. First is continued cooperation on the Colorado River. We continue to need that support of the three Basin states, the Lower Basin states, Arizona, Nevada, California, working together to ensure continued supplies throughout the Colorado River Basin, and we certainly appreciate your support of the Hoover Power bill, and we are going to need more legislation and more help on the river to continue the progress we have made.

Second, on the State Water Project, it is absolutely essential we have a Delta fix implemented as expeditiously as possible to get ecosystem restoration and new conveyance across the Delta. These are absolutely critical, and we need to move this as quickly as we possibly can.

Third and finally, we always appreciate the support for our recycling and our reclamation, our conservation programs. These are going to be absolutely critical as we diversify our water supply for Southern California, and enable California to continue to grow and prosper.

With that, I will take any questions when the time is appropriate. Thank you.

Mrs. NAPOLITANO. Thank you, sir.

[The prepared statement of Mr. Kightlinger follows:]

Statement of Jeffrey Kightlinger, General Manager, Metropolitan Water District of Southern California

Chairwoman Napolitano:

On behalf of the Metropolitan Water District of Southern California, thank you for convening this hearing to explore and address the water supply challenges facing this region and to share Metropolitan's action plan for addressing a worsening problem that threatens communities, businesses and farms throughout this state.

Southern California has experienced its first year of region-wide mandatory conservation since 1991 because of Metropolitan's decision last year to reduce deliveries to its 26 member agencies in six counties.

Metropolitan imports supplies from the Colorado River and from Northern California via the State Water Project. Three years of below-average rainfall throughout the state, combined with new restrictions on State Water Project supplies because of the deterioration and collapse of the ecosystem in the Sacramento-San Joaquin Delta, has resulted in the need to reduce supplies for 19 million Southern Californians and for residents throughout the state.

Because of aggressive efforts and outreach by Metropolitan and our member public agencies there is widespread awareness about California's water problems and our residents and businesses have risen to the challenge and significantly reduced their water use. For example, water use has been reduced in Southern California by over 15% throughout the region; some areas are even quite higher. But despite the welcome recent rains and the good effort on local conservation, the underlying crisis remains and will be readily apparent in the months and years ahead.

Southern California like much of the state faces ongoing shortage or near-shortage conditions because of the problems in the Delta. Metropolitan's initial allocation of supplies from the State Water Project for the coming year is 5 percent of a full delivery. That is the lowest initial allocation in the history of the Project. We hope and anticipate this allocation to increase in the weeks ahead, but the question is: by how much? Metropolitan's board of directors is scheduled to discuss and make a decision at its meeting in April to determine the amount of water it can deliver to its member agencies this year. The recent rains did not wash away our water problems—or, the state's problems, and the possibility of continued shortage conditions is quite real.

Many of us who have been following water issues for decades have been accustomed to a quick bounce-back in deliveries from the State Water Project when the drought cycle ends and the rains return. But this pattern will no longer hold true. New water supply restrictions because of deteriorating environmental conditions in the Delta will have their greatest impact in wet and average years. Metropolitan will lose the ability to capture as much as 600,000 acre-feet of water in above-average and wet years because of these restrictions. This is water that normally would replenish the groundwater basins in Los Angeles, the San Gabriel Valley and Orange County that desperately need replenishment. Some of these aquifers are at or near their lowest groundwater elevations in recorded history. That is unacceptable. As a region and a state, we must find a way to capture adequate supplies in wet years in order to withstand the inevitable dry cycles. The key to this solution lies in addressing the crisis in the Delta.

In the short term, all water supply restrictions must be based on sound science, while every effort is made to find the means to ease these environmental restrictions without harming fish populations. Three years of reduced water deliveries from the State Water Project have not reversed the collapse of the ecosystem, a compelling sign that ecosystem restoration and a strategy to address other stressors is essential.

For the longer term, the key to the Delta challenge relies in combining ecosystem improvements with water conveyance improvements. This strategy is now emerging through the state-federal effort known as the Bay Delta Conservation Plan. It is absolutely essential that the Interior Department stay on track and produce a draft environmental impact statement for the BDCP this year.

For Metropolitan, it will be vital to maintain our ongoing efforts to maximize the available supplies from the Colorado River, which faces its own challenges as it recovers from record drought. The conservation ethic of our residents will have to continue now and into the future and we will have to look for new and innovative ways to treat, manage and increase the use of recycled water to ensure the most efficient use of our limited supplies. Title XVI projects will be pivotal in bridging the gap between the problems we have today and the implementation of a long-term Delta solution. Equally important is the acceptance that improving the quality and reliability of our water, from improving treatment to addressing the crisis in the Delta, comes at a cost that will result in higher rates. Even so, our supplies remain well under a penny a gallon for some of the highest quality water for any major metropolitan region on earth. We have major challenges ahead of us. But we do have ways to solve them. Thank you Chairwoman Napolitano for your continued leadership on water issues on behalf of this region.

Mrs. NAPOLITANO. Mr. Brian Brady, General Manager, Imperial Irrigation District.

STATEMENT OF BRIAN J. BRADY, GENERAL MANAGER, IMPERIAL IRRIGATION DISTRICT, IMPERIAL, CALIFORNIA

Mr. BRADY. Thank you, Madam Chair and members. There is a common misconception in the Imperial Valley that the Imperial Irrigation District is transferring conserved water to urban Southern California, because it isn't needed in the Valley and there is money to be made. In fact, IID is a party to the QSA, and water transfer is authorized for precisely the opposite reason, to protect the Imperial Valley's water rights that would otherwise be subject to legal challenge under the reasonable and beneficial consumptive use standard that applies to all Colorado River contractors.

In other words, IID is voluntarily transferring conserved water as a means of preserving its historical rights and eliminating the threat of a forced taking of water from the Imperial Valley. Now without going into all the history, throughout the last six years IID's position has been the same. Water transfer agreements authorized by the QSA are far from perfect. I think we would all agree with that, but they are needed to afford the District and its

water users both a revenue stream to pay for conservation and sufficient time to stave off any future legal challenge.

I think, as we all know, the QSA is a product of decades of conflict resolution, compromise, consensus, and if we were allowed to unravel it, the result would be chaos. Some would say, why don't we start all over again. Our answer to that is that it is what would be walking away from as IID.

Number one would be an annual cap of 3.1 million acre feed from the Colorado River and certain procedures where we can go over that cap for particular reasons; a revenue stream to fund needed system and on-farm water conservation improvements vital to protecting the Valley's water rights and forestalling future challenges on beneficial use; a nearly finalized habitat conservation and natural community conservation plan to mitigate not only the transfer's impact on the Salton Sea but also to the District's strain on agricultural field habitats, and also early start habit and air impacts, mitigation efforts that are already underway in the Salton Sea.

It is this last point having to do with the Salton Sea that warrants careful consideration in the Valley. That is because the basis of Judge Candee's decision to invalidate the QSA, the joint powers authority with the science financial responsibility for the transfer's impact among participating water agencies in the State of California could stand as an impediment to any water sharing agreement going forward now or in the future.

The existing agreement again, even though it has been ruled invalid, offers the most viable framework and the least risk to the district in reaching accord on the Salton Sea mitigation question. That doesn't mean we will necessarily succeed. It is only that we have the greatest chance of success with that.

The promise for a better deal, as some would call for, must be measured against the prospect of no deal, and for this reason, above all others, abandoning the QSA and starting all over again just would be bad public policy, and more importantly to us, in a very parochial manner, bad for the Valley. Thank you very much.

Mrs. NAPOLITANO. Thank you, sir.

[The prepared statement of Mr. Brady follows:]

Statement of Brian J. Brady, General Manager, Imperial Irrigation District

There is a common misperception in the Imperial Valley that the Imperial Irrigation District is transferring conserved water to urban Southern California because it isn't needed here and there is money to be made in sending it elsewhere.

In fact, IID is a signatory to the Quantification Settlement Agreement and the water transfers it authorized for precisely the opposite reason: to protect the Imperial Valley's water rights that would otherwise be subject to legal challenge under the reasonable and beneficial consumptive use standard that applies to all Colorado River contractors. In other words, IID is voluntarily transferring conserved water as a means of preserving its historical rights and eliminating the threat of a forced taking of water from the Imperial Valley.

The reason this myth of "selling water" has taken hold locally, I believe, is because the internal debate over the valley's water rights has been raging for so long that fatigue has set in and only a few people are still around who can recall the chain of events leading up to the 2003 signing of the agreement, which, in turn, set into motion the nation's largest agricultural-to-urban water transfer.

The makeup of the IID Board of Directors, and of the Imperial Valley, has changed in the last six years, but the drought conditions that culminated in the decision to transfer up to 300,000 acre-feet of the area's water per year to the district's

urban partners have, if anything, become more intractable since the QSA went into effect.

IID is transferring water to the San Diego County Water Authority and the Coachella Valley Water District because of a ruling in 1982 by the State Water Resources Control Board that the district was failing to put its water to reasonable and beneficial use. IID has always maintained that its water use is as efficient as any district's in the West, but a determination was made that the costs of future legal fights were outweighed by the safety and certainty of a water transfer agreement that would pay for greater efficiency and shore up the district's exposure to reasonable and beneficial use challenges.

In 1989, IID entered in to a water transfer agreement with the Metropolitan Water District of Southern California to perform system improvements that would conserve 105,000 acre-feet annually, a water-sharing pact that remains in place today. Then, in 1995, the district began negotiations with the San Diego County Water Authority to conserve and transfer up to 200,000 acre-feet a year through a combination of system and on-farm water conservation measures that would create an economic stimulus in the Imperial Valley.

Those talks produced a signed agreement in 1998, but its implementation was put on hold by a larger effort on the part of the federal government to quantify water use in the lower basin of the Colorado River and to bring California into conformity with its annual entitlement of 4.4 million acre-feet from the river. The purpose of this overarching Quantification Settlement Agreement was to resolve longstanding disputes between water agencies and arrive at a compromise among California, Arizona and Nevada that would, according to then-Secretary of the Interior Gale Norton, "usher in an era of limits" on the Colorado River.

But achieving "peace on the river" was easier to do in a proclamation than it turned out to be in practice. The next four years would be taken up with crafting agreements that would not only pass muster with the seven Western states that rely on the Colorado River but would also find support on the IID board. The linchpin of this agreement was always the water transfer between IID and San Diego, but the priority system among Colorado River contractors as well as the state's interest in addressing impacts caused by the transfer on the Salton Sea introduced two new aspects to the discussion.

One was that the Coachella Valley Water District, which had subordinated its water right to that of the district's in 1934, threatened to block the transfer of water from going forward unless it could obtain additional water as part of any final agreement. The other was the Salton Sea, a troubled body of water that would be adversely impacted from any reduction in inflows caused by the water transfer. In both instances, an accommodation was made. The first was to allow CVWD into the transfer agreement for an additional 100,000 acre-feet a year; the second was to adopt fallowing as the sole means of generating water for the transfer during the first 15 years of the deal to mitigate its effects on the Salton Sea.

Neither of these changes was well-received by IID or, for that matter, within the Imperial Valley, but it remained constructively engaged in the process because the alternative, the summary taking of a quantity of its water by the federal government for no compensation, was considered too great a risk for the district and its water users.

And that is exactly what happened in January 2003, following a New Year's Eve vote to approve the QSA by the IID board that failed 3-2. Within a matter of days, the district saw its annual water order cut by 327,000 acre-feet and only got it back by winning an injunction in U.S. District Court. But this victory was only temporary, as the Bureau of Reclamation was allowed to prepare its case for a part 417 investigation into the reasonable and beneficial use of water in the Imperial Valley and there was no doubt that if IID did not find a way to re-engage in the QSA process it would be back in court, with no guarantee of a favorable outcome and an unspecified quantity of water hanging in the balance.

This proved to be sufficient motivation for the board to try again, which it did on October 3, 2003, passing the landmark agreement by a 3-2 vote that was as controversial then as it is today. IID went to court to validate the agreement, a legal process that would join all of the litigation that was bound to ensue, and the QSA coordinated cases were taken up before Judge Roland Candee in Sacramento Superior Court. In the meantime, water to meet the district's obligations to the urban water agencies and to mitigate the transfer's impacts on the Salton Sea would be produced primarily through fallowing.

Throughout this six-year period, IID's position has been the same: the water transfer agreements authorized by the QSA are far from perfect but they are needed to afford the district and its water users both a revenue stream to pay for conservation and sufficient time to stave off any future legal challenge to its reasonable and

beneficial consumptive use. The QSA is the product of decades of conflict resolution, compromise and consensus and if it is allowed to unravel, the result will be chaos. This isn't a scare tactic but a stark fact: remove the basic protections provided to IID under the QSA from hostile legal action by either the state or the federal government, and the vacuum created in its wake will become a vortex of legal uncertainty and political vulnerability.

The public has a right to know—and to comprehend—why the IID, in light of Judge Candee's recent decision to invalidate the QSA over its perceived deficiency in parceling out responsibility for the mitigation of the transfer's effects on the Salton Sea, would seek a stay of this ruling and to appeal it so that the transfer of water can continue indefinitely. Why, our critics ask, hasn't the district just walked away from the QSA and announced to the world that it now wants a better and more lucrative water transfer agreement than the one found to be invalid by a state court?

Perhaps the best way to understand it is to consider what IID would be walking away from:

- An annual cap of 3.1 million acre-feet from the Colorado River and an inadvertent overrun and payback policy that allows the district, under certain circumstances, to exceed that cap.
- A revenue stream to fund needed system and on-farm water conservation improvements vital to protecting the Imperial Valley's water rights and forestalling the possibility of future reasonable and beneficial consumptive use challenges.
- Nearly finalized habitat conservation and natural community conservation plans to mitigate not only the transfer's impacts on the Salton Sea but also to the district's drain and agricultural field forage habitats.
- Early-start habitat and air impacts mitigation efforts that are already under way at the Salton Sea and would cease to exist without the QSA in place.

It is this last point having to do with the Salton Sea that warrants careful consideration in the Imperial Valley. That's because the basis of Judge Candee's decision to invalidate the QSA, the joint powers authority that assigns financial responsibility for the transfer's impacts among the participating water agencies and the state of California, could stand as an impediment to any water-sharing agreement going forward, now or in the future.

The existing agreement, even though it has been ruled invalid, offers the most viable framework and least risk to the district in reaching accord on the Salton Sea mitigation question. That doesn't mean we will necessarily succeed, only that we have the greatest chance of success in pursuing, and attempting to fix, the plan that is already on the table.

The promise of a better deal must be measured against the prospect of no deal. For this reason, above all others, abandoning the QSA and starting over again wouldn't just be bad public policy.

It would be bad for the Imperial Valley.

Mrs. NAPOLITANO. We will move on to Ms. Maureen Stapleton, General Manager, San Diego County Water Authority in San Diego.

STATEMENT OF MAUREEN A. STAPLETON, GENERAL MANAGER, SAN DIEGO COUNTY WATER AUTHORITY

Ms. STAPLETON. Good afternoon, Chairwoman and Members of Congress. The Water Authority provides imported water to San Diego County and our $170 billion economy and 3.1 million people. The Water Authority, like Metropolitan Water District, gets our water from both the Bay-Delta and the Colorado River.

The Colorado River water is purchased both via Metropolitan Water District and through our water transfers with Imperial Irrigation District and Coachella through the canal linings. On the Sacramento-San Joaquin Bay-Delta, we purchase our supplies through Metropolitan Water District as well as some additional dry year supplies that we have gotten during this drought period.

We feel like we have hit the perfect storm in many regards. You heard today about the drought, both on the Bay-Delta and on the Colorado River. If that was the only challenge we had to deal with, we would be able to handle it. Water districts plan for multi-year droughts. We have invested billions of dollars improving our water supply reliability and additional billions of dollars in water infrastructure improvements to address droughts on the river and in the Bay-Delta, but our drought challenges are really compounded by court decisions and regulatory actions.

So that is why we talk about the perfect storm. It isn't just one issue that we are struggling with. It is multiple issues. On the Colorado River front, the recent decision by the Sacramento Superior Court Judge that invalidated dozens of agreements that comprised the Quantification Settlement Agreement has really added to the challenges for the Water Authority, for Imperial, Coachella and Metropolitan Water District.

Our agencies are working cooperatively together with the State of California and the Federal Government to resolve this latest challenge, and we expect that we will do so. We need the Federal Government to assist and support in these efforts to ensure the continuity of the QSA.

Adding to the perfect storm also is the climate change issue and the long-term impacts on precipitation and snow packs for our water agencies, and ultimately water reliability. It is clear that water planning in the 21st Century will look much different than water planning that we have historically done in previous decades.

For the San Diego County Water Authority, really, what is important to us is implementing our region's fully diversified portfolio. Over the course of two decades, we have invested billions of dollars in highly reliable and long-term water supplies and billions of dollars in our water infrastructure improvements, including reservoirs and dams, pipelines, water treatment plants.

I brought a slide today, and I don't know if it can go up. Nothing tells San Diego's story better than the graphic up on the screen. In the upper lefthand corner is a pie chart depicting the water supply portfolio in '91 where we were 95 percent dependent on a single supplier, and only five percent of our supplies were local yield.

You can see, by 2010 we have begun that diversification program through the QSA, through improved improvements in conservation, recycling, brackish groundwater recovery, and by 2020 we will be adding ocean desalination. You can see that it's really an investment in our water supply and in our infrastructure that will ultimately bring water reliability to our region.

I think Lester Snow said earlier, there is no silver bullet that will solve water supply reliability for California. It is going to be—someone said to me once it was really the silver buckshot. You need it all. You need all of the components to really make this happen.

I would like to, in a final minute, really talk about the Federal Government and a critical partner that we need out of you in improving California's water supply reliability. Specifically, on the Bay-Delta, you need to support the completion of the Bay-Delta Conservation Plan and consider actions to help us implement that plan. In addition, you need to make sure that the co-equal goals

of environment and water supply reliability are there and that one does not overshadow the other.

Congress has also played an important role of improving our self-reliance through Title XVI, water recycling projects or groundwater recovery. That self-sufficiency is truly important. Then on climate change, we believe Congress should focus its Federal efforts on improving climate modeling, including regional downsizing, and we seek your assistance and your funding in achieving that as well. Thank you.

Mrs. NAPOLITANO. Thank you, Ms. Stapleton.

[The prepared statement of Ms. Stapleton follows:]

Statement of Maureen A. Stapleton, General Manager, San Diego County Water Authority

About the San Diego County Water Authority

The San Diego County Water Authority is a public agency (special act district) that provides imported water supplies that amount to approximately 80% of all water used in San Diego County to support the region's $170 billion economy and 3.1 million people. The Water Authority is comprised of 24 member retail water providers—water districts and cities—and is governed by a 36-member board of directors.

The Water Authority owns, operates and maintains one of California's largest regional water distribution systems, with more than 300 miles of large-diameter pipelines, pump stations, reservoirs, and water treatment facilities.

The Water Authority imports water from two principal sources: 1) the Colorado River, via supplies purchased from the Metropolitan Water District of Southern California (MWD) and through long-term water conservation and transfer agreements with the Imperial Irrigation District; and 2) the Sacramento-San Joaquin Bay-Delta, through supplies purchased from MWD and additional short-term, dry-year water transfers from sellers located upstream of the Bay-Delta.

Colorado River Supply

What is the Quantification Settlement Agreement (QSA) and how does its implementation affect California's overall water supply?

The Colorado River Quantification Settlement Agreement, signed in 2003, along with 34 related agreements (collectively referred to as the QSA), settled more than seven decades of disputes over the use of Colorado River water within California. The QSA parties include the Imperial Irrigation District, Coachella Valley Water District, Metropolitan Water District of Southern California, San Diego County Water Authority, the State of California, the Federal Government, five Bands of Mission Indians, and other parties. The QSA quantifies California's entitlement to Colorado River water, provides mechanisms for transfer of conserved water, establishes obligations for funding and implementation of environmental mitigation and restoration programs, implements federal law providing for the lining of the All American and Coachella Canals, and settles various lawsuits and legal proceedings. The QSA permitted the implementation of the California 4.4 Plan, in compliance with United States Supreme Court order, as well as an array of water conservation and transfer agreements that provide significant water supply certainty and reliability throughout Southern California. The QSA is critical to the State's water supply reliability and helps reduce pressures on the ecologically sensitive Sacramento-San Joaquin Bay-Delta. A reliable water supply from the Colorado River is vitally important for Southern California water agencies as they manage water supply shortages from drought and regulatory restrictions on pumping of water from the Bay-Delta.

In 2010, the Quantification Settlement Agreement (QSA) and its water transfers and other programs are entering their seventh year of implementation. When the QSA is fully implemented, it will facilitate more than 765,000 acre-feet of transfer water annually to millions of Californians. Nearly half of all Californians receive at least a portion of their water supply from water transfers and other supply programs made possible by the QSA.

Before the QSA was signed in 2003, disputes among the "Seven States"[1] over use of the Colorado River were commonplace. Because of its large share of Colorado River supplies, California was at the center of most of those disputes. By quantifying the entitlement of the Imperial Irrigation District (the largest user of Colorado River water), and the Coachella Valley Water District, and settling disputes among competing California users, the State of California and the United States, the QSA provided the basis for conserved water transfer program and provided all Colorado River users with greater certainty over their rights to, and reliability of Colorado River water.

The QSA implements the Colorado River Interim Surplus Guidelines approved in January 2001, and includes the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement, providing a clear framework for management of California's deliveries of Colorado River water. It also paved the way for more recent and equally historic multi-state accords involving the Colorado River, including the agreements implementing the Record of Decision for the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operation of Lake Powell and Lake Mead, adopted in December 2007. The 2007 Interim Guidelines, amended and extended the 2001 Interim Surplus Guidelines, and provides a framework for additional conservation, storage, and delivery of Colorado River water. The agreements adopted pursuant to the 2007 Interim Guidelines provide additional water for Nevada, Arizona, and California. Under these agreements, California agencies are entitled to store conserved water year in Lake Mead under the agreement's Intentionally Created Surplus provisions.

What happens (i.e., what would be the water supply) if the QSA is not implemented as negotiated?

The certainty in water supply reliability that the QSA provides has been called into question by a recent ruling by the Sacramento Superior Court. Soon after the QSA was finalized in 2003, the Imperial Irrigation District filed a validation action[2] to obtain a judicial determination of the validity of its actions regarding 13 of the QSA agreements. The Coachella Valley Water District, Metropolitan Water District, San Diego County Water Authority, State of California, Vista Irrigation District, and City of Escondido joined the lawsuit in support of IID's validation effort. Individual land owners, the County of Imperial, and the Imperial County Air Pollution Control District opposed validation of the agreements. In addition, several parties filed separate lawsuits challenging various aspects of the QSA. The lawsuits, several of which have been dismissed by the court, were coordinated in a single proceeding in the Sacramento Superior Court. Superior Court Judge Roland Candee was assigned the case as the trial judge.

