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Department of Water Resources

United States Department of the Interior

OFFICE OF THE SOLICITOR
Pacific Northwest Region
Boise Field Office
Federal Building & U.S. Courthouse
MSC 020-550 West Fort Street
Boise, Idaho 83724-0020

March 14, 2003

Chris Meyers, Esq.
John M. Marshall, Esq
Givens Pursley, LLP
Post Office Box 2720
Boise, ID 83701

Re: United Water Idaho - Integrated Municipal Application Permit ("IMAP") and Map of United Water's Well Locations

Dear Counsel:

This letter is to clarify the confidentiality requirements that the U.S. Bureau of Reclamation attached to the release of the draft map it developed related to the location of United Waters wells within the Treasure Valley.

As you may know, in order for United Water to protect its municipal water supply from terrorism or other serious acts of contamination, it has instituted security precautions just like every other water purveyor in the country. One of these necessary measures is the protection of information as to the actual location of its groundwater wells and a corollary protective measure of refusing to release an overall map that sites its groundwater wells.

As a consequence of United Waters precautionary measures and for its use in the IMAP proceedings, Reclamation officials decided to develop a draft map showing the approximate locations of United Waters wells within the Treasure Valley using legal descriptions posted on IDWR's website. In December, Chris Meyer requested copies of the map to distribute to the IMAP parties for their own use.

Pursuant to Mr. Meyer's request for copies, Reclamation undertook a security review of the map and its release. Reclamation determined that in the general interest of public safety, the map should be designated "Official Use Only/SENSITIVE" and provided to the IMAP participants on a "Need to Know" basis.

In addition, the security review determined that the map should be furnished with the following statement:

> The Bureau of Reclamation has determined that this document contains information considered to be "sensitive" and necessary to be appropriately safeguarded. It is intended for your use only. This document, or copies of it, are not to be distributed to any other entities, without prior consent and approval of the Bureau of Reclamation.

Based upon my understanding of Reclamation's security determination, I asked United Waters counsel to seek a confidentiality agreement from each map recipient. Because of the controversy that ensued from this request, Reclamation reexamined its earlier security determination and found that a confidentiality agreement is unnecessary since the release of the map has been (and will only be) provided to individuals on a "Need to Know Basis." Further, Reclamation has full confidence and trust that the individuals who receive the draft map will keep it safe.

We regret the confusion over the confidentiality agreement and hope this letter clarifies what has occurred.

Sincerely,

Kathleen Marion Carr

cc: Director
Idaho Department of Water Resources
P.O. Box 83720
Boise, ID 83720

Peter R. Anderson, Esq.
Hearing Officer
729 West Braemere Road
Boise, ID 83702

Gary L. Spackman
Regional Manager
Idaho Department of Water Resources
Western Regional Office
2735 Airport Way
Boise, ID 83705

IMAP Parties

MOORE SMITH BUXTON & TURCKE, CHARTERED

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February 27, 2003

Peter R. Anderson
Hearing Officer
729 W. Braemere Rd.
Boise, ID 83702

RE: United Water's IMAP – Letter from Chris Meyer dated February 24, 2003

Dear Mr. Anderson:

We are writing on behalf of the Cities of Eagle, Kuna, Middleton and Star and the Star Sewer and Water District in response to United Water's February 24, 2003 letter to you regarding the SRBA. We are disturbed by this letter given that it seems to attempt to circumvent the procedure you outlined at the February 21, 2003 Prehearing Conference on this matter. It was our understanding that the parties would not argue their positions on concurrent jurisdiction at this juncture. Instead, you as the Hearing Officer were going to broach this subject with Judge Burdick, copy the parties with your letter and advise us of any response. We hope that is still the case. Unfortunately, United Water has once again confused the IMAP process by filing an extraneous document to which the parties must respond at some point.

On behalf our clients, we request that you strike Mr. Meyer's letter dated February 24, 2003 from the record. We also reserve the right to respond to Mr. Meyer's letter and provide our own legal argument at the appropriate time if his letter is not stricken from the record. We also wish to express our concern with United Water's handling of this proceeding. We seem to all agree on a process that is then ignored. The entire IMAP process and record is now such a mess due to United Water's constant submission of documents, changes, and other materials that it is virtually impossible to ascertain what the record is, much less explain it to our clients.

Sincerely,

Bruce M. Smith

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on the 27 day of February, 2003, I caused to served a true and correct copy of the letter to Hearing Officer Peter Anderson by the U.S. mail, addressed to the following:

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February 26, 2003

Peter R. Anderson
Hearing Officer
729 W. Braemere Road
Boise, ID 83702

Re: In the Matter of Integrated Municipal Application Package ("IMAP") Filed by United Water Idaho

Dear Mr. Anderson:

I am in receipt of a copy of Chris Meyer's February 24, 2003 letter to you. In response to Mr. Meyer's letter, it was my assumption from the hearing held on February 21, 2003 that it was your intent to write a letter to the SRBA District Court seeking the court's guidance regarding the issues addressed in Mr. Meyer's letter. It was my understanding that all parties agreed to your proposed approach, and that you did not invite any response from the parties.

My clients do not oppose the procedure to contact the SRBA District Court that you outlined at the hearing, and hereby request that you simply follow that procedure. Because we believe Mr. Meyer's letter constitutes a legal brief which argues that the matter should remain entirely with IDWR, my clients hereby reserve the right to respond to Mr. Meyer's substantive arguments at an appropriate time.

Sincerely,

Charles L. Honsinger

cc: Daren Coon
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2/26/03
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Via Hand Delivery

February 24, 2003

Peter R. Anderson, Esq.
Hearing Officer
729 W. Braemere Rd.
Boise, ID 83702

Re: In the Matter of Integrated Municipal Application Package ("IMAP") of United Water Idaho Inc., Being a Collection of Individual Applications for Transfers of Water Rights and Applications for Amendment of Permits.
Our File No. 30-71

Dear Mr. Anderson:

At the prehearing conference on February 21, 2003, you raised a procedural question regarding how the current IMAP proceeding will integrate with the SRBA court's decision.

The ensuing discussion focused in particular on this idea (as best I understand it): The ongoing IMAP administrative process would be curtailed. The Director would prepare a Director's Report on UWID's portfolio of water rights, which in turn would be submitted to the SRBA court. Meanwhile UWID's permit amendment applications would continue to be processed by the Department. Once the validity of UWID's water right portfolio was established through the SRBA process (and possible appellate review), the Department would complete the IMAP, integrating the water rights and permits.

I stated that I would need an opportunity to explore this issue with my client before responding. I wish to provide that feedback here. I trust that doing so in this letter, with copies to all parties, is appropriate.

Since last Friday's conference, we have had a chance to explore the matter at some length. In our view, the current administrative proceeding provides the most coherent, workable and efficient path to resolution of this case. The alternatives are not likely to save time, even if

things go without a hitch, and they carry the potential for conflicting intermediate decisions and unnecessary confusion.

I. THE CURRENT PROCESS IS NOT LIKELY TO RESULT IN DUPLICATIVE JUDICIAL REVIEW.

The concern was raised that the current administrative process may lead to duplicative judicial review. Specifically, we might see a progression from IDWR, to the District Court, to the Supreme Court, to the Director's Report, to the SRBA court, and finally back to the Supreme Court for a second time.

In our view, the second Supreme Court review (the duplicative one) is highly unlikely. Instead, we believe that the Supreme Court's first determination will be dispositive thereafter.

Plainly, the first appellate review (if there is one) will control what goes into the Director's Report. The SRBA judge presumably would follow the precedent of the Supreme Court and approve the Director's Report. Appeal of the SRBA court's ruling is doubtful. Principles of res judicata should be applied to present parties and principles of "failure to participate in prior administrative proceedings" should be applied to duly notified non-parties to this administrative proceeding. Assuming that someone did have standing to appeal, that party would find itself telling the Supreme Court that the decision it made a very short time previously, on identical facts, should now be overturned. That is not the sort of appeal that would attract many litigants.

II. CHANCES FOR SETTLEMENT ARE MAXIMIZED BY STAYING ON THE CURRENT ADMINISTRATIVE PATH.

To date, few substantive decisions have been made, and neither side has suffered any serious setbacks. But the approach you outlined at last Friday's conference may change that. You began scheduling a series of preliminary motions designed to answer fundamental questions. This should have the effect of moving this litigation into high gear. As in any litigation, as the case is shaped by important intermediate rulings, parties' perceptions change and their motivation to settle is often increased.

The efficiency and flexibility of the current proceeding, supported by an efficiently developed factual foundation, is best able to send meaningful signals to the parties and to keep everyone's attention focused on resolution of the matter. The current path is the one most likely to result in the parties finding solutions that eliminate the need for appellate review.

III. EARLY SRBA REVIEW WILL SLOW DOWN THE PROCESS.

For the SRBA court to obtain jurisdiction over UWID's water rights, it must await submission of the Director's report. That is not likely to happen until next year, or later. We do not believe there exists any short-cut method to secure SRBA jurisdiction over these claims.

Moreover, in our experience, the SRBA court's schedule is not likely to move the issues forward to resolution as quickly as the Department's.

IV. EARLY SRBA REVIEW WILL BE BASED ON INCOMPLETE ADMINISTRATIVE REVIEW.

If the Director were obligated to submit a Director's Report prior to the conclusion of the current proceeding, on what basis would he do so? He would have before him only raw claims for over 100 water rights and permits. To the extent that he considers the materials submitted under the IMAP, he would be making a decision based on untested allegations of one party to this proceeding (the Applicant) at a time when another proceeding (on UWID's permits) involving some of the same issues is pending before him and not yet ripe for his review. Thus, he would have to choose between: (a) submitting all rights in the portfolio without analysis, or (b) making a partially informed and premature decision about which rights, if any, are subject to forfeiture and, if so, to what extent.

Either result leaves the SRBA court and the parties without benefit of a meaningful Director's Report, as contemplated under the SRBA statute. Nor would the Director be in a position to fully and effectively serve his statutory role as an independent expert and technical assistant to the SRBA court.

Indeed, the entire purpose of having an administrative agency and a body of administrative law would be undercut. One of the reasons we have an administrative agency supervising water rights in this state it to get the benefit of that Department's experience and judgment. Neither the courts nor the parties are ultimately bound by the Department's administrative expertise, but both are entitled to receive it.

V. DUAL TRACK PROCEEDINGS ARE FRAUGHT WITH DANGER.

If UWID's water rights portfolio are submitted to the SRBA for review, that does not end the current administrative proceeding. UWID's permits amendment applications would remain before the Department. Consequently, there is still a need for the Department to establish, through this hearing, such things as the service area, the duration of the planning horizon, the planning area (including potential issues respecting conflicting comprehensive plans), and ultimately the quantity of water required to serve the planning area over the course of the planning horizon.

In other words, the proposal for early SRBA review necessarily entails bifurcating this proceeding. But there is no neat and non-redundant way to do so. Moreover, the bifurcation would entail two different decision-making bodies, simultaneously following separate tracks, with separate judicial reviews.

Such a dual-track process is fraught with danger. Concurrent proceedings in separate bodies may readily become complicated by arguments and conflicting decisions over who has jurisdiction to hear what and in what order.

For example, to the extent that the SRBA court takes jurisdiction over UWID's water rights, while the Department continues to process UWID's permits, both would be required to address and answer many of the same questions. Substantive conflicts, and procedural conflicts over the order in which they should be decided, are exceedingly cumbersome to resolve when two decision-making entities are involved.

We would all be better served to have the Hearing Officer retain jurisdiction over all issues. This way the issues may be defined and sorted as the Hearing Officer determines is necessary during the course of the proceeding.

Finally, a related point. Courts and administrative agencies frequently observe that making decisions in the abstract is dangerous. In order to see the big picture, they need to have the entire case before them. That argument fits these circumstances to a tee.

VI. UWID IS ENTITLED TO CONTINUE THE PROCESS IT INITIATED.

UWID initiated these proceedings before the Department with the understanding and expectation that the proceedings would not be interrupted and would continue through to a conclusion. UWID has invested over a hundred thousand dollars bringing the process this far. It has made that investment in reliance on the current framework applicable to all other parties before the SRBA. This includes the agreement between the court and the Department assuring applicants that their applications will not be short-circuited half way through the proceeding. Aside from the question of whether the Department and the SRBA court have the power to undue these expectations, there is simply no good reason to do so.

