



CONSERVATION OF WATER AND LAND RESOURCES

Mr. Charles H. Stoddard

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Reviewed by Col E. J. Ingmire, USA on 30 December 1963.

INDUSTRIAL COLLEGE OF THE ARMED FORCES
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Conservation of Water and Land Resources

4 December 1963

CONTENTS

	<u>Page</u>
INTRODUCTION -- Captain Thomas H. Henry, USN, Member of the Faculty, ICAF	1
SPEAKER -- Mr. Charles H. Stoddard, Director of the Bureau of Land Management, Department of Interior.	1
GENERAL DISCUSSION	26

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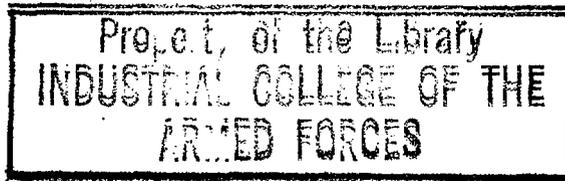
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Interviewed by: Col E. J. Ingmire, USA Date: 30 December 1963

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INDUSTRIAL COLLEGE OF THE ARMED FORCES

Washington 25, D. C.

CONSERVATION OF WATER AND LAND RESOURCES

4 December 1963

CAPTAIN HENRY: General Stoughton; Gentlemen:

This morning we continue our examination of resources, directing our attention to water and land conservation in this country. As you know, here we're dealing with not just a strategic material, but with the life of our country itself.

To discuss this matter we are fortunate in having our speaker. We've placed a lot of emphasis this year on managers and management. And I think you'll all agree that the man who manages 477 million acres of the public domain has quite a managerial job. In addition, he's eminently qualified by education, by past experience, and by his present position, to address us.

It's a great pleasure to introduce to you, Mr. Charles H. Stoddard, Director of the Bureau of Land Management in the Department of Interior. Mr. Stoddard.

MR. STODDARD: General Stoughton; Captain Henry; Members of the Faculty; Students:

There has been no really major effort to grapple with the backlog of conservation problems in this country since World War II. Until February 23, 1961, war and rebuilding a war-torn world, Korea and the return to normalcy, occupied the nation for 15 years. Our soil, forests, water and mineral resources have been drawn heavily upon the nation's basic stock of resource capital to win mankind's greatest conflict, and to win the peace and lick depressions and recessions conservation had

been on a stand-by basis. But with President Kennedy's Administration, his two messages on natural resources, the first one on February 23, 1961 and the second one on March 1, 1962, in his White House Conference on Conservation, the conservation programs in this country got underway once more.

These messages laid out the broad spectrum of the natural resource problems, the goals that the nation needed to work toward in order to develop solutions, and the programs that were required in order to attain these goals. A rational and, shall we say, a problem-solving climate was developed which enabled those of us in the resource management field to feel that the public problems that we had, large as they were, could be solved by rational definition, diagnosis, analysis and decision-making.

We felt that we did have an opportunity once more to get at this big backlog of problems, and that a political democracy can respond to the needs of a free society. During the past half century we've gone through a revolution in resource management. We've shifted from exploited depletion in resource capital to manage harvesting of yields, or at least the complete utilization of low, as well as high-grade depletable resources such as minerals. We've changed from the liquidation of publicly-owned resources and exploitive liquidation largely for private use, to an era of public and private investment in resources for public and private benefits.

One of the causes of this change at the turn of the century was the development of the conservation movement. The conservation move-

ment had its origins right around the Civil War and shortly thereafter, in writings by George Perkins Marsh and John Wesley Powell. The writings and analysis were brought into fruition as a social and political force, first by Carl Shertzer, the Secretary of the Interior in the 1870s, and later on by Teddy Roosevelt and Gifford Pinchot in the late 1890s and the early 1900s. They utilized the powers of government to modify and regulate the actions of the market-directed private sector.

The conservation movement had a three-pronged thrust. The first thrust was the preservation idea, where public lands would be withdrawn and withheld for national parks, national forests and so on; or, that we would have laws and regulations governing the taking of wildlife etc.

There was another thrust of conservation which was a developmental thrust, the idea of having reclamation for irrigation; of flood-control projects; of waterways; and the active use of government powers in the developing of resources.

There was a third thrust which has often been forgotten in recent years, and this was the so-called "progressive thrust" which was based on the movement of the agrarian reformers, the Granger Movement, etc. in the late 1800s and early 1900s, which was concerned about monopoly and its impact on a free society; the idea that we would have a widespread ownership of capital versus monopoly; that we have a widespread ownership of land, is fundamental to the maintenance of political democracy.

And these reformers, such as Bora, George Norris, Senator Bob LaFollette, Hiram Johnson, etc., were quite active in the public power

and the regulatory aspects of the conservation movement - the anti-monopoly phases of it. This was pretty well embodied in Pinchot's definition that conservation is the greatest good for the greatest number over the longest time. This is something of a cliché, but it does embody most of these three thrusts. However, in an effort to be more precise with respect to the definition of conservation, the people at resources for the future with whom I am formally associated, attempted a definition which I will throw at you and not expect anybody to remember. It is "Conservation is essentially a socio-political movement with moral overtones designed to modify man's use of the earth through the imposition of social restraints and the application of scientific practices so as to maintain continued availability of natural resources with minimum losses through depletion, and to assure the widest distribution of benefits at the least cost over time."