On December 10, 2009, Judge Candee issued a tentative ruling that found that the agreement creating the Quantification Settlement Agreement Joint Powers Authority (QSA JPA Agreement) violated a provision of the California Constitution governing financial obligations and appropriation of money by the State. On Jan. 14, 2010, Judge Candee issued a Statement of Decision affirming his tentative ruling and granting an initial 30-day stay from the date of the final ruling while the parties contemplate an appeal. Once Judge Candee issues a final judgment in the case, an appeal will be filed. Because Judge Candee found that 12 of the agreements were interdependent, he invalidated 11 other QSA agreements affecting long-term QSA transfers. As to the balance of the QSA agreements not before Judge Candee and already validated as a matter of law, Judge Candee ruled that they remained valid. In all, agreements that govern the conservation and transfer of more than 765,000 acre-feet annually may be affected by the ruling.

The Colorado River Basin is also experiencing drought conditions. What effects will continued drought conditions in the Colorado Basin have on overall California water supplies?

California's share of the Colorado River under shortage conditions is governed by the shortage guidelines that the Bureau of Reclamation implemented in December 2007 (Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead). These guidelines detail the conditions under which water shortages are declared on the river, and the agencies that are responsible for absorbing the shortages. A shortage condition exists when the

[1] In the U.S., seven western states—Wyoming, Colorado, Utah, New Mexico, Nevada, Arizona and California—share water supplies from the Colorado River. Under a U.S.-Mexico treaty, the Republic of Mexico also receives supply from the Colorado River.

[2] A validation action is a special kind of lawsuit under which a government agency can proactively seek a court's determination—or validation—that its actions or contracts are consistent with California law.

Secretary of Interior determines that insufficient water is available to satisfy the normal 7.5 million acre-feet (maf) of demand for the Lower Basin states (Arizona, California, and Nevada)[3] in a given calendar year. During a normal year, the Lower Basin states receive this water in the following proportion:

- Arizona: 2.8 maf
- California: 4.4 maf
- Nevada: 0.30 maf

Under provisions of the shortage guidelines, Reclamation would declare varying levels of shortage that depend upon projected elevations of water in Lake Mead. The supplies to Arizona and Nevada would be progressively reduced under an increasingly severe shortage, but California would retain its 4.4 maf normal year apportionment. The following table shows how shortages would be implemented depending upon projected Lake Mead elevations. As of Jan. 11, 2010, the Lake Mead's elevation was 1,097 feet.

Deliveries to Lower Basin States Under Shortage Guidelines:

State	Mead Elevation: 1,075' – 1,050'	Mead Elevation: 1,050' – 1,025'	Mead Elevation: Below 1,025
Arizona	2.48 maf	2.4 maf	2.32 maf
Nevada	0.287 maf	0.283 maf	0.28 maf
California	4.4 maf	4.4 maf	4.4 maf
Total Lower Basin	**7.17 maf**	**7.08 maf**	**7.0 maf**

Groundwater Supply

What role does groundwater play in overall water supply management and allocation? What is the status of groundwater supplies in Southern California? How can groundwater basins be recharged efficiently to maintain levels and minimize the impact of saltwater intrusion?

San Diego County has very limited groundwater resources, but we are working to make the most of what we do have. While San Diego County does not have the large basins that exist in parts of Orange, Los Angeles, Riverside and San Bernardino counties, it does have groundwater capabilities in the sandy alluvial basins along some of the local rivers and streams.

Most of the groundwater in the Water Authority's service area is brackish and many of the plans to use that water involve removing the salt through the use of desalination technology. Because of the advances in reverse osmosis membrane treatment and energy recovery technology, brackish groundwater recovery has become cost effective. Brackish groundwater and pumped groundwater currently meet 3% of our region's need for water. The Water Authority's member retail water agencies have plans to double that number to 6% by 2020 through brackish groundwater recovery and conjunctive use projects that would recharge a basin with local or imported water. Two of our member agencies—the Fallbrook Public Utilities District and Marine Corps Base Camp Pendleton—are working together on a conjunctive use project that will recharge a basin using local surface water runoff that will serve both Fallbrook and Camp Pendleton.

Other local agencies are exploring the idea of recharging a groundwater basin with highly treated recycled water using the same technology used to desalt brackish groundwater and ocean water.

While groundwater does not provide a very significant amount of supply to the region overall, for some retail water agencies it can be substantial and a key element of their overall water supply reliability. Two of our local retail agencies—the City of Oceanside and the Sweetwater Authority—operate brackish groundwater desalters that when fully expanded will make up 18% and 27% of their water supply by 2020.

Other agencies are exploring brackish groundwater recovery, but one of the limitations on the size of these projects is balancing the extraction of water from the basin with impacts to vegetation and habitat that rely on the groundwater. Cost effective recharge opportunities to maintain water groundwater level are limited because of our geology and most of these projects operate on a safe yield basis.

Although we don't have the local geology to develop large scale recharge projects in San Diego County, we still believe that groundwater is an important part of the region's water supply portfolio.

[3] The Upper Basin states are comprised of Wyoming, Colorado, Utah and New Mexico.

As an alternative to local groundwater storage, having water in storage south of the Delta is a key strategy to lessen the impacts of reduced Delta exports and a strategy that the Water Authority has embraced. Our agency has entered into two 35-year agreements for groundwater banking south of the Delta in Kern and San Bernardino Counties. Those agreements will provide our region with 70,000 AF of storage capacity with guaranteed annual put and take capacity. This provides San Diego County with additional drought protection in times like these, as well as allowing us to have a place to store water in wetter years when imported supplies may be available.

Water Supply Forecasting

What do you see a the cumulative effect of the decrease in snowpack in the Sierra Nevada and the Rocky Mountains and what can be done in the short term and long term to mediate the effects? What tools are you using to forecast water supply demands?

Scientists have established that the early signs of climate change are already being felt in California. We have seen increased average temperatures, changes in temperature extremes, reduction in snowpack in the Sierras and snowmelt occurring earlier.

Sierra Nevada

The California Climate Adaptation Strategy issued in late 2009 includes projections for 2050 of: a 2—5 degree F rise in temperature, a 12—35% reduction in precipitation, and a 12-18 inch sea level rise. This strategy further concludes that more precipitation will fall as rain. With increased rainfall and earlier runoff from snowmelt, the state will face increasing challenges of water storage for the dry season and protection from floodwaters during the wet season. Sea level rise may increase salt water intrusion into the Delta.

Colorado River

IPCC Working Group II concludes that there will be a 10%-30% runoff reduction over some dry regions at mid-latitudes during the next 50 years. Studies of the impacts of climate change on Colorado River streamflows have been going on for several decades, including statistical studies by U.S. Scientists from the 1980s and early 1990s, plus climate model studies from the last few years. These studies reflect a range of projections from a 5% reduction to a 45% reduction. Studies are currently under way to narrow the range of uncertainty of the reduction in flow on the Colorado River resulting from climate change.

Water supply planning is facing new uncertainties that challenge the use of conventional planning methods. Supply planning has traditionally used historical data based on a set of predictable patterns, such as recorded weather and hydrologic time series, to determine and shape future projections. This has served water utilities well in the past; however planning methods will need to change with the introduction of new uncertainties such as climate change and the greater weather variability that comes with it. To better guide the incorporation of uncertainty information into its water supply planning, the Water Authority will utilize a decision assessment framework as part of its 2010 Urban Water Management Plan update.

As a start to this process, the Water Authority is currently performing a water demand and supply mix vulnerability assessment. Once the vulnerabilities have been identified, the Water Authority will utilize a decision support planning method—"scenario planning"—which develops a small but wide-ranging set of future scenarios to test and make planning decisions more robust. Common strategies, or "No & Low Regrets" strategies, will be identified that can address a wide range of uncertainties. These No & Low Regrets solutions are adaptive and flexible, and can ramp up or ramp down, depending on how the future scenarios progress.

The Water Authority plans to revisit the scenario planning process every five years, as required under California law, to update its Urban Water Management Plan. The UWMP update will be the long-range planning assessment of the water supply mix reliability. As part of the shorter-term planning process, the Water Authority will evaluate the water supply mix reliability on an annual basis in its Annual Water Supply Report. Through this annual assessment process, the No & Low Regrets strategies can be revisited and their implementation adjusted, if needed, should changes to the scenario outcomes occur.

The end result is a more robust water supply mix with the highest level of reliability to respond to future uncertainties.

Near-Term and Long-Term Planning

The San Diego County Water Authority and nine other large urban water agencies formed the Water Utility Climate Alliance (WUCA) dedicated to providing leadership and collaboration on climate change issues affecting drinking water utilities by improving research, developing adaptation strategies and creating mitigation approaches to reduce greenhouse gas emissions. A key priority of WUCA has been federally-supported climate research, this stems from our need to better understand the potential impacts of climate change on the water systems we manage. Recently WUCA released a white paper on the state of the science on climate modeling and downscaling and how these tools can be improved to meet our needs. We hope that this white paper will be a catalyst for a continued dialogue between water utilities, the climate modelers, the research community and federal agencies.

A key finding of the paper is that for the next few years, significant uncertainties will remain at the scale and in the timeframe that utilities make decisions. In the meantime, water utilities will have substantial decisions to make with the potential for significant impacts. Although water utility planning is usually based on static climate projections and historical data, new approaches are needed to incorporate the wide range of climate projections into water utility planning.

As a result of this need WUCA will release a second white paper at the end of the month to provide guidance to water utilities, which may be conducting vulnerability assessments and want to move forward with adaptation strategies. The report documents five decision support planning methods that utilities can use to assist in characterizing and comprehending multiple uncertainties while minimizing the risks associated with these decisions.

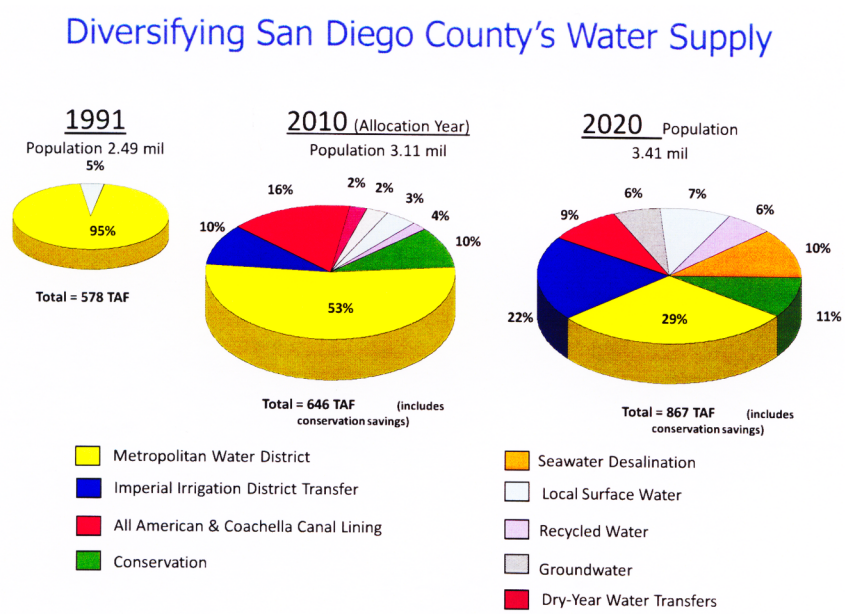
Although the Water Authority and the members of the Water Utility Climate Alliance have made significant efforts to comprehend the impacts of climate change on water utilities, we encourage the federal government to:

- Focus on improving climate modeling, including regional downscaling, to better meet the needs of water utility managers
- Provide support for climate adaptation projects, including infrastructure enhancements for large urban water utilities, that may be needed to reduce the regional impacts of climate change.

Conservation, Water Reuse, and Water Reclamation

What is the role of conservation, water recycling, and water efficiency in meeting future demands? What lessons can we learn from the city of Los Angeles cutting their water use by 17% in five months?

After the drought of the late 1980s and early 1990s, San Diego County learned the vitally important lesson of the consequences of overreliance on a single source of imported water. We emerged from that experience with a strategy to achieve greater reliability through development of a diversified water supply portfolio. Since 1991, the Water Authority and its 24 member agencies have been singularly focused on achieving diversification of both our imported and local water supplies. The following pie charts compare San Diego County's water supply portfolio in 1991, Fiscal Year 2010 and the projected supply mix in 2020.



Conservation, water recycling and reuse and the development of ocean water desalination are critical elements to our diversification strategy and successfully achieving supply reliability.

We have dedicated significant funds in the last 18 years to implement conservation and are an original signatory to the Memorandum of Understanding for Urban Water Conservation. Conservation programs and water efficiencies implemented since 1991 have reduced our service area's demand for water by 8% "enough water to meet the total annual water needs of 100,000 households of four. When coupled with the water use restrictions and aggressive outreach put in place to address the current supply situation, San Diego County used the same amount of water in 2009 that we last used in 1996 although we have added 400,000 people to our region.

Our goals for conservation in the future remain ambitious and we believe we are well on our way to accomplishing the states goal of a 20% reduction by 2020. We have had extensive dialogue with stakeholders through three regional Conservation Summits and the public and business community involvement that resulted. We are pioneering the use of water budgets to manage water use in the landscape and in creating a supply chain of water efficient landscape and a trained profession that knowledgeable in low water use plants and irrigation practices. San Diego County is home to a unique Water Conservation garden that provides the public an opportunity to see real world low water use landscape and how to do it. Managing demand through water use efficiency is an important part of our diversified portfolio, but we believe that supply reliability cannot be achieved by conservation alone. We cannot conserve water we don't have.

Water Recycling and Seawater Desalination are key elements in our diversified supply portfolio. Recycled water is expected to meet at least 6% of San Diego County's need for water by 2020. There are 17 active water recycling projects in the county for a variety of landscaping and industrial purposes. The Water Authority along with the Metropolitan Water District has provided financial incentives to almost all these recycling projects in order to make the projects more cost effective and price competitive with buying imported water. Because San Diego County does not have large industrial users of water or large groundwater basins to recharge reuse of recycled water is primarily limited to seasonal irrigation. This idles recycling plants during the wetter winter months. To better utilize these resources local agencies are exploring indirect potable reuse of highly treated recycled water through blending with surface water in reservoirs. If successful, reservoir augmentation could significantly increase the amount of recycling in San Diego County.

Seawater desalination is considered by our Board to have one of the greatest potentials as a new supply for San Diego County. Because of our proximity to the

ocean, the geological limitations I have discussed in my earlier testimony today, the Pacific Ocean represents a significant drought proof resource for our region that uses proven technology and can be developed cost effectively and in an environmentally responsible manner. Current plans to construct a 50 million gallon per day seawater desalination plant in Carlsbad through a public-private partnership involving 9 of our local retail agencies will supply enough water to serve over 100,000 households in San Diego County. The Water Authority itself is engaged in studies to develop additional seawater desalination projects and is planning for that resource to make up 10% of our supply portfolio by 2030. We are working with Marine Corps Base Camp Pendleton on the siting of a plant on the Base that would provide the opportunity for future expansion up to 150 million gallons per day and provide water to businesses and residents throughout the County. We are also exploring opportunities for desalination with Mexico as part of the effort to augment Colorado River supplies.

As with any of the supplies in our diversified portfolio we do not believe there is a single solution and it is no different with seawater desalination. It is an important part of our future supply but it is by no means the only part or the most important part but it is a supply we believe should be developed and we are pursuing it along with conservation and water recycling.

Northern California Water Supply

How are the water agencies in Southern California handling the reduced water imports from Northern California? What actions are they taking to make up for the reduced supply to meet their user demands? What management actions are being taken to maintain service to citizens?

As a result of continuing dry conditions and regulatory restrictions that are limiting pumping to southern California, water agencies across the region have responded by implementing drought management actions that range from drawing on dry-year storage reserves to supplementing reduced supplies with water transfers from willing sellers in northern California to implementing voluntary and mandatory allocation and water use restrictions to reduce municipal and agricultural water demand.

As an example of this response, the San Diego County Water Authority activated its Drought Management Plan in 2007 when the current dry conditions and pumping restrictions began to threaten water supplies. The Water Authority's Drought Management Plan, or DMP, includes a series of progressive measures to manage through shortage conditions, depending on severity. As conditions worsened in 2008 and 2009, the Water Authority moved from a call for voluntary reductions in water use to our current allocation of water supplies, coupled with mandatory water use restrictions at the consumer level, now in place across most of our service area. The Water Authority also moved to supplement our supply with the purchase of dry-year transfer water from willing sellers in northern California. These supply and demand management actions sparked a tremendous consumer response to the region's water supply shortage. Since July, consumer demand is well below allocation targets and as much as 13 percent below 2008 levels and 17 percent below 2007 levels.

Role of Congress

How can Congress assist in addressing demands for increased water supplies that may help some users balance the needs of the at risk species, the economy, and ecosystems in general?

The federal government is a critical partner in improving California's water supply reliability and can play vital roles in a number of water supply issues, including resolving problems plaguing the Sacramento-San Joaquin Bay Delta, in its role as water master on the Colorado River, and through support of local water supply development, including promising new technologies.

Bay-Delta

- Support the completion of the Bay-Delta Conservation Plan and consider actions that help implement the plan.
- Ensure that federal regulatory actions and congressional oversight recognizes the truly co-equal goals of the environment and the economy.

Regional Self-Sufficiency

- Reduce dependency upon imported water supplies and improved regional self-sufficiency through development of new local water supplies, including reclamation, seawater and groundwater desalination, conservation and local storage.
- Increase funding for Title XVI Water Reclamation Programs and Conservation Programs.

Climate Change

- Focus federal efforts on improving climate modeling, including regional downscaling, to better meet the needs of water utility managers.
- Provide financial support for climate adaptation projects, including infrastructure enhancements for large urban water utilities, which may be needed to reduce the regional impacts of climate change.

Mrs. NAPOLITANO. We will move on to Mr. Dan Parks, Assistant General Manager, Coachella Valley Water District in Coachella.

STATEMENT OF DAN PARKS, ASSISTANT GENERAL MANAGER, COACHELLA VALLEY WATER DISTRICT, COACHELLA, CALIFORNIA

Mr. PARKS. Thank you, Madam Chairwoman. First, I want to thank the Committee for their interest in California's supply challenges and opportunities.

Coachella County Water District is located in the desert between Palm Springs and the Salton Sea. We serve roughly a 1,000 square mile territory. In the desert, let us not overlook the obvious. Every day is a drought. Thus, we rely on importing water from our supplies from the Colorado River and the State Water Project. We use those sources to recharge our groundwater basin and irrigate crops. All of our domestic water is pumped from our groundwater basin.

Our economy consists of agriculture, the resort golf industry, and residential homebuilding. They all require a dependable supply of water. We have been successful with our history of managing water supplies. We manage that through conservation measures, core substitution projects such as using recycled water, and other nonpotable water supplies instead of pumping groundwater, and through our programs of recharging our groundwater basin.

This last year, due to the drought and due to the failure of the Delta ecosystem, we only received 40 percent of our nearly 200,000 acre-feet of State Project entitlement. The estimate for this year, as you have heard earlier, is five percent. Without these supplies, we will overdraft our groundwater basin and run the long-term risks of impaired water quality, permanent loss of storage, and ground subsidence. Also, our local economy is at risk.

Now, California's Legislature has passed a good foundation to restore the Delta and improve water supplies. However, to solve California's water crisis we must have improved conveyance across the Delta and water storage projects. These will be both extremely costly and take a decade or more to build. Unless California's water crisis is solved, California's economy will continue to suffer as, hopefully, the rest of this nation's economy improves. Of course, the economy is not hampered by water problems today, but they will be a limitation for California's future.

I ask your support, as the others on the panel today have, to support our state and Federal water contractors as we move ahead with a Delta fix, and of course, we always look forward to opportunities where the Federal Government can participate as a partner. I thank you, and be glad to answer questions at the appropriate time.

Mrs. NAPOLITANO. Thank you, Mr. Parks.

[The prepared statement of Mr. Parks follows:]

Statement of Dan Parks, Assistant General Manager, Coachella Valley Water District

My name is Dan Parks. I am assistant general manager of the Coachella Valley Water District (CVWD), Coachella, California. I am a registered civil engineer in the state of California and have an engineering degree from California State Polytechnic Institute in Pomona, California.

The CVWD is a public agency serving 1,000 square miles in Riverside, Imperial and San Diego counties.

CVWD's service area is somewhat unique. It lies within Southern California's desert with an average rainfall of a little over 3 inches. Many years have no measurable rain, yet in other years more than the annual average falls in one storm. Locally, every day is a drought in the desert.

The State of California is experiencing a two-pronged drought. In regard to climate, we are feeling the effects of what many are predicting will be the most severe drought in recorded history. On the other hand, we are also affected by a regulatory drought that is severely limiting the amount of water available from the State Water Project.

The Coachella Valley relies on imported water supplies from the Colorado River and State Water Project to recharge its groundwater basin. When water is available, it is stored in the ground water basin. When supplies are short, water is pumped from the groundwater basin to meet the needs of the area. Thus, the groundwater basin acts as a large storage reservoir. Groundwater in the Coachella Valley is cooperatively managed by the two agencies with State Water contracts, Desert Water Agency (DWA) and CVWD.

Since the 1980's, CVWD, DWA and The Metropolitan Water District of Southern California (MWD) have participated in a conjunctive use program. In wet years, MWD stores its surplus water in Coachella Valley's groundwater basin. In dry years, MWD takes delivery of CVWD's and DWA's State Water supplies, and in exchange, CVWD and DWA pump MWD water stored in the groundwater basin. This program benefits all agencies by utilizing wet year supplies to meet dry year water demands.

Over the years, we've increased our entitlement of imported water with the goal of recharging the same amount or more water than what is taken out of the aquifer each year. Legal entanglements surrounding the Sacramento Bay Delta have resulted in contractors only receiving 40 percent of their allocation last year. Without sufficient groundwater replenishment, the Coachella Valley faces potential negative effects of overdraft, including subsidence, diminished water quality and permanently reduced storage space.

We are fortunate to have multiple sources of water, including Colorado River. But the Colorado River Basin is also suffering from several years of drought. So far, we have been able to receive what water we need from that source, but Lake Powell, Lake Mead and other reservoirs on the river are very low.

Last year, two significant water management projects were completed, a facility to recharge 40,000 acre-feet of groundwater per year and the other to supply 50,000 acre-feet of non-potable water to golf courses in-lieu of pumping groundwater. The combined cost of these projects is $115,000,000.

