

# BEAR RIVER COMMISSION

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## MINUTES

### BEAR RIVER COMMISSION REGULAR MEETING

Utah Department of Natural Resources Building  
Salt Lake City, Utah  
November 27, 1990

#### COMMISSION MEMBERS

##### Federal Members

Kenneth T. Wright

##### Idaho Members

R. Keith Higginson  
Rodney Wallentine  
Floyd J. Jensen

##### Utah Members

D. Larry Anderson  
Blair Francis  
Calvin Funk

##### Wyoming Members

Gordon W. Fassett  
J. W. Myers  
S. Reed Dayton

#### ENGINEER-MANAGER

Jack A. Barnett  
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Bountiful, UT 84010

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#### ATTORNEY

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The regular meeting of the Bear River Commission was called to order by Vice-Chairman Wallentine at 1:30 p.m. on November 27, 1990, in the First Floor Conference Room of the Utah Department of Natural Resources Building in Salt Lake City, Utah. Vice-Chairman Wallentine asked everyone in the audience to introduce themselves. A copy of the attendance roster is attached as Appendix A. The agenda was approved without change (see Appendix B).

The Commission reviewed the minutes of the last Commission meeting. After making one minor change to the text, the minutes were unanimously approved.

Secretary/Treasurer Larry Anderson asked Bert Page to give the Secretary/Treasurer's report. Page distributed a Statement of Income and Expenditures for the 1989-1990 fiscal year of the Commission (see Appendix C). During that period, total income was \$214,271.31 and expenses were \$84,791.91, leaving a year-end balance of \$129,479.40.

Page also distributed a Statement of Income and Expenditures for July 1, 1990, to November 1, 1990 (see Appendix D). Page indicated that during that period, interest income totalled \$4,895.93. The three states had all paid their \$25,000 assessments. Total revenue for the period was \$209,375.33. The Commission had spent \$43,030 for stream gaging, plus \$16,768.43 for various other expenses, leaving a November 1 cash balance of \$149,576.90.

Page also distributed a year end report prepared by Gilchrist, Sadler & Harden, CPAs, for the fiscal year 1989-1990 (Appendix E). Page indicated that

there was nothing of concern in the audit which he felt needed to be brought to the attention of the Commission.

There was some discussion about why expenses for the U.S. Geological Survey's (USGS) stream gaging were less than the budgeted amount for the period ending November 1, 1990. Larry Anderson indicated that the \$43,030 was all that would be expended during the Commission's 1990-1991 fiscal year. The USGS had told the Commission how much to pay them during the USGS's 1990-1991 fiscal year, but the Commission's and the USGS's fiscal years do not coincide. The USGS's 1990-1991 fiscal year extends through September of 1991. Therefore if payments are made by the Commission between July 1, 1991, for example, and September 30, 1991, the Commission would consider those funds as fiscal year 1991-1992 expenditures, while the USGS would consider those funds as fiscal year 1990-1991 income. The \$49,210 figure the USGS had given the Commission was really for dollars the Commission would spend after July 1 during fiscal year 1991-1992. The Secretary/Treasurer's report was approved as presented by Page.

Anderson reminded the Commission that at the April 1991 Commission meeting, the budget will be set for the next two years. At the end of the 1990-1991 fiscal year, it is anticipated that the carry-over will be about \$50,000. Anderson indicated that annual income from the present level of state assessments plus interest was expected to average about \$80,000, while annual expenditures were projected to be around \$90,000. In April the Commission will need to consider raising state dues.

Jack Barnett then reported on the efforts of the Technical Advisory Committee (TAC). Barnett indicated the TAC had been actively reviewing the 1976 base map and procedures for verifying the map. The TAC feels they need to use whatever resources are available to verify the accuracy of the map--whether that be aerial photographs, satellite data, water right files, local officials, etc. Barnett indicated that he had a document describing the interim base map verification procedures which he wished to include as part of the Commission minutes (see Appendix F). During the summer of 1991, the TAC intends to spend additional time in the field to verify the base map. During the fall and winter, the TAC will finalize the map and present it to the Commission for approval at the April 1992 Commission meeting.

Barnett also indicated that while the TAC is in the field modifying the base map, they will also be estimating current depletions. The greater effort will be with respect to irrigation; however, each of the states is prepared to estimate depletions occurring in municipal and industrial areas. The TAC has prepared a document entitled Procedures for Estimating Depletions Under the Amended Bear River Compact (see Appendix G) which outlines how the TAC will proceed in the field. Barnett emphasized that the TAC and the Commission will not determine the depletions as of the spring of 1992,

but rather the Commission will receive reports from the TAC as to each of the states estimates.

Barnett then indicated that pursuant to Commission instruction, he had prepared a proposed agreement document to allow the Commission to transfer funds to each of the states as they proceeded with their efforts to verify the base map. The agreement would provide that as the three states proceed in the field with their efforts to verify the base map, the states would be required to prepare three brief reports outlining their efforts when 1/3 of the work had been accomplished, when 2/3 of the work had been accomplished, and upon completion of their efforts. Upon receipt of the first report, \$7,400 would be distributed to each state; upon receipt of the second report, another \$7,400 would be distributed; and upon receipt of the final report, \$7,433 would be distributed.

Barnett explained the basis for those amounts. He indicated that the Commission had identified \$70,000 for verification of the base maps. Of that amount, approximately \$3,000 had been spent on printing the quadrangles from the base maps. About \$275 had been spent for the printing of additional quadrangles where the quadrangles overlapped two states. This left the Commission with roughly \$66,730 to be divided among the three states, which worked out to about \$22,233 per state. The Commission authorized Barnett to act in behalf of the Commission to execute appropriate contracts with each state to complete the base map verification.

Barnett indicated that at the November 26 TAC meeting, the TAC had heard a report from Clark Ogden, a meteorologist with the State of Utah who has responsibility for the weather modification program. Mr. Ogden's report was very informative. The TAC felt it was acting as a vehicle for the exchange of information. Barnett indicated that some concern had been expressed about how weather modification in some areas might affect another area. Mr. Ogden, and perhaps a consultant from Colorado State University, expressed a willingness to meet at a later date in Evanston or someplace else.

With respect to stream gaging, Barnett indicated that this last summer he visited about half of the stream gages which the Commission contracts with the USGS to operate. Barnett indicated he soon hoped to visit the remaining half of the gages. He expressed some concern with respect to the availability of real-time data from the computer system. He intended to sit down with Lee Case and determine how to more effectively extract the data from the system. Barnett indicated that the USGS stream gage data will become more critical as the biennial report is being prepared.

Barnett also mentioned that the Commission had been considering the possibility of temporarily automating the gage above and the gage below Woodruff Reservoir. It was contemplated that Utah State

University might be asked to help in this automation. Lee Case indicated that the USGS would not be comfortable with anyone other than USGS personnel having access to stream gaging equipment. The USGS feels they have a certain liability to the landowners who allow them to access their property and read the gages. At this time the TAC is not recommending the automation of any more of the gages.

Lee Case indicated that the gaging stations which operate on a satellite system are checked every morning to make sure they are operational. Also, at each one of these sites there is a separate AVR recorder as a backup. Case also indicated that the USGS limits the access to the gaging stations to their trained personnel because the USGS feels they have an obligation to the Commission, who pays them to monitor that site, to see that all of the equipment is operational. Further, the USGS signs a contract with the landowner, giving the USGS access to the site. Via that contract, the USGS is liable for anything that happens at the site. Case indicated the USGS is firmly committed to providing the Commission with the data it requires. He also expressed the USGS's willingness to meet with Commission members to further explain how to access real-time data and some of the potential problems that can exist with this new technology.

There was some discussion as to why there appeared to be incomplete data on the computer record for the gage at Rainbow, for instance. Carly Burton indicated the gage had been moved and they were in the process of establishing a new rating for that gage. They had maintained a record at that gage from the Stevens recorder during that time, so there was a separate set of accurate data available. Barnett indicated that although he had experienced some difficulty accessing the computer data on a daily basis, he felt confident that the USGS would provide a complete set of data for the Commission's use.

Keith Higginson asked whether there were adequate measuring devices to monitor the reservoir storage during the 1990-1991 inflow season. There was some discussion about the accuracy of stage gages, with particular concern about the gage on Woodruff Narrows Reservoir. Barnett indicated he uses stage gages to determine what the total storage content is, but their accuracy is not as reliable as inflow/outflow records. There have been problems with the stage gages in the past when the stage is very low in the reservoir. Barnett indicated that adequate gaging stations were in place to be able to administer Compact allocations in the upcoming year. Barnett said that the TAC had been considering the possibility of automating the inflow, but so far no decision had been reached.

Barnett stated that the TAC felt they would not need to meet again until early in the next irrigation season. The TAC may meet in the Preston area, perhaps, and in addition to addressing the work items assigned to them, there will be additional field tours to observe how the map verification is going in that area.

Barnett next reported on his efforts as Engineer-Manager of the Bear River Commission. He distributed a hydrograph of Bear Lake data provided by Utah Power & Light (UP&L) (see Appendix H). The graph showed that the Lake has been losing storage from 1987 to 1990. The stage elevation has also continued to decrease during that time period. There was about 800,000 acre-feet (af) in storage in Bear Lake in December of 1988. Going into the spring and summer of 1989, storage rose to a little over 900,000 af. In 1990 there was less of an increase in the spring, and then the Lake level really started dropping off in July. It stayed below the irrigation reserve for the entire year, and by September fell below the 5,911 level and was well below that level as of November 27, 1990.

Barnett distributed a preliminary graph showing flow in the Upper Division (see Appendix I). He indicated that the 1990 flows were near record lows. The River was in a water emergency all during the month of May. There was good runoff during the month of June and into the first week of July, so during this time there was no water emergency. The water users below Woodruff Narrows concluded that they would not irrigate until late May, but keep the reservoir gates closed and store as much of the limited water supply as they could. They started their releases on May 25. Because of these late releases, the irrigation in the Upper Division was accomplished to a greater degree than many had thought possible. Crops were not as good as some years, but much better than some had anticipated, even though divertible flow significantly dropped in July. By July, many of the irrigators who were raising grass hay had sufficiently irrigated their crops to get them through the rest of the irrigation season, so the lack of water was not as damaging in the latter part of the summer.

Barnett next reported on the diversions in the Central Division (see Appendix J). He indicated irrigators were not as fortunate here. When divertible flow drops below 870 cfs, the River is in a water emergency. The flow never came close to that level, but peaked at a little over 600 cfs. When the flow at Border is below 350 cfs, the River is also in a water emergency. Only once during mid-June did the flow rise slightly above this level. It was a tough year for irrigators as there were major shortages.

Fassett asked why on the hydrograph of Bear Lake provided by UP&L (Appendix H), in September of 1990 the line suddenly dropped off. Barnett responded that when UP&L turns the pumps off, the level drops. Carly Burton explained that when the pumps are turned on at Lifton, there is a surge of water which affects both levels of the pumps on the Bear Lake side and the Mud Lake side. When everything is shut off and Mud Lake is isolated from Bear Lake, the recorders, which are inside of the Lifton station, will report the true readings on both sides. Burton indicated in September of 1990 they had to make about a .70-foot correction when the pumps were shut off. The lift from the Bear Lake

side into the station is recorded as elevation when the pumps are on, which is really a false elevation. When everything is shut down, the lake levels settle back down to true elevation. UP&L decided to show that change in elevation the day that it occurred.

Anderson restated Fassett's question, asking why this sudden drop-off in elevation does not show on any previous years. Burton indicated that this phenomenon occurs every year, but usually the rise and fall are not as significant. The problem is there is about a 10-foot elevation difference between Bear Lake and Mud Lake. For some reason, the greater the difference in elevation, the greater the impact. Burton indicated he had never seen that big of a correction before.

Fassett indicated that swings of 50,000 af because of a gage error can be a real problem from Wyoming's point of view as they are the upstream state and a third of that amount constitutes their total allocation. He asked how you could plan for such a big drop when the pumps are turned off. The Compact language does not allow for flexibility. Barnett suggested the TAC and UP&L should further investigate this issue. Higginson asked that UP&L supply all states with a copy of daily gage heights coordinating with the period of time UP&L turns the pumps on and off.

Reed Dayton reported on the efforts of the Operations Committee. Dayton indicated that despite the 1990 water shortages, the water year turned out better than was anticipated. The Operations Committee was notified that the level of Bear Lake had dropped below 5,911 in September of 1990. Dayton asked Barnett to briefly discuss the impact this had on the Commission.

Barnett pointed out that to his knowledge, only two reservoirs were constructed which had an opportunity to take advantage of additional storage as allowed for under the Amended Compact: Woodruff Narrows and Sulphur Creek. In 1991 when these two reservoirs fill from the carryover storage that they now contain, plus the new (1991) storage, to a point where their "old" (prior to the Amended Compact) allocation is filled, their storage will be terminated until such time as Bear Lake reaches 5,911.