I appreciate the opportunity to share these views with you and, by way of this letter, with the other parties. Undoubtedly, we will have further opportunities to discuss them. However, I felt that it was best to convey these views without delay.

Sincerely,

Christopher H. Meyer

cc: Service List

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Via Hand Delivery

February 24, 2003

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Sincerely,

Christopher H. Meyer

cc: Service List

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February 6, 2003

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Re: In The Matter of Integrated Municipal Application Package ("IMAP") of United Water Idaho Inc., Being a Collection of Individual Applications for Transfers of Water Rights and Applications for Amendment of Permits.
Our File No. 30-71

Dear Al, Scott, Dan and Charlie:

This is in further response to your information request of November 26, 2002.

System Design and Planning

In information request numbers 28, 29 and 30, you asked for a variety of information relating to system design and planning. I am enclosing a copy of the title page and table of contents of a system planning report entitled *United Water Idaho – Water System Master Plan.* It was prepared by Montgomery Watson in 1998. This report contains information that may be responsive to various other information requests as well. For example, it contains information on water conservation responsive to request number 31.

This report was not previously provided because it was prepared for internal planning purposes and contains confidential business information including economic data. However,

United Water has determined to waive its privilege with respect to this document in the interest of promoting a full and open discussion on metropolitan water planning.

Aside from the issue of privilege, however, there is a separate issue of security. Since 9/11, the Company has classified this document as non-public due to the inclusion of detailed information about system components. United Water will nevertheless make the document available to you for inspection, review and note-taking, if you sign a confidentiality agreement.

One note of caution: you should be aware that the Montgomery Watson report is already somewhat out-of-date. Moreover, it contains proposals, projections and recommendations that may or may or may not have been adopted. In other words, while it contains much useful and interesting information, explanation and follow-up discussion may be required.

Accordingly, we think the most effective way to facilitate this is to arrange a face-to-face meeting for you and your experts to explore these system design and planning issues at length with technical personnel from United Water. This meeting would also provide an opportunity for you to explore the full range of issues encompassed by the above-referenced information requests. Much of the information you seek simply is not in a readily reproducible format we can provide you. A meeting with UWID personnel should be the most effective way to get at that information. As you prefer, we could provide an overview in an hour or so, or a more detailed walk-through of system design and planning issues that may take one or more days.

UWID will make its personnel available to the maximum extent possible to accommodate your schedules. If this cannot be done in a single group session, we can meet with smaller groups. Please contact me at your earliest convenience with your preferred meeting time(s).

Certificated Service Areas

In request number 11, you asked for copies of UWID's certificated service agreements. We assume this refers to the certificated service area description as established by the I.P.U.C. These were previously provided to you. They are included as attachments to the service area descriptions provided to the I.D.W.R. Should it be of interest, I am also enclosing with this letter a metes and bounds definition of the most recent I.P.U.C. approved service area boundary for UWID.

This description is modified routinely (sometimes twice a year) to encompass additional properties as new customers are added. We trust you do not require all historical iterations of this document. I understand that this is the 32nd version. If so, please advise so that we may discuss the relevancy of the request and how to approach that research task.

Production Quantification Information

We have previously provided information responsive to paragraphs 16, 17 and 18. We recently came across additional information that we believe was compiled under the direction of Ed Squires. This information includes graphs, charts and the raw data upon which those charts and graphs are based. We enclose copies of this information with this letter.

As you know, Ed Squires previously was employed by United Water and assisted in preparation of the IMAP. He is now serving as a consultant to Protestants City of Meridian and City of Caldwell.

Outline

Finally, some of you have complained about the "piecemeal" form of the responses. We apologize for the flurry of responses and wish to assure you that our intent has been solely to get information to you as quickly as possible. As soon as each was completed, it was sent out without waiting for the others. Each request was processed on a separate track, requiring review or attention by different people. Often, a particular response had to loop back for additional review or attention. Indeed, this process is ongoing and we will continue to make responsive information available to you as it becomes available.

We continue to receive complaints that we are withholding information, which we assure you is not the case. We have not received from you any identification of what information is lacking. In order to help you identify what further information would be useful to you, we are providing the enclosed summary of the information provided to date. Again, we invite your cooperation in resolving any remaining issues.

Sincerely,

Christopher H. Meyer

John M. Marshall

Encl: (1) Excerpts of Montgomery Watson report
(2) Certificated Service Area Description Application
(3) Production Quantification Information
(4) Summary of Responses

cc: Service List
Client

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OUTLINE OF RESPONSES TO INFORMATION REQUESTS

From United Water Idaho
To Irrigation Entities and the Cities of Meridian and Caldwell

February 6, 2003

1. Please provide all documents, including but not limited to communications, which pertain to discussions UWID had with Treasure Valley local governments regarding a. The current and planned areas of city impact for each city; b. The comprehensive plan (both current and future) for each city; c. The relationship of items (a) and (b) to any planned or potential extensions of UWID's service area.
See United Water's letter of January 2, 2003. United Water does not have any additional responsive information at this time.
2. Please state your planning projections for service into the areas south and east (and southeast) of the City of Boise. By this request, Irrigation Entities also seek any communications or agreements UWID may have had with landowners in the areas south and east (and southeast) of the City of Boise regarding future land development into those areas.
See United Water's letters of January 2, 2003, January 7, 2003. United Water does not have any additional responsive information. Note that the IMAP itself contains United Water's planning projections for service into the areas south and east of Boise.
3. Please provide all documents, including but not limited to communications, which pertain in any way to discussions UWID had with Ada or Canyon counties regarding the comprehensive plan (both current and future) for each county, and the relationship of the comprehensive plan (both current and future) to any planned or potential extensions of UWID's service area.
See United Water's letter of January 6, 2003. United Water does not have any additional responsive information at this time.
4. Please provide any communications between UWID and any individual or entity with whom UWID has entered into an agreement in order to avoid or resolve a protest in this matter. By this request, Irrigation Entities request communications and agreements.
See United Water's letter of December 27, 2002. United Water does not have any additional responsive information at this time.
5. Please provide any communications between UWID and any entity or individual with whom UWID has not yet signed an agreement, which agreement would avoid or resolve a protest in this matter.
See United Water's letter of December 27, 2002. United Water does not have any additional responsive information at this time.

6. Please provide pumping records for each and every well owned by UWID, and/or which serves as a point of diversion for a UWID-owned water right for its complete history of operation. By this request Irrigation Entities seek: a. Pumping records for each above-described well; b. Electrical records for each above-described well and/or pump; c. The size and horse power of each pump for each above-described well; d. The diameter of the discharge pipe for each pump.
See United Water's letters of January 6, 2003, January 17, 2003, January 20, 2003, and January 30, 2003. The well production information attached to these letters is directly responsive. As previously noted, well-by-well production data prior to 1992 is not in electronic format and thus is not readily available. If you desire pre-1992 information, we must discuss how to make this archived information available, and as indicated in our January 6, 2003 letter, may require preliminary discussions, possibly through motions with the Hearing Officer, to determine whether such information is relevant. We declined to provide the additional information on electrical records, pump information and discharge pipe diameters on the basis that the pumping information is sufficient. You have not indicated that you disagree.
7. Please provide copies of all hydrologic data, studies, or reports upon which UWID relies as support for the IMAP or any component thereof. By this request, the Irrigation Entities also seek all hydrologic data, studies, or reports which UWID or its agents may have reviewed, relied upon, or considered in preparing the IMAP. By this request, the Irrigation Entities also seek the following: a. All interference studies that examine, but are not limited to, all current impacts on wells and future impacts on wells of the IMAP, if approved; b. All studies that examine both current and future impacts to surface water (including the Boise River, drains and canals) of the IMAP, if approved;
See United Water's letter of January 6, 2003. United Water does not have any additional responsive information at this time.
8. Please provide a comparison of the John Church population projections to the "real population" numbers for the past two years.
See United Water's letters of December 27, 2002 and January 17, 2003. Note that this information request requires United Water to undertake an entirely new analysis. John Church has not yet finished this analysis. As indicated previously, we will provide you with the requested information when it becomes available.
9. A comparison of the John Church water usage projections to the "real water use" numbers for the past two years.
See United Water's letters of December 27, 2002 and January 17, 2003. Note that this information request requires United Water to undertake an entirely new analysis. John Church has not yet finished this analysis. As indicated previously, we will provide you with the requested information when it becomes available.

10.	Please provide a map of all UWID wells labeled with the currently associated water right(s), as well as an identification of wells that are no longer operating, or are operating at less than originally licensed capacity. If unavailable, map of all UWID wells with information that is available.
See United Water's letter of December 30, 2002. We have indicated to you that because of post-9/11 security concerns, we cannot make a map showing the precise location of UWID's well locations available generally. We have made such a map available for your review at recent meetings and have made it clear that you are free to request additional opportunities to review the map. We also have provided you a copy of a map created by the Bureau of Reclamation that generally shows the location of points of diversion of United Water's wells. Moreover, Tab N of the IMAP is a comprehensive list of UWID's wells, indicating each wells' location, name and associated water right. The pumping information in our letters dated January 17, 2003, January 20, 2003 and January 30, 2003 also contain information you requested. In letters dated December 30, 2002, January 28, 2003, and February 6, 2003, we requested signed acknowledgements to safeguard the information in the map. This was per request by the Bureau of Reclamation pursuant to post-9/11 security measures. To date, none have been provided.	
11.	Please provide copies of all UWID's Certificated Service Agreements.
See United Water's letter of January 3, 2003. We provided copies of United Water's Service Area Descriptions that show United Water's certificated service area as determined by the IPUC, which we understand is what you mean by the phrase "Certificated Service Agreements." (If this assumption is incorrect, please let me know what a "Certificated Service Agreement" is.) This current certificated area (as of the IMAP application) is also provided in map accompanying the IMAP itself. **See United Water's letter of February 6, 2003.** We subsequently provided a metes and bounds description of the current service area.	
12.	Please provide all documents used or prepared to analyze the "Stepwise Function Exercise" referred to at p.6 of the September 1, 1997 memo from UWID (revised October 7, 1997).
See United Water's letter of January 8, 2003. To our knowledge, United Water never performed a detailed analysis based on the stepwise function. (All work on the stepwise function was undertaken by Ed Squires, now in the employ of Protestants.) **See United Water's letter of February 6, 2003.** We recently located what we believe are the spreadsheets and graphs underlying the analysis in the graph referenced in my January 8, 2003 letter.	
13.	Please provide all documents showing measurements of volumes and/or flow rates diverted from any of UWID's wells that are subject to IMAP from 1934 to the present.
See United Water's letters of January 6, 2003; January 17, 2003; January 20, 2003, and January 30, 2003. This request appears to be repetitive of the request in paragraph 6. If there is something different sought here, please advise.	

14. Please provide a list of "replaced" wells referred to on Page 4 of Memorandum to Ed Squires from Jeffrey C. Fereday and Christopher H. Meyer dated September 1, 1997 (Revised Oct. 9, 1997 for release to IDWR).
See United Water's letters of January 6, 2003; January 17, 2003; January 20, 2003, and January 30, 2003. The pumping information provided in response to request in paragraph 6 is responsive here. We know of no "list" of replaced wells.
15. Please provide the "global" description of UWID's service area referred to on Page 7 of Memorandum to Ed Squires from Jeffrey C. Fereday and Christopher H. Meyer dated September 1, 1997 (Revised Oct. 9, 1997 for release to IDWR).
See United Water's letter of January 3, 2003. United Water does not have any additional responsive documents.
16. Please provide copies of the "the historical production data for comparison with water rights [sic] priority dates as suggested by Dave Tuthill," identified in the memorandum from Edward Squired to Norman Young, dated October 9, 1997.
See United Water's letters of January 6, 2003; January 7, 2003, January 17, 2003; January 20, 2003, and January 30, 2003. The map attached to the January 7, 2003 letter along with the production records we have provided are the best information we have responsive to this request. **See United Water's letter of February 6, 2003.** Additionally, as noted above in the discussion for paragraph no. 12, we believe we have located the information used to generate the graph referenced in your request paragraph no. 18. This information has now been provided.
17. Please provide copies of "the historical record of our water rights acquisitions, the corresponding yearly production data, and the 'installed' capacity of our system as suggested by Dave Tuthill," as described in the memorandum from Edward Squires to Norman Young, dated August 10, 1998.
See United Water's letters of January 7, 2003 and February 6, 2003. See 16 above.
18. Please provide copies of "the draft graph Edward Squires and his staff prepared showing, for each year UWID's system capacity compared to total water rights," identified in correspondence to Norman Young from Christopher Meyer.
See United Water's letters of January 7, 2003.
19. Please provide copies of the "maps which expressly show that UWID is now serving as far away as Nampa and beyond," referenced in the January 19, 1999 memorandum from Edward Squires to Steve Lester.
See United Water's letter of January 8, 2003. We directed you to a map that responds to your request.
20. Please provide copies of the "draft chart . . . showing on a well-by-well basis how much additional capacity is achievable, and what steps would be required to achieve it," described in September 24, 1999 correspondence from Christopher Meyer to Karl Dreher.
See United Water's letter of January 7, 2003. Our response directly answers your request.

