PRESERVING DINOSAUR NATIONAL MONUMENT UNIMPAIRED

Statement presented by David R. Brower, executive director of the Sierra Club, before the Subcommittee on Irrigation of the Committee on Interior and Insular Affairs, United States Senate, Washington, D. C., in the course of the hearing on the Upper Colorado River Storage Project held June 28, 1954 and following days.

I represent the Sierra Club, a national conservation organization of 8,000 members, of which I am executive director, and in which I have been active for twenty years. I also speak on behalf of the Federation of Western Outdoor Clubs, a regional organization of thirty-one separate clubs in California, Oregon, Washington, and Utah whose membership totals 21,000 and includes the Sierra Club. For further details on these organizations and their views as previously expressed I would refer you to testimony beginning on pages 789, 797, 824 of the published hearings on the Upper Colorado Project held before the House Subcommittee on Irrigation and Reclamation last January. I shall not repeat here my earlier testimony.

For sixty-two years the Sierra Club has been striving to play well the role envisioned for it by John Muir, one of the nation's greatest conservationists, who was the club's president for its first twenty-two years. The club's successes—and there have been many—have been due to the devotion and the labors, selflessly volunteered, of many thousands of individuals through these six decades. You would recognize the names of many of them. Like most conservation organizations, this one has many experts and professional men in almost any field you can name, some of whom have received the highest honors their peers can bestow. Membership has included presidents of great universities, of a railroad, of a mining concern, of several scientific societies of the National Reclamation Association; top men in electronics, engineering, hydrology, geology, economics, law, and finance; members of the Congress and of a state legislature; a justice of a state supreme court; four directors of
the National Park Service, the previous Republican Secretary of the Interior; great teachers and great writers; All-American football players, outstanding mountaineers and skiers. And a host of people whose names may never get in the papers at all.

What do they have in common? A certain kind of humility in the presence of the natural beauty in the outdoor world. They have joined together to enjoy for themselves some of the finest scenery in the country, and to try to make sure, for the sake of their sons and yours, that man should not endeavor to scratch his name over the entire face of the land, but that man should instead leave some of the land unmarred, unaltered, and unimpaired, that we might always know with what skill and artistry God made the earth, unaided by man.

The Board of Directors of the Sierra Club, drawing upon the wide scope of knowledge within the membership, and after careful study, has taken this stand, and no member of the club has protested it: The Sierra Club has no objection to a sound Upper Colorado River Storage Project that does not impair the national park and wilderness system.

Our national parks, monuments, and wilderness are a priceless asset. They are the fruition of ninety years of prodigious effort on the part of men of great vision. I need not sing the praises of our enviable National Park System before Congress because it was Congress which established the National Park Service in 1916 and which has steadily improved and protected the system ever since.

I am well assured of your appreciation of the National Park System. Yet I am not sure that those people who are in the best position to know have presented to you the importance of Dinosaur National Monument to that system.
Words won't do it. Pictures won't do it very well. One of our printers commented, "We've seen a lot of pictures of Dinosaur, and I thought that you had probably shown all there was to see." This man had also seen two color motion pictures of boat trips down the canyons. "But I just wasn't prepared for what I saw," he told me. It just keeps unfolding and unfolding, always different. I rode with a different boatman every day, and each one told me, 'Today's the best of all.' It's the most gorgeous place I've ever seen."

The printer and his wife were on the first Sierra Club trip this year—the first of five, which traveled across the Monument from east to west—86 miles of floating from Lily Park through Split Mountain Gorge.

My secretary went on that trip, too. For more than a year she had been seeing letters, pictures, clippings, and articles about Dinosaur, as well as the two movies. She has seen very few parks and I'm not sure she had ever camped out before. She wanted to try the river trip and off she went. "But I'm going to walk around those rapids," she told me. She is one of those blonds who tan beautifully, and she came back a week ago Monday from the six-day trip, beautifully tanned. Ask her about that trip, and all you get is a rapturous sigh. It was the best trip she had ever had, anywhere. And did she walk around the rapids? Not one. She helped the boatmen row through some of them.

