

MINUTES OF THE
BEAR RIVER COMMISSION
REGULAR MEETING

November 23, 1987

10:00 a.m.

First Floor Auditorium
Department of Natural Resources Building
1636 West North Temple
Salt Lake City, Utah

THOSE PRESENT

WYOMING COMMISSIONERS

J. W. Meyers
Gordon W. Fassett
S. Reed Dayton
John Teichert (Alternate)

IDAHO COMMISSIONERS

Daniel Roberts
Don W. Gilbert
R. Keith Higginson
Rodney Wallentine

UTAH COMMISSIONERS

D. Larry Anderson
Blair R. Francis
Calvin Funk
J. Glen Nelson (Alternate)
Dean Stuart (Alternate)

LEGAL COUNSEL

E. J. Skeen

ENGINEER-MANAGER

Wallace N. Jibson

SECRETARY

Nancy Fullmer

OTHERS IN ATTENDANCE

UTAH

Robert L. Morgan, State Engineer, Division of Water Rights
Robert M. Fotheringham, Division of Water Rights
William Atkin, Division of Water Rights
Barry Saunders, Division of Water Resources
Lloyd H. Austin, Division of Water Resources
Norman E. Stauffer, Division of Water Resources
Bert Page, Division of Water Resources
Geralee Murdock, Division of Water Resources
Jody Williams, Utah Power and Light
Carly Burton, Utah Power and Light
Robert W. Hill, Utah State University
Larry Herbert, U.S. Geological Survey
Ken Lindschow, U.S. Geological Survey
Les Dixon, Corps of Engineers
Paul Keil, Corps of Engineers

IDAHO

Hal N. Anderson, Department of Water Resources
Pete Peterson, Watermaster
Stewart Buttars, Franklin County Commission

WYOMING

Marvin Bollschweiler, Evanston
Mike Ebsen, Hydrographer
John W. Shields, State Engineer's Officer

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ACTING CHAIRMAN REED DAYTON: We would like to excuse the Chairman, Ken Wright. He was unable to attend this meeting. Since there are some new people here this morning, I think we should have some introductions. We'll begin at our left here and go around the circle and then we'll have the introductions from the back.

LARRY ANDERSON: I'm the Director of the State Division of Water Resources, a member of Utah's Bear River Commission and the secretary/treasurer of the Commission.

ED SKEEN: I'm attorney for the Commission and have been for many many years.

BLAIR FRANCIS: I'm one of the Commissioners from the State of Utah from the Upper Division.

CAL FUNK: Commissioner from the Lower Division of Utah.

GLEN NELSON: Lower Division. They asked me to finish Paul Holmgren's term.

DEAN STUART: From the Utah Upper Division, I'm the alternate.

DANIEL ROBERTS: From Preston, Idaho, from Franklin County.

DON GILBERT: Commissioner from Idaho from Caribu County.

KEITH HIGGINSON: I'm Director of the Idaho Department of Water Resources.

ROD WALLENTINE: I'm the Bear Lake Commissioner from Idaho.

J. W. MEYERS: I'm from Evanston, Wyoming, Bear River Commissioner

JEFF FASSETT: I'm the new Wyoming State Engineer and also a member of the Bear River Commission.

WALLY JIBSON: Engineer-manager of the Commission.

REED DAYTON: Commissioner from Cokeville, Wyoming, and Vice-chairman of the Commission.

JOHN TEICHERT: I'm from Cokeville also. I'm an alternate commissioner or advisor.

JOHN SHIELDS: I work for the Wyoming State Engineer's Office.

MIKE EBSEN: I'm on the water commission for the State of Wyoming out of Evanston.

MARVIN BOLLSCHWEILER: From Wyoming.

STEWART BUTTARS: I'm a Franklin County Commissioner. I'm here just to observe.

BOB MORGAN: I'm Utah State Engineer.

ROBERT FOTHERINGHAM: Out of the Logan Area Office, with the State Engineer's Office.

WIL ATKIN: I'm also out of the Logan Area Office.

HAL ANDERSON: State of Idaho, I'm on a technical advisory committee.

BARRY SAUNDERS: Utah Division of Water Resources.

LLOYD AUSTIN: Utah Division of Water Resources.

NORM STAUFFER: Utah Division of Water Resources.

KEN LINDSKOW: Utah District of the U.S. Geological Survey.

LARRY HERBERT: Utah District of the U.S.G.S.

PETE PETERSON: Watermaster from Idaho for the Bear River.

JODY WILLIAMS: Utah Power and Light.

CARLY BURTON: Utah Power and Light.

BERT PAGE: Utah Division of Water Resources. I do the financial report for Larry.

REED DAYTON: Thank you very much. We'll begin our meeting this morning first by having a reading of the minutes of the last meeting. Wally.

SUMMARY OF MINUTES

WALLY JIBSON: (A summary of the April 13, 1987 Annual Meeting minutes were read. Copy attached.) I think most of you are aware that Paul Holmgren passed away this past summer. I talked to his wife at the services. She told how grateful Paul was to receive the plaque and the recognition from the Bear River Commission.

REED DAYTON: Are there any corrections to the minutes?

CAL FUNK: I move that we approve the minutes.

DAN ROBERTS: I'll second the motion.

REED DAYTON: All in favor say aye, no if any.

MOTION CARRIED.

REED DAYTON: We'll move on then to our next report, the Report of the Chairman, which I have nothing to report. The Report of the Treasurer by Bert Page.

REPORT OF TREASURER

BERT PAGE: Those of you at the table should have two copies of the financial report, one with a staple in and one without. The Commission meetings the way they are set up cross over the fiscal year every other meeting. So to give you a financial report in this meeting I have to divide it into two separate reports, the first which ends on June 30, the end of the fiscal year and the second one covering from July 1st to the present time. The one with the staple in it is for the fiscal year ending last June. You'll notice that the total income for the year, including the beginning balance of \$129,000 plus, was \$243,000. We took out \$65,190 to pay the USGS and an additional \$56,000 to pay various other expenses incurred by the Commission. We spent a total of \$121,294.02. That left us a balance in the bank of \$122,211.21 at the end of the year. The second page shows you where the money went as listed by each check we wrote. Part way down you'll notice a bank charge. I think we received new checks during the year. \$100,000 was put in the savings account from money that came in from dues. We ended the year with \$122,211.21. Are there any questions on this half of the report?

The second half begins July 1st and goes through October 31st. We have the beginning balance which is the ending balance of the prior year of \$122,211.21. At the time this report was put together two of the states assessments had not come in. I think we just received Wyoming's but not Idaho's.

WALLY JIBSON: Bert, which fiscal year is that \$30,000 for then?

BERT PAGE: It's for the year we're in right now.

WALLY JIBSON: 1988.

BERT PAGE: Yes.

WALLY JIBSON: So when I summarized the minutes, even though I had it typed 1988 and 89, it should be 89 and 90.

BERT PAGE: We picked up interest so far this year of \$2,699.13, which gives us an income of \$154,900. The Stream gaging bill has been paid to the USGS. We have paid out \$1,500 for Commission expenses and have a balance presently in the bank of \$117,708.20. There are only a couple of checks on the back that have been written so far this year. I might comment on the first check, there, I believe that was for flowers for Paul Holmgren's funeral. You'll hear more about the last one as the presentations are made. That leaves us with a balance of \$117,708.20. That's the report, Mr. Chairman.

REED DAYTON: Are there any corrections to the Treasurer's report? If not, will someone move that we accept the report as given.

DAN ROBERTS: I so move.

CAL FUNK: Second.

REED DAYTON: All in favor say aye, opposed if any. Motion passed.

LARRY ANDERSON: If you go back to 1986-87 fiscal year, you will note we spent only \$29,000 on the contract between Idaho, Utah and Wyoming, to determine the 1976 depletions. So, what I instructed Bert to do was to carry the remaining unexpended funds over into this fiscal year's budget. We show this year that contract amount being \$71,347.97. They will need all of those funds to complete the study. The bottom line is we didn't save \$20,000, we just didn't spend it last year.

REED DAYTON: Are there any questions?

KEITH HIGGINSON: Mr. Chairman, could I just ask about the USGS contract. Is that \$35,000 that shows as an approved budget, a \$30,000 reduction from the previous year? Not having been here it looks like something has happened.

BERT PAGE: It did. The prior year's budget got paid the same year with the current. So it was a double-up. We're okay this year, it was last year that was a problem.

WALLY JIBSON: Just another word of explanation there. We still go on a water year basis with the USGS Coop agreement, but we have changed to a June 30th fiscal year basis in the Commission, so there's just a little confusion there.

REED DAYTON: Are there any other questions relative to what has been said, if not, would someone make a motion that we accept this change.

DAN ROBERTS: I so move.

CAL FUNK: Second.

REED DAYTON: All in favor say aye, opposed if there are any?

MOTION CARRIED.

REED DAYTON: Next then we'll move to the Report of the Engineer-Manager, Wally Jibson, please.

REPORT OF THE ENGINEER-MANAGER

(A copy of the Report is attached to and made a part of, these minutes.)

WALLY JIBSON: Mr. Chairman, that concludes my report, unless you have questions.

REED DAYTON: Are there any questions or discussions on the report Wally has given us. If not, will someone make a motion that we accept the report.

ROD WALLENTINE: I so move.

REED DAYTON: Is there a second to that motion?

EFF FASSETT: Second.

REED DAYTON: It has been moved and seconded. All in favor say aye, opposed?

MOTION CARRIED.

REPORT OF COMMITTEES

REED DAYTON: The report of the committees is an update on Consumptive Use Study of the Universities. Mr. Hill isn't here, so we'll have his representative give that report please.

LARRY ANDERSON: I don't think we have anybody here. Why don't we go on with the others and pick him up later.

REED DAYTON: We'll hold that and if he comes we'll have that report. Then we have a report on 1976 Depletion Study by Robert Fotheringham.

1976 DEPLETION STUDY

BOB FOTHERINGHAM: After we sent this information to the Commission, I received additional information. I'll hand these out. (Copies attached to these Minutes). Since the last meeting the progress has been that the states have gotten together and tried to work out the formatting problems that have occurred between their different computer systems. That took a little bit longer than we thought it would, but it was accomplished and all of the Wyoming data came to Utah and then was reformatted and sent to Idaho. Idaho organized the information and made it so that we could look at an image on a computer screen. We did the classification of the data we had in Idaho in June. We had some problems with the classification which we didn't anticipate we would have. That was basically between urban and range-type lands so we had to go back and rework some of the data that we had gathered and sent that back to Idaho. Now at this point in time Idaho has generated, or is currently

generating, maps for the states of Wyoming and Utah to go back and qualify the classification we did and make sure we did it correctly. Hal today has some plats that we will show you and refer you to. It will give you a very rough idea of what we will have for the final product. It is going to take us longer to complete the study than we had anticipated. We may be able to complete the study by the spring of 1989 but ask that we be given until the fall of 1989 to submit the final report to the Commission. This delay has been caused by the formatting problems we've had and also because we've integrated this Commission approved procedure into the process. That's all I have. I would like to turn some time over to Hal Anderson who has generated these maps for your review.

HAL ANDERSON: What I have here is a generalized version of the base map for you all to look at. Basically what this shows is that we were able to take the information from the three states and glue it all together so to speak. That's one of the areas that set us back a little bit in time as far as coming up with the procedures to format the data from Utah and Wyoming into the formatting structures of our computer systems at Idaho. We were able to do that and what you see here is a very general base map which shows where the irrigated lands are in the basin. For your interest, we also have a wetland category that would be best described as a water riparian category. Wetlands is not an adequate description for this particular category. This is just what one of my analysts put on the base map. That will probably be listed in our final map products as a riparian category. Also, I have over here on the table for you to look at, at your convenience, the information that we're going to be using here on the base map. We adopted the procedure early on to use the 1:100,000 scale maps as our base map for this particular activity and what you can see here is the categories at this point in time that we are going to use to calculate consumptive use for our depletion studies. These include water, dryland, irrigated agriculture, riparian lands, and urban trees and urban grasses. We are in the process of fine tuning this data and should be considered a preliminary product. We are going to generate this type of map and information for the entire basin. Each state then will review these base maps to assure that all the information we currently have available within our states matches the classification we've come up with. You're welcome to come over here and look at this if time allows, during break or whatever.

WALLY JIBSON: I assume you didn't have your Smith's Fork data yet to go on this map, is that right?

HAL ANDERSON: That's correct. What data were you thinking about particularly, Wally?

WALLY JIBSON: All the irrigated acreage for Smith's Fork. I mean you don't show any symbols at all for Smith's Fork, just a few scattered ones.

HAL ANDERSON: This is very generalized data and it is possible we could have easily missed it on the map.

JOHN SHEILDS: Look at the detail on the other map. I think it will answer your question.

HAL ANDERSON: That's a good point, certainly. Each one of these symbols on here probably represent more than a section. It could easily have been that we're talking about a section wide strip down through there. It could have easily been missed. I'm sure that John has a strata for that Smith's Fork area, and I will, make sure that it is included on the final maps.

WES MEYERS: There are places that go over the division line of the area, how do you account for that?

HAL ANDERSON: This is a generalized divide from the original type four study.

BOB FOTHERINGHAM: Might I add that you may see data outside the boundaries simply because the maps we use go outside the boundary, and we may have categorized some of the land outside the division itself on this map. The map being handed around is very rough as far as having anything done. Hal is going to send maps to each state and we're going to go through each one of them to make sure that nothing was missed. If there is something in the computer that for some reason is skipped, then we're going to find those things out. This was just to give you a very general idea as to where the irrigated lands may lie in the basin.

HAL ANDERSON: That's correct. We have made no attempt at this point to make all the lands outside of the basin boundary disappear. We could've done that. But for our accounting purposes we are going to be using what each state has delineated, new basin boundaries as described in the Bear River Commission Compact on a 1 to 100,000. That was done in Idaho by our service and groundwater hydrology people and Utah has done the same thing. Each state is reviewing the division boundary delineated by each other, so we will have a base map which also has delineated basin boundaries on it. That will be recorded on the base map and will be accept or recommend from the technical advisory committee to the Commission for their approval. Those products will all be ones that will be submitted in the November 1989 meeting that Bob was talking about.

REED DAYTON: Are there any other questions or comments anyone would like to make at this time. If not we'll ask for a motion that we accept these reports.

CAL FUNK: Mr. Chairman, I move that we accept the committee's report.

DAN ROBERTS: I'll second the motion.

REED DAYTON: All in favor say aye, no if any.

MOTION CARRIED.

REED DAYTON: We'll move on to the next report by Mr. Morgan.

RECOMMENDATION FOR ADOPTION OF DEPLETION GUIDELINES

BOB MORGAN: As you know, you've given the technical committee some guidelines as to what they are to map and you can see the fruits of their labor. I don't know how to compare it other than you sort of give them the car keys to the car and they go out, and what we've got to do is make sure if we give them the credit card that they only use it when they really need it. So we have to adopt some guidelines so they can start to quantify this depletion study. The engineering committee was given the responsibility of coming up with some

recommended guidelines so you might study them so we could give further instruction to the technical committee on quantifying the depletion study. We were able to get the report to Larry prior to November 9th, and it was mailed to you. (Copy attached to these Minutes.)

The state engineers from the three states have met and have discussed these. There will be some slight differences between what you have and what we're going to recommend. Nevertheless, if you would refer to page nine of that handout that was sent to you on November 9th, we can discuss those recommendations. Remembering of course that the depletion study is supposed to quantify those depletions that occur within the basin after January 1, 1976. What we're saying in number one, and I'm going to paraphrase these, and I'm periodically going to refer to the Bear River as a check book. We look at it as a big check book and the depletions are similar to debits that you record in your check book. I don't know if yours is similar to mine or not, but if at the end of the month I add all those up and subtract and find out what's happened in my check book and the difference is to the right of that decimal point, I don't worry too much. But if the difference is to the left, then generally I have an accounting and I have to get back to my wife and we have to figure out what went wrong. What I'm saying is in figuring the depletions within the Bear River, if we can keep everything to the right of that decimal point then the error is not very significant, we need to keep this in mind. We're looking at an awful lot of acreage. We're looking at determinations that are not exact. These are arts, they aren't total sciences and so we may generalize in some areas. But if we're going to get the job done and do it efficiently and economically, we're going to have to make some compromises. Those will be reflected in some of these guidelines that we've recommended. The first one is essentially saying we prefer to look at the total river system. We will quantify all of the acreage within the system. We will map it all. But when we start figuring the depletion, we are recommending that we only figure the depletion of those lands that were brought into irrigation after January 1, 1976. Essentially we need to account for the depletions since that time instead of figuring the thousands and thousands of acres that were existing. We will identify those areas that have been brought into service since January 1, 1976 and use that to determine the depletion. Is there any confusion or questions concerning number one?

Number two is how we determine the depletion from an individual crop. You estimate what the crop coefficient is or the evapotranspiration or the use that crop is going to have on water and you come up with an ET number in the equation. What we're saying in number two is that there are a number of different crops in each area. One area or one division may have 50 percent alfalfa, 20 percent corn and 10 percent grain, whatever. In Utah when we do an adjudication we award to that water user the highest use which is generally alfalfa, but in calculating the depletion we think we should look at cropping patterns that are reported through the agriculture statistics agencies. These usually are available on a yearly basis. What we're recommending is that we look at a division or a section to see what the cropping pattern is. There will be a certain percentage that will be alfalfa, corn, grain, etc. I doubt if in the upper division there's much alfalfa. But we will look at those crops and then we will weigh that coefficient to go into the equation so when we get new lands in that area, we don't go to the irrigator and say what's going to be your crop. If he says corn, we give it a figure and from now on that's the figure to use as the depletion. We will use that weighted depletion coefficient for that particular parcel of ground knowing that that cropping pattern will be rotated and will be used differently. In addition to that, we come to the question of supplemental sources after 1976. Some of the water may be supplemental. For example, if we're looking at 200 acres and 200 acre-feet of water in the application. This happens particularly in the upper division where someone will be awarded so much water, which is not a full supply for that acreage. We are recommending to the Commission that when this type of allocation is made by the individual state, that the depletion be calculated on how much water is lost and be credited then to the individual state. We'll look at how the block of water is awarded, and as if the block of water is a sole supply for something less than the intended acreage. Then it will be evaluated on what would be the depletion to that sole supply acreage, realizing that originally it is a supplemental source to a much larger track of irrigated acreage.

We are also recommending to the Commission that we authorize the technical committee to compare the data that is presently in the computer. We have 1986 or 1987 data that is already in the computer. You are going to be calculating the depletion that has happened since 1976. We think that we

should evaluate that and look at the depletions that happen in a ten-year period of time and then you can make recommendations to the technical committee or the state engineers committee as to the frequency that these depletions should be studied. We may find this will give you a handle to see how fast the water is being used by that individual state. So we think we should be authorized what the depletion was at 1986 as well as the acreage that was there in 1976. This will then give you an idea as to the frequency, should the depletion study be done every five years, or should it be done every ten years. The study may point out it should only be done every 20 years. But we need to establish a frequency so we can go back and revisit and find what's happening to it in the individual states.

HAL ANDERSON: This whole idea about frequency is something we discussed at length. There are several issues that need to be considered that I think that the Commission needs to be aware of. One is the procedures that will be used to determine the frequency. Since we're using satellite data as the basis we will probably have to look at additional satellite information to see where new lands have gone in and compare existing water right records from our individual states as another source of information. These are both sources of information that are going to help us determine what lands were added between 1976 and 1986, a change in detection of new lands that have been added that we will need to calculate depletions for. Those exact procedures haven't been totally developed, but they should be as a function of this exercise. Now the funding that is going to be necessary to do that, or the direction that's going to be necessary to do that, is going to have to come from either the individual states or from the Commission.

BOB MORGAN: In addition to what is described in number two, we are recommending to the Commission that the theory that is described in item number six, be moved and included in number two. I would ask input from either of the other state engineers if I say this wrong. But what we're recommending to include in number two is a methodology whereby the depletion can be calculated on a tract of land when the use of that land is changed. For example, you may have ground that is dry farmed that is then converted to irrigated. We know that originally the dry farm used water. There was a depletion to the system there. We know that when you move to irrigating that

land that was dry farmed you deplete more. The existing dry farm depletion was there and we do not believe that the individual state should have to go back and have that total depletion for the area, there should be a balance. In other words, we look at the depletion for the irrigated acreage and the depletion for the dry farm and subtract those, and the increased depletion allotted to that state would be the difference.

BOB MORGAN: That type of situation will have to be evaluated and addressed with this type of methodology.

REED DAYTON: It appears to me that this is really a tough assignment in determining the depletion because of the many factors involved, your evaporation, your temperature, your types of soils and so forth. It's a big thing and maybe I'm like the man who's said too soon old and too late smart. It appears to me it's a tough assignment to make a good, fair reasonable depletion allowance, to determine that.

BOB MORGAN: It occurred to me, why didn't the other state engineers address this in 1980, and I can see why. It is a tough job and these men are working with it every day. It's going to be tougher, because they're looking for guidance from us and yet they get up and start talking about these and showing these maps, but I don't understand part of their language. We have to trust them and yet I think we have to provide the guidelines. You can be assured that if something comes up, and it will, we're going to bring any of those items that are critical back to the Commission for your concurrence.

KEITH HIGGINSON: Mr. Chairman, I think we recognize this as not only a technical problem, but it's a semi-political problem as well and you think that this Commission is where you're going to have to make the final decision. We're going to have to from the technical input recommend evapotranspiration rates to be used in application against new acreage in arriving at a depletion. You're going to have to negotiate a number. Obviously, Wyoming's not going to accept the same number that you would use at Logan, and Idaho's not going to accept the same number that might be applied at Logan; but it's going to have to be negotiated by area and it may be that you could go to individual farm plots and say this farm plot was formerly dry

land farmed and here was a piece of land that was in native grasses. If you were going to be strictly technical about it, you would arrive at a different number for each one of those plots. I don't think this Commission wants to get into that minute detail in every area. I think you're going to have to arrive by area, by county or by something, at a number that you feel comfortable with; because you have the authority as a Commission to adopt the procedure that is used. So there is going to be some negotiation, political negotiation as well as technical input.

REED DAYTON: That's why I see it as such a complicated and tough assignment.

KEITH HIGGINSON: We're going to try to simplify it for you.

STEWART BUTTARS: You're probably aware, but the farm program that is now developing wet lands or putting irrigation land water on dry lands is almost going to be zero. If you're going to be in the program, there's going to be no more of that. So that consumptive use might be less than it has been in the past.

BOB MORGAN: Granted there may be a number of factors, but this is the recommendation that we're making to you for an all encompassing guideline that we use the differences as netting the total depletions for the state. This is the type of equation, although it's not formalized here. We would recommend that the technical committee use this equation.

REED DAYTON: Any one else have any questions or anything to add.

BOB MORGAN: Okay, we'll move on to number three and our recommendation right now is that this issue be deleted and we would like to address it in six months. Basically, what this is saying is that in determining evaporation and setting evaporation as a depletion within a different division, lake evaporation could be calculated and be determined the same as the depletion that is accounted for by alfalfa. If it was a new reservoir that inundated an alfalfa field, essentially the depletion would be nonexistent. If it inundated dry farm, then you would take the difference between what the

evaporation was and the depletion due to the dry farm. There seems to be some issue as to the new procedure because the Compact said it was a redistribution of storage rather than new storage. After meeting with the state engineers, our recommendation is that we tell you what our concerns are and we would worry about them for six more months and address them then. We'd like to look at it just a little longer.

Number four, since there is no differentiation in the Compact between surface and groundwater, it's considered one. What we're recommending to comply with what we had recommended for number one, is that those lands that were irrigated prior to January 1, 1976 be considered full service land. In other words, they have a full supply, really it's the only way we can balance the check book.

DAN ROBERTS: Wouldn't it be possible to have a law that would require the irrigation companies to report the new lands that come in under irrigation? Up in Idaho, as I understand it, we have stock companies and irrigation districts and with irrigation districts the water is assigned with the land. Stock companies you can trade it like you do horses.

BOB MORGAN: I think you can trade it, but I don't know about the water rights. But in Utah you may have a delivery area of 10,000 acres that an irrigation company, stock company, or whatever, can deliver water to; but within the definition of their water right they are only allowed maybe 7,000 acres that they can irrigate. You can move the stock within that 10,000 acres, but at any one time, you cannot irrigate more than 7,000 acres. I would assume that Idaho and Wyoming have the same situation. If there are new lands that come into development they should be covered by new applications.

REED DAYTON: Any other comments, questions?

BOB MORGAN: Number five addresses an issue of banking. Certainly any abandonment or loss of a water right within an individual state would be handled subject to the laws in that state. If it were a water right that pertained to lands that were irrigated prior to January 1, 1976 and that water

right had been abandoned voluntarily or for whatever reason, it is a forfeiture of that water right and that forfeiture is subject to the laws of that individual state. If that land was abandoned when the picture was taken in 1976 and it was not irrigated and then it comes back and is irrigated after that, we could not interpret the intent since it had been forfeited and it would be a pre-1976 water right. Since it had been abandoned it could not be counted as a pre-1976 land. It would then revert back and be a post 1976 land and would have to be accounted for under the new depletion.