21. Please provide copies of "information about the current and projected shape of the Company's overall production curve for the agency's planning purposes," identified in October 26, 1999 correspondence from Christopher Meyer to Karl Dreher.
See United Water's letters of January 17, 2003; January 20, 2003, and January 30, 2003. The production numbers we have provided include the requested information.
22. Please provide copies of Christopher Meyer's "original draft of the bill (dated November 17, 1995)," identified in October 26, 1999 correspondence from Christopher Meyer to Karl Dreher.
See United Water's letter of December 26, 2002. United Water does not have any additional responsive information.
23. Please explain how Applicant determined the peak rate of flow currently used by UWID. See Table 11 on page 50 of IMAP . . . "rights in current portfolio used to support immediate demand = 147.5 cfs."
See United Water's letter of January 20, 2003. United Water does not have any additional responsive information.
24. What is the historic annual volume associated with the current use?
See United Water's letters of January 17, 2003; January 20, 2003, and January 30, 2003. By "historic volume associated with current use" we presume you mean historic system-wide production numbers, which we have provided.
25. Please provide any information to verify the elements of beneficial use rights included with IMAP. These include Nos. 63-4015, 63-4395, 63-4414, 63-44254 and 63-4752. Verification of the elements should include evidence supporting priority dates, pump curves and other data regarding the rate of flow and the historic annual volume per well, confirmed well locations (perhaps GPS data and a related map?), and information validating beneficial use of water as described by each water right. In other words, information expected in support of adjudication claims for these beneficial use water rights should be provided.
See United Water's letters of January 17, 2003; January 20, 2003, and January 30, 2003. United Water continues to put together information about its beneficial use claims. We will forward this information to you as it becomes available.
26. Please provide documentation of the current pumping capacity by UWID's system vs. actual diversions of groundwater. Also include documentation of current diversion capacity of surface water diversions vs. actual diversions (both peak flow and annual volume).
See United Water's letters of January 17, 2003; January 20, 2003, and January 30, 2003. The production information we have provided contains the information you seek.

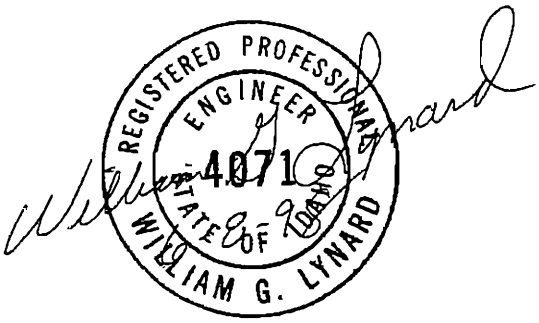
27. Please provide all system planning documentation including filings with the PUC and local governmental entities which relate in any way to UWID's local service area, current needs and future growth demands.
See United Water's letters of January 8, 2003. We have indicated that we cannot efficiently respond to this request without clarification from you. To date we have not heard from you.
28. Please describe the improvements that have been made, the investment in those improvements to accommodate future needs above current demand, between current demand and the UWID "paper rights," and above the "paper rights."
See United Water's letter of February 6, 2003. We have made available a copy of a system planning report entitled *United Water Idaho – Water System Master Plan*, subject to a post-9/11 security agreement. We have offered to make technical personnel available to answer questions on this and all other system design and planning issues.
29. Karl Dreher's letter of June 14, 1999, to you at pp. 3 - 4 , requests that UWID submit seven categories of information: a. overall detailed design of full capacity system; b. financial plan demonstrating ability to pay the full cost of constructing the full capacity system to meet future needs; c. completed environmental studies for the full capacity system; d. acquisition of land for wells, pump stations etc. needed for full capacity system; e. substantial construction of distribution mains for full capacity system; f. construction of distribution system and storage consistent with design of full capacity system; and g. development of operations protocol and infrastructure needed for full capacity system. Please provide that information.
See United Water's letter of February 6, 2003. We have made available a copy of a system planning report entitled *United Water Idaho – Water System Master Plan*, subject to a post-9/11 security agreement. We have offered to make technical personnel available to answer questions on this and all other system design and planning issues.
30. Please provide all planning documents for interconnection of UWID wells, surface diversions, mains, treatment facilities, storage and distribution system and service area.
See United Water's letter of February 6, 2003. We have made available a copy of a system planning report entitled *United Water Idaho – Water System Master Plan*, subject to a post-9/11 security agreement. We have offered to make technical personnel available to answer questions on this and all other system design and planning issues.
31. Please provide all water conservation plans of UWID and all studies comparing water usage by UWID customers with other western cities.
See United Water's letter of January 20, 2003. United Water does not have any additional responsive information at this time. **See United Water's letter of February 6, 2003.** The Montgomery Watson report contains information on water conservation.

32. Please provide all studies showing how much water is utilized per acre or per square foot by UWID customers on lawns, gardens and other irrigation uses.
See United Water's letter of January 8, 2003. United Water does not have any additional information at this time.
33. Please provide a list of UWID wells, by legal description and water right number, which are no longer producing or producing at less than installed capacity.
See United Water's letters of January 17, 2003; January 20, 2003, and January 30, 2003. The well production information we have provided includes the requested information.
34. Please provide comprehensive plans of municipalities served by UWID and all documentation examining how the IMAP compares with those comprehensive plans.
See United Water's letter of January 8, 2003. As indicated in our letter, you are welcome to obtain copies of the various municipalities' comprehensive plans.
35. Please provide proof of beneficial use for all licenses, including all post-1987 licenses.
See United Water's letter of January 8, 2003. As indicated in our letter, the information you request is located the files of the Idaho Department of Water Resources.

UNITED WATER IDAHO

WATER SYSTEM MASTER PLAN

FINAL REPORT
JUNE 1998



PREPARED BY

Montgomery Watson
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Boise, Idaho 83706
(208) 345-5865

TABLE OF CONTENTS

UNITED WATER IDAHO
WATER SYSTEM MASTER PLAN

Description	Page No.
EXECUTIVE SUMMARY	ES-1
Conclusions	ES-1
Planning Criteria	ES-1
Water Supply	ES-2
Water Quality	ES-3
Comparison of Water Supply Alternatives	ES-3
Capital Improvement Program	ES-4
Recommendations	ES-4
SECTION 1 — INTRODUCTION	1-1
Background	1-1
Objective	1-1
Authorization and Scope of Work	1-1
Task 1 - Data Collection and Compilation	1-1
Task 2 - Evaluation of Existing Water System	1-2
Task 3 - Service Area Characteristics	1-2
Task 4 - Planning Assumptions and Evaluation Criteria	1-2
Task 5 - Water Requirements	1-2
Task 6 - Sources of Supply Alternatives	1-2
Task 7 - Water Quality Regulations	1-2
Task 8 - Distribution System Evaluation	1-2
Task 9 - Develop and Screen Alternatives	1-2
Task 10 - Evaluation of Alternatives	1-3
Task 11 - Report Documentation	1-3
Task 12 - Project Management	1-3
Task 13 - Project Quality Assurance/Quality Control Program	1-3
Report Format	1-3
Definitions and Abbreviations	1-3
SECTION 2 — EXISTING WATER SYSTEM DESCRIPTION	2-1
United Water Idaho	2-1
History	2-1
Organization	2-1
Current and Future Service Area	2-2
System Configuration	2-2
Service Levels	2-3

TABLE OF CONTENTS
(continued)

Description	Page No.
Gowen/Columbia Service Levels	2-3
Second Bench Service Level	2-4
Barber Service Level	2-5
First Bench Service Level	2-7
East Main/West Main Service Levels	2-7
Lower Main Service Level	2-9
Warm Springs Mesa Water System	2-10
Water Supply and Treatment	2-10
Water Sources	2-10
Water Treatment	2-11
System Components	2-11
Wells/Pump Stations	2-11
Ranney Collectors	2-14
Marden Water Treatment Plant	2-15
Reservoirs	2-15
Booster Stations	2-17
Pipelines	2-19
Intertie Facilities	2-19
System Operations and Performance	2-21
Pressure	2-21
Flow/Delivery	2-22
Fire-Flow	2-22
Leaks	2-23
Customer Perception	2-24
Flow Metering	2-26
Water Conservation	2-26
Water Conservation Plan	2-27
Implementation	2-28
School Education	2-28
Public Information	2-28
Residential Home Water Audits	2-28
New Plumbing Code	2-28
Management of Unaccounted-for Water	2-28
SECTION 3 — SERVICE AREA CHARACTERISTICS	3-1
Geographic Setting	3-1
Topography	3-1
Climate	3-1
Land Use	3-2
Demographics	3-5
Employment	3-5

TABLE OF CONTENTS
(continued)

Description	Page No.
Historical and Projected County Population	3-6
Service Area Population and Projected Growth	3-6
UWID Historical and Projected Customer Growth	3-7
Historical Customer Growth	3-8
Projected Customer Growth	3-12
Institutional Setting	3-15
Adjacent Water Utilities	3-17
Capital Water	3-18
Eagle Water	3-18
Garden City Water	3-18
South County Water	3-18
Meridian Water	3-18
Irrigation Districts	3-18
SECTION 4 — PLANNING ASSUMPTIONS, DESIGN CRITERIA AND EVALUATION CRITERIA	4-1
Planning Assumptions	4-1
Planning Period	4-1
Service Area	4-1
Future Development	4-2
Sustained Groundwater Yield	4-2
Water Rights	4-2
Cost Estimating	4-3
Existing Well Production	4-5
Water Demand and Supply Considerations	4-5
Groundwater Treatment	4-5
Design Criteria	4-6
Evaluation Criteria	4-6
Economic Criteria	4-6
Capital Costs	4-7
Annual Operation and Maintenance Costs	4-7
Present Worth	4-7
Non-Economic Criteria	4-7
Water Rights Availability	4-7
Phasing/Staging Flexibility	4-7
Water Quality Regulations	4-7
Public Acceptance	4-8
Environmental Impacts/Permitting	4-8
Institutional Considerations	4-8
Water Supply Uncertainty	4-9

TABLE OF CONTENTS
(continued)

Description	Page No.
SECTION 5 — WATER REQUIREMENTS	5-1
Historical Water Requirements	5-1
Description of Available Data	5-1
Historical Water Consumption	5-1
Water Sales	5-1
Unmetered Water	5-2
Total Historical Consumption	5-4
Water Use Patterns	5-5
Seasonal Use	5-5
Diurnal Use	5-8
Peaking Factors	5-9
Water Demand Forecasting	5-10
Methodology	5-10
Unit Consumption Values	5-12
Future Water Demand Projections	5-12
Variations In Water Demand Projections	5-14
Growth Rate Variance	5-16
Water Conservation	5-16
Dual Irrigation	5-16
SECTION 6 — EXISTING WATER SUPPLY	6-1
Groundwater	6-1
Hydrogeology	6-1
Gowen/Columbia	6-1
Second Bench	6-2
Barber	6-2
First Bench (East and West)	6-2
East Main	6-2
West Main	6-3
Lower Main	6-3
Water Rights	6-3
Water Quality	6-5
Safe Yield and Production	6-5
Groundwater Management Area	6-10
Groundwater Under the Direct Influence of Surface Water	6-10
Surface Water	6-11
Hydrology	6-11
Water Rights	6-13
Water Quality	6-15

TABLE OF CONTENTS
(continued)

Description — Page No.

