IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT

IN THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re: SRBA,	)	
	)	Subcase No. 63-3618
Case No. 39576.	)	
	)	(Lucky Peak Reservoir)
	)	

DEPOSITION OF ROBERT J. SUTTER

VOLUME II

(Pages 144 through 262)

Law Offices of
Moffatt, Thomas, Barrett, Rock & Fields, Chartered
101 South Capitol Boulevard, Tenth Floor
Boise, Idaho

Wednesday, April 16, 2008
Beginning at 1:10 o'clock p.m.

(COPY)

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THIS DEPOSITION OF ROBERT J. SUTTER, VOLUME II, was taken on behalf of Pioneer Irrigation District and Settlers Irrigation District on Wednesday, the 16th day of April 2008, at the offices of Moffatt, Thomas, Barrett, Rock & Fields, Chartered, 101 South Capitol Boulevard, 10th Floor, Boise, Idaho 83702, before LoriA. Pulsifer, Court Reporter and Notary Public within andfor the State of Idaho, to be used in an action pending in the District Court of the Fifth Judicial District of the State of Idaho, in and for the County of Twin Falls,said cause being Subcase No. 63-3618 (Lucky Peak Reservoir)in saidcourt.

The following testimony was adduced, to wit:

* * *

(Exhibit Nos. 1 through 35, inclusive, having been previously marked for identification by the court reporter, are incorporated herein by reference.)

* * *

ROBERT J. SUTTER,

having been previously sworn, testified further, as follows:

FURTHER EXAMINATION

BY MS. MARTENS:

Q. Mr. Sutter, we are continuing your deposition from the break that we took way back on March 28, 2008. If you would, sir, please understand that you are still under oath; and we are still proceeding pursuant to the same rules and procedures we discussed at the commencement of that deposition. Is that acceptable to you?

A. Yes.

Q. Do you have any questions, moving forward, on that procedure?

A. No.

Q. Thank you. During your initial deposition, you discussed electronic mail that was available between you and counsel to the United States which included draft affidavits. I have been provided with some documents from your counsel that I believe are responsive to that request.

Can you please take a look at that group of documents and let me know if that represents the e-mails and earlier drafts of your affidavit?

A. Yes, it does.

MS. MARTENS: I would like to have this group of documents marked as Deposition Exhibit No. 36.

(Deposition Exhibit No. 36 was marked for identification by the court reporter.)

MS. MARTENS: David, did you keep a copy for yourself for today?

MR. GEHLERT: I do have a copy.

MS. MARTENS: Do you all want to share that down here? I do have one more.

MR. ARRINGTON: Thank you.

BY MS. MARTENS:

Q. Were there any documents that you found in your files or your electronic files related to this case that are not contained within that group of documents?

A. Ask that again, please.

Q. In your review of your files and your electronic files, did you find any documents related to this case that were not produced as a part of Exhibit No. 36?

A. By "documents," do you mean other e-mails?

Q. Correct.

A. When I went through my e-mails, I was only looking for e-mails that had draft affidavits attached to them. There were several other e-mails that may have had -- I would not say "documents," but there were other e-mails.

Q. So there are other e-mails available in your electronic files that relate to this case that have not been produced; is that correct?

A. Correspondence between Mr. Gehlert and myself,

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yes.

MR. GEHLERT: The only ones that Scott had requested were the ones that were related to draft affidavits.

THE WITNESS: That was my understanding.

MR. GEHLERT: The only other ones I can think of related to scheduling, availability for deposition times, things like that.

MS. MARTENS: We would ask that those be produced. I thought that we had requested all e-mails relevant to this case.

I will agree with you that the way that it was worded -- at the end, we were asking for e-mails; and then you clarified it as "related e-mails." It does not say whether those are related to affidavits but --

MR. GEHLERT: I had understood Scott's first request just to be for drafts. Then he amended that to say, "and related e-mails," which I took to mean related e-mails that, basically, cover e-mails for the drafts, which you were provided.

MS. MARTENS: Again, if you could, please produce those. If they are just relevant to deposition scheduling, then it should not impact the deposition, itself.

We would request all electronic mail and

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records within your files relevant to this case, both electronic files and hard copy files.

THE WITNESS: All right. There's, possibly, one e-mail also to Liz Cresto at the Department Water of Resources; but I can't be sure. That is the only other possibility that I can think of.

BY MS. MARTENS:

Q. All right. We would request a copy of that, as well.

A. Okay.

Q. Can you please tell me what you recall to be the content of that electronic communication with Liz Cresto?

A. I cannot.

Q. In addition, during your initial deposition, you testified that a contract was being negotiated with respect to your expert services. Has that contract been negotiated as of yet?

A. Yes.

MR. GEHLERT: Note that the deponent answered with enthusiasm.

BY MS. MARTENS:

Q. Indeed. I assume that you have a copy available to you of that contract?

A. I have a copy, yes.

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Q. And if we could, please, we would request a copy of that, as well.

I believe that you testified, during your initial deposition, as to the approximate time that you were retained in this case. Can you refresh my memory as to when you believe you were first retained in this case?

A. I spoke -- I believe I spoke with Mr. Gregg in late January, but I believe it was probably early February when I actually began working on this.

Q. Beginning with your first discussion -- I understand that occurred between you and Mr. Gregg; is that correct?

A. Correct.

Q. Beginning with that conversation and all the way until today, have you discussed any legal matters at issue in this case with any party?

A. What do you mean by "legal matters"?

Q. Have you had any discussions with any party that was involved in retaining you or anyone else, for that matter, as to what the legal theories are in this case?

A. The legal -- what do you mean by "legal theories"?

Q. Do you understand what the position of the United States is in this case? Do you understand what their contentions are?

A. Not really. I'm not entirely familiar with what the irrigation districts and the federal government -- I'm not exactly sure of all of the legal issues. In general, I believe I feel like I have some sort of understanding.

Q. Can you describe for me the understanding that you do have as to what the case is about, both from the United States' position and the irrigation districts' position?

A. I believe the irrigation districts' position is that the stream maintenance water in Lucky Peak Reservoir should, after the completion of the Snake River Basin Adjudication, be designated as water that is primarily for irrigation, regardless of use.

I think the federal government's position is that that stream maintenance water, storage water in Lucky Peak, should be designated solely as stream resource maintenance flow water.

Q. And has anybody described to you why they believe it should be designated as minimum streamflow water?

A. No.

Q. Do you have any independent knowledge as for the basis of such contention?

A. My guess would be that since, historically, the water, the stream maintenance water in Lucky Peak, has been used for a stream resource maintenance flow, it should remain that way for the health of the river.

Q. I believe you referred to it as a guess. Is that guess based upon representations made to you or your own independent knowledge and beliefs?

A. That's based on my knowledge of the way the water has been used in the past twenty, thirty years -- twenty years.

Q. And that knowledge was gained during your tenure at the Department of Water Resources?

A. Yes.

Q. Any other basis for a contention that the water is appropriate as a minimum streamflow purpose?

A. No.

Q. Have you been asked to testify at trial with respect to any opinions in this case?

A. No.

Q. Do you intend to testify at trial as to any opinions in this case?

A. I don't intend to.

MR. GEHLERT: I will just note for the record that the United States has not designated its trial

witnesses yet. We, of course, reserve the right to call Mr. Sutter at trial, should we decide that it is necessary to do so.

MS. MARTENS: I would assume that if trial opinions are developed that we would be permitted the opportunity to depose Mr. Sutter with respect to those opinions.

MR. GEHLERT: To the extent that they are different than what he has put in his affidavit.

MS. MARTENS: And beyond "different," I would suppose that anything supplementary would fall within "different;" is that correct?

MR. GEHLERT: I would assume so.

(Deposition Exhibit No. 37 was marked for identification by the court reporter.)

BY MS. MARTENS:

Q. Mr. Sutter, I have handed you what has been marked as Deposition Exhibit No. 37 which is a document entitled "Review of Boise River Flood Control Management."

I first saw this document today. I will tell you that I have not reviewed it. It was delivered to our office as part of a production by the Bureau of Reclamation yesterday or the day before. They were unable to get it to me in time to review prior to your

deposition.

I will ask you whether or not this is the review of the Boise River flood control by the Department of Water Resources that you authored?

A. Yes, it is.

Q. And during the course of your initial deposition, you testified that you thought it was sometime around 1977. Nobody has perfect memories, but would you agree with me that this particular document is dated November of 1974?

A. Yes, it is.

Q. With respect to this document, understanding that I have not reviewed it, does it reference or relate in any way to minimum streamflows in the Boise River?

MR. GEHLERT: If you need to take the time to review the document --

THE WITNESS: I would have to review it.

BY MS. MARTENS:

Q. That would be fine. When we take a break, if you don't mind doing that during a break, then I will ask you that question again. So we can just talk about it in general, for now.

Can you please tell me why you undertook this particular study, if I could call it a study?

A. As I recall, the Governor had received many

complaints from landowners along the Lower Boise River that their property was being flooded.

The early '70s were -- well, actually, the late '60s and the early '70s were years of high runoff when there were several years during which flood control releases were made and the maximum -- or close to maximum flood releases were made in the Lower Boise River.

So many people had built property along the river that encroached on the river and were being flooded. The Governor asked the Department of Water Resources to review the flood control procedures and make recommendations to respond to those concerns.

Q. And you were assigned that task?

A. Yes, I was.

Q. Do you recall who assigned you that task?

A. Alan Robertson, my supervisor.

Q. Do you know approximately when the task was assigned to you or how long it took you to complete this study?

A. No, I don't.

Q. Do you have an estimate?

A. Probably a year before -- prior. A year -- I would say, a year or less.

Q. Again, you and I are looking at this together.

If you would, refer to page 3 of the "Foreword." It indicates, "In May 1974, Governor Andrus requested that the flood control operations on the Boise River be reviewed and the possibilities for improved operations examined." Did I read that correctly?

A. Yes, ma'am.

Q. Could we infer, then, that it took you approximately six months?

A. Six months.

Q. Thank you. As part of your analysis, were you asked, with respect to the study that is contained within Deposition Exhibit No. 37, to make recommendations for a new manual?

A. Please repeat that.

Q. Perhaps I should rephrase it, anyway. When you were assigned this task by Mr. Robertson -- I believe that is who you said it was?

A. Yes.

Q. What did he ask you to do?

A. The flood control rule curves that were being used to provide the flood space and operate the river flood control had been developed prior to the construction of Lucky Peak Dam, which would have been in the early '50s.

Since 25 years had passed, we felt that the

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database had grown to where those curves should be redrawn.

That was the primary emphasis of this study. It was to look at the current -- meaning the ones that were used in 1974 -- the current flood control curves and assess their accuracy and possibly suggest other methods for flood control that might otherwise improve the flood control.

Q. Were you asked to make any recommendations relevant to minimum streamflows within the Boise River?

A. Not that I recall. I would have to read the report.

Q. My understanding, from your earlier session of your deposition, is this was the document which recommended the Water Control Manual that was ultimately, I believe, dated in 1985; is that correct?

A. Yes.

Q. And you were involved in that process for the eleven years or so that it took to develop the Water Control Manual; correct?

A. Marginally.

Q. Can you describe what you mean by "marginally," please?

A. We did not -- the Department did not participate materially, in that we did not do any of the

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technical studies. We were asked to participate in any meetings that occurred between the Bureau of Reclamation and the Corps of Engineers relevant to the revision of the manual.

Q. And you did so?

A. Yes.

Q. If you will, Mr. Sutter, please take some time to take a look at this report during the break. I will, following the break, again ask you the question of whether or not you made recommendations relevant to streamflow maintenance within that particular document.

A. Yes.

Q. Thank you. Mr. Sutter, if you could, please refer to Deposition Exhibit No. 27 as well as Deposition Exhibit No. 36. I am going to ask you some questions about some modifications that were made between the various drafts.

The way that I understand it has been produced, the most recent drafts are towards the top of the packet, Deposition Exhibit No. 36; and then, chronologically, they reverse. So what I understand to be your first draft is on the bottom. Does that make sense?

MR. GEHLERT: I will represent that is the way they are intended to be presented.

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THE WITNESS: I think so. I can't find the first one.

MR. GEHLERT: I believe this is the first one.

THE WITNESS: This is the first one?

MR. GEHLERT: There was no cover e-mail associated with that one.

THE WITNESS: There wasn't?

MR. GEHLERT: No.

THE WITNESS: I must have left it out because there was a real short, little -- I said -- I kept it real short.

MR. GEHLERT: Make a note to look and see. There wasn't one in the material that I got.

MS. MARTENS: So my understanding from the communication with your client is that we might be missing one e-mail that would --

THE WITNESS: The e-mail for the last affidavit, which is the first one, is not there. I expected to see it. It was a one-line e-mail which said, "I kept this very short; this is my first cut," something to that effect.

BY MS. MARTENS:

Q. Do you recall what the date of that e-mail was?

A. I think it was February 2nd. My recollection

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is it was February 2nd.

Q. And why did you draft the initial draft on February 2nd? Actually, let me go back and ask you a different question.

If I look at this initial draft, which I understand to be the last three pages of Deposition Exhibit No. 36, I recognize, as a lawyer, that the expert witnesses that I retain typically do not have the capability of creating captions like this and notary blocks like this and so forth.

A. Yes.

Q. Were you presented with an affidavit first, before you drafted this?

A. Yes.

Q. Can you tell me what the content of that initial draft was and how you received it?

A. I received an electronic copy of Mary Mellema's affidavit, and then I used that as a template to do the three-page affidavit you see.

Q. Were you asked to use her affidavit as a template?

A. No.

Q. How did you receive it?

A. By e-mail.

Q. Do you recall who e-mailed it to you?

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A. It was either Mr. -- it was either Jerry Gregg, Gail McGarry, or David Gehlert.
Q. So if I understand you correctly, you took her affidavit and you deleted out the content that she had included and drafted your own content?
A. Yes.
Q. And how long, approximately, did that take for you to complete?
MR. GEHLERT: Tara, can you clarify? Are you talking about the first draft or the whole affidavit?
MS. MARTENS: Yes, the first draft.
THE WITNESS: I would say, five or six hours.
BY MS. MARTENS:
Q. So this all occurred within the same day?
A. I could go back and check my records, but I think it was all in the same day.
Q. While you were drafting your affidavit, did you have any discussions with anybody about the content?
A. Which do you have as the last three pages?
Q. It ends with Paragraph No. 6. I think it is the only one that only has six paragraphs.
MR. GEHLERT: This one was the first draft of the last three pages. My numbering may have confused you.
THE WITNESS: No, I did not.

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BY MS. MARTENS:
Q. No discussions with anyone?
A. No.
Q. If I look at the next draft, which I believe, if I am reviewing the records correctly, came from you, dated February 6, 2008, with an e-mail --
A. Okay.
Q. I want to talk to you a little bit about the e-mail first. You thank the sender for -- I think something was sent to you, anyway, which I am not sure that you have. You say, "Thanks for the 1954 contract." Did you receive a contract from 1954?
A. Yes.
Q. When did you receive that contract?
A. That would have been sometime between February 2nd and February 6th.
Q. You have not produced that document or any correspondence that came with that document; correct?
A. No, I have not.
Q. Did you receive it electronically or in paper format?
A. Electronically.
Q. What was the purpose of your receipt of that contract?
A. Mr. Gehlert and I had discussed the 1953

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Memorandum of Understanding between the Corps of Engineers and the Bureau of Reclamation for operating -- for the existing Water Control Manual at that time.
He had explained to me that, as a result of that Memorandum of Understanding, the irrigation districts had signed contracts with the Bureau of Reclamation, subsequent to that Memorandum of Understanding, agreeing to the terms of that. As I recall, I asked to see that.
Q. You received it electronically?
A. Yes.
Q. I assume there was some sort of message attached to it?
A. Yes.
Q. And what did the message say, if you can recall?
A. I think it was something like, "Here is the 1954 contract that we talked about."
Q. Did he ask you to review it?
A. No.
Q. Did you review it?
A. I briefly reviewed it, yes.
Q. And what portion of the contract did you review?
A. The two portions -- there were two -- as I

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recall, there were two paragraphs. There was a Paragraph A and a Paragraph B in that contract which discussed the fill of irrigators' space under conditions of having Lucky Peak Reservoir present.
Q. And did you understand that those provisions were guarantees made to the irrigation districts by the Bureau of Reclamation?
MR. GEHLERT: Would you like to look at the contract?
THE WITNESS: Could you rephrase that?
BY MS. MARTENS:
Q. Yes. Did you understand that Paragraph 7 -- I will represent to you it is Paragraph 7 because you reference that in your electronic mail.
A. Yes.
Q. Did you understand that that represented a guarantee to the irrigation districts made by the Bureau of Reclamation?
MR. GEHLERT: And before Mr. Sutter answers the question -- and you can answer it -- I will just object on the basis that Mr. Sutter is not being offered as a witness to interpret the contracts.
THE WITNESS: I understood that to be a provision in a contract that was signed by both the irrigators and the Bureau of Reclamation. I am not sure

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what we would be guaranteeing. I can't speak to any guarantee.
BY MS. MARTENS:
Q. In your e-mail, you indicate that you believe that the contract may have been relevant prior to 1985. What is your basis for that comment?
A. In 1986, we instituted the Water Right Accounting Program and the new Allocations Program and revised the way that the system fill and system use of storage water was accounted for.
Prior to that, I am not familiar with the exact procedures that the watermaster used to allocate storage. That is the reason I said that, prior to 1985, I couldn't speak to the exact procedures.
Q. For purposes of creating the Accounting and Allocations Programs that you reference in this paragraph, was any validity given to these contracts -- and I mean the contracts from 1954 in this case that you reviewed.
A. I had not read that particular contract that we're talking about in the e-mail ever before.
Q. So when you created the Allocations and Accounting Programs, absolutely no consideration was given to this provision?
A. I was not aware of that contract.

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Q. So it could not have been a part of your creation of the Accounting and Allocations Program?
A. No.
Q. And how about the 1953 Memorandum of Understanding between the Bureau of Reclamation and the Corps of Engineers? Was any consideration given to that Memorandum of Agreement at the time that the Allocations and Accounting Programs were created?
A. Yes.
Q. And can you, please, explain how the 1953 Agreement was incorporated into the development of those programs?
A. The 1953 Agreement led to all three reservoirs being jointly used for flood control and irrigation.
Q. Anything else about the Memorandum of Agreement from 1953 that was utilized for purposes of creating the Allocations and Accounting Programs?
A. Not that I recall.
Q. Were any of the provisions applicable to amendment of the Memorandum of Agreement considered for purposes of creation of the Water Control Manual?
A. I'm not sure what you're referring to. What amendment?
Q. Okay.
A. No, no.

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Q. Were any provisions, other than the provision that allowed for the three reservoirs to be operated as a system, considered for purposes of creation of the Allocations and Accounting Programs?
A. Possibly. I would have to read the Agreement over, statement by statement, to see if any of it was included in the accounting. I'm sure there are portions of it that are, but I don't know. I would have to read it.
Q. And I guess that that question is sort of problematic to me, in other words, that you do not seem to know -- let me ask you this. Before you created the Allocations and the Accounting Programs, did you review the 1953 Agreement?
A. How soon before?
Q. At any time?
A. I think I had read portions of the '53 Agreement as it related to the flood control curves, earlier; but I did not sit down and read the whole Agreement right before I did the Accounting Program.
Q. Was the 1953 Agreement instrumental in the Accounting and/or Allocations Programs?
A. We coordinated the accounting with the Bureau of Reclamation, and it is my recollection that we relied upon them to provide us with the storage contracted

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amounts.
Q. Anything else?
A. No.
Q. At any time when you amended the Accounting and Allocations Programs, do you recall consulting the 1953 Agreement?
A. No.
Q. I think what you said in your e-mail here is you deemed it was obsolete; is that correct?
A. I can read what I said?
Q. Yes, please.
A. My take on this is that maybe Paragraph 7 was relevant prior to 1985 when physical fill was perhaps used to allocate water after a flood operation; but beginning in 1985, the computer accounting allowed a more precise and correct way to allocate water.
With the new computer base procedures adopted in 1985, Paragraph 7 is obsolete since the amount of storage in Part A will now always equal the amount of storage in Part B for Anderson Ranch and Arrowrock.
Q. Is that the underlying basis for the opinions that you have rendered in this case, that Paragraph 7 is obsolete?
A. No.
MR. GEHLERT: Well, I am going to object. Mr.

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Sutter has not rendered any opinion in this case on the provisions of Paragraph 7.

I have already explained that he is not being offered as a witness to interpret the contracts. He is being offered as a witness to explain IDWR's accounting process.

BY MS. MARTENS:

Q. You can answer the question, Mr. Sutter. Is it a basis of your opinions in this case that Paragraph 7 of the 1954 Agreement is obsolete?

A. What opinions are you referring to?

Q. The opinions that are rendered thus far in your Affidavit and, as I suppose the United States would argue, as supplemented by this deposition?

A. No, because I made this observation. It was not relevant to my affidavit.

Q. Is it your opinion, then, that the guarantee set forth in Paragraph 7 -- it is entitled "Guarantee." I guess whether or not you deem it to be a guarantee, it is entitled "Guarantee." Is it your opinion that it is obsolete?

A. It's my opinion that, after 1986, it would be irrelevant because Anderson Ranch and Arrowrock always fill.

Q. And I can understand, perhaps, why a party to

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the contract that views a provision as a guarantee might be concerned if it is deemed irrelevant or obsolete. So my question is pretty simple.

I mean, if it is your opinion that it is obsolete -- "yes" or "no" -- I don't know how "relevant" goes to "obsolete." To me, "obsolete" means "invalid." Does "obsolete" mean "invalid," to you?

A. Oh, no, no. Prior to the water right accounting, the watermaster had to rely on the physical contents of the reservoir; and, therefore, he may have calculated the fill of the reservoirs using individual reservoirs -- for instance, Anderson Ranch and Arrowrock.

With the advent of Lucky Peak Reservoir and the three reservoirs being used as a system and the new water right accounting procedures, then that no longer applied. That's what I meant by "obsolete."

Because of the new procedures, you could still say it's valid, but those two numbers would always be the same. So you wouldn't have to -- there would be no reason to even have those two there because they would always be honored.

Q. So any other basis for your opinion that Paragraph 7 is obsolete?

A. No.

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Q. Were you told by anybody that they deemed those provisions obsolete or invalid?

A. No.

Q. Any other portion of the 1954 contract that you reviewed with respect to creation of your affidavit in this case?

A. No.

MR. GEHLERT: Tara, if this is a good point -- it has been an hour -- why don't we take a break?

MS. MARTENS: Okay. If you could, as part of the break, review that report.

THE WITNESS: I will do that.

MS. MARTENS: Thank you.

(Recess.)

BY MS. MARTENS:

Q. Mr. Sutter, I understand that you have now had an opportunity to review the Boise River Flood Control Management Study that you conducted in 1974; is that correct?

A. Yes. Could I clarify a remark that I had made earlier?

Q. Yes.

A. After thinking about it, I think maybe I used the word "obsolete" in a manner that was misunderstood. Could I have the court reporter read back the part where

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I said that we honor both Paragraph A and B, I mean, in Paragraph 7 of that 1954 Agreement?

MS. MARTENS: If you know what he is referring to, can you find that, please?

(Whereupon, the proceedings found at page 173, line 25, through page 174, line 22, were read back by the court reporter.)

THE WITNESS: I think the reasons those two paragraphs, A and B, were put in is that, prior to Lucky Peak, if there were a flood operation and they failed to refill, the irrigators would lose that storage in Anderson Ranch or Arrowrock.

So that language was put in so that, with Lucky Peak in place, if Anderson Ranch and Arrowrock weren't physically full, they wouldn't suffer that failure to fill.

So with the new procedures -- so there were -- it was a number calculated by Paragraph A and Paragraph B, which was the initial fill, or the total fill, and the actual fill. That language was put in there to make the irrigators whole.

With the new procedures, we protect the irrigators 100 percent of the time so they are always full, by taking the failure to fill at Lucky Peak.

So you could say we still honored those

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contract provisions. They are still valid. But since the number that you would calculate under A would be exactly the same as B, it doesn't come into play ever. So we have protected the irrigators.

BY MS. MARTENS:

Q. Were you involved in the negotiation of the contracts in 1954?

A. I was not.

Q. Are you going to be rendering opinions as to the bases for the inclusion of Paragraph 7?

A. No.

Q. And your understanding of what Paragraph 7 is meant to mean -- where does that understanding come from? What is the basis of the understanding you just articulated?

A. My understanding there is my opinion, based on my knowledge, of the current way that the reservoir system is filled and my knowledge of, probably, how it was done prior to the construction of Lucky Peak.

Q. Again, you are not going to be rendering opinions as to the meaning of Paragraph 7; is that correct?

A. I'm explaining my statement in the memo.

Q. And that changes from your earlier testimony how?

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A. That clarifies my earlier testimony in that, possibly, when I used the word "obsolete," I meant that somehow -- that it was taken as somehow we have looked at those provisions in the contract and somehow we're not honoring them.

Q. But you did not consider them in any respect with regard to the Accounting and Allocations Programs you created; is that correct?

A. I did not.

Q. All right. Back to the Boise River Flood Control Management Study that was produced by the Bureau of Reclamation, have you had an opportunity to review this study during the break?

A. Yes, I have.

Q. And I had asked you a question earlier today during the deposition with regard to whether or not you were asked to review minimum streamflows in the Boise River as a part of this particular study. I believe your response was you would have to take a look at the report. Do you now have an answer to that question?

A. As a part of this study, we gave an overall description of the Boise River and other problems besides flood control.

So there is a description on page 37 of a low flow problem, or concern, during the wintertime in the

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Lower Boise River.

Q. And who raised that issue?

A. As I recall, it was a very relevant issue. In the '70s, there were articles in the paper. Fishermen, Fish and Game, and other wildlife people had raised concerns.

I think the City had concerns with water quality. It was just of general concern to the community.

Q. Did the Governor ask the Department of Water Resources to review that issue?

A. Not that I recall.

Q. Did Mr. Robertson ask you to review that particular issue?

A. I would assume so.

Q. Let me ask you what you did to evaluate that issue.

A. I didn't evaluate it. I just discussed it in general.

Q. And is the discussion on page 37 that discussion?

A. Yes.

Q. That was a horrible question.

A. Yes, it is.

Q. I apologize for that. Understand that I have

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not had an opportunity to review that provision. What did your discussion entail?

A. It describes the low flow problem, that there's a statement here that I think summarizes our intent.

Q. And what statement is that?

A. "This report includes potential solutions to the problem of low flows only insofar as changes in flood control operations may tend to alleviate the problem."

Q. Anything else?

A. No.

Q. Did you recommend that a minimum streamflow water component of a water right be sought with respect to Lucky Peak?

A. No.

Q. Was any discussion had of attempting to do so at that time that you recall?

A. In this report?

Q. Yes.

A. No.

Q. And during the period of your study, was that recommended?

A. Not in this report.

Q. As a part of your study, was it recommended and just not reported?

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A. No.
Q. I apologize for being somewhat repetitive here because I think that this was covered during your last deposition, but I just want to make sure that it is clear. You did review the Affidavit of Mary Mellema; correct?
A. Yes.
Q. But my understanding is that you independently looked at all of the issues that are addressed in your affidavit; is that correct?
A. Yes.
Q. You did not rely on her affidavit or opinions for purposes of your own opinions?
A. Not at all.
Q. In fact, you disagreed with some of her assertions in her affidavit; isn't that correct?
A. I disagreed with a table heading.
Q. That is all?
A. I believe there was one statement, also, which had the same wording as that table heading that I disagreed with.
Q. To help you along, I think there is a memorandum within the documentation. It is the only memorandum within the documentation labeled Deposition Exhibit 36. Does that help you?

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A. Yes.
Q. And are those the two issues that you disagreed with in your review of Mary Mellema's Affidavit?
A. Yes.
Q. Do you have any reason to believe that, prior to 1986, the statement in Paragraph 1 which reads, "At this time, any shortages due to flood control operations in the Boise Project that need to be made up to the various Reclamation contractors in Anderson Ranch and Arrowrock pursuant to the 1985 Water Control Manual and contracts occurs," end quote?
A. Is that a question?
Q. Yes.
MR. GEHLERT: I don't think you asked a question, Tara. You just identified the quote from the --
BY MS. MARTENS:
Q. We can have her repeat it. My question started out something like, do you have any reason to believe, prior to 1985, that, quote, "At this time, any shortages due to flood control operations in the Boise Project need to be made up to the various Reclamation contractors in Anderson Ranch and Arrowrock pursuant to the 1985 Water Control Manual and contracts occurs," end quote?

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A. I'm not aware of the exact procedures the watermaster used.
Q. I guess I am just confused because the Water Control Manual is dated 1985, and you are suggesting that there may have been some sort of procedures pursuant to the 1985 Water Control Manual that occurred prior to 1985. I do not understand Paragraph 1.
A. I thought, in Paragraph 1, it was that, while that statement may not be incorrect, it certainly is not relevant subsequent to 1986 because there never would be any shortages due to flood control that needed to be made up in Anderson and Arrowrock. So this would never occur.
Q. Nonetheless, you do not affirm that conclusion; is that correct? Strike that question. It is not important. We already talked about your review of her deposition.
Any other aspect of Mary Mellema's Affidavit that you disagreed with that you recall?
A. As we had discussed earlier, the only other disagreement I had was the table heading on page 4, at the top.
Q. I thought we also discussed, during the course of the last deposition, that the only conclusion that you reviewed and affirmed was the table set forth on

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page 4 for the years 1989, 1993, and 1999; correct?
MR. GEHLERT: Bob, if you would like to review your prior testimony, it is available.
BY MS. MARTENS:
Q. I can even read it back. Beginning at page 138 -- and I will reference to you that you were discussing with Mr. Campbell the documents that you had reviewed and so forth. At page 138, you answered:
"I looked at the watermaster reports, the portion that showed the results of the Allocations Program. I looked at the Arrowrock and Anderson Ranch fill numbers. They were all 100 percent.
Question: "And you state that the same conclusion was reached by Mary Mellema in her affidavit dated November 13, 2007; is that correct?"
Answer: "Yes."
Question: "Turn back to her affidavit, if you would. Tell me what portion of her affidavit you are describing in that sentence."
Answer: "That would be on page 4. It would be the second column -- or the third column."
Question: "In the chart?"
Answer: "In the chart at the top of the page where she shows 100 percent."
Question: "So you are agreeing with the

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chart?"
Answer: "I am agreeing with her conclusion that, in 1989, '93, and '99, Anderson and Arrowrock filled to 100 percent."
Question: "So your agreement with her conclusions does not extend to 1978, 1976, 1975, or 1972; is that correct?"
"Correct."
"Is there any other portion of Mary Mellema's Affidavit of November 13, 2007, with which you agree with her conclusion?"
Your answer was, "Once more?"
Question: "Let me read your statement."
Answer: "Okay."
Question: "'The same conclusion was reached by Mary Mellema in her affidavit dated November 13, 2007.'"
Answer: "I was referring to this table here of the 100-percent fill."
Question: "That is the only portion of your affidavit that I see you reference Mary Mellema's Affidavit.
"Now, is there another portion of your affidavit where you agree with the conclusions of Mary Mellema's Affidavit?"
You said, "Let me check."

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You did so and answered, "No."
That is the end of the testimony. Is that still correct?

A. With reference to her table, prior to 1989, those exact numbers -- I did look at those based on the watermaster report. I could not verify those numbers because I have no way to know how the watermaster accounted for those.

What I was referring to there, by looking at '89, '93, and '99 -- those numbers were derived using the new procedures. I did go in and was able to look at the exact calculation methods for those. So those numbers I can verify.

The previous numbers -- I have no way to know how the watermaster got those but I can say -- it's very simple to say that Mary Mellema has calculated those numbers correctly from the watermaster report.

I can't speak to how those numbers were calculated by the watermaster. That's what I was referring to there.

Q. All right. But you did disagree with her conclusion in this chart by omitting 1986; is that correct?

A. Yes. 1986 was a partial year. If you look at the 1986 watermaster report, it was a transition year.

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It was very short. We didn't start the accounting, I think, until June. The information was not in the report where Mary could have included that year.

But in going back to the actual accounting, I think there was a slight failure to fill due to flood control.

Q. Any other year that she failed to note in this chart that you could determine from the records?

A. Again, I only looked at 1986 on and -- no.

Q. So from 1986 through the present time, her chart is correct, with the exception of her omission of 1986?

A. Correct.

Q. And your opinions regarding her conclusions do not extend any earlier in time?

A. Her interpretation of the watermaster report is correct. If you look -- her 100-percent fill of Anderson Ranch is correct, by the data that she provided.

I cannot verify those numbers because I do not know how the watermaster calculated those numbers in those years.

Q. So you are not affirming her conclusions for any year prior to 1989 on her chart?

A. I would affirm her conclusions based on the

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information that she has included in her affidavit.

Q. But did you independently review any documentation to substantiate, for example, whether there might have been another year that she did not include in her chart?

A. I did not. I did not.

Q. For example, you would not know whether or not 1974 should be included in the chart?

A. I do not, no.

Q. During the course of your initial deposition, we discussed several changes that had been made to the Accounting and Allocations Programs since the time that you created them. Do you recall those discussions?

A. Yes.

Q. My understanding is that Weimin Li made modifications to the Allocations and Accounting Programs; is that correct?

A. Yes.

Q. And Pam Pace made modifications?

A. Yes.

Q. And Liz Cresto made modifications?

A. I'm not aware of any modifications that she made.

Q. And Cheryl Kramer, a part-time employee, had made modifications?

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A. Yes.
Q. Are you aware of any other modifications made by any other individuals?
A. Possibly, Sheryl Howe.
Q. Anybody else?
A. No.
Q. Are you consulted with respect to those modifications?
A. While I was the head of the Hydrology Section, I would have been consulted with major modifications but probably not minor modifications.
Q. And since that time, you would not have been consulted --
A. No.
Q. -- in any respect?
A. No.
Q. And you would agree with me that, as I go through and note modifications, not all modifications provide for the individual that made the change?
A. Correct.
Q. It also appears, as I go through the records, beginning in 1995, others were in charge of the Water Right Accounting and Allocations Systems, rather than you; is that correct?
A. Yes.

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Q. And those individuals that were in charge of the Water Right Accounting and Allocations Systems included Sheryl Howe?
A. Yes.
Q. Pamela Pace?
A. Yes.
Q. And Liz Cresto?
A. Yes.
Q. Anybody else who you are aware of that, between the time of 1995 and 2008, has been in charge of that system -- those systems?
A. No.
Q. Was there any policy or procedure after 1995 that you would be consulted with respect to any modifications to those systems?
A. No.
Q. Is there any formal system in place regarding modifications to the system?
A. No.
Q. Is there any policy or procedure or rule that prevents those persons who are in charge of the Water Right Accounting and Allocations Systems from making modifications to the program?
A. No.
Q. And I do not want to put words your mouth, but

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I have notes here that you testified that the system is a dynamic tool.
A. Yes.
Q. Would you characterize the program as, quote, "hardwired," end quote?
A. What is your definition of "hardwired"?
Q. I don't know. You can tell me if you have a definition of "hardwired."
A. You know, people will say, "Oh, it's hardwired; it's a black box." I don't go along with that because it's just a tool. It's like a desk calculator. You punch in the numbers or whatever. No, it is not hardwired.
Q. It can be changed at any time?
A. Yes, if you are smart enough.
Don't write that down.
Q. As part of our review during your last deposition, you testified related to a print-out which depicted the Allocations Program; is that correct? We had several different versions and so forth. It was all an Allocations Program and not an Accounting Program; correct?
A. Yes. I had an example of the output from the Allocations Program.
Q. And even, actually, a print-out of the program,

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itself?
A. Yes.
Q. But you did not provide any copies of the Accounting Program?
A. I did not.
Q. Were you asked to produce the print-out of the Accounting Program?
A. No.
Q. And you have not done so?
A. I have not.
MR. GEHLERT: I assume that is publicly available through IDWR, as the Allocations Program is?
THE WITNESS: Yes.
BY MS. MARTENS:
Q. We had a discussion, also -- well, not "we" but Mr. Campbell and you had a discussion during your initial deposition about natural flow that is passed through the system during flood control operations. Do you recall that exchange?
A. Yes, I do.
Q. It is not really accounted for in any respect?
MR. GEHLERT: Do you want to review your testimony on that?
BY MS. MARTENS:
Q. I am not trying to put words in your mouth.

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You can correct me if I am wrong.
A. Yes, it is accounted for. Yes.
Q. Tell me how it is accounted for.
A. For each day of the water right accounting, a natural flow is computed at several locations along the Boise River, usually at a location where a stream gage exists.
That natural flow is compared to the actual measured flow. If the flow that's measured is greater than the computed natural flow, that amount that's greater is stored flow.
If it's less, then it's flow that has been stored. So in that respect, at each gage location, the natural flow is computed and the storage flow is computed. If you add those two together, you get the actual flow.
Q. And how do you determine what portion is passed through the system? That was a poor question. Let me see if I can rephrase it to make more sense.
There is a portion of natural flow that is passed through the system during flood control operations; correct?
A. Correct.
Q. And what did you -- and I can find it in the record, but it is probably quicker if you just remind

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me. What is it that you have deemed that natural flow that has passed through the system through flood control? It was not "unallocated," but it was another term that you used. "Unaccounted for," maybe?
A. Yes. There is unaccounted-for storage, but that's not the natural flow that's passed through the system.
Q. Do you have a term for the natural flow that is passed through the system during flood control operations?
A. Natural flow that is passed through the system.
Q. And where is that depicted in the records?
A. If you look at the out-flow at any reservoir, that out-flow consists of two parts. Think of it as red and blue water, natural flow and stored water.
So if one were to try to quantify the natural flow passed through the system during a flood operation, you could go to the out-flow of Lucky Peak Reservoir, since it is the final reservoir on the system, and look at the natural flow that is calculated on any particular day. That would be the natural flow passed through the system.
Q. And is that --
A. May I?
Q. Go ahead.

