Remarks Prepared for Delivery
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Unlike the other members of this panel, I represent an agency whose activities are confined primarily to only half of the United States. Therefore I shall confine my remarks for the most part to what has been done, is being done, and, in the opinion of those of us in the Bureau of Reclamation, should be done in the field of water resource development in the 17 Western States.

In the West, the natural flow of most streams is meager and erratic, varying greatly both seasonally and annually. For more than 70 years, the Bureau of Reclamation has been designing,
building, operating and maintaining the facilities needed to store water when and where it is available and deliver it when and where it is needed to meet the growing and changing needs of the men and women who have built the West.

Since the Reclamation Service was established in 1902, we have provided water to irrigate undeveloped lands and to keep developed lands from going out of production; we have furnished drinking water to towns and cities, and water for industry; we have held back water to prevent floods in the winter and spring and released water to allow boats and barges to navigate streams which would otherwise be dry in the summer and fall; we have produced low-cost, environmentally-clean hydroelectric power without burning non-renewable coal or natural gas or oil in the process; we have built fish ladders and fish hatcheries to maintain
and enhance the fisheries in Western streams; and
we have provided water to improve spawning
conditions for salmon and to establish refuges for
migratory waterfowl.

In recent years we have been as concerned
with the quality of the water in the rivers we
regulate as we have with the quantity of water we
make available; and we have been as concerned with
the environmental impact of our projects on
surrounding communities as we have with their
economic impact on the Nation.

Today, the Bureau of Reclamation has completed
or under construction some 285 storage dams and
reservoirs with a total storage capacity of more
than 135 million acre feet. To deliver that water
to the people who need it we have constructed 140
diversion dams and 7000 miles of canals.
We are spending more money today than ever before in our history to complete the construction of additional facilities to conserve and deliver water and to produce hydroelectric power.

Yet, despite all we have been able to accomplish in the past, despite all we are doing today, much of the West faces the prospect of a serious water shortage within the next 20 years.

The reasons are complex and varied, but can perhaps be summed up in these words: complacency, inflation, and increased demand.

Most of you will recall that not too long ago many people felt that one of the major problems in the United States was the surplus of food which glutted our warehouses. Much of the blame—if you can call it that—for the surplus was placed upon irrigated agriculture. Despite the protestations of
experts that the surplus represented only a small portion of the world's annual food consumption, we went through a period when planning and construction of facilities for irrigation use was very purposely slowed down. Today, for reasons which I will discuss in a moment, the need for more water development to produce more food and fiber is becoming recognized once again. But, because it takes an average of 15 to 20 years to bring a water project from the planning stage to completion, we are now in the position of having to play catch-up ball.

And we're having to do it with money that just doesn't buy as much as it used to.

Let me give you an example. The President has requested Congress to approve an appropriation of $598 million for the Bureau of Reclamation for
the Fiscal Year beginning in July. Such an appropriation would allow us to conduct a construction program of $420 million, an all-time high for Reclamation.

We are greatly encouraged by this substantial increase in our budget, but I must point out that while our construction budget has been increased by 15 percent, construction costs are now going up at the rate of 20 percent annually.

In addition, the FY 1976 budget request actually reduces the amount of money available for our general investigation program. This will prevent us from devoting as much attention and effort to research and investigation as we would like during this period of impending water crisis.

The need for more water to produce more food and more energy is becoming increasingly apparent
every day, not just to those of us who face the problem of meeting that need but to anyone who reads a newspaper, watches television, listens to the radio—or buys groceries and gasoline.

The need to produce more energy so as to make this country secure against oil blackmail is being stressed continually by the President and the Secretary of the Interior. And producing more energy—through coal gasification and liquefaction and the processing of oil shale—will require more water.

Food surpluses are a thing of the past. Even though the rate of population growth is declining in the United States, the population is still rising and projections are that there will be 20 million more people in the United States in the year 2000 than there are today. Worldwide, the
rate of growth is phenomenal—every year there are 93 million new mouths to feed. All over the world, people are awakening to the imminent need for increased food production and to the role that water resources development must play in meeting that need.

One obvious way we can help meet that need is through the development of more facilities to store and deliver water to generate power and increase the yield of farmlands through irrigation while meeting the other increasing needs of our growing population. Those needs include flood control, navigation, municipal and industrial water, fish and wildlife protection, and environmental enhancement.

But there are other ways in which more water can be put to beneficial use. One of the most productive is by increasing the efficiency
of our present and proposed water distribution systems.

Thirty percent of the water diverted for use in the West is now being lost in transit--through percolation, evaporation, leakage--before it reaches the farm. Then, unfortunately, on-farm operations are no better than 40 to 45 percent efficient.

Not all of this, of course, can be considered a loss, especially in the case of upstream diversions, because some of the deep percolation returns to the stream and can be re-used.

Nevertheless, great opportunities do exist to make more water available for beneficial use by improving our management techniques and by upgrading our facilities--through concrete linings or closed pipes in our distribution systems, through more sophisticated controls on the farm and the
conversion from present irrigation methods to sprinklers and drip irrigation.

