

STATUS OF FEDERAL WESTERN WATER RESOURCES

OVERSIGHT HEARING

BEFORE THE
SUBCOMMITTEE ON WATER AND POWER
OF THE

COMMITTEE ON RESOURCES
U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED SEVENTH CONGRESS

FIRST SESSION

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CONTENTS

Hearing held on March 27, 2001	Page 1
Statement of Members:	
Calvert, Hon. Ken, a Representative in Congress from the State of California	1
Prepared statement of	2
Statement of Witnesses:	
Brophy, Michael J., Chairman, Western States Water Council	11
Prepared statement of	13
Burgess, Dr. Philip M., Senior Fellow for Technology and Society, Center for the New West	48
Prepared statement of	50
Hirsch, Dr. Robert M., Associate Director for Water, U.S. Geological Survey, Department of the Interior	7
Prepared statement of	9
Malloch, Steven, Counsel, Trout Unlimited	40
Prepared statement of	42
McDonald, J. William, Acting Commissioner, Bureau of Reclamation, U.S. Department of the Interior	3
Prepared statement of	5
Salisbury, Jennifer, Secretary, New Mexico State Department of Energy, Minerals, and Natural Resources, on behalf of the Western Governors' Association	35
Prepared statement of	38
Young, Ronald E., President, The WateReuse Research Foundation Board	52
Prepared statement of	54
Additional materials supplied:	
Purkey, Andrew, Executive Director, Oregon Water Trust, Statement submitted for the record	69
Walcher, Greg, Executive Director, Colorado Department of Natural Resources, Statement submitted for the record	71

OVERSIGHT HEARING ON THE STATUS OF FEDERAL WESTERN WATER RESOURCES

**Tuesday, March 27, 2001
U.S. House of Representatives
Subcommittee on Water and Power
Committee on Resources
Washington, DC**

The Subcommittee met, pursuant to notice, at 2:00 p.m., in Room 1324, Longworth House Office Building, Hon. Ken Calvert [Chairman of the Subcommittee] presiding.

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

Mr. CALVERT. The oversight hearing by the Subcommittee on Water and Power will come to order. The Subcommittee is meeting today to hear testimony on the status of Federal Western Water Resources.

Under Committee Rule 4(g), the Chairman and Ranking Minority Member can make an opening statement. If any members have statements, they can be included in the hearing record under unanimous consent.

Mr. CALVERT. Our Subcommittee is in a unique position this Congress to take action on two issues that have dominated media headlines this year—energy and water. As we have seen in California and other Western States, healthy economies and healthy communities depend on reliable supplies of each.

Water and power are intimately tied to the history of the western United States. During the 19th and early 20th centuries, Federal water projects made irrigated agriculture viable and the creation of cities possible.

Federal hydropower electrified the West and then fueled the rise of manufacturing and industry during World War II. Today, Federal water and power supports one of the world's most productive agricultural regions while providing the electricity needed to run our information-based economy.

We have come here today to do two things—first, to evaluate the status of our Federal western water resources; and second, to explore how they may be better managed to meet our changing needs.

The western U.S. is the fastest-growing region in the country. By 2025, the 17 Western States will add another 33 million people. In

addition, seven of the ten fastest-growing U.S. cities are located in the West. With this growth comes new economic prosperity and new opportunities in balancing water supply and demand.

The Western States must plan for their future as a region. Water and power resources are not created and used in a vacuum. As we have seen with our current energy crisis and potential drought, resource supply challenges affect us as a region. They will not and do not remain isolated.

As we listen to the testimony presented here today, our focus should be on the future direction of water resource planning. What are our priorities, and where will they take us in the West in the next 20 years?

I would like to thank our witnesses for coming here today and look forward to hearing from them on this important issue.

If the Ranking Member arrives shortly, we will certainly recognize him for any opening statement he may have, and if not, any opening statement may be placed in the record.

[The prepared statement of Mr. Calvert follows:]

**Statement of The Honorable Ken Calvert, Chairman,
Subcommittee on Water and Power**

Our Subcommittee is in a unique position this Congress to take action on two issues that have dominated media headlines this year... energy and water. As we have seen in California and other western states, healthy economies ... and healthy communities ... depend on reliable supplies of each.

Water and power are intimately tied to the history of the Western United States. During the 19th and early 20th centuries, Federal water projects made irrigated agriculture viable ... and the creation of cities possible. Federal hydropower electrified the West and then fueled the rise of manufacturing and industry during World War II. Today, Federal water and power supports one of the world's most productive agricultural regions, while providing the electricity needed to run our information-based economy.

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The western U.S. is the fastest growing region in the country. By 2025, the 17 western states will add another 33 million people. In addition, 7 of the 10 fastest growing U.S. cities are located in the West. With this growth comes new economic prosperity ... and new opportunities in balancing water supply and demand.

The western states must plan for their future as a region. Water and power resources are not created and used in a vacuum. As we have seen with our current energy crisis and potential drought, resource supply challenges affect us as a region. They will not, and do not, remain isolated.

As we listen to the testimony presented here today, our focus should be on the future direction of water resource planning. What are our priorities? And where will the West be in 20 years?

I would like to thank our witnesses for coming out here today, and look forward to hearing from them on this important issue.

Mr. CALVERT. I would certainly like to thank the panels of witnesses who are here with us today and would like to call the first panel forward for their testimony: Mr. J. William McDonald, Acting Commissioner, Bureau of Reclamation; Dr. Robert Hirsch, Associate Director of Water, United States Geological Survey; and Mr. Michael Brophy, Chairman of the Western States Water Council.

I would like to now recognize Mr. McDonald to testify for five minutes. The timing lights are on the table and will indicate when your time has concluded when the red light comes on. All witness

statements will be submitted for the record, if they are longer, after the hearing.

With that, Mr. McDonald, you may begin.

STATEMENT OF J. WILLIAM McDONALD, ACTING COMMISSIONER, BUREAU OF RECLAMATION, U.S. DEPARTMENT OF THE INTERIOR

Mr. McDONALD. Thank you, Mr. Chairman.

My name is Bill McDonald, and I am Regional Director of the Bureau of Reclamation's Pacific Northwest Region, and I am also serving as the Acting Commissioner of Reclamation.

I have here a map that shows how we are distributed geographically and organizationally, and I will take this opportunity, Mr. Chairman, to briefly describe that we have five regions in reclamation, and I am privileged to have with me in the audience some of my colleagues, if I could just acknowledge them, and we look forward to working with you and the Subcommittee.

Rick Gold is Acting Regional Director of the Upper Colorado Region; Bob Johnson is Regional Director of the Lower Colorado Region; and finally, Lowell Plass is the Deputy Regional Director for the Mid-Pacific Region, and I believe you met Lowell a couple of weeks ago when you toured the project.

With your permission, Mr. Chairman, I would be glad to summarize my prepared remarks and simply have the written text entered in the record.

Mr. CALVERT. Without objection.

Mr. McDONALD. Thank you.

You have asked that we address the capacity of reclamation to meet the water needs of the Western States in both the long and the short term. Let me begin by giving you just a very brief background on reclamation.

We are the largest water resource management agency in the West, operating 348 reservoirs and 58 hydroelectric power plants. We provide one out of five Western farmers with irrigation water. We deliver water to more than 31 million people throughout the 17 Western States. We are the second-largest producer of hydroelectric power in the United States, with our plants on an average annual basis generating enough electricity to serve 14 million people; and that electricity, of course, is marketed by the Bonneville and Western Power Administrations.

Finally, our reservoirs accommodate 90 million visitors each year at over 300 recreation sites as the American public enjoys the flatwater recreation and associated opportunities that are presented by our facilities.

Our ability to assist in meeting the West's future water needs both in the short and the long term must begin, in our view, with the continued operation of our projects in accordance with all applicable Federal laws, State water rights and interstate compacts and judicial decrees, our contractual commitments to our irrigators and other project water users. And when applicable, of course, the operation of our projects must also fulfill the Secretary of the Interior's Tribal Trust responsibilities and the United States international treaty obligations to Mexico and Canada on certain of our river systems.

In this day and age, needless to say, balancing water supply and hydro power demands with environmental and other obligations is an increasingly complicated and difficult task which at times requires some reductions either in the supplies available to our contractors or in the power which we are able to generate. More often than not, however, we believe that we are able to find a middle ground which enables us to fulfill all needs.

Having dependable supplies of water power in the future also requires, besides the continued operation of our projects, that they, of course, be properly maintained. To put that maintenance responsibility in context, approximately 50 percent of Reclamation's dams were built prior to 1950, and about 90 percent were constructed before state-of-the-art design and construction practices for dam construction were in place. Given the age of that infrastructure, sustaining an appropriate level of annual maintenance and making safety of dams modifications as required and on a timely basis are critical to protect public safety and property and to ensure that the benefits of our projects can continue to be realized.

Let me take this opportunity in the context of the operation and maintenance of our projects, Mr. Chairman, to assure you and the panel that Reclamation is doing everything it can to generate electricity at this particular time in light of the West Coast electrical power marketing problems. While we presently have some generating units down for planned maintenance at certain of our power facilities, that in no way has affected our ability to generate, the reason being that there is only so much fuel—that is to say, water—in our reservoir systems, and we are able to fully run all of the available water through existing generators even though some are out for planned maintenance.

On a different subject, my colleague, Bob Hirsch, from USGS will discuss general water supply conditions in the West, so I will not repeat those here; but not unexpectedly, we are experiencing drought, as we do from time to time, in sections of the West. It is particularly severe, as Bob will point out, in the Pacific Northwest this year.

Pursuant to the authorities of the Reclamation States' Emergency Drought Relief Act of 1991, I would point out to the Committee that Reclamation does have some authority to construct temporary facilities, but only temporary facilities, and to implement management plans in the case where a drought occurs.

The third area that I would emphasize as important to the future is voluntary transfers of water from existing to new users. Keeping in mind that approximately 85 to 90 percent of the water consumed in the West is devoted to agriculture, it is Reclamation's view that in the face of rapid urbanization, the changing economics of farming, and the need to strike a balance with appropriate protection of environmental values, voluntary transfers of water from willing sellers to willing buyers is very much a part of the future management of the Western water supply. In that context, Reclamation also supports the use of excess capacity in our physical facilities to store and convey non-project water supplies when, again, there are voluntary transactions between willing sellers and buyers who would like to make such a change in the use of water.

Finally, we would observe that dams and reservoirs will be developed in the West in the future probably on a limited basis. Only, accordingly, the increased efficiency of use of the water supplies which have already developed is in our view a vital part of the West's water future.

Reclamation has two major programs in that regard, and we believe we are a leader in these fields. First, through our Water Conservation Field Services Program and other activities, we provide water districts with technical and financial assistance to develop effective water conservation plans to stretch the use of those already existing developed supplies; and secondly, recycling and reuse of wastewater along with desalinization for agricultural and landscape irrigation, groundwater recharge, and industrial cooling holds very great potential for the future. Reclamation's Water Use Program assists Western cities in enhancing their supplies by providing funds for 25 projects that have been authorized by Congress at what is estimated to be a total ultimate cost of \$600 million. To date, approximately \$205 million has been made available to Reclamation for this Federal assistance, and upon completion of these projects, we would expect a yield of an additional 500,000 acre-feet for beneficial use for the cities that are moving forward in that way.

In conclusion, Mr. Chairman, finding ways to meet water needs presents a great challenge for Reclamation, to the States, to the Western communities and to other stakeholders. We look forward to working with the Subcommittee and with all water users and the interested public to find ways to meet competing demands in the future.

Thank you very much. I would be glad to respond to questions. [The prepared statement of Mr. McDonald follows:]

Statement of J. William McDonald, Acting Commissioner, Bureau of Reclamation, U.S. Department of the Interior

My name is Bill McDonald. I am the Regional Director of the Pacific Northwest Region and also am serving as Acting Commissioner of the Bureau of Reclamation (Reclamation). I appreciate the opportunity to be here today to discuss the state of western water resources.

The Subcommittee has asked for an assessment of the capacity of Bureau of Reclamation facilities to meet the water needs of the Western States in the short and long term. Let me begin with a short overview of the facilities which Reclamation has developed and the benefits which they yield.

Background

As the largest water resources management agency in the west, Reclamation administers or operates 348 reservoirs with a total storage capacity of 245 million acre-feet, 58 hydroelectric powerplants with an installed capacity of 14,744 megawatts, and more than 300 recreation sites in the 17 western states. These facilities enable Reclamation to meet important needs and provide numerous benefits:

- We provide one out of five western farmers with irrigation water for 10 million acres of farmland that produce 60 percent of the nation's vegetables and 25 percent of its fruit and nuts.
- We deliver water to more than 31 million people in the west, the most rapidly urbanizing region of the country.
- Our powerplants generate an average of more than 42 billion kilowatt hours of energy each year, making Reclamation the nation's second largest producer of hydroelectric power and the 11th largest generating utility in the United States. Reclamation produces enough electricity to serve 14 million people. Reclamation's Central Valley Project in California generated more than 6.5 billion kilowatt hours of energy in 1999 and serves approximately 2 million Californians.

All power generated by Reclamation facilities is marketed by the Bonneville Power Administration and the Western Area Power Marketing Administration.

- Our projects support habitat with water for wildlife refuges, migratory waterfowl, anadromous and resident fish, and endangered and threatened species.
- Our reservoirs accommodate 90 million visits a year at more than 300 recreation sites.

All indications are that this year is shaping up to be a very dry year in many regions of the west, particularly in the Pacific Northwest. A below normal water inflow to Reclamation facilities means that water deliveries, power production and environmental requirements will have to be carefully balanced to satisfy to the greatest extent possible multiple project purposes.

Project Operations

In addressing future water needs Reclamation must continue to operate and maintain our projects, in accordance with all applicable Federal laws and regulations, state water rights and interstate compacts and judicial decrees, and our contractual commitments to irrigators and other project water users. At the same time the Secretary of the Interior must fulfill tribal trust responsibilities and the United States international treaty obligations with Mexico and Canada.

Balancing water supply and hydro power demands with environmental and other obligations is an increasingly complicated and difficult task which at times requires some reductions either in the water supplies available to our contractors or in the power which we are able to generate. More often than not, however, we are able to find middle ground which enables us to fulfill all of our obligations.

Enhancing the Efficiency of Use of Already Developed Water Supplies

New dams and reservoirs will probably be developed in the West in the years ahead only on a limited basis. Accordingly, increasing the efficiency of use of the water supplies which have already been developed will be a vital part of the West's future. I would like to highlight a few of the ways in which Reclamation is contributing in this regard.

Water Conservation. Water conservation is a key tool in expanding existing water supplies. As the 1998 Report of the Western Water Policy Review Advisory Commission said, Water conservation, or improved efficiency of use, can have many benefits and should be the first approach considered for extending or augmenting available supplies.

The Reclamation Reform Act directs Reclamation to encourage water conservation and directs water districts receiving irrigation water to develop conservation plans. Some districts have employed state of the art conservation technology, including drip irrigation. Drip systems deliver water directly to individual plant roots, thereby eliminating evaporation and saving water and energy.

Through our Water Conservation Field Services Program, we provide water districts with technical and financial assistance to develop effective water conservation plans. While Reclamation has a role to play in water conservation, there also are opportunities for state and local entities to offer incentives through rate restructuring, low interest loans for farmers to install more efficient irrigation facilities, and rebates for installation of efficient appliances, landscaping retrofits, and toilets.

Water Reuse. Recycled water is used for a variety of purposes, including agricultural and landscape irrigation, ground water recharge, and industrial cooling. Reclamation's water reuse program assists western cities in enhancing their water supplies by providing funds for the 25 projects authorized under Title XVI of Public Law 102-575, as amended. Since 1992, the Congress has authorized water reuse projects in the states of California, Nevada, Utah, New Mexico, Texas, Arizona, and Oregon. Non-Federal cost sharing partners pay at least 50 percent of the feasibility study costs and 75 percent of the construction costs. Total Federal costs for the 25 authorized projects is estimated at \$600 million. To date, approximately \$205 million has been made available in Federal assistance.

These projects are in various stages of planning, design and construction but all are estimated to be completed by 2012. Upon completion, they are expected to yield an additional 494,000 acre feet water for beneficial use.

Addressing an Aging Infrastructure

Having dependable supplies of water and power also requires that the infrastructure which Reclamation has developed over the past century be properly maintained. Approximately 50 percent of Reclamation's dams were built prior to 1950 and about 90 percent were constructed before current state-of-the-art design and construction practices were in place. Given our aging infrastructure, sustaining an appropriate level of annual maintenance of existing facilities, and making safety of dams modifications as required and on a timely basis, are critical to protect public

safety and property and to ensure that the benefits of Reclamation's projects can continue to be realized.

As with our dams and water delivery systems, Reclamation's powerplants must also be maintained in a constant state of readiness. Again, sustained maintenance, and replacement and modernization of equipment and machinery over time, are critical to the readiness of our hydro power system.

In the face of the energy problems being experienced on the West coast, I would like to assure the Subcommittee that Reclamation is generating all of the electricity which it possibly can at this time. While we presently have some units down for planned maintenance, this is not affecting our ability to generate. This is because we have only enough water in our various reservoir systems to run the generators which are on line.

Facilitating Voluntary Water Transfers

Approximately 85 to 90 percent of the water consumed in the West is devoted to irrigated agriculture. In the face of rapid urbanization, the changing economics of farming, and the need to strike a balance with the appropriate protection of environmental values, voluntary transfers of water from willing agricultural sellers to willing buyers is one means by which the future water needs of the West will be addressed.

The Assistant Secretary for Water and Science approved Principles Governing Voluntary Water Transactions That Involve or Affect Facilities Owned or Operated by the Department of the Interior (the 1988 Principles) on December 16, 1988. Within the framework provided by the 1988 Principles, Reclamation has been, and continues to be, supportive of voluntary transfers and conversions of project water in accordance with State and Federal law from existing to new uses. In this regard, Reclamation has issued policies which supplement and expand upon the 1988 Principles insofar as those principles pertain to transfers of project water.

The 1988 Principles also pertain to the use of excess capacity in Reclamation projects for the storage and conveyance of non-project water. Within the framework provided by the 1988 Principles, Reclamation has issued policies which address making excess capacity available under appropriate circumstances to assist in improving the management of the West's water resources.

Conclusion

Finding ways to meet water needs presents a great challenge for Reclamation and western communities. We look forward to working with the Subcommittee and with all water users and the interested public to develop ways to meet competing demands. Thank you for the opportunity to participate in today's hearing.

Mr. CALVERT. Our next witness is Dr. Robert Hirsch, the Associate Director for Water for the U.S. Geological Survey.

Dr. Hirsch, you may begin your testimony.

STATEMENT OF ROBERT M. HIRSCH, ASSOCIATE DIRECTOR FOR WATER, U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

Mr. HIRSCH. Good afternoon, Mr. Chairman and members of the Subcommittee.

Thank you for the opportunity to report on the status of water conditions in the Western United States as monitored by the USGS.

I would like to summarize my written testimony at this time.

The USGS Water Resources Program provides reliable, impartial, and timely information about the Nation's water resources. We work closely with local, State, tribal, and Federal agencies and the private sector to provide them with the information they need to make informed decisions. In particular through our Cooperative Water Program, we partner with over 1,300 non-Federal agencies to carry out our data collection and hydrologic studies missions.

For over a century, the USGS has played the key role in monitoring the flow of our Nation's rivers. Currently, we operate about

7,000 streamgages, and we freely provide the data to a wide range of users. This information is used for a multitude of purposes, including water supply planning and operations, flood risk assessment and warning, water quality management, and recreational safety. We are in the process of modernizing this network, and at this time, about 5,000 of the streamgages have satellite telemetry that enables us to provide near-real-time data to all users via the Internet.

Using these data, I will describe the current Western surface water situation and changes that have occurred in recent weeks and also place this in a national context. The illustration I have here gives an indication of that.

I will rely on this illustration, which is one that we create daily and place on the USGS web site. It is based on conditions for the preceding week at all USGS streamgaging stations that have 30 or more years of record and have telemetry systems—about 2,300 stations nationwide. Each dot on the map represents an individual streamgage. They are color-coded, with red indicating where the flows for the week were the lowest ever recorded for that time of year, brown indicating flow that was below the 10th percentile, orange between the 10th and 25th percentile, green indicating normal, light blue the 75th to 90th percentile, dark blue above the 90th percentile, and black representing record high flows for that time of year.

The map that you see in front of you is current as of Sunday night of this past weekend.

Hydrologically, conditions in the West are quite varied at the present time. The Southwest is having relatively normal conditions, a pattern that we have been observing since last November. Most of the Great Plains from the Dakotas to Texas are experiencing normal to above normal streamflows; in fact, in Eastern Texas, a number of rivers and streams have recorded new daily high flows during the past month.

In contrast, the Pacific Northwest is experiencing below normal streamflows in response to winter season precipitation that has averaged only 25 to 75 percent of normal.

The most serious low-flow conditions are occurring in Washington and Oregon. Notably, below normal streamflows were recorded at 90 percent of our real-time streamgages in Oregon last week, and at 75 percent of the streamgages in Washington. Conditions have moderated slightly in the last week but not enough to be anything close to an end to this drought situation.

The snowpacks in river basins in these States is generally less than 60 percent of average this year. The low seasonal precipitation and the currently low reservoir storage have resulted in spring and summer stream flow forecasts of less than 70 percent of average for most areas in Washington and Oregon. The outlook for Idaho is even worse, with forecasted spring and summer flows of less than 70 percent of average.

Nearby States, such as Montana and Wyoming, are also experiencing low streamflows, snowpack and soil moisture, although the dryness is less severe than in the Pacific Northwest. Northern California, particularly the Northern Sierra Nevada, had relatively dry conditions and low streamflow earlier in the winter but has

recovered considerably during the past month. Currently, reservoir contents are about normal across California, as are daily and weekly average streamflows.

It is worth noting that unlike the current situation in the East, in Florida and particularly Western North Carolina, where drought has persisted for more than two years and enormous moisture deficits have accrued, the dryness in the Northwest is only about four months old. Admittedly, it came at the worst possible time of year since the region depends on winter season precipitation and snowpack to meet the spring and summer water demand. Even so, the current situation would have been much worse had there not been normal to above normal precipitation during the preceding 18 months.

The streamgaging network measures the pulse of the Nation's rivers and enables us to produce a snapshot of conditions such as I have used here. We have worked closely with the Congress over the last three years on issues relating to the modernization and stability of the network, and with the support of Congress, we have been able to reverse the decline in the network. We are in the process of adding 37 new stations and reactivating 73 others this year.

Modernization of our ground water level monitoring has not progressed to the point where we can provide the same kind of synoptic view of ground water conditions as we presented here today for surface water. However, we believe that the science of ground water hydrology is crucial to water management in the West and nationwide. Conjunctive use of surface and ground water has great potential for making water supplies more drought-resistant. Ground water is crucial to sustaining streamflow and temperature conditions for habitat and for water supply. We believe that ground water technologies such as artificial recharge, aquifer storage and recovery, and recharge of reclaimed wastewater, are pivotal parts of the water management equation.

The science to support the use of these new technologies is a part of our strategic plan for the future of USGS ground water science.

I thank the Subcommittee for this opportunity to testify and look forward to answering your questions today and working with you over the coming months and years.

Mr. CALVERT. Thank you for your testimony.

[The prepared statement of Mr. Hirsch follows:]

**Statement of Robert M. Hirsch, Associate Director for Water,
U.S. Geological Survey, Department of the Interior**

Good afternoon, Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to report on the status of water conditions in the Western United States as monitored by the U.S. Geological Survey (USGS). Because this is the first appearance of the USGS before this Subcommittee in the new Congress and before you as Chairman, allow me to start with a few preliminary thoughts about the role of the USGS.