When there wasn't enough splash from rapids, the 10-boat flotilla with some 70 people aboard, got into water fights to keep things lively. You can splash quite a lot of water on someone if you use an oar or a baling can right. Helping in the battle, with their dignity pleasantly relaxed, were one of the nation's foremost physicists and an assistant U.S. Attorney General.

The physicist had his four-year-old daughter along. She helped too. And so did the leader of the trip—who is a great-grandfather.
Two of my boys and I wish this hearing could have been held in May. We should then have been able to take the river trip again ourselves. As it is, we'll wait until next year. Once isn't enough by any means. Six days only serve to tantalize you, to show you twenty new places you'd like to camp in and explore. I'm using the word "you" in a general sense; it probably covers everyone in this room who has any liking at all for the outdoors and who doesn't mind sleeping out in the open.

It doesn't break you, either. This year the nearly 300 people from all over the country who are taking the Sierra Club's nonprofit trip are paying $65 for six days on the river, including boats, boatmen, leadership, and a small crew to do most of the cooking and pot walloping.

Is it hazardous? Without proper precautions you can get into trouble, and not just on a river. Even in a bathtub. I'd say the greatest hazard is driving to Vernal, Utah, the jumping-off point. One man from Vernal, who I am quite sure has not been down the river, alternates between saying a corpse could make the trip and you may be a corpse if you try. Having been through once I know I would hesitate to go through the Monument in a boat of my own until I had learned more about river running, but I wouldn't hesitate to go on an organized trip with skilled boatmen along. Likewise, I'd hesitate to take a horse into national-park back country until I knew more about horses. Once you yourself step into one of Bus Hatch's rubber boats and let one of his boatmen take you down the Yampa or the Green, you'll not be worried again over alarmist claims about the river hazards in Dinosaur. I think there's still room for a few on the July 15 trip that goes through the Canyon of Lodore if somehow you can arrange to hang the "Gone fishing" sign on your door. In that canyon there are rapids which nearly everybody must walk around. But it's a short, easy, scenic walk.
Yes, I am sure that once you have gone through you will well understand why hundreds of people who have been through consider entirely wrong the claim that a dam would enhance this place. It would do to Dinosaur what a dam would do to Yosemite Valley—destroy the best of the Valley itself, and do untold damage to the effect of Yosemite National Park as a whole as well as to the national park idea. As the National Park Service itself has said, the effects of the dam would be deplorable.

It seems to us well worth extremely great effort to find a way to preserve and enjoy Dinosaur just as it is, unaltered and unimpaired. We have only begun to see how much it can mean to the nation as a primeval national park, one of the finest units in all the system, unexcelled by any canyon park.

The Sierra Club, with its own limited means of bringing the Dinosaur river trips to public attention, has encouraged a good 500 people to see Dinosaur for themselves on club-organized trips. It will be 32 years before all our membership goes through at this rate, and by then there will be a new generation on deck. It's worth bearing in mind that 300 people who take a six-day river trip are getting as many man-hours of enjoyment as about 40,000 people who take the short dusty ride from Highway 40 to the hot little museum and quarry to look at the Dinosaur bones.

Isn't it worth exploring how much this unique and enjoyable canyon travel can expand without damaging the place? What would the potential be, for example, if other groups arranged trips like the Sierra Club's? What would happen, too, if the chamber of commerce in Vernal, the natural gateway to the wild beauty of the Dinosaur canyons, were to start encouraging transcontinental travelers to pause for a good trip to or down the canyons?

With good business administration, an expanded boat concession in Dinosaur probably has a potential something like this. Two eight-boat flotillas could
leave daily from Lily Park and Gates of Lodore for six-day trips, using staggered campsites, for an average of two and a half months each. Some of the trips might travel longer per day (the average is less than a half day's travel per day to stretch it to six days) and get through sooner; other trips might take longer. Shorter trips would be available, such as Gates of Lodore to Echo Park, Castle Park to Echo Park, Echo Park to Island Park, and Rainbow Park through Split Mountain Gorge. We can, to arrive at a potential, assume two a day of each of these short trips, of a full or part day's duration, running simultaneously and with the same capacity.

By this schedule, about 900 people would put in every day--plus 96 boatmen, plus self-sufficient river runners who could stand the traffic.

