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A ROADMAP FOR INCREASING OUR WATER AND HYDROPOWER SUPPLIES: THE NEED FOR NEW AND EXPANDED MULTI-PURPOSE SURFACE STORAGE FACILITIES

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON WATER AND POWER

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

Tuesday, October 29, 2013

Serial No. 113–51

Printed for the use of the Committee on Natural Resources

Available via the World Wide Web: http://www.fdsys.gov
or
Committee address: http://naturalresources.house.gov

U.S. GOVERNMENT PRINTING OFFICE

85–371 PDF WASHINGTON : 2014

For sale by the Superintendent of Documents, U.S. Government Printing Office
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OVERSIGHT HEARING ON A ROADMAP FOR INCREASING OUR WATER AND HYDROPOWER SUPPLIES: THE NEED FOR NEW AND EXPANDED MULTI-PURPOSE SURFACE STORAGE FACILITIES

Tuesday, October 29, 2013
U.S. House of Representatives
Subcommittee on Water and Power
Committee on Natural Resources
Washington, DC

The subcommittee met, pursuant to notice, at 2:24 p.m., in room 1324, Longworth House Office Building, Hon. Tom McClintock [Chairman of the subcommittee] presiding.

Present: Representatives McClintock, Lummis, Tipton, LaMalfa, Hastings, Napolitano, Costa, Huffman, Cárdenas, Ruiz, Lowenthal and DeFazio.

Also Present: Representative Valadao.

Mr. MCCLINTOCK. The committee will come to order.

I would like to apologize to our witnesses for the late beginning, but I do not think we will be interrupted by votes before 4:30 today. So that is the consolation on the late start.

Before we begin with statements from Members and witnesses, I would ask unanimous consent that Mr. Valadao be allowed to sit with the subcommittee and participate in today's hearing.

Without objection.

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

Mr. MCCLINTOCK. The purpose of today's hearing is to identify the current impediments to increasing water storage and hydropower capacity, and to look at new concepts on the construction of smaller high elevation dams.

During the first two-thirds of the 20th century, local, State and Federal Governments devoted themselves to the development of the vast untapped water resources of the Western United States. Yet in the 1970s, this positive and forward looking policy was abandoned in favor of increasingly restrictive environmental demands.

We have now lived under these policies for more than four decades, and as a result, we face increasingly severe water and electricity shortages, spiraling water and electricity prices, devastated farms, and a chronically declining economy. It seems we have lost sight of several self-evident water truths.

First, more water is better than less water. That is about as self-evident as it gets. Yet we often hear that instead of producing new storage, we should resign ourselves to chronic water shortages and manage those shortages through increasingly severe conservation measures.

But conservation does not add more water. It merely manages a water shortage.

Second, cheaper water is better than more expensive water. If we agree on this, then it naturally follows that before we employ more expensive sources of water, like desalinization and recycling, we should first be sure we have exhausted the less expensive alternatives like water storage.

Third, water is unevenly distributed over both time and distance. If we want to have plenty of water in dry periods, we have to store it in wet ones, and if we want to have plenty of water in dry regions, we have to move it from wet ones. Mother Nature produces about 45,000 gallons of fresh water each day for every man, woman and child on this planet. The problem is not supply. It is distribution. That is why we build dams and aqueducts.

Fourth, we do not need to build dams and aqueducts if our goal is simply to let the water run into the ocean. Water tends to run downhill very well on its own. It does not need our help to do so. We build dams and aqueducts to put surplus water to beneficial human use before it runs into the ocean.

Now, if we agree on these self-evident water truths, then why are we not approaching our policies in concert with those truths?

In the 20th century, the Bureau of Reclamation built more than 600 dams and reservoirs. Yet today two-thirds of them are more than 50 years old, and with the exception of the Animas-La Plata Project in southwestern Colorado, Reclamation has not built a large multi-purpose dam in an entire generation.

We will hear that California's water system was built for 22 million people, but it is now struggling to serve 38 million. The last major water project in California over a million acre-feet was the new Melones Dam in 1979. Yet with water supplies strained to the breaking point, the left sees no problem committing billions of gallons of precious water for the care and amusement of the Delta smelt.

The status quo is simply not working, and the purpose of today's hearing is to chart a path that leads us to a new era of abundance.

We are fortunate to have Mr. Robert Shibatani before us today. His ground breaking high elevation storage concept avoids many of the obstacles to traditional on-stream downstream storage projects.

There is no shortage of water and no shortage of economical storage sites. Financing has never been a problem for projects that produce abundant water. Experience shows us that such projects pay for themselves many times over. What we suffer is a super abundance of bureaucracy and a catastrophic shortage of vision and political will. That is what has to change.

I am looking forward to hearing from our witnesses today as we chart a course away from past policies of paralysis, shortage, rationing and decline toward a new era of action, abundance and prosperity.

[The prepared statement of Mr. McClintock follows:]

PREPARED STATEMENT OF THE HONORABLE TOM MCCLINTOCK, CHAIRMAN, SUBCOMMITTEE ON WATER AND POWER

The purpose of today's hearing is to identify the current impediments to increasing water storage and hydropower capacity and to look at new concepts on the construction of smaller high-elevation dams.

During the first two thirds of the 20th century, local, State and Federal Governments devoted themselves to the development of the vast untapped water resources of the Western United States.

Yet, in the 1970s, this positive and forward looking policy was abandoned in favor of increasingly restrictive environmental demands.

We have now lived under these policies for more than four decades, and as a result face increasingly severe water and electricity shortages, spiraling water and electricity prices, devastated farms and a chronically declining economy.

It seems we have lost sight of five self-evident water truths:

First, More water is better than less water. That's about as self-evident as it gets, yet we often hear that instead of producing new storage, we should resign ourselves to chronic water shortages and manage those shortages through increasingly severe conservation measures. But conservation doesn't add more water or give you the multi-purpose benefits that dams give communities

Second, Cheaper water is better than more expensive water. If we agree on this, then it naturally follows that before we employ more expensive sources of water like desalination and recycling, we should first be sure we've exhausted the less expensive long-term and multi-purpose alternatives like surface water storage projects.

Third, Water is unevenly distributed over both time and distance. If we want to have plenty of water in dry periods we have to store it in wet ones, and if we want to have plenty of water in dry regions we have to move it from wet ones. Mother Nature produced 45,000 gallons of fresh water each day for every man, woman and child on the planet. Our problem is not supply—it is distribution. That is why we build dams and aqueducts.

Fourth, we don't need to build dams and aqueducts if our goal is to let our water run into the ocean. Water tends to run downhill very well on its own and doesn't need our help to do so. We build dams and aqueducts to put surplus water to beneficial human use before it runs into the ocean.

Fifth, water is valuable, which allows the market to assign a price to it that can account for its scarcity, availability, storage, transportation, demand and substitution costs, and which in turn tells us which projects are viable and which are wasteful.

If we agree on these five self-evident water truths, then why aren't we proceeding on policies in concert with them?

In the 20th century, the Bureau of Reclamation built more than 600 dams and reservoirs. Yet today, two-thirds of them are more than 50 years old and with the exception of the Animas-La Plata Project in southwestern Colorado, Reclamation has not built a large multi-purpose dam in an entire generation. We will hear that California's water system was built for 22 million people, but is now struggling to serve 38 million people. The last major Federal, multi-purpose water project in California was the New Melones Dam in 1979. Yet with water supplies strained to the breaking point, the left sees no problem committing billions of gallons of precious water for the care and amusement of the Delta Smelt.

The status quo is simply not working and the purpose of today's hearing is to chart a path that leads us to a new era of abundance.

We are fortunate to have Mr. Robert Shibatani before us today. His ground-breaking high-elevation storage concept avoids many of the obstacles to traditional on-stream downstream storage projects.

There is no shortage of water and no shortage of economical storage sites. Financing has never been a problem for projects that produce abundant water and power—experience shows us that such projects pay for themselves many times over. What we suffer is a superabundance of bureaucracy and a catastrophic shortage of vision and political will. That is what has to change.

I am looking forward to hearing from our witnesses today as we chart a course away from past policies of paralysis, shortage, rationing and decline toward a new era of action, abundance and prosperity.

Mr. MCCLINTOCK. And with what, I will yield to the ranking member, my colleague from California, Mrs. Napolitano, for 5 minutes.

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

Mrs. NAPOLITANO. Thank you, Mr. Chairman, and thank you to the witnesses for being with us today.

I have no objection to the hearing and its emphasis, but the concern, however, remains that this hearing only looks at one side of the coin. It only looks at new surface storage. It does not look at groundwater storage, efficiencies, water recycling, desalination, and of course, education.

This is our second hearing specifically on this issue since last February. We have not looked at any of the other options. If we are looking for solutions to our water problems and for certainty for our communities, then we must all have full consideration of all other options, including storage and other alternatives, such as desalinization and recycling. We cannot just prioritize the option that is the most expensive, least efficient, takes longer to create, and it creates the most environmental conflict.

There is no argument about the impact reclamation projects have had on the West. Nearly 40 million people now depend on water from reclamation projects, but the enormous fiscal and environmental cost of these projects as well as the development of prime locations for surface storage projects has led us to look at different alternatives.

Our Majority will argue that environmental regulations have hindered construction of new facilities in the West. The biggest issue to dam construction is, of course, cost. How can Congress guarantee these communities billions of Federal appropriated dollars that are necessary for construction?

It is also important to know that $22 billion reclamation is already spent on major water projects. Only 25 percent, or 5.2 billion, has been repaid to the Federal Government. Any authorization of new storage projects will have to compete for funding in Reclamation's limited budget, which is probably a billion-some, a billion and a half. I cannot remember the exact amount, and after the Federal debt associated with the water projects.

The biggest impediment to dam construction is limited Federal funding. New storage when appropriate is not impossible, and California has added 5.6 million acre-feet in new groundwater and surface water storage in the last 20 years. This includes new water, surface water storage, like Contra Costa's Water District Los Vaqueros Project, which had 60,000 acre-feet of construction completed last summer on time, on budget, and no litigation.

In my own district, the Metropolitan Water District completed Diamond Valley Reservoir in 2003, adding 800,000 acre-feet of capacity to our local water supply system, and they did so with no Federal funding and in compliance with all environmental regulations.

However, water managers have already realized they cannot wait to compete for limited Federal dollars or the 20 to 30 years or so it will take to construct a facility. They need to solve problems now. Water managers are looking for projects that involve limited Federal involvement and can produce water, wet water, on a faster scale.

This can also be seen in the 53 water recycling projects Congress has authorized since 1992. Health facilities, Reclamation has already helped health facilities facilitate the conservation of 616,000 acre-feet of water from 2010 to 2012 with title 16 Water Smart grants and other conservation programs.

Reclamation's current goal is to conserve accumulation totals since 2009 of 790,000 acre-feet of water by the end of 2014. The threat to our water supply is real. We have many challenges like climate change, decreased snow pack, increased demand and development of alternative water, intensive fuels like oil shale. Not all of the water needs in the West can or should be met by new dams or bigger dams. New storage is not always the right answer or the only answer, and the same can be said of water recycling or desalinization.

What works for one community may not work for others, and we must select the most effective and affordable solution. To know the right solution for the community is to have all options on the table, and looking at surface storage does not provide our water managers with the baseline data they need to conserve for all our communities.

And, Mr. Chairman, I would like to introduce for the record the "Hydrologist Urges Underground Water Storage" in the Modesto Bees, October 25.

Mr. MCCLINTOCK. Without objection.

[The Modesto Bees article "Hydrologist Urges Underground Water Storage" follows:]

[From the Medesto Bee, October 25, 2013]

HYDROGEOLOGIST URGES UNDERGROUND STORAGE OF WATER

(By Garth Stapley)

"Groundwater, Wealth, Contentment, Health" read words superimposed onto a picture of Modesto's beloved arch, in a slide splashed on a huge lecture-hall screen. It was the last in Friday's presentation by an expert suggesting how Modesto and Turlock might solve emerging problems of too much pumping.

"Modesto, consider the possibilities," hydrogeologist Chris Petersen said as he clicked to the clever slide, drawing laughter from the standing-room-only crowd of about 300 crammed into a Modesto Junior College auditorium.

Petersen, who was raised in Ripon and attended MJC for 3 years before going on to graduate degrees and gaining a reputation for water expertise, said this area could learn much from others that have gathered stakeholders, approached State government for grant money and formed cooperative water districts. He focused on those that inject and store water below the Earth's surface, a fairly untried strategy in these parts.

"I believe we here in Modesto are pretty darned smart and can figure this out and can be an example to the rest of the world," Petersen said.

The cost of underground storage isn't as bad as people might think, he said: as little as $110 per year for an acre-foot of water, or about what two small families use in a year. That's compared with as much as $1,000 per acre-foot for above-ground reservoirs, or $2,000 for desalinization—taking salt out of sea water, he said. "It's not that bad," Petersen concluded. "This is the way to go."

The cost of doing nothing is worse: Wells continue to go dry—as many already have in the Denair area—water quality degrades, farmers quit growing and lawsuits mount.

"You're going to be fighting your neighbor and making the lawyers rich. Who wants to do that?" Petersen said. "Either come together and work together and solve it yourselves—go to the State and ask for money; they'll willingly give it to you—or you do nothing and the State will step in and take control."

He said he was "stunned" that so many would give up Friday night social activities to hear him speak about a subject that many consider dry. In his 26 years as a water expert, he never had appeared before a crowd so large, he said.

About half of those in Friday's audience were students, judging by a show of hands, and maybe a third were property owners concerned for their wells. They could be jeopardized by neighbors' pumps, which can suck from aquifers laterally without anyone seeing it from the surface.

Growers have sunk gigantic wells to nourish millions of new almond trees on previously marginal rangeland lining the east side of the Valley. That area does not seem able to replenish its groundwater basins, compared with that under the Modesto area, which relieved aquifer stress after the city quit pumping so much when its canal water treatment plant began operating in the mid-1990s.

Other regions are much worse off than this, Petersen said, pointing to San Joaquin County, the region from Merced to Bakersfield, and India.

In a question-and-answer period after Petersen's slide show, Oakdale Irrigation District board member Frank Clark challenged his principal suggestion for recharging aquifers, asking why anyone would want to give wealthy nut investors even more to pump. "It's just corporate greed," Clark said. ″They're going to keep pumping more and more, and you can't put water in the ground fast enough to compensate for them pulling it out.″

Mrs. NAPOLITANO. And I will be submitting other information for the record in regard to the storage, the Bureau studies, the 17 programs they have, where they are at, and the funding they have, who is online, who is not online.

Mr. MCCLINTOCK. Without objection.

Mrs. NAPOLITANO. Thank you. With that I yield back.

[The prepared statement of Mrs. Napolitano follows:]

PREPARED STATEMENT OF THE HONORABLE GRACE F. NAPOLITANO, RANKING MEMBER, SUBCOMMITTEE ON WATER AND POWER

Thank you Mr. Chairman and thank you for the witnesses for being here today.

I have no objection to this hearing and its emphasis. My concern, however, is that this hearing only looks at one side of the coin-it only looks at new surface storage. It does not look at groundwater storage, efficiencies, water recycling or desalination. This is our second hearing specifically on this issue since last February, and we still have not looked at all of our other options.

If we are looking for solutions to our water problems and for certainty for our communities, then we must have a full consideration of all other options—including storage or other alternatives like water recycling. We cannot just prioritize the option that is the most expensive, least efficient, and creates the most environmental conflict.

There is no argument about the impact Reclamation projects have had on the West. Nearly 40 million people now depend on water from Reclamation projects. But the enormous fiscal and environmental cost of these projects, as well as the development of prime locations for surface storage projects, has led us to look at different alternatives.

The majority will argue that environmental regulations have hindered construction of new facilities in the West. The biggest issue to dam construction is cost. How can Congress guarantee these communities the billions of Federal appropriated dollars that is necessary for construction?

It is also important to note that of the $22 billion Reclamation has already spent on major water projects—only 25 percent or $5.2 billion has been repaid to the Federal Government.

Any authorization of new storage projects will have to compete for funding in Reclamation's limited budget AND add to the Federal debt associated with water projects.

THE BIGGEST IMPEDIMENT TO DAM CONSTRUCTION IS LIMITED FEDERAL FUNDING

New storage when appropriate is not impossible, and California has added 5.6 million acre-feet in new groundwater and surface water storage in the last 20 years.

This includes new surface water storage, like Contra Costa Water District's Los Vaqueros Project. The Los Vaqueros' 60,000 acre-feet construction was completed last summer, on time, on budget and no litigation. In my district, the Metropolitan

Water District completed the Diamond Valley Reservoir in 2003, adding 800,000 acre-feet of capacity to our local water supply system. They did so with NO Federal funding and in compliance with all environmental regulations.

However, water managers have already realized that they cannot wait to compete for the limited Federal dollars or the 10, 20, or 30 years it will take to construct a facility. They need to solve their problems now.

Water managers are looking for projects that involve limited Federal involvement and can produce water on a faster scale. This can also be seen in the 53 water recycling projects Congress has authorized since 1992. This can also be seen in the leveraging of Federal funds through the WaterSMART program.

The threat to our water supply is real. We have many challenges like climate change, decreased snowpack, increased demand and the development of alternative water intensive fuels like Oil Shale. Not all of the water needs in the west can or should be met by new dams or bigger dams. New storage is not always the right answer, and the same can be said of water recycling or desalination. What works for one community may not work for others, and we must select the most effective AND affordable solution.

To know the right solution for the community is to have all the options on the table. Looking at just surface storage does not provide our water managers with the baseline data they need to serve our communities.

Mr. MCCLINTOCK. The Chair is now pleased to recognize the Chairman of the Natural Resources Committee, The Honorable Doc Hastings of Washington.

STATEMENT OF THE HON. DOC HASTINGS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Mr. HASTINGS. Thank you very much, Mr. Chairman for holding this hearing, and thank you for the courtesy of allowing me to make a statement.

I believe that America needs an "all of the above" water supply strategy. Today's hearing, I think, is a step in the right direction. Water storage has been the key to economic prosperity and a way of life in my Central Washington District, which is home to two large Federal water projects and an integral part of the Columbia River power system.

Together these two projects irrigate more than a million acres of farmlands, make possible a vital navigation link for millions of tons of grains and commodities annually. It provides numerous recreation and flood control benefits, and these projects, not wholly within my district, but these projects provide over 21 billion kilowatt hours of carbon-free, renewable hydroelectric power to customers throughout the Pacific Northwest.

Before these projects were constructed, this area was an arid desert where there was little but tumbleweeds and sagebrush. Today it is one of the most productive and diverse agriculture areas in the world. As we will hear later today, Yakima County in my district is one of the top agricultural areas in the Nation, ranking 12th nationally in total value of agriculture products sold.

Without a doubt, this is possible because a prior generation had the vision of capturing spring runoff to deliver water during dry times. Surface storage continues to have lasting and positive impacts not only in my Central Washington District, but to the country in general. But these projects are under constant assault by litigation and other pressures to change their operations to other purposes.

I will continue to oppose these policies that change existing projects and their historical mission, but, Mr. Chairman, what is

obvious is that it is necessary for us to build more surface storage if we want to maintain our prosperity. I am aware of those who say that conservation is the only way to produce more water. Conservation can and should play a role. However, it alone is not the answer.

After all, you cannot conserve water that has already been lost to the ocean, and you cannot conserve water that does not exist.

We will hear testimony today, particularly from Mr. Derek Sandison of the Washington State Department of Ecology, that conservation has its limits and that more storage is necessary to account for lost water and potentially drier times.

And we will also hear that Federal rules and regulations make any such individual projects' costs prohibitive and sometimes infeasible. Amidst the painfully long permitting process and the uncertainty associated with it, most of these projects and the investments that they attract are negatively compromised before they can even get off the ground. This is a paradigm that must change because the supply and demand numbers simply do not add up.

Again, in the Yakima River Basin alone over 450,000 acre-feet of additional storage is needed for multiple human and species needs. This is not a new discovery. Yakima has been in need of additional water storage for many decades, and achieving this goal has been and is a top priority of mine. Yet I am concerned that our existing Federal regulatory framework may not allow this to happen and that without action drought and dry years would again bring economically devastating rationing of water supplies.

Conservation and construction of storage must go hand in hand for this to work. Real credit, again, goes to Mr. Sandison and the local group of all stripes who came together in the working group on the Yakima Basin, and they have stayed at the table to seek a truly collaborative approach to solving Yakima's waters needs. Real demonstrable progress has already been made and while it will take time, patience and creativity to achieve, building new storage is absolutely critical.

It is this generation's turn to recognize our Nation's growing water needs and to take steps to meet it. For us to have another water supply renaissance, we must embrace new or expanded storage so we can truly have "all of the above" water supply strategy well into the future.

We have the power to make that happen, and we will push legislative reforms to bring regulations back to reality.

Once again, Mr. Chairman, thank you for having this hearing, and I look forward to hearing what the witnesses have to say, and I will yield back my time.

[The prepared statement of Mr. Hastings follows:]

PREPARED STATEMENT THE HONORABLE DOC HASTINGS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON

Thank you, Chairman McClintock, for holding this important hearing today. I firmly believe that America needs an "all-of-the above" water supply strategy. Today's hearing is a step in that direction.

Water storage has been the key to economic prosperity and a way of life in my Central Washington District, which is home to two large Federal water projects and the Columbia River power system. Together, these two projects irrigate more than a million acres of farmland, make possible a vital navigation link for millions of tons of grain and commodities annually, provide numerous recreation and flood control

benefits and provide over 21 billion kilowatt hours of carbon-free, renewable hydroelectric power to customers in the Pacific Northwest.

Before these projects were constructed, this area was an arid desert where little but tumbleweeds would thrive. Today, it is one of the most productive and diverse agricultural areas in the world. As we will hear later today, Yakima County is one of the top agricultural areas in the Nation, ranking 12th nationally in the total value of agricultural products sold. Without a doubt, this is possible because a prior generation had the vision of capturing spring runoff to deliver water during dry times.