WALLY JIBSON: Bob, wouldn't this be true even if it were not abandoned? If it were not irrigated on January 1, 1976, it may not be abandoned but it may never have been irrigated. So the same thing would be true.

BOB MORGAN: That's true. There will be instances when a municipality gains access to irrigated acreage for a development within that municipality. We then move the water off the irrigated acreage to some new acreage and the city takes over that land and they start to grow people on it and streets, roof tops, and driveways. What we're recommending is if that had been a pre-1976 depletion, that just because new acreage came into effect after 1976, it is with an old water right and is a replacement for pre-1976 acreage, that the individual state be allowed to bank that acreage until it is developed. If it is pre-1976 acreage that they be allowed to bank that acreage, essentially they get a negative depletion until that new acreage is brought under cultivation.

REED DAYTON: Any questions on this item?

NORM STAUFFER: On number four you talked about all lands presently irrigated prior to January 1, 1976, are generally considered full water supply. On number two you talked about supplemental water. When we talk about the upper division we've got Woodruff Narrows that supplies water to 40,000 acres. If we build Smith's Fork, it's going to supply several hundreds ~~of~~^{of} thousands of acres. How do you propose to go about that? I don't think you've addressed that here.

BOB MORGAN: I think Keith said the Utah approach to adjudication is that we look at the supplemental source and then equate what would be the depletion if that supplemental source would become a sole supply.

NORM STAUFFER: Wouldn't it be better to do a reservoir operations study on the total land pre and post project on a project of that magnitude? I don't think you want to cut that option out.

KEITH HIGGINSON: Norm, I think you'd have to do the operation study to determine what block of water you're talking about as a sustained yield from that project that would then go to the Utah adjudication methodology of determining how much can you serve as a sole supply, how many acres.

NORM STAUFFER: But the additional water may not be used at all some years.

BOB MORGAN: That's fine. You can't just look at it on an individual year. You have to look at how that project evolves. I don't think you could even represent it with a ten-year average. You're just going to have to look at it and say how would you equate that supply and what would be the sustained yield, what would be the demand on that. Essentially, you would eventually have to arrive at some way of evaluating, whether it's looking at the total life of the project, or seeing what has been the average supply to the acreage.

NORM STAUFFER: I understand both Utah and Wyoming State Engineers have allocated the storage and depletions to Woodruff Narrows. Are you going to go back and redo that under these new procedures?

KEITH HIGGINSON: Are you talking about pre-1976 allocations?

NORM STAUFFER: Both states have said what the allocation would be to that project.

BOB MORGAN: It becomes a house cleaning type thing. If we have over allocated it and we're reaching that point where we're getting to the allocation, we'll cut it off. We're open for suggestions here. If you want

us to go back and look at it, we can make that a subject that we should address and report back to you in April.

LARRY ANDERSON: How important is it that we adopt some tentative procedures today so that the group that is doing the depletion study can complete their work. Do they need some direction?

BOB MORGAN: They do need the direction. The evaporation issue is not going to be a critical one. We can address that in April and give them guidelines. What's going to happen is that they come to bodies of water that are post 1976, and they will just leave those areas blank until we give them some guidance next year. What it will also mean is, if we have post 1976 depletions that have been allocated they will not evaluate those areas until we give them some direction. They can continue with the study and they will identify acreages, it is just that they won't be able to put the numbers on those until we give them some guidelines.

ED SKEEN: Bob, how are you handling applications that were pending on January 1, 1976, not certificated, just pending. How are you going to treat that?

BOB MORGAN: I think if that land was not irrigated prior to that date -----

ED SKEEN: There is still a right that will be developed presumably when the application is completed and certificated. On January 1, 1976 there may be no lands under irrigation on that date, but there'd still be an approved application that under the state law would have to be considered.

BOB MORGAN: My understanding of the Compact is that irrigated lands, not water rights is reference to lands that are irrigated and depletions that were in existence as of January 1, 1976. If my interpretation is right, I would say that for depletion, even it were not developed January 1, 1976 and in full operation, we would have to count it as our depletion after that.

WALLY JIBSON: The way the Compact is worded, it says rights to water first apply to beneficial use on or after January 1, 1976. So that water right just hasn't been applied to beneficial use. It's nonexistent.

KEITH HIGGINSON: It's chargeable under the new Compact allocation.

JOHN TEICHERT: There are a few places where there may be a lapse during that. The land had been irrigated, but maybe they weren't irrigating in 1976 but they were.

BOB MORGAN: That's one thing that these guys have to be careful about. If there is evidence of irrigation prior to 1976 and the forfeiture issue is not there, then it would be a pre 1976 water right. Even though the application is in existence for a water right, if the land is not developed and the water not put to beneficial use, I think the Compact is clear that it has to be allocated post 1976.

DAN ROBERTS: It seems to me that if it's like the company I'm with, the real nitty gritty of the thing is that he's been paying for an application with the canal company, he's on record as paying for that prior to that date, and he's received water, that would be the point, wouldn't it?

BOB MORGAN: If he's received water and put it on the land.

DAN ROBERTS: And paid his assessments.

BOB MORGAN: I don't care if he's paid his assessment or not, that's a personal item with that company.

WALLY JIBSON: Water rights whether he's paid his dues, it's just whether that water has been applied to beneficial use prior to that date.

CAL FUNK: I move that we adopt the Engineer's Report and more specifically that we adopt these six points, less number three, that Bob has just enumerated as guidelines for the technical committee for them to work with and

see if there's any adjustment needed with the eye to them ultimately becoming part of the Commission approved process for determining Compact depletions.

REED DAYTON: In other words, if I understand you correctly, we'd approve the report that's been given with the recommendations that he has made?

CAL FUNK: Yes. As guidelines for the technical committee at this point and looking ultimately toward a Commission approved procedure for determining depletions.

DAN ROBERTS: I'll second that motion.

REED DAYTON: All in favor please say aye, opposed if there are any?

MOTION CARRIED.

BOB MORGAN: Thank you, Mr. Chairman. What we'll do, if it is permissible, we'll call then the interim guidelines and he's saying I'd better write something up and circulate it to them and then we will get it to you.

LARRY ANDERSON: To assist in putting the minutes together, I would hope the motion would include a revised set of conclusions and recommendations as Bob has addressed them here, that you'll prepare those and we'll include those as part of the minutes for the Commission.

REED DAYTON: Since we began these reports, Mr. Hill has shown up and we'd like to hear from you, Robert Hill. And the two gentlemen that came in late, I wonder if you'd introduce yourselves please.

LES DIXON: I'm with the Army Corps of Engineers and this is my associate Paul Keil.

UPDATE ON CONSUMPTIVE USE STUDY

ROBERT HILL: I assume that the members of the Commission have a copy of this brief status report that we put together. (Copy attached to these minutes.)

If we could, for the record, refer to the first page of this status report which summarizes where we're at at the present time. I'd like to read from the last two paragraphs indicating that we're now completing the final field work which has to be done with each lysimeter. We covered the lysimeter with plastic, filled it with water, and the water was pumped out periodically every Friday or Saturday and every Tuesday since about the first of October. So we had several weeks of pumping water out and coming back and taking a reading trying to get an estimate more accurate than our guess on what the specific yield was in the lysimeter. If the water table drops ten inches, how many inches of water does that really represent coming out of the soil profile as we remove the water pressure. The last readings on that determination were taken Saturday. Preliminary estimates indicate that the specific yield is about three to five percent and we have been assuming ten to twelve percent. So the numbers given on the last page of this status report are going to be revised somewhat. The studies we have yet to complete before the final report include the calibration of the empirical ET equations, which is dependent upon our completing the lysimeter analysis and then the demonstration of the use of these equations to illustrate how we could calculate the duty of water. We have selected, in consultation with Wally and others, the water years of 1976 to 1986, which means we'll obtain historical data from the weather stations available to us in the upper Bear, Evanston, Woodruff, perhaps Randolph, Montpelier, and Hilliard. The Evanston weather station was closed out, so we've had to estimate data for the last year and a half and some months prior to that. We'll then use some acreage figures either available from the Commission from one of the technical committees up-to-date as of 1976, or as a fall back position we'll use the 1965 land use mapping that was done as part of the Bear River hydrologic inventory. That's essentially the essence of where we're headed and where we have yet to go.

LARRY ANDERSON: As I remember, you're through with all your field work, now it's just matter of putting your report together. You are supposed to have a report to us by April.

BOB HILL: April 1 is what we agreed upon as a due date for the final report. We're hoping to have a draft ready for Wally to particularly look at and maybe

the state engineer's offices if they would like to look at it prior to that, I don't know if that will be ready by the end of January or middle of February.

LARRY ANDERSON: I think it is important that we have your report out so we can get it to the commissioners prior to our next meeting. If it's going to be through by April 1st, then you would come in at our next meeting and give as much detail as you want, and answer questions that we may have as to what you've learned in the last four years.

BOB HILL: That's correct. I would like to make a comment. I believe Keith commented something about the duty of water being different at Hilliard as opposed to Randolph and as opposed to Montpelier. If you look at the last page, in 1987 we had 29 inches of estimated water use in Hilliard, 29.3 at Randolph and 30.8 at Montpelier.

KEITH HIGGINSON: I compared Logan to those.

BOB HILL: I don't have Logan anywhere here. I don't know what it would be at Logan. We do have a study going on at Logan, but it's not far enough to compare.

KEITH HIGGINSON: That raises a question. As a result of this study, are we going to have ET figures for the entire basin or only from these three sites?

WALLY JIBSON: We have these three sites, but you have a lot of data at Soda for instance, and at lower areas of the basin, do you not?

BOB HILL: As far as the actual lysimeter measurements, we have them at these three sites. Now we have lysimeters in Cache Valley we're using to determine ET for cattails, willows, bull rushes, alfalfa and grass that perhaps you could call a related study, but a separate project. We could use that as calibration. As far as temperature data goes, we have only the detail data from these particular sites.

WALLY JIBSON: I was thinking of the sites we visited west of Soda.

BOB HILL: You're thinking of Talmage. The site that Idaho was looking at on irrigated and non-irrigated.

WALLY JIBSON: I've been assuming that we'll project this information down there to the lower basin without having to run another study on it.

WES MEYERS: Does this upper river data apply to the different type of agriculture on the basin farther down? Down below Bear Lake you start running into cash crops and all sorts of things where up above it's just basically grass production. I've asked the same question several times and never got an answer yet, why we were studying the upper area only and not the whole Bear River basin.

DAN ROBERTS: What is that station on Bob Gettison's place.

WALLY JIBSON: I don't recall. Mr. Chairman, in partial answer to Wes and I know we haven't definitely answered this in the past, but in relation to time we're more concerned with the upper basin than we are with the basin between Idaho and Utah. They have block allocations and we eventually will have to know what these depletions are, but we're not pressed with limitations other than the large block applications, whereas above Bear Lake we have limiting depletions that could become important in the next few years. We don't know how many years before we'll approach these limitations that are given in the Compact. To me it is more important to get this data first for the basin above Bear Lake. I don't know whether other commissioners agree with me on this, but I think we have to come to an accounting earlier in the basin above Bear Lake than we do the basin below Bear Lake. But eventually we'll have to use this same process to determine depletions between Idaho and Utah.

WES MEYERS: Is that because of a more limited water supply?

WALLY JIBSON: The Compact limitations on the depletion allowance.

WES MEYERS: Does the depletion allowance apply to all lands equally or are we looking mostly after 1976.

WALLY JIBSON: All we're concerned with the depletion allowances is the increase after January 1, 1976.

WES MEYERS: Isn't there a greater increase in irrigated land below Bear Lake than there is above Bear Lake.

WALLY JIBSON: Probably so, but the Compact allocates in the area below Bear Lake the first 125,000 acre-feet of depletion is allocated to Idaho. The second 275,000 acre-feet is allocated to Utah. That's depletion in both cases, but this doesn't mean that Idaho has to develop that 125,000 first, it means that they have priority on it over Utah for the first 125,000. But this is a relatively large depletion as compared to the depletion allowances under the Compact in the basin above Bear Lake. To my way of thinking it is more important to get a handle on that depletion above Bear Lake right now than it is below Bear Lake. Not that we won't have to do it later.

WES MEYERS: Is the information you're getting more of a tool for allowing water rights, or is it going to be developed to a perfection so that it is a regulating tool as the available water drops?

WALLY JIBSON: Well, I don't know if I can answer that Wes just the way you want it. It merely will tell us you have so much depletion allowed above Bear Lake. Wyoming has so much, Utah has so much and the section of Idaho above Bear Lake. Utah and Wyoming have 13,000 acre-feet each, that's depletion, that's not diversion to storage. Because that's relatively small compared to the depletion allowed in Idaho and Utah down in the lower basin, we need to get a handle on that quicker. For instance, as Bob Morgan suggested, we're ten years down the road and we ought to have a determination now of how much increased depletion there is. So I think it's more important to the Commission that we can calculate that for the areas above Bear Lake at this time than for the areas below Bear Lake. Not that they're being penalized or being limited except by the Compact. It probably doesn't answer your question.

WES MEYERS: I've said before that we're going to wander aimlessly for quite a while before anything works. Now it was brought up that you needed a ten year average or possibly a 20 year average before you can use this and then if next

year's a dry year, we haven't got anything to use. We just go along like we've been doing no matter what the depletion is until we get some experience. As you know I never could understand what this was all about anyway.

JOHN TEICHERT: I've got a question on table two, these lysimeter readings would be depletion.

BOB HILL: Let me qualify table two. This is our estimate based on an assumed specific yield of the lysimeters. As I commented we assumed ten to 12 percent and it's looking at more like three to eight percent probably. I've got the final numbers, so these numbers will probably change. I was surprised to see that they're all about the same this year and we've had an unusually long growing season. It's almost warmer up in Hilliard Flat three or four weeks ago than it was down in Montpelier, so some interesting things have happened there. There's two questions I hear Wes asking. When I met with Bob Morgan and Bob Fotheringham earlier this year, the same sort of question came up. As I see it there are two issues, one of which is a duty of water which applies to an allocation of water to acreage that may be in existence or may come into existence. For that number we may be looking at a ten year average and it may be two acre-feet in a certain area. That means for 100 acres of irrigated land there would be a 200 acre-foot of water depletion charged against the allocation in the Compact. On the other hand, Wes, I hear another question of yours, we're charging along in 1988, we get down into the end of June and it's a dry year and all of a sudden it looks like our depletion is going to exceed what would be allowable under the Compact. Can we deal with the operational aspect of it. The answer is yes, if we pay the price and the price is going to be near real time information. At Randolph we put our weather station on a telephone line so we can call it up every midnight and get information down off the weather station. On a weekly basis, we feel pretty good about calculating crop water requirements to help irrigators that are pumping water in other parts of the state, manage their irrigation water, how much water should they be irrigating this week and so on. We could do a similar thing in the Bear River, the whole Bear River system if we wanted to do that or needed to do that. Wally knows that we placed a station at Border that has the same weather information that we have at Randolph, Hilliard and Montpelier with the

addition of a depth sensor there at the Border gage. Last summer or early spring we showed Wally how he could use a PC to dial up a memory bank on our campus and get data from the satellite from that station on Border and we also have one at Smith's Fork. So Wally could come in every four hours and see what the flow rate is at those two stations. So we could go near real time if the Commission wanted to go that route for operation studies. I don't see that as part of our study. We did it as kind of an interesting thing to try out.

WALLY JIBSON: Bob, I mentioned that in my report to the Commission.

BOB HILL: So that could be a possibility to go near real time. The two questions then, is the duty of water which is the long-term sort of an estimate and the other issue is the operation. Back to your question, John.

JOHN TEICHERT: The question I had on this Bob, this depletion I just don't understand the difference between 1984 and 1987 if this represents depletion.

BOB HILL: There's seasonal length differences there and in 1984 we were trying to track the water table. When they dried those meadows up getting ready to cut we dried our lysimeters up. This year we didn't do that. We maintained the water table high. I have some slides to show what the conditions looked like in early September this year. Those lysimeters looked a little bit greener than they did in the surrounding area and this was only the tenth of September. Things were still growing into October. We had a long season and we deliberately held that water table high. That's the difference in part between 1987 and 1984. We got caught in 1985 when we dropped the water table too fast in the lysimeter in Montpelier, and we ran down below the roots and essentially wiped out one and almost two lysimeters because we dried it up trying to track the water table. There's another issue that's something we've got to deal with from the technical side as we analyze the data, is how do we interpret this information. I think we'll come back to the Commission informally, maybe to Wally and the state engineer's office prior to the final report and say here's how we can see some possibilities. This might be what we recommend, but here's some alternatives. As you can see, if we have a long growing season and keep things wet, there's a really high potential up there for depletion in the Hilliard Flat again.

KEITH HIGGINSON: It just occurs to me that the Commission is not going to have everything it needs to adopt a Commission approved procedure until we have ET numbers for every sub-area that you choose to select. I see that there may be as many as seven or eight different sub-areas within the Bear River basin that you may want to set some kind of an ET figure for. This information may help you in the upper basin where there hasn't been a whole lot of other research data available, but as you come down into Soda and Grace and Preston and Logan and Box Elder County and Malad area, it may be that you need to have a similar number maybe not derived from new research, but derived from already existing data for each one of those areas so that you then can crank it into your procedure, I think that's what Wes is asking for. I don't think you can adopt a procedure that you will apply only to the upper basin and then ignore the rest. I don't think we can do that on an interim basis or anything else. I think you've got to adopt a procedure that's applicable to the whole basin.

WALLY JIBSON: The question I was going to ask Bob was essentially what you asked. How much existing data will we have in the more diversified types of farming from Soda down, that we can use without doing additional field studies.

BOB HILL: There's a fair amount in Cache Valley that might depreciate because of our experimental station work there in Cache Valley. In fact, we've run irrigation and water use studies on corn, wheat, alfalfa, dry beans and potatoes at Logan, the same studies we're running in Kimberly, Idaho and in Kaysville. So we have three sites with exactly the same experiment. This was in 1980, 1981 and 1982, plus there have been other studies on water use and yield and irrigation relationships in Cache Valley. If we could assume that the base equation calibrated to the alfalfa water use would be transferable up into the Soda area, or over into the Garland-Tremonton area, and if we could use crop coefficients derived at Kimberly, Idaho, then we can, with weather data, calculate depletions or crop water use in the other sub-basins. In fact we are attempting to make that same approach over in Tremonton where we have another one of these weather stations similar to what we've had in the upper Bear.

WALLY JIBSON: These weather stations will be more or less permanent fixtures.

BOB HILL: Some will.

WALLY JIBSON: Some will, but they'll cover the lower basin. We're talking about what we've got now in the upper basin.

BOB HILL: We'll have Cache Valley, Box Elder area, and Randolph covered as far as our agricultural weather station network for the state. That leaves Hilliard, Soda, and Montpelier. There is some discussion about whether we can make Montpelier a permanent station as part of an activity Idaho and the Bureau of Reclamation and others might have.

CAL FUNK: I've got the understanding that we had a difference in data at the starting point, and because of the type of use of irrigation water in the upper basin, we didn't know how much was really consumptively used where you turn this huge canal over the meadow and you don't measure what comes in. Down in our area there's a record of cropping patterns and I understood from Bob Hill the other day the part of my farm that's up on the hill and gets supplemental water will have a different depletion allowance than the part down in the bottom that has a full supply. The crop history, how much is alfalfa and how much is grain, will have different numbers rather than saying just because its called irrigated land it'll all have the same depletion, because that much water hasn't been put on. It goes back to what Dan just said, the diversion is the depletion in the situation he described. So I think we've got a different starting point on data in the upper and lower basin. I thought that's why we were trying this lysimeter work was to find out just how much it took to keep that meadow land green, how much was depleted.

BOB HILL: My understanding of what the contract was for was the latter purpose you stated, to find out how much water was being used by those wet meadows. It is difficult for us to estimate from other means, so the lysimeters were put in. Also up in Hilliard there's no alfalfa that we could find that survives very long. At the JF Ranch there is alfalfa adjacent to where we have our lysimeters and we put neutron access tubes in that field,

two of them, to a 10 foot depth. We're looking at the alfalfa water use there under the umbrella of this study, but not reported as part of the lysimeter data. That's where we will hope to check, the calibration of some of the equations against that alfalfa when it is fully grown. In the Talmage area we had the same sort of thing happening with the access tubes in alfalfa and dry land. At Bancroft we had access tubes in dry land alfalfa. Those stations were closed out a couple of years ago and we backed off on the scope of the study and just went to the three sites. In Cache Valley we've had several studies over a period of time. I don't think it's my position to recommend what we do about the bench lands versus the bottom lands. That's a different issue than what we're trying to deal with.

LARRY ANDERSON: We're all anxious to see the data that Bob has developed from this study. I think that's going to generate a considerable amount of discussion with the technical entities in the states, and I would suspect that we'll have to come back to the Commission with some additional suggestions on what needs to be done. So the report that Bob's going to come up with will give us a chance to review and get the three states involved early. We may then be able to come back to the Commission in April with some recommendations of what, if anything else needs to be done.

BOB HILL: I've got a question. We can make two assumptions. We can dry things up at the beginning of August prior to the cutting of the meadows in the middle of August. That was the assumption we used during the first couple of years. We got hurt on that because we got below the roots. The meadow roots just weren't down as far as we thought they were. The last year, 1987, we kept things wet and that's different than what happens in the real field situation. We've got to wrestle with that in a technical sense. What would be the suggestion from the Commission. We can give you both alternatives.

HAL ANDERSON: Obviously you want to duplicate the real world. You're trying to estimate water use.

BOB HILL: There are some years when they have water in the fall and come back and put it on, so the real world changes a little bit. I Appreciate that our lysimeters aren't the real world. We disturb things when we put those in.

WALLY JIBSON: I think we'll have to determine that. The only thing I can say is in our studies for the Compact, we did use a cut off date in figuring full service or full water supply to those lands up there. We studied it various ways, but we did use a cut off date. In many of our studies we used July 15th with the understanding that there was basically no water applied afterwards. Though we know that some fall pasture water is applied, but I think that's something we'll have to determine later.

BOB HILL: I think we can give you both alternatives. We will also come in with maybe three or four different equations that show the ramifications of using each of those different equations. So from the historical sense we might say here's what would happen if we used each of those equations. Here are the results but we can't make a decision for you on that. But if you said use that particular one, we could make a decision. .

HAL ANDERSON: Does that mean Bob that we won't be able to use the information from the previous years to come up with a mean since you operated differently this year.

BOB HILL: There are a couple of things that happened at Montpelier, for example. Remember we had the problem in 1985 with drying up the lysimeters, the site change, and so on. We put two new lysimeters in, and in 1986 you see the effect of a short season. I've shown data starting the first of June when the new ones went in through the remainder of the season. The new ones lagged behind the two old ones, but in 1987 the two new ones were ahead of the old ones. We've got to look at that and go back to see what that means to us if we go back in time.

HAL ANDERSON: Do you think you could determine if you have dried it out what would be the real use.

BOB HILL: Yes, we can determine I think from 1987 what the use would have been.

REED DAYTON: Any other comments or questions. If not, all those in favor of the report by Mr. Hill, please say yes, opposed if there are any?

MOTION CARRIED.

REED DAYTON: Thank you Mr. Hill. We will omit temporarily number eight and comment from Mr. Anderson, an introduction.

LARRY ANDERSON: Mr. Les Dixon is with the Corps of Engineers in Salt Lake City. He's relatively new to this particular office, and we're glad to have him here with us. I believe he has met with each of the states about a flood control reconnaissance study the Corps of Engineers is proposing to make on the Bear River. Les, if you would go ahead and summarize what you want to do.

FLOOD RECONNAISSANCE STUDY
CORPS OF ENGINEERS

LES DIXON: In 1986 Congress authorized the Corps of Engineers to conduct a reconnaissance study of the Bear River basin and asked us to look at the need for flood control and related purposes on the river basin. As was stated, I met with the states' staffs. If we are funded this year, and we anticipate receiving approximately \$400,000 from Congress, we hope to initiate a reconnaissance study. A reconnaissance study from start to finish has to be completed within 12 months. The purpose of this study is to determine whether there is a federal interest in assisting the three states in developing flood control projects and related projects on the river system. With that I'll turn it over for any questions if you have any.

LARRY ANDERSON: I think it's important to realize this study was placed in the 1986 legislation because of all the flooding that was taking place in the Great Salt Lake and Bear River. We have requested, by letter to the Corps of Engineers, they begin that study. We felt it was important that all three states be involved. The Corps will look at data that has been developed in the different states, as well as new data that they may develop that could be useful to us. We want to be able to direct them in their study so the information that comes back will be available not only to the three states, but also to the Commission. The information that comes out of the study will be of interest, and there may be a possibility there is a federal interest in

developing some project on the Bear River that's associated with flood control. In addition to flood control benefits, we may be able to look at water development, recreation and other potential benefits, but the main emphasis is in flood control.