Twenty campsites would be occupied each night, and about that many trucks and buses would be busy shuttling boats and people to the starting points.

About 70,000 persons could thus see parts of Dinosaur from the river each summer season, perhaps spending about $10 per day for transportation and meals on the river, plus whatever they needed to spend for goods and services in Vernal, or in a separate gateway settlement established to encourage people to see Dinosaur.

The dinosaur quarry could be made very attractive. There could be further travel by way of an improved loop road taking in Castle and Echo Parks and Harper's Corner, with overnight accommodations for visitors interested in the less enticing bench country back from the rivers' banks, or wishing to explore riding and hiking trails.

Thus the man-days of use per year might eventually number several hundred thousand and the natural qualities of Dinosaur National Monument would be continuously sought out for their unique beauty by national-park travelers.

Let me emphasize that this is a theoretical potential use of Dinosaur's
recreation possibilities as a natural national park. It may never get that high; I myself feel that there are other values to national parks than those measured by counting the crowds who pass by. The head-count puts the emphasis on quantity, and is too likely to overlook the qualitative experience national parks can and should provide. It is not getting to the bottom of the issue to say that one area is good because 2 million people pass by each year and another area is useless because only 20 thousand people see it. I think that it is the re-creative, inspirational values that we must consider here—and that have been considered well by those who have set up and protected the national park system.

If, however, the Echo Park reservoir replaces the wild canyon rivers, Dinosaur could not be expected to be the mecca for reservoir recreation predicted by those who would flood its canyons. Its national park qualities would have vanished. It would be one more reservoir in an Upper Basin project calling for 700 miles of new reservoirs to add to the nation's existing hundreds of miles of reservoirs. In summer it would be a hot and glaring lake with no attractive woods growing at its fluctuating water line. Vast areas of denuded landscape would be exposed year after year. The reservoir might fill once or twice in forty years, and all its active storage might be drawn down as often. The intermittently drowned and desiccated vegetation would be no attraction. The rapid encroachment of silt, exposed in varying amounts according to draw-down, would repel travel in the upper reaches and in the embayments. If history of other reservoirs is a fair criterion, there would be a momentary improvement of fishing, then a steady decline. Its summer upland temperatures would be hot, its glare unrelieved; its winter climate would be too severe. It is not in the climatic zone that can bring large numbers of travelers past Lake Mead the year around.

Not in our time, of course, but in due time, and depending upon whose
sedimentation scale we rely upon, this reservoir, and all the beauty it inundated, would completely silt up. The top 200 feet on Steamboat Rock would be the tombstone for a park that need not have died.

These estimates have solid basis in three examples which we ought to heed.

Lake Mead. Prior to construction of Hoover Dam and formation of Lake Mead, this region was not a public attraction. The scenery is spectacular and tremendous in expanse but no single natural feature or group of natural features was given national attention.

Total travel to Lake Mead National Recreation Area for 1953 was 2,220,940 persons.

Approximately 300 people a year take the all-day scenic boat trip.
Approximately 4500 people a year take the one-hour boat trip on the lake.
Approximately 500 people a year take a three-hour scenic boat trip.

The fluctuation hampers recreation use of the lake to a very marked degree and adds tremendously to the cost of maintaining boat docks, boat launching facilities, sanitation along the shore, swimming facilities, and many other public use facilities, including safety and navigation aids.

Hetch Hetchy. In Yosemite National Park we learned a costly lesson, and once is too often. Back in 1911--there was no National Park Service to protect an irreplaceable scenic valley. And proponents of Hetch Hetchy dam were claiming:

San Francisco will wither without this water
We must have this cheap power
There are no good alternatives
The scenery will be enhanced
Greater accessibility will result
Nature lovers are obstructing progress
California's land must be used for California's benefit
In 1954—we know better, too late. Not one of these claims proved valid. Yet we are now hearing parallel claims for Echo Park. We are still not faced with a choice between water and scenery; sound planning will conserve both.

We know that our superb and enviable National Park System is not an accident. Men of vision have been building it for ninety years. Ninety years from now the need for parks will be greater. And posterity deserves the best, not the dregs, of the things that make America beautiful. They and we can have them if we keep our vision clear and remember, with former Interior Secretary John Barton Payne, "There is a heap more in this world than three meals a day."