The original Compact provides for 35,500 af to be stored. Not all of that water is allocated to Woodruff Narrows or Sulphur Creek. With the notification of the States of Utah or Wyoming of changes in where they intend their allocations to be used for this storage, the two States combined would be allowed to store 35,500 af over and above what they now have in storage under the additional storage that is allowed by virtue of the original Compact. All States were in agreement as to that operating procedure, but it was requested that there be some effort to further verify what storage occurs and what storage reservoirs do exist in the basin, particularly in the Upper and Central Divisions. Barnett committed to prepare a document that would list all

of the reservoirs, their storage capacity, and other pertinent information to be available to all Commission members well in advance in the critical points in the forthcoming storage season.

Carly Burton distributed a handout showing significant events in Bear Lake and Bear River Operation during 1990 and which gave details on how 1990 compared with other years (Appendix K). Burton indicated the Outlet Canal was shut off on September 15, 1989. At that time, Bear Lake elevation was 5,913.56. The low level occurred on December 5, 1989, at 5,913.41. During the winter there was not much water which could be stored. On May 8 the Outlet Canal releases began. That was about the third earliest date in history that releases commenced. Normally, releases start about the third week in June. On May 8, the high elevation of the Lake was 5,914.10.

Irrigation demands and subsequent releases from the Lake increased. By July 5, all five pumps at Lifton were operating, but because of the differential in elevation between Mud Lake and Bear Lake, they could only release about 1,445 cfs. At that time the inflow to Cutler Reservoir was only about 600 cfs, but the irrigation demand at Cutler Dam was 900 cfs. They were losing ground on Cutler; the Lake level dropped about 3 feet during that time. They had quite a few pumping irrigators who were out of water around Cutler Reservoir.

UP&L decided to try something new. They called the major irrigation companies in the basin and requested a 25 percent reduction in irrigation demands. All of those companies cooperated in that request, and flows were able to recover. After that date, none of the companies increased their irrigation demands to the point they were at before the request was made.

On September 13, a letter was sent to Jack Barnett, putting him on alert and requesting Compact regulation under Article VI, Paragraph B of the Amended Compact. At that time the Lake elevation was approaching 5,911. By September 18, Bear Lake elevation dropped to 5,910.99. By September 21, the Outlet canal was shut off. It was shortly afterward the adjustment was made in UP&L records to reflect the true Lake elevation Fassett had asked about. On October 15, the Lake level was at 5,909.9; and as of November 27, the lake elevation was 5,909.8.

Burton indicated that in November of last year, the flow in Rainbow Canal was about 120 cfs. This year it was at 60 cfs. Burton said he did not expect the Lake level to recuperate very much this winter.

Fassett asked what triggers the day UP&L decides to open the Outlet Canal. Burton indicated it is determined by the inflow at Cutler Dam and how that inflow compares to the irrigation demand at that time. When the irrigation demand and the inflows get close to

balancing out, UP&L starts releasing from Bear Lake. If, for example, Bear River Canal Company is diverting 900 cfs and the calculated inflow is 950 cfs, then UP&L needs to anticipate that water will need to come from Bear Lake in the near future. There is a five-day lag time from Bear Lake to Cutler, so UP&L tries to anticipate that. They use storage reserves in Cutler Reservoir, as well as Oneida and Soda, to help speed up that process. If they get to the point where the inflow is not sufficient to meet the irrigation demand, they may augment that with releases out of those three reservoirs until the Bear Lake water gets there. The releases are based on many years of operating experience. Once the releases start, the system is operated so just enough water for irrigation reaches Cutler, and none is left over for generation through the Cutler plant. In effect, the plant at Cutler is shut down for the rest of the season.

Fassett then asked if there was some way Cutler notified UP&L that they wanted their direct flow water rights, which are senior to anyone upstream, satisfied before they request water from storage. Bob Morgan said that the river commissioner, in cooperation with Idaho, tends to determine what the base flows are in accordance with decrees. They determine which priorities are to be filled by base flows.

Carly Burton turned the Commission attend to the second page of his handout illustrating Bear Lake runoff from 1913-1990. He indicated the numbers were derived from a calculated number based on the available water supply in the Bear River and its tributaries. That number takes into consideration lake evaporation, precipitation, etc. Burton indicated the 1990 data on the graph was inaccurate. It shows 43,000 af of runoff, but the actual number was -16,000. Burton indicated UP&L will be sending out a corrected version of this bar graph. That negative number indicates the Lake evaporation was greater than the available water supply from the Bear River and the tributaries, making it about the fourth driest year on record.

Burton indicated he had totalled the net runoff for 1987-1990. For all four years combined there was about 184,000 af, or about 60 percent of the annual average of 313,000 af.

Burton then examined a graph comparing annual Bear River runoff above Bear Lake for historical drought years. He indicated 1990 closely compares to the 1961 drought year.

Assuming a drought situation in 1991, UP&L is considering restricting the amount of available storage water to all of the contracted users for 1991. In January 1991 they will schedule a meeting with the appropriate users, look at the conditions of the lake, the runoff forecasts, projected water supplies, etc., and try to work out some kind of a plan for use and delivery of storage water in 1991. If the 1991 water year is normal, however, those restrictions will not be necessary.

The question was asked how low Bear Lake can be pumped. Burton indicated the historical low which occurred in 1935 was 5,902. The Lake is nearly 8 feet about that. Burton indicated, however, that last fall they had taken some soundings about 2,200 feet out from the plant in the lake, and there was only about 2.8 feet at that time. Sand has accumulated in the Lake at the north end which may cause some problems keeping the channel clear. Burton indicated that dredging operations took place during the summer and then a backhoe was used to dig the channel back on both sides. The channel is in good shape for now, but the lower the Lake drops, the more difficult it will be to maintain a channel out into the lake. The pumps, cannot, however go down below 5,902.

Keith Higginson asked Pete Peterson to comment on his experiences as the Idaho watermaster this last season. Pete said the main problem was above Bear Lake. They were running at about 50 percent. Meadows in Bear Lake looks like Death Valley, instead of Meadows. Below Bear Lake the large irrigation companies cooperated and reduced their usage by 25 percent which really helped out when they were in a bind. Peterson felt work needed to be done on the upper portion of the Central Division to try to get some water down there. Last summer there wasn't enough water to run to the end of the ditches. Yet up in Evanston, everything was nice and green up there and the canals were flowing over their banks.

Bob Morgan pointed out that at the Utah caucus, it had come out that with the operation of pumps on the Lake, the water available in the upper section of the Central Division was depleted at a greater rate than it would have been if the pumps had been turned off sooner. The 5,911 level would then have been reached a little faster and opened up a little more water in the Upper Section.

Carly Burton added that in the Rainbow Canal for this last year, the peak flow for the whole year was only 189 cfs. That occurred about the middle of March. The average annual flow is about 2,000 cfs. Conditions were well below normal.

Barnett indicated that in the two years he has served as Engineer-Manager, contracts have been entered into with many of the pumpers, an interstate unofficial list is being circulated as to priorities, a Utah river commission has been added, and the river commissioner in Idaho near the state line has gained more experience; all of these factors have led to a reduced probability of the need for regulation by the Commission.

Blair Francis gave the Records Committee report. He indicated the Records Committee met the morning of November 27 and discussed three items. First, they discussed the Amended Compact and Bylaws. After analyzing the best method for reprinting the booklets, the Records

Committee determined to use the text of the Amended Compact as contained in the previous version and add the amended Bylaws to those pages via the computer found in Jack Barnett's office. The booklet would be about the same size and 500 copies would be printed. Barnett estimated the cost would be under \$500. A motion was passed to redirect \$500 from the USGS stream gaging line item to the printing line items within the Commission's FY 91 budget.

Second, the Records Committee discussed the history of the Bear River Commission to be compiled by Wally Jibson. Francis reported that Jibson had not been able to meet his own stated deadline to have a draft report in the Commission's hands before the November 27 meeting. Jibson had indicated to Barnett that he would have a draft in Barnett's hands by the first week in December. That draft would then be distributed to all Commission members. Commission members would be given until about the end of January to look at it and make suggestions for changes. Records Committee members would contact their respective Commission members for comment. Records Committee members would then relay those comments to Barnett. Francis also indicated that as per the agreement with Jibson, there should be a payment to him of \$2,700 before the first of the year.

Anderson indicated that he felt Jibson's draft Commission history should be distributed to those people who are familiar with the history, such as Ed Skeen and Dan Lawrence. Higginson raised the issue of how the Commission should treat Jibson's history, whether it would be formally adopted and published as the official history of the Commission or whether it might be identified as "Wally Jibson's memory of the History of the Commission." It was determined that this decision, and other decisions with respect to distribution and related expenses, should wait until the Commission had a chance to review Jibson's report.

The third item discussed by the Records Committee was the printing of the next biennial report. It was decided that the diversions listed in tabular format should be included in the report. Due to new information in the Lower Division, there will be some additions to the customary listing. It was determined that the Commission finances section should be moved ahead of the diversion listing. The Records Committee directed Barnett to investigate putting the report into a larger print form. Barnett is to report back to the Records Committee by about March 1, with the final product being completed in advance of the November 1991 Commission meeting. There was some discussion about how many to print and it was concluded that Barnett should print the same amount as last time.

Floyd Jensen indicated the Records Committee had considered printing the data within the biennial report with two separate chapters for each year covered in the two-year report. Francis and others felt it might be a good idea to try it that way. Barnett indicated that

regardless of how the biennial report is formatted, it might be helpful if a certain amount of the data relating to the first year is worked up, printed, and made available to the states as soon as possible after the first year, rather than waiting until the end of the two-year period.

Management Committee members then had the opportunity to highlight current events within their respective states. Fassett reported on the development of the Cokeville Meadows National Wildlife Refuge. He indicated that when Wyoming's Legislature passed the enabling legislation allowing the refuge to go forward, the Legislature emphasized that any water right issues which arise will fall under Wyoming law. As State Engineer, Fassett signed an agreement with the U.S. Fish & Wildlife Service which outlines how water right issues will be addressed if the refuge is established. This agreement ensures that state laws and compacts will be fully recognized by the Fish & Wildlife Service, and they will have to come through the normal processes to get anything approved.

Fassett further reported that a draft Environmental Impact Statement (EIS) had been developed on the Refuge, and there had been some public hearings (locally, as well as in Cheyenne and elsewhere). The comment period on the draft EIS closes on December 19. A record of decision has to be made, some gubernatorial approvals still need to be obtained, and then federal authorization and funding to purchase the lands and set the boundaries, etc., still has to take place.

Fassett also reported on the weather modification concern in southwestern Wyoming. He indicated they had been working closely with Utah state officials. Wyoming is looking for a new appropriation from its State Legislature to jointly fund some research to pursue with Utah the issue of the downwind effect.

Larry Anderson reported that in the Utah there was a great deal of interest in the development of the Bear River. Two years ago a Bear River Task Force was created by the Legislature, consisting of 22 members from various backgrounds and geographical regions. Anderson indicated his offices were being used, in part, to staff that Task Force. A year ago, the State of Utah passed legislation appropriating \$1.25 million to the Division of Water Resources to prepare a pre-design study on the development of the Bear River. As part of that assignment, the Division was to provide an interim report to the Task Force on their study of the Bear River. Larry distributed copies of that report to the Commission.

Anderson indicated that as part of the pre-design study, his office is looking at present water use, supplies, and rights in Cache, Box Elder, Rich, Weber, Davis, and Salt Lake Counties. Once they have gathered that data, they will determine future water needs. The Division of Water Resources presently has a water supply computer model

covering all of Salt Lake County. That model is being expanded into Weber and Davis Counties so it can be used to predict future water needs. That model should be up and working within the next three months for Weber and Davis Counties. They do not intend to use the computer model in Cache, Box Elder, and Rich Counties, but they will use existing data and the information they collected.

The Division of Water Resources is then to evaluate alternative water supplies to meet the projected future needs. Anderson reported that this evaluation has been completed for Salt Lake County. That study cannot be finished in Weber and Davis Counties until the computer model is operational. They are looking at alternative means of meeting the needs in those areas of the Wasatch Valley, other than bring Bear River water in to them. In the Cache, Box Elder, and Rich Counties, of course, the water supply will come from the Bear River.

The Division is also doing operation studies and computer models. The State of Utah, through the Division, again, has evaluated five dam sites and completed preliminary designs and cost estimates. The Division is updating those designs to reflect 1990 costs on water storage reservoirs at Honeyville, Barrons, Avon, Millcreek, and Oneida Narrows. The Division has entered into contracts with environmental consultants to identify the environmental concerns and issues with constructing these reservoirs (except Oneida).

The Division is also looking at water quality concerns in the Lower Bear River as the water is used for municipal needs and recreation. When the work is all completed, they will conduct a financial and economic analysis, trying to identify the most reasonable alternative to meeting future water needs of the Lower Bear River drainage, as well as the Wasatch Front. That report is scheduled for completion in October 1991.

The Task Force and the Legislature are moving ahead to introduce legislation, supported by the Task Force, to authorize the creation of a Bear River Water Development Fund. As part of that, the Legislation proposes the appropriation of \$10 million a year to the Fund to be used in the construction of three reservoirs: Honeyville, Barrons, and Avon.

Anderson indicated he expected some legislation to come out of the Legislature with respect to Bear River development. There seems to be very little opposition in Utah, and a lot of interest by the Bear River Migratory Bird Refuge and Wasatch Front interests to participate in that development. Anderson further indicated that the Division's studies in Salt Lake County have indicated that there is adequate water supply to meet the projected population through the year 2018, but they are still very anxious to participate in any plans to move Bear River water to the area. Anderson said the proposed legislation will require

that before construction begins, contracts be in place for 75 percent of the water.

