

MINUTES OF THE  
BEAR RIVER COMMISSION  
ANNUAL MEETING

April 20, 1981

Room 303  
State Capitol Building  
Salt Lake City, Utah

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10:00 a.m.

CALL TO ORDER

CHAIRMAN JIBSON: Our annual meeting, then, will officially come to order. I didn't realize that I was so isolated up in Cache Valley until Connie informed me this morning that our former Chairman and Federal Representative, E. O. Larson, passed away about two weeks ago. I think Connie has distributed copies of a resolution that she and Dan have prepared. I would like to read it. Do you have copies of that around the table? (At this point, Chairman Jibson read the Resolution.)

This will be signed by the Chairman, and the Commissioners from each state. We will have two covering letters go with this. I will send one as Chairman of the Commission. Dan has prepared one that he said was just a little personal because Olie had given him his first job, I think, when he was out of school. I would like to read Dan's letter. I think its a very nice letter and we would like to send both letters, along with the resolution, to Mrs. Larson. (At this point, Chairman Jibson read the letter.) So, we will send around the original for original signatures today. I am sorry that all of our Commissioners are not here. Dan Roberts called me at six o'clock this morning and he is in bed with the flu; but we will pass this around the table for signatures, and get this to Mrs. Larson as soon as we can. We could get a picture of E. O. We will have one 'In Memorium' picture to go in our biennial report for Cliff Skinner. We could get one from Mrs. Larson and have two in this report before its published; but we will discuss that report a little more. (Copies of the Resolution and letters are attached to, and made a part of, these Minutes.)

I think at this time we'd better have introductions. We have a few new faces among us. We can start out here and go right around the table and then back around, and then up with Ed.

Those Present

United States

Wallace N. Jibson, Chairman and Federal Representative

Idaho Commissioners

Don W. Gilbert

Utah Commissioners

Daniel F. Lawrence (Secretary-Treasurer)  
Simeon Weston  
Paul Holmgren

Wyoming Commissioners

George Christopulos, State Engineer  
John A. Teichert (Alternate Commissioner)  
J. W. Myers

Legal Adviser

E. J. Skeen

Alternates and Others in Attendance

Blair R. Francis (Alternate Commissioner) Utah  
Cal Funk (Alternate Commissioner) Utah  
Dee C. Hansen, State Engineer, Utah  
John P. Holmgren, II, Division of Water Resources, Utah  
Norman Stauffer, Division of Water Resources, Utah  
R. Michael Turnipseed, Division of Water Rights, Utah  
Bert Page, Division of Water Resources, Utah  
Walter R. Scott, Hydrographer - Commissioner, UT-WY, Utah

Kenneth Dunn, Director, Department of Water Resources, Idaho  
Russell Stoker, Watermaster - Bear River, Idaho

Marvin Bollschweiler, Water Commissioner, Wyoming  
John P. Buyok, State Engineer's Office, Wyoming  
Paul Schwieger, State Engineer's Office, Wyoming

Ted Arnow, District Chief, U.S. Geological Survey

J. G. Haight, Utah Power & Light Company  
Carly Burton, Utah Power & Light Company  
Raymond T. Petersen, Woodruff Narrows Reservoir Company

Connie Borrowman, Secretary to the Commission

Roland Robinson from the Solicitors Office, the Chairman's legal adviser, was here a few minutes ago. He does have a conflict, and I told him I didn't know of any 'shooting matches' coming up today and so he asked to be excused. We are happy to welcome the new members to the group.

MR. LAWRENCE: Mr. Chairman - Mr. Dunn introduced himself as the new Director. I don't know if all the Commission members know that Steve Allred has resigned. I think last Monday was Ken's first official day as Director; and I would like, on behalf of the Commission, congratulate him on his promotion and new position.

CHAIRMAN JIBSON: We do officially congratulate you, Ken. We heard unofficially about this a while back. We note that Idaho is still short a Commissioner replacement for Cliff; but we certainly welcome you to the group.

MR. LAWRENCE: We would like a Motion concerning the Resolution.

CHAIRMAN JIBSON: Yes, I think it would be in order that we have a Motion on the Resolution at this time.

MR. CHRISTOPULOS: I will so move.

MR. LAWRENCE: I will second.

CHAIRMAN JIBSON: It has been moved and seconded that we prepare this Resolution and have it in our official files, and send it to Olie's widow. Any further discussion? All in favor?

MOTION CARRIED.

#### APPROVAL OF MINUTES OF LAST MEETING

CHAIRMAN JIBSON: Our next item of business will be approving the Minutes of our Special Meeting of September 18, 1980. Minutes were distributed, but I know there are some here today who probably didn't get copies. I have four of five copies here, that we can hand around. I have summarized the Minutes and we will read the summary. If you have any questions on the Minutes, we can discuss those before approval.

## SUMMARY OF MINUTES OF SPECIAL MEETING

September 18, 1980

Special meeting of the Bear River Commission was called primarily to consider budget and stream-gaging programs for 1981 fiscal and water year. The meeting convened at 10:00 a.m. in Salt Lake City. George Christopulos, Dan Roberts, Sim Weston and our legal adviser, Ed Skeen were absent because of other commitments. Minutes of the Annual Meeting, held April 28, 1980, were approved.

The Chairman's (Assistant Secretary's) Report briefly discussed compact operation for the season but was limited primarily to budget and stream gaging for 1981. He recommended discontinuance, as of September 30, 1980, of five additional gaging stations. These consisted of East Fork Little Bear River, Hyrum Reservoir, Logan River below Blacksmith Fork, Hammond Canal and West Side Canal. The Commission approved this recommendation with one change--Malad River near Plymouth was substituted for East Fork Little Bear River. UP&L will continue operation of the two canals in the group.

Discontinuing the five gaging stations reduced the number of stations in the cooperative program from 38 to 33. The suggested budget was based on these 33 stations at a cost of \$3,120 per station year.

Most of the meeting was devoted to a discussion of the overall administrative program of the Commission as would be reflected in my decision to retire completely from Federal Service. Because of this decision, I had modified the usual "Compact Assistance" portion of the budget to be included as a direct-expenditure item rather than as a part of the cooperative program with the USGS. Either way, this has been and is an obligation of the Commission without matching Federal funds. My initial suggestion of \$8,000 in this assistance item was increased to \$10,000 by Commission action after a second look at anticipated work for the fiscal year. This action amended the overall budget to an allocation of \$51,480 to the USGS and \$63,690 to the Bear River Commission, or a total of \$115,170.

The Commission, in approving the budget with some reservation from Idaho on future budgets, authorized Secretary Dan Lawrence to meet with me and prepare a contract for the usual assistance work that would be limited to \$10,000 for the fiscal year. (This has been done and I am now working within this contract.)

The Secretary-Treasurer was also authorized to prepare a letter on behalf of the Commission and forward to Secretary Andrus recommending that I continue as Federal Representative on the Commission following my retirement from Federal Service. A similar letter, drafted by Dan, would be prepared for signatures of the three Governors. (These letters have been submitted and favorable answers received from Secretary Andrus and his successor, Secretary Watts. Each stated that he was directing the Geological Survey to be the responsible agency for providing the necessary Commission-related expenses of the Federal Representative.)

Following discussion on automation of streamflow records along the lines being tried in other basins in Idaho, the meeting adjourned at noon.

Now, you have had a chance to look over the Minutes. Do we have any corrections or additions that any of you have noticed in the Minutes? Motion, then, would be in order to approve the Minutes.

MR. MEYERS: So move.

MR. HOLMGREN: Second.

CHAIRMAN JIBSON: It has been moved by J. W. Myers. Seconded by Paul Holmgren. Any further discussion on the Minutes? All in favor of approving the Minutes of the Special Meeting say 'aye'. Opposed?

MOTION CARRIED.

Next is a report of the Chairman, and I think the remarks that I made in summary of the Minutes concerning the approval of the Secretary of Interior on my continued service is about all I have specifically to report on. Any other comments I have, I think I will make in connection with the report that will be made by the Assistant Secretary. I think we will move to a report of the Secretary-Treasurer at this time.

#### REPORT OF SECRETARY-TREASURER

MR. LAWRENCE: Chairman, before Bert gives my report, we have an agreement between the Bear River Commission and the Department of Interior Geological Survey - a Joint Funding Agreement - that needs signing. All of the fine print is too small for me to read, but it's for \$51,480 by the Party of the First Part for July 1, '80 to June 30, and \$58,480 from the Party of the Second Part. We pay \$58,450 and GS \$51,480. Is that right? There is a difference of \$7,000. Ted Arnow, District Chief, has signed this contract. I don't know if Commission approval is necessary; but I think it is desirable, and so I would move that we authorize the Chairman to sign this contract - and if you wanted to add the Treasurer, that's fine.

MR. ARNOW: This is a 1981 fiscal year contract. But would you read those dates again, please?

MR. LAWRENCE: July 1, 1980 to June 30, 1981.

MR. ARNOW: I believe that is an error on the part of my office.

MR. LAWRENCE: Another error - you sent this to Olie Larson's address. Incidentally, this is dated December 24, 1980 and we received it February 19, 1981.

CHAIRMAN JIBSON: We have no unmatched money any more, including 1981. This is a direct expenditure; so it should be \$51,480 to both parties.

MR. LAWRENCE. Could you frame a statement that we would authorize for signing, the proper amount and year?

MR. ARNOW: I will get this fixed up appropriately and send it to the Chairman of the Commission.

MR. LAWRENCE: We ought to give him authority to sign it; if we knew how much.