In some areas of the state, various forms of rationing or use restrictions are in place. Groundwater storage has allowed CVWD to implement a softer program of conservation measures than other areas. Because the average Coachella Valley home uses 80 percent of its water outside, CVWD's conservation and outreach programs are targeted toward reducing outdoor water use. Our success is attributed to a combination of imposing a water-budget based rate structure, desert appropriate landscape regulations, and incentive programs to increase irrigation efficiency and eliminate water waste. The programs have resulted in reducing water use by more than 10 percent on a permanent basis. Long-term reductions are expected to exceed 20 percent as customers make further changes in their landscape and irrigation systems.

The ability to capture, transport and store water is of key importance to managing California's water supply. In the short run, a solution is needed to reduce the pumping restrictions in California's Sacramento—San Joaquin Delta. In the long run, additional water storage is needed. If climate change results in less snowpack as some predict, additional transport capacity and storage will be needed to capture rain fall rather than let it run to the ocean.

In regard to Colorado River supplies, CVWD is a party to the Quantification Settlement Agreement (QSA). Signed in 2003, the QSA is a series of agreements between federal, state and local agencies which resolves disputes between California agencies created by the priority system of allocating water and resolves concerns of

other western states and the United States Bureau of Reclamation over California using more than its amount of Colorado River water. A recent California court determined one sentence in one agreement violated a California Constitution provision and invalidated the QSA.

Since 2003 much work has been done among western states to address managing the Colorado River during both surplus years and drought years. I believe we are in better position to minimize reductions in the Colorado River supply through those management programs. Relations between California agencies and the other western states are not the same as they were in 2003. I believe it is more likely that the parties to the QSA will rise to the challenge created by the courts decision and find a solution whereby the QSA is implemented as negotiated.

One dilemma we face in addressing demands for increased water supplies is the inherent conflict between endangered species and the use of water to supply the public and its economy. It would be helpful if environmental laws balanced human needs with those of at risk species and the ecosystem.

Thank you for the opportunity to comment on these matters.

Mrs. NAPOLITANO. We will begin the question and answer period.

Mr. Kightlinger, can you tell me what the current average cost of a delivered acre-foot of water currently is?

Mr. KIGHTLINGER. On our power side, our average cost of delivery is basically driven by our power, and on the Colorado River it is in the $50 to $60, $70 an acre-foot.

Mrs. NAPOLITANO. How much?

Mr. KIGHTLINGER. It is between $50 and about $60 an acre-foot on the Colorado River side, and higher on the State Water Project, $70 to $90 an acre-foot for power on the State Water Project.

Mrs. NAPOLITANO. And that is what you charge your customers?

Mr. KIGHTLINGER. No, that is just the cost of moving it. Our typical cost of an acre-foot of water right now, treated, is about $750 an acre-foot.

Mrs. NAPOLITANO. Thank you. How do you plan to implement the reductions of the water supply from both the Colorado and the Northern California to your 26-member water agencies?

Mr. KIGHTLINGER. We worked with our member agencies and put together a supply allocation plan where we looked at everybody's base use and tried to reduce that by 10 percent and accommodate certain areas that had losses of local supply due to impacted groundwater wells or pollution, and so we put together this plan, and we implemented it, and we are very pleased, as I noted earlier, that we called for a 10 percent reduction in use in calendar year 2009, and we have achieved over 15 percent to date.

Mrs. NAPOLITANO. Thank you. Ms. Stapleton, congratulations on your advances in all your reductions. It is very impressive. How do you plan to implement the reductions in the water supply from MWD and potentially the Colorado River on your customers?

Ms. STAPLETON. One of the things is communication with our region, not only through our retail water agencies but with the population at large. We have worked very closely with our businesses as well as our agricultural communities to do a couple of things. Number one is to keep them informed right up front of what is happening and what the potential implications can be.

Number two is that we notified them of the allocation shortage and also opportunities in where they can receive financial assistance for conservation programs or installation of conservation measures, as well as what we have been able to achieve is focusing on outdoor landscaping has been extremely helpful. So we have ac-

tually obtained a higher than needed conservation over this last six months or so. We have been very pleased with our community response. They have really stepped up to the plate when we asked them.

Mrs. NAPOLITANO. But you have been engaged in many efforts?

Ms. STAPLETON. Yes.

Mrs. NAPOLITANO. Mr. Parks, how do you plan to implement the reductions in the water supplies from the Colorado and the Northern California for your farmers, and if you have any assistance programs to them?

Mr. PARKS. Our ag. supplies—we have been very fortunate to participate in the Bureau of Reclamation's 2020 program and have put out some demonstration incentive projects whereby our agricultural growers could use such technologies as high tech irrigation scheduling, moisture management, and soil management procedures to be much more efficient in their application of water. It has been a tremendous success, and we have shown proven savings with that.

Mrs. NAPOLITANO. Thank you. Mr. Brady, how would you implement the water delivery restrictions if the restrictions occur on the Colorado River, and what process would you do so to implement that?

Mr. BRADY. Well, Madam Chair, the essence of the QSA is that we transfer eventually up to 300,000 acre-feet to the urban areas by implementing on-farm and system conservation measures. The system measures are going to cost somewhere around $300 million. The on-farm, we will be paying farmers to implement drip and sprinkler systems and the like. Beyond that, if there are restrictions on the Colorado that take us below our allocation, we will most likely go to allocation per acre on farmed land, and the farmers—we intend to work with the farmers so that we can maintain, if possible, the same yields with, of course, less water.

Mrs. NAPOLITANO. I would suggest to all of you, stay for the scientific panel who is coming on afterwards, to listen to some of what they are saying about how we can help each other.

What is your plan if the QSA decision does not change, any of you?

Mr. BRADY. Well, I would just say that we are not planning for the QSA, but we will continue to transfer water until we are told that it is illegal to do so.

Ms. STAPLETON. Madam Chair, I think from our standpoint, we believe, and it is where we are focusing our effort, is to actually address the provision which the Judge found to be unconstitutional, to go into that, look at it, specifically understand fully what the Judge's concerns were, work with the state and the Federal Government in identifying that, and correcting that problem. That is what we are working on, and we look forward to the Federal Government being a partner to ensure the continuity of the QSA.

Mr. PARKS. If I might add to that, how appropriate the title of today's hearing, challenges and opportunities. I believe this creates a challenge to which the parties to the QSA will rise to the opportunity to find a solution. It is very good and refreshing to hear both the Bureau and the state's comments today, that they, too, support the QSA as negotiated.

Mrs. NAPOLITANO. Let us just look for the action behind it. Mr. McClintock.

Mr. MCCLINTOCK. Thank you, Madam Chairwoman. Mr. Kightlinger, you indicated that wet or average water years will bring even more water supply restrictions to the Delta. At our mock hearing this morning in Fresno, we were told that up to 10,000 acre-feet of additional water is now being diverted to the ocean per day as a result of the recent rainfall. What impact is this going to have on your water supply and groundwater replenishment?

Mr. KIGHTLINGER. It is a very significant impact. Metropolitan gets 50 percent of the State Water Project as our entitlement. For the last three years, we have not been able to deliver any water to our groundwater basins for replenishment, and those basins are at record low levels in the San Gabriel and the San Fernando Valley and Orange County. So they are hurting for replenishment water, and we have not been able to receive any replenishment water since those fishery restrictions have gone into play.

Mr. MCCLINTOCK. I want to focus on a bit of your testimony here where you said, "Many of us who have been following water issues for decades have been accustomed to quick bounce-back in deliveries from the State Water Project when the drought cycle ends and the rains return. This pattern will no longer hold true. New water supply restrictions—new water supply restrictions because of deteriorating environmental conditions in the Delta will have their greatest impact in wet and average years. Metropolitan will lose the ability to capture as much as 600,000 acre-feet of water in above-average and wet years because of these restrictions."

Now we just heard a great deal of fanfare over Title XVI projects. I believe that they were producing roughly 350,000 acre-feet. These restrictions alone are going to cost Metropolitan alone 600,000 acre-feet. How do you square those two? On the one hand, we are spending phenomenal amounts of money, again up to $18,000 per acre-foot in capital costs on these Title XVI projects to produce roughly 350,000 acre-feet of water, while near-bureaucratic restrictions are costing you, just at Metropolitan alone, 600,000 acre-feet.

Mr. KIGHTLINGER. Yes. We believe we need a very diverse portfolio of water supply.

Mr. MCCLINTOCK. Do you think that is a sustainable policy, restrictions that are costing you 600,000 acre-feet of water?

Mr. KIGHTLINGER. Absolutely not. It is not sustainable. So that is why we must find a way to repair that Delta ecosystem and to build some new conveyances so that we can get back to more reliable State Water Project levels.

Mr. MCCLINTOCK. Well, we have been diverting these massive amounts of water, and the population of the Delta smelt continues to decline. Maybe that is just nature's way of telling us that is not the problem. You argue for a new conveyance across the Delta. I assume that is as peripheral canal to more efficiently move water from the north to the south but, at the same time, the administration in Sacramento, the State Water Resources Control Board appointed by the Governor, voted to take away the Federal development rights for the Auburn Dam.

If we are not going to produce additional water in the northern region, what good is it going to do to improve our conveyance facilities? We have to have water to convey, and we have an Administration that is actually blocking the development of these projects; and by the way, the AB-32 restrictions have a huge impact on future cement productions. You know, every ton of cement requires the production of a ton of carbon dioxide, and in case the rocket scientists in Sacramento haven't noticed, cement is a rather handy thing to have around if you are going to build a conveyance facility or a dam. Your comments?

Mr. KIGHTLINGER. Oh, our comment is just that we believe we have to do both. We are going to eventually need more storage in the state. We have been roughly a storage poor state, and that includes both groundwater and surface storage, and we have to have more conveyance, because right now we can't even move the water we have in storage.

Mr. MCCLINTOCK. Well, don't you think we ought to have more storage to go along with that more conveyance?

Mr. KIGHTLINGER. Absolutely.

Mr. MCCLINTOCK. Though you would disagree that the policies out of Sacramento that are impeding construction of the Auburn Dam and impeding our ability to produce cement economically are going to have a serious additional impact on our water needs?

Mr. KIGHTLINGER. I don't know about the Auburn Dam specifically, but I do know they have five specific new storage sites they are analyzing, and that is the process that we have to go through and, hopefully, choose one or two of those sites.

Mr. MCCLINTOCK. One final question. You mentioned the—and in fact, several witnesses have mentioned the effectiveness of water conservation in San Diego County. Ms. Stapleton said that San Diego County used the same amount of water in 2009 that was used in 1996, although they have added 200,000 people to the region.

Well, the thing that jumps off the page at me in other claims like this is that in 2009 we were in a severe recession. In 1996 we had a booming economy. I wonder how much of the water conservation success is actual success and how much of it is directly related to the recession.

Ms. STAPLETON. I think there is a portion of it that is related to the recession, but we track gallons per capita per day very closely, and we have been able to make real progress in less water usage on a per capita basis. That is through the installation of a number of indoor fixtures, whether it be washing machines, dishwashers, shower heads and so forth, and then turf irrigation and the outdoor landscaping area.

As I said, we see conservation as a piece of the solution, but certainly not the only solution. You cannot get enough water by just conserving. If you don't have the water initially, you can't conserve it. It doesn't make sense. It is a piece of the pie. It is not the entire solution.

Mrs. NAPOLITANO. Mr. Calvert.

Mr. CALVERT. Thank you, Madam Chairwoman. Mr. Kightlinger, even if the water bond issue passes in this next election, how long will it take to build those improvements?

Mr. KIGHTLINGER. We are looking at probably 2018 at the earliest, maybe 2020.

Mr. CALVERT. Saying that if those improvements, based upon your testimony, 2018, we must have an interim solution on the Bay-Delta. Is that correct?

Mr. KIGHTLINGER. Yes, sir.

Mr. CALVERT. Now you have been involved in coming up with ideas, along with people in the Central Valley, on how we can come up with an interim solution to allow us to mitigate for the Biological Opinion, and at the same time pump water, and part of that was the Two Gates project that was mentioned in earlier testimony. Isn't that correct?

Mr. KIGHTLINGER. Yes, sir.

Mr. CALVERT. What is your opinion why that temporary solution is unable to get the necessary permits to build in an immediate way?

Mr. KIGHTLINGER. Well, we see the Administration is very concerned with implementing it until they are convinced about the science behind it and the theory that the smelt will track with the turbidity, and the gates would help cut off the smelt and be able——

Mr. CALVERT. What is your opinion about that? People have been looking at this for some time. Experts that have a contrary point of view of the administration believe that this, at the same time, would resolve the issue of the smelt and, at the same time, allow for additional water flow. Do you share that belief?

Mr. KIGHTLINGER. No. We were one of the authors. We were one of the chief proponents of the Two Gate proposal. We have faith in the science.

Mr. CALVERT. So if this agreement is going to continue to be put off, and the Biological Opinion is going to continue to be followed, even if we end up with 120 percent snow melt at the end of the season and you are unable to pump water, and this goes on from year to year, what is going to happen in one or two years from now?

Mr. KIGHTLINGER. We are going to be in a world of hurt, and——

Mr. CALVERT. Applying that to the Quantification Settlement, we had a recent judicial opinion that we are aware of, what happens, God forbid, if the QSA comes unwound, along with the restrictions you have in the Bay-Delta? What happens? I guess that is the question that all of you could answer.

Mr. KIGHTLINGER. We will have a significant problem here at Metropolitan, if we are cut back on both our Colorado River supplies and the State Water Project supplies simultaneously.

Mr. CALVERT. And by the way, I was involved in negotiation of the Quantification Settlement Agreement. I know, and work with many of you on that. It wasn't an easy agreement to come by, and still somewhat controversial, I understand, in the Imperial Irrigation District and other areas, but I will ask the gentleman who is the General Manager: Has production in the Imperial Irrigation area, agricultural production, been affected by the Quantification Agreement?

Mr. BRADY. I would say—and given that I have only been there 20 months, my institutional history is not that long, but I would

say that it has not. Right now we are in an interim fallowing program, and we have worked within the constraints of the QSA.

Mr. CALVERT. So the conservation improvements that were designed to improve water conservation in the Imperial Irrigation District are working?

Mr. BRADY. Well, they are working. There are several parts to it. The initial ones are. We are planning for additional ones, yes.

Mr. CALVERT. If the Quantification Agreement came undone, would anybody there think that we could ever put this agreement back together again with dynamics for the Upper Basin states and the Lower Basin states, and what is going on locally in politics? Yes?

Ms. STAPLETON. I think the real issue is it is like pulling a thread on a sweater. There are so many components, not only in the Quantification Settlement Agreement but in the agreements with the other six Basin states that, in fact, it took over eight years to negotiate the QSA, and subsequent years to come up with the criteria on the Colorado River with the other Basin states, and so forth. To have that all swept away—I don't think you are talking about being able to achieve it again, certainly in the next decade.

Mr. CALVERT. Thank you. I am going to be leaving shortly, but I just wanted to make this point. If we don't resolve an interim solution soon in the Bay-Delta and sweep away this immediate threat on the QSA, we have no certainty on water supply in California, no certainty at all. As you know, under state law that can have a horrendous effect on issuance of both commercial and residential building permits if ever this economy ever turns around. So I just wanted to make that point, and I thank the Chairwoman, and I apologize. I have to head back out.

Mrs. NAPOLITANO. Thank you for your attendance. You have made some very good points. May I add that he was the Chairman when I was Ranking Member for a while. So he has a great deal of background, and was my mentor at one time. Thank you.

Just to Mr. Kightlinger, are you in agreement with Title XVI programs and to your overall Metropolitan water portfolio, and while you are at it, I would like to know if there are any improvements that could be made in the infrastructure to yield more water, understanding that we are not—many water agencies I have talked to are not collecting enough money to be able to set aside for infrastructure repairs. The aging system in Southern California is horrendous, as in many other parts of the state.

You see, the water mains now are bursting almost on a daily basis, which was not an occurrence that we faced years ago. All of that, how is that going to affect us being able to ensure the water quality, water delivery for our customers?

Then to Ms. Stapleton, what is the current use of the gallons per day from your folks? I will wrap it all into one, because that is so important, the answers, for us.

Mr. KIGHTLINGER. I will start, Madam Chair, and thank you for your question. We have to continue to invest in our infrastructure in Southern California and continue to invest and reinvest. The Title XVI boost that Commissioner Connor spoke to was very helpful, that $160 million. They helped many of the recycling and reclamation projects in Southern California.

Mrs. NAPOLITANO. Well, that came from the leadership on our side. Thank you very much.

Mr. KIGHTLINGER. We understand. Thank you, and we appreciate the support. Metropolitan has invested to match that and go beyond, another $370 million into recycling and reclamation projects. The message we have delivered is the cost of water has to go up as the area continues to grow, as we have to find more and more water supply, we are raising rates, and we have to do that to continue to invest and not have our water supply crumble and break around us.

Ms. STAPLETON. Regarding the usage of water by our residents, we started out in those same years that I referred to probably nearly 200 gallons per person per day. We have dropped it now into the 160s, and it is continuing to drop. We really look at it carefully, and it is working in cooperation with our businesses and our residents. We believe that we are well on our way to achieving that 20 percent conservation by 2020.

Mrs. NAPOLITANO. Thank you so very much. I will go into one more question.

Mr. MCCLINTOCK. Has anyone done a cost/benefit analysis on these various forms of water delivery? Mr. Kightlinger, you pointed out that residential rates, in particular, or water rates in general are going up dramatically as we look for more and more exotic ways of producing water, and yet we ignore surface water storage as the obvious unfulfilled promise of California's resources. So the question I have is: Have you looked at the costs and benefits of these various types of water production, from desalinization, to recycling, to local surface water, to increasing storage on the Sacramento?

Everybody thinks that the Colorado is the mother of all water in the western United States. As you know, the Colorado River is a junior sister to the Sacramento. The difference is that we store 70 million acre-feet on the Colorado, and yet we store only 10 million acre-feet on the Sacramento. Your thoughts?

Mr. KIGHTLINGER. Those are all very good points. We do do cost effective analyses of all projects, and we look at that. We also have to look at which are the most reliable, and which supply water year in and year out, and how we can mix and match the best supplies. Certainly, we are storage-short in the State of California compared to the Colorado River.

Mr. MCCLINTOCK. Well, what is cheaper, surface water storage or recycling?

Mr. KIGHTLINGER. Surface water storage is very expensive. It is on a comparable basis with recycled water, but it also is very valuable. When you need it, it is always there for you and in large amounts.

Mr. MCCLINTOCK. Have you guys done a study on that? I would like to see some reliable figures where we can get a cost/benefit analysis of each of the forms of water development.

Mr. KIGHTLINGER. We have done that, and we will provide your staff with that. Thank you.

Mrs. NAPOLITANO. Thank you, panel, and I invite you to stay with us for the next panel, and appreciate your travel and your time and your effort.

I would like to call up Dr. Peter H. Gleick, President, Pacific Institute in Oakland; Professor Jay Famiglietti, Ph.D., with the Department of Earth System Science, University of California at Irvine; Mr. Miguel Luna, Executive Director of the Urban Semillas, "seeds" to those of you that don't understand Spanish, Los Angeles; Ms. Lucy Dunn, President and Chief Executive Officer of the Orange County Business Council in Irvine; Mr. Joe L. Del Bosque, Owner of Empresas Del Bosque Inc. in Los Banos; Mr. Larry Collins, Vice President, Pacific Coast Federation of Fishermen's Association in San Francisco.

Audience, if you could take your conversations outside, thank you very much. We want to continue and be out of here on a timely basis. Dr. Gleick, I would like to start off with you.

STATEMENT OF DR. PETER H. GLEICK, PRESIDENT, PACIFIC INSTITUTE, OAKLAND, CALIFORNIA

Dr. GLEICK. Yes. Good afternoon, Madam Chairwoman, members of the Subcommittee. Thank you very much for having me here today. This has been quite an interesting hearing.

I have submitted my written testimony. I am just going to summarize a few key points. Let me reiterate something that has already been said. I agree there is no silver bullet to California's water problems. We have many problems. There are many solutions. I think everyone involved in the state's water debates would acknowledge the need for diverse answers or a portfolio, as we sometimes say, of solutions, but the need to do many things does not mean we need to do everything or we can afford to do everything. We have to do the most effective things first, the most cost effective things first. This has already been mentioned.

What I would like to do a little bit today is focus on opportunities, the good news, if you will. In particular, I am going to talk about two things very briefly. One is the potential for additional conservation and efficiency improvements statewide. The other is opportunities to rethink water supply statewide.

In particular, there is vast untapped potential for reducing our demand for water without affecting the benefits that that water provides. Improving the efficiency of use of water is the fastest, the cheapest, the most environmentally sound option for meeting California's current and future needs.

We have to change the way we think about supply. There are enormous opportunities for new supply in California, but I would argue that we ought to not be thinking about expensive, inefficient surface storage. As much as we ought to be thinking about smart surface storage and groundwater, we ought to be thinking about recycled and reclaimed water. We ought to be thinking about, where appropriate, desalination.

It is important to realize that we don't want water. We want the services and the benefits that water provides. We want a healthy agricultural economy. We want clean clothes, and we want to be able to clean our dishes. We want to make semi-conductors and the other things that are industrial processes produce, all of which require water, but all of which require less water than we are spending to do those things today. That is the definition of improving ef-

ficiency. We can do the things that we want with less water than we are spending to do them today.

Californians have made enormous progress in this in the last 25 years. Our water use is relatively flat. Our population has grown. Our economy has grown. Our per capital water use has gone down. We have been able to meet a lot of our demands, in part by improving efficiency, and yet our current use of water is still wasteful. There is still enormous potential to improve efficiency.

In a few weeks the Pacific Institute—it is my institute in Oakland; it is a nonprofit research institute—is going to release a new assessment, in part stimulated by a letter that the Chairwoman sent to the Department of the Interior last August requesting that we rethink a million acre-feet quickly. Where can we find a million acre-feet in the State of California relatively quickly?

Our new assessment is going to look at the potential for conservation and efficiency to produce a million acre-feet quickly. We decided we would look at 60 percent agriculture, 40 percent urban. We would look at only things that were cost effective, only things that used existing technology.

The savings in the urban sector, 400,000 acre-feet, we estimate, would cost about $2 billion and produce about 400,000 acre-feet of water, would save a lot of energy in the meantime.

I would note Temperance Flat, the current dam that has been proposed on the San Joaquin, is estimated to cost well over $3.3 billion, would probably produce far under 200,000 acre-feet of water, an example of the potential for conservation and efficiency to meet some of our demands.