Anderson indicated the Division is also preparing a State Water Plan for the Bear River basin. This report touches the potential of exporting 100,000 af to the Wasatch Front, but it primarily concentrates on the Bear River basin's water supply, current uses, and projected needs in the basin. Most of this effort deals only with the State of Utah. This document should be ready for public distribution in about June of 1991.

Keith Higginson indicated Idaho had also created a Bear River Task Force, which monitors Utah's progress. Idaho's Legislature only appropriated \$5,000 for its Task Force, compared to Utah's \$1.25 million appropriation. The Idaho Task Force has encouraged their Legislature to appropriate more funds, but the Legislature has turned a deaf ear on their requests.

Higginson said that during the first week of December, the Idaho Task Force would hold meetings in Soda Springs and Montpelier to hear presentations from local interests who were promoting the development of the two reservoir projects on the Bear River: the Soda Springs/Caribou Dam (at Soda) and the Rocky Point Dam (at Montpelier). Higginson also indicated the Task Force would be meeting at that time to work on a final report to the Governor since the Task Force would terminate December 31, 1990.

Higginson also reported on a proposed hydroelectric project on the Bear River main stem in the Oneida Canyon. S&F Power Company had proposed the construction of about a 100-foot high dam and hydropower project, which would flood the lower reaches of that canyon. The project generated much opposition and concern. Two days of hearings were held in Preston. Higginson rejected the application for three reasons: 1) the storage of water in the reservoir and the operation of the dam would reduce the quantity of water available to existing right holders because the applicant had no plans for offsetting the evaporation and other losses of the reservoir; 2) the applicant had failed to submit a certified financial statement indicating they had the financial resources available to complete the project; and 3) the project would not be in the public interest.

There was some discussion with respect to the time and place for the next Commission meeting. It was determined the next Commission meeting would be held on April 16. If committee meetings were deemed necessary, they could be held on April 15. Those meetings would be held in Salt Lake City Utah at the Utah Department of Natural Resources building.

The meeting adjourned at 3:45 p.m.

**ATTENDANCE ROSTER**

**BEAR RIVER COMMISSION  
REGULAR MEETING  
Salt Lake City, Utah  
November 27, 1990**

IDAHO COMMISSIONERS

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WYOMING COMMISSIONERS

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

ENGINEER-MANAGER

Jack A. Barnett

SECRETARY

Heidi S. Marciniak

OTHERS IN ATTENDANCE

IDAHO

Hal Anderson, Department of Water Resources  
Pete Peterson, Watermaster - Dist. #11  
Don Gilbert, Last Chance Canal Company  
John Thomas, Last Chance Canal Company

UTAH

Robert M. Fotheringham, Division of Water Rights  
Lloyd H. Austin, Division of Water Resources  
Carly Burton, Utah Power & Light  
Rock Holbrook, Utah Power & Light  
Jody Williams, Utah Power & Light  
Norman Stauffer, Division of Water Resources  
Lee Case, U.S. Geological Survey  
Darrell Carlson, U.S. Geological Survey  
Robert L. Morgan, State Engineer, Division of Water Rights  
Bert Page, Division of Water Resources  
Barry Saunders, Division of Water Resources  
Don Barnett, Bear River Commission  
Claire Allen, BWR  
John Bjerregaard, Hansen, Allen & Luce Engineering

WYOMING

Sue Lowry, State Engineer's Office  
Jim Kircher, U.S. Geological Survey  
John Yarbrough, State Engineer's Office  
Marvin Bollschweiler, Retired



- IV. Report from Technical Advisory Committee                      Barnett
  - A. Depletion study
    - 1. Base map verification
    - 2. Depletion estimates
    - 3. Budget and contracts
  - B. Weather modifications
  - C. Stream gaging
    - 1. Real time gages
    - 2. Temporary gages
  
- V. Report of Engineer-Manager on 1990 water deliveries                      Barnett
  
- VI. Report of Operations Committee                                      Dayton
  - A. Bear Lake operations (past, present, and future)                      Burton
  - B. Storage restrictions in current years                      Barnett
  - C. Water delivery in Lower Division in 1990                      Higginson/  
Morgan
  
- VII. Report of Records Committee                                      Francis
  - A. Biennial report
  - B. Jibson's Commission history
  - C. Republishing of Bylaws and Compact
  
- VIII. Report of the Management Committee
  - A. Fassett (Wyoming)
  - B. Anderson (Utah)
  - C. Higginson (Idaho)
  
- IX. Other items from Commission members
  
- X. Next Commission meeting    Wallentine
  - A. Date--April 15, 1991 (annual meeting - third Monday in April)
  - B. Location

Anticipated adjournment: 4:30 p.m.

BEAR RIVER COMMISSION  
STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF JULY 1, 1989 TO JUNE 30, 1990

INCOME	CASH ON HAND	INTEREST INCOME	FROM STATES	TOTAL REVENUE
Cash Balance 07-1-89	\$127,472.17			\$127,472.17
State of Idaho			\$25,000.00	\$25,000.00
State of Utah			\$25,000.00	\$25,000.00
State of Wyoming			\$25,000.00	\$25,000.00
Interest on Savings and other income		\$11,799.14		\$11,799.14
TOTAL INCOME TO June 30, 1990	\$127,472.17	\$11,799.14	\$75,000.00	\$214,271.31

DEDUCT OPERATION EXPENSE

EXPENDED THROUGH U.S.G.S.

	APPROVED BUDGET	UNEXPENDED BALANCE	EXPENDITURES TO DATE
Stream Gaging	\$38,400.00	\$0.00	\$38,400.00
SUBTOTAL	\$38,400.00	\$0.00	\$38,400.00

EXPENDED THROUGH COMMISSION

Personal Services	Jack	\$24,887.00	-\$3,069.84	\$27,956.84
	Technician	\$3,000.00	-\$990.00	\$3,990.00
	Wally	\$0.00	-\$3,925.49	\$3,925.49
Travel (Eng-Mgr)		\$800.00	-\$1,545.38	\$2,345.38
Office Expenses & Supplies		\$250.00	-\$1,427.20	\$1,677.20
Printing Biennial Report		\$2,300.00	\$323.00	\$1,977.00
Treasurer Bond & Audit		\$700.00	-\$320.00	\$1,020.00
Printing		\$100.00	\$100.00	\$0.00
1976 Base Maps		\$3,000.00	\$0.00	\$3,000.00
Legal Consultant		\$500.00	\$0.00	\$500.00
Special Studies		\$25,000.00	\$25,000.00	\$0.00
SUBTOTAL		\$60,537.00	\$14,145.09	\$46,391.91

TOTAL		\$98,937.00	\$14,145.09	\$84,791.91
CASH BALANCE AS OF 6-30-90				\$129,479.40

BEAR RIVER COMMISSION  
DETAILS OF EXPENDITURES

FOR PERIOD ENDING JUNE 30, 1990

208	JACK BARNETT	\$495.47
209	JACK BARNETT	\$2,073.92
210	JACK BARNETT	\$3,250.50
211	ED SKEEN	\$500.00
212	WALLY JIBSON	\$1,890.16
213	U.S.G.S	\$38,400.00
214	JACK BARNETT	\$2,477.13
215	WALLY JIBSON	\$2,035.33
216	JACK BARNETT	\$2,240.93
**	BANK CHARGE	\$1.08
217	JACK BARNETT	\$2,578.33
**	BANK CHARGE	\$11.92
218	GILCHRIST & CO	\$920.00
219	JACK BARNETT	\$2,709.45
220	ROSE PRINTING	\$1,977.00
221	JACK BARNETT	\$2,175.39
**	BANK CHARGE	\$0.93
222	JACK BARNETT	\$2,747.21
223	JACK BARNETT	\$2,610.85
224	FENTON INSURANCE CO	\$100.00
225	JACK BARNETT	\$3,124.62
226	V O I D	
227	A G R	\$3,000.00
228	JACK BARNETT	\$2,553.01
229	V O I D	\$0.00
230	JACK BARNETT	\$2,897.73
231	JACK BARNETT	\$4,020.95
		\$0.00
	TOTAL EXPENSES	<u>\$84,791.91</u>

BANK RECONCILIATION

JUNE 30, 1990

Cash in Bank per Statement 6-30-90	\$1,743.64
Less: Outstanding Checks	\$6,918.68
Total Cash in Bank	<u>-\$5,175.04</u>
Plus: Savings Account-Utah State Treasurer	\$134,654.44
TOTAL CASH IN SAVINGS AND IN CHECKING ACCOUNT	\$129,479.40

BEAR RIVER COMMISSION

STATEMENT OF INCOME AND EXPENDITURES

FOR THE PERIOD OF JULY 1, 1990 TO NOVEMBER 1, 1990

INCOME	CASH ON HAND	INTEREST INCOME	FROM STATES	TOTAL REVENUE
Cash Balance 07-1-90	\$129,479.40			\$129,479.40
State of Idaho			\$25,000.00	\$25,000.00
State of Utah			\$25,000.00	\$25,000.00
State of Wyoming			\$25,000.00	\$25,000.00
Interest of Savings and other income		\$4,895.93		\$4,895.93
 TOTAL INCOME TO November 1, 1990	 \$129,479.40	 \$4,895.93	 \$75,000.00	 \$209,375.33

DEDUCT OPERATING EXPENSES

EXPENDED THROUGH U. S. G. S.

	APPROVED BUDGET	UNEXPENDED BALANCE	EXPENDITURES TO DATE
Stream Gaging	\$49,210.00	\$6,180.00	\$43,030.00
 SUBTOTAL	 \$49,210.00	 \$6,180.00	 \$43,030.00

EXPENDED THROUGH COMMISSION

Personal Services	Jack	\$26,380.00	\$15,388.35	\$10,991.65
	Technician	\$3,200.00	\$2,532.49	\$667.51
Travel (Eng-Mgr)		\$1,800.00	\$1,507.80	\$292.20
Office Expenses		\$2,100.00	\$1,917.93	\$182.07
Printng Biennial Report		\$0.00	\$0.00	\$0.00
Treasurer Bond & Audit		\$1,000.00	\$140.00	\$860.00
Printing		\$200.00	\$200.00	\$0.00
Legal Consultant		\$500.00	\$0.00	\$500.00
Commission History		\$5,000.00	\$5,000.00	\$0.00
Special Studies				
a. 1976 Base Map		\$3,275.00	\$0.00	\$3,275.00
b. 1976 Depletion Study		\$66,725.00	\$66,725.00	\$0.00
 SUBTOTAL		 \$110,180.00	 \$93,411.57	 \$16,768.43

TOTAL \$159,390.00 \$99,591.57 \$59,798.43

CASH BALANCE AS OF 11-1-90 \$149,576.90

BEAR RIVER COMMISSION  
DETAILS OF EXPENDITURES

FOR PERIOD ENDING NOVEMBER 1, 1990

232	JACK BARNETT	\$2,198.33
233	JACK BARNETT	\$2,904.80
234	E.J. SKEEN	\$500.00
235	JACK BARNETT	\$2,503.86
236	D I T S	\$3,000.00
237	D I T S	\$275.00
238	JACK BARNETT	\$2,298.31
239	U S G S	\$43,030.00
240	GILCHRIST, SADLER, & HARDER, CPAS	\$860.00
241	JACK BARNETT	\$2,228.13

TOTAL EXPENSE \$59,798.43

BANK RECONCILIATION

NOVEMBER 1, 1990

Cash in Bank per Statement 11-1-90	\$49,717.97
Less: Outstanding Checks	\$48,691.44
Net Cash in Bank	\$1,026.53
Plus: Savings Account-Utah State Treasurer	\$148,550.37
TOTAL CASH IN SAVINGS AND IN CHECKING ACCOUNT	\$149,576.90

# FINANCIAL REPORT

BEAR RIVER COMMISSION  
YEAR ENDED JUNE 30, 1990

**GILCHRIST, SADLER & HARDEN, CPAs**

A PROFESSIONAL CORPORATION  
SALT LAKE CITY, UTAH

BEAR RIVER COMMISSION  
REPORT ON FINANCIAL STATEMENTS  
YEAR ENDED JUNE 30, 1990

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Statements of Revenue and Expenditure and Cash Balance	4
Comparison of Budgeted Revenue and Expenses to Actual	5-6
Notes to Financial Statements	7-8

Independent Auditors' Report

To The Commissioners  
Bear River Commission  
Salt Lake City, Utah

We have audited the accompanying statements of revenue and expenditures and cash balance arising from cash transactions of the Bear River Commission as of June 30, 1990 and 1989 and for the years then ended. These financial statements are the responsibility of the Commission's directors. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

As described in Note-1, these financial statements were prepared on the basis of cash receipts and disbursements, which is a comprehensive basis of accounting other than generally accepted accounting principles.

In our opinion, the financial statements referred to above present fairly, in all material respects, the assets and liabilities arising from cash transactions of the Bear River Commission as of June 30, 1990 and 1989, and its revenue collected and expenses paid during the years then ended, on the basis of accounting described in Note-1.