CHAIRMAN JIBSON: Do you all have your Minutes with you? If you will turn over to page 4 of my report in the Minutes, we have a budget for the fiscal year ending September 30, 1981. I have marked that 'revised' because in our Commission meeting, as I just noted in the Minutes, the direct expenditure item was raised from \$8,000 to \$10,000; but that did not affect the Cooperative Agreement. So the Cooperative Agreement between the Geological Survey and the Bear River Commission should be for \$51,480 each side, with no unmatched funding. Now that budget has been approved. Do we agree on that, Ted?

MR. ARNOW: I agree on that; and I will have the Joint Funding Agreement revised to match that, and send it directly to you.

MR. LAWRENCE: Chairman, I move that we authorize the Chairman to sign that agreement.

MR. GILBERT: Second.

CHAIRMAN JIBSON: Any further discussion on the Cooperative Agreement? All in favor? Opposed?

MOTION CARRIED.

MR. PAGE: This is the Financial Statement for the Bear River Commission as of April 30, which is yet to come. I figure if Ted can find the address of Mr. Larson, I can forecast a little bit. (Summary of Financial Statement, as presented by Mr. Page, follows.)



BEAR RIVER COMMISSION

STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF OCTOBER 1, 1980 TO APRIL 30, 1981

<u>Income</u>	<u>Cash On hand</u>	<u>Misc. Income</u>	<u>Approved Budget</u>	<u>Total Revenue</u>
Cash Balance 10/1/80	\$48,098.20	\$-----	\$-----	\$48,098.20
State of Wyoming	\$-----	\$-----	\$23,000.00	\$23,000.00
State of Idaho	\$-----	\$-----	\$23,000.00	\$23,000.00
State of Utah	\$-----	\$-----	\$23,000.00	\$23,000.00
Interest on Savings and other income	\$-----	\$-----	\$-----	\$-----
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TOTAL INCOME TO April 30, 1981	\$48,094.20	\$-----	\$69,000.00	\$117,098.20

DEDUCT OPERATION EXPENSE

EXPENDED THROUGH U.S.G.S.

	<u>APPROVED BUDGET</u>	<u>UNEXPENDED BALANCE</u>	<u>TOTAL EXPENDITURES</u>
Stream Gaging	\$51,480.00	\$51,480.00	-0-
SUBTOTAL	\$51,480.00	\$51,480.00	-0-

EXPENDED THROUGH COMMISSION

Compact Assistance	\$10,000.00	\$ 7,413.30	\$ 2,586.70
Printing Annual Report	\$ 1,200.00	\$ 1,200.00	\$-----
Treasurer Bond and Audit	\$ 350.00	\$ 30.00CR	\$ 380.00
Printing and Reproduction	\$ 300.00	\$ 280.00	\$ 20.00
Legal Consultant	\$ 300.00	\$ 300.00	\$-----
Office Expenses and Supplies	\$ 60.00	\$ 2.97CR	\$ 62.97
SUBTOTAL	\$12,210.00	\$ 9,160.33	\$ 3,049.67
TOTAL EXPENDITURES	\$63,690.00	\$59,140.33	\$ 3,049.67
UNEXPENDED CASH BALANCE AS OF 4-30-81			<u>\$114,048.53</u>

BEAR RIVER COMMISSION

DETAILS OF EXPENDITURES

FOR PERIOD ENDING APRIL 30, 1981

296	Wallace N. Jibson	\$ 371.70
297	Wallace N. Jibson	384.00
298	Wallace N. Jibson	384.00
299	VOID	---
300	Wallace N. Jibson	684.00
301	Gilchrist & Co., CPA'S	380.00
302	The Copy Center	20.00
303	Wallace N. Jibson	763.00
304	Utah State Treasurer	73,000.00
	New Checks	<u>62.97</u>
		\$76,049.67
	Less Savings	<u>73,000.00</u>
	Total Expense	\$ 3,049.67

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BANK RECONCILIATION

April 30, 1981

Cash in Bank per Statement 4-1-81	\$ 77,252.72
Less: Outstanding Checks	\$ <u>73,000.00</u>
Total Cash in Bank	\$ 4,252.72
Plus: Savings Accounts - Utah State Treasurer	<u>\$109,795.81</u>
TOTAL CASH ON HAND AND IN THE BANK	<u><u>\$114,048.53</u></u>

CHAIRMAN JIBSON: Do we have any questions on the Financial Statement?

MR. LAWRENCE: I have one. These certificates, do they turn over and get a different interest rate; do we get a report from the Treasurer every three months?

MR. PAGE: We get a report - it depends on what he invests them in. When they come due, then we do get the interest. There has been none become due this year, so I show no interest on here. Generally, they tell us when they send a certificate to us, it's kind of a receipt, like a bank statement but I didn't bring that with me. They are better than we can get anywhere else because we are investing in the 100,000 plus dollar market. Everytime we invest something, the Treasurer takes some of his money and someone else's, whoever may be investing, and it's always in \$100,000 lots; so we can get the best market on that.

CHAIRMAN JIBSON: Any other questions? A Motion would be in order to approve the report of the Secretary-Treasurer.

MR. MYERS: So move.

MR. WESTON: Seconded.

CHAIRMAN JIBSON: Any further discussion on the matter? All in favor?  
Opposed?

MOTION CARRIED.

#### REPORT OF STATE ENGINEERS' COMMITTEE

CHAIRMAN JIBSON: I would like to deviate from our agenda just a little bit at this time and call on Dee Hansen, Utah State Engineer, for a report from the State Engineers' Committee concerning remote sensing, and other discussion we have had in the last two meetings on implementation of the depletion features of the Amended Compact.

MR. HANSEN: Thank you Mr. Chairman. As you recall in the Minutes of the last meeting, we discussed at some length the possibility of using remote sensing to determine the acreage within each state as of January 1, 1976. Utah has made some attempt, in the latter part of '76, to identify the amount of acreage that had already been placed under irrigation; but Idaho had indicated at that time there was no way of them really knowing what they have, and so we started discussing the use of remote sensing.

Dr. Merrill Ridd is here from the Center for Remote Sensing and Cartography, University of Utah. I have worked with Dr. Ridd over the past few years attempting to figure out how we could do acreage surveys for enforcement purposes. I found him a delight to work with. He agreed to come this morning and give us a short presentation. I thought it would be well for all of you to have him give a little presentation so that you know what we are talking about, and then if there is a need or an opportunity to enter into some sort of a contract with Dr. Ridd to do all three states, that you would be in a better position perhaps, with that knowledge, to do this. Dr. Ridd, why don't you come forward and give a short presentation, if you would.

DR. RIDD: Thank you very much. I will get set up here as quickly as I can. I brought along two illustrations. We have had the good fortune to work with the State Engineer's office in Utah, as well as with the Water Resources Division and just quickly, I brought two brief illustrations.

The first one, which is the simpler of the two, which does not involve any digital or computer mapping facilities, which we did with Dee Hansen's people in Southern Utah in exploring the expansion of irrigation down there; and then the second illustration, which I'll try to summarize rather quickly, is one that we did with Dan Lawrence and Norm Stauffer's office in a Uintah Basin study conjointly with the Soil Conservation Service, in which we were trying to get a little more detail on actual land use classification, with some handle on water consumption.

With regard to the first, then, this is a portion of a satellite image of Southern Utah. The two black areas, I don't think you will be able to see the detail from where you are, this is the Enterprise Valley area, near Enterprise and Beryl Junction; this is the Parawan Valley area near the town of Parawan in Southern Utah. I realize that you can't see that from a distance; but I will pass around some things which you can see, and then refer briefly to the reports that we have written on it. The issue here was the expansion of irrigation in those two valleys working with Mr. Hansen's people, Jerry Stoker and his group in the Cedar City office. They identified certain people, potential violators I suppose of the expansion concept, and we got the details of the township and range land which they should have been, which they were allocated to operate within; and then we, through the use of satellite imagery with just manual interpretation, identified whether

or not these people were over, or under, their allocated acreage. The Parawan Valley area was far more so than the Enterprise area. But the illustrations that I have here, which I will pass around since I realize you cannot see these in detail from where you are - here is a three-date set of the Beryl Junction-Enterprise area, on which is a superimposed overlay of the township and range system together with the outline of the fields or the ownerships in question. The issue here was to look at those several dates, and determine through the sequence of time, this is the growing season of 1978, how many of these farmlands were being irrigated beyond that allocation. You will see, as I hand these around, that in some dates it is difficult to tell; in other dates its quite clear-cut. Typically, the later in the season the more sure we are - and with looking at the two dates combined, we can be very sure, as we were in this case with 98% accuracy, we missed on only one field as a result of our investigation. Following our investigation in the lab with the imagery, we went into the field to double check while the irrigation season was still on and we found, in fact, that all except one field in the two county study area were properly identified as being irrigated. When we get down to dealing with one date, it's a little bit problematical because, of course, a thing like alfalfa could be in stubble form in mid-season and may not be evident in the imagery.

One thing that you need to understand and most of you do not, I am sure, at this stage of the game, is that the bright red here indicates healthy green vegetation. A dim red or the faded red or pink colors indicate that there is probably some healthy green vegetation there; but it is either a stubble field that has been cropped, or it's a field that is being poorly watered, or some such thing as that - and then of course the matter of checking it in the field to verify either of those assumptions has to follow.