It's all there. I've tried it out on a good many people. They say, "It's all there, but now that you've got it what are you going to do with it?"

Well, there have been about four phases in the evolution of our conservation programs in this country. The first phase, as I've indicated, was the withdrawal and the preservation phase. This went from the late 1890s up until about World War II. The second phase began right after World War II when there was a holding, a protection, custodial, the beginnings of the application of ^{the} scientific stage that ~~we~~ were beginning to move into. There was a great deal of argument about how much regulation should be exerted by the public sector over the private sector in the exploitation of resources.

The third phase began with the New Deal which was essentially the reversal of exploitation. There was a restoration of destroyed areas, and inventory and further intensification of research. This era was cut short by World War II, and we've been on a sort of custodial basis during the period, as I indicated earlier, up until about 1960.

During this decade we're in a new phase which is essentially intensive management and application of scientific techniques and professional skills with a considerably heavier investment in resources development than we've ever had in our previous history.

Well, now, to get down to the basic land and water conservation situation; we have certain elements that are fixed in our spectrum. We have about 2 billion acres of land in the 48 States, "The Lower 48" as they call them in Alaska, which is about $\frac{1}{2}$ crop-land, $\frac{1}{2}$ forest-land, with 700 million acres of pasture and range-land, and the balance being in various categories - waste-land, cities, towns and other miscellaneous uses.

Now, with this land base we have an increasing population pressure upon it. And with the prospect of a population increase from 180 million to over 330 million, which is a median projection for the Year 2,000, we have only one course available to us, and that is to increase production from this land by intensive application of capital and labor and managerial skills. We know that the agricultural situation is a very dynamic one today; that there are techniques developing which will assure us of at least adequate food to supply to 330 million people from our crop-land acreage which is something less than 500 million acres.

But the application of these techniques can only take place if we're sure that we also apply proper soil and watershed conservation measures where applicable, to prevent wind and water-caused losses through destruction of the basic soil capital as a result of erosion. The techniques that have been worked out with respect to the conservation of soils and water are all well down the road. We have some quite precise knowledge on what needs to be done. I think all of you have probably been exposed at one time or another, and certainly in flying over some parts of the country where there is rolling farmland you've seen strip-cropping, contour terracing, grass waterways, rotation cropping of the wheat-lands in the West, for instance, where you see alternate strips for dry-farming; pasture rotation, windbreaks and shelterbelts, stream-bank revegetation, range reseeding, gully control, diversion terraces, farm ponds, and many of the other devices that are applied to the land for slowing down water and reducing the impact of wind.

We estimate that about 235 million acres of the crop-land are in need of protection; they are not now protected, but they need these various measures that I have mentioned. About 60 million acres of crop-land - this is from water erosion control measures - require wind erosion control measures, either alternate strip dry-farming or shelterbelts, or some of the other techniques that are used in soil management. In addition, about 200 million acres of range-land in the West - the land that you see in cowboy movies, but it's seldom identified with the bureau that I administer, although that's where it takes place - are in need of range improvement and soil conservation measures.

This essentially is the job that we face in the soil conservation field; it's a job of investment of somewhere around \$5 billion on private lands, and \$1 billion on public lands, for these basic soil conservation measures. And additional estimated \$4 billion would be required if the work were done which is also needed for the conservation of the watersheds themselves. Now, getting the application of these techniques to our lands we've developed a number of policies and approaches. We have the direct approach on public lands where public money can be spent through public programs to apply these techniques. And we have had to develop a new approach - that is, for this country - on private lands. There was a question, as I mentioned a few moments ago, in the 1920s whether we would try to regulate private owners, or whether we would find another technique.

The country has decided that another technique more in keeping with our traditional pattern - the technique is one of cooperation, technical assistance, and subsidy. All three of them are coordinated largely through soil conservation districts which are locally chartered units of government for the purpose of encouraging land-owners to apply soil conservation measures on their lands, and other measures, forestry as well.

The Department of Agriculture is largely involved in cooperation, technical assistance and subsidy on private lands, whereas the Department of Interior has the primary responsibility with respect to the application of these practices on public lands.

In the investment of public money for these works on public lands

we are being required more and more to use economic analysis in making the decisions with respect to where these expenditures and allocations of funds will go. We are constantly faced with the problem in the cost-benefit ratio situation, of the conflicting situation that exists between direct, short-term, local, private, measurable benefits which are quantitative benefits which can be analyzed quite directly through IBM machines and data processing, versus indirect, intangible, public, off-site - and somebody said "fugitive benefits." You have quantitative short-term in the first case, and qualitative long-term in the second case.