Salt Lake City, Utah  
October 25, 1990

*Gilchrist Sadler & Harden*

BEAR RIVER COMMISSION  
Statements of Revenue and Expenditures and Cash Balance

	Year Ended	
	June 30,	
	<u>1990</u>	<u>1989</u>
REVENUE		
Assessments		
State of Idaho	\$ 25,000	\$ 25,000
State of Utah	25,000	25,000
State of Wyoming	<u>25,000</u>	<u>25,000</u>
Total	75,000	75,000
Interest income	<u>11,799</u>	<u>13,248</u>
Total revenue	<u>86,799</u>	<u>88,248</u>
EXPENDITURES		
Commission's portion of direct expenses of the stream gaging program	38,400	37,650
Administrative expenses:		
Legal fees	500	500
Auditing fees	920	735
Surety bond	100	50
1976 Depletion study (Note-3)	-0-	32,880
Contractual services	38,218	14,701
Advertising & office expenses	<u>6,654</u>	<u>2,622</u>
Total expenditures	<u>84,792</u>	<u>89,138</u>
EXCESS (DEFICIT) OF REVENUE OVER EXPENDITURES	2,007	(890)
FUNDS AVAILABLE AT THE BEGINNING OF PERIOD	<u>127,472</u>	<u>128,362</u>
FUNDS AVAILABLE AT THE END OF PERIOD	\$ <u>129,479</u>	\$ <u>127,472</u>
CASH BALANCE		
On hand or in bank	\$ (5,175)	\$ 3,017
Utah public treasurer's investment fund	<u>134,654</u>	<u>124,455</u>
	\$ <u>129,479</u>	\$ <u>127,472</u>

The accompanying notes are an integral part of these financial statements

BEAR RIVER COMMISSION  
Comparison of Budgeted Revenue and Expenses to Actual  
For the Year Ended June 30, 1990

	Expected Revenue and Expenditures As Budgeted (Unaudited)	Actual Revenue and Expenditures	Difference Increase (Decrease)
<b>REVENUE</b>			
Assessments			
State of Idaho	\$ 25,000	\$ 25,000	\$ -0-
State of Utah	25,000	25,000	-0-
State of Wyoming	<u>25,000</u>	<u>25,000</u>	<u>-0-</u>
Total	75,000	75,000	-0-
Interest income	<u>8,000</u>	<u>11,799</u>	<u>3,799</u>
Total revenue	<u>83,000</u>	<u>86,799</u>	<u>3,799</u>
<b>EXPENDITURES</b>			
Commission's portion of direct expense of the stream gaging program (note-2)	38,400	38,400	-0-
Administrative expenses:			
Legal fees	500	500	-0-
Surety bond & auditing fees	700	1,020	320
Contractual services	28,687	38,218	9,531
Printing & office expenses	5,650	6,654	1,004
Special Studies (note-4)	<u>25,000</u>	<u>-0-</u>	<u>(25,000)</u>
Total expenditures	<u>98,937</u>	<u>84,792</u>	<u>(14,145)</u>
EXCESS (DEFICIT) OF REVENUE OVER EXPENDITURES	\$ <u>(15,937)</u>	\$ <u>2,007</u>	\$ <u>17,944</u>

The accompanying notes are an integral part of these financial statements

BEAR RIVER COMMISSION  
Comparison of Budgeted Revenue and Expenses to Actual  
For the Year Ended June 30, 1989

	Expected Revenue and Expenditures As Budgeted <u>(Unaudited)</u>	Actual Revenue and <u>Expenditures</u>	Difference Increase <u>(Decrease)</u>
<b>REVENUE</b>			
Assessments			
State of Idaho	\$ 25,000	\$ 25,000	\$ -0-
State of Utah	25,000	25,000	-0-
State of Wyoming	<u>25,000</u>	<u>25,000</u>	<u>-0-</u>
Total	75,000	75,000	-0-
Interest income	<u>9,961</u>	<u>13,248</u>	<u>3,287</u>
Total revenue	<u>84,961</u>	<u>88,248</u>	<u>3,287</u>
<b>EXPENDITURES</b>			
Commission's portion of direct expense of the stream gaging program (note-2)	37,650	37,650	-0-
Administrative expenses:			
Legal fees	500	500	-0-
Surety bond & auditing fees	785	785	-0-
Contractual services	14,300	14,701	401
Printing & office expenses	1,900	2,622	722
1976 depletion study (note -3)	<u>32,880</u>	<u>32,880</u>	<u>-0-</u>
Total expenditures	<u>88,015</u>	<u>89,138</u>	<u>1,123</u>
EXCESS (DEFICIT) OF REVENUE OVER EXPENDITURES	\$ <u>(3,054)</u>	\$ <u>(890)</u>	\$ <u>2,164</u>

The accompanying notes are an integral part of these financial statements

BEAR RIVER COMMISSION  
Notes to Financial Statements  
For the Year Ended June 30, 1990

Note-1 ACCOUNTING POLICY

The accounts of the Bear River Commission are maintained, and the statements of revenue and expenditures are presented, on a cash basis reflecting only cash received and disbursed. Therefore, receivables and payables, accrued income, and expenses, which may be material in amount, are not reflected, and these statements are not intended to present the overall financial position or results of operations in conformity with generally accepted accounting principles.

Note-2 BEAR RIVER COMPACT

The Bear River Compact is a tri-state agreement between Wyoming, Idaho, and Utah for the utilization and development of the waters of the Bear River. The Commission was organized April 5, 1958, and the by-laws were adopted April 26, 1958. The Commission is the administrative agency which carries out the provisions of the Bear River Compact. Three commissioners from each of the three represented states, plus one non-voting commissioner representing the United States, constitutes the ten-member Commission. The United States representative acts as Chairman. All expenses of the Commission are shared by the three states on an equal basis.

The Commission enters into an annual agreement with the United States Geological Survey, Department of the Interior, for the operations and maintenance of gaging stations. Expenses for the gaging station program are shared equally by the Commission and the Geological Survey. Other expenses attributable to the Commission are paid by the Commission whether the expenses are incurred by the Geological Survey or the Salt Lake City office.

On October 17, 1988, for the fiscal year ended June 30, 1989, the Commission paid \$37,650 for its one half share of the joint operations of 17 gaging stations. The total cost of the operation for the September 30, 1988 water year represents \$4,380 per station and \$870 for the publication of three stream gaging records.

On August 29, 1989, for the fiscal year ended June 30, 1990, the Commission paid \$38,402 for the water year ending September 30, 1989. This amount represents one half the cost of operating 17 gaging stations and publishing three stream gaging records.

BEAR RIVER COMMISSION  
Notes to Financial Statements (continued)  
For Year Ended June 30, 1990

Note-2 BEAR RIVER COMPACT (continued)

On December 5, 1989 the Commission signed a joint funding agreement for the water year ending September 30, 1990 in the amount of \$43,030. This amount represents one half the cost of operating 17 gaging stations and publishing three stream gaging records.

Note-3 1976 DEPLETION STUDY

On September 15, 1986 the Commission entered into an agreement with the Idaho Department of Water Resources, the Utah State Division of Water Rights, and the Wyoming State Engineer's office to determine depletion on the Bear River as provided by the Amended Bear River compact. Payments for the term of the contract are expected to be \$91,970. The contract terminated June 30, 1988. Payments made under the contract for the years ended June 30, 1990 and 1989 total \$-0- and \$32,880 respectively.

Note-4 Commitments

Special Studies

In April 1989, the Commission approved the allocation of \$25,000 for each of the fiscal years ending June 30, 1990 and 1991, for use by the Commission in any consulting agreements or studies that might be required for completing the states consumptive use studies. During the year ended June 30, 1990 the Commission did not spend any funds relating to this allocation. During the meeting held April 16, 1990 the Commission approved an additional \$45,000 for the 1991 fiscal year. The amount allocated for the 1991 fiscal year is \$70,000. The total amount allocated for use by the Commission to cover the costs of the three states completing their consumptive use studies is \$95,000.

Commission History

In a meeting on April 16, 1990, the Commission approved a contract with Wallace N. Jibson to write a history of the Bear River Commission for approximately \$4,500 plus \$500 for typing. The commission allocated \$5,000 for this project in the fiscal year ending June 30, 1991.

BEAR RIVER COMPACT BASE MAPPING:  
A SUMMARY OF METHODS USED

INTRODUCTION

This report documents the procedures used to develop the land type base maps and associated reports for the Bear River Compact Depletion Study. The final maps, at 1:100,000 scale, show water, wetlands, irrigated cropland, nonirrigated cropland, urban, and other, as of January 1, 1976. These maps also include transportation, hydrography, state and county boundaries, basin and division boundaries, and the public land survey system (PLSS). The final report is a tabular file that lists the acreage of each land type by PLSS section.

PRODUCTION OF THE 1980 BASE MAPS

The 1980 base maps of land type were produced using a methodology that combines output from photointerpretation of high altitude aerial photography with digitally processed Landsat MSS satellite data. This procedure was developed to improve land type classification accuracy by reducing errors of commission. 1980 information was used because the Idaho Dept. of Water Resources (IDWR) already had most of the Landsat data and an initial classification completed for most of Idaho.

Developing Strata

Strata were developed for a satellite data post processing overlay algorithm that improves the quality of the land type information. Photointerpretation techniques were used to delimit irrigated cropland, nonirrigated cropland, wetlands, and urban areas from NHAP 1:80,000 scale color-infrared (CIR) aerial photography for Idaho, and large scale resource photography for Utah and Wyoming. The boundaries were transferred to corresponding USGS 1:100,000 scale maps using a Zoom Transfer Scope. The land type information was then digitized and merged into one file. This file was converted to raster format to facilitate the overlay process with the classification produced from the satellite data.

Landsat MSS Classification

Three Landsat MSS scenes were required to cover the Bear River Basin. These are scenes, path 41 row 30, path 41 row 31, and path 40 row 31. All three were collected during the late summer of 1980. The satellite data was processed using both ERDAS and in-house software. Scenes were georeferenced to the UTM projection using ground control points selected in the images and on USGS 1:24,000 quads. These scenes were mosaicked to produce one image file that covered the whole Bear River

Basin. The mosaicked scene was then clustered and classified to produce a 255 spectral class image. The spectral classes were identified to the six land types for postprocessing procedures.

#### Postprocessing

The postprocessing procedure overlays the 255 spectral class image with the rasterized strata file using a GIS matrix algorithm. The resulting file is a land type classification digital file. This file was converted to a vector format using ARC/INFO software and maps were produced at a scale of 1:100,000. These preliminary maps were sent to Utah and Wyoming for evaluation and comments. Upon return, appropriate changes were made to produce the final 1980 land type maps. Copies of the Utah and Wyoming maps were sent to Automatic Geographic Reference Service (AGR) in Utah.

#### PRODUCTION OF THE 1976 MAPS OF IDAHO

The final 1980 land type maps were plotted at a scale of 1:100,000. These maps also showed the PLSS to facilitate further analysis. A Zoom Transfer Scope was used to register the maps with 1976 1:120,000 scale CIR aerial photography. Photo-interpretation techniques were applied to "predate" or edit the 1980 maps to 1976 by delimiting areas that had changed between the two dates on the maps.

These maps were taken to county USDA SCS and ASCS offices for evaluation along with the 1976 aerial photography. USDA personnel worked with an IDWR analyst and marked areas on the maps that needed to be changed. Edits on the map were then digitized to produce maps that showed land type information as of 1976.

The final 1976 land type maps were plotted at a scale of 1:100,000. These include the Malad City, Pocatello, Preston, and Soda Springs quads. The maps show land type, the PLSS, Division and basin boundaries, state and county boundaries; and also transportation and hydrography that was processed from USGS Digital Line Graphs. The final tabular report lists the acreage of each land type in each section.

PROCESS USED FOR  
DETERMINING DEPLETIONS  
1976 - 1980  
STATE OF UTAH

The water rights data base for Utah contains information for each water right such as source, filing date, proof or "election" date, etc. A search was conducted with the selection criteria based on a flow greater than or equal to 0.10 cfs, and an election-proof date within the time period indicated. This search was cross-checked with "Inventory of Water Rights-Bear River Basin, Utah" (August, 1975) and other lists compiled.

Each water right was individually reviewed to determine depletion. For those claims that were supplemental, a fair evaluation was made to determine if they should be counted for depletion. Those applications that were filed previously to 1976 and proven up on after 1976 were further researched to see when they had been put to beneficial use. This was accomplished through contact with the water user and other sources such as the ASCS which does aerial mapping and assists in water development projects.

The depletion acres were highlighted on hydrographic survey maps and digitized to be so indicated on the base map. Industrial, municipal and other uses will be evaluated individually to determine depletion.

METHODS FOR DETERMINING  
AREAS TO BE SUBTRACTED FROM 1980 LAND USE  
MAP TO REFLECT LAND USE AS OF 1/1/76

The mapping project conducted by the Bear River Commission is to have as its final product 1:100,000 scale maps reflecting land use in the Bear River basin as of 1976. This mapping project was a joint effort of the Utah Dept. of Natural Resources, AGR, Idaho Div. of Water Resources and the Wyoming State Engineer's Office. Because Idaho already had 1980 LANDSAT imagery for a majority of the basin, the Commission decided to use LANDSAT to get a 1980 map showing land use as of summer of 1980 and then lands put into production between 1976 and 1980 would be deleted. A base map showing basin land use as of 1/1/76 would be the final product.