I'll pass these around so that you can see these three dates. I'll send the Enterprise Valley this way, and the Parawan Valley that way so that you can see them. This scale on this is 1 to 125,000. It's double-up from the typical enlargement. We typically work from an enlargement at 1 to 250,000, which is the Army Map Service scale, as some people have called it. We find that we have a lot more visual discrimination at 1 to 125,000; if

we enlarge further than that it gets to be a little bit fuzzy, and there is no real advantage in enlarging it. We also made acre adjustments, I might add, before I end this little discussion on the irrigation study. We made acreage estimates both from the color photography or imagery which you see here, which is made from digital data coming from the satellite; as well as acreage estimates from another sensor on board, a return beam vidicom, which produces a black and white rather than color image, but which has a scale resolution much finer - down to about 25 to 30 meters - whereas the resolution on this is approximately 80 meters minimally; and the way you distinguish the particular field size on here is the geometry of the field and some knowledge of area. On this one that detail is much more discriminating, so you can be much more precise here in the definition of the acreage with this black and white; whereas the distinction of whether the field is being irrigated or not is usually more clearly identified on the color. So these two work well hand-in-hand. Let me send those down this way for you to look at.

The Parawan Valley area, the same thing occurred there. Here is a May image, May 1978; here is a July image of the same area with the field boundaries superimposed; here is an August image of the same area; and then here is the black and white RVV product on which the acreage determinations were scaled. Let me pass those around. You can look at those a little more closely.

We did that in the season of 1978, wrote up the summary for Mr. Hansen's office, provided some slides to verify the actual irrigation of the field, and then the following year we did a similar thing experimenting with a single date of imagery. Here is July of 1979; here is May of 1980; so we have these three dates. I'll pass these around in opposite directions so that you can see the two different field patterns. Here is July of '79 for the Parawan Valley area, and May of 1980 for the Enterprise area.

The reports and tabulation of acreages are in these reports for any who care to look at them. One report for each of the several years. And there were violations in every year. As I say, a larger percentage of violation in the Parawan Valley area.

Now that completes the brief summary of the essence of this study on simply identification of irrigated versus non-irrigated land. The question

was not to identify the crop type, nor identify water consumption amounts, but simply the binary decision as to whether the field is being actively irrigated that year or not; this is the question that Water Rights Division was anxious to know.

MR. LAWRENCE: Merrill, this overlay has some cross-hatching. I missed what you said that is.

DR. RIDD: Well, the field patterns on there are identified with the lower squares. The township and range system is indicated section by section with a general overlay. This is a half-inch to the mile, now; so the half-inch units are sections on there. And then the individual fields are identified within those - the 40 or 80 acre, or whatever size fields. Some are cross-hatched or stipled, and others are not. That's simply for our record keeping, and really is not relevant to my discussion to you. That was simply our way of keeping track of the fields.

Now the second study is somewhat more involved. The study that we recently completed jointly with the Water Rights and Water Resources Division, Mr. Lawrence's office through Norm Stauffer and Dave Cole and that group, and jointly with the Soil Conservation Service. There was funding provided from both sources, and the data are equally shared, or mutually shared, between the two agencies - SCS and the Division of Water Resources. It will take me just a little bit longer, I think, to express this. I'll make it as simple as I can. I know how busy your agendas are in a meeting like this, so I'll make this just as brief as possible. I need to give you a bit of a visual reference here; so I'll pin this Land-Sat image up on the board to show the general area of interest; it's this red, patchy area here in the Ashley Valley. The Steinaker Reservoir shows up here; this is the Uintah Mountains; the Green River cutting through Split Mountain and going on through; here is the Duchesne over in here; Roosevelt is about here; Pelican Lake, and Bottle Hollow Reservoir, Sand Wash Reservoir - I realize you can't see the details on this from where you are - Borem Reservoir. The red patches here that follow river bottoms are riparian vegetation. That was part of our objective, especially for the SCS, to determine and classify wet land types, whether an inland fresh marsh or whether a wooded marsh or a shrub marsh. We followed Circular 39 - some of you may be familiar with that. We waited for the new replacement of Circular 39 to come out before

we finalized our classification, and determined that for the purpose of this study Circular 39, Interagency Publication of about 1956, was really a better classification for Utah and for this purpose than the successor of that study which was published last year. So following Circular 39, we came up with 10 wetland types, most of them occurring along the bottomlands of rivers and swales; but some of them actually occurring within farm fields where over irrigation had led to what we call a type 2 class of wetland where there were cattails and other types of wetland vegetation, which were not characteristic of the alfalfa field in which it grew and that sort of thing. So we were mapping down to roughly, as near as we could, an acre to two acres to three acres. Sometimes we can get that fine, and other cases we cannot.

The broader patches of red in here are, of course, the upland areas, the broad plateaus or uplands between drainages where irrigation water is spread out onto the fields; and here we are looking at the irrigated lands in that basin. Our objective was to do both; to map the irrigated lands and distinguish crop type, not just the question of whether or not irrigated, but what crop type; the second part of it being to map and classify the wetland types that were there, with as fine a degree of resolution as we could. We knew that our 'bread and butter' in the whole study would be the U-2 photography - many of you are aware of what this is - it's color infrared photography which can only be used in a light table, so I really need to hold it up toward a light so you can see it, of course. This is used on a light table, both in the lab and a portable light table in the field, and it's the variations in reddishness in these field patterns which give us the clue as to what's in that field. It's not just the tone, but it's also the pattern; whether there is a streaking or a pattern that indicates that an alfalfa field has been windrowed or whatever. You're all familiar with that sort of technique, I'm sure. It's conventional, aerial photo technique, has been used for 40 years or so, but applied to color infrared photography which is far more discriminating than black and white photography ever is, or ever could be, in identifying not just whether it is irrigated or not, but what crop type - and even going a step further, some relative statement about water consumption.

So the 'work horse' in this investigation was the U-2 photography. The backup in the system was Land-Sat. The U-2 plane flies about 60,000 feet,



so this is 10 miles up. With a 24" focal length lens they can scale this at 1 to 30,000, which is what this photography is. It's about 2" to the mile. Actually, it's just a little bit smaller scale than the conventional USGS quadrangle.

With regard to the quadrangle, this was our base scale for mapping - a much larger scale, by about 5 fold, than the scale of photography which I have already passed around in the Southern Utah study - 1 to 24,000. So here we are dealing with a quad scale of 1 to 24,000, a U-2 scale of 1 to 30,000; and by a very innovative bit of manipulating two different data sets, we were able to come up with what we think is a very fine technique. It's not appeared in the literature, but it is something we're going to publish because it has been such a remarkably effective technique, as displayed in this study. The two techniques, again, are the U-2 photography on one hand, and the Land-Sat digital maps on the other. I think I have an illustration here from the Blue Bell quadrangle in which you will see the Sand Wash Reservoir in the lower left or the west central part. You can see this is scaled to fit the quadrangle so that in our digital mapping, as we take the computer tape from NASA, with the software that we have we are able to scale an individual picture element or print symbol from the computer line printer, to a certain cell size specifying the number of meters east, west, north, south. We can scale it to whatever scale we choose to. We chose to scale it at 1 to 24,000; that was our finished product scale.

We found out that by merging these two techniques we were much more accurate than we ever were just using the U-2 photography alone, which, in itself, is in a league better than black and white photography. So we stepped up one league, so to speak, to go to U-2 photography. We stepped up into another league by taking the digital data and scaling it at the same scale as the U-2 photography. Our first effort was to look at the U-2 photography, make delininations on this as one would do conventionally with an aerial photo interpretation to distinguish pasture from corn, from alfalfa, from wheat, and various kinds of wetlands from each other with an overlay. Then to make an interpretation from a digital map - if you saw this closer up you would see there are A's, and B's, and C's, down to Z's. There are one's, two's and three's scattered through the map - and the trick is to determine what the two's are, what the Z's are, and so on. And with interaction

with the field, one can do that. Then one can come back to the laboratory and delineate on this map, with the numbers as the guide, in the same way that one delineates on this map with the photo as the guide.

So we did those two independently at first, and then struck upon the remarkable conclusion that if we would take this print map from the Land-Sat digital data, out of the computer, and make a transparent film of it, a film positive, and rescale it to exactly the scale of the U-2 photo, which is to scale it down to 1 to 30,000, and superimpose the one on the other, we have the best of two worlds combined; and it's a case where  $1 + 1 = 3$ ; where the interaction between the two systems is far better than the sum of the independent parts. That is, this combined interaction of digital interpretation superimposed upon the total values and patterns of the fields underneath, was a remarkably accurate way of not just distinguishing crop type; but also distinguishing, to some degree or other, relative amounts of water consumption. This is a hypothesis, now, that we have not fully tested in the field; it's being tested now by interaction with the people out in the field. It's pretty well shown by our experience here that relative amounts of water consumption can at least be inferred, to some degree of accuracy or other, beyond just stating whether this is pasture or alfalfa field. The next question is, well-watered pasture; partially-watered; or poorly-watered pasture - and the distinction of both the numerical values of the Land-Sat digital overlay and the U-2 photography, together, are telling us over and over again - this field is well-watered; this one is poorly watered; this one is intermediate. So we were able to make such discriminations, although it was not called for in the contract. We wrapped up that report by indicating that this was a system which we think could be applied with a fair degree of accuracy.

So theres the technique. The end product, now, for that particular study, which was called for in the contract, was to take the 1 to 24,000 scale quadrangles, and provide a mylar overlay indicating the crop type and the wetland classification. So on here, I'll pass this around, you'll see a bunch of P's, that represents pasture; you'll see a bunch of A's, that represents alfalfa; you'll see some PJ, obviously pinion-juniper; you'll see some U-1, U-2 and so on, these are little urban things - we also mapped urban land use. You'll also see some I, idle land, you'll see some G, greasewood; you'll also see some 2P, this was our own in-house symbolism

which made its way all through the study and became recorded as a part of the final product - 2P, in this case, means it's really a wet pasture. It's a pasture which has been irrigated but over-irrigated, at least in some parts, which parts we would identify and put a 2P on, which indicates that it's no longer conventional pasture; it's actually converted to a wetland habitat with carricks and other kinds of wetland vegetation that would occur in such a place.