Essentially the amounts that are allocated for these purposes, going through these processes we find that siltation is taking place in the reservoirs. We know that soil losses are taking place on private lands, or any kinds of lands - crop-lands, range-lands etc. We know that silt in the rivers is destructive of the value of the water supply, and it renders rivers relatively useless for recreation purposes. And yet, trying to put down a figure on these losses is somewhat impossible to do with any degree of accuracy.

So, essentially what we are coming up with is the decision-making with respect to the allocation of funds in the short-term sector - the short-term direct benefits which will be related directly to what we can prove. In other words, the Bureau of the Budget says, "You want so much money for what; prove it," and we can prove it as far as the direct benefits are concerned. This is essentially using the quantitative analysis, which is using market place techniques.

But, on the indirect long-term benefits, these are decisions that are really in the public sector; that the Congress must make for the people as a value judgment rather than a quantitative measure judgment. And, with all of the flaws that there are in the decision-making in the political process, this is the best thing that we have come up with, and I think that we probably will for a long time. We are getting on with the work. Congress is giving us the support; not as much as we need, but at least it's being recognized that the whole job can't be done by a quantitative measurement in terms of making surveillances.

Well, so much for land resources outside of the forest. In the case of forest resources we have also something just under 500 million acres of commercial timberland which is in varying degrees of condition. Over the last three centuries the forests of the United States, with the exception of relatively small acreages but relatively large volumes in the Pacific Northwest, have been worked over once or more times. They have been cut, and in many cases burned - as in my home country, in the northern part of Wisconsin and Minnesota. That timber was logged and burned, and it's only recently coming back as a result of fire protection and reforestation.

So that, the condition and quality of the forest resource is much below its potential. But it is capable of sustaining the needs that we have for the future if we make the moves during this decade that we have to make in order to supply or be assured of the timber supply by the Year 2,000. Because, forestry, as the President said in his first message on natural resources, is a sharpest challenge to our foresight. We have to

make decisions today, in planting trees, that our grandchildren will harvest. And this means some withholding, some restraint on our part in making these investments, so that the future will have an assurance of an adequate timber supply, watershed protection, wildlife cover, recreation opportunities, etc., all of which go along with forestry, long after our time on earth is past.

We have essentially a current annual consumption of about 12 billion cubic feet of forest products. By the Year 2,000 it's expected that we will have 24 billion cubic feet as our requirement - double - with a smaller forest acreage. There is expected to be some loss because of city development, highways, airports, and various other encroachments. So that, our 485 million acres of forest-land will be cut down to about 450 million. But the current productivity of the forest resource is so well below capacity that by the intensification of our management practices we will be able to more than take care of the annual requirement by the Year 2,000.

We have 40 million acres, for example, that need reforestation. We have 115 million acres of very lowly productive forest-land that needs timber-stand improvement; it needs release cuttings; it needs thinnings; it needs the applications of these various techniques that will throw the growth on the better-quality trees, eliminate the poorer-quality trees, stimulate the rate of growth, and thereby increase the total annual growth per acre, and the accumulation over a period of time, in higher-quality timber rather than lower-quality. We need an estimated annual investment of about \$2½ billion for this decade in our forests

in order to attain this higher degree of productivity both in rate of growth and quality growth.

Now, getting over into water resources, we have a somewhat different and very interesting situation. I might say with respect to the land resources before I leave the subject, we have a number of agencies in the federal government that are concerned with land resources. But primarily they are in the Department of Agriculture and the Department of Interior. It is the Forest Service and the Soil Conservation Service that are concerned with the basic resource. The other agencies in the Department of Agriculture are largely concerned with agricultural production, regulation, research, and various other activities.

In the Department of Interior we have the Bureau of Indian Affairs, the Indian Reservations, the National Park Service for the national parks, the Bureau of Sport Fish and Wildlife with their national wildlife refuges; and then we have the Bureau of Land Management with the public lands which are left from the original acquisitions, located largely in the West.

I might say that in the natural resources field it's more serious in water than it is in land, and it's very serious in land, the problem of coordinating the programs of these separate bureaus and separate departments, is a very, very difficult job, and the coordination is not really being done, although there are efforts at certain programs to try to get bridges between agencies. But we just haven't developed the techniques that we need in order to do it. And I think that in order to accomplish some of these goals that I've indicated that we need to work toward, there is going to have to be more attention given to this coordi-

nation job.

The first Hoover Commission Task Force in 1949 recommended that there be a pulling together of the various resources agencies into one department.

In the field of water resources we have a rather interesting set of basic data and problems. For example, the East is well supplied with water and the West is not. In the East - east of the 100th Meridian; there is usually the separation of East and West in the natural resources field, the 100th Meridian running right down the middle of the Dakotas, into Nebraska, Kansas, Oklahoma, and then into Texas - it's essentially the line that divides the 20-inch rainfall line. The rainfall west of it is below 20 inches. And 20 inches is considered the minimum necessary in order to have enough to pull through annual crops without irrigation.