The USGS is a science agency within the Department of the Interior with a history of 122 years of providing scientific information needed for the wise management of our Nation's natural resources. The study of water goes back to our very early years and the work of our second Director John Wesley Powell who focused much attention on the availability of water resources for the economic development of the West. The USGS of today consists of four major program areas: Geology, Mapping, Biology, and Water. The USGS strives to combine these four disciplinary areas to provide a more complete data and analysis of the resource and environmental issues that our Nation faces today.

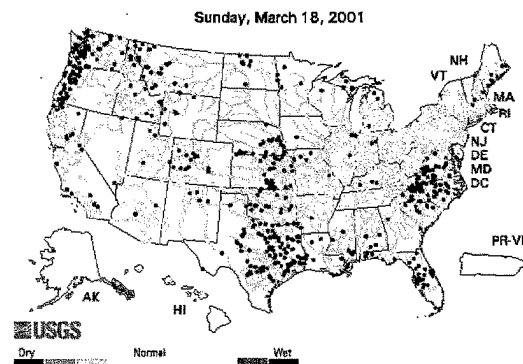
The USGS water resources program provides reliable, impartial, timely information that is needed to understand the Nation's water resources.

It is crucial to note that the USGS provides unbiased science to resource and regulatory decision makers. We work closely with local, State, tribal, and Federal agencies, and the private sector to provide them with the information they need to make informed decisions. Of particular interest to the Committee may be our Cooperative Water Program, through which we partner with over 1300 non-Federal agencies to carry out data collection and hydrologic studies.

For over a century the USGS has played the key role in monitoring the flow of our Nation's rivers. We operate about 7000 streamgages, which monitor the flow of water in our Nation's rivers and streams, and we freely provide the current and historical data to a wide range of users. This information is used for purposes that include: water supply planning, flood risk assessment, water quality management (including calculation of Total Maximum Daily Loads), water supply operations, streamflow forecasting (done primarily by the National Weather Service and the Natural Resources Conservation Service), habitat assessments, and personal planning of river-based recreational activities. Currently, we are in a process of modernizing this network. At the present time, about 5000 of these stations have satellite telemetry that enables us to provide near-real-time data to all users via the Internet.

Using these data, and information from other agencies, I will describe the current Western surface-water situation, variations and changes that have occurred in recent weeks and also place this in a national context. To do this I will rely on an illustration that we create daily and place on the USGS website. It is based on conditions for the preceding week at all USGS streamgaging stations that have 30 or more years of record and have telemetry systems. Each dot on the map represents an individual gage. They are color coded with red indicating that flows for the week were the lowest ever recorded for that time of year, brown indicating that flow was below the 10th percentile, orange was between the 10th and 25th percentile, green indicates normal (25th to 75th percentile), light blue is 75th to 90th percentile, dark blue is above the 90th percentile, and black represents record high flows for this time of year.

Figure 1. AVERAGE STREAMFLOW FOR THE WEEK ENDING MARCH 18



Hydrologically, conditions in the West are quite varied at the present time. The Southwest is having relatively normal conditions, a pattern that we have been observing since last November. Most of the Great Plains, from the Dakotas to Texas are experiencing normal to above-normal streamflows; also a persistent pattern during recent months. In eastern Texas, a number of rivers and streams have recorded new daily high flows during the past month, while flood flows have been observed at many others.

In contrast, the Pacific Northwest is experiencing below-normal streamflows in response to winter season precipitation that has averaged only 25 to 75 percent of normal. Currently, 75 percent of USGS real-time streamgages in this region are reporting below-normal flows.

The most serious low flow conditions are occurring in Washington and Oregon. Notably, below normal streamflows were recorded at 90 percent of our real-time stations in Oregon last week and at 75 percent of the gages in Washington. The snowpack in river basins in these States is generally less than 60 percent of aver-

age. There are also significant deficiencies in reservoir storage. Statewide, the useable contents of reservoirs in Washington are about 50 percent of average, while those in Oregon are only slightly better at 75 percent of average. The low seasonal precipitation and the currently low reservoir storage have resulted in spring and summer streamflow forecasts of less than 70 percent of average for most areas in Washington and Oregon. The outlook for Idaho is even worse, with nearly the entire State forecast to have spring and summer flows of less than 70 percent of average.

Nearby States, such as Montana and Wyoming are also experiencing reduced streamflows, snowpack, and soil moisture, although the dryness is less severe than in the Pacific Northwest. Indeed, although the useable contents of reservoirs in Montana are about 60 percent of average, those in Wyoming are actually above average. Still, more than 60 percent of the real-time streamgages in both States are reporting below-normal flows. Northern California, particularly the Northern Sierra Nevada, had relatively dry conditions and low streamflows earlier in the winter, but has recovered considerably during the past month. Currently, reservoir contents are about normal statewide, as are daily and weekly average streamflows.

It is worth noting that, unlike the current situation in Florida and western North Carolina where drought has persisted for more than two years and enormous moisture deficits of more than two feet have accrued, the dryness in the Northwest is only four months old. Admittedly, it came at the worst possible time of year since the region depends upon winter season precipitation and snowpack to meet the spring and summer water demand. Even so, the current situation would have been much worse had there not been normal to above-normal hydroclimatic conditions during the preceding 18 months.

The streamgaging network, that measures the pulse of the Nation's rivers (and enables us to produce a snapshot of conditions such as I have used here), is a high priority for the USGS. We have worked closely with the Congress over the last three years to explore the issues relating to the modernization and stability of the network.

I should also briefly mention the importance of ground water as an indicator of drought and as an important aspect of the mechanisms available to communities, agriculture, and industry as insurance against drought. While our ground-water level monitoring networks have not been modernized to a level where we can provide the same kind of synoptic view of ground-water conditions as we presented for surface water, we anticipate improvements in the next few years. We believe that the science of ground-water hydrology is crucial to water management in the West and nationwide. Conjunctive use of surface and ground water has great potential for making water supplies more drought resistant. Ground water is crucial to sustaining streamflow for habitat and for water supply. More and more we find that our partners are interested in the role that ground water plays in maintaining adequate flow and temperature conditions in rivers.

We also find that emerging technologies such as artificial recharge, aquifer storage and recovery, and recharge of reclaimed wastewater are pivotal parts of the water management equation. The science to support the use of these new technologies is a part of our strategic plan for the future of USGS ground-water science.

I thank the Subcommittee for this opportunity to testify and I look forward to answering your questions today and working with you over the coming months and years.

Mr. CALVERT. Our next witness is Mr. Michael Brophy, Chairman of the Western States Water Council.

Mr. Brophy, you may proceed with your testimony.

**STATEMENT OF MICHAEL J. BROPHY, CHAIRMAN,
WESTERN STATES WATER COUNCIL**

Mr. BROPHY. Thank you, Mr. Chairman, members of the Subcommittee.

My name is Mike Brophy, and I am Chairman of the Western States Water Council. I have with me here today Mr. Tony Willardson, who is on the Council staff.

The Council is comprised of representatives appointed by the Governors of 18 Western States. The Council is charged with fostering interstate cooperation in water resources and protecting

vital State prerogatives with regard to the management of water resources in the West.

While necessarily expressing my personal views in this testimony, I will rely heavily on positions that the Council has taken consistent with the request by the Subcommittee, and with the leave of the Chair, I will summarize my written testimony.

The Subcommittee has asked that I address the current situation of water in the West, particularly from the perspective of the Council. This invitation is appropriate because States play the pivotal role in both water quantity and quality allocation in the Western United States.

I wish to begin by emphasizing that in the arid West, providing adequate water supplies to meet current and future demands continues to be the priority. This priority is underscored by the current extent of drought in many areas of the West. Streamflows in much of the West are expected to be less than 70 percent of average, with the entire Columbia River Basin expected to prove the second driest year in recorded history.

These drought conditions are a major factor in the current energy crisis. Western States are particularly cognizant of the water needs of rural communities. They also remain concerned about the claims being asserted by Indian tribes to water resources and the potential of such claims to disrupt existing rights in non-Indian communities, underscoring the desirability of cooperative efforts with the tribes and their Federal trustee in addressing tribal needs. In this regard, the Council has acted with other members of the so-called Ad Hoc Group on Indian Water Rights in encouraging the settlement of Indian land and water rights claims, particularly with regard to identifying an alternative funding mechanism for funding such settlements. A recent letter from the Ad Hoc Group further explaining this effort is attached to my written testimony.

The Federal Government also has claims to substantial amounts of water in the West on its own behalf given the extent of Federal land ownership. These claims are most often presented within the context of State general stream adjudications, where the water rights of all claimants in a given stream system are ascertained. In this regard, this Congress should address the inequity that now results from exempting the Federal Government from paying any filing fees or costs associated with these adjudications. I have attached the Council's position which explains our support for a remedy, now before Congress in the form of H.R. 705.

There is significant need for the Federal Government to work with States and others in providing reliable water data. In particular, as Congress considers the budget, we urge you to recognize the serious need for adequate and consistent Federal funding to maintain and restore NWCC's SNOTEL System and USGS's Cooperative Streamgaging Program, with a primary focus on coordinated data collection and dissemination. I have appended a position recently adopted by the Council explaining the Western States' position in support of these programs. They provide vital data necessary for water management and the protection of human life and property. The snow measuring program and the

streamgaging programs are important national infrastructure which must be maintained.

Finally, I wish to reiterate the importance of the long-held congressional policy of deference to States regarding water management. States are moving to address the challenges they face in water resources. Federal preemption of State authority is not the way to address the complex challenges associated with water management in the West. Rather, what is necessary is encouraging partnerships between the State and Federal agencies in the development and implementation of key policies, supporting the pivotal role the States must play in addressing these challenges, and affording flexibility for ongoing innovation at the State level in order to effectively carry out this role.

Thank you very much. I appreciate the opportunity to testify.

[The prepared statement of Mr. Brophy follows:]

Statement of Michael J. Brophy, Chairman, Western States Water Council

My name is Michael Brophy. I am Chairman of the Western States Water Council. The Council is comprised of representatives appointed by the governors of eighteen western states. The Council has been charged with fostering interstate cooperation in water resources and protecting vital state prerogatives with regard to the management of water resources in the West. While necessarily expressing personal views in my testimony, I will rely heavily on positions of the Western States Water Council consistent with the request by the Subcommittee. To my written testimony, I will also append for the record positions of the Council for your reference.

The Subcommittee has asked that I address the Current Situation of Water in the Western United States from the Perspective of the Western States Water Council. This invitation is particularly appropriate, because states play the pivotal role in both water quantity allocation and water quality protection in the West. Further, a recent survey of our member states provides a basis for my remarks.

I wish to begin by emphasizing that in the arid West, providing adequate water supplies to meet future demands continues to be a priority. This priority is underscored by the current extent of drought in many areas of the West. Streamflows in much of the West are expected to be less than 70% of average, with the entire Columbia River Basin expected to produce the second driest year in recorded history. These drought conditions are a major factor in the current energy crisis. Western states are particularly cognizant of the water needs of rural communities. They also remain concerned about the claims being asserted by Indian tribes to water resources and the potential of such claims to disrupt existing rights in non-Indian communities, underscoring the desirability of cooperative efforts with the tribes and their Federal trustee in addressing tribal needs. In this regard, the Council is active with other members of the so-called Ad Hoc Group on Indian Water Rights in encouraging the settlement of Indian land and water right claims, particularly with regard to identifying an alternative mechanism for funding such settlements. A recent letter by the Ad Hoc Group further explaining this effort is attached to my written testimony.

The Federal Government also has claims to substantial amounts of water in the West on its own behalf, given the extent of Federal land ownership. These claims are most often presented within the context of state general stream adjudications, where the water rights of all claimants in a given stream system can be ascertained. In this regard, this Congress should address the inequity that now results from exempting the Federal Government from paying any filing fees or costs associated with these adjudications. I have attached the Council's position which explains our support for a remedy, now before the Congress in the form of H.R. 705.

While virtually every western state needs additional supplies to meet growing consumptive use demands, western states also recognize the need for existing water infrastructure rehabilitation. Further, they also recognize as a significant challenge, the need to sustain instream values generally, and specifically for maintaining and enhancing water quality, and for protecting endangered species. The West is often subject to wide swings in water supply. Thus, states identify drought planning and response as a priority problem, and similarly flag flood planning and response. Overlaying many of the above challenges are legal and institutional conflicts facing

western states, involving Federal/state relationships, conflicts between states, and disputes among water users, among others.

To meet these increasing demands, several states are considering additional surface reservoirs, which, for the most part, will be smaller in scale than the large projects of the past, more innovative, environmentally sensitive, and financed primarily from state and local resources. The reallocation of water from existing uses to other uses will likely accelerate, chiefly from agricultural uses to other uses, primarily municipal. While states will often facilitate such transfers to meet specific water supply and environmental challenges, in some cases they may restrain market transfers, not only to protect third parties, but also the public interest in general.

While recognizing the limits of water conservation in providing new water and additional caveats relating to the site-specific impacts of water conservation measures, states are carefully considering opportunities to stretch existing supplies of water through more efficient use, reuse, and reservoir reoperation (prior to the development of new storage facilities). States are further exploring opportunities to cost-effectively manage ground water recharge, recognizing it as a potentially significant storage alternative, and some states are further pursuing the potential of desalinization and weather modification to augment existing supplies.

As the emphasis on the importance of water conservation increases, states are developing and adopting a number of programs to encourage such measures as low water-use landscaping, and water rates that encourage conservation in urban areas, and development of conservation plans and incentives and leak detection programs in rural/agricultural settings. The reuse of wastewater effluent is also increasing. Many communities are currently reusing effluent for landscape and agricultural irrigation. To facilitate a reallocation of existing uses to augment supplies in areas of relative scarcity, some states have established water banks, while others have adopted measures to streamline the transfer process.

Western states have made innovations in their laws and institutions in order to augment and protect instream flows and to incorporate consideration of the public interest in their water right application and transfer processes. States are also endeavoring to incorporate innovations in their water quality programs, particularly regarding non-point source pollution. States have adopted various measures to deal with the problem of ground water depletion. States have also strengthened their capacity to deal with floods and drought. Innovations to improve information on water availability and use are common.

States in the West have recognized and moved to enhance the potential value of local watershed coordination initiatives. As conflicts over water use intensify in an era of both increasing and changing demands, states are also addressing the need to deal more effectively with these disputes. For a variety of reasons, states are also increasing their emphasis on maintaining and enhancing the environment. These reasons include, but are not limited to, Federal mandates such as the Endangered Species Act and the Clean Water Act.

Given the diminishing Federal resources available to carry out the requirements of these and other Federal acts, and the concurrent increase in the state burden for environmental protection, states urge that increased flexibility be given regarding their implementation, so that states and others can tailor programs and prioritize resources to meet real needs. Streamlining Federal permit processes is also important. The Federal Government should encourage innovations, which frequently involve market incentives and non-regulatory tools, as they have often been found to work more effectively than top-down regulation. The Council has, for example, urged flexibility in implementing the Total Maximum Daily Load program under the Clean Water Act. Further, the Federal Government continues to have an important role with regard to disaster response and other mitigation associated with droughts and floods.

There is a significant need for the Federal Government to maintain and rehabilitate its existing water storage infrastructure, and to work with states and others in providing reliable water data. In particular, as Congress considers the budget, we urge it to recognize the serious need for adequate and consistent Federal funding to maintain, restore, modernize, and provide for targeted expansion of NWCC's SNOTEL System and Soil and Climate Analysis Network (SCAN), and USGS's Cooperative Streamgaging Program and National Stream Information Program, with a primary focus on coordinated data collection and dissemination. I have appended a position recently adopted by the Council explaining the western states position in support of these programs.

Finally, I wish to reiterate the importance of the long-held Congressional policy of deference to states regarding water management. States are moving to address the challenges they face in water resources. Federal preemption of state authority

is not the way to address the complex challenges associated with water management in the West. Rather, what is necessary is encouraging partnerships between the state and Federal agencies in the development and implementation of key policies, supporting the pivotal role states must play in addressing these challenges, and affording flexibility for ongoing innovation at the state level in order to effectively carry out this role. Thank you.

Position No. 231 (See also No. 219) adopted November 14, 1997

RESOLUTION OF THE WESTERN STATES WATER COUNCIL REGARDING FEDERAL NON-TRIBAL FEES IN GENERAL ADJUDICATIONS

Grand Junction, Colorado

October 20, 2000 (revised and reaffirmed)

WHEREAS, states must conduct lengthy, complicated and expensive proceedings to establish the relative rights to water in water rights adjudications; and

WHEREAS, Congress recognized the necessity and benefit of requiring the United States claims to be adjudicated in these state adjudications by adoption of the McCarran Amendment; and

WHEREAS, those claiming and establishing their right to water, including Federal agencies, are the primary beneficiaries of adjudication proceedings by having the states officially quantify and record these water rights; and

WHEREAS, the courts have determined that under the McCarran Amendment the United States need not pay fees for processing Federal claims; and

WHEREAS, the Federal claims are typically among the most complicated and largest of claims in state adjudications; and

WHEREAS, if the United States does not pay a proportionate share of the costs associated with adjudications, the burden of funding the proceedings unfairly shifts to the state and other water users and often delays completion of the adjudications by depriving the states of the resources necessary to complete them; and

WHEREAS, delays in completing adjudications result in inability to protect private and public property interests or determine how much unappropriated water may remain to satisfy important environmental and economic development priorities.

NOW THEREFORE BE IT RESOLVED that the Western States Water Council again ask the Congress to recognize that requiring states and private users to fund processing of Federal, non-tribal claims in water rights adjudications unfairly shifts the burden of funding these proceedings away from the parties who derive the greatest benefit from the proceeding and effectively establishes an unfunded mandate; and

BE IT FURTHER RESOLVED that the Council continue urging Congress to pass legislation narrowly tailored to establish that the United States, when a party to a general adjudication shall be subject to fees and costs imposed by the state to conduct the proceedings to the same extent as private users.

**Ad Hoc Group
on
Indian Water
Rights**

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January 18, 2001

Members of the Bush Administration Transition Team for the Dept of Interior
c/o Ann Klee, Chief Counsel
Senate Committee on Environment and Public Works
410 Senate Dirksen Office Building
Washington, DC 20510

Dear Ann:

We write to urge your support of the necessary funding to: (1) provide for federal negotiating teams working with Tribes and affected non-Indians to achieve Indian water right settlements, and (2) to assure implementation once such settlements are achieved and approved by the Administration and the Congress.

By way of background, the Ad Hoc Group on Indian Water Rights was formed in response to an initiative undertaken first by the Western Regional Council (a group of large businesses oriented towards natural resources development in the West). Recognizing the potential complications and uncertainties that unsettled Indian water rights claims represented, the Western Regional Council developed proposed legislation in 1981 to quantify Indian water rights. The Tribes opposed the legislation, but from these discussions arose an interest in beginning a dialogue on what would be an acceptable approach to settling Indian water rights claims. Subsequently, the Western Governors' Association was brought into these discussions, and thereafter the Western States Water Council.

In the course of these discussions, it was generally agreed that there was a need to quantify Indian water rights, and that negotiated settlements were preferable to litigation for purposes of quantifying these rights. Additionally, it was agreed that such settlements should be encouraged and facilitated by the federal government, both in terms of assisting in the negotiations, as well as in providing appropriate funding for the settlements. From these discussions and related efforts evolved a process that contributed to the approval of several Indian water rights settlements.

The Ad Hoc Group has sponsored workshops in Washington, D.C. for representatives of the Department of Interior, Department of Justice, Office of Management and Budget, House and Senate committee staff, and tribal and local groups to identify problems associated with the approval of such settlements and to discuss ways to address these problems. These workshops helped refine and improve the process for settlement.

For some years following 1992, however, the process for settlement appeared to have broken down due to several factors including a lack of commitment from key federal agencies. Few negotiating teams were being formed, few new settlements had been approved, tribes were returning to the courts to get their rights established, agreements which had been approved were experiencing difficulties in being implemented, and funding had all but disappeared. However, with continued support from the Ad Hoc Group members and others, the process was reinvigorated. The Department of Interior created the Federal-Tribal Water Funding Task Force to look at issues of funding settlements, and also assigned new personnel to work on these issues. These steps recognized that the biggest obstacle to further success is assurance that approved settlements will be funded once authorized by Congress, without adverse consequences to Indian programs.

Three settlements were approved by the last Congress and others are expected to be submitted to the new Congress. Approved settlements need funding support. Moreover, for continued success with Indian land and water disputes, there must be sufficient funding to support the negotiating teams in their efforts.

The members of the Ad Hoc Group on Indian water rights have consistently supported the negotiated settlement of Indian land and water right disputes. We believe that the funding of land and water right settlements is an important obligation of the United States government. We urge that steps be taken to change current budgetary policy to ensure that any land or water settlement, once authorized by the Congress and approved by the President, will be funded without detriment to other important programs within the Department of Interior. We would be pleased to meet with you at your convenience to further discuss these matters. Thank you.

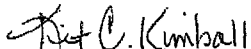
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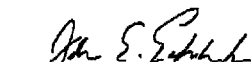
The Honorable Jane Dee Hull, Co-Lead Governor on Indian Water Right Settlements
Western Governors' Association



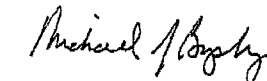
The Honorable John Ritzhaber, Co-Lead Governor on Indian Water Right Settlements
Western Governors' Association



Kit Kimball, Director
Western Regional Council



John Echohawk, Executive Director
Native American Rights Fund



Michael Brophy, Chairman
Western States Water Council

cc: David Hayes, Deputy Secretary of Interior (Designated Contact for Interior Transition)
Chair and Ranking Minority Member, House Budget Committee
Chair and Ranking Minority Member, House Resources Committee
Chair and Ranking Minority Member, Senate Budget Committee
Chair and Ranking Minority Member, Senate Indian Affairs Committee

Mr. CALVERT. Thank you for your testimony.

We will now begin questions, and we have a 5-minute rule. I will begin the questioning, and we will alternate between majority and minority.

Mr. McDONALD, currently, the Bureau is facing a \$5 billion backlog and potentially up to \$7 billion in new project needs in the next several years. How are you proposing to move these projects forward with your limited budget?

Mr. McDONALD. It is true, Mr. Congressman, that there is a considerable number of authorized new projects, particularly in the last two or three years, as you noted. We certainly evaluate carefully as we put our budget request together what we think the relative priorities of funding needs are.

I can assure you that our first priority is to maintain and operate the existing infrastructure along the lines that I testified to and then, within the budget constraints we face, to identify the priorities for additional work that might be possible. Obviously, the particulars await the release of the President's budget request in a couple of weeks.

Mr. CALVERT. You mentioned in your testimony that the Bureau's infrastructure is aging.

Mr. McDONALD. Yes, sir.

Mr. CALVERT. In what ways will the dams, canals, and other waterway delivery systems be affected by this and our future reliability for water?

Mr. McDONALD. Our view, Congressman, is that as long as we invest in the appropriate operation, maintenance, and rehabilitation of these facilities, they will be reliable for decades to come. There is no reason for them to ever arrive at a physical condition where they are not reliable in providing sustainable supplies.

Mr. CALVERT. Are there any specific projects out there that show any potential for problems in the immediate future?

Mr. McDONALD. There certainly are projects that we have lined up in our respective operation and maintenance priority systems and in our dam safety program that we are looking 2, 3, 4 years down the road for funding requirements in order to carry out the appropriate level of activity.

Mr. CALVERT. Specifically, are any of these threatening the immediate water supply in the next several years?

Mr. McDONALD. Not that I am aware of, no, sir.