This overlay, then, was prepared for each of the 38 quadrangles. Also, prepared and being distributed now is a copy of the print map, which is now scaled back up to the scale of the quadrangle so that it may be superimposed on the quadrangle. This is what we are using now for our field check to verify that hypothesis that where we see an A and a B, for example, we know it's well-watered alfalfa; where we see a C or a D it's poorly-watered alfalfa; where we see a 1 or a 2 it's a pasture; where we see a 3 or a 4 it's a poorly-watered pasture, and that kind of thing.

I guess the point, in conclusion, that I would emphasize here is that for simply distinguishing whether a field has been irrigated or not during growing season, we can identify that very clearly, very simply, with a visual classification, with photo interpretation techniques, from the Land-Sat imagery itself, without going through the computers. If we now want to go a step further and identify crop type, then it's certainly essential, to have accuracy, to go through digital processing unless you are going to spend a lot of time in the field. The third level of mapping would be the inferences about relative amounts of water use, and obviously that takes, again, digital computer mapping, and hopefully jointly with U-2 photography.

That completes the summary, a quick summary of the discussion of the principle. We might just indicate here visually, as a final note, that kind of intermediate project or intermediate product which we use to distinguish what the A's and B's, and 1's and 2's and 3's mean on the print map. We have a signature plot, as we call it, which shows how the water goes; it's always lowly reflected in all four bands of light. There's a green band of light, and a red light, and two infrared light wave lengths, and water reflects lowly in all of those, particularly in the infrared; and we simply give that a heavy overstrike. That's why the black is an

arbitrary selection. Sand Wash Reservoir shows up in the lower left here, is an overstrike with three symbols superimposed so it comes out black. We always do that with water because it's such a good visual reference. All the others we can arbitrarily assign 1's, 2's, and 3's, and so on. Alfalfa, for example, always comes very low, especially a good healthy field with a continuous stand of alfalfa, and will reflect very little light in the green and red. This is like conventional photography. It's going to be a dark field if it's a heavy, continuous alfalfa field; whereas in the infrared, it bounces way up here. Here's the A curve way up here. The A's and B's are what we know to be healthy, lush, continuous alfalfa. Everything in between can so be identified. That's the tool that we use to distinguish what the symbols are on here; that, together with field interaction. That is kind of a thumb-nail sketch of what we have done on these two.

I have thought that it might be appropriate to provide a common denominator base for the three states. If that seems to be appropriate, I would be happy to discuss that further, at your discretion.

CHAIRMAN JIBSON: Do you have any questions at this time? I would assume, Dee, that you would recommend that your committee look into this further?

MR. HANSEN: I was hoping to get some direction from the Commission as to whether you would want me to pursue the possibility of cost figures on the contract to do this for all three states. I need to know whether you want just the acreage identified as of the summer of 1975 - so we would know the fixed acreage prior to January 1, '76. And then also whether you want to pursue a possible on-going program to determine consumptive use from the various land areas in the future. I would welcome some direction from the Commission as to what you would like the committee to continue doing.

CHAIRMAN JIBSON: This on-going thing could be up-dated yearly, or greater intervals?

MR. HANSEN: Maybe every two or three years we would want to run an up-date to see where each state is with regard, not only to acreage, but at that point attempting to determine consumptive use.

MR. DUNN: Well, of course I haven't been at the previous meetings, but a question I had is one of the system that you have. Is it compatible, do you know, with what we have in Idaho or have you talked with Kim Johnson?

DR. RIDD: I have talked to Kim. They have in, I presume it's your office - are you with the Water Resources? - a Vicar Eivis software. We use a different set of software, but they can be inter-related.

MR. DUNN: Can you talk to one another?

DR. RIDD: We can verbally; not very conveniently with computer. But we can explore that. Mr. Chairman, Kim is actually the one that mentioned to me a couple of weeks ago when I met him at a conference in California, that I might be interested in doing some work with the Bear River Compact Commission.

MR. DUNN: I think work such as this is the only way to go in the future. Field surveys are just too time consuming and too costly. I would urge the Commission to go as far as they can in utilizing satellite imagery and the whole remote sensing field.

MR. CHRISTOPULOS: I am certainly interested in pursuing this, find out where we can go. Of course, I have some questions in my mind as to the accuracy at that scale. And, I guess that just remains to be seen; I need to be convinced of it. I don't really know what they have been doing along these lines at the University of Wyoming, either. I know they do have a remote sensing setup there, too.

MR. TEICHERT: I did go in the University of Wyoming to look at some of this, and the possibility on adjudications and, of course, the thing that bothered me in looking at some of these was the time of year that they were taken. I noticed that grounds that I knew had been irrigated did not appear as irrigated; they may have been in grain. We were harvest time, and it may be it didn't show up on this infrared. And then in our area, too, we do have a few places where I think you'd have to take into consideration water rights; but we had places where maybe for a few years people lapsed in taking care of their irrigation for a period of time, yet they had valid water rights.

MR. HANSEN: I think you're discussing questions that we have had, and that's why you saw three images through the summer; because there are times of the year, as Dr. Ridd indicated, alfalfa, right after you cut it, would show more reflectance or less intense infrared, indicating a dry area, when in reality it is not dry. So you have to take those things into account. I

think the acreage, George, the resolution is getting fairly good. You still can't get to within a tenth of an acre, but probably within two acres in 40, Dr. Ridd?

DR. RIDD: Our general calculation on that was about a 95% accuracy in acreage. That's partly because we know the field sizes. If we were working with irregular, oddly shaped fields it would be different. Some of that you take by inference. There, again, it depends on whether you are doing it digitally or manually; but certainly with 10% of accuracy we could say with confidence in terms of acreage, and a much higher percentage in terms of binary in the question of whether it's irrigated or not. So there are two kinds of accuracy.

MR. HANSEN: I think for our purposes, 95% accuracy is good enough for what we are talking about. The on-going thing, we may want to look at that each year, how that may have shifted.

DR. RIDD: May I add a point, Dee, here that we discovered in working with the Uintah Basin thing - I think there is a common assumption that the acreage procedures that we used in the past were accurate, and what we're trying to do is make it as good as that. Interestingly, on this Uintah Basin thing, the person that we subcontracted with and worked with, Jim Christensen, whom many of you know, had been the one who, while he was with the Division of Water Resources, had done the survey in the Uintah Basin on these same fields in 1970, or whatever the date ten years earlier; and over and over again he was overwhelmed with what greater accuracy we were able to get just with the U-2 photography as distinct from the black and white photography which he had used. So we are already in a new league in terms of accuracy with regard to the question of identification of crop types and that sort of thing. That's even without any Land-Sat digital information. When we add that, the accuracy is even greater. Nobody seems to question the accuracy of the 1970 survey. But everyone wants to question the accuracy of the present one; and I think that's appropriate. I'm not challenging that, but I think there is a kind of interesting comparison. We kind of assume that what has been done has been accurate, or that if we were to go do it again with black and white photography it would somehow be tested, it has been around for 40 years, it's accurate. I think there is an interesting bit of mental play on that; that we are comparing two levels of accuracy and we

were no more sure that the first one is accurate than the second one. But accuracy is still an important issue. We are dealing with the adjudication of water. I don't mean to demean that question at all; it is very critical.

CHAIRMAN JIBSON: Significant changes that might show up from year to year, or whatever interval we plan on, couldn't we follow up with a certain amount of field checking on this, Dee? Do you assume that this might be practical?

MR. HANSEN: I am assuming that each state would want to do so - checking on their own to give their own state self-assurance that what is being presented is accurate. I understand those problems and, surely we want to check; maybe as a committee we want to check some of it jointly. But if there is some funding that needs to be carried through the Commission, and I presume that that's the best way for it to go as one contract rather than each state do it individually, we need to be looking at that so that funding can be arranged for if we have to.

GEORGE CHRISTOPULOS: Are the two reports that you spoke of, are they completed now? The one for the State Engineer and the other for the Water Resources? Are copies of those available?

DR. RIDD: Yes; you bet.

MR. HANSEN: The thing that we're trying to work to, George, in this acreage survey is that we would like to develop a situation where we don't have to manually do any of this. We'd like to have the satellite imagery data fit into our computer; and the computer - and Dr. Ridd's trying to work out how you address a satellite image, because it's moving all the time to a different location - how you establish an address on the image that relates to Farmer John Doe's field. And then the computer can tell you whether he is irrigating more acreage than he has a legal right to. Then the computer does all that for you, and prints out only those that are in violation. Then you probably would manually field-check all of those to make certain before you file a lawsuit against him. We'd like to have all that done.

CHAIRMAN JIBSON: You're talking now more of satellite imagery than U-2.

MR. HANSEN: Only because the satellite imagery is amenable to feeding directly to a computer.

DR. RIDD: And because it's always available.

CHAIRMAN JIBSON: We're talking a lot of money, aren't we? On U-2?

MR. HANSEN: Probably more - because you have to do a lot of manual labor.

DR. RIDD: And you have to acquire the photography, its getting more difficult to acquire and it has to be specified as to the date. You may not be able to get it when you want it; whereas the Land-Sat is in orbit, and every 9 or 18 days you get a new view.

MR. TURNIPSEED: As I understand, there is a new satellite going up next year?