East of the 100th Meridian we have 790 billion gallons per day, of water that is available. West of the 100th Meridian we have 290 billion gallons per day. The consumption of water that we have for the country as a whole, today is 345 billion gallons per day. Now, this does not mean consumption in terms of creek use and evaporation and disappearance. This means that somehow or other this amount of water is processed in various ways, most of which is returned. We have an actual depletion of this 345 billion gallons a day, of 85 billion gallons a day. This amount goes out in evaporation, either through steam that's generated or through much larger losses from reservoir evaporation, or irrigation evaporation.

I might say that irrigation is one of the high consumptive uses of water. This is mainly in the West where the water supply is short. We have on-site uses of some 70 billion gallons a day, all of which is returned. And then, one of the major uses of water - and I think this comes as a surprise to those who are not fully familiar with the water field - is the dilution of treated effluent from sewage treatment plants. As water is returned to the rivers after the sewage treatment takes place, it's loaded with clean organic material. This organic material is a culture medium for many bacteria which can get started, unless you have a dilution in a rapid flow from a storage reservoir. This whole fight over the Potomac River and how much water we're going to develop through dams etc. is an example of this exact problem. It's not the question of how much water are we going to need for consumptive uses in the Washington Metropolitan area; the main problem is how are we going to dilute the sewage that we turn out of the Washington Metropolitan area. This requires water storage in quite large quantities.

Now, this is assuming existing technology. But there are some developments - possible developments - in the technology of water treatment that may provide a breakthrough. Because, there is a tremendous waste in the treatment of sewage. I mean, you're turning all this organic material back. Well, it could have an economic value if we could find the technology to recover it. But at present it's wasted and it's highly consumptive of water.

Several years ago, some of the research people in the Geological Survey - and I think this is being taken up by other agencies now - de-

veloped on a very, very small scale the use of the fuel cells as a means of handling wasted organic material. And it was successful in generating electricity, developing a residue which was useful for fertilizer, turning loose a clear-content water, and cutting down the whole cost of treatment and not requiring dilution. Well, this is still in a very experimental stage, but if this technique or some other comes along this could change the whole water picture and everything I'm talking about with respect to future requirements. And I think we're almost going to have to do this, because our water supply is fixed.

The real problem that we have in addition to location, as I've mentioned, is the problem of quality. Volume is important in all resources, but quality is also important. And quality is vital to human life in water resources; quality not only as far as the organic material that the water may carry, but also the siltation question; the question of inorganic materials largely is the result of industrial wastes - organic material from municipal sewage.

The cost of treatment of water is very, very high. And we have the problem of a whole series of cities, say on the Ohio and Mississippi Rivers, running water through their cities and back out, turning relatively clean water back into the rivers, so that the rivers can be used not only for water in the next town below, but for recreation uses, for wildlife, for fishery production, etc. The investment that we have in water treatment, or that we will be looking forward to having to make, will be just a tremendous drag on our economy. Water has always been very, very cheap in terms of other raw materials; it has actually been

so cheap that some economists feel that we're going to have to use price as a mechanism to allocate water in the future, because we have a relatively fixed water supply and a growing demand.

Well, now, the estimated increase in water consumption between now and the Year 2,000, 345 billion gallons a day, and 694 billion gallons, roughly, is the median prediction for the Year 2,000. The dilution figure would jump from 190 billion gallons a day to 446 if we have no change in technology. The other uses would not increase percentage-wise nearly as much.

The measures that we can follow to conserve and allocate water to its best uses are several. In the first place, we have to assure a steady supply of basic water flow. This is the result largely of watershed management. This is to assure that the springs will flow free and at the same volumes that they have; that the run-off that takes place after rainstorms, that goes into rivers, will pay out at not accelerated rates which washes silt and soil; that there is an infiltration into the ground water table that will constantly maintain a solid source of well water and also a contribution to stream flow, etc.

And these practices that I mentioned with respect to the land are critical as far as watershed management. There are additionally other techniques which can be used to manipulate the land in order to increase or decrease the surface flow of water as well as the rate of infiltration.

Then we have the problem of storage, storage for control and storage for use; storage to control floods, and storage for dilution of

treated effluent. We have storage for the creation of power - hydro-electric power - and storage for irrigation purposes. These are the principal ones; also storage for city supply and water supply in general. This storage is probably the biggest single investment fact that we have in the natural resources field within the next 40 years. It's estimated at somewhere around \$60 billion all-told. We have the storage requirements for flood control; a storage requirement for dilution and all these requirements that I indicated a few minutes ago. They require building dams and dams are very expensive. The problem that we have with dam construction here is pretty much a situation of public investment from now on on the larger watersheds. Because, you have the whole problem of regulating the rate of flow down through a stream and tying the multi-purpose values into the dam construction.

There has, of course, been an ideological argument raging for years between public power and private power advocates, but largely that has revolved around ideology, or should we say "political philosophy;" I think this is probably more appropriate. But the job that we have when we're regulating stream flow is to make sure that we have all of the various factors that are required in the construction of a dam, taken into consideration. Frequently, when a dam is put in for a single purpose such as generating power for a private utility. It won't have the free-board that's necessary in order to back up floods, and it just wouldn't be economic for a private utility to build that size a dam on the Columbia River.