Hetch Hetchy was not quite so beautiful as its neighbor, Yosemite Valley, but it had much of Yosemite's charm and living space—great oaks, verdant meadows, tree-framed waterfalls, and one of the finest streams in all the Sierra Nevada. Kolano Rock was one of the handsome landmarks under which hundreds of thousands might have camped in these days of overcrowding in our parks.

But Hetch Hetchy had a good dam site. True, others existed downstream—and still exist today—and the water would flow down to them, for diversion to a distant, growing city. Hetch Hetchy, though, was at a higher elevation, and the greater height could produce a little more power. A great battle waged, but there was not yet a National Park Service, and conservation organizations were few. As James D. Phelan wrote in 1911, espousing the dam in this valley, 
"... its beauty will be enhanced ... making the valley more sightly and accessible.... There can be no question but that the beauty of the scene, with a dam easily concealed by grasses and vines, will be enhanced by the effect of the lake reflecting all above it and about it and will be in itself a great and attractive natural object."
The Valley was made more accessible, but now for every million who come to Yosemite Valley to stay, a mere thousand come to Hetch Hetchy reservoir to turn around and leave.

Just as in Dinosaur, it was not necessary in Hetch Hetchy to choose between water or scenery. Water flows downhill, and there were and there still are sites for storage reservoirs from which waters of the Tuolumne could be diverted to San Francisco. A lower diversion point meant a lower power head, but this was not at issue, and there is indication that San Francisco would have been better off financially had it not gone to the added expense of going high for power. Certainly there were alternate sources of power then, and thermal-generated steam is the predominant power source in California now, even with many streams still undeveloped.

Former San Francisco Mayor Phelan, writing in Out West magazine in 1911, went so far as to imply that the Hetch Hetchy invasion would supply water not only for San Francisco, but East Bay cities as well.

His crystal ball was clouded. Starting years after San Francisco, the East Bay Municipal Utility District kept out of the National Park System, developed its water two streams north—on the Mokelumne River—and completed its project and was exporting water to San Francisco before Hetch Hetchy water could reach San Francisco mains.

One cannot say for certain what the full recreational potential of Hetch Hetchy reservoir may be. In spite of provisions of the Raker Act, the area is operated somewhat as a private lake. Even so, the setting is obliterated, the fishing is not good, and there is no place to camp. Seventeen years after the addition of 85 feet to the dam, there is still construction clutter around the dam, which is not "concealed by grasses and vines." There is no possibility of enjoying the type of human experience national parks were set aside to perpetuate.
Today, were it unimpaired, Hetch Hetchy Valley could be carrying part of Yosemite Valley's overload, and be enjoyed for itself, too, while those who preferred the real values of reservoir recreation were dispersing themselves upon the many available reservoirs. Instead, San Francisco's gain (probably at an inordinate financial burden) became the nation's loss—a loss that is constantly increasing as the progress of our culture brings more population, more leisure, and more of the strains that national-park recreation helps so wonderfully to ease.

Mr. Phelan, troubled by the application of the word "vandalism" to those who would invade Hetch Hetchy, commented that "people who have a bad case use harsh words." In the cold light of hindsight, we can now see whose was the bad case—and remember that the kindest term the "vandals" had for the opposition was "nature lover." That term, now being called forth again for its overtones of derision, served then, as now, more to becloud than to clarify. Those who felt a reverence toward their natural heritage also seem to have been in closer touch with logic, their insight free of myopia. Their crystal ball, we now know, was clear.

If we heed the lesson learned from the tragedy of the misplaced dam in Hetch Hetchy, we can prevent a far more disastrous stumble in Dinosaur National Monument.

Yellowstone. A threat like that to Hetch Hetchy and Dinosaur was staved off in 1921 in Yellowstone National Park. Dam proponents were then urging a project to raise Yellowstone Lake six feet. It would help the park, they said, increasing the size and beauty of Yellowstone Falls. Arguments that it would create a dangerous precedent they tried to dismiss as visionary and sentimental.

Defenders of the new National Park System, however, prevailed. They revealed the project's incompetency to accomplish the results claimed for it.
Former Secretary of the Interior John Barton Payne pointed out: "The water does not stay in the park. Use it outside."