SECTION 7 — WATER QUALITY REGULATORY AUDIT 7-1

Regulatory Overview 7-1
Regulatory Audit Summary 7-1
TTHM Rule and Proposed D/DBP Rule 7-4
Combine Groundwater and Surface Water Compliance with TTHM Rule 7-5
Surface Water Compliance With Proposed HAA_5 Regulations 7-6
Surface Water Compliance with Proposed Enhanced Coagulation Regulations 7-6
Surface Water Treatment Rule 7-8
Marden WTP Compliance with SWTR Filtration Regulations 7-9
Marden WTP Compliance with SWTR Disinfection Regulations 7-12
Groundwater Under the Direct Influence of Surface Water 7-15
Enhanced Surface Water Treatment Rule 7-16
Marden WTP Compliance with Proposed ESWTR Regulations 7-17
IOC, SOC and VOC Regulations 7-18
IOC Regulations 7-18
Surface Water Compliance with IOC Regulations 7-18
Groundwater Compliance with IOC Regulations 7-18
SOC Regulations 7-18
Surface Water Compliance with SOC Regulations 7-19
Groundwater Compliance with SOC Regulations 7-19
VOC Regulations 7-19
Surface Water Compliance with VOC Regulations 7-19
Groundwater Compliance with VOC Regulations 7-19
Proposed Sulfate Regulation 7-19
Surface Water Compliance with Sulfate Regulations 7-19
Groundwater Compliance with Sulfate Regulations 7-19
Arsenic Regulation 7-20
Surface Water Compliance with Arsenic Regulations 7-20
Groundwater Compliance with Arsenic Regulations 7-20
Fluoride Regulations 7-20
Surface Water Compliance with Fluoride Regulations 7-20
Groundwater Compliance with Fluoride Regulations 7-20
Information Collection Rule 7-20
Combined Surface Water and Groundwater Compliance with ICR 7-21
Lead and Copper Rule 7-24
Combined Surface Water and Groundwater Compliance with Lead and Copper Rule 7-24
Total Coliform Rule 7-25
Combined Surface Water and Groundwater Compliance with TCR 7-25

TABLE OF CONTENTS
(continued)

Description	Page No.
Radionuclide Regulations	7-25
Existing Regulations	7-25
Combined Surface Water and Groundwater Compliance with Existing Regulations	7-26
Radon Regulations	7-26
Groundwater Compliance with Radon Regulations	7-26
Proposed Groundwater Disinfection Rule	7-28
Groundwater Compliance with Proposed GWDR	7-28
Secondary Standards	7-28
Combined Surface Water and Groundwater Comparison to Secondary Standards	7-28
Corrosivity	7-28
Fluoride	7-29
Iron and Manganese	7-29
Total Dissolved Solids	7-30
SECTION 8 — INFRASTRUCTURE MODIFICATIONS AND IMPROVEMENTS	8-1
Hydraulic Modeling	8-1
Description of Model	8-1
Modeling Assumptions and Evaluation Criteria	8-2
Backbone Improvements	8-2
B1 -Lower Main to West Main Transmission Pipeline	8-3
B2 - First Bench/Lower Main/West Main Link	8-3
B3 - Lower Main Service Level State Street Pipeline Upgrades	8-3
B4 - First Bench Service Level Division	8-3
B5 - East Main Service Level Transmission Upgrades	8-4
B6 - Boise Avenue Booster	8-4
B7 - Barber Service Level Pipeline Upgrades	8-5
B8 - Gowen/Columbia Service Level East to West Pipeline Upgrade	8-5
B9 - Gowen/Columbia Service Level Southwest Pipeline Connection	8-5
Storage Inventory	8-5
Booster Station Upgrades	8-6
SECTION 9 — DEVELOPMENT AND SCREENING OF WATER SUPPLY ALTERNATIVES	9-1
Supply versus Demand	9-1
Potential Water Supply Alternatives	9-4
Groundwater	9-4
Existing Groundwater Supply	9-4

TABLE OF CONTENTS
(continued)

Description — Page No.

Treat Existing Groundwater Supply 9-8
New Production Potential 9-8
Total Estimated Safe Groundwater Supply 9-10
Surface Water 9-11
Marden WTP 9-11
Columbia Bench WTP 9-11
Veterans Collector 9-11
Additional GWUDI Supplies 9-12
Aquifer Storage and Recovery 9-12
Reservoir Storage 9-13
Water Reuse 9-13
Water Conservation 9-14
Alternative Screening 9-14
Groundwater 9-15
Treat Existing Groundwater Supply 9-15
New Groundwater Production 9-15
Surface Water 9-15
Aquifer Storage and Recovery 9-16
Reservoir Storage 9-17
Reuse 9-17
Water Conservation 9-17
Water Supply Alternatives 9-18
Alternative GW1 - Maximize Existing Groundwater Production 9-19
Alternative GW2 - Maximize New Groundwater Production 9-19
Alternative SW! - Maximize New Surface Water 9-19

SECTION 10 — EVALUATION OF WATER SUPPLY ALTERNATIVES AND RECOMMENDED WATER SUPPLY PLAN 10-1

Comparison of Water Supply Alternatives 10-1
Economic Comparison 10-1
Non-Economic Comparison 10-3
Water Rights Availability 10-3
Phasing/Staging Flexibility 10-3
Water Quality Regulations 10-4
Public Acceptance 10-4
Environmental Impacts/Permitting 10-5
Institutional Considerations 10-5
Water Supply Uncertainty 10-5
Summary Comparison and Recommendation 10-6

TABLE OF CONTENTS
(continued)

Description	Page No.
SECTION 11 — WATER DISTRIBUTION SYSTEM HYDRAULIC EVALUATION AND FIRE-FLOW ANALYSES	11-1
Hydraulic Modeling Conditions	11-1
Water System Hydraulic Evaluation	11-1
Fire Flow Analyses	11-4
Fire-Flow Requirements	11-4
Analyses and Results	11-4
SECTION 12 — CAPITAL IMPROVEMENT PROGRAM	12-1
Facility Sizing Criteria	12-1
Cost Estimating	12-1
Capital Improvement Program	12-2
Existing Facility Retirement Program	12-8
APPENDIX A — LIST OF REFERENCES	
APPENDIX B — SERVICE LEVEL SCHEMATICS	
APPENDIX C — WATER CONSERVATION PLAN	
APPENDIX D — GROUNDWATER CHARACTERIZATION	
APPENDIX E — WATER QUALITY DATA	
APPENDIX F — WATER SUPPLY ALTERNATIVE COST ESTIMATES	
APPENDIX G — WATER SYSTEM MODELING RESULTS	
EXHIBIT I — WATER DISTRIBUTION SYSTEM	
EXHIBIT II — CAPITAL IMPROVEMENT PLAN	

LIST OF TABLES

Table No.	Description	Page No.
2-1	Total System Yearly Production Summary	2-3
2-2	Gowen/Columbia Service Level Yearly Production/Transfer Summary	2-5
2-3	Second Bench Service Level Yearly Production/Transfer Summary	2-6
2-4	Barber Service Level Yearly Production/Transfer Summary	2-6
2-5	First Bench Service Level Yearly Production/Transfer Summary	2-8
2-6	East and West Main Service Level Yearly Production/ Transfer Summary	2-9
2-7	United Water Idaho Wells/Pump Station Data	2-12
2-8	Reservoir Location, Type and Capacity	2-16
2-9	Booster Station Data	2-18
2-10	Pipeline Summary	2-20
2-11	Intertie Facilities	2-20
2-12	Summary of System Water Leaks	2-23
2-13	1994 To 1996 Customer Water Quality Complaint Summary	2-25
2-14	Types of Customer Complaints	2-26
3-1	Historical Climatological Data for Boise	3-2
3-2	Service Area Land Use Summary	3-4
3-3	Population and Growth Projections	3-7
3-4	Number of Customers	3-10
3-5	Future Customer Projections	3-13
3-6	Jurisdiction of Institutions and Agencies	3-15
4-1	Projected Unit Cost Data For Alternative Water Supply Development	4-4
5-1	Unmetered Water, Production and Sales	5-4
5-2	Total Water Demand by Service Level	5-6
5-3	Maximum Day Peaking Factors by Service Level	5-10
5-4	Average Day Unit Consumption Values by Service Level	5-13
5-5	Projected Water Demands by Service Level Through 2020	5-15
6-1	Well Water Quality	6-6
6-2	Estimated Safe Groundwater Yield	6-9
6-3	Boise River Flows Below Lucky Peak	6-12
6-4	Existing Surface Water Rights	6-14
6-5	Boise River and Collector Water Quality	6-15
7-1	Proposed TTHM and D/DBP Regulations	7-4
7-2	Historical HAA_5 Concentrations at Marden WTP	7-6
7-3	Marden WTP Historical TOC Levels	7-7
7-4	*Giardia* Cyst Reduction Requirements Based on Source-Water Cyst Concentration	7-9
7-5	"Worst Cast" CT Compliance Evaluation for 0.5 Log *Giardia* Inactivation	7-14
7-6	CT Compliance Evaluation for 0.5 Log *Giardia* Inactivation at pH 6.5	7-15

LIST OF TABLES
(continued)

Table No.	Description	Page No.
7-7	Summary of 18-Month Monitoring Requirements for the Marden Water Treatment Plant	7-22
7-8	Summary of 18-Month Monitoring Requirements for the Ground Water Treatment Plant	7-23
7-9	Lead and Copper Sampling Results in Distribution System	7-24
7-10	Radionuclide MCLs for Water System	7-25
7-11	Radon Analyses for Wells	7-27
7-12	Secondary Drinking Water Regulations	7-29
7-13	Iron and Manganese Levels in Select Wells	7-31
8-1	Service Area Storage Inventory	8-7
8-2	Recommended Booster Station Upgrades	8-9
9-1	Existing Supply versus Projected Demands	9-2
9-2	Available Peak Production and Water Quality of Existing Wells	9-5
9-3	Additional Well Production Potential	9-9
9-4	Total Estimated Safe Groundwater Yield	9-10
9-5	Potential GWUDI Well Sites	9-12
10-1	Summary of the Economic Analysis of Water Supply Alternatives	10-2
10-2	Summary Comparison of Water Supply Alternatives	10-7
11-1	Recommended Water System Improvements	11-2
11-2	Fire-Flow Analyses Results	11-5
12-1	Capital Improvement Plan Capital Cost Estimate	12-3
12-2	Existing Well Retirement Program	12-9