Surface storage continues to have lasting and positive impacts not only in Central Washington but to the country in general. Yet, these projects are under constant assault by litigation and other pressures to change their operations to other purposes. I will continue to oppose these policies that change existing projects and their historical mission. What is obvious is that it is necessary for us to build more surface storage if we want to maintain our prosperity.

I'm aware of those who say that conservation is the only way to produce more water. Conservation can and should play a role; however, it alone is not the answer. After all, you cannot conserve water that has already been lost to the ocean or simply doesn't exist.

We will hear testimony today—particularly from Mr. Derek Sandison, from the Washington Department of Ecology—that conservation has its limits and that more storage is necessary to account for lost water and potentially drier times. Yet, we will also hear that Federal rules and regulations make many such individual projects cost prohibitive and infeasible. Amidst the painfully long permitting process and the uncertainty associated with it, most of these projects and investment interest are negatively compromised before they even get off the ground.

This is a paradigm that must change because the supply and demand numbers simply don't add up. In the Yakima River Basin alone in my district, over 450,000 acre feet of additional water storage capacity is needed for multiple human and species needs.

This is not some new discovery. Yakima has been in need of additional water storage for many decades, and achieving this goal is a top priority of mine.

Yet, I am concerned that our existing Federal regulatory framework may not allow this to happen and that without action, drought and dry water years could again bring economically devastating rationing of water supplies.

Conservation and construction of storage must go hand-in-hand for this to work. Real credit is owed to Mr. Sandison and the many local partners of all stripes who came to the Working Group table—and have stayed at the table—to seek a truly collaborative approach to solving Yakima's water needs. Real, demonstrable progress has already been made and while it will take time, patience and creativity to achieve, building new storage is absolutely critical.

It's this generation's turn to recognize our Nation's growing water needs and to take steps to meet it. For us to have another water supply renaissance, we must embrace new or expanded storage so that we can a truly have an all of the above water supply strategy well into the future. We have the power to make that happen and we will push legislative reforms to bring regulations back to reality.

In closing, I again want to thank Mr. Sandison and other witnesses for their leadership and for being here today. You are the ones on the ground who deal with water supply uncertainty every day. Your stories and needs will help guide this committee in bringing about resolution to these pressing issues.

Mr. MCCLINTOCK. Thank you.

The Chair is now pleased to recognize the Ranking Member of the House Natural Resources Committee, Mr. DeFazio for 5 minutes.

STATEMENT OF THE HON. PETER A. DEFAZIO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON

Mr. DEFAZIO. I thank the gentleman, and I thank the full committee Chairman for his statement.

This is another area where I think there are substantial grounds for agreement between the majority and the minority in terms of our objectives. But perhaps the path there that we envision is

maybe a little more complicated, maybe a lot less expensive, and something that has not been talked about much.

I mean, we are living off of a 19th and 20th century infrastructure as relates to water storage in the Western United States for the most part. There are areas where we have just ditch systems that can be improved at a very low cost and deliver additional water.

There are other innovative things that could be done. What we need is to take a really comprehensive look at all the factors that are playing in here. We have a system that is in places deteriorated and needs restoration and repair. We have some that needs upgrading. There certainly are places where we could look at new infrastructure.

The major impediment, however, is the same impediment that we have on roads, bridges, highways, and transit, the same impediment that we have on the Corps of Engineers' projects across the United States of America, and that is we are not investing in America's infrastructure the way our competitor nations are around the world. We are simply not doing that.

I have spent a lot of time on this, particularly on the Transportation Committee, but it applies over here, too. We are not investing as has been pointed out here in water infrastructure. We need to make a commitment, and we need to determine that there are investments, and there are simple expenditures of government funds. We do not discriminate in that way, and in fact, we have tied our hands even further by saying, "Well, we cannot have any of those earmarks."

That means if you want to deal with a project in a State, a new irrigation project, a storage project, you are probably going to get hung up by the rules.

So, we have to take an approach that is, I think, more comprehensive, look at changes in population, look at changes in the weather, look at new technologies that are out there or improvements that are out there for the existing system; how much can be gained then; what is the cost-benefit analysis that relates there, and then, yes, we can look at additional storage as needed.

But massive new storage projects, particularly storage projects that would employ 20th century engineering techniques, are not the long-term solution to the western problems. We are looking at major problems even in the Northwest where people make jokes about our rainfall on the west side, docks on the east side where they don't get that much rain, but even there we're seeing major changes in patterns that are going to overwhelm or under-whelm our existing system potentially because of early snow melt, patterns in the last few years of very heavy rains and warm weather well into the winter season which leaves less snow pack, which leads to higher flows, new challenges to the system, so the major systems like the Columbia Basin system to the Willamette system and others, and we simply need to take a comprehensive approach.

I am pleased we are having this hearing here today, and I believe at least one witness, I think, maybe two will touch a bit on those themes.

Thank you, Mr. Chairman.

Mrs. NAPOLITANO. Mr. Chairman, would you yield?

Mr. DEFAZIO. Yes, certainly I would yield.

Mrs. NAPOLITANO. Thank you.

And you talk about it, and that is why I believe we need to look at the infrastructure because some statistics prove that we lose about something like 22 percent of the actual water to water main breaks, and that's investment in infrastructure that is aging.

So you are right. We need to do a very comprehensive look at it. So hopefully we will be working on that.

Thank you, and I yield.

Mr. DEFAZIO. I yield back the balance of my time.

Mr. MCCLINTOCK. The gentleman yields back.

The gentleman from Colorado.

STATEMENT OF THE HON. SCOTT R. TIPTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF COLORADO

Mr. TIPTON. Thank you, Chairman McClintock, for convening today's hearing to pursue innovative ways to be able to promote new water storage while also examining different obstacles that are impeding that construction.

Last month a deadly storm struck my home State of Colorado causing unprecedented lethal flooding that damaged over 16,000 homes, destroyed hundreds of local businesses. My heart, as does everyone, goes out to all the families and business owners who are still struggling to be able to recover from this tragic event.

But as the Chairman noted, with the exception of the Animas-La Plata Project in southwest Colorado, the Bureau of Reclamation has not built any new large multi-purpose dams or reservoirs over the last generation. Preventing all the damage from a storm of this magnitude in Colorado is impossible. However, our Nation's failure to develop new surface storage projects only continues to amplify the devastating results of storms like this one.

Increasing water storage is critical. It is the natural cycle of rivers in the West, which is one of boom and bust, surplus and drought. Streamlining the regulatory permitting process is just one way to be able to reduce the ills associated with this cycle and can help better prepare those communities that rely on snow pack to support local economies. Colorado is a headwater State, and as the water information program in southwest Colorado reports, more than 10 million acre-feet of water flows out of Colorado watersheds annually. Thanks to the foresight of previous generations, water storage infrastructure was built throughout the West to be able to capture this vital resource. This infrastructure helped reduce the threat of catastrophic flooding and provided a secure and stable source of water.

Many western cities have grown and prospered in part thanks to that water that originates in Colorado. Without the ability to be able to store water that falls on Colorado's slopes, the West as we know it would not exist. The Colorado Water Conservation Board has estimated by the year 2050, Colorado will need an additional 1 million acre-feet of water to be able to meet projected demands. This figure accounts for water saved through conservation.

But water conservation is something all westerners know and the importance of it. Conservation is not enough. New water storage will play a role in meeting future demand and can also be uti-

lized to be able to meet environment and species protection goals, support our farm and ranch communities, and ensure recreational opportunities that are consistent and address the reducing of destruction by wildfires as well as caused by drought conditions.

Unfortunately, we have many groups that have failed to recognize the potential environmental benefits of increased storage, and they have held up development of new projects with endless litigation and a variety of other tactics. Rather than increasing storage capacity, some of these groups have instead focused on efforts to redistribute water from rural to urban areas.

This is frightening not only from the perspective of water rights, but in terms of our Nation's food supply. This problem is exacerbated by the fact that Colorado farmers and ranchers have been enticed to sell over 190,000 acre-feet of water from municipal and industrial use since 1987.

To make matters worse, the Greeley Tribune recently reported that in most years many of Colorado's farmers lease extra water from neighboring cities to maximize production, but this year cities concerned with refilling their depleted reservoirs leased far less water than normal to farmers, forcing some crop growers to plant less acres or plant crops that require less water.

The growing West needs new water projects, and the Federal Government should be fostering a regulatory environment that encourages new surface storage production rather than stifling these efforts. Unfortunately, in too many instances, this is not the case. The Grande-Mace Water Conservancy District had planned to rehabilitate the breached reservoirs in the fall of 2008, but cited various regulations as the reasons preventing them from moving forward on these projects.

Even more troubling is an example from 2011 where the Bureau of Reclamation sent nearly $30,000 in cash for one survey to entice responders to go on record supporting the physical removal of four dams in California and Oregon. My hope is that today's oversight hearing will shine a light on some of the obstacles that are preventing the construction of new Federal and non-Federal water storage projects, as well as explore some innovative options, some technologies that will increase the capacity.

Water is one of the most important natural resources in Colorado and a main driver of economic growth. Prudent supply management and the ability to be able to store much needed water will allow communities to support jobs that depend on the availability of water to protect food security, control flooding, ensure continued recreational opportunities, provide water for the development of hydropower, and meet environmental protection needs.

Thank you, Mr. Chairman, for holding today's important hearing, and I yield back.

Mr. MCCLINTOCK. Thank you.

The Chair is pleased to recognize Mr. Costa of California for 5 minutes.

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

Mr. COSTA. Thank you very much, Chairman McClintock and Ranking Member Napolitano for holding this hearing.

Title, road map for increasing our water and hydropower supplies, the need for new and expanded multi-purpose surface facilities. I concur on all of the above, but that is, I think, part of the story. The other part is using all of the water tools that are in our water management toolbox.

And I think we made this overly complicated. Frankly, we know that particularly in the West, but certainly throughout the world, the climate is changing, and reservoirs that were based upon 100-year record of recordkeeping with snow packs receding, that those reservoirs have to be operated differently than they were in the past.

And we know that we are going to need to capture additional water because when we do have that additional rainfall, we need to try to make sure that we can conserve it not only for the existing use, but for conjunctive use to make groundwater banks work because you can't inject that water in groundwater banks unless you have the surface supply to keep it when you get the rain.

And so I really believe that we're kind of going about this all wrong in the sense that we've all got our favorite projects. I don't care if they're in California or if they're in Colorado or Washington. You go on, you know. You have your list of favorite projects. They are part of many of our talking points.

However, the fact is that we know that we have an existing shortfall in Western States as we have around the world. We ought to be able to come to some kind of conclusion as to what that annual shortfall is in terms of acre-feet, and we ought to look at the next long-term efforts over the next 20 or 40 years as to what the additional need is notwithstanding the implementation of conservation, groundwater baking, water transfers, desalinization. All of these are part of the tools that we have to use.

And then we ought to have one underlying guide that we all subscribe to that is a good, conservative principle. What is it? It is what is the most cost effective because notwithstanding your favorite project or my favorite project, at the end of the day, this water costs more than it did when our parents and our grandparents developed the projects that we're living off of today.

Yes, the new costs will have to be blended with the existing old costs. That makes it more financially feasible, and that is what we ought to be doing. So it seems to me that in California, and I will be California-centric for a moment, we have 38 million people. We have a water system designed for 20 million people. By the year 2030, we are going to have 50 million people.

If we are going to continue to economically be successful in California, we are going to have to grow our water supply by using all the water tools in that water toolbox, and we need to do it in the most cost effective way possible. So we use conservation. We use desalinization. We use groundwater banking, and yes, we do additional reservoir surface supplies. Raising Shasta is a good project. Temperance Flat I think has merit. The States looking at site's reservoir is a potential, and, yes, we could expand Los Vasqueros a second time. All of those reservoir surface storage projects have multiple benefits.

The trick, of course, is how you pay for them, and to that end Senator Feinstein and I have asked the Bureau of Reclamation to

the extent that they're involved in High Shasta and Temperance Flat to expedite studies that have been going on for way too long. We need to get the feasibility studies complete so we can then determine the cost feasibility and whatever other potential challenges we face.

I mean, obviously, a number of these projects have environmental opposition, and yes, that gets to the regulatory aspect because, frankly, the Endangered Species Act passed under and was signed into law by a good Republican administration, I think, has gone in the directions that many of us would not like to see it today. Ever since *Tennessee Valley Authority* v. *Yale,* we have aspects of the Endangered Species Act that I think have been used in ways that are counterproductive.

Therefore, we need to look at how we deal with that. In California, we have a real challenge there, but I will continue to support the Governor in his efforts with the Bay Delta Conservation Plan that includes adding additional surface storage along with using the other water management tools in our water toolbox.

If we are going to agree on what our deficits are, whether it is in California and whether in other Western States, and what we need to add in terms of acre-feet, and then figure out what is the most cost effective to develop that additional water supply, I mean, wet water is wet water, and frankly, the water that takes us to a population of 50 million people for our urban population to maintain our agriculture economy and to deal with the environmental issues is what I support.

Thank you very much for listening to me.

Mr. MCCLINTOCK. The Chair now recognizes Mr. Valadao of California.

STATEMENT OF THE HON. DAVID G. VALADAO, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. VALADAO. Thank you, Mr. Chairman.

Mr. Chairman, thank you for convening this subcommittee today to discuss the important issue of water storage and for your continued leadership on this subject.

My congressional district includes some of the most productive and diverse farmland in our Nation. We are proud of our agriculture heritage and the crops we produce, but we know that we would not be where we are today without previous generations' decisions to invest in water infrastructure.

Reservoirs and dams play an important role by capturing water in wet years, protecting families from flooding and giving water managers the ability to provide a regular flow of water in times of drought.

In addition, dams and reservoirs provide nearly 15 percent of all electricity in our home State of California and account for well over half of all renewable energy produced nationwide.

Unfortunately, the investments in water storage made by previous generations have not continued into the modern day. Today over two-thirds of all Bureau of Reclamation facilities are over 50 years old. In my home State, the Central Valley Project, designed to provide critical water delivery for 22 million families and farm-

ers, is now stretched thin, and the same system now serves over 38 million individuals.

Restricted by heavy-handed regulation and litigated by environmental activists who have turned suing the government into a multi-million dollar taxpayer funded industry, our Nation's water systems have failed to keep up with today's demands. Today farmers and families across the district are feeling the real impacts of restricted infrastructure growth.

The most unfortunate part of the recent water shortages is that it does not have to be this way. It is not that we are a society that uses too much water or that we have become more efficient. Rather, the investment in our water infrastructure has failed to keep pace with our growing population and economy.

In 2009, Federal regulations magnified the impacts of the drought to leave Central Valley Project farmers with a 10 percent water allocation. As a result, thousands of acres of farmland were fallow and more than a billion in income and 20,000 jobs in the region were lost. The impacts are still being felt today.

This year, because of onerous regulation under the Endangered Species Act, over 800,000 acre-feet of water was allowed to flow out to the sea rather than be delivered to farmers and families in my district who need it most. Today water shortages and environmental red tape are forcing California farmers to deal with 20 percent of their water allocation.

Next year, because of the same bureaucratic overreach, farmers—and this very well may be a 0 percent year for us, for individuals, economies and civilizations—the same truths hold true. Without water you die.

Although there are many factors that contributed to the 2000 water crisis, one thing is clear. The ability to store more water in wet years could have guarded against the 2009 crisis and the new one we are facing in 2014. Water storage provides many benefits, but the most important benefit it provides is the assurance that when times are dry, water will be there for families, to water crops, to protect jobs, and to continue to fuel our economy.

We must invest in our water infrastructure today so we can be assured for our tomorrow. I thank the Chairman for this opportunity to be here to discuss this important water topic.

Thank you.

Mr. MCCLINTOCK. Thank you.

Mr. Huffman of California.

STATEMENT OF THE HON. JARED HUFFMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. HUFFMAN. Thank you, Mr. Chair.

I look forward very much to this discussion today, and in terms of my opening remarks, I guess I want to respectfully push back a little bit against the idea that it is somehow environmental regulations or environmental standards that are holding up the possibility of constructing lots of new dams.

I am not aware of a single dam, at least in California, maybe throughout the West, that actually has the financing in place to happen and is being held up because of environmental require-

ments. If somebody here today knows of such a project, I would love to know that.

I am aware of a lot of new dam proposals that are being held up because of feasibility studies and the basic requirement that beneficiaries find a way that they can actually pay for these things before we start to build them. That is common sense, and that is sort of the law of reality and financing. That is not any particular environmental standard.

The fact is the most cost effective dams in California and in other parts of this country were built a long time ago. The remaining dam sites that are under consideration are far more expensive and far less productive because the biggest dam in the world doesn't make it rain or snow anymore. You are talking about managing the same increment of water.

There was a statement made at the outset that conservation does not add more water. I think if we had a few of the water managers from southern California and other parts of California here today, they would tell you that is absolutely false. There are so many conservation strategies that we have pioneered in recent decades that do produce more water.

We need to hear that perspective. We need to hear how evaporative losses and other losses have been dramatically reduced by pioneering conservation strategies far cheaper, by the way, than the tremendous price tag of building new surface storage.

We need to hear how transmission losses and efficiencies in the actual water infrastructure, as the Ranking Member likes to talk about, can dramatically increase the amount of available water, wet water for beneficial uses throughout the system.

It is sort of assumed and was assumed in the opening that cheaper water is better than more expensive; therefore, we should be moving to surface storage before recycling and desalination. Well, there is a reason why new dams are generally not being constructed. There are some exceptions. Los Angeles and others have found a way to find the money, and they have been able to move forward with their surface storage, but there is a reason why you are seeing more recycling and desalination starting to happen. That is because people are willing to pay for them.

These are not projects that are carrying with them huge Federal subsidies like the kind of new surface storage projects that we like to talk about in these discussions. These are projects that San Diego and other places have decided are important enough to them that they are willing to actually pony up their own money and make them happen.

The statement that the last major surface storage in California was New Melones in 1979 is not correct. That was the last Bureau of Reclamation Central Valley Project surface storage, but as the Ranking Member pointed out, there have been huge new surface storage projects that have come on line in California, but again, the secret to making them happen is that people did not put their hand out and ask for huge Federal subsidies. They actually found beneficiaries that were willing to pay for those projects, and guess what. The environmental laws did not stop them. They actually happened: Los Vaqueros, Diamond Valley. There are lots of other local

surface storage projects that they have been able to find a way to actually make happen.

So it is really important, I think, as we move forward with this discussion to sort of tease out the religion of surface storage from the actual facts on the ground. It would be nice to hear from more water managers that have actually found ways to build these projects because there is another story to be told here, and there is all sorts of water that we can be making available for all the beneficial uses that I know we all care about if we focus on creative strategies and the realities and the finances of water management instead of bringing out the old dogma about environmental laws and new dams being something that would happen in the absence of the Endangered Special Act.

So I look forward to our discussion, and I will try to bring it back to those realities whenever I can.

Mr. MCCLINTOCK. I think we will now hear from our panel of witnesses. Each witness' written testimony will appear in the hearing record. So I would ask that you keep your oral statements to 5 minutes.

The timing light is pretty simple. Yellow means you have 1 minute left. Red means stop, and that is all you need to know about the timers. With that I am pleased to recognize Mr. Robert Shibatani. He is the CEO and Principal Hydrologist of the Shibatani Group from Sacramento California. Welcome.

STATEMENT OF ROBERT SHIBATANI, CEO AND PRINCIPAL HYDROLOGIST, THE SHIBATANI GROUP, INC.

Mr. SHIBATANI. Thank you very much.

Good afternoon, Mr. Chairman and members of the subcommittee.

After what appears to be several decades of relative idleness, if you want to put it that way, water managers, water practitioners across the Nation are now realizing that we are embarking upon a new era of dam and reservoir revitalization and one that is quite different than what we experienced in the past. I would like to spend a few moments with all of you this afternoon talking about one specific aspect of that discussion/debate, and that is related to some of the opportunities emerging related to high elevation and new storage.

Let me perhaps begin by defining what that is. High elevation storage in California represents new facilities above existing State, Federal and local agency impoundments that currently ring or circle the Central Valley and what we operationally label as terminal or rim reservoirs.

So given their location, there are a number of distinguishing factors that make these facilities quite different than their historic counterpart. For one, they are at high elevation, which means that they are at the source area of both snow accumulation and the potential effects of climatic forcings brought upon by climate change, and we are observing some of those effects today.

Number two, because of their remote location, some of the potential population displacement risks are largely marginalized relative to other facilities.

Number three, the construction related effects associated with their development, things such as sensitive receptors to such things as noise, air quality, traffic disruptions, possibly even land use conflicts, are largely marginalized relative to reservoir sites more closely situated near high population centers.

Fourth and finally, their distal proximity to the downstream outflow locations, either the Pacific Ocean or some estuary—California is a good example, the Bay Delta—along with the interceding reservoirs between them in the Pacific Ocean largely mean high elevation storage facilities are largely immune or unaffected by downstream delta water quality requirements.

Now, functionally, hydrologically, capturing new upstream precipitation provides a downstream flood control benefit at the point source of runoff generation. So it is the first line of defense for flood control, very, very different from levy management, which is the last line of defense for flood control.

Now, the additional storage developed in these upstream reservoirs also provides a number of environmental benefits, such things as habitat protection flows, fish attraction flows for journeying adult spotters, pulse flows or downstream water quality control, including estuaries that have salinity as a major issue. And the last issue, of course, is dilution potential for the many thousands of NPDES and waste discharge requirements that are currently in existence today.

Significantly, high elevation storage also provides operational flexibility for those jurisdictions that enjoy joint Federal water project operations, local and regional water supply sustainability, and the support for a very robust and active water transfer market.

From an endangered species perspective, high elevation storage provides additional cold water pool reservoir assets that are very, very important for in-stream thermal management. New dams and new reservoirs, as we all know, there are many emerging studies that are confirming that those facilities provide an effective adaptation to the effects of climatic change brought about by either warming temperatures or a change of precipitation form.