To the Senate Committee on Irrigation Mr. Payne said: "Once you establish the principle that you can encroach on a national park for irrigation or water power, you commence a process which will end only in the commercialization of them all."

When asked if he realized that this bill called for a dam only six feet high, he predicted that it would soon be followed by a bill asking permission to raise the dam to twenty-five feet. "And the fight to get that," he stated, "will be just as insistent as the fight now to get six feet."

It was for this committee that he summed up the case of park protection with the remark, "There's a heap more in this world than three meals a day."

The threat to Yellowstone resulted in passage of the Jones-Esch bill rescuing National Parks and Monuments from the application of the Water Power Act—a protection broadened by a 1935 amendment and cited in the proclamation enlarging Dinosaur National Monument to its present magnificent scope.

In Hetch Hetchy there was no National Park Service and the National Park System lost.

In Yellowstone, the Department of the Interior stood behind the Park Service and the parks gained protection.

In Dinosaur the issues are in essence the same. But the National Park Service cannot speak. Protection of the Park System is thus up to the people, who own it, and their Congress. **Eternal vigilance is the price of liberty—and of national parks.**

We are told, "To Be Safe, Resist the Beginnings."

**Even if we expended all the few resources we must forgo to keep an unimpaired national park and wilderness system, we should gain but a few years!**
respite from the search for substitutes which a resourceful people will find. Parks are too much to lose for so little gain. It makes sense, therefore, to develop substitutes in time.

To give this view perspective, let's use a statistic. There are reported to be (the Bureau of Reclamation uses this figure) 400 billion tons of bituminous coal in the upper basin coal reserve. All the power that Echo Park dam will generate from start to silted-up finish can be replaced by utilizing only 10 ounces of coal out of every ton of coal in the upper basin reserve (assuming no upstream sediment control).

Or state it another way. For all its importance where legitimately developed, hydroelectric power provides but 5% of our present energy requirements. Coal, oil, and gas supply the rest. If we developed every usable bit of stream in this country we could add but 2% more of our present requirements. The undeveloped part of the Colorado is but a fraction of that 2%, and Echo Park dam is but a fraction in turn of the undeveloped part of the Colorado River. Multiplying these factors together, we come up with a ratio that can be expressed this way: If you were to consider that our total rate of using energy today would light our house for an evening, Echo Park's total share would come on and go off while you blink your eye. It is one part in ten thousand.

Echo Park dam would solve no power shortage, and it would lose a park forever.

Statistics are tiring, but to the foregoing, which I have derived from Harrison Brown's revealing book, The Challenge of Man's Future, I add one more by courtesy of Mr. Robert LeBaron, who was interviewed in the June 25 U.S. News and World Report on the subject billed as "Atom Power for Homes in 5 Years.

Our uranium reserves are roughly 25 times the U.S. coal reserves and 100 times the oil and gas reserves.
Echo Park therefore could supply only the most infinitesimal part of our energy requirements before it silted up. Left as a natural wonder, it can fulfill a park need until our culture dies, several millenia, let us hope, into the future.

I hope these remarks have made two points--

1) Even if we had to choose between this park and this resource, we should choose the park, for it adds too little to our resources, and it depletes too much from parks we shall need far more urgently.

2) But we don't even have to choose. The upper basin states can eat their cake and have it too, and the nation will gain from both—provided that we use alternative solutions, and require that they be objectively presented.

If everyone agreed with this statement, you would have before you a bill which didn't contemplate an Echo Park dam—if indeed such a bill hadn't already passed the Congress four years ago.

But apparently everyone doesn't agree, and I'd like to discuss a few more facts for whatever this may accomplish toward bringing agreement closer.

All along, the Sierra Club's chief concern has been national-park and national-wilderness preservation. The principle of park preservation should be able to stand alone. But we have been persuaded by practical men that one way to prevent park invasion is to offer alternatives to that invasion. This has led us to study more thoroughly than we wished the details of the Upper Colorado Storage Project, to make our own observations about it, to check them with experts, to dig out facts that were missing in the basic 1950 Report on the Project by the Bureau of Reclamation, to discover important errors, and to see the Bureau correct some of them.