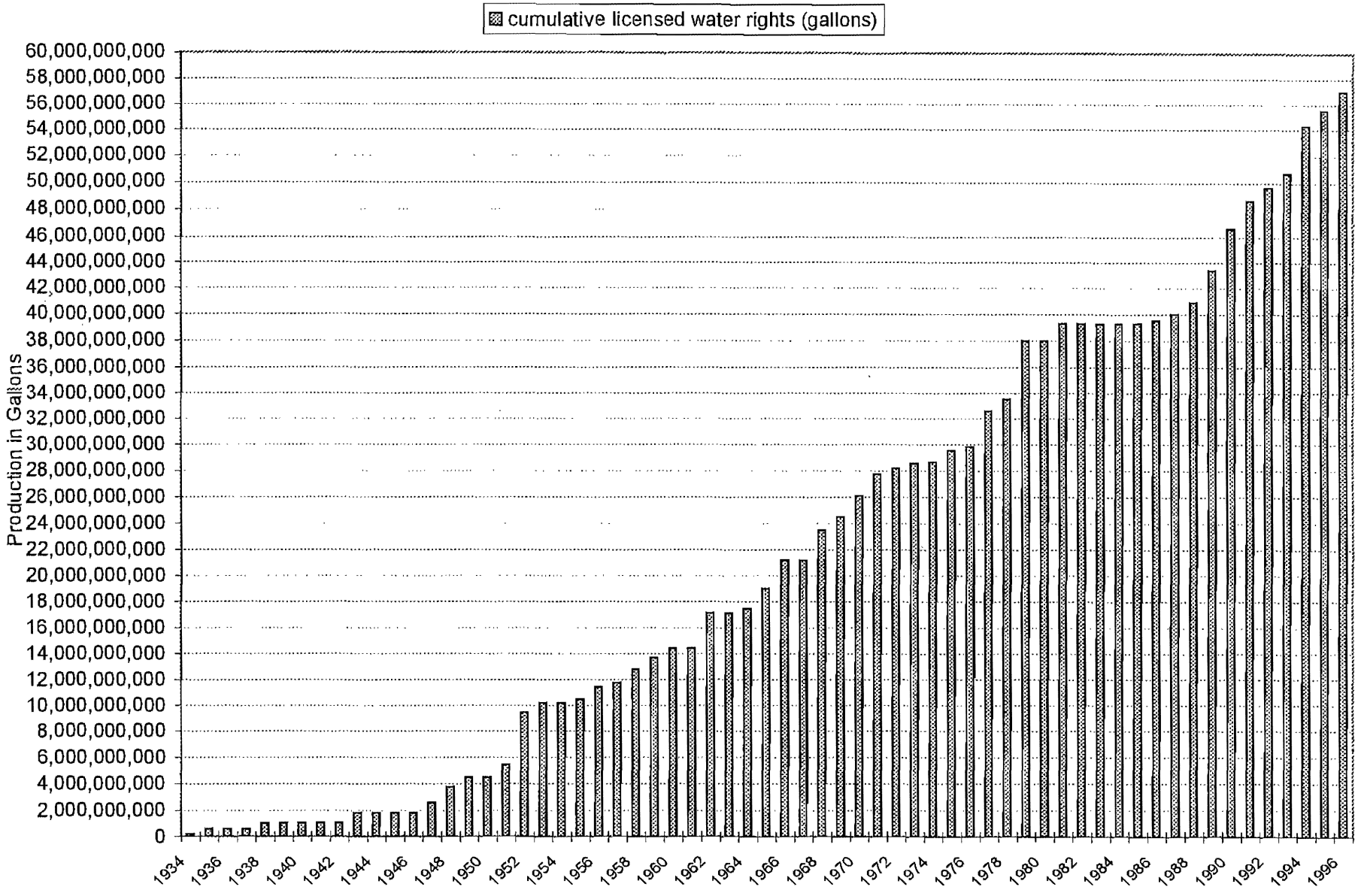
LIST OF FIGURES

Figure No.	Description	Page No.
2-1	Organization Chart	2-1
2-2	Future Service Boundary	2-2
2-3	Service Level Elevation Schematic	2-3
2-4	Marden Water Treatment Plant Process Flow Schematic	2-15
2-5	Intertie Facilities	2-19
3-1	Number of Customers	3-9
3-2	Yearly Customer Growth	3-11
3-3	1996 Customer Distribution	3-12
5-1	Annual Water Sales	5-2
5-2	Relative Water Sales in 1996	5-3
5-3	Average Day Water Demand	5-5
5-4	Seasonal Variations in Water Production	5-7

LIST OF FIGURES
(continued)

Figure No.	Description	Page No.
5-5	Average Annual Residential Water Use vs. Precipitation and Temperature	5-8
5-6	Daily Consumption Over "Typical" 24-Hour Periods	5-9
5-7	Projected Water Demands Through 2020	5-14
5-8	Projected Maximum Day Water Demands with Dual Irrigation	5-18
6-1	Southeast Boise Groundwater Management Area	6-10
7-1	Historical TTHM Concentrations	7-5
7-2	Marden Water Treatment Plant Raw Water Turbidity	7-9
7-3	Marden Water Treatment Plant Raw Water Frequency Distribution	7-10
7-4	Marden Water Treatment Plant Finished Water Turbidity	7-11
7-5	Marden Water Treatment Plant Filtered Water Turbidity Frequency Distribution	7-12
8-1	Recommended Backbone Improvements	8-3
9-1	Existing Supply vs. Project Demands	9-1
9-2	Water Supply Alternative GW1	9-19
9-3	Water Supply Alternative GW2	9-19
9-4	Water Supply Alternative SW1	9-19
9-5	Water Supply Alternative GW1	9-20
9-6	Water Supply Alternative GW2	9-20
9-7	Water Supply Alternative SW1	9-20

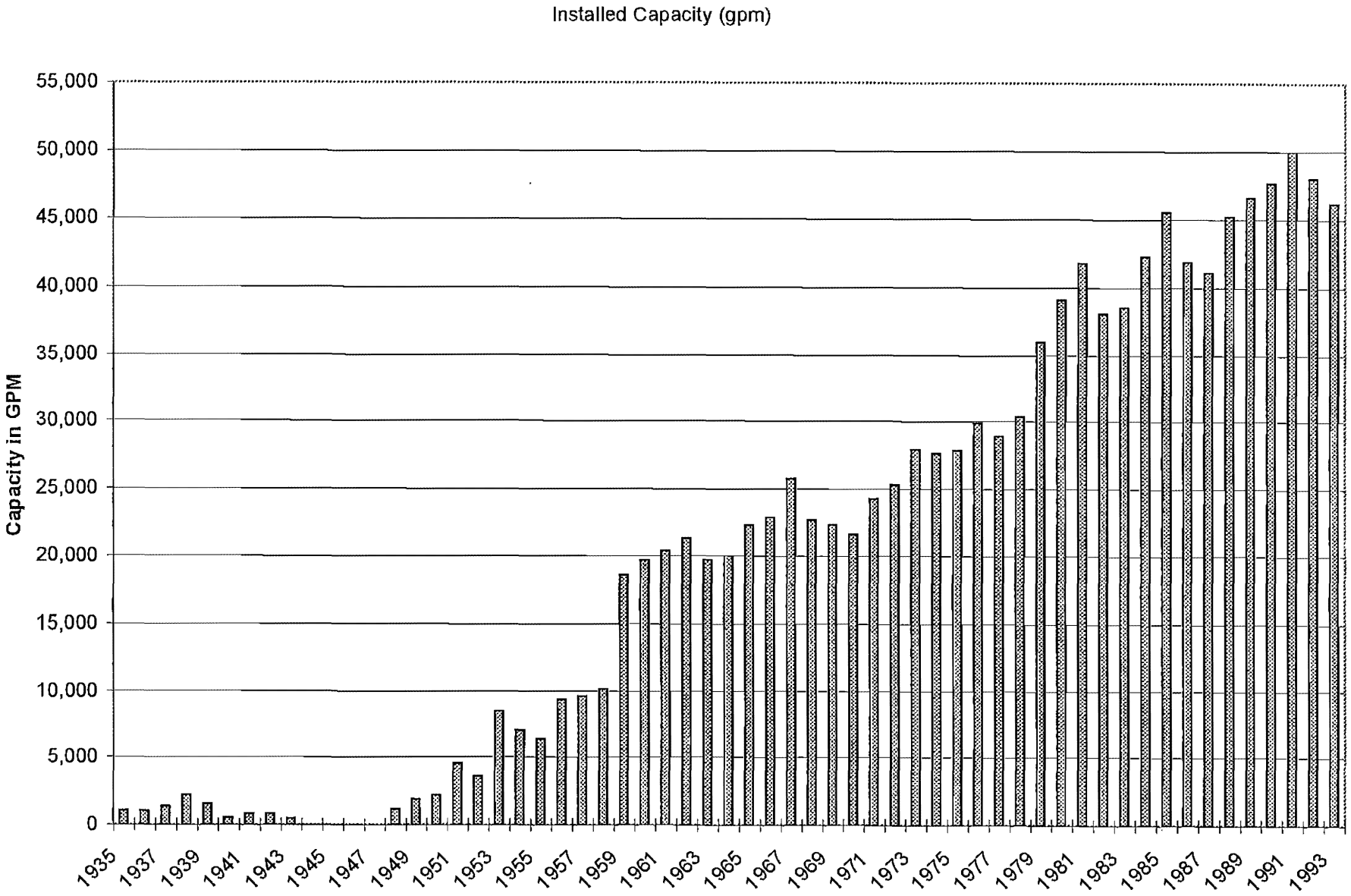
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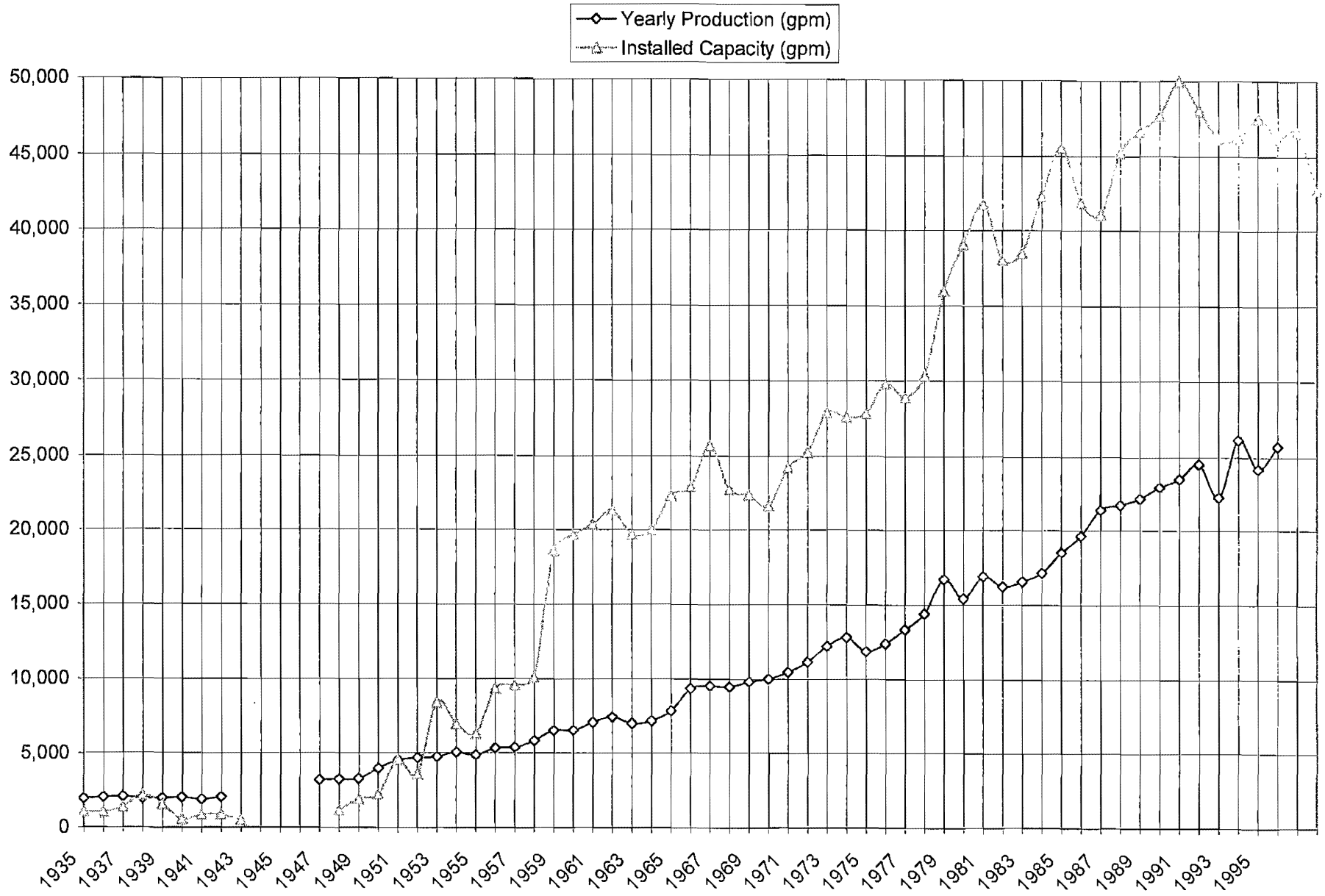


year	cumulative licensed water rights (gallons)	year	Cumulative Licensed Water Rights (gpm)
1934	188,711,424	1934	359
1935	580,281,424	1935	1,104
1936	580,281,424	1936	1,104
1937	580,281,424	1937	1,104
1938	1,028,461,424	1938	1,957
1939	1,028,461,424	1939	1,957
1940	1,028,461,424	1940	1,957
1941	1,028,461,424	1941	1,957
1942	1,028,461,424	1942	1,957
1943	1,816,321,424	1943	3,456
1944	1,816,321,424	1944	3,456
1945	1,816,321,424	1945	3,456
1946	1,816,321,424	1946	3,456
1947	2,582,951,424	1947	4,914
1948	3,762,351,424	1948	7,158
1949	4,493,601,424	1949	8,549
1950	4,493,601,424	1950	8,549
1951	5,437,151,424	1951	10,345
1952	9,447,229,984	1952	17,974
1953	10,169,039,984	1953	19,347
1954	10,176,247,712	1954	19,361
1955	10,464,027,712	1955	19,909
1956	11,407,567,712	1956	21,704
1957	11,747,247,712	1957	22,350
1958	12,794,547,712	1958	24,343
1959	13,723,577,712	1959	26,110
1960	14,405,297,712	1960	27,407
1961	14,405,297,712	1961	27,407
1962	17,099,107,712	1962	32,533
1963	17,099,107,712	1963	32,533
1964	17,452,937,712	1964	33,206
1965	19,002,772,810	1965	36,154
1966	21,184,712,810	1966	40,306
1967	21,184,712,810	1967	40,306
1968	23,484,562,810	1968	44,681
1969	24,499,354,869	1969	46,612
1970	26,056,154,869	1970	49,574
1971	27,707,354,869	1971	52,716
1972	28,181,484,869	1972	53,618
1973	28,535,314,869	1973	54,291
1974	28,669,764,869	1974	54,547
1975	29,526,034,869	1975	56,176
1976	29,804,374,869	1976	56,705
1977	32,604,354,869	1977	62,033
1978	33,547,904,869	1978	63,828
1979	37,975,524,869	1979	72,252
1980	37,975,524,869	1980	72,252