We had a case in point several years back, in the Hell's Canyon

controversy which some of you may remember. This was a classic example of the matter that I'm talking about. There was one large dam-site, or three small ones. And the three small ones, under a private utility, won out under the political situation that existed at the time. But there will be relatively little storage in case of a very heavy accumulated snowfall in the Rockies that are a tributary to the Columbia River, or the Snake River, where this is located, a tributary of the Columbia.

So that, all of these other things that are required in storage have got to be taken into consideration if we're going to have adequate management of the stream flow as it moves from top to bottom to the rivers. This does not exclude private use of the power or water resources or anything else. But it means that somehow you've got a very heavy investment, some of the benefits of which are strictly downstream or public in value. And the public should be expected to pay for them. So that, it gets the thing, really, out of political philosophy and into the matter of realism, of how you're going to divide up the benefits of the investment made.

3 We've got another major factor in the investment job that we have to conserve water resources, and this is in the sewage treatment plants. I haven't looked at the figure for several years, but as of about three years ago we had a \$5 billion backlog in the need for construction of sewage treatment plants. Because, our cities, our suburbs etc. were expanding so rapidly that they were expanding ahead of the development of the sewage treatment plants.

With the passage of the Humphrey-Blotnik Water Pollution Control Act in 1961 this situation - this backlog - has been worked into. This Act provides for, among other things, federal matching grants to the states in a larger measure than existed in the earlier Blotnik Act. And it also provides for a certain federal regulatory function. You have a number of streams, of course, that are interstate, that the State Water Pollution Control Agency would have difficulty in getting together with other states upstream and downstream; it becomes, clearly, a federal function.

So that, where you have a difficult situation coming about, there are provisions for the moving in on situations with the advice and consent of the Governor of the state, by the federal government, to take on situations that are extremely difficult. An example took place last winter on the Upper Mississippi, near Minneapolis, where two kinds of oil, soybean oil and petroleum, because of the extremely cold weather there was some expansion that took place and it split the tanks open. They spilled these oils right over the ice on the Minnesota River right above where it runs into the Mississippi.

This oil sat there from January until the breakup time in March. And with all the agencies acting about it uncoordinated as only government agencies can act, apparently the Governor said, "Let's get the federal government into this picture in a coordinated way." Well, about that time the breakup took place and it was too late. The oil began to move down the river and it was an awful mess. This was just about the time, of course, that the water fowl were coming back from the South

and there was a very heavy loss of wild ducks and some wild geese in that area because of this oil spillage.

I might say that with respect to many of these conservation measures, the biggest outcry over this matter was not from people who were concerned with water quality or people in the towns who turned on their taps, it was the sportsmen and the outdoor recreation people; they were the ones who zeroed in and said this is a situation that really needs attention by government agencies. And as they often do they got quite excited about it. There were pictures of them taking ducks into their houses and kitchens and cleaning them off etc., trying to get them so they'd be able to live.

But it's this kind of emotion, you see, that's involved in this kind of conservation. It makes it difficult, and yet it gives us political support. It makes it difficult to get rational handling of some of these matters because some of these people think with their emotions. But it also provides the kind of political drive that is necessary to get some of us bureaucrats off our duffs and into action. And so, there are two sides to the emotional conservation picture.

Well, to get into the question, again, the measures of how to conserve water supplies, the diversion of water from surplus to deficit areas, we have examples taking place in Northern and Southern California - the big water-line that is being constructed - in proposals that have been developed over the years, during, say, the drought in Texas, to pipe water over from the Mississippi River, or to bring water into California from the Columbia, etc., there are some of these that are

taking place, and I think probably we'll have more in the future.

There is another technique that we can use also, to increase the supply of water. At least a slight increase in the available supply can come about through the desalinization techniques that are being worked on. There is no breakthrough that's developing, but gradually there are some lowering of the costs in treating the water through desalinization techniques.

The reduction of evaporation from reservoirs is another technique that at least reduces losses, if it doesn't increase the total supply. Also, shifting in conserving uses to bring water supply and demand into balance. This is largely through the price mechanism that I mentioned earlier. And here's a phase of economics. The economics of water has been a very fuzzy situation. The reason it has been fuzzy is that water has not been priced in a relatively competitive free market; it has been institutionally or administratively priced by the city, town, or water company that has supplied the water. This is essentially because water is a natural monopoly, and it has to be in order to be officially distributed.

But the costs have largely related to the costs of distribution and nothing else. They haven't related to the cost of providing that supply. Then there's the other question, and that is, "How can price be used as a mechanism to allocate water to the most efficient uses?" We go through, sometimes, during the drought periods, reducing the number of showers we take, the number of times we water the lawn, and these various prohibitions are released from time to time by city water

departments, to stretch the water out.