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A. Let's say that there is a flood operation, and the natural flow of the Boise River is 20,000 cfs. Of that 20,000 cfs, 14,000 is being stored in the reservoirs to prevent flooding. You've got a release of 6,000 that's coming down through Boise. That's all natural flow.
Let's say that a little bit earlier in the season you have a natural flow of 3,000 cfs. Let's say 6,000 cfs. And you are getting ready for flooding later on so, of that 6,000, you are storing 3,000 in the reservoirs.
So if you looked at the flow of Lucky Peak, the natural flow -- and let's say you were releasing 6,000. Let's see. 6,000 in? 3,000. So in that respect, you would be taking 6,000, storing 3,000; and the remaining 3,000 is natural flow.
If you were releasing flood space -- or space in the reservoirs to prevent flooding and you had a flow of 6,000 at Lucky Peak and you were evacuating 3,000 out of the reservoirs, then 3,000 would be natural flow and 3,000 would be stored flow.
Q. Okay.
A. So we have a distinct accounting. But when I was talking to Mr. Campbell, what I was saying is we don't accumulate this natural flow and put it someplace.

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Q. It is not credited to any holder?
A. It would be credited to a right if a right were on, but maybe all of the rights had been filled. We don't know. So just looking at the flow in the river, we don't keep track of it. There's no reason to.
Q. So you do not maintain any record of this flow that is not allocated to a particular account holder?
A. You could definitely go back in and go into our database and pull that out. Let's say that you asked for it. I could go and get a print-out of it and add it up and give it to you, but I don't know why you would want that.
Q. During that particular discussion, you indicated that you do not believe -- I think you just reiterated that it is not relevant to this case.
I am curious as to what you were told was relevant to this case when you were researching the basis for your opinions which were rendered in your affidavit.
A. My perception of what was relevant was the fill, the accounting procedures used to fill Lucky Peak Reservoir, and --
Q. I am sorry to stop you there, but that just immediately raises something.
A. Okay.

Q. And that is, I thought you testified earlier that you did not believe the Accounting Program was relevant because you did not produce the same print-out out of the program, itself, that you did for the Allocations Program.

So you did believe that the Accounting Program and procedures were relevant?

A. I did not use any of the Accounting Program calculations or I didn't refer to it in my affidavit. By "accounting," I meant accounting in the Allocations Program.

Q. Go ahead. I am sorry. The question that I had asked was what you were told was relevant, for purposes of this case, and that you utilized to render your opinions that are set forth in your affidavit.

A. It was my perception that what was relevant in this case were the procedures used to account for the storage water fill in the Allocations Program for Lucky Peak Reservoir.

Q. Anything else?

A. In particular, the accounting of the fill of the stream maintenance account in a flood control situation.

Q. Anything else?

A. The only other thing would be how that

accounting also affected Anderson Ranch and Arrowrock.

Q. Anything else?

A. Just, in general, the water right accounting procedure that the Department and the watermaster used to account for water throughout the irrigation year.

Q. You may recall this document. We took a look at it for a little bit during the prior session of your deposition; it is Exhibit No. 32. Did you review that data prior to the execution of your affidavit?

A. Yes, during.

Q. During, okay. Can you explain to me why it is dated in March when you signed your affidavit in February?

A. Oh, I was asked to -- I did not realize, at the time, that I would have to produce all of the documents that I used. So I went back after the fact and gathered up most of the documents that I turned in. So in printing these off, the dates are probably after the affidavit.

Q. Understood. Thank you for that clarification. I am jumping around a little, and I apologize. It is sort of what has to happen at the conclusion of these things.

A. That's fine.

MS. MARTENS: We can go off the record.

Did you want to take a break?

MR. GEHLERT: Yes. Actually, I thought you were taking an informal break. I'm sorry.

MS. MARTENS: A break is fine.

MR. GEHLERT: I just want to talk to Bob about schedules.

(Recess.)

MS. MARTENS: So I think that David would like on the record that we discussed some documents that were just recently produced and the potential for this deposition spilling over, time-wise.

I have represented that, from Pioneer Irrigation District's and Settlers Irrigation District's perspectives, we would agree not to reschedule any deposition of Mr. Sutter until such time as there has been a decision rendered by the court on the pending motions for summary judgment.

Q. Mr. Sutter, I would like you, again, to refer to Deposition Exhibit No. 27, which is your affidavit. I am having difficulty with Paragraph No. 2 and it corresponding to a statement made in the Reply Brief. If you could, simply explain this to me.

"As Mr. Sutter explains, the accounting for the project reservoir water rights is done by IDWR, in conjunction with the Boise River Watermaster, pursuant

to two computer programs administered by the IDWR.

"One, the Accounting Program, accounts for the water rights of the three reservoirs. The second, the Allocations Program, allocates storage within each reservoir to the various spaceholders."

Assuming that is an accurate statement, it is referred to Paragraph 2 of your affidavit?

MR. GEHLERT: That is the text that she just read to you.

THE WITNESS: Okay.

BY MS. MARTENS:

Q. I guess what I am not understanding is the, "...allocates storage within each reservoir to the various spaceholders." Am I missing something?

A. I don't think so.

Q. I just wanted to make sure that that was not in there somewhere and I was missing it. Thank you.

In Paragraph 6, you refer to low to moderate run-off. There is a corresponding statement within the brief that indicates, quote, "In 'normal'" -- and "normal" is within quotes -- "years where there are no flood control operations, water is allocated proportionally according to the contracts, and the specific contractual provisions the irrigation entities have raised here do not come into play."

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Then reference is made to your Paragraph 6(a). Can you explain that statement, if at all?
A. Are you asking me to explain 6(a)?
Q. Yes.
A. "In a year of low to moderate runoff, the paper fill in one or more of the Boise River reservoirs may not fill to 100 percent..."?
Q. Yes, and your reference to, "...the contractual provisions the irrigation entities have raised..." Let me say that those are not words that you used, but it is being attributed to you.
So I was curious as to what contractual provisions you are referring to, if at all, in Paragraph 6(a). I mean, if I read 6(a), I do not see any reference to contractual provisions, do you?
A. I do not.
Q. Thank you. Do you know what contractual provisions would be referred to in 6(a) -- or by a reference to 6(a)?
A. I would think that it would be the same as entitlements, which are the numbers that the Bureau of Reclamation gives us pursuant to their contracts.
Q. So even though you do not calculate entitlements, you are not suggesting, are you, that entitlements are not relevant, are you?

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A. They are very relevant because those are the numbers that we use to allocate the water to various spaceholders.
Q. So any statement attributed to you that provides, quote, "...the specific contractual provisions the irrigation entities have raised here do not come into play," end quote, would be inaccurate; correct?
MR. GEHLERT: That is not a statement that is attributed to Mr. Sutter. There's a "see" in there. There is an inference that can be drawn from Paragraph 6(a) of his affidavit which talks about years when there are no flood control operations.
MS. MARTENS: Excuse me. I have requested that the deponent testify and not counsel to the United States. Your direction to him as to an inference, I think, is quite unfair.
Q. I will even show you the provision, but I would request that counsel not testify for you. Okay? It begins with the very last paragraph.
It states, "In 'normal' years where there are no flood control operations, water is allocated proportionally according to the contracts, and the specific contractual provisions the irrigation entities have raised here do not come into play."
Is that an inference that I should understand

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from your testimony -- in Paragraph 6(a)?
A. I am not sure what that's referring to, the second part.
Q. So you do not know what that refers to?
A. I have no knowledge of that.
Q. Thank you. Also, in that same sentence, you refer to "normal" years?
A. Yes. Wait a minute.
MR. GEHLERT: She is asking you about --
THE WITNESS: Oh, here?
BY MS. MARTENS:
Q. Pardon me. In that sentence, your counsel refers to, quote, "normal," end quote, years. You refer, in your paragraph, to "low to moderate runoff." Can you quantify what is meant by "normal" or -- let me ask you that. Can you quantify what is meant by "normal"?
A. "Normal" would refer to "average."
Q. And can you quantify what is meant by "average"?
A. "Average"? An average year is a generalization, meaning in a typical year the runoff wouldn't be really high or wouldn't be really low.
Q. Do you have any numeric designations for what is meant by "average"?

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A. I can't recall the average runoff of the Boise River.
Q. I would also like you to review, if you could, Paragraph 8 in your affidavit. You can go ahead and read it to yourself first.
A. Of my affidavit?
Q. Yes. It is on page 4, at the bottom, where it begins, and goes through page 5.
A. Okay.
Q. There is a statement in the brief that occurs at the bottom of page 11. If you want to read along, it states, "After the reservoir rights have filled on paper, that refill water is designated as 'unaccounted for' storage."
I guess I don't understand how that statement is relevant to Paragraph 8. Can you explain that to me, please?
A. I think that's referring to a flood control year in which sufficient natural flow has passed by the reservoirs to fill all of their rights on paper. Flood space has been provided in the reservoirs by releasing storage water, and then the system begins to refill.
Storage is taking place, but there is no valid right to take advantage of that storage. So it's accounted for as unaccounted-for storage.

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Q. Okay.
A. And that would be the second sentence in Paragraph 8, "The Accounting Program tracks the amount of natural flow stored during the refill phase of a flood operation as 'unaccounted for' storage."
Q. With no associated water right; correct?
A. Correct.
Q. And I think that we already discussed -- correct me if I am wrong here -- that with respect to your term "ideally" in the sentence that provides, "At the end of a flood operation, ideally the amount of 'unaccounted for' storage will be equal to the amount of storage released for flood control so that the amount of water stored physically in the reservoirs will be equal to the paper fill, which is 100 percent of the storage right..."
That occurred in the years you reviewed? In the ten years, you reviewed six times -- the goal was accomplished, in other words, six times?
A. Yes.
Q. Six out of ten times; correct?
A. Yes.
Q. Thank you. Again, I am sorry to keep doing this to you. Excuse me for not fully understanding what is being said here.

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This refers to your Paragraph No. 9 -- or that is what it is in reference to. It states, "As noted above, the Arrowrock and Anderson Ranch water rights were already filled on paper prior to the operation of the Allocations Program and remain full throughout the process."
Can you please explain that statement to me?
A. I think that refers to the situation in which the unaccounted-for storage does not equal the flood release. So there is a -- we call it a failure to refill or a shortfall and how that shortfall is handled.
All three reservoirs in a flood operation fill to their maximum amount. This includes Arrowrock and Anderson Ranch. Water rights are completely full.
Q. The next sentence states, "That explains why the United States has unfailingly met its contractual obligations to the Arrowrock and Anderson Ranch spaceholders without having to rely on water from the Streamflow Maintenance account."
Given that statement -- you have indicated "unfailingly." It is fair, isn't it, for me to understand that you have only reviewed the years 1986 to the present; correct?
A. Yes.
Q. So "unfailingly" since 1986; correct?

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A. Yes.
MR. GEHLERT: Well, let me just offer a clarifying objection. Mr. Sutter never used the term "unfailingly."
BY MS. MARTENS:
Q. If you were to have used the term "unfailingly" -- that is fine. I will agree with that clarification that I am reading from a brief.
Now, is that true, though, with respect to 1986?
A. 1986?
Q. Yes.
A. Yes, it is.
Q. So in 1986 the United States met its obligations to Arrowrock and Anderson Ranch spaceholders without having to rely on water from the Streamflow Maintenance account?
A. They are totally unrelated.
MR. GEHLERT: Do you want to look at the watermaster report for 1986?
THE WITNESS: Anderson Ranch and Arrowrock filled 100 percent. I can look.
MR. GEHLERT: Take a second to confirm your memory.

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BY MS. MARTENS:
Q. And recognize, please, that the full statement is, "...the United States has unfailingly met its contractual obligations to the Arrowrock and Anderson Ranch spaceholders without having to rely on water from the Streamflow Maintenance account."
A. I don't feel qualified to interpret the contracts of the Bureau of Reclamation.
Q. So you do not know whether or not it met its contractual obligations to those spaceholders without having to rely on water from the Streamflow Maintenance account?
A. I'm not sure what all of their contractual obligations are.
Q. If you look at 1986, the data that you provided, would it make sense that it could have -- or it did?
A. In 1986, the contracts -- all of the spaceholders in Anderson Ranch and Arrowrock filled to 100 percent.
Q. And how about Lucky Peak?
A. I think it failed to fill by a slight amount.
Q. And how much do you think that that slight amount of failure to fill might have been? You are free to review the record.

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A. Do you want me to guess?
Q. No. You can review the record, if you would like.
A. I don't think I have that in front of me.
Q. Would you like to look at the Affidavit of Mary Mellema? Would that provide you with the data you need?
A. No.
Q. What would you require?
A. I would have to look at the watermaster report for 1986.
Q. That should have been attached to her affidavit. I thought that she attached all of those.
A. I don't think so.
MR. GEHLERT: We can go off the record.
(Whereupon, an off-the-record discussion was held between counsel.)
BY MS. MARTENS:
Q. You might recall, Mr. Sutter, that you and I talked earlier a little bit about "hardwired." I will now tell you why I asked you that question and where it came from.
There is an indication in this brief -- it is not, in fairness, attributed to you. It states, "IDWR's accounting system is hardwired to ensure that Arrowrock

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and Anderson Ranch remain full on paper regardless of which reservoir(s) may not have physically refilled during flood control operations and regardless of the status of any account in Lucky Peak."
And that is where the "hardwired" question came from. I do admit to you, sir, that it was not attributed to you. I thought that it had been. So I apologize for that.
I would like you to refer to, now, Paragraph 10 of your affidavit, if you could, please, sir. I am going to read to you another statement from the brief. Again, it is not attributed to you; but I just want to make sure, in my mind, that I understand.
The sentence reads, "In short, the irrigation water needed to fulfill the United States' contractual obligation is not taken from the Streamflow Maintenance account."
If I refer to your statement in Paragraph 10, those two items do not seem to be consistent, to me. Would you agree with me?
MR. GEHLERT: Before Mr. Sutter answers, can you clarify what provision in Paragraph 10 you are alleging is inconsistent with that?
BY MS. MARTENS:
Q. Well, I think you probably need to read

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Paragraph 10 in whole. What I am asking you, Mr. Sutter, is: Is Paragraph 10, in your mind, consistent with the statement that, "In short, the irrigation water needed to fulfill the United States' contractual obligation is not taken from the Streamflow Maintenance account. Rather, the water needed for the irrigation contracts never goes into the Streamflow Maintenance account"?
A. I assume that the, quote, unquote, "...irrigation water needed to fulfill the United States' contractual obligation..." is referring to Anderson Ranch and Arrowrock water since that's mentioned above. And then that would be consistent with my Paragraph 10.
Q. If you include contractual obligations relevant to Lucky Peak, it is not consistent, though, is it?
A. It would still be consistent.
Q. So explain to me how you can opine that, "Additionally, if the shortfall is greater than 60,000 acre-feet, the amount in excess of 60,000 acre-feet is taken proportionally from all entitlements in Lucky Peak, including the remainder of the Streamflow Maintenance entitlement."
How is that consistent with the statement that the contractual obligation is not taken from the

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Streamflow Maintenance account?
A. Well, in that case, everybody shares proportionally to the fill.
Q. Including the Streamflow Maintenance account?
A. Including the Streamflow Maintenance account, less 60,000.
Q. If we look, for example, at the shortfall in 1989, in 1989 the statement would be false because the shortfall in 1989 was 126,000 acre-feet, plus; is that correct?
A. Yes. But none of that was taken from the Streamflow Maintenance account. It was just shared proportionally by all of the spaceholders in Lucky Peak, less the 60,000.
Q. So what is the Streamflow Maintenance account?
A. 102,000 acre-feet, I think.
Q. So nothing was taken from the Streamflow Maintenance account in 1989?
A. Later in the year it probably was. For Streamflow Maintenance, it was probably used later in the year but not during the fill season. Water was going into that account.
Q. So if I go back to your affidavit again -- I am sorry if I am so dense.
A. No. That's okay.

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Q. If you can, try to explain this for me one more time. You say, "...the amount in excess of 60,000 acre-feet is taken proportionally from all entitlements in Lucky Peak, including the remainder of the Streamflow Maintenance entitlement"?

A. Correct.

Q. So --

A. It is shared -- the new fill is shared proportionally by all of the spaceholders in the reservoir, less the 60,000. So that shortfall is suffered by everyone proportionally.

Q. Including the Streamflow Maintenance account; correct?

A. Including the Streamflow Maintenance account, less 60,000. It would be 42,000.

Q. If I look at 1989, for example, and there is a 126,000 acre-feet shortage, I think you are telling me that the first 60,000 of that is taken from the Streamflow Maintenance account?

A. It's not placed in the Streamflow Maintenance account.

Q. So ignoring that piece -- that reduces, in my mind, I guess, the shortage to 60,000 plus; is that right?

A. Right.

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Q. Does any portion of the Streamflow Maintenance account share in a reduction at that time?

A. Every spaceholder -- every remaining spaceholder, including the 42,000, or the 100,000 less the 60,000, shares that proportionally. So a little bit is taken from everybody.

Q. So some is taken from the Streamflow Maintenance account; correct?

A. A tiny bit is not filled or -- you could look at it either way. It's not placed in there. They suffer that deficit.

Q. So any time there is a shortage above 60,000 acre-feet -- I just want you to assume that it is a greater-than-60,000 acre-feet shortage, like 1989 -- there is a portion that is -- I think the word is even taken from your affidavit -- taken proportionally -- even though it might be minute, a portion is taken from the Streamflow Maintenance -- here, you call it "entitlement."

MR. GEHLERT: I am going to object. This has been asked and answered several times. You are trying to bait him into saying something. He has already said that the water is not placed into the account.

The reporter can read back what he testified when you asked him the question the first time -- or maybe it was the third time.

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BY MS. MARTENS:

Q. Mr. Sutter, if you could, please, testify. I would appreciate it.

A. There is no water that is taken away, subtracted from -- well, as a result of the flood operation, storage water was released down the River. Then it refills.

If it doesn't refill entirely, there's a shortfall; and that shortfall, the first 60,000 of it, is suffered. It's considered a later priority of fill. So that suffers the first deficit.

And then any remaining shortfall, which would be whatever your number was, less 60,000, is shared proportionally by all of the other users. Now, you could look at it as -- you could take their whole account and take a little bit of it away or you could fill it up. It's the same thing.

You are not moving water around. We are not taking water out of an account, a Streamflow Maintenance account, and putting it anyplace. We are just -- we are sharing proportionally that failure to fill, the same as if we didn't have a flood operation and Lucky Peak only filled partially because of a drought.

Q. So your testimony is that if there is more than a 60,000 acre-feet shortage due to flood control operations, each entitlement, which is the word you used, shares equally? Whether we use the term "taken" or "not filling," it is --

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A. Yes. You could take a little bit away from everybody, or you could give everybody proportions.

Q. So when you use the term "taken" in your affidavit, that is what you are referring to? And I am at the last sentence of Paragraph 7 which exists on page 6.

A. Yes.

Q. So using your language there, "taken," and applying it to the sentence that we were referring to about whether anything is taken from the Streamflow Maintenance account, those things are inconsistent, to me, because the same word "taken" is used. Do you understand my confusion?

A. I see your confusion, but it's apples and oranges because, here, they are talking about actually taking water that has filled and giving it to somebody else. Here, the word "taken" is used in a different context.

Q. Where everybody is sharing a shortfall?

A. Yes. So I still don't see an inconsistency. Even though the word "taken" is used in both places,

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it's used in a different context.
Q. I understand that. The reason why I am confused is -- and, no, I wasn't trying to bait you, Mr. Sutter. I am truly confused because what I am seeing in one place is that everybody shares a shortfall. Correct? In your affidavit, you are saying that everybody shares in a shortfall.
I do not see how this paragraph accounts for when everybody shares in a shortfall. You have explained it to me so that I understand.
What I now do not understand at all is the paragraph in the brief. I understand what you have written in your affidavit, but I do not understand the statement in the brief. Maybe you can explain to me --
A. Well, if you read that and put in "contractual obligation in Lucky Peak," which I don't think is what -- given the fact that he was talking about -- and I am just speculating --
Q. Right.
A. -- Arrowrock and Anderson Ranch, I think he meant, in short, the irrigation water needed to fulfill the United States' contractual obligation in Anderson Ranch and Arrowrock. That's true.
Q. Okay.
A. If you said, okay, he is talking about Lucky

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Peak, "In short, the irrigation water needed to fulfill the United States' contractual obligation..." in Lucky Peak is not taken -- then it really doesn't make sense because it wouldn't take water from itself to give back to itself.
Q. So if we read it like I did, meaning the United States' contractual obligations to the irrigation districts, not in any one particular reservoir but their obligations, then this sentence is inaccurate if we read it together with your affidavit? That is all I am asking.
A. I am not an attorney. I think you would have to ask the person who wrote this statement what his intent was.
Q. Irrespective, if there is a shortage, everybody suffers; is that correct?
A. Yes, ma'am.
Q. Thank you. I apologize for hammering that. It really made no sense to me when I read that. I read in one place that there is a reduction occurring, and then I read another sentence that seems to say the opposite. I apologize for everybody having to endure that.
Referring back to the affidavit, which is Deposition Exhibit No. 27, and comparing it with Deposition Exhibit No. 36 --

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MR. GEHLERT: Actually, Tara, before we start on that, can we take a second?
MS. MARTENS: Sure.
(Recess.)
MR. GEHLERT: By way of heads up for scheduling, I may or may not ask one or two questions.
MS. MARTENS: Well, do you want to ask those now? The next thing I will be going into is the affidavit.
MR. GEHLERT: The only thing that stuck in my mind was you asked about this statement, and I was not sure whether Mr. Sutter ever was directly asked whether this was an accurate statement or not.
THE WITNESS: Yes. I think that's consistent. We're talking about the top of page 11, the two programs; one is the Accounting Program and one is the Allocations Program.
BY MS. MARTENS:
Q. I did not find any reference in Paragraph 2 to allocations of storage within each reservoir to the various spaceholders. So that was my question, whether or not I missed that in Paragraph 2. I thought your testimony was that that was not in Paragraph 2.
A. I think that was in Paragraph 9.
MS. MARTENS: That does remind me of something.

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The court reporter asked during the break whether or not we are going to mark this as an exhibit. That would probably be helpful, both for her and for us, when we are reviewing the deposition.
So I will ask you to mark that as Deposition Exhibit No. 38.
(Deposition Exhibit No. 38 was marked for identification by the court reporter.)
BY MS. MARTENS:
Q. Mr. Sutter, I will hand you what has been marked as Deposition Exhibit No. 38 and just ask you whether or not that is the document that we have been referring to during our discussion as, quote, "the brief," end quote?
A. Yes, it is.
Q. Thank you. One of the things that I did, Mr. Sutter, when I received all of these various versions of your affidavit that have been included as Deposition Exhibit No. 36 -- is that correct --
A. Yes.
Q. -- is I have gone through and tried to kind of identify what changes were being made as you were amending this affidavit. Let me ask you, first of all, were the changes that were made all made directly by you -- and I mean on the word processor?

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A. Yes.
Q. At one point in the modifications, you changed the term "account" to "entitlement." I know that we have spent some time on the definition of "entitlement" already in your deposition.
It is kind of a two-part question, and I know that your counsel might object to it as being compound. I hope it will help you understand what I am trying to get from you.
First of all, why did you change the term "account" to "entitlement"? Second of all, what do you mean by the term "entitlement"?
A. As I recall, Mr. Gehlert and I had some discussion over what term to use. He was asking the same question of me. It was hard to find the exact, correct word so that it wouldn't be confused with something else.
I think I first used the word "account," but then there's the Accounting Program. Are we dealing with the Allocations Program?
We have contractual amounts that are in contracts but, yet, there are other entities that have space in reservoirs that are not accounts or contracts.
I thought about using the word "spaceholder," but some people really aren't spaceholders. It's just

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hard to know what to use.
I came down to the word "entitlement" as meaning, if you take the total space in any of the reservoirs, after that space has filled, that water that accrues to that space is allocated to various canal companies, uses, whatever.
So I finally just used the word "entitlement" as sort of the most general term I could use.
Q. Is "entitlement" a term that you have used throughout your nearly forty years with the Department of Water Resources? Was that a term you used, or did you develop that term for this litigation?
A. I developed that term for this litigation. I am not sure that I really had a term that I used previously. I probably just put "user." I think, if you look at the program, it may say "user."
Q. So if I refer back to the time period when you were developing the Allocations Program, for example, you would not have used the term "entitlement" at that time?
A. Probably not.
Q. "User" was a more commonly-used term by you at that period of time?
A. Yes, or "diversion."
Q. Any other term you recall using? I know there

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might be things you cannot come up with now, but are there terms that would usually be synonymous with how you are using "entitlement" in this case?
A. I think in my computer programs I used the words "user" and "diversion," neither one of which is totally, legally correct.
Q. If you refer to Paragraph 7 in Exhibit No. 27, which is the final version of your affidavit, you testify there, "It is logical that the system will fill completely in any year in which there is a system flood control operation because the criteria for flood releases are based on the presence of insufficient space in the system to capture the forecasted runoff." Do you see that sentence?
A. Yes.
Q. That sentence is missing up until the very last iteration of your affidavit. Can you tell me -- again, this will be compound -- first, why it was added; and, second of all, what you mean by that statement?
A. I think that that third statement was added in that paragraph because, in my previous draft -- I had submitted that to Mr. Gehlert to review -- I had made the statement that, in all of the years since 1986, all three reservoirs have always filled.
As I recall, he asked me if, in my opinion,

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there would ever be an instance in which you would have a flood operation and they wouldn't fill. So in order to clarify that or expand on it, I added that sentence. By adding that sentence, I say it's logical.
The flood control rule curves are designed on a statistical basis of past runoff. In my professional opinion, any time that you would have an instance where the forecasted runoff would dictate a flood release, it would be 99.99999 percent sure that you would have enough natural flow in the Boise River to fill all three reservoirs.
Q. So it would be either a highly unlikely statistic or an error in forecasting for there to be a flood control release and the reservoirs not initially fill? Is that a correct understanding?
A. Yes. And I can't imagine an error in forecasting that would be that great because the Boise River -- there's only -- there's less than a million acre-feet of storage in the system.
Q. Referring back to 1989 and the 126,000 acre-feet shortage, was there an error that year that resulted in such a significant shortage?
A. I believe there was a forecasting error, yes.
Q. Do you recall that year and what happened?
A. Not specifically, except that the forecast was

in error and they released too much water and could not refill.

Q. Do you know whether, in 1989, the reservoirs initially filled?

A. On paper?

Q. Yes.

A. Oh, yes, they did.

Q. I suppose you do not want me to go through where you took a comma out, do you? I have a very thorough paralegal.

A. Sure. Show me.

MR. GEHLERT: We had great debates about the proper grammar.

THE WITNESS: I still want that comma in there.

BY MS. MARTENS:

Q. Referring to Paragraph No. 9 -- and this might have something to do with learning that a year had been left out -- well, I do not want to put words into your mouth, but I am just curious.

In one of your drafts, you included a sentence that stated, quote, "This is consistent with the table at the end of Paragraph 5 in the Affidavit of Mary Mellema dated November 13, 2007."

Eventually, by the time you were done, you changed your testimony or opinion to state, quote, "The same conclusion was reached by Mary Mellema in her affidavit dated November 13, 2007."

So, again, my first question to you is: Why was it changed? Second of all, is it because, you know, it was not based upon the same data?

A. It's --

Q. It is Paragraph No. 9.

A. On the original, though?

Q. Yes. I can find that for you.

A. Yes.

Q. It would be the iteration that was attached as the February 8th draft.

A. Yes. Okay. I think the concern here was that the table -- when I originally put that statement in there, I was referring to the right half of that table. I think, after discussing this with Mr. Gehlert, I did not -- I had a bit of a problem with the left half of her table.

So in order to clarify that, I just made it a general statement about agreeing with her conclusion, which was the 100 percent, rather than saying, "I agree with the right half of the table," because I didn't like her title for the left half.

Q. Right. We talked about that.

A. I think that's why I did that.

Q. Also, it is missing data for 1986; correct?

A. I hadn't even considered that. I don't think I thought about that when I did that.

Q. See what happens when I assume? I assumed you changed it because '86 was not there.

A. No.

Q. You changed it because you agree with the right half of the column of Paragraph No. 5's table set forth in her affidavit, but you do not agree with the title of the second column?

A. Yes.

Q. And you do not agree with the designation of years, in the sense that at least one year is left out; and you also did not evaluate those earlier years?

A. There may be additional years. I did not go through those years. So I wanted to be specific on that. I think that's what happened there.

Q. As part of amendments that you made to your affidavit -- and I am referring specifically to Paragraph No. 9 -- you added the last four paragraphs. We have already talked about the very last sentence and why you made the changes to that.

I am curious as to what caused you to add the portion of Paragraph No. 9 that reads, quote, "The Allocations Program therefore allocates a full supply of storage to all individual entitlements in Arrowrock and Anderson Ranch reservoirs.

"From 1986 through 2007, there have been ten years for which system flood control releases were made. I have examined these years and in all cases, Arrowrock and Anderson Ranch entitlements received 100 percent allocation."

Again, my question, after reading all of that, was: Do you recall why you added that information?

A. It was earlier --

Q. Yes. It was not present in your February 7, 2008, draft. It will be somewhat confusing to you, so I will try to help you if I can. If you will, go to your draft on page 5. When you changed your draft, at some point you started adding a lot more paragraphs.

You will see within parentheses "(or allocated space)." Do you see that on page 5 of that particular draft?

A. Oh, yes.

Q. That is where your Paragraph 9 ended at that time.

A. I know I added more paragraphs because I thought I had put too much in each paragraph. So I added more to make it more readable.

Yes. I think -- yes. I think that following

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statement just expands on the previous statement that the paper fill of Arrowrock and Anderson Ranch Reservoir remains at 100 percent.

Then I think, in response to a question from Mr. Gehlert, it's logical, if those reservoirs fill to 100 percent, then all of the individual spaceholders or storage entitlements will also receive 100 percent.

Q. Let me ask you this.

A. That's my recollection.

Q. This is kind of why I thought it happened, why the change occurred. Again, I was wrong last time so I do not want to make assumptions.

Did you do research in the middle of drafting your affidavit? In other words, did you go look at those ten years in between these two drafts, for lack of a better explanation?

A. Yes. You're correct. Yes. That's exactly what happened.

Q. Do you have --

A. It's my recollection --

Q. Go ahead.

A. It's my recollection that there was some question, in discussions between Mr. Gehlert and myself, and I said, "I know that happened."

He said, "You'd better go look." So I went to

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the Department of Water Resources and sat down and that's when I did the little -- I'm not sure which exhibit this is. It would have been February 7th.

Q. We should probably identify it.

A. It is dated February 7th.

Q. Bear with me for a second. Now, after most of the deposition has gone by, I know where to find these quickly.

A. Let's see if the dates fall in line.

Q. Deposition Exhibit No. 33 is dated 2/7/08. Just to help you, sir, it did appear for the first time in your February 8th draft.

A. So the timing seems right. I can't be 100-percent sure, but I think this is what happened.

Q. So is my -- if I assume that you did the research that is depicted on Exhibit No. 33 during the time that you were revising your affidavit, that would be correct?

A. Yes.

Q. Could you explain to me which ten years you reviewed?

A. I reviewed all of the years, 1986 through 2007. I found ten years in which there were flood control operations: 1986, '89, '93, '95, '96, '97, '98, '99, 2000, and 2006.

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Q. So back to that amendment, it is your recollection, if I understood your testimony correctly -- and please tell me if I am wrong -- that you had some opinions, that Mr. Gehlert requested that you go confirm your opinions, you did so and made the notes that are reflected in Exhibit 33, and then you revised your affidavit to include those four final statements that are contained in Paragraph 9 of your final affidavit; is that correct?

A. It would be the last -- well, the statement is, "From 1986 through 2007, there have been ten years for which system flood control releases were made." That one.

Also, "I have examined these years and in all cases, Arrowrock and Anderson Ranch entitlements received 100 percent allocation." Those two.

Q. Any there more?

A. That's it.

Q. Any other reason why you made those changes that you recall?

MR. GEHLERT: Go back.

THE WITNESS: Go back one?

Well, those two statements were a result -- I think I actually -- no, I can't say -- yes. I examined these ten years, and I also looked to see whether or not

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there was a failure to fill for flood control and whether or not the reservoir rights had filled on paper, and then I added these two sentences.

BY MS. MARTENS:

Q. And was it at that time that you realized that 1986 had been omitted from Mary's opinions?

A. Yes.

Q. There is one other thing I am just going to ask you because it is kind of a general question. It looks like, when you were first working on your affidavit, it was your opinion that the watermaster ran the Water Right Accounting Program.

Was it your understanding when you started working on this affidavit that the watermaster, rather than the Idaho Department of Water Resources, ran the Accounting Program?

A. When I was -- prior to 2002, when I was there, the watermaster did run the program. He actually had a terminal computer where he actually made the daily runs. Somewhere between 2002 and today, they updated their equipment; and he lost that capability.

In my discussions with Liz Cresto, I wanted to make sure. I kind of thought -- something in the back of my mind told me that that had happened. So I asked her.

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She said, "Yes. In fact, we have to do the runs here at the office now."

I don't know when that occurred. It was an upgrading of equipment, and he lost the ability to actually punch the button himself.

Q. That sounds like a tough upgrade.

A. It's crazy.

Q. That is upgrading for you, isn't it? Upgrading yourself right out of a role?

A. Yeah.

Q. So in 2002, it was the watermaster and not the Department of Water Resources that ran the Accounting Program?

A. Either one could run the program; but, normally, it was the watermaster, himself, who actually punched the button that made the run.

Q. And can you define what you mean by "doing the run"?

A. "Doing the run" means that the Water Right Accounting Program is run for one or more days in which reservoir contents, river discharges, and canal data are all entered into the program to distribute the natural flow and to account for storage water.

Q. Is there some physical component to doing the runs? I mean, do you have to go out into the field and

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measure something? What is all involved in that? Is it just computer work, or is it actually measurements?

A. There are three types of measurements. I think we kind of discussed this last time. The reservoir contents come in from the Bureau of Reclamation's Hydromet system.

I did check on that. The Bureau of Reclamation does maintain the gages at the reservoirs.

The USGS stream gages are controlled by the U.S. Geological Survey. However, they are all fitted with transmitters that transmit the discharge data on a daily basis via the Hydromet system. That's a satellite.

The third component would be the canal discharge data, and that is entered by the watermaster. He goes out once a week during the irrigation season and actually current meters all of the canals and gets a reading. That data is interpolated from the week before he went out, and all of that data is entered.

Before the runs are made, the watermaster prints out all of that data, checks it over to make sure it's correct, and then runs the water right accounting usually one week at a time. He will do seven days.

If there's a drought situation, he may do it more often. During the irrigation season, he usually

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does it once a week.

Q. And as the procedure exists at present, it is actually not that the watermaster does it every week but the watermaster requests IDWR to do it for him once a week; correct?

A. He still measures the canals and gets the data. I am not quite sure how he gets that into the machine now. He used to be able to do that. I would have to check on that. When all of the data is entered, then Liz Cresto actually makes the run for him.

Q. Thank you for that. That, again, is a different procedure than existed when you were with the Department?

A. Yes, yes. Same result.

Q. Did you ever run the water right accounting system?

A. Yes.

Q. And what years did you run it?

A. From 1986 until I became head of the Hydrology Section. Wait a minute. 1986 through 1995. Yes.

Q. And in 1995, not only were you no longer in charge of the water -- pardon me. You were no longer in charge of those systems beginning in 1995; correct? Or you did not operate those systems in 1995?

A. I hired Sheryl Howe in 1995 or '96. It was

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quite a training period there where she and I worked together until she became familiar enough to do it. Then I turned it over to her, but we worked closely together.

Q. I guess I am curious as to when the watermaster started operating that accounting system.

A. I know that a few years -- he did not even have a computer terminal in 1986. Somewhere in there, he -- I'm not sure.

Q. So from the time when he got a computer until he got upgraded --

A. Yes.

Q. -- he did the accounting system?

A. Yes. That's what happens when you leave.

MS. MARTENS: Without belaboring the other changes in here and to give other people a fair opportunity to ask some questions, I am going to turn it over to some of the other counsel to ask some questions while I go through my notes to finalize, just to save some time.

MR. GEHLERT: Can we impose on you to get some more water?

MS. MARTENS: Of course.

(Recess.)

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EXAMINATION
BY MR. FARRIS:
Q. Good afternoon, Mr. Sutter. My name is Bryce Farris, and I represent Nampa and Meridian Irrigation Districts. I just have a few questions. I want to try to clarify some of the points that you have made in the past few days.
You have said a few times that Anderson Ranch and Arrowrock reservoirs always fill. How many years did you go back to look at that?
A. I believe I said Anderson Ranch and Arrowrock always fill when there's a flood control operation.
Q. So are there years that Anderson Ranch and Arrowrock have not filled that you looked at?
A. I did not look at those years but, yes, there are many years in which Anderson Ranch, in particular, does not fill.
Q. So --
A. I'm not sure about Arrowrock.
Q. But for purposes of your affidavit, you looked at 1986 to 2007?
A. I looked at the flood control years during that period.
Q. You did not look at all years?
A. No.

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Q. You looked at --
A. I just looked at the years to determine whether or not there was a flood control operation.
Q. And if there was a flood control operation, then you went back. So your statement that Anderson Ranch and Arrowrock always fill is conditioned upon the fact that it is a flood control year?
A. Yes.
Q. During a flood control year?
A. Yes.
Q. Is that right?
A. Yes.
Q. And in your note, Exhibit 33, you have listed ten years. Those are the years that Lucky Peak did not fill?
A. Those ten years are years in which there was a flood control operation.
Q. So between 1986 and 2007, those are the ten years that there was a flood control operation?
A. Correct.
Q. And so Arrowrock and Anderson Ranch filled those ten years?
A. And Lucky Peak.
Q. And Lucky Peak filled those ten years?
A. On paper.