Mr. CALVERT. Last year, the Bureau sent legislation to increase funding for dam safety, which we passed, but the Senate did not act on, which is not surprising around here. What is the status of dam safety legislation, and will the Bureau be sending it again to Congress?

Mr. McDONALD. In our judgment, Mr. Chairman, we have an adequate authorized ceiling with the amount that was included in the appropriations bill for this year to handle our dam safety program through this fiscal year; but it is our judgment that we will need additional authority before the end of this calendar year so that we can continue on into Fiscal Year 2002. The four projects that would be affected in Fiscal Year 2002 are Deadwood Dam in Idaho, Grassy Lake, and Glendo Dams in Wyoming, and Warm Springs in Oregon, and we will need an increased ceiling to proceed

in Fiscal Year 2002 with those. Until we have a new commissioner, I do not know that the new administration will have an opportunity to entertain dam safety legislation proposals, but certainly it is a matter that we will bring to the attention of the new commissioner at the earliest opportunity.

Mr. CALVERT. This is one of my last questions to you, and you could probably take the rest of the day to answer it, but in what ways is the Bureau of Reclamation planning for meeting the growing water demand in the West?

Mr. McDONALD. I think that to conserve time, I will emphasize three things. First, as I testified to, we think there is a place in the future of water management in the West for voluntary transfers between willing sellers and buyers.

Secondly, we are certainly working with States, watershed organizations, local districts, Indian tribes and others in planning activities, particularly in a watershed ecosystem context, that deal with the whole range of competing water supply needs.

Finally, I would emphasize that investing in applied science and technology to develop products that enhance water user flexibility to address future challenges is very much part of that planning process.

Mr. CALVERT. How about surface water storage sites—did you mention any of those?

Mr. McDONALD. We certainly have an authorization from Congress for the Animas-La Plata project and would hope to move forward with that. Beyond that, I cannot think of any new authorizations that we have.

Mr. CALVERT. Are you looking at identifying future potential storage sites in the West?

Mr. McDONALD. I am aware of some of our planning studies that do identify new sites, yes, sir.

Mr. CALVERT. In what areas has the Department of Reclamation coordinated with State and Federal agencies to plan for droughts?

Mr. McDONALD. Our authorities for drought, Mr. Chairman, are under the Reclamation States Emergency Drought Relief Act of 1991. It essentially provides us with two authorities—first of all, an authority to provide financial and technical assistance for development of drought contingency plans. We have had agreements and done that with Arizona, Hawaii, New Mexico, Oklahoma, Utah, and a number of Indian tribes, and then in the face of a natural drought, we have some limited authority to construct temporary facilities and to deal with management practices through the duration of the drought.

Mr. CALVERT. Thank you. I will have another round and will be coming back to you all.

Ms. Solis, would you like to ask some questions?

Ms. SOLIS. Thank you, Mr. Chairman.

I was curious—you mentioned that there were some plants that were down, but it was not affecting hydroelectricity in the State of California. Which plants were you talking about, specifically?

Mr. McDONALD. In the course of normal maintenance, Congresswoman, we have two units out of 26 in the Upper Colorado Region system. One of those is at Glen Canyon Dam, one is at Blue Mesa in Colorado. In the Lower Colorado Region, we have six units out

of 28 units down; three of those are at Hoover, a couple more upcoming at Hoover—they are not down right now, but they are scheduled for maintenance in the next few weeks—and then, there is a unit down at Davis and one up for testing.

We will have all of those back up on line, generally speaking, between the 5th of April and the 31st of May, and again, the fact that those units are down has in no way affected generation and capacity, because the ones that are up and running can take more than the water that is available to run through them at this current time.

Ms. SOLIS. It still does not solve our problem.

Mr. McDONALD. It does not; I understand.

Ms. SOLIS. Just a last question. In reading your testimony, I know you did not read everything, but regarding the Reclamation Reform Act and trying to encourage water conservation, how far along would you say we are with actually advancing that technology? You mentioned drip irrigation, conservation technology. How far along are we, and what do we need to do to help move those farmers along?

Mr. McDONALD. I think that in the last 5 or 10 years, there has been considerable progress. Organizations like the Western States Water Council, which is here to testify in the form of Mr. Brophy, are working with other Federal agencies, working with individual districts, we have had some very successful and innovative programs in the last several years, and I am personally finding a lot of excitement in the irrigation community because a lot of these improvements make financial sense to the farmer—that is what their interest in it is—as well as all the environmental and agricultural benefits that it has.

Ms. SOLIS. Thank you.

Thank you, Mr. Chairman.

Mr. CALVERT. Thank you, Ms. Solis.

Mr. Osborne?

Mr. OSBORNE. Thank you, Mr. Chairman.

Thank you for being here today. I appreciate it.

I have a fairly general question. I notice that with our current situation, it appears that perhaps additional storage is needed in the West; yet I also know that there are certain interests that would do away with dams altogether. I was interested in where you feel the equilibrium is. Is there a possibility of increasing storage at this point, or is the political climate such that it makes it difficult to do anything new?

Mr. McDONALD. My personal view, Congressman, is that it is certainly not out of the realm of possibility that there will be new dams and storage reservoirs constructed in the future. I do not think there is any doubt that that will happen. I think, however, that it will be done on a very selective basis, and it will be done as a suite of water management activities not to the exclusion of improvements in efficiency of use, transfers among existing users, and that kind of thing.

Mr. OSBORNE. Thank you.

I have a question for Mr. Hirsch. There were a couple of terms in your testimony that I was not aware of. You mentioned “artificial recharge” and “aquifer storage.” Could you amplify on those a

little bit, because they caught my attention, but I did not know exactly what they were.

Mr. HIRSCH. Yes. Artificial recharge is any attempt by humans to increase the rate at which water enters the ground water system, enters into an aquifer. This can involve spreading water on the surface; it can be putting water into a streambed that might otherwise be dry. This may be wastewater, it may be water collected in some manner to supplement water supply.

Aquifer storage and recovery is one very specific technology of artificial recharge where one in fact injects water into an aquifer—at times when there is a lot of water available and a rainy season, let us say—injects it into the aquifer and then withdraws it from the very same well during a dry period.

These technologies are widely in use in Southern California, in Florida, in Arizona, and in a number of other very arid parts of the country, although I think their use is spreading. There is a whole host of scientific questions about their efficacy, and it is an area that we have been working on, but it is of interest to note that particularly in places like the Everglades or in CALFED, two major ecosystem restoration programs around the country, these technologies have been proposed as a major aspect of the restoration plan.

Mr. OSBORNE. Thank you.

Mr. McDonald, I have a question regarding your statement that 85 to 90 percent of the water consumed in the West is devoted to irrigation, and with the needs of municipalities and other needs, there might be transfers of water. Do you see the amount of irrigated acres eventually decreasing, either voluntarily or involuntarily, or do you feel that we can maintain the present amount of irrigation that we now have and still maintain the municipal needs that are developing?

Mr. McDONALD. My personal judgment would be that the economics of irrigated agriculture are such that there will be a small decline over time. I think relatively speaking, though, that what we need to keep in mind is that a very small reduction in the agricultural sector can support a vastly increased population, so I think they are relatively minor marginal changes, and I think they are going to be ones which are accommodated in the context of State law and willing sellers who desire to go out of business.

Mr. OSBORNE. Is there any difficulty transferring water—are you talking about from one drainage to another, or simply water within a drainage allocated to different usages?

Mr. McDONALD. Throughout the West, I have seen examples of both, where the proposed retirement of agriculture would result in a diversion from one basin to another basin. I have also seen examples that are within a basin. All, of course, are subject to State law; that will be the principal guiding institutional mechanism under the State's water rights systems.

Mr. OSBORNE. Thank you very much. No further questions, Mr. Chairman.

Mr. CALVERT. Thank you, Mr. Osborne.

Ms. Napolitano?

Ms. NAPOLITANO. Thank you, Mr. Chairman, and I certainly thank you for bringing the agencies here to speak to such a great and pertinent issue for California—water.

I have several questions. First of all, the U.S. Geological Survey Water Resources Division has a monitoring tool which is vital in drought prediction. I want to be sure that we get a copy of something of that nature. I am not quite sure who has it, and I would like to see what it says, because in California, we went through a drought 8 or 10 years ago, and it was not a nice thing. So I think we need to be sure that we are living up to some of the things that were recommended and that we are doing the best that we can. I am not sure if I can get it, and I am sure other members would be interested in seeing that—

Mr. CALVERT. We will ask for any documentation like that to be submitted to us, and we can distribute that to the members.

Ms. NAPOLITANO. Thank you. The other question of Mr. Hirsch is on the streamgaging network. Do you feel that the Administration is going to continue to support adequate funding for the program itself to at least give the communities warning outlooks across the Nation?

Mr. HIRSCH. I think we have to wait for the President's budget to come out to see what the status of that is.

Ms. NAPOLITANO. What is going to be your proposal, or what has it been?

Mr. HIRSCH. The Administration needs to come forward; we need to simply see what the Administration's proposal is, which will come out in the next two weeks.

Ms. NAPOLITANO. Okay, but you are not proposing either full funding or anything of that nature?

Mr. HIRSCH. We have been interacting with many, many stakeholders on the issue of streamgaging, which has been of great interest. We have had requests for congressional reports to the Congress by the Appropriations Committee. So we have gone on record a number of times describing what we think is needed for the Nation from a flood warning and water management and scientific standpoint and have had a series of stakeholder meetings, including one just recently out in the West with some of the State engineers, where we have described our long-term plans and objectives for a national streamgaging program. We would be happy to share that information with you.

Ms. NAPOLITANO. Mr. Chairman, may I ask that that information be submitted to the Committee?

Mr. CALVERT. Without objection.

Ms. NAPOLITANO. Mr. McDonald, what is the status of the Southern California Regional Water Recycling Study? That is of vital interest to me and others because of the great amount that has already been done in recycling with the different entities that I serve. If we had the study—I do not know when it is coming out, I do not know the status of it—I would like to have your answer to let us know when we can expect it.

Mr. McDONALD. Off the top of my head, Congresswoman, I am sorry that I do not remember the particulars. I would be glad to respond promptly through the record within a day or two, if I may.

Ms. NAPOLITANO. I would also like to have that submitted to this Committee.

Mr. McDONALD. That is fine; I would be glad to.

Ms. NAPOLITANO. Mr. Chairman, that is a recycling study that has been pending for a while.

Mr. CALVERT. Without objection.

[Information furnished by Mr. McDonald follows:]

The Southern California Comprehensive Study is being finalized and will be transmitted to Congress as soon as it receives approval from the Secretary of the Interior and the Office of Management and Budget.

Ms. NAPOLITANO. And the last point that I wanted to ask about was on the Desalinization Act of 1996, which is going to be ending, or at least, that is my report—authorization for the program expires at the end of the fiscal year. Are we going to see any implementation of something that will take care of the desalinization, especially on Government lands? Are we expecting that it will be re-established, refunded, reenacted—anybody?

Mr. McDONALD. It is correct, Congresswoman, that the authorization for the program is expiring. Again, that is the kind of thing that Reclamation will be bringing to the attention of the new commissioner and new assistant Secretary as soon as they are appointed.

Ms. NAPOLITANO. And the refunding is going to be one of the recommendations?

Mr. McDONALD. I am not in a position to comment as to what we will recommend or not, but it will certainly be on the list of expiring authorizations that we will bring to the attention of the new administration.

Ms. NAPOLITANO. In other words, you do not have an answer.

Mr. McDONALD. We do not have a position yet; that is correct.

Ms. NAPOLITANO. Mr. Chair, I am not quite sure where we stand on desalinization or on the extension of that. I certainly would like to have the Committee take a look at it and see if it warrants our support to be able to urge the Administration for either a new enactment or an expansion of that Act.

Mr. CALVERT. It is something that I am certainly interested in, and I will be happy to work with the gentlelady on that.

Ms. NAPOLITANO. Thank you, sir.

Mr. CALVERT. Thank you.

Mr. Otter?

Mr. OTTER. Thank you, Mr. Chairman.

Let me include my voice in the choir thanking you for bringing these issues before us today.

I would like to start my questioning with Mr. Brophy from the Western States Water Council. Mr. Brophy, we in Idaho have been struggling with the permitting process. After we get a permit from the U.S. Fish and Wildlife Service on certain adjudication of water permits in the Upper Snake in Idaho, we turn around and have to go through another permitting process with the National Marine Fisheries Service, or vice versa—it depends. And then we find ourselves having to go through another process with FERC.

Does your organization have any enthusiasm for trying to streamline this process, perhaps having a single agency to go to and perhaps time period within which they have to respond?

Mr. BROPHY. Thank you, Congressman Otter.

Western States Water Council has been very interested in streamlining the various permitting processes that States have to go through. It is a constant complaint from State engineers and from water rights holders and others that they are put through one permitting program and then another. We have never taken a position on actually putting all permitting programs together, but we have consistently supported streamlining permitting processes and looking for innovative ways to get through the permitting process.

Mr. OTTER. As a follow-up question, in your estimation, if I were to introduce two bills, one using the legislative oversight to repeal the authority given to all other Federal agencies, and another giving one agency the authority to issue an across-the-board permit on water use and adjudication, whom would that surviving agency be? Do you have an opinion on that?

Mr. BROPHY. My personal opinion would be that it would be the Bureau of Reclamation, but I am sure there would be many others who would have other opinions.

Mr. OTTER. We will get to those opinions later.

Mr. Hirsch, do you think that irrigation is in fact a way to recharge the aquifers?

Mr. HIRSCH. Indeed irrigation does recharge aquifers in most cases. In the High Plains, for example, after a decade or two, if time elapses between the application of the water, that water does in fact reach the water table. Now, that does not mean there is not a continued decline, but in fact it does reach the water table, and we find that in many, many areas that receive surface area irrigation, those aquifers are being recharged in that process.

Mr. OTTER. And, in fact, haven't we seen a decline in recharging the aquifers from surface irrigation as a result of sprinkler and high-technology irrigation, like drip systems and those sorts of things as opposed to gravity flow?

Mr. HIRSCH. I think that that is correct. We certainly see that as the amount of water applied gets more and more accurately tailored to the amount of evapotranspiration required to grow the plants, there is less and less recharge to the aquifer.

Mr. OTTER. Thank you very much, Mr. Hirsch.

Mr. McDonald, have we had some major failure problems at Arrowrock Dam?

Mr. McDONALD. No, sir. Nothing has failed, although the five sluiceways at the bottom of the dam have, due to cavitation problems downstream from the gates, been inoperable since 1987, and of the 10 ensign valves that are in the middle of the dam, we have three locked down because we are concerned about their operational safety.

Mr. OTTER. Have you had a failure?

Mr. McDONALD. Nothing has failed as such in the sense of blowing out or being knocked out.

Mr. OTTER. In fact we have not had a loss on pressure or water, or it has not become dangerous?

Mr. McDONALD. It is a situation that is not safe, Congressman. We are in a position where the ensign valves, were they to get stuck either in the open position or in the closed position—

Mr. OTTER. Have they been stuck?

Mr. McDONALD. They have, yes, sir.

Mr. OTTER. How many times?

Mr. McDONALD. I do not know for sure, but—

Mr. OTTER. Yet since 1987, we have not used them?

Mr. McDONALD. No—we have operated the ensign valves.

Mr. OTTER. Successfully?

Mr. McDONALD. Some of them successfully, some of them not; that is why three are locked down.

Mr. OTTER. So tell me why the Bureau of Reclamation chooses a drought here, in a year when we already know that Arrowrock and the south fork of the Boise River and Anderson Ranch, that we are now going to draw down those dams in order to fix those valves?

Mr. McDONALD. Actually, ironically, a drought is the best time to do the work at this dam, because we would otherwise have to waste the water and draw the dam down so we could get at the valves. As you may understand, Congressman, they are on the upstream face of the dam, that is to say they are underwater, and to repair them, we would have to pull the dam down.

Mr. OTTER. So we are not going to have to pull it down?

Mr. McDONALD. We will not have to pull it down to wastewater; it is going to automatically get pulled down in this drought year so that we can deliver our contract supplies.

Mr. OTTER. Thank you.

Mr. CALVERT. Thank you, Mr. Otter.

Mr. Smith?

Mr. SMITH OF WASHINGTON. Thank you, Mr. Chairman, for assembling this panel and holding this hearing today on such an important issue.

I confess that jurisdictionally, I am still sort of sorting through who is in charge of what when it comes to water. I know there are lots of hands involved in terms of regulations and permitting process and all that. But since you three are here, I will ask you.

As has been discussed here, we have quite a problem with our water supply in the Pacific Northwest this year, exacerbated by a number of factors; and beyond that, we have the energy problem, since we are so dependent on water to generate power. As I said, I think it is a real shame in the Pacific Northwest that this is the year that we do not have a surplus of energy. With California needing it so badly, we could do quite well; as it is, we are going to have a hard time just keeping up.

What I am really interested in, though, is the Endangered Species Act and how it will affect all of this. There will be a number of decisions that EPA is primarily going to have to make in terms of how to use the water that may adversely affect salmon. I do not know what your knowledge is of the law—I am sure there are some environmental groups that will protest that—I am wondering how you foresee that coming out in the Pacific Northwest this year when we have a situation where, if we do not use more water, we may have a rolling blackout situation in the BPA region, but on the

other hand, to use the water could potentially violate the 4(d) rule and some of the existing regulations on salmon.

How does that come out, and how much flexibility do we really have to use that water this year with the ESA hovering over us?

Mr. McDONALD. I would be glad to try to respond, Mr. Smith, since I am the Regional Director of the Bureau of Reclamation in the Pacific Northwest and intimately involved in those day-to-day decisions.

Fundamentally, of course, we are operating in the Federal Columbia River power system, which is 12 dams of the Corps of Engineers and two of the Bureau of Reclamation, under the current Biological Opinions issued in December of 2000. In a drywater year like this, we are operating under the provisions in the Biological Opinion that provide exceptions to the requirements of the opinion for emergencies. It is the view of the Bonneville Power Administration, Corps of Engineers and Reclamation that we face such an emergency due to the financial uncertainty of the market and the fact that we have less capacity available than we should for a reliable system.

Since approximately the 1st of January, we have essentially been operating to produce power. Up until the last week or so, that power operation has fortunately matched the requirements of salmon, driven principally by the fact that the chum is the first salmon species to come back into the mainstem and start spawning in November and December. They do so below Bonneville Dam and in a couple of the small tributaries below Bonneville. They lay their eggs at high water in November, because we were generating power at the time, and we have maintained those high levels because of power.

The problems essentially are from this time forward. Under the Biological Opinion, we should have refilled reservoirs to certain targets by April 10th. The point of those targets for refilling is to balance flood control with water in storage so that we can have water to release for flow augmentation in the spring. We are going to be far, far short of being able to refill to the April 10th targets. That will then bring the next major issue about which decisions have not been made, and that is going to be how far short of the spring flow targets are we, and do we spill any water over the Corps of Engineers' facilities as opposed to running all water through the turbines for power generation.

The tradeoff fundamentally will then be between spring flow targets and summer flow targets. The closer we get to spring flow targets, the more we sacrifice storage now, which would be to the benefit of power, confidentially; but then we will have that much less water in storage come July, and we need summer flows commencing about the 20th of August going into and through most of September.

So that is the basic tension in the system. The other thing, frankly, from a water operator and power generator perspective as we balance our ESA obligations and our tribal trust obligations that we are concerned about is that the drought is so serious this year that we are putting a very large hole, if you will, in the reservoir system, and it will take an average year or better to recover

next year. So we are going to skate into the winter power season on thin ice this year from the power generation perspective.

Mr. SMITH OF WASHINGTON. I guess the question in that situation is who trumps whom. If the ESA and the tribal concerns do not want the water to be released, but the BPA says we need to do it for power, is there any clear idea of who wins that argument?

Mr. McDONALD. We are kind of operating a week at a time, Congressman, and doing our very level best to consult with all the interested parties to find what the balance is.

Mr. SMITH OF WASHINGTON. So no, basically, at this point; it is kind of unknown.

Mr. McDONALD. Yes.

Mr. SMITH OF WASHINGTON. Thank you.

Thank you, Mr. Chairman.

Mr. CALVERT. I think it probably could be said that California cannot look forward to a lot of excess power over the next year, I suspect.

Mr. McDONALD. We have noticed that in the last few months.

Mr. CALVERT. Okay.

Mr. Walden?

Mr. WALDEN. Thank you, Mr. Chairman.

Mr. McDonald, I want to go back to a comment that you made about two or three projects that might need additional funding authority under Federal legislation. One of them that you mentioned was Warm Springs Dam. I am trying to figure out which dam that is. Is that the Wickiup Project?

Mr. McDONALD. I confess that I am drawing a blank; I am so new to the region that I do not quite have every dam name put with the project. I apologize. I will have to check.

Mr. WALDEN. If you could get back to me on that, because I know there is some restoration and dam safety work going on at Wickiup, which is in the general area.

Mr. McDONALD. Okay—that refreshes my memory. It is not the Wickiup project. I am still not remembering the name of the project, so I will double-check.

Mr. WALDEN. All right. If you could get back to me on that—

Mr. McDONALD. They are on different tracks; they are different dams.

[Information furnished by Mr. McDonald follows:]

Part of the Vale Project, Warm Springs Dam is located on the Middle Fork of the Malheur River in east-central Malheur County, in Southeastern Oregon. The upper portion of Warm Springs Reservoir extends into Harney County.

Mr. WALDEN. Last week, when we were both over on the Senate side on the Klamath project issues, one of the people who testified released a report about how to improve water quality in Klamath Lake to help with the suckers there, and he spoke about the oxygenation proposals that he had.

I wonder if you have had a chance in the intervening time to take a look at that report, or people in your agency—and perhaps anybody at this table—if you are familiar with these proposals to literally put oxygen into the bottoms of some of these lakes to improve the quality of the water?

Mr. McDONALD. The Reclamation staff, Congressman, has been looking at that report last week and literally over the weekend. It was a subject of discussion yesterday at the meeting we organized at your request and the Senators' request yesterday in Klamath. When I leave here, I will have a conference call with my staff to be brought up to date. But I do know that it was specifically considered. I do not know that the consultant was there, but the water users were there, and talking through the science brought forth by that report was one of the agenda items.

Mr. WALDEN. Are either of the other of you familiar with these projects to pump oxygen into the bottoms of these lakes to improve the quality of the water?

Mr. HIRSCH. USGS is involved in the Klamath Lake water quality issues and has been for many years, and we certainly have looked at various places around the country where oxygen or simply air has been pumped into water bodies to improve their condition. We would be happy to provide you with some feedback on that once I touch base with my staff in Oregon. We would be happy to do that.

Mr. WALDEN. Okay, that would be good. As you know, time is of the utmost concern in the Klamath Basin this year. Today is the 27th, so in four days, basically, a report has to come out about whether those farmers are going to get any water or not.

The concern I have dates back to legislation that we were able to pass last year, authorizing this study for additional storage. Mr. McDonald, as I reread some of your comments from last week over the weekend, I found myself wanting to ask more questions, and lo and behold, here we are with that opportunity.

The question I have—and you do not have to do it right now—but if you could get more specific about where your agency is on a time line with these studies.

Mr. McDONALD. Okay.

Mr. WALDEN. It seemed kind of vague in terms of what I was reading, and I really want to know dates and times. Where are we in assessing, and what is the time line that we need to be one to increase water storage in that basin, because so much is at stake. People are literally going broke.

I can tell you that my field director was at the meeting in Klamath yesterday. From his report, it was not a very productive meeting. People walked away feeling they had gotten no answers and were very, very frustrated. Emotions were running high; apparently, more than 300 people were outside protesting one way or another.

We have got to get on this, and I want to be in a position, given the flow of legislation here, to make sure that we do not miss any deadlines here to move forward on storage.