So such things as a shifted hydrograph in upstream watersheds, things such as annual yield differentials, things such as extreme event probabilities associated with climatic forcings are all each accommodated through new high elevation storage.

Now, I get the question asked quite frequently whether new dams are even possible in this contemporary context, and I usually answer that query with a flip question in return, and I approach this from a hydrologic perspective only because that is the limitation of my expertise. So I ask the prescient question: does a watershed experience at any time of the year uncontrolled releases (a) or surplus flows (b) during any given water year?

Typically, in the Western States, in the Mountain States, that answer is yes. That uncaptured flow is the water that I want to serve as a foundational basis for new water storage development across the Western States.

Now, Mr. Chairman, let me conclude by saying that there are a number of challenges that lay ahead of us clearly. Many of them in my view are regulatory driven, and in my experience in the work that I have done on water supply development for the last 30

years, there has never been a more pressing and prescient time for new storage development in the United States today.

There are a number of growing concerns, demands associated with new supply security, water quality control, including protection from saline intrusion associated with sea level rise. All of these, Mr. Chairman, can be accommodated by new high elevation storage potential adaptations across the Western and Mountain States.

With that I want to thank you for your time.

[The prepared statement of Mr. Shibatani follows:]

PREPARED STATEMENT OF ROBERT SHIBATANI, CEO AND PRINCIPAL HYDROLOGIST, THE SHIBATANI GROUP, INC., SACRAMENTO, CALIFORNIA

Good morning Mr. Chairman; distinguished members of the subcommittee.

I want to thank you for the opportunity of appearing before you today. I appreciate your indulgence in allowing me to share with you what I feel are prescient opportunities in improving U.S. water supply security and resiliency. These same opportunities also allow us to address the chronic need to improve ecosystem functionality and species recovery, and reassess the persistent dichotomy between long-standing flood control management and water supply development. The opportunities I speak of are related to new water storage and, in particular, high elevation storage.

Such facilities in my view, can serve as an effective new platform to directly meet the challenges posed by a growing population, refocus attention on retaining a larger portion of a valuable public trust resource for a wide variety of beneficial uses, encourage a broader commitment to improving the Nation's aging water infrastructure, and provide direct climate change adaptation. Ensuring water security can provide a vital foundational basis for robust national economic recovery.

By way of brief background, I am physical hydrologist and current CEO of The Shibatani Group, an international climate change hydrology, water governance, and water resources development advisory firm based in Sacramento, California. I have been working exclusively in the fields of hydrologic research and applied water resources management consulting for 30 years. While my technical specialties are in snow hydrology and climate change watershed functionality, my applied specialties are in new water storage and water supply development.

The focus of my testimony this afternoon centers on the current new era in dam/reservoir revitalization, particularly those elements associated with what I term high elevation storage, and some of the factors that are making this contemporary era of dam/reservoir planning quite different than those of past eras. I draw upon examples from California, but the principles are consistent wherever unattenuated surplus flows exist and, particularly, under climate change, to snow dominated watersheds.

To be sure, new dams and reservoirs evoke strong emotions and in many ways represent an identifiable icon in the long-standing polarity between environmental and development interests. Yet, the functional basis for this polarity is diminishing even if perhaps the rhetoric is not.

Changing hydrologic conditions in many of our Nation's watersheds are compelling water managers to look at long-term water management quite differently than they ever have before.

To begin my testimony, let me start by defining high elevation storage. High elevation storage includes primarily, those new on-stream dams and reservoir sites above existing or terminal reservoirs. So, taking the expansive Central Valley of California as an example, it includes new reservoirs that would be constructed above the existing Federal, State, and local agency impoundments that circle the Central Valley, and are known as the "terminal" or "rim" reservoirs.

Given their location, there are numerous factors that distinguish these types of reservoirs from others and provide certain advantages relative to their historic counterparts. They are located at high elevation and so, are at the source areas of snow accumulation and the areas where the effects of climatic forcings are first being observed. They are typically in remote areas so population displacement risks are minimized. Moreover, typical construction-related effects such as sensitive receptors to noise, air quality, traffic disruptions, and land use conflicts are significantly reduced, relative to those closer to more populated areas. Their proximity to the Delta and the presence of intervening reservoirs means that they are largely unaffected by the regulatory impositions for Delta water quality.

Hydrologically, their location above existing terminal reservoirs provides several benefits. By capturing precipitation at its upstream source, downstream flood protection is addressed at the point of runoff generation. Retaining additional water in high elevation upstream areas provides relaxation of the flood encroachment rules in the downstream terminal reservoirs. This of course has positive implications to water supply and other later season environmental water uses since the terminal reservoirs would not have to be drawn down as far during the winter season as they are now. The risk of non-refill, therefore, is reduced relative to the size of the new reservoir and overall annual yield of the watershed.

To be candid, this is where I have often run counter to levee proponents in the flood control debate who posit that levees by comparison represent the first line of defense in flood protection. While commonly stated, this thinking ignores the truism that flood risks result from unattenuated high flows from upstream areas. The first line of defense is more aptly represented by eliminating or at least reducing the upstream flood release in the first instance. Additional storage does just that.

New high elevation storage reservoirs offer significant additional operational flexibility for water resource managers in many other areas. The premise is really quite simple. Capturing a larger portion of water that would otherwise be lost during the rainy season provides the additional assets that water managers can then put to direct beneficial use later on. In many ways, it converts what can be viewed as wastage and simply holds it in reserve until it can be used more beneficially later in the year.

One of the significant advantages of high elevation storage is the conversion of energy from potential to kinetic. By simply running water through turbines along its natural oceanic migration we generate a natural and highly reliable energy source based on the facts that (1) it rains every year and (2) water always runs downhill.

The resulting higher carryover storage in those downstream reservoirs also provide many environmental benefits including habitat flows, side channel/pond replenishment, fish attraction flows, pulse flows for maintaining downstream water quality (particularly important where estuarine salinity is an issue), and dilution potential for the thousands of NPDES permits and waste discharge allowances in existence. Moreover, in the upstream areas, which are traditionally dry after the spring melt period, additional storage provides enhanced opportunities to maintain instream wetted perimeters and reduce upper basin desiccation.

Anything requiring instream flow augmentation will benefit from new storage and high elevation storage maximizes the potential for those many benefits.

This added storage also provides significant improved flexibility for water supply deliveries; both locally and regionally, as well as helping to enhance local water-related recreation, tourism, and local small businesses.

At the Statewide level, additional storage provides enhanced opportunities to improve overall CVP/SWP operational flexibility. Moreover, it provides increasing capabilities to offset recurring shortages imposed by the Federal/State water projects through an active and robust water transfer market. This is an important consideration since water transfers serve as a significant revenue source to several local special districts based on (A) a commodity that is replenishable annually; (B) would have otherwise been "lost" to the ocean, and (C) can provide concurrent environmental benefits in its carriage water function.

From an endangered species mitigation perspective, high elevation storage can provide direct hydrologic benefit to a major stressor that has contributed to the threatened state of listed anadromous fish species along the west coast.

NOAA's Biological Opinions for Central valley steelhead and the various runs of Chinook salmon associated with the long-term operation of the Federal/State water projects in California identified water temperature as a critical issue. It is not the only issue, as invasive species, exports, water quality, genetic alteration, and ocean conditions all play a role, but water temperature is a significant issue.

Instream water temperature is largely controlled by releases from the terminal reservoirs. Again, with additional high elevation storage, the need to maintain existing flood encroachment in the downstream or terminal reservoirs is reduced. If then, greater refill is allowed to occur then, on average, we can expect higher carryover storage as we enter into the irrigation or high demand season. If we make the assumption that there is a linear relationship between reservoir total volume and the hypolimnitic volume, that is, the coldwater pool at the bottom of reservoirs, then additional coldwater can be generated by the mere existence of new high elevation storage reservoirs. Such coldwater pool assets for ESA-related anadromous fishery protection—covering thermally sensitive life-cycles of these listed fish species would provide significant benefit to NOAA's mitigation actions. This would help improve,

protect or otherwise restore vulnerable salmon and steelhead populations within our freshwater systems.

In other words, with new high elevation storage, we can, through coordination operations, significantly improve the ability to address a major stressor that has contributed to the decline of these federally listed endangered species.

As with dams, climate change is also a subject that in contemporary discourse possesses passionate responses. We have all seen plenty of examples of this.

As a hydrologist, as with most applied practitioners I hope, I tend to strip climate change of all the political rhetoric and focus solely on its physical implications. Climate change adheres to the same physical laws as the hydrological environment for which it is imposing an effect.

The fact remains, regardless of the causation debate, our hydroclimatic regimes here in the United States and indeed across the globe are changing and, in many cases, changing rapidly. As the recent IPCC WGI Report released earlier this month in Stockholm confirmed, anticipated climatic forcings will continue (and more aggressively) affect our watersheds. How, where, and when to apply new physical and operational prescriptions to accommodate such changes are only just beginning. And new storage will play an important role in this managed adaptation.

But how does climate change factor into the discussion regarding new dams? New dams, as numerous studies are now demonstrating, provide an effective adaptation measure to the effects of climatic shifting on hydrologic regimes. How? By providing attenuation capability of additional water made available within high elevation watersheds. Runoff response will be more instantaneous as more precipitation will fall as rain as opposed to snow, thus eliminating a natural storage reservoir we have relied on for decades. With increased early season runoff, the antecedent moisture within most watersheds will also increase leading to earlier saturation and accentuating the runoff response later in the season.

As water practitioners increasingly accept the hydrological realities of these changing conditions, many have accepted the necessity of new storage as an effective means of preserving our control over this vital resource. New high elevation reservoirs provide that first line of management control. Focus is centered on the exact areas where climate change will first affect a region's entire water availability.

A common argument against new dams is the blockage of historic fish passage; most notably the listed anadromous fish species that have had their original spawning ranges significantly curtailed with the construction of today's existing dams. High elevation storage, however, are proposed to be situated in locations well above existing dams and, in many cases, above a series of already existing impoundments. Fish passage is not an issue. To be sure, programs such as the Interagency Fish Passage Steering Committee are looking at re-introducing listed species above the terminal reservoirs, but again, in many areas, several existing impoundments already exist before we get to those high elevation areas.

A prescient question today is—are new reservoirs even possible? To answer that query, I typically ask a very fundamental question; does the watershed experience uncontrolled releases or surplus flow conditions at any time of the year? Typically, the answer is yes. It is that yield that I propose to capture with new high elevation storage facilities.

Taking California as an example, it is not difficult to see why this makes sense. On average, we receive about 200 MAF of precipitation each year. Of that, we "manage" about 40 percent or 80 MAF. By "manage" I am referring to water that is allocated and prescribed for beneficial use—it is our "dedicated" yield. This includes urban, residential, M&I, and Ag water as well as that water prescribed for environmental flows purposes—including instream flows, Wild & Scenic Rivers, and managed wetlands and wildlife refuges.

That leaves the majority, or 120 MAF that is unavailable or lost. While much of that loss is uncontrollable, namely through direct evaporative or transpirative loss and deep percolation to the salt sinks, a large portion is also lost as outflow to the Pacific.

As we all can appreciate, all rivers must maintain a minimum baseflow condition. There has to some water in the rivers—we cannot store all of it. But therein lies the test, how much water is appropriate in rivers in order to maintain all of the instream functions necessary to serve natural ecosystem and societal needs? On the one extreme of course is the flood season when most reservoirs are evacuating large quantities of water both before and during rain events. This is water that, but for perhaps 4 or 5 months, changes from a threat to an absolute necessity.

This is where, in my view, there must be a concerted effort to "close the flood control and water supply gap". It is an irrefutable edict of hydrology that says you cannot have a flood control and water supply issue in the same water year unless, the infrastructure is inadequate. That certainly seems to be the case today as we com-

monly experience flood control issues in mid-winter, only to turn around and cut water contractor deliveries several months later because our reservoir carryover storage is too low.

The inconvenient truth is that we are today still relying on 20th century infrastructure and the assumptions attached to those early facility designs and yet are faced with 21st century issues.

The population of California back in the early 1940s when many of the Federal water projects in the State were being planned and designed for example was less than 9 million. Today, 70 years later, our population exceeds 38 million. Leaving aside the increase in consumptive demands, original design capacities could not account for the growing and complex yield needs that have evolved over time; those of endangered species, wildlife refuges, and water quality control. All of this has led to an overall diminishment of available water supplies to water users since the total available yield has not changed, only its apportionment across a wider array of uses.

Add in the hydrologic timing shifts associated with climate change, and it becomes essential that we look at water yield management with new eyes—ones that take seriously the reality that our static (and aging) infrastructure is increasingly being asked to accommodate changing hydrologic conditions and provide water to an ever increasing number of uses and increasingly complex timing modes. We have a continually migrating environmental baseline—yet our infrastructure has remained static. This goes against the widely accepted and fundamental hydrologic principle that states—stationarity is dead. In other words, we cannot rely on fixed infrastructure or historical assumptions given the rapidly changing and dynamic nature of our environment.

In my view, I feel that we have emerged, perhaps by necessity, into a new era of water storage development. In fact, I have never seen such interest in new storage development as I am seeing today. Federal, State, and local/regional initiatives as well as urban water purveyors, power interests, and Ag districts are increasingly supporting the need to new water storage. That, together with a new player; private investor interests are making new storage a dynamic new reality.

A growing number of Americans are slowly realizing the value of water, the increasing need to serve multiple beneficial uses, and the urgent need to move away from entrenched 20th century dogma regarding water infrastructure functionality—and take a refreshing new look at how we manage water under these rapidly changing circumstances. Closing the flood control—water supply gap is the first step toward this new charter—and high elevation storage is an effective means of accomplishing these new objectives.

Mr. Chairman, let me close by saying that there are indeed many continuing challenges ahead. But never has there been a more pressing need for new storage than what exists today. Its ability to proactively meet the growing demands and concerns associated with water supply security, the need for clean energy, fish habitat enhancement, instream thermal refugia for listed fish species, downstream water quality protection, including protection against saline intrusion associated with SLR, improved flood control, and source area adaptation to the effects of climate change in our mountain regions are just some of our growing contemporary needs. In fact, for once, there almost appears to be bi-partisan acceptance between environmental and water development interests—one that did not exist even a few years ago, but now seem jointly accepting of this vital necessity for long-term societal health. High elevation storage is emerging as a critical facet in future water sustainability and an inimitable prerequisite for any national economic recovery mandate.

New high elevation storage across the Western and Mountain States can help provide many of those benefits.

I want to thank you Mr. Chairman and the subcommittee members for your time today. Hopefully, I have been able to shed light on some of the contemporary thinking in water resources management and am more than happy to answer any questions.

Mr. MCCLINTOCK. Great. Thank you very much.

Now I would like to recognize Mr. Derek Sandison, Director of the Office of Columbia River for the Washington State Department of Ecology, from Yakima, Washington, to testify.

STATEMENT OF DEREK SANDISON, DIRECTOR, OFFICE OF COLUMBIA RIVER, WASHINGTON STATE DEPARTMENT OF ECOLOGY

Mr. SANDISON. Chairman McClintock and Congresswoman Napolitano and members of the committee, my office is responsible for water supply development in the eastern half of our State, what we refer to as the dry side of Washington, where average precipitation is often less than 10 inches a year. Management of water supply in this semi-arid part of the country has been typically contentious and often litigious.

In 2006, the Washington State legislature passed landmark legislation known as the Columbia River Water Supply Management Act to improve water supplies in the eastern part of Washington State. That act directed my department to aggressively pursue development of new water supplies for both in-stream and out of stream uses and created a $200 million water supply development account.

Our office estimates that the demand for additional out of stream water in the Columbia River main stem and tributaries is about 900,000 acre-feet, and unmet tributary in-stream flow needs are about 500,000 acre-feet. About one-half of the out of stream demand and about one-third of the unmet in-stream needs are in one tributary basin, the Yakima River Basin, which will be the focus of the latter portion of my presentation.

Since its beginning 7 years ago, our office has initiated nearly 40 water supply projects under the 2006 legislation, and we estimate that by the end of this year we will have made about 300,000 acre-feet of additional water supplies available in our project areas.

However, the on-the-ground efforts to address the serious water resource and aquatic resource problems of the Yakima Basin are just getting underway. The Yakima Basin is an approximately 6,000 square mile drainage basin in south central Washington. It supports a population of about 360,000 people, and it is the home to the Yakima Nation.

The Yakima River Basin contributes over $3 billion annually to the agricultural economy of the State, and on the fish side historically the basin was the second largest producer of salmon and steelhead run in the entire Columbia Basin, second only to the Snake River.

The Bureau of Reclamation operates five existing surface water reservoirs with a total capacity of about a million acre-feet. It is about one-third of the annual runoff in the basin. The basin is heavily dependent on east slope cascade range snow path to supply water in the semi-arid lower basin during the summer months. Surface water resource at the basins are over-appropriated and frequent droughts over the past several decades have demonstrated the vulnerability of the basin's water supplies.

In-stream flows and aquatic resources of the basin have suffered as well. Runs of salmon and steelhead that once numbered at least 800,000 fish were reduced to about 8,000 fish by 1980. Three stocks of salmon have been extirpated and our steelhead and bull trout are ESA listed.

In 2009, the Office of Columbia River and Reclamation started collaborating with the Yakima Nation and basin stakeholders to

formulate a comprehensive strategy to address critical resource needs. That collaboration focused on expanding the work of the 1979 Federal Yakima River Basin Water Enhancement Project or YRBWEP and the 1994 congressional amendments that created Phase 2 of the YRBWEP.

In April of 2011, consensus was reached on the Yakima Basin integrated water resource management plan, which we hope will become Phase 3 of the YRBWEP. The integrated plan proposes major ecological restoration of the Yakima River Basin, including providing for fish passage at all in-basin reservoirs, providing main stem and tributary habitat enhancements, and restoration of substantial portions of the upper watershed for both terrestrial and aquatic species.

The integrated plan also calls for improvements in water supply through fostering expanded water markets, enhancing agricultural conservation, modifying existing storage facilities and constructing new storage facilities. The additional supply will provide drought relief to existing irrigators, water supply security to municipalities, water for fish out-migration, and water to mitigate the predicted loss of snow pack associated with climate change.

It is recognized that implementation of the surface water storage elements will be difficult and expensive, but there is really no other sources of water available, size storage, that will be capable of meeting the full needs of the basin.

Earlier this year the Washington State legislature with bipartisan support passed and Governor Inslee signed into law legislation authorizing our department to begin implementation of the integrated plan. At the Governor's request, the legislature also provided $131 million in appropriations to initiate implementation of the plan.

However, to fully advance the integrated plan, the State of Washington will need congressional authorization and continued Federal financial participation as we move forward. So we look forward to continuing our longstanding partnership with the Federal Government, and thank you very much for the opportunity to testify.

[The prepared statement of Mr. Sandison follows:]

PREPARED STATEMENT OF DEREK SANDISON, DIRECTOR, OFFICE OF COLUMBIA RIVER, WASHINGTON DEPARTMENT OF ECOLOGY, YAKIMA, WASHINGTON

When most people think of Washington State, they visualize an area with a wet climate. While that perception is at least partially accurate, the rain forests on our Olympic Peninsula receive on average about 140 inches of rainfall a year, much of the east half of the State, which lies in the rain shadow of the Cascade Mountains, has a semi-arid climate. The total annual number of inches of precipitation in some portions of eastern Washington is measured in single digits. For example, in the lower Yakima River Valley of Washington, the annual precipitation is less than 9 inches. It is eastern Washington, the dry side of the State including most of the Washington portion of the Columbia and Snake River basins, for which my organization is responsible for management and development of water supplies.

Management of water in the Columbia River and Snake River basins during the 1980s and 1990s was highly contentious and marked by protracted legal battles. Many of the tributary basins were and still are closed to further appropriation and dry year stream flows in many portions of eastern Washington have been seriously diminished, contributing to substantial reductions, and in some cases extirpation, in salmon and steelhead runs. In 2006, the State of Washington determined that it was time to take another tack.

In that year, with strong bipartisan support, the Washington State Legislature passed and former Governor Gregoire signed into law landmark legislation known as the Columbia River Water Supply Management Act (chapter 90.90 RCW). The act directs the Washington State Department of Ecology to "aggressively pursue" development of new water supply for both instream and out-of-stream uses and created a $200 million water supply development account (bond fund) to support our water supply development activities. Expenditures from the account may be used to assess, plan, and develop new storage; improve or alter operations of exiting storage facilities; implement conservation projects, develop pump exchanges; lease or acquire water; or undertake any other actions designed to provide access to new water supplies within the Columbia River basin of Washington for both instream and out-of-stream purposes. The legislature made it clear that in meeting the water needs of the basin, we were expected to use all options at our disposal, or use what we term, a big tool box.

The legislation required that two-thirds of water supplies developed through new storage and funded by the water supply development account be committed to out-of-stream uses. The remaining one-third would be allocated for instream uses.

In implementing the legislation, our department was directed to focus on the following needs:

- Finding replacement water for irrigators in the central portion of the Columbia Basin, known as the Odessa Subarea, where aquifer levels are rapidly declining;
- Developing sources of water supply for the roughly 600 pending water right applications, some of which were 15 to 20 years old;
- Finding an uninterruptible supply of water for a class of water right holders whose water use is curtailed in drought years; and
- Developing sources of water to meet future municipal, domestic, industrial, and irrigation needs within the Columbia River and Snake River Basins of Washington State.

To guide our water supply development investments as well as to define the extent of the water supply problems that we are required to address, the legislature required that a Supply and Demand Forecast be prepared every 5 years beginning in 2006. In 2011, the Department of Ecology's Office of Columbia River, in collaboration with Washington State University and the Washington Department of Fish and Wildlife, released the second Water Supply and Demand Forecast prepared under the 2006 legislation. Preparation of the forecast involved a rigorous examination of instream and out-of-stream water needs and water availability for both the Columbia River and Snake River mainstems as well as all tributary basins. The forecast concluded that total out-of-stream mainstem and tributary demand for additional water supply is about 900,000 acre-feet and unmet tributary instream flow needs are about 500,000 acre-feet. About one-half of the out-of-stream demand and about one-third of the unmet instream needs is in one tributary basin, the Yakima River basin, and will be the focus of the latter portion of my testimony.