REED DAYTON: Any other questions you'd like to direct to Mr. Dixon?

JEFF FASSETT: Do you have a formal scope of work or a plan prepared at this point as to what you're going to be doing?

LES DIXON: No we don't. What we will be doing as Larry stated is we don't want to repeat work that you've already done. We'd like to build on any work that you've already done, and we'd like to concentrate on those areas that all three states feel there is a potential for a project and kind of keep the scope as narrow as possible.

KEITH HIGGINSON: What are the prospects for funding? Where are you on the funding cycle.

LES DIXON: We're still waiting on Congress to pass the budget for this year. We were in the President's budget. We were in the House's version of the budget, and we were in the Senate's version of the budget. All three for \$400,000. I don't know what Gramm-Rudman will do to that, but I'm highly confident that we will receive funds.

WES MEYERS: We in Wyoming have a water development program, and I was wondering how that would mesh into our projects that have been talked about on the Bear River, namely Smith's Fork and the West Fork of the Bear River. We have a site there in Utah so it is probable we could work out something so that we could extend our projects to work in with this flood control deal?

LES DIXON: Very possible.

WES MEYERS: I think you talked to Mike Purcell, at a meeting in Salt Lake a few days ago, is that correct?

LES DIXON: That's correct.

WES MEYERS: Mike and I work on the Wyoming Water Development Commission together. I would say we are interested in at least those two places. There are more sites, namely the Yellow Creek site and the Coyote Creek site in Uintah County where Utah has talked for years of developing water to send down to the Wasatch Front. You'd have to talk to them about what their plans are because I'm not up-to-date. I think you have hit a responsive nerve and we'd like to pursue it.

LES DIXON: I have met with the staffs of all three states. I was highly impressed with the staffs and all three staffs encouraged us as far as potential projects.

REED DAYTON: Thank you very much, Mr. Dixon. We have some resolutions that we thought we'd like to present. One by the State of Wyoming by our State Engineer Jeff, and one for Idaho by Dan Roberts. Then Mr. Anderson has a presentation to be made.

JEFF FASSETT: I'll go ahead and read the resolution that we have to offer today which concerns the past service of George Christopoulos as Wyoming State Engineer. (A copy of the Resolution is attached to these Minutes).

DAN ROBERTS: I'll second the motion.

REED DAYTON: All in favor of this please make it manifest by saying aye, opposed.

MOTION CARRIED.

DAN ROBERTS: I have a resolution here from the Idaho group in appreciation by the Bear River Commission regarding A. Kenneth Dunn. (A copy of the Resolution is attached).

CAL FUNK: Second.

REED DAYTON: It's been moved and seconded that we accept this resolution, all in favor say aye, opposed if any.

MOTION CARRIED.

LARRY ANDERSON: At the direction of the last Commission meeting, we were asked to prepare a plaque for both Ken and George. We've worked closely with the States of Idaho and Wyoming in preparation of those plaques. We'll give the plaques to Jeff and Keith to take back and make the presentations to George and Ken at a convenient time. We hope the plaques meet with your approval. We have made arrangements with a company here in Salt Lake that can make the plaques. We just need to know a month or so in advance and we can make any others that may be required.

REED DAYTON: Is there any unfinished business at this time.

LARRY ANDERSON: Mr. Chairman, I have a letter I'd like to pass out. (Copy attached to the Minutes.) This is from Chairman Kenneth Wright indicating first of all that he would probably not be able to attend this meeting, and secondly he provided a list of questions he would like to see raised by the Commission. What I would suggest since Mr. Wright is not here, is that each state separately get together with their Commission members to review the letter by Mr. Wright, and make a determination as to whether or not they think those are critical items that need to be addressed by the Commission. The states can either send back a letter to Mr. Wright, or the three states could get together and prepare a joint letter, or we could put in on the next agenda in April for further discussion. I didn't feel comfortable about making any recommendations that committees be set up at this time. I felt that was really a decision the states should make and inform Mr. Wright of their decision. I would make that as a motion.

DON GILBERT: Second.

REED DAYTON: It's been moved and seconded that we accept this, all in favor please say aye, opposed if there are any.

MOTION CARRIED.

REED DAYTON: Is there any new business to be considered at this time?

LARRY ANDERSON: Again, Mr. Chairman, if you'll note on your agenda we've got the next meeting of the Bear River Commission scheduled for April 18, 1988. We have scheduled that for 11:00 a.m. We moved this meeting up so Mr. Wright could come and he was still unable to make it. I believe 11:00 a.m. is the time Wyoming needs so they can fly in that morning and still make it here in time. If there are problems we can certainly reschedule the time and date of the meeting.

I remind you that Wally has brought down the fourth biennial report of the Bear River Commission. We would like each state to take a couple of packets home with them or as many as they need. We'll keep some here at our office, and I'm sure Wally will take the rest back with him. Would each state mail them to their own Governor.

NANCY FULLMER: We sent out a mailing list of those who should get the Bear River Commission notices, I just wondered if any of you had any corrections. We'll assume everything is right and mail them out because I've had a lot of requests for them.

LARRY ANDERSON: Could I just indicate we appreciate the committees getting the information to us in advance to send out to the Commission members. If the Commission members like that information in advance, you might let the committees know. It puts a little more pressure on them to get their meetings over in advance and get the information out. I think it makes our meeting move along a lot quicker, and I believe we're much better informed and prepared for the meeting if that data can be sent out in advance. We'd like to do that again and ask Bob Hill and Bob Morgan to have information to me in advance of the meeting so we can send it out.

REED DAYTON: Is there a motion for an adjournment.

ROD WALLENTINE: I move.

CAL FUNK: Second.

REED DAYTON: Moved and seconded, all in favor say aye, opposed. Adjourned until April 18, 1988 at 11:00 a.m.

MEETING ADJOURNED AT 12:15 P.M.

ATTACHMENTS

Summary of Minutes

Treasurer's Report

Engineer-Manager Report

Bear River Basin Base Mapping - 1976 Depletion Study

Recommendation for Adoption of Deletion Guidelines

Update on Consumptive Use Study

Resolutions

George L. Christopoulos

A. Kenneth Dunn

Letter from Chairman Kenneth Wright

Remarks given at Bear River Water Seminar

BEAR RIVER COMMISSION

ANNUAL MEETING

April 13, 1987

Summary of Minutes

The Annual Meeting convened at 8:00 am in Salt Lake City. Introductions included Lee Case, Successor to Ted Arnow, USGS; Cal Funk, new Commissioner from Lower Utah to replace Paul Holmgren, and Glen Nelson, President of Bear River Canal Company, to serve as Alternate in place of Cal Funk. The chairman announced that the Great Salt Lake pumping trip would begin at 10:00 am. Minutes of the 11/86 meeting were summarized and approved with minor corrections.

The Engr-Mgr report indicated that a dry season could be expected in 1987, down to 44 percent from Smiths Fork and 60-80 percent in other areas. (Actual runoff was in the 45 percent range in all areas.) Budget estimates were presented for fiscal years 1988 through 1990. Final year of contract with USU is for \$36,120 through 6/30/87, but additional field data will be collected through 1987 season with final report due April 1, 1988. (\$27,090 payable in 1987, \$9,030 payable in 88) A 2-year contract is now in effect between Commission & States for depletion studies to implement operation of the Compact. Total of this agreement is \$91,920 with expected carryover from 1988 of \$50,000 to be divided equally between 1989 and 1990.

Bert Page reported for the Treasurer indicating a cash balance of \$161,611. A question was raised on interest on surplus funds which Bert explained was invested by the State Treasurer with other State funds.

The approved assessment of \$30,000 per State per year was reduced to \$25,000 for 1988~~9~~ & 1990. Reserve of about \$100,000 is projected to June 30, 1990.

The State Engineer's technical subcommittee reported on progress of work on depletion studies which is about on schedule. A rough draft of water-use map should be available for the November meeting.

Bob Hill was not present but asked the Mgr to report briefly on the consumptive use study. Mini-weather station at Randolph is in continuous operation with those at Montpelier and Hilliard about ready to start up for the season. Mention was made of the satellite transmission of gage heights from the Smiths Fork and Bear River at Border gaging stations. (These readings were a big help in this dry year.)

It was suggested and agreed to get special committee reports out a few weeks ahead of meetings for study.

Larry Anderson reported that a plaque had been presented to Paul Holmgren at his home. (Most commissioners are aware that Paul passed away this past summer.)

Larry Anderson suggested that the engineer's committee report in November on developing of commission-approved procedures. Reed Dayton was re-elected as Vice-Chairman and Larry Anderson as Sec'y-Treasurer.

Ken Dunn mentioned a letter he would hand Carly Burton concerning implications of subordinating hydro water to irrigation in Bear Lake.

We were briefed on the SL pumping program & meeting adjourned at 9:20

BEAR RIVER COMMISSION

STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF JULY 1, 1986 TO JUNE 30, 1987

INCOME	CASH ON HAND	INTEREST INCOME	FROM STATES	TOTAL REVENUE
Cash Balance 07-01-86	\$129,873.12			\$129,873.12
State of Idaho			\$35,000.00	\$35,000.00
State of Utah			\$35,000.00	\$35,000.00
State of Wyoming			\$35,000.00	\$35,000.00
Interest on Savings and other income		\$8,632.11		\$8,632.11
TOTAL INCOME TO June 30, 1987	\$129,873.12	\$8,632.11	\$105,000.00	\$243,505.23

DEDUCT OPERATION EXPENSE

EXPENDED THROUGH U.S.G.S.

	APPROVED BUDGET	UNEXPENDED BALANCE	EXPENDITURES TO DATE
Stream Gaging	\$65,190.00	\$0.00	\$65,190.00
SUBTOTAL	\$65,190.00	\$0.00	\$65,190.00

EXPENDED THROUGH COMMISSION

Personal Services	\$8,600.00	\$1,952.75	\$6,647.25
Travel	\$400.00	\$226.98	\$173.02
Office Expenses & Supplies	\$250.00	-\$138.02	\$388.02
Treasurer Bond & Audit	\$650.00	-\$25.00	\$675.00
Printing and Reproduction	\$100.00	-\$98.70	\$198.70
Legal Consultant	\$500.00	\$0.00	\$500.00
Contract-USU	\$27,090.00	\$0.00	\$27,090.00
Contract-Idaho, Utah & Wyoming	\$50,000.00	\$29,567.97	\$20,432.03
SUBTOTAL	\$87,590.00	\$31,485.98	\$56,104.02

TOTAL	\$152,780.00	\$31,485.98	\$121,294.02
CASH BALANCE AS OF 6-30-87			\$122,211.21

BEAR RIVER COMMISSION
 DETAILS OF EXPENDITURES
 FOR PERIOD ENDING JUNE 30, 1987

140	WALLY JIBSON	\$1,197.58
141	VAN COTT, BAGLEY, ETC.	\$500.00
142	U.S.G.S.	\$65,190.00
143	U.S. POSTMASTER	\$22.00
144	STATE TREASURER	\$100,000.00
145	GILCHRIST & CO CPA	\$625.00
146	WALLY JIBSON	\$1,569.75
147	KENNETH WRIGHT	\$233.46
148	STATE OF IDAHO	\$9,120.00
149	THE PRINT BROKER	\$198.70
150	HILLER INDUSTRIES	\$40.00
---	BANK CHARGE	\$13.24
151	FENTON INSURANCE AGENCY	\$50.00
152	EROS DATA CENTER	\$660.00
153	MILE POST INN	\$79.32
154	WALLY JIBSON	\$2,336.21
155	UTAH STATE UNIVERSITY	\$27,090.00
156	UTAH DIVISION OF WATER RI	\$10,592.03
157	WALLY JIBSON	\$1,716.73
158	EROS DATA CENTER	\$60.00

		<u>\$221,294.02</u>
	LESS SAVINGS ACCOUNT	\$100,000.00
	TOTAL EXPENSES	<u>\$121,294.02</u>

BANK RECONCILIATION

JUNE 30, 1987

Cash in Bank per Statement 6-30-87	\$11,418.00
Less: Outstanding Checks	\$1,776.73
Total Cash in Bank	<u>\$9,641.27</u>
Plus: Savings Account-Utah State Treasurer	\$112,569.94
TOTAL CASH IN SAVINGS AND IN CHECKING ACCOUNT	<u>\$122,211.21</u>

BEAR RIVER COMMISSION

STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF JULY 1, 1987 TO OCTOBER 31, 1987

INCOME	CASH ON HAND	INTEREST INCOME	FROM STATES	TOTAL REVENUE
Cash Balance 07-01-87	\$122,211.21			\$122,211.21
State of Idaho			\$0.00	\$0.00
State of Utah			\$30,000.00	\$30,000.00
State of Wyoming			\$0.00	\$0.00
Interest on Savings and other income		\$2,699.13		\$2,699.13
TOTAL INCOME TO October 31, 1987	\$122,211.21	\$2,699.13	\$30,000.00	\$154,910.34

DEDUCT OPERATION EXPENSE

EXPENDED THROUGH U.S.G.S.

	APPROVED BUDGET	UNEXPENDED BALANCE	EXPENDITURES TO DATE
Stream Gaging	\$35,680.00	\$0.00	\$35,680.00
SUBTOTAL	\$35,680.00	\$0.00	\$35,680.00

EXPENDED THROUGH COMMISSION

Personal Services	\$8,600.00	\$7,210.84	\$1,389.16
Travel (Eng-Mgr)	\$400.00	\$347.52	\$52.48
Office Expenses & Supplies	\$250.00	\$169.50	\$80.50
Printing Biennial Report	\$2,500.00	\$2,500.00	\$0.00
Treasurer Bond & Audit	\$700.00	\$700.00	\$0.00
Printing and Reproduction	\$100.00	\$100.00	\$0.00
Legal Consultant	\$500.00	\$500.00	\$0.00
Contract-USU	\$9,030.00	\$9,030.00	\$0.00
Contract-Idaho, Utah & Wyoming	\$71,537.97	\$71,537.97	\$0.00
SUBTOTAL	\$93,617.97	\$92,095.83	\$1,522.14

TOTAL	\$129,297.97	\$92,095.83	\$37,202.14
CASH BALANCE AS OF 10-31-87			\$117,708.20

BEAR RIVER COMMISSION
 DETAILS OF EXPENDITURES
 FOR PERIOD ENDING OCTOBER 31, 1987

159	NANCY FULLMER	\$21.20
160	U S G S	\$35,680.00
161	WALLY JIBSON	\$1,441.64
162	UTAH DIV WATER RIGHTS	\$2,480.79
163		\$0.00
164	TROPHIES, INC	\$59.30
		\$39,682.93
	LESS SAVINGS ACCOUNT	\$0.00
	TOTAL EXPENSES	\$39,682.93

BANK RECONCILIATION

OCTOBER 31, 1987

Cash in Bank per Statement 10-31-87	\$3,940.07
Less: Outstanding Checks	\$1,500.94
Total Cash in Bank	\$2,439.13
Plus: Savings Account-Utah State Treasurer	\$115,269.07
TOTAL CASH IN SAVINGS AND IN CHECKING ACCOUNT	\$117,708.20

BEAR RIVER COMMISSION
880 River Heights Blvd
Logan, Utah 84321

November 23, 1987

Engineer-Mgr Report

Wallace N. Jibson

1987 Water Supply

Provisional streamflow records show that seasonal runoff in 1987 ranged from 41 percent of the 1943-86 average in the upper Bear River basin to 47 percent from tributaries in Cache Valley. Though higher than the record-breaking lows in 1977, the 1987 seasonal supply was one of the three lowest since 1941 and only from 23 to 27 percent of the 1986 record runoff.

The following table compares 1985, 1986, and 1987 runoff in the May-September period with the 1943-86 average at three representative gaging stations in the three divisions of the basin.

Streamflow in Acre-Feet

	Average 1943-86	1985	1986	1987*	1987 as Percent of Ave.
Upper Bear R.	119,800	119,600	211,100	48,800	41 %
Smiths Fork	113,300	81,300	183,900	49,600	44 %
Logan River	130,100	124,700	220,300	60,700	47 %

* Provisional record, 1987, subject to change

Reservoirs

Hydrographs of Bear Lake for 1986 and 1987 are shown on page 3. A gain of only 1.3 ft (92,000 ac-ft) occurred from the low of 5,918.33 ft in February to the peak of 5,919.65 ft on June 15. The low runoff is reflected in this small gain, but fortunately, demand on the stored water was less than would be expected in such a dry year, and the Lake bottomed-out at 5,917.40 ft on Oct. 31. By November 12 the level had reached 5,917.48 ft (990,000 ac-ft) with total inflow of 265 cfs and outflow down to 18 cfs leakage. Under normal conditions the lake level should be up to or near the 5,918 target level by March 31, 1988.

Woodruff Narrows hydrographs are shown on page 4. About 34,000 acre-feet was released in June and July to supplement deficient natural-flow supply in Rich County, Utah and the BQ and Pixley Dam areas of Wyoming. Other reservoirs above Bear Lake were fully utilized in supplementing natural flow.

Compact Operation

Diversion records are not yet available in the Upper Division. Comments are occasionally made by Rich County users that little if any effort has been made to regulate under the Compact in this division since Woodruff Narrows was built in 1961.

Compact Operation (Continued)

In any 5-day period it is very difficult, following peak flow, to determine an accurate total of all diversions in the Upper Division because of the large number of canals and the rapid decline in main-stem flow reducing diversions each day. However, if concerned users will examine annual and biennial reports they will find very few if any days each year that Upper Wyoming Section exceeded compact allocations. Several factors account for this. First, the Wyoming watermaster regulates diversions down to basic rights, and lower if necessary in most if not all years without any direction from the Commission. Second, return flows from Whitney, Sulphur Creek, and Woodruff Narrows reservoir releases increase total divertible flow in the Division with a corresponding increase in each section's allocation. Third, Article IV, 1, e, of the Compact provides that any unused allocation in a river section of the Upper Division is available for use first, in the other section of the same State and second, in sections of the other State. Lower Wyoming Section ceases diverting in most years in the first ten days in July, and the 9.6 percent allocation immediately becomes available to the Upper Wyoming Section at a time when in some years the basic allocation of 49.3 percent might be exceeded. In many years the unused allocation is not needed; for instance, 1985 was an average year in the Upper Division, yet Upper Wyoming Section diverted only 49.8 percent of the divertible flow during the water emergency period, just 0.5 percent above the basic allocation. Incidentally, diversions in all sections are reduced by the amount of storage water used before computing divertible flow and compact allocations.

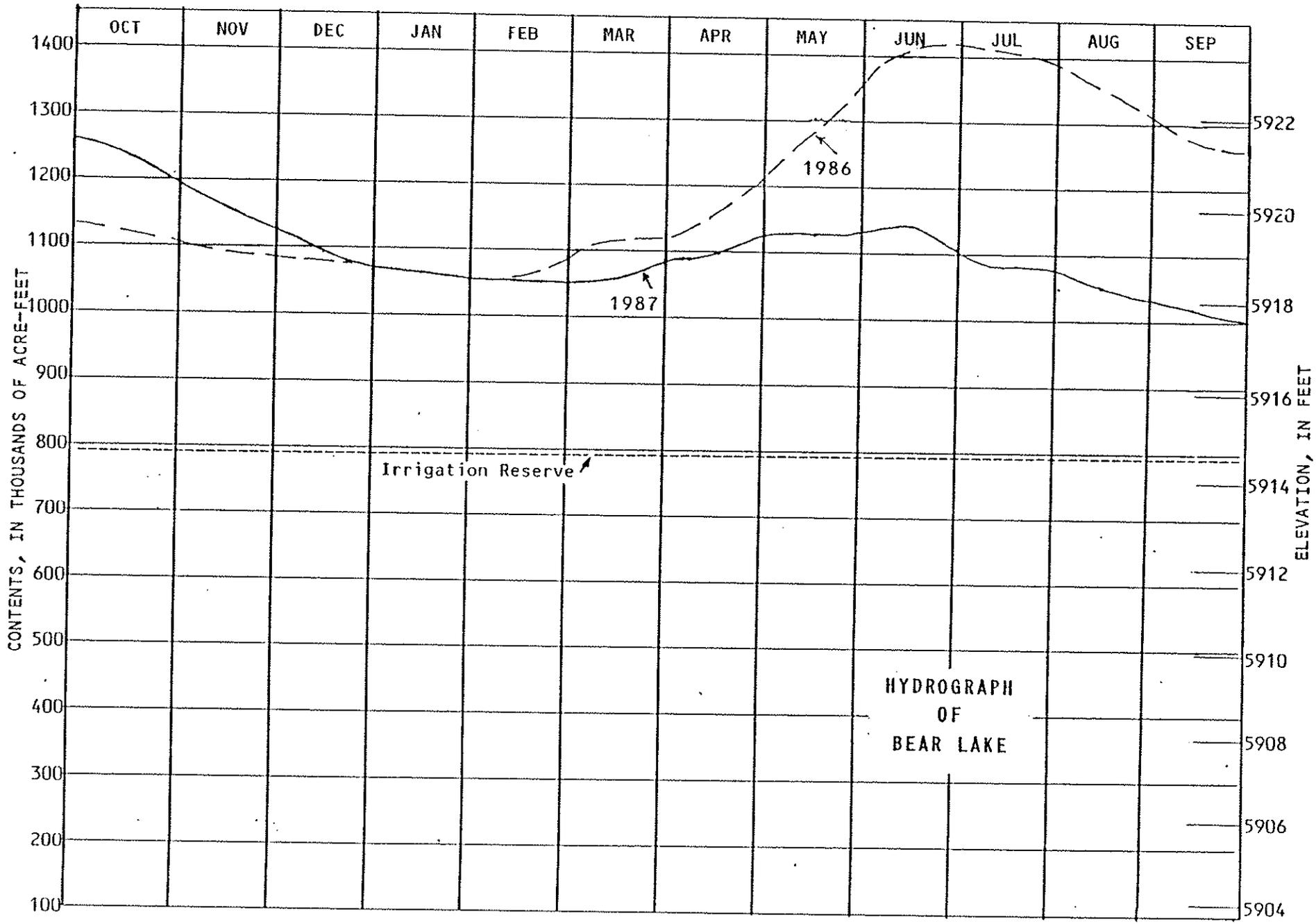
Compact operation in the Central Division is shown graphically on page 5. Divertible flow was below 870 cfs and Bear River at Border was below 350 cfs for a few days in mid-May and after about June 25 — each event occurring within a day or two of each other. Wyoming Section was well within its 43 percent allocation throughout the period of water emergency. Somewhat surprising was that in such a dry year Smiths Fork users diverted about all that could be physically taken from the stream, but main stem flow coming from the Upper Division and including much return flow from storage water applied significantly increased divertible flow in the Central Division that made possible compliance with the compact with little or no regulatory action by the watermaster. Woodruff Narrows Reservoir had a substantial effect on Central Division supply.

Budget

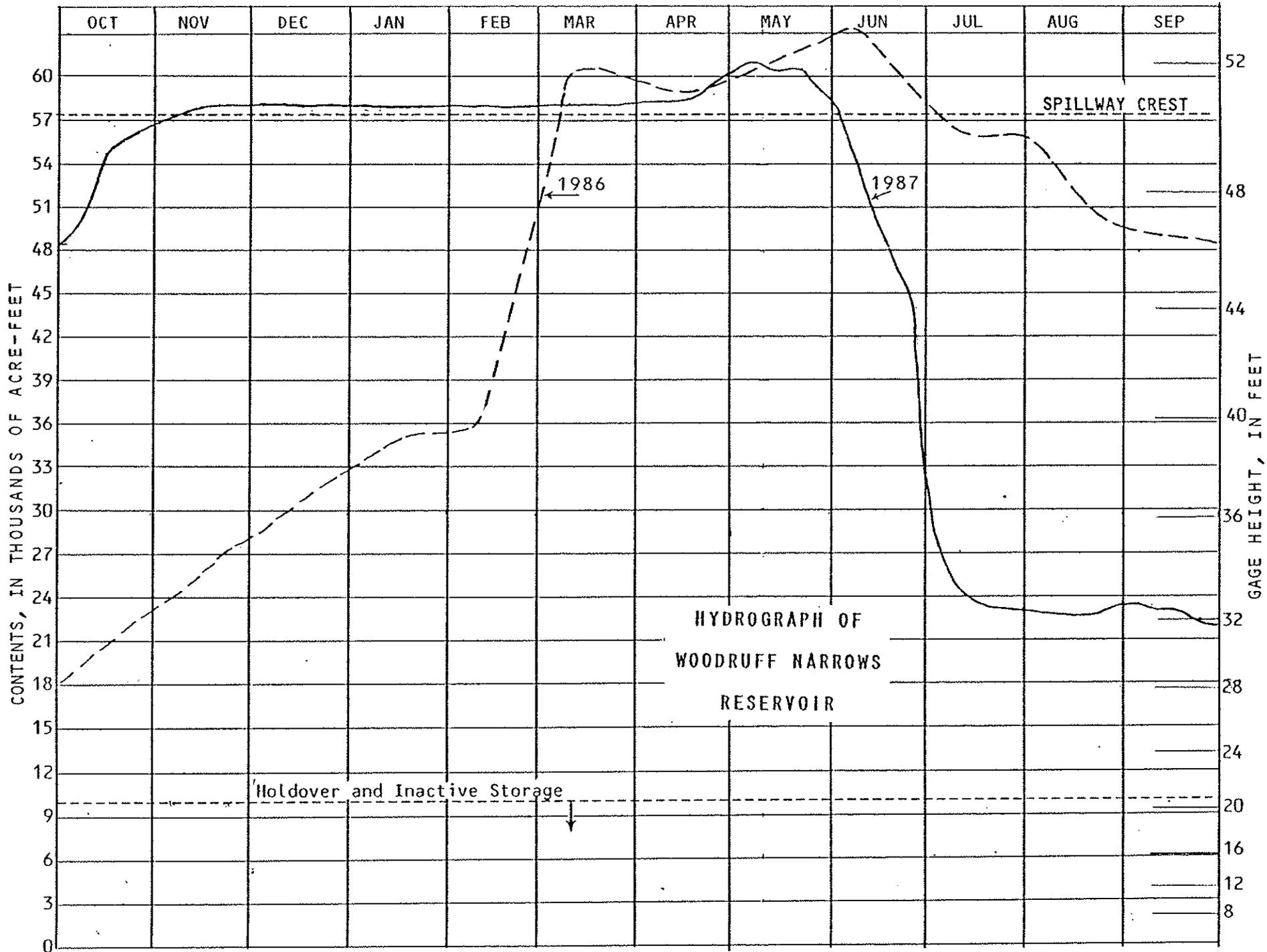
The budget was presented and approved in April for fiscal years 1988 through 1990 in accordance with the bylaws. This budget with income and expenditure projections is included for reference on p. 6.