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Q. On paper? Okay. But there were some of the years that they filled on paper but did not physically fill, due to miscalculations or errors?
A. I'm not sure about the physical. I just looked at the paper. Anderson Ranch and Arrowrock always fill on paper -- and Lucky Peak.
Q. Take the year -- I think it was '89 that you were talking about --
A. Right.
Q. -- where there was a shortfall of 126,000 acre-feet. That year Lucky Peak filled on paper; is that right?
A. Yes.
Q. But it didn't fill -- I use the term "physically," but maybe that is not the right term. It didn't --
A. I think the term here -- if you look at the second column in my notes, I called it a failure to fill due to flood control.
MS. MARTENS: Is that helpful?
MR. FARRIS: Yes.
THE WITNESS: In four of those years -- let's see -- one, two, three -- in four of those years, there was a failure to fill due to flood control. So in four out of the ten years, there was a failure to fill due to

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flood control. In the other six, it filled completely on paper, again, the second time.
BY MR. FARRIS:
Q. Right. Are you familiar with the term "carry-over"?
A. Yes.
Q. What is your understanding of the term "carry-over"?
A. There can be two types of carry-over. Carry-over is water that, at the end of the irrigation season, still -- there is storage water that still remains in the reservoirs. In some of the reservoirs, that carry-over stays with the individual entitlement.
For instance, in Arrowrock, it does not. So in Lucky Peak and Anderson Ranch, individual entitlements have carry-over water that they can then use the following year. Arrowrock, itself, retains its water but it is not -- it loses its identity, as far as entitlement.
Q. Where exactly are you getting this understanding from? Is this from a contract, or did someone tell you this?
A. I guess the Director of the Department of Water Resources told me this.
Q. Do you know which Director and when?

A. Probably, Keith Higginson.
Q. And when?
A. Probably, in the mid '70s.
Q. These programs that you prepared -- are there two separate programs, an Allocations Program and an Accounting Program?
A. Yes.
Q. Did you learn of this information and your understanding of "carry-over" prior to preparing those programs?
A. Yes.
Q. Do your programs account for carry-over?
A. Yes.
Q. Can you, generally, go through the Accounting Program and tell me how, generally, the concept of carry-over is carried out in the Accounting Program?
A. Carry-over is actually computed by the Allocations Program at the end of the year. So on October 31st, when the storage reconciliation and all of the storage uses are accounted for, the Allocations Program is run one more time.

It not only takes care of the first half of the season, but it takes care of the second or the last half and computes a carry-over number for storage that has gone unused for each reservoir and entity within that

reservoir.

That carry-over then becomes input to the next year when you run the Allocations Program for the first half of the following year.

So the integrity of all of those numbers is maintained by directly inputting it into that program so that, after the reservoirs fill in the following year, the program checks each user's carry-over and adds that to their new fill that is computed, which is computed proportionally on their space entitlement. It adds that new fill on to the carry-over.

If that total amount is greater than their space entitlement, it takes that additional amount and redistributes it to all of the other people in the reservoir. This is an integrative process until all of the new fill is allocated.
Q. You mention that there are two halves to the year. What are those two halves?
A. The first half -- we haven't talked about that.
Q. Right.
A. This is in a non-flood control year. Carry-over is -- in a flood control year, carry-over is wiped out completely because the system is filled. Everybody gets 100 percent.

So in a non-flood control year, after the

reservoirs reach their maximum paper fill, the Allocations Program is run in order to compute how much storage each diversion user or entitlement has, starting the irrigation year.

That amount is put into the Accounting Program so that the canal companies can keep track of how much storage water they have remaining and so they can plan their irrigation season.

Then at the end of the irrigation season, on October 31st, all of the storage uses are known; and those are put back into the Allocations Program. It is re-run. This is the second run, the second half of the season.

It subtracts all of those uses from the reservoirs in an order which is specified by the canal companies and the users. That, then, computes the carry-over for the following year. Those numbers are put back in, and the process continues.
Q. You said a lot there. Let me see if I can break it down and back you up.
A. Sorry.
Q. In Exhibit 27, Paragraph 3, you define the irrigation year as beginning November 1st and ending October 31st?
A. That's the irrigation year.

Q. Right?
A. Yes.
Q. So you have a period of time beginning November 1st to whenever you are done storing water, and that may vary; is that right? It could be June? It could be July? It could be --
A. As late as July. However, if it goes as late as July, it's probably a flood control year and carry-over is wiped out. But, yes, it could go as late as July -- mid July, I think.
Q. So you have from November 1st to whatever that period is where you determine that the storage season is over?
A. Yes.
Q. And you do some sort of a reconciliation? You call it "a run"?
A. Yes. You run the Allocations Program using the reservoir fill from the Accounting Program.
Q. To determine how much, during that period, each entitlement -- you used the word "entitlement" -- is entitled to of their storage?
A. Yes.
Q. Then a user, whether a canal company or irrigation district, can know how much entitlement they will have for the remainder of the irrigation year?

A. Correct. Those numbers are put back into the accounting program. It is backed up until April 1st, which is the beginning of the irrigation season; and then the irrigation season begins, and the runs are made.

Q. And then at the end of the irrigation year --

A. Season.

Q. -- October 31st --

A. Year or season, yes.

Q. -- then you do the run again to determine how much of their storage they have used?

A. Yes. The Accounting Program throughout the irrigation season keeps track of how much storage each entitlement has used.

On October 31st, those numbers are pulled out of the Accounting Program and put into the Allocations Program to run the second half of the Allocations Program.

The first half accumulates the storage and calculates who it goes to, and the second half takes the storage away to see how much carry-over they have left.

Q. When do you make the determination on an irrigation year that there has been this shortfall? Let's take the hypothetical that there is a 60,000 acre-feet shortfall. When do you make that

determination?

A. That is done at the last day of storage, which would be that first half, that first run. That's when that shortfall is determined.

Q. Here is where maybe I am confused. You talk about, in Paragraph 11, "Storage in the Streamflow Maintenance entitlement has always been released beginning sometime in October after the end of the irrigation season in order to maintain a flow in the Boise River below Lucky Peak Reservoir"?

A. Correct.

Q. If they begin using the water at the end of -- let's say, November 1st on, how do you know that shortfall if you don't reconcile until June or whenever? How do you make that determination?

A. The stream resource maintenance flow is subtracted from -- not the new fill but last year's fill. Since that water was accumulated the previous run-off year and fill year, then that account stays the same all summer long until October 15th, approximately, when the canals quit diverting.

Then that water is released from the reservoir; and that's subtracted from last year's accumulation of stored water, which presents a problem because, now, you are filling an account that's using water.

So there's a little provision in the program to automatically deduct that from the carry-over because the carry-over is the fill because it hasn't been used all summer.

So there's a little routine that, when a stream resource maintenance flow for the Boise River is released after October 15th, then it automatically deducts it off of the carry-over so that it can refill, if need be.

Q. Let's take last year. So the irrigation year -- let's take the irrigation year beginning November 1, 2006, and try to map this out.

A. Okay.

Q. What you are saying, or what I think I understand you saying, is that, for the Streamflow Maintenance account, or entitlement or whatever we want to call it, you are using the numbers for prior to that?

A. Yes, that spring.

Q. October 31st and earlier?

A. Yes.

Q. So you use --

A. Which is logical because you are now filling the reservoirs. You don't know how much water you have.

Q. But at some point, there had to be a first

year. There had to be a first year where they had to accumulate some water; right? They had to accumulate some storage, if you are doing it that way? Does that make sense?

A. I guess it would be the first -- I'm not sure what happened in 1956 when Lucky Peak was built. I'm not sure when all of that water was -- the contracts -- I don't know the history there. That's when that would have occurred, somewhere from 1956 forward. I'm not sure.

Q. Well, in this case, we are talking about a change in a permit that changed the character of the water, and I believe that was in 1986. Does that ring a bell with you?

So what I am trying to figure out is there had to be a first year. If you are using the prior year for the Streamflow Maintenance account, there had to be a first year where they had to, basically, build that account.

A. There are two stream resource maintenance accounts; one is the 50,000 for Fish and Game, and the other is the 102,000 for the Bureau of Reclamation.

Historically, only the 50,000 was used for stream resource maintenance flow. But then the Bureau of Reclamation, somewhere in the mid '80s, began

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supplementing that flow with their uncontracted water.
Q. Right. And that would be the -- so you have two separate --
A. Somewhere in the mid '80s.
Q. So you have, in either of those programs, two separate accounts?
A. We lumped them together as one, I think.
Q. Do you remember when you did that?
A. No. They are separate.
Q. So you have two separate accounts? One is the 50,000 acre-feet, the Fish and Game account; correct?
A. Correct.
Q. And the other is the 102,000 account that came about sometime in the mid '80s?
A. Correct.
Q. So let's focus on just the 102,000 acre-foot account. Before you could start using your program and accounting for it, the way I understand it, you had to have one year, the first year, that you had to build that account. Do you know when that happened?
A. I do not recall. I would imagine it would have been 1986 when we started the water right accounting. That space accrued water that year at 100 percent because 1986 was a flood year, and that account filled to almost 100 percent.

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Q. And then did they use water in 1986?
A. I can't recall. The watermaster report would show that, if you wanted to check.
Q. Let's try to go back to last year again. So let's say November 1, 2006, begins the water year.
A. The irrigation year.
Q. The irrigation year, okay. What you are saying is the Streamflow Maintenance account was built up the year before?
A. Correct.
Q. So beginning November 1st, as they start using water for release to maintain the streamflow of the Boise River, that is coming off of what was in their account prior to October 31, 2006?
A. Yes, correct. You could call that "carry-over." That would be in their carry-over because they didn't use any during the summer. So they have a carry-over amount.
Q. And then as they use the water from November 1st to, likely, the beginning of the irrigation season --
A. Depending upon whether there is a flood release.
Q. Okay.
A. There wasn't -- I don't think.

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Q. Hypothetically, let's say April 1st, although it doesn't really matter. They used their entitlement from the year before that they carried over?
A. Correct.
Q. And you keep track of that in these programs?
A. Yes.
Q. Have you gone back and looked to see how much they carry over each year?
A. I have not.
Q. That was not part of your task?
A. It was not.
Q. In your experience, from being in your position with the Department, have you had occasion to know what they typically carry over from year to year?
A. In a flood year, they would be carrying over almost all of it because they wouldn't be using any storage because there were flood releases.
In a drought year, you could calculate it pretty easily. I think, when there are several years in a row of below-average runoff and no flood releases, that's when that account is used most. I don't have the numbers in front of me.
Q. So from November 1st to April 1st, the non-irrigation season, is when they would be releasing water. So let's say November 1st of 2006 to April 1st

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of 2007. Then the irrigation folks go from April 1st to whenever the end of their season is?
A. Correct.
Q. Then would the Streamflow Maintenance account have to still have carry-over in order to be able to release water in November of '07? Maybe I am not doing this very systematically.
A. It depends on the new fill to Lucky Peak. Let's say it's a drought year and the new fill in Lucky Peak is almost nothing. Then they would have to rely on their carry-over from last year.
Then the next year, if it's a drought year, has to last two or three or four years, maybe. But if the runoff is sufficient to provide new fill in Lucky Peak, then that account builds back up.
Q. So after April 1st, after the Streamflow Maintenance account ceases releasing water for streamflow maintenance, it could still have some additions to its account as the storage continues into, say, June?
A. Yes, definitely. It's treated like any other user, except for the 60,000, in a flood control year.
Q. But because you have the ongoing releases and filling of the accounts with the Streamflow Maintenance, when do you make the determination that there is going

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to be a shortfall, that different users have to share proportionally?
A. Okay.
Q. Let's try, if we can, to stick with 2006, 2007. When would you have made that determination, if there was going to be a shortfall?
A. Okay. There was no flood control operation in 2007. So we're not talking about a shortfall, like we have used it in the affidavit, the difference between the storage and unaccounted-for space.
There, if you were to use the word "shortfall," it would be Lucky Peak failed to refill. So I would think that April 1st, or shortly after, with no flood release -- I'm not sure when the last day of fill was in 2007.
Whenever that occurred, then you would have the figure to Lucky Peak. You would put that into the Allocations Program, and it would take whatever the new fill was in Lucky Peak.
And everybody then -- the 60,000 wouldn't come into play, and everybody would receive a proportional amount of that new fill based on their entitlement.
Whatever that entitlement was that was calculated for the stream maintenance account would be added on to any remaining carry-over that they had after

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their use during the winter to come up with a new number. I'm not sure what that was in 2007.
I don't have that. No, I don't.
Q. But in a situation where you are describing, at the end of Paragraph 10, where there is a shortfall --
A. That's a flood operation. That's totally different.
Q. If there is a shortfall like that, then that 60,000 acre-feet that you say -- it comes off the top first?
A. Right.
Q. When does that come off the top of the Streamflow Maintenance entitlement? What part of the year?
A. On the last day of unaccounted-for storage fill, you would compute a shortfall. Let's say a shortfall did occur. Okay. Then that shortfall is subtracted from the total space in Lucky Peak.
That number is put into the Allocations Program. It allocates water to all of the users first, 100 percent, including 42,000 of the stream maintenance water, the 102,000 minus 60,000.
Q. Can I stop you there?
A. Okay.
Q. Including the 50,000 Fish and Game that you

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talked about?
A. Yes, yes.
Q. So you have the two accounts?
A. Yes.
Q. The 60,000 comes off of the account that we have described as the 102,000?
A. That's the end result, depending upon the magnitude of the new fill, of the new fill in Lucky Peak. If that new fill results in a deficit less than 60,000, everybody gets 100 percent first -- that 50,000, the 40,000, all of the irrigators.
If there's any left over, that is put back in the Streamflow Maintenance account, the Bureau of Reclamation's Streamflow Maintenance account.
Q. So if there is more than 60,000 -- if there is a shortfall of more than 60,000 and you proportionally take or however you want to say it --
A. Either way. You could proportionally reduce everybody's account or you could only give them -- they suffer that deficit.
Q. But if there is more -- if there is more than the 60,000 and that suffering of deficit, that goes to both the Fish and Game account and this other account?
A. And 40,000, yes.
Q. So the remaining 40,000 of the other Streamflow

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Maintenance account?
A. Yes.
Q. You treat them as two separate accounts and take them down proportionally?
A. Yes.
Q. So in a situation where you have them completely filled and the carry-over is wiped out, how do you reconcile that with the Streamflow Maintenance account?
A. If there is a flood control operation, all of the accounts fill to 100 percent initially. So carry-over doesn't become an issue. Everybody has 100 percent.
If there's a shortfall, then it goes back to this special calculation where the 60,000 is considered like a separate reservoir. It's separate. Everybody left shares proportionally.
So the Streamflow Maintenance account -- if you are talking about the Bureau of Reclamation's stream maintenance account, it would show 42,000.
Let's say that the rest of the -- what it does is it computes the percent. Let's say that the shortfall was greater than 60,000 and there was a 10-percent deficit or a 90-percent fill of the rest of the space.

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Then it simply takes 90 percent of everybody's entitlement and gives them that. So everybody would get 90 percent. Now, the stream maintenance account doesn't have the 102,000. It says 40,000, so they would get 36,000.

Q. Okay.

A. I know I didn't answer your question.

Q. I don't know if you did.

A. I'm not relating to it.

Q. I am trying to figure out if you have got a situation where you carry over -- is there a situation, I guess, that the carry-over for the Streamflow Maintenance account is wiped out?

A. Yes.

Q. Tell me how that --

A. In any flood operation, it's wiped out.

Q. Can you explain that to me? Maybe I don't -- I'm not following you.

A. I will just walk you through an example. Let's say, on November 1st of a certain year, we start releasing water for a flow down the Boise River. I think there are 250 cfs or 200.

That water comes out of the stream maintenance account. It comes out from their carry-over or their fill from the previous year. Let's say, on February

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1st, we get a forecast and there's a lot of snow and we start releasing water for flood control. Okay?

It's a 100-percent chance that sometime in January, February, or March all of the reservoirs will fill to 100 percent. Carry-over is zeroed out because they're full. Everybody got 100 percent.

So carry-over becomes irrelevant, including the stream maintenance account. We have flood water going down the river. They are not using water anymore. It's full.

Q. In that situation, they would then use -- they would then -- when you reconcile it later in the year, the first half, then they would have water to be able to use beginning October 31st of the following year?

A. 100 percent, yes.

Q. I understand.

A. That little bit they used in November and December was replaced with flood water.

Q. I understand.

A. So you don't get charged for it.

MR. FARRIS: I think that is all I have.

MS. MARTENS: Do you have anything, David?

MR. GEHLERT: Did you want to mark that e-mail we provided, or are you going to ask questions about it?

MS. MARTENS: You know, I felt like I needed to

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listen. It looks pretty complicated to me. I think I need to compare it with the chart. You probably want, at least, a copy. I need a copy of it. He wants this back; right?

MR. GEHLERT: Why don't we have him identify it and mark it as an exhibit, and then you can do what you want with it?

MS. MARTENS: Do you want to keep a copy, though, before I marked one for an exhibit?

THE WITNESS: I can make another copy.

MS. MARTENS: Off of your computer?

THE WITNESS: Yes.

MS. MARTENS: We will mark as Deposition Exhibit No. 39 an e-mail that was produced this afternoon by Mr. Sutter as being responsive to our request at the last session of his deposition.

(Deposition Exhibit No. 39 was marked for identification by the court reporter.)

FURTHER EXAMINATION

BY MS. MARTENS:

Q. We still have a few minutes. I just have some clean-up questions. Have you reviewed any documents between the sessions of our depositions that you had not reviewed prior?

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A. Just the e-mails that I was copying. I went through all of my e-mails and made copies. So I reviewed those. I think there was one other reference I made to something I had cleared up. I can't recall.

Q. With respect to determining what constituted a flood control year in your analysis, what standard did you utilize?

A. Okay. First, I looked at Exhibit --

MR. GEHLERT: It looks like it's 32.

THE WITNESS: Exhibit 32.

BY MS. MARTENS:

Q. Thank you. Okay.

A. I looked at the discharge at Glenwood Bridge. In general, when I saw discharges -- it depends on the month. But during the wintertime, if it was greater than 300 or 400 cfs, I viewed that as a flood discharge. During irrigation season, if it was the early irrigation season, if it was more than 2,000 --

Q. And can --

A. Then I also -- to make sure, I looked into the watermaster report. The watermaster gives a little description of the year at the beginning of every report. I just kind of looked at that to make sure that he talked about flood releases.

Q. Did you look at the watermaster report summary

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descriptions for all years or just the years that were above the 400 numeric or the -- did you say -- 2,000 numeric for the early irrigation season? I am sorry. I forgot what --

A. During the winter, from January through March, generally, if the flow was greater than 300 or 400 cfs, it would be a flood release. And, yes, I just looked at the watermaster reports for those years that I determined there was a flood release.

Q. You did not look at the summaries for every year since 1986 but just those years that met your numeric standards, whether it be wintertime or early irrigation season; is that correct?

A. Correct.

MS. MARTENS: Those are all of my questions. Thank you.

Did you have any, David?

MR. GEHLERT: No.

(The deposition stood adjourned at 5:00 o'clock p.m.)

(Signature requested.)

* * *

CERTIFICATE

I, LORI A. PULSIFER, Certified Shorthand Reporter, do hereby certify that:

The foregoing proceedings were taken before me, at which time the witness was placed under oath;

The testimony and all objections made were recorded stenographically by me and were thereafter transcribed by me;

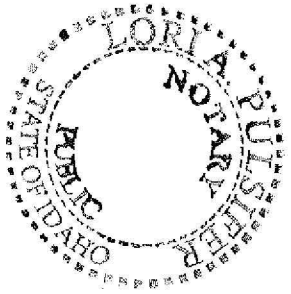
The foregoing is a true and correct record, to the best of my skill and ability;

Pursuant to request, notification was provided that the deposition is available for review and signature; and

I am not a relative or an employee of any attorney, nor am I financially interested in the action.

I have hereunto set my hand and seal this 19th day March 2013.

LORI A. PULSIFER, CSR, RDR, CRR
Idaho CSR No. 354

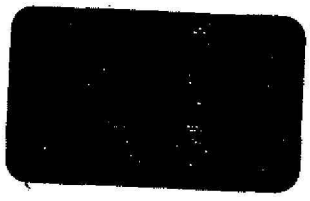


From: Robert J Sutter <bsutter@juno.com>
To: David.Gehlert@usdoj.gov
Date: Tue, 12 Feb 2008 15:47:12 -0700
Subject: Final Final draft

Dave,

I have added statements at the end of paragraph 7 and 9.

Bob



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Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
	)	
	)	**AFFIDAVIT OF ROBERT J. SUTTER**
	)	
STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

I, ROBERT SUTTER, being duly sworn upon oath, state as follows:

1. I am a registered Professional Engineer in the state of Idaho. I was employed as a Water Resource Engineer in the Hydrology Section of the State of Idaho Department of Water Resources from 1969 to 1995. I served as Hydrology Section Manager for the State of Idaho Department of Water Resources from 1995 to 2002.

2. In 1986, I developed the Boise River Water Right Accounting computer program (hereafter called the "Accounting Program") and the Boise River Storage Allocation computer program (hereafter called the "Allocations Program") for the Boise River. These two programs have been used by the Idaho Department of Water Resources (Department) and the Boise River Watermaster (Watermaster) to account for natural flow and reservoir storage water each and every year since 1986. The Department runs both the Accounting Program and the Allocations Program. However, the Department and the Watermaster work closely with each other, exchanging information in an iterative manner while making all program runs. The Watermaster uses the results of these programs to correctly deliver natural flow and storage water throughout the year. I have reviewed both the Accounting and the Allocations programs that are currently being used by the Department and the Watermaster and have found both to be essentially the same as when I left the Department in 2002.

3. For water right accounting purposes, the Department uses an "irrigation year," which begins on November 1 and ends on October 31. It includes the non-irrigation season period from November 1 to April 1 when reservoirs store water, as well as the period after April 1 when the irrigation season begins. In many years reservoirs continue to store water into the irrigation season, sometimes as late as July.

4. Typically the Accounting Program is first run sometime between February and April for the time period beginning November 1, the first day of the irrigation year. For each day after November 1, the Accounting Program calculates the amount of water that is credited to each of the Boise River Reservoirs, Arrowrock, Anderson Ranch and Lucky Peak, according to their respective storage rights. The accumulated amount of storage credited to each reservoir storage

right is often termed "paper fill," as opposed to the measured contents of the reservoir, which is termed "physical fill." The physical fill in a reservoir seldom equals the paper fill because: a) the system (Arrowrock, Anderson Ranch, And Lucky Peak reservoirs) storage fill and use is not reconciled until the end of the irrigation year; and b) the three Boise River reservoirs are operated as a system and therefore storage water credited "on paper" to one reservoir can physically be stored in a different reservoir. The Accounting Program only accounts for the fill of the reservoir storage right. The Accounting Program does not calculate the amount of storage water that accrues to individual space entitlements.

5. As natural flow recedes, reservoir storage rights (which are generally later in time than irrigation natural flow rights) go out of priority, and reservoirs stop accruing stored water. Reservoir storage rights go out of priority typically sometime between April 1 and July 31, depending on the magnitude of runoff. Once the reservoirs stop accruing storage, the Allocations Program is run to calculate stored water allocations for individual space entitlements. The United States Bureau of Reclamation provides a list of space entitlements in each reservoir to the Watermaster and the Department. The Allocations Program computes storage water allocations for these entitlements in Arrowrock, Anderson Ranch and Lucky Peak reservoirs simultaneously based on the paper fill of each reservoir.

6. There are two different situations for which the Allocations Program calculates the amount of water that has been stored in each space entitlement:

a) In a year of low to moderate runoff, the paper fill in one or more of the Boise River reservoirs may not fill to 100 percent of its storage right (or total allocated space). In this type of year, the Allocations Program distributes the amount of the accumulated paper fill to all

space entitlements proportional to their entitlement. This is typically done sometime after April 1 when the reservoir rights cease to accumulate paper fill.

b) In a year of above average runoff, storage water may be physically released from the Boise River reservoirs early in the irrigation year to make space to store anticipated high natural flows to prevent flooding in the lower Boise River below Lucky Peak Reservoir. This flood control operation typically can occur anytime from January through May.

7. When storage is released for flood control, the paper fill of each reservoir in the Accounting Program is not affected, and continues to increase until each reservoir fills to 100 percent of its storage right. I have examined accounting results for all years since the inception of the use of the Accounting Program in 1986. As a result of this examination, I have found that for years when system flood control operations have occurred on the Boise River, the paper fill of all storage rights in Arrowrock, Anderson Ranch and Lucky Peak reservoirs has never failed to initially fill to 100 percent. It is logical that the system will fill completely in any year in which there is a system flood operation because the criteria for flood releases are based on the presence of insufficient space in the system to capture the forecasted runoff.

8. As the flood control operation typically progresses, the reservoirs cease storage releases and begin to physically refill as the high runoff is then stored to prevent downstream flooding. The Accounting Program tracks the amount of natural flow stored during the refill phase of a flood operation as "unaccounted for" storage. When the accumulation of "unaccounted for" storage ends, the flood operation is completed. The end of flood operations typically occurs sometime from April through July. At the end of a flood operation, ideally the amount of "unaccounted for" storage will be equal to the amount of storage released for flood

control so that the amount of water stored physically in the reservoirs will be equal to the paper fill, which is 100 percent of the storage right (or allocated storage). If the "unaccounted for" storage is less than the storage released for flood control, this shortfall is termed the "failure to refill due to flood control."

9. At the end of the flood control operation the Allocations Program is then run to calculate stored water allocations for individual space entitlements. Again, the Allocations Program computes allocations for all three Boise River reservoirs simultaneously using the paper fill of each reservoir. In this system flood control situation, the paper fill of Arrowrock Reservoir and Anderson Ranch Reservoir remains at 100 percent of their storage right (or allocated space). The Allocations Program therefore allocates a full supply of storage to all individual entitlements in Arrowrock and Anderson Ranch reservoirs. From 1986 through 2007, there have been ten years for which system flood control releases were made. I have examined these years and in all cases, Arrowrock and Anderson Ranch entitlements received 100 percent allocation. The same conclusion was reached by Mary Mellema in her Affidavit dated November 13, 2007. In order for Anderson Ranch or Arrowrock not to fill on paper after a system flood operation, the shortfall would have to be greater than the allocated space in Lucky Peak. This would be very unlikely.

10. The paper fill of Lucky Peak Reservoir used by the Allocations Program is equal to its allocated space less any "failure to refill due to flood control." This "shortfall" is subtracted from the Lucky Peak Reservoir paper fill because Lucky Peak Reservoir has the latest water right priority of the three Boise River reservoirs, and Lucky Peak Reservoir is the primary flood control facility. In the case where there is a "shortfall" in Lucky Peak Reservoir paper fill, the Allocations Program allocates the fill in Lucky Peak as follows: If the shortfall is 60,000

acre-feet or less, all entitlements in Lucky Peak Reservoir receive 100 percent of their allocation except for the Streamflow Maintenance entitlement in Lucky Peak Reservoir, which receives an amount equal to its entitlement less the shortfall. Additionally, if the shortfall is greater than 60,000 acre-feet, the amount in excess of 60,000 acre-feet is taken proportionally from all entitlements in Lucky Peak, including the remainder of the Streamflow Maintenance entitlement.

11. Storage in the Streamflow Maintenance entitlement has always been released beginning sometime in October after the end of the irrigation season in order to maintain a flow in the Boise River below Lucky Peak Reservoir. These Boise River storage releases continue throughout the non-irrigation season (November 1 to April 1) unless flood control releases preclude the need for such flow maintenance.

Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J. Sutter, P.E.

SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho, _____
Residing at: _____
My Commission Expires: _____

From: Robert J Sutter <bsutter@juno.com>
To: David.Gehlert@usdoj.gov
Date: Fri, 8 Feb 2008 14:20:36 -0700
Subject: Final Draft Affidavit Sutter

Dave,

Final draft.

Bob

RONALD J. TENPAS
Acting Assistant Attorney General
Environment and Natural Resources Division
DAVID W. GEHLERT
Natural Resources Section
Environment and Natural Resources Division
U.S. Department of Justice
1961 Stout Street, 8th Floor
Denver, Colorado 80294
Phone: (303) 844-1386
Fax: (303) 844-1350

Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
	)	
	)	**AFFIDAVIT OF ROBERT J. SUTTER**
	)	
STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

I, ROBERT SUTTER, being duly sworn upon oath, state as follows:

1. I am a registered Professional Engineer in the state of Idaho. I was employed as a Water Resource Engineer in the Hydrology Section of the State of Idaho Department of Water Resources from 1969 to 1995. I served as Hydrology Section Manager for the State of Idaho Department of Water Resources from 1995 to 2002.

2. In 1986, I developed the Boise River Water Right Accounting computer program (hereafter called the "Accounting Program") and the Boise River Storage Allocation computer program (hereafter called the "Allocations Program") for the Boise River. These two programs have been used by the Idaho Department of Water Resources (Department) and the Boise River Watermaster (Watermaster) to account for natural flow and reservoir storage water each and every year since 1986. The Department runs both the Accounting Program and the Allocations Program. However, the Department and the Watermaster work closely with each other, exchanging information in an iterative manner while making all program runs. The Watermaster uses the results of these programs to correctly deliver natural flow and storage water throughout the year. I have reviewed both the Accounting and the Allocations programs that are currently being used by the Department and the Watermaster and have found both to be essentially the same as when I left the Department in 2002.

3. For water right accounting purposes, the Department uses an "irrigation year," which begins on November 1 and ends on October 31. It includes the non-irrigation season period from November 1 to April 1 when reservoirs store water, as well as the period after April 1 when the irrigation season begins. In many years reservoirs continue to store water into the irrigation season, sometimes as late as July.

4. Typically the Accounting Program is first run sometime between February and April for the time period beginning November 1, the first day of the irrigation year. For each day after November 1, the Accounting Program calculates the amount of water that is credited to each of the Boise River Reservoirs, Arrowrock, Anderson Ranch and Lucky Peak, according to their respective storage rights. The accumulated amount of storage credited to each reservoir storage

right is often termed "paper fill," as opposed to the measured contents of the reservoir, which is termed "physical fill." The physical fill in a reservoir seldom equals the paper fill because: a) the system (Arrowrock, Anderson Ranch, And Lucky Peak reservoirs) storage fill and use is not reconciled until the end of the irrigation year; and b) the three Boise River reservoirs are operated as a system and therefore storage water credited "on paper" to one reservoir can physically be stored in a different reservoir. The Accounting Program only accounts for the fill of the reservoir storage right. The Accounting Program does not calculate the amount of storage water that accrues to individual space entitlements.

5. As natural flow recedes, reservoir storage rights (which are generally later in time than irrigation natural flow rights) go out of priority, and reservoirs stop accruing stored water. Reservoir storage rights go out of priority typically sometime between April 1 and July 31, depending on the magnitude of runoff. Once the reservoirs stop accruing storage, the Allocations Program is run to calculate stored water allocations for individual space entitlements. The United States Bureau of Reclamation provides a list of space entitlements in each reservoir to the Watermaster and the Department. The Allocations Program computes storage water allocations for these entitlements in Arrowrock, Anderson Ranch and Lucky Peak reservoirs simultaneously based on the paper fill of each reservoir.

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space entitlements proportional to their entitlement. This is typically done sometime after April 1 when the reservoir rights cease to accumulate paper fill.

b) In a year of above average runoff, storage water may be physically released from the Boise River reservoirs early in the irrigation year to make space to store anticipated high natural flows to prevent flooding in the lower Boise River below Lucky Peak Reservoir. This flood control operation typically can occur anytime from January through May.

7. When storage is released for flood control, the paper fill of each reservoir in the Accounting Program is not affected, and continues to increase until each reservoir fills to 100 percent of its storage right. I have examined accounting results for all years since the inception of the use of the Accounting Program in 1986. As a result of this examination, I have found that for years when system flood control operations have occurred on the Boise River, the paper fill of all storage rights in Arrowrock, Anderson Ranch and Lucky Peak reservoirs has never failed to initially fill to 100 percent.

8. As the flood control operation typically progresses, the reservoirs cease storage releases and begin to physically refill, as the high runoff is then stored to prevent downstream flooding. The Accounting Program tracks the amount of natural flow stored during the refill phase of a flood operation as "unaccounted for" storage. When the accumulation of "unaccounted for" storage ends, the flood operation is completed. The end of flood operations typically occurs sometime from April through July. At the end of a flood operation, ideally the amount of "unaccounted for" storage will be equal to the amount of storage released for flood control so that the amount of water stored physically in the reservoirs will be equal to the paper fill, which is 100 percent of the storage right (or allocated storage). If the "unaccounted for"

storage is less than the storage released for flood control, this shortfall is termed the "failure to refill due to flood control."

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Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J. Sutter, P.E.

SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho _____
Residing at: _____
My Commission Expires: _____

From: Robert J Sutter <bsutter@juno.com>
To: David.Gehlert@usdoj.gov
Date: Fri, 8 Feb 2008 11:08:24 -0700
Subject: Final? Draft

Dave,

I like adding more paragraphs - much easier to follow. Also please review underlined portion in Paragraph In Peragraph 9.

Bob

RONALD J. TENPAS
Acting Assistant Attorney General
Environment and Natural Resources Division
DAVID W. GEHLERT
Natural Resources Section
Environment and Natural Resources Division
U.S. Department of Justice
1961 Stout Street, 8th Floor
Denver, Colorado 80294
Phone: (303) 844-1386
Fax: (303) 844-1350

Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
	)	
	)	**AFFIDAVIT OF ROBERT J. SUTTER**
	)	
STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

I, ROBERT SUTTER, being duly sworn upon oath, state as follows:

1. I am a registered Professional Engineer in the state of Idaho. I was employed as a Water Resource Engineer in the Hydrology Section of the State of Idaho Department of Water Resources from 1969 to 1995. I served as Hydrology Section Manager for the State of Idaho Department of Water Resources from 1995 to 2002.

2. In 1986, I developed the Boise River Water Right Accounting computer program (hereafter called the "Accounting Program") and the Boise River Storage Allocation computer program (hereafter called the "Allocations Program") for the Boise River. These two programs have been used by the Idaho Department of Water Resources (Department) and the Boise River Watermaster (Watermaster) to account for natural flow and reservoir storage water each and every year since 1986. The Department runs both the Accounting Program and the Allocations Program. However, the Department and the Watermaster work closely with each other, exchanging information in an iterative manner while making all program runs. The Watermaster uses the results of these programs to correctly deliver natural flow and storage water throughout the year. I have reviewed both the Accounting and the Allocations programs that are currently being used by the Department and the Watermaster and have found both to be essentially the same as when I left the Department in 2002.

3. For water right accounting purposes, the Department uses an "irrigation year", which begins on November 1 and ends on October 31. It includes the non-irrigation season period from November 1 to April 1 when reservoirs store water, as well as the period after April 1 when the irrigation season begins. In many years reservoirs continue to store water into the irrigation season, sometimes as late as July.

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5. As natural flow recedes, reservoir storage rights (which are generally later in time than irrigation natural flow rights) go out of priority, and reservoirs stop accruing stored water. Reservoir storage rights go out of priority typically sometime between April 1 and July 31, depending on the magnitude of runoff. Once the reservoirs stop accruing storage, the Allocations Program is run to calculate stored water allocations for individual space entitlements. The United States Bureau of Reclamation provides a list of space entitlements in each reservoir to the Watermaster and the Department. The Allocations Program computes storage water allocations for these entitlements in Arrowrock, Anderson Ranch and Lucky Peak reservoirs simultaneously based on the paper fill of each reservoir.

6. There are two different situations for which the Allocations Program calculates the amount of water that has been stored in each space entitlement:

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space entitlements proportional to their entitlement. This is typically done sometime after April 1 when the reservoir rights cease to accumulate paper fill.

b) In a year of above average runoff, storage water may be physically released from the Boise River reservoirs early in the irrigation year to make space to store anticipated high natural flows to prevent flooding in the lower Boise River below Lucky Peak Reservoir. This flood control operation typically can occur anytime from January through May.

7. When storage is released for flood control, the paper fill of each reservoir in the Accounting Program is not affected, and continues to increase until each reservoir fills to 100 percent of its storage right. I have examined accounting results for all years since the inception of the use of the Accounting Program in 1986. As a result of this examination, I have found that for years when system flood control operations have occurred on the Boise River, the paper fill of all storage rights in Arrowrock, Anderson Ranch and Lucky Peak reservoirs has never failed to initially fill to 100 percent.

8. As the flood control operation typically progresses, the reservoirs cease storage releases and begin to physically refill, as the high runoff is then stored to prevent downstream flooding. The Accounting Program tracks the amount of natural flow stored during the refill phase of a flood operation as "unaccounted for" storage." When the accumulation of "unaccounted for" storage ends, the flood operation is completed. The end of flood operations typically occurs sometime from April through July. At the end of a flood operation, ideally the amount of "unaccounted for" storage will be equal to the amount of storage released for flood control so that the amount of water stored physically in the reservoirs will be equal to the paper fill, which is 100 percent of the storage right (or allocated storage). If the "unaccounted for"

storage is less than the storage released for flood control, this shortfall is termed the "failure to refill due to flood control."