To address regional water needs, the Department of Ecology's Office of Columbia River has initiated nearly 40 water supply projects under the 2006 legislation. It is important to note that our partner in many of our water supply development activities, including the Odessa ground water replacement efforts and addressing the needs of the Yakima River basin, has been the U.S. Bureau of Reclamation (Reclamation). That collaboration has proven to be a valuable asset to the State of Washington.

By the end of this year, we anticipate that we will have been successful in developing and making available about 335,000 acre-feet of additional water supply for instream and out-of-stream uses. We have developed that supply primarily through modifications to existing surface storage reservoirs, conservation and conveyance system improvement projects, and acquisitions. We are in the process of developing aquifer storage capacity at a number of locations and expect that the next increments of additional supply will come from those sources. By the end of our current biennial budget cycle in June 2015, the projects we have progress or completed will have expended about $175 million of the original $200 million water supply development account.

However, on-the-ground efforts to address the serious water resource and aquatic resource problems of the Yakima River basin are just being initiated. The Yakima River basin is an approximately 6,000 square mile drainage basin in south central Washington. It supports a population of about 360,000 people and is home to the Yakama Nation. The Yakima River basin contributes over $3 billion annually to the agricultural economy of the State of Washington. Yakima County ranks 12th nationally in the total value of agricultural products sold. Yakima County ranks first na-

tionally, in apple, mint, winter pears, and hop production. The Yakima Basin exports around $1.8 billion in farm products through the ports of Seattle and Tacoma annually. Historically, the basin was the second largest producer of salmon and steelhead runs in the entire Columbia River system.

Since 1905, when the State granted rights for all unappropriated surface water in the basin to Reclamation, surface water flows in the basin have been managed by Reclamation. Reclamation operates five existing reservoirs with a total capacity of about 1,000,000 acre-feet, which is about one-third of the annual runoff in the basin. The basin is heavily dependent on east-slope Cascade Range snowpack to supply water to the semi-arid lower basin during the summer months.

Water users in the basin are a combination of the pre-1905, senior surface water right holders, direct customers in of Reclamation served water under Reclamation's 1905 water right, a small number of post-1905, junior surface water right holders, and ground water right holders, mostly with post-1905 priority dates.

The surface water resources of the basin are overappropriated, and a State court adjudication of those water rights has been ongoing since 1977. The State closed the basin to additional ground water rights in the 1990s. Recently, the U.S. Geological Survey concluded that the basin's ground water aquifers are in continuity with surface waters. Thus, rights for ground water, on which most of the basin's municipalities depend, are likely to be determined to junior to the 1905 water rights of the Bureau of Reclamation.

Frequent droughts over the past several decades demonstrated the vulnerability of the basins water supplies. During droughts in 2001 and 2005, the irrigation districts served by Reclamation, referred to as the "proratable" irrigation districts, received only about 40 percent of their water supply.

Instream flows and aquatic resources of the basin have also suffered. Out-of-basin and in-basin factors, including diminished stream flows and lack of fish passage at existing reservoirs, have combined to drastically reduce the numbers of salmon and steelhead. Runs of salmon and steelhead the once numbered at least 800,000 fish declined to about 8,000 fish by the 1980s. Sockeye, coho, and summer Chinook salmon have all been extirpated; although efforts are underway, led by the Yakama Nation, to reintroduce new stocks of those species. The basin's steelhead and bull trout are Endangered Species Act listed threatened species.

Water supply shortages coupled with severe reductions or elimination of major salmon and steelhead runs makes the need for drastic improvements to water resources and aquatic resources of the Yakima River basin imperative. Thus, since 2009, the Office of Columbia River and Reclamation have been collaborating with the Yakama Nation and basin stakeholders to formulate a comprehensive strategy to address critical resource needs. That collaboration focused on expanding the work of the 1979 Federal Yakima River Basin Water Enhancement Project [YRBWEP] and the 1994 Congressional Amendments that created Phase 2 of YRBWEP. That strategy took shape by mid-2011 when consensus was reached on the on Yakima River Basin Integrated Water Resource Management Plan (Integrated Plan). The Integrated Plan is being proposed as Phase 3 of YRBWEP. Development of the Integrated Plan was facilitated by additional Federal support resulting from the Yakima River basin being selected as the recipient of Reclamation's first Basin Study grant.

The Integrated Plan proposes a major ecological restoration of the Yakima River basin. In addition to providing for fish passage at all major in basin reservoirs to open high basin spawning and rearing areas that have been blocked for a century and to providing substantial mainstem and tributary habitat enhancements, the Integrated Plan will involves restoration of substantial portions of the upper watershed for both terrestrial and aquatic species. It provides for operational modifications to improve operational efficiency and flexibility.

The Integrated Plan also calls for substantial improvements in water supply. As noted previously, about one-half of eastern Washington's out-of-stream water needs and one-third of our unmet instream flow needs are in the Yakima River basin. The water supply improvements will come in several different forms. Efficiency of existing use of water will be improved through reducing barriers to the transfer of water between willing buyers and willing sellers. Municipal and agricultural conservation efforts will be enhanced. For example, the plan calls for supplementing the 72,000 acre-feet of conserved irrigation water achieved as part of the 1994 YRBWEP Phase 2 efforts with another 170,000 acre-feet of conservation savings. Studies are also underway to better understand the potential role of aquifer storage in providing passive recharge to the mainstem of the Yakima River in targeted locations.

However, the objectives of the Integrated Plan cannot be met without significant improvements in surface water storage. The Office of Columbia River and Reclamation determined based on an analysis of water supply needs that development of ad-

ditional 450,000 acre-feet of additional water storage capacity, in the form of modified and new surface storage facilities, will be needed to provide:

- Drought relief to existing irrigators in the basin;
- Secure water supplies for our municipalities with junior water rights and to meet their future needs; and
- Adequate water for fish outmigration and pulse flows in all years.

In addition, climate modeling by the University of Washington Climate Impacts Group and the Federal River Management Joint Operating Committee predict that substantial reductions in snow pack depth and duration are likely as we move toward mid-century. The Integrated Plan recognizes that the only effective means of offsetting snowpack reductions in the Yakima River basin are improving flood plain aquifer storage potential and increasing surface storage capacity. Sensitivity analysis modeling of the Integrated Plan indicate that at buildout, about 500,000 acre-feet more water will be available under drought conditions by mid-century with the Integrated Plan than without.

There are no other sources of water supply available besides storage capable of meeting the needs of the basin. Conservation is often suggested as a substitute for water storage; however, there are severe limitations to the role of conservation as a source of water supply. As noted previously, the Integrated Plan proposes to accomplish another 170,000 acre-feet of irrigation conservation savings. Those savings will provide valuable flow improvements in targeted stream reach where those flow benefits will improve conditions for fish. However, it must be remembered that most conservation efforts focus on reducing the amount of water that leaks from conveyance systems (for example, canals or ditches) or from irrigation practices that result in more water being applied than is needed by the crops being grown. The leaked water returns through runoff or through ground water to the river at a point downstream of where it was diverted. Along the Yakima River mainstem, return flows rejoin the river within days or a few weeks after diversion and contribute to downstream river flows. If through conservation measures, the leakage or overapplication of water is reduced or eliminated, the amount of water diverted can be reduced. Those diversions savings add more flow to the river, but only between the point of diversion and the point at which return flows rejoined the river. Below the return flow point, there is no residual benefit to the river. If the conserved water described in the preceding example was used for some out-of-stream purpose, flow below the return flow point would be permanently diminished. The surest way to dry up the river would be to employ such a practice on a widespread basis.

Additionally, the amount of conservation savings that could be captured through conservation is greatly reduced under drought conditions, because, simply put, you can't conserve water that doesn't exist. The Office of Columbia River and Reclamation estimate that of the 170,000 acre-feet of average year conservation called for in the Integrated Plan, only about 50,000 acre-feet of savings would be captured in drought years like 2001 and 2005.

Earlier this year, the Washington State Legislature passed and Governor Inslee signed into law legislation authorizing the Washington State Department of Ecology to begin implementation of the Integrated Plan. At the Governor's request, the legislature also provided a substantial capital budget appropriation to initiate implementation. The State of Washington welcomes a continued Federal partnership in this effort.

Mr. MCCLINTOCK. Thank you very much for your testimony.

The Chair is now pleased to introduce Ms. Laura Ziemer, Senior Counsel and Water Policy Advisor for Trout Unlimited, based in Bozeman, Montana, to testify.

Welcome.

STATEMENT OF LAURA S. ZIEMER, SENIOR COUNSEL AND WATER POLICY ADVISOR, TROUT UNLIMITED

Ms. ZIEMER. Good afternoon, Mr. Chairman, Ranking Member Napolitano, members of the committee.

Thank you for the invitation to testify today on behalf of Trout Unlimited and its 150,000 members from Maine to Alaska who are working to restore local trout streams.

I myself work and live in Montana and have experienced firsthand the devastation of prolonged drought, and that is why I have dedicated the last 15 years of my professional life to finding innovative solutions to water scarcity. In my experience on the ground throughout the West, diverse partners are coming together to find the innovative solutions to water scarcity at a variety of scales by rethinking old infrastructure and repairing natural systems.

Trout Unlimited is not opposed to new storage. We believe it has a role to play in modern water management, and to this end I have learned a couple of things over walking irrigation districts for the last 15 years that I would like to share today.

First, I have learned that the largest and cheapest reservoir of new storage and new water lies in the miles of irrigation canals and laterals dug by shovel and plow over 100 years ago. For example, my colleagues in Eastern Washington have worked with the Wenatchee Water Users to upgrade irrigation works to now the most advanced system in the State. By doing so, they returned almost 8,000 acre-feet of new water to the flow limited Wenatchee River for imperiled spring Chinook salmon, and not only that but helped secure the city of Wenatchee's municipal water supply.

Another example comes from the southwest corner of Wyoming. There to use partnership with Julian land and livestock to upgrade a flood irrigation system to gated pipe not only increased hay production, but also improved stream conditions for Bonneville cutthroat trout.

Finally, I have personally worked with large irrigation districts across Montana's Rocky Mountain front. There I have worked with districts that have canals that hold more water than the rivers they are diverting from, and in there we found tremendous water savings by making those canals more efficient. In the one project that we have just finished implementation on, we returned 5,000 acre-feet of water, new water, saved water back to the Sun River while at the same time making that delivery system more secure and ensuring more reliability of irrigation water.

In that same context we looked very carefully at both new storage in the basic as well as expanding existing storage, but the infrastructure projects were 21 times cheaper than either the new storage or expanded storage. So those are the ones that we proceeded with.

And Congress can encourage these kinds of cooperative solutions by funding farm bill and Bureau Reclamation competitive grant programs.

Second, I have learned it can be a lot cheaper, faster, and smarter to expand on existing reservoirs than build a new one, and new storage can be used in a variety of ways to optimize water supply. For example, the Chatfield Reservoir in Colorado, we are looking at that for reallocating storage water to new supply for both municipalities and irrigation. That is the kind of solution that does not require new concrete but just new thinking.

Finally, I have learned over the years that the best solutions are usually not the easiest ones. The innovative work I have done with Trout Unlimited has involved a lot of listening over the time to what other people need water for.

New storage likewise is best planned and carried out in a multi-stakeholder basic study process and imbeds storage into a multi-pronged approach for addressing water scarcity, and certainly the Yakima River Basin plan that my colleague Mr. Sandison just described is an excellent example.

When we invest in the river basin's natural infrastructure, it becomes a highly cost effective way to buffer the effects of both floods and drought. The Yakima Plan recognizes this and proposes an ambitious plan of headwater protection, flood plain restoration and tributary flow enhancement. Trout Unlimited has found that over the years these are the kinds of solutions that allow communities, fish, and farmers to thrive in an arid land.

I hope my testimony today has been helpful in charting a road map to water security in the West, and I thank you for your invitation to testify.

[The prepared statement of Ms. Ziemer follows:]

PREPARED STATEMENT OF LAURA S. ZIEMER, SENIOR COUNSEL AND WATER POLICY ADVISOR, TROUT UNLIMITED, BOZEMAN, MONTANA

Dear Chairman McClintock and Ranking Member Napolitano,

Thank you for the invitation to testify today on behalf of Trout Unlimited [TU] and its 150,000 members nationwide. I have had the privilege to work for many years with TU's volunteers to restore local streams, and engage young people in TU's work to conserve, protect and restore our Nation's watersheds. I live and work in Montana, and have experienced first-hand the devastation of prolonged drought in an already-arid land.

Westerners experience water scarcity at a number of different levels. Extended drought creates problems for individual rancher and farm operations struggling to find enough river flows to irrigate crops, and for the fish that find that their habitats have heated up, shrunk, or just plain dried up. Swings and cycles in regional weather patterns create basin-level scarcity that affects not only irrigation districts, but also municipalities worried about meeting water demands. At the largest scale, whole sections of the West can experience such dry conditions that fires compound the problem of not enough water to go around, and whole assemblages of aquatic species are pushed to the brink of extinction. In the past year alone, blue-ribbon trout rivers in Montana have been closed to fishing due to low river flows; drought has continued more years than not in the Colorado River basin since 1999, causing a razor-thin margin between water supplies and demand within the basin; and, in August the Bureau of Reclamation announced that it would cut releases from Lake Powell by 750,000 acre feet next year—a first since the construction of Glen Canyon Dam created Lake Powell over 40 years ago.

The seriousness and scale of these problems is why I've dedicated the last 15 years of my professional life to finding collaborative solutions to water scarcity in the West. I've pioneered collaborative approaches to creating new water supplies with Montana ranchers, created working architecture for drought response plans that operate at the basin scale, and assembled diverse coalitions of interests to come together around innovative changes to water management across multiple, large river basins. Although these approaches vary in scale and focus, the one thing they have in common is building the trust to apply creativity to difficult, long-standing problems born of too many demands and too little water in arid lands. I have learned a couple of things over the past 15 years of walking irrigation ditches and listening to ranchers' needs that I would like to share today.

My message is simple: On the ground throughout the West partners are coming together to find innovative solutions to water scarcity challenges at a variety of scales. Congress should encourage cooperative stakeholder processes to solve storage challenges, and provide adequate funding for cost-effective programs that catalyze cooperative solutions, such as key Farm Bill programs, and the Bureau of Reclamation's competitive grant and basin study programs.

1. UPGRADING IRRIGATION INFRASTRUCTURE: A COST-EFFECTIVE SOURCE OF NEW SUPPLY

First, I've learned that the largest and cheapest reservoir of new water lies in the miles of irrigation ditches and laterals dug with shovels and plows over 100 years

ago. TU has worked with individual ranchers, farmers, and large irrigation districts to design, fund, and upgrade irrigation infrastructure to salvage this new water supply and apply it to multiple uses: irrigation, municipal, and restoration of river flows. TU has worked in partnership with ranchers and farmers across eastern Washington's Methow, Wenatchee, Yakima, Entiat, and Okanogan river basins, in Idaho's Salmon, Little Lost, and South Fork Snake river basins, Utah's Bear River, Colorado's Gunnison River basin, and in Wyoming's Bear, Big Horn, Green, North Platte, Snake, and Wind river basins. TU has also worked with California's wine growers to improve their irrigation practices while improving stream flows. Personally, I've worked with individual ranchers across Montana's upper Missouri, Yellowstone, and Clark Fork river basins on dewatered tributaries to upgrade headgates, convert long, leaky ditches to pipes, and replace flood irrigation with pivots. I've also worked with large irrigation districts on the Rocky Mountain Front to line canals holding more water than the river from which they're diverting, in order to turn some of that water back to the river—the Sun River.

Montana's Sun River Irrigation Infrastructure Upgrade. On the Sun River, the Bureau of Reclamation's WaterSmart competitive grant program helped cost-share these large-scale infrastructure improvements. This program is an excellent example of successfully getting Federal dollars to the ground to solve water scarcity conflicts in a cost-effective way. Prior to embarking on the WaterSmart projects, those of us working collaboratively in the Sun River basin conducted a multi-year, comprehensive inventory of potential new sources of water to make irrigation supplies more secure and provide instream flow benefits to the chronically dewatered Sun River. The Sun River flows 70 miles across Montana's Rocky Mountain Front to the Sun's confluence with the Missouri River near the city of Great Falls, and irrigates 117,700 acres. The Sun River supplies two irrigation districts serving hundreds of water users and the Broken O Ranch—the largest irrigated ground under a single ranch in Montana (17,000 irrigated acres). We investigated: new storage, adding storage capacity to existing Reclamation reservoirs, pump-back systems, lining canals, converting from flood to pivot irrigation, and replacing aging siphons and turn-outs. For each of these approaches, we conducted a preliminary feasibility review and cost estimate, and after this initial screening, narrowed the focus down to 14 alternatives for a more detailed feasibility analysis and cost comparison.

The projects emerging from this comprehensive, comparative analysis ranged from adding capacity to an existing storage project to upgrading irrigation water conveyance systems. New storage options did not pass the initial feasibility screening based on their high cost per acre-foot of water. The most cost-effective storage option analyzed in depth was adding 26,000 acre-feet to the existing Pishkun Reservoir. This had an estimated cost of $29 million, providing new water supply at $1,115/acre-foot. On the other hand, one of the conveyance system projects that we ultimately pursued with Reclamation's WaterSmart funding converted 4,860 feet of leaky ditch to PVC pipe, producing 4,158 acre-feet of water for a project cost of $222,367. This provided new water supply at $53/acre-foot (21 times cheaper than adding storage capacity to Reclamation's Pishkun Reservoir). Three more infrastructure projects are in various phases of development and construction that will provide even more water savings.

Washington's Wenatchee River Irrigation Upgrade. It was about 1866 when the Pioneer water users first began diverting water from eastern Washington's Wenatchee River—the Civil War had just ended, and the West was opening up. Pioneer services 107 water users on over 375 irrigated acres. TU worked with Pioneer to change their point of diversion from the flow-limited Wenatchee River to the Columbia River, thereby protecting over 38 cubic feet per second [cfs] in the Wenatchee River, improving habitat for imperiled spring Chinook, steelhead and bull trout. Pioneer Water Users benefited by adopting the most sophisticated irrigation system in Washington State that will last through the next century: the whole system is managed by a "brain" that dictates how the pressurized system rotates water use among five pumps, which manages use from 10 gpm to 3,000 gpm. The instream benefit to the Wenatchee is complemented in the Columbia by the fact that the system is based on demand. Withdrawal from the Columbia River only occurs when and at the volume that water is needed by the agricultural users, creating additional water savings. This collaboration between TU and Pioneer also increased the water security for the town of Wenatchee by transferring saved water to their municipal supply. Although not a simple project—17 separate permits were obtained and 12 funders contributed to the project—its $3.4 million total cost for 7,823.5 acre-feet provides municipal, irrigation, and habitat benefits for imperiled species at $435 per acre-foot of water savings—not to mention also creating over 40 jobs during 6 months of construction during the recession. This project demonstrates the effectiveness of leveraging Bureau of Reclamation funding with State and Federal

salmon recovery funds, along with county, conservation district, and water users' contributions, that were all key to the success of creating multiple benefits.

Wyoming's Rock Creek (Bear River Basin), Infrastructure Upgrade. In Wyoming, TU has worked across six river basins with Wyoming ranchers and farmers to find ways to improve irrigation infrastructure while also creating benefits for wild and native trout. TU's work with Wyoming rancher Truman Julian illustrates our approach. In the southwest corner of the State, TU and Julian Land and Livestock found common ground around upgrading a flood irrigation system to gated pipe. This increased the yield on the ranch's grass hay while benefiting Bonneville cutthroat trout. The project also included the installation of new diversion structures to eliminate annual maintenance requirements, improve riparian conditions, and allow upstream fish passage throughout the year. The partnership with Julian Land and Livestock led to partnerships with other landowners in the drainage. Irrigation efficiency projects are now complete on every ranch from Rock Creek to the confluence of the Bear River to improve flows and habitat conditions for native fish.

On the ground throughout the West, ranch and conservation partners are coming together to find innovative solutions to water scarcity challenges that modernize infrastructure, benefit producers, and restore fisheries. Congress can help encourage this collaborative work by passing a 5 year Farm Bill so that conservation programs like the Environmental Quality Incentives Program and the new Regional Cooperative Conservation Partnership program, which is included in both the House and Senate versions of their Farm bill, will be available to irrigators. Please note the attached letter from a diverse group of agriculture and conservation groups urging Congress to pass a 5 year Farm bill reauthorization. Other programs which Congress should provide adequate funding for include the U.S. Fish and Wildlife Service's Fish Passage Program so that it can help with irrigation infrastructure upgrades that benefit fish and water users. Finally, real, on-the-ground progress is made through funding the Bureau of Reclamation's WaterSmart grants, Cooperative Watershed Management grants, Reclamation's funding through Cooperative Agreements, and the Bureau's Basin Study programs. These programs support not only individual projects, but also multi-faceted, collaborative approaches being developed at the basin scale, such as the Yakima River basin process described below.

2. COST-EFFECTIVE NEW STORAGE IN EXPANDING OR RE-ALLOCATING COLORADO PROJECTS

TU is not opposed to new storage. New, small-scale storage can implement water supply strategies that TU supports, such as water reuse and flexible water sharing arrangements between agriculture and municipalities. In other cases, new storage projects can be designed and operated to deliver multiple benefits—to irrigation, municipalities, and to stream flows. Finally, it can be a lot cheaper, faster, and smarter to re-allocate or expand an existing reservoir than build a new one. In fact, TU, working with other conservation partners, have together identified 102,000 acre feet of new, potential water supply in Colorado to meet the Front Range's growing water demand, across an array of expansions and re-allocations of existing projects, as well as other strategies such as water re-use.