Mr. McDONALD. I will be glad to respond on the record, Congressman.

[Information furnished by Mr. McDonald follows:]

Public Law 106-498 authorized Reclamation to conduct a number of feasibility and other studies related to the Klamath Project. Reclamation estimates that the Section 2 studies will be completed as follows:

Raising Upper Klamath Lake—Fiscal Year 2003

Gerber Reservoir—Fiscal Year 2003
 Long-term Demand Reduction Program—Fiscal Year 2003
 Long-term Water Acquisition Program—Fiscal Year 2004
 Water Quality Improvement Program—Fiscal Year 2004
 Ground Water Development—Fiscal Year 2005

In addition, Reclamation will enter into a partnership with the Oregon Water Resources Department to review potential studies on water supply needs of non-project lands in the Upper Klamath Basin, as authorized in Section 3.

Mr. WALDEN. Thank you very much.

Thank you, Mr. Chairman.

Mr. CALVERT. Thank you, Mr. Walden.

Ms. Solis, do you have any additional questions?

Ms. SOLIS. No, Mr. Chairman.

Mr. CALVERT. Ms. Napolitano?

Ms. NAPOLITANO. Yes, Mr. Chair.

One of the things that concerns me is that we have looked at many of the water issues for the Western States, and of utmost concern to me, especially in California, is storage and recycling. I do not see storage as a local issue, other than a storage dam under the underground rivers or the aquifers. I am looking to find out if any of the agencies are looking at support to the local municipalities for underground or above ground storage of water that they can purchase in winter when it is cheaper and then be able to use for their own communities, as opposed to relying strictly on the water in California from the aqueduct or from the Colorado or from other sources.

Beyond that, there is the issue of being able to help reopen water wells that have been closed for whatever reason, whether because of maintenance or because they have perceived contamination and are not tied into any water mains that will help meld the water or break it down in order to make it potable.

Those are issues that have not even begun to be discussed, and yet they can be answers for some of the issues in California as well as other States, because we are not looking beyond; we are looking only at the traditional things that we are used to.

On recycling, a lot of the problems are with the small municipalities that cannot afford to bring a recycling infrastructure into the community. Are we looking at assisting them so they can then use pure water rather than recycled water for commercial, industrial, and municipal uses?

Mr. HIRSCH. Let me comment a little bit from the perspective of the U.S. Geological Survey. We have a program and have had it for over 100 years called the Federal-State Cooperative Water Program in which we cooperate with communities, and we have many, many municipalities, counties, et cetera, as well as State agencies that we undertake work with. They bring half the money, we bring half the money, and we undertake particularly hydrogeologic studies of many of the basins throughout California to look at their potential as sites for long-term storage, aquifer storage and recovery, recharge, and the reuse of reclaimed wastewater—Orange County, Antelope Valley, just to name a couple of places where we have been extremely active working with and assisting those

communities to identify long-term solutions in terms of underground water storage.

Ms. NAPOLITANO. I want to just pick up on that one point, because the sanitation district is now utilizing runoff after the first 24 hours of water to be able to replenish the aquifers. Well, they claim to have great space for storage, yet we are not looking at being able to use the existing storage to put in the additional water that we may need eventually; it is just running through the rivers and into the ocean.

Another issue that has come up recently is that EPA is forcing sanitation to do not tertiary treatment of water that is going to the ocean, but a fourth treatment which is going to cost billions of dollars to the taxpayers to set up a new facility to do the fourth treatment.

I am not sure what they are basing that on—that is another story—but to me, if we were able to use that water in refurbishing the aquifers, we would be better off, or if we could find a way to have it go through the natural system and put it back into use in the aquifers.

Mr. HIRSCH. I am not familiar with the details of the examples that you are talking about, but we would be happy to come and visit with you and get some more details and see if we can be of any help.

Ms. NAPOLITANO. I would appreciate it, sir, because that goes for most of Southern California.

Mr. CALVERT. I thank the gentlelady.

I will go ahead and ask a couple of questions, and Mr. Pombo will be back shortly.

A question was brought up earlier by Ms. Napolitano on the Streamgaging Program, and I am wondering if USGS is cooperating with other Federal agencies that may have some technologies that might assist in that—specifically, the National Weather Service, with some of our satellite imagery data, that type of thing. Are you exploring new technologies to be able to do this type of information-gathering?

Mr. HIRSCH. First, just to comment on the National Weather Service, we provide virtually all of the streamflow information that the National Weather Service uses in making their streamflow forecasts, and we work very, very closely with them on our program.

From a technology standpoint, we had a workshop with NASA and many of their funded entities and a number of parts of the Defense Department, in fact, to talk about potential money-saving or improvements in our streamgaging activities.

Over the last three years, we have had a program within the USGS that we call Hydro 21, looking at radically new ways of going about this process of streamgaging, and in fact have conducted a couple of experiments in which we have used helicopters and radar away from the stream in fact to make measurements. We believe that this will in the long run lead us to some abilities and some reliabilities that we have not had in the past.

None of those have shown themselves to be technologies that are ready for widespread deployment, but we are actively pursuing that kind of—

Mr. CALVERT. I was going to ask how accurate is that data?

Mr. HIRSCH. In fact, the few experiments that we have done have shown it to be quite accurate, really, in the same range of less than 5 percent error as we would see with our current meter-based measurement.

Mr. CALVERT. That is using helicopters and other fixed-wing aircraft?

Mr. HIRSCH. Not fixed-wing, but helicopters. The application of the helicopter technology, which in fact would be quite expensive but has tremendous potential applicability to large regional flood situations in which it is very difficult to deploy our staff on the ground to safely make the kinds of measurements that are needed.

The other application is from a couple of kinds of radars that were developed for military application, one of which senses the velocity of the water on the surface—a lot like a police radar gun, essentially—and another kind of radar which penetrates the water and defines the channel shape as it changes over time, which is very important in a lot of Western streams.

Those are the kinds of technologies that we are looking at, and they do appear to be accurate and at the moment not more cost-effective than the ones we use today. But we need to explore that and look for savings from miniaturization and a large market that might potentially develop.

Mr. CALVERT. Back to developing water supply plans for the West, do you guys in the water reclamation business and the USGS work closely together to make sure we develop additional water supplies for the West?

Mr. McDONALD. We do indeed. Both of us can respond that way. There are many cooperative programs between the two agencies, Congressman. We in Reclamation often look to USGS for technical expertise. We participate in their Streamgaging Program, rely on their science in many instances, and I think we have a long, literally decades-old, tradition of cooperation and collaboration.

Mr. CALVERT. Could you give us some examples on use of groundwater and surface storage that can make the Western States more drought-resistant? There was certainly some talk about that earlier. Are there plans under way that you are aware of that we do not know about?

Mr. McDONALD. I would defer to Mr. Brophy if he has examples among the Western States. I cannot think of anything, Congressman, that Reclamation itself may have.

Mr. BROPHY. Mr. Chairman, the State of Arizona is involved in an extensive groundwater banking program where Colorado River water is stored underground either by direct recharge into the aquifer or by delivery of surface water to irrigated fields, and they do not pump groundwater where ordinarily they would. In that way, the State of Arizona is generating hundreds of thousands of acre-feet a year additional storage in aquifers in Central Arizona. That water is going to be used to firm up our municipal supplies in Central Arizona and is also going to be used to facilitate interstate water banking and help the State of Nevada get over the next 30 years as they grow in Clark County.

Mr. CALVERT. I know that in California, this is extremely important. As you are aware, we are going to have to be looking toward

the 4.4 million acre allocation in the next several years, so we are looking for a lot of help in groundwater management in California, certainly, to make sure we have enough supply to get through the time when we are not able to take over the 4.4 million acre-foot allocation. So we look forward to working with both USGS and Reclamation and anybody else to help us get to that point.

With that, Ms. Solis, do you have any further questions?

Ms. SOLIS. No, Mr. Chairman.

Mr. CALVERT. Ms. Napolitano?

Ms. NAPOLITANO. One thing that is puzzling me—there was mention in one of the comments of the Indian water rights. I had a conversation with a tribal chairman who indicated to me that they had water that they did not use. What is it that prevents us from being able to work out a cooperative agreement? It is a different State than California, and I am wondering if it is something that we need to look at, because I had been given information from another agency that there was no law that permitted it or that it was not legally feasible. So I am wondering if there is an ability for us to dialogue—and I am speaking specifically to the Colorado River water.

Mr. BROPHY. Mr. Chairman, Congresswoman Napolitano, Indian water rights claims throughout the West are a threat to non-Indian water uses, and the Council has actively supported negotiated settlement of Indian water rights claims throughout the West. There are significant claims in Arizona, New Mexico, Colorado, Montana, the State of Washington, and throughout the West.

Typically, when claims are settled, it puts Indian communities in a position to market water that they might receive. Under the current state of the law, at least, many people think that the Non-Intercourse Act prohibits Indian communities from leasing water which they have rights to and that they need congressional permission to be able to lease or otherwise dispose of their water; that they need an exemption from the Non-Intercourse Act.

Also, there is general opposition in many quarters in the West to Indian communities marketing their water supplies if in fact the water supplies that they are using are meant to satisfy their reserve rights to water. The thought is that that water should be used on reservations, so many interests in the West will oppose the marketing of water that is in fact reserved water.

Colorado River water in Arizona, for example, is marketed by Indian communities that have achieved water rights settlements, and it is done with the permission of Congress.

Ms. NAPOLITANO. I see. That answers one question.

Now, another question that comes to mind is that land along the Colorado River is Federal, and there is an issue of salinity and what we can do to help clean up some of that salinity before it gets down to the users in the other States.

Mr. McDONALD. I will respond to the Congresswoman. Congress has authorized something called the Colorado River Basin Quality Control Program. It is administered principally by the Bureau of Reclamation and involves a number of other agencies. It is a program that was developed and carried out cooperatively with the seven Colorado River Basin States and has as its objective reducing salt-loading to the Colorado River from both natural and manmade

sources in a manner that will allow the seven Basin States to continue to the development of their compact-entitled waters. In Reclamation's judgment, it has been a very successful program over the years; it has been authorized and amended a couple of times by Congress to streamline it and tailor-make it to the situation faced in the Colorado River Basin, and I think that Reclamation, working cooperatively with the States, has found it to be quite a successful program.

Ms. NAPOLITANO. I would request, Mr. Chair, that we get a report on that salinity program so that we are aware of how it is going to affect us.

Mr. CALVERT. Without objection.

Mr. McDONALD. We make regular annual reports to Congress, and we would be glad to provide the most recent one.

Ms. NAPOLITANO. Thank you.

[Information furnished by Mr. McDonald follows:]

[The "2000 Annual Report on the Colorado River Basin Salinity Control Program" was too lengthy to be included and is retained in the Committee's official files.]

Mr. CALVERT. I just have a quick tag-on question before we go back on the issue of Native American water rights. The Gila River Indians are obviously interested in this. In the new settlement agreement, Mr. Brophy, that is apparently being negotiated, will the Gila Indians be able to market their water?

Mr. BROPHY. Mr. Chairman, the Gila River community will be given statutory authority to market a portion of their Colorado River entitlements.

Mr. CALVERT. Within the State of Arizona or outside the State of Arizona?

Mr. BROPHY. Strictly within the State of Arizona.

Mr. CALVERT. Thank you.

Mr. Osborne?

Mr. OSBORNE. I have one question. Where I come from and I think every place else, we are trying to get more water, and one suggestion has been a revision of forestry practices where undergrowth and dead timber is removed. I have heard estimates of being able to save several hundred thousand acre-feet of water.

Is this pie-in-the-sky in your estimation, or is this an accountable and accurate way of solving some of the water issues?

Mr. HIRSCH. I assume we are talking about the trees that grow in the areas near streams. That is one aspect of this topic. In fact, we worked very closely with the Bureau of Reclamation for quite a number of years, particularly in the Gila River Basin of Arizona and a number of other areas, to look at the efficacy of these approaches, and while I think the general conclusion is that on a short-term basis, one can increase water yields by changing the vegetation along the riparian zone, it is very difficult to maintain that improved yield over a period of time because of the need to repetitively go in and modify the vegetation.

In general, yes, modifying the vegetation can have some effect, but I am not familiar with any large areas where that has been done to great effect.

Mr. OSBORNE. Thank you. I have no further questions.

Thank you, Mr. Chairman.

Mr. CALVERT. Ms. Solis?

Ms. SOLIS. No questions.

Mr. CALVERT. Mr. Otter?

Mr. OTTER. Thank you, Mr. Chairman.

I want to go back with Mr. McDonald one more time. I just want to make it clear—so I can put my folks at home at ease—we are not going to spill one drop of water to replace those valves; we are not going to waste any water?

Mr. McDONALD. If we maintain the construction schedule that we are on now, because it is a drought and the reservoir would be drawn down anyway to deliver water to irrigators, we will have the happy circumstance, the ironic circumstance, of being able to pull it down because we had to anyway to deliver water, and we will not waste anything, and that will expose the valves so that we can proceed to construction.

Mr. OTTER. Great. So the stars are lined up, and we know where we are going.

Mr. McDONALD. In an unfortunate way, yes, the drought has a silver lining in this particular case.

Mr. OTTER. All right. We have all got to count our blessings somewhere, and I would just as soon count mine there.

Mr. McDONALD. As soon as you convince Scott Campbell, I will appreciate it.

Mr. OTTER. I would like to ask the panel as a whole if they are familiar with the term 21,000 megawatts nationwide that could be added to existing hydroelectric projects, that we could actually add 21,000 megawatts of electricity to bricks and mortar already in place.

Are any of you familiar with that figure?

Mr. McDONALD. I am not, Congressman. I suspect it is a figure that has come from an organization like the Federal Energy Regulatory Commission that licensed the private power facilities throughout the country.

Certainly in Reclamation, it would be only a matter of perhaps a few hundred megawatts that could be financially and economically added to our existing power plants.

Mr. HIRSCH. I am not familiar with it.

Mr. BROPHY. Nor am I.

Mr. OTTER. Finally, I would like to ask Mr. Brophy one more time to make sure—I cosponsored with Congressman Simpson the Act which would require the Government to pay its share of the costs in adjudicating water and fighting for that adjudication. Has your organization gone on record in support of the Government paying for those costs in questions of adjudication and water rights?

Mr. BROPHY. Mr. Chairman, Congressman Otter, yes, we have; it is attached to my testimony. We think that the United States should pay its fair share in these adjudications.

Mr. OTTER. Thank you very much.

Thank you, Mr. Chairman. That is all I have.

Mr. CALVERT. Thank you.

Does anyone have additional questions?

Ms. NAPOLITANO. Just a follow-up. I do not think I got an answer about if there are any programs that are being looked at to assist municipalities in doing either above- or below-ground storage.

Mr. McDONALD. Certainly, Reclamation as part of its overall planning process is working with the water—

Ms. NAPOLITANO. No—at the municipal level.

Mr. McDONALD. At the municipal level, we are working with a number, and I think the Title XVI Wastewater Reuse Program is a good example. Many of those projects, as you know, Congresswoman, being in Southern California, certainly we have been deeply involved in both the California 4.4 Plan and the CALFED process, which have a variety of structural arrangements that deal with both surface and groundwater supplies.

Ms. NAPOLITANO. But are you working through the cities themselves, are you working with the counties, or are you working with the water agencies themselves? That makes a big difference.

Mr. McDONALD. I see what your question is. I do not recall the particulars in the context of the 4.4 Plan and CALFED. I would be glad to get those particulars and respond for the record.

Ms. NAPOLITANO. It would be nice to know, Mr. Chairman, so that the rest of the members will understand whether they can tell their communities that they have access to programs that will help them, or where they can go to get that assistance.

Mr. CALVERT. We will obtain that information and distribute it to the members.

Ms. NAPOLITANO. Thank you, sir.

Mr. CALVERT. Mr. Walden, additional questions?

Mr. WALDEN. No, Mr. Chairman.

Mr. CALVERT. I have no additional questions, so I will thank this panel for their testimony and for answering our questions. We certainly appreciate your attendance and look forward to having you back again in the future.

Thank you all.

Mr. CALVERT. Our second panel consists of Ms. Jennifer Salisbury, Secretary, New Mexico State Energy, Minerals and Natural Resources Department; Mr. Steve Malloch, Counsel, Western Water Project, Trout Unlimited; Dr. Philip M. Burgess, Senior Fellow, Center for the New West; and Mr. Ronald E. Young, President, WaterReuse Foundation.

We thank the witnesses. We have a 5-minute rule, and you have an indicator light on the witness table. When it is green, you are fine; when it turns yellow, you have one minute to sum up; and when it turns red, please attempt to conclude your testimony in a timely way.

With that, Ms. Jennifer Salisbury, you may begin your testimony.

STATEMENT OF JENNIFER SALISBURY, SECRETARY, NEW MEXICO STATE ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

Ms. SALISBURY. Thank you, Mr. Chairman, members of the Committee. It is really an honor to be here.

Although I am the Secretary of the Energy, Minerals and Natural Resources Department for the State of New Mexico, a

department that has jurisdiction over most of the natural resources in the State, including the 42 million acres of forested land on which we are required to put out forest fires, I am here to represent the Western Governors' Association this afternoon. The Western Governors' Association is made up of the 18 Western States and also includes three of the Territories.

I would like to make three points if I may. First, as most of you already know since you are in the process of experiencing some level of drought, unlike other disasters, drought moves very slowly. It takes months of below-normal precipitation to create a drought and more than one good rainfall to catch up.

While it may be slower or less dramatic than other natural disasters, the effects are long-lasting and widespread and can cause great misery. I just want to give you some examples of the direct physical impacts that I know you are aware of.

In the 1995-1996 drought that New Mexico experienced, and in our sister States of Arizona and Texas, Texas had in excess of \$1.2 billion in damages to its agricultural industry. Other drought effects are that it can exacerbate forest fires. Last year, as I am sure all of you know, New Mexico had one of its worst fire seasons in history. The Cerro Grande fire in Los Alamos burned up more than 40,000 acres as well as hundreds of houses.

The fire season also burned across the State more than 500,000 acres and cost us about \$60 million. Drought means less water in our streams, soil, and resources. Drought results in less water for livestock and for wildlife. The Northwest, as was mentioned in the earlier panel, has been experiencing a drought, and I think it is interesting that the effect might be really bizarre down the road. Because there is less water in the reservoirs, it may mean there is less water available for electricity; that may mean that less electricity may be made available to California this summer when it expects more electricity from the Northwest, which could exacerbate the rolling blackouts that they are expecting.

So drought may be slow to be recognized, but it can be severe and cause incredible consequences.

The second point that I would like to make, which we experienced in New Mexico in our 1996 drought, is that once drought is over, it is very hard for the institutions to retain or maintain any sort of memory. For the most part, we lose that memory, we move on to whatever the next most important issue is. Although intellectually, we would like to think that we can continue on, what really happens is that you just forget, and people move on.

So instead of being proactive, what we are most like is what the characters were like in John Steinbeck's "East of Eden," and I would like to quote: "And it never failed that during the dry years, the people forgot about the rich years, and during the wet years, they lost all memory of the dry years. It was always that way."

The third point that I would like to make is that be that as it may, the Federal response to drought is uncoordinated, ad hoc, and very difficult to get. The assistance that is provided is primarily geared toward relief; very little is available to help States plan for drought. Of the 88 drought-related programs that have been funded by the Congress over the last decade, only 47 of those provide for drought relief, and only 7 provide for drought planning.

Let me give you a couple of examples of what I mean by the response being ad hoc and difficult to get. Farmers learned in New Mexico during our drought that the documentation that was acceptable to get assistance from the Department of Agriculture under some of the programs that they have available may not be sufficient documentation for other programs. In other words, you may have to fill out more than one form or several forms to actually get relief.

Obviously, all of these programs are dependent on appropriations, and a lot of these appropriations are only available through the supplemental process; they are not regularly available. So relief may not be available, for example, until a farmer has already experienced disaster.

Another example—the Secretary of the Army, the Corps of Engineers, has authority to transport or haul water in emergency situations, and a lot of these appropriations are only available through the supplemental process; they are not regularly available. So relief may not be available, for example, until a farmer has already experienced disaster.

Another example—the Secretary of the Army, the Corps of Engineers, has authority to transport or haul water in emergency situations, and a lot of these appropriations are only available through the supplemental process; they are not regularly available. So relief may not be available, for example, until a farmer has already experienced disaster.

How can this situation be changed? I think the Western Governors would recommend to this Committee and the Congress that we believe that a comprehensive, coordinated, and integrated approach is needed to address future drought emergencies. Western Governors would like to emphasize to the Committee that the approach must include four elements.

First, the approach must provide for a monitoring system to collect, analyze, and assess data. That has already been mentioned in the previous panel. This is absolutely fundamental to making good policy decisions. The problem is that the existing system does not allow for a standardized format, and it is not coordinated.

Second, this approach must provide a framework that promotes planning and mitigating drought impacts. Over 30 States have drought plans already in existence. But having a plan is of little value if it is not implemented. Successful implementation obviously requires practice, particularly when you are not in a drought situation which we are not in right now, because if you do not practice, people move on and retire, and you lose that institutional memory.

Third, the approach must enhance the response capability of the Federal Government. At a minimum, we believe that the Federal Government must improve the way that droughts are managed, particularly by streamlining the processes and programs and by providing some sort of coordinated relief.

And fourth, the approach must find a way to better communicate to the citizens of our States that they are in a drought. We believe that if citizens are given the tools to do the right thing, they will do the right thing and conserve.

The Governors believe that these four elements—monitoring, planning, response, and communications—are the keys to ensuring that the devastating effects of drought are mitigated if not minimized.

The Western Governors are in the process, Mr. Chairman, members of the Committee, of putting together a comprehensive piece of legislation which we hope we will be able to present to this Committee and other members of Congress sometime in the next month or so. It will contain all of these elements.

Thank you very much. I will be happy to answer any questions.
Mr. CALVERT. Thank you.

[The prepared statement of Ms. Salisbury follows:]

Statement of Jennifer Salisbury, Secretary, New Mexico Department of Energy, Minerals, and Natural Resources, on behalf of The Western Governors' Association

Mr. Chairman and members of the Committee, thank you for the opportunity to appear before you today to discuss an issue of great importance to the Western states -- Western water and specifically the status of drought planning and response. My name is Jennifer Salisbury. While I am the Secretary of the New Mexico Department of Energy, Minerals, and Natural Resources, I appear today on behalf of New Mexico Governor Gary Johnson, who is the Lead Governor for the Western Governors' Association Drought Program. The Western Governors' Association is an independent, nonprofit organization representing the governors of 18 states, American Samoa, Guam and the Northern Mariana Islands. Through their Association, the Western governors identify and address key policy and governance issues in natural resources, the environment, human services, economic development, international relations and public management.

Drought is a normal part of the climate for virtually all regions of the United States, but it is of particular concern in the West, where any interruption of the region's already limited water supplies over extended periods of time can produce devastating impacts. Records indicate that drought occurs somewhere in the West almost every year. However, it is multi-year drought events that are of the greatest concern to planners, natural resource managers and government policy makers.

Water scarcity continually defines and redefines the West. The steady growth that has been characteristic for much of the West today creates increased demands for agricultural, municipal and industrial water supplies. Furthermore, such competing demands as the public's rising concern for meeting "quality of life" and environmental objectives create water supply management challenges in times of normal precipitation. Drought exacerbates these challenges.

During the 1995-1996 drought, the Southwest and southern Great Plains states, including New Mexico, which were hit hard by the drought, were often frustrated in our attempts to provide drought assistance to our citizens. In my own state, for example, the drought exacerbated the fire season. In 1996, more than 85,380 acres burned on state and private lands costing taxpayers about \$7 million. What we generally found was that most government agencies, at all levels, lacked policy for planning and responding to drought, regardless of its duration or impacts. In addition, this provides confusion and a lack of understanding of roles and responsibilities among government entities. The lack of state-wide preplanning for some states, plus the absence of organizational structures and processes to identify and resolve issues, facilitate networking and promote partnerships also hindered reaction time and effectiveness.