DR. RIDD: Yes, it is scheduled for the third quarter of 1982, and its called "Land-Sat D"; it'll be Number 4 when its launched. It has a new kind of scanner on board which has a much higher resolution, down to a cell size of about 30 meters, or a quarter of an acre; as distinct from the present one which is slightly over an acre. So it will have a much higher degree of resolution. And when that happens, I think even before that time, we will be able to solve the problem that you have just addressed with regard to the overlay of the ownership. By that time we'll have all that perfected and will be able to do it with a higher degree of resolution.

MR. HANSEN: We need to do that as a Commission, but we just want to know what we're trying to work toward.

MR. LAWRENCE: Could I ask what might be considered a naive question? You mentioned you could tell the degree of irrigation, really; whether it was poorly-irrigated, or fully irrigated. In the Compact we are talking about consumptive use and, I guess, water rights for diversions. Is it true that we assume that we'll get, if we went this way, we would get data that's 6 years removed from the 1976 date and so forth, and then take into account whatever changes we knew about between that date, or something?

MR. HANSEN: The U-2 flights that have been flown are still available. Satellite imagery is still available for '76. It could be obtained. The resolution is not as good as it now is becoming but, yes, you can go back and pick up '76 data or '75 data as it turns out.

MR. LAWRENCE: Then the main question is - would you identify different cropping patterns from this and apply different consumptive use? Would you have to take an average of several years, or work out a formula for one average for all acres?



MR. HANSEN: I guess we don't know that yet. These are the things you have asked the Engineering Committee to look at, to try and determine formulas for establishing depletion levels within the states. Perhaps this is the best way for determining those. We could set formulas, using Blaney-Criddle or other methods, but that's assuming the crop was irrigated. Here, we find out, in fact the crop was irrigated, or it was poorly irrigated. Maybe we use both; maybe we attempt to establish what might have taken place and what in reality is taking place, and we would want to compare that, certainly, with river flow - the hydrology, to see if, in fact, those assumed deficient levels from the infrared photography are matching what we see as a decline in river flow. There are a lot of things that we need to look at. We probably have a whole lot more questions than answers right now; but somehow we have got to start getting into that.

MR. TURNIPSEED: We assume on supplemental water rights and new applications approved after '76 that if he felt the need to supplement his water right is was either because he was short in an individual year because of a late-dated priority, or he had a partial supply that he needs to supplement through the entire season. The reason you have to tie it to the hydrology, is just like Norm's computer model on the Woodruff Narrows; those lands will still show up as fully irrigated even though the supply was 70% or 50% or 30% of normal; and that's the only way that you're going to get a very accurate depletion of that water, especially in surface storage, because you're carrying it over into a drier year where normally you would be able to show 30% water, or 50% water.

MR. STOKER: Have you come to any determination as to what this might cost per unit, per section, per something or other, per state?

CHAIRMAN JIBSON: This is just something we're beginning a little exploration of.

DR. RIDD: I don't have an answer for you right now. We could explore that and come to you with a figure.

MR. HANSEN: I would be happy to pursue and report back to you, if the Commission desires.

MR. TEICHERT: It is going to vary from year to year, and if you're building storage a lot of this, just to firm up the water rights that you have or to use it. To have that water sitting on there, to be able to utilize that

water better than we presently do. But also, I kind of feel that the big question, as I look at the development along the river, is not going to be from additional irrigation; it's going to be from industry - the water for industry is going to play a lot bigger part, at least in the upper part of the Bear River, than new agricultural land.

MR. MYERS: Of course you're going to have to treat that separately.

MR. HANSEN: I think the first step is that we need to determine the January 1, '76 level of irrigation. Total acreage within each state. That seems to be the question we have to come up with first. Beyond that, I think we can talk about how far we want to go. How successful that effort is, whether we want to go beyond that step. I guess I would want your concurrence in pursuing that area first, and the cost that that might involve.

CHAIRMAN JIBSON: I would think that, well, we're not in a position to get into detail here anyway, but if we can give some direction to the committee, a lot of these questions come up - they're questions that will have to be resolved, but certainly not with our group here. The committee should look into that. I think what Dee needs today is some direction from the Commission as to which way they should go, and if they should try to get some cost estimates, and within their committee discuss a lot of these other details. I know we could discuss it all day, and there are so many things I don't understand about it, and I am sure a lot of us don't understand about it, that we can't even ask intelligent questions on some of it; but maybe if we can give you some direction, Dee, that your committee can get into some of this.

MR. HANSEN: I think it may be possible there are some funding sources available through NASA or some other source, initially. I think those will probably dry up once it becomes a viable on-going thing; but it's possible, in an effort to use the satellite imagery, that they would want to put up some funding to help it get rolling. But you should be aware that if we're able to get some federal funding, eventually that may dry up and we would have to carry the full load.

MR. LAWRENCE: It seems to me, Mr. Chairman, that we ought to simply encourage the committee to be as innovative as they can; to be talking about the '80's and not the '60's in terms of the state of the art that's available to us;

and do the best they can to get some prices and make some comparisons. There is representation from all three states on the committee and we would like you to go ahead and do the very best job they could. This is what we spent 11 years getting to.

CHAIRMAN JIBSON: Is this agreeable to the other states, without necessarily making a Motion on it? We're interested, and we want it pursued to the point that we can then get down to something we can get our teeth into.

DR. RIDD: I might just mention, Mr. Chairman, that we do have some seed money right now. We are under a NASA grant right now, some of which we could liberate to get this going. I would have to go back to the office and determine what we could plug into it for this first year, but we do have some funding which has flexible capabilities and we could allocate in this way. We could get it going in that way. I am sure it will take a little more support than what we can actually gather from this NASA funding, but it certainly would provide some seeds for us.

MR. DUNN: Mr. Chairman, could I ask - who are the members of that committee?

CHAIRMAN JIBSON: We call it a State Engineers' Committee, and it consists basically of the state engineers and their technical assistants. I think Alan has been working on it with Steve Allred in the past, representing Idaho.

Well, if we don't have anything further, we'd like to tell Dr. Ridd that we appreciate his coming. We will certainly be working with you.

DR. RIDD: I appreciate the opportunity to visit with you. I would like the pictures back, because they are all one-of-a-kind.

#### REPORT OF ASSISTANT SECRETARY

CHAIRMAN JIBSON: I want to make the airport by about 2:15 or 2:30 p.m. I would hope that we can wrap this up by noon or shortly thereafter; so I think at this time I'll give my report and we'll talk about budget and stream gaging again. This will be our usual type of report for our annual meeting this spring, 1981 Water Supply Outlook and Compact Operation.

(The Chairman's report is attached as a part of these Minutes. The following comments were made in the places indicated on the report.)

- ①. Since we came, maybe I'd have to modify that a little bit. We got pretty healthy rains up Cache Valley way and Ken was saying Boise got good rain over the weekend.
- ②. Notice from the percentages down in the table below and these figures, that we start out in pretty fair shape in the Uintah Mountains and get worse as we move downstream.
- ③. I am still a little puzzled at this because the major tributaries coming in between the two actually drain the general area that the upper Bear does; and I can't believe that Wyoming could divert that much more water, not if we ride herd over them a little bit. I haven't talked to Bob Whaley about it yet, but it seems to me that there's quite a spread there between the two areas of the river. They may be right; I don't know.
- ④. And this one bothers us.
- ⑤. Logan River is quite typical of the other streams in lower Basin: Cub, Little Bear, Blacksmith Fork, they're all below 50%. I would hope that Smiths Fork would improve, and I think the enlarged Woodruff Narrows Reservoir is going to help your people considerably. They made me guess here a month or so ago when I was up Randolph, whether it was going to fill or not, and I said, "well I think it will fill but you may not be able to irrigate until August". I think, as I said there, whether it fills or not depends on how quick you do have to irrigate.
- ⑥. I think the Power Company was guessing that maybe it would reach a peak at about 1,150,000 or maybe a little bit above the '79 peak. Is that what it looks like to you fellows?
- ⑦. Ordinarily, in an average year they get things opened up pretty well by May 15. Now, this year looks like maybe you're going to start earlier than that unless things change up there, Sim. Did you get a good rain over the weekend? I understand it is fairly dry and growing is starting earlier.
- ⑧. This was a little surprising, and is relatively good news considering the fact they had such a low forecast.
- ⑨. This was also good news in the Upper Basin, that that reservoir is full.
- ⑩. The difference between the 6% and the 7.4%, of course, is the fact that our stream-gaging program is a separate program and it doesn't comprise half

of the total budget. Now, if you'll study the table as I read through, maybe you can follow the budget on page 6 without it being too confusing.

- (11.) I agree with the decision of the Commission to amend the Compact and go to a biennial report. I think there will be advantages to it and there will be some savings; but we won't save on the order of 50%, or anything like that.
- (12.) Connie, Bert, and I have been discussing it this morning and it may be that we'll work in the future to cut our offset printing and xerox printing.
- (13.) I don't presume, Ed, each time that I bring this budget here to just assume that you're going to okay it. I think we should get your comments on it.
- (14.) I don't know whether states have been billed and paid on that. I guess they have.
- (15.) I think, at this point, maybe before we get into further discussion on the budget and before we finish up the report, we might get a report from Ted Arnow as to what the situation looks like for matching federal funds, as we have proposed them here today.

MR. ARNOW: Well, the situation doesn't look too rosy. This is the information that I received just last week. The Geological Survey project was submitted by the Carter Administration. This is for fiscal '82, which is going to start October 1. When submitted by the Carter Administration it was submitted at the same level as it was for fiscal '81, except for two increases: one for water quality studies, and one for water-use studies.