Rio Grande Reservoir. The Rio Grande Reservoir in southern Colorado delivers irrigation water to the farmers and ranchers of the San Luis Valley Irrigation District. The project is over 100 years old, and the State of Colorado has placed it under storage restrictions because the structural integrity of the dam is in question. The district is in the process of rehabilitating the dam which will allow for increased storage in the existing reservoir. Much of the added capacity at the Rio Grande Reservoir will serve the purpose of making more reliable deliveries to the farmers and ranchers of the San Luis Valley Irrigation District. The district, however, is also in discussions with the Colorado Division of Parks and Wildlife, TU, and others about the possibility of allocating some of that new capacity to meet other purposes, namely interstate compact delivery requirements and improvement of stream flows in the Rio Grande River. As such, the project has the potential to provide multiple benefits, including recreational and environmental purposes that are important to TU and the local community.

Windy Gap. For a decade, the Northern Colorado Water Conservancy District has proposed to "firm" the yield of its existing Windy Gap Reservoir by increasing the amount of water the project delivers from the Colorado River to the Front Range. TU had opposed the proposal because of our serious concerns about its impacts on the already-stressed Colorado River. Earlier this year, however, after many years of discussion, TU and the northern district reached an agreement. Under the agreement, the northern district will: curtail diversions as needed to avoid high stream temperatures caused by low flows; release water from storage as needed to

create high spring peaks flows to flush sediment on a prescribed schedule; put several million dollars on the table to construct a by-pass channel around the Windy Gap Reservoir, which currently is a source of whirling disease and dangerously high stream temperatures; and, has offered up several million more dollars to restore Colorado River habitat. With these conditions implemented, TU believes the project will leave the Colorado River healthier than it is today. The success of the Windy Gap firming project is its dual benefits: an increase in 32,000 acre-feet annual yield of water supply and environmental benefits to the Colorado River.

Chatfield Reservoir. On Colorado's South Platte River flowing north through Denver, TU has weighed in as supportive in concept of the Army Corps of Engineers' plan to re-allocate 26,000 acre-feet of storage water in the Chatfield Reservoir from flood-control to provide 8,000 acre-feet of annual yield for irrigation and municipalities. Although TU has concerns that the currently proposed operation of the new capacity could deplete flows downstream, thus damaging the health of the urban reach of the South Platte River, TU is working with project proponents and regulators to address these concerns. Although still in process, the Chatfield Reservoir re-allocation is an example of a water supply solution that doesn't require new concrete, just new thinking.

3. MULTI-STAKE HOLDER, BASIN-STUDY COLLABORATIVE PLANNING PRODUCES THE BEST PROPOSALS FOR NEW STORAGE

Finally, I've learned over the years that the best solutions are usually not the easiest ones. The innovative work I've done with TU has involved a lot of listening to what other people need water for. New storage, likewise, is best planned and carried out in a multi-stakeholder, basin-study process that considers a variety of alternatives, looks carefully at hydrology and future water supply forecasts, and embeds storage into a multi-pronged approach for addressing water scarcity. The Yakima River basin study and resulting collaborative plan, completed as one of the Bureau of Reclamation's Basin Studies, is one example of this process. The Yakima plan recommends new storage as one solution among a range of other approaches.

Yakima River Basin Plan. In fact, the Yakima River Basin Integrated Water Resource Management Plan has seven distinct elements, all designed to allow communities, fish, and farming to thrive in an arid land. The Plan's seven different approaches are: (1) open fish passage at six existing dams; (2) structural and operation changes to existing dams to add storage capacity, increase water use efficiency, and improve salmon habitat; (3) increase new surface water storage; (4) groundwater recharge and storage; (5) investment in irrigation efficiencies and water conservation; (6) promote water transfers through water markets and water banks; and, (7) habitat enhancement and watershed protection through headwaters habitat acquisition, floodplain restoration, and other tributary improvements. This suite of alternatives to draw from in moving forward with Plan implementation underscores that no one, single approach can address water scarcity in the Yakima basin. Rather, it is the multiplicity of approaches—from new surface storage to investing in the basin's "green and blue" infrastructure—that provides resiliency to water scarcity in the basin.

Climate Change Will Bring New Challenges to the West's Water Supply. The strongest expression of climate change predicted for the West will be through water. This makes the kind of comprehensive, collaborative planning process exemplified by the Yakima basin especially important. The only thing we know for sure about the West and climate change is that the weather is going to get more unpredictable. With less snow, more rain, and more frequent droughts and storms predicted, if you plan on building a bigger bathtub, you want to know that you'll be able to fill it, given predicted changes in precipitation. In addition, Yakima's proposed investments in floodplain restoration, headwaters habitat preservation, and tributary restoration mean that the basin will be more resilient to both droughts and storms, able to soak up high storm flows while slowly releasing water during a drought. A multi-stakeholder, basin-study process looking at a whole range of alternatives stacks the deck in favor of coming up with solutions to water scarcity that will be more resilient to predicted climate change impacts. The approach taken in the Yakima River basin plan to pursue seven distinct pathways toward water security means that agriculture, fisheries, and communities will all be more resilient to the impacts of climate change, and better prepared to adapt to the changes it brings.

Hydropower Also Faces Challenges and Opportunities from Climate Change. Just as with storage facilities, changes to timing and magnitude of streamflow will have an impact on hydro operations and in the cost-benefit calculation for new hydro development. The benefit of adding hydro at existing projects is

that it can and should help to provide a revenue stream for re-investment in project upgrades and enhancements to aquatic ecosystem functioning. Such investments will help keep hydro production viable even in a changing climate. A roadmap for increasing hydropower supplies should focus first on existing infrastructure. This focus would prioritize power gains through efficiency improvements—improvement and modernization of existing resources and equipment—and adding or expanding production at existing, well-maintained infrastructure, like Federal storage facilities. A good pathway for such work is contained in section 2009 of the Senate Water Resources Development bill, S. 601, which would authorize and promote development of hydropower at existing Army Corps facilities where no hydropower now exists.

In addition to adding hydro to existing Federal storage dams, opportunity also exists to expand hydropower development in irrigation delivery systems, where water is already in motion for another important use. This type of energy development has the potential to be particularly beneficial for rural agricultural communities as in-conduit energy development can bring in rural, dispersed sources of power to irrigation districts and water users whose power needs are often far from the grid. That is why we were pleased to work with Representative Tipton and this committee to assist with passage of H.R. 678, Mr. Tipton's small hydro bill.

Congress can help by supporting multi-use authorizations at Federal facilities. Such action would add power production and fish and wildlife as authorized purposes consistent with existing and primary project purposes. This would enable flexible management and allow for more creative solutions. Hydropower is a perfect addition to the discussion of water storage and supply—because anywhere water is moving, there is opportunity for power generation. The challenge is for hydro to remain an incidental benefit, not a primary driver, of out-of-river water use. Hydro additions to water delivery infrastructure can be used to help fund project improvements and aquatic restoration needs at the point of diversion. Just as new storage is best achieved in the context of a multi-stakeholder, collaborative, basin-scale approach, hydro is most successful when analyzed at the system level and power benefits are balanced against the cost of providing for multiple uses.

I'd like to close by describing a recent experience from Bozeman, Montana—my hometown. Our city, while less than 50,000 people, has nevertheless experienced some of the highest population growth rates in the entire country in the last decade—in some years growing at an astonishing 28 percent. Faced with a predicted water supply gap, the city engineers began moving forward with a large dam proposal in our municipal watershed. City leaders wisely decided to initiate a multi-stakeholder, long-range planning process before committing to the dam. As a participant in the process, we looked at a whole range of alternatives that were consistent with community values and preservation of important agricultural lands within our mountain valley. What we found was that on a 30-to-50-year planning horizon, there are a whole range of smaller, scalable water supply alternatives that were cheaper to bring on line than one big investment in new storage.

4. CONCLUSION

While the magnitude, variety and scale of these water scarcity challenges are daunting, I remain both optimistic and inspired that we can find solutions that work. Every time I work with a Montana rancher who finds a new way to deliver water to his crops that will also leave a stream healthier, I am inspired by those who are true stewards of the land. As you will often hear them say, we are only here for a little while, but the land and the rivers remain. It is our challenge to work with the West's rivers and the abundance of life that they provide, so that they in turn can continue to provide for future generations.

Thank you again for the invitation to testify on Trout Unlimited's experience regarding the need for new surface storage.

Mr. MCCLINTOCK. Thank you very much.

And the Chair is now pleased to recognize Mr. Valadao to introduce our final witness.

Mr. VALADAO. Thank you, Mr. Chair.

It's my distinct pleasure to introduce a good friend of mine, Tom Barcellos. I got to know Tom quite a few years ago as my counterpart at Land O' Lakes and another dairy farmer.

Tom is an interesting person because he is a farmer in the district in the Central Valley, but he was actually named in 2006 as a conservation tillage farmer Innovator of the Year by University of California and the USDA Natural Resources Conservation Service, Conservation Tillage Work Group, and he has been a leader in our valley and an innovator with many different ways to conserve water and still grow food for the world.

So thank you, Tom Barcellos.

STATEMENT OF TOM BARCELLOS, DAIRY FARMER, PORTERVILLE, CALIFORNIA

Mr. BARCELLOS. Thank you, Congressman.

Chairman McClintock, Ranking Member Napolitano, and members of the subcommittee, thank you for the opportunity to appear before you today.

My name is Tom Barcellos, and I am a family dairy farmer from Tipton, California on the east side of the San Joaquin Valley. I serve on the board of directors of Lower Tule River Irrigation District, which is a member of the Family Farm Alliance. I also represent both of those organizations here today.

Like many water users represented by the Family Farm Alliance, I rely upon a combination of surface and groundwater supplies managed through a variety of local, State, and Federal arrangements. Like me, many family farms, as well as the communities that they are intertwined with, owe their existence in large part to the flood control safety and certainty provided by water stored behind dams.

Nowhere is the uncertainty of water supplies greater than in California's San Joaquin Valley. We faced incredibly complex Federal regulatory structure, the very expensive and lengthy processes we face to make obtaining and sustaining water supplies increasingly difficult on both agricultural and municipal users. For the farmer, the current water allocation and reallocation schemes offer us a sense of disillusionment and economic uncertainty.

Severe water shortages caused by the combination of Federal fisheries restrictions and drought on water supplies to the western side of the valley forced hundreds of thousands of acres of farmland to be fallowed in 2009 and beyond, costing Central Valley agriculture nearly $1 billion in lost income and more than 20,000 lost jobs. In 2009 also, the Central Valley Project received only 10 percent of the water they contracted for, the lowest allocation in the history of the project.

This year, 20 percent; next year, these water users face zero allocation at this point. Implementation of Federal laws, such as the ESA, is the primary reason for this grim scenario.

Expanded storage in California would be hugely beneficial right now. The Family Farm Alliance in 2005 launched a project that pulled together a master data base of potential water supply enhancement projects from throughout the West. That effort showed that there are now feasible studies on new surface storage projects in the Central Valley and elsewhere.

That same year the Bureau of Reclamation identified nearly 1,000 potential hydroelectric and water supply projects in the

Western United States that had been studies but not constructed. Water resources are available to be developed.

Demand management is often seen as a solution to water supply issues. For example, between 2003 and 2010, San Joaquin Valley farmers invested almost $2.2 billion to upgrade irrigation systems on over 1.8 million acres of farmland. Those investments helped improve water use efficiency and food production and helped fuel the rural economy at a time when water supply cuts were increasing unemployment. Although production was maintained through efficiencies, groundwater levels suffered for the lack of recharge supplies.

Little progress has been made on the supply management end of things. While development has occurred on conjunctive management and groundwater banking projects, development of new surface storage projects have virtually ground to a halt in the past 30 years, especially in areas where any sort of Federal nexus exists for proposed projects. Farmers will continue to do all they can to save water.

However, water savings cannot be expanded indefinitely without reducing acreage and production. At some point the growing water demands of the West, coupled with the omnipresent possibility of drought, as we have seen must be met or it will be taken from agriculture.

We cannot continue to downplay or ignore the negative implications of reallocating more agricultural water supplies to meet the new urban energy and environmental water demands. Solutions will require workable policy that emphasizes the development of new storage projects. To make that happen, existing procedures for developing additional supplies need to be revised to make project approval less burdensome.

The Federal Government really needs to adopt a policy of supporting new efforts to enhance water supplies and encouraging State and local interests to take the lead in formulation of those efforts.

For example, the Tule River's Success Reservoir Enlargement Project is a Corps of Engineers and locally sponsored flood control project that involves raising and lengthening the existing spillway of Success Dam to increase the storage space in Success by 34 percent. The additional storage space of this proposed project more than doubles the flood protection for the city of Porterville and downstream lands.

No better example of what new storage capacity provides can be seen than in the watershed directly north of where I farm, where the Lake Kaweah enlargement terminus dam spillway has already demonstrated its effectiveness. The new project has raised the level by 21 feet, increasing the storage capacity by a third. This project has generated many environmental benefits and is a key component in local conjunctive use equation. The relatively simple and inexpensive project took over 20 years to complete, and that was without any environmental opposition.

We continue to push for improved water storage and conveyance infrastructure to mitigate for water that has been reallocated away from agriculture. Without water supply liability, irrigated agriculture through a combination of new infrastructure and other sup-

ply enhancements, efforts and demand management, our country's ability to feed and clothe itself and with the world will be jeopardized.

My written testimony expands on details on these topics. Thank you for the opportunity to testify before you today.

[The prepared statement of Mr. Barcellos follows:]

PREPARED STATEMENT OF TOM BARCELLOS, DAIRY FARMER, PORTERVILLE, CALIFORNIA, ON BEHALF OF BARCELLOS FARMS, LOWER TULE RIVER IRRIGATION DISTRICT AND THE FAMILY FARM ALLIANCE

Chairman McClintock, Ranking Member Napolitano and members of the subcommittee:

Thank you for the opportunity to appear before you to discuss the need for new water storage projects and examine regulatory and bureaucratic challenges that delay or halt the development of new water supply enhancement projects in California's Central Valley and the rest of the Western United States. My name is Tom Barcellos, and I am the owner of Barcellos Farms and T-Bar Dairy in Tipton, California and a partner in White Gold Dairy and LGT Harvesting. My dairy operation and custom farming business employs two of my son-in-laws in the family operations.

I serve on the board of directors for the Lower Tule River Irrigation District, who I am representing here today. I am also an alternate director on the board of the Friant Water Users Authority. Both the District and the Authority are members of the Family Farm Alliance, who I am also representing at today's hearing.

The Family Alliance advocates for family farmers, ranchers, irrigation districts, and allied industries in 17 Western States. The Alliance is focused on one mission—to ensure the availability of reliable, affordable irrigation water supplies to western farmers and ranchers.

Many of us in western agriculture have a strong water, soil and land conservation ethic. In fact, in 2006, I was named the 2006 Conservation Tillage Farmer Innovator by the University of California and USDA Natural Resources Conservation Service Conservation Tillage Workgroup. However, those of us familiar with water management know that increased water conservation and efficiency can help, but they are only part—a small part—of the solution. And buying and bullying water away from farmers isn't the solution either. Meeting the current and future water needs of the West will require a thoughtful combination of means, not the least of which is the creation of new storage.

Like many water users represented by the Family Farm Alliance, I rely upon a combination of surface and groundwater supplies, managed through a variety of local, State, and Federal arrangements. Like me, many western family farms and ranches of the semi-arid and arid West—as well as the communities that they are intertwined with—owe their existence, in large part, to the flood control safety and certainty provided by water stored and delivered by Bureau of Reclamation (Reclamation) and Corps of Engineers (Corps) projects.

The topic of this oversight hearing is tremendously important and immediately relevant to me and other California water users, and to farmers, ranchers and rural communities all over the West. I would like to start my testimony with an overview of the big-picture challenges western farmers and ranchers face as they strive to feed our country and the appetite of a rapidly expanding world population. I will explain why it is preferable to develop new water infrastructure to protect our diminishing farm population over policies that encourage competing demands to transfer water away from agriculture. Certainty in western water policy is essential to the farmers and ranchers I represent, and that is why a suite of conservation, water transfers and other demand reduction mechanisms must be balanced with proactive and responsible development of new water infrastructure. This testimony will point out that typical westerners are strongly supportive of new projects, especially if those projects can minimize moving water away from farmers and ranchers. And finally, I will conclude with a discussion that suggests the proper role for the Federal Government to play when it comes to participating in new storage projects in these cash-strapped times.

WESTERN FAMILY FARMERS AND RANCHERS SUPPORT WATER SUPPLY ENHANCEMENT PROJECTS

Central Valley farmers and ranchers and others throughout the West rely on traditional water and power infrastructure to deliver irrigation supplies. Many of us

have been advocating for new storage for decades, and we have provided specific recommendations to Congress and the White House on how to streamline restrictive Federal regulations to make these projects happen. Water conservation and water transfers are important tools for improving management of increasingly scarce water resources. However, these demand-management actions must be balanced with supply enhancement measures that provide the proper mix of solutions for the varying specific circumstances in the West.

Supply enhancement should include rehabilitation of existing facilities and construction of new infrastructure. Rehabilitation measures should focus on maximizing the conservation effort through increased delivery efficiencies, construction of re-regulation reservoirs to minimize operational waste, and construction of new dams and reservoirs in watersheds with inadequate storage capacity to increase beneficial use and provide operational flexibility. Additional groundwater supplies should also be developed, but in a manner where groundwater use falls within the safe yield or recharge parameters of the aquifer. Conjunctive management of surface water and groundwater—a key component of water management where I live—should be encouraged.

We know there are opportunities to develop new projects in the Central Valley and elsewhere. The Family Farm Alliance in 2005 launched a project that pulled together a master data base of potential water supply enhancement projects from throughout the West. The Alliance's goal was to gather together ideas from around the West and put them into one master data base. That effort showed there are some very feasible new surface storage projects, in the Central Valley and elsewhere. The benefits from these projects include providing certainty for rural family farms and ranches, additional flows and habitat for fish, and cleaner water and energy. That same year, the Bureau of Reclamation submitted a report to Congress that identified nearly 1,000 potential hydroelectric and water supply projects in the Western United States. that have been studied, but not constructed. The 2005 Alliance and Reclamation efforts show that, in most areas of the West, water resources are available to be developed. Environmentally safe and cost-effective projects exist. They await the vision and leadership needed to move them to implementation.

THE UNCERTAIN NATURE OF CALIFORNIA'S CENTRAL VALLEY WATER DELIVERIES

The increasingly complex Federal regulatory structure, and the increasingly expensive and protracted processes which this structure encourages, makes obtaining and sustaining water supplies increasingly difficult on both agricultural and municipal users alike. For the farmer or rancher, the current water allocation and reallocation schemes often create economic conditions, a sense of disillusionment and resignation, and uncertainty. Nowhere is the uncertainty of water supplies greater than where I live, in California's San Joaquin Valley.

Severe water shortages caused by the combination of Federal fisheries restrictions and drought on water supplies to the western side of the valley forced hundreds of thousands of farmland to be fallowed in 2009. University of California experts estimate that the combined effects of these restrictions on the water supply have cost Central Valley agriculture nearly $1 billion in lost income and more than 20,000 lost jobs. In 2009, water users that depend on the Federal Central Valley Project [CVP] received only 10 percent of the water they contracted to receive, the lowest allocation in the history of the project. Without these Federal restrictions, the allocation would have been 30 percent. The U.S. Department of the Interior provided allocation of water for south-of-delta CVP agricultural water service contractors in 2010 to a whopping 25 percent of their contract. This year, that same allocation was 20 percent of their contract. Next year, even with average hydrologic conditions this winter, those water users face a ZERO allocation, and implementation of Federal laws such as the Endangered Species Act and Clean Water Act is a primary reason for this grim scenario.

THE IMPORTANCE OF PROTECTING AND ENHANCING RELIABLE AGRICULTURAL WATER SUPPLIES

Agriculture holds the most senior water rights in the West and is considered a likely source of water to meet growing municipal and environmental demands. Unfortunately, severing water from agricultural land makes the land less productive. Period. Policy makers should be wary of putting additional, focused emphasis on agricultural water transfers, particularly in the context of growing domestic and global food security and scarcity concerns.

Two years ago, the Global Harvest Initiative [GHI] released its Global Agricultural Productivity [GAP] Report, which measures ongoing progress in achieving the goal of sustainably doubling agricultural output by 2050. For the first time, the GAP

Report quantifies the difference between the current rate of agricultural productivity growth and the pace required to meet future world food needs. The report predicts that doubling agricultural output by 2050 requires increasing the rate of productivity growth to at least 1.75 percent annually from the current 1.4 percent growth rate, a 25 percent annual increase.

The Family Farm Alliance and the Irrigation Association recently completed a white paper that was specifically drafted to be read by policymakers seeking to better understand the economic impact of western irrigated agriculture. This report stems from an earlier effort, prompted in 2012 to address strategic policy questions about water resources economics raised by senior staff from the U.S. Environmental Protection Agency. The White Paper—which was peer-reviewed by the Farm Foundatio—summarizes basic economic information current to irrigated agriculture and quantifies what many policymakers view as a critical indicator of economic significance—irrigated agriculture's impact to annual household income in the Western United States. The full magnitude of the *Irrigated Agriculture Industry's* contribution to the economy is rarely, if ever, quantified in terms of total household income for the western region. Real household income is the contribution to actual dollars in the pocket. It takes the form of wages, salaries, and products sold, both directly and indirectly.

According to the Paper, the annual direct household income derived from the irrigated agriculture industry—which is made up of direct irrigated crop production, agricultural services, and the food processing and packaging sectors—is estimated at $64 billion in the Western U.S. region. After further analysis of the total direct, indirect and deduced impacts, researchers determined the total household income impact to be an estimated $156 billion annually (based on 2011 commodity prices). The report also clearly shows that the affordability of U.S. household food purchases affecting discretionary income, over time, have contributed substantially to the national economy, since it allows more household income to be devoted to consumer goods and services.