9. At the end of the flood control operation the Allocations Program is then run to calculate stored water allocations for individual space entitlements. Again, the Allocations Program computes allocations for all three Boise River reservoirs simultaneously using the paper fill of each reservoir. In this system flood control situation, the paper fill of Arrowrock Reservoir and Anderson Ranch Reservoir remains at 100 percent of their storage right (or allocated space). The Allocations Program therefore allocates a full supply of storage to all individual entitlements in Arrowrock and Anderson Ranch reservoirs. From 1986 through 2007, there have been ten years for which system flood control releases were made. I have examined these years and in all cases, Arrowrock and Anderson Ranch entitlements received 100 percent allocation. This is consistent with the table at the end of Paragraph 5 in the Affidavit of Mary Mellema dated November 13, 2007.

10. The paper fill of Lucky Peak Reservoir used by the Allocations Program is equal to its allocated space less any "failure to refill due to flood control." This "shortfall" is subtracted from Lucky Peak Reservoir paper fill because Lucky Peak Reservoir has the latest water right priority of the three Boise River reservoirs, and Lucky Peak Reservoir is the primary flood control facility. In the case where there is a "shortfall" in Lucky Peak Reservoir paper fill, the Allocations Program allocates the fill in Lucky Peak as follows: If the shortfall is 60,000 acre-feet or less, all entitlements in Lucky Peak Reservoir receive 100 percent of their allocation except for the Streamflow Maintenance entitlement in Lucky Peak Reservoir, which receives an amount equal to its entitlement less the shortfall. Additionally, if the shortfall is greater than

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Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J. Sutter, P.E.

SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho _____
Residing at: _____
My Commission Expires: _____

From: Robert J Sutter <bsutter@juno.com>
To: David.Gehlert@usdoj.gov
Cc: EMCGARRY@pn.usbr.gov
Date: Thu, 7 Feb 2008 14:04:42 -0700
Subject: Another Draft

Davo,

I have underlined the changes in this draft. Also it was 1986 when we first did the accounting. Also my comments on Mary's affidavit.

Hope we are getting closer.

Bob

RONALD J. TENPAS
Acting Assistant Attorney General
Environment and Natural Resources Division
DAVID W. GEHLERT
Natural Resources Section
Environment and Natural Resources Division
U.S. Department of Justice
1961 Stout Street, 8th Floor
Denver, Colorado 80294
Phone: (303) 844-1386
Fax: (303) 844-1350

Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
	)	
	)	**AFFIDAVIT OF ROBERT J. SUTTER**
	)	
STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

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Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J. Sutter, P.E.

SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho _____
Residing at: _____
My Commission Expires: _____

Memo

To: David Gehlert
From: Bob Sutter
Subject: Mary Mellema Affidavit

Date: Feb 7, 2008

I have reviewed the Affidavit of Mary Mellama (SRBA Subcase Nos. 63-3618) dated November 13, 2007 and have the following comments.

1) The statement in Paragraph 4 " *At this time any shortages due to flood control operations in the Boise Project that need to be made up to the various Reclamation contractors in Anderson and Arrowrock, pursuant to the 1985 Water Control Manual and contracts, occurs.*" is not relevant and does not occur under the accounting procedures put in place in 1986. This may have occurred prior to 1985.

2) The table at the end of Paragraph 5 should be titled "Amount of Space not Filled in Lucky Peak Reservoir Due to Flood Control" rather than "Amount of Space not Filled in Anderson and Arrowrock". I believe taking the difference between the total of space entitlements in Lucky Peak and the storage allocated to Lucky Peak derived these numbers. It should be noted that these numbers may have been based on physical contents of Arrowrock and Anderson Ranch prior to 1986, but not after 1986 when the computer accounting procedures were put in place.

From: Robert J Sutter <bsutter@juno.com>
To: David.Gehlert@usdoj.gov
Date: Thu, 7 Feb 2008 09:25:33 -0700
Subject: Revised Revised Affidavit

Dave,

Here it is. I'm still not sure about the wording. I think there may be a reference to the Boise River that you suggested adding somewhere, but I couldn't remember where. Let me know.

I am headed to IDWR this morning to double check on some things.

Bob

On Wed, 6 Feb 2008 14:18:06 -0500 "Gehlert, David (ENRD)" <David.Gehlert@usdoj.gov> writes:
> Thanks Bob. I'll take a look at your revised draft and give you a
> call
> ASAP. Dave
>

RONALD J. TENPAS
Acting Assistant Attorney General
Environment and Natural Resources Division
DAVID W. GEHLERT
Natural Resources Section
Environment and Natural Resources Division
U.S. Department of Justice
1961 Stout Street, 8th Floor
Denver, Colorado 80294
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Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
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	)	**AFFIDAVIT OF ROBERT J. SUTTER**
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STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

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2. In 1985, I developed the Boise River Water Right Accounting computer program (hereafter called the "Accounting Program") and the Boise River Storage Allocation computer program (hereafter called the "Allocations Program") for the Boise River. These two programs have been used by the Boise River Watermaster (Watermaster) and the Idaho Department of Water Resources (Department) to account for natural flow and reservoir storage water each and every year since 1985. Over the course of the year, either the Watermaster or the Department runs the Accounting Program. Typically the Watermaster runs the Accounting Program for the more routine time periods during the irrigation season, while the Department runs the more complex periods, such as the first run of the year. The Department almost always runs the Allocations Program. However, the Watermaster and the Department work closely with each other, exchanging information in an iterative manner while making all program runs. I have reviewed both the Accounting and the Allocations programs that are currently being used by the Watermaster and the Department and have found both to be essentially the same as when I left the Department in 2002.

3. For water right accounting purposes, the Department uses an "irrigation year", which begins on November 1 and ends on October 31. It includes the non-irrigation season period from November 1 to April 1 when reservoirs store water, as well as the period after April 1 when the irrigation season begins. In many years reservoirs continue to store water into the irrigation season, sometimes as late as July.

4. Typically the Accounting Program is first run sometime between February and April for the time period beginning November 1, the first day of the irrigation year. For each day after November 1, the Accounting Program calculates the amount of water that is credited to each

of the Boise River Reservoirs, Arrowrock, Anderson Ranch and Lucky Peak, according to their respective storage rights. The accumulated amount of storage credited to each reservoir storage right is often termed "paper fill", as opposed to the measured contents of the reservoir, which is termed "physical fill". The physical fill in a reservoir seldom equals the paper fill because: a) the system (Arrowrock, Anderson Ranch, And Lucky Peak reservoirs) storage fill and use is not reconciled until the end of the irrigation year; and b) the three Boise River reservoirs are operated as a system and therefore storage water credited "on paper" to one reservoir can physically be stored in a different reservoir. The Accounting Program only accounts for the fill of the reservoir storage right. The Accounting Program does not calculate the amount of storage water that accrues to individual space entitlements.

5. As natural flow recedes, reservoir storage rights (which are generally later in time than irrigation natural flow rights) go out of priority, and reservoirs stop accruing stored water. Reservoir storage rights go out of priority typically sometime between April 1 and July 31, depending on the magnitude of runoff. Once the reservoirs stop accruing storage, the Allocations Program is run to calculate stored water allocations for individual space entitlements. The United States Bureau of Reclamation provides a list of space entitlements in each reservoir to the Watermaster and the Department. The Allocations Program computes storage water allocations for these entitlements in Arrowrock, Anderson Ranch and Lucky Peak reservoirs simultaneously based on the paper fill of each reservoir.

6. There are two different situations for which the Allocations Program calculates the amount of water that has been stored in each space entitlement:

a) In a year of low to moderate runoff, the paper fill in one or more of the Boise

River reservoirs may not fill to 100 percent of its storage right (or total allocated space). In this type of year, the Allocations Program distributes the amount of the accumulated paper fill to all space entitlements proportional to the magnitude of their entitlement. This is typically done sometime after April 1 when the reservoir rights cease to accumulate paper fill.

b) In a year of above average runoff, storage water may be physically released from the Boise River reservoirs early in the irrigation year to make space to store anticipated high natural flows to prevent flooding in the lower Boise River below Lucky Peak Reservoir. This flood control operation typically can occur anytime from January through May. When storage is released for flood control, the paper fill of each reservoir in the Accounting Program is not affected, and continues to increase until each reservoir fills to 100 percent of its storage right. Since the inception of the use of the Accounting Program in 1985, for years when flood control operations have occurred on the Boise River, the paper fill of all storage rights in Arrowrock, Anderson Ranch and Lucky Peak reservoirs has never failed to initially fill to 100 percent. As the flood control operation typically progresses, the reservoirs cease storage releases and begin to physically refill, as the high runoff is then stored to prevent downstream flooding. The Accounting Program tracks the amount of natural flow stored during the refill phase of a flood operation as "unaccounted for" storage. When the accumulation of "unaccounted for" storage ends, the flood operation is completed. The end of flood operations typically occurs sometime from April through July. At the end of a flood operation, ideally the amount of "unaccounted for" storage will be equal to the amount of storage released for flood control so that the amount of water stored physically in the reservoirs will be equal to the paper fill, which is 100 percent of the storage right (or allocated storage). If the "unaccounted for" storage is less than the storage

released for flood control, this shortfall is termed the "failure to refill due to flood control". At the end of the flood control operation the Allocations Program is then run to calculate stored water allocations for individual space entitlements. Again, the Allocations Program computes allocations for all three Boise River reservoirs simultaneously using the paper fill of each reservoir. In this flood control situation, the paper fill of Arrowrock Reservoir and Anderson Ranch Reservoir will be 100 percent of their storage right (or allocated space). The paper fill of Lucky Peak Reservoir used by the Allocations Program is equal to its allocated space less any "failure to refill due to flood control". This "shortfall" is subtracted from Lucky Peak Reservoir paper fill because Lucky Peak Reservoir has the latest water right priority of the three Boise River reservoirs, and Lucky Peak Reservoir is the primary flood control facility. In the case where there is a "shortfall" in Lucky Peak Reservoir paper fill, the Allocations Program allocates the fill in Lucky Peak as follows: If the shortfall is 60,000 acre-feet or less, all entitlements in Lucky Peak Reservoir receive 100 percent of their allocation except for the Streamflow Maintenance entitlement in Lucky Peak Reservoir, which receives an amount equal to their entitlement less the shortfall. Additionally, if the shortfall is greater than 60,000 acre-feet, the amount in excess of 60,000 acre-feet is taken proportionally from all entitlements in Lucky Peak, including the remainder of the Streamflow Maintenance entitlement.

7. The amount of stored water that is allocated to the Lucky Peak Reservoir Streamflow Maintenance entitlement has always been released in October after the end of the irrigation season in order to maintain a flow in the Boise River below Lucky Peak Reservoir. These Boise River storage releases continue throughout the non-irrigation season (November 1 to April 1) unless flood control releases preclude the need for such flow maintenance.

Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J. Sutter, P.E.

SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho _____
Residing at: _____
My Commission Expires: _____

RONALD J. TENPAS
Acting Assistant Attorney General
Environment and Natural Resources Division
DAVID W. GEHLERT
Natural Resources Section
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U.S. Department of Justice
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Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
	)	
	)	**AFFIDAVIT OF ROBERT J. SUTTER**
	)	
STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

I, ROBERT SUTTER, being duly sworn upon oath, state as follows:

1. I am a registered Professional Engineer in the state of Idaho. I was employed as a Water Resource Engineer in the Hydrology Section of the State of Idaho Department of Water Resources from 1969 to 1995. I served as Hydrology Section Manager for the State of Idaho Department of Water Resources from 1995 to 2002.

2. In 1985, I developed the Boise River Water Right Accounting computer program (hereafter called the "Accounting Program") and the Boise River Storage Allocation computer program (hereafter called the "Allocations Program") for the Boise River. These two programs have been used by the Boise River Watermaster (Watermaster) and the Idaho Department of Water Resources (Department) to account for natural flow and reservoir storage water each and every year since 1985. Typically the Watermaster and the Department run the Accounting Program, and the Department runs the Allocations Program. However, all program runs are a joint effort between the Watermaster and the Department. I have reviewed both programs and have found both to be essentially the same as when I left the Department in 2002.

3. The "irrigation year" begins on November 1 and ends on October 31. It includes the non-irrigation season period from November 1 to April 1 when reservoirs accrue storage water, as well as the period after April 1 when the irrigation season begins. In many years reservoirs continue to accrue storage water in to the irrigation season after April 1, sometimes as late as July.

4. Typically the Accounting Program is first run sometime between February and April for the time period beginning November 1, the first day of the irrigation year. For each day after November 1, the Accounting Program calculates the amount of water that is credited to each of the Boise River Reservoirs, Arrowrock, Anderson Ranch and Lucky Peak, according to their respective storage rights. The accumulated amount of storage credited to each reservoir storage right is often termed "paper fill", as opposed to the measured contents of the reservoir, which is termed "physical fill". The physical fill in a reservoir seldom equals the paper fill because: a) the accounting program does not subtract storage uses from the paper fill; and b) the three

Boise River reservoirs are operated as a system and therefore storage water credited "on paper" to one reservoir can physically be stored in a different reservoir. The Accounting Program only accounts for the fill of the reservoir storage right, and does not calculate the amount of water that accrues to individual space entitlements.

5. As natural flow recedes, reservoir storage rights (which are generally later in time than irrigation rights) are cut, and reservoirs stop accruing stored water. Reservoirs stop accruing storage water typically during the period April 1 to July 31, depending on the magnitude of runoff. Once the reservoirs stop accruing storage, the Allocations Program is run to calculate stored water allocations for individual space entitlements. The United States Bureau of Reclamation provides a list of space entitlements in each reservoir to the Watermaster and the Department. The Allocations Program computes these entitlements for Arrowrock, Anderson Ranch and Lucky Peak reservoirs simultaneously based on the paper fill of each reservoir.

6. There are two different situations for which the Allocations Program calculates the amount of water that has been stored in each space entitlement:

a) In a year of low to moderate runoff, the paper fill in one or more of the Boise River reservoirs may not fill to 100 percent of its storage right (or total allocated space). In this type of year, the Allocations Program distributes the amount of the accumulated paper fill to all space entitlements proportional to the magnitude of their entitlement. This is typically done sometime after April 1 when the reservoir rights cease to accumulate paper fill.

b) In a year of above average runoff, storage water may be physically released from the Boise River reservoirs early in the irrigation year to make space to store anticipated high natural flows to prevent flooding in the lower Boise River below Lucky Peak Reservoir. This

flood control operation typically can occur anytime from January through May. When storage is released for flood control, the paper fill of each reservoir in the Accounting Program is not affected, and continues to increase until each reservoir fills to 100 percent of its storage right. In years when flood control operations have occurred on the Boise River, the paper fill of Arrowrock, Anderson Ranch and Lucky Peak reservoirs have never failed to initially fill to 100 percent. As the flood control operation typically progresses, the reservoirs cease storage releases and begin to physically refill, as the high runoff is stored to prevent downstream flooding. The Accounting Program tracks the amount of natural flow stored during the refill phase of a flood operation as "unaccounted for" storage. When the accumulation of "unaccounted for" storage ends, the flood operation is completed. The end of flood operations typically occurs from April through July. At the end of a flood operation, ideally the amount of "unaccounted for" storage will be equal to the amount of storage released for flood control so that the amount of water stored physically in the reservoirs will be equal to the paper fill, which is 100 percent of the storage right (or allocated storage). If the "unaccounted for" storage is less than the storage released for flood control, this shortfall is termed the "failure to refill due to flood control". At the end of the flood control operation the Allocations Program is then run to calculate stored water allocations for individual space entitlements. Again, the Allocations Program computes allocations for all three Boise River reservoirs simultaneously using the paper fill of each reservoir. In this flood control situation, the paper fill of Arrowrock Reservoir and Anderson Ranch Reservoir will be 100 percent of their storage right (or allocated space). The paper fill of Lucky Peak Reservoir used by the Allocations Program is equal to its allocated space less any "failure to refill due to flood control". This "shortfall" is subtracted from Lucky Peak Reservoir

paper fill because Lucky Peak Reservoir has the latest water right of the three Boise River reservoirs, and Lucky Peak Reservoir is the primary flood control facility. There are two different procedures used in the Allocations Program to account for the "shortfall" in Lucky Peak Reservoir paper fill. First, if the shortfall is 60,000 acre-feet or less, the shortfall is subtracted from the Streamflow Maintenance account in Lucky Peak Reservoir and, as a result, all other entitlements in Lucky Peak Reservoir receive 100 percent of their allocation. Second, if the shortfall is greater than 60,000 acre-feet, the amount in excess of 60,000 acre-feet is taken proportionally from all space entitlements in Lucky Peak, including the remainder of the Streamflow Maintenance entitlement.

7. The amount of stored water that is allocated to the Streamflow Maintenance entitlement is always released in October after the end of the irrigation season in order to maintain a flow in the Boise River below Lucky Peak Reservoir. These releases continue throughout the non-irrigation season (November 1 to April 1) unless flood control releases preclude the need for such flow maintenance.

Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J. Sutter, P.E.

SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho _____
Residing at: _____
My Commission Expires: _____

RONALD J. TENPAS
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Counsel for the United States

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	
	)	
Case No. 39576	)	Subcase Nos. 63-3618
	)	
	)	**AFFIDAVIT OF ROBERT J. SUTTER**
	)	
STATE OF IDAHO	)	
	) ss.	
County of Ada	)	

I, ROBERT SUTTER, being duly sworn upon oath, state as follows:

1. I am a registered Professional Engineer in the state of Idaho. I was employed as a Water Resource Engineer in the Hydrology Section of the State of Idaho Department of Water Resources from 1969 to 1995. I served as Hydrology Section Manager for the State of Idaho Department of Water Resources from 1995 to 2002.

2. In 1985, I developed a water right accounting computer program and a storage accounting computer program for the Boise River. These two programs have been used by the Boise River Watermaster to account for natural flow and reservoir storage water each and every year since 1985.

3. At the beginning of each irrigation year, November 1, the Watermaster runs the water right accounting program using a daily time step. This program calculates the amount of water that is credited to each of the Boise River Reservoirs, Arrowrock, Anderson Ranch and Lucky Peak, according to their respective storage rights. When the reservoirs have accumulated their maximum credited water, the Boise River Watermaster runs the storage accounting program to calculate stored water allocations for individual space holders.

4. In a year of low to moderate natural flow, the space in one or more of the Boise River reservoirs may not fill to capacity. In this case, individual space holders receive an amount of storage water proportional to their contracted space.

5. In a year of above average natural flow, storage water may be physically released from the Boise River reservoirs early in the irrigation year to make space to store anticipated high natural flows to prevent flooding in the lower Boise River below Lucky Peak. The storage water credited to each reservoir, however, is not reduced, and continues to accumulate according to its right until it fills to its storage right. The physical space evacuated for flood control is later refilled as high natural flow is stored to prevent downstream flooding. In such years all reservoir storage accounts have never failed to fill to capacity.

6. In the case where the physical space of the Boise River reservoir system does not completely refill, the first 60,000 acre-feet of failure to refill is removed from the accumulated

fill in the Streamflow Maintenance account in Lucky Peak Reservoir. All other accounts in Lucky Peak Reservoir then remain full. Should the failure to refill the Boise River system due to flood control be greater than 60,000 acre-feet, the amount in excess of 60,000 acre-feet is distributed proportionally among all space holders in Lucky Peak, including the Streamflow Maintenance account. Storage credited to Arrowrock and Anderson Ranch reservoirs is unaffected and therefore remains full.

Further your affiant sayeth naught.

DATED this _____ Day of _____ 2008.

_____
Robert J, Sutter, P.E.

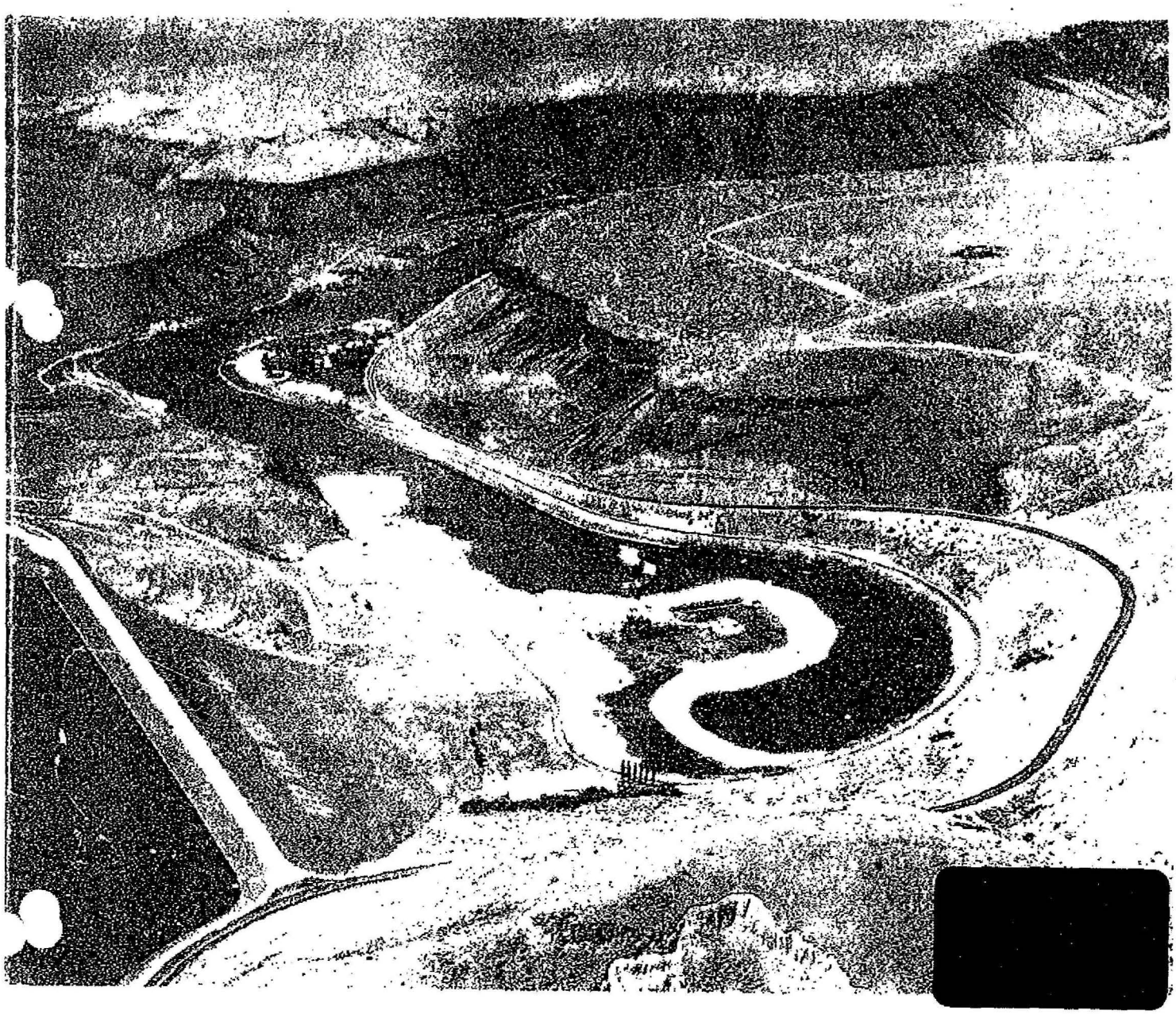
SUBSCRIBED AND SWORN to before me this _____ Day of _____, 2008.

Notary Public for Idaho _____
Residing at: _____
My Commission Expires: _____

COPY

Review of

Boise River Flood Control Management



November 1974

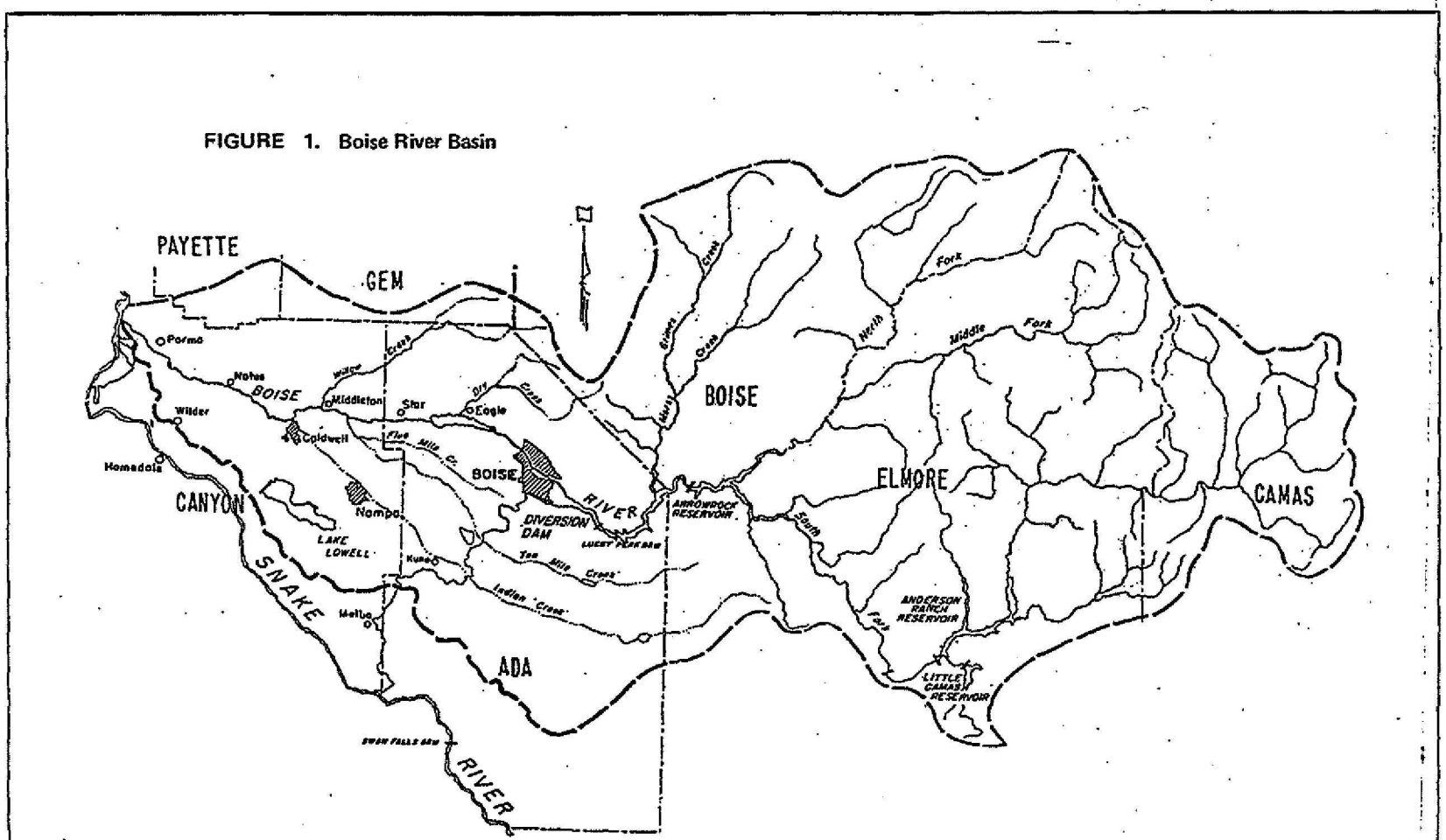
REVIEW OF

BOISE RIVER FLOOD CONTROL MANAGEMENT

IDAHO DEPARTMENT OF WATER RESOURCES
STATEHOUSE
BOISE, IDAHO 83720

NOVEMBER 1974

FIGURE 1. Boise River Basin



FOREWORD

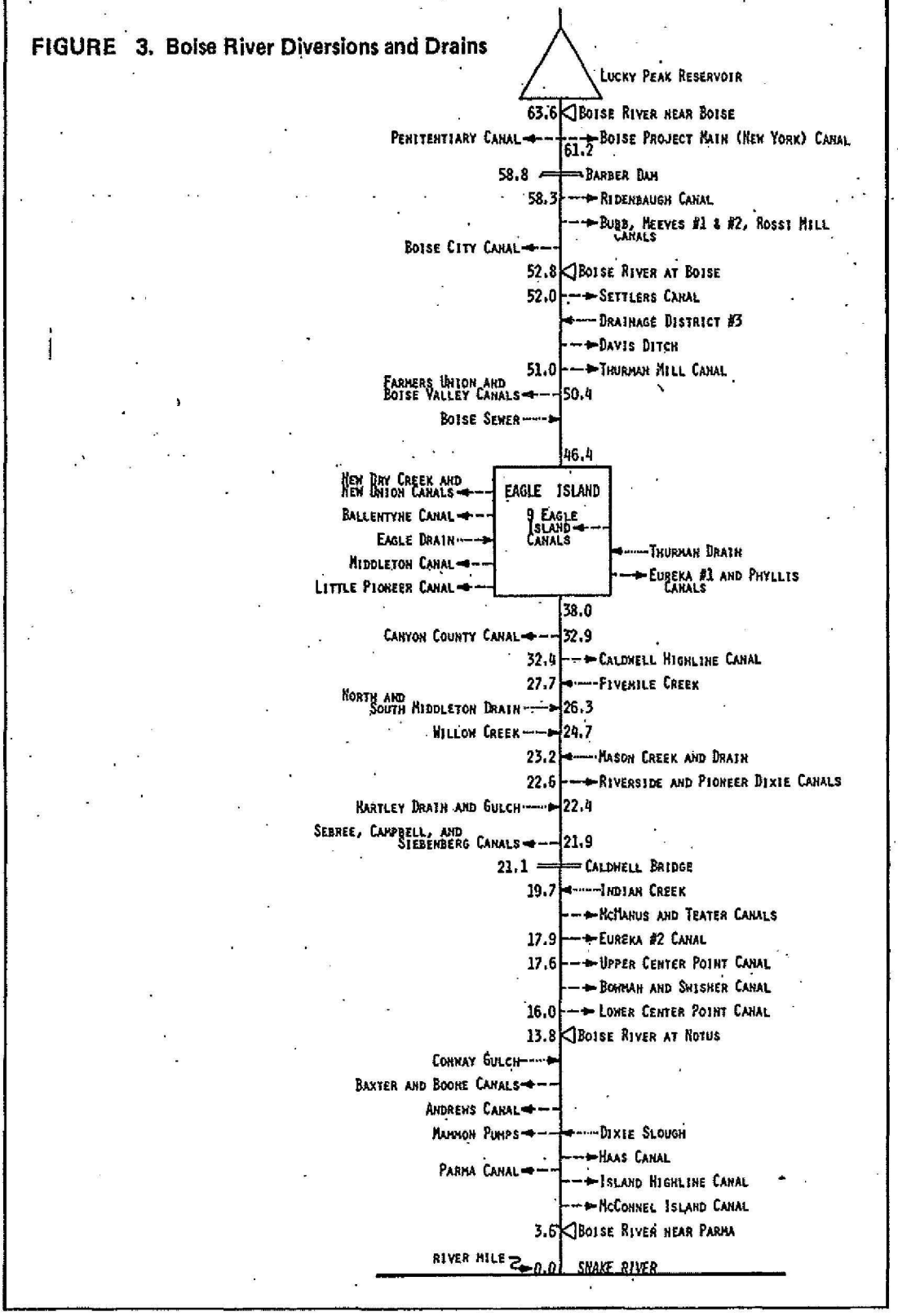
In May 1974, Governor Andrus requested that the flood control operations on the Boise River be reviewed and the possibilities for improved operations examined.

This report is a study of the flood control operation of the Boise River. The river system of dams and reservoirs is operated mainly for irrigation, power, recreation and flood control; however, irrigation, power and recreation uses are not discussed except as they relate to flood control management.

Present management agreements, runoff forecast methods, and flood frequencies are presented. The procedures which established the water releases from Lucky Peak, Arrowrock and Anderson Ranch reservoirs are reviewed.

The report identifies problems, examines the potential of various alternatives, and presents recommendations which would lead to improved operation.

FIGURE 3. Boise River Diversions and Drains



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INTRODUCTION

THE PROBLEM

Boise River flows are controlled by the federal system of reservoirs which were constructed for irrigation, flood control, recreation, and power. Since completion of Lucky Peak Reservoir in 1954, flows have been almost completely regulated. A formalized flood control procedure was instituted at that time which specified how the reservoirs were to be managed during the flood control season. The system has operated successfully with that procedure for about twenty years generally controlling all floods to within the original objective of a regulated flow of 6500 cfs through the city of Boise.

Conditions have changed in the intervening years. More use is now made of lands along the river between Lucky Peak Dam and the mouth. In some areas encroachments have been made on the channel by levees, farming activities, roads, and home construction. Channel capacities may also have changed from natural causes associated with the more complete flow regulation.

In recent years landowners along the river have frequently complained about high flows during the springtime flood regulation period. Other complaints have been made about flows which were too low at times.

In response to these complaints Governor Andrus requested a review of the reservoir operation procedures. His memorandum of May 1974 to the Department of Water Administration and the Water Resource Board (now consolidated into the Department of Water Resources) is quoted below.

> "Numerous landowners affected by the high levels of Boise River water have contacted this office to determine whether a more efficient method might be incorporated into the operation of the controlling reservoirs.
>
> "Please conduct a comprehensive review of the procedures which established the water releases from Lucky Peak, Arrowrock and Anderson Ranch reservoirs.
>
> "Extremely low flows preceding recent high releases have drawn criticism to the methods employed in regulating the river flow. Landowners ask why releases of Boise River water were not made at an earlier date last winter in anticipation of this year's high runoff.
>
> "Make public the results of the review."

This report is in response to the Governor's directive. Following sections will describe the Boise River system, its operation, and the potential for changes which may alleviate some of the downstream problems.

Aspects of the operation not directly related to flood problems will be treated only to the extent necessary to clarify flood control operations. Substantial information for this report describing the system and its operation was obtained from the Corps of Engineers and Bureau of Reclamation, the operating agencies.

RELATED STUDIES

Other studies have analyzed present and alternative methods of management of the Boise River and adjacent land areas. Following are brief descriptions of recent studies which are related to the subject of this report. These studies are in various stages of completion.

Boise Valley Regional Water Management Study

This study is being conducted jointly by the Ada Council of Governments, Canyon Development Council, and U. S. Army Corps of Engineers, Walla Walla District. It was begun in 1973 and will be completed in June 1976. The study will develop plans for management of wastewater, recreation, and domestic water supply. In addition, programs will be recommended for urban flood damage reduction.

Wastewater management analyses will include studies of various combinations of flow augmentation and wastewater treatment which meet Environmental Protection Agency and State of Idaho water quality criteria. Results will include comparisons of waste loads, required flows, and associated costs. Preliminary studies have been made to determine the frequency of availability of flow from the unallocated space in Lucky Peak Reservoir. Results indicate that when combined with the space allocated to the Idaho Fish and Game Department, a release from Lucky Peak of 120 cfs could be made during the non-irrigation season in 95 percent of all years; and a release of 150 cfs could be made in 85 percent of all years.

Boise Post Audit Hydrology Subproject

This study is part of a University of Idaho project entitled "A Case Study of Federal Expenditure on a Water and Related Land Resource Project, Boise Project, Idaho and Oregon." The project was funded by the Office of Water Resources Research for the fiscal year 1974. The intent of the case study is to evaluate the social, economic, and physical impact of the federally funded Boise Project. The Hydrology Subproject was organized to provide background information on past and present water supply management and hydrologic conditions. The information will be used to support later phases of the case study.

The Hydrology Subproject draft report was completed in June 1974. It contains descriptions of runoff, flood frequencies, water rights, irrigation operations, return flows, reservoir operations, and groundwater in the Boise drainage. The descriptions and data contained in this study relate directly to a review of Boise River management and some of the material is used in this report.

Lucky Peak Dam and Lake Environmental Impact Statement

This report is being prepared by the Corps of Engineers for submission to the Council on Environmental Quality. The purposes of the report are to describe the environmental setting of Lucky Peak Reservoir, the impact of the reservoir on the environment, and to examine possible alternatives of reservoir management. A draft report was completed in March 1974 and comments from agencies, organizations, and individuals have been requested.

A description of the operation of Lucky Peak Reservoir for irrigation, flood control, and recreation is given in the report. Impacts of the operation on recreation, water quality, and animal life are discussed. Management alternatives presented by the report are:

(a) Do nothing;
(b) Use Anderson Ranch Reservoir storage to supplement Lucky Peak recreational water levels;
(c) Increase downstream flood control measures;
(d) Use dead storage to augment winter flows;
(e) Supplement municipal and industrial water supplies from Lucky Peak storage;
(f) Add Lucky Peak power generation capacity;
(g) Coordinate Lucky Peak levels with fish and wildlife requirements;
(h) Use weather modification techniques to control runoff.

The draft statement rejected the last two alternatives because of inadequate data. In considering the other alternatives the recommended course of action was to adopt the first alternative, or "continue with present operation, maintenance and management practices according to the existing system agreement." It is stated that selection of management alternatives is limited by established physical and cultural factors.

Boise Valley (Ada County) Levee Restudy

A continuing study initiated in 1973, this study is an evaluation by the Corps of Engineers of the present levee system along Boise River in Ada County. Alternative solutions that are to be examined are new and rebuilt riverfront levees, set-back levees, channel enlargement, flood plain management, flood insurance programs, and no further action. An increase in channel capacity would affect the reservoir flood control operations; therefore, decisions made as a result of this study will influence the entire river system management. Two public meetings have been held to present this study to the public and gain input. No conclusions have yet been reached. The study is scheduled for completion in 1975.

Flood Plain Information, Boise, Idaho and Vicinity

The flood plain of the standard project and intermediate regional floods from Barber Dam to the Ada-Canyon County line are defined in this report. It was prepared by the Corps of Engineers and completed in October 1967. The report contains descriptions of historic floods and their effects.

The intermediate regional flood, having an average frequency of occurrence of one in 100 years, was estimated as 15,000 cfs at Boise. The standard project flood, which "can be

expected from the most severe combination of meteorological conditions," was estimated at 27,500 cfs at Boise. These discharges reflect upstream reservoir regulation. Detailed maps are included of the areas which would be inundated by these flows. No attempt was made to present alternatives for solving flood problems, as the report was intended for use as a guide for land use controls by the city and county governments.