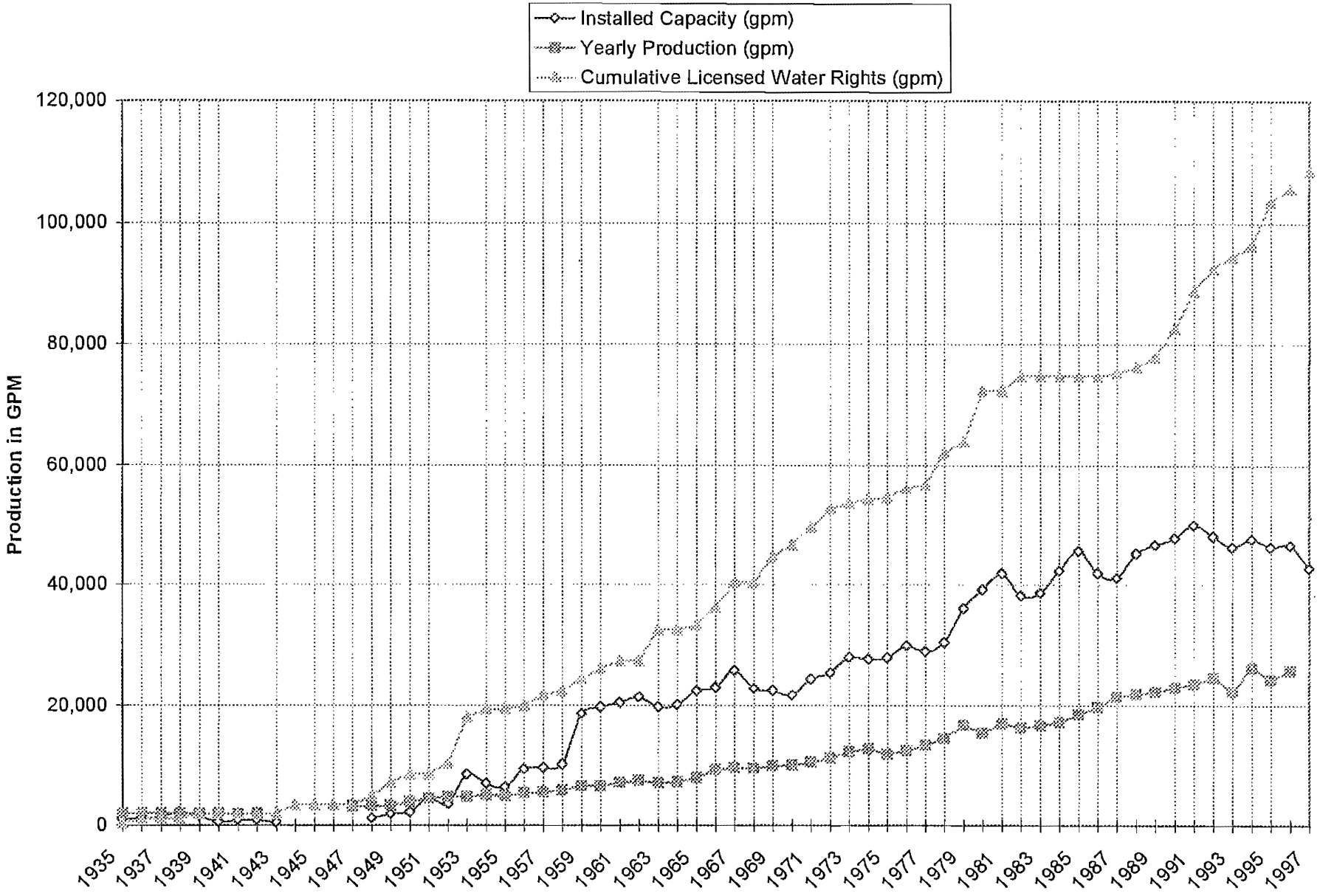
1981	39,263,474,869	1981	74,702
1982	39,263,474,869	1982	74,702
1983	39,263,474,869	1983	74,702
1984	39,263,474,869	1984	74,702
1985	39,263,474,869	1985	74,702
1986	39,525,304,869	1986	75,200
1987	40,015,953,197	1987	76,134
1988	40,907,603,197	1988	77,830
1989	43,365,561,213	1989	82,507
1990	46,642,041,213	1990	88,741
1991	48,686,428,621	1991	92,630
1992	49,663,178,814	1992	94,489
1993	50,715,178,814	1993	96,490
1994	54,324,208,814	1994	103,357
1995	55,503,608,814	1995	105,600
1996	57,025,118,814	1996	108,495

Installed Capacity Chart




Yearly Production (gpm)
Installed Capacity (gpm)
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1935
1937
1939
1941
1943
1945
1947
1949
1951
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
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1979
1981
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1985
1987
1989
1991
1993
1995

UWID 1934-1997 graph



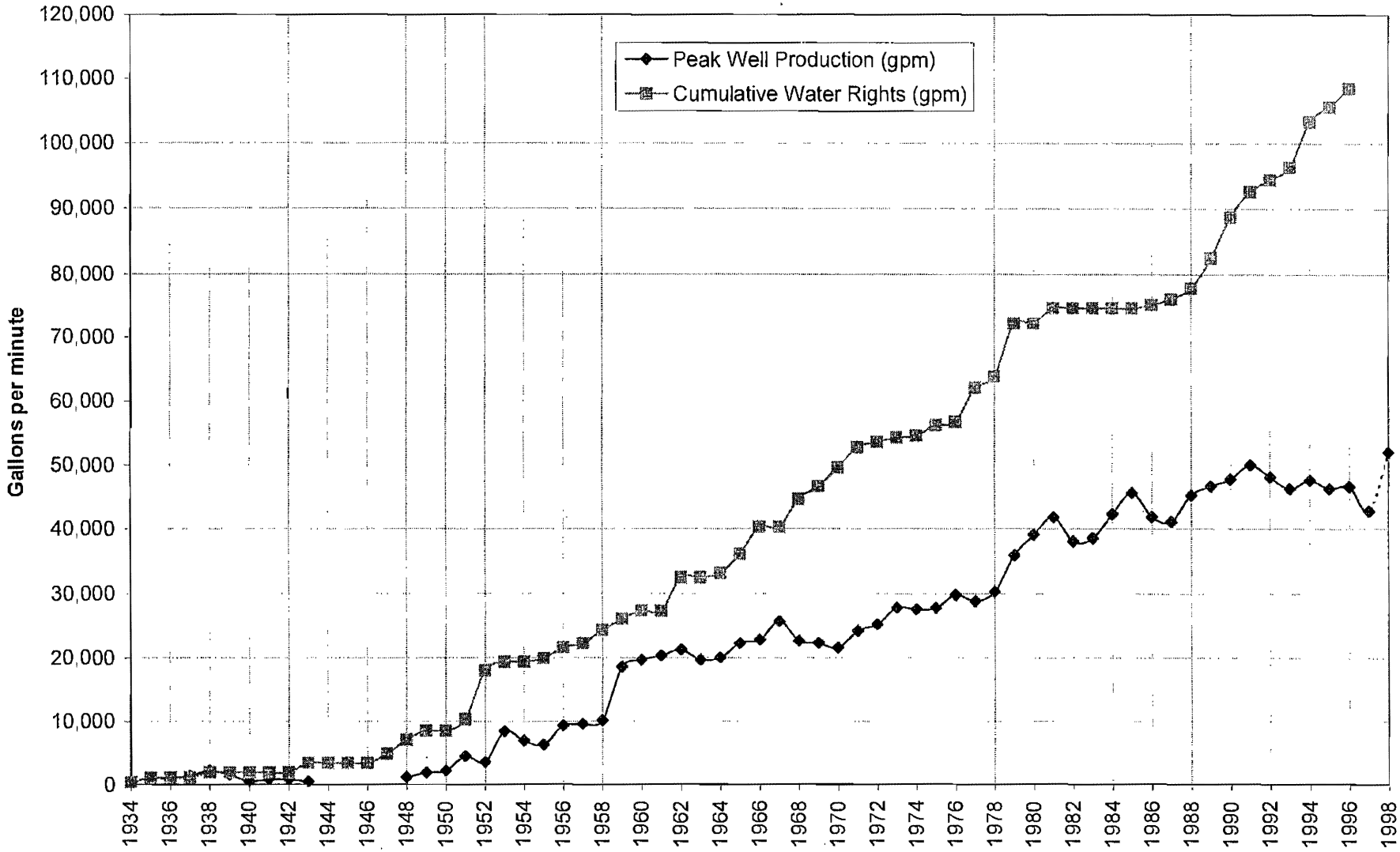
Instaled Capacity data

year	Installed Capacity (gpm)		Yearly Production (gpm)			Cumulative Licensed Water Rights (gpm)
1935	1,059	1935	1,938		1934	359
1936	1,059	1936	2,030		1935	1,104
1937	1,396	1937	2,072		1936	1,104
1938	2,197	1938	1,941		1937	1,104
1939	1,556	1939	1,969		1938	1,957
1940	555	1940	2,012		1939	1,957
1941	853	1941	1,884		1940	1,957
1942	853	1942	2,033		1941	1,957
1943	473	1943			1942	1,957
1944		1944			1943	3,456
1945		1945			1944	3,456
1946		1946			1945	3,456
1947		1947	3,188		1946	3,456
1948	1,163	1948	3,228		1947	4,914
1949	1,917	1949	3,279		1948	7,158
1950	2,230	1950	3,969		1949	8,549
1951	4,530	1951	4,533		1950	8,549
1952	3,579	1952	4,696		1951	10,345
1953	8,436	1953	4,747		1952	17,974
1954	6,969	1954	5,051		1953	19,347
1955	6,320	1955	4,857		1954	19,361
1956	9,342	1956	5,346		1955	19,909
1957	9,585	1957	5,406		1956	21,704
1958	10,129	1958	5,862		1957	22,350
1959	18,569	1959	6,532		1958	24,343
1960	19,666	1960	6,551		1959	26,110
1961	20,364	1961	7,071		1960	27,407
1962	21,317	1962	7,425		1961	27,407
1963	19,676	1963	7,000		1962	32,533
1964	20,024	1964	7,178		1963	32,533
1965	22,324	1965	7,856		1964	33,206
1966	22,906	1966	9,330		1965	36,154
1967	25,729	1967	9,543		1966	40,306
1968	22,737	1968	9,452		1967	40,306
1969	22,371	1969	9,827		1968	44,681
1970	21,627	1970	10,008		1969	46,612
1971	24,288	1971	10,477		1970	49,574
1972	25,286	1972	11,161		1971	52,716
1973	27,909	1973	12,222		1972	53,618
1974	27,631	1974	12,806		1973	54,291
1975	27,863	1975	11,859		1974	54,547
1976	29,839	1976	12,409		1975	56,176
1977	28,907	1977	13,341		1976	56,705
1978	30,363	1978	14,399		1977	62,033
1979	35,974	1979	16,675		1978	63,828
1980	39,094	1980	15,413		1979	72,252
1981	41,793	1981	16,865		1980	72,252
1982	38,083	1982	16,214		1981	74,702