The Reagan Administration made no changes except to knock out the increase for water-use studies. What that means is the budget which now is at Congress contains no increase for cooperative matching funds, unless they're earmarked for new water quality studies. It has not yet reached the hearing stage, neither the Senate nor the House; and the rate Congress has moved in the past, we don't expect to hear anything about it for a long time. So, unless there is some Congressional add-ons, which doesn't appear likely this year, we are faced with the same level of funding as we had in fiscal year 1981 except for an increase in water quality related studies. So, the word that I got at the end of all this was that it is extremely unlikely that we would get more in fiscal '82 than we have in fiscal '81.

Now, if that happens, if I cannot get any more to offer to the Bear River Commission for matching than I had last year, what I would have would be \$51,480 - which is what we had last year. If we apply those monies directly that would operate 30.73 gaging stations which, of course, we would round to 31.

CHAIRMAN JIBSON: Now, if we cut one gaging station, on the base of Ted's figures, I figured we'd have \$51,925 or about \$440 more. Like you said, if we rounded that up that would just be an increase of \$400 over last year's budget. If we were to cut two gaging stations, we would drop down to \$50,250 from the suggested budget here.

Perhaps we should go ahead and finish this report and then come back and discuss both our stream-gaging program and our budget.

16. I think in the future, once we get onto a biennial basis where even though we have to compute all our records each year, get them all ready for report and then make up the report the second year, that we can come pretty close to the deadline that we had put up in the Compact. I told Ted that we will have a little race on with him whether our report's published before his or not this year. I had to razz Jay a little bit the other day because our FPC records are not quite ready yet; but some of those records we should include in our biennial report - they're of a special significance to the Commission. I expect within the next few weeks we can get things wrapped up there.

Now if we turn to our Application Summaries - and incidentally, on your Minutes which were handed out, you will recall that in our September 18 meeting, it was a special meeting. We hadn't scheduled it, though we did finally decide to hold it in lieu of our regular meeting which was called for in November; at the time of the meeting, we did not have a financial statement and we did not have our applications for appropriation. So, attached to the Minutes were the application summaries and also the financial statement that were mailed later. Since those came, we have summaries again for this past 6 months.

17. Incidentally, Dee, you had that one marked as an "underground" but I don't believe Marion was planning on drilling a well up there for 150 second-feet.

(18.) They're going to have to have a lot better year than they got this year to come up with that.

CHAIRMAN JIBSON: Basically, what we said was that with a cutout date of December 31, 1980 we would try to summarize our rights, proved up on and in use since January 1, '76, so that we could use a tentative figure here of our development since that date. Now, with your type of update summary on yours, I think we can pretty well do that and the other states may want to bring that up-to-date. Unless you have a direct question on it, I won't review what was stated there in the Minutes. You all have your last year's Minutes - that's not the September Minutes, but the April Minutes. Looking at the April Minutes, pages 35 and 36, we were discussing first the elimination of small domestic rights, and I think single-family dwelling rights and so forth. I think we all agreed that they would not be included in future summaries, and this is the reason that you notice Utah has a one-page summary now the same as Idaho, and the same as Wyoming; because all of the small domestic rights are not being included. We were discussing that, and then - Steve Allred says "I have one question with the ground rules. Idaho has a mandatory filing process for all old rights and there are going to be tens of thousands of those by 1983" - he was still discussing this thing, including small ones - "and it's already starting. I'm assuming that you don't want anything that's a claim of an old right since that would already be covered by the Compact". Then I state, "I would think that you wouldn't want anything prior to January 1, 1976". Mr. Hansen: "That would be part of your base map. It may be valuable for you to verify that and put it on paper." George Christopoulos: "I think if we leave these out, those post-dated, post January 1, 1976 domestics, if we're going to leave out the domestic and stock that are exempt from the Compact, I think we ought to put a little caveat at the head of the tabulation saying that as of a certain date, we stop reporting these." Then I state, and maybe I shouldn't have stated that, "Yes, we could do that and I would put it in my report and, also, it would show in our next biennial report. If we have no objection to that, then we will leave out, in the future, the domestic filings and we will summarize, with the next cutoff date of December 31, 1980, the status of our rights since January 1, 1976". Though we didn't pass it by Motion, I asked if we agreed on that and there was no disagreement on it.

So, if we could get those, maybe I can make a summary that might have some meaning to it, that would basically be from January 1, 1976 through December 31, 1980 that would go in the biennial report. Of course, in the final analysis, what we're interested in is rights put to beneficial use; not just approved, but if we don't have a follow-up on these rights that are pending and so forth as of that date, we don't even have a starting point. Idaho, since we asked for a summary - I think we asked for it each year or each two years - has been pulling theirs from the computer printout, I guess, and each six months they have been pulling in a new summary for us, so that we can go back and see what happened to an old right that maybe has been pending for many years and is now approved, so that we can have an update on what is actually approved for development.

MR. HANSEN: Does 'approved' mean that it has been placed to beneficial use? Or don't you know that?

MR. DUNN: We can tell whether it has been licensed or not; but if it's been approved it may have been put to beneficial use, but we wouldn't know it until the time we made a field examination or issued a license.

MR. HANSEN: The summary, Wally, that you're talking about, is that approval? - which doesn't really tell us anything. What we want to know is the actual consumptive use or depletion level. That has to be those that are 'licensed', as Ken says. We call them 'certificated'. It's the same thing.

CHAIRMAN JIBSON: I guess my point is, Dee, for the past few annual reports I have tried to bring up-to-date, approved and pending rights in each state. That's clear back to 1950 or whatever. Now, the question is, in view of the amended Compact, are we interested in anything prior to January 1, 1976?

MR. HANSEN: I think your point is well-taken. I think we ought to have another category for those licensed, or certificated, or whatever Wyoming calls it, showing those that have now been placed to beneficial use. I think we can do that fairly easily on those, over domestic filings. We have a lot of those. If we eliminate those, then I think Mike could pull that fairly easily, and submit it to you. But I wanted to be sure I knew what we wanted to submit to you.

CHAIRMAN JIBSON: We're not going to be able to tell from this what our increased depletion is.



MR. HANSEN: See, Idaho isn't doing this. They're just showing you the approved ones.

MR. DUNN: We're showing both, approved and licensed.

MR. CHRISTOPULOS: You're showing whatever's been approved since January 1, 1976, and whatever's been adjudicated?

CHAIRMAN JIBSON: If we could get that information within the next 2 or 3 weeks, I think we just as well put it in the biennial report. I didn't discuss it directly with Mike.

Do we have any questions on the report? Do we want to come back to a discussion of our budget, and stream gaging program, as we have proposed it? What action do you want to take at this time?

MR. CHRISTOPULOS: The way you've got this '82 budget proposed, you've got it proposed with an assessment of \$21,533 for each state and we were assessed at a rate of \$24,000?

CHAIRMAN JIBSON: We approved \$24,000, George, but I asked to hold it in abeyance. So, the last assessment that was actually made the states was \$23,000 for 1981.

MR. CHRISTOPULOS: What I'm thinking of, from what I hear this morning, and if we go in the direction of trying to do anything like this, any reserves we have I think would be rapidly eaten up.

MR. HANSEN: I am not sure that would be the case, George. I was going to ask if you have any latitude that I have \$5,000 or \$10,000 to play with, or to talk to Dr. Ridd about, and use the seed money that we now have available to us. That may not be available if we wait. But NASA has some money - they're anxious to use the satellite imagery and so they're willing to put up sometimes large amounts to funding for the first few years. But you need something to go with it. You know, they're trying to draw in some local funds. We may not be talking about large amounts. I guess I need to know some range of what you're willing to go along with.

CHAIRMAN JIBSON: What have we got that we're not obligated? We'll be obligated to the Bear River Commission as of September 30, 1980 for \$51,480 plus some additional obligation on our direct expenditure item; but we're probably in the \$45,000 to \$50,000 range in the cash reserve now, or will be at the end of this fiscal year.

MR. LAWRENCE: Did we pay our assessment draft for July 1, all of us, or did we just send them out?

MR. CHRISTOPULOS: We're paid up now through September 30, '81 aren't we? I think we're funded for the following fiscal year. I guess everybody is, aren't they?

MR. LAWRENCE: Is this \$100,000 - or \$10,000?

MR. HANSEN: I am talking about in the range of \$10,000 to match with whatever seed money we can pick up. I would want to come back to the Commission if it gets to be a major item. I don't anticipate it, but with my experience with Dr. Ridd, I don't think that we're talking about more than \$10,000 or something, from our side.

MR. STAUFFER: I think you are talking about not using the digital data. If you're going into that - the Uintah Basin total project you're talking about \$40,000 to \$50,000. We had SCS money, NASA money, and our money.

MR. HANSEN: I guess we're only looking initially at the acreage survey for the three states. I'll just have to get into some discussions to find that out, but I guess I'd like to have some indication of some funding ability - if there is seed money available, and if we can start to tie it up. If you say I can't contract for more than \$10,000, that's what I'll stick to. At any rate, I would discuss that with the engineering committee before there was any decisions made with Ridd. So, each of the states would have an opportunity.

MR. CHRISTOPULOS: So what do you think about - if we were to put up \$10,000 you're thinking about putting up? The states splitting that, or thinking of taking that out of the reserve, more or less?

MR. HANSEN: Out of the Commission reserve.

MR. DUNN: Our assessment next year we're going to leave it at \$23,000?

CHAIRMAN JIBSON: Well, I think that's a decision that we have to make today, Ken. In previous annual meetings in April, I have always been asked to project this for two or three years hence, for legislative councils and so forth; and I chose not to do it this year, partly because of this program Dee is talking about.