We find there are 600,000 acre-feet that could be saved pretty quickly in agriculture by applying additional smart irrigation technology, the things that farmers are already doing; regulated deficit irrigation on certain kind of acreage; and converting part of the Central Valley acreage that is not on drip and sprinklers to drip and sprinklers.

Let me conclude. There are new ways of thinking about supply. We should be doing more reclaimed water and reuse of water. We should be doing smart desalination. We should be doing much more conjunctive use, much more storage of groundwater, the best place to store water in California. All of these things are part of what we need to do to meet California's growing demands, and perhaps provide some of this interim solution that we so desperately need, because of the long time frame required for some of the other things that we have already addressed today.

I am going to stop there. I would be happy to answer any questions during the question and answer period. Thank you.

Mrs. NAPOLITANO. Thank you.

[The prepared statement of Dr. Gleick follows:]

Statement of Dr. Peter H. Gleick [1],
President of the Pacific Institute

The Critical Role of Water Efficiency and Conservation in Solving California's Water Problems

Honorable Representatives, distinguished guests: Thank you for inviting me to discuss the key role that water efficiency and conservation has and will play in solving California's water problems. Notwithstanding the recent winter rains the state has received, California continues to face serious unresolved water challenges. Current proposals for meeting those challenges are inadequate and largely misdirected. But effective solutions are available.

Summary

Water is vital to the health of our economy and natural ecosystems. California's cities and agricultural communities rely on reliable supplies of clean and adequate fresh water. As California's population and economy grow, there is mounting concern about our ability to meet future water demand amidst pressure on our complex water systems. In the 20th century, our approach to meeting this demand has been to develop new supply. While this approach has brought tremendous benefits to this state, we have reached the limits of traditional supply options and continuing to rely on building new infrastructure will fail to solve our crisis. A broader and more integrated approach is needed.

There is no "silver bullet" solution to California's water problems, and everyone involved in state water debates will acknowledge the need for diverse answers or a "portfolio" of solutions. But the need to do many things does not mean we must do, or can afford to do, everything. We must do the most effective things first.

In particular, there is vast untapped potential for reducing our demand for water without affecting the benefits that water provides. Improving the efficiency of our water use is the cheapest, easiest, fastest, and least destructive way to meet California's current and future water supply needs. Indeed, without past efforts to improve water-use efficiency, our current crisis would be much worse. And we must expand our thinking about supply, away from costly and ineffective new dams and toward the other excellent options for expanding supply.

My testimony today will address three issues:

1. The flaws of our traditional methods of water planning;
2. The massive untapped potential for improving water-use efficiency. Specifically, I will address the potential to quickly reduce demands in California by one million acre-feet at a cost far below that of any new supply option that has been proposed.
3. The potential for expanding water supplies through non-traditional approaches of water recycling and reuse, smart desalination, rainwater harvesting, and better conjunctive use of California's surface and groundwater.

1. Traditional Water Planning Assumptions are Incorrect

Traditional water planning is based on two premises. First, it assumes that as populations and the economy grow, water use must also grow. Second, it assumes that in order to meet growing demand, new dams must be built, new groundwater aquifers tapped, and new supplies brought from farther and farther away. This is what most of you believe; it is what most of the public believes; it is what most water managers believe.

Both of these assumptions are false.

Figure 1 shows California's gross state product, population, and water use between 1975 and 2001. Total water use in California was less in 2001 than it was in 1975, yet population increased by 60% and gross state product increased 2.5 times.

The same trend is true for the United States as a whole. The latest information from the U.S. Geological Survey shows that total water use in 2005 for the United States is now lower than it was in 1975. Figure 2 shows total U.S. water withdrawals from 1900 to 2005 along with Gross National Product. Per-capita water use has dropped even more dramatically over the past three decades. This suggests that we can and in fact we have broken the link between water use, population, and economic growth. This has been achieved in large part by improvements in conservation and efficiency. Figure 3 shows the "economic productivity" of water use in the

[1] President, Pacific Institute, Oakland, California. Member, U.S. National Academy of Sciences. www.pacinst.org.

United States over the past century. Improvements in efficiency of water use now permit us to produce nearly three times as many dollars of goods and services per gallon of water as just a few decades ago.

Absent a discussion about population policy, our goal in California must be to continue these trends toward higher economic productivity of water and decreasing per-capita water use.

2. Conservation and Efficiency Are the Most Important Options

It is important to realize that we do not want water; we want water services. We want to grow food and fiber, clean our clothes and dishes, get rid of our wastes, produce semiconductors and other goods and services. This realization lies at the heart of conservation and efficiency. If we can continue to provide these goods and services with less water, we have increased the efficiency of our water use.

Californians have improved efficiency of our water use over the past 25 years as shown in Figure 1. But our current water use is still wasteful. The Pacific Institute has completed a series of independent reports on urban and agricultural water efficiency that provide a comprehensive statewide analysis.[2] Our findings have been adopted by the California Department of Water Resources in the California Water Plan. These studies finds that existing, cost-effective technologies and policies can readily reduce current state demand for water by six to eight million acre-feet, or around 20 percent. The Governor's recent call for a 20 percent reduction in water use by 2020 is thus based on sound science and economics, even if the policies to achieve such savings are not yet in place.

Widespread conservation and efficiency improvements are possible in every sector and these water savings can be found for much less than the cost of building new supply or expanding our current supply. These savings are real and represent a tremendous amount of untapped potential. Even today, after California's conservation efforts, over 60% of all toilet flushes are well above national standards, suggesting that many old inefficient fixtures remain. More than 65% of all crops in California are still grown with inefficient flood or sprinkler irrigation systems. Studies have shown that installing efficient irrigation technologies, such as drip system, can reduce water use and increase agricultural yield. Given that the agricultural sector uses 80% of California's water supply, or about 34 million acre-feet per year, even small efficiency improvements can produce tremendous water savings. Additional water savings are possible if farmers continue the trend of moving away from water-intensive crops like cotton, pasture, rice, and alfalfa in favor of more valuable low-water crops like vegetables, fruits, and nuts.

In a few weeks, the Pacific Institute will release a new assessment of how to save one million acre-feet of water, split 60/40 among agricultural and urban users, quickly and cost effectively. Let me offer an advanced look at some of our findings:

- 400,000 acre-feet of water can be quickly conserved by urban users by replacing only some of the many remaining inefficient toilets, showerheads, restaurant spray-rinse nozzles, washing machines. These savings would require an investment of under $2 billion and over the life of these fixtures, the energy, water, and wastewater savings will far exceed the initial investment.
- Another 600,000 acre-feet of water can be saved by applying smart irrigation scheduling to 20% of the state's vegetable and orchard acreage, practicing regulated deficit irrigation on 20% of current almonds and pistachios acreage in the Sacramento Valley, and converting 20% of Central Valley vegetables, and 10% of orchards and vineyards, to drip and sprinklers. These changes would save water at a cost of around $100 per acre-foot.

These savings are just the tip of the iceberg: far more water could be saved at far less cost than any proposed new supply option. For example, the proposed Temperance Flat dam is grossly uneconomic and would, at a cost far exceeding $3 billion (or over $900 per acre-foot), only provide between 100,000 and 200,000 acre-feet of water, and even these figures are disputed.

Our research has shown that California's total water use in 2030 could be 20% below current levels while still satisfying a growing population, maintaining a healthy agricultural sector, and supporting a vibrant economy. Some of the water saved could be rededicated to agricultural production elsewhere in the state; support new urban and industrial activities and jobs; and restore California's stressed rivers, groundwater aquifers, and wetlands—including the Sacramento-San Joaquin Delta.

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[2] See: Gleick et al. 2003, "Waste Not, Want Not: The Potential for Urban Water Conservation in California" and Cooley et al. "Sustaining California Agriculture in an Uncertain Future." Pacific Institute, Oakland, California.

I note that water conservation and efficiency has the additional benefit of producing significant energy savings. Capturing, treating, transporting, and using water require a tremendous amount of energy. This is particularly true in Southern California, where water supplies and population centers are separated by hundreds of miles, requiring a tremendous amount of infrastructure to move water from where it is available to where it is needed. As a result, California's water-related energy consumption accounts for roughly 19% of all electricity used in California, approximately 32% of all non-powerplant natural gas use, and 88 million gallons of diesel fuel. Thus improving statewide water conservation and efficiency can achieve substantial energy savings.

3. Additional Water Supply Options Are Available

Current proposals to expand water supply in California by building a few new dams are seriously flawed. As mentioned above, the best ideas for new dams in California are grossly uneconomic and do nothing to solve the state's water problems. But there are other good water-supply options we must pursue. These options include:

- **Water recycling and reuse:** Water reclamation and reuse can augment water supplies, as well as provide a means to treat wastewater and reduce environmental discharges. Water agencies in California currently produce about 500,000 acre-feet of recycled water, the majority of which is used for agricultural and landscape irrigation. Expanding current efforts could produce a substantial amount of new water. For example, the Irvine Ranch Water District, in Southern California, meets nearly 20% of its total demand with recycled water. A new residential community in Ventura County, California is using recycled water for all of its landscaping needs at an estimated cost of $200 per acre-foot, far below the cost of new surface storage. Significant other opportunities exist to increase recycling and reuse throughout the state, effectively lessening the need to identify and develop new water supplies.
- **Conjunctive use:** Surface water and groundwater are hydrologically linked. Conjunctive use takes advantage of this connection by storing excess surface water, including stormwater, in groundwater basins for later use in drought periods. This option can improve supply reliability and flexibility, reduce land subsidence, and minimize the impacts of urban runoff on local steams and the marine environment. But it requires fundamental changes in the way we monitor and manage groundwater. It is time for the state of California to enter the 21st century and require comprehensive groundwater management.
- **Desalination:** Appropriately designed and sustainably managed desalination (both seawater and groundwater) can provide a costly but reliable, high-quality water supply. But desalination must be done in an environmentally sound manner, and without inappropriate public subsidies. Current plans for desalination in southern California do not yet meet these conditions.

Summary and Recommendations

Better water conservation and efficiency can meet California's water needs for decades to come. Total state demands for water can drop by as much as 20 percent while still satisfying a growing population, maintaining a healthy agricultural sector, restoring the health of the Sacramento-San Joaquin Delta and other threatened ecosystems, and supporting a vibrant economy.

Can such an efficient water future be achieved? Yes, given appropriate attention and effort, California's water-use practices can be substantially modified over the next quarter century, just as they have over the past 25 years. Implementing these efficiency measures requires action on the part of legislators, water managers, water districts and agencies, farmers, corporations, and all individuals.

Finally, a quick comment on the recent political attempts to overturn or eliminate the requirement that the Federal government protect endangered and threatened species. Species extinction is not a sustainable water policy. And the collapsing ecosystem is not the cause of our water problems, it is a symptom. If the problem is falsely and ideologically defined as "people versus fish," our water policy will have failed. We must ensure that both people and fish can thrive with the water we have.Gleick 3 charts go at end insert 3-5

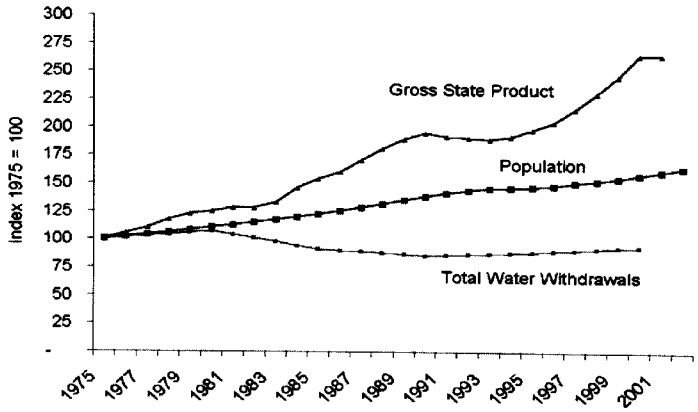


Figure 1. California's water use (green line), population (red line), and gross state product (blue line) between 1975 and 2001. Data is indexed to 1975. Water use from the U.S. Geological Survey. Analysis by the Pacific Institute.

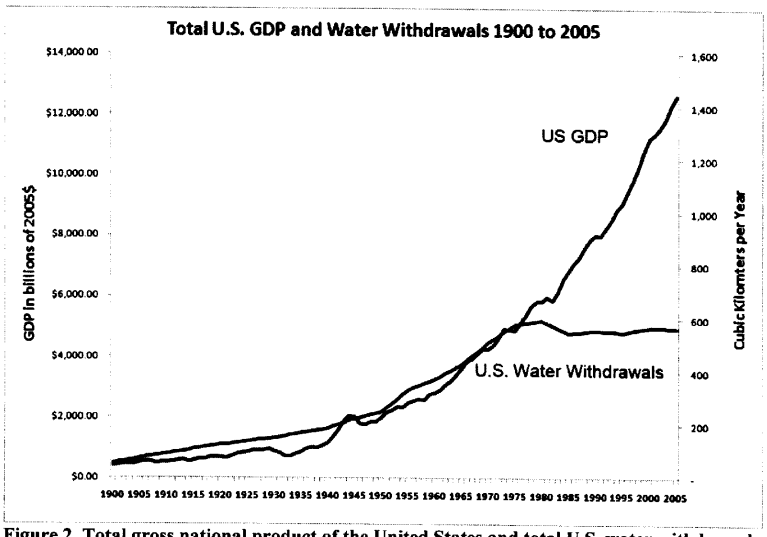


Figure 2. Total gross national product of the United States and total U.S. water withdrawals, from 1900 to 2005. Total water use in the U.S. peaked in 1980 and has leveled off since then. Water use data from the USGS. Analysis by the Pacific Institute.

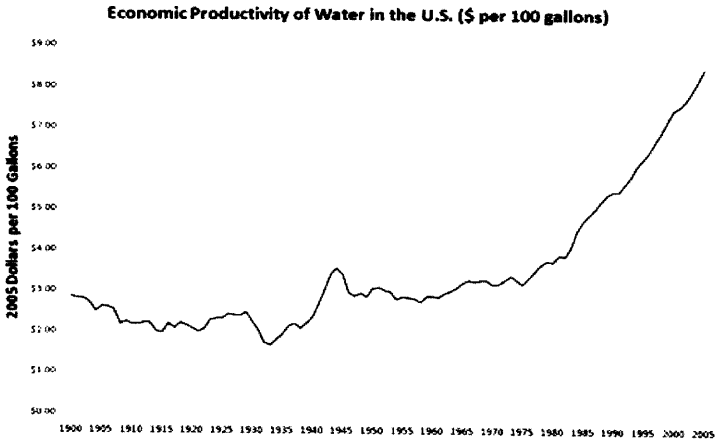


Figure 3. The "economic productivity" of water use in the United States over the past century in dollars per hundred gallons of water use (2005 dollars). Data on water use from the USGS, on the economy from the Dept. of Commerce. Analysis by the Pacific Institute.

Mrs. NAPOLITANO. I would like to now call upon Professor Jay Famiglietti, Department of Earth Science.

STATEMENT OF JAMES S. FAMIGLIETTI, DEPARTMENT OF EARTH SYSTEM SCIENCE, UNIVERSITY OF CALIFORNIA AT IRVINE, IRVINE, CALIFORNIA

Dr. FAMIGLIETTI. The Central Valley offers a compelling example of the importance of groundwater to the water supply and of the need to manage its use for sustained availability and productivity. As one of the most productive agricultural regions in the world, the Central Valley relies heavily on groundwater to meet its irrigation water demands.

The extended western U.S. drought and resulting changes in surface water allocations are now triggering an increased reliance on groundwater to meet those demands. Meanwhile, our warming climate is resulting in a decreasing snowpack in the Sierras and the Rockies, which will slow future rates of groundwater recharge and limit the aquifer's ability to replenish these additional water withdrawals.

Monitoring groundwater availability in the Central Valley is, therefore, critical to help manage California's water crisis and its impact on the state's economy and the nation's food production. It is exceedingly difficult to observe the ups and downs of groundwater storage for a large system like the Central Valley aquifer using traditional ground based observations from wells. Fortunately, a new satellite mission, the Gravity Recovery and Climate Experiment, or GRACE, now enables routine groundwater monitoring from space. GRACE measures minute changes in earth's gravity field.

Notice its time variable component. Because these changes are largely driven by changes in the distribution of liquid and solid

water on our planet, we can use the gravity measurements to estimate the corresponding changes in water stored on land.

GRACE has already been successfully applied to track monthly groundwater changes in several large aquifer systems around the world, providing a holistic picture of aquifer behavior that would not otherwise be possible. For example, last summer we published a study of rapid rates of groundwater depletion in northwestern India, an agricultural region like the Central Valley that is heavily dependent on groundwater for its irrigation demands. Could I have my slides, please?

The next two slides summarize our recent work on the combined Sacramento and San Joaquin River Basins, including the snowpack in the western Sierras and the groundwater in the Central Valley. The upper left panel shows the GRACE estimate of the change in total water storage for the region; that is, all of the snow, surface water, soil moisture, and groundwater for the October 2003 through March 2009 time period.

The drought conditions since 2005 are evident in the figure. During the entire study period, water storage in the Basins decreased by 31.3 cubic kilometers or roughly the volume of Lake Mead. Since GRACE measured the change in all the snow, surface water, soil moisture and groundwater together, we need to estimate and remove these first three in order to isolate what is happening with just the groundwater. These are shown on the other panels of the slide.

Soil moisture, in the upper right, totaled 1.7 cubic kilometers. Reservoir storage at the lower left declined by 7.6 cubic kilometers, while the snowpack losses at the lower right totaled another 1.7 cubic kilometers. Removing these from the total water storage change that we get from GRACE, the groundwater storage changes from the Central Valley, as shown in this slide. The table shows that during the study period groundwater storage decreased by over 20 cubic kilometers, or nearly two/thirds the volume of Lake Mead.

As you know, California's water future is highly uncertain. Climate change may drive the Sierra snowpack close to zero by the end of the century, while our population will continue to grow. Unfortunately, the Colorado River Basin faces a similar plight, as shown in this last slide.

I hope that my testimony convinces you that advanced technologies such as the GRACE mission can make an important contribution to the future of water management. If I have, then unfortunately, I have some bad news for you. GRACE will perform reliably for only another three to five years. Its follow-on, known as GRACE II, is not slated for launch until 2020.

Assuming the usual delays, we can probably expect a gap of at least a decade in GRACE water storage data. If your Committee believes, as I do, that GRACE is invaluable in order to adapt water management to changing climate and human activities, then please do what you can in Congress to help increase the priority of the GRACE II mission. Thanks once again for the opportunity to testify.

[The prepared statement of James Famiglietti follows:]

Statement of Dr. James S. Famiglietti, Director, UC Center for Hydrologic Modeling, Professor of Earth System Science, Professor of Civil and Environmental Engineering, University of California, Irvine

Chairwoman Napolitano, Ranking Member McClintock, and other members of the subcommittee: thank you for the opportunity to provide testimony on the state of our water supply and water supply monitoring in California, including groundwater resources.

My name is James Famiglietti. I am a hydrologist and Professor on the faculty at the University of California, Irvine, with appointments in the Department of Earth System Science and the Department of Civil and Environmental Engineering. I am the Founding Director of the new UC Center for Hydrologic Modeling. My research group uses satellite remote sensing to track water availability on land, and has been working for many years towards improving hydrological prediction in regional and global weather and climate models. I am also the former Director of the UCI Institute of Geophysics and Planetary Physics and the past Chief Editor of the interdisciplinary Earth science journal Geophysical Research Letters. I am currently in the last year of a three-year term as Chair of the Board of Directors of CUAHSI, the Consortium of Universities for the Advancement of Hydrologic Sciences, Inc. It is on the strength of nearly 25 years of research, teaching and service to the water science and engineering community that I offer the following testimony.

INTRODUCTION

Groundwater—the water stored beneath the land surface in aquifers—accounts for nearly 30 percent of global freshwater resources. Today, some 2 billion people rely on groundwater as a primary source of drinking water and for irrigated agriculture. However, in many regions of the world, groundwater resources are under stress due to a number of factors, including groundwater depletion (when withdrawal rates exceed recharge rates), salinization and contamination. When coupled with the pressures of changing climate and population growth, the stresses on groundwater supplies will only increase in the decades to come.

In many regions in the United States, including the Ogallala Aquifer of the High Plains, the Colorado River Basin, California, and its Central Valley, groundwater plays an essential role in supporting agricultural activity, as well as in domestic and industrial use. In some regions in the U.S., groundwater provides the sole freshwater source, while in others, it is used to supplement surface water supplies, which can vary with swings in weather and climate. For example, until recently, the cities of Fresno and Visalia depended entirely upon groundwater for their domestic supply; and in my own hometown of Irvine, roughly 50 percent of the water supply is drawn from local aquifers beneath Orange County.

Nearly 80 percent of the fresh water used in the United States is for agriculture (though more recent statistics on water use for power generation underscore the importance of that sector). In regions such as the Central Valley and the Ogallala, groundwater provides the majority of the irrigation water requirements. The Central Valley offers a compelling example of the importance of groundwater, as well as the need to manage its use for sustained availability and productivity. The Central Valley is one of the most productive agricultural regions in the world, producing more than 250 different crops worth $17 billion per year (2002 dollars), or 8 percent of the food produced in the U.S. by value; it accounts for 1/6 of irrigated land in the U.S.; and it supplies 1/5 of the demand for groundwater in the U.S. In short, it the second most pumped aquifer in the United States.

The current water crisis in California places additional stress on Central Valley groundwater resources. Continued drought has resulted in decreasing surface water allocations to the southern valley, triggering an increased reliance on groundwater, in a region where groundwater dependence is already high. The crisis is being exacerbated by the ongoing drought, since less rainfall results in less groundwater recharge. Under these conditions, groundwater use rates exceed replenishment rates, and the groundwater supply and the water table drop. Likewise, climate change and its impact on the decreasing snowpack in the Sierras and the Rockies poses its own set of challenges to reliable water supply in California. Decreasing snow in the Sierras may well lead to additional reductions in Central Valley groundwater recharge, while the diminishing snowpack in the Colorado River basin may well result in decreasing surface and groundwater availability there. Hence monitoring groundwater availability in the Central Valley is critical to help manage California's water crisis, its impact on the state's economy and the Nation's food production

Surprisingly, in spite of its importance to freshwater supply, groundwater resources are often poorly monitored, so that a consistent picture of its availability is difficult and sometimes impossible to construct. Typical groundwater monitoring

relies on tracking water levels in a network of wells. However, existing monitoring wells are often sparse, measurement records are frequently discontinuous (Figure 1), and wells are often monitored by different agencies, at different time intervals, and record lengths often vary. Well measurements from different local, state and federal agencies are often archived at different locations, stored in different formats, and may not be easily or freely accessible. The recent U.S. Geological Survey report on "Groundwater Availability of the Central Valley Aquifer, California," which was several years in the making, underscores the major effort required to assemble a comprehensive picture of changing groundwater availability. It is not clear that such an effort can be sustained as part a routine monitoring program.