Instaled Capacity data

1983	38,554	1983	16,538		1982	74,702
1984	42,293	1984	17,118		1983	74,702
1985	45,569	1985	18,484		1984	74,702
1986	41,885	1986	19,624		1985	74,702
1987	41,099	1987	21,414		1986	75,200
1988	45,229	1988	21,746		1987	76,134
1989	46,649	1989	22,159		1988	77,830
1990	47,706	1990	22,966		1989	82,507
1991	49,975	1991	23,537		1990	88,741
1992	48,046	1992	24,550		1991	92,630
1993	46,202	1993	22,259		1992	94,489
1994	47,550	1994	26,183		1993	96,490
1995	46,215	1995	24,223		1994	103,357
1996	46,576	1996	25,747		1995	105,600
1997	42,745				1996	108,495

Peak Groundwater Production vs. Total Water Rights



year	Peak Well Production (gpm)	Cumulative Water Rights (gpm)
1934		359
1935	1,059	1,104
1936	1,059	1,104
1937	1,396	1,104
1938	2,197	1,957
1939	1,556	1,957
1940	555	1,957
1941	853	1,957
1942	853	1,957
1943	473	3,456
1944		3,456
1945		3,456
1946		3,456
1947		4,914
1948	1,163	7,158
1949	1,917	8,549
1950	2,230	8,549
1951	4,530	10,345
1952	3,579	17,974
1953	8,436	19,347
1954	6,969	19,361
1955	6,320	19,909
1956	9,342	21,704
1957	9,585	22,350
1958	10,129	24,343
1959	18,569	26,110
1960	19,666	27,407
1961	20,364	27,407
1962	21,317	32,533
1963	19,676	32,533
1964	20,024	33,206
1965	22,324	36,154
1966	22,906	40,306
1967	25,729	40,306
1968	22,737	44,681
1969	22,371	46,612
1970	21,627	49,574
1971	24,288	52,716
1972	25,286	53,618
1973	27,909	54,291
1974	27,631	54,547
1975	27,863	56,176
1976	29,839	56,705
1977	28,907	62,033
1978	30,363	63,828
1979	35,974	72,252
1980	39,094	72,252
1981	41,793	74,702
1982	38,083	74,702

1983	38,554	74,702
1984	42,293	74,702
1985	45,569	74,702
1986	41,885	75,200
1987	41,099	76,134
1988	45,229	77,830
1989	46,649	82,507
1990	47,706	88,741
1991	49,975	92,630
1992	48,046	94,489
1993	46,202	96,490
1994	47,550	103,357
1995	46,215	105,600
1996	46,576	108,495
1997	42,745	
1998	52,000	

Fax to C. Murphy

McDEVITT & MILLER, LLP

Office of the Secretary
Service Date
October 31, 2002

NOV 0 4 2002

RECEIVED BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION OF UNITED WATER IDAHO INC. TO AMEND ITS CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY NO. 143 TO INCLUDE THE NAMPA CHARTER SCHOOL.	CASE NO. UWI-W-02-3 ORDER NO. 29141

On August 1, 2002, United Water Idaho Inc. (United Water; Company) filed an Application requesting authority to amend the certificate service area boundaries of its Certificate of Public Convenience and Necessity No. 143 (as amended) to include the Nampa Charter School. On August 23, 2002, the Commission issued a Notice of Application and Notice of Modified Procedure seeking public comment. The Commission Staff, Wes Miller and Coventry Development (Coventry), and United Water Company each filed comments. On October 25, 2002, Staff and United Water entered into a Stipulation settlement regarding the refund amount owed to Coventry.

THE APPLICATION

The expanded certificated area proposed in the Application is located in Canyon County near Lewis Lane between 12th Avenue Road and Powerline Road. By installing a pipeline along Sunnyridge Road, this proposed expansion would connect to the Coventry Place subdivision – which is within United Water's certificated territory and only 0.4 mile from the Nampa Charter School. Application Exhibit A legal description; *Idaho Code* § 61-526; Commission Rules of Procedure, IDAPA 31.01.01.112 and .201. The proposed area to be served is non-contiguous to United Water's main system.

United Water contended that the areas requested are not within the authorized service territories of any other public utility water corporation under the jurisdiction of the Commission and will not interfere with the operation of any water utility corporation under the Commission's jurisdiction. The Company further stated that there are no known public water utilities, persons or corporations with whom the expansion is likely to compete.

United Water indicated that the owners of the Nampa Charter School have executed a Water Main Extension Agreement (Agreement), which it has attached as Exhibit B to the

Application. The Company noted that the Agreement is identical to standard form agreements approved by the Commission in previous cases. United Water stated that it intends to provide service pursuant to its Tariff No. 1 (General Metered Service). United Water also maintained that the requested expansion of its Certificate No. 143 and service territory is consistent with the public convenience and necessity.

STAFF COMMENTS

Staff initially recommended that the Commission approve United Water's Application to amend and revise its Certificate of Convenience and Necessity to provide service to the Nampa Charter School under the terms and conditions of service proposed by United Water. However, Staff argued that under its interpretation of Coventry's Non-Contiguous Water System Agreement, United Water did not owe a supply source refund to Coventry's developer.

Staff noted that Commission Order No. 27976 issued on March 29, 1999, authorized United Water to serve the Coventry Place subdivision as a non-contiguous area. Future growth in subsequent phases of the Coventry subdivision will occur in the general direction of the Nampa Charter School, lessening the distance between the subdivision and the school. As long as no other capable public water provider in the area objects to United Water providing service to the Charter School, Staff supported United Water's Application to expand the non-contiguous area and provide service. Staff stated that other customers would not necessarily be harmed by United Water providing service to the Nampa Charter School.

The Nampa Charter School has a fire flow requirement substantially higher than the requirement for the residential customers in the Coventry subdivision. In order to meet the fire flow requirement of the school, United Water required the Charter School to bear the entire cost of the necessary pump modifications because they were made solely for the benefit of the Charter School and not for other subdivision customers in general.

In accordance with United Water's tariffs, the Non-Contiguous Water System Agreement for the Coventry Place subdivision contains a provision that requires United Water to reimburse the developer of the subdivision for use of the source of supply by latecomers. The Non-Contiguous Water System Agreement also contains provisions specifying an $800 source of supply refund for residential customers, including provisions for proportional refund amounts when multiple sources of supply are utilized. In this instance, Staff found that the Nampa Charter School was in fact a "latecomer" and utilized the same wells as Coventry. However, all

incremental costs for source of supply needed to serve the Nampa Charter School were paid for by the school. Staff argued that the school effectively contributed its own source of supply and relied only partially on the source of supply contribution provided by the developer of Coventry. Because the costs Coventry originally contributed will provide sufficient capacity to serve the needs of the subdivision through build out, Staff maintained that the developer was no worse off and would continue to receive refunds as customers within the subdivision utilize his contributed supply. Staff also argued that the Charter School is not a residential customer for which the $800 refund was intended. Even if a refund were warranted in this case, Staff believed it should not be based on average residential consumption when the new connection serves a commercial customer (e.g., the school) that has the potential for significantly different annual consumption.

COMMENTS OF WES MILLER AND COVENTRY DEVELOPMENT

In response to Staff's Comments, Wes Miller and Coventry Development, Inc. (collectively referred to as "Coventry") filed comments in this case on October 18, 2002. Mr. Miller is the developer of the Coventry subdivision whose well would serve the Nampa Charter School. Of the $152,000 expended for its own distribution lines, the Charter School paid approximately $7,000 in well improvements. Coventry's comments contrasted this with the approximately $240,000 spent by Coventry to drill the well and install the water system. Although the well was designed to be adequate for 400 to 500 lots, the school's use of the water will cut down on the number of lots that can be connected to the well.

Coventry stated that its Non-Contiguous Water System Agreement with Untied Water entitled it to be repaid for the cost of the well and water system at the rate of $800 per hook-up. When fully developed Coventry Place subdivision will only have 53 lots, which will not generate sufficient monies to reimburse Coventry for its costs. Rather, 300 hook-ups at $800 each are required to reimburse Coventry's costs. This agreement to reimburse Coventry's costs is limited to Coventry's out-of-pocket expenses; thus United Water will never pay Coventry more than the $240,000.

Coventry agreed with United Water that the utility owes it a fee resulting from the Charter School hook-up. If United Water is not allowed to pay a fee for each hook-up including the Nampa Charter School's hook-up, Coventry argued that it would never receive reimbursement for turning ownership of the well and system to United Water.

UNITED WATER'S REPLY COMMENTS

While United Water appreciated Staff's recommendation to amend and revise its Certificate of Public Convenience and Necessity to provide service to the Nampa Charter School, the Company disagreed with Staff's recommendation to disallow a refund to the developer of the Coventry Place subdivision for two reasons.

First, United Water argued that Staff's proposed disallowance of refunds would undermine the predictability of the non-contiguous expansion program and impair United Water's contract with Coventry. Although Staff stated that the development of non-contiguous systems should be encouraged, United Water stated that Staff's recommendation to disallow refunds would act as a disincentive since developers will install their own systems if they cannot receive reimbursement by "latecomers." The Company agreed with Staff that the Nampa Charter School qualified as a "latecomer" under the Non-Contiguous Water System Agreement. Since Coventry's developer had a contractually based expectation of receiving refunds pursuant to paragraph 14, the Company argued it would be highly inequitable to re-write the contract after the fact.

Second, United Water maintained that Staff misunderstood the level of investment made by the Nampa Charter School. While Coventry's developer advanced $240,570 for source of supply, the Nampa Charter School paid only $8,315 in source of supply costs to upgrade the pump for fire flow requirements. Increasing the capacity of the well did not take into account the other components or costs necessary to develop a well as a source of supply, i.e., land, pump house, well drilling and development, and electrical pumping equipment. The Company did not believe the $8,315 paid by the Nampa Charter School has any bearing on the cost advanced by Coventry's developer that is subject to reimbursement under the Non-Contiguous Water System Agreement.

Although Staff based its recommendation on paragraph 10 of the Non-Contiguous Water System Agreement, the Company did not feel that this paragraph applied to reimbursement of costs for Source of Supply triggered by "latecomers." Rather, paragraph 10 established the amount of reimbursement for each lot within the project and how much reimbursement would be divided in cases where additional sources of supply were developed. The Company strongly disagreed with Staff's position that the $8,315 cost to increase the size of the pump bowl paid by the Nampa Charter School was an "additional potable Source of Supply"

as contemplated in paragraph 10. According to the Company, Staff's logic that any number of "latecomers" contributing various upgrades to a single source of supply would then result in an innumerable number of sources of supply where in fact only one existed, misapprehended the configuration of the existing water system.

STIPULATION

On October 25, 2002, the Commission Staff and United Water filed a Stipulation resolving the supply source refund amount owed to Coventry's developer. The Stipulation resulted from clarifications made at a meeting held on October 24, 2002. Pursuant to Commission Rule 272, Staff notified Coventry's attorney of the conference but he declined to participate. IDAPA 31.01.01.272.

Staff and the Company stipulated that Coventry Place is entitled to a one-time refund of $1,600. The rationale for this amount is that since a one inch meter residential connection generates a refund of $800 under the Non-Contiguous Water System Agreement between Coventry and United Water, then Nampa Charter School's two inch meter connection should generate a refund of twice the residential connection, or $1,600. The Company and Staff also agreed to discuss possible revisions to the standard form non-contiguous agreement regarding refunds to "latecomers" with a view toward recommending any appropriate revisions to the Commission. Finally, United Water and Staff stipulated that the Commission may approve United Water's Application to Amend its Certificate of Public Convenience and Necessity No. 143 subject to these clarifications without objection.

DISCUSSION AND FINDINGS

The Commission has reviewed the Company's Application and proposed Certificate amendment. We have also reviewed the analysis and recommendations of Staff and Coventry in this matter as well as the Company's response. The Commission continues to find that the issues presented in Case No. UWI-W-02-3 are suitable for processing under Modified Procedure, i.e., by written submission rather than by hearing. IDAPA 31.01.01. 204.

The Commission has considered the relevant statutory authority (*Idaho Code* § 61-526) and Commission Rules (IDAPA 31.01.01.112) regarding amendments to Certificate of Public Convenience and Necessity for existing utilities. We find that the Company's filing satisfies the underlying statutory and procedural requirements for Certificate applications. We further find, as qualified herein below, that the Company's filing and the submitted Agreement

comport with the Company's rules and regulations governing water main extensions (Rules 74-77 Special Facilities) and noncontiguous expansion (Rules 78-84).