Applications for Appropriation

A summary of applications for the past six months is tabulated on pages 7 and 8. Noteworthy, is a filing by the Utah Board of Water Resources for 30,000 acre-feet of storage at the Avon site on Little Bear River. A Wyoming filing for 59 cfs from Bear River appears to be located at or near the BQ diversion dam.

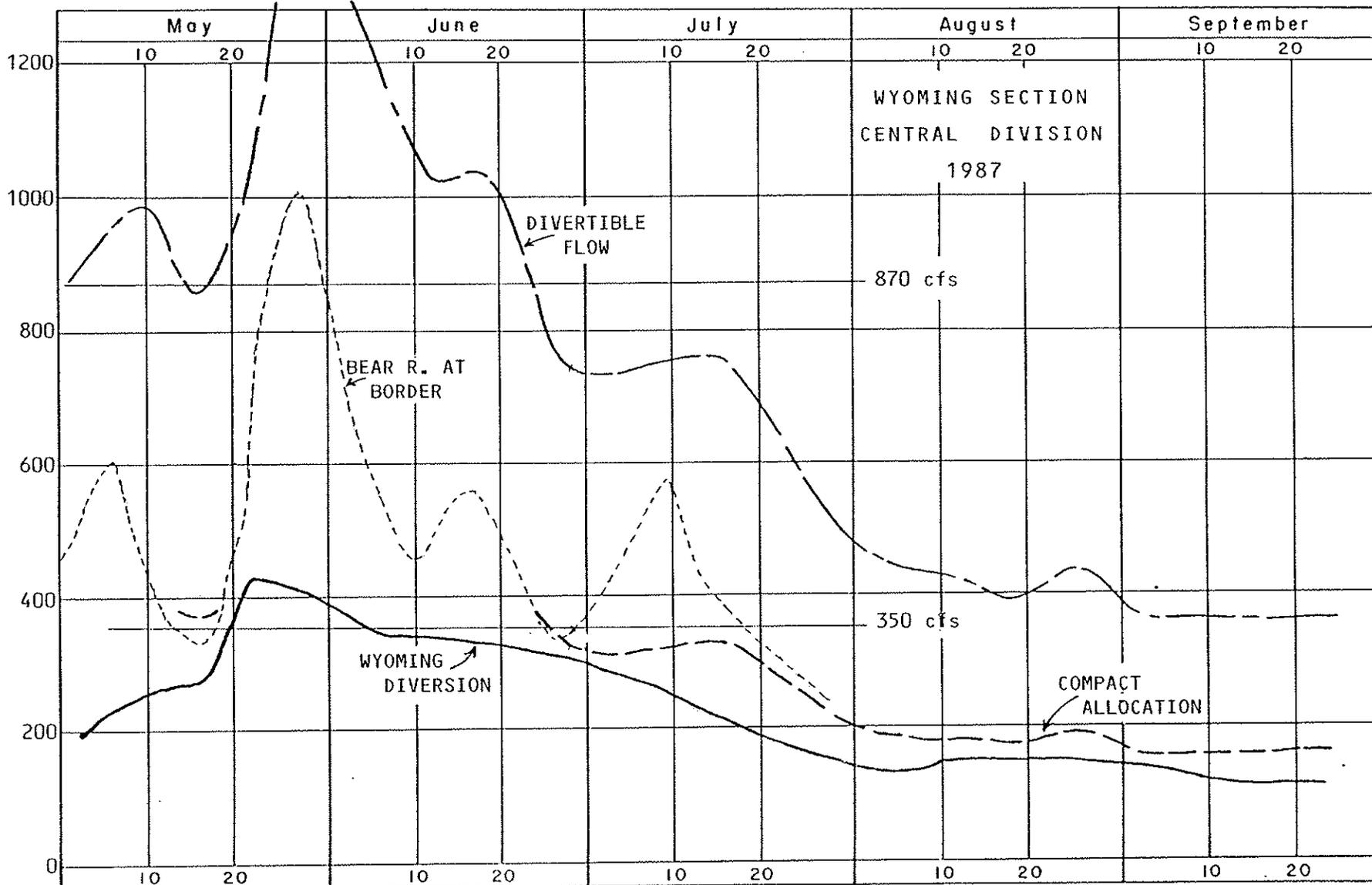


HYDROGRAPH
OF
BEAR LAKE



HYDROGRAPH OF
WOODRUFF NARROWS
RESERVOIR

CUBIC FEET PER SECOND



-5-

BEAR RIVER COMMISSION
BUDGET, INCOME, AND EXPENDITURES

APRIL 13, 1987

<u>BUDGET</u>	FISCAL YEAR ENDING <u>6-30-88</u>	FISCAL YEAR ENDING <u>6-30-89</u>	FISCAL YEAR ENDING <u>6-30-90</u>	FISCAL BIENNIUM ENDING <u>6-30-90</u>
<u>COMPACT ADMINISTRATION</u>				
PERSONAL SERVICES (ENGR-MGR)	\$ 8,600	\$ 8,600	\$ 8,600	\$ 17,200
TRAVEL (ENGR-MGR)	400	400	400	800
OFFICE SUPPLIES	250	250	250	500
PRINTING BIENNIAL REPORT	2,500	00	2,700	2,700
AUDIT & TREASURER BOND	700	700	700	1,400
PRINTING & REPRODUCTION	100	100	100	200
LEGAL RETAINER & FEES	500	500	500	1,000
CONSUMPTIVE-USE STUDIES (USU)	9,030	00	00	00
COMMISSION-APPROVED PROCEDURES	<u>41,970</u>	<u>25,000</u>	<u>25,000</u>	<u>50,000</u>
SUBTOTAL:	\$ 64,050	\$ 35,550	\$ 38,250	\$ 73,800
<u>STREAM-GAGING PROGRAM (USGS)</u>	\$ 71,360	\$ 75,330	\$ 79,470	\$ 154,800
TOTAL BUDGET:	\$ 135,410	\$ 110,880	\$ 117,720	\$ 228,600
<u>ALLOCATION OF BUDGET</u>				
U.S. GEOLOGICAL SURVEY	\$ 35,680	\$ 37,665	\$ 39,735	\$ 77,400
BEAR RIVER COMMISSION	<u>99,730</u>	<u>73,215</u>	<u>77,985</u>	<u>151,200</u>
TOTAL BUDGET	\$ 135,410	\$ 110,880	\$ 117,720	\$ 228,600
<u>ASSESSMENT</u>				
ASSESSMENT TO EACH STATE	\$ 30,000	\$ 25,000	\$ 25,000	\$ 50,000
TOTAL THREE-STATE ASSESSMENT	\$ 90,000	\$ 75,000	\$ 75,000	\$ 150,000
<u>INCOME-EXPENDITURE PROJECTION (1988-90)</u>				
<u>INCOME</u>				
BEGINNING BALANCE	\$ 90,000	\$ 87,270	\$ 96,055	
INCOME FROM THREE STATES	90,000	75,000	75,000	
INCOME FROM INTEREST	<u>7,000</u>	<u>7,000</u>	<u>7,000</u>	
TOTAL INCOME	\$ 187,000	\$ 169,270	\$ 178,055	
<u>EXPENDITURES</u>				
STREAM GAGING (USGS)	\$ 35,680	\$ 37,665	\$ 39,735	
COMPACT ADMINISTRATION	13,050	10,550	13,250	
CONSUMPTIVE-USE STUDIES (USU)	9,030	00	00	
COMMISSION-APPROVED PROCEDURES	<u>41,970</u>	<u>25,000</u>	<u>25,000</u>	
TOTAL EXPENDITURE:	\$ 99,730	\$ 73,215	\$ 77,985	
UNEXPENDED BALANCE:	\$ 87,270	\$ 96,055	\$ 100,070	
<u>NOTE:</u> STREAM GAGING COST PER STATION:	\$ 4,150	\$ 4,380	\$ 4,620	(17 STATIONS)
PLUS PUBLICATION CUTLER STATIONS	\$ 810	\$ 870	\$ 930	

Presented to Commission: NOVEMBER 23, 1987.

Applic. Number	Date of Filing	Name	Source	Use	Location		Amount (cfs)	Act'n
<u>STATE OF IDAHO</u>								
11-7362	3/23/87	D&S DEVELOPMENT	SPRINGS	IRRIG.	S2T9SR41E	CARIBOU	0.60	PEND
11-7367	6/15/87	COPENHAGEN HILLS	SPRINGS	IRR. DOM	S25T12SR42E	BEAR L.	0.20	PEND
11-7369	9/21/87	KENDALL LARSEN	GROUND WATER	IRRIG.	S10T13SR43E	BEAR L.	1.00	PEND
13-7439	3/12/87	ROBERT FACKRELL	WILLIAMS CR.	POWER	S28T12SR41E	CARIBOU	40.00	PEND
13-7444	5/7/87	GEORGE KIMBALL	SPRINGS	FISHERY	S17T10SR40E	CARIBOU	20.00	PEND
13-7446	9/14/87	MARLIN SMITH	SPRINGS	IRR STK	S16T15SR39E	FRANKLIN	0.08	PEND
15-7102	6/2/87	MYRON JONES	GROUND WATER	IRRIG.	S34T12SR34E	ONEIDA	2.00	APP
<p>TOTAL SURFACE WATER, IDAHO: PENDING, 60.88 cfs(Incl. 60.0 cfs non-consumptive use). APPROVED, 00</p> <p>TOTAL GROUND WATER, IDAHO: PENDING, 1.00 cfs. APPROVED, 2.00 cfs.</p> <p>CHANGE IN STATUS PAST SIX MONTHS OF PREVIOUSLY REPORTED APPLICATIONS:</p> <p>APPROVED TO LICENSED: SURFACE WATER, 1.63 cfs. GROUND WATER, 1.50 cfs.</p> <p>APPROVED TO INVALIDATED: SURFACE WATER, 11.05 cfs(Includes 10.0 cfs Power) 4,000 Ac-Ft(Weston Cr)</p>								
<u>STATE OF WYOMING</u>								
TF 19-11-247	4/17/87	LJE Inc.	BEAR RIVER	MISC	S11T14NR121W	UINTA	0.056	PEND
UW 74674	6/1/87	EVANSTON BROADCASTING	BEAR RIVER ?	MISC	S24T15NR121W	UINTA	0.056	APP
UW 75629	8/19/87	EXXON CORP.	BEAR RIVER ?	MISC	S9T20NR119W	LINCOLN	0.333	APP
TF 26 2/134	5/5/87	CITY OF EVANSTON	BEAR RIVER	MUNIC	S31T14NR119W	UINTA	42.1 A.F	PEND
TF 26 4/139	5/15/87	CHEVRON USA	PLEASANT VALLEY C	INDUST.	S2T15NR120W	UINTA	0.18 AF	PEND
29728	8/4/87	MTN FUEL RESOURCES	BEAR RIVER	INDUST	S35T13NR120W	UINTA	2.7 cfs	APP
29755	9/8/87	WOLVERINE EXPLORATION	BEAR RIVER	INDUST	S3T12NR120W	UINTA	0.11	APP
TF 26 6/181	9/11/87	KEITH ET AL PUTNAM	BEAR RIVER	IRRIG	S15T22NR120W	LINCOLN	58.68cfs	PEND
<p>TOTAL SURFACE WATER, WYOMING: APPROVED, 2.81 cfs...PENDING, 58.736 cfs & 42.28 ac-ft</p> <p>TOTAL GROUND WATER, WYOMING: APPROVED, 0.389 cfs...PENDING, 00 cfs</p> <p>NO CHANGE IN STATUS PAST SIX MONTHS OF PREVIOUSLY REPORTED APPLICATIONS</p>								

APPLICATIONS TO APPROPRIATE WATER
BEAR RIVER DRAINAGE
STATE OF UTAH
04/01/87 to 10/31/87

Nov. 23, 1987
Presented to
Commission

WR No.	Filing Date	Applicant	Source	Uses	Location	Quantity	S
23-3692	05/05/87	Weston, Theron	Meadowville Upper Canal Overfl	I	28 13N 5E	0.5	U
23-3693	05/26/87	Corporation of the Presiding Bishopric	Spring	S	4 12N 6E	0.5	U
23-3695	06/25/87	Ellis Ranch	Francis Lee Canal	I	23 9N 7E	3.0	U
23-3696	07/27/87	Cornia, Orson	Abandoned Gravel Pit	I	16 9N 7E	2.0	U
23-3699	09/01/87	Buck, Max C	Abandoned Gravel Pit	I	16 9N 7E	2.0	U
25-8830	04/20/87	Bess, Noel	Old River Bank Spring	SOt	10 9N 1E	1.0	A
25-8831	04/20/87	Bess, Noel	Spring	SOt	10 9N 1E	3.0	A
25-8833	04/27/87	Fredrickson, Brent	Well	IDS	13 11N 1W	0.1	A
25-8834	04/27/87	Thurston, LaMar	Well	IOt	22 12N 1E	0.2	A
25-8835	04/27/87	Nielsen, Alan L.	W.F. Peterson Spring Stream	Ot	4 10N 1E	0.5	U
25-8840	05/11/87	Smith, J. Cash	Haybend Spring Streams	I	30 13N 1E	2.0	U
25-8841	05/15/87	Parker, David Boehme & Gordon (POA)	Well	IDS	5 11N 1E	0.1	A
25-8850	06/11/87	Sherwood Hills Resort - Desseret Federal	Well	ID	20 10N 1W	1.2	U
25-8853	06/19/87	Buttars, Chester J.	Unnamed Springs (2)	I	3 14N 1W	0.225	U
25-8858	07/22/87	Webb, Geniel H.	Underground Water Road Drain	IS	27 14N 1E	0.1	U
25-8859	08/10/87	Providence City Corporation	Well	Mu	10 11N 1E	1.225	U
25-8860	08/17/87	Nielsen, Clyde C.	Well	I	16 10N 1E	0.333	U
25-8861	08/17/87	Utah Board of Water Resources	Little Bear River	Misc	22 9N 1E	30000.0	U
25-8863	08/21/87	Hebdon, David	Well	IDS	34 10N 1E	0.1	U
25-8867	08/26/87	Taggart, Keith	Well	IDS	2 11N 1W	0.1	U
25-8869	09/03/87	Shill Family Trust, Talmage W.	Well	I	25 11N 1W	0.1	U
25-8872	10/02/87	Spendlove Enterprises	Well	IDOt	8 11N 1E	0.2	U
29-3304	04/22/87	Garn Enterprises Inc.	Well	IDS	18 13N 2W	1.0	U
29-3306	04/24/87	Hardy, John Dee	Underground Water Drain	IS	32 10N 2W	1.0	A
29-3307	04/24/87	Adams, Douglas R.	Willow Spring	Ot	1 9N 2W	0.25	A
29-3321	06/11/87	Bear River Canal Company	Bear River	ISOt	26 13N 2W	300.0	U
29-3334	08/19/87	Baugh, Ronald M.	Well	IDS	12 13N 3W	0.1	U
29-3338	08/31/87	Hansen, Wesley R	Overflow ditch from unnamed sl	IS	32 10N 2W	1.0	U
29-3344	09/25/87	Garn Enterprises Inc.	Developed Drain	S	17 13N 2W	0.5	U
29-3345	09/22/87	Ashby, Marvin R.	Overflow from Garland City Wat	IS	28 12N 3W	0.1	U
29-3348	09/24/87	MacKay, Kathleen Green	Well	IOt	18 9N 2W	0.1	U
29-3352	09/25/87	Mason, Hal J.	Underground Water Drain	IS	17 13N 2W	0.5	U
29-3353	09/25/87	Mason, Hal J.	Underground Water Developed Dr	IS	17 13N 2W	0.5	U
29-3355	10/26/87	Wells, William Arnell	Underground Water Drains (2)	IS	15 8N 2W	2.5	U

Total Surface Water, Utah: Approved, 5.25 cfs Pending, 315.925 cfs; 30,000 Ac-Ft
Total Ground Water, Utah: Approved, 0.4 cfs Pending, 4.458 cfs

Progress Report

Bear River Basin Base Mapping

November 9, 1987

The Bear River Basin base mapping project is proceeding but running a bit behind schedule. Hopefully, some of the lost time can be recovered during the upcoming year. It seems that Idaho and Utah have resolved most of their data transfer and formatting problems and are now proceeding well. Given the progress to date, a realistic completion date for the base map and associated tabular data for all water uses would be spring of 1989. The overall effort to date has been excellent, but there are still several technical issues which need to be resolved, especially for nonirrigation water uses. A draft base map should be ready for review by spring 1988 and should be presented to the commission during the spring meeting.

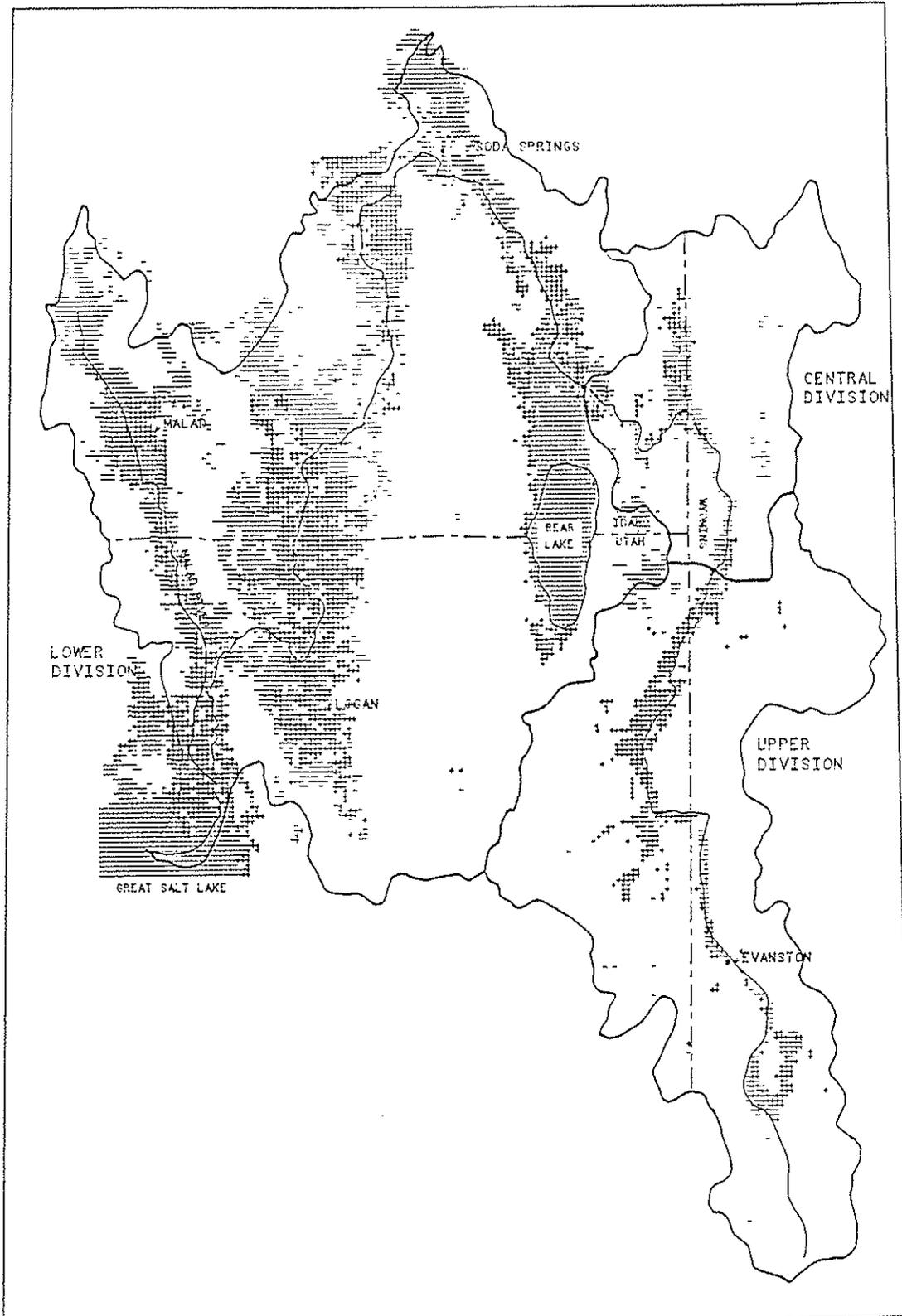
Specific progress to date includes:

Task 1, 2 and 3 are complete. These include planning, acquiring maps, and obtaining access to aerial photography. Aerial photos were interpreted for general land-use types, or strata, and boundaries for these strata were drawn onto 1:100,000 maps. The strata were: water, wetlands, irrigated agriculture, nonirrigated agriculture, and other. These strata were needed to remove potential problems due to confusion with the Landsat satellite data classification. Also included in these first three tasks, was the digitizing (making computer readable files) of the map information. These were: the strata boundaries; the basin, division, and county boundaries; and the public land survey lines. Originally, the transportation and hydrography (streams, lakes and canals) information was to be digitized from 1:100,000 scale maps, but these were purchased from the USGS at a considerable savings over digitizing them ourselves. The State of Idaho has acquired the satellited imagery from EROS Data Center as well as the strata data from Utah and Wyoming. Getting data from Utah and Wyoming that was in correct format for the Idaho system took longer than anticipated.

Task 4, the classification (grouping satellite data into land cover classes) of the Landsat satellite data, is nearing completion. After looking at the classification during June 1987, the technical advisory committee determined that we needed to include one more strata to reduce some of the confusing classes. We need to distinguish between urban area and the "other" strata, which includes range and forest. This required all three states to backtrack and include an urban strata in their digitized file, this required additional work. Idaho has received the new strata from Utah and Wyoming and have combined it with Idaho data. The Landsat image is reclassified and Idaho has made classification maps for Utah and Wyoming to verify. After Idaho receives and incorporates Utah and Wyoming's comments

on the final classification, Idaho will transform the classified data into a format that Utah can use, and send it to them for summary and reporting.

BEAR RIVER PROJECT



10 20 30 40 MILES
Nominal scale is 1:1000000

WATER/WETLANDS
DRYLAND AGRIC.

IRRIGATED AGRIC.





STATE OF UTAH
NATURAL RESOURCES
Water Rights

Norman H. Bangert, GC
Dee C. Hansen, Executive C
Robert L. Morgan, State E

1636 West North Temple • Suite 220 • Salt Lake City, UT 84116-3156 • 801-533-6071

November 9, 1987

Mr. Larry Anderson
Secretary Treasurer
Bear River Commission
1636 West North Temple
Salt Lake City, UT 84116

RE: Report to Bear River Commission

~~Larry~~
Dear Mr. Anderson:

Presented herewith is a partial review of several items which have been discussed by parties interested in the Bear River negotiations, and need to be brought to the attention of the commission for discussion and implementation of the depletion allowances and commission approved procedures.

The State Engineer's Committee is presenting these items for commission review and will present additional concepts for commission review. The committee would request that before action is taken by the commission to define a portion of the procedure, that it be submitted to the TAC for review to ensure that data is available or can be made available to implement the procedure.

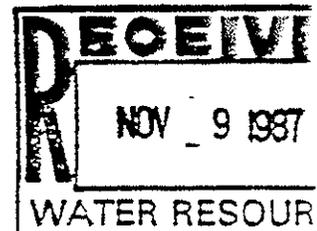
An overview of the total process will be to define commission procedure on irrigation and storage issues, and then move to industrial and municipal concerns.