We have had some success with our Irrigation Management Service program, under which we have been attempting scientifically and systematically to establish irrigation practices which insure more efficient use of water resources. It is a sophisticated program, using computer analyses of field data to determine more precisely when to irrigate and how much water to apply. Reclamation personnel assist in developing the IWS program but after it is developed and its value established, we expect the irrigation district and the farmer who reaps the benefits to finance the continuing program. The benefits include increased production, better quality crops, improvement of water quality, reduction in percolation and drainage losses,
conservation of energy by keeping pumping at a minimum, and the reduced leaching of fertilizers and salts. So far, a few farmers have contracted for this service on a continuing basis from commercial firms, but we haven't yet convinced the majority of them that the benefits outweigh the costs. We've had a lot of help in this program from the Extension Service and the Soil Conservation Service and are always willing to cooperate fully with them and others in the development and implementation of better irrigation management programs.

Another method of increasing the amount of water available for beneficial use is by the augmentation of surface flows through weather modification, through the development of our geothermal resources, and through the recycling
and conservation of waste water.

A third method, which actually includes the first two, is total water management. Total water management involves basin-wide programs for conservation and improved efficiencies in water management and use, coordinated scheduling of river basin water storage and control works, salvage and reclamation of poor quality supplies, conjunctive use of surface and ground waters, reallocation of water supplies to higher uses, and all other such practices that promote the fullest and highest uses of a basin's water supplies. For the total water management concept to be successful, it is essential that all local, State, regional, and national entities involved in a basin or area's water planning, conservation, and development programs work in close cooperation.
In recent months the Bureau of Reclamation has completed a number of studies on the availability of water for energy development in the West. In these studies we have called attention to the potential for water augmentation and total water management programs as a means of ensuring that supply keeps up with demand.

One of those studies dealt specifically with "Water for Energy in the Upper Colorado River Basin." That area represents a classic argument for the necessity of a total water management policy. Water in the Colorado River is already over appropriated in many States. In some areas, the water is of poor and deteriorating quality. Demands for all traditional uses are increasing and now the Basin is faced with a new and urgent demand for water to develop its vast energy resources.
Meeting the projected demands for water in the Colorado River Basin will require an ambitious and visionary total water management program, including augmentation.

One potential source of augmentation is weather modification. Our research indicates that an operational cloud seeding program could increase the water supply in the basin by 900,000 to 1.3 million acre feet annually. This could mean a potential increase in annual water yield of from 6 to 9 percent, which would be a major contribution in meeting future water demands. This new water would be extremely low in cost; the present estimate is $2.50 per acre foot.

Geothermal resources in the Lower Colorado River Basin offer another potential source of augmentation. Desalting of geothermal brines can
be very expensive, but when coupled with the development of geothermal power, the economics can be brought down to acceptable levels. Because the geothermal resource is scattered over a large area, the recovery of large blocks of power and water may present some formidable physical constraints. But smaller blocks of up to 100,000 acre feet might be developed with fewer problems. While water developed from geothermal sources would be expensive by current standards of comparison, the price becomes very attractive when compared with alternative sources of comparable blocks of new water.

A dual purpose sea water desalting--nuclear power plant on the Gulf of California or Pacific Ocean could also provide a new source of water for the Colorado River Basin through exchange.
This would also be expensive water, but could be used by industry when cheaper water supplies were not available.

There are other means of providing water in the Colorado River Basin: through mining of ground water; new storage opportunities; and exchange programs substituting ground water for Colorado River water in adjacent basins.

Our fiscal 1976 budget proposes $1.8 million for continuing investigations on the Colorado River Water Quality Improvement Program, which is a vital part of the total water management program in the Basin.

Another $18 million is provided in the budget for Title I of the Colorado River Basin Salinity Control Project which consists of the proposed desalting plant near Yuma, the lining of the
Coachella Canal, and construction of bypass drains and a well field.

In addition, the President's budget calls for the expenditure of over $1.2 million for seven continuing or new total water management studies by the Bureau of Reclamation. These include studies in Southwest Idaho, the Upper Snake River, Yakima Valley, Central Valley in California, the Lahontan Basin, the Elephant Butte--Ft. Quitman area in New Mexico and Texas, and the Missouri River upstream from Gavins Point.

So you can see the Bureau of Reclamation is giving more than lip service to the concept of total water management.

In summary, our studies clearly indicate the potential for serious water shortages in many locations unless prompt action is taken to avert a water crisis.
The current energy shortage and the national goal to become self-sufficient in energy production make it necessary to accelerate efforts to develop domestic energy sources. Increased agricultural production is necessary to keep food prices at reasonable levels and to gain the benefits of broader world trade. An adequate and timely water supply is essential to expand energy and agricultural production and to support an increase in key industrial products.

It is, therefore, highly important that the development, use, and management of our Nation's water supplies be given more attention during the next few years than they have over the past decade. A policy of timely and effective investment in research, planning, development and management of our water resources will serve to forestall probable serious impacts of water shortages, and
will provide for basic economic expansion that
will help provide jobs and support for a strong
and stable economy, as well as social enhancement.
Any delay in meeting this challenge could have
far-reaching, disastrous economic and social
effects.

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