Flood Hazard Report, Caldwell, Idaho and Vicinity

The Corps of Engineers has recently initiated a study of flood prone areas along Boise River through Caldwell. The study will be completed in 1974 and will present information similar to that included in "Flood Plain Information, Boise, Idaho and Vicinity."

Southwest Idaho Water Management Study

The Bureau of Reclamation's Southwest Idaho Water Management Study includes the drainages of the Boise and Payette rivers and the lands north of the Snake River and west of King Hill. The study will evaluate the problems, needs, and alternative solutions for improved management of the water resources in these areas.

One primary purpose of the study is to find means to more efficiently utilize the storage and conveyance facilities of the river and canal systems. This would include an analysis of the current operating procedures and their effects on flood control, storage yields, recreation, and other uses. Canal systems will be studied to determine if current functions, including the bypassing of some floodwaters, can be improved.

The study will include further analyses of the unallocated space in Lucky Peak Reservoir. Potential uses of this space, the possibility of more extensive multiple use of present storage, and the effect on reservoir regulation and/or downstream release procedures will be evaluated.

Additional uses and needs for Boise River water include instream flows, water quality flows, and municipal water supply. The means which are finally adopted to satisfy these needs could have an effect on the sequence of storing and releasing water. Transbasin diversion, re-use of water, and exchanges in water supplies are potential new water sources. Urbanization in the Boise Valley may have created a significant water supply available for exchange. These possibilities will be studied to determine the best water management alternatives.

A status report on the Water Management Study will be prepared in 1976. Alternatives requiring early action will be identified and recommended for detailed study and/or possible implementation.

Lucky Peak Flow Maintenance Study

The Corps of Engineers has begun a study with the primary purpose of finding a feasible plan to correct the Lucky Peak flow shutdown problem. The study will consider alternatives including passing water around, through and over Lucky Peak Dam, or any other alternatives to maintain a flow below Lucky Peak. The study will also consider changing reservoir regulation emphasis in light of public concern over downstream flooding.

Study of water passage over or through Lucky Peak will include consideration of adding power generation. Inclusion of power as a project purpose at Lucky Peak would necessitate study of a revised operation procedure and downstream reregulation. A cursory consideration of raising the dam or adding spillway gates to increase storage capacity will also be made. Increased storage capability could be used for increased flood control, low flow maintenance, and/or power head.

A series of public meetings is being held to encourage public participation. The first of these was held on October 17th.

Environmental Planning Report No. 8

This study is being conducted by the Ada Council of Governments to provide background information on the water resources of Ada County for water quality planning. Sections of the report on "Potential Waste Water Sources" and "Water Use" have been completed with a section on "Water Quality Monitoring" to follow.

While the report focuses primarily on waste water sources, discussion of the effects of regulation on water quality and aquatic life is also included.

Current and Projected Recreational Demand on the Lower Boise River

This study, which is being prepared by Boise State University and the College of Idaho for the Corps of Engineers is scheduled for completion in March 1975. An Interim Report on review of literature, survey of spring and summer recreational activity, and a general population survey has been completed. The final report will include a fall and winter use assessment, projection of trends, and conclusions and recommendations.

BASIN DESCRIPTION

RUNOFF CHARACTERISTICS

RESERVOIRS

IRRIGATION

FLOOD FREQUENCY

FLOOD DAMAGE

BASIN DESCRIPTION

The Boise River, a major tributary of the Snake River, is part of the Columbia River drainage system. The Boise River basin (Figure 1) can be divided into two general areas on the basis of its topography. The lower watershed includes the portion of the basin below Lucky Peak Dam and is characterized by river bottom land, terraces, and low rolling hills with a few distinct mountains. The upper watershed is composed of steep mountains with a highly dissected pattern of V-shaped valleys.

Total drainage area of the Boise River Basin is 4234 square miles with the upper basin above Lucky Peak Dam having a basin area of 2650 square miles. The principal water courses flow in a westerly direction from headwaters in the Sawtooth Mountains about 200 miles to join the Snake River at river mile 391.3. The elevation ranges from about 2200 feet at the mouth of the Boise River to 10,600 feet along the eastern boundary of the basin in the Sawtooth Mountains.

Major tributaries of the Boise River and drainage areas are:

North Fork	382 square miles
Middle Fork	380 square miles
South Fork	1314 square miles
Mores Creek	426 square miles

The four tributaries comprise about 97 percent of the drainage area above Lucky Peak Dam and about 63 percent of the total drainage area of the basin. Streams in the lower watershed flow only during the spring and early summer.

RUNOFF CHARACTERISTICS

The pattern of natural streamflows in the Boise River is characterized by low flows from late July through February, increasing flows during March, and high flows in April, May, and June. Occasionally this pattern is interrupted by high flows of short duration during the winter months caused by rainstorms. Flood flows would, without regulation by reservoirs, occur annually in the snowmelt runoff season which normally extends through April, May and June.

The majority of the runoff is generated above Lucky Peak Dam. The yield from natural runoff below Lucky Peak is minor as there are no perennial streams, other than irrigation

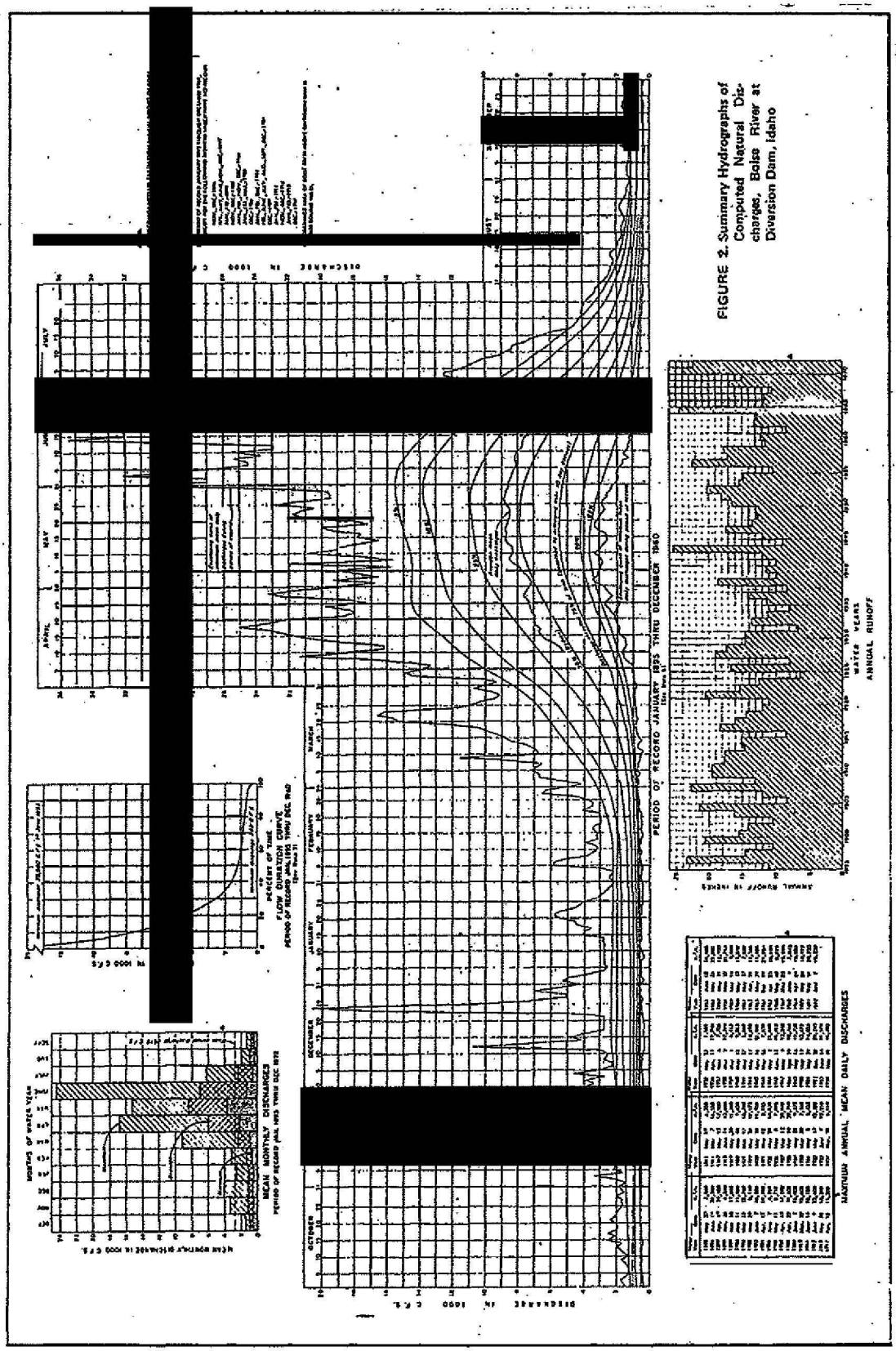


FIGURE 2. Summary Hydrographs of Computed Natural Discharges, Boise River at Diversion Dam, Idaho

drains, which enter the river. Records of runoff have been kept in the vicinity of Lucky Peak Dam since 1895. This location is usually identified as "near Boise" or "at Diversion Dam."

Natural runoff characteristics are shown on Figure 2. Average discharge near Boise is about 2750 cfs or 2 million acre-feet per year. Maximum recorded mean daily discharge was 35,500 cfs on June 14, 1896, and the maximum instantaneous discharge, estimated at 44,000 cfs without regulation, occurred on December 24, 1964. The latter flow resulted from a short duration rainstorm.

RESERVOIRS

There are four major reservoirs in the Boise River system, which were federally constructed, and also some minor privately developed reservoirs. The major reservoirs are shown in the following table.

Reservoir	Stream	Capacity		Construction	
		Gross (ac-ft)	Active (ac-ft)	Agency	Year
Anderson Ranch	S. Fork	493,200	423,200	USBR	1945
Arrowrock	Boise R.	286,600	286,600	USBR	1915
Lucky Peak	Boise R.	307,040	278,200	USCE	1954
Lake Lowell	Off-Stream	190,100	169,000	USBR	1908

Reservoir Functions

The three Boise River reservoirs, Anderson Ranch, Arrowrock, and Lucky Peak, with the off-stream reservoir Lake Lowell, have evolved into a system operated for irrigation, power, flood control, and recreation. Initially, with construction of Lake Lowell and Arrowrock reservoirs, irrigation water supply was the primary purpose. With the addition of Anderson Ranch Reservoir, the operation was extended to regulation for power production and flood control. Lucky Peak Reservoir was justified primarily for flood control.

Reservoir Water Rights and Storage Allocations

The water rights that permit storage in the three Boise River reservoirs are listed as follows.

Date of Priority	Reservoir	Amount
January 13, 1911	Arrowrock	8,000 cfs
June 25, 1938	Arrowrock 1/	15,000 acre-feet
December 9, 1940	Anderson Ranch 1/	493,161 acre-feet
April 12, 1963	Lucky Peak 2/	307,000 acre-feet

1/ Licensed Rights, not included in the Stewart or Bryan Decrees.

2/ License pending upon proof of beneficial use on or before March 20, 1975.

The storage rights shown above were obtained by the U. S. Bureau of Reclamation mainly for irrigation water supply. Contracts were then made between the Bureau and various irrigation districts and canal companies for the stored water. These contracts are not water rights but do define the space allocations of water stored under the federal right. Space allocations in Anderson Ranch, Arrowrock, and Lucky Peak reservoirs are shown in Table 1.

TABLE 1

SPACE ALLOCATIONS IN BOISE RIVER RESERVOIRS, 1974 STATUS

(acre-feet)

District or Company	Arrowrock	Anderson Ranch	Lucky Peak
Boise Project Board of Control	232,871	359,934	
Pioneer Irrigation District	21,018	25,582	16,000
Ridenbaugh Canal Company	3,832	15,137	35,000
Farmers Union Ditch Company	2,874	5,727	10,000
Settlers Irrigation District	1,778	5,810	10,000
Farmers Co-op Canal Company	1,227		
Hillcrest Irrigation District	23,000		
Power		5,200	
Pioneer Ditch Company		2,174	500
New Dry Creek Ditch Company		1,296	3,000
Boise Valley Ditch Company		961	2,500
South Boise Mutual Company		543	500
Capitol View Irrigation District		460	300
Ballentyne Ditch Company		376	1,300
Idaho Fish and Game Department			50,000
Eagle Island Water Company			7,650
Middleton Irrigation Association			6,380
Canyon County Water Company			6,000
Middleton Mill Ditch Company			4,620
Eureka Water Company No. 1			2,800
Davis Ditch			1,500
New Union Ditch Company			1,400
Boise City Canal Company			1,000
Thurman Mill			800
Rossi Mill			700
Unallocated			116,250
TOTAL ACTIVE SPACE	286,600	423,200	278,200

IRRIGATION

The location and names of major canals are indicated on Figure 3. The total capacity of the more than 40 canals diverting water from the Boise River is approximately 6700 cfs.

Boise Valley can be divided into three general irrigated areas. The largest is the Boise Project which is served mainly by diversion from the Main (New York) Canal. This canal diverts water from the Boise River at Diversion Dam to irrigate the area above and belo

Lake Lowell. Boise Project is administered by the Boise Project Board of Control. The Bureau of Reclamation has estimated that 1973 gross crop value from the Project averaged $62.50 per acre foot of water diverted.

The second area lies immediately north and south of the Boise River between Diversion Dam and the Snake River. This area includes older privately developed irrigation districts which divert directly from the river.

The northwest portion of the valley is irrigated with water diverted from the Payette River. Irrigation of this area does not significantly affect flows of the Boise River and, therefore, will not be discussed in this report.

Acreages and Water Use

The Boise Project can be divided into the upper and lower system. The upper system, 116,300 acres, includes the area served directly from Boise River, mostly by the Main (New York) and Ridenbaugh canals. The lower system, 50,600 acres, includes the area that receives water after it has first been stored in Lake Lowell. The present average annual farm delivery of the Boise Project is about 3.75 acre-feet per acre. The average annual diversion of the Main (New York) Canal is about 925,000 acre-feet. The normal maximum diversion rate at the head of the canal is about 2850 cfs.

The remainder of the canals diverting from the Boise River supply approximately 160,000 acres of land. The average annual diversion rate computed from total diversion from the river, is six acre-feet per acre. Insufficient data exists to determine farm delivery rates. Normal maximum diversion rates during the summer are 600 cfs from Diversion Dam to Boise, 1400 cfs from Boise to Star, 850 cfs from Star to Notus, and 175 cfs from Notus to Parma. The actual magnitude of the diversions has a great effect on Boise River flows, in particular above Star, where diversions may range from zero to 2000 cfs.

Diversion Rights

The early water right decrees on the Boise River were preceded by many court cases involving claims of different individuals and companies contending harm from the over-allocation of the Boise River waters. All decreed rights are now governed by the Stewart Decree of 1906 and the Bryan Decree of 1929 which state the priorities, amounts and procedures by which each canal receives water. These rights are administered by the Boise River Watermaster who acts under the authority of the Department of Water Resources. The Watermaster is responsible for the measurement and distribution of water according to all decreed and licensed rights.

FLOOD FREQUENCY

Unregulated Floods

Natural or unregulated annual maximum daily discharges in excess of 20,000 cfs have occurred on 10 occasions since 1895 in Boise River at Diversion Dam. In most of the years, the natural flow exceeded the amount which causes some flooding along Boise River under present conditions. Winter rainstorms resulted in natural flows of 20,600 cfs and 44,000 cfs in December 1955 and December 1964. Since winter rainstorm flood volumes are much less than snowmelt flood volumes they are more easily regulated by the reservoirs. Rainstorm floods are not included in the flood frequency discussion which follows.

TABLE 2

ANNUAL SPRINGTIME MAXIMUM MEAN DAILY NATURAL FLOW OF THE BOISE RIVER

Water Year	Day	Flow (cfs)	Water Year	Day	Flow (cfs)
1895	May 6	7,900	1935	May 25	9,500
1896	Jun 14	35,500	1936	Apr 24	19,790
1897	Apr 19	29,500	1937	May 6	7,700
1898	Apr 27	7,960	1938	May 2	19,290
1899	May 10	19,000	1939	May 1	8,410
1900	May 11	12,000	1940	May 13	9,870
1901	May 16	13,900	1941	May 27	8,860
1902	May 29	8,190	1942	May 27	10,690
1903	Jun 2	16,800	1943	Apr 18	25,040
1904	Apr 15	19,700	1944	May 16	7,630
1905	Jun 2	6,260	1945	May 5	11,640
1906	May 12	8,710	1946	Apr 19	18,810
1907	Apr 15	17,000	1947	May 9	13,840
1908	Apr 22	10,600	1948	May 29	15,260
1909	Jun 6	16,000	1949	May 16	12,830
1910	Mar 22	16,600	1950	May 17	13,670
1911	Jun 13	15,100	1951	May 29	14,070
1912	Jun 9	15,600	1952	Apr 28	23,430
1913	May 28	13,300	1953	Apr 29	12,780
1914	Apr 16	11,300	1954	May 21	14,460
1915	Apr 20	6,227	1955	Jun 10	10,480
1916	Jun 19	16,500	1956	May 25	22,950
1917	May 15	17,850	1957	May 21	16,930
1918	Jun 14	12,600	1958	May 22	21,750
1919	May 30	11,580	1959	May 16	9,040
1920	May 18	9,620	1960	May 13	11,840
1921	May 17	18,740	1961	May 27	7,830
1922	May 26	18,170	1962	Apr 21	11,340
1923	May 26	11,950	1963	May 24	11,480
1924	May 18	5,190	1964	May 21	10,940
1925	May 20	14,350	1965	Apr 23	20,850
1926	May 6	7,090	1966	May 10	8,220
1927	May 18	20,060	1967	May 25	15,600
1928	May 10	20,710	1968	Jun 4	7,050
1929	May 25	9,370	1969	Apr 24	15,930
1930	May 30	7,560	1970	May 28	14,850
1931	May 15	5,270	1971	May 14	20,250
1932	May 14	13,580	1972	Jun 2	19,600
1933	Jun 4	12,510	1973	May 20	9,550
1934	Mar 30	6,100	1974	May 9	18,500

1895-1916 Flows are recorded maximums, Boise River near Boise.
1917-1954 Boise River at Dowling Ranch + Mores Creek near Arrowrock + storage changes.
1955-1973 Boise River near Boise + storage changes.

The exceedence probability of unregulated annual maximum flood discharges is shown graphically on Figure 4. The unregulated curve represents the percent chance of exceedence of various discharges at Diversion Dam without upstream storage. For example, without reservoir regulation a flow greater than 12,800 cfs could be expected in 50 percent of the years or on the average, once in every two years.

Regulated Floods

The discharges shown in Table 2 prior to 1915 are identical to those that were actually observed at Diversion Dam. After 1915, floods at Diversion Dam were regulated by storage at Arrowrock (1915), Anderson Ranch (1945), and Lucky Peak (1954) reservoirs. To illustrate the magnitude of flood peak reduction accomplished by the three reservoirs, Table 3 lists the regulated annual maximum mean daily discharge at Diversion Dam with the corresponding unregulated discharge. Also shown is the same data for the discharge at Boise which is much less because of upstream irrigation diversions. Only the period 1955-74 is shown when all three reservoirs were in operation.

TABLE 3

ANNUAL MAXIMUM MEAN DAILY DISCHARGE OF BOISE RIVER

(cfs)

Year	Unregulated at Diversion Dam	Regulated at Diversion Dam	Regulated at Boise
1955	10,480	5,110	1,740
1956	22,950	9,470	6,840
1957	16,930	10,600	6,870
1958	21,750	10,000	6,320
1959	9,040	5,390	1,800
1960	11,840	8,200	5,710
1961	7,830	5,360	1,560
1962	11,340	5,320	1,540
1963	11,480	9,820	5,870
1964	10,940	7,230	4,630
1965	20,850	11,600	7,170
1966	8,220	4,960	1,760
1967	15,600	5,270	1,640
1968	7,050	5,130	1,800
1969	15,930	8,660	5,280
1970	14,850	8,500	5,030
1971	20,250	10,800	6,850
1972	19,600	10,200	6,710
1973	9,550	4,760	1,460
1974	18,500	10,815	7,350

Frequency curves of regulated floods below Diversion Dam and at Boise are also shown on Figure 4. These curves, which were provided by the Corps of Engineers, represent the best available estimates of regulation achieved by the Boise River reservoirs under the present method of operation. They indicate that the system successfully regulates floods to the allowable release rate (about 7200 cfs through the city of Boise) in 97 percent of the years. In approximately one year in fifty a flood flow greater than 10,000 cfs can be expected to occur at Boise. A flow greater than 15,000 cfs will occur once in 100 years. Damages associated with these and other flows are discussed in the following section.

FLOOD DAMAGE

Channel Capacity Changes

In recent meetings with landowners along Boise River, there were claims that the capacity of the Boise River channel is decreasing. Landowners cited examples of drains being ineffective because of increased water surface elevations. While insufficient information is available to draw any firm conclusions, it may be that the channel capacity varies with time from location to location. Changes in flow regime caused by flood control operations provide for periodic long durations of moderate flows which may have made the channel more unstable. This instability may allow creation of local bars in the riverbed, thereby raising water surface elevations. Construction of levees across high-flow channels in the lower river during recent years has decreased channel capacity. This activity forces the flow into a narrower, more confined channel, thus increasing the water surface elevation adjacent to and upstream from the levees.

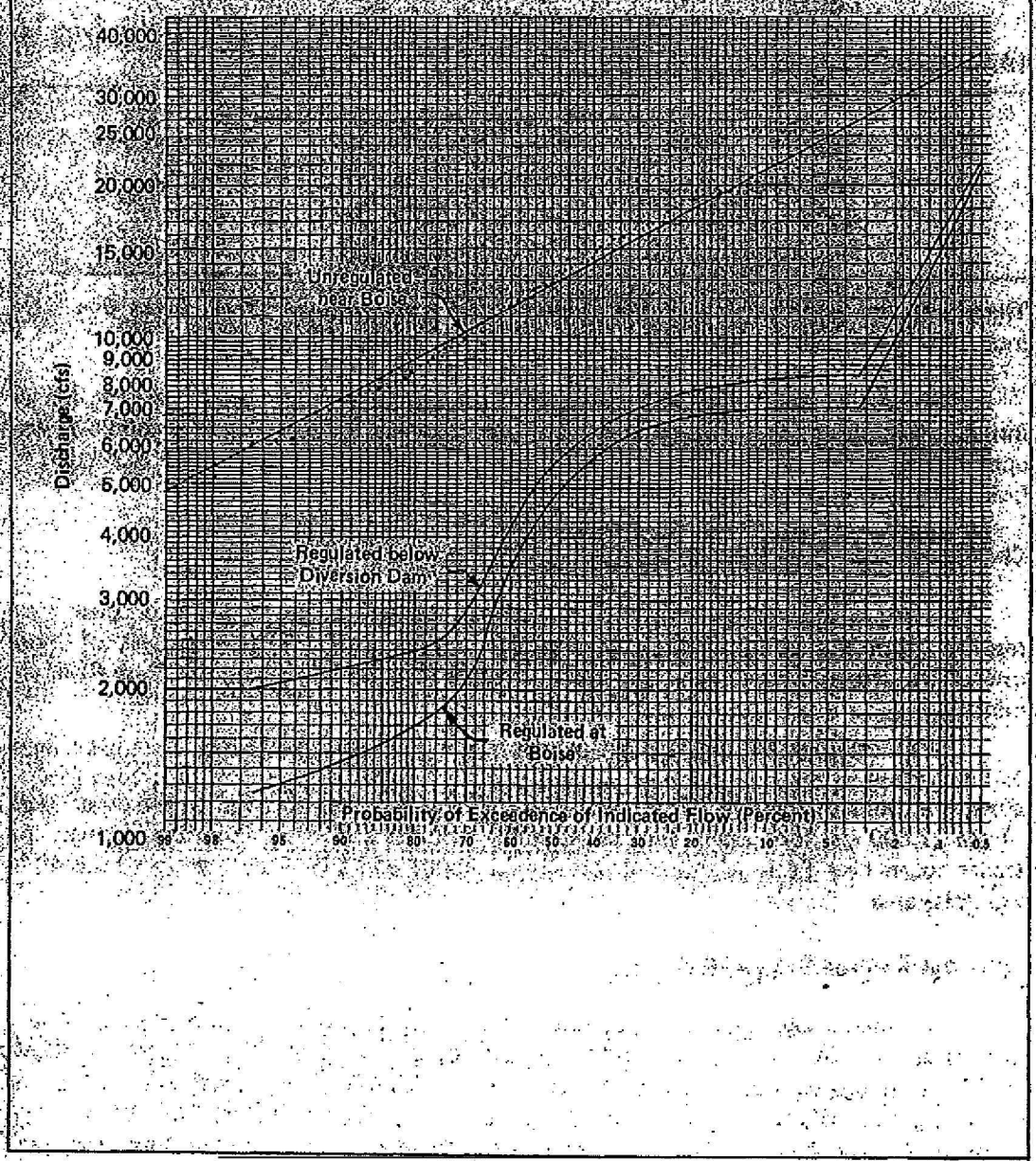
In a study made in 1972 by the U. S. Geological Survey, a considerable decrease in stream capacity was noted at the stream gaging stations at Notus and Boise. Records show that at the same stage of the river, flows at Notus were 11,800 cfs in 1938 and 8000 cfs in 1972. Flows at the same stage at Boise were 9600 cfs in 1943 and 7700 cfs in 1972. In terms of stage, an 8000 cfs flow at Notus would now be about 2 feet higher than in 1938 and 7700 cfs at Boise would be about 1 foot higher.

Reservoirs upstream also have some positive effects on stream channel capacity. Sediment retention by the reservoirs results in increased capacity of the released flows to degrade the downstream channel. In comparing river surveys taken in 1938 with surveys in the mid-1960s and later, there are numerous locations that show significant degradation of the river thalweg, the lowest point of the channel. Cross sections of the Boise River through Caldwell, taken in 1973, show a considerably lowered channel from the 1938 topography.

A comparison was made by the Corps of Engineers of channel capacity of the Boise River at similar flows at two separate time periods. The comparison was made from photo mosaics of the Boise River on February 17, 1965 and April 17, 1974. The similar flows on these two days are listed below:

Gage	17 Feb 65	17 Apr 74
Lucky Peak	7,070 cfs	8,118 cfs
Boise	6,430 cfs	6,450 cfs
Notus/Parma	7,000 cfs	6,670 cfs

FIGURE 4. Frequency Curves, Annual Maximum Daily Springtime Flows, Boise River



Approximately 49,000 feet of levees were constructed in the period of February 17, 1965 to April 17, 1974. The new levees are primarily of gravel construction and were privately built. In some instances, these levees have maintained the river in its banks, and hence have resulted in more intensive farm use, usually in the form of grazing land being converted to native hay, alfalfa, or improved pasture land. In other cases, the levees have been used to cut off meander channels with varying success.

In comparing flooded areas in 1965 and 1974, approximately 255 acres were partially or completely inundated on February 17, 1965 that were not on April 17, 1974; and 25 acres, which do not include gravel operations, were inundated on April 17, 1974 but not in 1965. Much of the change in inundation was due to the construction of the levees mentioned above.

A comparison was made of the April 17, 1974 mosaic with photos taken on June 12, 1974. Respective flows were:

Gage	12 Jun 74	17 Apr 74
Lucky Peak	7,800 cfs	8,118 cfs
Boise	4,182 cfs	6,450 cfs
Parma	4,200 cfs	6,670 cfs

There were no appreciable differences in flooded areas at these flows. Areas that were inundated at the higher flows were also inundated at the lower flows.

Low flow channels were defined at both conditions. The land area that is no longer inundated or no longer has flows in the meander channels at the lower flow condition was approximated by the Corps of Engineers to be 1400 acres. This land is used as grazing or holding land for most of the year during low flows.

Changes in Flood Plain Development

Changes in the period from 1965 to 1974 in agricultural use of the flood plain have resulted from the building of levees mentioned previously. These examples of more intensified farming are few, and the overall changes in agriculture along the Boise River are minor.

Construction in the flood plain over this nine-year period has been relatively light. Building close to the river has been minimal; only a few gravel operations have been located along the banks of the river. The majority of development has occurred on the outer edges of the 27,500 cfs flood plain. New construction includes a few farm buildings, homes, and trailer courts near Eagle Island, and several new homes and a few commercial structures in the Boise area.

Discharge-Damage Relationships

Discharge-damage relationships presented here are based on a flood plain inventory conducted in the spring of 1974 by the Corps of Engineers. Figure 5 shows discharge-damage curves for three reaches of the Boise River. These reaches are (1) Boise, extending from Glenwood Street Bridge upstream to Broadway Bridge, (2) Ada County, from the Canyon-Ada county line to Lucky Peak Reservoir, excluding the Boise reach, and (3) Canyon County, from the mouth of the Boise River upstream to the Canyon-Ada

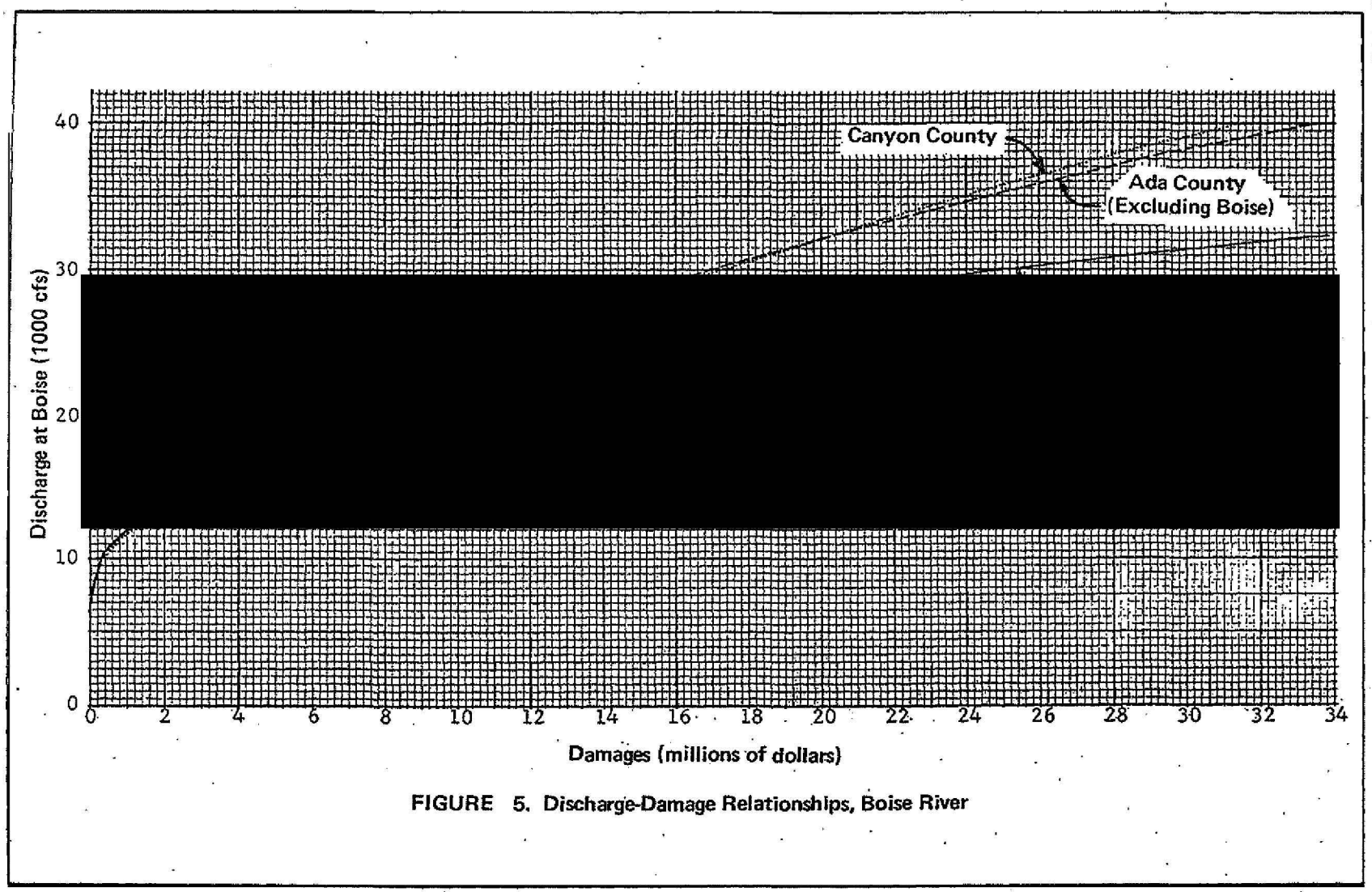


FIGURE 5. Discharge-Damage Relationships, Boise River

county line. From the curves, damages for 1974 price level and development for various flows for the three reaches are shown in Table 4.

TABLE 4

DISCHARGE-DAMAGE RELATIONSHIPS, BOISE RIVER

Flow (cfs)	Boise ($)	Ada Co. Excluding Boise ($)	Canyon Co. ($)	Total ($)
6,500	2,000	13,000	25,000	40,000
10,000	270,000	270,000	410,000	950,000
15,000	3,080,000	2,600,000	3,150,000	8,830,000
30,000	25,000,000	17,000,000	17,300,000	59,300,000
40,000	63,000,000	33,500,000	31,500,000	128,000,000

Damages in Boise from a release of 6500 cfs, the operating objective, are only five percent of the total occurring along the Boise River. For large floods damages which would occur in Boise approach fifty percent of the total. Damages in rural areas are relatively large for the lower flows but do not increase with flow as rapidly as in Boise.

By comparing the average annual flood damages expected without any regulation to the damages with current regulation, the flood damage reduction attributable to the existing projects can be estimated. Average annual damages without regulation would be $16.3 million at 1974 levels of price and development. With present regulation, the average annual flood damages are $0.53 million. This is $15.8 million less than they would be without any control under existing conditions of development.

The effective damage reduction attributable to the existing project operation can also be demonstrated by showing the reduction of damages in the larger floods of recent times. Estimates of flood damages that would have occurred along Boise River if there had been no regulation are compared in Table 5 to those that did occur during the five largest floods in the last ten years.

While the amount of flood damage reduction provided by the existing system is impressive, the remaining potential flood damage is also significant. The major reason for this is the fact that the existing projects are not adequate to afford complete flood regulation. For large, rare floods the reservoirs would fill and pass flows that would cause very large damages. For example, there is a two percent chance each year that flows in Boise will exceed 10,000 cfs. Stated another way, on the average once every 50 years major flooding can be expected in Boise with the current flood control operation on Boise River. Damages associated with this flooding would be greater than $950,000 (Table 4).

The flood damages that might be expected in the future are highly dependent upon control of flood plain development exercised at the local level. If homes and other structures are allowed in the flood plain, the increase in damage potential will be substantial. At the present time the Corps of Engineers estimates future flood damages assuming that the National Flood Insurance program will be in effect. That is, assuming effective flood plain zoning. Using this assumption, it is projected that flood plain growth will be limited to about one percent annually. The current average annual flood damages of $530,000 will grow to $872,000 in the year 2024. Discounting this growth to present terms by the current federal interest rate of 5-7/8 percent, the average annual damages over the 50-year period would amount to $620,000.

PRESENT REGULATION

RESPONSIBILITY AND AUTHORITY

FLOOD CONTROL

IRRIGATION

STREAM FLOW MAINTENANCE

POWER

PRESENT REGULATION

RESPONSIBILITY AND AUTHORITY

Responsibility for the operation of the Boise River system is shared by the Corps of Engineers, Bureau of Reclamation, Boise Project Board of Control, and Boise River Watermaster.

The Bureau of Reclamation has administrative responsibility for operation of the Boise River system for irrigation and is directly responsible for the physical operation of Arrowrock, Anderson Ranch, and Diversion dams. The Corps of Engineers has responsibility for physical operation of Lucky Peak Dam.

The Boise Project Board of Control is the operating agency for the irrigated lands of the Boise Valley which were developed by the federally supported Boise Project. The Board is composed of directors representing the various irrigation districts of the Boise Project. Operation and maintenance of facilities including Lake Lowell, the New York Canal, and associated canals, laterals and drains, is the responsibility of the Board of Control.

The Boise River Watermaster administers all water rights for diversion or storage according to Idaho water law.

Two flood control districts were organized to combat local flood problems on the lower Boise River. District 10 includes areas along the river from the western edge of Garden City to Caldwell and District 11 extends from Caldwell to the mouth.

Flood control management of the Boise River reservoirs is the responsibility of the Corps of Engineers and the Bureau of Reclamation. The division of responsibility and the plan of operation are given in the "Reservoir Regulation Manual for Boise River Reservoirs." The Regulation Manual, prepared in 1956 by the Walla Walla District Corps of Engineers, contains a detailed flood control plan of operation including forecast procedures, parameter curves for space evacuation, allocation of space among the three reservoirs, an operating procedure for floods which are too large to fully regulate, and organizational responsibilities.

Memorandum of Agreement

A Memorandum of Agreement, which is contained in the Regulation Manual as Appendix A, committed the existing irrigation reservoirs (Arrowrock and Anderson Ranch) to a

system flood control operation with Lucky Peak Reservoir. The Agreement was made upon completion of Lucky Peak Reservoir to protect the existing irrigation use of Anderson Ranch and Arrowrock reservoirs during flood control operations, and to commit the space in Lucky Peak Reservoir to irrigation as well as flood control use. The elements of the agreement provide the true plan of operation of the three reservoirs since it is the only part of the Regulation Manual that was formally agreed to by the Departments of the Army and Interior. The plan of operation adopted by the Corps of Engineers in the Regulation Manual was not agreed to by the Bureau of Reclamation. Important features of the Memorandum of Agreement include:

(1) Commitment of 983,000 acre feet of space in the three reservoirs to use for flood control and irrigation. This is essentially all of the active space in the reservoirs.