From this study we come up with this tentative conclusion, which we can amplify in such detail and with such documentation as you may wish: that
conclusion: even if the present plan did not invade the park system, which it does, and even the total plan had been proved necessary (we do not find that it has), still it is not a sound project.

When I was pointing out various probable flaws in its soundness before the Hoover Commission Task Force in San Francisco last May, Governor Lee of Utah said to me: "Don't you think you are on sounder ground in your argument on that basis [unsoundness] than you are that it is going to injure some park? ... I think your soundest argument is against the cost, and certainly isn't because it is part of the National Park System." (I quote him directly.)

I disagreed, because we believe that if we defended only those parks which could not be soundly exploited, our national park system would have died before Abraham Lincoln started it. That does not mean, however, that we feel we should shun considerations of engineering or economic or agricultural soundness.

I have gone into these questions with no engineering background except what an editor can acquire when his father and his brother are engineers--and when he knows a few top engineers to go to for assistance. This is similar to the procedure an attorney would follow in the same situation. The following pages deal with questions and answers arising from discussions with competent authorities in the various fields concerned. I hope they will help you in defining a sound project.
TWO CONSTRUCTIVE SUGGESTIONS

We have two constructive suggestions to offer. First, we urge that destruction of park values be avoided and that the national park and wilderness system be improved.

Our findings agree with those of the best qualified experts, who have devoted their careers or their philanthropic efforts to park preservation. Our findings are that dams in Dinosaur would forever destroy all that is of national-park meaning in the place. We know that Dinosaur, for all its relative obscurity today, is one of the finest parts of the National Park System. We know that an invasion here will gravely threaten the entire system. For although you can ask yourselves here, "To dam or not to dam?" it is beyond anyone's power, gentlemen, to say what will or will not be a precedent. Only time can decree that. What goes before is precedent, and cannot be undone.

If a half-century-old reclamation withdrawal at Brown's Park should now be used to destroy the park quality of the heart of Dinosaur, then Kings Canyon National Park is on the way out along the same road. The destructive pattern would have been set.

The federal agency that would normally be here to protect the parks from a damaging precedent cannot appear without jeopardy. The charts, the photographs, the documents, the tables and diagrams, the staff, the pleas -- all these things that an efficient agency of the administration could have assembled to help save the parks -- this service has been denied to you, and I fear that the agency would suffer were you to order it to appear.

A mere handful of men, most of them laymen, are trying to fill that wide gap. They come to represent organizations concerned with the public interest
in conservation, organizations that exist on modest dues paid by devoted members. It is an enormous responsibility.

The Sierra Club's second constructive suggestion concerns a proposal for a revised Upper Colorado Storage Project. The proposal covers many fields of study, and as I have pointed out earlier, we have been most fortunate to have been able to rely on expert opinion, both from within and from outside our own membership, for our information in these various fields. I am especially reassured to be able to tell you that one of our experts is the same expert upon whom President Eisenhower, after a searching of the country, has relied for information in the same field. When we speak of evaporation loss, for example, we speak with a background of information assembled from hydrologists all over the nation.

In outlining the proposal of a revised project, I must necessarily speak in round numbers, for our basic data, those compiled by the Bureau of Reclamation, have not yet been subjected to the dispassionate check which has been urged by many advisors to the Administration and by independent agencies. Round numbers will, however, provide you with the general order of magnitude of what is involved.

PROPOSAL FOR A REVISED UPPER COLORADO RIVER STORAGE PROJECT

Introduction

An important letter from former President Herbert Hoover was brought to the attention of this subcommittee Tuesday by Senator Bennett of Utah, who spoke of Mr. Hoover's acute perception concerning Colorado River problems. Mr. Hoover's insight is the result of his long engineering experience and intimate knowledge of that stream. I would call your attention to one of Mr. Hoover's extremely important sentences in that letter:
"Studies now available show that to meet this obligation the 1922 Compact, the Upper states will have to provide at least 20 million acre-feet of holdover storage to be used during low flow periods, comparable to 1931-40, or lacking storage, will have to limit their use to about 64 percent of their allocation, in order to make available 75 million acre-feet at Lee Ferry."