Sincerely,

Robert L. Morgan, P.E.
Utah State Engineer

RLM:RMP:hw

enclosures



Introduction

The content of this proposal is not meant to specifically set forth a detailed step by step means to answer a question of "Commission-approved procedure" for the calculation and administration of depletions, but rather is an outline for discussion as to the extent of the efforts the Commission must undertake to develop and implement that procedure. The Commission will need to consciously choose among alternatives through examination and negotiation as well as using information provided through technology to obtain an optimum outcome for the three states.

Overview

To formulate a Commission-approved procedure for Article V, of the Bear River Compact, the Bear River Commission has funded a consumptive use study and is currently attempting to quantify water use as of January 1, 1976 through a base-map compilation and tabulation of data on water uses for the major categories of water use including irrigation, agriculture, storage, public supplies, and private supplies.

The Technical Advisory Subcommittee to the State Engineer's Committee has, to this point, been compiling the irrigated lands (as of 1976) map of the Basin. This mapping will establish, for presentation to and review by the Commission, the lands which were irrigated prior to January 1, 1976. These are lands which formerly have a right through use, to water.

The Compact recognizes all water rights acquired under the laws of the respective states to the use of water applied to beneficial use prior to January 1, 1976, and granted additional allotments of water to be developed in the respective States or divisions of the river system. These additional allotments of water were assigned depletion limitations. No Article in the Compact makes any differentiation between surface or ground water, hence the additional depletion limitations apply with respect to both sources of supply.

Statement of Problem

The Commission has been faced with establishing approval procedures since the ratification of the Compact on February 8, 1980. Much time, effort, and monies have been spent to identify reasonable and workable means and methodologies, such as the present utilization of Landsat imagery and geographic information system (GIS) computers, for the Commission to use to develop and administer the required "Commission-approved procedure."

The actual consumptive uses occurring in the compact drainage area are complex and variable, hence any selected means for accounting for the depletion will be less than totally accurate, no matter how much additional information on the water use variables may be gathered. The question as to what data are available throughout the Basin is a major concern for several reasons: without data no estimates can be made, and without consistent data throughout the Basin there may be inequities

between the States as to how much post-1/1/76 depletion is occurring.

Accuracy is important due to the tremendous importance of the Bear River resource to the citizens of the Basin, but the procedure developed must be sufficiently economical and accomplishable. For purposes of the compact, the Commission may need to make generalizations to avoid the costs that would be incurred to empirically model all of the variables that exist.

Irrigation and Lake Evaporation

Estimates of crop water requirements for irrigated crop lands throughout the Bear River Basin are presently being evaluated by the three-state university study under the direction of Robert Hill of Utah State University. The objectives of the study, as stated by the researchers, are:

1. Obtain field measurement data on crop water use for selected area of the Bear River Basin.
2. Determine which of the empirical method or methods can be adjusted to adequately represent measured consumptive use.
3. Estimate historical depletions with the appropriate empirical method and available historical weather data.
4. Coordinate field work with the Bear River Commission and the various State Engineer and Water Resource

agencies, and maintain cooperation with similar research work elsewhere in Idaho, Utah and Wyoming.

5. Present the results through reports and workshops in a useable manner to the Commission and State agencies.

The empirical equation developed at the conclusion of the study will estimate potential or anticipated consumptive water use by irrigated agriculture lands. Climatic conditions are the main factors affecting seasonal evapotranspiration (ET) that can be measured at sites across the entire Bear River Basin. The most important climatic factor affecting ET is radiation because it is the energy source for the plant growth process. Air and soil temperature, humidity, rainfall and wind also influence ET. Variables which are either unmeasurable or not readily quantified are not part of the ET equation but can greatly affect the actual consumptive use are as diverse as the individual who manages the water applied to the crop, the availability of water through the delivery system to the lands, and the location or orientation of lands that are irrigated to other irrigated parcels or wetlands.

Most consumptive use studies are done on a very small and more easily managed environment, in which parameters such as those mentioned above and others which may relate to a specific controlled environment are more closely uniform over the entire study area. The Commission's ongoing consumptive use study is attempting to include the entire Bear River Basin, through measurement of climatic factors at four sites throughout the

Basin and actual consumptive use as determined by lysimeters at three sites scattered through the upper regions of the Bear River drainage. The Commission will deal with the information on at least a sub-basin scale, in that the researchers' work indicates that a single coefficient applicable across the Basin is inappropriate. Additional data gathering beyond the scope of the current consumptive use study will be necessary in getting to an estimate of what the depletion occurring in the Basin as of 1/1/76 was due to irrigated agriculture lands. The consumptive use equations developed by the universities must be applied to the basin. This will require additional work to assign areas of influence to weather stations and other calibration efforts.

Evaporation from water surface was studied by Kenneth G. Hubbard and E. Arlo Richardson and published in a report titled Tabulation and Application of Pan Evaporation Data for Utah Through 1976, by UWRL. The report was an effort to quantify lake evaporation and identify the variables in the climate that may contribute most. Vapor pressure and its relationship to temperature was the most significant factor having an effect on water evaporation. An Iso-map was generated as part of their study to show coefficients to apply to pan evaporation to obtain the lake evaporation for a lake in the State of Utah. (Figure 1)

The coefficients shown on the Figure do not deviate much from the coefficients for evapotranspiration for alfalfa. The three state consumptive use study will be more representative throughout the entire basin. For this reason, rather than to extrapolate these coefficients, determined by Hubbard, to the

Figure 1.

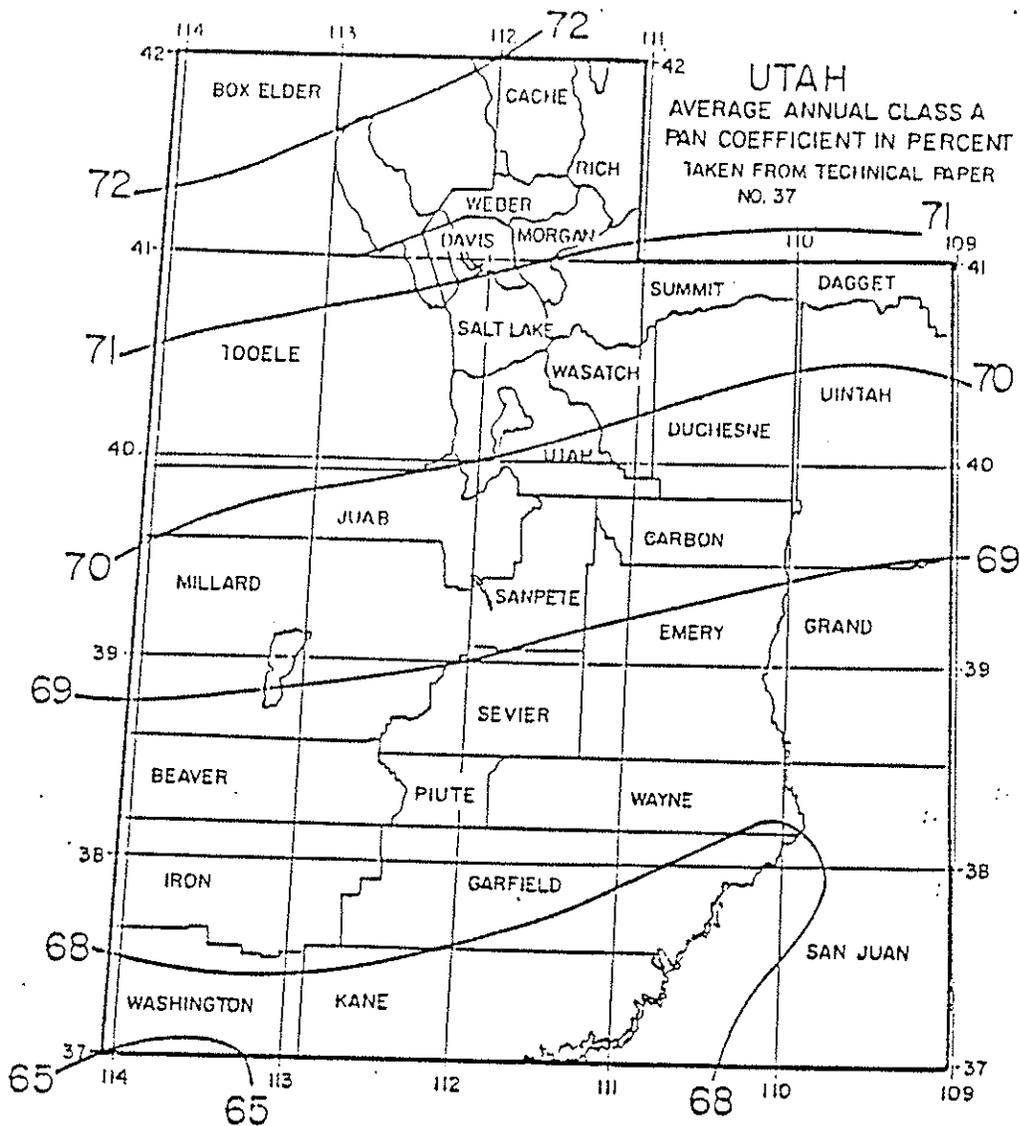


Figure 4. Isolines showing the pan coefficients which are used as a multiplying factor to estimate lake evaporation from pan evaporation. Pan coefficients represent the average ratio of lake evaporation to pan evaporation in a given area.

other states, it may be reasonable to calculate the evaporation from a given lake to be the same value as the potential evapotranspiration from alfalfa over the same surface area. This type of assumption would meet general acceptance from water use planners, but needs more thorough review by the State Engineers' Committee to determine if it would be an acceptable assumption for the Commission-approved procedures.

Some Known Concerns

(Supplemental Rights)

Supplemental waters for irrigation have generated opposing points of view in past discussions by members of the Commission. The depletion from all of the sources of supply to a given acreage cannot add up to a number greater than the total crop water requirement. Therefore, as sources are added to a fully righted piece of land, there is less of a use requirement from the prior sources of water rights. The addition of supplemental surface or groundwater to already irrigated lands is unfortunately not based solely on need. Many times new water right filings are made to tie up a water source to avoid encroachment by others for needed water, or they may even be added as a means to get grants from federal or state agencies. Some water users file to have a secondary supply as a precaution in case of the failure of the original source.

The amounts of water taken from supplemental sources on a year by year basis varies for reasons that may have very little to do with crop requirements, such as the quantity of runoff,

crop type and pumping costs. Systems constructed for the delivery of the supplemental supply rights are not as reliable, in many cases, as those for the original supply rights. Many of the primary sources are lacking the measuring devices and other appurtances that are conducive to water administration and regulation because of the cost involved to add them to the system. To assume that accurate records of the depletion occurring due to the exercise of supplemental rights will be reliable or available without great cost to the Commission and water users, would be unrealistic and in error. Authority may not exist within each State's water law to order the installation of proper measuring devices and headgates suitable for regulation.

(Rights established prior to January 1, 1976 which become inactive.)

Municipal development gradually urbanizes the rural landscape and alters land use/management patterns with attendant changes in established water uses. As this occurs, the irrigation rights formerly used on these lands are lost through non-use if water right transfers or changes in use (and/or places of use) are not effectuated under the respective State's law. If these waters revert back to the public and are appropriated under a new water right, they will obviously be put to beneficial use after January 1, 1976, the Compact cut-off date.

Some previous discussion has concerned whether these waters should be retained by the respective states for reallocation

without being counted as post-1/1/1976 depletion from their respective Compact allotments. Since the water law in each State controls the disposition of water rights in these types of circumstances, the water now available could be appropriated according to that State's laws without that appropriation being counted as part of the depletion allowance provided for in Article V.C. or VI.B. of the Compact. In effect, a "banking" of existing depletion could be initiated whereby "deposits" (cancelling of old rights) and withdrawals (new appropriations) could occur. Such a proposal seems equitable on its face and in keeping with the Compact's terms relating to additional depletion ("increase in depletion...in excess of the depletion as of January 1, 1976"). The fact must be recognized that the individual States' water laws may have bearing as to how this system could function. It may be desirable to have the "bank balance" accounted for in a tabular report to the Commission on a routine basis. Rights lost due to forfeiture on non use prior to January 1, 1976 would not be included in this banking process and would revert to the category of unappropriated water.

Wetlands

Natural vegetation is a large user of water in the Bear River drainage area. The areas where agriculture or development exist will be represented on the basemap prepared for the Commission. Within these bounds will be lands classified as wetlands. These lands contain plants which are natural water consumers.

Wetland vegetation, depending on type, extent of land covered, and available water, can consume up to 30% more water than alfalfa. In water-short years when these lands become less than saturated, these uses typically are below that of irrigated crops, hence there is a great amount of variation associated with phyreatophytic water use.

Conclusions and Recommendations

The Commission will have the needed information to make general rules and implement guides which will account for water depletion. However, more research and data gathering for modification of the "Commission-approved procedure", or defending the procedures should be of importance to the Commission. In recognition of the need to implement a "Commission-approved procedure", the following recommendations are presented to the Commission.

1. The Commission should preform accounting of the additional depletion occurring since January 1, 1976, rather than attempting to quantify the total basinwide depletion prior to that date. Thus, it is recommended that the Commission "bookkeep forward" after January 1, 1976 and determine only the depletion chargeable under the Amended Compact, rather than subtracting the total depeletion as of 1/1/1976 away from a total future-date depletion at the time of an update to determine whether the difference is less than the respective State's depletion allotment.

2. The irrigated lands to which water is first applied to beneficial use after 1/1/1976 should have their depletion accounted for by applying the appropriate seasonal crop coefficient to the empirical ET equation(s) adopted by the Commission as a result of the ongoing consumptive use study. The crop coefficient should reflect the fact that different crops are raised from one year to the next. A method of aggregating or weighting the seasonal crop coefficient needs to be employed. One method of weighting would be to utilize a cropping distribution developed for a particular county, subbasin, or for the entire basin. It is thought a county-wide distribution will continue to be available through Agricultural Census data and, because it more closely reflects local conditions, would be more accurate.

3. The Commission needs to determine how lake evaporation occurring due to the additional storage allotments under the Amended Compact was meant to be handled in terms of the additional depletion limitations. Lake evaporation could be calculated to be the same as the potential alfalfa use at the location of the water body.

4. Since the Compact does not differentiate between depletions due to surface or ground water supplies, it should be assumed that lands irrigated prior to January 1, 1976 have a full supply, thus eliminating the tedious task of trying to account for small blocks of water that may or may not be used.

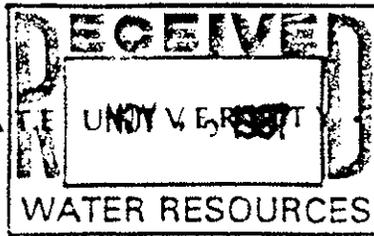
5. The matter of rights that were acquired prior to January 1, 1976 in any of the signatory states which become inactive and hence are subject to loss by the appropriator under respective State's law through abandonment or forfeiture needs to be dealt with by the Commission. Certainly, if a right has been abandoned, it cannot be asserted as being a pre-1/1/1976 right; however, the concept of "banking" depletion due to the future retirement of pre-1/1/1976 depletions when irrigated lands are retired due to development is preferred by the states.

6. Lands brought into irrigation after 1/1/1976 which formerly were either wetland, dryfarm, or range of some kind should be evaluated at the time of conversion, and to the consumptive use that was formerly occurring. That prior consumptive use would not be counted against the depletion limitations specified in the Compact.



College of Engineering
Department of Agricultural
and Irrigation Engineering

UTAH STATE



LOGAN, UTAH 84322-4105

November 12, 1987

Duty of Water Under Bear River Compact:
Field Verification of Empirical Methods

A Three State Cooperative Project Sponsored by the Bear River
Commission.

University of Idaho	Utah State University	University of Wyoming
Ag Engineering	Ag & Irr Engineering	Ag Engineering
C.E. Brockway	R.W. Hill	R.E. Burman
C. W. Robison	(Project Coordinator)	
	Niel Allen, Rick Allen	

Progress Report, Summer 1987

Automated remote weather data stations were established during April at Montpelier, Idaho; Randolph, Utah and Hilliard Flats, Wyoming (Table 1). These sites were visited weekly from April through late October. Example weather data is shown in Figures 1, 2 and 3 for Montpelier, Randolph and Hilliard Flats.

The measurement of meadow water use in the non-weighing lysimeters at Montpelier, Randolph and Hilliard Flats was continued from April through October, 1987. Summarized seasonal water use from the lysimeters at each of three sites is given in Table 2. The water use estimates are based on assumed specific yield volume for each lysimeter. Water use ranged from 15.4 to 30.8 inches among all sites for 1984 - 1987. The water use for 1987 was higher than other years, possibly due to the longer than usual growing season. The data shown herein are preliminary and subject to change with the completion of the field work and verification.

Final field work is being completed for each lysimeter to check the neutron probe calibration by taking soil samples. Determination of specific yield of water as the water table drops will be accomplished by filling each lysimeter with water and covering with plastic (so that $ET = 0$). Water will be pumped out and the water table position measured 3 - 4 days later. This will be done for several cycles over a three week period.

Studies remaining to be completed include calibration of the empirical ET equations and demonstration of the use of these equations in estimating the duty of water. This will be done for water years 1976 through 1986 based on historical (monthly) temperature and precipitation records available in the Upper Bear River Basin.

Table 1. Names, Locations and Information Measured at Weather Sites in the Bear River Basin during 1986 and 1987.

Name	Crop	Location	Latitude	Elev. feet abv. msl
1. Montpelier, ID (Wallentine) hourly solar radiation, air temperature, wind travel, relative humidity, soil temperature and precipitation.	Irrigated Meadow	T14S,R44E,s15	42°14'	5928
2. Randolph, UT (J.F. Ranch) hourly solar radiation, air temperature, wind travel, relative humidity, soil temperature and precipitation.	Irrigated Meadow	T12N,R8E,s30	41°45'	6280
3. Hilliard Flat (Barker) daily max and min air temperature and relative humidity, daily total solar radiation and rain and wind travel at 6-hour increments.	Irrigated Meadow	T13N,R119W,s28	41°5'	7550

Note: The Randolph station has been incorporated into the Utah Agriculture Weather Network and has been equipped with a telephone modem for real time access.

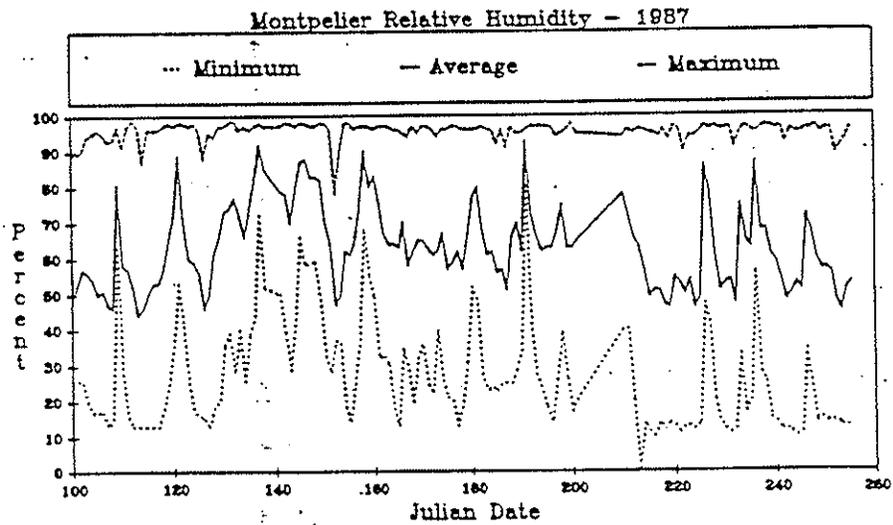
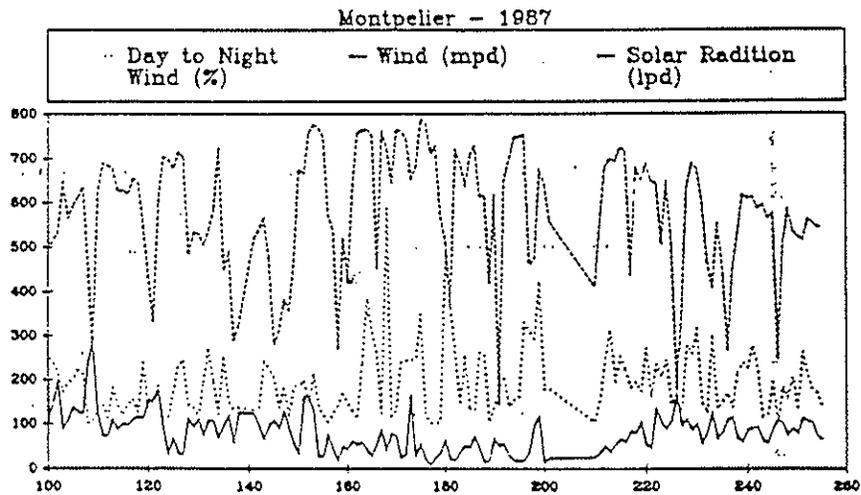
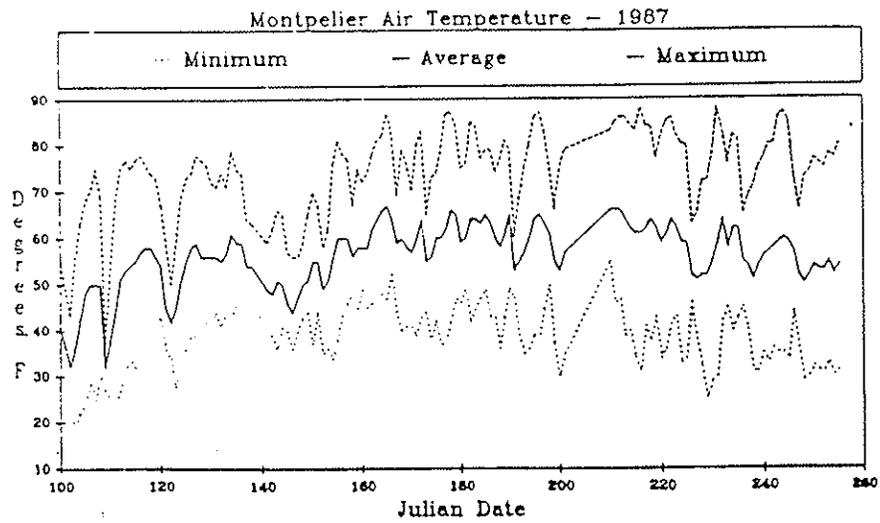


Figure 1. Daily Temperatures, Wind Travel, Solar Radiation, and Relative Humidities for Montpelier, Idaho, 1987.