(2) Specification of flood space parameter curves to be used from January 1 to July 31 with agreed upon forecasts of runoff to determine evacuation requirements and allowable refill.

(3) Protection of space allocations in Arrowrock, Anderson Ranch, and Lake Lowell against water loss as a result of flood control operations.

(4) Provision for coordination and agreement on runoff forecasts.

(5) Specification of a maximum regulated flow objective of 6500 cfs below Diversion Dam during the reservoir refill period. This flow may be exceeded if diversion rates assumed in the derivation of the flood space parameter curves are not made.

(6) Provision of evacuation and refill sequence among the three reservoirs.

(7) Provision for releases during the refill period greater than 6500 cfs below Diversion Dam when forecasts of runoff require more than 983,000 acre-feet, the total active system space, to be provided for flood control. These increased releases would be specified by the Chief of Engineers (U. S. Army Corps of Engineers) after consultation with the Commissioner of Reclamation.

(8) Provision for maintaining Lucky Peak Reservoir full for as long as possible after the flood control season or until September 15 for recreation purposes. This would be done by releasing Arrowrock water first for downstream irrigation uses.

(9) Provision for modification of the operating plan with respect to allowable releases and space requirements for flood control upon agreement of the Chief of Engineers and Commissioner of Reclamation or their authorized representatives. Such modification shall take place only after consultation with the state of Idaho Reclamation Engineer, Boise River Watermaster, and Boise Project Board of Control Manager.

The above plan was developed jointly by the Bureau of Reclamation, Region 1, Boise, Idaho, and the Corps of Engineers, Walla Walla District. With respect to item 9, allowable releases below Diversion Dam (item 5) have been modified as discussed in a later section to approximately 7500 cfs when irrigation diversions are sufficient to reduce the flow to 6500 cfs below Boise. Adequacy of the Memorandum of Agreement is examined in a later section of this report.

FLOOD CONTROL

Runoff Forecasts

Successful flood control operations on the Boise River are very dependent on the accuracy of runoff forecasts. Snow water content, precipitation, and other hydrologic data are used to estimate subsequent flood volumes. The Memorandum of Agreement requires forecasts of runoff volume of Boise River at Diversion Dam from the first of January through June of each season. Forecasts are made at various times throughout the runoff season by the Soil Conservation Service, National Weather Service, Bureau of Reclamation, and the Corps of Engineers. The following discussion centers on the January to April period since this is usually the period of maximum snow accumulation.

In general, only the forecasts made by the Bureau of Reclamation and Corps of Engineers are used for flood operations, although all forecasts are examined. An April through July operating forecast is agreed to by both agencies after individual April 1 forecasts are made. Prior to April 1, separate forecasts are made and used to prepare proposed operations. The agencies then discuss and agree on a common operating plan.

The forecast procedure developed by the Corps of Engineers, as described in Appendix B of the Reservoir Regulation Manual, utilizes a complex method that includes snow water content data for five sites, and precipitation totals for six stations. The basic forecast was developed for the April - July period using April 1 snow course data and October through March precipitation totals. Forecasts of April through July runoff are made on the first day of January, February and March using the basic forecast equation. Adjustments are then made to obtain the actual date through July forecasts.

The forecast procedure developed by the Bureau of Reclamation utilizes data from five snow courses, four precipitation stations, and the antecedent natural flow of the Boise River. Forecasts are made on the same dates as the Corps of Engineers procedure.

Forecasts are least accurate for the January 1 forecast date, with monthly improvements until the April 1 forecast. This improvement is to be expected since the maximum snow accumulation at higher elevations does not usually occur until April, and the total volume of runoff is best estimated by sampling the total volume of water stored as snow in the basin. A measure of forecast accuracy is given by the correlation coefficient (r), obtained when observed and predicted values are compared using linear regression techniques. As the r value approaches 1.0, predicted values better represent observed values. Table 6 compares recent January through April runoff forecasts of the Corps of Engineers and Bureau of Reclamation to actual runoff. Correlation coefficients varied from 0.870 to 0.947 for the Corps of Engineers forecast, and from 0.840 to 0.965 for the Bureau of Reclamation forecast.

The relative accuracy of the Bureau of Reclamation forecast was greater than that of the Corps of Engineers for the January 1 and February 1 dates. The Corps forecast was more accurate for the March 1 and April 1 forecast dates.

Data for the five lowest runoff years (1955, '61, '66, '68 and '73) show that both the Bureau and Corps methods overestimated the actual runoff in four out of the five years for every forecast date. Part of this inaccuracy is due to the fact that other factors (such as soil

TABLE 6

COMPARISON OF FORECASTS WITH ACTUAL RUNOFF, BOISE RIVER AT DIVERSION DAM

(1,000 acre-feet)

Year	January 1 - July 31			February 1 - July 31			March 1 - July 31			April 1 - July 31		
	Actual Runoff	Bureau of Reclamation Forecast	Corps of Engineers Forecast	Actual Runoff	Bureau of Reclamation Forecast	Corps of Engineers Forecast	Actual Runoff	Bureau of Reclamation Forecast	Corps of Engineers Forecast	Actual Runoff	Bureau of Reclamation Forecast	Corps of Engineers Forecast
1950	2032	1624	1480	1969	1641	1810	1894	1583	1615	1741	1717	1967
1951	2184	2031	1730	2114	1948	1940	1988	2045	1975	1866	1931	1925
1952	2526	2726	2240	2460	2587	2490	2379	2685	2445	2276	2507	2413
1953	1869	1584	1260	1768	1719	1800	1680	1670	1675	1554	1464	1412
1954	1814	1877	1460	1750	1822	1830	1655	1726	1660	1506	1534	1708
1955	1218	1153	1170	1171	821	950	1131	737	870	1074	749	940
1956	2720	2752	2185	2570	2661	2460	2477	2743	2415	2250	2249	2279
1957	2124	1871	1595	2074	1606	1520	1976	1786	1695	1790	1754	1708
1958	2222	1930	1750	2166	1812	1870	2035	1816	1800	1915	1787	1800
1959	1342	1556	1310	1265	1401	1330	1193	1397	1300	1099	1237	1264
1960	1489	1397	1120	1436	1119	1055	1371	1264	1160	1191	1124	1067
1961	969	1439	1350	927	1048	1055	868	1013	1050	774	1002	1010
1962	1647	1980	1970	1592	1607	1740	1512	1596	1590	1426	1542	1605
1963	1532	1398	1380	1488	1103	1240	1338	1102	1070	1244	881	985
1964	1511	1739	1550	1456	1751	1800	1400	1330	1325	1326	1378	1280
1965	3141	2639	2505	2972	2821	3030	2794	2383	2600	2606	2046	2330
1966	1049	1505	1570	984	1224	1295	936	949	950	831	834	893
1967	1565	1579	1510	1499	1680	1850	1439	1425	1500	1352	1276	1379
1968	1052	1371		1004	1079	1120	904	1160	1110	783	846	816
1969	2300	2327	2000	2168	2486	2625	2076	2496	2350	1926	2056	2150
1970	1971	1346		1842	1933	2290	1737	1745	1920	1585	1546	1637
1971	3032	2585	2300	2870	2717	2770	2699	2564	2417	2482	2591	2495
1972	2806	2344	2150	2701	2489	2695	2586	2650	2400	2129	2071	2103
1973	1049	1672	1615	976	1498	1535	916	1229	1210	824	936	962
1974	2821	2696	2295	2692	2533	2320	2601	2500	2115	2344	2468	2420
		0.870	0.840		0.914	0.891		0.933	0.942		0.947	0.965

(such as soil moisture deficiency) affect the amount of snow water that eventually becomes runoff. Even if snow water equivalent and precipitation were the only factors influencing runoff, some error would be expected in a forecast since the measured data only represents point samples of the quantities, not the actual quantities as they exist on the entire basin.

A similar examination of data for the five highest runoff years (1956, '65, '71, '72 and '74) shows that for the January 1 and February 1 forecasts, both methods consistently underestimated the actual runoff. For the March 1 date, the Bureau forecast values were more normally distributed about the actual value, while the Corps forecast was consistently below the actual runoff value. For the April 1 date, both forecasts were normally distributed about the observed value. Data for the years 1950 through 1974 are shown in Table 6.

Determination of Flood Space

Releases at Lucky Peak during the flood control season result from the amount of flood space required as specified by the Memorandum of Agreement. Figure 6 is Plate A-2 of the Agreement which specifies the flood space required as a function of date and forecast runoff. These curves are called "flood storage allocation parameter curves" and are the primary determiner of flood operations after an operating forecast is agreed upon.

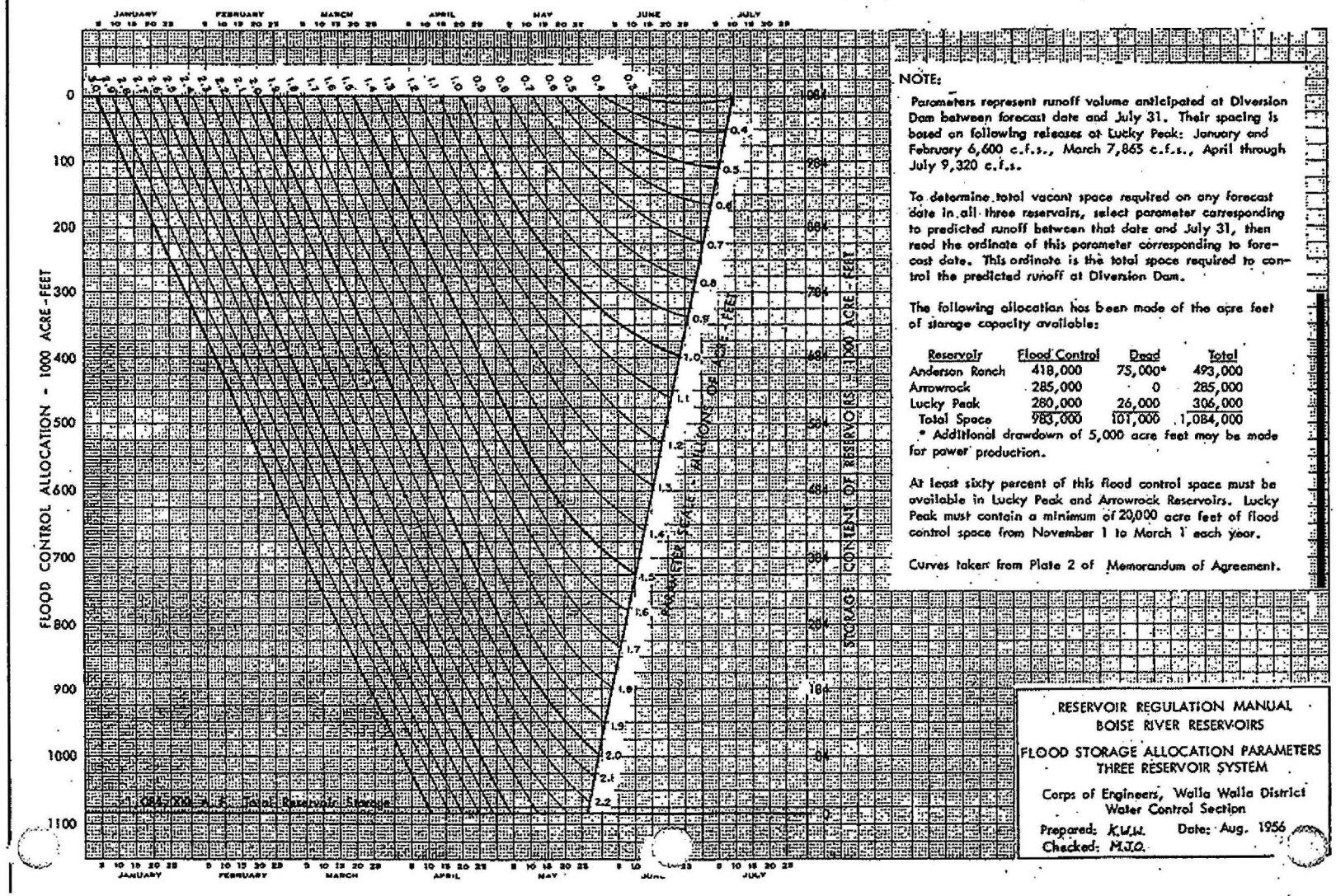
The storage allocation parameter curves were developed from analyses of past floods. Flood season runoff for each year of record prior to 1950 was analyzed for the total storage reservation that would be required to control the runoff to the allowable discharge in Boise River. Allowable discharge at Lucky Peak was then defined as 6500 cfs below Diversion Dam plus the diversions into New York Canal (1365 cfs in March and 2820 cfs from 1 April through 31 July). Parameter curves representing 100,000 acre-feet of runoff were sketched as approximate enveloping lines, and generally encompassed the maximum required storage reservation on any date for any of the floods studied. The parameters were then modified to provide margins of safety in reservoir space evacuated for flood control to compensate for errors in forecasts. The magnitude of the margin of safety was varied with the time of the season and with the magnitude of runoff as shown in Table 7.

TABLE 7

APPROXIMATE SAFETY MARGINS FOR FORECAST ERROR USED IN CONSTRUCTION OF FLOOD SPACE PARAMETER CURVES

Forecast Parameter (million ac-ft)	Safety Margin (1000 ac-ft)				
	Feb. 1	March 1	April 1	May 2	June 1
3.0	400	360	300	–	–
2.5	400	330	270	–	–
2.0	–	300	200	160	–
1.5	–	–	140	40	–
1.0	–	–	–	80	0
0.5	–	–	–	–	70

FIGURE 6. Flood Storage Allocation Parameter Curves from Memorandum of Agreement



NOTE:

Parameters represent runoff volume anticipated at Diversion Dam between forecast date and July 31. Their spacing is based on following releases at Lucky Peak: January and February 6,600 c.f.s., March 7,865 c.f.s., April through July 9,320 c.f.s.

To determine total vacant space required on any forecast date in all three reservoirs, select parameter corresponding to predicted runoff between that date and July 31, then read the ordinate of this parameter corresponding to forecast date. This ordinate is the total space required to control the predicted runoff at Diversion Dam.

The following allocation has been made of the acre feet of storage capacity available:

Reservoir	Flood Control	Dead	Total
Anderson Ranch	418,000	75,000*	493,000
Arrowrock	285,000	0	285,000
Lucky Peak	280,000	26,000	306,000
Total Space	983,000	101,000	1,084,000

* Additional drawdown of 5,000 acre feet may be made for power production.

At least sixty percent of this flood control space must be available in Lucky Peak and Arrowrock Reservoirs. Lucky Peak must contain a minimum of 20,000 acre feet of flood control space from November 1 to March 1 each year.

Curves taken from Plate 2 of Memorandum of Agreement.

RESERVOIR REGULATION MANUAL
BOISE RIVER RESERVOIRS
FLOOD STORAGE ALLOCATION PARAMETERS
THREE RESERVOIR SYSTEM
Corps of Engineers, Walla Walla District
Water Control Section
Prepared: K.W.W. Date: Aug. 1956
Checked: M.J.O.

Use of the parameter curves can be discussed in two stages, the period of evacuation and the period of fill. The evacuation period begins in January as soon as the first forecast is made and continues until the natural inflow exceeds the release at Lucky Peak. The release at Lucky Peak is that which is necessary to obtain the required flood space at the end of the evacuation period. Beginning in January, the release is calculated using April 15 as the tentative date for the end of the evacuation period. The forecast runoff from April 15 through July 31 is used with Figure 6 to determine the required flood space on April 15. As new forecasts become available, space requirements and releases are revised. Table 8 shows an example calculation of required release at Lucky Peak Dam during the evacuation period using March 1, 1974 actual data. As used in this and later sections dealing with the evacuation sequence "required release" refers to the average release necessary to obtain the April 15 required space. The Agreement appears to "require" this release, but the operating agencies interpret this section of the Agreement to be not mandatory and have normally used it only as a guide.

TABLE 8

EXAMPLE CALCULATION: REQUIRED LUCKY PEAK RELEASE DURING EVACUATION PERIOD

Date: March 1, 1974

March 1 to July 31 forecast runoff:	2,129,000 ac-ft [1]
Average probable inflow until April 15:	430,000 ac-ft [2]
April 15 to July 31 forecast runoff:	1,699,000 ac-ft

Number of days until April 15 = 45 days

(1) Reservoir contents on March 1	509,700 ac-ft
(2) Space required on April 15	415,000 ac-ft [3]
(3) Space available on March 1	478,400 ac-ft [4]
(4) Required evacuation	-63,400 ac-ft [5]
(5) Probable inflow March 1 – April 15	421,000 ac-ft
(6) Release required to April 15	357,600 ac-ft [6]
(7) Average daily release (45 days)	7,946 ac-ft
(8) Average release required	4,000 cfs

[1] Average of Bureau of Reclamation and Corps of Engineers forecast.

[2] Based on relationship with March-July forecast.

[3] From April 15 – July 31 forecast and Figure 6.

[4] Maximum content = 988,100 acre-feet.

[5] Item (2) minus item (3).

[6] Item (4) plus item (5).

Filling operations immediately follow the period of evacuation. The parameter curves in Figure 6 are used to determine the releases, but releases are planned on the basis of short term forecasts of reservoir system inflow. This is a continuing process and forecasts and releases may be revised daily. The Agreement states that releases cannot exceed the allowable release during the filling period unless the forecast indicates a space requirement greater than the total active storage capacity of the system.

Allocation of Flood Space

Current flood regulations specify that at least 60 percent of the required flood space allocation be provided in Lucky Peak and Arrowrock reservoirs. This means that space in Anderson Ranch in excess of 40 percent of the total cannot be counted as flood space. The space distribution between upstream and downstream reservoirs was based on the relative inflow upstream and downstream from Anderson Ranch Dam. Preliminary Bureau of Reclamation studies indicate that the 40 percent space limitation in Anderson Ranch Reservoir may be increased without reducing the system flood control effectiveness. The space distribution has been modified on a temporary basis by mutual agreement between the Corps and the Bureau. Feasibility of changing the 40 percent limit at Anderson Ranch is discussed in a later section.

Throughout the evacuation period, releases from individual reservoirs are scheduled such that space is provided in the following order: first, from Lucky Peak; second, from Arrowrock; and last, from Anderson Ranch. The reverse order is followed during the filling period so that flood space is maintained low in the system.

Allowable Release

At the time the Memorandum of Agreement was written the allowable release was selected to limit inundation to pasture lands. Strict interpretation of the Memorandum of Agreement would place the allowable release at 6500 cfs flow below Diversion Dam. However, it is apparent that the intent was to limit flows to 6500 cfs in the channel below the city of Boise. Because there are significant diversions in the reach below Diversion Dam, and because the channel capacity for that reach is significantly more than 6500 cfs, the Corps and the Bureau have been interpreting the allowable release to be 6500 cfs below the city of Boise instead of at Diversion Dam. This interpretation compensates in part for the diversion assumptions of New York Canal which have often proved to be higher than actually experienced. Releases of up to 8000 cfs below Diversion Dam are made during flood control operations if irrigation diversions are sufficiently large. This would result in flows through the city of Boise as high as 7200 cfs.

The allowable release as referred to in this report will be considered to vary from 6500 cfs below Diversion Dam before irrigation begins, to a maximum of 8000 cfs when all canals are diverting at or near capacity.

Major Floods

Although most floods are regulated to the allowable release by use of the storage allocation parameter curves, Boise River is occasionally subjected to floods much larger which cannot be so regulated. With present downstream channel capacity, there is

insufficient reservoir capacity in the system to fully regulate the standard project flood or maximum historical floods. Also, heavy precipitation and consequent snow accumulation may develop late in the season, leaving insufficient time to evacuate reservoirs to obtain required space for complete regulation. For these floods, operation of the reservoir system to permit releases above the allowable could materially reduce the magnitude of the peak discharge later in the flood season.

The Boise River Regulation Manual contains a procedure developed by the Corps of Engineers for definition and regulation of major floods. The procedure contains major flood parameter curves which would replace the allowable release method during a major flood. This procedure would result in releases greater than the allowable, thus retaining space for control of the major flood peak. The method has received formal approval by the Corps of Engineers, but it has never been formally agreed to by the Bureau of Reclamation.

The plan of operation agreed to by the Corps and Bureau (in the Memorandum of Agreement) is interpreted by both agencies to preclude use of the major flood parameter curves if the storage required for control of floods to the allowable release is less than 983,000 acre-feet, the total system flood space. This interpretation is based on the following quotation from the Agreement:

> "From the date of the governing forecast each year through July 31 of that year, . . . the combined reservoir content, as determined from the parameter chart (Plate 2), will be maintained except when irrigation requirements necessitate a drawdown below such total content, but will not be exceeded except when total storage above such content is required to limit the releases to allowable flows (as determined by downstream channel capacity and irrigation diversions) at Diversion Dam. However, when the forecasted runoff indicates extraordinary flood flows, requiring storage capacity for flood control in excess of the total active storage capacity of the reservoir system (983,000 acre-feet), temporary releases will be made at a rate so as to minimize the peak rate of flow in the river channel below the Diversion Dam. The rate of such releases shall be specified by the Chief of Engineers after consultation with the Commissioner of Reclamation to the extent consistent with paragraph 6g herein."

The above quote defines the condition under which the major flood parameter curves might be used, but appears to apply only to the filling period. Releases greater than allowable under any other condition during the filling period would be in violation of the Agreement.

IRRIGATION

Refill of storage space follows generally the reverse order from that used in drafting storage but for the same general reasons. Water is stored in Anderson Ranch first for the purpose of maximizing upstream storage and increasing the head on Anderson Ranch

powerplant. Arrowrock is filled next and Lucky Peak, which controls the greatest tributary area, is filled last to insure maximum flood control space in the reservoir most capable of controlling floods.

Irrigation diversions usually begin on April 1 and gradually increase throughout the month. The amount of water to be released at Lucky Peak for irrigation is determined by the Boise River Watermaster and the Boise Project Board of Control Manager. Release of storage from individual reservoirs is determined by the Bureau of Reclamation.

Withdrawals of stored water for irrigation are made first from Arrowrock Reservoir. Paragraph 6h of the Memorandum of Agreement states that:

> "In order to enhance the recreational value of Lucky Peak Reservoir after recession of the flood each year, that reservoir will be filled, if not already full from flood water storage or natural flow, by transfer of water from Arrowrock storage, and will be held full through September 15 each year except when Arrowrock Reservoir has been drawn down to a level from which it can no longer supply the irrigation requirements prior to that date, . . ."

Current operation procedures limit the irrigation season drafts of storage from Anderson Ranch to amounts that can be utilized through the powerplant to the extent practicable. Thus it is the policy to make storage releases first from Arrowrock, second or concurrently from Anderson Ranch with the above limitations, and third from Lucky Peak Reservoir.

Irrigation diversions can significantly reduce the flow in Boise River thus allowing greater releases at Lucky Peak after April 1 when irrigation begins. In derivation of the flood control parameter curves it was assumed that the New York Canal diversion would provide a conservative estimate of irrigation diversion effectiveness during floods. Assumed diversions for the canal were 1365 cfs in March, and 2820 cfs April through July.

The assumed diversion of 1365 cfs by the New York Canal in March was based on the normal diversion for storage in Lake Lowell. This assumption also assumed release of water to Snake River through the wasteway system. Recent experience indicates that rather substantial rehabilitation of the wasteways would be required to pass any appreciable amounts of water directly to Snake River. In some recent years, there was no diversion to the New York Canal in March.

During the actual flood runoff (filling period) in April, May, June, and July, any deficiency in diversions from those assumed for parameter curve construction would limit flood regulation ability. In some years irrigation diversions do not begin until about April 15. Diversions by the New York Canal do not always average 2820 cfs as was assumed in development of the plan. However, the diversions to all canals between Lucky Peak and the western limits of Boise generally average considerably more than the 2820 cfs through the flood period (between the date of the governing forecast, when runoff first exceeds 9320 cfs, until the flood is past).

STREAMFLOW MAINTENANCE

Canals of the Boise River divert almost all of the water from the river above a point near Star during the irrigation season when flood releases are not being passed. Similarly, canals at Caldwell often divert nearly all of the Boise River flow. This results in flows which are often less than 100 cfs at these locations.

A second low flow condition occurs from October 15 until flood releases begin or irrigation resumes. Discharge from Lucky Peak is 100 cfs or less during this time in all years. When flood releases become necessary, flows are often rapidly increased to 4000 cfs or more. In terms of stream resource maintenance, the effects of this operation are twofold. First, the extended period of low flows reduces the waste assimilation capacity of the river and often results in very high downstream waste concentration. The small flow, together with waste loadings, has created a poor game fish habitat. Secondly, the wide fluctuation in flows is damaging to aquatic life in the river. The fluctuations cause a less stable environment for fish and, consequently, a smaller fish population.

The following discussion describes the operational reasons for the occurrence of low flows. This report includes potential solutions to the problem of low flows only insofar as changes in flood control operations may tend to alleviate the problem. Potential solutions are currently being analyzed, however, by the Corps of Engineers in their "Boise Valley Regional Water Management" and "Lucky Peak Flow Maintenance" studies.

Reservoir Shut-off

Current operating procedures provide some flow in the river below Anderson Ranch Dam and below Lucky Peak Dam most of the time. Requirements for inspections or maintenance, however, occasionally require that the flow be shut off for limited periods of time. This happens at both dams whenever it is necessary to de-water the outlet tunnel which is the only means for releasing water when reservoir pool levels are below the spillway crests. At Lucky Peak, maintenance has required releases to be curtailed for periods up to six weeks.

Allocated Space

Under current procedures, 50,000 acre-feet of storage capacity in Lucky Peak Reservoir is used for flow maintenance below Lucky Peak Dam. Releases are made in accordance with schedules provided by the Idaho Fish and Game Department. The basis for use of the 50,000 acre-feet of Lucky Peak was established under the water right permit for Lucky Peak Reservoir storage which was issued by the State of Idaho to the Bureau of Reclamation on March 20, 1964. Each year in October when releases for irrigation have stopped, about 110 cfs is released at Lucky Peak from this storage. This discharge is maintained until the next irrigation season unless: (1) flood control operations require a greater release; or (2) the amount of water that is available from the space has been entirely used. In the latter event, a special agreement between the Idaho Fish and Game Department and the Bureau of Reclamation may be made to make releases from unallocated space in

Lucky Peak. When the amount of water remaining in the unallocated space is less than average, this agreement would probably not be made and releases would then approach zero.

POWER

Under the current operating plan, the power operation at Anderson Ranch Dam is secondary to both the operation for irrigation storage and for flood control. During the irrigation storage draft season, releases from Anderson Ranch Dam are scheduled to permit utilization for power production but are limited to amounts expected to be required for irrigation. The overall objective is to retain as much of the system storage in Anderson Ranch Reservoir as possible for the purpose of maximizing power head and system storage yields. Maintaining storage in Anderson Ranch reduces the risk of spilling at the downstream reservoirs the next year without filling Anderson Ranch.

Power production during late fall and early winter is limited to a minimum of 10 megawatts (MW) which is required for firm power production. This requires releases of about 450 cfs. During the January-June period, power production is also limited to 10 MW unless streamflow forecasts indicate that expected inflow is more than adequate to assure reservoir fill. In this case maximum production capability of 35 MW is reached. Power production during the spring flood runoff period may further be limited by flood control operations. The principal objective is to avoid premature fill of the downstream reservoirs and loss of control of flood inflow below Anderson Ranch Dam.

RECENT FLOOD OPERATIONS

FLOOD REGULATION 1971 THROUGH 1974

OPERATIONAL PROBLEMS

EVALUATION

RECENT FLOOD OPERATIONS

FLOOD REGULATION 1971 THROUGH 1974

Since completion of Lucky Peak Dam and Reservoir in 1954, the Boise system has achieved its regulation objective each year. Natural inflows, which have been as high as 44,000 cfs, have been reduced to 6500 cfs or less in the lower river. The operation has caused flows in the lower river to remain near 6500 cfs for several months, however, and has created much public discontent because of inadequate channel capacity in some locations. This section will discuss the actual flood operations in four recent years (1971, 1972, 1973, and 1974) so that the effectiveness of the present operation can be illustrated and evaluated. The years 1971, 1972, and 1974 were of above average runoff, and 1973 was a year with below average runoff.

Figures 7, 8, 9, and 10 present a summary of the Boise River system operation in 1971, 1972, 1973, and 1974, respectively. Included are the space requirement for flood control as indicated by the parameter curves (Figure 6), the actual system storage, the natural inflow to the reservoirs, Lucky Peak release, and the flow at Boise. In general, it can be noted that in each year except 1973 the system had less space available on April 15th than required by the flood control parameter curves. However, the required space was in each case gained during the month of May.

Evacuation Period

During the evacuation period, January 1 to April 15, the space required by the Agreement must be determined by projecting the releases necessary to attain the required space on April 15. Therefore, a short analysis of January through March releases required by the Agreement was made using the average of the Bureau of Reclamation and Corps of Engineers' forecasts. These releases were calculated as shown previously in Table 8. The releases are compared in Table 9 to the average releases that were actually made from the date of the forecast until the next forecast was available. In all four years the actual release was smaller than that required during January and February. In 1971, 1973, and 1974 the releases were greater in March than actually required.

The space that would have resulted from the required releases is also shown on Figures 7 through 10, as well as the required releases. These releases are similar only in January to those shown in Table 9, because the releases in Table 8 were calculated using the observed beginning of month reservoir contents in order to show comparisons with the actual

TABLE 9

COMPARISON OF ACTUAL FLOOD RELEASES WITH RELEASE REQUIRED BY AGREEMENT DURING EVACUATION PERIOD

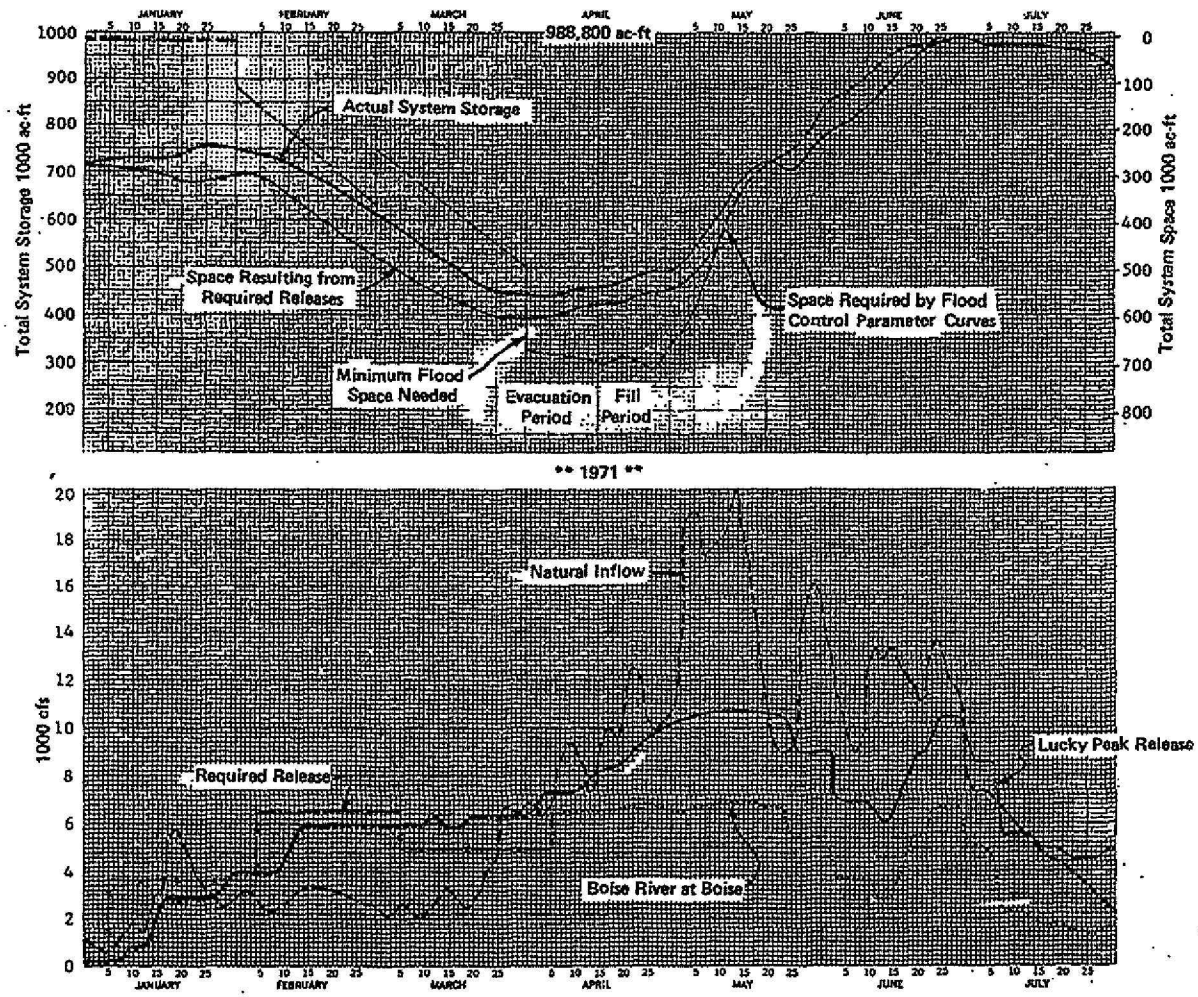
Year	Month	April 15-July 31 Forecast 1/ (1000 ac-ft)	Average Daily Release Required 2/ (cfs)	Actual Average Release until next Forecast (cfs)
1971	January	1710	3506	2598
	February	1950	6500	5380
	March	1815	5964	6251
1972	January	1670	3497	2411
	February	1985	6500	5600
	March	2021	6500	6197
1973	January	1246	938	142
	February	1145	545	197
	March	974	71	523 3/
1974	January	1778	2594	358
	February	1702	4100	3090
	March	1699	4008	4469

1/ Average of Corps of Engineers and Bureau of Reclamation forecasts.

2/ Limited to 6500 cfs channel capacity below Boise.

3/ Release made for transfer of storage to Lake Lowell.

operation for the later months. Had the required releases been made, different reservoir contents would have resulted as shown in the four graphs. With the required releases, space closer to that required on April 15 would have been achieved in the three high runoff years. In each case, early releases would have been greater, but the need to pass flows of 6500 cfs or more through Boise would not have been eliminated. In 1972 the duration of flows at 6000 cfs would have been greater. In 1974 maximum releases prior to April 1 would have been reduced from over 4000 cfs to 3000 cfs or less.



Units in Acre-Feet

Date of Forecast	Apr 15 - Jul 31 Forecast Runoff
Jan 5	1,710,000
Feb 4	1,950,000
Mar 5	1,815,000
Apr 7	2,110,000

Apr - Jul Operating Forecast	Apr - Jul Actual Runoff
2,350,000	2,463,000

FIGURE 7. Boise River System Regulation - 1971

An additional line labeled "minimum flood space needed" is shown on the regulation graphs. This line represents the space necessary to control floods within the capacity of the Boise River as determined directly from the parameter curves on Figure 6. The minimum flood space needed was zero in 1973, and is not shown on Figure 9. In all four years the actual space was greater than minimum space needed prior to April 1. It is evident that actual operation during evacuation lies somewhere between the minimum flood space needed and the space resulting from required releases.

The system could be operated anywhere below the space needed line and be in no danger of having to exceed the allowable release unless (1) a runoff sequence more unique than those used to derive the parameter curves occurred, or (2) forecast error exceeded the safety margin shown in Table 7. However, operating the system along the space needed line would result in delaying releases until later in the evacuation period and tends to maximize the duration of flows at the allowable release. In fact, the space needed line assumes the maximum allowable release will be made during the remainder of the flood season. This operation would provide maximum assurance of total system refill. Operation along the required release line averages the release over a longer period, thus tending to increase early releases and decrease the duration of maximum allowable releases. This operation provides a lesser assurance of total system refill.