Status reports had been compiled by the SEO and submitted to Wally Jibson in 1981 summarizing all surface and groundwater permits issued between 1976 and 1981. A list of valid permits was taken from these reports. The individual permits were pulled and acreages found on the surface water maps and groundwater maps filed for adjudication. The acreages of original supply were transferred onto mylar, 1:24,000 scale maps for digitizing. The codes reflecting land use prior to irrigation were determined from quad maps and conversations with Mike Ebson, Division IV Hydrographer-Commissioner. Mike also reviewed the areas mapped from the water rights and state that land use had no changed on some. Many had been previously irrigated by no water right had been obtained. One permit had been obtained but the land was no in production 1980, so the LANDSAT image would reflect what the land use was in 1976.

Coverages reflecting the acreages were created in the ARC/INFO system. A tape containing these coverages was sent to Utah's AGR for clipping the 1980 map to reflect the 1976 land use. The coverage is in AJBIEBER.GIS>BEAR.D>BR1976.

Sue Lowry  
Interstate Streams Engineer  
1/11/89

METHODOLOGY FOR DEPLETION CALCULATIONS  
STATE OF UTAH

I. DEPLETION PROCEDURES

- (A) Irrigation Depletion  
(1) Newly Irrigated Lands

Depletion amounts from newly irrigated lands will be determined by multiplying the acreage brought into production by the irrigation requirement of the crop mix of the sub-basin. The irrigation of new lands will be charged an irrigation requirement based on the consumptive use values reported in Research Report #125, by Robert W. Hill, Charles E. Brockway, Robert D. Burman, L. Niel Allen and Clarence W. Robinson, Utah Agricultural Experiment Station, Utah State University, in cooperation with the University of Idaho and University of Wyoming, January 31, 1989. For every acre brought into irrigated agricultural production, the equation may look something like:

Example area - Thomas Fork Sub-basin:

Criteria: 40 acres new crop mix

Based on Estimated Depletion Table 15,  
page 48, Research Report #125.

$(40 \text{ acs}) (1.04) \text{ acre-feet} = 41.6 \text{ acre-feet}$   
of depletion.

The consumptive use values in Research Report #125 are based on the weighted average crop mix for each sub-basin. Consumptive use values from the above referenced report will be used, but may be modified by the Commission. Modifications will require supporting information and appropriate adjusted tables will be required to verify depletion values. Any modifications made by the State of Utah will be documented to the satisfaction of the other two

states with justification as to why the modification was desirable.

By definition, depletion by the native vegetation or dryland crops is equal to the effective precipitation. No adjustment of the calculated depletion to account for prior use of the land such as dryland agriculture converted to irrigation will be required. Lands classified by the Commission as wet meadows are drained and then irrigated will not be assessed a depletion. If it is determined that the evapotranspiration loss from crops is less than the wetlands depletion, the difference will be "banked."

When lands with a pre-1976 Utah State water right is taken out of production, the State of Utah will transfer the depletion from that water right to lands with post-1976 priorities without a new depletion charge. Utah will be responsible for maintaining an accounting system documenting the transferred water right and the post-1976 lands receiving the depletion. Any pre-1976 depletions that have not been "re-appropriated" to a post-1976 water right will be "banked".

(2) Supplemental Supplies from New Development

To evaluate supplemental use of water on lands irrigated prior to 1976, any development or change in use will be documented, quantifying additional depletion. The document will address the area, extent of lands to receive supplemental supply, mainstem or tributary development, water availability and other necessary information. This section refers to any large area of land being supplied with supplemental waters from direct diversion sources or a water storage project that will supply supplemental irrigation water.

The depletion assigned to the smaller supplemental rights or filings may be calculated through a similar procedure as for new lands, i.e., take 40 acres in Thomas Fork that previously had an irrigated right, for which an

applicant chooses to make an application to firm the supply. The depletion of 41.6 acre-feet would then be multiplied by the average shortage rate in the sub-basin of the Bear River. Shortage rates by sub-basin will be reported to the Bear River Commission by the State of Utah with appropriate documentation to substantiate the numbers provided. The shortage rate will be a percentage figure applied to account for an average water requirement deficiency in each sub-basin.

Utah may also account for their supplemental supply uses by monitoring measuring devices installed by individual irrigators using supplemental rights or by an alternative accounting method accepted by the Commission.

(3) Irrigation Depletion Reporting Procedure

Utah will be responsible for the production and reporting of its own data. An accepted standard mapping and data base manager such as ARC-INFO or an equivalent will be used. All map and tabular information submitted to the Commission will be generated using an approved data base manager.

The data should be formatted as follows:

<u>Column</u>	<u>Item</u>
1.	Utah
2.	compact division
3.	subdivision from Report # 125
4.	section, township, and range
5.	new acreage put into production or acreage receiving supplemental supply
6.	for supplemental supplies, the % short for the sub-

basin

7. irrigated land, in acres, taken out of production  
(negative acreage value for banking)
8. irrigation requirement in acre-feet per acre from  
Report #125.
9. depletion. This value is the sum of acreage  
within a section. A section may have a negative  
acreage value if a majority of the land was taken  
out of production. The acreage value from columns 5  
and 7 are multiplied by consumptive irrigation  
requirement (col. 8) and percent short (col. 6) for  
supplemental, and input to column 9.
10. division totals. This is the summation of all the  
depletion attributable to Utah by Compact  
division. Compact division boundaries described in  
the amended Compact are shown on the basin base  
map.
11. number of acres held in water rights banked by  
State and Compact division.

(4) Reporting Requirements

Two main types of reporting will be submitted to the Commission. On a biennial basis, Utah will determine the amount of depletion from newly irrigated lands and from supplemental supplies. The biennial, tabular report will contain information on the acreage by section within a sub-basin, the depletion of that acreage and a total depletion calculated for each Compact division within the State of Utah. Also included in the report will be the

accounting of the calculated depletion and a comparison with the Compact allotments. A depletion balance will be calculated and included in the report. This report will be sent by the Engineer-Manager to the Commission members biennially, four weeks prior to the fall meeting. If the report is acceptable, it will be adopted as the official depletion record by the Commission. If there are questions regarding the Utah methodology or total depletion estimates, they will be rectified by Utah and the report will be resubmitted at the next Commission meeting for adoption.

The second type of reporting will consist of mapping update, to be compared to the base map, reflecting changes in irrigated lands along with a comprehensive, basin wide report showing land use. This update will be completed at the direction of the Commission. The mapping update will show new lands added and lands taken out of production since January 1, 1976. This map information will be generated using the accepted data base manager and sent to the Commission. Utah will document how their map products were generated and their information verified. At the Commission's direction, map information will be compiled and merged to form updated 1:100,000 maps and a basin wide map.

The variety of potential uses for Bear River water by Utah cannot be determined. It is not the intent to limit future uses with these depletion procedures. Depletion from uses such as out-of-basin exports or depletion from wildlife or aesthetic uses will be estimated by Utah as new uses are accepted.

(B) Municipal Depletion

The Amended Bear River Compact specifically exempts self-supplied domestic and stockwater use in the Upper and Central divisions from depletion charges. In order to be consistent, this exemption is extended to the Lower

Division as well. The definition for "municipal" for use in the calculation of depletions is: Any organization that supplies potable water and is required to report its activity as per the National Safe Drinking Water Act.

The increased or decreased depletion attributed to these uses will be calculated, tabulated and reported to the Commission in the following format.

1. Name of municipality or water using group.
2. Total diversion rate prior to January 1, 1976, known or estimated in acre-feet.
3. Diversion rate as of current reporting date in acre feet.
4. Total diversion increase or decrease since 1976 in acre feet.
5. Total depletion increase or decrease since January 1, 1976 in acre feet. The depletion will be an agreed upon factor established by the operation committee of the Bear River Compact, representing the percent of the diversion which is consumed, times the total diversion increase or decrease.

These data will be reported such that totals for divisions within Utah will be shown.

Where measured or metered data is not available, census data or current data will be used and a mathematical calculation made to determine water use as of January 1, 1976. The Commission will require that a document be submitted which outlines the process the State of Utah used to determine the depletion as of January 1, 1976. This document will be reviewed by the Commission and will be approved through a motion by the Commission.

The State of Utah will compare the use data on intervals decided by the Commission.

(C) Industrial Depletion

Each industrial user who is self supplied, will be accounted for by the state of Utah and a total water use by county will be compiled in the following format.

1. Name of the industrial or commercial establishment.
2. Standard Industrial Code (SIC) for the industry.
3. Total diversion prior to January 1, 1976 estimated or known in acre feet.
4. Diversion rate as of current reporting date in acre feet.
5. Total diversion increase or decrease since January 1, 1976, in acre feet (decrease will be a negative value).
6. Total depletion increase or decrease since 1976 in acre feet.

These data will be reported in such a way that totals for divisions within Utah will be shown.

Where data is not available for January 1, 1976, current use data will be used and a mathematical calculation made to determine water use as of January 1, 1976. The State of Utah will submit a document which outlines the process Utah used to determine the depletion as of January 1, 1976. This document will be reviewed by the Commission, and will have to be approved through a motion by the Commission upon receipt of the operations committee.

The State of Utah will compare the use data on intervals decided by

the Commission.

(D) Production of the 1980 Base Maps

The task of map review and production is an established process and has been documented as follows:

The 1980 base maps of land type were produced using a methodology that combines output from photointerpretation of high altitude aerial photograph with digitally processed Landsat MSS satellite data. This procedure was developed to improve land type classification accuracy by reducing errors of commission. 1980 information was used because the Idaho Department of Water Resources (IDWR) already had most of the Landsat data and an initial classification completed for most of Idaho.

Developing Strata

Strata were developed for a satellite data post processing overlay algorithm that improves the quality of the land type information. Photointerpretation techniques were used to delimit irrigated cropland, non-irrigated cropland, wetlands, and urban areas from NHAP 1:80,000 scale color-infrared (CIR) aerial photography for Idaho, and large scale resource photography for Idaho, and large scale resource photography for Utah and Wyoming. The boundaries were transferred to corresponding USGS 1:100,000 scale maps using a Zoom TransferScope. The land type information was then digitized and merged into one file. This file was converted to raster format to facilitate the overlay process with the classification produced from the satellite data.

Landsat MSS Classification

Three Landsat MSS scenes were required to cover the Bear River Basin. These are scenes, path 41 row 30, path 41 row 31, and path 40 row 31. All three were collected during the late summer of 1980. The satellite data was

processed using both ERDAS and in-house software. Scenes were georeferenced to the UTM projection using ground control points selected in the images and on USGS 1:24,000 quads. These scenes were mosaicked to produce one image file that covered the whole Bear River Basin. The mosaicked scene was then clustered and classified to produce a 255 spectral class image. The spectral classes were identified to the six land types for postprocessing procedures.

#### Postprocessing

The postprocessing procedure overlays the 255 spectral class image with the rasterized strata file using a GIS matrix algorithm. The resulting file is a land type classification digital file. This file was converted to a vector format using ARC/INFO software and maps were produced at a scale of 1:100,000. These preliminary maps were sent to Utah and Wyoming for evaluation and comments. Upon return, appropriate changes were made to produce the final 1980 land type maps. Copies of the Utah and Wyoming maps were sent to Automatic Geographic Reference Service (AGR) in Utah.

#### PROCESS USED FOR DETERMINING DEPLETIONS 1976-1980 STATE OF UTAH

The water rights data base for Utah contains information for each water right such as source, filing date, proof or "election" date, etc. a search was conducted with the selection criteria based on a flow greater than or equal to 0.10 cfs, and an election-proof date within the time period indicated. This search was cross-checked with "Inventory of Water Rights-Bear River Basin, Utah" (August, 1975) and other lists compiled.

Each water right was individually reviewed to determine depletion. For those claims that were supplemental, a fair evaluation was made to determine if they should be counted for depletion. Those application that were filed previous to 1976 and proven up on after 1976 were further

researched to see when they had been put to beneficial use. This was accomplished through contact with the water user and other sources such as the ASCS which does aerial mapping and assists in water development projects.