MR. LAWRENCE: But Wyoming's on a biennium, and you've already got it appropriated; right?

MR. CHRISTOPULOS: Yes, we're appropriated through June 30 of '82. I would imagine that we have the \$24,000 that was assessed, in there already.

MR. LAWRENCE: All three of us are appropriated that long.

MR. CHRISTOPULOS: I think the question I have is - I think if we're appropriated for \$24,000, I foresee very distinct and good possibility that we could be spending that kind of money, spend that reserve down in the next 2 or 3 years, if we're going to go spending some money on doing this consumptive use study, whether we do it through this type of program or whatever, I think we're going to be into it as far as spending some funds.

MR. DUNN: That's why I think we need to do some work now to find out what it's going to cost. If we can get some estimates of cost - if it's \$100,000 a state or \$10,000 a state - at least we know what we might be able to get through the legislature and whether we even want to seek those kind of funds. I would think some dollars now might be well spent.

MR. CHRISTOPULOS: I would like to suggest that we go ahead and stay with the \$24,000 for the fiscal year '82. And I also would suggest that we go ahead and let Dee go ahead and contract for up to \$10,000 without coming back to the Commission; and then in the event that it's more than that, he can come back to us and see what develops. I'll so move.

MR. LAWRENCE: Second.

CHAIRMAN JIBSON: Any discussion? All in favor? Opposed?

MOTION CARRIED.

CHAIRMAN JIBSON: Now, is there a necessity, at this time, of having to project a budget for 1983? Is 1982 as far as we need to go today as far as assessments to the states are concerned?

MR. CHRISTOPULOS: We'll be budgeting this summer for the following biennium. But I suppose we could probably build in some sort of an inflation factor into what we have been doing, based on what we've done in the past.

CHAIRMAN JIBSON: As of now, your assessment for the states will be \$24,000 for 1982 fiscal year and Dee is authorized, then, to work within the limits of about \$10,000. Is this satisfactory, then?

MR. CHRISTOPULOS: Are the other states budgeting this summer, then?

MR. LAWRENCE: Yes. We're on an annual basis, but one year less than you. But it's next month for us. That will be for '83.

MR. CHRISTOPULOS: So, what will we be budgeting for then, just the \$24,000 plus some sort of an inflation factor?

MR. LAWRENCE: I guess so; and it will be pretty small, I think. I wish Bert were here. I think this reserve has been with us for quite a while. Our legislature has a tendency to look at these reserves, so I think we ought to look at that. I think we're all right. I think George is the one that's more concerned because he has an extra year of extrapolation. I think we ought to be able to do it for \$24,000 (for the next two years).

CHAIRMAN JIBSON: Well, if we're pretty well agreed on that, I think we should come back to this proposed budget that I have, and assume that it is restricted to last year's budget which would mean cutting out one gaging station. Of course, you remember, in the past two or three years we discussed gaging stations; we've discussed those that we felt could be discontinued and we've discussed some that we felt maybe could be turned over to the individual state, where the gaging station is largely for state or local use. First, could I ask you Jay and Carly, is there any problem with Bear River near Collinston?

MR. HAIGHT: No.

CHAIRMAN JIBSON: Okay, fine. That brings us down to a base of 32 gaging stations and if Ted does not get funded for more than last year, we should cut one more out. In the past I've suggested a number of gaging stations that might be considered. One is the Chapman Canal, which is primarily a seasonal record. It adds a little significance to the Compact, inasmuch as we have a stipulation in there that there is a maximum flow that can be taken across the state line in the Chapman Canal. For this reason I think that the Station, itself, ought to be maintained. Now the question is, whether the Commission should maintain it or whether Wyoming has enough value out of it in distribution of their water that if the equipment were left intact they would take it over.

The station below Whitney Reservoir - West Fork Bear River at Whitney is in a little bit the same category. The local water commissioners have to make a lot more trips up there than we do, other than the fact that we're operating the station.

There's another station in Idaho that I noticed in reviewing it a couple of days ago - Cottonwood Creek was first put in at the request of the Bureau of Reclamation for possible development up in that area, further development, and I believe that station now has been in for a total of about 40 years, Ken. It correlates pretty well with other stations, and there might be a question as to whether it ought to be continued.

I thought of another station that we use for a computation station, and that is Bear River below Smiths Fork; but Norm informs me that they would like to keep that for a key modeling station in connection with our future depletion studies.

Cottonwood Creek was put in in 1938, so we have better than a 40-year record on that station. Of the Idaho stations, I think Cottonwood Creek would be my recommendation to discontinue, if you want to discontinue one of those.

We did discontinue one or two in Cache Valley now, and the one or two others that I had suggested - Little Bear River above Porcupine Reservoir, and the one below Davenport Creek would probably be continued under your own program. Dee, is that right? If the Commission dropped either one of them.

MR. HANSEN: I want to remind you that at the last meeting you dropped four Utah Stations. I made the comment that the next ones come from some other state.

CHAIRMAN JIBSON: Well, as far as our 'druthers', it would be either Cottonwood Creek or Chapman Canal; and I'm sure Chapman Canal, you would want to keep some kind of semblance for record, wouldn't you, Marv? You have to distribute the water for Utah lands under the Chapman, as we all know, and that's the only measure of water that you have going over Neponset, right?

MR. BOLLSCHWEILER: Usually that reservoir is full on a normal year, though, before we get into release.

CHAIRMAN JIBSON: Yes, but you eventually have to regulate their direct flow, right? What about the Whitney Station? But I mean as far as your maintaining it? With the stations that we've discontinued the past year or two, we are getting fairly well balanced out between states. I guess maybe one reason I haven't suggested Cottonwood Creek in past years is because probably Idaho is a little bit on the short end of total number of stations; and as the Compact

requires, the cost for stream gaging has been split a third each way, and I believe this is the only criterion you can go on because the very fact that a station is physically located in one state or the other, it could have more value in the downstream state than where it is located. So, the fact that one state is a little short, or a little strong, on total gaging stations, I don't believe is that important, here, where we stream gage on a basin-wide basis for the Compact. So, whether we discontinue one in Idaho, reduce one more there, or discontinue one in Wyoming, I don't think this is particularly a matter of concern as to how many stations we have left.

MR. DUNN: Are you looking for a volunteer, Mr. Chairman?

CHAIRMAN JIBSON: Well, I guess; and we may not have to drop it. If Ted is able to pick up a few shillings here, we'll be able to go with our 32 gaging stations.

MR. TEICHERT: What I'm wondering, would that one on Chapman Canal - would it go by there? Would that actually cost that much or do you have each one of those prorated for each gaging station? It doesn't seem like it's a much added cost, where it goes by.

CHAIRMAN JIBSON: No; Ted has to do his budgeting on a total number of gaging stations. If he has to start breaking them down by station, according to whether you have got a seasonal record or something like that, he'd be in no end of difficulties; so, his estimate here of \$3,350 is the average gaging station. But, if we were to drop Chapman Canal then we would drop \$3,350.

MR. BOLLSCHWEILER: Is the West Fork and the East Fork stations on the Bear River cooperative stations?

CHAIRMAN JIBSON: Yes. We talked about discontinuing those. We discussed them in some length in the last two meetings. It seemed to be the consensus opinion here that they ought to stay in. They have a certain amount of interest to the Commission, as well as just to the states in which development might take place. They haven't been in too long, and I don't feel real good about the records in there yet, as far as discontinuing them. As I say, we may not have to do this. I would, though, like to get your feeling on it in case, before the next meeting rolls around, we have to decide by September 30 which station goes out, if we have to drop one.

MR. DUNN: Mr. Chairman, with Cottonwood Creek, if we have 40 years of record there, it would seem like a likely one that could be dropped. Idaho wouldn't object, I think.

MR. CHRISTOPULOS: I am sure that we could drop one of the other ones too, but if you want to drop this one, we'll drop one the next time around.

CHAIRMAN JIBSON: Then we'll plan that if that budget is held strictly to last year, we have to cut one gaging station out for \$3,350 - and we'll cut out Cottonwood Creek as of September 30, 1981. Then, with that decided, we should have a Motion to approve the 1982 budget as presented, or disapprove it; whatever your pleasure is.

MR. WESTON: I move that we adopt the 1982 budget; that is, with the assessment raised to \$24,000.

MR. CHRISTOPULOS: Second.

CHAIRMAN JIBSON: Any discussion? All in favor? Opposed?

MOTION CARRIED.

CHAIRMAN JIBSON: I had on my agenda, and we didn't have it on the printed agenda, that we have to elect officers. It has been customary to elect a Vice-President of the Commission for a two-year term. George Christopulos of Wyoming has served one year now. We elect each year, but we have been choosing one man for two years.

MR. LAWRENCE: I move that we re-elect Mr. Christopulos as Vice-Chairman at the same rate of pay.

MR. GILBERT: Second.

CHAIRMAN JIBSON: Any other nominations? All in favor?

MOTION CARRIED.

CHAIRMAN JIBSON: We also should elect a Secretary-Treasurer. We haven't seen that change too much.

MR. CHRISTOPULOS: I'll nominate Dan Lawrence.

MR. HOLMGREN: Second.

CHAIRMAN JIBSON: It has been moved and seconded that Dan Lawrence continue to serve as Secretary-Treasurer. Any discussion? All in favor?

MOTION CARRIED.