But the time looks as if it's coming, where we will have certain priorities with respect to water and its uses, and that these priorities will be related, or rather, allocated on a price basis. For instance, the price that we pay for water today is not related at all to the cost of watershed management. And yet, somebody who owns land, private or public agencies, are going to have to manage their watersheds in order to provide constant flows. But how do we relate these on-site costs of the landowners and the yield of water which is essentially a crop from their land, to the consumers down below who don't pay for it? Well, these are some of the kinds of questions, I think, that we're going to face in the future in the allocation and conserving of our water supplies.

Now, how do we handle these things? We're going to have to handle them through the only mechanism that we know, and that's federal, state and local agencies. And here we get into, if you'll pardon the expression, a real can of worms. The principal agencies in the water business include, by department, the Department of Interior, the Department of Health, Education & Welfare, the Department of the Army - the Corps of Engineers - and the Department of Agriculture. And with the exception of the Department of the Army which has one agency, the others all have several.

Then you have state agencies, local agencies, and you have interstate compacts. So far, at this stage of the development of our civilization, these agencies have grown up on the basis of a need at a certain point in history which was recognized and set up by the Congress to carry

out. But we're coming to a point now that water, of all the resources, is probably the one that, in terms of looking at it in terms of its physical and geographic situation, is the thread that runs through all of our resources; it's the one binding resource that encompasses all of our land area. And yet, as a people we organize ourselves with more damn agencies in the water field than we have in almost any other federal or governmental activity.

One hopeful effort at trying to resolve the problem - and some people are skeptical of it - is a bill that has been introduced by Senator Anderson's Water Resources Planning Act. He has set up a water resources coordinating committee which will be representative of all the agencies. All these agencies would then do a common job of planning various river basin developments. They would all submit budgets relating to their work. Then you'd have an agreed plan for that river basin and that river basin's development work would be done in a coordinated way through this commission.

Well, I think we're going to have to come to some kind of a grass-roots coordination in any case, but whether we can do it on the ground without doing it in Washington I'm not entirely clear. I don't know. I think the composition of the commission is going to be important. I have sat in on enough of these, and I'm sure all of you have, of these various committees that are coordinating this and that, and it's all well and good. But unless the people on these committees and commissions have authority to make policy decisions they become nothing more than technical debating societies and the real issues are never presented.

I have come to this conclusion with some degree of regret because I like to think that men of good will can sit down with rational minds and solve problems. But if they haven't the policy authority, then they're not in a position to do so. And who has the policy authority to make a commitment? Mainly the Secretariate of the various departments. In my job as a bureau chief I only have certain policy authority and it's quite clear. In most cases where there are new policies involved, I've got to go to the Assistant Secretary or the Secretary, to get a decision. This is as it should be; nevertheless, somebody on my staff who goes onto a coordinating committee can't make the commitments that are needed.

The reason I go into some length on this is because the management of natural resources is really the management of our society in its relation to natural resources, and the way in which people relate to their use of natural resources. This means, what kind of organizations are we going to have in doing this relating? And the kinds of policies that these organizations carry out in the process will depend on the kinds of authority and commitment that they have before they enter the job.

I've seen too many of these debating societies to have faith in a coordinating commission without policy authority.

Well, to review some of the ground that I've covered here, I think the thing that strikes home with respect to the conservation of land and water resources, is that we have a fixed land and water base on this continent. We have a growing population. We know we can expand the productivity of our soil, of our agricultural and timber resources, by

current and newly-developed techniques, and through the investment of more money, but that this is going to require a new effort in terms of policy in order to do so. It's going to mean some changes of techniques that we have followed in the past, public policy techniques in terms of the way in which we organize ourselves to handle these questions and to administer programs.

I think that we know that as far as the land resources are concerned, the increase in yields of farm products and livestock will come about if we can be sure that we apply soil conservation and watershed conservation practices that are known and are developing. Because, this is essential to the maintenance of our basic resource capital.

But, really, the big questions that we have in resource management are not in terms of the application of techniques; they're essentially public policy questions. The organization of our federal and state agencies in terms of capability to do and respond to the jobs that we have, or whether they're going to be so bogged down in redtape, conflict and competition; that all of this is going to hold back our effort while we have a burgeoning population.

We're going to have to face up to the question of spending government money. This is one, of course, that's being hotly debated in terms of political philosophy, all over. And our federal budget which does not reflect capital investment, and shows everything on a current expenditure basis, is a real detriment to the concept of making investments in basic resources. Because, when you do spend money on any of these kinds of programs and practices that I mentioned, it looks as though you're

blowing the federal budget skyhigh. But actually, these are investments which will produce yields in the future. And yet, to get this concept across is very difficult because our budget structure is the way it is. A corporation budget structure would simply say, "We're setting up a capital investment, we'll float a bond, and we'll pay it off in returns. But this is a very, very serious detriment and something that we're going to have to face up to, because the investment of money to make possible the carrying out of all these programs and practices is going to be the biggest challenge that we will have during this decade, and I think, for some years after.