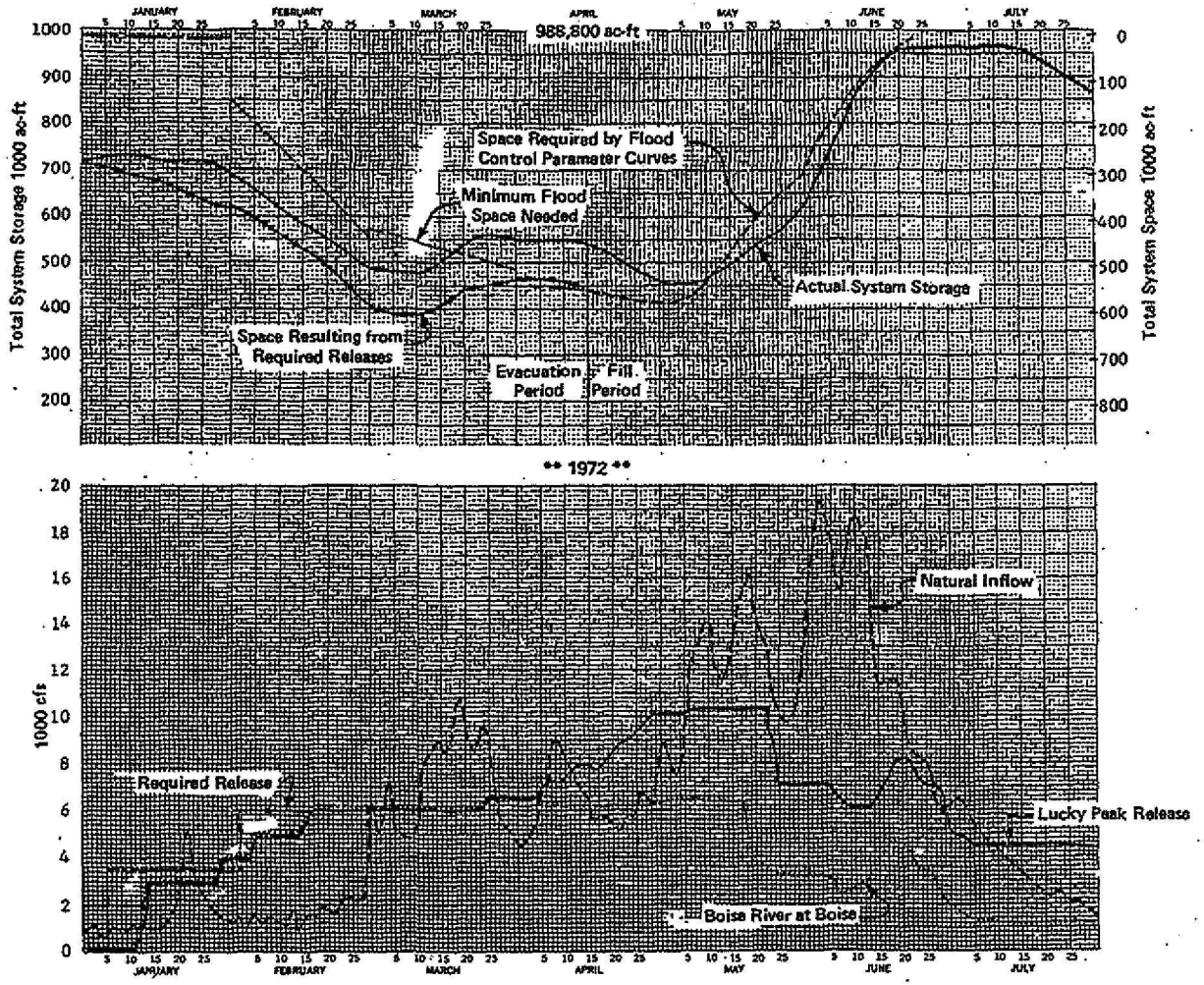
From the preceding analysis it is concluded that in 1971, 1972, and 1974 the failure to provide the April 15 required space resulted in part from insufficient releases. In 1971 and 1974, the required releases would not have provided the April 15 required space because of the heavy March snowfall which was not reflected in a forecast until after April 1. The actual April 15 required space is not determined until that date, and, therefore, not having the space available on that date does not necessarily violate the Agreement.

In 1973, provision of the required release in January and February would have reduced the amount of storage in the Boise system by about 70,000 acre-feet. That year the maximum storage attained was about 918,000 acre-feet. As shown on Figure 9, maximum storage with the required releases would have been about 848,000 acre-feet. Because Lucky Peak Reservoir allocations are junior in priority, the effect of this would have been that each storage use in Lucky Peak (see Table 1) would have received only 50 percent of their allocation, 25 percent less than actual. This, however, would not have been significant since less than 20 percent of Lucky Peak storage allocations were used in 1973, and 1974 was an above average runoff year. If 1973 had been followed by a critical series of below average runoff years, shortages would have been 70,000 acre-feet greater.

The releases calculated above assumed ideal operating conditions. In reality, various operational constraints cause the operation to be somewhat less than ideal. Examples of these constraints and their impacts are discussed in a following section.

Filling Period

While flood operations during the evacuation period are governed by an April 15 target date, space requirements throughout filling can be determined directly from the flood parameter curves (Figure 6) using the current runoff forecast.



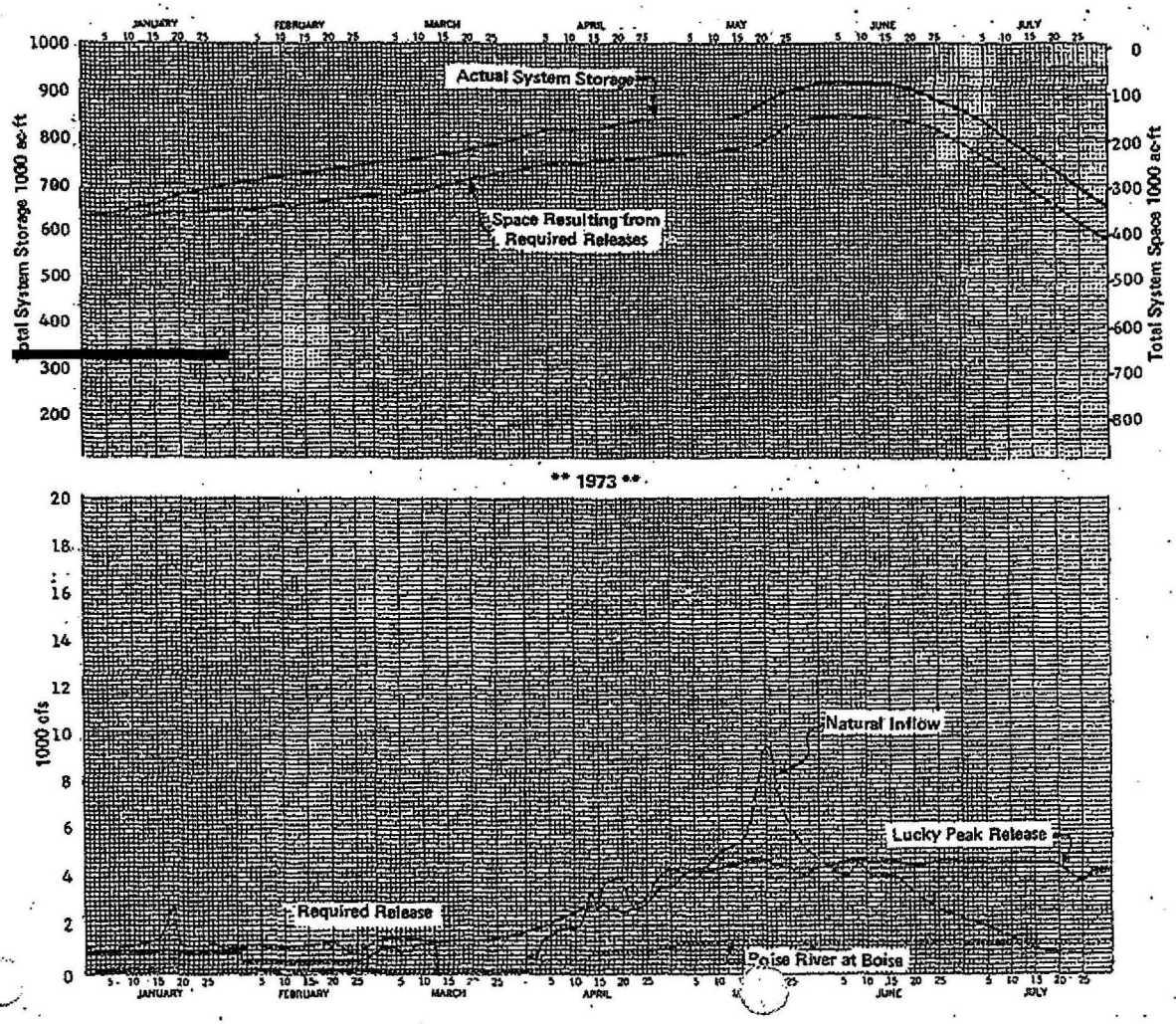
Units in Acre-Feet

Date of Forecast	Apr 15 - Jul 31 Forecast Runoff
Jan 5	1,670,000
Feb 3	1,985,000
Mar 3	2,021,000
Apr 5	1,925,000

Apr - Jul Operating Forecast	Apr - Jul Actual Runoff
2,100,000	2,101,000

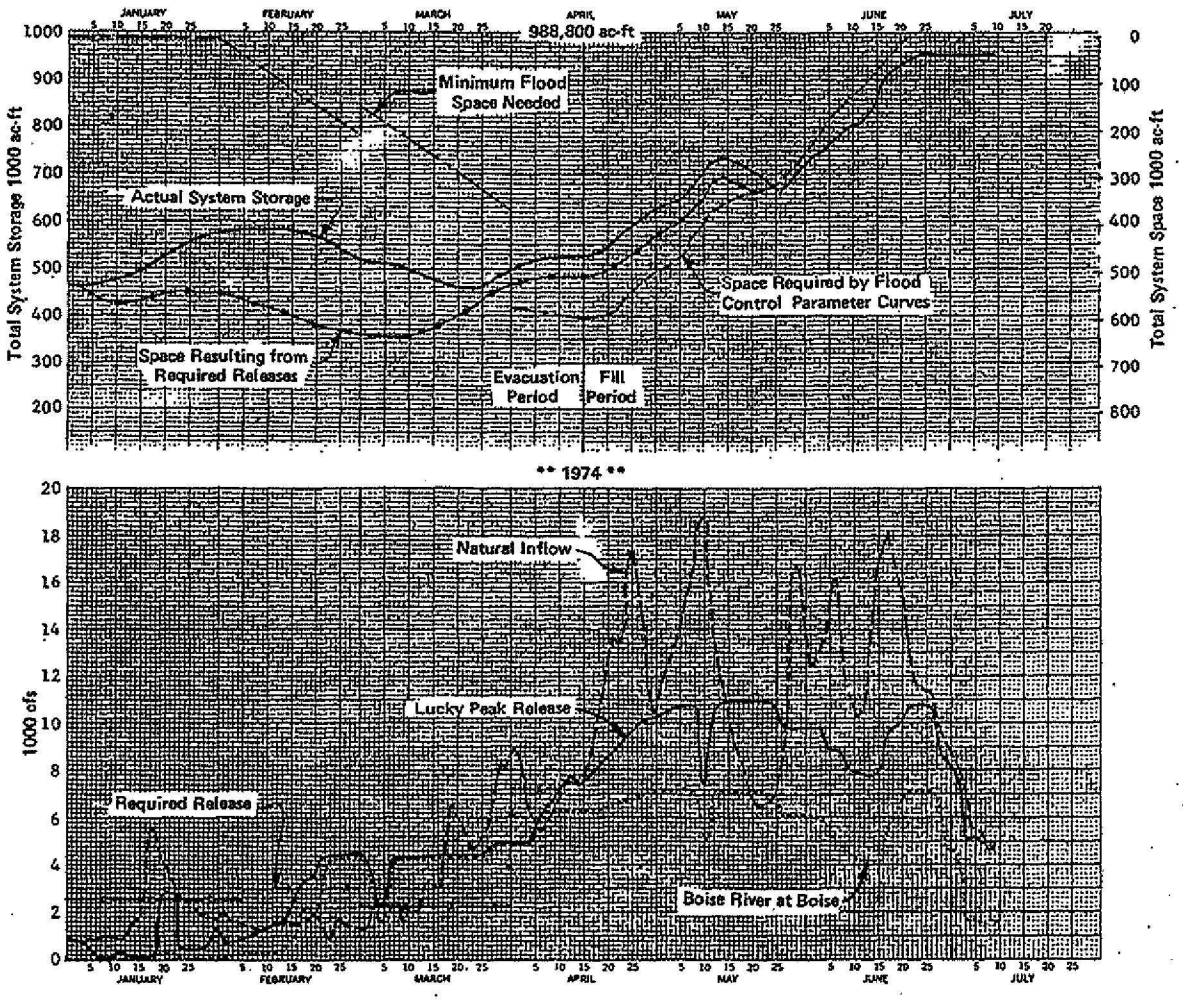
FIGURE 8. Boise River System Regulation - 1972

FIGURE 9. Boise River System Regulation - 1973



Units in Acre-Feet

Date of Forecast	Apr 15 - Jul 31 Forecast Runoff
Jan 1	1,246,000
Feb 1	1,145,000
Mar 1	974,000
Apr 1	852,000
Apr - Jul Operating Forecast	**Apr - Jul Actual Runoff**
Not needed	824,200



Units in Acre-Feet

Date of Forecast	Apr 15 - Jul 31 Forecast Runoff
Jan 1	1,778,000
Feb 5	1,702,000
Mar 1	1,699,000
Apr 1	2,070,000
Apr - Jul Operating Forecast	Apr - Jul Actual Runoff
2,200,000	2,344,000

FIGURE 10. Boise River System Regulation - 1974.

When the space available is less than the required space, the maximum allowable release is made. Examination of Figures 7, 8, and 10 show a lowering of outflow from Lucky Peak during the latter part of May when the space available was greater than required by the flood parameter curves and subsequent increase in outflow during June when the available space approaches the required space indicated by the parameter curves. This type of operation will be characteristic as long as the current plan of operation is in force. Adjustments in release must be made during the filling cycle if the reservoir space is to follow the parameter curves.

During 1971, the reservoirs had essentially filled by the 1st of July when preceding inflows had been quite high. It is evident that the system nearly lost the ability to control flows to the maximum allowable release that year. It is also evident that during the month of June the system was operated according to the Agreement. The 1971 operation indicates that there is little factor of safety for flood control in the system using the existing Agreement. It is noted that in 1971 additional space could have been gained by higher releases during the latter part of May and the first three weeks of June, as is also generally true for the years 1972 and 1974. To do so would have been in violation of the Agreement and in some years would prevent complete filling of the total storage.

OPERATIONAL PROBLEMS

Many intervening factors prevent executing flood control operations in an exact fashion. Often these factors can be anticipated, but more commonly, they cannot.

Operations during 1974 included typical examples of unexpected constraints. As shown on Figure 10, releases from Lucky Peak were reduced twice, once for dike construction and once to aid in the search for a drowning victim. In particular, the second occurrence came at a time when additional space for flood control was needed.

Many of the diversion structures in the lower Boise River are temporary earth dams in the river channel and must be reconstructed each year. Often requests are received at the beginning of the irrigation season for the flows to be lowered so that this work can be accomplished. When these requests are granted, the provision of flood space may be hampered.

Delays can be experienced in receiving and processing snow course data. Normally snow measurements are made on the first day of each month, but often several days pass before an actual forecast becomes available. This can be the result of difficulty in obtaining the measured snow data and in agreeing on an operating forecast between the agencies. The time lost can be critical, especially late in the season and if the accumulated snowpack has greatly changed.

Other problems that arise are similarly unique. They are generally related to activities in the lower river and may occur only a single time, but they do have an impact on flood operations.

EVALUATION

Examination of 1971 through 1974 Boise River operation points out problems characteristic of the system, namely:

- Because of the relative inaccuracy of early forecasts, there is a reluctance to make required releases early, thus having a greater assurance of total refill.
- Capability to evacuate required flood control space is marginal during some years because of the 6500 cfs limitation for flows in the lower Boise River.
- More reliable forecasts are needed, especially during the evacuation period, January through March.
- More frequent forecasts are needed during the evacuation period to facilitate a system operation which is more sensitive to changing conditions.
- Lack of a common forecast procedure causes uncertainty in flood operations.
- The flood parameter curves are conservative for refill of the reservoirs, but not conservative for flood control, especially during the month of June. This means that a lower risk of refill is achieved at the expense of a higher risk for large flood damage.
- Control may be lost during some future years when required flood control space is less than the total space because of the above considerations.

POTENTIAL FOR IMPROVED OPERATION

RUNOFF FORECASTS

FLOOD SPACE PARAMETERS AND ASSUMPTIONS

CRITERIA FOR MAJOR FLOOD REGULATION

FLOOD SPACE DISTRIBUTION AMONG RESERVOIRS

CHANNEL CAPACITY

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ADDITIONAL STORAGE

POTENTIAL FOR IMPROVED OPERATION

It is a conclusion of this report that regulation of the Boise River has been very effective in controlling floods in the Boise Valley. The system could, however, be operated in many other ways and remain as effective, or become more effective in control of floods. Whether or not a change in operation can be classified as an "improvement" depends in large part on the value placed on the various uses of water. Some operational alternatives involve using more advanced technology and can be accomplished by expending time, manpower, and funds to do the work. Other alternatives involve reallocation of functional uses of the projects based on changing social values. Some alternatives lie between the above extremes.

This section will identify "problems" and present alternatives, and will evaluate the potential for changing the present system regulation, based on the investigations presented in the preceding sections. The problems discussed will be limited to those related to flood control, but the effects on other functions (irrigation, recreation, etc.) will be discussed as thoroughly as possible.

The implementation of some alternate operations involve physical, legal, and social constraints. In particular, the Memorandum of Agreement between the Bureau of Reclamation and the Corps of Engineers would have to be modified to effect many of the changes described in this section. In discussing the potential for alternate operational procedures, the Agreement will not be considered a constraint. The report concludes with a discussion of processes involved in changing the Regulation Manual and instituting other changes.

RUNOFF FORECASTS

Because runoff in the Boise River results primarily from snowmelt, forecasts of runoff volume can be made with a reasonable degree of accuracy. However, relatively small errors in forecasts can result in significantly different flood operations. Although forecasts of the various agencies often differ among themselves, there is no consensus among agencies concerning the accuracy of the methods. A previous section (see Table 6) displays the relative accuracy of forecasting procedures of the operating agencies. This section describes one possible method for improving runoff forecasting.

The Northwest Watershed Research Center of the Agricultural Research Service (ARS) recently developed a procedure that holds promise as a forecasting tool. The procedure uses

a linear model incorporating snow course and precipitation data that is quite similar to the existing forecast models. For most models, the coefficients which best fit the observed values are determined using the "least squares" method. The ARS method utilizes a "pattern search" optimization technique which minimizes the errors for a given forecast period by searching for the optimum values of coefficients. The validity of the procedure is not reduced by the use of independent variables (snow course and precipitation data) that are highly correlated, as is the case with the least squares method.

The pattern search method is easy to apply to a variety of models. A separate optimization can be performed for each forecast date, allowing available data to be more fully utilized. This allows the importance of the snow courses to vary from one forecast date to another since they represent samples of snow water equivalent on different zones of the watershed.

The ARS forecast method was modified for this study to allow inclusion of precipitation station data and was used to develop a forecast procedure using data from the period 1950-74. Forecasts were calculated for each forecast date (January 1 to April 1). The number of snow courses used depended upon data available for that forecast date, and varied between four and ten, while three precipitation stations were used for every forecast date.

Use of the above forecast method yielded higher correlation coefficients (r) than the operating agency methods for every forecast date. The r values obtained were 0.901, 0.918, 0.962, and 0.980 for the January 1, February 1, March 1 and April 1 forecast dates. The correlation coefficient represents the fit of the observed and predicted data for the entire 25-year period, with the exception of January 1 forecast which uses a 17-year period. Comparison of ARS forecast method with the existing forecasts for the five highest and five lowest runoff years showed errors in the same direction, but with improved accuracy. No forecast was consistently high or low relative to the others. The ARS forecast method more accurately predicted actual runoff on the average. Therefore, it is concluded that present forecast procedures can be improved.

The development of a single forecast method would lead to the adoption of the best procedure. This is true because the best procedure is a technically determinable fact. Whatever set of criteria are used to judge the method, there is one best method. A single forecast procedure also permits the operational forecast to be determined by anyone, not just the operating agencies. The single forecast method allows the decision making processes involved in reservoir operation to be seen in a clearer, more straight forward manner.

There is a need for flexibility in flood operations apart from forecast computations to permit judgment to enter the process at some point. The adoption of a single forecast procedure would not preclude the use of judgment. In fact, operational decisions would be enhanced because of a better forecast; but these decisions should take place separately from forecast determination.

The effect of major storms is not reflected in runoff forecasts until the following month. More frequent forecasts would provide better quantification of snowpack changes, and, therefore, result in improved system operation. Mid-month data are taken on only a few snow courses. In the long range there appears to be a potential to improve the flood control operation by expanding the mid-month snow data program. Existing mid-month data should be analyzed to determine potential for updating first of the month forecasts.

Daily streamflow models have the capability to estimate potential runoff sequences provided that an adequate continuous data reporting system exists. Models such as these could eventually replace the monthly forecast equations now used. Continuous monitoring and reporting of snowpack conditions would be one of the requirements of such a system.

FLOOD SPACE PARAMETERS AND ASSUMPTIONS

Once forecasts of runoff have been made, operation of the Boise River reservoirs for flood control becomes dependent on the flood space parameter curves shown on Figure 6. These curves are used by the operating agencies, the Bureau of Reclamation and the Corps of Engineers, during the evacuation and fill periods to judge the releases that should be made to provide the required flood space. As illustrated in the review of 1971 through 1974 operations, the procedure for use of the curves during the evacuation period as stated by the Agreement is not strictly followed; and there is little safety margin for flood control during the refill period.

The curves on Figure 6 were constructed in 1950 prior to the construction of Lucky Peak Dam. More than 15 years have now passed with the entire system in existence. It is now appropriate to re-examine the parameter curves for possible modification. This section discusses the potential for such modification as well as that for using alternate parameter curves.

Use of Recent Flood Data

The present flood space parameter curves were derived using the hydrologic data from 1895 through 1949. Since 1949, several years of above average runoff have occurred. By including this data in the analysis of flood space parameter curves, a better judgment can be made of the adequacy of the curves. Flood space requirements for the five largest flood years since construction of Lucky Peak Dam were derived based on the allowable releases stated in the Agreement. These space requirements were then compared to the original enveloping curves constructed before safety margins for forecast error were added. It was found that the original curves satisfactorily enveloped the space requirements for the five flood seasons. It was, therefore, concluded that the existing enveloping curves adequately represent all available flood data assuming the allowable releases are as stated in the Agreement.

Safety Margin for Forecast Error

Table 7 listed the approximate runoff forecast safety margins applied to the various magnitudes of runoff to obtain the parameter curves on Figure 6. The margins allowed for forecast error decrease with advancing forecast date. Toward the end of the flood season, safety margins for forecast error approach zero. The margins of safety were chosen in this manner to assure complete system refill.

There appears to be a definite potential to provide greater flood protection on Boise River by including greater safety margins for forecast error for all forecasts late in the flood season. For example, the safety margin for forecast error on June 1 for forecasts greater than 1 million acre-feet is near zero; but forecasts in this range can be in error by ten percent or more. To increase the safety margin would mean that a greater risk would be taken for complete system refill. Other effects of refill risk are discussed in a following section.

Available Refill Volume

One of the characteristics of Boise River regulation that brought about this review is the extremely low fall and early winter releases followed by large releases for flood control. This section examines the potential for making releases earlier and thus minimizing the fluctuations that now occur.

Hydrologic data from 1928 through 1973 were examined to determine the amount of water that would be available for refill of storage space each year under the present system operation. This volume is equal to the total natural runoff less required releases for irrigation and flow maintenance from a given date until the reservoirs reach maximum content for the year. The volume, or "available refill", was derived for each year of the 46-year period from November through July. By determining the frequency of occurrence of various volumes of available refill, one possible procedure was developed to effect earlier season releases.

The low regulated flow period below Lucky Peak Dam begins each year in late October when irrigation diversions are stopped. Frequency analysis for November shows that 98 percent of the time, the amount available for refill will be greater than 225,000 acre-feet. Using a total active space of 988,000 acre-feet, this means that reservoir contents in excess of 763,000 acre-feet on November 1 could be released with 98 percent probability of refilling the entire space that year. Similarly, using the total allocated space (see Table 1) of about 872,000 acre-feet, storage in excess of 647,000 acre-feet could be released with a 98 percent chance of refill. Reservoir contents necessary for 90, 95, and 98 percent assurance of refill are shown in Table 10 for refill of (1) the total system space, (2) the allocated space, and (3) the total space excluding Lucky Peak Reservoir. Results are shown for the beginning of November, December, and January.

Total active space filled on November 1 rarely exceeds 600,000 acre-feet and averages less than 300,000 acre-feet. Therefore, it is evident that making any early season release will

TABLE 10

RESERVOIR CONTENTS REQUIRED FOR ASSURANCE OF REFILL OF BOISE RIVER SYSTEM

Space to be Refilled1/	Percent Chance of Fill	Required Contents at Beginning of Month (ac-ft) November	December	January
Total Capacity (988,000 ac-ft)	98	760,000	790,000	820,000
	95	700,000	730,000	765,000
	90	630,000	645,000	705,000
Allocated Space (871,500 ac-ft)	98	654,000	675,000	705,000
	95	585,000	615,000	650,000
	90	515,000	550,000	590,000
All Space Excluding Lucky Peak (709,800 ac-ft)	98	485,000	515,000	545,000
	95	425,000	455,000	490,000
	90	355,000	390,000	430,000

1/ Does not include dead storage.

cause some risk to refill of the entire space. However, by examination of Table 10, it can also be seen that assigning some risk to refill of the entire space imparts a much less risk of refill to all space excluding Lucky Peak; and assigning some risk to the allocated space similarly imparts less risk to refill of all allocated space other than that in Lucky Peak.

Possible use of the data in Table 10 is illustrated in Table 11 for the years 1971 through 1974. Additional releases that would have been made in November and December are calculated assuming a five and ten percent risk of refill of the allocated space (871,500 acre-feet). In three of the four years, additional releases ranging from 240 to 1340 cfs would have been made with a ten percent risk. In 1973, a year when the system did not totally fill, about 80,000 acre-feet would have been released. This would have caused the system to fill only to 840,000 acre-feet, about 30,000 less than the total allocated space. Making such releases in November and December would risk filling the space in Arrowrock, Anderson Ranch, and Lake Lowell, but the risk would be very small. In the above example, a one percent chance of not completely filling the other reservoirs would exist.

After January 1 when forecasts of runoff are made, the frequency of occurrence of available refill can be predicted with greater certainty by relating the refill volume to the forecast. To test such a procedure, estimated monthly forecasts from 1928-74 were

TABLE 11

EXAMPLE USE OF ASSURED REFILL OF BOISE RIVER SYSTEM USING PERCENTAGE RISK ON TOTAL ALLOCATED SPACE

Risk of Refill	Date	System Contents (ac-ft)	Required[1/] Contents (ac-ft)	Excess (ac-ft)	Average Additional Release (cfs)
10%	Nov 1, 1971	543,600	515,000	28,600	480
	Dec 1, 1971	606,600	550,000	56,600	920
	Nov 1, 1972	594,700	515,000	79,700	1340
	Dec 1, 1972	573,000	550,000	23,000	370
	Nov 1, 1973	578,500	515,000	63,500	1070
	Dec 1, 1973	564,500	550,000	14,500	240
	Nov 1, 1974	353,100	515,000	0	0
	Dec 1, 1974	439,800	550,000	0	0
5%	Nov 1, 1971	543,600	585,000	0	0
	Dec 1, 1971	635,200	615,000	20,200	330
	Nov 1, 1972	594,700	585,000	9,700	160
	Dec 1, 1972	643,000	615,000	28,700	470
	Nov 1, 1973	578,500	585,000	0	0
	Dec 1, 1973	628,000	615,000	13,000	211
	Nov 1, 1974	353,100	585,000	0	0
	Dec 1, 1974	439,800	615,000	0	0

1/ From Table 10.

correlated with the January through April available refill. Results are shown in Table 12 for the 95 percent assurance of refill (five percent risk) for three different volumes to be refilled. An example calculation using this data for the year 1971 through 1974 is shown in Table 13. The calculations in this table are consistent with those for the 5 percent risk of refill of the total allocated space in Table 11. Because of the extremely large forecasts in 1971, 1972, and 1974, almost the entire contents would have been available for release on January 1 with little danger to refill. In these three years the flood parameter curves of Figure 6 should govern releases beginning January 1. In the 1973 example in Table 13, about 87,000 acre-feet would have been available for release in January; again, this release would have caused some allocated space in Lucky Peak not to fill.

TABLE 12

RESERVOIR CONTENTS REQUIRED FOR 95% ASSURANCE OF REFILL

(ac-ft)

Space to be Refilled[1]	1st of Month - July 31 Forecast	Required Contents at Beginning of Month (ac-ft) January	February	March	April
Total Capacity (988,000 ac-ft)	1,400,000	910,000	840,000	720,000	640,000
	1,600,000	720,000	680,000	560,000	480,000
	1,800,000	540,000	530,000	390,000	330,000
	2,000,000	370,000	370,000	230,000	180,000
	2,200,000	190,000	190,000	80,000	20,000
Allocated Space (871,500 ac-ft)	1,400,000	790,000	720,000	600,000	520,000
	1,600,000	600,000	560,000	440,000	360,000
	1,800,000	420,000	410,000	270,000	210,000
	2,000,000	250,000	250,000	110,000	60,000
	2,200,000	70,000	70,000	0	0
All Space Excluding Lucky Peak (709,800 ac-ft)	1,400,000	630,000	560,000	440,000	370,000
	1,600,000	440,000	400,000	280,000	200,000
	1,800,000	260,000	250,000	110,000	50,000
	2,000,000	90,000	90,000	0	0
	2,200,000	0	0	0	0

[1] Does not include dead storage.

TABLE 13

EXAMPLE USE OF ASSURED REFILL WITH A 5% RISK OF COMPLETE FILL OF TOTAL ALLOCATED SPACE

(ac-ft)

Date	Date-July 31 Forecast	System Reservoir Contents	Required[1] Contents	Available for Release
Jan 1, 1971	2,255,000	705,500	30,000	675,000
Jan 1, 1972	2,242,000	674,500	30,000	644,500
Jan 1, 1973	1,686,000	617,200	530,000	87,200
Feb 1, 1973	1,520,000	599,100	630,000	0
Mar 1, 1973	1,224,000	645,600	760,000	0
Apr 1, 1973	952,000	707,000	870,000	0
Jan 1 1974	2,383,000	460,300	0	460,300

[1] Interpolated from Table 12.

The above examples illustrate that there is a potential to make earlier releases from the Boise River system if more risk is accepted for total refill. They show only a few of the many operations that could be adopted. As the risk of refill is increased and the volume of storage to be refilled is decreased, larger and earlier releases can be made. Prior to the availability of forecast data (November and December), releases impart a greater risk to refill. After forecasts become available, releases can be made with very small risk to refill when forecasts are above average.

Probable Runoff

A critical factor in flood regulation with the Boise system is evacuation of stored water during the months from January through March. To make the required releases, an estimate of probable runoff from the forecast date to April 15 must be made (see line 5, Table 8). The estimate of probable runoff is an average based on a relationship with forecast runoff to July 31 given in the Memorandum of Agreement. An inaccurate estimate of the probable runoff to April 15 can contribute to the failure to provide the required evacuation space. For example, in 1972 the required evacuation space was not attained, and the January through March runoff was much greater than the assumed average. A revision of the probable runoff relationship could include a greater degree of safety during the years of high runoff.

Recession Volume

Late in the refill period of flood regulation operation is based on the minimum space needed to control the remaining runoff to the maximum allowable release. An alternate method of space reservation late in the flood season could be based on the ability to refill with recession flows which are smaller than channel capacity, yet larger than irrigation requirements. Cursory studies by the Corps of Engineers indicate that in twenty of the years from 1941-74 recession volumes varied from 14,000 to 122,000 acre feet. An amount of space equal to the expected recession volume would be reserved until the flood peak had occurred. Estimation of recession volume from other parameters, such as snow, should be made to fully evaluate the potential of this type of operation.

Risk for Refill

As the Boise River system is now operated, there is little risk taken for refill of the system. Releases are made as late as possible in the evacuation period, and flood space requirements late in the fill period have no margin of safety. As shown previously in Table 7, it is also assumed that little forecast error exists at the end of the flood season. In 1971, 1972, and 1974 when runoff was far above average, the system was filled as early as possible. As discussed earlier, there is a large amount of storage which is unallocated and is usually not used, especially in years of high runoff. In most of the high runoff years, much of the allocated space also remains unused. Greater flood protection could be achieved by taking some risk on the refill of this space, and by including a safety margin for forecast error in the late refill season.

A previous section on "Available Refill Volume" has discussed an application using refill risk from the end of the irrigation season throughout the evacuation period. By making releases during the evacuation period as required by the regulation manual, a greater risk for refill would be taken. Making late season releases according to the probability of occurrence of recession hydrograph volumes, as discussed in the previous section, could also be used to provide a risk to refill.

The risk taken for total refill could be varied to any degree. More detailed studies would be necessary to identify the exact consequences of any proposal. However, taking some risk on refill would reduce the total amount stored in the Boise system in some years. If such a year were the first of a critical sequence of dry years, shortages would occur sooner. Late in the summer, Lucky Peak Reservoir would be drawn down earlier in some years with a loss to recreation. Releases from Lucky Peak Reservoir would tend to be greater and occur earlier in the flood control season.

Allowable Release

Important in the derivation of the flood space parameter curves is the allowable release. The amount of flood space required increases as the allowable release decreases. The allowable release presently used is that flow which limits the flow in the Boise River below Boise to 6500 cfs. Alternate operations could either increase or decrease the allowable release. The main consideration of such a change is the flood damage that would occur under alternate operations.

At the present time, complaints about the Boise River flood control operation are generated by the problems caused by river flows on the order of 7000 cfs or less. Even though the total flood damages at these flows are not great (see Table 4), the individuals having bank erosion or flooding are very concerned. To further complicate the situation, the extent of flooding for flows down to about 4200 cfs is nearly as great as that of 7000 cfs. Thus, in order to eliminate all flooding considered to be serious, flows on the Boise River would need to be maintained below 4200 cfs. If this were done, the probability of having large floods would increase markedly. Because these large floods cause extensive flood damages, operating the existing reservoirs with lower releases would increase average annual flood damages.

The greatest potential increase in flood damages that would occur by shifting to an operation with lower releases would be in Boise, although this type of operation would increase the average annual flood damages throughout the Boise River. In effect, by lowering the releases from Lucky Peak, flood damages in most years would be eliminated; but the probability of much larger flows than have been experienced since Lucky Peak was constructed would be increased.

In fact, to minimize average annual flood damages with existing channel conditions, it would be desirable to increase the flow objective below Boise to something on the order of 10,000 cfs. If this were done, average annual flood damages based on current conditions of development and price level would be reduced approximately $350,000. The reason for this is the same as discussed above; that is, by having higher releases, the chance of the reservoirs spilling so that the peak of a large rare flood must be passed is

substantially reduced. For example, at Boise under the existing operating plan, there is a two percent chance each year that flows in excess of 10,000 cfs will be experienced, or on the average once every 50 years flows at Boise will exceed 10,000 cfs. However, if the allowable releases were increased to 10,000 cfs below Boise, flows exceeding 10,000 cfs could be expected to be more infrequent than once every 200 years. While the higher release would provide more average annual benefits at Boise than the remainder of Ada County or in Canyon County, there would also be an increased average annual flood damage reduction in the other two reaches.

The above discussion illustrates that there is little potential to reduce the allowable release below 6500 cfs in the lower Boise River. To do so would increase the average annual damages caused by flooding. Even if the risk of refill were greatly increased to afford present level flood protection at a lower allowable release rate, average annual damages would still be greater at the lower rate. There is, however, potential to increase the allowable release rate. Doing so would increase the frequency of minor flood damage to some areas along the river, but it would reduce the risk of a major flood which would be more costly in terms of average annual damages. The maximum allowable release that should be considered is approximately 10,000 cfs in the lower river.

Dependability of Diversion

In the derivation of the flood space parameter curves, the allowable release was derived assuming diversions to the New York Canal of 1365 cfs in March and 2820 cfs from April through July. As discussed earlier, these diversions are often not made or are less than that assumed.

The Memorandum of Agreement states that "diversions to the New York Canal may infrequently be reduced below the diversion figures indicated above. When the above decreased diversions are required, it may be necessary to increase flow in Boise River below Diversion Dam." In the last ten years, 1965-74, diversions have averaged 185 cfs in March and 1510 cfs in April. Although the Agreement does permit increasing the release to compensate for the small diversions, there has been a reluctance to do this in March and early April because of the increased flooding it would cause. By the end of April diversions to other canals near Boise effectively reduce the flooding caused by releases greater than those originally assumed. In recent flood years the allowance for diversions in the allowable release has been as much as 4300 cfs in May and June.

The flood space parameter curves should be revised to reflect present diversions above Boise during the early irrigation season. In above average flood years the small March and early April diversions could limit evacuation capability. Even though present operation may try to compensate for reduced diversions, a more accurate estimate of the space required should be made.

CRITERIA FOR MAJOR FLOOD REGULATION

As stated previously, the reservoir system on Boise River does not provide complete flood protection and there is a two percent chance each year that a flood of 10,000 cfs or more will occur. While the Corps of Engineers' Regulation Manual contains a procedure for major flood regulation, no such procedure has been agreed to by the Bureau of Reclamation.

The Agreement states that major flood operations can begin when the forecast calls for space requirements greater than the total system flood space. A more comprehensive definition of an impending major flood is needed to cover all possible occurrences. Major flooding could occur when space requirements are less than the total system flood space if the space available is much less than that required. Under such circumstances it may be desirable to increase the releases above that presently allowed, to prevent passing a much larger flood peak.

If a major flood did occur, and the system did exceed the maximum allowable release, the expertise to regulate the flood to the minimum possible discharge is available in the Corps of Engineers. If this occurred, data such as soil moisture content, available storage, streamflow, and weather forecasts would be used in simulation models to choose the best operation. What is lacking is an adequate procedure between the operating agencies for defining major flood conditions and who should have control over the subsequent operation. The procedure in the Agreement for major flood operation is poorly defined and very vague.

The formulation of major flood criteria is considered to be one of the most urgent needs for improving flood operations of the Boise River. Although such criteria would not be used most of the years, it has perhaps the greatest potential to afford better overall flood protection for the Boise Valley.

FLOOD SPACE DISTRIBUTION AMONG RESERVOIRS

Of the total flood space required in the three reservoir Boise River system, no more than 40 percent can be provided at Anderson Ranch Dam. In some years power production at Anderson Ranch may be limited because the resulting space provided from power releases cannot be counted as flood space. There are indications based on preliminary studies by the Bureau of Reclamation that the percent of flood space effective at Anderson Ranch could be varied with runoff potential. These studies show that for low runoff years, the percent effective space in Anderson Ranch could be increased.