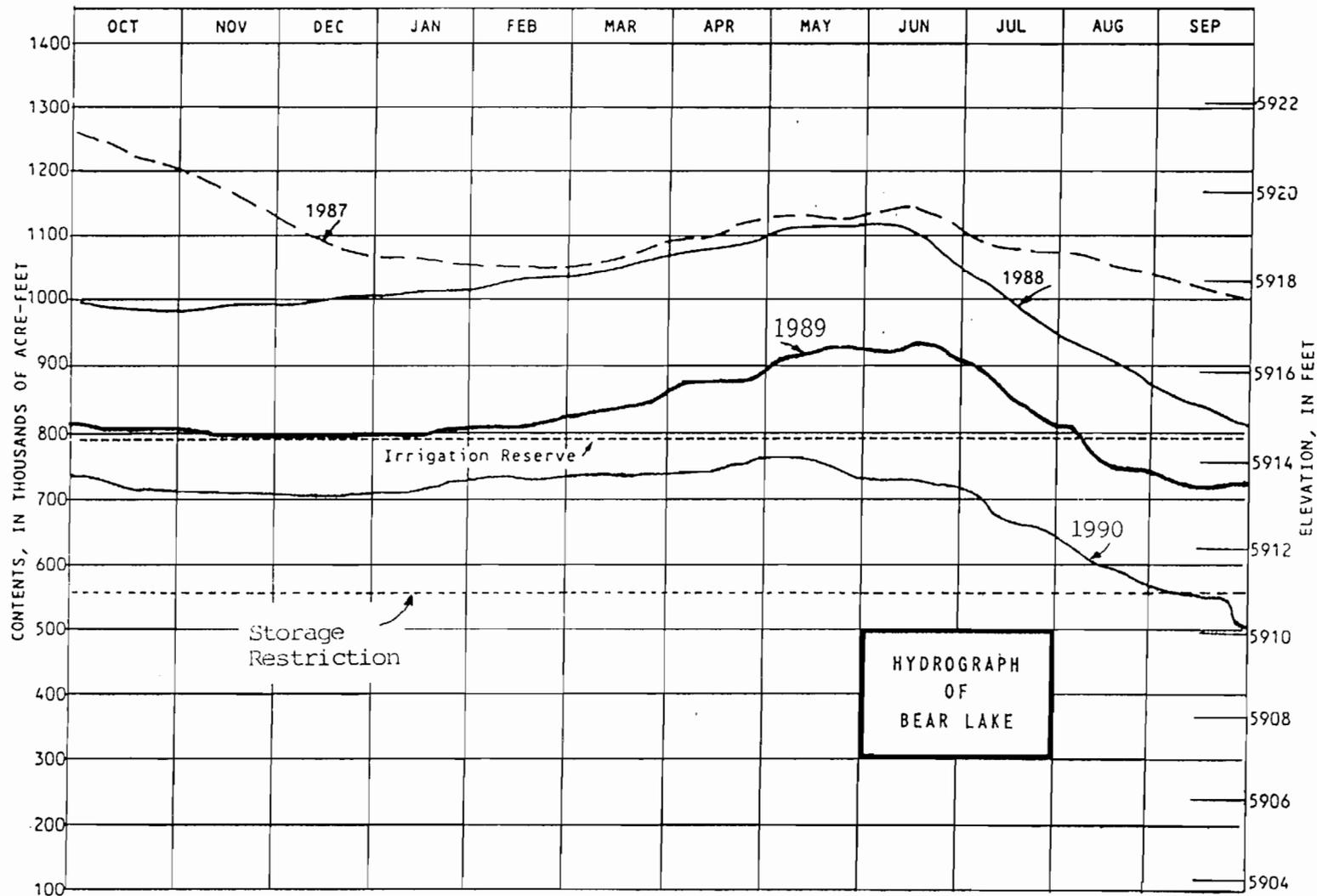
The depletion acres were highlighted on hydrographic survey maps and digitized to be so indicated on the base map. Industrial, municipal and other uses will be evaluated individually to determine depletion.

To verify the map product, described as the interim Base Map, the State of Utah will prepare a comparison map by merging the water rights strata and the 1986 land use data with the interim base map. The areas of non-compliance will be identified by a legend.

Those areas that are identified as areas which have like use will be accepted as correct. Areas that do not show the same use will be field reviewed and modified as needed to describe appropriately the depletion that occurs on the land as categorized by the commission.

# HYDROGRAPH OF BEAR LAKE

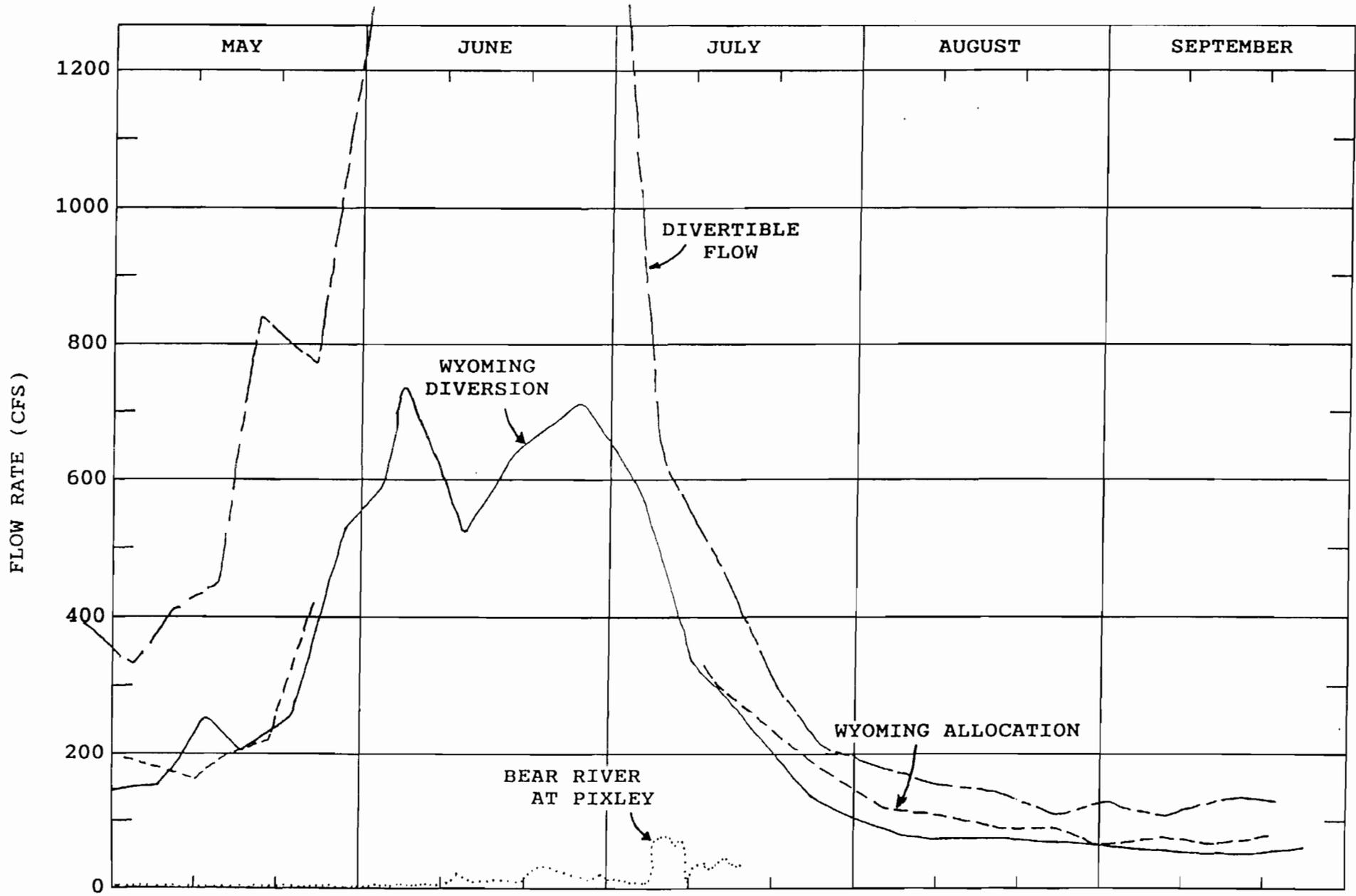
WATER YEARS 1987 - 1990



# UPPER DIVISION - UPPER WYOMING SECTION

# DRAFT

1990

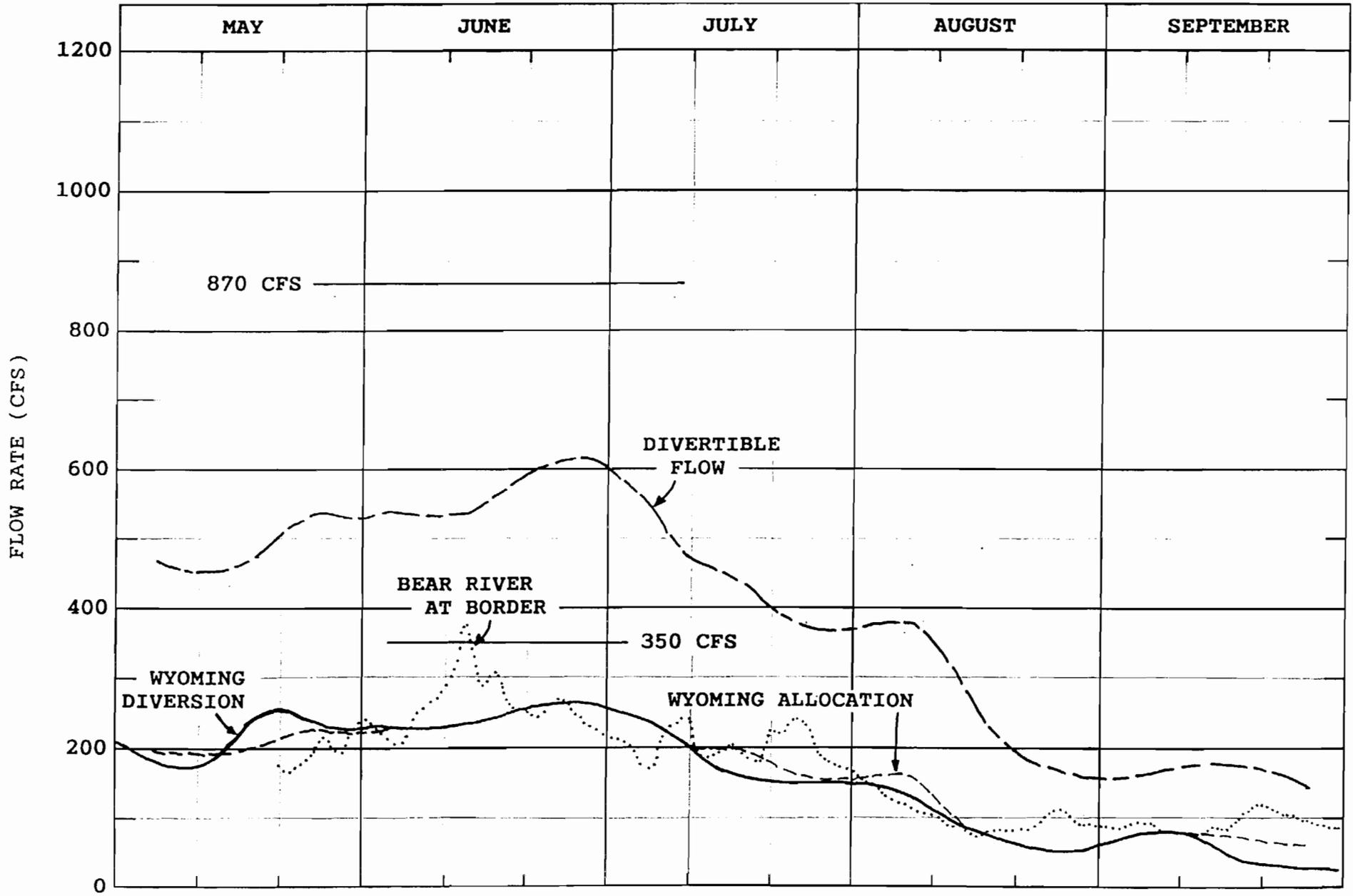


(Plotted flow rates based on reported weekly averages.)

# CENTRAL DIVISION - WYOMING SECTION

1990

**DRAFT**



(Plotted flow rates based on reported weekly averages.)

**BEAR LAKE - BEAR RIVER OPERATION**

**SIGNIFICANT EVENTS DURING 1990**

September 15, 1989      Shut off Outlet Canal - Bear Lake elevation 5,913.56.

December 5, 1989      Bear Lake low elevation - 5,913.41.

May 8, 1990            Began Outlet Canal releases. Bear Lake high elevation reached 5,914.10.

July 5, 1990            Maximum Outlet Canal release - 1,445 CFS. Contacted irrigation companies to reduce irrigation demands by 25%.

September 13, 1990    Sent letter to Bear River Commission requesting Compact regulation under Article VI, Paragraph B.