This matter of realism with respect to public consideration of these policy questions is something that I hope we're going to have a continued atmosphere of rational debate on, the issues themselves rather than on some of the kinds of situations that have developed where name-calling and obfuscation of issues has been preferred. This means that we've got to have policy realism; we've got to have recognition of the problem itself; an admission that the problem itself is something that we have to come to grips with. If we get that I think we can get the atmosphere for coming to grips with the problem even though there may be several answers.

But even though we go through all of these problems and solve them, making these adjustments and improving our application of techniques, improving our federal agencies etc. and our organizational structures, we do need the goals to take care of our people for the Year 2,000, so that they will be adequately fed, they will have housing, water supplies

etc. What happens after the Year 2,000? That is, on this fixed land and water base. With that, I leave the question up to you. Thank you.

QUESTION: I understand that in the United States there are a number of underground water streams running around the countryside. Is anything being done to tap this water in the sense of conservation?

MR. STODDARD: The Geological Survey in the Department of Interior has been making an inventory of underground water storage. And they have broad water resource maps which show water resources in a generalized way; the depths at which they occur. There not, I think, any huge flows that could be diverted, say, from the Middle West to the West or somewhere else. The way in which water is found depends very much on the geological structure. In the Northern Lake States region you have a high water table. In the lower Middle West you have a much lower water table. You have water tables that are very low in the Southwest. We have many places in the West - not restricted to the West - where the water table is decreasing because the well consumption is greater than the recharge rate.

There are techniques that they're developing now for taking flood waters and returning them to ground water. But this is in a very early stage of development and utilizing the technique. But I don't think we can look for any large channels or underground sources that we know about now.

QUESTION: I imagine that the development of the Rio Grande Basin with the arid North Texas bites and also in the international business

there are complexities between the U. S. and Mexico - and technicalities. Could you give us a sketch on what's going on down there?

MR. STODDARD: Well, the problem is, of course, that most of the water in the Rio Grande is retained up somewhere on the United States' side. By the time it gets to the lower portion of the river, there are times of the year when there is very little flow. There are a number of dams that are constructed for the retention of the flow and for regulating the flow. The principal problem in the Rio Grande, in addition to the allocation of the water and these matters that you mentioned as between states and Mexico, is the condition of the watershed of the Rio Grande. It's in terrible shape.

That's an area that's subject to intensive short-duration rainstorms. They are quite infrequent but they're very destructive of the soil. The result is that you have a very heavy run-off accompanied by erosion and siltation, and quite a lot of evaporation takes place at the same time. Attention so far has largely been given to storage of whatever water is in the river now, and there is considerable siltation taking place in the reservoirs.

There is not any proposal as yet for the development of a compact for allocation of water such as there is developing on the Colorado River, or on the Delaware and some other smaller rivers where there are interstate compacts. There is a proposal on the Columbia, as you know, for allocation of power resources and regulation of the river between the United States and Canada. There is also on the Columbia a compact between the States of Oregon and Washington, for allocation of water.

But, so far, the Rio Grande has not come into this situation, and I can't really tell you the reason why. It's in a very water-short situation and has this deteriorated watershed situation.

QUESTION: I recall having read recently of an area in Florida where they're having difficulty with and are going to combat detergents in water after the first of the year. Can you comment on detergents in water?

DR. STODDARD: The detergents in water do not break down under treatment, and therefore they're carried along when the treated water is returned to the water supply. There is no real poison or detriment that is involved, to human life directly, but there are annoyances in the bubbling aspects. There is some question with respect to what impact it may have on fish and wildlife, and other organic life in the water.

The soap companies have been under so much pressure that they're attempting to get worked out and put on the market - and they say they will next year - a soft detergent; one which does break down under chemical action.

QUESTION: What techniques do you use to reduce the rates of evaporation in reservoirs and large bodies of water, and what effect does this have on fish and wildlife?

DR. STODDARD: Practically all the work that has been done has been on an experimental basis. We have a chemical - I've forgotten the name of it, but it's a very, very tiny film that is put out over the water's surface which practically eliminates evaporation. So far

as we know, it doesn't have any serious effect on fish and wildlife. But as I say, it's still in an experimental stage of development and it's not entirely clear whether this is going to be an economic proposition or not. I think they're searching for other kinds of chemicals which might be substitutable for this one.

QUESTION: Mr. Stoddard, I was up in the Seattle area for some time and I was thoroughly amazed out there at the amount of forest land that is under private ownership. I was also impressed with the amount of publicity that was put out by a company like the Weyerhaeuser Company on its conservation and reforestation efforts. I wonder whether or not you can believe that publicity.

My question really is, how much confidence do you have in the conservation efforts by these large organizations in the private sector?

MR. STODDARD: Well, let me say this; that in the period since World War II, these companies have been under very heavy public pressure to change their forest practices. And there have been, on the part of a number of companies, very substantial efforts to reforest lands that are cut over, almost at the rate now, that the cutting is taking place. The best land in the West, of course, was picked up from the public domain before the national forests were reserved. These are the lands that they're still operating on. Much of the Western timber industry depends on public land as a source of raw material.