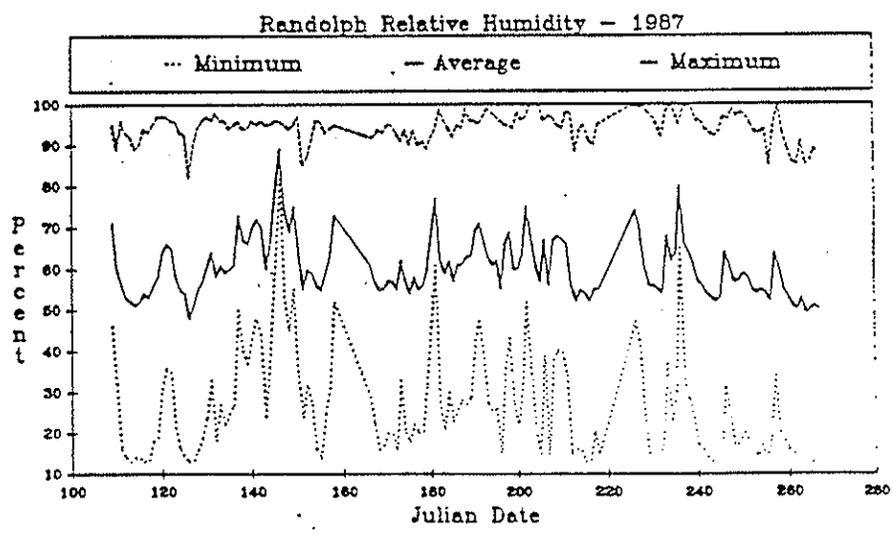
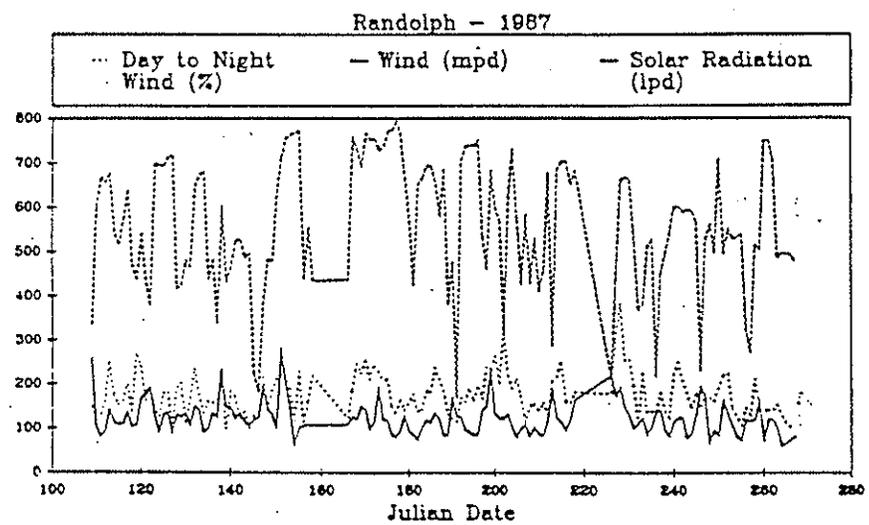
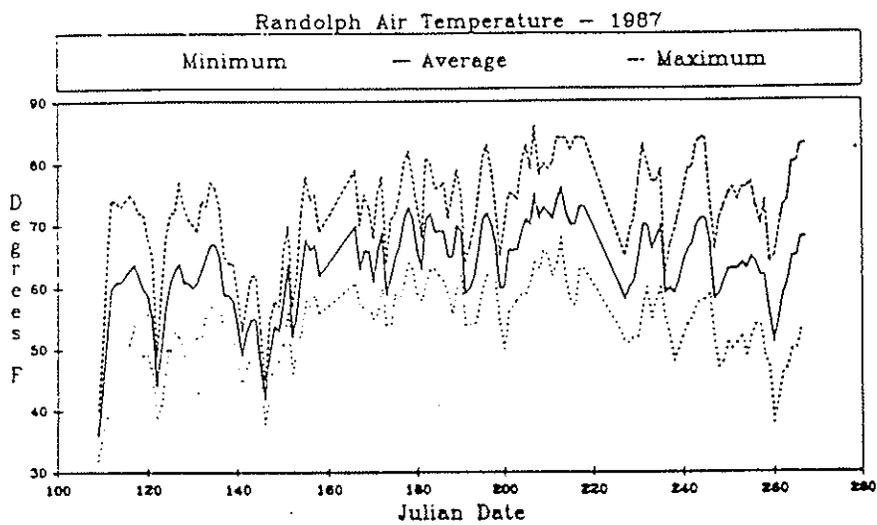


Figure 2. Daily Temperatures, Wind Travel, Solar Radiation, and Relative Humidities for Randolph, Utah, 1987.

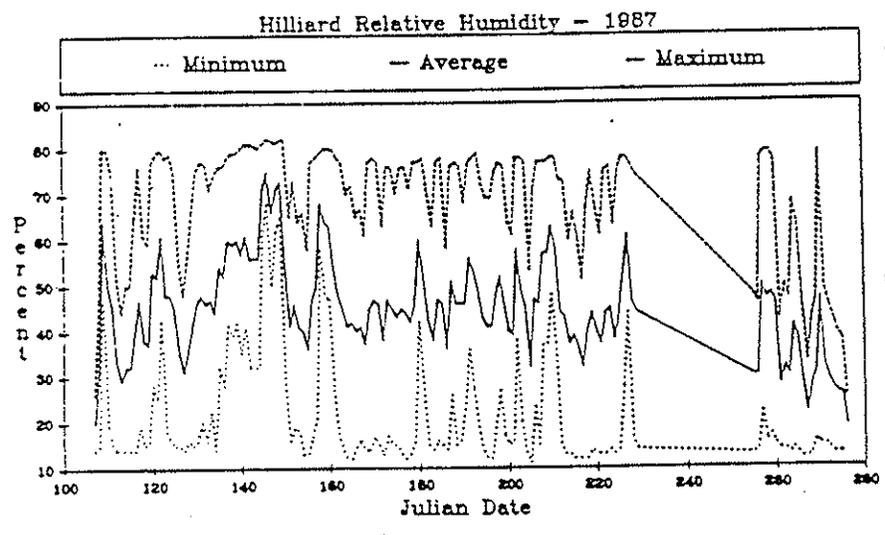
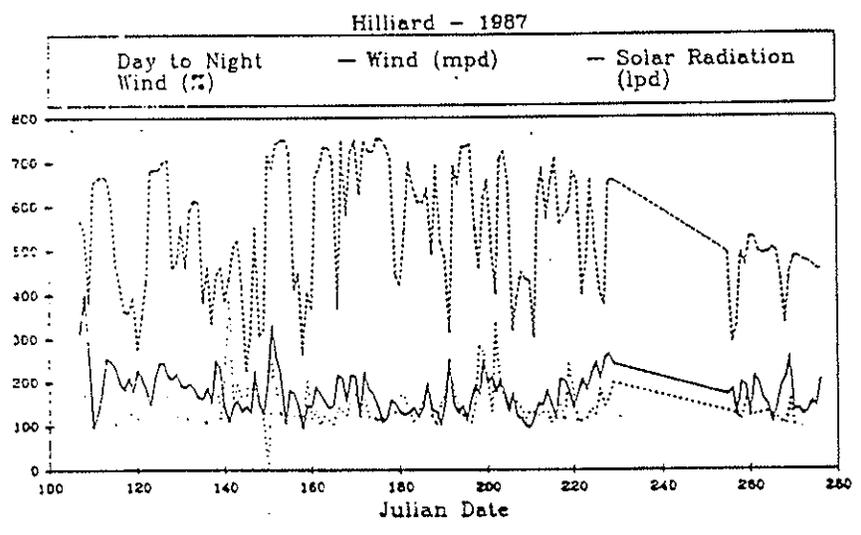
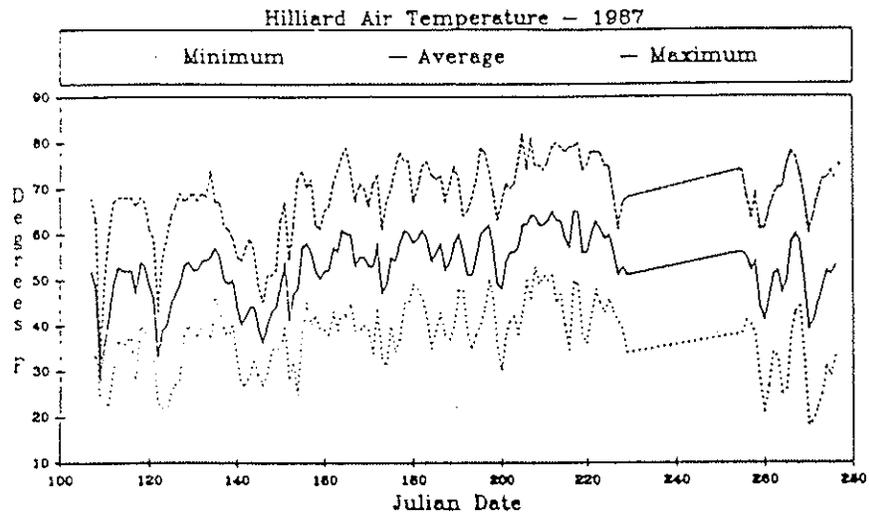


Figure 3. Daily Temperatures, Wind Travel, Solar Radiation, and Relative Humidities for Hilliard, Wyoming, 1987.

Table 2. Estimated seasonal meadow water use from lysimeter at Montpelier, Randolph, and Hilliard Flats (1983 - 1987).

	1983	1984	1985	1986	1987
	----- inches -----				
Montpelier					
OLD	14.9*	19.4	20.2	19.91*	26.5
NEW				16.3 *	30.8
Randolph					
	18.2*	24.8	28.2	27.8	29.3
Hilliard					
	16.9*	15.4	22.1	26.8	29.0

* Beginning in June.

Note: Each value represents the average of two lysimeters. The season duration varies from site to site and year to year, generally starting in late April to mid May and ending by early to mid October. Estimated water use is based upon assumed values of specific yield and will probably be revised when the field work has been computed.

RESOLUTION

The Bear River Commission in a regular meeting on November 23, 1987, at Salt Lake City, Utah, does, by motion duly made, seconded and passed by unanimous vote of the Commission's members, RESOLVE THAT:

WHEREAS, George L. Christopulos always ably and honorably performed his assigned duties during the more than 30 years of service to the State of Wyoming, including his accomplishments as Wyoming State Engineer from December 1, 1974 until March 16, 1987; and

WHEREAS, George L. Christopulos has represented notably the State of Wyoming as a Member of the Bear River Commission since his appointment thereto effective December 1, 1974; and

WHEREAS, George L. Christopulos, through his active participation in the negotiation of the Amended Bear River Compact, contributed directly to the Member States gaining additional water storage and depletion entitlements above those specified in the original Compact, thus furthering the development of the water resources of the Bear River Basin; and

WHEREAS, George L. Christopulos has, throughout his career as a public official in the water resources field, always sought to foster the spirit of compromise, cooperation and comity which is cardinal to successful interstate river administration; and

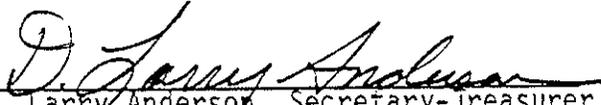
WHEREAS, the State of Wyoming has been well served by this respected and knowledgeable public servant in the activities of the Bear River Commission; and

WHEREAS, the States' Members on the Bear River Commission will miss the wise counsel, objectivity and humor which George has manifested during his association with the Bear River Commission; and

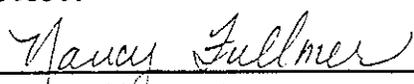
NOW, THEREFORE, BE IT RESOLVED that the Bear River Commission does hereby express its deep gratitude and appreciation to George L. Christopulos for his contributions to the Bear River Commission, the successful negotiation of the Amended Bear River Compact, and the wise and equitable development of the water resources of the Bear River Basin for beneficial use by the citizens of the Basin, for which purposes the Compact and Commission are in place, and for his vigilant efforts to foster the sense of interstate cooperation by which those purposes may be realized;

BE IT FURTHER RESOLVED that the Members of the Bear River Commission, wish George, Esther and their family the very best of health and happiness in life now and in the future.

For the BEAR RIVER COMMISSION


D. Larry Anderson, Secretary-Treasurer

Attest:



Nancy Fullmer, Secretary

RESOLUTION OF APPRECIATION
by the
BEAR RIVER COMMISSION
Regarding
A. KENNETH DUNN
November 23, 1987

WHEREAS, A. Kenneth Dunn, a distinguished Director of the Idaho Department of Water Resources, has served diligently as an ex-officio member of the Bear River Commission since 1981, and

WHEREAS, Ken has effectively carried out his responsibilities as an ex-officio member of the Commission and thus served well the interests of Idaho and the Bear River Basin in the vital area of water resources planning and development, and

WHEREAS, in his dealings as an ex-officio member of the Commission, Ken has always been an example of cheerfulness and graciousness, and

WHEREAS, the Commission has benefited greatly by his wisdom and counsel during his tenure as an ex-officio Commission member,

NOW, THEREFORE, LET IT BE RESOLVED that the members of the Bear River Commission express their appreciation and gratitude for six years of dedicated and outstanding service rendered by A. Kenneth Dunn.

BE IT FURTHER RESOLVED that the members of the Commission extend their sincere appreciation and affection to Ken and his family for six years of association, friendship and service.

This Resolution was adopted by the unanimous vote of the Bear River Commission members at the Regular meeting of the Bear River Commission on November 23, 1987.


D. Larry Anderson, Secretary-Treasurer

Attest:


Nancy Fullmer, Secretary

Kenneth T. Wright
320 North Michigan Avenue
Chicago, Illinois 60601
312-558-9055

November 10, 1987

Mr. Larry Anderson
1636 W. N. Temple
Water Resource Dept.
Salt Lake City, UT 84116

Dear Larry:

It may be that I cannot attend the November meeting. It all depends upon the weather.

Since the government only uses United, my options are limited and I am cutting it close. If I miss this Kemp affair, which is my own party at my own house, I may never be invited back again. I'll let you know the Friday before the meeting.

If I don't make it I would like you to Chair and I would like you to add an additional subject to the agenda.

Briefly, I would like a committee formed to analyze the structure and operation of the Commission for the purpose of recommending possible changes that would result in cost savings without disrupting the Commission's work. For example:

- 1) Should we privatize the Commission with state and federal monies going directly to a governing Board which hires and administrates a fulltime employee(s) who runs the operation year round. I am told this has occurred in other similar areas.
- 2) Should this governing board or the existing Commission set up be reduced to less than three representatives and alternates from each state. Why not two or one?
- 3) Are the current measuring systems and evaluation procedures adequate? Where can we improve, become leaner and more efficient?
- 4) Is the cooperation between the three states fully developed? Where can we do more to share and not duplicate effort?

These and many other questions should be looked into by the Committee or perhaps an outside management consultant or both.

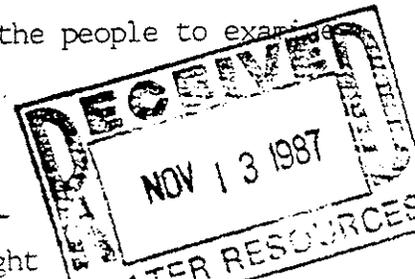
Maybe the review would indicate everything is just dandy the way it is but it doesn't hurt to look.

I believe it is incumbant on all of us who are subsidized by the people to examine where we can do our job better and at less cost to them.

Let's talk about this prior to the 23rd.

Best,


Kenneth T. Wright



Attached are some prepared remarks that were given at the Bear River Water Seminar held in Logan, Utah on January 8 and 9, 1988.

BEAR RIVER WATER SEMINAR

JANUARY 9, 1987

BEAR RIVER COMPACT &

ROLE OF THE COMMISSION

WALLACE N. JIBSON

NEARLY 20 YEARS BEFORE UTAH BECAME A STATE, JOHN WESLEY POWELL, NOTED EXPLORER AND SCIENTIST, IN A REPORT TO THE CONGRESS RECOGNIZED FUTURE WATER APPROPRIATION DIFFICULTIES BETWEEN UTAH AND WYOMING TERRITORIES AND A FEW YEARS LATER ASKED THE CONGRESS FOR LAWS GOVERNING PRIORITIES AND BENEFICIAL USE OF WATER. IT IS INTERESTING TO NOTE IN ONE OF THESE REPORTS THE STATEMENT ABOUT THE FINAL ENTRY OF BEAR RIVER INTO UTAH "...IT HAS ACQUIRED SO GREAT A VOLUME THAT IT IS IMPRACTICAL TO MAKE USE OF ITS ENTIRE AMOUNT."

OF INTEREST ALSO WAS THE REPORT OF ONE OF THESE EARLY PIONEERS WHO WHEN MAKING A RECONNAISSANCE OF THE BASIN FOUND WHAT HE CALLED A CHOICE SITE FOR THE FUTURE IMPOUNDMENT OF WATER - HE MADE A TRANSIT SURVEY OF THE SITE - TODAY WOODRUFF NARROWS DAM AND RESERVOIR OCCUPY THIS CHOICE SITE.

WE CAN SEE WHY BEAR RIVER BECAME ONE OF THE TARGET AREAS OF EARLY INVESTIGATIONS WITH ONE OF THE EARLIEST STREAM-GAGING STATIONS IN THE COUNTRY ESTABLISHED IN 1889 NEAR COLLINSTON, UTAH.

THE EARLIEST IRRIGATION RIGHT ON BEAR RIVER IS ALSO THE EARLIEST RIGHT IN THE STATE OF WYOMING, AN 1862 RIGHT TO THE MYERS IRRIGATION CANAL SOUTH OF EVANSTON. WES MYERS, ONE OF OUR BEAR RIVER COMMISSIONERS, TOLD ME OF HIS GRANDFATHER CROSSING THE RIVER ON HIS WAY TO UTAH. HE WENT ON TO SALT LAKE WHERE HE OPERATED A SMALL BUSINESS FOR A COUPLE YEARS, BUT HE KEPT REMEMBERING THE WAIST-HIGH NATURAL TIMOTHY IN THAT NARROW BEAR RIVER VALLEY SO RETURNED AND STARTED RANCHING. SEVERAL MILES OF RIVER BASIN IS STILL IN THE MYERS FAMILY.

BEAR RIVER IN ITS NATURAL CHANNEL PASSES SEVERAL MILES TO THE NORTH OF BEAR LAKE. ABOUT 1909 EFFORTS BEGAN TO CONSTRUCT FACILITIES FOR DIVERTING THE RIVER WATER INTO BEAR LAKE. THE TASK OF CONSTRUCTING AN INLET AND AN OUTLET CANAL WAS COMPLETED BY UP&L COMPANY SUCCESSOR TO TELLURIDE POWER IN 1918. THIS WAS AND IS TODAY THE SINGLE MOST IMPORTANT DEVELOPMENT AFFECTING BEAR RIVER WATER, AND A FEDERAL COURT DECREE (DIETRICH) IN 1920 GRANTED TO UP&L CO A TOTAL OF 5,500 CFS OUT OF THE BEAR TO DIVERT TO BEAR LAKE FOR STORAGE WITH TWO PRIORITIES OF 1911 AND 1912. THE DECREE MENTIONS NOTHING RELATIVE TO THE LAKE OPERATING LEVELS, MAXIMUMS OR MINIMUMS OR TOTAL QUANTITIES.

DERIVATION OF THE 5,500 CFS IS NOT CLEAR, BUT IT WAS NOT UNTIL 1984 THAT THE TOTAL FLOW IN THE RIVER EVEN APPROACHED THIS AMOUNT WHEN ABOUT 5,000 CFS WAS MEASURED AT THE POINT OF DIVERSION. NEEDLESS TO SAY, THIS RIGHT STOPPED ANY DEVELOPMENT OF STORAGE ABOVE BEAR LAKE WITH A LATER-DATED RIGHT PROVIDED THESE UPPER USERS IN WYOMING AND UTAH RECOGNIZED THE DECREE WHICH AFTER ALL THEY WERE NOT A PARTY TO. NEVERTHELESS, RECOGNIZING ANOTHER STATE'S RIGHT AND FEARFULL OF COURT ACTION, ESSENTIALLY NO STORAGE WAS DEVELOPED UNTIL THE BEAR RIVER COMPACT BECAME LAW IN 1958. EVEN SO, THIS WAS A SORE SPOT TO USERS IN THE UPPER BASIN.

ON THE OTHER SIDE OF THE COIN, WE EXPERIENCED IN THE 1931-35 PERIOD THE DRIEST CONSECUTIVE FIVE YEARS IN THE 67-YEAR PERIOD OF RECORD. BEAR LAKE WAS DRAWN DOWN TO THE BOTTOM OF THE PUMP DRAFT TUBES (5902 FT ELEV.), THE POINT WE CALL ZERO USEABLE WATER. BUT THE OTHER PROBLEM WAS THE NATURAL FLOW OF THE RIVER...WYOMING USERS HAD THE "HRIORITY" BUT NOT THE PRIORITY OVER IDAHO USERS ABOVE BEAR LAKE AND DIVERTED MOST OF THE AVAILABLE SUPPLIES IN THIS DRY PERIOD. USERS IN IDAHO VOWED THAT THIS WOULD NEVER HAPPEN AGAIN, AND EITHER FEDERAL COURT ACTION OR AN INTERSTATE COMPACT MUST COME ABOUT.

SO, THESE SORE SPOTS; FIRST, STORAGE ABOVE BEAR LAKE, AND SECOND, ALLOCATION OF NATURAL FLOW BETWEEN STATES WERE OF MOST IMPORTANCE IN BRINGING ABOUT NEGOTIATIONS TOWARD AN INTERSTATE RIVER PACT THAT WENT ON FOR MORE THAN TEN YEARS UNTIL IN 1958 THE BEAR RIVER COMPACT WAS APPROVED BY THE CONGRESS.

NATURAL FLOW ALLOCATION AMONG STATE SECTIONS ABOVE BEAR LAKE WAS BASED ON IRRIGATED ACREAGE IN EACH SECTION WITHOUT REGARD TO RELATIVE PRIORITIES (UPPER AND CENTRAL DIVISIONS). A PROPOSED ALLOCATION OF 36,500 AC-FT ANNUALLY FOR UPPER RIVER STORAGE THAT WOULD NOT BE JUNIOR TO BEAR LAKE RIGHTS DREW CONSIDERABLE OPPOSITION FROM IDAHO AND UTAH USERS DEPENDENT ON BEAR LAKE WHO REMEMBERED THE THIRTIES AND THE EXHAUSTION OF THE LAKE SUPPLY. ALSO OPPOSING THIS GRANT WAS UP&L COMPANY WHO AT THE TIME WAS PRODUCING MAYBE 75 PERCENT OF ITS TOTAL POWER FROM WATER MOSTLY IN THE BEAR WITH FIVE POWER PLANTS WITH A TOTAL OF 115,000 Kw. LARGE QUANTITIES OF STORED WATER HAD BEEN RELEASED SOLELY FOR POWER PRIOR TO THE THIRTIES AND CONTRIBUTED TO THE LAKES DEPLETION TO ZERO BY 1935.

TO ASSURE DOWNSTREAM USERS OF A SUPPLY AT LEAST EQUAL TO THAT IN THE CRITICAL PERIOD AND STILL ALLOW UPSTREAM STORAGE, RESTRICTIONS WERE IMPOSED ON FUTURE USE OF BEAR LAKE WATER SOLELY FOR POWER GENERATION. THIS WAS ACCOMPLISHED BY THE ADOPTION OF A BEAR LAKE IRRIGATION RESERVE WHEREIN BEAR LAKE WATER BELOW 5,914.70 FT ELEVATION COULD NOT BE RELEASED SOLELY FOR POWER GENERATION BUT COULD PRODUCE POWER AS IT WAS ROUTED DOWN THE RIVER FOR IRRIGATION. THIS MAXIMUM RESERVE WAS APPLICABLE AFTER THE FULL 36,500 AC-FT WAS DEVELOPED, INCREASING IN INCREMENTS DURING DEVELOPMENT. TODAY THE RESERVE IS 5,914.61 FT CORRESPONDING TO 30,000 AC-FT DEVELOPMENT.

FOLLOWING THE THIRTIES AND A LESS SEVERE DROUGHT IN THE FORTIES, BEAR LAKE HAS BEEN OPERATED ESSENTIALLY AS AN IRRIGATION RESERVOIR WITH HYDROPOWER SECONDARY. THUS, THE POWER COMPANY HAS SET ITS OWN RESERVE EVEN BEFORE THE COMPACT REQUIRED IT AND AT A HIGHER ELEVATION. BETWEEN 1926 AND 1946, THE LAKE WAS BELOW THE IRRIGATION RESERVE ELEVATION VIRTUALLY ALL THE TIME, SINCE 1946 THE ELEVATION HAS BEEN ABOVE THE RESERVE EXCEPT SHORT PERIODS IN THE MIDLIFTIMES, EARLY SIXTIES, AND 1977-78.

IN THE LOWER DIVISION BETWEEN IDAHO AND UTAH THE INITIAL COMPACT PROVIDES THAT IF NECESSARY WATER DELIVERIES BETWEEN IDAHO AND UTAH WILL BE BASED ON PRIORITY WITHOUT REGARD TO STATE LINE. NO DIVISION OF STORABLE WATER WAS MADE. NEITHER DID THE COMPACT ALLOCATE GROUND WATER IN ANY DIVISION, NOR DID IT CONSIDER DEPLETION OR CONSUMPTIVE USE IN ALLOCATING NATURAL FLOW OR STORAGE.

RIVER ADMINISTRATION UNDER THE COMPACT WENT SMOOTHLY WITHOUT PARTICULAR PROBLEMS IN THE BASIN ABOVE BEAR LAKE, BUT IT SOON BECAME APPARENT THAT A DEFINITE ALLOCATION OF UNDEVELOPED WATER SHOULD BE MADE BETWEEN IDAHO AND UTAH SO THAT EACH STATE COULD PROCEED ACCORDING TO ITS OWN PLAN OF DEVELOPMENT WITHOUT THE PRESSURE OF OBTAINING EARLIER PRIORITIES AS AGAINST THE OTHER STATE. THEN TO, WYOMING AND UTAH USERS ABOVE BEAR LAKE HAD FELT SHORTED IN THE STORAGE ALLOCATION OF 36,500 A-F OF WHICH 1,000 A-F WAS RESERVED FOR THOMAS FORK IN IDAHO. AFTER ALL, THE AVERAGE ANNUAL FLOW ENTERING IDAHO OFF THE UTAH AND WYOMING WATERSHEDS WAS 337,000 AF (1937-86)

A REVIEW OF THE COMPACT IS PROVIDED FOR INTERVALS NOT EXCEEDING 20 YEARS, AND AMENDMENTS MAY BE PROPOSED. AGAIN, SEVERAL YEARS WERE SPENT IN THIS REVIEW BEFORE AN AMENDED COMPACT WAS APPROVED IN 1980. THE AMENDED PACT ALLOCATES AN ADDITIONAL STORAGE OF 70,000 AF ABOVE BEAR LAKE DIVIDED EQUALLY BETWEEN WYOMING AND UTAH AND 4,500 AF FOR USE IN IDAHO. HOWEVER, ANNUAL DEPLETION FROM THIS NEW STORAGE, PLUS NEW RIGHTS INCLUDING GROUND WATER, CANNOT EXCEED 26,000 AF ANNUALLY DIVIDED EQUALLY PLUS 2,000 AF IN IDAHO.