These issues and other growing domestic and global food security and scarcity concerns must be considered as Federal water policies are developed and implemented. We cannot continue to downplay or ignore the negative implications of reallocating more agricultural water supplies to meet new urban, energy, and environmental water demands. It is clear that greater recognition should be given to western irrigated agriculture's direct contribution to the U.S. economy, and that water policy actions are integral to the broader economy's well-being. America's low-cost access to safe, high-quality food and fiber is critically important and is made available in large part by Western irrigated agriculture.

We can find solutions to water conflicts that protect our ability to feed ourselves, export food to others, and continue to lead the world in agricultural production, all the while finding ways to accommodate the water supply needs of continued urban growth, energy needs, recreational demands, and environmental requirements. Fair, balanced, and long lasting solutions will not come easily. They will require visionary leadership and a firm commitment to a sensible, workable policy. And that policy must include an emphasis on developing new storage projects.

DEMAND MANAGEMENT VS. SUPPLY ENHANCEMENT

We often see bold general statements of water transfer proponents about the potential for agricultural water use efficiency to free up water that can be used for in-stream flows. However, those statements are usually followed up by a list of the factors that make it a difficult proposition. Those include re-use deficiencies when water is removed upstream in the system, water rights that protect water users from water being taken away if they conserve water, and transactions that move water between presumably willing buyers and willing sellers, but have the effect of taking land out of production. All of those issues are dealt with directly in a report developed by the Center for Irrigation Technology [CIT] at Fresno State. The report, "Agricultural Water Use in California: A 2011 Update"4, refutes some long-standing beliefs about agricultural water usage and confirms others. The full report is available at *http://www.californiawater.org.* The CIT report and others have reached a similar conclusion: the only large potential for moving water from agriculture to other uses will come from fallowing large swaths of farmland.

If we don't find a way to restore water supply reliability for irrigated agriculture through a combination of new infrastructure, other supply enhancement efforts, and demand management—our country's ability to feed and clothe itself and the world will be jeopardized.

Water conservation (i.e. "demand management") is often seen as the solution to water supply issues. In fact, in the past 15 years, tremendous agricultural conserva-

tion efforts have been undertaken throughout the West, including widespread installation of high technology drip irrigation systems in the Central Valley, where I farm. On the other hand, relatively little progress has been made on the "supply management" end of things. While development has occurred on conjunctive management and groundwater banking projects, development of new surface storage projects have virtually ground to a halt in the past 30 years, especially if any sort of Federal nexus exists for proposed projects.

Western farmers and ranchers have long taken a progressive approach to water management. Farmers are already investing in upgraded irrigation systems. For example, between 2003 and 2010 San Joaquin Valley farmers invested almost $2.2 billion in upgraded irrigation systems on over 1.8 million acres of farmland. Those investments helped improve water use efficiency and food production and helped fuel portions of the rural economy at a time when water supply cuts were increasing unemployment. And, these sorts of efficient farm practices have led to increased economic value and production. A report by the California Department of Water Resources [1] shows that the value of California farm products doubled during the 40-year period from 1967 and 2007 while at the same time, applied water decreased by 14 percent. Other research by the California Farm Water Coalition showed that the volume of farm production between 1967 and 2000 rose approximately 89 percent with only a 2 percent increase in applied water per acre. These indicators support assertions that farmers in general are improving water use efficiency in significant ways over time.

While conservation is surely a tool that can assist in overcoming water supply problems, it cannot be viewed as the single answer to water shortages. For example, conserved water cannot always realistically be applied to instream uses, as it will more likely be put to beneficial use by the next downstream appropriator or held in carryover storage for the following irrigation season. Also, in urban areas, further tightening of water conservation measures, in essence, "hardens" those urban demands. Some degree of flexibility must be embedded in urban water conservation programs to allow these areas to employ more restrictive water conservation measures during drought periods. Without having the ability to save water during drought periods via drought conservation measures, the resulting hardened demand will force urban water managers to more quickly look to secure water from other areas; namely, agriculture and the environment. So, clearly, mandated or "one size fits all" conservation programs are doomed to failure in light of the drastically different circumstances of water users across the West.

Farmers and ranchers will continue to do all they can to save water. However, water saving cannot be expanded indefinitely without reducing acreage in production. At some point, the growing water demands of the West—coupled with the omnipresent possibility of drought—must be met. The members of the subcommittee must understand that in the West, the water needed to meet these demands will either come from developing new water supplies . . . or it will be taken from agriculture.

POLITICAL SUPPORT FOR NEW WATER PROJECTS

Colorado State University [CSU] in 2009 completed a west-wide (17 States) survey that found—throughout the West—strong citizen support for water going to farmers and also strong support for building new water infrastructure. The report provides very interesting findings that underscore western householders support for water storage projects and irrigation over environmental and recreational water needs in times of shortage. Three focus groups were used to develop a multi-faceted questionnaire. An Email invitation to an Internet survey yielded 6,250 municipal household respondents in 17 Western States. Among western respondents to the CSU poll, the most popular strategies for meeting long-term needs are to build reservoirs and reuse water, whether it is on private lawns or public landscapes. The least popular alternative is to buy water from farmers. When addressing long-term scarcity, respondents preferred reservoir construction and reuse systems over other acquisitions and, in particular, are not in favor of water transfers from agriculture.

These findings fly in the face of arguments made by some environmental activist groups and editorial boards of certain western urban newspapers, who insist that the public shares their view that dams are outdated, monstrous aberrations that should be destroyed. The findings in this report should further convince our political leaders to ignore the naysayers and stand up for farming and new water supply enhancement projects.

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[1] The DWR report is available at: *www.farmwater.org/DWR_Econ_Efficiency.pdf.*

APPROPRIATE ROLE OF THE FEDERAL GOVERNMENT IN THESE ENDEAVORS

Federal water agencies' (like the Bureau of Reclamation) once active role in building new dams and reservoirs has diminished significantly over the last three decades. Construction of large dams, in general, has become virtually impossible in recent decades due to new societal environmental priorities, and related passage of numerous Federal laws that create litigious uncertainty and tremendous regulatory obstacles for proponents of new dams. Given this current political reality, the Federal Government should instead adopt a policy of supporting new efforts to enhance water supplies and encouraging State and local interests to take the lead in the formulation of those efforts. Local problems call for local solutions, and local interests have shown enormous creativity in designing creative water development projects, as I will discuss later in this testimony.

Even before the advent of the challenging economic times we now live in, we witnessed a progressive cutback in Federal water supply funding. We understand that those who benefit from new water supply infrastructure should help pay for that infrastructure. However, policymakers need to understand that, for the most part, new water supplies are not being proposed to meet the expanding needs of agriculture. On the contrary, we are seeing a move in the opposite direction, where agricultural lands are going out of production and being lost to expanding urban development. Water that was originally established for agriculture and the communities it supports is now being reallocated to meet new growing urban and environmental water demands. The growing number of urban water users in the West and the public interest served through improved environmental water supplies should naturally be part of equitable financing schemes.

The President and Congress will prioritize whatever Federal funds are available to meet existing and future needs. As for the rest of the capital, it must come either from State and local governments or from the private sector. If the Federal Government cannot fund the required investments, it should take meaningful steps to provide incentives for non-Federal entities to fill the void, and remove barriers to the new ways of doing business that will be required. In this time of tight budgets and huge overseas spending, the Federal Government must adopt a policy of supporting new projects to enhance water supplies while encouraging State and local interests to take the lead in the implementation of those projects.

PROBLEMS WITH EXISTING REGULATIONS AND PERMITTING OF NEW PROJECTS

The often slow and cumbersome Federal regulatory process is a major obstacle to realization of projects and actions that could enhance western water supplies. Here are just a few reasons why Reclamation and other Federal agencies (particularly fisheries agencies) need to find ways to streamline regulations and permitting requirements:

- Planning opportunities and purposes for which a project may be permitted are restricted, which narrows the planning horizon, and makes it impossible to plan for projects with long-term benefits;
- The alternatives proposed for assessment by the National Environmental Protection Act regulators are frequently inappropriate, unrealistic, difficult-to-implement, and often in conflict with State law. The permitting process stalls, and costs increase to the project applicant;
- Federal regulators take a long time making decisions on projects, and at times they seem unable to even make decisions. As a result, projects are postponed and money is wasted as additional studies and analyses are conducted;
- Applicants end up spending tremendous amounts of money for potentially uncertain mitigation;
- Rather than doing things concurrently, conflicting agency permit requirements can add time to the project planning and implementation process and increases greatly the potential for last-minute surprises that could endanger the proposal or require significant additional work.

We pledge to continue our work with Federal agencies and other interested parties to build a consensus for improving the regulatory process.

THREE GENERAL RECOMMENDATIONS

It is clear that the existing procedures for developing additional supplies need to be revised to make project approval less burdensome. By the time project applicants approach Federal agencies for authorization to construct multi-million dollar projects, they have already invested extensive resources toward analyzing project alternatives to determine which project is best suited to their budgetary constraints.

However, current procedure dictates that Federal agencies formulate another list of project alternatives which the applicant must assess, comparing potential impacts with the preferred alternative. These alternatives often conflict with State law. Opportunities should be explored to expedite this process—perhaps through a "one-stop permitting shop" approach—and reduce the costs to the project applicant.

Improved and accessible mitigation banking would also help matters in some areas. Under such an approach, applicants faced with excessive mitigation costs would be allowed to pay a reasonable sum per acre to a regional mitigation bank or set aside mitigation lands as a condition to implementation of their project. The Federal Government should encourage the creation and more widespread use of public and private mitigation banks.

Most water supply entities are willing to make investments to meet human and environmental needs, but they need to know up front that the Federal Government will honor its part of the bargain. This means that the Federal Government should enter into meaningful contracts that protect the expectations of the non-Federal parties, and concepts like the "No Surprises Rule" under the Endangered Species Act must be validated and expanded.

BENEFITS OF NEW STORAGE IN THE SAN JOAQUIN VALLEY

Local and State interests have shown enormous creativity in designing creative water development projects. For example, the Tule River Success Reservoir Enlargement Project [SREP] is a Corps of Engineers flood control project that involves the raising of the existing spillway of Success Dam 10 feet and lengthening the spillway 165 feet to obtain 28,000 acre-feet of additional flood control and water conservation storage space. The enlargement project increases the storage space in Success Reservoir by 34 percent. The additional storage space improves the flood protection for the city of Porterville (45,000 population) and the highly developed agricultural lands from a return period flood event occurring once in 47 years to a return period flood event occurring once in 100 years. In other words, the proposed project more than doubles the flood protection for the city of Porterville and downstream lands.

The Preconstruction Engineering and Design (PED) phase of the SREP by the Corps of Engineers, at a cost of $2 million, was scheduled to be complete in 2003, but remains in progress as of this date. The Congress and California State Legislature have appropriated funds for construction of this project in the past decade. The local non-Federal sponsors, composed of the city of Porterville, the Tule River Association, the Tulare Flood Control District, the County of Kings and the Tulare Lake Basin Water Storage District, have agreed upon an apportionment of the local non-Federal cost share and provide the funds as required for the design and construction of the SREP.

If SREP were in place now, we would have a valuable management tool that would better help us address the water resources challenges we face in the southern San Joaquin Valley. The conjunctive management of surface and groundwater—in its broadest definition, the coordinated and combined use of surface water and groundwater to increase the available water supply of a region and improve the reliability of that supply—is an essential component of water use where I farm. Storage of surface water is a vital part of utilizing water conjunctively; you cannot manage water conjunctively with groundwater recharge basins, alone. In recent years, farmers in the Valley have been forced to do more with less water, in large part due to recent reallocations of water away from agriculture and toward the perceived needs of fish protected by the Endangered Species Act [ESA]. Having the enhanced ability to store surplus water derived in wet years for use in dry years and those times when environmental demands further restrict our available supplies provides additional management flexibility and multiple benefits.

No better example of what new storage capacity provides can be seen in the watershed directly north of where I farm, where the Lake Kaweah Enlargement/Terminus Dam Spillway has already demonstrated its effectiveness. Lake Kaweah was originally created in 1962 with the completion of Terminus Dam. Built by the U.S. Army Corp of Engineers in cooperation with local sponsors, the main dam is 250 feet high, 2,375 feet long and was designed to provide a 60-year level of flood protection. After tremendous flooding in 1955 wreaked over $20 million in flood damage to downstream areas, the cost/benefit ratio of building a dam became too great to ignore any longer. The dam was built for approximately $24 million. Ever since, Lake Kaweah has been a key to the urban and agricultural development that has occurred in the Kaweah Basin area. Its three main functions include:

- Flood control for over 300,000 citizens and approximately. 500,000 acres of land.

- Storage that provides irrigation water for much of one the most important agricultural counties in the country.
- Improved water conservation options in a basin where the groundwater is severely over-drafted.

Even though the dam has been extremely beneficial, over 10 additional flooding events have occurred since 1962, which led to the planning and eventual construction of the new Terminus Dam Spillway. This construction raised the lake level by 21 feet, increasing the storage capacity by about ⅓ to store a total of 185,600 acre-feet. The enlargement project has had a ripple effect, as well. Not only does it provide for more flood control and increased water storage, but it also has benefited numerous road and bridge improvements in the vicinity of the lake. Further, this project has generated many environmental benefits, including flora and fauna areas that cover over 5,700 acres.

It is very important to note that this project took over 20 years to complete, and that was without any environmental opposition. That should provide the Subcommittee with a sense of what a huge undertaking such a project like this is. What made this project possible was the incredible support—via coordination and financial resources—between the Federal, State and local entities who participated in this. It is difficult to envision a project getting built today without it. Success simply will not occur if all three levels—local, State and Federal—do not step-up and commit to the long haul.

Local interests believe that completion of SREP will provide similar, measurable benefits to many sectors. We continue to work with the Corps of Engineers to collaboratively address dam overtopping, seismic and seepage concerns and move this project forward to construction.

CONCLUSION

We believe that it is possible to meet the needs of cities and the environment in a changing climate without sacrificing western irrigated agriculture. To achieve that goal, we must expand the water supply in the West. There must be more water stored and available to farms and cities. Maintaining the status quo simply isn't sustainable in the face of unstoppable population growth, diminishing snow pack, increased water consumption to support domestic energy, and increased environmental demands. Modern, integrated water storage and distribution systems can provide tremendous physical and economic flexibility to address climate transformation and population growth. However, this flexibility is limited by legal, regulatory, or other institutional constraints, which can take longer to address than actually constructing the physical infrastructure.

The organizations I represent want to work with the administration, Congress, and other interested parties to build a consensus for improving the regulatory process. The real reason we continue to push for improved water storage and conveyance infrastructure is not to support continued expansion of agricultural water demand (which is NOT happening in most places). Instead, we seek to mitigate for the water that has been reallocated away from agriculture toward growing urban, power, environmental and recreational demands in recent decades. If we don't find a way to restore water supply reliability for irrigated agriculture through a combination of new infrastructure, other supply enhancement efforts, and demand management—our country's ability to feed and clothe itself and the world will be jeopardized.

I close this testimony with a final reference to the dire situation that is facing California's San Joaquin Valley now, and the potential disaster it faces next year. With normal hydrology this winter, and with minimal to moderate water being dedicated to ESA-"protected" fish, water managers are expecting a 0–10 percent water allocation for 2014 under the existing ESA paradigm that has been imposed on the California Bay-Delta. That translates to 300,000–500,000 acres of prime Central Valley Project irrigated farm land—the fruit and vegetable basket of America—laying fallow next year.

My fellow farmers and I in the San Joaquin Valley are businessmen, and those of us that grow permanent crops must make 30-year decisions to plan for land use, plantings, debt, and infrastructure in order to help produce food for a global exploding population. The uncertainty to their water supply—in large part caused by litigation and Federal implementation of antiquated laws—makes long-term planning impossible, as they try their best to stay in business. And, remarkably, the water cutbacks that have already occurred are not increasing the populations of salmon and smelt. Further cutbacks will only serve to harm agriculture and other water users. San Joaquin Valley farmers cannot afford any more cutbacks in their water deliveries, which will also add to unemployment that already has reached Depression-era levels in agricultural towns up and down the Valley.

There is actually considerable discretion in HOW Federal laws like the ESA are implemented. Given the significant scientific uncertainty with many of these species and the ecosystems in which they reside and the failure of the ESA regulators to look at the host of stressors affecting them, the agencies need to step back and rethink the consequences of their actions. Even though the ESA does not require the human consequences of their decisions to be considered, it does not prohibit such consideration. We need to clearly determine how much new water is needed for new uses, and then find ways to support those uses in a sustainable way that doesn't hurt irrigated agriculture. Certainly, the proper use of discretion by Federal agencies as they administer Federal laws is critical toward this end. However, new infrastructure is another such way; the construction of additional water supply and conveyance infrastructure may allow more efficient management and enable greater cooperation between traditional and non-traditional water users.

Western irrigated agriculture is a strategic national resource, and the role of the Federal Government in the 21st century should be to protect and enhance that resource. Federal agencies have a role to play in infrastructure development, but interference with or duplication of State authorities must be minimized.

Thank you for this opportunity to present my testimony today.

Mr. MCCLINTOCK. Great. Thank you for your testimony.

We will now move to questions by Members, and the Chair will defer to the Chairman of the Natural Resources Committee, Doc Hastings, for 5 minutes.

Mr. HASTINGS. Thank you very much, Mr. Chairman.

Let me make an observation here. This discussion, I think, has been very good on both sides. I was kind of struck by what Mr. Costa said earlier. He said in California that the system that is supplying 38 million people was built when California had about 20 million people, roughly half the population.

The Yakima River Basin was brought up here as being something that is good, and I very much am in support of that effort, but the last time there was storage built in the Yakima River Basin was 80 years ago. Mr. Sandison mentioned that now that system currently supplies about 300,000 people. I guarantee you it was probably one-third of that 80 years ago.

The reason I simply bring this up is that if these systems that are I will not say "antiquated," but that old, clearly, clearly new technologies had to be used to conserve water to still supply a growing population to that point, and I think that at some point you have to recognize, especially with the growing population and growing demands, that at the end of the day you have to have more storage. And that is really what this hearing, I think, is all about.

I mentioned in my opening statement that conservation ought to be part of that, but it cannot be the only tool. Now, to that end, Mr. Sandison, you have been working obviously in the Yakima River with a diverse group of people. In your written statement, you did mention that conservation is important, but not the only answer.

So let me just ask this question straightforward. If you do not have more storage, what would be the future of the Yakima River Basin, given the demands on that system right now?

Mr. SANDISON. Mr. Chairman, we would fall well short of our objectives by almost any measure in terms of our ability to deal with current shortfalls during droughts, our ability to deal with the impacts of climate change going down the road. I mean, the quan-

tities of water, particularly for out-of-stream use, that we need in the basin can only be developed through surface water sources.

So conservation, as I indicated, plays an extraordinarily important role in this, but the primary use of that particular tool in the Yakima is for stream reach flow augmentation. So we can do a lot in terms of improving stream flow in critical segments of the Yakima through conservation, but it is not going to supply water that is going to be available to use for out-of-stream uses, for agriculture, for cities water.

Mr. HASTINGS. One other issue, too, and it has been alluded to by several Members, and I think you alluded to it in your testimony regarding regulations and what that does to, hurdles, if you will, to building these projects. Could you just elaborate a bit on some of the potential Federal regulations that are in place that at least need to be addressed?

I am not going to put it necessarily in a negative light, but need to be addressed.

Mr. SANDISON. Well, of course, as we move through feasibility analysis of any of the major projects that we are proposing, we also are subject to the requirements of the National Environmental Policy Act, and so we have been doing detailed environmental analyses on all the projects we do.

We, of course, are facing concerns about Endangered Species Act nexus or the nexus with the Endangered Species Act, and it is a little bit interesting because one of the primary purposes that we are trying to do is to de-list steelhead. I mean, we have a listed species, a threatened species in the basin. We think we can go a long way toward improving the populations.

So, on the one hand, we are trying to solve an Endangered Species Act problem and, on the other hand, we bump up against spotted owl issues, and that sort of thing as we look at some of the projects.

So, we have to deal with that. I think the Clean Water Act is another area of concern with respect to the surface storage proposals because of primarily the difficulty in managing temperature impacts associated with surface storage. And there are always the Federal trust responsibilities with the tribes that we are trying to work with Bureau of Reclamation to fulfill.

So we manage through a very complicated array of not only Federal requirements but State requirements as well.

Mr. HASTINGS. Let me just make an observation, if I can, Mr. Chairman, regarding that. There has been discussion here by Members, frankly, on both sides about the regulations, and I am not necessarily convinced that the regulations themselves stop projects, but what concerns me is the threat of litigation that slows down the process. When it slows it down, you have less certainty with maybe an investment that needs to be made, whether you are a farmer that is going to make an investment off an irrigation canal.

All of those things are not because the regulation has been strictly enforced, but it is the threat of litigation that slows the whole process down.

And finally, I just want to mention since Mr. Sandison mentioned fish. I want to make this observation. The Columbia River system now is experiencing the greatest run of fall Chinook ever

since we started keeping records going back to 1938, and there are a number of dams on those rivers that I know some critics think ought to be torn down.

Thank you, Mr. Chairman, for your courtesy.

Mr. MCCLINTOCK. It is called the Pacific decadal oscillation.

The Chair recognizes the ranking member for 5 minutes.

Mrs. NAPOLITANO. Thank you, Mr. Chairman.

And to Ms. Ziemer, would you discuss the cost effectiveness of multi-stakeholders and the funding most available for multi-purpose use?

Ms. ZIEMER. Yes, thank you.

What is interesting in my experience about multi-stakeholder multi-purpose projects is that they include often a substantial or at least a partial investment in the natural infrastructure of places, and what is interesting about that investment compared to, say, investments in built infrastructure is that with built infrastructure, as soon as you build them they start to depreciate, but with investments in natural infrastructure, those investments are like interest bearing accounts, and over time they become stronger, more robust, and more valuable.