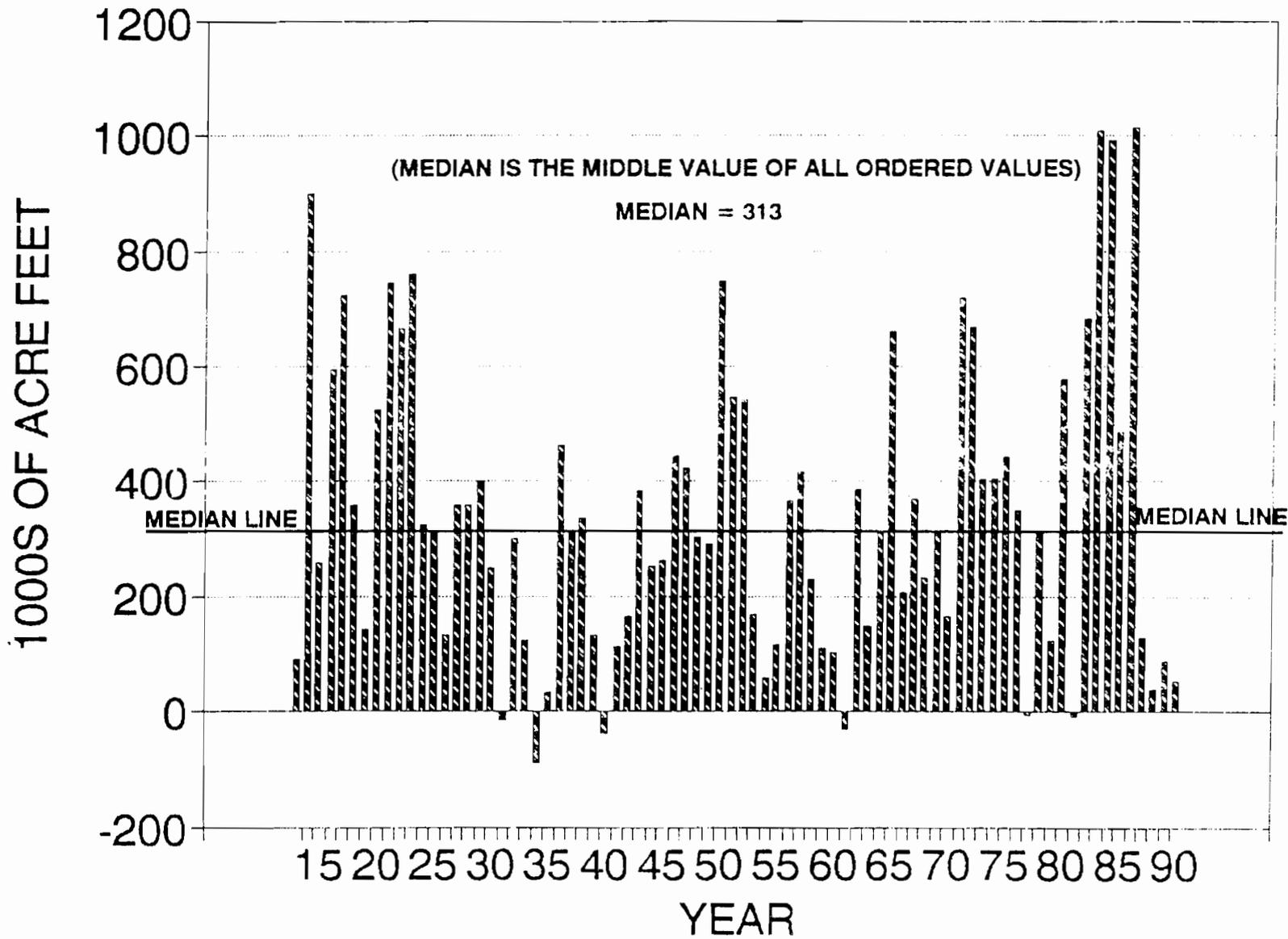
September 18, 1990    Bear Lake elevation dropped to 5,910.99.

September 21, 1990    Outlet canal shut off.

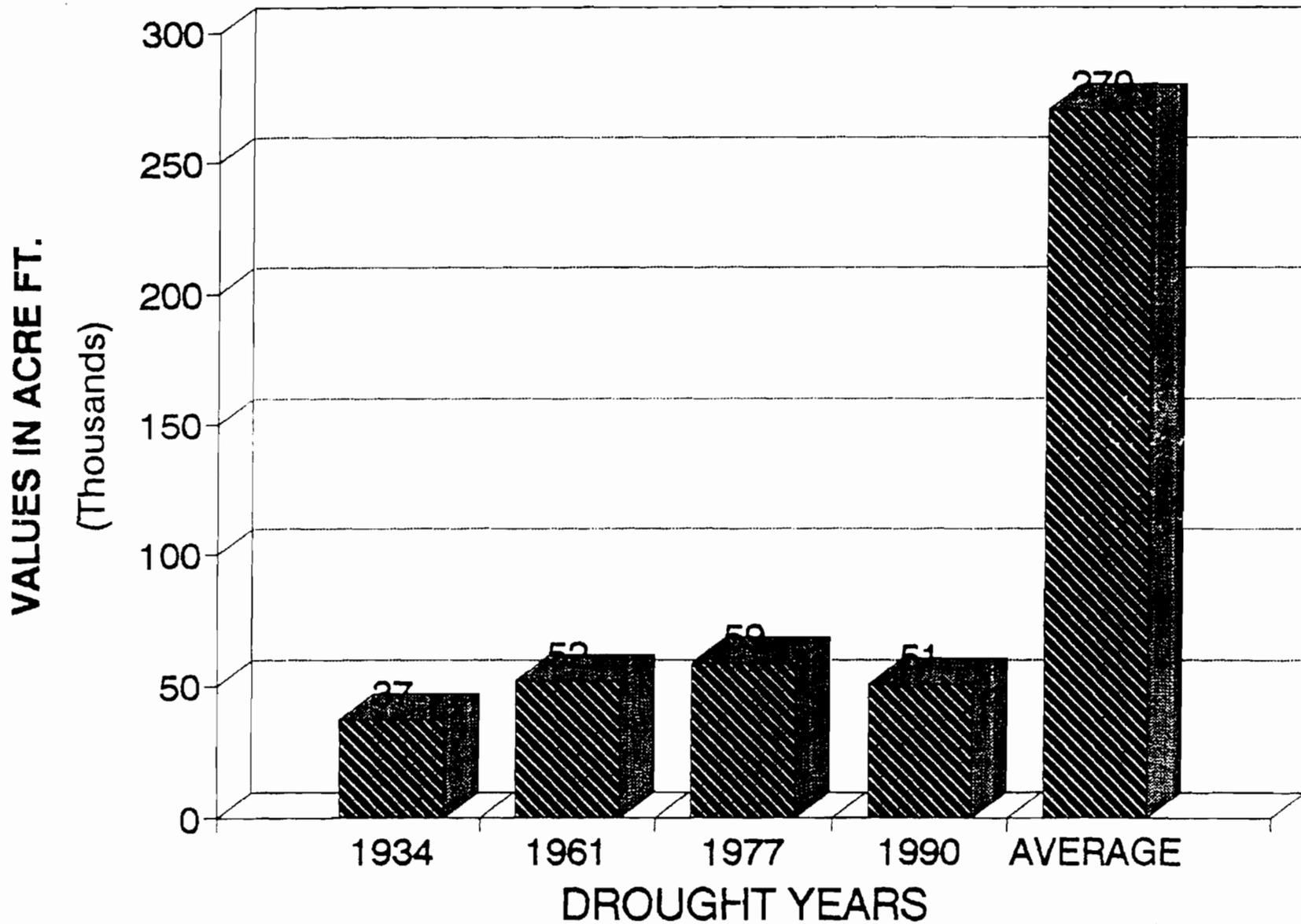
October 15, 1990      Bear Lake elevation 5,909.90.

November 27, 1990     Bear Lake elevation 5,909.80.