THE ADDITIONAL STORAGE ALLOCATION IS LIMITED TO PERIODS WHEN BEAR LAKE IS ABOVE 5,911 FT ELEVATION. THIS LEVEL GIVES DOWNSTREAM USERS ABOUT A 3-YEAR HOLD-OVER SUPPLY. DEPLETION FROM THE ADDITIONAL STORAGE OF COURSE REDUCES WATER AVAILABLE FOR POWER PRODUCTION. THIS LOSS TO HYDROPOWER, THOUGH IMPORTANT, IS LESS SIGNIFICANT NOW WHEN HYDROPOWER ACCOUNTS FOR ONLY 3-5 PERCENT OF TOTAL PRODUCTION. IF BEAR LAKE IS FULL AND OVERFLOWING SUCH ADDITIONAL WATER ALSO CAN BE STORED ABOVE BEAR LAKE UNDER A COMMISSION-APPROVED PROCEDURE.

THE AMENDED COMPACT GIVES IDAHO THE FIRST RIGHT TO REMAINING WATER IN THE LOWER DIVISION OF 125,000 AF OF DEPLETION. UTAH IS GIVEN THE SECOND RIGHT TO 275,000 AF DEPLETION, AND THE NEXT 75,000 AF IS DIVIDED EQUALLY. ANY REMAINING IS ALLOCATED 70 PERCENT TO UTAH. AGAIN, GROUND WATER IS INCLUDED IN THESE ALLOCATIONS.

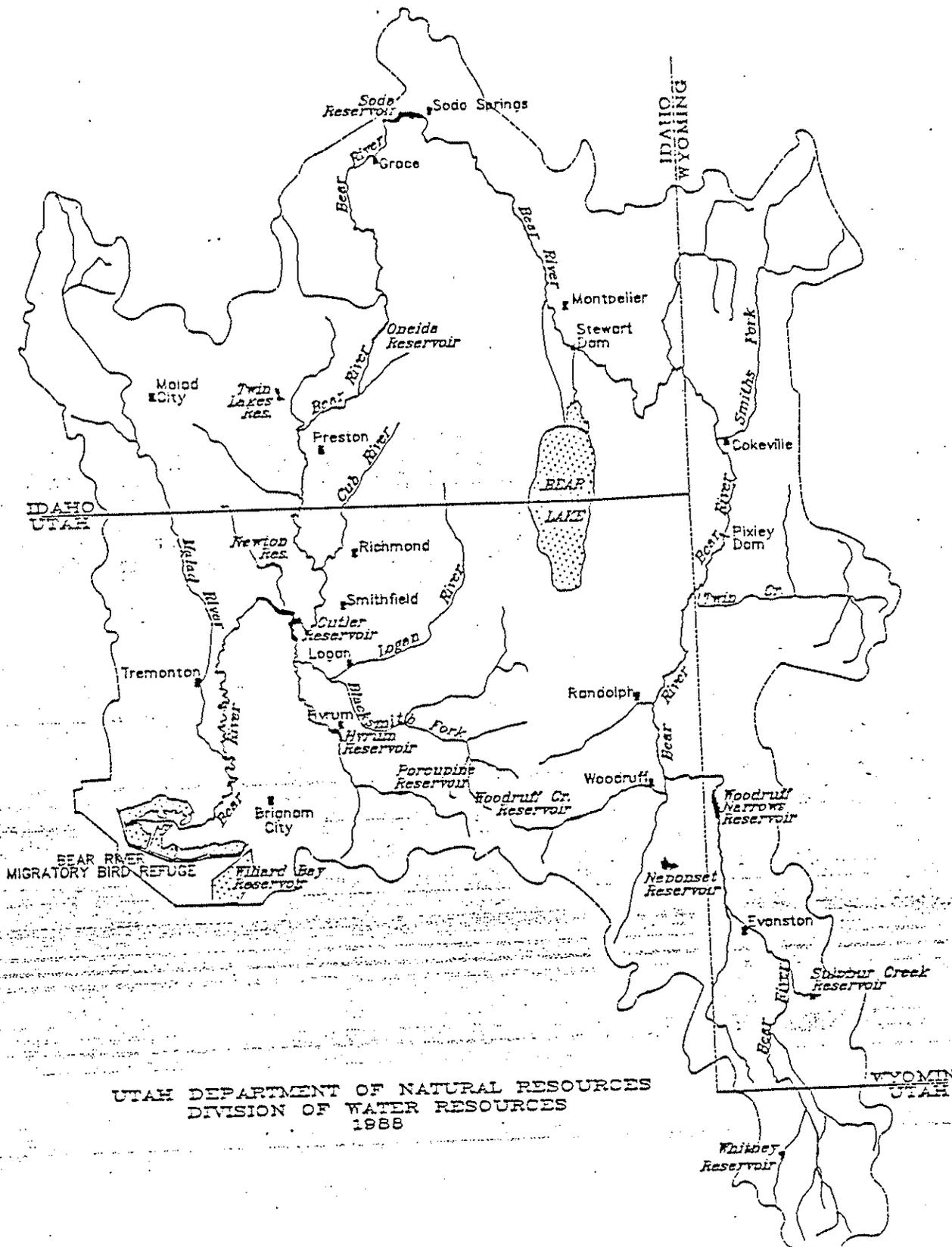
THE BEAR RIVER COMMISSION, CONSISTING OF THREE FROM EACH STATE PLUS A FEDERAL REPRESENTATIVE WHO SERVES AS CHAIRMAN WITHOUT VOTE CONSTITUTES A LEGAL ENTITY CREATED TO ADMINISTER THE COMPACT. THE COMMISSION IS AUTHORIZED TO DO ALL THINGS NECESSARY IN ADMINISTERING AND ENFORCING THE COMPACT. THIS INCLUDES HIRING AND CONTRACTING FOR SERVICES. AN EXISTING CONTRACT IS WITH USU FOR CONSUMPTIVE-USE STUDIES OF WATER APPLIED FOR IRRIGATION. RESULTS OF THIS STUDY ARE NEEDED TO IMPLEMENT ADMINISTRATION OF THE COMPACT. A SIMILAR CONTRACT IS WITH THE THREE STATES - MORE WILL BE SAID ABOUT THIS STUDY THIS AFTERNOON.

BUT, THE COMMISSION'S AUTHORITY IS LIMITED TO COMPACT MATTERS. WE HAVE HEARD REMARKS ABOUT THE ADVANTAGE OF THE COMMISSION BEING A SPONSOR FOR WATER DEVELOPMENT. THIS TYPE OF ACTIVITY IS BEYOND ITS SCOPE, BUT THE COMMISSION DOES LOOK WITH INTEREST AT SUCH PROGRAMS BECAUSE ONE OF THE STATED PURPOSES OF THE BEAR RIVER COMPACT IS "...TO PERMIT ADDITIONAL DEVELOPMENT OF THE WATER RESOURCES OF THE BEAR RIVER."

ARTICLE VII OF THE COMPACT STATES IN PART, " IT IS THE POLICY OF THE SIGNATORY STATES TO ENCOURAGE ADDITIONAL PROJECTS FOR THE DEVELOPMENT OF THE BEAR RIVER AND IN FURTHERANCE OF SUCH POLICY, AUTHORITY IS GRANTED TO INVESTIGATE, PLAN, CONSTRUCT, AND OPERATE SUCH PROJECTS WITHOUT REGARD TO STATE BOUNDARIES...." AND, IN ART VIII IT PROVIDES FOR WATER AND PROPERTY RIGHT ACQUISITION ACROSS STATE BOUNDARY LINES, INCLUDING THE RIGHT OF EMINENT DOMAIN.

THE ABOVE PROVISIONS FOR PLANNING WITHOUT REGARD TO STATE BOUNDARIES IN NO WAY TAKES AWAY THE AUTHORITY OF THE INDIVIDUAL STATES TO APPROPRIATE AND ADMINISTER THE WATER RESOURCE IN THE STATE, BUT IT DOES EXPEDITE INVESTIGATIVE WORK THAT SO MANY TIMES INVOLVES MORE THAN ONE STATE.

Amended Bear River Compact (Summary)



UTAH DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER RESOURCES
1988

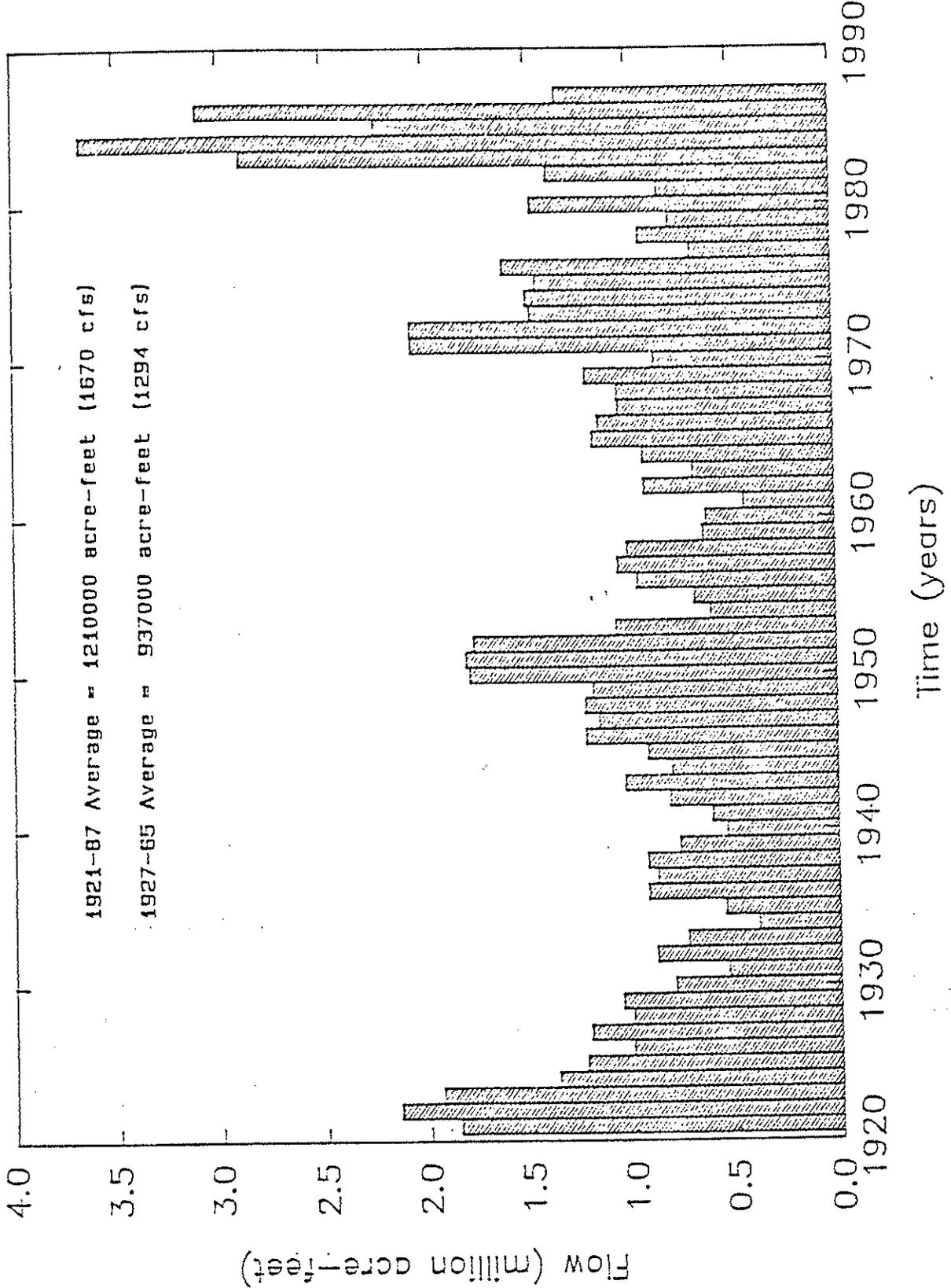
BEAR RIVER BASIN

The Bear River is an interstate stream which drains an area of 4,776,000 acres including 1,725,000 in Idaho, 2,092,000 in Utah, and 959,000 in Wyoming. Its headwaters are but 90 miles from its mouth; yet it meanders 500 miles in a circuitous course in reaching Great Salt Lake. In its travels it makes five stateline crossings in three states. The Bear River is the largest tributary to the Great Salt Lake and the largest stream in the North American Continent that does not reach the ocean.

Settlement of lands adjacent to Bear River began about 1860 and power development began in 1907. In 1909 work began to convert Bear Lake into a storage reservoir by providing additional fill to the natural causeway between Bear Lake and Mud Lake and constructing inlet and outlet canals connecting Bear Lake and Bear River. Now, approximately 500 irrigation organizations own and operate separate irrigation systems in the basin, supply irrigation water for half a million acres of land. There are presently five hydroelectric power plants on the mainstem Bear River with a total generating capacity of 125.5 megawatts. The plants are owned and operated by Utah Power and Light Company. Municipal and industrial withdrawals for a population of approximately 130,000 are made in the basin. The National Bear River Migratory Bird Refuge is located at the mouth of the Bear River.

The Bear River Basin has a mean annual streamflow yield of approximately 1.8 million acre-feet. The mean annual flow of the Bear River into the Great Salt Lake is approximately 1 million acre-feet. The annual flow of the Bear River near Corinne for the 1921-87, 67-year period, is shown on the bar chart below. This is the lowest gaging station on the Bear River near the mouth before flowing through the National Bear River Migrating Bird Refuge and into the Great Salt Lake. The average annual flow for the 67-year period is 1,210,000 acre-feet or 1,670 cfs. The high flow year was 1984 with a total flow of 3.7 million acre-feet or an average of 5,100 cfs. The low flow year was 1934 with a total flow of 393,000 acre-feet or an average of 543 cfs. As can be seen on the chart, the early 20's and 80's are very high flow years. The 1927-65, 39-year period has an average annual flow of 937,000 acre-feet or 1,294 cfs. The 1927-65 period has been used by the U.S. Bureau of Reclamation and state water planning agencies to represent the water supply available for development. The mean monthly flow of the Bear River near

BEAR RIVER NEAR CORINNE



Formal negotiating meetings began in 1970. A total of 17 meetings were held. The intent in the creation of the negotiating group was that its members were to seek an understanding of possible allocation of water among the three states which might lead to modification of the 1958 Bear River Compact.

In 1975, the Negotiating Committee drafted proposed revisions to the 1958 Compact and the separate state committees held information meetings on the proposed changes. The Commission then held public hearings in Logan, Preston and Evanston. As a result of the testimony, the Bear River Commission decided not to seek approval of the three state legislatures in 1977. At a series of meetings in 1977 and 1978, the Commission sought to find language which would satisfy objections raised during and following the hearings.

At a special meeting held July 17, 1978, the Bear River Commission approved a new "Working Draft" of the Compact for consideration in the respective states. Hearings on this draft were held in December 1978 in the three states.

The Bear River Commission, on December 22, 1978, approved a final draft of the Amended Bear River Compact. The Amended Bear River Compact was ratified by the legislatures of Idaho, Utah and Wyoming during the 1979 legislative sessions. The United States Congress gave its legislative consent, and the President of the United States made it effective by adding his signature on February 6, 1980.

AMENDED BEAR RIVER COMPACT PROVISIONS

The Amended Bear River Compact provides the following changes to the 1958 Compact:

- I. Lower Division below Stewart Dam (Bear Lake)
 1. Allocates the waters below Stewart Dam between Utah and Idaho, but states that water delivery will be based on priority of rights without regard to state boundary lines for all of those rights where water was applied to beneficial use prior to January 1, 1976.
 2. The water not applied to beneficial use prior to January 1, 1976, is allocated as follows:
 - A. Idaho is granted the first right to develop and deplete 125,000 acre-feet, including groundwater, in the Lower Division.
 - B. Utah is granted the right to develop and deplete 275,000 acre-feet, including groundwater, in the Lower Division.
 - C. The next 150,000 acre-feet of water depletion, including groundwater, will be divided equally between Utah and Idaho.
 - D. All water in excess of the above allocations will be split between Utah and Idaho, with Idaho receiving 30 percent and Utah 70 percent.
- II. Upper and Central Division (above Bear Lake)
 1. All present rights remain in force as stated in the 1958 Compact.
 2. Additional storage granted above Bear Lake is 74,500 acre-feet, of which 4,500 acre-feet is granted to Idaho, and 35,000 acre-feet is granted each to Utah and Wyoming.

This storage, including groundwater development, is subject to an annual depletion limit of 28,000 acre-feet of which Idaho is allocated 2,000 acre-feet, and Utah and Wyoming 13,000 acre-feet each. The Upper and Central Divisions will not be allowed to store this water when Bear Lake is below elevation 5911 feet.
 3. When Bear Lake is full and overflowing, additional water can be stored in the Upper and Central Divisions. These "Bear Lake spills" are allocated as follows: 6 percent to Idaho, 47 percent to Utah, and 47 percent to Wyoming.

WATER DEVELOPMENT INSTITUTIONS

(remarks by Calvin W. Hiibner)¹

I wish to thank Senator Holmgren, Commissioner Nishiguchi, Kent Horton and the others who organized this seminar for allowing me to participate with you. I am sure that all of us have been enlightened from the discussions in which we have participated last evening and today. Intellectual activity is physically draining for most of us and the days have been long. For that reason I know that you will appreciate any effort on my part to keep these remarks to a reasonably short time frame and therefore take mercy on all of you. I caution you of course to be aware that it is quite difficult for a professor to talk for a short time. Nevertheless, let me try.

When we discuss development organizations we are invariably led to a discussion of government and politics. Most have strong feelings about these words, and not all of these feelings are positive. I am reminded of H.L. Menken's description of government as an "efficient engine of plunder." Personally I know of a certain date in mid April when our 1040 forms are due and at the end of November when a visit to the county treasurer's office is necessary in order to pay property taxes that I sense a certain logic to Menken's description. Most of the other time in the year, however, I am able to remember that these taxes (aka plunder) are necessary in order for us to enjoy the government services that we demand. It also crosses my mind on occasion that I am an employee of government. Without this plunder it would be most difficult to achieve our societal goal of providing goods and services that are in the "public interest." The provision

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of water for municipal, industrial, and recreational use are certainly goals that we share in this society. In addition, water appears to be useful for power production, the production of food and fiber, and other associated uses that we are not prepared to ignore.

My reading of the water resource literature as well as experience leads me to believe that water delivery services are usually best served by cooperation and are most effectively managed on a regional basis. In the 1980s it is not a function that is efficiently provided by the family group or at the neighborhood level. Sometimes it is possible to validly argue that everyone should look after his or her own water needs and ignore others, but this is very seldom a cost effective solution to the provision of a quality water supply. In addition, regional water systems are amenable to economies of scale. In the 1980s a regional water system is provided as a government service. Yes, I am aware of the arguments in favor of privatization, but privatization of a capital intensive water program such as that necessary for an acceptable level of water quantity and water quality is just talk. Large scale private water systems are for another time and another place, not the 1980s. When large groups of people need water they cooperate willingly in order to get it in a cost effective manner. In a voluntary cooperative effort not all who use water and benefit from its use are willing to pay the cost of development. Those who take advantage of the system are called free riders. In the arid West our solution to the problem of free riders has been to use the powers of government to ensure equity. Everyone pays a fair share. This system is now over 100 years old. Allow me to illustrate this.

We have heard discussions of Water Conservancy, Water Storage or Irrigation Districts among this group. All such Districts follow the pattern set in the Wright Act which was passed by the California Legislature in 1887. The Wright Act allowed California residents to organize Water Storage Districts by petition and a popular referendum in order to provide irrigation, municipal and industrial water for large tracts of land in the state. The present local government special districts that provide water on an area wide basis are all traced to this brainchild of the California politician Percy Wright. This act was controversial but was found constitutional by the U.S. Supreme Court in the 1896 case of Fallbrook Irrigation District v. Bradley. Mrs. Bradley, a British subject, owned 10,000 acres in San Diego county and was being assessed taxes in order to pay for an irrigation system that she did not intend to use and that she did not want. Mrs. Bradley was, after all, in the business of producing beef on her ranch. She did not want to grow avacados or oranges or grapes or condominiums or whatever one produced in San Diego county in 1896. The court found that the California Legislature was serving the public interest in this case and the unwanted taxation could not be construed as the taking of property without due process of the law. I can envision the same case with different names being argued in Northern Utah or Southern Idaho or Western Wyoming today. The political process today works as it did in California in the 19th century. The political process can be used to provide water for you and to pay for it through taxation and user charges. It really is of little consequence that part of the population does not want to use water or that someone does not want to pay for it. The political

process is used to provide for what is perceived to be in the public interest by the majority.

That period in history, 100 years ago, was an era of intense social unrest. This was the period of the robber barons, exploitation by monopolies and it was a popular reaction to these and other perceived evils that gave us the mass popular unrest that resulted in the Granger movement and its political manifestation -- Populism. The story of Populism is familiar to all either from an American History course or maybe from reading the "Wizard of Oz," Frank Baum's story for children. Dorothy's adventure in the land of Oz is really a thinly disguised political allegory. Dorothy and Toto, representing the naive popular political movement lead the tin woodsman, rusty and no longer able to move -- representing industry; the brainless scarecrow -- the unorganized farmers; and the cowardly Lion who roared, but had no courage -- William Jennings Brian -- on a trip down the yellow brick road to Oz -- the symbol of Gold -- to the Emerald City -- Washington D.C. -- and without knowing what they were doing overthrew the Wizard -- that old Humbug (any President) but most likely Grover Cleveland. Remember how this odd collection destroyed the wicked witch of the west? This witch was really the harsh environment of the west that had enslaved its people including the winged monkeys -- the American Indians. The witch was destroyed by water -- irrigation, yes reclamation. In Oz, as in true life, the naive popular coalition captured the Emerald City and with the scarecrow in charge, government was used to change the world. Remember with the witch of the west destroyed by reclamation, the tin woodsman (industry) became king of the west.³

In real life -- California in 1887 and followed soon by all of the other western states -- the power of government was harnessed to bring water to the farms, cities and industries. Wealth was created by bringing water to the farms and by providing water for people and for industry and the monopoly of railroads owned by the British and the Eastern establishment and the power of large landowners was broken. The popular belief in 1887 was that water development would bring prosperity. Prosperity was in the public interest. Government must use its coercive power to require all to pay in order to achieve the larger public interest. Has anything changed? I think not.

Decades of social science research tell us that in the long run a population will get what it wants from its government. Not all are equal in this process. There is, after all, considerable evidence that most of the adult American public take little note of what is in the public interest. In an average general election only about 60% of the public can be counted on to vote for candidates to the executive or legislative offices that will decide what is in the public interest. Most of those who vote do nothing more in the political process than vote. In any given decision making area only about 10% to 12% of the adult American public are active in community affairs. We can anticipate that it is this portion of the public that cares and that decides what the public interest is. This active portion of the population can be further divided into the 1/3 of that population that is usually against everything related to water development and another 1/3 of the population that is in favor of any water development including the most nit-witted ideas that can be

generated. The remaining 1/3 of the politically active population (3 to 4 percent of the population total) is actually engaged in looking at the facts relevant to water development in order to determine what is really in the public interest. These are the elites in the population who actually lead and influence public opinion.

Let me now turn to a few remarks on the type of governmental structure that is relevant for water development. What is best? Is it a Water Conservancy District, a Metropolitan Water District, a State Organization or what? The short answer is simple. The structure that is best is the one that works. The details of the particular structure are of little importance. We see this historically in the development and demise of the political machine. In the 19th century local governments provided few social services. The political machine arose in almost every part of America and provided social services. The political machine only disappeared when other institutions were able to provide social services -- federal, state and local. Water institutions are no different. State, local and federal governments were unable to deliver water. Other institutions were created to perform that function. The new institutions (special purpose districts) will go away only at such a time as when water management is no longer a demand on political institutions or when state and federal governments satisfy social demands through the general purpose governments -- counties, municipalities, or the states.

Much too much time is spent in the Bear River Basin debating the relative merits of enabling legislation for structures such as Water

Conservancy Districts and Irrigation Districts. Some changes were needed a few years ago in Utah in the statute that authorized Water Conservancy Districts. In this case the District Board Members appeared to be unresponsive to the electorate --or such electorate as existed. That was remedied. No doubt other minor changes in the Water Conservancy District statute would still be of some value, but the Districts do have considerable redeeming value or at least cause little harm. They have been around since the 1930s and we understand how they work. Massive changes in how we provide regional water management and development would most likely become a modern day WPA project for the legal profession as we petition the courts to interpret what is the most recent legislative intent.