So with multi-purpose, multi-benefit projects, those investments in the natural system continue to earn interest over time and over the period of plan and implementation, and they actually enlarge the natural capital.

Mrs. NAPOLITANO. And can you maybe explain a little bit of what role the Endangered Species Act or the National Environmental Policy Act has played in the various water projects you have worked on?

Ms. ZIEMER. Thank you.

Yes, I can. In my home State of Montana, we are a rural population and a headwater State, and so complying with environmental regulations in the ESA has been relatively routine. But, of course, we only have a handful of listed species. In places like where Mr. Barcellos is from, I think those ESA conflicts are much more difficult to handle, and they require a lot more time and creative thinking to come to resolution on.

That said, I think that that kind of difficulty in finding the way through Endangered Species Act complications underscores the need for multi-stakeholer, multi-benefit projects so that those kinds of concerns can be addressed in both the concept and design stage in order to facilitate getting through the regulatory permit stage.

Mrs. NAPOLITANO. Thank you.

Mr. Sandison, will the integrated plans for water storage projects provide a benefit-cost ratio on a stand-alone basis without the conservation and restoration measures?

Mr. SANDISON. Congressman, sort of the basic premise of an integrated plan is the whole is greater than the sum of the parts, and so a disaggregated analysis of the components of an integrated plan typically would fail to capture the synergies among the component parts of the program.

Having said that, I mean, the formal benefit cost analysis has not been done on either the entire project or on any of the individual storage projects. We have done a first cut at the benefit-cost

associated with the entire project and sort of a back-of-the-envelope associated with some of the larger individual parts.

With respect to a storage reservoir like one we are looking at called Wymer Reservoir where about half of the water in the reservoir, well, half of the water exactly, half of the water in the reservoir would be for providing fish flows and half for out-of-stream supply.

When you look at the fish flow side, it is difficult to, when you look at the total benefits to fish associated with the integrated plan, to allocate the benefit to the various parts of the plan that would aid in salmon recovery. For example, what portion of the total fish benefit could you attribute to the passage, which allows fish access to cold upper basin spawning and rearing grounds?

How much of it is allocated to the habitat improvements along the streams, and how much is allocated to the storage which provides the flows needed to allow the fish to move from the mouth of the Yakima River to the headwater areas?

So it is hard to do that, and then on the out-of-stream side, we have a project that is not looking at expanding irrigated agriculture or really trying to drought-proof a basin with an existing agricultural economy. It is harder to capture the benefits when you are trying to sort of preserve an economy than when you are trying to grow an entirely new one.

Mrs. NAPOLITANO. My time is running short, sir, but have you considered the evaporation rate?

Mr. SANDISON. Yes. That is factored into our demand calculations, and we have also factored that into the climate change analyses that we have done in sort of sensitivity analysis of how the plan will perform under climate change conditions.

Mrs. NAPOLITANO. OK. Because we talk about climate change, but we do not talk about the actual loss of above ground storage evaporation rates, and I think that should be part of the equation when we talk about that.

Mr. SANDISON. Yes, ma'am.

Mrs. NAPOLITANO. And the fact that NOAA is even stating that we may have a dry year in 2014.

Mr. SANDISON. Yes.

Mrs. NAPOLITANO. Thank you, Mr. Chair.

Mr. MCCLINTOCK. Thank you.

Mr. Shibatani, what percentage of Sacramento runoff is utilized for all purposes, including environmental?

Mr. SHIBATANI. For the Sacramento region in general?

Mr. MCCLINTOCK. Yes.

Mr. SHIBATANI. Well, let me just start with the overall State perspective, Chairman.

Mr. MCCLINTOCK. Well, just quickly. I mean, what percentage of our runoff is controlled? What percentage is uncontrolled?

Mr. SHIBATANI. There is about 80 percent of total precipitation that comes in that is managed for use, and that is sort of divided through ag., M&I, environmental flows. The rest of the 120 million acre-feet Statewide or 60 percent of that available water is just simply not touched by our management prescription.

Mr. MCCLINTOCK. So that is 120 million acre-feet a year?

Mr. SHIBATANI. Statewide, yes.

Mr. MCCLINTOCK. Statewide.

Mr. SHIBATANI. Eighty million acre-feet.

Mr. MCCLINTOCK. Not required for environmental flows.

Mr. SHIBATANI. Correct.

Mr. MCCLINTOCK. And it simply runs off into the ocean.

Mr. SHIBATANI. Well, there are three factors of losses. That is water that is not touched by our management prescriptions. So it is water that is either lost directly through evaporative losses, transferred losses through vegetation and soil, or losses to the deep salt sink or runoff to the Pacific Ocean. So that is the yield differential.

Mr. MCCLINTOCK. What would be required to harness more of that surplus water?

Mr. SHIBATANI. Well, for the direct evaporative water and the transferred water, there is not much you can do. For the deep loss into the salt sink there is not much you can do. But for the amount of water that actually leaves through channelized outflow is what, 15 million acre-feet that leaves through the north coast? There is about 7 million acre-feet a year that leaves through the Golden Gate. So we have 22 million acre-feet of outflow. That is riverine outflow that is going out to the ocean as lost runoff.

And just to add a point, Mr. Chairman, we talk about many operators and engineering operators for reservoirs. We talk about how much water is actually released through reservoir spills. Now, spill water is water in excess of a flood encroachment curve. Each reservoir has an encroach curve. Folsom happens to have a very, very deep encroachment curve.

My contention has always been those encroachment curves are very, very deep because of the size of the actual——

Mr. MCCLINTOCK. If I could cut to the chase, the point is that there is a great deal of water that could be stored for future use that right now is going into the Pacific Ocean.

Mr. SHIBATANI. Absolutely, Mr. Chairman.

Mr. MCCLINTOCK. Is there any shortage of geologically suitable sites to store that additional water?

Mr. SHIBATANI. In watersheds that I have seen, and just to give one quick example, think of the American River Watershed as a watershed that would have most of its facilities built. We did a study with some various partners just a couple of years ago called the Joint Benefits Investigation Study. We identified 30 sites in the American River Basin Watershed that had potential for feasibility studies for new——

Mr. MCCLINTOCK. Just in that single watershed, 30 potential sites. So suitable geological sites are not in short supply. How about financing? We have heard a lot about that.

Now, I seem to recall in 1960 California undertook the State Water Project. It produced 700 miles of canals, 5.7 million acre-feet of water storage, 10 major storage dams, 11 secondary dams, nearly 3,000 megawatts of generating capacity, and as I recall, that was financed almost exclusively by either revenue bonds or self-liquidating general obligation bonds repaid by the beneficiaries of these projects in proportion to their use; is that correct?

Mr. SHIBATANI. Correct.

Mr. MCCLINTOCK. Well, should an economically viable water project not pay for itself?

Mr. SHIBATANI. Absolutely.

Mr. MCCLINTOCK. And have the projects that we saw, for example, in the State Water Project not done precisely that?

Mr. SHIBATANI. I am not sure. If you take the Federal projects as an example, there is still large repayment debt on the Federal projects, but I think just getting back to one of the first points——

Mr. MCCLINTOCK. Well, the Federal projects are Federal funds funded for these projects. They are being repaid slowly. The revenue bonds and self-liquidating general obligation bonds for the State Water Project have been paid back on schedule. I am not aware of any of those bonds defaulting.

Mr. SHIBATANI. Right.

Mr. MCCLINTOCK. And when you have a multi-function dam, you not only have water sales but power, flood control, and recreation; is that correct?

Mr. SHIBATANI. Correct, with power sales being the primary revenue generating source.

Mr. MCCLINTOCK. Now, has dam engineering changed radically over the past generation, I mean, just the process of building a safe dam?

Mr. SHIBATANI. I think dam safety has improved considerably. I think dams in this contemporary context have to look at more modified components to meet some of the many environmental issues associated with damn operations. I know that when we did the Folsom modifications 10, 15 years ago, we developed the first temperature control device for Folsom. We regained the shutters on the power penstock intakes. There are a lot of new additions going into new dam facilities these days, Chairman, that are quite different than what we had 20, 30 years ago.

Mr. MCCLINTOCK. We will pick up on that point on the second round.

And with that I am pleased to recognize Mr. Huffman.

Mr. HUFFMAN. Thank you, Mr. Chair.

I would like to start with Mr. Shibatani. I found your testimony interesting about all that outflow that escapes the dams.

Mr. SHIBATANI. Yes, Congressman.

Mr. HUFFMAN. And that it conceptually could be captured at a high elevation storage point. But that outflow actually serves some purposes, does it not, when it escapes those dams?

Mr. SHIBATANI. It does serve a purpose, yes.

Mr. HUFFMAN. Well, not just a purpose, but let's talk about the many purposes that it serves. I mean, there are entire municipalities whose waste water discharge programs would not exist if they did not have dilution ratios based on that outflow. That is one thing that comes to mind.

Mr. SHIBATANI. Correct.

Mr. HUFFMAN. So you may have some municipalities all over the State of California that might object to you shutting down their waste water treatment operations.

Those outflows that some might take as wasted also help juvenile salmon out-migrate. They help migrating salmon spawn. They provide water quality benefits that are essential to maintaining bene-

ficial use. There are riparian users downstream from those dams that have priority water rights——

Mr. SHIBATANI. Correct.

Mr. HUFFMAN [continuing]. To use it for irrigation, for any number of other purposes. They provide all sorts of system work for riparian ecosystems. They mobilize gravels. They do things that an ecosystem cannot even function without.

Have you looked at how much of that water is actually doing something important versus how much could sort of conceptually—I am sure it is fun to run these hydrological exercises—but that you could actually take away into the system through these high elevation storage systems.

Mr. SHIBATANI. You raise a very good point, Congressman, and I think one thing that is unique about California, and you are well aware of this, we live in a Mediterranean climate where our precipitation occurs 4 months of the year.

Mr. HUFFMAN. But my question is: have you analyzed how much of it is actually available for the conceptual high elevation storage that you are talking about today?

Mr. SHIBATANI. We have done some preliminary assessments just because we know——

Mr. HUFFMAN. Have you looked at water rights? Have you looked at downstream beneficial uses?

Mr. SHIBATANI. We have not looked at the actual water right tagging.

Mr. HUFFMAN. Then how can you know how much is actually available for this hydrologic exercise?

Mr. SHIBATANI. Well, we do it from a mass balance perspective first so when we know that precipitation is coming in November through March, we look at that volume. We say how much are the reservoirs evacuating (a).

Mr. HUFFMAN. What is the number? You said there is 18 million in outflow, 18 million acre-feet in outflow. How much do you think you could actually capture in upstream?

Mr. SHIBATANI. Well, let's see.

Mr. HUFFMAN. Without impacting other water users.

Mr. SHIBATANI. Depending on which waters you are talking about, are you talking about the Sacramento-San Joaquin watershed going out to Golden Gate?

Mr. HUFFMAN. OK.

Mr. SHIBATANI. OK. There is 7 million acre-feet that goes out per year.

Mr. HUFFMAN. Well, let's talk about that watershed.

Mr. SHIBATANI. OK. Sure.

Mr. HUFFMAN. I was interested that in your testimony you did not identify a single river or a single location for these facilities. You just testified generically that this theoretically is possible to do all of this upstream high elevation storage, but on every major tributary of that system, you have existing high elevation storage, with the exception of Wild and Scenic Rivers. They have their own legal impediment to what you are proposing.

Mr. SHIBATANI. Correct.

Mr. HUFFMAN. But have you looked at the other hydro projects, for example, in the San Joaquin, the Big Creek Unit of Southern

California Edison, the many dams that PG&E has throughout the Sacramento system?

If you are going to start putting dams in upstream of them, you are impacting their water rights, and you are impacting their hydropower operations. Have you gotten blessings from all of these different users?

Because California is a State that is already allocated all of its water.

Mr. SHIBATANI. It has allocated its water during certain times of the year.

Mr. HUFFMAN. Yes.

Mr. SHIBATANI. So if you go to the State Board and say, "Is that particular river over-allocated?" they will say, "From April through September, yes; November through March, perhaps no."

Mr. HUFFMAN. OK.

Mr. SHIBATANI. So when you talk about allocation——

Mr. HUFFMAN. I find it rather significant that you did not identify any specific location where the theoretical high elevation storage would happen. If you have some specific sites, I would love to have you propose them. I do not have enough time to go into it, but I would love to see it.

I want to ask Mr. Barcellos a question because of course it was very alarming for me to hear you say that even with a normal hydrology next year that you are anticipating a zero percent water allocation.

I am aware of a Westlands Water District, and they have the worst allocation. Everyone knows that. Their last notice October 17 said that even at below normal year and with minimal to moderate delta restrictions, which was your assumption as well, therefore casting 25 to 30 percent or up to 35 to 40 percent allocation.

So I am confused about your testimony saying that you are anticipating zero percent because that is very alarming, and then I also want to ask you——

Mr. BARCELLOS. I was referring——

Mr. HUFFMAN. Hold on. I am not finished with my question. I want to also ask you to speak——

Mr. BARCELLOS. Well, I wanted to answer your question.

Mr. HUFFMAN [continuing]. To the other water users in the area because, of course, the Friant water users right next door are going to get a significantly higher allocation. The exchange contractors also on that same system are going to get between 75 and 100 percent for free.

So I just want to ask you to maybe speak to those and how do you justify telling the committee zero percent when Westlands itself is saying much more than that?

Mr. BARCELLOS. I was referring to what the anticipated allocation was going to be to Westlands. I am in the Friant Unit, as I stated earlier. I am on the east side of the valley. At this point we do not know what our current allocation is going to be. On a normal year, if we can possibly anticipate 50 percent, I think we are going to be lucky.

If the exchange contractors do not get the water because we have a short year, they can put a call on the water that Friant has available. We have technical experts that work that out. I work strictly

from a board perspective on my farming operation, but those numbers change, as you know, from month to month depending on what precipitation is in those certain watersheds.

Mr. HUFFMAN. All right. Well, thank you.

I just want to suggest that we need to be very careful when we make representations like that in a congressional committee, and I want to congratulate you for your record high ag. production last year in 2012 for the State of California. That is impressive.

Mr. MCCLINTOCK. And the gentleman's time has expired.

The Chair now recognizes our one non-Californian, Mr. Tipton of Colorado.

Mr. TIPTON. Thank you, Mr. Chairman.

And, Mr. Shibatani, I think I would like to maybe bring this a little bit back to my home State of Colorado.

Mr. SHIBATANI. Yes, Congressman.

Mr. TIPTON. We have had some devastating floods, as I am sure you are probably aware of earlier just a month or so ago. How could some of the high altitude storage benefit in terms of being able to protect against some of the flooding like we saw in Colorado?

Mr. SHIBATANI. I think, Congressman, the primary premise of high elevation storage is essentially yield retention during the periods of the rainy season, and to the extent that there are additional facilities that we can put above existing or terminal reservoirs in your State, it is almost a mass balance exercise. If you have three 200,000 acre-foot reservoirs, one single 1 million acre-foot reservoir, it is all a question of attenuating that flood peak that the terminal reservoir operators have to then release either through food encroachment rules that they are mandated to release.

So to answer your question, it is a simple question of retaining more yield upstream that we can then reserve for not only flood control benefits during the time of the rainy season, but also serve as a potential commodity asset that but for 4 or 5 months that water could be used for a lot of beneficial purposes, including water supply, ag., municipal deliveries, as well as environmental flows, water quality enhancement, and recreational benefits as well.

So I do not know if I am answering your question, but the whole concept is to retain more supplies upstream during time——

Mr. TIPTON. Well, I would like to follow up actually on my good friend, Mr. Huffman, because in California, Colorado, we have seen explosions in growth in population. If we look at the entire country, 1960, the Census pointed out we had about 130 million Americans. Now we are at 300-plus million Americans.

You just described for me in Colorado we might be able to save lives, save property, save a lot of damage to infrastructure with high altitude storage.

Mr. SHIBATANI. Yes.

Mr. TIPTON. Let's talk a little bit about hydro that he had brought up. Would there be an opportunity to be able to have hydroelectric power which is going to benefit all of those communities as well, and as that drops down—you are the expert in this—to be able to reuse that same water to generate further hydroelectric power?

Mr. SHIBATANI. Absolutely, Congressman, and that is one of the primary motivations of high elevation storage. I mean, the standard rules are that it rains every year. We cannot guarantee how much, but it does rain every year, and the water always follows its national oceanic migration. If you put a turbine in it, it is converting potential energy to kinetic, clean——

Mr. TIPTON. Chairman McClintock brought up that we have a lot of projects that are apparently being able to be cash float off of this. What do you see as the number one impediment to developing some of these projects?

Mr. SHIBATANI. These storage projects?

Mr. TIPTON. Yes.

Mr. SHIBATANI. I clearly feel today that the overlapping and almost redundant layers in certain environmental regulations that we are currently operating under are scaring away a lot of investors. I know private sector investors that are chomping at the bit to underwrite these facility projects. The first question they ask me is, "Have you secured your permits?"

And my answer is always, "No, not yet." They are going to wait until all of those permits and approvals are in place before they are ready to sign that check, and they will sign that check fast and move these infrastructure projects forward.

So I do not have to leave the impression that I am not supportive of these various environmental and very important environmental regulatory oversight processes, but let's face it, NEPA, CEQA, ESA, they were about 30, 40 years ago. Other things have changed. These regulations have not.

And I have been doing environmental documents for 30 years, and I just cannot seem to get them done fast enough to get some of these major infrastructure projects moving forward. Everything else is static except for the environment that is moving forward. That has to change.

Mr. TIPTON. So what you are pointing out, clarify it for me if I am inaccurate on this. We have a regulatory process that was established for the 20th century, maybe earlier on in the 20th century. We have now moved into the 21st century.

Mr. SHIBATANI. Correct.

Mr. TIPTON. And we have new processes, new technologies which enable us to do it more efficiently and still be able to respect the environmental concerns which we all share, and be able to address Mr. Barcellos' point that rather than taking 20 years to be able to develop a project, we could actually do it in a much more timely fashion just with cleaning up that regulatory process.

Mr. SHIBATANI. You are absolutely correct, Congressman, and the one point I would quickly add here is that the shelf life for a lot of environmental documents is very, very short. The private sector develops methodologies and metrics very quickly, and so by the time I bring a project for certification, it could be 10, 15 years old.

The easiest way to oppose that project is just to make the claim that the best scientific information is no longer valid. Ten years has gone by. That is a legitimate concern. We have to re-circle and startup from the beginning again, and we never get to that end point.

Mr. TIPTON. So it is time for the regulatory process to come out of the past, join us in the future, and to be able to build for a more prosperous country; is that right?

Mr. SHIBATANI. At least stay on the same pace of change as the environment. The environment is changing. Climate change is pushing it a certain way. The regulatory environment has to stay in pace with that.

Mr. TIPTON. Right. Thank you so much.

Mr. SHIBATANI. Thank you.

Mr. MCCLINTOCK. Thank you.

Mr. Cárdenas.

Mr. CÁRDENAS. Thank you very much.

I would like to ask this question if either one of you can point out a project that you are aware of where the Federal Government actually participated in the financing and/or bringing dollar resources to that project. I am from the State of California. It seems like most of the recent projects in California have been paid for by local State bonds and other financing mechanisms, not necessarily Federal.

Can either one of you or each one of you think of a project that actually is within your realm of what you do that actually had Federal funds?

Ms. ZIEMER. I will kick it off just with the Federal funding through both Bureau of Reclamation's Water Smart Grants as well as Farm Bill Equip Programs have been very important for the investment in upgrading infrastructure for irrigation districts and water users that leads to salvaged water for multiple benefits: irrigation, environmental flows, as well as municipalities. So certainly that has been very important.

Mr. CÁRDENAS. And how about new projects, as in new facilities? It seems like you just pointed out that the Federal Government seems to be involved as far as you are aware in helping with mitigations, helping with improvements, et cetera, but how about specific new projects?

Ms. ZIEMER. Well, other than the planning money that came through Bureau of Reclamation's Basin Study Program to help identify the Yakima storage, I am not aware of other new storage.

Mr. CÁRDENAS. And then that would have been a small percentage or a large percentage of the overall cost of that project?

Mr. SANDISON. In the case of Yakima, we were the first basin study grant recipient in the country, as I understand it.

Mr. CÁRDENAS. How long ago roughly? How long ago was that?

Mr. SANDISON. Oh, that was 2 years ago, I believe.

Mr. CÁRDENAS. When you received that.

Mr. SANDISON. So the Bureau of Reclamation has been a cost share partner with us in Yakima actually since 2003, but when we began this process of the integrated planning in 2009, we had been roughly a 50–50 cost share partner, and the total amount of money expended to this point is probably in the $12 million range in terms of getting us to a plan that is through a programmatic environmental impact statement, and so on, and have a planning report submitted to OMB.

In the Odessa Project, which is a groundwater replacement project in the Federal Columbia Basin Project, we have been,

again, a cost share partner since 2005 with Bureau of Reclamation, and again, about $6 million had been invested on both sides on that, and we recently completed the environmental impact statement, and the Federal record decision was entered into.

We are about to issue the water right, the secondary use permit to Bureau of Reclamation which would allow for that project to proceed and to replace groundwater, on the ground replacement of groundwater in what we call the Odessa area. So in both cases we have been active cost share partners with Bureau of Reclamation.

Mr. CÁRDENAS. However, when it comes to establishing, say, a surface water storage project, say, a new dam or something like that, you mentioned $12 million, which is nice to see that there is participation there from the Federal level. Yet at the same time what is a typical cost of a brand new facility if something were to be cited and it would actually get past all of the environmental requirements and then actually built?

Is it in the tens of millions or hundreds of millions or does it possibly tip across a billion dollars?