The main goal of this testimony is to share with committee members recent advances in satellite technology that now enable routine groundwater monitoring from space, including in the Central Valley. The satellite mission of interest today, the Gravity Recovery and Climate Experiment, or GRACE, has already been successfully applied to track monthly groundwater storage changes in several large aquifer systems around the world. It is our hope that the information that advanced technologies such as GRACE can provide will ultimately be incorporated into the information stream that supports environmental decision making. I will also appeal to you for your help. Unfortunately, hydrological model development and water observing networks have lagged far behind the increasingly urgent need to address pressing issues of national significance. We cannot make the necessary progress in areas such as water, energy and food security without your leadership and support.

BACKGROUND

The GRACE mission was launched in March 2002. It consists of two satellites that orbit around Earth each month. The primary measurement is not of Earth's surface, but rather, of the distance between the two satellites, which is perturbed by changes in gravity from place to place as the pair orbit around the globe. The mission collects millions of these inter-satellite distance measurements, which are exceptionally accurate (to the sub-micron level), and uses them to produce a map of our planet's gravitational field. Taking the difference between these maps yields the time-variable component of the gravity field. The major topographic and geologic features of Earth do not change on a monthly basis: their contribution to Earth's gravity field is static. Consequently, owing to the fact that water is one of the heaviest materials on Earth, the time-variable component of the gravity field is largely a reflection of changes in water storage each month. Hence the measurements of this time-variable component of the gravity field are used to estimate the corresponding changes in water mass stored on land and in the oceans. GRACE cannot measure the total (absolute) amount of water stored in a river basin, an aquifer or any other region of interest. It can only tell us the change between successive measurements of the gravity field.

GRACE data have been successfully used to measure changes in the Greenland and Antarctic ice sheets, the Alaskan glaciers, and the Patagonian glaciers in Chile. Our research group at UC Irvine has focused on hydrologic applications of GRACE. We have demonstrated how GRACE data can be used to track water storage changes (Figure 2), to estimate evapotranspiration and to estimate streamflow from the world's major river basins. We also incorporate GRACE data in computer models of hydrology to improve prediction of surface and groundwater storage changes. GRACE data are now an input data stream into the operational U.S. Drought Monitor (Figure 3). After nearly 8 years of GRACE data, we are now able to identify trends in water storage that result from both natural and anthropogenic forces (Figure 4).

One of the key hydrologic contributions of GRACE is that it has enabled satellite observation of groundwater storage changes. Our group has pioneered these techniques, beginning over a decade ago with our pre-launch feasibility study of the potential of GRACE to monitor groundwater storage changes in the Ogallala Aquifer. Since then we have used GRACE data to explore groundwater storage changes in the Mississippi River basin, and in aquifers in Illinois, Oklahoma and Australia. Figure 5 shows a figure from our recent study of rapid rates of groundwater depletion in northwestern India, an agricultural region like the Central Valley that is heavily dependent on groundwater for its irrigation demands.

It is critical to recognize the contribution of the GRACE mission to observing the changing hydrology of the continents. Figures 2, 4 and 5 display information on the behavior of water storage on land that is essentially brand-new: before the GRACE mission, this information was simply not available. For example, the ups and downs of river basin water storage shown in Figure 2 were simply not known: likewise the pattern of water storage trends in Figure 4. In particular, remote sensing of groundwater was regarded as a "Holy Grail" in the hydrologic community. In addition to

the several reasons described in my introductory testimony, since groundwater is located below the Earth's surface, it is not "visible" by traditional, optical satellite missions. GRACE has effectively allowed us to "see" beneath the surface, by "weighing" groundwater storage changes from space.

There are several caveats that must be understood before we discuss the Central Valley example. First, GRACE operates at relatively low resolution in space and time. It can measure monthly changes in water storage, for regions with a minimum area 150,000 km2, with an accuracy of 1.5 cm of equivalent water height. Its performance improves with increasing area and time period. Second, GRACE measures changes in all of the water stored in a region—that is, it is unable to differentiate among snow, ice, surface water, soil moisture and groundwater. In order to isolate changes in one of these individual storage reservoirs, for example, groundwater, mass changes in the other above-mentioned storages must be estimated and removed. Typically these data come from ground-based observations, advanced hydrological models, or from other satellites.

Third, the GRACE mission has a limited lifespan. Barring any unforeseen battery or electronics failures, mission scientists at NASA's Jet Propulsion Laboratory estimate that GRACE will perform reliably for only another 3-5 years.

Finally, it is important to note that our goal is not to expose water "overuse." In fact, Figure 4 shows that in many land regions, for example, in high-latitude Eurasia, water storage is increasing. Moreover, unpublished research from our group suggests that the continents as a whole show zero storage change, or even a small increase in water storage, during the life of the GRACE mission. Rather, we are committed to developing advanced methodologies to help monitor water storage changes, characterize water availability, and to predict and understand the forces that contribute to regional water stress. As mentioned earlier, it is our hope to share this information with regional water managers, and with state and federal policy and decision makers.

WATER STORAGE CHANGES IN THE SACRAMENTO AND SAN JOAQUIN RIVER BASINS: GROUNDWATER DEPLETION IN THE CENTRAL VALLEY

Our most recent regional study is of the combined Sacramento and San Joaquin River basins in California. This 154,000 km2 region includes California's major mountain water source, the snowpack in the Sierra Nevada mountain range, as well is its primary agricultural region, the Central Valley (52,000 km2). We selected this region for study due to its socioeconomic importance for California and for the Nation. This research shown here was presented in December 2009 at the Fall Meeting of the American Geophysical Union (AGU) conference held in San Francisco. It is currently in preparation for submission to a peer-reviewed journal.

Figure 6 (upper left) shows the change in total water storage (all of the snow, surface water, soil moisture and groundwater) for the combined Sacramento-San Joaquin drainage area. The drought conditions since 2005 are evident in the figure. During the 66-month time period studied (October 2003-March 2009), water storage in the basins decreased by 31.3 km3, or roughly the volume of Lake Mead.

As I mentioned earlier, in order to estimate only the groundwater storage changes in the region, mass changes in the other major water stores (snow, surface water, soil moisture) must be estimated and removed. Soil moisture is largely unmeasured in the United States. Consequently, we estimated and removed the soil moisture signal using the average of three different soil moisture simulations for the corresponding time period, taken from advanced hydrological models, and run at the NASA Goddard Space Flight Center (upper right). The loss of soil moisture during the study period accounted for 1.7 km3 of the 31.3 km3 total. Reservoir storage data (lower left) were compiled from the state CDEC website, and accounted for 7.6 km3 of water loss. The snowpack estimates, or its snow water equivalent (lower right), were obtained from the National Operational Hydrologic Remote Sensing Center (NOHRSC), and are a combination of both observations and advanced simulation models. The NOHRSC data represent the best estimate of the Sierra snowpack currently available. These data show a decrease of 1.7 km3 during the study period. The results the total water storage, snow, surface water, soil moisture, and groundwater (discussed next) are summarized in Table 1. Note that the trends reported are for the specified time period, which was selected to maximize the overlap among the various datasets used in the study.

Since the total water storage change in the Sacramento and San Joaquin basins is the sum of the snow, surface water, soil moisture and groundwater changes, subtracting the first three of these components from the total (observed by GRACE) yields the groundwater storage change (Figure 7). Table 1 shows that during the study period, groundwater storage changes accounted for 20.3 km3 of the total water loss. We assume in this work that nearly all of the groundwater loss occurs

in the Central Valley, since the other major geological features in the combined basins, that is, the mountain ranges surrounding the Valley, have limited capacity to store groundwater.

The picture that emerges from this analysis is consistent with the U.S.G.S. study, and extends that study from its end date in 2003 to the present. Our estimated loss trends are similar to those of the U.S.G.S., and the steep decline estimated in our study is similar to the those estimated by the U.S.G.S. in previous drought periods. Furthermore, the results are consistent with our understanding of Central Valley farmers' behavior. Facing significant cuts in surface water allocations, farmers are forced to tap heavily into groundwater reserves to attempt to meet their irrigation water demands. Our research also indicates (not shown here) that nearly 75 percent of the 20.3 km3 of groundwater loss is occurring in the San Joaquin River basin, including the Tulare Lake basin, which is also consistent with ground-based observations (Figure 8) and other studies.

WHERE DO WE GO FROM HERE?

As you know, California's water future is highly uncertain. Climate change may drive the Sierra snowpack close to zero by the end of the century, while our population will continue to grow. Unfortunately, the Colorado River basin faces a similar plight (Figure 9). It is not hard to imagine that water may emerge as one of the key political issues in the decades to come. Perhaps that time is now. Will water be the "oil of the future?" Maybe.

Given the importance of water, both now and in the future, the U.S. must significantly accelerate its predictive capabilities in order to address the pressing issues we will soon face. Will we have enough water to supply our growing population? Will there be enough water to sustain agricultural activity? Is there enough water and land to support biofuel production? How will declining snowpack affect hydropower in the American West? How will changes in extreme events such as flooding and drought affect California? How can water management best adapt to these changes in climate, snowpack, population and hydrologic extremes? Agencies like NOAA, the National Weather Service, and NASA, are responding, but slowly given current economic constraints. I contend that a significant investment in hydrologic prediction, observation and research must be made, now, in order to build the intellectual infrastructure to ensure the security of our nation in the decades to come.

My own contribution to this effort is through leadership at the state and national levels. I am the founding director of a new modeling center at UC Irvine called the UC Center for Hydrologic Modeling. Our goal is to develop a very high-resolution hydrological model for the state that includes all major components of the natural (snow, ice, surface waters, soil water, groundwater) and managed (reservoirs, aqueducts, groundwater withdrawals) water cycle that can be used to test solutions and provide answers to the questions above. Another goal is to provide a forum for water managers, practitioners, environmental decision makers, and center researchers, to transfer knowledge, provide training, and develop meaningful collaborations that can advance water management in our state.

I am leading a similar effort at the national level. This activity, called the Community Hydrologic Modeling Platform (CHyMP), is unfunded, but is highly regarded by the National Science Foundation and other agencies such as NASA and NOAA. Both the UC Center and the CHyMP effort will require sustained funding at the state and national levels. Again, I am already devoted to the cause, but I need your help to identify the resources to ramp up and sustain these critical activities. Students must be trained at all degree levels. New modeling paradigms must be developed that can easily accommodate ground-based observations, emerging sensor technologies, and satellite observations like those from GRACE. There is much work to be done.

I hope that I have convinced you that advanced technologies such as the GRACE mission can make an important contribution to the future of water management. I will be happy to work with your staff to spread the word about the potential of GRACE so that it can be fully utilized in water prediction and management. However, recall that GRACE will last, at best, another 3-5 years. The follow-on mission, known as GRACE 2, is not slated for launch until 2020. Assuming the usual delays, we can expect a gap of at least a decade in GRACE water storage data. If your committee believes, as I do, that GRACE is invaluable in order to adapt water management to changing climate, then please do what you can in Congress to help increase the priority of the GRACE 2 mission.

I thank you once again for the opportunity to testify.

[NOTE: Figures have been retained in the Committee's official files.]

Mrs. NAPOLITANO. Is the Commissioner still here? I don't know what to say, other than there are things we need to maybe explore with NASA, with NAS, with all those agencies, to see how we can begin to look at some of what they are findings can impact and assist our agencies. Thank you.

I would like to move on to Mr. Miguel Luna, Executive Director of Urban Semillas. Welcome.

STATEMENT OF MIGUEL A. LUNA, EXECUTIVE DIRECTOR, URBAN SEMILLAS, LOS ANGELES, CALIFORNIA

Mr. LUNA. As a community organizer, my perspective will be one that comes from community at the grassroots level. I wanted to start my testimony with this quote. "Solutions have been a permanent dialogue between human beings and water." I feel part of the problem of the state of today's water stems in part from a historical lack of dialogue with this resource. Our interaction with this vital resource has been one-way, us demanding from it, without hearing the warnings, the warnings when we pollute it, when we overdraft it, when we waste it.

Of course, I am aware that our water situation requires solutions that are engineered and that also utilize nature's services, but if we move forward without a true appreciation of water and the role it plays in nature, our rivers, our food, our energy, our communities, then we will continue to run into the same problems we face today, just at a later time and most likely with a greater magnitude of negative impact and at a greater cost, both economically and ecologically.

I wouldn't be doing my job of building capacity within the communities I work with if I didn't partner with other organizations to identify support and implement sustainable local solutions which many of us feel are the most cost effective, least environmentally destructive and, why not, even provide community benefits that boost local economies through the creation of jobs and the retraining of workers to fit new emerging technologies and eco-friendly best practices.

They are all outlined in my testimony that was crafted by the Water Coalition I belong to with other several colleagues. I wanted to highlight some of them. One is sustainable growth in areas that can sustain it, requiring the inclusion of the most water efficient design, fixtures and landscaping to draw down new water demand.

Retrofitting aging infrastructure to minimize systemwide inefficiencies in leaking infrastructure; taking a proactive role in repairing and replacing old infrastructure before large breaks occur; expanding the purple pipe system that delivers recycled water so we can offset potable water demand; support the collaboration between the Department of Water and Power and Bureau of Sanitation; and the development of a recycled water master plan that outlines strategies to increase the city's recycled water use to 50,000 acre-feet by the year 2019; promoting water culture through conscientious water management and conservation.

The Pacific Institutes estimates about one-third of current urban usage, more than 2.3 million acre-feet of water, could be saved statewide through better implementation of existing technology for homes and businesses, and more aggressive education at all levels

with matching expansion of water conservation programs for customers.

Revitalization and restoration of our streams, creeks and rivers, which are deeply connected to water supply: When we restore creeks and rivers, they can serve as a viable natural way for our aquifers to be replenished to serve as key water sources. They also revitalize communities and, in the process, can provide for short and long-term jobs, maybe even for a better sustainable future for our children.

One example of this is a local project, the Elm Avenue Retrofit Demonstration Project in Sun Valley. This project models a sustainable future for neighborhoods throughout Los Angeles, but also the ideal collaboration between agencies and groups at all levels. This is a project where the Bureau of Reclamation, the City of Los Angeles, and two local LA groups.

Bailey-San Gabriel River Watershed Council and Tree People are working together to make it happen. A whole block in an area where there are no storm drains flooded all the time, now will capture rainwater on site and infiltrate it. Not only that, but most of the homeowners are already replacing their lawns with native landscaping and re-articulating their private yards to include biological swales as well as adding rain barrels to their properties. While still not completed, it is already providing for a better quality of life and serving as a great education and community engagement tool.

I wanted to close with safe water for all. While we are very fortunate this year in the City of LA to be able to open our tap and have access to safe drinking water, it is not the case for other places in the state. One example is our neighboring City of Maywood where a population of 50,000, 98 percent Latino, is served by three water mutual companies, and still customers open their taps of water containing manganese, lead, PCs and other contaminants.

We must have policy in the state that ensures that every human has a right to clean, affordable and accessible water. Thank you so much.

Mrs. NAPOLITANO. Thank you, Mr. Luna.

[The prepared statement of Mr. Luna follows:]

Statement of Miguel A. Luna, Executive Director, Urban Semillas, Los Angeles, California

We Have Enough Water, but Not Enough to Waste: Solutions to Securing LA's Water Future

Introduction

There has been much discussion recently of Los Angeles being in the midst of a drought. Although this type of dramatic language is good for capturing the attention of the public, it is ultimately misleading. Depicting the current water situation as a drought implies that Los Angeles is facing a temporary water shortage, an abnormal situation that will pass in time. This is not the case. Years of low rainfall tend to sound alarm bells amongst the public, but for Southern California, dry years are actually more common then wet ones. Most of the city is in a semi-arid Mediterranean climate with generally low annual rainfall that can fluctuate from year to year. Moreover, the effects of climate change have caused the fluctuation in annual rainfall to increase: both the wettest and driest years of record for the Los Angeles region have occurred in just the past eight years.

Los Angeles draws its water supply from a variety of sources. However, many of these are now oversubscribed, and several face serious water quality problems. LA's

sources of imported water can no longer supply the city at the level they once did, due to legally mandated environmental mitigation programs and increased demand from other communities that share these resources. LA's local water sources also face problems such as pollution, overuse, and the danger of seawater infiltration into underground freshwater basins.

In spite of all this, there is still hope for LA's water future, but city officials and residents must look for sustainable solutions, rather than crisis-driven band-aid fixes that will only exacerbate the problems in the long term. Central to such a sustainable approach is first acknowledging that for LA to continue to thrive, it will need to reduce its dependence on imported water.

Necessary strategies to increase LA's local water supplies include:

- Manage the entire greater Los Angeles watershed using a holistic regional approach.
- Aggressively pursue all water conservation, efficiency, and recycling options on individual, business, and industrial levels by pursuing water education, water efficiency solutions, greywater and rainwater capture systems, drought resistant landscaping, incentives for conservation, and low impact development.
- Require that all new development be water neutral by requiring the use of the best conservation, efficiency, and recycling practices.
- Repair aging water infrastructure, require water system audits, and expand water-recycling infrastructure.
- Mandate groundwater clean-up efforts and tighter pollution controls to deter further degradation.

By taking these actions to preserve and protect LA's local water supplies, the city can also fight environmentally unsound and expensive water distribution trends such as water privatization and the over reliance on bottled and vended water.

These changes will also create new employment and development opportunities for local communities. The implementation of water-saving technologies, retrofitted infrastructure, and new LID development practices is a chance to create new jobs in this time of economic crisis. It's also an important opportunity to redevelop low-income communities in a responsible way, making sure they aren't left behind in these efforts and providing them with better infrastructure and public space.

Implementing these solutions is a priority that can't wait. If both the city government and residents act now, Los Angeles has an opportunity to maximize its local water resources to secure a safe water supply for a sustainable future.

Water Supply

The water supply for the Los Angeles region comes from a variety of local and imported sources, and as the population has grown over time, LA's reliance on imported water has increased. The city currently imports about 65 percent of its water. State and federal courts have reduced LA's allocations from these non-local sources in recent years. Exploring and investing in ways to maximize local resources will be the best way to offset these supply reductions.

Imported Water Sources

The Los Angeles Aqueduct carries water from the Owens Valley and Mono Lake. It is controlled by the LA Department of Water and Power (LADWP) and provides water solely to the City of Los Angeles. Currently, the aqueduct supplies the city with 11 to 32 percent of its annual water supply.

The Colorado River Aqueduct carries water from the Colorado River to many different parts of Southern California and supplies 37 to 46 percent of the water used in this region. It is controlled by the Metropolitan Water District (MWD), a public water wholesaler made up of 26 member agencies that together provide drinking water to some 19 million people in parts of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties, a combined area of over 5,000 square miles.

Los Angeles shares the Colorado River with six other states upstream (Utah, Wyoming, Colorado, New Mexico, Arizona, and Nevada) and with Mexico downstream. California has been allocated 4.4 million acre-feet per year from this aqueduct, but due to surpluses in years past, MWD had been using more than its allocation by about 800,000 acre-feet. Because of increased demand from other states upstream, the Secretary of the Interior is forcing California to reduce its take of Colorado River water back to its 4.4 million acre-feet allocation.

The third source of imported water for Southern California is the California State Water Project. The California Aqueduct, at 444 miles long, is the largest aqueduct in the world. All the pumping of water out of the Delta and over the Tehachapi mountains makes the State Water Project the largest single consumer of energy in California. The State Department of Water Resources administers the project and

through it supplies water from the Feather River and the Sacramento and San Joaquin River Delta in Northern California to the Bay Area, the Central Valley, and much of Southern California. In spite of its scale and energy consumption, the State Water Project has never provided as much water as it was supposed to. The state is contracted to deliver 4.2 million acre-feet per year but only delivers an average of 1.86 million acre-feet a year, less than half. The State Water Project could see its ability to deliver water further hindered by such impacts of climate change as the greater frequency of dry years, a sea level rise requiring additional fresh water releases from reservoirs into the Delta to maintain water quality, and a corresponding curtailing of pumping water south of the Delta.

Already the diversion of so much water from the Sacramento and San Joaquin River Delta has caused an environmental disaster in the region. Due to overdrawing water for agricultural and urban uses, increased water salinity, and pollution, the balance of a vital ecosystem is being seriously damaged. The most obvious and inexpensive solution to stop the degradation and begin to restore the Delta is to decrease the Central Valley and Southern California's reliance on the Delta as a water source by maximizing reliance on local water sources.

Local Water Sources

The Los Angeles region currently gets about 35 percent of its water supply from local water sources. However, many of these sources are under-utilized for various reasons.

Surface Water

About 20 percent of LA's water supply comes from local surface water: near-by rivers, streams, lakes, and reservoirs. The water for all of these sources originates from rainwater and snowmelt from surrounding mountains. Almost all rainwater is diverted to storm drains that send the water out to sea. Most rivers and streams in the LA area have been engineered to flush out water to the ocean, since these have been channeled and paved to prevent flooding. However, some rainwater is stored in man-made lakes (or reservoirs) to later be diverted to spreading basins. These are ponds where rainwater is allowed to spread and slowly percolate back into the groundwater table, increasing the city's groundwater supply. There are also some parts of the Los Angeles River and other streams that have not been paved, where water can seep back into the ground.

Ground Water Basins

The Los Angeles region receives about 15 percent of its water from groundwater basins. There are six major groundwater basins in the LA area, of which the San Fernando Basin is the largest, alone providing about 80 percent of the local groundwater supplies. These basins are replenished through spreading, the percolation of surface water back into the ground, and also through injection. Injection, where wells pump water down into the aquifer, is normally used in places where the basins have been oversubscribed or there is a danger of salt-water intrusion or sinkage. These groundwater basins hold large quantities of water and could be a much bigger water source for the LA area. However, not all of the groundwater in the basins can be used. Numerous basins have been contaminated with industrial waste from World War II era rocket fuel, such as chromium 6 and perchlorate, which has taken them out of use for drinking water. Additionally, many of the basins are polluted by agricultural run-off and leaking septic systems, which result in water quality issues.