Any organization will efficiently carry out public policy well if it is staffed by well paid competent professionals who are chosen for their positions on the basis of merit. In addition, those who make policy for the organization must be bright and responsible to the electorate. On the other hand, no organization, no matter how it is structured, can efficiently carry out public policy if the politically responsible decision makers are "turkeys" or if it is staffed by ill paid political hacks masquerading as professionals. In the last quarter of the 20th century is it unreasonable to expect both modern democratic political structures and well qualified staff in all positions in our political organizations? I think not!

Enough from me. Let me close with advice. Keep in mind that I am not an expert! After all I live here and an expert is defined as someone who is far enough away from home so that his spouse doesn't

find out what he said. This is only advice from a simple school teacher.

1. Determine the facts.
2. What is the most likely scenario for the future?
3. What is the demand for water in the future?
4. What is the cost of all water development options?
5. What benefit is expected from water development?
6. Share this information with the public?
7. You will then have an informed public and as a leader in the political process you must then do what the public will then demand. If you don't do what they want, the public will find new political leaders in order to achieve their demand.

¹ These remarks were prepared for delivery at the Bear River Water Seminar in Logan, Utah on January 8-9, 1988. Dr. Hibner is a Professor in the Department of Political Science at Utah State University.

² 164 United States 112.

³ For a full discussion on the above see Henry M. Littlefield, "The Wizard of Oz: Parable on Populism." American Quarterly 16, Spring 1964, pp. 47-58.

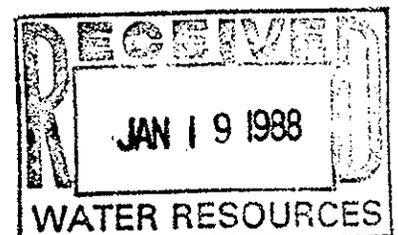
WATER DEVELOPMENT AS A TOOL FOR ECONOMIC DEVELOPMENT
IN THE BEAR RIVER BASIN

By Jay C. Andersen¹

Before I get into this topic directly, I would like to spend just a few minutes telling you some of the things that are going on up at the university. We have some rather interesting things I think. Some of them are rather subtle and you may not realize that these things are happening.

I am as deeply offended as any of you at the strident voices from faculty members and from other places on antidevelopment issues where it seems clear that vocal and well-funded minorities are seeking to appropriate public and privately owned property to their own minority type of use preferences. I consider it immoral and wasteful on much of the obstructionist things that go on. The pendulum has swung too far from some disregard of environmental and related issues to where how the obsessions we have with court orders and regulations and demonstrations seriously impair the functioning of the economy. Crime, drugs, and the impairment of the economy by excessive attention to regulations and concentration on protection of all possible side effects, sites, species, and recreational and wilderness experiences are serious detriments and threats to the country. Mines have been undermined, commerce and industry have been subverted, and the well-being of most people ignored.

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But, honestly, I have concerns for zealots of other kinds who have long strived to use their influence to use capital and resources of others to enhance their own wealth position. Instances where cities, industrial companies, power users, irrigators, and many other classes of entrepreneurs have succeeded (often by subterfuge) to gain advantage have occurred. I conclude, therefore, that I am against those who seek to have us make economically inefficient and inequitable decisions and investments from wherever the source of proposals come.

It is my contention that the strength of the university comes from the ability of faculty members to make objective analyses and advise the people accordingly. You should pay less attention to those on faculty or elsewhere who are out of their discipline and take up crusades of advocacy. Unfortunately, courts, governments, the news media, and people, in general, pay undue attention to the shrieking voices of uninformed advocates of certain positions and little or no attention to those who have made patient analysis of the pro and cons of important issues. Strident voices will continue as long as we have freedom of speech. Let us always have that freedom. My suggestion is that you strive to pay less attention.

Let me illustrate the kind of work we can do with some work of myself and several colleagues in the last couple of decades. After I had spent about ten years with the U.S. Department of Agriculture, the first assignment I had at USU was that I was asked to evaluate a proposal to grow and freeze vegetables in Sanpete County. With some help from colleagues, we concluded that there were reasons why at that time, place, and conditions, such an enterprise could not be viable. Now there were some powerful people in state government, the Four Corners Regional Development Commission, and in the University who were anxious that this enterprise be

found feasible. I had recently been stationed at two universities where professors had been dismissed for taking up unpopular opinions. That was heavy on my mind as the results of the study became evident. I was hopeful that people get in trouble because of the way they present information, not for the nature of their findings. Fortunately, all of the important people in control had the integrity to accept the study. To this day I believe that the study was correct and that the decision which the growers and promoters reached to not proceed with the plant was in the best interest of growers and taxpayers. But, if the study we made had been fully read and understood and the promoters had gone forward with the plant anyway, I would have been the first to attempt to give further aid where I could contribute.

About a decade later, Dean Matthews and I were called into Governor Matheson's office along with the Commissioner of Agriculture and asked to evaluate a livestock packing plant proposal on which there were some differences of opinion. Again, it was clear that the governor and the commissioner were anxious to see something develop if it could be expected to be profitable. Again, with help of colleagues we studied numerous alternatives in size of plant and mixes of products and found that the conditions were not conducive to success in any of the options proposed by livestock people or for those which we could devise. The growers decided not to proceed. Again, to the immense credit of the powers we reported to, the results were accepted.

Again, within the last couple of years there have been renewed proposals for vegetable production and processing. Dr. Don Snyder of our department and others of us again found that there were only certain limited sets of conditions under which the proposal could succeed

financially. The study is still being scrutinized and opportunities evaluated. There may be more work on this.

Be assured that there was no negative predisposition on the part of any of us involved in these studies. Life would have been and would be now simpler if we could have determined more positive results from these studies. Samuel Goldwyn once said, "Never make predictions, especially if it's about the future." Life would be simpler. But, projections about the future are interesting and sometimes informative.

Now, let me give you a couple of other examples. About seven or eight years ago, the Utah Irrigation Pumpers Association came to us for help in mitigating the very rapid increase in power rates that had hurt them. Previously, pumpers had been represented to the effect that their financial position was too poor to endure continued increases. The problem was that the power company was allowed certain revenues for power and any decreases for pumpers showed up as increases for households, industry, or other groups. Relief was hard to achieve. In trying to help them we decided on an approach to attempt to spread the power company's load out by providing incentives to pumpers to pump when other users were not at peak use. Thus, new plants and other expensive power production alternatives could be averted. Numerous analyses and appearances before the Public Service Commission have paid off. The payments by farmers have been reduced by several million dollars per year, and much is being done to make all power production lower in cost.

I found it useful to work on this issue not because of wanting to be an advocate for farmers, but because the economic principles were interesting and because there was an opportunity for farmers and other residents of

Utah to all gain. I think it has been a very productive effort because we had the freedom to be a little creative and to pursue new options.

Finally, in one more example, a little over a year ago I was appointed to be a member of the Farmland Assessment Advisory Committee. This committee advises the State Tax Commission. As I came onto this committee, there was considerable pressure to increase farmland assessments and thus property taxes by about 20 percent. The state needed revenues. But in looking at the law which states that farmland should be assessed on the basis of its income-producing capability, we presented evidence that farm income had not increased to warrant such a change. I believe that this analysis at least forestalled tax increases to farmers. Again, this was not done in any biased attempt to aid farmers to the detriment of others but because the provisions of the law and the analysis we did showed the correctness of this position.

I have in the past and in the future will try as hard as I can to present an unbiased analysis of the options and the findings as we consider development proposals and any of our other analyses. But, I choose not to make decisions for people. The choice becomes the option of the user. I would have to tell you that I have presented likely outcomes of certain investment or development schemes and my predicted outcome was bankruptcy. In one case that I can remember, the person said he was going to try it anyway. The outcome was exactly as predicted, but my responsibility ended with answering the questions not telling the individual what to do. I do not have to assume responsibility for the bankruptcy. Think of the lawsuits if we told people what to do and we were wrong. It is equally inappropriate for you to ask me to facilitate whatever you want to do

without any kind of analysis. I don't want to be and cannot be simply an advocate for the positive or the negative.

Perhaps you think I should take the advice of an old professor who had a sign with a motto hanging in his office that said, "Don't be so open-minded that your brains fall out." I think some of the illustrations I gave you indicate that we are willing to publish, defend, and espouse certain conclusions as we come to them. Perhaps you are now thinking of me, "He may be wrong, but he's never in doubt."

Well, all of these illustrations are not designed to cause you to bring praise or condemnation to me or any colleagues at the university. The point is that the rest of my remarks on Bear River Water Development are designed to indicate that we must be objective. Some indicators will suggest moving ahead. Others will wave flags of caution because of potential hazards in the economic progress that might or might not occur and because of concerns with equity of potential participants.

Well this question of using water to provide for economic development is an interesting one. One of the contrasts that can be made is to view the Columbia Basin up in Washington as compared to the Phoenix and Tucson areas down in Arizona. It seems clear that the Columbia Basin as it now is with communities all over, with the viable agriculture (as much as agriculture is viable anywhere), would be quite different if the Columbia Basin project hadn't been placed in there. So it is very clear to see that something has happened. On the other hand, if we look at the Phoenix and Tucson areas, the rate of growth in their economies is approximately the highest in the nation. And yet it is one of the most water-short areas. Water is scarce, it must be taken from one use and put into a higher valued use to provide for growth. So we have an interesting contrast here. But

there are some differences. One of the differences is that the Columbia Basin has developed using primarily the water-intensive kinds of activities in agriculture and the processing of these products and, essentially, nothing existed there before. Neither was there any water readily available. Whereas in Phoenix and Tucson, in many cases growth depends on activities in the industrial sector, the electronics sector, and just plain as a place to live and retire. The choice to live there is due to a comfortable climate and that does not depend on intensive water use. So there are some significant differences in the way we might look at the use of water and the development of these two areas.

One of the things we ought to do is to define what we mean by economic development. If we are going to do something to try and promote economic development, it is clear that we need to know what that goal is, what it is we are looking for. I'd like to start with defining a few things that economic development is not. First thing that it is not is that it's not just having more people. If we have more people in a given area who are poor, we would define that as being something other than economic development. That can happen with some kinds of activities. If we bring in very low-paying jobs, bring in the kinds of things that have very high costs such as the development of the schools and highways, police departments, and so forth; it can very well turn out that even though there are more people, these people are worse off than before. Along the same lines, economic development is not simply having more economic activity, but with less income. The sort of things that we might have are again some low-paying jobs and difficulties with climbing up the income and opportunity ladder. If we can't increase as we go along in the income and the opportunities, then we are not better off. It is also not clear that if some

people are made better off by some kind of a development and some are made worse off, that an area is better off for having engaged in this new activity. It may well be that it would be better to avoid it if quite a few are worse off, since that creates problems in equity and a lot of difficulties that are hard to overcome. What we are saying by these things that economic development is not, is that all change is not growth. That is just the same as saying that all movement is not forward. So we don't necessarily want to do something in the name of economic development if in fact it doesn't provide for that economic development. It is clear that the cost can be too great and the benefits too low for some changes to be worthwhile. We can say that economic development has occurred when the people involved have expanded their range of choices, especially the economic choices. That is, if they have more income, they can choose more broadly among the goods and services that can be obtained. If they have a better environment to live in, then they have an expanded range of choices of things to do. If the situation is simply more enjoyable and comfortable, then we say that people have had an increase in economic well-being. It is pretty obvious that in some cases income may be increased at the expense of some environmental amenities. Then it is not so clear whether economic development has occurred. The value of each side, the increase or the decrease must be evaluated. I take the point of view that it is man we care about. I don't care how bears, fish, skunks, or any other kinds of creatures or any other kinds of trees or plants feel, if they in fact do feel, about the development. It is for the benefit of mankind or it is for the disbenefit of mankind if we do something. It may be that the welfare of the trout in the fishery does enhance the well-being of man and then it becomes of concern to man, but other kinds of creatures and things except

as they impact on people do not matter as far as my point of view on what constitutes development.

So we come down to the bottom line on evaluating water projects and that is that the calculation of benefits and the costs to people needs to be unbiased. The benefits and the costs need to be related to the people who receive these. If someone receives a benefit, he should presumably pay for the cost of providing that benefit. This seems like it is appropriate in fairness as well as in economic efficiency criteria. Some may gain and some lose, but the costs ought to closely follow the benefits received. For some, it may be that their taxation is higher. It may be that there is a loss or gain in amenities and so forth. All of these things need to be weighed in a very careful and unbiased way.

If a water development project depends on taxing those who do not stand to gain to make it financially feasible, then it may indeed not only be unfair but also have a negative impact on economic development. I find this to be contrary to economic principles and contrary to basic guidelines of fairness and equity. Taxes take money out of circulation and prevent other activity that leads to economic progress.

It is true that benefits and disbenefits of a water project development may be fairly widespread. Secondary effects may be positive in a local area due to employment and income increases because of forward and backward linkages to the project. Examples of this are the economic activities to produce supplies and inputs for the project during construction and operation. Agricultural input suppliers and recreational equipment makers and sellers are often benefitted. Forward linkages may include agricultural processing, transportation, and further development of more

intensive agriculturally related enterprises such as beef production and processing when only crop production previously existed.

On the side of disbenefits (which is especially troubling in agricultural projects in an era of surpluses), these costs are extensive and widespread. Every alfalfa grower in the United States is probably harmed by a minute amount for every ton of alfalfa that is grown on a new project at any location. But, the sum of all of these small costs is at least equal to or greater than the benefit to the new project grower. Somewhat unfortunately, agricultural products are characterized by inelastic demand, which leads to more production reducing total revenue to all farmers. Therefore, if we view water projects from a national perspective, then it is nearly impossible to realize net benefits from agricultural development. Even for a crop like apples we can be assured that the apple growers in Washington, Michigan, and New York are sensitive to development of new apple production areas in Utah or elsewhere.

Even in a more provincial sense, if the state of Utah finances a project, we must be somewhat concerned that the new project reduces the benefits in existing projects. Examples are: apple-growers in Payson; alfalfa-growers in Delta, Milford, Southern Idaho, etc.; water recreation in Bear Lake, Willard Bay, Hyrum Dam, etc.

Dr. Garry Carruthers, an agricultural economist colleague who was formerly Assistant Secretary of Interior and is now Governor of New Mexico, has made a significant point in calling for cost-sharing to be borne precisely according to who benefits from the project. As he points out, if each beneficiary of the project is called on to pay for the project according to benefits received, there will be little or no incentive to justify projects which do not have positive net benefits. Then there would be no

attempt to involve those who do not benefit in a project. Incidentally, Carruthers may now have a slightly different perspective, especially if he has hopes of federal funding for a New Mexico project. In reality, there are no federal programs to pay for water in New Mexico or in Utah like there were a few decades ago. Local cost-sharing and bearing is now a way of life.

I liked the approach that we developed for three countries in West Africa. Each sector like agriculture, navigation, and power in each country and each country in total had determined the costs they were to bear and for which they were totally responsible for guaranteeing loan repayment.

Let's turn now to an assessment of just what the development opportunities are in the Bear River Basin. We would consider agricultural developments, industrial development, municipal development, or other possibilities.

Development Opportunities

Agricultural Development

The simple truth is that hay and grain crops cannot pay for water development at this time. The demand for water and the price that can be paid for water depend on the profitability of growing these crops. It just isn't there. But, what of the future?

Livestock Economy

In Utah, for every year in many years livestock receipts have been about 75 percent of all farm receipts. Clearly, most of the crops grown have gone for livestock feed. Without careful investigation of this relationship, I suspect that about the same relationship holds in the Bear

River Basin. So, if crop growers get higher prices for feed, it hits stockmen in the pocket. The stockmen have learned long ago that government crop subsidies aren't in their best interest. Added amounts of feed grown might depress prices along with providing a better base for livestock enterprises. But, it isn't clear that added feed crop production would greatly benefit our predominantly livestock economy—especially if feed production was at high cost.

World Trade

Recent improvements in wheat prices seem to be primarily from failure of the monsoon in India and South Asia and from other means to make our products more competitive. However, our ability to sell is in the long run dependent on our ability to produce quality goods at competitive prices in world market places. Our share of world agricultural trade has declined in the 1980s because of our own government policies and the emergence of other producers. The loss in grain markets has been a major factor in the decline of the farm economy. Grain production has increased throughout the world in recent years. The Green Revolution has been effective. Wheat can be grown almost everywhere in the world. As more and more countries gain and then exceed self-sufficiency in food grain production, their wheat is changed to a feed grain. We are now in that phase except for some temporary setbacks. Thus, our markets for both food and feed grains are disappearing. It is my opinion that we will not in the foreseeable future return to the luxury of exporting 70 percent of our wheat and 30 percent of our feed grains as we did in 1981. The only exception foreseeable is worldwide drouth or other disaster which none of us would choose or plan for.

Some have been disappointed that the decline in the value of the dollar has not more quickly improved the balance of trade in agriculture. Two factors slow the recovery of trade which was expected as the dollar decline makes U.S. goods cheaper to foreign customers. First, even though the dollar has declined against many currencies, this has not been universal. Examples are the Mexican peso and the Canadian dollar. These two currencies and some others have declined even faster than the dollar. Thus, the value of the dollar, in general, may not influence trade, in particular agricultural commodities, as expected. Second, when trade arrangements and agreements are made, there may be a substantial lag of time before new changes are made because of considerable inertia in the system.

As hopes for a turnaround in the U.S. farm economy continue, the reality of the situation must be recognized. The farm economy depends in a major way on exports. And being able to export depends on being competitive. High cost of production such as associated with expensive irrigation water cannot again be sustained.

Alternative Crops

The agricultural depression has brought farm interests everywhere to where they are considering growing and processing so-called high-value crops. At one point in time, a count was made recently that asparagus production and processing in excess of present levels was being considered in 38 states. Other crops have brought similar interests. The biggest concern that we have is that the markets for these crops are thin. Entry costs are usually high and a few too many producers will spoil it for everyone. There is potential for big losses.

On the other hand, the most successful producers now are often those who do find a little different market niche. They find a product in demand and using best technologies and attention to market demand and production detail, they make a decent living. Specialty crops and livestock specialties may make the difference. But, in almost every case this would not justify development of new agricultural land or water. They really are alternative enterprises to the present ones.

In summary, there are no foreseeable needs, demands, opportunities, or in any other terms reasons to develop water for agricultural enterprises. The fact that there is unirrigated land out there and some water out there is totally an insufficient reason to develop water. One farmer may find it in his personal interest to intensify his cropping if he already has the machinery and other resources so that he can spread his fixed costs and raise each bushel or ton for lower cost. But to provide for this would be an unreasonable use of public resources.

Challenges

1. Water Quality

The apparent reason to choose to consider upper reaches of the Bear River and tributaries to develop for M & I purposes is the diminished quality of water in the lower Bear River. Sedimentation, phosphorus, organic matter, salts, etc. come from numerous sources especially in Idaho and Utah.

It is my impression that there will be increasing and intense political and regulatory pressure to improve water quality to make the river more useable in lower reaches. Part of the pressure will continue even though the river has been "dirty" through geologic time. That is, natural

occurrences are, to some extent, responsible. Some improvement can and ought to be accomplished and is due to farming and living. But, what I see happening is that those who desire to use Bear River water will insist increasingly that better water be delivered to the lower Bear. This means that residents of the Basin, perhaps especially those above Box Elder County, will be responsible for the work and cost of clean water rather than lower Basin residents and nonresidents being responsible for conveyance structures to avoid dropping water into the main channel. It will amount to a major shift in financial responsibility from that which might now be foreseen.

Much of the argument on water quality and even federal legislation is oriented to "zero discharge" requirements. This is unattainable and inefficient. We should avoid concerns with this criterion. Clearly the costs to attain zero discharge exceed the benefits. Land and streams have some absorptive capacity.

2. The Conservancy District and Financial Responsibility

According to present law, being included in a Conservancy District could raise an individual's property taxes by only one or two percent. But, there is confusion on this. Your efforts to have the law clarified are commendable. Perhaps there is not a major cause for concern--probably the financial stake is not very great. Even if there are few, remote, on hard-to-recognize benefits, cost isn't much for most taxpayers. But, there may be principles involved. I personally have a strong aversion to taxes or other costs being levied on me for which I receive no benefits, even if they are quite small. That just does not seem fair. It becomes especially

offensive if a small number of people benefit greatly at the expense of many.

The amount of tax that could be levied by a Conservancy District, apparently being a small amount to individuals, is small in the aggregate. Thus, the actual development of impoundments, conveyences, generating stations, and other facilities is well beyond the scope of funding from the taxes raised. The source of funds must be primarily from other taxing units or from revenues from sales of water, power, and other products of the project. These can come from municipalities, irrigation districts, or individuals. Recipients of project services would be well-advised to be very careful on contractual obligations. It may be true that a conservancy district, or some like organization, is the only way to get local representation. Other units may dominate the decision-making if there is no strong local entity.

3. Agricultural Development

As we have noted, any development, even on an interim basis, to use water in agriculture until other demands materialize is subject to severe challenges. Agricultural users can't afford to pay for the water. It is worth no more than \$10-\$15 per acre foot. Even the secondary benefits (if we were to consider these) are not possibly worth more than an additional \$10-\$15. And then, of course, there is the problem of the market and price burdens placed on current growers.

The benefits occurring from the linkages to agriculture are not sufficiently spread around the population to warrant general taxation of all individuals. Agricultural development seems less pertinent through time. Even if financial arrangements, likely based on farmers' "ability to

pay" are provided, the full costs of irrigation development or supplementation must be paid by someone. Can we afford to use scarce capital and other resources in subsidizing agricultural development? I think not.

4. Industrial Development

Ray Moses' maxim is that "water runs uphill to money." There are ways to buy and sell water. IPP got their water. Huntington power plant got their water. Money makes it flow. Facts are that water is not a very important cost item in most industries. Consider three energy industries that are generally considered to be very heavy in water use. Dr. Batty, in our engineering college over a decade ago, estimated that if the cost of water was increased by \$200 per acre foot of water, it would increase the cost of coal gasification by just more than two percent, and for coal liquefaction or for coal-fired electrical generation, the increase in cost would be only one percent or a little more. Many other industries use much less water per unit of their product output and can buy up farms or buy water rights readily without significantly affecting their costs or profits. With water being worth less than \$20 per acre foot in irrigation, there is no doubt that industry can bid it away. In the research we did some years back in writing the book "Regional Growth and Water Resource Investment" we found that in theory and in practice manufacturing and service industries do not choose a location based on cheap or plentiful water. They use other criteria to locate and then they get the water. Most industries have found water-saving technologies in recent years to lessen the need for large quantities of water. Therefore, we do not foresee significant advantages to public water development for industry as an

incentive to attract more jobs and income. Other approaches would likely be more cost effective.

5. Municipal Use

Two approaches are going on in municipal water development. One is, of course, to continue to augment water supplies and to meet continuing high levels of water use per capita. In the Great Basin, water use is 300 gallons per capita per day for domestic water use. Since the water bill remains a small part of a family's income, not much change happens unless a significant change is made. We only go on paying a little more over time as new sources of water must be obtained as population and commerce and industry expand. Just as with industrial uses, the value of water in municipal use is sufficient to bid it away from other (especially agricultural) uses.

Another approach is to develop culinary water rates that provide incentives to reduce water use. In many places in the world where water is scarce and expensive, toilets are designed to use less than one gallon per flush. Ours use 5 gallons.

One of the realities is that households are responsive to price in their use of water. As water sources become more expensive and water rates must be increased, then people reduce water use. Of course, not many drink less. During the drouth one of our dairy farmers had a bumper sticker that read, "Save Water, Drink Milk." Of course, that's not realistic, but landscaping can be changed or irrigation changed and more efficient plumbing fixtures can be obtained. For many years I have observed that water resources planners fail to account for response to price changes occasioned by heavier demands on the system which lacks additional inexpensive

sources. They go on and on assuming that household use will always be 300 gallons per capita per day. I doubt that this will hold and that has important implications for municipalities within the Bear River Basin as well as those that are seen as potential customers outside the basin. Maybe those markets will not be as big as we assume. Rene Dubos said it simply and eloquently, "Trend is not destiny."

Municipalities will look at their options and decide where to obtain water. They will consider minimizing risk, cost of providing the water, water quality, and other criteria. Surely though they will consider alternative sources. One of the certainties is that they will consider buying out other uses as well as conservation of water.

Conclusion

I wish to congratulate those of you who are responsible for proceeding to do some planning for the future use and development of the Bear River. It is most commendable that you wish to be in control of your own destiny. It wouldn't be any fun to go back to the shovel fights on the ditchbank to resolve water issues. It is obvious that all of us and the public in general have much to learn in regard to future demands and opportunities for use of the water resource. It also seems apparent that there are many options from which to choose.

My plea is that adequate consideration be given to all options and that both costs and benefits be considered. We must especially guard against "climbing a mountain just because it's there," or irrigating land just because it's dry or providing water from faraway mountains at extreme cost just because "that would be nice." I am especially concerned that

local people spend heavily to provide water to some distant potential customer who may or may not choose to buy it.

Go forward, but go with both eyes wide open, and with your hand and head protecting your wallet and mine.