At the Federal level, we found that droughts had historically been treated as unique, separate events even though there had been frequent, significant droughts of national consequences over the years. Actions were taken mainly through special legislation and ad hoc action measures rather than through a systematic and permanent process, as occurs with other natural disasters. Frequently, funding to assist states with related impacts was unavailable, or not available in a timely manner.

In reaction to this disjointed national drought policy, Governor Johnson worked with his colleagues in WGA to develop a policy resolution. His efforts were successful as the Governors adopted a resolution which stated in part: "The Western governors believe that a comprehensive, integrated response to drought emergencies is critical...[and that] it is important to work together and cooperatively with other affected entities to plan for and implement measures that will provide relief from the current drought and prepare for future drought emergencies." In addition, the resolution called on western states to further study the issue and make recommendations on how to improve Federal and state responses to drought.

The states' recommendations are contained in a 1996 report "Drought Response Action Plan." Besides making suggestions on how to improve responses to droughts, the report emphasized the need for incorporating mitigation and preparedness measures in government drought programs. One key recommendation called for the development of "a national drought policy or framework that integrates actions and responsibilities among all levels of government (Federal, tribal, state, regional and local)." With strong support of the Western Governors, Congress enacted the "National Drought Policy Act of 1998, P.L. 105-109. The law established an "advisory commission to provide advice and recommendations on the creation of an integrated, coordinated Federal policy designed to prepare and respond to serious drought emergencies." The National Drought Policy Commission's report was issued last year.

A second key recommendation in the 1996 WGA report called for the creation of a regional drought coordination council. This recommendation led to a Memorandum of Understanding between WGA and several Federal agencies which was signed in early 1997. The MOU resulted in the establishment of the Western Drought Coordination Council (WDCC). Co-chaired by Governor Johnson and Deputy Secretary Richard Rominger of USDA, the Council members concentrated their efforts on improving drought preparedness, mitigation and response in the West.

During the next two years, the WDCC worked to close some of the gaps identified in the report. As examples, the WDCC generated such products as: (1) a step-by-step guide for planners to help identify and assess their vulnerability to drought; (2) the Catalog of Federal Assistance Programs, which was an effort to identify all of the Federal drought assistance programs and make them available in one catalog; and, (3) the Western Climate and Water Status Report, which was an effort to coordinate available monitoring data into quarterly reports to alert officials to potential drought development.

Despite making significant strides in coordinating drought programs, the WDCC recognized a critical piece was still missing: Federal legislation articulating, indeed mandating, the coordination and integration of drought programs. Consequently, in May 1999, the Western Drought Coordination Council went into hiatus in order to focus on providing assistance to the National Drought Policy Commission and to avoid a duplication of effort.

In a 1999 policy resolution, Western governors reiterated their call for a comprehensive, integrated response to drought emergencies, including mitigation planning. Western governors view this as critical to the social, environmental and economic well-being of the West.

In urging that Congress enact legislation, which provides for a comprehensive, coordinated and integrated approach to future drought emergencies, the Governors also recommended the following elements:

- (1) Monitoring/Assessment/Prediction -- Provides for the development of a comprehensive monitoring system to collect, analyze and disseminate available data and products in a useable manner so citizens and businesses can make critical decisions based on credible data.
- (2) Preparedness and Mitigation -- Provides a framework that assists states, Federal agencies, tribes, local governments and water utility agencies to assess vulnerabilities and therefore enable them to reduce the economic, social and environmental impacts (i.e. vulnerability) of drought; provides incentives for a variety of preparedness actions, policies and mitigation options that will facilitate improved cooperation among all levels of government and promote individual responsibilities in planning for and mitigating drought impacts; and provides policy to promote drought contingency planning, emphasizing a more proactive, anticipatory approach to drought management.
- (3) Response -- Enhances the current drought response capability of Federal agencies, states, localities and tribes through a variety of appropriate policies and programs; provides needed policy to promote regional drought response mutual aid; strengthens intergovernmental response partnerships; and improves overall drought response management and customer service.
- (4) Communications -- Encourages the use of a variety of communication tools to identify and use drought-related information.

As mentioned above, the National Drought Policy Commission issued its report in May 2000. In recommending that comprehensive legislation be enacted, the Commission found that "this country relies on a patchy approach to reduce the impacts of drought."

Using the reports and recommendations of the Western Governors, the Western Drought Coordination Council, and the National Drought Policy Commission, WGA now has begun to develop draft legislation to turn the recommendations into reality. We cannot emphasize enough that Congress must engage this topic and act in order to develop national policies which will organize and integrate the Federal drought

preparedness programs and improve the overall response to drought. Additionally, we believe Congress should consider reviewing such programs and issues as the prepositioning of fire fighting equipment, water hauling, crop insurance, livestock feed assistance, drought planning, drought monitoring programs, and the definition and use of Federal drought program 'triggers.' Finally, the legislation should provide the appropriate authorization and funding. WGA anticipates forwarding a draft bill to Congress for your consideration in mid- to late April.

The WGA drought bill will be comprehensive and likely require review and consideration by a number of Congressional committees, including this one. Nevertheless, given La Nina, El Nino, Global Warming, and the normal occurrence of drought, we hope Congress will meet the challenge and help prepare the nation for drought by enacting legislation.

Again, on behalf of the Western Governors, thank you for giving us the opportunity to provide testimony on Western Water Issues and in particular drought policy. We look forward to working with you to address the complex water issues that face our region and nation.

Mr. CALVERT. The next witness is Mr. Steve Malloch, Counsel for the Western Water Project, Trout Unlimited.

You may begin your testimony.

**STATEMENT OF STEVEN MALLOCH, COUNSEL,
TROUT UNLIMITED**

Mr. MALLOCH. Thank you very much, Mr. Chairman and members of the Committee. Thank you for inviting me here today.

I am Counsel for Trout Unlimited. TU's 130,000 members are Teddy Roosevelt-style conservationists, working in their communities and engaged in solving real problems affecting trout and salmon.

The fundamental problem we face in the West is that the Western water system established in the mining camps a century and a half ago simply deferred gunfights. Today, we are in the thick of those fights over competing uses. While once the objective in the West was putting water to use, now we have a much more complicated situation, with population growth and very real environmental water needs.

In this testimony, I will touch on some of the innovative water work in the West, the good; highlight some problems, the bad; and suggest areas ripe for change, ugly but could be better.

First the good. I would like to highlight three positive forces. In collaborative watershed initiatives, irrigators, urban water interests, and conservationists find that they in fact have much in common and that crafting their own solutions is much better than having solutions forced upon them—from Washington, from the Federal courts, and from their local courts.

Second, in maintaining healthy river flows, market force are starting to work. In several States, notably, Montana, Oregon, and Washington, private parties obtain water rights through willing seller/willing buyer transactions, and they manage to keep the fish wet.

Third, water quantity issues are going national. Public interest in water issues is growing as Western-style quantity problems spread from the Southeastern ACF and Everglades systems to the main conflicts over Atlantic salmon flows. We are no longer dealing with a strictly Western set of problems.

Now for the bad. I would like to highlight two of the seemingly endless list of conservation problems. The most fundamental

conservation problem is in the decline of aquatic ecosystems. We have already lost 20 complete species of Western fish to extinction; 100 more are considered threatened, endangered, or of special concern. That is about 70 percent of the native fish species west of the Rockies. Add to that hundreds of sub-species or, as the Fish and Wildlife Service call them, "ecologically significant unit," particularly Pacific salmon and steelhead, have been extirpated or endangered.

It is almost impossible to find a major water project without an ESA problem. Of course, the ESA is not the problem; it simply tells us how badly the aquatic ecosystems have fared.

We have heard a fair amount today about the growth in demand for new water. There is a figure attached to my testimony that shows that in much of the West over 85 percent of the annual runoff is already used. There simply is not much new water left. The inescapable consequence is that we will have to shift water from existing uses to new uses and make better uses of the water already developed.

Now for the ugly. There are really no shortages of creative and innovative solutions. First, we clearly need to invest in facility improvements. We should stop needlessly killing fish and damaging aquatic ecosystems. A recent study at a Bureau project on the Lower Yellowstone River found over 800,000 fish, including two ESA candidate species, sucked into the irrigation system in one season. Let us invest in fish screens and fix this problem.

We also need to stop wasting water. Let us invest to increase efficiency and devise mechanisms to put conserved water to use meeting pressing urban environmental demands. In much of the West, losing 30 percent of the diverted water, wasting it before it ever reaches the farm, is normal. At a Montana Bureau project on the Sun River, the system loses over 58 percent of diversions. At this same project, the Arctic grayling, an ESA candidate species, lives in the irrigation canals because the project sends over 1,500 CFS into the irrigation ditches and leaves barely 100 CFS for the river. If we fix the conveyance loss problem, there would be lots more water left for the fish. We really need to invest in conservation, both through the conveyance system and on the farms.

We need to encourage market solutions, particularly those that allow private interests to hold rights to river flows. We need to promote the watershed initiatives. Federal agencies need to be encouraged to engage in these initiatives and be creative in using their authority to implement the solution. Congressional guidance and encouragement to the agencies would be very helpful there.

We need to base decisions on good science. We have already heard a fair amount about the USGS Streamgaging System; let me add my voice to that. Money and collaboration are worthless without good science and good information.

Finally, we need to review the operations, facilities, and uses of Federal water projects. In light of the growing need for water in the West, we need to create an efficient and collaborative mechanism to review Federal projects and to make changes needed while respecting existing property and contract rights.

Trout Unlimited does not advocate heavy-handed Federal action, however, we do need changes to the Western water system. We

recognize valid property and contract rights in water, community concerns, and the rights of States. There is, however, a significant role for Federal investment and engagement in solving the real problems before us.

Thank you.

Mr. CALVERT. I thank the gentleman for his testimony.

[The prepared statement of Mr. Malloch follows:]

Statement of Steven Malloch, Counsel, Trout Unlimited

Mr. Chairman, Members of the Committee, thank you for inviting me here today. I was asked to testify about innovative ways to accommodate environmental needs in western water resources. The problems with western water are legion. Sometimes it seems that one cannot set foot on a Bureau of Reclamation or western Corps project without endangering another species. Yet many of the problems are solvable and there are success stories when dealing with western water environmental issues.

I am Counsel for Trout Unlimited, Inc. (TU), where I focus on western water issues. TU is America's coldwater fishery conservation organization. Our mission is to conserve, protect and restore North America's trout and salmon fisheries and their watersheds. We are a private, non-profit organization with 130,000 members in 500 chapters nationwide. TU members are not stereotypical environmentalists we are usually middle-aged, educated, Teddy Roosevelt-style conservationists, engaged in solving real problems, rather than posturing. Our members put substantial amounts of their personal resources and time into restoring and enhancing their home Rivers.

The fundamental problem we face is that the water allocation system established in the mining camps of the mid-1800's was not designed to balance competing socially beneficial uses it was designed to award rights and defer gunfights. Billions of Federal, state and private dollars were then invested in projects built upon that poorly engineered foundation. Today, in the 21st century, the gunfights avoided a hundred years ago are breaking out. Just as diverting water for irrigation, mining and municipal use is valuable and important, so is water flowing in rivers for ecological, recreational and aesthetic uses. Species conservation, human health, recreation, sustainable economic development and quality of life all demand that rivers and streams be treated as more than mere suppliers of commodity water.

There are positive signs that water in the West is being used in more balanced ways and there are examples of how water policy is changing as well. In this testimony, I will touch on some of the problems, but focus on opportunities for protecting and restoring the environment as well as meeting agricultural and municipal needs. There are three main parts to my testimony a summary of some of the innovative water resources work in the West; highlights of some of the ecological and system problems; followed by suggestions for change that is needed.

Positive Forces Around the West

Teddy Roosevelt's pragmatic style of addressing environmental and conservation problems is making progress around the West. I want to highlight three enormously positive forces in that style at work in the West.

Watershed Initiatives

The first is that irrigators, urban water interests, conservationists and others are finding that they often have much in common if they manage to talk with each other rather than at each other when faced with a serious problem. We also find that we would prefer to negotiate our own solutions rather than relying on the courts or regulatory agencies to make the decisions. The rise of hundreds of collaborative watershed initiatives is a tremendously positive force, in large part because it forces all parties to face real problems and wrestle with real solutions. Here are a few of the many examples:

- In some cases, such as on Idaho's Henry's Fork, the conversation led to significantly improved operations that benefit rivers below Bureau of Reclamation dams. For the Henry's Fork, perhaps the premier destination trout stream in the country, flushing sediment from the reservoir devastated the fishery; the reservoir operators now know the problems flushing causes, both to the fishery and the recreation-dependent local economy, and manage the project to avoid the problem. Solving that issue led to a host of other collaborative efforts in the watershed, some successfully completed, some still in discussion, such as transferring ownership of the Reclamation project to the irrigation district.

- Watershed groups are also wrestling with tough problems such as responses to drought and integrating flow with quality problems situations where the existing legal system typically fails to maintain the ecosystem values of rivers. In Montana, watershed collaborations have addressed instream use of water in serious and useful ways. For example, during last summer's drought, Trout Unlimited, water users and other water interests entered into voluntary agreements based on the principles of shared sacrifice that led to innovative drought response plans for the Big Hole, Jefferson and Blackfoot Rivers in Montana. The collaborative drought plan avoided an environmental, recreational and conservation catastrophe.
- The Forest Service is effectively using a form of a watershed initiative in joining collaborative negotiations over often-contentious bypass flow provisions in Forest Plan revisions. Using authority Congress granted several years ago, the Federal land management agencies are finding that many of critical issues can be most effectively addressed through collaborative processes.

Healthy River Flows

A second enormously positive force is the effort to maintain fisheries and aquatic ecosystems faced with water shortages. Fish cannot breath air maintaining wet streams and rivers is a huge problem in the West. In a number of places, efforts are yielding significant steps towards solutions. For instance:

- In several states, notably Montana, Oregon and Washington, private parties are obtaining water rights through willing seller, willing buyer purchase or lease, and putting them to work keeping fish wet. To the astonishment of those who oppose private parties holding flow rights for conservation, the local economies are not collapsing. Private land trusts provide a model for these water trusts, which are a growing and promising partial solution to the flow problem.
- The Bureau of Reclamation is beginning to recognize that it can shape river flows for purposes in addition to irrigation, flood control and power. In a number of projects, adjustments are being made in operations that improve river flows for fish and wildlife.

Public Awareness

The third force is public interest and awareness water quantity issues are gaining an increasing amount of attention. This link between healthy rivers, water quality, and the growing demand for water for urban needs as well as irrigation and other commercial uses is gain attention around the country. In the Southeast it is the Apalachicola/ Chattahoochee/Flint system that looks just like a western interstate problem; in the Northeast it is the increasing conflict between agricultural uses and flows needed for Atlantic salmon restoration; while urban water districts vie with anglers and local communities for the upper Delaware's water; and around the country it is in relicensing of non-Federal, FERC licensed, hydropower plants where river flow is often contested. The issues we face in the West are spreading to other regions, and national public awareness of the problems is growing.

There are countless success stories around the West, solutions shaped to fit the local conditions and accepted by the affected stakeholders. Many are coming out of California, where despite bloody and protracted water wars, and unresolved issues, many positive steps have been taken.¹

HIGHLIGHTS OF THE ECOSYSTEM PROBLEMS

The purpose of this hearing is not to explore the seemingly endless list of problems in western water. However, the most acute of those problems are what push us towards making progress on the other, less urgent, problems. In discussing innovative solutions, it is important to mention some of the most pressing issues for which those innovative solutions are needed.

Decline of Aquatic Ecosystems

It is becoming difficult to work on any Bureau of Reclamation project without stumbling over the Endangered Species Act. Members of this committee will be familiar with the litany of wrenching ESA problems the Bureau has faced in the last few years: Columbia–Snake salmon and steelhead; Upper Colorado fish; Rio Grande silvery minnow; Sacramento–San Joaquin salmon and other fish; Missouri sturgeon; Trinity salmon and steelhead; the Platte whooping cranes and more. In the news

¹For many California examples, see The Pacific Institute (1999). Sustainable Use of Water: California Success Stories. Oakland. Pacific Institute of Studies in Development, Environment and Security.

this month, Klamath Project irrigators request invoking the God Squad to allow them access to water despite the risk of extinction for salmon and suckers.

Of course the problem does not lie in the ESA the ESA simply tells us that we have systematically degraded western aquatic resources through the enormous investment in western water projects by Congress and others over the last century. In fact, the ESA often provides the impetus to address festering problems, and provides the tough problem that finally brings all sides together in a settlement process.

In some cases the ecosystem problems are fundamental and can only be solved by drastic solutions. The Lower Snake River is an example of a problem caused by dams for which there is simply no good technological or operational fix. An extreme solution removal is the only alternative to extinction for a number of salmon runs there.

However, in many cases, projects constructed before the rise of environmental consideration and regulation are simply unintentionally destructive they were built using diversions that fish cannot pass and intakes that pull fish into deadly irrigation ditches. A recent study of fish entrainment at a Bureau project on the lower Yellowstone River found over 800,000 fish sucked into the irrigation system at one dam alone over the four-month irrigation season.² This destruction of fish is not intentional; it is a result of fish entrainment simply not being a design issue when the project was built.

The overall damage to western fish species has been extreme. We have already lost 20 species of western fishes to extinction in the last century. One hundred more fish species are considered threatened, endangered or of special concern in total 70%, of all native fish species west of the Rocky Mountain are at risk.³ In addition to extinction of full species, hundreds of subspecies or ecologically significant units have been extirpated or endangered. The American Fisheries Society surveyed Pacific salmon and steelhead stocks several years ago: of over 400 stocks identified, 100 are already extinct, 214 were considered to be at moderate or high risk of extinction or of special concern, and only about 120 were considered secure.⁴

Growth in Demand for Water

Demand for new, assured, water supplies is growing at a time when essentially no unused water is available. In addition to relatively stable irrigation water uses, demand for explicitly recognized instream uses such as fish and wildlife, recreation, and aesthetics is greatly increasing, and demand for withdrawal and consumption for the rapidly growing western cities is climbing. Add to that demand the reality that groundwater mining withdrawal in excess of recharge is both common and ultimately unsustainable, and the problem is stark. In many western basins, more water is claimed than is typically available.

The problem is shown graphically in the attached figure showing the proportion of runoff already withdrawn from the water system. In much of the central-west and southwest, over 85% of the annual runoff is used. This level of water development leaves nothing for instream use or for growth in urban use.

Energy

The West now faces energy woes that pose a whole series of problems for the western and Federal water system. Demand for electricity in a time of electricity shortage and drought has caused operations to shift to maximum power production despite resource damage. The short-term problem in the West is also leading to calls for permanently relaxing natural resource and water quality protection in Federal and non-Federal power production.

Power costs affect the western water system because so much power is used in moving water around. Conservationists have urged use of more efficient diversion technology for years. A diversion dam may block fish passage and entrain fish into irrigation canals pumps are more efficient and less damaging. In much of the West, fish screens and fish passage on existing dams and diversions would be difficult to install and costly; these fixes are best designed as part of the system rather than being added later. In other cases, the screens and passage simply do not achieve the goal. Shifting to pumps often makes the most sense. But running pumps takes electricity and energy costs are skyrocketing. In the years of cheap electricity, many

²Heibert, S., R. Wydoski and T. Parks (2000). Fish Entrainment at the Lower Yellowstone Diversion Dam, Intake Canal, Montana, 1996–1998. U.S. Bureau of Reclamation.

³Minckley, W.L. (1997). Sustainability of western native fish resources. In W.L. Minckley (Ed.), Aquatic Ecosystem Symposium (pp. 65–78) Denver, CO. Western Water Policy Review Advisory Commission. Available at <http://www.den.doi.gov/wwprac/reports/aaquatic.htm>.

⁴Nehlsen, Willa, J.E. Williams and J.A. Lichatowich (1992). Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho and Washington. Trout Magazine, Vol.33, no. 1

irrigators were willing to incur the cost of pumps and shifted to more modern, less damaging forms of diversion. But now they are paying the price through higher electricity costs.

Solutions

In your invitation, you asked for creative and innovative solutions. There is no shortage of creativity and innovation in the western water system. There is sometimes a failure to communicate and understand perspectives, there is fear of the future, and there is a need for investment. Congress has a role in all of these. Given rising public attention to the problems, some of the solutions will have wide acceptance we should work through those as quickly as possible. Other solutions will require more careful crafting and conscious development of support; the alternative to those difficult and painful steps is continued degradation of aquatic ecosystems and ultimately extinction for many species and stocks.

It should be understood, however, that western water issues are fundamentally the problems of the states; states issue water rights, are responsible for managing fish and wildlife, and are charged with environmental protection. Even Federal water rights are typically adjudicated in state forums and processes. In many cases the Federal role will be to encourage, cajole, and support the states in taking bold steps to solve the problems.

Invest in Facility Improvements

The first level of solution is very basic bring 19th century water technology into at least the mid-20th Century, if not the 21st. Much of the irrigation system we use in the West, and much of the Reclamation system, is century-old technology. It was fine for its day, but it was not designed to deal with endangered fishes, shortages of water and competing demands on the system. We need significant upgrades in the system many of those upgrades need not be divisive. Money is going to be the answer for many of the problems facing us; however the money should not be going into new water projects. Instead Federal funds should be directed at enhancing the existing projects so that they are more efficient and provide benefits to greater numbers of people, while restoring affected ecosystems.

Fish Passage and Entrainment

We should stop needlessly killing fish when fish screens would help. The last Congress enacted a law to support installing fish screens in the Northwest. There is an appropriate Federal role in technology development and advice, as well as funding, for installing fish screens throughout the Federal and non-Federal water system. We can avoid the wrenching ESA problems by ceasing to kill fish and other aquatic organisms unintentionally through entrainment in irrigation ditches.

Technology improvements are also needed for many diversions. Across the West, diversion dams cut off access to habitat because there is simply no way for fish to get around the dams. In some cases, fish passage can be retrofit for existing dams. In others, the diversion should be shifted to surface or groundwater pumping. Again, there is a compelling Federal role for improving Reclamation dams and those on Federal lands. There is also a role for aid to non-Federal projects.

I must note that fish screens and improved diversion structures are not a total answer to all problems of fish entrainment and passage. In some cases, the existing structures cannot be effectively modified, and should be removed. Those situations, foremost among them the lower Snake River hydropower dams, should not prevent application of technological fixes where they are appropriate and effective.

Conveyance Efficiency

There is a huge need for increasing the conveyance efficiency of existing projects and on-farm water use. The best general information that gives an indication of how inefficiently water is used in the West is from the USGS's five-year assessments of national water use.⁵ In the Pacific Northwest, where flows are an enormous problem because of salmon, the conveyance loss of irrigation water withdrawn from rivers and the ground is 31% - almost a third of the water is simply lost, usually through leaky ditches. In the Missouri region, the figure is about the same 32%. Other regions are more efficient, ranging from 28% loss in the Rio Grande to 6% in California. From a hydrologist's perspective, much, but not all, of that water finds its way back into the system, through runoff or groundwater recharge. However,

⁵Solley, W., R. Pierce, H. Perleman (1998) Estimated Use of Water in the United States in 1995, US Geological Survey Circular 1900. Available at <http://water.usgs.gov/watuse/pdf1995/html/>. Basin specific information referenced available at <http://water.usgs.gov/watuse/spread95.html>.

water returning to streams is changed in quality, temperature and timing and simply removing water from rivers has important ecological consequences.