They never mention this in their ads. The ads tell the best; they put the best foot forward, and this is a normal human thing to do. Some companies are deliberately exploiting the forests still. But

Weyerhaeuser in this particular case is one of the outstanding forward-looking companies.

QUESTION: I understand we're losing land in the West through salinization and irrigation. Could you tell us a little about that?

MR. STODDARD: Well, this has happened historically all over the world. There is a tendency where irrigation takes place, for salt to rise and crust the surface of the soil, and therefore make the soil not suitable for crop production. However, there are techniques now for getting the soil to move back down by changing the irrigation methods. And the application of this technique can restore a great deal of this crop-land back into production.

QUESTION: Can you shed some light on the reason for concern over evaporation? Does not all of this return through rainfall?

MR. STODDARD: Yes, it does, but it doesn't all return to the same place; as I indicated earlier, the water deficit areas are in the West. That's where the limited supply is. And since this is the zone of the prevailing westerlys, the climate is such that all the evaporation that takes place moves up into the clouds and much of it moves East. It doesn't do the West any good. So, if they can save water in one place they'll have it available there.

QUESTION: From the point of view of maximum value of water conservation techniques, is there any area that you could adjudge number one in urgency?

MR. STODDARD: Well, I don't want to be bureaucratic or self-promoting, but the real problem that we have is the Western rangelands

where they've been over-grazing for years. The department and the bureau that I'm with has not had a program adequate to overcome the over-grazing and apply the soil conservation measures. We're much further ahead on the better crop-lands etc. in the Middle West, the East and the South, than in the West.

QUESTION: Assuming there are 477 million acres of land in the public domain, this must decrease. Could you tell us or comment on how and at what rate?

MR. STODDARD: Well, about 300 million of it is in Alaska. The Alaskan Statehood Act set up the right to select 100 million acres of it. So, if they selected it all there would be a net of 200 million in Alaska left. But the balance of the land, which is in about 12 Western states is not decreasing very rapidly. The land is such that it is primarily of value for grazing purposes.

About the only movements from public into private ownership are around cities and towns; that is, of any substantial amount, where there is an expansion of cities like San Diego, Las Vegas, Reno, and the Arizona and New Mexico towns, etc. where there is a need for more land. This is where the largest area of movement is taking place. It's relatively small - about 300,000 acres a year, something like that. We're getting into a classification program to try to identify how much of this land really should go into the private sector, and work up a program for disposal, and then management of the rest of the land so that we can make a long-term investment and put it under proper management.

QUESTION: What is the procedure by which a private concern gets

access to public timber?

MR. STODDARD: The timber is put up for bid based on an analysis of the allowable cut. Each year a determination is made in terms of how much timber shall be offered from that particular unit of land, based on the growth, the accumulated growing stock, and the other technical factors that go into the equation. Then the location of the ripest timber is determined, the volume, the value is appraised, and it's put up for competitive bids for sale. They companies come in and bid, and the successful bidder gets it.

QUESTION: Irrigation being one of the largest users of water, the Bureau of Reclamation is engaged in new projects to bring new lines into production. At the same time, you're talking about possible bridges between agencies. The Department of Agriculture has been engaged in trying to retire crop-lands or put them into soil banks. Would you care to comment on these and tell us who is ahead?

MR. STODDARD: Well, I might say that the land that is being brought in for reclamation by irrigation is largely in crops and the law prohibits the production of crops and surplus. So that, it's largely in crops that are in surplus. I mean, we don't have cotton; we don't have corn; we don't have wheat; we don't have peanuts and whatever else we have in the surplus field. Most of the irrigation is going in for either fresh vegetable-type crops, or, say, sugar-beets which, due to Mr. Castro, we have a shortage of.

So that, the conflict there is not as great as it would appear at first, but there are some conflicts which are, some of them, political.

Because, the Western Congressmen vote the money for these projects. The Southern Congressmen vote the money for the agricultural projects. And you don't have a complete meeting of the minds.

QUESTION: Sir, with reference to the Hell's Canyon-Snake River controversy of several years ago, would you comment, please, on whether the issues involved there were political?

MR. STODDARD: Well, there were basic issues as between, on the size of the dams, whether we have a multi-purpose dam which tied in with the whole river regulation system and these public benefits that I mentioned, or whether you would have a smaller dam which was tied in directly with the private benefits of power production. This, of course, then is taken into the political arena; it was political; there's just no getting around it. Because, you have a basic sort of philosophy between the two parties with respect to power.

You have the Democratic Party which says that the public sector will be pushed a little more than the private sector, which may produce conflict. You have the Republican Party which says that the private sector will be pushed; with good arguments in both cases. But when the thing is reduced to objective analysis, I think it lines up on two sides. And you can then make the judgment on the basis of factors other than political with respect to the development of water resources in any one place.

Smaller reservoirs, say in the State of Wisconsin where I come from, for water-power development, there is no question because they're single-purpose and there isn't any other problem. But where you have a multi-

purpose question coming in, then you have ideological as well as matters of analysis that enter into it.

CAPTAIN HENRY: Mr. Stoddard, all of us thank you for an interesting and most informative morning.