In that one sentence is the key to a revision of the Upper Colorado Project which will resolve a controversy and which will also accomplish the following:
1) Provide each upper basin state not only with its full allocation, but also with more water for beneficial use than the present proposal will make available.
2) Eliminate enough proposed evaporation loss to supply a city the size of New York.
3) Retain Dinosaur National Monument in an unaltered condition.
4) Reduce by about $975,000,000 the proposed Storage Project cost.
5) Maintain higher water quality in the basin.
6) Develop more power potential with greater upper basin benefits.

Although Mr. Hoover's sentence was written in 1945, it has recently been reviewed and is correct. The revised project derived from it offers tremendous advantages to the upper basin and the nation. I am sure that there are several independent engineers who can assist the Administration in developing the details.

In summary it would operate in the following manner:

I. Summary of Revised Project

1. The Mexican Treaty in effect reduces allocations to both basins by 10% and the upper basin allocation is 6,750,000 a.f. (7,500,000 less 750,000).
So in our thinking we should use this figure - 6,750,000 acre feet.

2. Adjusting Mr. Hoover's figures for this, the upper basin, with no storage, can fulfill Compact commitments and use 70% of its allocation, or with 9,000,000 a.f. storage it can use 85% of its allocation. I'll talk about the remaining 15% in a moment.

3. Here is a table showing an Equitable Distribution of the 9,000,000 acre-feet of Storage:

<table>
<thead>
<tr>
<th>Dam</th>
<th>Active Capacity (1,000 a.f.)</th>
<th>Evaporation (a.f.)</th>
<th>Cost (1953 where available or 1950 plus 12-1/2%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flaming Gorge</td>
<td>2,950</td>
<td>56,000</td>
<td>$93,000,000</td>
</tr>
<tr>
<td>Cross Mountain</td>
<td>4,200</td>
<td>70,000</td>
<td>$57,000,000</td>
</tr>
<tr>
<td>Curecanti</td>
<td>800</td>
<td>16,000 est.</td>
<td>$43,000,000</td>
</tr>
<tr>
<td>Navajo</td>
<td>1,050</td>
<td>16,000</td>
<td>$71,000,000</td>
</tr>
<tr>
<td>Totals (rounded)</td>
<td>9,000</td>
<td>160,000</td>
<td>$275,000,000</td>
</tr>
<tr>
<td>Present project (10-dam) total</td>
<td>37,000</td>
<td>830,000</td>
<td>1,250,000,000</td>
</tr>
<tr>
<td>Difference</td>
<td>28,000</td>
<td>670,000</td>
<td>975,000,000</td>
</tr>
</tbody>
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4. This falls 15% (1,000,000 a.f.) of providing the full upper basin allocation. Nevertheless, the upper basin can have more water available for actual use under the revised project than under the present project. There are several methods for realizing this. Here is one:

a) Note first that if the present project's 6 remaining dams were constructed in order to provide for the last 1,000,000 a.f., the upper basin could not use that 1,000,000, because 670,000 would be lost through evaporation from the reservoirs proposed by the Bureau of Reclamation, and this loss would be chargeable to the upper basin. Thus for about $1 billion, it would receive only 330,000 a.f. more water.

b) Therefore, it would be in the interest of both basins and the nation to work out such an inter-basin agreement as this: the upper basin
could divert and use, for example, 650,000 a.f. (which is more than the 330,000 it would have received) by using exchange storage downstream. Both basins would thus gain additional water because of the saving of irreducible loss through evaporation of water, a mineral for which we've yet to find a substitute.

5. Development of the other power sites can be deferred indefinitely. For their hydro-electric power, thermal-generated steam power can be produced from upper basin coal, with enormous benefits to employment and economy in the region. All the power that the deferred dams would generate until they were fully destroyed by silt can be produced by utilizing 4 pounds out of each ton of coal in the upper basin reserve. (400 billion tons is the figure cited by the Bureau of Reclamation; 800 billion by Mr. Clyde and Senator Bennett. I used the lower figure.)