A set of parameter curves similar to those used to establish system flood space requirements could be used to control the space distribution among reservoirs. These parameter curves would relate forecast runoff and/or other variables to the expected inflow below Anderson Ranch Dam in excess of the downstream channel capacity with sufficient factors to allow for forecast errors.

A study should be made to determine the maximum percent effective space that can be provided at Anderson Ranch. Once this information is available, the consequences of adopting new flood space criteria should also be analyzed. Preliminary estimates are that there is potential for an average increase of 10 MW in power production during the three month period March-May. Studies should include the impact on the change in reservoir contents of Anderson Ranch Reservoir and its refill capability. Although this alternate operation could improve power production, there would be no potential for providing increased flood protection.

CHANNEL CAPACITY

In a previous section, the problems associated with reducing reservoir releases to meet existing channel capacities were discussed. The alternative exists to physically change the capacity of the Boise River channel so that greater major flood protection can be made available with no increase in local flooding. Increasing the capacity of the channel to carry more flow can be accomplished by clearing and enlarging the existing channel, building levees, or a combination of the two.

The maximum channel capacity that should be considered is about 10,000 cfs, the approximate capacity of Boise River through Boise. Because of bridges, utilities, and other developments across and adjacent to the river, it is impractical to consider enlarging the river through Boise. In addition, if there were sufficient capacity in the river to release 10,000 cfs, the upstream reservoirs could be operated to significantly reduce the chance of greater floods occurring.

Enlarging the Boise River from Boise to the mouth would involve large costs and cause major environmental alterations. Channel enlargement would eliminate many islands used by wildlife, destroy fish habitat, and adversely affect all semi-aquatic birds and mammals. Enlargement would provide greater flood damage reduction than levees because flows could be carried at a reduced height which would help alleviate high groundwater conditions adjacent to the river. Channel enlargement would not be permanent because the river would continue to shift and build up a gravel base which would have to be removed to maintain the channel capacity. Nearly continuous riprap would be required to avoid bank erosion.

Seventy percent of the river below Boise has levees of various kinds. These have been built by local people and by the Corps of Engineers during emergency flood situations. In many cases the levees are inadequate to withstand other than minor flood flows. Levees might be constructed on the river bank or set back from the river. Continuous levees constructed along the river bank would have to be riprapped, thus destroying streamside vegetation. In addition, the riprap would be placed below the river channel to avoid being undermined; consequently, the channel would have to be disturbed during construction.

Offset levees could be beneficial to fish and wildlife habitat. It would be necessary to reserve the area between the river and the levees for cattle grazing or other uses that could withstand flooding with minimum damage. Much of the wildlife habitat would be protected as opposed to the present situation where this habitat is being cleared away to provide for more intensive agriculture.

From a practical standpoint, it appears that any efforts to increase channel capacity would involve a combination of channel clearing, streambank levees and offset levees. Channel clearing should be restricted to a few locations where the capacity has been severely limited. Streamside levees should be restricted to those reaches where the existing ones are rather adequate. In the remaining reaches the levees would be set back from the river. To effectively allow modification of reservoir operations, channel capacity changes would have to be made along the entire river. To do otherwise would result in increased frequency of flood problems for the unprotected areas.

There is potential to increase flood protection along Boise River by increasing the channel capacity. Areas along the entire river below Lucky Peak would benefit by greater

flood protection. This includes additional protection through Boise as well as in the reaches where the actual enlargement would be made. For this reason economic evaluation of the levees should involve crediting of damage reduction through Boise to the downstream levees. Overall feasibility of channel enlargement will be determined by the Corps of Engineers in the Levee Restudy which will be completed by the summer of 1975.

Regardless of results of the Levee Restudy, private levee construction will continue. In order to prevent further restriction of channel capacity, a plan for proper placement of these levees is needed. Such a plan could best be prepared by the flood control districts with assistance of the Idaho Department of Water Resources and the Corps of Engineers.

FLOOD PLAIN ZONING

Potential increases in future flood damages on Boise River could be controlled by enforcement of flood plain zoning. However, the flood damages that have been experienced in recent years will not be substantially affected by zoning. Most of the recent flooding has been on agricultural land and zoning would not affect the continued use of the flood plain for agriculture. Zoning would control the addition of flood-prone structures. As there is limited structural development in the flood plain outside of Boise, adopting and enforcing flood plain zoning could be very effective in preventing future escalation of structural flood damage.

The National Flood Insurance Program administered by the U. S. Department of Housing and Urban Development makes flood insurance available at reasonable costs to those located in flood-prone areas. However, for residents to qualify for this insurance it is necessary for the governing body having zoning jurisdiction to adopt flood plain control measures. No later than one year after identification of a flood hazard area, all lending institutions under Federal supervision must require flood insurance for structures located in that area before making loans. However, this insurance is largely limited to structures and their contents and does not, for example, provide flood insurance for crop losses.

The major flood areas below Lucky Peak Dam are located almost entirely in Ada and Canyon counties. The Corps of Engineers' reports "Flood Plain Information, Boise, Idaho and Vicinity" and "Flood Hazard Report, Caldwell, Idaho and Vicinity", will adequately define flood prone areas along Boise River from Barber Dam to the Canyon County line and through Caldwell. This information will be used by the Department of Housing and Urban Development to prepare flood hazard area maps for the cities and counties. Maps already prepared include the cities of Eagle, Garden City, Middleton, Caldwell, Parma, Nampa, and Boise.

Once flood hazard maps are presented to the cities and counties, they must resolve within one year to use the maps in evaluating the issuance of building permits in the flood plain in order for builders to qualify for flood insurance and thus qualify for loans from federally supervised lending institutions. At present none of the mapped cities have passed such resolutions. Zoning is particularly important in the city of Boise where flood plain encroachment has occurred. The major reason for official reluctance to zone for floods is fear that property values in flood hazard areas will decrease. The Idaho Department of Water Resources, as the state coordinating agency for flood insurance, has encouraged cities

and counties to adopt resolutions or zoning regulations necessary to qualify for insurance. This has been done in cooperation with the Department of Housing and Urban Development and the Corps of Engineers through public workshops and other information programs. The effort will be continued so that local authorities will be kept informed of the benefit and consequences of flood plain management programs.

ADDITIONAL STORAGE

Additional flood storage could be gained by constructing another reservoir on Boise River. For example, the Corps of Engineers has proposed a reservoir on the Boise River with an active capacity of 490,000 acre-feet. Such a reservoir could be used to provide present level flood protection at a lower allowable release, greater major flood protection at the present allowable release rate, or some alternative between these two.

The major disadvantage of construction of another reservoir is the loss of a free-flowing portion of the Boise River. The net effect on fish and wildlife resources would most likely be detrimental. Further study of new reservoirs on Boise River should not be made until all nonstructural alternatives such as zoning and reservoir re-operation have been improved to the maximum possible extent.

Additional flood storage could also be provided by enlarging the existing reservoirs. The possibility of raising Lucky Peak Dam or Arrowrock Dam is presently being studied by the Corps of Engineers.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

Of the alternative operations described in this report, some could be adopted under the existing Agreement. Included among these are the use of a common runoff forecast procedure, strict interpretation of the Memorandum of Agreement, modification of allocated flood space, and modification of the maximum allowable release. Changes concerning these items are allowed by the Memorandum of Agreement between the operating agencies. Instituting a change would, however, be difficult. Agreement would have to be reached between the Corps of Engineers and the Bureau of Reclamation on the desirability of a change and the exact form of the change. Recommendations of this report on short term changes can only urge the two agencies to modify present operation.

Other management alternatives require revision of the Memorandum of Agreement, the completion of new studies, or both. Revision of the flood space parameters and addition of major flood criteria involve revision of the Operating Manual and the Agreement. This process would be lengthy not only because of the studies that would have to be completed, but also because agreement between the Corps of Engineers, Bureau of Reclamation, and possibly, the State of Idaho, would have to be reached. Agreement between the agencies would be difficult because the Bureau of Reclamation is chiefly concerned with assuring maximum reservoir fill for irrigation, while the Corps of Engineers has more adequate flood control as a primary goal.

Both agencies do agree, however, that Regulation Manual revision is needed, and that the present manual could be improved. It is the principal recommendation of this report that preparation of a new Regulation Manual and Agreement be initiated as soon as possible, and the subjects treated in this report be incorporated in the revision. The manual should be prepared jointly by the Corps of Engineers and the Bureau of Reclamation with the consultation of the State of Idaho. To eliminate the present confusion concerning the differences between the Regulation Manual and the Agreement, a new Agreement should recognize the Regulation Manual as the determiner of all reservoir operations. Provision should be made for frequent updating.

Structural alternatives, such as channel clearing, new or rebuilt levees, and new reservoirs are much longer range than operation revision. Extensive study and public authorization of such projects would be necessary. In addition, the Idaho Water Resource Board has stated as a water planning objective "the preference of management over structural

alternatives in reducing or preventing flood damages." New reservoirs, because of public attitudes, are not desirable at the present time. The social and economic feasibility of a combination of channel clearing and levee construction will be much better defined upon completion of the Corps of Engineers' "Boise Valley Levee Restudy."

The various sections of this report contain conclusions concerning present and future flood operations on Boise River. Many of these are technical in nature and are not repeated here. The report was prepared as a result of inquiries regarding the sequence of low fall flows followed by relatively high spring releases. That flow sequence occurs because it is impossible to forecast seasonal runoff until information on the accumulating snowpack becomes available in January. In years of large runoff the January forecast may indicate the need to begin reservoir evacuation for flood control. The allowable release which now occurs during the flood regulation season was apparently the principal cause of the complaints regarding the flood control operation. Recommendation number four, below, does not satisfy the desire of some landowners for a lower regulated release. The capability to evacuate required flood control space is marginal during some years because of the 6500 cfs allowable release. The allowable release is discussed on pages 56 and 57.

The report concludes (page 56) that increased releases in the fall months could be made only by accepting a greater risk of refilling the system. Various levels of risk associated with increased fall releases were presented in Tables 10 and 11. These early releases could shorten the period during which maximum allowable releases (6500 cfs) are required, but would not eliminate the need for such releases in most years.

The effect of taking a greater refill risk on irrigated agriculture and reservoir recreation has not been evaluated. The purpose of this report has been to examine the various potentials for improving the flood control operation but not to select a preferred operation. Several levels of refill risk have been discussed and each would have a different impact. In the detailed studies for manual revision, the trade-offs between flood control and other reservoir uses should be evaluated before a new operating plan is selected.

It is concluded that the flood control objective of 6500 cfs on the Boise River system has been successfully met since the present operating plan became effective in 1954. During that period, there would have been four springtime floods of greater than 20,000 cfs if there had been no reservoirs in the system.

Following are major recommendations concerning Boise River flood control.

(1) A new Reservoir Regulation Manual should be prepared with appropriate supporting Agreement.

(2) Beginning in 1975, releases during the evacuation period should be determined by averaging the computed release over the remainder of the period as defined in paragraph 6c of the present Agreement.

(3) A procedure should be developed to use a portion of the space in Lucky Peak Reservoir to provide greater flood protection for the occurrence of a major flood. Decisions must be made regarding the degree of flood protection desired in relation to reservoir refill risk.

(4) The present maximum release from Lucky Peak Reservoir of 6500 cfs below Boise should not be decreased. Consideration should be given for an increase in the maximum release.

(5) A single forecast procedure for reservoir operation should be developed and put into use as soon as possible. Feasibility of automating the existing snow course network for continuous monitoring should be examined.

(6) The cities and counties within the Boise River flood plain should take the necessary steps to qualify for flood insurance. This should be accompanied by programs to develop public awareness of flood hazard areas.

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IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA	)	Subcase No. 63-03618
	)	
Case No. 39576	)	REPLY BRIEF IN SUPPORT OF THE UNITED
	)	STATES' MOTION FOR SUMMARY
	)	JUDGMENT
	)	

Introduction

The Objectors ask this Court to overturn a licensed water right first permitted by the Idaho Department of Water Resources ("IWDR") more than twenty years ago. As a threshold matter, their challenges must be barred because they are collateral attacks on the IDWR's decision to permit and license the streamflow maintenance water right. The Objectors' argument that the Director of the IDWR proceeded under the wrong statute in permitting and licensing the streamflow maintenance water right, if accepted, would obviate the water right entirely. In its decision in Subcase 91-63, this Court found that wholesale challenges to a water right such as the Objectors are improper collateral attacks which must be barred. That

conclusion applies equally here. Not only must all facial challenges to the water right be barred, but there is no persuasive reason to permit reconsideration of any of the elements of the water right.

Second, the Objectors' argument that the water right should have been established by the Idaho Water Resources Board ("IWRB") pursuant to the instream flow program in Idaho Code Title 42, Chapter 15 ignores a practical reality: without Lucky Peak Dam and Reservoir to divert and store the water, there could be no water right because the dam is necessary to divert and store the spring run off so that it can be released over the course of the winter.

Third, while the Objectors' desire to ensure that the Streamflow Maintenance water right does not interfere with their contractual entitlements is understandable, the remedy they seek – having the Streamflow Maintenance water right designated for irrigation purposes as well – is wholly unnecessary. The government's response brief explained that the irrigators have *never* been shorted the "make up" water they are entitled to under the 1953 Memorandum of Agreement and its implementing contracts. Below, we explain why: the "make up" water is not taken from the streamflow maintenance account; rather the "make up" water never goes into the streamflow maintenance account.

I. THE OBJECTIONS MUST BE BARRED BECAUSE THEY ARE IMPROPER COLLATERAL ATTACKS ON A LICENSED WATER RIGHT.

The objections must be barred because they are collateral attacks on an administrative decision by the Idaho Department of Water Resources that should have been raised more than twenty years ago. The Objectors argue they should be allowed to circumvent the process for review of state administrative decisions because their challenges fall within the exception to the rule barring collateral attacks that this Court recognized in Consolidated Subcase 91-63. To the contrary, this Court's analysis demonstrates that the objections must be barred.

First, the objections that the streamflow maintenance water right was licensed under the wrong statute, if accepted, would eviscerate the entire water right. As this Court observed, such challenges are improper collateral attacks because they "should have been raised in the prior proceedings." Memorandum Decision and Order on Cross-Motions for Summary Judgment, SRBA Subcase No. 91-63 (Sept. 2, 2004) at 30 ("91-63 Order"). Second, the controlling law, as well as the facts are the same today as they were in 1985; therefore, there is no reason to re-examine the elements of the Lucky Peak storage water right.

A. This Court's Decision in Subcase 91-63 Establishes that Objections Which Seek to Obviate a Licensed Water Right, as Those Here Do, are Improper Collateral Attacks Which Must be Barred.

As this Court explained in its decision in Subcase 91-63, "[t]he law of the case in the SRBA precludes the outcome of an administrative license proceeding from being collaterally attacked in the SRBA." 91-63 Order at 12. Collateral attacks are barred because "[t]he exclusive remedy is (was) to contest the permit application in the proper administrative proceeding and if necessary through judicial review pursuant to the Administrative Procedures Act."[1] *Id.* Precluding collateral attacks is especially important in an adjudication because "[f]inality in water rights is essential." *State v. Nelson*, 131 Idaho 12, 16, 951 P.2d 943, 947 (1998). That is particularly true here, where the thousands of Idahoans who have come to rely on the winter flows in the Boise River made possible by the streamflow maintenance water right are not parties to the case. *See Nevada v. United* States, 463 U.S. 110, 144 (1983).

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[1] This Court's recognition that the proper time to challenge a licensed water right is at the time of the permit application demonstrates that there is no merit to Nampa & Meridian Irrigation District's suggestion that the Lucky Peak water right is not entitled to preclusive effect because the license was not formally issued until three days after the Director's Report. *See also Matter of Permit No.* 47-7680, 114 Idaho 600, 604-05, 759 P.2d 891, 895-6 (1988) (also illustrating that the proper time to challenge IDWR's decisions regarding a water right is at the time a permit is issued or amended).

The Objector's primary argument is that the water right should have been licensed under the instream flow program, I.C. § 42-1501 *et seq.* It is undisputed that Objectors could have brought that argument at the time application to amend its permit was approved. Indeed, both the Idaho Board of Water Resources and the Idaho Department of Water Resources expressly considered that argument – and rejected it. *See* Idaho Water Resources Board, Agenda Item No. 8, Dec. 13, 1984 (Exhibit W to the AFFIDAVIT OF DAVID A. JARVIS); IDWR Issue Paper at 2 (Exhibit F to the AFFIDAVIT OF JERRY A. KISER, dated Oct. 12, 2007) ("KISER AFFID.").

If this Court were to reconsider the administrative agencies' decisions and accept the Objectors' argument, the consequence would be divest the United States of its water right entirely, since only the Idaho Board of Water Resources can hold a water right established under Title 42, Chapter 15.[2] As this Court recognized in Subcase 91-63, collateral attacks which would have the effect of stripping the license holder of his right entirely cannot be heard:

> [T]o the extent the Irrigation Entities seek to obtain full title (on behalf of their members) to the subject water rights - that . . . would be a collateral attack on the prior decree or license. That issue should have been raised in the prior proceedings.

Id. at 30. Accordingly, this Court's decision in Subcase 91-63 demonstrates that the Objectors' claim that IDWR proceeded under the wrong statutory program must be barred and the streamflow maintenance water right sustained.[3]

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[2] The Boise Project Board of Control ("BOC") argues that its objection merely challenges the beneficial use of the water right. BOC RESPONSE TO MOTIONS FOR SUMMARY JUDGMENT, dated Nov. 14, 2007 at 8 ("BOC RESP. BRF."). But it does so by arguing that the beneficial use confirmed by the license can only be made by the Idaho Water Resources Board. *Id.* at 5. Thus, the Board of Control, like the other Objectors, attacks the validity of the entire water right.

[3] The Objectors, particularly Pioneer and Settlers, strive mightily to avoid that conclusion by urging this Court to construe their argument that IDWR acted under the wrong statute as alleging the Director exceeded his statutory authority in violation of Idaho's constitution. That argument must fail because the Director has been tasked with implementing both water rights

B. There is No Compelling Reason to Re-examine any of the Elements of the Streamflow Maintenance Water Right.

This Court's decision in Subcase 91-63 observed that the *elements* of a licensed water right are not entirely immune from re-examination because those elements "can subsequently be changed voluntarily such as through contract or by operation of law (*i.e.*, forfeiture or abandonment)." *Id.* Some of the Objectors ask this Court to add an irrigation component to the Streamflow Maintenance water right in order to protect contractual interests established by a 1953 Memorandum of Agreement and implementing contracts.[4] As is explained in Section III, *infra*, there is no basis to do so because the irrigators have not made beneficial use of the streamflow maintenance water and no need to do so because the State's accounting program is hardwired to protect those contractual interests.

Even if that were not the case, the objections should be barred because the

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program at I.C. § 42-201, *et seq.*, and the instream flow water rights program at I.C. § 42-1501, *et seq.* Accordingly, even if the Director had acted under the wrong program, he would merely have erred; he would not have exceeded the authority available to him by statute. Even if that were not the case, allegations that statutory authority has been exceeded are not constitutional questions. *E.g., Bivens v. Six Unknown Fed. Narcotics Agents*, 403 U.S. 388, 396-97 (1971) (distinguishing between "actions contrary to [a] constitutional prohibition," and those "merely said to be in excess of the authority delegated . . .by the Congress"). Finally, there is no merit to Pioneer and Settlers' argument that the Director violated Idaho's constitution because the permit approval was not presented for approval by "concurrent resolution of the Idaho legislature" as would have been required under the instream flow statute. *See* I.C. § 42-1503. First, as is explained *infra*, the instream flow statute is inapplicable because the streamflow maintenance water right is predicated on the diversion and storage of water. Second, the Idaho Supreme Court has repeatedly found that legislative actions taken by concurrent resolution violate the enactment and presentment provisions of the Idaho Constitution. *E.g., Idaho Power Co. v. State*, 104 Idaho 570, 574, 661 P.2d 736, 740 (1983). Indeed, in light of that, the Idaho Attorney General has concluded that I.C. § 42-1503 is itself unconstitutional. Attorney General Opinion No. 87-6 (Exhibit MM to the THIRD AFFIDAVIT OF DAVID A. JARVIS).

[4] The 1953 Memorandum of Agreement was attached as Exhibit E to the AFFIDAVIT OF DAVID A. JARVIS. Examples of the implementing contracts were provided at Exhibits B and C to the AFFIDAVIT OF JENNIFER A. STEVENS.

rationale which led this Court to re-examine and clarify the title issue does not apply here. In Subcase 91-63 this Court found that the title element of the water rights needed to be clarified in light of the Supreme Court's direction in *Ickes v. Fox*; some of the United States water rights had been decreed prior to the decision and even those licensed after did not reflect the decision. Here, in contrast, there is no judicial decision (re)defining an element of the water right. Moreover, in 91-63 there was a significant dispute between the parties over the terms of the governing law. Here, in contrast, there is no dispute over the terms of the governing contracts. Indeed, the United States has reiterated its commitment to the provisions of the 1953 Agreement and implementing contracts. *See* RESPONSE BRIEF IN SUPPORT OF UNITED STATES' MOTION FOR SUMMARY JUDGMENT, Dated Nov. 14, 2007 at 11-12. In short, there is no compelling reason today, twenty years after the Objectors had an opportunity to protest the terms of the permit, to allow them to collaterally attack and redefine the elements of the Streamflow Maintenance water right.

II. THE LUCKY PEAK LICENSE AND WATER RIGHT DO NOT CONFLICT WITH TITLE 42, CHAPTER 15 OF THE IDAHO CODE.

Each of the irrigation entities argues that the streamflow maintenance water right for Lucky Peak cannot be affirmed because it was not licensed pursuant to the requirements of the instream flow statute found at I.C. § 42-1501 *et seq.*[3] Pioneer and Settlers Irrigation Districts additionally assert that the establishment of the United States water right was "backhanded" because it was done by a transfer rather than as a new appropriation. PIONEER

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[3] Several of the irrigation entities also characterize the United States as arguing that federal law pre-empts state law and allow it to release water for streamflow maintenance purposes regardless of the storage water rights. That is not the case. Several of the objections filed suggested that the irrigators believe that Lucky Peak Reservoir is not authorized to release water for streamflow maintenance. Accordingly the United States explained the statutory basis for Lucky Peak's operation authorizes releasing water to maintain streamflows.

AND SETTLERS' RESPONSE TO UNITED STATES BUREAU OF RECLAMATION'S MOTION FOR SUMMARY JUDGMENT, dated November 14, 2007 at 11 ("P & S RESP.").

Pioneer and Settlers' argument merely illustrates one reason why the Objectors are wrong in arguing that Lucky Peak could only have been established pursuant to the instream flow program. At the time the United States filed an application to amend its permit in 1984, it had a permit which authorized it to store up to the full content of Lucky Peak reservoir. Permit No. R 1183 (Exhibit II to the AFFIDAVIT OF DAVID A. JARVIS). Consequently, there was no water available for appropriation under Title 42, Chapter 15.

Further, there was no basis for the water right to have been established under the instream flow program. Title 42, Chapter 15, was enacted to "provide an express, generally applicable procedure for the appropriation of water *where no physical diversion is involved.*" STATE OF IDAHO, DEPARTMENT OF FISH AND GAME'S BRIEF. . . dated Nov. 14, 2007 at 10 ("STATE BRF.") (emphasis added). Here, in contrast, the natural flow of the Boise River is diverted into Lucky Peak Reservoir and stored. *See* BOC RESP. BRF. at 5-6; STATE BRF. at 5. The dam and reservoir are critical to the operation of the water right because they allow water to be captured during the high flows of the spring and stored so that it is available for use over the winter when it is needed to maintain streamflows for the benefit of fish, wildlife, recreation, aesthetics and other purposes. Thus, as the Idaho Board of Water Resources, the entity charged with administering Title 42, Chapter 15, explained "[t]he dam is considered to be the diversion for a storage water right, and if the streamflow maintenance uses can be considered to be beneficial, a valid water right can be constituted." Idaho Water Resources Board, Agenda Item No. 8, Dec. 13, 1984 (JARVIS AFF., Ex. W).

Only Pioneer and Settlers argue that streamflow maintenance is not a beneficial

use. P & S RESP. at 12-13. Those irrigation districts suggest that because the instream flow statute provides that the preservation of "the minimum stream flows required for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, transportation and navigation values, and water quality" is a beneficial use when done pursuant to the instream flow act, similar uses cannot be beneficial in any other context. *Id.* at 7. Pioneer and Settlers again miss the point.

First, as IDWR recognized in its consideration of the permit application, in light of Title 42, Chapter 15, "the precedent for recognizing such uses is established in Idaho law." IDWR Issue Paper at 2 (KISER AFFID., EX. F). Apart from that, the fact that providing water to protect fish and wildlife habitat, aquatic life, recreation, aesthetic beauty and water quality purposes, as the streamflow maintenance releases do, is a beneficial use in the context of the instream flow program, does not mean that those uses cannot be beneficial when applied to a water right predicated on the diversion of water. Indeed, if that were the case, no fish farm could establish beneficial use. *Cf. Faden v. Hubbell*, 28 P.2d 247, 250-51 (Colo. 1933) ("[i]t is self-evident that water diverted and employed for the propagation of fish is devoted to a useful purpose").

Not surprisingly, the uses encompassed within the umbrella term "streamflow maintenance" are widely accepted as beneficial uses. As the United States explained in its opening brief, the use of water to sustain fish and wildlife is recognized as a beneficial use of water throughout the west, including Idaho. U.S. OPEN. BRF. at 16 n. 11; *Stott By and Through Dougall v. Finney*, 130 Idaho 894, 950 P.2d 709 (Idaho 1997) (dams and reservoirs serve "beneficial uses such as flood control, power generation, recreation, and providing beneficial environments for fish and wildlife"); *State v. U.S.*, 134 Idaho 106, 996 P.2d 806 (Idaho 2000)

(the exception to requirement of a diversion for stockwater uses "does not extend to beneficial use for wildlife habitat"). Similarly, recreation and aesthetic beauty are also well established as beneficial uses. *See e.g. Phelps Dodge Corp. v. Arizona Dept. of Water*, 118 P.3d 1110, 1112 (Ariz. Ct. App. 2005) (Arizona's statute for "general water usage rights" recognizes recreation and fish and wildlife as beneficial uses); *In re Adjudication of the Existing Rights to the Use of all of the Water, Both Surface and Underground, Within the Missouri River Drainage Area*, 55 P.3d 396 (Mont. 2002) (affirming water rights established by diverting water for fish, wildlife and recreational uses); *Hallauer v. Spectrum Properties, Inc.*, 18 P.3d 540 (Wash. 2001) (beneficial uses include fish and wildlife maintenance and enhancement, recreation and preservation of environmental and aesthetic value); *see also Idaho Dept. of Parks v. Idaho Dept. of Water Admin.*, 96 Idaho 440, 443-444, 530 P.2d 924, 927-28 (1974) (noting that "numerous other western states have recognized through legislation that utilization of water for scenic or recreational purposes is a beneficial use.").

In short, the streamflow maintenance component of the Lucky Peak storage water right "was perfected in accordance to Idaho law" because the dam serves as a diversion device and the water is applied to a beneficial use. *See* STATE BRF. at 10.

III. THERE IS NO BASIS TO DESIGNATE THE STREAMFLOW MAINTENANCE WATER RIGHT FOR IRRIGATION USE.

The final issue raised by the irrigators does not go to whether the streamflow maintenance water right should exist, but rather, whether the "purpose of use" element should include irrigation as well as streamflow maintenance. The irrigation entities claim that designation is necessary to preserve the United States' ability to continue to meet its obligations under the 1953 Memorandum of Agreement and its implementing contracts. The United States does not dispute that the 1953 Agreement and its implementing contracts require Reclamation to

make Anderson Ranch and Arrowrock irrigation contractors whole when flood control operations leave less water in Anderson Ranch or Arrowrock Reservoirs than would have been there in the absence of flood control operations.[6] The Objectors' arguments, however, proceed from a fundamental misunderstanding. Contrary to their assertions, the "make up" water is not taken from the streamflow maintenance water right. Instead, IDWR's accounting program ensures that the Anderson Ranch and Arrowrock contractors are made whole before any water is made available to the streamflow maintenance account.

The AFFIDAVIT OF MARY MELLEMA explained that watermaster records demonstrate that Anderson Ranch and Arrowrock spaceholders have been kept whole in each year flood control operations have occurred since coordinated reservoir operations began in 1955. AFFIDAVIT OF MARY MELLEMA, dated Nov. 13, 2007 at ¶ 6. Ms. Mellema is a Reclamation employee and did not have the expertise to explain how IDWR's water rights accounting ensures that will happen. The attached AFFIDAVIT OF ROBERT J. SUTTER, former Hydrology Section Manager for the IDWR and author of the programs used to account for the reservoir water rights, provides that explanation.[7]

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[6] Flood control operations are explained *infra*. The Board of Control argues that the contracts require Reclamation to provide water "whenever flood control activities have prevented the filling of the upstream reservoirs." BOC RESP. BRF. at 2. That is not correct. The measure is not whether the reservoirs have filled. Rather it is whether flood control operations have left less water than would have been there absent those operations. *See* 1954 Contracts, Exhibits B and C to the AFFIDAVIT OF JENNIFER A. STEVENS at ¶ 7(a).

[7] Counsel for Pioneer and Settlers' deposition of Ms. Mellema illustrated that she (like most Reclamation employees) has had no direct experience with IDWR's accounting system. The conclusions she drew however, relied on after-the-fact records and therefore did not require knowledge of the accounting process. In any event, Mr. Sutter has affirmed her conclusions and provided a detailed explanation of IDWR's water rights accounting. In the event counsel want to depose Mr. Sutter pursuant to I.R.C.P. 56(e), he can be available for deposition on February 21, or such other date as is mutually convenient for the parties.

As Mr. Sutter explains, the accounting for the project reservoir water rights is done by IDWR, in conjunction with the Boise River Watermaster, pursuant to two computer programs administered by the IDWR. One, the Accounting Program, accounts for the water rights of the three reservoirs. The second, the Allocations Program, allocates storage within each reservoir to the various spaceholders. *See* AFFIDAVIT OF ROBERT J. SUTTER at ¶ 2.

The water year for the reservoir system begins November 1. *Id.* at ¶ 3. As the reservoirs begin storing water, the Accounting Program accounts for the volume of water stored in each of the three reservoirs, but no water is allocated to individual accounts within each reservoir. *Id.* at ¶ 4. At some point, typically in April or May but sometimes as late as July, the three reservoirs reach the maximum storage credit they will achieve during the year. *Id.* at ¶ 5. Whenever that maximum storage point is reached, the Allocations Program is run to allocate the water within each reservoir to the specific accounts, including the irrigation contractors and the Streamflow Maintenance account. *Id.* Delivery of the Streamflow Maintenance water does not occur until months later in the fall. *Id.* at ¶ 11. In "normal" years where there are no flood control operations, water is allocated proportionally according to the contracts, and the specific contractual provisions the irrigation entities have raised here do not come into play. *See id.* at ¶ 6a.

The accounting process is more complicated in the years when water has been released for flood control purposes. Flood control operations occur during high water years and result in water being evacuated from the reservoirs in order to ensure that there is space available to capture the spring run off. *Id.* at ¶ 6(b). While the water is being physically released from the reservoir system, water flowing into the reservoirs is credited to the reservoirs on paper. *Id.* at ¶¶ 7-8. After the reservoir rights have filled on paper, that refill water is designated as

"unaccounted for" storage. *Id.* at ¶ 8. As the reservoirs begin to refill, the "unaccounted for" storage account continues to be credited on paper as long as excess natural flow is available to the system. *Id.* at ¶¶ 7-8. The reservoirs remain filled on paper for the duration of the season. *Id.* at 9.

Ideally, the reservoirs capture enough "unaccounted for" storage to match the paper fill in the accounting system. *Id.* at ¶8. In some years, however, more water is released for flood control than is subsequently captured from the run off. When that happens, the shortfall is termed "failure to refill due to flood control" *Id.* Regardless of where the shortfall is physically located, the Allocations Program then subtracts the "failure to refill" amount from the Lucky Peak Reservoir paper fill because Lucky Peak is the junior reservoir.[8] *Id* at ¶ 10. As noted above, the Arrowrock and Anderson Ranch water rights were already filled on paper prior to the operation of the Allocations Program and remain full throughout the process. *Id.* at 9. That explains why the United States has unfailingly met its contractual obligations to the Arrowrock and Anderson Ranch spaceholders *without* having to rely on water from the Streamflow Maintenance account: IDWR's accounting system is hardwired to ensure that Arrowrock and Anderson Ranch remain full on paper regardless of which reservoir(s) may not have physically refilled during flood control operations and regardless of the status of any account in Lucky Peak.

In short, the irrigation water needed to fulfill the United States' contractual obligation is not taken *from* the streamflow maintenance account. Rather, the water needed for

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[8] The accounting can ignore the physical location of the shortfall because the three reservoirs are operated as a unitary system and the contracts allow water to be provided from any of the reservoirs. *See* Act of August 24, 1954, 68 Stat. 794 (1954); *see also* AFFIDAVIT OF ROBERT J. SUTTER at ¶ 4.

the irrigation contracts never goes into the streamflow maintenance account.[9] Because water need for irrigation never enters the streamflow maintenance account, the irrigators do not make beneficial use of the streamflow maintenance water right and there is no basis to burden the streamflow maintenance water right with an irrigation designation.

Conclusion

The Objectors bring collateral attacks that seek to eviscerate entirely the water right licensed to the United States. Those attacks come more than twenty years after the fact and there is no compelling reason to allow them to be heard now. Even if the objections were not required to be barred as improper collateral attacks, they must be rejected because the licensed water right was established in full conformity with Idaho law. Lucky Peak dam serves as the diversion and there is no question that fish propagation and the other uses encompassed with the streamflow maintenance label are beneficial uses under Idaho law. Finally, the United States' contractual obligations provide no basis for redefining the purpose of use element of the water right. The United States meets, and unfailingly has met, its contractual obligations, without using streamflow maintenance water for irrigation purposes, and the reservoir accounting system used by the watermaster and IDWR renders Objectors' request for relief inapposite and unnecessary.

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[9] Moreover, the system of accounting used effectively gives the irrigators a better deal than called for under their contracts. The contracts provided that any "shortage" of storage caused by flood control operations would be split pro-rata among all water uses. 1954 Contracts, Exhibit B and C to the AFFIDAVIT OF JENNIFER A. STEVENS at ¶ 7(a). Thus under the contracts, each irrigation contractor and the streamflow maintenance account would share the shortage in direct proportion to their share of the total storage space. In contrast, under the accounting specified in the Water Control Manual, when the available water is allocated among the various accounts, 60,000 af of the streamflow maintenance account is treated as "last to fill" water. Thus, as a practical matter the first 60,000 acre-feet of any shortage is borne by the streamflow maintenance account rather than other Lucky Peak spaceholders.

Dated this 14th day of February, 2008.

Respectfully submitted,

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ATTORNEYS FOR THE UNITED STATES

Juno e-mail for bsutter@juno.com printed on Thursday, February 21, 2008, 11:22 AM

Dave,

I reviewed the attachments to Mary's affidavit which show charts from the Boise River Watermaster reports for the years when there was a failure to completely refill after a system flood control operation.

For years prior to the adoption of the new Water Control Manual and accounting procedures (1972, 1975, 1976, 1978):

For these years, Mary has attached Charts 10 and 11 from the annual watermaster reports. Chart 11 lists the space allocations in acre-feet for Arrowrock, Anderson Ranch, and Lucky Peak Reservoirs by user or entitlement. This is the amount of water that would be allocated if the reservoirs filled completely. The space allocation in all of these years in Arrowrock, Anderson Ranch, and Lucky Peak reservoirs was 286,600 acre-feet, 423,200 acre-feet, and 278,200 acre-feet, respectively.

Chart 10 lists the amount of water that was actually allocated to each reservoir by user or entitlement. From Chart 10, it can be seen that Arrowrock and Anderson Ranch reservoirs were allocated a complete supply of water even though the system did not completely refill after the system flood control operation. This means that all individual accounts in Arrowrock and Anderson received a 100 per cent supply of water. From Chart 10 it can also be seen that the amount by which the system failed to refill after flood control was shared proportionally by *all* users and entitlements in Lucky Peak.

For years after the adoption of the new Water Control Manual and accounting procedures (1989, 1993, 1999):

For these years, Mary has attached Charts 8 and 9 from the annual watermaster reports. Chart 8 lists the space allocations in acre-feet for Arrowrock, Anderson Ranch, and Lucky Peak Reservoirs by user or entitlement. This is the amount of water that would be allocated if the reservoirs filled completely. The space allocation in all of these years in Arrowrock was 286,600 acre-feet. The space allocation in Anderson Ranch was 423,200 acre-feet in 1989 and 464,200 acre-feet in 1993 and 1999. The space allocation in Lucky Peak was 264,250 acre-feet in 1989 and 1993, and 264,370 acre-feet in 1999.

Chart 9 lists the amount of water that was actually allocated to each reservoir by user or entitlement. From Chart 9, it can be seen that Arrowrock and Anderson Ranch reservoirs were allocated a complete supply of water even though the system did not completely refill after the system flood control operation. This means that all individual accounts in Arrowrock and Anderson received a 100 per cent supply of water. From Chart 9 it can also be seen that the amount by which the system failed to refill after flood control was taken entirely out of the water allocated to Lucky Peak Reservoir. In 1989, the failure to refill was greater than 60,000 acre-feet. Therefore, in 1989 the first 60,000 acre-feet was taken from the stream resource maintenance flow account (USBR flow). The remainder of the failure to refill was then shared proportionally by *all* users and entitlements in Lucky Peak. In 1993 and 1999, the failure to refill was less than 60,000. from Chart 9, it can be seen that this failure to refill was taken entirely from the stream resource maintenance account (USBR flow), and all other users and entitlements received a complete allocation of water.