Water Recycling

Water recycling, the process through which wastewater undergoes multiple levels of treatment so that it can be safely reused, is another important opportunity for increasing local water supplies. Currently, treated wastewater is used in Los Angeles for a variety of purposes, such as landscaping, industrial use, artificial bodies of water, and injection into underground water basins to prevent salt water infiltration. Recycled water is carried by its own separate plumbing infrastructure, purple pipes, and is not used for drinking purposes in LA County. Recycled water may be used on individual, institutional, and industrial scales.

There are three main levels of treatment for municipal wastewater. Primary treatment involves the removal of sewage solids through sedimentation. Secondary treatment uses biological processes to further remove organic compounds, with microorganisms using the oxygen in aeration tanks to consume the compounds as their food. Tertiary treatment combines chemical disinfection using chlorine, sedimentation, and filtration. Recycled water that has gone through all three stages of treatment may be used in for irrigating golf courses and parks. The California De-

partment of Health Services closely monitors and enforces health requirements for the use of recycled wastewater.

Los Angeles began water recycling in 1979 for irrigation and industrial uses. While LA currently uses about 4,600 acre-feet of recycled water—saving enough potable water for about 9,200 homes—this only represents around 3 percent of LA's total water use. Recently golf courses like Woodley Golf Course and schools like Loyola Marymount University have begun using recycled water for their irrigation.

Conservation

A most promising source of local water is the water that Los Angeles saves through local conservation measures, both through individual residential and business efforts with government incentives. Although the LA region has managed to reduce its water consumption a great deal, there are still untapped opportunities to conserve a lot more. Using local water resources more efficiently is the best and least expensive way for Los Angeles to increase its water supply and achieve regional water independence. The city has already made great strides in conserving water. Despite population growth of 35 percent since 1970, Los Angeles has experienced a mere 7 percent jump in water consumption. During that same period individual per capita water usage dropped by 15 percent. More recently, after 5 months of mandatory water rationing, the LADWP announced in December 2009 that they had reduced water consumption by 18.4 percent.

Watershed Management

Watershed management may also help safeguard clean water supplies and identify recycling and conservation opportunities. A watershed is the area of land where all the water in it or on top of it, from rainfall, snowmelt, and melting ice, drains downhill into a single destination such as a lake or ocean. Water does not stay still. It flows both above and below ground, and even when held in lakes and seas, it evaporates into the atmosphere and falls again as rain. Thinking in terms of watersheds enables one to understand how seemingly distinct water sources such as individual rivers, lakes, and aquifers are in fact linked together by virtue of flowing toward the same destination. According to the Environmental Protection Agency (EPA) there are 2,110 watersheds in the continental United States—2,267 including Hawaii, Alaska, and Puerto Rico.

Watershed management approaches thus seek to view both land and water resources as they are connected to one another in the watershed and to manage them accordingly. Such a management approach is essential to both identifying sources of existing groundwater pollution and preventing further pollution. It is also necessary to navigate the intricacies of conflicting water supply and water rights demands. Watershed management requires the collaboration of anyone taking water from or putting water back into the watershed, thus looking at the overall water quality and quantity implications throughout a watershed of land use, development, industry, agriculture, and other activities.

The main watersheds in the Los Angeles area are the Los Angeles River Watershed, covering an area of over 834 square miles, the San Gabriel River Watershed, covering about 640 square miles, and the Santa Clara River Watershed, covering an area of 1,600 square miles.

Facing Los Angeles' Water Supply Problems

Problem: Groundwater Pollution

In Los Angeles there are numerous ground wells, however, we can only one fourth of the existing wells. Drawing uncontaminated water from polluted basins increases the risk of the polluted plumes migrating to other basins and thereby spreading the contamination. Such is the case with the Main San Gabriel Valley Basin, which is contaminated with chromium 6 and perchlorate. The Department of Defense has fought for years to avoid funding significant clean up by stating that they would not act until the EPA set national standards for permissible levels of perchlorate contamination in drinking water, while simultaneously fighting for broad exemptions from federal environmental laws. The California State Legislature created the San Gabriel Basin Water Quality Authority, but its efforts have been hamstrung by lack of federal funding.

Solution: Groundwater Clean Up

Polluted groundwater in the Los Angeles region represents a huge source of water that cannot be fully utilized. LADWP's attempts to further groundwater clean up by filtering recycled water into polluted basins should be studied and pursued rather than taken off the table. Pressure must be put on the responsible parties, including the Department of Defense, to fulfill their legal duty to clean up superfund sites

in our groundwater basins. Previous legislative efforts by California federal representatives such as then Rep. Hilda Solis stalled in Washington during the Bush Administration. A broad coalition of local, state, and federal officials should aggressively pursue clean up funds through Congress and the Obama Administration. The EPA should prioritize making its final regulatory determination for perchlorate and ensure that public safety is the paramount criterion in the determination. To prevent future groundwater contamination, stricter legislative standards must be devised and enforced for capturing polluted runoff and preventing dangerous chemicals from entering the watershed.

Problem: Unsustainable Development

Population increases will place additional strains on Los Angeles' water supply. However, it is necessary to first distinguish between development built to meet the demands of a growing population and development meant to create demands where they do not exist. Several mass development projects such as Tejon Ranch depend entirely on imported water supplies that critics claim can be found only on paper.

Solution: Water Neutral Development

While development may be inevitable, it is urgent that it be done responsibly and in areas that can sustain the growth. In Water Neutral Development the local water supplier would require new developments to include the most water efficient design, fixtures, and landscaping to draw down new water demand. Any new demand brought online by the project would be mitigated in the adjacent residential areas. For example, the developer could pay into a water conservation or mitigation fund as a means to offset new demand. The fund would provide a new revenue stream for conservation programs that are regionally based and not contingent on bond funds or the state budget. Not only does this form of development help an area grow and be sustainable, it also provides a new funding stream for conservation programs such as MWD's Water$mart program that is pending cancellation.

- Require new residential and commercial developments that are subject to CEQA to incorporate cost-effective water efficiency measures.
- Require that any water use in the new development be fully mitigated through water efficiency measures in existing communities or by developing local water supplies.
- Require that 40% of the benefits from mitigation projects be directed to disadvantaged communities that otherwise would not be able to afford efficiency and adaptation measures.
- Require that a portion of the work is done with community based organizations who have gone out of business during the drought!
- Begin the manufacturing of water saving equipment in Los Angles to provide jobs and economic development

Problem: Aging Infrastructure

Aging water mains waste tremendous amounts of water through leaks and spills, but can also cause great damage when they break.

Solution 1: Repairing and Replacing Old Infrastructure

System-wide inefficiencies such as leaky infrastructure are an easily preventable source of waste in the Los Angeles region. By retrofitting old plumbing systems in homes and businesses LA can achieve substantial water savings. Local water agencies should take a proactive role in repairing and replacing the city's old infrastructure rather than waiting for large breaks to occur. The city must increase the rate of replacement of infrastructure repair and rehabilitation.

Solution 2: System Audits

System audits should apply to residential and commercial users. Similar to the energy assessment that DWP provides to its customers, water audits should also be provided. For example, in Australia the water company can monitor the water use of any single customer, or across a particular area. They installed special meters that are connected remotely to a computer system. This allows monitoring of specific locations or areas and makes it easier to target outreach where it is most needed. This should be done at no charge to LADWP lifeline rate customers.

Solution 3: Expand Recycled Water Infrastructure

Existing infrastructure should be expanded so that the use of recycled water can become more widely utilized. Its use in new developments for purposes like landscaping or toilets should also be mandated.

Problem: Wasting Good Water

In spite of the progress that has been made, there are still many unexplored opportunities for water conservation in Los Angeles. The Pacific Institute estimates that more than 2.3 million acre-feet of water (or one third of current urban usage) could be saved statewide through better implementation of existing conservation technologies for homes and businesses that range from more efficient toilets, showers, washing machines, and dishwashers, to fixing leaks and changing impermeable turfs to native landscaping. Eighty-five percent of those savings could be achieved at costs lower than those required to tap new water sources. Excessive levels of personal water use, for domestic and landscaping purposes, also represent a large source of unnecessary consumption. An aging water infrastructure exacerbates the problem, while an unwillingness to fully exploit resources like rainwater and greywater further frustrates conservation efforts.

Solution 1: Education

- Prioritize educational outreach. LADWP should partner with the Los Angeles Unified School District to educate students about conservation and engage them in water audits through existing programs such as the Infrastructure Academy to improve water conservation in schools.
- Provide workshops and assistance for customers to use existing dual meter programs for landscape watering and provide rebates to make it more affordable.
- Increase outreach for purchasers for recycled water.
- Increase and advertise California Friendly Landscape workshop for LADWP customers in multiple languages.
- Distribute conservation program materials in high traffic areas like markets and malls to ensure renters get the information.
- City officials should model behavior by stringently following the city's water conservation ordinance

Solution 2: Water Efficiency Solutions

New technologies represent a huge source of potential water savings. Many of the technologies aimed at individual consumers are readily available and easy to install. Low flow high efficiency toilets and showerheads address some of the larger sources of domestic water use. Water-efficient washing machines and dishwashers tackle another area of significant water consumption. Point of use water heaters without tanks save on water consumption and energy usage by reducing wait times for hot water. Consumers can also cut back on the biggest source of domestic water consumption—outdoor usage—through the installation of smart irrigation technology. Smart irrigation systems eliminate over watering by automatically adjusting the timing and volume of water use to reflect actual needs. Conservation technologies aimed at the business and public sectors can also yield impressive results. In addition to the opportunities described above, water can also be conserved with waterless urinals and the retrofitting of car washes.

- Meter apartment complexes and use dual plumbing in retrofits and new buildings for the use greywater for toilets and other non-potable uses.
- Retrofit existing public buildings for water efficiency and implement low impact development strategies in new and redeveloped buildings.
- Include water efficiency standards in building ordinances.
- Continue to explore ways to maximize water recycling.
- Dual landscape meters
- ET irrigations controllers—implement the existing Prop. 84 grant with CBO's

Solution 3: Greywater and Rainwater capture systems

Greywater and rainwater capture systems are two ways to make use of water resources that would otherwise go to waste. With greywater systems, wastewater from sources like washing machines, hand sinks, and showers is captured on site and reused in toilets and landscape irrigation systems. Greywater is defined as wastewater that, although not potable, does not contain sewage, significant food residue, or dangerous concentrations of chemicals. As 50 to 80 percent of residential wastewater is greywater, these systems represent huge potential water savings. Rainwater capture systems do exactly what their name suggests, capture and store rainwater for use in irrigation. These systems cut down on water consumption but also provide an additional ancillary benefit: by using captured rainwater for landscaping purposes, the rainwater then filters through the ground and helps replenish local groundwater basins.

- The city should expand its current rainwater barrel pilot program and provide education and incentives for greater implementation of rainwater capture sys-

tems citywide, particularly in environmental justice communities and provide information about the program in multiple languages.
- The city should provide greywater guidelines and workshops in multiple languages making use of new state guidelines.

Solution 4: Drought Resistant Landscaping

Outdoor water usage represents the greatest amount of residential urban water consumption, as much as 60 percent of urban water consumption in LA goes to landscaping and other outdoor use. Although Southern California is a semi-arid climate, many home and business owners choose to landscape their properties with traditional lawns or imported tropical plants, evidencing deeply set cultural preferences. Both of these landscaping choices require more water to survive than the Los Angeles area can naturally provide. One square foot of turf uses approximately 50 gallons of water per year. Moreover roughly 50 percent of water used for irrigating lawns and gardens is wasted due to over watering and evaporation. Over watering also washes significant amounts of pesticides and fertilizers into storm drains, tributaries, creeks, groundwater supplies, and ultimately into the ocean.

By contrast, many California native plants (or plants from other Mediterranean regions) are well adapted to the dry Southern California climate and are able to thrive on comparatively little or no water. According to the results of a study by the City of Santa Monica's Office of Sustainability and the Environment, maintaining a traditional lawn requires almost ten times the amount of water needed to support a sustainable landscaped lawn (57,000 gallons of water per year for a typical single family home versus 6,000 gallons per year).

Sustainable landscaping, which uses native grasses, shrubs, flowers, cacti, and other plants instead of typical lawn grasses like St. Augustine Grass or Buffalo Grass, also creates a wealth of other environmental benefits. According to the same Santa Monica study, yard waste is significantly reduced with sustainable landscaping (250 pounds per year versus 670 pounds), as are maintenance hours (15 hours per year versus 80 per year). Planting California native plants also creates habitat for native fauna like birds and butterflies whose numbers are rapidly dwindling due to habitat destruction. State law requires that all cities and counties adopt by January 1, 2010 the Department of Water Resources Model Water Efficient Landscape Ordinance. The ordinance does not apply to new or rehabilitated landscape projects that cover an area less than 1000 square feet or that exceed 1000 square feet but do not require a building permit.
- Switch to sustainable, native landscaping.
- Install remote meters for easy monitoring of water consumption. Make use of existing landscape or outdoor meter program by providing incentives and notifying customers.
- Although MWD has a California friendly landscape and gardening classes program through the Be Water Wise conservation campaign, MWD, LADWP, and other water agencies need to be more aggressive in providing individuals and businesses with education and incentives to replace their lawns.
- Sustainable landscaping should be compulsory for all city properties and the city should consider mandating native landscaping for all new developments.
- The city should be the leader in native landscaping in their parks and public spaces.

Solution 5: Incentives for Conservation

- Provide more incentives to LADWP customers to conserve by extending and increasing the rebates for efficient washers, smart controllers, rotating nozzles, low-flow toilets, and turf removal not less than 250 square feet. Make it easier for DWP customers to access rebates.
- Improve enforcement of water use restrictions.
- Tiered pricing should be increased without impacting the lifeline rate to four or five tier pricing levels to provide incentive for customers to use less water, especially by reducing lawn maintenance: the more water used the more it costs.
- Ensure that MWD expands the water conservation credit program.

Solution 6: Low Impact Development (LID)

Low Impact Development is a term used to refer to development practices that seek to capture a larger percentage of rainwater runoff. By capturing the water onsite it can be released back into the groundwater table where it replenishes underground basins. This process allows air pollution and other particulate matter to be filtered out of the water as it percolates down through the soil.

In LID practices, rainwater is diverted from roofs and paved areas to landscaping, planter boxes, and bio-retention areas, instead of storm drains and rainwater cap-

ture systems like underground cisterns where soils do not allow permeability. Cement and asphalt surfaces are replaced with porous pavement that allows water to filter through to the ground. Bio-retention areas, zones that retain rainwater, and run off allow soil and plant-based filtration to clean water before it percolates into ground water. These bio-retention areas can also double as public green space, as is the case with Pan Pacific Park and Park La Brea which serve as retention areas, during times of heavy rain.

In addition to yielding environmental benefits, LID practices are actually more cost effective over time. Because LID is more sustainable and makes use of better materials, fewer repairs are required. Widespread implementation of LID practices will also reduce the need to replace storm water drainage infrastructure.

Related to LID is the City of Los Angeles' Green Streets Initiative. The Green Streets design strategies, which have already been implemented in a number of test projects, call for:

- Increased use of permeable surfaces on sidewalks and streets, allowing for a higher degree of water infiltration and
- Landscape systems such as vegetated swales, flow-through planters, and storm water curb extensions that capture and filter storm water.

Green Street developments also serve the additional function of beautifying neighborhoods with new landscaping. This can be of particular value in creating new green space for LA's many park-poor communities.

On January 15, the Los Angeles Board of Public Works unanimously approved the draft LID ordinance requiring that 100 percent of the rainfall from a three-quarter inch storm at newly built houses, developments, and certain redevelopments either be captured and reused or infiltrated on site, or that developers pay a stormwater mitigation fee to help fund offsite LID projects like Green Streets.

- Push for an expansion of the city's current Green Streets pilot programs that have already proven effective. Particular effort should be made to provide funding and incentives for this type of redevelopment in low income areas, so that they are not left behind.
- Install mini-water treatment plants and onsite water treatment plants

Solution 7: Other Watershed Solutions

Other efforts can help to improve the quality and availability of drinking water within our local watershed. Restoring natural bottoms to some parts of Los Angeles' many channeled waterways will help a greater degree of storm-water runoff to filter down into groundwater basins rather than emptying into the ocean. Increased conjunctive use of surface water to store winter and spring surpluses will also increase local water supplies for future use. To bolster this effort greater emphasis should be put on exploring new potential sites for spreading basins.

Problem: Over consumption of Bottled and Vended Water

Encouraging people to use tap water, rather than bottled water, will also help the water situation in our region. It is a commonly held misconception that the tap water in Los Angeles is not fit for drinking. In fact, LA's water not only meets or exceeds all federal and state safety standards, but in 2008 MWD also tied for the gold medal in the Berkeley Springs International Water Tasting Award for best testing municipal water. Despite these facts many Los Angeles residents still choose to rely on bottled or vended water for their drinking water needs.

Bottled and vended water are a waste of both money and resources. In California, the price of bottled water represents a 10,000 percent markup from the cost of tap water. Bottled and vended water is also environmentally damaging, not only because of the amount of trash generated, but also because of the resources required to transport this water over long distances. Purchasing bottled water also helps to accelerate the process of water privatization that is occurring in many parts of the world. As industry takes control of more fresh water sources communities that once relied on these resources are finding their access curtailed.

Finally, there are also safety concerns with vended water. In 2000, the Los Angeles County Environmental Toxicology Bureau found that 33 percent of the 279 water vending machines they tested failed to meet the EPA standard for trihalomethanes, a by-product of water chlorination. Vended water machines throughout the city are largely unregulated. Water machine operators are only required to test machines for trihalomethanes once a week and fecal coliform bacteria once every 6 months. However, many operators fail to comply with even those meager regulations. This is a real problem for Los Angeles residents, especially in low income communities, where they pay a disproportionate amount of their income for water they think will be superior to tap water, when often it is of far inferior quality.

Solutions:

To remedy our city's reliance on bottled and vended water it is first necessary to change public perceptions regarding the safety of tap water. In 1999, MWD embarked on a public campaign to inform Latinos that MWD's water is clean and safe for drinking. The DWP can learn from MWD's experience to expand its own outreach efforts in this area. The mayor has already issued a memo to LA city departments regarding their wasteful expenditures for bottled water. It is important that he now hold them accountable for their continued bottled water use by banning bottled water in all city departments. The City of San Francisco banned bottled water within all branches of city government, successfully reducing city bottled water purchases from about $500,000 a year to zero. Lastly the city and county public health departments should collaborate with the state Department of Health Services to inspect vending water machines and stores.

Conclusion

There are many factors that play into the current state of the water in the Los Angeles region, but it is clear now that this is a permanent problem that city government and residents will have to face now and into the future. The solutions proposed here are low hanging fruit that both officials and residents can use to maximize local water resources with the lowest monetary and environmental costs. Conservation, better watershed management, recycled water, and avoiding vended water and water privatization are all easy solutions that can have big effects. These solutions will both provide enough water for the Los Angeles region and provide economic benefits such as green jobs and community redevelopment. Availability of clean drinking water and water for nature is a growing problem and if the city does not implement these measures now, it will become harder and harder to reach the population's water needs and achieve the regional water independence necessary for the city's future.

Mrs. NAPOLITANO. We move on to Ms. Lucy Dunn, President and Chief Executive Officer of Orange County Business Council, Irvine.

STATEMENT OF LUCY DUNN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, ORANGE COUNTY BUSINESS COUNCIL, IRVINE, CALIFORNIA

Ms. DUNN. Thank you, Madam Chairwoman. I appreciate the opportunity of representing the business community today.

Southern California is the economic engine of the State of California, and California itself is the economic engine of the nation. In addition to agriculture, this state's innovations in biotech, medical device, green technology—you name it—are all dependent on a clean, reliable source of water.

Southern California uses every tool in the toolbox right now. You have heard that over and over today. We are leaders in conservation, groundwater replenishment, desalting offshore, recycling, but we see the crisis is real and will not be resolved in any single strategy or an end to the current drought. Droughts in California are a fact of life here. They will return and, as we have not made major new investments in water infrastructure commensurate with the environmental, population, climate and infrastructure aging realities we have to deal with, we will face incalculable long-term impacts on California's economic competitiveness and quality of life.

We simply cannot exist without a secure water supply system with sufficient clean water for all in California, and it does affect the nation. Given the threats to the State Water Project and the Central Valley Project in the Delta, there is no excuse for not making it the highest priority of the state and the Federal Government to agree on a feasible remediation plan and to implement it as soon as humanly possible. The state's economy and a major part of the

country's economy is hanging in the balance. Do not repeat the mistakes of Katrina and New Orleans.

The business community understands it costs money to build and maintain a reliable and environmentally friendly water system. Investments of billions of dollars will be required. We are more than willing to pay our fair share as residents and as water users. There are also many opportunities to attract private capital, as we are doing in the transportation sector in California and, frankly, in public/private partnerships throughout the nation. These are well documented models of cooperation and success.

We urge you in government to consider and authorize as necessary private investment participation in water infrastructure to augment and work side by side with public investment. Do not let the lack of public investment capital be the cause of failure to modernize this state's water system.

You have many coalitions of support among business groups and water agencies in the state, in particular, the formation of a joint partnership between the Silicon Valley Leadership Group and the Orange County Business Council called The Real Coalition. The largest economic associations in the state, over 18 of us business groups, have formed together with water as one of our top priorities.

You also see that here locally in Southern California with the Southern California Water Coalition, strong supporters of clean, safe water, helping each other understand the issues and get out the word to the public.

You know, it is the first time in human history that I can recall where a government has turned off water for its people. If in Los Angeles we can get through a regulatory process that allows an environmental streamlining for a football stadium here in Los Angeles, we should be able to do the same thing for 38 million people in the State of California and get this project in the ground. I love football. I love water. Let's just get it done. It is enough talk, enough studies. We have studied this to death. It is time now for strong action on the ground for a very cranky public out there. Thank you. Thank you for the opportunity.

Mrs. NAPOLITANO. Thank you.

[The prepared statement of Ms. Dunn follows:]

Statement of Lucy Dunn, President and CEO, Orange County Business Council

California, home to one in eight Americans, accounts for around 12 percent of the nation's gross domestic product and has the economic horsepower of the world's eighth-largest economy.

When the state stumbles, its sheer size 38 million people creates fallout for businesses from coast to coast, which means California's economic malaise could make it harder for the entire nation's economy to recover.

The single biggest threat facing businesses in California, outside of the existing economic crisis, is the lack of a reliable water supply.

For Orange County specifically, this reality is sobering because water resources managed by state and regional agencies account for 50 percent of our overall yearly water supply countywide. Just like America's relationship with foreign oil, we are dependent on others for a large portion of this most basic element of life—water.

Water is a critical element in every industry and particularly for bio-tech, manufacturing, agriculture, homebuilding and new green-tech.