Individual projects and basins may be significantly less efficient. For instance in Montana on the Sun River, irrigation conveyance losses amounted to 58.5% of freshwater withdrawals over half of the water withdrawn from the Sun River was lost to leaky ditches. The Sun River is a good example of the need for conveyance efficiency investment because the 1920's era Reclamation project there sends over 1500 cubic feet per second (cfs) into the irrigation ditches and leaves barely 100 cfs for the river. Yet more than half of that diversion never reaches its goal. The result is that a population of arctic grayling that the Fish & Wildlife Service has determined to warrant listing under the ESA now lives in the irrigation canal because there is little water in the river. Investment in conveyance efficiency, coupled with mechanisms for leaving the water in the river, would go a long way towards preventing listing of the grayling and improving the wild fishery in the Sun River.

In addition to distribution system efficiency, on-farm conservation is needed. While this is traditionally not within the Bureau of Reclamation's realm, it is an important piece of the overall solution to western water problems, quantity and quality. Appropriate ways to provide incentives for on-farm efficiency must be developed.

Efficiency improvements are a much cheaper way of obtaining additional water than either reuse and recycling efforts or building new water projects. In most places in the West there is simply no unused water available; additional traditional projects, even for necessary goals such as settling Indian water rights claims or forestalling ESA problems compound the problems.

Investments in fish passage and entrainment measures, efficiency improvements, and recycling and reuse projects, are a terrific start on many of the West's problems. TU does not advocate heavy-handed Federal action in making facility improvements; we recognize valid property rights in water and community concerns. Nor are we advocating simply giving more money away to farmers already heavily subsidized through the Reclamation and Federal farm programs. The quid pro quo for efficiency improvements should be solving real problems.

Encourage market solutions

That markets for water must develop in the West is part of the current conventional wisdom in water policy. Markets are growing through water banks, drought action plans and outright sales. Congress does, however, need to encourage western states, Federal agencies and water users to use these approaches.

The growth of private water transactions to solve river and fishery problems is one of the most promising developments in the West. While the water trust movement is far from the scale of the land trust movement that has swept the nation over the last decade, it is growing. Three states are leaders Oregon, Montana, and Washington. In Oregon, last year there were over 50 separate water rights transactions for conservation purposes. In Montana 220 cfs were leased for fishery and river conservation. The Montana program has been so successful that a bill extending the 10-year lease program to 30 years to encourage capital investments needed to improve efficiency swept through the legislature without significant opposition—a sign that despite significant differences between environmental and agricultural interests, there has been enough progress to be willing to sit down and find out what we can agree on, and act on that agreement.

We recognize the reluctance of many in the West to grant water rights for healthy river flow to state or Federal Government. A solution to that problem is to use third party intermediaries such as the state water trusts, the Nature Conservancy and Trout Unlimited to broker willing seller deals, and where appropriate, hold the water rights, or allow the landowners to convert their consumptive use rights to river flow right. But in many states this cannot be done. If the Federal Government wants to create incentives for voluntary flow restoration, Congress should reward the states that allow and encourage such conversions.

Reclamation and the other Federal agencies are increasingly working on habitat and flow protection and enhancement, both in response to the ESA and in anticipation of ESA problems. We strongly urge Congress to support these efforts, and suggest that wherever possible Federal funds be channeled to states and third parties to efficiently complete transactions that would be made more difficult by direct Federal participation.

Promote Watershed Initiatives

Federal agencies are notoriously fickle actors in collaborative efforts. Movement towards effective and successful collaborative watershed initiatives is often impeded by Federal agencies unsure of their authority to engage in the initiatives and un-

willing to commit to actions outside of standard procedures. Congressional support, direction, and funding for active agency engagement in collaborative watershed initiatives, and increased latitude in Federal agency actions based upon these initiatives, would be helpful.

Although it is outside this Committee's jurisdiction, TU strongly supports efforts to use incentives to address water quantity and quality issues. A leading example of this approach is found in the Fishable Waters Act of 2001, H.R.325. An amendment to the Clean Water Act, the FWA would provide watershed councils the funding and scientific and technical resources needed to design and implement watershed measures for protecting and restoring fish habitat to meet the fishable waters goal of the CWA. The state-established watershed councils would include the major fisheries conservation and private landowner stakeholders in the watershed, who will work together cooperatively to prepare customized plans to meet local fisheries habitat needs. Typical fish habitat conservation measures that the FWA would yield, all done cooperatively with landowners and local communities, would include controlling soil erosion and other forms of non-point pollution, removing obstacles to fish migration, such as obsolete dams, and providing additional flows.

Base Decisions on Good Science

All the money and all the collaborative effort in the world are worth next to nothing if the facts that decisions are based upon are wrong. Without reliable factual information upon which to base decisions, the choices we face are risky gambles. The stakes are too high the future of western growth, development, recreation and biological heritage to base upon wishes, suppositions and inference when facts could be had. We will face risks in any event, so we should try to minimize them by using the best factual basis and best science to make decisions.

Unfortunately the fundamental facts for water problems are at risk. The US Geological Survey has long provided the fundamental information about stream flows everyone uses for water management, flood control, power generation, recreation and aquatic biological resource management. But the streamgaging budget for the USGS has not kept pace with the cost of the system and many gaging stations have been closed. Unfortunately, hundreds of the most valuable stations the ones with long records, most useful for scientific research and hydrological analysis are gone. The streamgage system needs to be modernized and expanded.

In addition to streamgage information, TU strongly supports enhanced basic and applied science needed to manage the Federal lands and the western aquatic ecosystems.

Review the Operations, Facilities and Uses of Federal Water Projects

One of the most striking recommendations of the recent World Bank-sponsored World Commission on Dams was that facilities and operations of large water projects should be periodically reviewed.⁶ However, there is no mechanism short of an Act of Congress to review the purposes, operations and facilities of Federal water projects. In light of the growing need for water in the West, the time has come to create an efficient mechanism to review Federal projects and to make changes needed to bring the benefits in line with society's current needs, while respecting existing property and contract rights. A collaborative process, where all affected parties work together to achieve consensus on changes needed is the best starting model for such an effort.

In addition to the suggestions above, there are issues that need to be addressed that will be more controversial, and will take larger leaps to accomplish. For instance, Congress has a history of encouraging states to modernize state water laws in order to make Reclamation projects more efficient or legally possible; it is time for Congress to consider encouraging states to allow private rights for healthy river flows, to develop water markets and to use water efficiently, as a quid pro quo for needed investment in Federal projects. The whole realm of Federally reserved rights, for Native Americans as well as Federal land reservations, is politically charged, but absolutely needs solutions; over 200 unresolved Indian claims remain outstanding. Congress should work with states, tribes and affected persons to establish clarity in Federal water rights and to meet the Federal goals.

Thank you for your attention.

Mr. CALVERT. Next, Dr. Philip Burgess, Senior Fellow, Center for the New West.

Dr. Burgess, you may begin your testimony.

⁶Available at <http://www.damsreport.org/>.

**STATEMENT OF PHILIP M. BURGESS, PH.D., SENIOR FELLOW,
CENTER FOR THE NEW WEST**

Mr. BURGESS. Thank you, Mr. Chairman.

I have a statement that I would ask be included in the record.

Mr. CALVERT. Without objection.

Mr. BURGESS. My job today is to talk about the demographic trends in the West. Let me say that 11 of the 12 public lands States in the West headed the list of America's fastest-growing States. With the exception of Wyoming, which grew 9 percent, every Western State grew faster than the national average of 13.2 percent. Even California, which went into the decade with a huge base, 29 million people, ended the decade with 33 million people and grew at 13.8 percent. So even the sixth-largest Nation in the world grew faster than the national average.

The punchline on the rates of growth is that the sparsely-populated but rapidly-growing interior States of the Mountain West are America's fastest-growing region. What we have here is a huge, almost nation-State, California growing faster than the national average, and another huge collection of States surrounding California in the Inter-Mountain West that are growing even faster, and the population base of both of them is about equal.

Second, let us talk about absolute numbers. Of all the growth in the West, about 10 million people of the Nation's 33 million growth, about 40 percent of that occurred in California; the other 60 percent occurred outside California. The growth in the West totalled 10.3 percent, and that accounts for one-third.

The third point I want to make is about the urban-rural distribution. Contrary to popular belief, the West is the most urbanized area of the country—not if you talk about SMAs and conventional Census definitions, because we have capitals out there that do not meet the Census definition of a metropolitan area—but if you talk about the percentage of people who live in communities over 15,000 or 25,000 or 50,000, the West is at the top of almost all of those lists. And that continues. The West is about 80 percent of the people living in these urbanized areas, four out of five people, whereas the national average, depending on how you talk about urban, is more like one out of two.

The second thing is that in the West, it is not just the cities, it is also the rural areas. In other parts of the country, this Census shows that we have had a tremendous return to the urbanized areas. That has happened in the West. The cities are growing very rapidly all through the West. But also in the West, small towns and rural areas are growing, and that is what sets the West apart very dramatically.

For example, all 29 of Utah's counties, both urban and rural, gained population. All of Washington State's counties gained population. All but six of Colorado's 63 counties gained population. All but two Idaho counties gained population, and 28 of 44 Idaho counties topped the Nation's growth average.

So when we start looking at what is happening in the West, it is not just growth in the metropolitan and urbanized areas; it is also huge growth in the urban and small towns and rural areas.

So it is a very important new development that just started happening toward the very end of the 1980's and took off in the early part of the 1990's.

The third thing is that the interstate corridors in the West are magnets for growth. Much of Montana's growth is along I-90. Much of the growth in Washington and Oregon is clustered around I-5. Utah's rapidly growing Wasatch Front is bisected by I-15. The 10 most populous counties in Colorado straddle the I-25 corridor. In fact, the I-25 corridor in Colorado today has more people than the entire State of Colorado had in the 1990 Census.

Another important new development in the West is the emergence of what we call leapfrog counties. What we are seeing is that people are jumping over the county adjacent to a metropolitan area and going out two counties to live and work.

Why is this happening? We have gone out and interviewed a lot of these people, and it is happening because with new telecommunications technology, people feel free to move out farther; they can come in later because they can work at home in the morning; they can come home later at night; they can work 4 days a week instead of 5 days a week and stay connected to their office on the fifth day while they work at home.

In our view, the growth of these leapfrog counties at a time when everybody is focused on reducing sprawl shows a tremendous disconnect between where a lot of the policy debate is and where people are voting with their feet.

Fourth is the growing diversity. Only the South and the West benefited from domestic migration. The Northeast and Midwest suffered a net out-migration, and very substantially in the Northeast. On the other hand, all regions of the country experienced substantial population growth from immigration, although most of the new immigrants came to the South and to the West, and to the West by a nearly two-to-one ratio.

So the biggest increase of immigration came to California, Washington, and Arizona and are having a huge impact not just on the economies but also on the populations.

Let me close by saying that I think one of the most important changes in the West has been the economic diversification of what were once monocultures relying on agriculture or mining. Today, the new economy has moved full force into the Inter-Mountain West with spillover from California—computers, software, microprocessors, multi-media, environmental control systems, medical instruments. Companies are moving there because for the first time in history, we have people-driven growth. In the past, growth was always driven because of the availability of jobs. Today what is happening is that high-end knowledge workers, the kinds of people these new economies need, are moving to the West for other reasons, for personal reasons, life-style reasons, quality of life reasons, and now, companies are following them there in order to get access to the talent, which is the crown jewel of the new economy.

Thanks very much.

Mr. CALVERT. Thank you, Dr. Burgess.

[The prepared statement of Dr. Burgess follows:]

Statement of Philip M. Burgess, Ph.D., Senior Fellow for Technology and Society, Center for the New West

Mr. Chairman. My name is Phil Burgess. I am a senior fellow for Technology and Society at the Denver-based Center for the New West. I have been a student of the forces shaping the New West since 1975, when I first moved to Denver to serve as executive director of the Federation of Rocky Mountain States. I appreciate the opportunity to be here to day to talk about the demographic trends that are shaping the West today.

Census 2000 overview. Preliminary data from Census 2000 show clearly that the 11 public lands states² of the American West head the list of America's fastest-growing states and continue to attract people both Americans looking for new opportunities and immigrants in large numbers.

First, consider growth measured by the percent change, 1990 - 2000:

- All 5 of the top 5 fastest growing states are in the West: Nevada, Arizona, Colorado, Utah and Oregon
- The West also includes 6 of the top 10, 8 of the top 15, and 10 of the top 20. Only Wyoming (rank 22) did not make the top 20 fastest growing states.
- Punchline: The sparsely-populated but rapidly-growing Western states make the West America's fastest growing region.

Second, consider growth measured by absolute members, 1990 - 2000:

- Two of the top 5 (California and Arizona) and 4 of the top 10 (California, Arizona, Washington and Colorado) are located in the West.
- Adding Nevada (13), Oregon (16) and Utah (21), 7 of the top 25 are in the West.
- New growth in the West totaled 10.2 million. Of this total, 80% occurred in the top 7 including 40% (or 4.1 million) in California.
- Punchline: 1 out of every 3 new persons in America counted in Census 2000 is located in the Western US and nearly half of those are in California with the rest distributed among the remaining Western states.

Third, the West is become more diverse as many of the new immigrants, especially Hispanic and Asian immigrants, are settling in the American West.

Migration. Since World War II, the West and the South have been America's fastest growing regions. This trend continued during the 1990s as more Americans migrate to the American West and as more of America's new immigrants, especially those from Asia and Mexico, settle in the West.

As a result, Westerners are younger, more ethnically diverse, and better educated than the rest of the country. Examples: Washington state has the nation's highest percentage of high school graduates; Colorado the highest percentage of college graduates; New Mexico leads the country in Ph.D's per capita.

Today, the West is also the destination of choice for the footloose opportunity seekers including Americans who are moving in droves to what Rand McNally calls America's "mild and wild" places and immigrants from other countries, especially from Mexico and Asia, who are major assets providing energy, connections and know-how to the West's entrepreneurial and increasingly globalized economy and they reinforce American idealism: They know why they are here.

Finally, because the West is attracting so many people from New Economy knowledge workers to professional nomads and retirees we have the phenomenon of population-driven growth as people move to the West to provide services to the region's growing population. This is quite a change

Urbanization. Zane Grey, Shane and Lonesome Dove, the solitary cowboy riding fence on the open range these images come to mind when you think about the West. Even today, the Big Sky, large ranches, trekking or mountain biking in what Joel Garreau called the "empty quarter" are common scenes of the West. Despite these gripping rural images, however, the West is America's most urbanized region. More than 4 of 5 Westerners live in urbanized areas unlike the rest of the U.S., where nearly 1 of 3 lives in a rural setting.

Most of the West resembles an archipelago of urbanized areas separated from each other by vast expanses of largely empty land. Relations among these "city-states" and between these cities and their rural hinter-lands increasingly define important fault lines in the politics of the West.

Diversification. For most of its economic history, the West has been a natural resource colony of the West. Western oil, gas and coal fueled humming factories to the East. Western beef and grain fed their workers. Western timber provided housing for their people.

²The 11 public lands states of the lower 48 include Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.

The West is still the nation's natural resource treasure house and extractive industries still play an important role in the culture and economies of the West. But the relative importance of natural resource industries has decreased with economic diversification especially as the new knowledge-based industries on which America and the region's economic future increasingly depend.

The nation's economic center of gravity is shifting west. Example: Since 1983, trade across the Pacific has exceeded trade across the Atlantic and is now more than double the Atlantic trade.

Another example is the growth of the West's manufacturing base. For decades California and Washington have been the world leaders in aerospace, America's principal manufacturing export. But few have noticed that Los Angeles is now the center of the nation's apparel industry, that one of America's most productive steel mills is in Utah, that California is America's largest industrial state and its largest agricultural state or that Western states are found among the top tier in manufacturing job growth.

Western states especially California, Oregon, Washington, Colorado and Arizona hold a disproportionate number of the Inc. 500 "fastest growing" businesses in America. Midway through the decade, for example, all of Forbes magazine's top 10 cities for starting New Economy business were located in the West.

There are important changes that advantage the West and make it attractive to the new migrants. Example: Entertainment now rivals space exploration and defense as the driving force for the development and application of new computing, software and multimedia technologies. Metropolitan Denver has become a global hub for the communications industry both cable and telecommunications and is the home of CableLabs, the industry's R&D unit.

Many of the nation's most important New Economy companies are located in the West: 11 of 14 semiconductor manufacturers listed by the Business Week 1000, 14 of 22 manufacturers of computers and peripherals, and 18 of 31 software firms including the two largest are headquartered in the West. Of the top six biotechnology firms, the three largest are in the West. And the West is home to the nation's aerospace industry.

The West is a leader in these foundation industries of the New Economy for several reasons. First, the region's social, political and institutional atmosphere is more conducive to start-up industries. Example: Expansion Management magazine consistently ranks the Western states in the top categories of their business climate ratings.

Second, talented people are the crown jewels of the New Economy, and talented people are in short supply. Hence, because we live in a sellers' market for talent, New Economy industries are attracted to the West because more of the entrepreneurs and knowledge workers on whom these industries depend prefer lifestyles and the natural and cultural amenities that are abundant in the West.

Globalization. International trade is America's fastest growing commercial sector. This pattern is also found in the Western states, where exports are a major source of new jobs. Western exports come from both the traditional resource industries (e.g., agriculture, coal) and from the new knowledge-based industries. Examples: "education" (computers, software, entertainment, multimedia) and business and professional services (telecommunications, management consulting, design and construction, financial).

As global economic activity has shifted from the Atlantic to the Pacific, Los Angeles is poised to be in the 21st century what New York was during most of the 20th, London in the 19th, and Paris in the 18th a "world city," a dominant center of world commerce, culture and fashion.

Seattle (like Atlanta and Miami in the South and Chicago on the Great Lakes) is already an established global hub; Denver, Salt Lake City, Portland and Phoenix are emerging global hubs. The coming Pacific Century will also be an American Century and will draw even more people to the region.

Gentrification. The revolution in telecomputing (computers plus software plus high-speed, broadband networks) and rapid advances in express mail are quickly eliminating most of the liabilities of the West's remote location of many of the West's cities and towns. One result: More entrepreneurs and freelance professionals writers, brokers, software designers, analysts, engineering and management consultants are migrating to the West's small towns and urbanized areas where they use new telecomputing technologies to create new businesses as they remain connected to the outside world by faxes, modems, express mail and airplane tickets. We call these people Lone Eagles. Two or three Lone Eagles can be a major economic boon to a small town.

As we enter the 21st century, the West has many assets that will continue to attract people its geographical location, the richness of its natural resources, the

education and energies of its peoples, the youthfulness of its population and openness of its political structures. The West also has growing political clout, as shown by the Electoral College, where the region accounts for one out of three votes up from one out of five (16%) in 1952.

But the West's greatest advantage may be its culture. In the words of the great Western writer Wallace Stegner, the West is "the native land of hope." And hope is a powerful magnet for people not just for Americans, but for people from around the globe.

Mr. CALVERT. The next witness is Mr. Ronald E. Young, President of WateReuse Foundation.

You may begin your testimony, Mr. Young.

**STATEMENT OF RONALD E. YOUNG, PRESIDENT, WATEREUSE
RESEARCH FOUNDATION**

Mr. YOUNG. Thank you. I am Ron Young, and I am from Southern California, Mission Viejo. I am President of the WateReuse Foundation, and I also serve on the Research Advisory Board of the National Water Research Institute.

In my career, I have worked both in the public and the private sectors, so I have had an opportunity to look at environmental engineering and the water business from both sides of the cup.

I have some descriptive literature on NWRI and WateReuse, and I will submit that for the Committee's reference.

Mr. YOUNG. I have been asked to talk today about the need for research and technology improvements in water recycling and desalination.

My rhetorical question is: What are the two greatest drivers to creating new water supplies? The first answer to that question is population growth. I feel like I wasted my time putting this together after hearing all the other speakers talk about it. We see the U.S. population projected to double and then quadruple in the next 100 years. We see Southern California being in a growth mode in the five-county Southern California area, where in the next 20 years, they talk about increasing the population by 6 million people in an area that currently houses 10 million people. They will be doing that without adding any additional land to the development area. That 6 million people is the equivalent population of two Chicagos, which would be 3 million people each that we see now.

The second answer to that question is threatened water supplies. As you have heard, our water supplies have real competition nowadays, and there are also issues of contamination. One example of competition that we heard relates to threatened or endangered species. That number of species has risen from 300 to 1,200 in the last 20 years, and with that rise is a need for environmental water to be able to satisfy that progress.

Looking at a specific example, the CALFED Bay-Delta process, they have identified an order of magnitude of water of about one million acre-feet that will be required for environmental needs. That happens to be the amount of water that could supply the population of two Chicagos.

When we look at contamination, we know that that can come from nature by adding salts to the ground water, making it brackish and not fit for irrigation. We also know that leaking tanks and

drainage flows from livestock and agriculture can add to contamination in areas like Riverside County, Ontario, Chino Basin area, where the dairies have contributed, and solutions are being worked out with desalination as we speak.

But how can water treatment technologies come to the rescue? New technologies supported by applied research are critical to providing safe and sustainable treatment for recycling and desalting water to meet our future urban, industrial, agricultural, and ecosystem needs.

The two key areas are wastewater recycling and water desalting. Wastewater recycling is a common practice in many States, but it needs to be more than just irrigating golf courses and playgrounds. Florida, Texas, Arizona, California, Oregon, and Washington all have such projects. We need to add industrial and commercial uses such as cooling water, car washing, and toilet flushing to that list of uses.

Recycling for potable use is also possible. As an example, again putting numbers to some of the flows, the four major wastewater outfalls in Southern California from L.A. City, L.A. County, Orange County, and San Diego, discharge about a billion gallons a day of fresh water to the Pacific Ocean. That is the equivalent amount of water that could be used to supply water to two Chicagos for 6 million people.

Desalting is also key. Recycling brackish water and other water, desalting those waters, is important as a new source of supply. A 1997 Bureau of Reclamation report reported that about 75 percent of the desalting is done on brackish water, and that is carried out in California, Florida, the Virgin Islands and Texas leading the Nation in desalting treatment plants.

Ocean desalting comprises only about 10 percent of the desalting and is an area that needs more work. The Virgin Islands lead the way there.

Applied research is needed to provide a scientific basis for our country's engineers and water professionals to use new technologies to facilitate development of future water supplies. To that end—and I will also submit these to the Committee—the National Water Research Institute has completed national meetings where desalinization and water research priorities have been put together by a panel of national experts. They met for three days to study each of these priorities, and those are the priorities that are in my testimony. Because of the Committee's time requirements, I will not go through all of that.

In conclusion, Mr. Chairman, with the rapidly growing populations of the Sun Belt States of California, Arizona, Texas and Florida, coupled with the multiple threats to water supplies, there will be a continuing need to develop recycling and desalination technologies to treat new sources of water in a safe, sustainable, and economic manner.

Mr. Chairman, we know that applied research works. As an example, research and applied technologies in the field of personal computing have increased the power of PCs from 200 to 800 megahertz in the last four years, while reducing the cost of those units from \$4,000 to \$1,500.

Reverse osmosis desalting costs have dropped due to changes in technology from about \$15 per 1,000 gallons in the 1950's to about \$2 per 1,000 gallons today.

The common thread in these two examples is power. The major operating costs for desalting are chemicals and power. Better membranes in desalting will reduce fouling, and that will reduce chemical usage. Better membranes using lower pressures will reduce power costs and requirements. Even with the desalting costs reduced to today's levels, they are still above the average cost of conventional treatment. Improving treatment economics and the value of water through applied technology could alleviate future water shortages.