# BEAR LAKE RUNOFF FROM 1913 - 1990

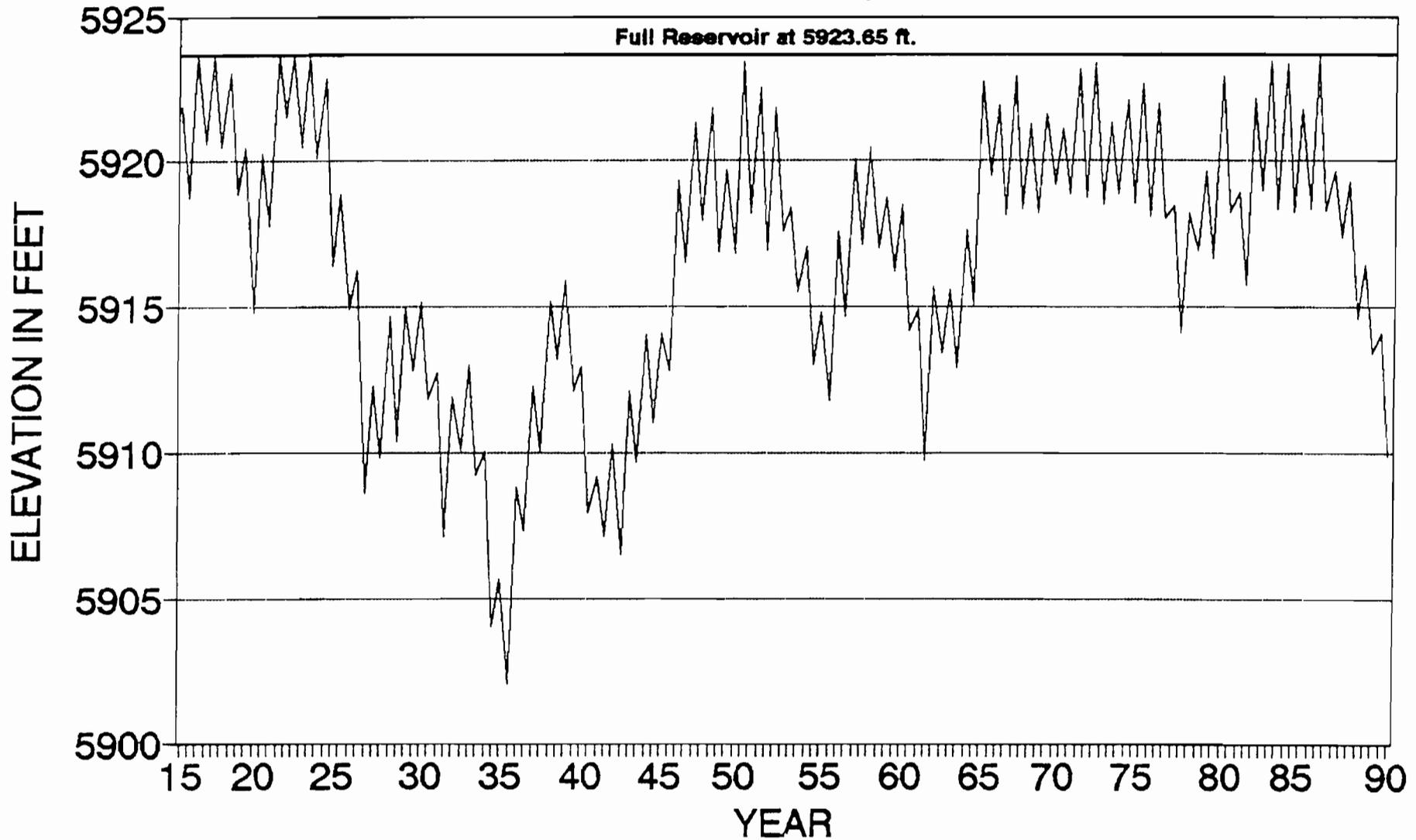


# COMPARISON OF ANNUAL BEAR RIVER RUNOFF ABOVE BEAR LAKE FOR HISTORICAL DROUGHT YEARS

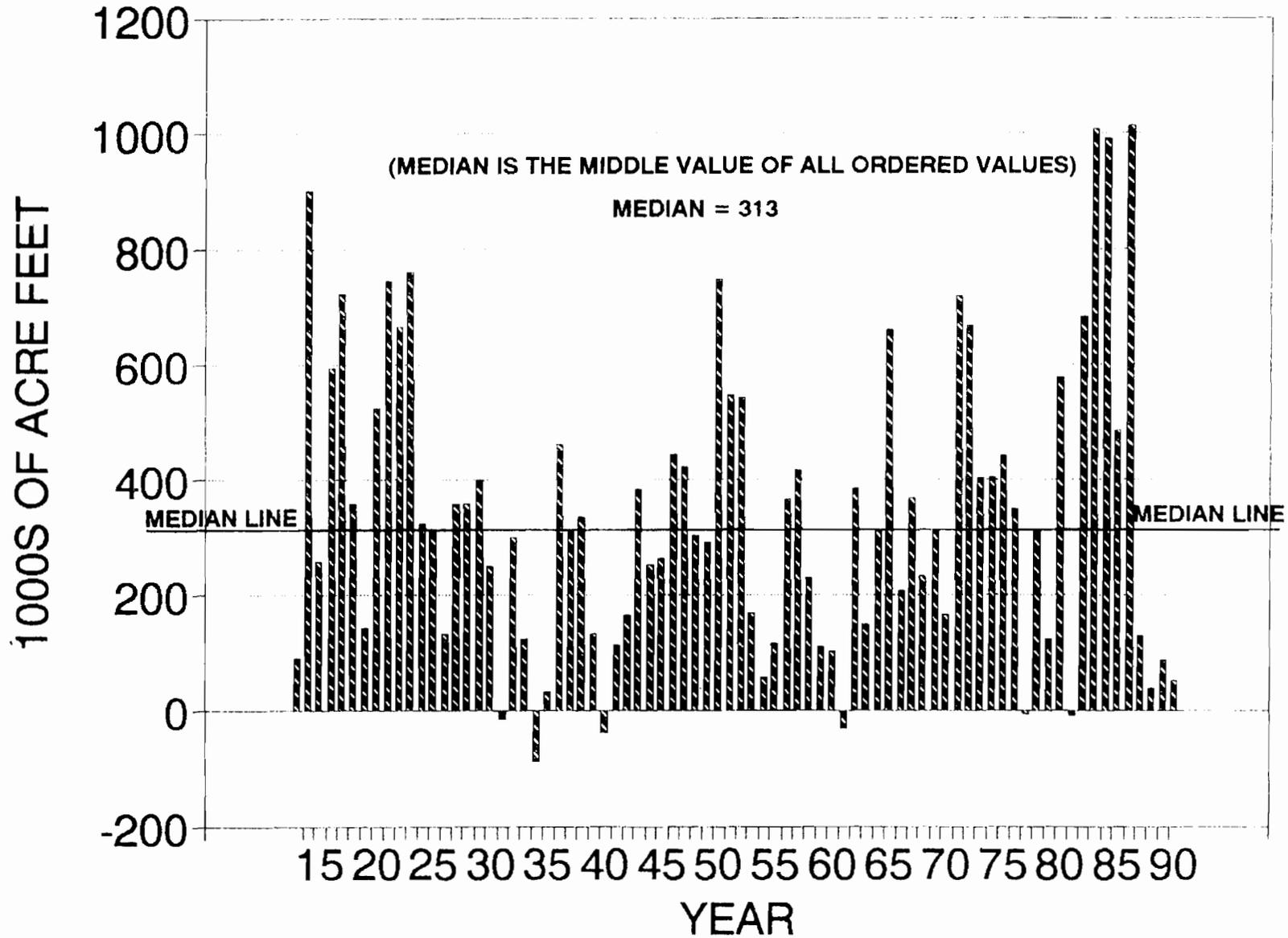


# BEAR LAKE ELEVATION

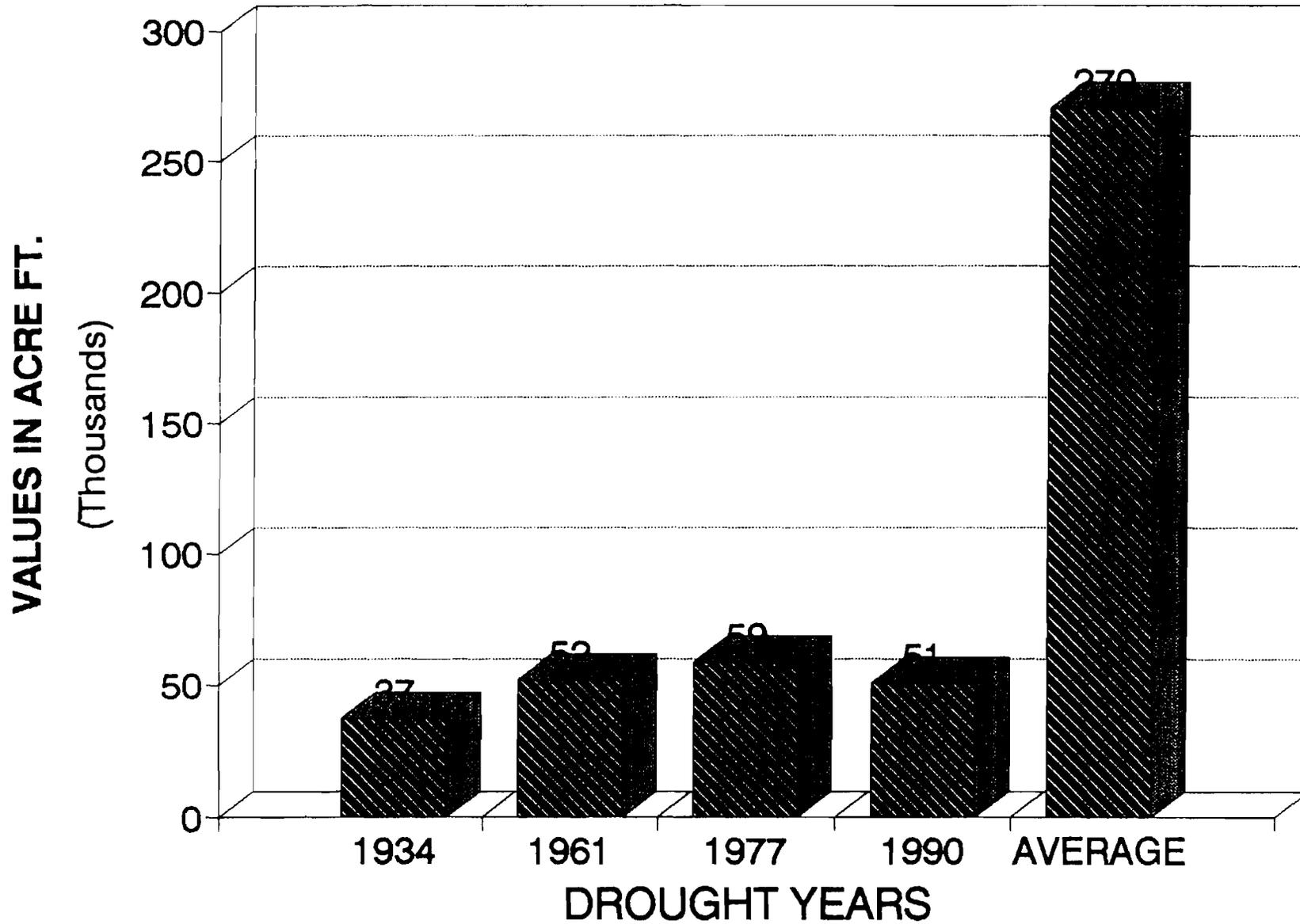
## FROM 1916 TO 1990



# BEAR LAKE RUNOFF FROM 1913 - 1990

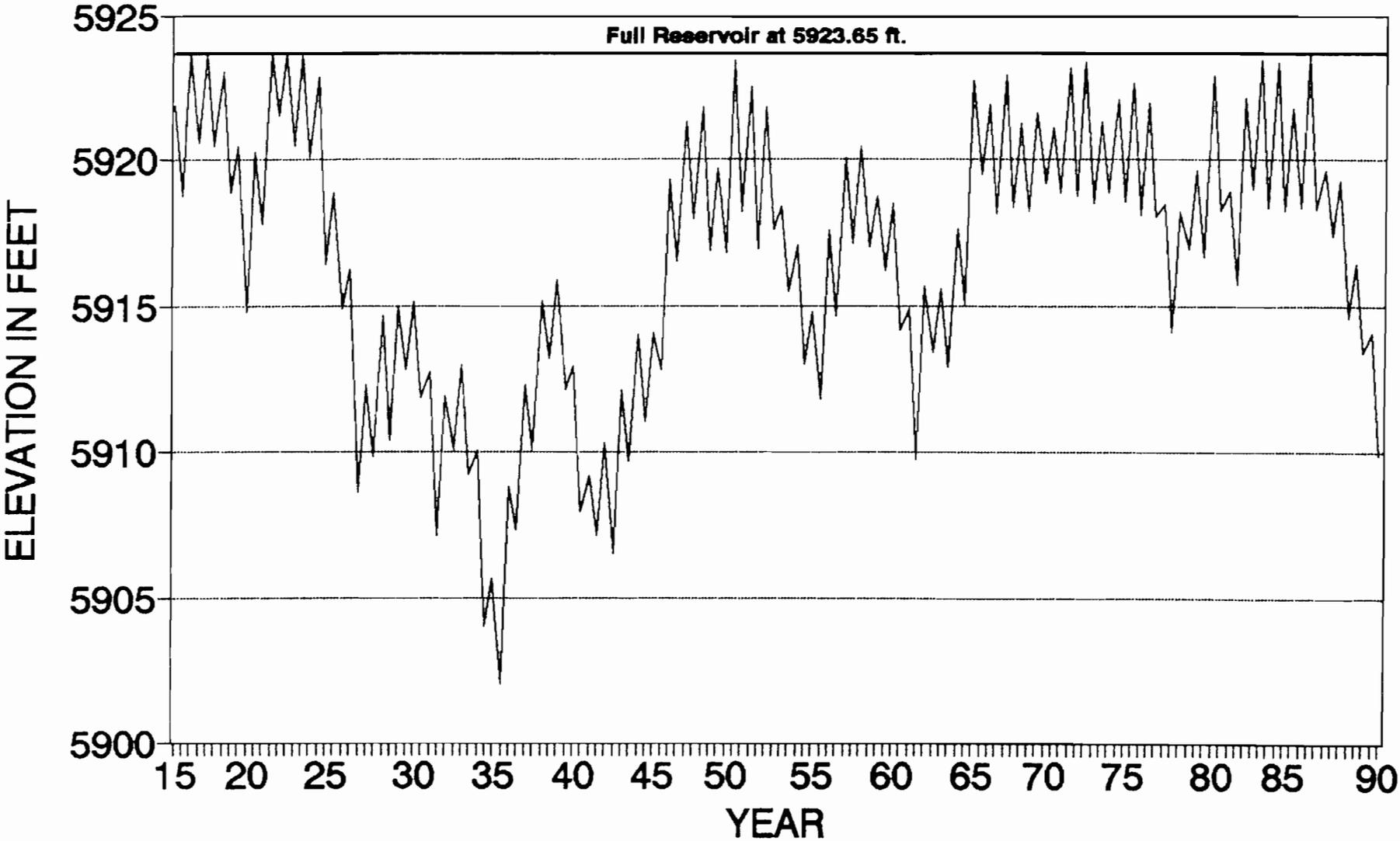


# COMPARISON OF ANNUAL BEAR RIVER RUNOFF ABOVE BEAR LAKE FOR HISTORICAL DROUGHT YEARS



# BEAR LAKE ELEVATION

## FROM 1916 TO 1990



SUMMARY MINUTES OF THE BEAR RIVER TAC MEETING  
SALT LAKE CITY, UT NOVEMBER 26, 1990

<u>Utah</u>	<u>Wyoming</u>	<u>Idaho</u>	<u>Commission</u>
L. Austin	J. Teichert	H. Anderson	✓ J. Barnett
B. Fotheringham	J. Yarbrough	K. Higginson	D. Barnett
N. Stauffer	S. Lowry		
C. Ogden	J. Fassett		

An informal lunch meeting was held with Dave Truman from the Bureau of Reclamation office in Salt Lake. He is working with the mapping project for the Colorado River basin and was interested in comparing their methodologies for determining consumptive use with those used by the Bear River Commission.

1. Approval of Agenda
2. Summary minutes of the August 28-30, 1990 meeting in Montpelier were reviewed.
3. Jack gave an overview of the information he planned to discuss in his TAC report to the Commission, beginning with the base map verification procedures. Copies of the procedures drafted by Hal were given to each TAC member for discussion in the state caucuses before the Commission meeting.
4. Jack will report that the TAC will be using the opportunity of base map verification to document the uses of water that have occurred between 1976 and Jan. 1, 1990. The results will be presented as a report by each state to the Commission, but will not be accepted as a Commission document. The TAC recognizes that the Interim Procedures adopted by the Commission reflect a different procedure than the course now taken by the TAC. A new set of "Commission approved procedures" will be developed upon completion of the base map verification and the depletion estimates. These revised procedures will be presented at the November, 1992 Commission meeting. The procedures for estimating the depletions between 1976 and 1990 will also be presented to each state during the caucuses.
5. Jack distributed a draft contract between each state and the Commission for reimbursement of expenses for base map verification and depletion estimates. Jack will request general approval of the contracts from the Commission and the authority to contract with the states. Each state will likely have their own legal requirements for language and signatories for the contracts. Jack will make the language changes discussed during this meeting and send a clean copy to each TAC member for review by the state's attorneys. Each state can request up to \$22,233 between now and

April 1992. The Commission will be asked for a separate appropriation to publish the final base maps in 1992.

7. Weather Modification: Clark Ogden gave a summary of Utah's past activities in weather modification. Residents in the Uinta Basin in Utah have also been concerned about the cloud seeding along the Wasatch Front. A report has just been completed examining the weather fronts and the correlation between patterns in the Uinta basin and the Wasatch Front. Utah is also currently funding research to test the effectiveness of different generator locations, spacing, etc. The annual budget of the total program in Utah is about \$480 million, with the state's cost share portion at \$150 million. Wyoming has put in a supplemental budget request for funds to work with the same consultants that Utah has hired to develop model results of downwind effects for the Wyoming side of the Uinta mountains.

6. Stream Gaging: Jack had contacted Bob Hill regarding the placement of temporary real time gages above and below Woodruff Narrows. Bob was amenable to running the gages for a year or two for the Commission to get a feel for the utility of the data from these stations. However, the USGS is now adopting a policy of not allowing non-USGS personnel to have access to gaging locations. Many problems remain with accessing the real time data available from the Commission and Utah Power and Light supported gages. Jack and Don will continue to work with USGS to obtain completed gage records.

8. The TAC will likely have a short meeting in conjunction with the April Commission meeting for an update on the map verification work. A full meeting will be scheduled for early June to tour the Soda Springs section of the river and to further review field work.

(footnote from Commission meeting) The TAC was directed by the Commission to work with Utah Power and Light in explaining why the gaged level of Bear Lake decreases dramatically after the pumps are turned off for the season. As this fluctuation can be extremely important now that the Lake is at or below 5911., we need to determine how we can best work with UP&L in discerning what factors influence this large level change and what is the "real" Lake level.

Sue Lowry, Interstate Streams Engineer