CHAIRMAN JIBSON: Most years we do not take any action on the Assistant Secretary. I think the Assistant Secretary may be a little bit like Douglas McArthur; they gradually fade away, in this case. I might say that the contract you authorized Dan to work out with me, we discussed, and it was worked out to my satisfaction. I think it is a very fair contract. I did suggest to Dan that he call me something besides an Assistant Secretary in that contract because 45 years ago, when I was up in Idaho working for the Department of Agriculture, I was always an Assistant Secretary and I thought maybe before I died I might be called something else. So, we put "Engineer" in the contract, rather than Interstate Commissioner which had some implications that we didn't particularly want, in view of my position here as Chairman. We called me an "Engineer" in that contract, and this is fine.

This office of Assistant Secretary is called for in the by-laws. I don't see any particular reason, and perhaps we could get Ed's idea on this, to discontinue the office as such. But, I believe the duties of an Assistant Secretary might be modified somewhat so that he could be just as the title says, an assistant to the Secretary. Now either Connie or Bert, who work closely with Dan as the Secretary-Treasurer, I think could be designated as an Assistant Secretary. Or, if you just want to leave the office intact it could be left that way; but I don't really believe that I should be called an Assistant Secretary, and an Engineer, and a Chairman, and so forth.

MR. SKEEN: I believe that whatever is done would require some modification of the by-laws. I'd suggest that we, before the next annual meeting, suggest some proposed changes in the by-laws to reflect what we want to accomplish. I'd be glad to be assigned the task of submitting, maybe a month or two before the next annual meeting, some proposed changes in the by-laws.

CHAIRMAN JIBSON: Is that satisfactory?

MR. LAWRENCE: Mr. Chairman, I make a Motion that paragraph 6 of article III which provides that the Commission may employ such engineering, legal, and clerical personnel, we let that be the basis under which we have employed Mr. Jibson as the Engineer; and that we leave the Assistant Secretary position covered in paragraph 4 of the by-laws be vacant and we ask Mr. Skeen to prepare, before next April in advance of the Commission meeting for proper circulation, an amendment to the by-laws concerning the Assistant Secretary.



MR. CHRISTOPULOS: Second.

CHAIRMAN JIBSON: Any discussion? All in favor?

MOTION CARRIED.

CHAIRMAN JIBSON: Do we have any unfinished business or new business? If not a Motion would be in order for adjournment.

MR. LAWRENCE: I think Sim has an announcement, before we adjourn.

MR. WESTON: Being as how our project of Woodruff Narrows Reservoir has been completed and is now holding water in the new part, we have to have it dedicated; so, on July 1 we plan our dedication at 10:00 a.m. We would like to invite all the Commissioners from all three states to come, if they would like, to join with us in our dedication. I think Dan and the Water Resources people will be on tour and they will probably be there. We plan on dedicating it on July 1 and 10:00. We will be happy to have you all come.

CHAIRMAN JIBSON: We appreciate that, Sim. I assume that you got those scaled rocks off the edge there. I remember when Governor Clyde dedicated the first one, we all kept looking above his head to see if we might get the job done before those rocks scaled off. We appreciate that invitation.

MR. LAWRENCE. Move we adjourn.

MR. CHRISTOPULOS: Second.

CHAIRMAN JIBSON: All in favor?

Meeting adjourned at 12:30 p.m.

TELEPHONE  
(801) 752-3181

BEAR RIVER COMMISSION  
OFFICE OF FEDERAL REPRESENTATIVE  
22 EAST CENTER  
LOGAN, UTAH 84321

April 23, 1981

Mrs. Idona Larson  
580 South 1300 East  
Salt Lake City, Utah 84102

Dear Mrs. Larson:

Members of the Bear River Commission were saddened to hear of the passing of our long-time chairman and Federal Representative. I first met "Ollie" nearly 35 years ago as we began serious negotiations on a Bear River Compact. Until his retirement in 1976, I don't recall a single meeting of the Bear River Commission that he missed.

It is an honor for me to forward the attached Resolution, signed by present members of the Commission, along with a personal note from our Secretary-Treasurer, Daniel F. Lawrence. We recognize his many years of service to the Bear River states and extend our deep sympathy to you.

Sincerely,

A handwritten signature in cursive script, reading "Wallace N. Jibson".

Wallace N. Jibson  
Chairman and Federal Representative

BEAR RIVER COMMISSION  
EMPIRE BUILDING, SUITE 300  
231 EAST 400 SOUTH  
SALT LAKE CITY, UTAH 84111

April 20, 1981

Mrs. Idona Larson  
580 South 1300 East  
Salt Lake City, Utah 84102

Dear Mrs. Larson,

I was saddened to hear that my friend "Olie" passed away, and I immediately recalled the time, 41 years ago, when I was interviewed by him, and he hired me as a surveyor on the Duchesne Tunnel. This, incidentally, was my first government job, and I have respected and loved him through all these years.

I served as Secretary-Treasurer to the Bear River Commission for a great deal of the time that he served as Chairman, and that was also a very rewarding experience and association.

The attached Resolution, by the Bear River Commission members, is an indication of the feelings of the Commission, and we extend our best wishes to you at this time.

Sincerely,

Daniel F. Lawrence  
Secretary-Treasurer

Attachment

RESOLUTION  
BY THE  
BEAR RIVER COMMISSION

In Memorium  
Ernest Oliver Larson

WHEREAS, Ernest Oliver Larson enjoyed a long and distinguished career in the development of the water resources of the West, having served with various federal agencies, including a long and distinguished service with the Bureau of Reclamation; and

WHEREAS, Mr. Larson served as a Regional Director of the Upper Colorado Region of the Bureau of Reclamation for many years; and

WHEREAS, Mr. Larson was appointed, June 16, 1958, by the President of the United States as the Federal Representative and Chairman of the Bear River Commission, and Mr. Larson served faithfully in that capacity until September 9, 1976, including the time when serious negotiations were underway between the three Basin States for amending the Compact; and

WHEREAS, on April 2, 1981, in Salt Lake City, Mr. Larson passed away from this life:

NOW THEREFORE BE IT RESOLVED, that the Bear River Commission, comprising, as it does, members from the States of Idaho, Utah, and Wyoming, and meeting in regular session on this the 20th day of April 1981, with pride and reverence, officially recognizes Chairman Larson's great service to the Bear River states and to water development in general.

BE IT FURTHER RESOLVED, that this Resolution be spread on the records and archives of the Bear River Commission, and that a copy be sent to his widow, Mrs. Idona Larson, extending to her our heart-felt sympathy; and that copies also be sent to the Governors of each of the three Basin States.

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Chairman

Idaho Commissioners

Utah Commissioners

Wyoming Commissioners

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BEAR RIVER COMMISSION

DETAILS OF EXPENDITURES

FOR PERIOD ENDING APRIL 30, 1981

296	Wallace N. Jibson	\$ 371.70
297	Wallace N. Jibson	384.00
298	Wallace N. Jibson	384.00
299	VOID	---
300	Wallace N. Jibson	684.00
301	Gilchrist & Co., CPA'S	380.00
302	The Copy Center	20.00
303	Wallace N. Jibson	763.00
304	Utah State Treasurer	73,000.00
	New Checks	<u>62.97</u>
		\$76,049.67
	Less Savings	<u>73,000.00</u>
	Total Expense	\$ 3,049.67

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BANK RECONCILIATION

April 30, 1981

Cash in Bank per Statement 4-1-81	\$ 77,252.72
Less: Outstanding Checks	\$ <u>73,000.00</u>
Total Cash in Bank	\$ 4,252.72
Plus: Savings Accounts - Utah State Treasurer	<u>\$109,795.81</u>
TOTAL CASH ON HAND AND IN THE BANK	<u><u>\$114,048.53</u></u>

BEAR RIVER COMMISSION

STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF OCTOBER 1, 1980 TO APRIL 30, 1981

<u>Income</u>	<u>Cash On hand</u>	<u>Misc. Income</u>	<u>Approved Budget</u>	<u>Total Revenue</u>
Cash Balance 10/1/80	\$48,098.20	\$-----	\$-----	\$48,098.20
State of Wyoming	\$-----	\$-----	\$23,000.00	\$23,000.00
State of Idaho	\$-----	\$-----	\$23,000.00	\$23,000.00
State of Utah	\$-----	\$-----	\$23,000.00	\$23,000.00
Interest on Savings and other income	\$-----	\$-----	\$-----	\$-----
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TOTAL INCOME TO April 30, 1981	\$48,094.20	\$-----	\$69,000.00	\$117,098.20

DEDUCT OPERATION EXPENSE

EXPENDED THROUGH U.S.G.S.

	<u>APPROVED BUDGET</u>	<u>UNEXPENDED BALANCE</u>	<u>TOTAL EXPENDITURES</u>
Stream Gaging	\$51,480.00	\$51,480.00	-0-
SUBTOTAL	\$51,480.00	\$51,480.00	-0-

EXPENDED THROUGH COMMISSION

Compact Assistance	\$10,000.00	\$ 7,413.30	\$ 2,586.70
Printing Annual Report	\$ 1,200.00	\$ 1,200.00	\$-----
Treasurer Bond and Audit	\$ 350.00	\$ 30.00CR	\$ 380.00
Printing and Reproduction	\$ 300.00	\$ 280.00	\$ 20.00
Legal Consultant	\$ 300.00	\$ 300.00	\$-----
Office Expenses and Supplies	\$ 60.00	\$ 2.97CR	\$ 62.97
SUBTOTAL	\$12,210.00	\$ 9,160.33	\$ 3,049.67
TOTAL EXPENDITURES	\$63,690.00	\$59,140.33	\$ 3,049.67

UNEXPENDED CASH BALANCE AS OF 4-30-81

\$114,048.53