Finally, Mr. Chairman, we need the continued support of your Subcommittee to allow applied technology research to address the nationwide research priorities that I have outlined here. To bring that research into production, we need Congress to provide additional resources for Title XVI funding.

Therefore, as your Subcommittee deliberates on program priorities, we ask that you consider ranking water technology research and Title XVI at the very top of the priority list.

I thank you for this opportunity to testify.

[The prepared statement of Mr. Young follows:]

Statement of Ronald E. Young, P.E., DEE, President, WateReuse Foundation

Thank you, Mr. Chairman and members of the Subcommittee on Water and Power for the invitation to discuss how water recycling and desalination can increase water supplies in the arid West.

By means of a self-introduction, I am Ron Young, a resident of Mission Viejo, CA. My professional career of 35 years is entirely in the Environmental Engineering field. I am a Registered Civil Engineer in CA and a Diplomate of Environmental Engineering with the American Association of Environmental Engineers. I am a Senior Associate with Malcolm Pirnie, Inc., one of 1200 employees in this national century-old exclusively environmental engineering consulting firm. My background includes both private and public sector experience with 11 years as General Manager of the Irvine Ranch Water District, one of the nation's leaders in water recycling. I serve as a member of the Research Advisory Board of the National Water Research Institute and as President of the WateReuse Foundation Board.

The WateReuse Foundation (WRF)

The WateReuse Foundation is a non-profit organization established in 1993 by representatives of public and private sector organizations to develop the science and technology necessary to support and enhance the water recycling needs of the 21st century. The Foundation is the only national organization dedicated to the research and educational needs of the water recycling industry and ultimately the public.

The WateReuse Foundation provides education and research to benefit the environment, sustain agriculture, and meet the needs of urban and industrial water users. It produces high quality research in the areas of technological, social, and economic advancement designed to lead to the creation of cost-effective, safe and reliable recycled water supplies. I would like to submit for the record additional information on the Foundation and the WateReuse Association that I believe may be useful for this Subcommittee as you consider policy responses to meet the needs of the west.

What are the two greatest drivers to create new water supplies?

The American Association for the Advancement of Science Annual meeting in San Francisco last month presented a session on "the Collapse of Complex Societies". The overriding theses presented by speakers was that of all the factors contributing to the collapse of Rome, Babylon and the Mayan empire,

Two stood out: too many people and too little fresh water.. Dr. Vernon Scarborough, an archaeologist at the University of Cincinnati pointed out that the Mayans "suffered from problems that are startlingly similar to those today".

First, Population Growth.

In a recent American Water Works Association Research Foundation (AwwaRF) study to assess the future of water utilities, they cited a U. S. Bureau of Census projection that the U. S. population would double by 2100 using moderate fertility, immigration and longevity assumptions. The same projections quadruple using aggressive assumptions. On a more immediate timeframe, the Southern California five County area population growth in the next twenty years is estimated to increase by 6 million people or “two Chicagos” within the same land area that the current 10 million residents occupy. This growth is from the March 2001 report; *Sprawl hits the Wall, Confronting the Realities of Metropolitan Los Angeles*, The USC Southern California Studies Center and The Brookings Institutional Center on Urban and Metropolitan Policy.

Second, Threatened Water Supplies.

Traditional water supply sources have real competition and contamination issues that will reduce growth rates to match the population increases. Water is a finite resource. Every school child learns that 3/4 of the earth’s surface is covered in water. What often is lost in this fact is that only 5% of that volume is fresh water. Seventy percent of the fresh water is locked in the frozen ice caps at the tips of our planet. As the number of species listed as threatened or endangered has risen from 300 to 1200 in the last 20 years, the environmental needs for water have also increased. In California, environmental water needs being examined as part of the Bay-Delta environmental review process are in the order of magnitude of the water needs of “two Chicagos”. New environmental water would not be available for urban or agricultural supply. In addition to this need, we are beginning to witness international demands for ecosystem water supplies that will affect our abilities to meet domestic demand.

Contamination of water supplies also threatens to reduce available supply for growing needs. Sources of contamination can be from nature, such as salts to create brackish water not fit for irrigation or man-made drainage that can contain chemicals from leaking tanks, waste flows from livestock/agriculture or small quantities of substances we are only now able to detect using extremely sophisticated instrumentation.

How can water treatment technologies come to the Rescue?

In that same AAAS meeting, speakers pointed out that previous prophets of doom, such as the English politician economist T. R. Malthus and the “Club of Rome’s” report, entitled *The Limits to Growth*, which in 1972 predicted the world’s population would overwhelm its resources, have been proved wrong so far by the rapid progress of technology.

New technologies supported by applied research are critical to providing safe and sustainable treatment for recycling and desalting water to meet our future urban, industrial, agricultural, and ecosystem demands. As pristine water is already used we will search for new sources to meet society’s needs. This search has already begun.

The recycling of wastewater is no longer an option just for irrigation of parks and golf courses but is used for residential lawns, toilet flushing in office and industrial buildings, cooling water in industrial (refineries and power generating plants) and commercial buildings, car washes and the replenishment of water sources used for drinking water. These uses are underway in Florida, Texas, Arizona, California, Oregon and Washington. Several communities around the Great Lakes are also relying on reusing water supplies to comply with restrictions on increasing lake pumping. While today’s hearing focuses on the West and its future water needs, the point that I would like to add is that water demands and supply are increasingly becoming matters of concern for areas without regard to the area’s climate. For example, Florida is now in the midst of a drought even though historically the State receives 43–44 inches of rainfall annually.

We will also look to recycled wastewater discharged into the ocean through outfall pipes as a source of drinking water. The one billion gallons per day from the four major Southern California outfalls could meet the needs of a little more than two million households or “two Chicagos”. This is a prime topic for research to prove the safety and reliability of treatment given the histories of projects in Denver, San Gabriel, Dublin San Ramon, Tampa Bay and San Diego.

We will look to desalting brackish water (too salty to drink but not as salty as sea water) to blend into drinking water supplies to optimize local sources. A 1997 Bureau of Reclamation Report No. 24 lists 178 potable water-desalting plants in the U.S. with about 75% using brackish water. The plants were located in 21 states and

territories with Florida (90), California (17), Virgin Islands (14) and Texas (11) having the majority. Most of the plants are small, less than 1 million gallons per day.

We will look to the ocean as a source that is close to coastal growth areas. The 1997 survey listed about 10% of the desalting plants using the ocean as a source. The largest are in St. Thomas and St. Croix, Virgin Islands Water and Power Authority with a capacity of 8.1 million gallons per day. There has been only slight growth in ocean desalting compared too brackish and membrane softening, which are growing in double-digit percentages. Total U.S. desalting is about "3/5 of a Chicago". The use of recycling and desalting has only scratched the surface and needs more use to become accepted and commonplace as a source of water.

Applied research is needed to provide a scientific basis to the country's engineers and water professionals to use new technologies to facilitate development of future water supplies. To that end the National Water Research Institute has assembled two Research Workshops of nationally recognized experts and leaders to develop Research Priorities in the field of Non-Potable Water Recycling (May, 1999) and Desalination (January, 2001).

WRF Research Agenda

The WateReuse Foundation's prioritized research agenda was developed through a workshop held in May 1999 by the National Water Research Institute on water recycling. Workshop participants developed a list of 25 priorities with the top 10 plus one (salinity management) becoming the research agenda of the WateReuse Foundation. The 11 research priorities are as follows:

1. Microbial risk assessment methodologies as a tool to help establish water reuse criteria;
2. Identify reuse criteria that are both protective of public health and enable maximum flexibility and efficient use of treatment technologies;
3. Understand the pathogen inactivation relationship and performance parameters for various disinfection and treatment processes to develop cost-effective public health protection;
4. Develop a program to quantify, measure, compare, and communicate relative levels of safety of non-potable reuse to the public and policymakers;
5. Develop water quality standards for chemical constituents;
6. Establish a rational basis for demonstrating equivalent treatment with alternative processes for pathogen removal/inactivation;
7. Ensure that recycled water is microbiologically safe;
8. Maintain water quality in the reclaimed water storage/distribution system;
9. Standardize protocols for field-testing of recycling equipment and practices;
10. Develop monitoring strategies to verify treatment and disinfection reliability; and
11. Conduct salinity impact, source control, and treatment studies.

These 11 research priorities form the basis for the Reuse Foundation's research program in 2001; this program is being carried out in partnership with the U.S. Bureau of Reclamation. This 11-point research program will also act as the basis for the Foundation's Annual Research Conference in Monterey, CA in June 2001.

Proposed Scope of Work and Research Agenda for 2001

The WateReuse Foundation's Research Committee convened a meeting on February 23 to select an initial group of projects for funding in the year 2001. After considerable deliberation, the Committee selected the following projects for funding. The estimated cost of each research project is shown in parentheses.

- Investigate the Effectiveness of Treatment Technologies to Eliminate Precursors or Destroy/Remove Nnitrosodimethylamine NDMA;
- Develop and/or Refine Analytical Methods for NDMA;
- Long Term Edible Crop Irrigation Project;
- Develop a Better Understanding of Political Opposition to Potable Reuse Projects;
- Investigate Removal of NDMA in Various Soil Types to Expand the Knowledge of NDMA Fate and Transport; and
- Investigate the Effectiveness of Low and Medium Pressure UV to Destroy NDMA.

At its January 29 Board meeting, the WateReuse Foundation's Board of Directors approved funding for two ongoing projects being led by the AWWA Research Foundation:

- Salinity Impact and Source Control; and
- Characterizing Microbial Water Quality in Non-Potable Reclaimed Water Distribution Systems to Optimize End Uses.

The WaterReuse Foundation also is contributing to two research projects dealing with pharmaceutically active and endocrine disrupting compounds being jointly funded by the Joint Water Reuse Task Force, a coalition consisting of the AWWA Research Foundation, the Water Environment Research Foundation (WERE), and the National Water Research Institute (NWRI).

These 10 projects, in addition to several existing projects initiated in previous years, constitute the WaterReuse Foundation's research agenda for 2001. The WRF is actively pursuing matching funds to accomplish this agenda.

Desalination Priorities

The top ten priorities from the NWRI Workshop out of 18 issues developed by a panel of 27 national researchers, utility, business and consulting experts follow:

1. Research and Development to Improve Membrane Process Technology;
2. Develop an Education and Public Relations Strategy to Facilitate the Implementation of Desalination Projects;
3. National Desalting and Water Quality Improvement Act;
4. Develop a Comprehensive Framework to Guide the Decision-making Process for Potential Desalination Users;
5. Concentrate and Waste Management;
6. Energy Reduction for Desalination Plants;
7. Look Outside-the-Box for Innovative Solutions;
8. Determine the Value of Water for Different Water Uses;
9. Improve the Fundamental Understanding of Membrane Science;
10. Establish a National Advisory Panel for Developing Water Purification Technologies to Increase Water Supplies.

Conclusion

Mr. Chairman, with the rapidly growing populations in the "Sunbelt states" of California, Arizona, Texas, and Florida, coupled with the multiple threats to water supplies there will be a continuing need to develop Recycling and Desalination Technologies to treat new sources of water in a safe, sustainable, and economic manner.

Mr. Chairman, we know Applied Research works. As an example, research and applied technologies in the field of personal computing have increased the power of PC's from 200 to 800 MHz in the last four years while reducing costs from \$4,000 to \$1,500. Reverse osmosis desalting costs have dropped due to changing technological applications from \$15 per 1,000 gallons in the 1950's to \$5.50 in the 60's to about \$2 in 2001. The common thread in these examples is power. The major operating cost for desalting are chemicals and power. Better membranes with reduced fouling will reduce chemical usage. Better membranes using lower pressures will reduce power costs. Even with the desalting costs reduced to today's levels they are still above the average costs of conventional treatment. Improving treatment economics and the value of water through applied technology research could alleviate future water shortages.

Mr. Chairman, we need the continued support of your Subcommittee to allow Applied Technology Research to address the nationwide Research Priorities outlined herein. To bring that Research into production we need Congress to provide additional resources for Title XVI funding. Therefore, as your Subcommittee begins deliberations on program priorities, we ask that you consider ranking 1) water technology research and 2) Title XVI at the very top of the priority list. We also request that you work with your colleagues on the spending committee to ensure the appropriation of adequate budgetary resources for these priorities.

Thank you for the opportunity to share the views of the WaterReuse Foundation and the National Water Research Institute with you today. Both organizations stand ready to assist you and the Subcommittee. I would be pleased to respond to any questions the Subcommittee may have.

Mr. CALVERT. Thank you.

It has been excellent testimony from all the witnesses today. I think you have covered the waterfront, so to speak, as far as the various needs and potential solutions that may be out there.

To start off, I will ask my questions, and then we will rotate among the various Members who are here.

Ms. Salisbury, what do you think are the most important actions that we need to take to mitigate drought conditions in this country?

Ms. SALISBURY. I think, Mr. Chairman, that the most important thing the Congress could do is to try to provide for a way for drought to be coordinated among the Federal agencies. That would mean probably designating the lead agency as the coordinating agency.

Mr. CALVERT. Okay. That leads to another question. What would be the relationship between water storage and coordination with various agencies and drought preparedness—do you think that that is handled very well?

Ms. SALISBURY. I think it probably is not handled well, Mr. Chairman, partly because we do not get the data that we need, the appropriate data or enough data, to determine when we are in a drought situation, to take those steps that we need to take to conserve more.

I know that in my own State of New Mexico, we do not coordinate with the Federal Government very well to know when there are going to be drawdowns on the reservoirs. Right now, we are talking about doing drawdowns on certain reservoirs to provide more water downstream for the silvery minnow, which is an endangered species in New Mexico. Luckily, we are not in a drought situation, so that will not be exacerbated in any way, but it could be.

Mr. CALVERT. Do you have any recommendations to increase water supply in the West and help coordinate not only with Federal agencies but with the environmental community as far as being able to in effect increase the amount of water that we presently have in order to meet these various requirements—ESA, urban uses, et cetera?

Ms. SALISBURY. Mr. Chairman, there are probably a lot more people in this room who are qualified to answer that question than I am.

Mr. CALVERT. I did not know if your Western Drought Coordination Council had made any official recommendations for the Congress.

Ms. SALISBURY. We have made some recommendations, Mr. Chairman, through conservation measures, to increase the amount of water that may be available, and—

Mr. CALVERT. Certainly, I think conservation is supported by everybody, but I was thinking primarily of new supplies as well. Any suggestions would be welcome.

Mr. Malloch, does Trout Unlimited support the removal of dams in the Western river basins? Specifically, what is Trout Unlimited's position on removal of four Snake River dams and the Glen Canyon dam?

Mr. MALLOCH. The short answer is that we support removal of a very small number of dams that have extreme problems. The two sets of dams that you just mentioned are good examples. We do support removal of the Snake River dams, because based on the science as we understand it, there is no other alternative to preserving the stocks of salmon on that river.

If I may just finish, on Glen Canyon, we have not taken any position in support of removal of that dam.

Mr. CALVERT. Do you think that you could work with various groups to find an alternative to removal of dams, technology being

what it is? Have you looked into that at your organization to find alternatives to dam removal?

Mr. MALLOCH. Absolutely.

Mr. CALVERT. And you have found no other alternative other than dam removal?

Mr. MALLOCH. Based on the science as we understand it now and the actions that have been taken to date, removal of the Snake River dams is the only alternative to extinction. Given the decisions that have been made about removal, we are actively working to implement the recovery plans and doing everything we can to make sure that those are effective.

Mr. CALVERT. You mentioned in your testimony that the Forest Service is using a form of watershed initiatives in negotiations over bypass flow provisions. Can you give an example of that?

Mr. MALLOCH. Yes. In Colorado, there are three National Forests where the Forest Service is using what I believe they call the "pathfinder process."

We understand that bypass flows are often very controversial. In Colorado, they are quite controversial. If there is a way to achieve the goal of meeting the needs of the natural resources without the Forest Service exercising that bypass flow authority, we are all for it.

At the same time, I think it is necessary in the negotiations for the Forest Service to have that authority in case the negotiations, the watershed initiatives, do not work.

Mr. CALVERT. You mentioned in your testimony that we have already lost 20 species of Western fish. What is the source of that information?

Mr. MALLOCH. That is Professor Minckley at University of Arizona, and it is a report that he prepared for the Western Water Policy Review Commission. The reference is in my testimony.

Mr. CALVERT. Thank you.

Ms. Solis?

Ms. SOLIS. Thank you, Mr. Chairman.

I would like to also thank the Chairman for bringing this panel together. I think it would have been very interesting to see reactions by the previous panel to see how they might help us address some of these issues.

I am very delighted to hear that the Western Governors' Association has a proposed plan to put forward. Some of the ideas are really great, but I would ask you what is it going to cost us to do that.

Ms. SALISBURY. Mr. Chairman, Congresswoman Solis, at this point, the drafts that I have seen of the legislation would set up a coordinating group and would try to streamline some of the authorities that currently exist. I think that presupposed in the legislation, however, is that some of these programs that currently exist today would be funded. The way I understand how some of them work, they are authorized but not necessarily funded from year to year.

Ms. SOLIS. So we need to do a better job, then, of bringing, as you said earlier in your testimony, folks together, and there could potentially be a cost savings?

Ms. SALISBURY. I would think so. I would hope so. And not only that, it would be more seamless for the customer, for the person

out there trying to use some of the authorities that currently exist. It can be mind-boggling if you are a farmer or a rancher, and you are facing devastation, and you have no idea or clue where to go, and the local agency that you are seeking help from may not necessarily know what exists in other agencies. It is a pretty daunting task.

Ms. SOLIS. Just one last comment for the last speaker regarding the use of water reusage and programs there. I know that the State of California has used and implemented many programs to use gray water and reclaimed water, for example, on some of their university campuses. I wonder if the Federal Government has set any kind of example in moving that kind of technology forward with our own public lands that we hold, or facilities. I would be anxious to hear—maybe this is a question for the other panel—if there has been any movement in that way to kind of set the tone, so to speak, as to what kinds of innovative technologies could be undertaken and their usefulness.

Maybe you know of some of those that have been done by the Federal Government. I do not have any knowledge of that.

Mr. YOUNG. If I may, I know of no national policy for water recycling or reuse of wastewater, although in California, as part of the CALFED process, all the stakeholders did come together and sign a common proclamation, which was all the environmental and research agencies of the State of California Department of Fish and Game, Fish and Wildlife, the Federal Government, Bureau of Reclamation, EPA, Corps of Engineers. They signed a supporting proclamation along with the WaterReuse Association, encouraging and supporting water reuse, so we can plan to move ahead and take advantage of available opportunities with Title XVI funds. But it was just at that kind of umbrella level that it was moved forward.

Ms. SOLIS. It is interesting and may be something that this Committee might want to ponder if there is such an inclination to want to move in that direction to try to better utilize technology and advance that.

Mr. CALVERT. If the gentlelady will yield, we are going to do exactly that, as a matter of fact, as we move forward on our CALFED legislation. So we look forward to working with you.

Mr. Osborne?

Mr. OSBORNE. Thank you, Mr. Chairman.

Thank you all for coming today.

I am a trout fisherman and a salmon fisherman, so I am interested in some of Mr. Malloch's testimony. This is a little bit off the point, but what is the status of whirling disease right now in the West?

Mr. MALLOCH. We are still in pretty bad shape. There is no cure for whirling disease. There is some promise of resistant strains of rainbow trout. But there is a lot of need for better hatchery practices in the States that are stocking fish, and there is a lot of need for trout fishermen to be really careful not to spread whirling disease.

Mr. OSBORNE. So you do not feel that it has bottomed out and is on its way back at this point?

Mr. MALLOCH. I hope it has bottomed out.

Mr. OSBORNE. Okay. What is the status of summer stream flows in the West? Do you feel that it is going to be critical in terms of temperature and flows given the current situation, or do you feel that flows are apt to be adequate?

Mr. MALLOCH. Well, the West is a big place. In the Pacific Northwest, it is going to be absolutely critical. In Idaho, Montana, Washington, Oregon, parts of California, there are going to be very large problems with maintaining existing fish stocks.

In other parts of the West, water supply is not so much of a problem.

Mr. OSBORNE. I have just one more question. In regard to the question that was asked by the Chairman about the removal of dams on the Snake River, I know they have tried fish ladders, and they have tried trucking. Do you feel that there is no viable alternative to knocking the dams out?

Mr. MALLOCH. The real problem is getting the smolts downstream, and those dams are just big, hot lakes that kill the fish on the way down. There seems to be a very depressing trend in the population of the fish since the dams were built, and I certainly hope that there are alternatives that will work, but to date, the science does not appear to be very promising.

Mr. OSBORNE. So there has been a steady decline in the salmon stocks, then?

Mr. MALLOCH. There is a lot of noise in the populations; you can get a better year or a worse year, but overall, a steady decline.

Mr. OSBORNE. Thank you.

I have a question for Mr. Burgess. Is the infrastructure used to store and transport water adequate to meet the needs of the West's growing population?

Mr. BURGESS. No—a quick answer. I think there is no question that we will have major growth over the next decade. America's economic center of gravity is moving to the West, and there is no reason to believe that that is going to stop when you look at the forces that are shaping that.

The new industries that are starting are also water-intensive industries, water and energy-intensive industries. So I think that contrary to popular belief again, the high-tech community is a big user of water and a big user of energy both.

So we are looking at some major needs to build new facilities, create new supplies, reallocate existing resources—whatever the solution, there has to be more water for M and I uses in the coming years.

Mr. OSBORNE. Say some more about new facilities. What do you mean by new facilities—dams?

Mr. BURGESS. Storage facilities, surface storage facilities, recharging—all the things that the first panel talked about I think should be on the table.

Mr. OSBORNE. So you and Mr. Malloch are not quite on the same page here; is that correct?

Mr. BURGESS. I do not think so. We are next to each other, it looks like. I would like to minimize that right now.

Mr. OSBORNE. Thank you.

No further questions, Mr. Chairman.

Mr. CALVERT. Thank you.

Ms. Napolitano?

Ms. NAPOLITANO. Thank you, Mr. Chairman.

Given the information that we heard from the first panel, what would be the ideal way that we could work together to bring a solution to the surface so that we can all work together, not only the trout organizations and the environmentalists and the Bureau, as well as the users? What would be the ideal solution? What can we look forward to—given the fact that we know we have an increase in citizens in the Western area of this country, given the fact that we in California are going to have to face a 4.4 billion acre restriction—given all the givens that we know, what would help? What would be the thing that this Committee and the Congress should be looking at?

Mr. BURGESS. Could I comment on that? I believe that one of the most overlooked facts in the current debate on energy—and we are going to have one on water at some point unless we change our ways—is that the debate always balances the environment against energy supply or, as we have heard today from some witnesses, the environment against water supply.

I have been working in the West for more than 20 years, and I remember the Energy Mobilization Board in 1980; I remember the oil shale installations in Colorado where we built towns of 30,000 people overnight; I remember the coal development when we had 30 tons a year in 1975, and today in Wyoming, we have one mine that produces over 200 million tons of coal a year.

I think the biggest threat to the environment is unstable supplies of water and energy. The biggest threat to the environment is an unstable supply of water and energy, because when those supplies become unstable, people will do anything, and Members here are driven to do things they would never have done one year earlier as they did in 1980.

Ms. NAPOLITANO. Which is why the question—what can we do?

Mr. BURGESS. So what we do is give the highest priority to solving the supply problem. Stable supplies are key to a good environment.

Ms. NAPOLITANO. How—we know that is the question, but—

Mr. BURGESS. No, we do not. With all due respect, I think a lot of people are saying that we have to balance these two, and maybe they go together. I am suggesting they do not go together.

Ms. NAPOLITANO. No, I am not saying there is a balance. I am really asking for answers from those people who are bringing information to us and saying we know we have to work together—that is a given—but how do we make it happen?