Mr. SANDISON. It is the latter. I mean, just for example, the projects we are looking at in the Yakima Integrated Plan, the most expensive project is 160,000 acre-foot off-channel reservoir called Wymer. I mentioned it earlier. The cost estimate on Wymer is $1.1 billion, with a B, and we have a couple of other projects that are a little bit smaller scale but are in the $280 million to $600 million range.

Mr. CÁRDENAS. Is there any anticipation that in near future projects that the Federal Government would be participating in any semblance above $100 million or more per project, or is it just mainly grants that help percolate the process of getting it off the ground?

Mr. SANDISON. Again, in the case of the Yakima Integrated Plan, it is our expectation that there would be a Federal partnership, a cost partnership, funding partnership on the larger projects, which several of them would be over a $100 million investment.

Mr. CÁRDENAS. If you will allow me time for one more question, Mr. Chairman.

Mr. MCCLINTOCK. If it is a yes or no.

Mr. CÁRDENAS. Never mind. Thank you.

[Laughter.]

Mr. MCCLINTOCK. Mr. LaMalfa.

Mr. LAMALFA. Thank you, Mr. Chairman.

This is always a very difficult issue, but I think we have to acknowledge some positive strides have been made in California. They are doing amazing things with conservation and recycling in urban areas as well as in agricultural irrigation and recycling Ag water and using it over and over again as well.

But we keep coming back to the needs of a growing population and a further shift and reallocation of existing water that was built for other purposes at the time to environmental uses. Millions of acre-feet have been shifted, and when you talk about strategies and visions to even increase more flows during the time of year, and speaking mostly of California here again, but during the time of year where it cannot be captured for Ag use or other use, strictly flows for fish purposes as deemed by somebody, including ideas of

shifting so much of the flows to that. You would have effectively a dead pool behind some of the dams, basically a drop of water left behind that nobody can access.

So there are some pretty radical ideas out there on the shifting of water use and supply that really put a chill on current uses, Ag uses. So it exacerbates the need even more for all types of water supply creation, more conservation, more recycling, yes, more looking at desalination where you had that unlimited water supply along the coast. Technology is getting better to more cheaply do desalination, where urban use on a one acre-foot or half acre-foot per household use is affordable. It will never be affordable inland for Ag use on desalination, but it can be used in those places.

So what I am getting at is that the need for more supply inland for Ag use for those other long-term uses is greater, but we hear thoughts in the committee that, well, the money is not there. The desire is not there.

And, Mr. Shibatani, you talked about it is there, but when you add a 10 to 15 or 20-year buffer of regulatory tangles and permit tangles and lawsuits and all of that, of course the money is scared away by that.

So how do you see us getting out of this? What do you see is going to be the solution here to actually increase the supply?

We are not going to do it all through conservation. We have taken great strides, but do you think conservation totally is the answer when we are talking about these other allocations and shifting of water supplies that are currently happening away from Ag and urban use toward the environment?

How are we going to do this?

Mr. SHIBATANI. Well, I think, Congressman, as my colleagues have eloquently espoused, any one particular element in a water supply portfolio cannot be the solving answer. So water conservation, while important, certainly it has progressed considerably over the last several decades. For the amount of demands and concerns that we have facing us in the future and the importance of having in-stream flows provide benefit, thermal benefit, water quality benefits, protection against sea level rise, we need to have additional assets in those storage reservoirs. It provides a flood control benefit. It provides a supply benefit. It provides an in-stream environmental ecosystem functionality benefit.

But most importantly, what it does is that it takes California's inherent hydrology, which is a 4-month based; it puts it into storage and allows the resource managers then to use their professional discretion rather than have that water leave and run out to the Pacific Ocean, to then say, "What do we want to use or how do we want to allocate that as experts in the system to then mete out the appropriate allocations?"

So my contention has always been, and I think the Chairman mentioned this at the beginning, California has never been a water short State. It has always been a State challenged by moving water from Point A to Point B. If we have additional supplies up in the source areas where that precipitation is occurring and shifting under current climatic forcings, then it is incumbent upon us.

Mr. LAMALFA. Let me touch on that. If there is a climate force that is changing, then is it not even greater that during that nar-

row window of time that we capture a greater amount of that water that is no longer snow pack, if indeed we do play that climate change game?

Mr. SHIBATANI. Well, that is true. That is true. If you look at the hydrograph of California, we have always managed for that spring freshet. That spring peak is dropping and moving earlier to the season. So we are going to have more water in our watersheds earlier in the season, and that would just leave, unless we captured it.

So climate change——

Mr. LAMALFA. That, and we would have certainty of the people that would invest in this that they can actually get a project done. Otherwise they are going to stay away with their money.

Mr. SHIBATANI. Correct. So when I talk to private investors and say that we can expand our hydrogenating period time, they start looking at climate change. It becomes a very enticing character that you can throw in front of a private equity investor to say that we can extend our hydropower generation period by 2 or 3 months.

And to get back to your question, private investment or private investors in the equity market, they know exactly California's potential for hydropower, and they are just waiting for us to do something on the regulatory environment to make it a little more efficient, a little more judicious in meeting its responsibilities to come up with some kind of genuine expediency to get these longstanding infrastructure projects built that, quite frankly, are decades overdue to actually reinvest private sector money into this State.

Mr. LAMALFA. They know the potential. I have a book that thick from 1957 of all the potential projects that could have been done if the money and the willingness would be there.

Thank you. I yield back.

Mr. MCCLINTOCK. Thank you.

Wyoming has joined us. Mrs. Lummis.

Mrs. LUMMIS. Thank you, Mr. Chairman.

What happens in California is important to my State because we are at the headwaters, and a lot of the water in the Green River flows into the Colorado and ends up in your neck of the woods, and of course, what happens below Lake Powell, the lower Colorado River management and the upper Colorado River management are supposed to be separate.

But we also recognize that as the demands of the larger population areas downstream begin to demand more water, your ability to store water in those higher elevation storage areas protects our ability to use our own water in the upper Colorado.

So what you do with regard to creating new storage, especially in your high areas, is very much important to us as we try to protect our own water uses for upper Colorado River Basin States.

Question, Mr. Barcellos. If you listen to some of the environmental groups, you would get the notion that conservation and efficiency are the answers to water shortages, but could you talk a little more about what the Ag community is doing on the conservation front and what role conservation can play in the future in addition to this other conversation we are having about storage?

Mr. BARCELLOS. Well, conservation has allowed the expansion of many of the communities because the agriculture has conserved

the water that made it available for communities to expand their own water usage from groundwater pumping.

We have expanded some acreages and crops, feeding many, many more people in the world and creating a large agricultural economy, $12 billion in California on an annual basis. And the fact that we are somewhat at the limit of conservation practices, they have pretty well been developed with drip tapes, with fan jets, and all of our irrigation practices.

We really have to work now on finding additional water supplies to recharge groundwater for the communities that are not alongside of a river or anywhere in that neck of the woods because our groundwater recharge is what supplies all of the communities in the area. So we have to work partnerships with the communities and agriculture to manage those supplies.

But we have come a long way in water management.

Mrs. LUMMIS. Thank you.

Mr. Sandison, question for you. What would be the result of conservation alone being used on a broad scale without the construction of new surface storage?

Mr. SANDISON. Well, again, specific to my testimony which focused on the Yakima River Basin, in that basic the benefits that would derive from conservation projects would, again, we stream reach benefits so that you are actually improving flows for a segment of stream.

However, because of the nature of the conservation savings, which is basically capturing leakage, the water is diverted, put into a canal. The water leaks out. That water gets back to the river now, and so what the conservation projects do is give you a stream reach benefit between the point of diversion and the point at which the water would have returned under natural conditions.

So, again, it is limited to stream reach benefits in the Yakima, what will not supplant the water that would be provided through storage or provide water for out-of-stream needs.

Mrs. LUMMIS. So it is a fair statement for me to say that storage is needed in order to add more total water capacity to conveyances.

Mr. SANDISON. That is our position, yes.

Mrs. LUMMIS. A question for Mr. Barcellos.

How would you resolve the issue of addressing hurdles to moving forward on new storage?

Mr. BARCELLOS. Well, I think we have heard today that financing is a large part of it, but we have communicated with larger communities that are willing and able to finance certain projects that would allow conjunctive use through groundwater banking, water transfer, and having additional storage would facilitate that.

So there are financing issues there that we have discussed and could be addressed, but you also have, as was stated earlier, a lot of money does not flow until you have the permitting processes done, and those are quite difficult. So we need to find a way to make the permitting process a little more practical.

Who do you go to? One group starts in one place with environmental things. You have the Clean Water Act that somebody has to go get permits and carry things over there. So if we could centralize one place, it could actually give permits based on need and

overcome the threat of litigation, then that would go a long way to solving that issue.

Mrs. LUMMIS. I see that my time has expired, Mr. Chairman. Thank you very much.

Mr. MCCLINTOCK. Thank you very much.

We are going to go to a quick lightning round here just to pick up a couple of final details.

Mr. Barcellos, you never had an adequate opportunity to respond to Mr. Huffman's insinuation that you were throwing out faulty numbers when it came to the west side of the San Joaquin Valley. Is it not true that Westlands numbers show an initial allocation of zero to 15 percent under normal conditions?

Mr. BARCELLOS. Yes, it is, and actually in my written testimony, that is considerably expanded on some of the projects that I did not have time to discuss in oral.

Mr. MCCLINTOCK. Great.

Mr. BARCELLOS. So the written testimony is 12 pages. It is pretty complete.

Mr. MCCLINTOCK. Thank you, and that will be a part of the record.

The rhetorical question was raised, well, what dams are being stalled by environmental objections. Well, I can tell you in my district alone we are running into a fusillade of environmental opposition to a simple proposal by Merced to raise the new Exchequer Dam at Lake McClure by a mere 10 feet, which it was designed to be raised by.

So that will give you some idea of the problems that we are facing.

Mr. Shibatani, you pointed out the difference between allocated and non-allocated water. Water might be allocated between March and November, but not allocated between December and February, basically.

Mr. SHIBATANI. Correct.

Mr. MCCLINTOCK. Is that not the time when we watch the Sacramento River swollen with enormous flood runoff?

Mr. SHIBATANI. Absolutely.

Mr. MCCLINTOCK. So that is what you are talking about storing, is it not?

Mr. SHIBATANI. That is the uncaptured amount that we want to store.

Mr. MCCLINTOCK. And in order to store all of that floodwater, we have to have a place to put it.

Mr. SHIBATANI. Absolutely.

Mr. MCCLINTOCK. And that is the whole point.

If the climate continues to warm, as it has been on and off since the last Ice Age, snow packs will not be holding water as long. Does that not also argue for more water storage?

Mr. SHIBATANI. Absolutely. During that time of year, too, Mr. Chairman.

Mr. MCCLINTOCK. Now, we covered the fact there are plenty of geologically adequate sites, particularly in the high elevations. We have covered the fact that these projects should be, can be, and if they are properly thought out are self-financing, in fact, can produce revenues pretty much in perpetuity.

And you have covered the point that one of the greatest drawbacks to these projects is fear of regulatory delays that simply make them no longer viable. What can you recommend to us as changes that need to be made at the Federal level to bring about this new era of water storage?

Mr. SHIBATANI. I think there are two facets there, Mr. Chairman. One facet I think has to do with the actual responsibilities and the accountabilities with those permitting agencies that have to deal with the applications that come before them. Now, they will come back and say that we are resource constrained. We do not have enough staff. We have a back log.

I would almost recommend, and I am going to throw this out there just because it is the kind of stuff that I do, maybe there is a situation where we can develop a new statute call the Responsibility and Accountability Act of 2014 that compels public trust resource agencies, compelled with the responsibility of adjudicating on private proponent applications to actually expedite those processes and put some kind of accountability on timelines so that all parties, applicants and the permitting agencies, can actually meet.

If we have that kind of assurance, I could go to the private sector market and say at least in law, there is this time period and some closure date. It gives them some assurance that we have a target to reach. Without that, it is an open-ended checkbook, and I cannot—not me personally—but we cannot necessarily compel that kind of interest for private sector investment.

Mr. MCCLINTOCK. In fact, I am told if there was just some certainty in outcome that private sector financing for these projects would be abundant and there would be no need for putting taxpayers at risk on any of this. The risk would be borne by private investors.

Mr. SHIBATANI. That is correct, and that is one of the big issues about why certain groups that I am associated with, Mr. Chairman, were moving away from State and Federal fundings for these major infrastructure projects. That is not going to get done.

Private sector is chomping at the bit with all the pension funds, waiting to reinvest in what they feel are very important natural resource, public trust, needed infrastructure improvement projects for the Nation. So the money is available.

Mr. MCCLINTOCK. So it is not financing. It is not suitable sites. It is not engineering. It is government regulatory——

Mr. SHIBATANI. Uncertainty.

Mr. MCCLINTOCK [continuing]. Delays and uncertainty that are the root of our problem.

I would be very interested in working with you on such legislation.

Mr. Sandison, one quick question. The concerns over conveyance were raised, particularly the loss of water through seepage. For example, you mentioned in your paper that might conserve water short range, but downstream it has no effect.

Would you very quickly?

Mr. SANDISON. Yes, Mr. Chairman. The savings you capture are in the reach between the point of diversion and where that leakage would naturally return, and if you reduce the diversion accordingly, you increase flow in that reach, but if you try to take that same

saved water and move it to another out-of-stream use below that point of return, you would have a permanent loss of low in the river. And if you compounded that by doing it over and over again, you would simply de-water the river.

Mr. MCCLINTOCK. Great. Thank you.

Ms. Napolitano.

Mrs. NAPOLITANO. Thank you, Mr. Chairman.

Mr. Sandison, you mentioned in your testimony that conservation will not solve the problems in the Yakima Basin, but do you agree that conservation is key to the integrated plan, which includes storage?

And would you agree that conservation might work for some areas but not as well for others?

Mr. SANDISON. Yes. Congresswoman, I do not want to over-generalize here. So I keep my remarks kind of limited to the Yakima Basin where what I have described as being the case, it is a river system with old irrigation systems. It may be unique to the area.

Yes, the conservation has been under the Yakima River Basin Water Enhancement Project, Phase 2, an ongoing effort. We have saved about 72,000 acre-feet of water, conserved about 72,000 acre-feet of water thus far under Phase 2. The integrated plan calls for another 170,000 acre-feet of storage.

Mrs. NAPOLITANO. So what do you need to move forward?

Mr. SANDISON. Well, funding for those individual projects. The YRBWEP Phase 2 projects in the past have been a combination of Federal, State, and irrigation district funding. We are looking at this new 170,000 acres to see how the funding could be constructed for that.

Mrs. NAPOLITANO. Do you see an impediment then in any of the environmental issues or regs. or anything of that nature?

Mr. SANDISON. As we move forward with conservation projects, we do not typically have significant regulatory hurdles to overcome in that regard.

NAPOLITANO. So that would not be the impediment?

Mr. SANDISON. No, not for the conservation project.

Mrs. NAPOLITANO. Absent the funding.

Mr. SANDISON. Yes, I mean, absent funding, right. It is not an impediment.

Mrs. NAPOLITANO. I just looked at and I introduced into the record, but I did not indicate what it really did, but hydrologist Chris Peterson recently in Modesto made a statement that I found rather interesting, that it takes $110 per year per acre-foot to underground store; 1,000 acre-feet for above ground reservoirs, and 2,000—those are some old figures—for desalination.

So, you kind of have to look at all the other types of water conservation and water storage, et cetera, and everything else.

Ms. Ziemer, the President in August signed the Small Conduit Hydropower Act, and as stated before, and I do agree, small scale projects have cumulative capacity of the Glen Canyon Dam when constructed. Do you think large scale hydropower is the only solution?

And what role do these small projects play and what is their advantage?

Ms. ZIEMER. In a State like mine, Congressman Napolitano, the small and rural States like Montana, small scale hydro has a huge potential to address energy demand because part of the problem with rural needs and rural energy demand is the conveyance or getting transmission lines out to these rural locations.

With small in-conduit hydro we can produce the power in the place where it is needed in order to pump water and to move irrigation works without investing in the long conveyance in transmission lines, and it is really actually a genius solution, and I have to add Trout Unlimited was very proud to work with Representative Tipton on that bill.

Mrs. NAPOLITANO. Great. I was just checking some figures with staff, and since 1992, the Bureau of Reclamation's title 16 has produced almost 800,000 feet of water, wet water.

The Diamond Valley Lake, Metropolitan owned and produced started in 1995 and finished in 2003 with their own money. It took 8 years, and it will store almost the same amount of water.

So something that we need to start looking at is the comparison of saving and being able to conserve, educate our folks, and I commend Mr. Barcellos for being able to do a lot more of the conservation both in farming and in the raising of cattle and other dairy farms because those are important things for California and for the rest of the Nation for that matter.

But I think we need to be able to work together and find solutions that are going to be, as my colleague was stating, the most effective and cost effective for the people, and being able to work together to make the issues more clear to those or clearer to those that have the ability to take into consideration and to come up with legislation to fix problems or help communities thrive.

So with that I yield back, and thank you, Mr. Chair.

Mr. MCCLINTOCK. Thank you.

And Mr. LaMalfa to close.

Mr. LAMALFA. Thank you, Mr. Chairman.

First, I love this term of art, "wet water." You know, is there dry water or powdered water? Just add water?

Mrs. NAPOLITANO. Would the gentleman yield?

Mr. LAMALFA. Sure.

Mrs. NAPOLITANO. I find that paper water and there are allocations of percentages of water. It is called paper water. So in other words, if you have 50 percent of the water allocation, on paper, when there is not a full 100 percent water, that is wet water.

Mr. LAMALFA. I was just having a little fun, ma'am.

Mrs. NAPOLITANO. OK. Well, I just want it for the record. Thank you.

Mr. LAMALFA. OK. Yes. Well, it is good. Now we have that clarified.

Mr. Barcellos, now we were talking earlier about the process of bringing something from idea to an actual project, and the framework, if you can call it one, for permitting. So could you walk through a little more specifically on what that is really looking like these days?

How many different agencies are involved? Do they talk to each other? I mean just for the record out loud so people can hear. What

agency has to talk to the other? Are you the middle man or does anybody even have a chance to communicate?

Because this has all been done in many, many places around this country with building projects in the past, and there really is not anything that much newer under the sun, other than a location where you have the usual concerns that a dam is going to cause inundation of an area behind the dam, and then you start getting into cost-benefit ratios.

Why is it so tough? Why is it so tough to get people to communicate with each other?

We talked a little bit about having a template. Could you just elaborate a little bit what that looks like for people who might be watching or for the record on how frustrating that is?

Mr. BARCELLOS. Well, my expertise, as I said earlier, is not in the technical aspect. I am a board member and a farmer first.

But one example, when we were working with the seismic remediation project on Success Dam, that is a Corps of Engineers managed dam, and any time we had water elevations coming up, we had a flood year sometime back, and the process of getting permits even just to sandbag to raise the level because of an elderberry bush that ultimately they spent tens of thousands of dollars sandbagging around it to raise the level. Ultimately the sandbags killed it because it did not let the water free flow by, and it got too hot and that just took care of that problem.

There were others they were unable to protect that survived because the cooling water as it was flowing by once the water level receded, it was fine. However——

Mr. LAMALFA. Did a study decide that the sandbags would help the one and not hurt the other?

Mr. BARCELLOS. I am sure somebody did or somebody should, but the fact is as we go forward—we have a little hydro plant on our dam also—the regulations that you have to go through to keep that going. If you want to build a new project, where do you start? Do you start with ESA and you start looking at endangered species? And then you are going to inundate an area with water. So then all of a sudden now you have seepage so you have to work with the Clean Water Act.

I do not know all of the different areas you would have to go. So it would be nice to have a clearinghouse of one place.

Mr. LAMALFA. One-stop shopping though can lock them in a room and make them decide what it all is, and then you apply, right?

Mr. BARCELLOS. Yes, because what happens is one gets a little bit of permission and says, "Before we can go to the next step, you have to get clearance from the other one, and then when you get that come back and talk to us."

Mr. LAMALFA. And pretty much all of these boil down to environmental issues, don't they?

Mr. BARCELLOS. They are all directly related.

Mr. LAMALFA. Yes, even though we hear earlier it is an environment and it is investors. I guess it is the chicken or the egg because the investors are ready to go, but 10 or 15 years' worth of permits do not seem to allow it.

Down in the valley there, too, when we talk about allocations where there is the threat or it might be 0 percent for certain districts, certain areas in the Central Valley, and I guess there is a problem that we accept that anywhere from 20 to 30 to 40 or maybe 50 is great, where in the past there were allocations that at one point may have been 100.

And so do we just accept that these lowered standards, these lower numbers are what it is going to be in perpetuity, or do we do something about it with adding to the storage, adding the supplies as environmental concerns become a greater part of our reallocation?

Mr. BARCELLOS. We cannot continue on the way we are. The Central Valley is in a groundwater overdraft. So any water that has passed by that has gone to the ocean unabated and has not served a reclamation use for trying to bring back fish, it has not benefited the Delta because it flowed through too quickly, because it was all flood releases.

There are factors that come into play that in those wet years if we could capture water, we are not going to capture maximum every year. Anybody who is a realist knows that. But if we could catch them on those really wet years and have that water to manage in conjunctive use for groundwater recharge, groundwater banking, utilizing it for irrigation for farms, and as I stated earlier, sometimes too much water conservation is what is impacting the groundwater on communities that do not have access to anything other than groundwater. So we have to keep them in mind, too, and that is something that our district works very hard at, is groundwater recharge to maintain water available for those communities also.

Mr. LAMALFA. As do we in the North with a lot of acres of rice, et cetera.

Thank you for your testimony. I yield back.

Mr. MCCLINTOCK. Thank you.

I want to thank all of you for your testimony, for your patience today and for your expert guidance on this important issue.

The record will be held open for 10 days. So you may get additional questions as a result of this hearing, and the record will be kept open to receive your responses.

Again, many thanks to all of you. If there is no further business and without objection, the subcommittee stands adjourned.

[Whereupon, at 4:25 p.m., the subcommittee was adjourned.]