Any and all signals that suggest we are emerging from this economic downturn could be dashed if we do not have a sufficient water supply.

Why would a Wisconsin Senator care about California's water?

California has been the leader in U.S. agricultural production for over 60 years. Eight of the nation's top 10 producing counties are in the state. California grows more than half of the country's fruits, nuts and vegetables. It is the country's number one agricultural exporter.

California is the leading dairy state and also America's top wine producer, making 90% of all U.S. wine, and is the fourth leading wine producer in the world.

California's food production and processing industry is critical to both California and the United States' overall economy. Food production companies face unprecedented global competition and must remain cost competitive to stay in business.

Natural and regulatory drought conditions are resulting in zero water supplies in many Central Valley areas and similar situations have begun to emerge elsewhere in California, including many of the state's major urban areas.

Travel to California's bread basket and you'll see miles of fallow fields and stumped orchards and cross through small towns facing enormous hardship with unemployment as high as 40%. Water means food, jobs and a future.

California's innovation

California is a world technological and economic leader. It has been the birthplace of many products and social trends that have changed the world. From Levi Strauss jeans in the 1850's to the birth of the modern computer, some of the world's most significant technological innovations, and social trends had a start here. The popsicle, the zamboni, the polygraph test, the modern theme park, windsurfing and even golf carts were invented here in California.

California continues to lead innovations in water technology.

- Seawater Desalination plants
- Ground water replenish systems
- Establishment of rebate and grant programs to incentivise efficient usage

Endangered Species Act

Environmental reform should value our people more than a fish.

Not even Mother Nature can match the impact the Endangered Species Act has had on California's water supply.

Enforcement, or threat of enforcement, of both the federal and state Endangered Species Acts have become the foremost controlling factors in the development of California's water resources. Compliance with ESA creates significant impacts on water supplies throughout the state.

Regulatory actions to protect species have reduced water deliveries from the state's two largest water systems in recent years to more than 25 million people in the San Francisco bay Area, Central and Southern California.

There is no question that protection of the largest estuary on the West Coast is critical. The Sacramento-San Joaquin Delta is in an ecological crisis, but so are California's farmers and residents. There must be a way to balance economic and environmental viability.

The current status seems to put a small fish about the needs of humans. This policy also creates new environmental problems. By forcing agricultural production to fallow, risk shortages of our food supply here at home and force greater production of greenhouse gases as once local food production must be shipped in from foreign locations. We all believe in conservation of the species, but shouldn't people come first?

R.E.A.L. Coalition points

The water supply system that supports most of California's residents, businesses and underpins its ecological health is facing unprecedented challenges. Coordinated near-and long-term actions to address constraints and conflicts are needed if we are to realize the co-equal values of adequate water supply for California, and ecosystem health and revitalization. Given the breadth and statewide impact of the crisis, the interest of the business community is coincident with that of the general public.

About OCBC

The Orange County Business Council is the leading voice of business in Orange County, California. OCBC represents and promotes the business community, working with government and academia, to enhance Orange County's economic development and prosperity in order to preserve a high quality of life. OCBC serves member and investor businesses with nearly 250,000 employees and 2,500,000 worldwide. In providing a proactive forum for business and supporting organizations, OCBC helps assure the financial growth of America's fifth largest county. For more information, visit www.ocbc.org.

Mrs. NAPOLITANO. We go on to Mr. Larry Collins—Audience, please refrain from interrupting. I won't ask again. You are taking the time of these people to testify. Mr. Larry Collins, Vice President of the Pacific Coast Federation of Fishermen's Associations in San Francisco. Welcome, sir.

STATEMENT OF LARRY COLLINS, VICE PRESIDENT, PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS, SAN FRANCISCO, CALIFORNIA

Mr. COLLINS. Good afternoon, Madam Chairwoman, Mr. McClintock. My name is Larry Collins. I am a commercial salmon fisherman. I am Vice President of the Pacific Coast Federation of Fishermen's Associations, which is the largest organization of working fishing men and women on the West Coast, with associations mostly in California but also in Oregon and Washington. I am also President of the Crab Boat Owners Association out of San Francisco, and we have been fishing wild California King Salmon for well over 100 years.

I think that Ground Zero for us is on the coast, not in the valley. Every working waterfront from Santa Barbara to the Washington border has been out of work for the last two years, because we have had a "no salmon" season. I have been fishing with my wife for 25 years, chasing these fish, these beautiful fish, up and down. It seemed like we always were able to have a balance between water for the cities, water for the farmers, and enough water for the fish to get up or the baby fish to get out through the gate.

There are a couple of things that people say that really bother a commercial salmon fisherman, that water through the gate is wasted, that hydroelectricity power—they call it cheap—and when they talk about cheap water. It all depends on where you are sitting. San Francisco Bay-Delta—it is our Everglades. It is like Chesapeake Bay. It is where the crabs grow up, where the herring fishery that is stopped this year for the first time in history, where the salmon go through. It is critical to the commercial fisherman on the coast, up and down the coast.

You know, you were talking before about training people about water. I do the Fishermen in the Classroom Project with the Gulf of Farallones Marine Sanctuary. I go into the classrooms, and I talk to the kids about how these are public trust resources. Every fish, every crab out in the ocean—they own them. They are always impressed by that fact. I tell them that the water that is in the rivers is a public trust resource, too, and I tell them that these are very valuable resources.

So every now and then, if things get out of balance because people try and take more than they ought to, and that is what we need a government for—to keep things in balance. I am not against farmers growing things down in the Valley, but, in my mind, the main course is salmon. We need to fix this environment so the salmon can get up, and the baby salmon can get out.

You know, I have been interested in water issues since the passage of the CVPIA, which is 18 years ago, and I thought, oh, boy, fish doubling. We are going to put this water down the river so the fish can get up. It was supposed to be 600,000 feet from the state and 600,000 feet from the Fed. We are going to get doubled up

here, and we were going to all be healthy, and everything was going to be beautiful.

Eighteen years later, it hasn't happened. None of that water has flowed through the gate, and that, to me, is not wasted water. That estuary needs that mixture of salt and fresh water to be healthy. A healthy estuary is every bit as productive as anywhere in the Valley. We have a community that travels up and down the coast chasing these fish, and that community is as important as any town in the Valley.

We would like to thank Congress for seeing our need a couple of years ago and getting us some disaster relief money, or I wouldn't be here today, and none of the fleet would still be here. Salmon is 70 percent of my income. So it has been a pretty tough hit, and we may not get a salmon season again this year. So we may have to come and ask Congress for help again.

We can fix this thing, but we got to get the balance right. We got to value the salmon as much as we value the farms and the urban areas. We have to share that water. We got to make it right. Thanks.

Mrs. NAPOLITANO. Thank you, sir.

[The prepared statement of Mr. Collins follows:]

Statement of Larry Collins, Vice President, Pacific Coast Federation of Fishermen's Associations, San Francisco, California

Good afternoon. I am Larry Collins, vice president of the Pacific Coast Federation of Fishermen's Associations, largest organization of working fishermen and women on the West coast with member associations mostly in California but also in Oregon and Washington.

My wife Barbara and I fish for salmon and crab out of San Francisco on our vessel, the "Autumn Gale".

I first got involved with water issues around the time of the CVPIA passage and have been involved ever since. Salmon fishing was 70 percent of my income so, clearly, if the resource wasn't healthy I didn't work.

We appreciate the opportunity to appear before you today to provide the fisherman's perspective on California's water resources, the ways in which these resources are being managed and abused, and the assistance which Congress might provide to assure a more equitable and sustainable distribution of the state's water resources among food producers—both fishermen and irrigators—and the state's urban communities.

We are out of work, now, as salmon fishermen.

Barbara and I have been successful fishermen for 25 years. During these years we bought our home in San Francisco, raised our two kids, and paid our bills—all from the income earned from of our fishing.

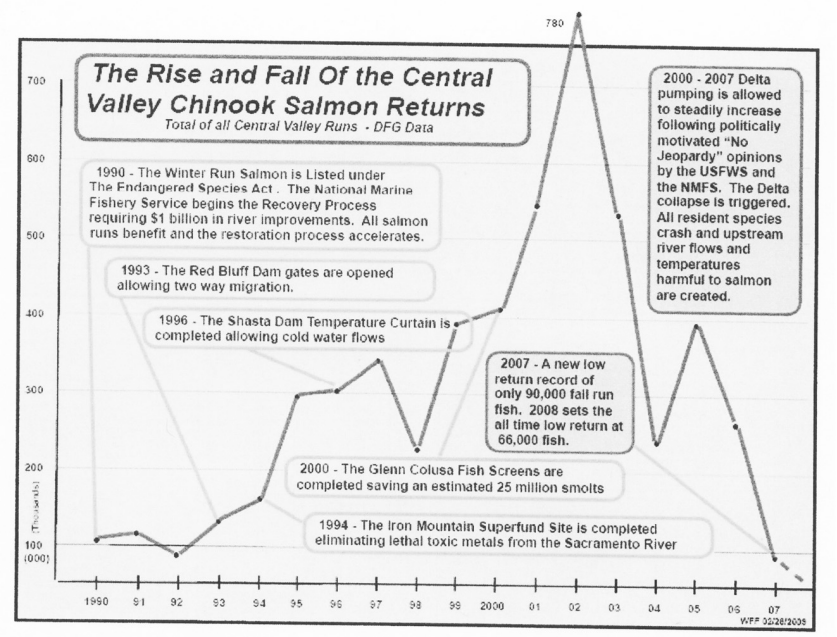
California's salmon fisheries have been shut down, by order of the U.S. Secretary of Commerce, under the regulations of the Federal Magnuson-Stevens Fishery Conservation and Management Act, since 2007.

That is, we've been out of work, now, for two years by direct Federal mandate. Prospects for fishing for Central Valley chinook ("king") salmon—the mainstay of our fishery—are dim for 2010.

Following the closure of our fishery in 2008 the National Marine Fisheries Service—the Service's scientists headquartered at their Santa Cruz, California laboratory—prepared an assessment of the reasons for the poor condition of Central Valley salmon stocks. The lead investigator of that NMFS panel, Dr. Steven Lindley told the press "Poor ocean conditions triggered the collapse. But what primed it is the degradation of the estuary and river habitats and the heavy reliance on hatcheries over the years [1] (Hatcheries are created, of course, to mitigate for salmon habitat lost to water developments.)

[1] Dr Lindley's statement may be found at http://articles.sfgate.com/2009-03-19/bay-area/17215271—1—chinook-salmon-pacific-fishery-management-council-national-marine-fisheries-

This chart documents the dramatic decline of the Central Valley Chinook salmon.



We're not talking about just another estuary here.

We are talking about the San Francisco Bay Estuary, the most important estuary on the Pacific Coast of North or South America

The San Francisco Bay-Delta Estuary ecosystem has been declared, time and again, by the California Legislature—most recently in its November, 2009 "historic Bay-Delta water deal" legislation—to be a resource area of both state and national significance, held in trust for the public by the State government.

Given the nexus among State and Federal water quality, environmental policy and endangered species acts, we assume that such public trust responsibility extends to Congress and the Federal government, as well.

To say that the San Francisco Bay-Delta Estuary is a national treasure does not adequately define its importance. It is a planetary treasure and its health or sickness has grave consequences for all of us. The responsibility for its safekeeping lies primarily in the hands of State government.

So how has the safekeeping of the Estuary by its State and Federal stewards been going lately?

There's been a lot of hand-ringing, of course, because there are supposedly high protection standards in place for the Estuary, but since the Governor declared a drought emergency two years ago many of those Delta protections—including those necessary to address the degradation pointed out by Dr Lindley—have been suspended.

And, of course, there have been those controversial Federal court decisions, back and forth, about how much water can be taken from the Delta before harm is done to its public trust resources.

How bad has the drought been?

It would be hard to tell from the media the past year or so just how bad—or not—the "drought crisis" has been. What is clear is the subject supported a year-long media circus.

According to the U.S. Bureau of Reclamation precipitation in Northern California—where three-quarters of the state's water comes from—was 94 percent of average in 2009.

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service; his report "What caused the Sacramento River fall Chinook stock collapse" at http://swr.nmfs.noaa.gov/media/SalmonDeclineReport.pdf

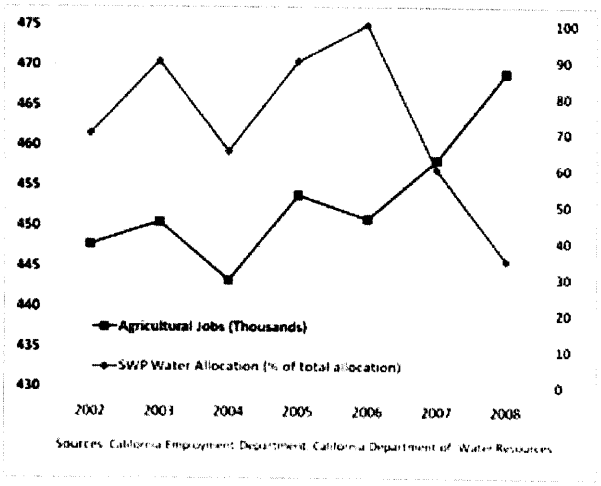


Figure 1. California agriculture sector employment, 2002-2008, and percent of total water allocation delivered to its customers by California's State Water Project.

And how about unemployment?

The suffering of the farm community of Mendota, California has played on the pages of every major newspaper in the country, on Fox "News" repeatedly, and most recently in a 60 Minutes broadcast.

How bad is unemployment in Mendota? Really bad—not only in 2008 and 2009, but in practically every year for which there are records.

Unemployment peaked in Mendota last year at 42 percent. It hit 38 percent seven years ago and got below 20 percent, thanks to the construction boom, for the first time in 2005-2007.

The Berkeley-based Pacific Institute noted last year:

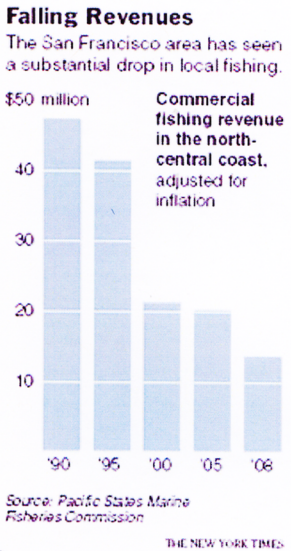
> "...the drought has had very little overall impact on agricultural employment, compared to the much larger impacts of the recession. In fact, in the last three years, while State Water Project allocations have decreased statewide, California's agricultural job sector has grown. Further, according to Professor Jeffrey Michael, director of the Business Forecasting Center at the University of the Pacific in Stockton, rising unemployment in the Central Valley is largely the result of the bad economy, not a lack of water."[2]

How bad is unemployment in California's salmon fisheries?

Unemployment in the California salmon fisheries, the result, in major part, as Dr Lindley said, of the degradation of the Estuary and river habitats, is 100 percent—by order of the U.S. Secretary of Commerce.

A study conducted by our industry last summer, using 2006 National Marine Fisheries Service survey data, indicates that the shut-down of salmon fishing in California—both commercial and sports fishing—has delivered a $1.4 billion annual loss, and the loss of 23,000 jobs to our state. The study found that the recovery of California's salmon fisheries to their good, pre-drought condition would provide California a $5.6 billion annual economic gain and the creation of 94,000 new jobs.

[2] See Professor Michael's report at http://forecast.pacific.edu/articles/PacificBFC—Fish%20or%20Foreclosure.pdf



In contempt of Congress—the U.S. Bureau of Reclamation's administration of the Central Valley Project Improvement Act's Anadromous Fish Restoration Program

Development of the Federal Central Valley Project began in the 1930s, driven at the time by the need to lift the state out of the Great Depression. There were, of course, no water quality or fishery protection laws at the time.

As development of the CVP progressed over the years, its impact on water quality and fishery resources became increasingly hard to ignore. The complete drying up of the San Joaquin River for 75 miles below the CVP's Friant Dam and the loss of 300,000 chinook salmon there was the most visible of the CVP's aquatic insults. But there were many other, less obvious impacts, including the over-diversion of water from the Trinity River and the steady decline of Chinook salmon in the Sacramento River.

In the early 1990s the stars aligned to make some significant changes to the CVP's Depression-era congressional authorization:

1. Key House and Senate committees were in the hands of Members informed and deeply concerned with Central Valley, Trinity River and Bay-Delta Estuary conditions, Representative George Miller and Senator Bill Bradley.
2. The 1983 National Audubon Society v. Los Angeles court decision ordering the restoration of Mono Lake's public trust resources had California's southland communities scrambling for replacement water supplies, and
3. A real drought which persisted for six years from 1986 until 1993 had driven a wedge between urban and agricultural water users, who were traditionally aligned in their quest for more and more water from Northern California, over what struck many city-dwellers, rightly or wrongly, as agriculture's water greed and misuse

The Central Valley Project Improvement Act of 1992—the CVPIA, signed into law by George Herbert Walker Bush—came from that convergence of politics and drought.

The CVPIA dedicated water to the restoration of the Trinity River. Earlier allocations for Trinity River salmon flows, made in the 1950s and '60s, had been manipulated by the U.S. Bureau of Reclamation, with considerable help from Trinity diversion-interested Members of Congress, to levels inadequate to maintain the river's salmon resources.

The CVPIA dedicated 800,000 acre-feet of CVP "yield"[3] with which the Secretary of the Interior was to address explicit environmental improvement actions in the

[3] i.e., of the CVP's 13,000,000 acre-foot reservoir capacity and 7,000,000 acre-feet of annual "safe", or reliable yield

Bay-Delta Estuary and its watershed—not the Secretary's on-going Clean Water and Endangered Species acts responsibilities, mind you, but specific fish and wildlife restoration actions.

The CVPIA responded, in effect, to the California Water Resources Control Board, which had determined through two years of intense inquiry into the flow needs of Bay-Delta Estuary resources, from 1986 through 1988, that 1.6 million acre-feet of additional water through the Delta was needed to maintain Central Valley salmon and other public trust resources in good condition.

The CVPIA specifically embraced the policy enacted in 1988 by the California Legislature to double Central Valley salmon over the depressed numbers that they reached in the 1960s and 1970s [4]—and put up the Federal government's "fair share" of the 1.6 million acre-feet of water needed—the CVPIA's 800,000 acre-feet for assuring Central Valley salmon "safe passage" through the Delta to the Bay and ocean beyond.

In a U.S. Office of Management and Budget-prescribed evaluation of the CVPIA's Anadromous Fish Restoration Program—that salmon-doubling effort mandated by Congress—an independent science review panel found in 2008 that the Bureau of Reclamation has "gamed" the CVPIA salmon water ever since the program began—that not one drop of the 800,000 acre-feet of CVP water allocated by Congress to the rebuilding of Central Valley salmon has ever made it though the Delta to San Francisco Bay. [5]

The OMB independent science review finding that Reclamation is in contempt of Congress deserves some sort of reaction, some response from Congress. We know of none to date.

CVP water trading threatens implementation of Delta flow criteria

Which brings us down to a couple of closely related California water supply challenges that deserve the attention of your Committee:

1. The California Legislature's mandate two months ago to the State Water Resources Control Board to determine the "flow criteria" necessary to protect the public trust resources of the San Francisco Bay-Delta Estuary.
2. Efforts underway to gut the environmental safeguards that Congress placed in the CVPIA, which, unless stopped, will confound horribly the State's efforts to implement those flow criteria when they are determined this summer.

H.R. 3750, which resides in your Committee, would increase sales of CVP water from traditional Project users to non-Project users by, among other things, stripping away the environmental safeguards placed by Congress in the CVPIA.

Let me explain.

Prior to the CVPIA, the use of CVP water was strictly confined to the CVP's designated "place of use", within the boundaries of the CVP's water district customers.

California's southland communities were scrambling in 1992, as we mentioned, for water to replace what they would lose to the National Audubon's 1983 Mono Lake State Supreme Court decision.

Congress said, OK, we'll allow the sale of some CVP water to non-CVP water users, but we're talking about only water that has been used on-farm at the time the CVPIA was enacted. That way, Congress was heading off the sale of the water that it had reserved for Trinity River restoration and Central Valley salmon doubling.

H.R. 3750 strips away the CVPIA's environmental restraints [6]—the saving clauses for the Trinity River restoration and salmon doubling—and plunges the CVP headlong into California's growing "arbitrage" water market—that handful of political insiders waxing fat by buying heavily-subsidized public project water and "flipping" it, at greatly increased prices [7] to non-CVP buyers.

To the extent that H.R. 3750 waives away the protections for the water that Congress intended be used for doubling Central Valley salmon stocks, it severely threatens the implementation of the State Water Resources Control Board Delta "flow criteria", they which the Legislature's 2009 "historic Delta water deal" intends be ap-

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[4] See CA Fish & Game Code Section 6900, the "Salmon, Steelhead Trout, and Anadromous Fisheries Program Act"

[5] See http://www.cvpiaindependentreview.com/FisheriesReport12_12_08.pdf, the bottom of page 41 and the top of page 42 of the report, where the reviewers say they are "flabbergasted" to learn that Reclamation has gamed the water in direct contradiction of its Congressional mandate

[6] subparagraphs (A) and (I) of section 3405(a)(1) of the Reclamation Projects Authorization and Adjustment Act of 1992—the CVPIA—Public Law 102-575; 106 Stat. 4709

[7] See "Harvest of Cash; Kern County Agency Buys Public Water Low, Sells High http://www.contracostatimes.com/ci_10152127 and "Massive Farm Owned by L.A. Man Uses Water Bank Conceived for State Needs" http://articles.latimes.com/2003/dec/19/local/me-kern19

plied to the protection of the Bay-Delta Estuary's public trust resources, including Central Valley salmon.

Once sold, particularly into urban markets, this heavily-subsidized public project water is very, very hard to retrieve.

We recommend, with all our might, that your Committee take a long, hard look at the environmental chaos that would result should you release H.R. 3750. We recommend you hold it in your Committee.

To be clear, we are not against legislation to help farmers. What we are opposed to is legislation like H.R. 3750 which threatens to move publicly-subsidized CVP water from the farms into the hands of water traders.

I'll be glad to answer such questions that I can. PCFFA's executive director, Zeke Grader, is also here today and will gladly answer any questions that you may wish to put to him.

Let me quickly add my thanks to the Members of Congress for their help in keeping our fleet alive these last two years. When we could not go fishing you provided us badly needed disaster relief. We don't know yet if there will be a season this year but if there isn't, we will need your help again.

Thank you for this opportunity to address your Committee.

Mrs. NAPOLITANO. Now for Mr. Joe Del Bosque, owner of Empresas Del Bosque, Inc., in Los Banos. Welcome.