Mr. MALLOCH. We do sit next to each other. I do not think I could agree with Dr. Burgess more that unstable supplies are a real threat. But I would like to propose two very standard answers to the Western water situation. The first is efficiency. We have to use the water that we have in a much more rational fashion; squeeze the good out of every drop that we can. And the second is markets. We have to have markets to reallocate the water from uses that may be an artifact of history, that may still provide some economic benefit. But compared to what Intel can pay for their water, perhaps there are some ways that we need to change the use of water.

So I just do not see that there are going to be a lot of new, standard-issue water projects built in the West. There just is not that much water left to dam. There may be some conveyance facilities that are needed, and there is an awful lot of investment in efficiency that is required, and we really need to figure out a way to reallocate the water. So efficiency and markets.

Ms. NAPOLITANO. How about speeding up the process for the research on recycled water?

Mr. YOUNG. Terrific. May I?

Ms. NAPOLITANO. I am talking your language.

Mr. YOUNG. Thank you. I think that that is absolutely paramount to start that process and fully engage the process, not in a part-time way but in a full-time way, so that we can look at research, so that we can look at supplies.

I think that what we have heard today is that pristine water is being used about to its maximum and that we are going to have to look to alternate supplies to be able to find those new sources of water. That billion gallons a day of fresh water that is going out into the ocean out of the outfalls needs to be scalped or recycled and reclaimed so that it can be put to appropriate uses. There are small agencies individually applying themselves to do that, but it needs to be done on a much larger scale, and to do that and accomplish that threshold, we need a public confidence and/or approval that says this is a tack that we approve of going on. And I think research brings the credibility and the science to the technology so that the practicing engineers can put that infrastructure in place. As we all know, if you go down to the wastewater plant, that flow comes 24-7-365, so that is pretty darn reliable, and I think that if we use that in appropriate ways, we can release some of that water upstream for the fish or the growing smaller communities that are in the watersheds away from the growing metropolis areas.

Ms. SALISBURY. And if I could segue—and this is sort of intuitive and probably very obvious—but to ensure the stable supplies and efficiency and perhaps markets requires planning and coordination. Those are key.

Ms. NAPOLITANO. By all agencies.

Ms. SALISBURY. Absolutely—and States and localities and tribes as well.

Ms. NAPOLITANO. Thank you.

Thank you, Mr. Chairman.

Mr. CALVERT. Thank you.

Mr. Burgess, you made an excellent point and one that I agree with, obviously. When I was Chairman of the Energy and Mineral Resources Subcommittee, I used to argue that if we do not move toward finding resources and delivering those resources, we may come to a day when we may try to obtain resources from folks who normally would be opposed to that may find themselves in favor of something that they were opposed to in years past.

When I was Chairman of the Energy and Environment Subcommittee, I would make the same argument for nuclear power, that we ought to look at nuclear power and develop nuclear power if we want no CO₂ in the atmosphere, et cetera.

Now we are here today with water, and we have heard great testimony from all of you and certainly you have testified that our

population will continue to increase in the West. We have had this mentality—do not build it, and they will not come. Do not build the freeways, do not build the power plants, do not build the infrastructure, do not build additional water delivery systems.

And I would respectfully disagree with Mr. Malloch that there are ways to add to water supplies, either offstream storage, which obviously has more acceptance to the environmental community, and some additional onstream storage by expanding additional reservoir capacity and potentially several other reservoirs that could be used also for flexibility and for environmental mitigation and that we can offset some of these things.

So my question to Mr. Burgess would be if we did not build any of this, if we do not build any additional infrastructure for water specifically, will people come to California and to Idaho and to Oregon and everywhere else, anyway? Will the population continue to increase?

Mr. BURGESS. Dick Lamm, the former Governor of Colorado, had that theory on building highways, and he did not build the highways because he thought that would help manage growth; and what it did was create traffic jams. People kept coming—as I said, we have more people living in the front range of Colorado today than the entire State.

So I think that as long as we have a Constitution that guarantees the free movement of people and goods across State lines, you are going to see people moving to the West.

Mr. CALVERT. We saw this mentality, what we refer to as “growth inducement”—if you build an infrastructure project that induces growth, growth will come. I have found that it comes anyway, that if you do not build the infrastructure, it comes anyway.

I think everyone on the panel agrees that reclamation is a good thing; that developing water sources and reutilization of existing water is a good thing and certainly something that I support. My area, obviously, Riverside, California and certainly Orange, California, is trying to undergo probably the largest reclamation project in the country where you are from, wanting to reclaim about 100,000 acre-feet of water to recharge aquifer and reutilization of that water through the community. That is a significant project, and certainly, I am hopeful that legislation could support that. That lessens demand for other uses.

I would like to ask a couple of other questions also regarding urbanization in the West. In California specifically, obviously—since I am here, I will go ahead and ask the question—we have certainly seen urbanization, as you mentioned. I guess it is not a very well-kept secret that Los Angeles is a big city, and we will see that city continue to grow. It is probably the fastest growing city in the West, I suspect, not only percentage-wise but just with actual numbers of individuals; is that a correct statement?

Mr. BURGESS. Yes. The whole Southern California area is now the world's leading agricultural area and the world's leading industrial area.

Mr. CALVERT. How many people live in the Los Angeles Basin right now?

Mr. BURGESS. More than 12 million.

Mr. CALVERT. I was going to say it is more than that, actually, but it is certainly an area that is going to need a lot of water, and we are going to need to build the structures for it. And in the West, certainly, that has the same effect—Phoenix; certainly Idaho has significant growth. I guess Idaho is the fastest growing State in the Union; is that correct?

Mr. BURGESS. Nevada is, but Idaho is in the top five.

Mr. CALVERT. So it is right up there; okay.

For WaterReuse, how many acre-feet of water is currently being recycled nationally, Mr. Young?

Mr. YOUNG. I do not know that number exactly. I know that California and Florida are kind of neck-and-neck at about 300 million gallons a day.

Mr. CALVERT. So in the next 20 years, if there is adequate funding and we have the right program in effect, do you believe we can expand that dramatically?

Mr. YOUNG. Absolutely.

Mr. CALVERT. Certainly the technology is there to do that, and that would certainly lessen the urban demand for water to some degree.

What should be the role of the locals and States in funding such a recycling program? Do you think that they should take that on by themselves, or do you think that Federal assistance is necessary in order to kickstart this?

Mr. YOUNG. It depends on the level of recycling that the water agencies themselves are involved in. Part of my background is with the Irvine Ranch Water District in Orange County, and we had one of the Nation's largest dual distribution systems where we recycled 80 percent of all of our wastewater and used it as an irrigation source throughout the open space, parks and schools, and used it at every possible location that we could, and that was totally funded by local funds.

Mr. CALVERT. Getting beyond the so-called gray water—because I know that in their heads, people have toilet-to-tap mentality—how do we start changing the perception of people that water reutilization is necessary? Do you start educating children at a young age about the importance of conservation and water reutilization in the schools, and that this water is sometimes actually cleaner than the water they are using in the first place?

Mr. YOUNG. Absolutely, Mr. Chairman. It happens through an education process with children in schools. It is also a very important education process with the professionals in the field and with the policymakers and decisionmakers at the local, State, and Federal Government to have that support.

National Academy of Sciences has done work on it, and they raise issues, and I think the issues need to be answered through a research mode so that we can have that level of academia supporting not only the technologies but also the process that is gone through in making those decisions.

Mr. CALVERT. That is certainly important.

Mr. WALDEN, do you have any questions?

Mr. WALDEN. Mr. Chairman, I apologize for being in and out. There have been a few crises, some related to the very issue we are discussing, especially as it relates to my district.

Mr. CALVERT. You can probably expect more of those crises in the future, I suspect. That is what we are talking about.

Mr. WALDEN. Yes, I think so, Mr. Chairman. As we have seen in this hearing and as I have seen over in the Energy and Commerce Committee, not only are we facing this extraordinary energy crisis, but also in the Pacific Northwest a water crisis of epic proportion, unfortunately, and that is putting huge stress on our hydro system and on our economy as well as on our crops and on the environment.

I would say that I reject the notion and would reiterate it again to remove the Snake River dams. I do not think that is a short-term solution by any means, and I am not convinced that it would be that successful long term and it would certainly have an incredible impact on the region out there, both in terms of transportation and the economy of the region as well as our access to power; it is enough power to light the city of Seattle, and even the city of Seattle has backed off from their original support of that concept. I think most of us have.

With that, Mr. Chairman, I have another meeting I have to go to.

Mr. CALVERT. We are going to leave the Columbia dam up there, too.

Mr. WALDEN. There are several right up the Columbia River system. But having said that, there are clearly some things that we are doing in the watersheds. I noticed in some of the testimony positive comments about the work that is being done on the ground and in the streams. I think that too often, I have seen good work on the ground for which we get no credit in the big national debate over this.

It is unfortunate, because the watershed councils, the basin projects, the Dechutes Resource Conservancy—a lot of effort is going on. Clearly, down at the Klamath Basin, one of the solutions down there to the problem of over-application of the water is added storage, which could be done fairly reasonably at both Klamath Lake and I believe it is either Gerber or Clear, where you could add the storage, which will help fish, both the salmon and perhaps the suckers as well, and provide more water for all of us to fight over for these competing needs.

But right now, I think we have a Federal Government that, over time, has appropriated that water about three different times, and in this drought situation, it is coming to the “perfect storm” down there, only it is a dry lightning storm—there is no water.

Thank you, Mr. Chairman.

Mr. CALVERT. It is a big problem. Thank you.

Mr. Osborne, do you have any additional questions?

Mr. OSBORNE. Yes, just a couple. Obviously, water is necessary for human consumption, animal consumption and irrigation, I guess for crop consumption, but it really does not have to be there for power generation.

I think the Chairman earlier alluded to nuclear power, and of course there is wind power, solar power, and alternative sources of energy. Have any of you thought extensively about some solution to the water dilemma along those lines?

[Pause.]

Mr. OSBORNE. Do you understand my question? What I am saying is that we obviously have to have power, and we are using huge amounts of water right now to generate power, and it seems to me that there are other ways to generate power besides running it through a hydroelectric dam. It would seem that one very obvious way to conserve water would be to look at alternative sources, and yet there are a lot of environmental concerns about nuclear power. I do not imagine there has been a lot done on the West Coast in nuclear power for some time. I know there is some wind generation. I do not know much about solar power. But I just wondered if any of you have tried to put a pencil to the possibility of relieving some of our water demands by using alternative sources for power generation.

Mr. YOUNG. Mr. Congressman, it is a good question, and I think one of the answers is that because a lot of the research in the water-derived industry has been lacking, we have not had the opportunity for the great minds at the universities to sit back, take a pencil, and just start noodling those very highly philosophical questions—like is there a better way; can we be innovative and think outside the box of streams and dams to supply water, and is there a way to break the link, as you suggest, between water and power, because they historically have been linked together just absolutely hip-to-hip.

I guess I would reiterate my point that if we have congressional funding that can get the research at a much higher level and at a much broader level, there might be opportunities for that.

I know that the power industry, EPRI, the Electric Power Research Institute, has a tremendous funding source and looks at it from their side, but we have not had similar parity in looking at it from the water side. The nuclear power plants do require a tremendous volume of water because they still have the same cooling cycle that is required in the generation process because of the heat that is generated by nuclear instead of using coal or gas-fired burners, and the plants along the ocean then become—and we have seen this happen in Tampa Bay and in other locations where desalting of the ocean water can synergistically be collocated with power plants because the water is warmer, the water is able to be reused, the brine from desalting is able to be mixed with the discharge water without actually adding any new salt to the discharge stream or to the ocean to minimize or completely negate any environmental effects.

So there are some opportunities, I think, in that field if we are able to more fully explore what we can do with what we have. And I think, as pointed out earlier by the panel, if you do it in a non-threatening atmosphere where the populace is screaming down at you, “We have to have this problem solved tomorrow,” it would be a much better way to go to be able to establish those solutions.

Mr. MALLOCH. If I could briefly answer the question, Trout Unlimited did not do this report, but I am aware of a report done by NRDC looking at where the power would come from if you removed the Snake River dams. Their conclusion was that a relatively feasible amount of new wind generation, which is one of the most rapidly growing of the renewables, coupled with some con-

servation, could fairly painlessly and in fact economically efficiently replace the power generated at the Snake River dams.

I have a copy of that report, and I would be happy to provide it to you if you would like it.

Mr. CALVERT. That would be fine. Thank you.

Mr. CALVERT. I want to add one editorial comment, since I used to chair the Energy and Environment Subcommittee, so I have some knowledge on some of the so-called renewable energy uses.

I think that a good point was made about the utilization of nuclear or any power source in order to reutilize that hot water to make desalinization less costly; you could do it for about \$700 an acre-foot rather than \$1,500 an acre-foot. But the reality is that we become less dependent on hydroelectric, because as the population has grown in the West, we have not built additional dams, so the amount of capacity and percentage of the total amount of demand has diminished. But it has great spiking capability because those turbines come on immediately when we need that power.

So it would be very difficult in the West to meet our energy requirements—or anywhere, quite frankly—without hydroelectric without a long time of creating new energy sources. But certainly wind is important—we use a lot of it in Riverside County; we are the largest wind farm in the country, I think, down the Banning Pass—and we are doing a lot on solar energy. Those are great ways to get additional energy, but it is going to take a while to replace hydroelectric, which is still a significant source for electric power, especially in the West. But we need to change the mentality of a lot of people, especially on nuclear, because that is really the only way we can go without resolving some of the environmental problems. We are doing to hear from New Mexico and maybe Wyoming here now.

Ms. SALISBURY. Yes. I was just going to say, Mr. Chairman, that we have plenty of natural gas that we would be happy to provide.

Mr. CALVERT. Built a couple more distribution lines out to California; we would be very happy if you would do that.

Are there any additional comments from the panel?

Mr. Burgess?

Mr. BURGESS. One thing that concerns me is that looking forward, not only do we need more water, but also more energy in the West, and yet on the other hand, we are having lively public debate about decommissioning dams. We will soon be decommissioning nuclear power plants because they are coming to the end of their useful lives. We now have proposals to tax fossil fuels that were defeated back in 1993, but they are coming forward again under the Kyoto Treaty.

So it seems to me that the lively debate is about getting rid of energy sources in the midst of an energy crisis.

Mr. CALVERT. I can fairly say that this administration is not going to move toward taxing energy sources relative to the Kyoto Accord. I suspect they do not have very many votes for the Kyoto Accord in the Senate. But your point is well-taken—we have to start resolving these issues now.

I am going to close this hearing because I have to go back to the office. I want to thank this panel for your excellent testimony and for answering our questions. You certainly pointed out that water

is the crisis right now, and we need to start working toward resolve it.

With that, thank you for your testimony and for answering our questions.

We are adjourned.

[Whereupon, at 4:28 p.m., the Subcommittee was adjourned.]

[Additional material supplied for the record follows:]

[The following statement was submitted for the record by Andrew Purkey:]

Statement of Andrew Purkey, Executive Director, Oregon Water Trust

The Oregon Water Trust (OWT) is a private, nonprofit organization established in 1993 and governed by a Board of Directors which reflects the diversity of water interests in Oregon. OWT uses a voluntary, market-based approach to enhance streamflows by acquiring consumptive water rights from willing sellers and converting them to instream water rights under Oregon state water law.

OWT appreciates the opportunity to submit written testimony to the House Committee on Resources, Subcommittee on Water and Power. OWT believes that its approach to streamflow restoration should serve as a model for other states attempting to address this ecological problem. OWT is interested in exploring opportunities for the Federal Government to encourage and support private, voluntary, "willing buyer/willing seller" exchanges that improve water quantity and quality, consistent with state water law.

Background

Despite Oregon's reputation as a perpetually rainy place, for many months of the year in many parts of the state the water in our rivers and streams is over-appropriated—more rights to divert water have been issued than there is water in the stream. When periods of naturally low flows coincide with withdrawals, many streams suffer from inadequate streamflows and some are dewatered entirely. When natural streamflows are modified by diversions, the ecology of the stream system, watershed, and basin are affected as well. The altered flow may no longer be sufficient to provide habitat for anadromous or resident fish; as water temperature rises, sediment accumulates and water quality diminishes. When all water is siphoned from a stream making passage impossible, fish may be unable to reach their productive habitat areas. Every plan for recovery of salmon and steelhead runs recognizes the importance of water quantity and streamflow enhancement for restoring and preserving aquatic habitat, fisheries and ecological systems.

OWT specializes in reallocating water to instream use by acquiring previously allocated water rights and transferring them to instream use. OWT acquires water rights with relatively senior priority dates, and uses existing laws and water markets to accomplish voluntary transfers to put water back into Oregon's rivers and streams to enhance streamflow, restore habitat, and improve water quality.

Oregon Water Law

In Oregon, it was not until the 1987 passage of the Instream Water Rights Act (ORS 537.348) that instream flows were legally recognized as being a beneficial use of water. The Instream Water Rights Act allows a water right holder to donate, lease or sell part or all of their existing water right to become an instream water right, which retains the same priority date of the original right. Acquiring instream water rights with relatively senior priority dates is the most certain way of restoring streamflows, since senior water rights are less likely to be shut off in dry years and summer months when there are more rights to withdraw water than water in the stream. It is also the fairest way of restoring streamflows as it respects existing water rights that have been issued by the state.

OWT converts existing water rights to instream flows using the Instream Water Rights Act by first negotiating a private, "willing buyer/willing seller" agreement with a water right holder, and then applying to the Oregon Water Resources Department for approval of a lease or transfer of the water right to instream use.

The 1987 amendments to Oregon's water laws also provided the first incentives for water right holders to conserve water resources through more efficient use of water. The Conserved Water Program (ORS 537.455) makes it possible for a water user who voluntarily increases irrigation efficiency to reallocate the saved water to

instream use, use it to irrigate additional lands, or lease or sell the water to another irrigator.

OWT's Tools

Given Oregon's water laws, water right holders may voluntarily choose to work with OWT to create short-term leases, long-term or permanent transfers, and conserved water for instream use.

- **Short-term Instream Leasing Program:** For temporary agreements of one or two years, OWT applies to the Oregon Water Resources Department's (OWRD) instream leasing program. Leases are a temporary way for landowners to restore streamflows and still retain the option of irrigating in the near future. A lease is considered by the state to be a beneficial use of water and thus protects a water right from forfeiture due to non-use.
- **Permanent or Long-term Instream Transfers Program:** For permanent and long-term transfer agreements, including a permanent sale or donation or a long-term lease, OWT negotiates a private agreement with the water right holder. OWT then files a transfer application with OWRD.
- **Conserved Water Program:** OWT helps finance and implement projects to conserve water through increasing irrigation efficiency, usually converting from less efficient flood irrigation to more efficient sprinkler irrigation. In exchange, the landowner then agrees to reallocate his share of the saved water to an instream water right through OWRD.

OWT's Results

Since its founding in 1993, OWT has pioneered the use of Oregon's Instream Water Rights law and Conserved Water Program statute, negotiating the first lease and first purchase of water rights for transfer to instream use and completing the first conserved water project.

In 1994, OWT completed 4 one-year leases that restored about 2 cubic feet per second (cfs) of flow. By 2000, OWT had completed 57 deals involving over 100 water right certificates that restored 35 cfs of flow to instream use.

Current Federal Support for OWT

OWT receives acquisition funds from a variety of private and public funding sources, including local, state and Federal agencies. OWT has received funding from the U.S. Department of Interior, Bureau of Reclamation (Bureau) to restore streamflow to an important tributary of the Snake River. The Bureau has also supported OWT's acquisitions in the Deschutes Basin of central Oregon.

OWT has also received funding from the Bonneville Power Administration (BPA), under its anadromous fish recovery program. BPA funds support OWT's acquisition work throughout the Oregon tributaries of the Columbia River. For example, OWT purchased an 1860 priority date water right on Fifteenmile Creek, an important winter steelhead tributary of the Columbia River near The Dalles, Oregon.

Finally, OWT and the Applegate River Watershed Council worked with Oregon's congressional delegation last year to secure a \$500,000 appropriation from Congress to help support the Farmer's Ditch project on the Little Applegate River in southwestern Oregon.

The \$1.5 million project will restore approximately 14 cfs of flow (7000 gallons per minute) to the Little Applegate and allow for the removal of two diversion structures that serve as passage barriers for fish. Project funds will be used to switch participating landowners to pump and sprinkler irrigation systems with water being diverted from the mainstem Applegate River to irrigate approximately 700 acres. The Applegate River has a U.S. Corps of Engineers storage facility at its head, with the Bureau allocating water for downstream irrigation use. Other funders of this innovative project include the state of Oregon, the National Fish and Wildlife Foundation, the Orvis Company and the World Wildlife Fund.

Conclusion

Again, OWT appreciates the opportunity to submit this written testimony to the House Committee on Resources, Subcommittee on Water and Power. We look forward to working with members of the committee to evaluate appropriate opportunities for the Federal Government to encourage and support the work of OWT and similar private organizations across the United States, consistent with each state's water law.

[The following statement was submitted for the record by Greg Walcher:]

**Statement of Greg Walcher, Executive Director,
Colorado Department of Natural Resources**

Mr. Chairman, the State of Colorado thanks you for holding this important hearing on drought and the need for water storage in the West. We may have grown complacent about water supplies over the recent decades of abundance, but last summer's hot, dry conditions provided a sobering reminder of cyclic drought and devastation.

In December of 1999, Colorado Governor Bill Owens convened a state-wide conference on flood and drought preparedness. There, we learned the question is not "if" but "when" we will enter another severe, long-term drought like the dust bowl of the 1930s or the drought of the 1950s. Only water storage provides adequate protection against these natural disasters, so it was encouraging that a recent survey of Coloradans found 90% believe we should build reservoirs to conserve surplus Colorado River water.

The first Europeans to explore what is now Colorado labeled it an arid wasteland. In this century, water storage and irrigation transformed the State. Cottonwoods and willows dot the once-treeless plains. Rivers that dried up in the summer months now provide drinking water, irrigation, recreation and wildlife habitat year-round.

However, last year, Colorado suffered a dry spring and record-breaking summer heat which led to drought conditions. South Platte River flows were lower than ever in recorded history and demand for irrigation water drained several key reservoirs. Nearly two dozen counties were forced to seek Federal drought disaster relief. Several other communities placed restrictions on lawn watering, showers and even toilet flushing.

The Colorado Water Conservation Board recently surveyed communities to judge state-wide preparedness for drought and found that less than half of cities surveyed have done any kind of drought planning. If dry conditions persist, we could be in serious trouble.

In a sustained drought, farmers and ranchers would lack water required to produce food. Many could be forced to sell their land or water, thereby encouraging development of open space and loss of wildlife habitat. Even farms with senior water rights could be gobbled up by municipalities thirsty for drinking water. The impact on rural communities could be devastating.

Conservation measures help stretch limited supplies, but conservation alone may not be enough. Some water users are collaborating to stretch supplies through innovative new measures such as conjunctive use and water reuse. These efforts, which examine how to recharge aquifers in wet years and reuse municipal water for irrigation and industrial use, hold real promise. But the most certain drought protection is a long-term water supply through storage.

At Governor Bill Owens' flood and drought conference, the Army Corps of Engineers calculated reservoirs have saved Coloradans \$19.8 billion from natural disasters like floods and droughts. That equates to a six dollar savings for every dollar spent on reservoirs for flood control and drought mitigation. Water storage also provides resources for recreation and wildlife.

Across the West, our future is forever linked to our water. Our challenge is to bring together diverse interests to find common goals for the benefit of local communities and the environment. Without adequate planning, innovative measures and new water storage, the West could once again resemble the hostile and arid wastelands disparaged by early travelers.