6. The Bureau's preliminary incremental analysis of November 9, 1953 indicates that the team of Flaming Gorge, Cross Mountain, and Curecanti dams, with some slight adjustment of joint-cost allocation, should be feasible, with Cross Mountain providing greatest assistance. These three together are almost exactly the equivalent of Echo Park in power generation and revenue. The details are not available on Navajo, where the cost of producing power would be high, but where special considerations, as I understand it, should govern.

All four dams are high on their respective streams, and all would benefit diversion projects directly and avoid the concentration of storage low in the upper basin, such as at Glen Canyon, where there are newly discovered geological difficulties at the damsite and where the evaporation rate seems to be much higher than would be expected at that elevation.
II. Water Quality

Reduction of water quality under the present Bureau plan might result from various factors, including:

1. Concentration by evaporation. The present plan will reduce this quality loss by about 80%.

2. Dissolving of minerals from formations the reservoirs would flood. The present plan reduces this loss by about 75%.

3. Exchange. Higher streams tend to be purer, and the Central Utah Project contemplates exchanging "highly saline" waters of the Green River for water in Uinta streams. In the present plan, gravity diversion from Flaming Gorge to Utah could be expedited, and the quality could thus be equitably balanced.

4. Leaching and return flow. Quality loss from this source would be reduced if the upper basin should determine that its greater opportunity for expansion lay in domestic and industrial consumptive use rather than in high-altitude crop production and possible overburdening of range land in the watershed. It certainly seems to me that the nation and the upper basin would gain if emphasis were placed upon industrial decentralization into the upper basin's mineral storehouse, as Mr. Clyde has stated so well. It is generally agreed that agricultural expansion, when our surpluses are gone, will be more economical and productive in the Middle West, East, and South.

III. Silt

The present plan provides no expensive silt-collecting reservoirs on the main stem of the Colorado. But I think we will all agree that if possible, we
should bend our effort toward holding the soil where it is instead of collecting it in reservoirs that cannot be replaced.

May we not join in urging a vigorous, two-pronged study of watershed protection, in the national interest for generations to come, upon appropriate government agencies? I suggest the two parts for two kinds of streams -- those which probably always ran muddy, and those which probably ran clear (even as the Yampa used to, when Charlie Mantle first came to Dinosaur) before man abused the land.

1) Desert sedimentation control. - Vast quantities of sediment are brought into the Colorado, especially from the Little Colorado and San Juan basins, where flash floods are probably the geological rule, in areas where there may never have been and may never be vegetative types which can prevent devastating erosion. For control, do we need a few large-capacity settling basins or many small ones, in areas presently of minimum agricultural and scenic value? There would probably have to be heavy evaporation loss during the settling-out periods in these arid silt-producing regions; this is the price that we must pay, I think, to keep this silt out of wealth-producing reservoirs.

2) Watershed protection. - Soil conservation, revegetation and reforestation, and range improvement should be expedited in all those parts of the Colorado River system where there is a prospect of restoring the natural protection of watersheds which can return us to clear streams and natural stream regulation through storage of water in humus, soil, and ground. We stand only to gain in the long run by conserving that critical asset, soil, and making a more beautiful river basin.
CONCLUSION

Finally, in conclusion, let me emphasize again that our concern for the preservation of the National Park System led us into an earnest effort to find a way whereby the objectives of the Upper Colorado Project could be realized in a program that would serve all the public interest. This effort has led us into a careful examination of all possibilities, and out of it has come, among other suggestions, the concrete proposal that I have just placed before you.

This proposal essentially calls for 4 storage reservoirs high on their streams: Flaming Gorge in Utah backing up into Wyoming; Cross Mountain and Curecanti in Colorado, and Navajo in New Mexico. These projects would serve not only for storage, but also for diversion of water for various uses. The proposal would avoid needless waste of a vast amount of irreplaceable water and improve water quality. It would cost nearly a billion dollars less than the project now advocated by the Bureau of Reclamation. It could vastly expand upper basin economy, facilitate decentralization. It would save Dinosaur as the unique asset it is.

Such a program, developed as competent engineers can develop it, will, I am convinced, serve well the total public interest, including the interest of the Upper Colorado region, in the wise use of their water and other resources — and also, I must emphasize, including the preservation of the National Park System which is such a valuable resource to the region and to the entire nation.

- End -