STATEMENT OF JOE L. DEL BOSQUE, OWNER, EMPRESAS DEL BOSQUE INC., LOS BANOS, CALIFORNIA

Mr. DEL BOSQUE. Thank you, Madam Chairwoman. I am glad to be here to hear the points of view on the water. It is very good to hear that, and you have won one forum.

My name is Joe Del Bosque. I grew up on a farm in the San Joaquin Valley, became a farmer in 1985, and my wife and I grow cantaloupes, organic cantaloupes, asparagus, almonds, and cherries. At peak season my farm employs over 300 people growing, picking, and packing fresh fruits, nuts, and vegetables for the country. My farm would be considered average an average size and representative of the very diverse San Joaquin Valley.

The farm lies in the CVP, Central Valley Project. So we are at Ground Zero in this drought. We have been operating with chronic water shortages since 1992 when, as Mr. Collins mentioned, the CVPIA was passed, but since 1992 until 2008 our average water allocation was 60 percent, and the worst that we had was 25 percent. We have learned a lot during that time, learned a lot how to become efficient. We have learned a lot about how to find sources of water, transfer water. We learned how to be as efficient as possible growing our crops, but nothing could prepare us for what we got in 2009, a 10 percent allocation. It has been devastating to our part of the world.

As I said, our farm as tried to become as efficient as possible. All of my crops are under drip irrigation. In fact, I have more drip irrigation than I have crops, because we don't have enough water to go around. So I had to lay 850 acres fallow on my farm last year. I still have to pay rent, mortgage payments, tax assessments on that land. So it has been a very tough economic hit for us.

The worst part of this situation is what it has done to our communities and our farm workers. Our farm workers are a very important part of our farm, and they are the most vulnerable segment of our communities out there. We have heard all sorts of statistics on unemployment of farm workers out there, and disputes about whether it is 35 or 40 percent or not.

The fact of it is that I know that we did not hire a lot of people back this year. I know that a lot of the people that we did hire were underemployed. You don't see that in the statistics. These people during peak season typically work six and seven days a week very happily, and most of the time in the summertime they were only working five days a week. For farm workers, that is very devastating. It is not like you or I. They don't have additional sources of income. They rely on us, and so that is why I am here, for them.

Many of them were seen at food distribution lines in Mendota, Firebaugh, San Joaquin, Huron, receiving food that oftentimes came from China. That was very demoralizing to see that. Several times I volunteered to distribute food, and I found the wives of my workers in line. These are people who would rather be working.

Handouts are appreciated, but they don't pay for rent. They don't pay for their children's clothing. These people need to get back to work, and we need them. Our fruits and vegetables need these people. They are just as important to us as our land and our water. It is a three-legged stool. We need all three.

The economic impacts of my farm—I am not even going to talk about that. It is not as important as what it has done to our people. So where are we now? You know, we have seen these storms that have come and dumped tons of rain and snow in the mountains. As was stated earlier, there is about 100,000 acre-feet of water flowing to the ocean right now. Our pumps are running at 60 percent speed. The amount that we are losing there could supply my farm's annual—the whole farm's annual irrigation needs for two years.

I am not saying that water is lost, and we don't want all the water. We know that the fish need water, but our area is suffering, and that is why we have come here to speak up. The ironic thing is that now there is an issue coming up called turbidity, and as the storms swell the rivers even further and there is more water in them, we are going to get less, because apparently, if the smelt don't see the pumps, we have to turn the pumps off.

Mrs. NAPOLITANO. Thank you, sir. Could you wrap it up?

Mr. DEL BOSQUE. Yes, I will. Thank you. I would like to say that our Federal Government has not been of help to us. We feel in the Central Valley that we have been neglected, that they have been giving us promises since last summer. We have seen very little, if anything, from them, and so, Madam Chairwoman, we would like to appeal to you, and anyone else who will listen, that we need to get something done. We need to get some sense into this. Thank you.

[The prepared statement of Mr. Del Bosque follows:]

Statement of Joe L. Del Bosque, Owner, Empresas Del Bosque Inc, Los Banos, California

Introduction

My name is Joe Del Bosque. I grew up on a farm, the son of farm workers on the Westside of the San Joaquin Valley. Thanks to this great country, I went to college, and was able to become a farmer in 1985. Some of the land that I now own, I worked as a boy picking melons. I now grow cantaloupes, organic cantaloupes, asparagus, almonds, and cherries on about 2300 acres. At peak season, my farm employs over 300 people growing, picking, and packing nuts, fruits, and vegetables, feeding people across America. My wife, Maria Gloria, who was also a farmworker,

helps me manage the operation. My farm would be considered average in size and representative of the very diverse Westside.

Our water supply

Our farm lies in several water districts, but all are federal districts that receive water through the CVP. Our water comes from the Delta, pumped into canals that provide water for farms and cities. About 25 million people receive some of their water through this system, including San Jose, Los Angeles, and San Diego.

We have been farming with chronic water shortages since 1992 when the CVPIA took effect. Before 2009, in our worst years we received a 25% water supply. The recent biological opinions for smelt and salmon have cut our water supply deeper than solely hydrologic conditions. That is the reason that we only received 10% in 2009.

For over fourteen years we have been adopting high tech irrigation systems to become more efficient and conserve water. This has required large investments and learning new methods. Last year, 170 acres of land with high tech drip irrigation systems laid idle because there wasn't enough water. At some point, we can no longer conserve our way out.

Impacts to my farm

Since 2007, the amount of crops that my farm produces has been reduce by almost half. I no longer grow tomatoes or wheat. My bread-and-butter crop, cantaloupes has been reduced by 55%. Asparagus acreage has been cut in half. Last year I terminated leases on 300 acres of land, and another 850 acres were left idle. I still had to pay rent or mortgage payments, taxes, and assessments on this land. We have had to find other sources of water to make up the shortfall for the survival of our trees, always at expensive rates. Since 2007 my water cost has tripled causing me to exhaust cash reserves.

Right now is the time of the year when my banker is reviewing our loan requests. I will have to provide him with sources and quantities of water for our farm. All I have to show him now is what I have left over from last year, which is very little. We typically start planting in March. The Bureau of Reclamation didn't allocate water to us last year until May 7. This makes ag bankers very nervous.

Impacts to the community

Some of the most vulnerable people in our farming communities, our farm workers, have been hit hard by this drought. With less produce to grow and harvest, many workers were not rehired. Those that had jobs were often underemployed. During the summer harvest season when people normally work six or seven days a week, most employees worked only five. This is a terrible impact on our worker's and their families. Some of our workers bought homes for the first time in late 2008, only to struggle to make payments in 2009. In our local towns of Mendota and Firebaugh the unemployment rates skyrocketed to 35% and 40%. Hundreds of people who should have been growing and picking our food were gathered in food distribution lines. Several times that I volunteered to distribute food, I found the wives of our employees waiting in line. These are people who would rather be working. Handouts are appreciated, but they do not pay rent or children's clothing. God only knows how they are surviving the winter. I'm sure many have gone back to their home countries. Madam Chairwoman, we need these people. They are just as important to our farms as our land and water.

Other economic impacts

The impacts of starving our farms is far-reaching. Just from the reduction of our cantaloupe acreage is a significant economic loss to our economy. That reduction, 595 acres, would have generated over $4 million to our economy, $1.1 million of that in wages, and several hundred thousand dollars in taxes. Every farm dollar would have been multiplied by four or five in our distribution and retail sectors. The crop produced would have fed over 2 million people their annual consumption of the fresh fruit. All this for about 900 acre feet. About the same amount that waters about 600 lawns per year.

What do we face for 2009?

The biological opinions for smelt and salmon have restricted pumping from the delta since November 1, and consequently choking our water supply. Even during storm events such as this week when rivers have tripled in size, the pumps are restricted, and water flows to the ocean. This week we have lost about 10,000 acre-feet per day. That is enough water to irrigate my entire farm for two years. As rivers reach flood stage, we expect pumping to be restricted even further due to tur-

bidity standards. Apparently when the smelt can't see the pumps, these must be shut down.

Our government has not helped us. Most of the aid that Washington sent to California for drought relief went to environmental projects such as fish screens, and didn't produce any water at all. Some went to fund groundwater wells which will exacerbate the depletion of our aquifers. The two-gates project has been all but scuttled by the Interior Department. Secretary Salazar came to my farm in October, gave us little hope, and he has made it real. Madam Chairwoman, who else can we turn to?

Among farmers in the San Joaquin Valley, there is a very real urgency. We are watching as our future spills out the Golden Gate Bridge to the Pacific every day. We cannot sustain another 2009. We have already seen farmers pull our their almond orchards in the San Joaquin Valley, and avocado growers decimate their trees in San Diego County. All the water that has been deprived us, causing economic and social devastation, has not improved the populations of smelt or salmon. We have come to the point where our leaders must make some sense of this and prevent further disaster to our farms and people. It was done in New Mexico with the silvery minnow; it can be done here. Thank you for the opportunity to present this testimony to you and the committee.

Mrs. NAPOLITANO. Thank you so very much for your testimony.

We are running a little behind. I want to be sure that we are out of here shortly. Since there are only two of us left, it may be making a little leisure. But I will start off with Ms. Dunn.

This is more of a comment than a question, but is the business community ready to put in financial, moral and other support to solve the water problems, because normally the polluters, the PRPs, potential responsible parties, walk away and leave the taxpayer to pay for the pollution in many of the areas. That, to me, is a great concern.

So while some of the businesses may say that they are wanting all these benefits, there is also a cost to that, and I want to be sure that we do not ignore that. So that is just as a comment. But thank you very much for your testimony.

Ms. DUNN. Ma'am, if I may, I want to share with you that I couldn't agree, and I think the businesses, certainly in my organization and up and down the state, would concur that a clean, reliable water supply, together with a clean environment, is very important to business as well. They could not do business without it. So that will happen.

Mrs. NAPOLITANO. Thank you. Well, we may call on you for maybe identifying some of those parties to help out.

Ms. DUNN. Absolutely.

Mrs. NAPOLITANO. Dr. Gleick, have you calculated the cost comparisons of the various types of water development projects such as surface, recycle, and groundwater storage?

Dr. GLEICK. We have done some of that. The water agencies have done some of that. The state and the Federal Government has done some of that. There are many different options out there. It depends on what you want to build where.

We believe that the conservation and efficiency options that I described very briefly and that are described more in the report we are doing are the cheapest. They pay back the fastest. They save water. They save energy. They let water——

Mrs. NAPOLITANO. Such as?

Dr. GLEICK. Well, for example, one of our suggestions is replacing 2 million very inefficient toilets in the state. New York City replaced 1.3 million toilets in three years in a city of 8 million. We

have a population of 35 or 36 or 37 million. That would save an enormous amount of water.

Mrs. NAPOLITANO. I might want to interject, but recently in a briefing that I had with many water agencies, they said they have tapped out. I don't believe it. I think you are right.

Dr. GLEICK. Surface storage is an option. There are discussions of a number of dams that have been proposed. They seem to be very expensive, even the best estimates of what it would cost to build a surface storage dam, and I can't remember a surface storage dam that we actually built for what the initial estimates were anyway, but we have lost a lot of groundwater, as we have heard.

It is much cheaper to store water underground. We ought to figure out a way to capture a lot of this runoff, store it in underground reservoirs, underground aquifers. Now that is conjunctive use. It is much cheaper. Desalination is very expensive, but we might choose to build it for its reliability. It is very reliable. We might consider building desalination in Southern California, if we agree to take less water from the Delta. That is an option that hasn't been discussed.

There are lots of answers here to your question, depending on what you want to build where.

Mrs. NAPOLITANO. Well, thank you very much for your very insightful testimony and to your answers, because I think you have a lot of good, solid information for a lot of the water agencies that we can benefit from.

Where do you think the best application of funds can be made right away to get the biggest benefit in addressing our supply issue?

Dr. GLEICK. I think, in part, it is a question for many farmers, for example, of coming up with upfront money for them. Those farms that have not moved to drip, that have not moved to precision sprinklers, that aren't able to measure their soil moisture and irrigate when the crops really need it rather than just when it is delivered by irrigation districts, or irrigation districts who don't have the money to rebuild their delivery systems so they can deliver water more accurately, that is an upfront cost.

Some of those savings pay back over a long period of time, but there isn't money for upfront expenditures. The Equip program under the farm bill provided some of that money, but that money ran out really quickly. That is one example of a good source of—a potentially very fruitful source of money. I have other examples I would be happy to share with you.

Mrs. NAPOLITANO. All right. We would like for you to submit it to the record, Dr. Famiglietti, can GRACE be used to identify how much water is actually in the Central Valley aquifer or, as far as that is concerned, in that Basin, and try to figure out if there are any other aquifers that had been unidentified that may have been spotted or you know there has been some kind of activity that leads you to believe that they may be usable for storage of rainwater capture, recycled water, etcetera?

Dr. FAMIGLIETTI. GRACE cannot tell us the absolute amount of how much water is there. It can tell us the changes from month to month, but as we spoke earlier, I do think that there is the potential to identify new sources, and I gave an example before of

how we see some signals of water storage variation in places where we might not expect it; for example, in the Sahara Desert.

So we can look there and see that there is a fair amount of water stored in the Nubian aquifer. So I think that we can be using it to do a little prospecting, if you will.

Mrs. NAPOLITANO. So what would it take for us to request that you begin that prospecting on behalf of California?

Dr. FAMIGLIETTI. Oh, not too much, but as I mentioned in my testimony, I think the biggest thing is that the data will be disappearing soon. So I think the biggest contribution that you can make——

Mrs. NAPOLITANO. Again, Commissioner Connor, help.

Dr. FAMIGLIETTI. And I can get you the names of the appropriate NASA officials to speak with about how to increase that priority.

Mrs. NAPOLITANO. Very quickly, Mr. Luna, what is your number one challenge to achieve water sustainability in the Los Angeles area, and what options exist to achieve that?

Mr. LUNA. I am big believer in education. So I think we need to do more of that. When I say more, I praise the existing information that has been out there, but we need to educate, and we need to educate our youth, prepare them for how we are leaving the status of this planet for them, and by preparing them I mean appropriate tools, education-wise, culturally. They need to appreciate it. So I think that is the biggest challenge for the immigrant communities. It is not that we don't get it. It is that we disconnect, and we come here, and we suddenly forget that water gets flushed away, and that tap, that water, is connected to other places.

So I think it is that connection and that water culture that we need to build, is what I see as most challenging, but also provides the best opportunity, because it doesn't cost that much.

Mrs. NAPOLITANO. And also in different languages. Mr. McClintock.

Mr. MCCLINTOCK. I was just pondering the question of financial commitment that the Chairwoman raised with Ms. Dunn, and it seemed to me a good opportunity to take a trip down memory lane back to 1960 when California voters approved the Burns-Porter Act. The Burns-Porter Act authorized the construction of the State Water Project, including the great California Aqueduct and the series of northern dams. It included Oroville that I mentioned earlier.

That bond measure was $1.75 billion in 1960. You do the inflation adjustment. It is about $12.5 billion in today's money. So about $12.5 billion to produce the State Water Project, essentially everything that we are dealing with today that we depend upon for our water supply from Northern California.

Now in the last dozen years, California voters have already approved six bond measures totaling $17 billion, all of which promise to increase our water supplies. So the question I would ask Ms. Dunn is where is our generation's state water project? Do you think the money that has already been committed has been very well spent?

Ms. DUNN. None of these bonds, sir, were perfect, and many of the bonds, my personal review, contained a lot of benefit for the environment and not a lot of water in them, but the reality is the nature of the bond processes—I know I do not have to instruct you,

sir—is such that they are a result of many compromises. So even this bond package that is coming to the ballot now is not perfect, but it does provide for a delicate balance among both the environment and the economic benefits that we need.

Yes, that is correct. The funds that we have received under previous bonds probably didn't produce the infrastructure, all the infrastructure, that we needed, but there were benefits in them that helped.

Mr. MCCLINTOCK. Speaking of the bond process, up until the last generation, we first decided what project we were going to build, what dam we were going to build, what canal we were going to build. We went out and got bids on that, and once we knew and had agreed to exactly what we were going to build and how much it was going to cost, only then did we go to voters with a bond.

When we went to the voters with a bond, it was a self-liquidating general obligation bond. In other words, it was not redeemed by general taxpayers. It was redeemed by the users of the water and power from that dam in proportion to their use. That has been completely turned upside down. The most recent bond, and for that matter, the six that preceded it, don't authorize specific projects. They establish grab-bags of money.

Why are we surprised then when that money is frittered away on small projects that don't add up, don't begin to add up to the magnitude of the Burns-Porter Act projects that had produced the state water system.

Ms. DUNN. If there is a question in there, the answer is I agree with you.

Mr. MCCLINTOCK. Good answer. Mr. Collins, to what extent does a renewed commitment to fish hatcheries roll into this whole equation? I was very impressed by the enormous commitment that the State of Alaska has made to salmon hatcheries off of their coast. What role do fish hatcheries play in the salmon population?

Mr. COLLINS. Hatcheries are absolutely necessary. We wouldn't have any salmon left. You know, they were a mitigation for when the dams went up. There were huge runs of salmon that were naturally occurring that became extinct when, for instance, the Friant Dam went up. We would be out of business without the hatcheries, and we need to fund then fully and make sure they keep working, and I think, expand them. If we expand them, it will help everybody.

Mr. MCCLINTOCK. I was very impressed by the—I forget the exact figures—the astonishing number of salmon produced by the hatcheries in Alaska.

Mr. COLLINS. Five billion.

Mr. MCCLINTOCK. Should we be making the same commitment in California?

Mr. COLLINS. We can't. We don't have the rivers and the area that they need for that kind of production. I think it is 5 billion fish they have up there. We could definitely double the number of hatchery production in this state, and it would be a good thing.

Mr. MCCLINTOCK. Thank you.

Mrs. NAPOLITANO. Would the gentleman yield for a second?

Mr. MCCLINTOCK. Sure.

Mrs. NAPOLITANO. I was asking the staff. In other briefings that I have been at, and hearings, I hear that some of the folks don't like the hatcheries, because it dilutes the fish, the species.

Mr. COLLINS. We have had hatcheries on Central Valley runs. The Mad River hatchery started in the 1880s. Most of the Central Valley fish are more homogenized than the individual runs like the clam, if they are further up, because it is such a long history. When it was started, they didn't know what we know now about genetic policy. They are way, way better at it now than they used to be.

They are very strong, these fish. I mean, they go out the gate. If they can get through the Delta to get out, they are this big, and three years later they are 35 pound fish. So they are very excellent fish.

Mrs. NAPOLITANO. Right. But I guess maybe what I am getting is that we need to be sure we have hatcheries, and that is alluding to his point, is that somewhere along the line we need to support it, but ensure that they are run well.

Mr. COLLINS. Yes, and we need the wild fish. We need the wild fish to be able to get up the river, too, and that is why we need the water there.

Mrs. NAPOLITANO. Thank you. Ms. Dunn, what is your number one challenge to achieving the water sustainability in Orange County, and what options exist to achieve it?

Ms. DUNN. I think the number one issue for Orange County is continuing to educate the public on the issues of water and how important it is to understand—it is interesting for me personally to see how often folks don't even realize that so much of our water in Southern California comes from the Delta, how important it is to us. So education is important.

Mrs. NAPOLITANO. So you would say that we have not done a good job?

Ms. DUNN. I would say collectively, all of us, not just, obviously, Congress.

Mrs. NAPOLITANO. Thank you.

Ms. DUNN. But in addition, making sure that our elected officials, our local elected officials, understand that they set examples for conservation, for recycling, for understanding water. I think that is an important component.

Mrs. NAPOLITANO. Thank you, ma'am. Mr. Del Bosque, what can be done to achieve water sustainability for your farm and your local cooperatives?

Mr. DEL BOSQUE. In my local area, we have gone to high tech irrigation systems. We are using all kinds of atmospheric instruments and monitors. You know, when you are down to 10 percent, there is not much more you can do. You know, we are doing it.

This old irrigator told me one time, he says, we are working the water so hard, it is getting callouses, and that is a fact. Our water that we put on our crops is literally put on by eyedroppers. We have no runoff. We have no excess water. There is nothing to recycle or reuse. it is all there, just in the crop. So for us the only answer is to find some sort of reliability in the water that we get.

I believe it is going to take some sort of storage, whether it is surface storage or below ground storage. We are just starved for

water. There is no other way for us than to try to increase our supply some way and to be a little more reliable.

Mrs. NAPOLITANO. Recycle water for nonedible crops?

Mr. DEL BOSQUE. For what?

Mrs. NAPOLITANO. Usage of more recycled water?

Mr. DEL BOSQUE. We have no water to recycle.

Mrs. NAPOLITANO. Well, no. We have a lot of rainfall, and you are able to capture it, if you could find a place to store it. Some areas use rubber dams to be able to capture runoff and be able to have it trickle into the aquifers. There has got to be ways of being able to continually look for solutions.

Mr. DEL BOSQUE. Yes. I agree. We do need to, and nobody has a greater sense of urgency about that than we farmers in the San Joaquin Valley.

Mrs. NAPOLITANO. Well, thank you to all of you. I would state that we should have the media lined up here, being participants and being able to get the general public interested in the water solutions. Maybe it is because there has been so much rain, they think the drought is over.

I would hope that somehow we are able to educate, as you will: Yes, have a drink; turn the water on everywhere. The fact is the constant message from most of the panelists has been education. It is an important project. It is an important topic. It is an important issue for all of us.

Please count on us in being able to do what we can. The problem is, as everybody knows, if you are going to try to buy air time, it is expensive. So we need to find ways of being able to get the message out, whether it is to the water end users in their bill, to getting the state to cooperate, getting the media to understand the severity of the issue, and being able to say, hey, we are going to have more unemployment and some of you may be out of work. Maybe that will get to them. I don't know, but somehow we need to work together, continue working on that.

Thank you very much to all the panelists for your time, for your ability to travel and be with us. This concludes the Subcommittee's oversight hearing on "Perspectives on California Water Supply: Challenges and Opportunities."

I thank the Members that came, my staff. Thank you, Metropolitan. Thank you. I do want to close and honor Steve Hall, a former member of the ACWA, and Wes Bannister from MWD, and Tom Grant, Executive Director of the Environmental Defense Fund.

Thank you to all witnesses for appearing. Your testimonies and expertise have indeed been very enlightening and helpful. Under Committee Rule 4(h), additional material for the record should be submitted within the next 10 business days from today. The cooperation of all of the witnesses in replying to any questions submitted to you in writing would be most greatly appreciated.

With that, this hearing is now adjourned.

[Whereupon, at 3:55 p.m., the Subcommittee was adjourned.]

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