The Commission finds the Water Main Extension Agreement with the Nampa Charter School and the Company's related Application are acceptable. The Commission also accepts the stipulated resolution of the supply source refund amount based on meter connection size as reasonable under the circumstances presented in this case. Although Coventry's developer has not signed this Stipulation, we note the $1,600 refund amount is more than what was originally contemplated by both Staff and United Water and thus benefits Coventry's developer.

We find that there are no known public water utilities, persons or corporations with whom the proposed Certificate expansion is likely to compete. We find that the present and future public interest will be served by issuance of an amended Certificate of Public Convenience and Necessity No. 143 to United Water for the requested area. We find it reasonable to authorize extension of service to the Nampa Charter School under the submitted Agreement.

CONCLUSIONS OF LAW

The Commission has jurisdiction over United Water Idaho Inc., a water utility, and its Application in Case No. UWI-W-02-3 pursuant to the authority and power granted under Title 61 of the Idaho Code and the Commission's Rules of Procedure, IDAPA 31.01.01.000 *et seq.*

ORDER

IT IS HEREBY ORDERED that the Certificate of Public Convenience and Necessity No. 143 of United Water Idaho Inc. be amended to reflect the addition of the particular area described as the Nampa Charter School in Canyon County, Idaho, and as reflected and more particularly described in UWI-W-02-3 Application, Exhibit A—Legal Descriptions—Nampa Charter School. United Water Idaho Inc. is directed to prepare and file an amended Certificate for Commission approval.

IT IS FURTHER ORDERED and the Commission does hereby approve the providing of water service and construction of related facilities to the Nampa Charter School in accordance with the submitted Agreement which we find comply with the Company's non-contiguous expansion tariffs (Rules 78-84).

IT IS FURTHER ORDERED that we adopt the Stipulation executed by United Water and the Commission Staff. It is reasonable based upon the facts of this case. Coventry subdivision is entitled to a one-time refund of $1,600 for the Nampa Charter School.

THIS IS A FINAL ORDER. Any person interested in this Order may petition for reconsideration within twenty-one (21) days of the service date of this Order. Within seven (7) days after any person has petitioned for reconsideration, any other person may cross-petition for reconsideration. See *Idaho Code* § 61-626.

DONE by Order of the Idaho Public Utilities Commission at Boise, Idaho this 30th day of October 2002.

PAUL KJELLANDER, PRESIDENT

MARSHA H. SMITH, COMMISSIONER

DENNIS S. HANSEN, COMMISSIONER

ATTEST:

Jean D. Jewell
Commission Secretary

O:UWIW0203_ln

BOUNDARY DESCRIPTION
FOR CERTIFICATE OF CONVENIENCE & NECESSITY NO. 143
THIRTY-SECOND AMENDMENT

This Amendment Includes and Supersedes
All Prior Amendments No. 1 through 31

Commencing at the common Section Corner of Sections 23, 24, 25 and 26, Township 4 North, Range 2 East, Boise Meridian, THE REAL POINT OF BEGINNING;

thence westward approximately 3 miles along the north section line of Sections 26, 27 and 28 to the common section corner for Sections 20, 21, 28 and 29, Township 4 North, Range 2 East, Boise Meridian;

thence northward approximately 1 mile along the common north-south section line between said Sections 20 and 21 to the common section corner for said Sections 20 and 21 and Sections 16 and 17, Township 4 North, Range 2 East, Boise Meridian;

thence westward approximately 1 mile along the east - west section line common to said Sections 17 and 20 to the section corner common to Sections 17, 18, 19 and 20, Township 4 North, Range 2 East, Boise Meridian;

thence northward approximately 2-1/2 miles along the north - south section line of said Sections 17 and 18 and Sections 7, 8, 5 and 6 to the east - west half section line of said Section 5, Township 4 North, Range 2 East, Boise Meridian:

thence eastward approximately 1-1/2 miles along the said east - west half section line of Section 5 and Section 4, Township 4 North, Range 2 East, Boise Meridian to the north - south half section line of said Section 4, Township 4 North, Range 2 East, Boise Meridian;

thence northward approximately 2-1/2 miles along the said north - south half section line of Section 4, Township 4 North, Range 2 East, Boise Meridian and Sections 33 and 28, Township 5 North, Range 2 East, Boise Meridian to the common east - west section line of Sections 21 and 28, Township 5 North, Range 2 East, Boise Meridian;

thence westward approximately 1 mile along the said east - west section line common to Sections 21 and 28 and Sections 20 and 29, Township 5 North, Range 2 East, Boise Meridian to the north - south half section line of said Section 29, Township 5 North, Range 2 East, Boise Meridian;

thence southward approximately 1/2 mile along the said north - south half section line of Section 29, Township 5 North, Range 2 East, Boise Meridian to the east - west half section line of Section 29, Township 5 North, Range 2 East, Boise Meridian;

thence westward approximately 1/2 mile along the said east - west half section line of Section 29, Township 5 North, Range 2 East, Boise Meridian to the north - south section line common to said Section 29 and Section 30, Township 5 North, Range 2 East, Boise Meridian;

thence southward approximately 1 mile along the said north - south section line of Sections 29 and 30 and Sections 31 and 32, Township 5 North, Range 2 East, Boise Meridian to the east - west half section line of said Section 31, Township 5 North, Range 2 East, Boise Meridian;

thence westward approximately 1 mile along the said east - west half section line of Section 31, Township 5 North, Range 2 East, Boise Meridian to the north - south section line common to said Section 31, Township 5 North, Range 2 East, Boise Meridian and to Section 36, Township 5 North, Range 1 East, Boise Meridian;

thence southward approximately 1-1/2 miles along the said common north - south section line of Section 31, Township 5 North, Range 2 East, Boise Meridian and of Section 36, Township 5 North, Range 1 East, Boise Meridian and of Section 6, Township 4 North, Range 2 East, Boise Meridian and Section 1, Township 4 North, Range 1 East, Boise Meridian to the section corner common to Sections 6 and 7, Township 4 North, Range 2 East, Boise Meridian and Sections 1 and 12, Township 4 North, Range 1 East, Boise Meridian;

thence westward approximately 1/2 mile along the east - west section line common to said Sections 1 and 12, Township 4 North, Range 1 East, Boise Meridian to the north - south half section line of said Section 12, Township 4 North, Range 1 East, Boise Meridian;

thence southward approximately 1 mile along the said north - south half section line of Section 12, Township 4 North, Range 1 East, Boise Meridian to the east - west section line common to said Section 12 and Section 13, Township 4 North, Range 1 East, Boise Meridian;

thence westward approximately 1/2 mile along the said east - west section line common to Sections 12 and 13, Township 4 North, Range 1 East, Boise Meridian to the Section corner common to Sections 11, 12, 13 and 14, Township 4 North, Range 1 East, Boise Meridian;

thence southward approximately 1/4 mile along the north - south section line common to said Sections 13 and 14, Township 4 North, Range 1 East, Boise Meridian to the centerline of Hill Road;

thence northwesterly along the said centerline of Hill Road to a point on the north-south half section line of Section 14, Township 4 North, Range 1 East, Boise Meridian;

thence southward along the said north-south half section line of Section 14, Township 4 North, Range 1 East, Boise Meridian to the centerline of State Street;

thence southeasterly along the said centerline of State Street to a point on the west line of the East 1/2, West 1/2 of Section 30, Township 4 North, Range 2 East, Boise Meridian;

thence southward along the said west line of the East 1/2, West 1/2 of Section 30, Township 4 North, Range 2 East, Boise Meridian, to the north meander line of the Boise River;

thence southeasterly along said north and east meander line of the Boise River to a point on the north line of the South 1/2, Southwest 1/4, Southwest 1/4 of Section 4, Township 3 North, Range 2 East, Boise Meridian;

thence westward along said north line and the north line of the South 1/2, South 1/2 of the Southeast 1/4 of Section 5, Township 3 North, Range 2 East, Boise Meridian, parallel to the south section line of said Sections 4 and 5 to the centerline of Settler's Canal;

thence northwesterly along the centerline of Settler's Canal to a common point between said canal and the centerline of Glenwood Street;

thence northward along said centerline of Glenwood Street to the rim of the Bench lying south of Chinden Boulevard;

thence northwesterly along the said rim of the Bench to the common north-south section line of Sections 26 and 27, Township 4 North, Range 1 East, Boise Meridian;

thence northward along the said north-south section line of Sections 26 and 27 to the common section corner of Sections 22, 23, 26, and 27, Township 4 North, Range 1 East, Boise Meridian;

thence westward approximately 2 miles along the common east-west section line between Sections 22, 21, 27, and 28, Township 4 North, Range 1 East, Boise Meridian, to the common section corner of Sections 20, 21, 28 and 29, Township 4 North, Range 1 East, Boise Meridian;

thence northward approximately 1/4 mile along the common north-south section line of Sections 20 and 21, Township 4 North, Range 1 East, Boise Meridian, to the centerline of Thurman Drain;

thence northwesterly along the said centerline of Thurman Drain to the common north-south section line of Sections 20 and 19, Township 4 North, Range 1 East, Boise Meridian;

thence westward approximately 2 miles along the East–West centerline of said Section 19, Township 4 North, Range 1 East, Boise Meridian and Section 24, Township 4 North, Range 1 West, Boise Meridian to the North-South section line of said Section 24 and Section 23, Township 4 North, Range 1 West, Boise Meridian;

thence northward approximately 1/2 mile along the said north-south section line of said Sections 23 and 24, Township 4 North, Range 1 West, Boise Meridian to the section corner common to Sections 13, 14, 23 and 24,Township 4 North, Range 1 West, Boise Meridian;

thence westward approximately 1-1/2 miles along the common east-west section line of Sections 14, 15, 23 and 22, Township 4 North, Range 1 West, Boise Meridian to the north-south half section line of said Section 22, Township 4 North, Range 1 West, Boise Meridian;

thence southward approximately 1 mile along the north-south half section line of said Section 22, Township 4 North, Range 1 West, Boise Meridian to a point 100 feet south of the common east-west section line of Sections 22 and 27, Township 4 North, Range 1 West, Boise Meridian;

thence eastward approximately 4 miles parallel to and 100 feet south of the common east-west section line of Sections 22, 23, 24, 27, 26 and 25, Township 4 North, Range 1 West, Boise Meridian and Sections 19, 20, 30 and 29, Township 4 North, Range 1 East, Boise Meridian to the north-south half section line of said Section 29, Township 4 North, Range 1 East, Boise Meridian;

thence southward approximately 1 mile along the said north-south half section line of Section 29, Township 4 North, Range 1 East, Boise Meridian to the common east-west section line of said Section 29 and Section 32, Township 4 North, Range 1 East, Boise Meridian;

thence eastward approximately 1/2 mile along the common east-west section line of Sections 29 and 32, Township 4 North, Range 1 East, Boise Meridian to a point approximately 100 feet West of the common section corner of Sections 28, 29, 32 and 33, Township 4 North, Range 1 East, Boise Meridian;

thence southward approximately 1 mile parallel to and 100 feet west of the common north-south section line of Sections 32 and 33, Township 4 North, Range 1 East, Boise Meridian, to a point which is 100 feet west of the common section corner of Sections 32 and 33, Township 4 North, Range 1 East and Sections 4 and 5, Township 3 North, Range 1 East, Boise Meridian;

thence eastward approximately 1 mile along the common east-west section line of said Sections 33 and 4 to a point which is 100 feet west of the common section corner of Sections 33 and 34, Township 4 North, Range 1 East, Boise Meridian and Sections 4 and 3, Township 3 North, Range 1 East, Boise Meridian;

thence southward approximately 2 miles parallel to and 100 feet west of the common section line of Sections 3, 4, 9 and 10, Township 3 North, Range 1 East, Boise Meridian, to a point which is 100 feet west of the common section corner of Sections 9, 10, 15 and 16, Township 3 North, Range 1 East, Boise Meridian;

thence westerly approximately 1/2 mile along the common east-west section line of Sections 9 and 16, Township 3 North, Range 1 East, Boise Meridian to the north-south center line of said Section 16, Township 3 North, Range 1 East, Boise Meridian;

thence southerly approximately 3 miles along the said north-south centerline of Section 16 and of Sections 21 and 28, Township 3 North, Range 1 East, Boise Meridian to the common east-west section line of said Section 28 and Section 33, Township 3 North, Range 1 East, Boise Meridian;

thence easterly approximately 1/2 mile along the said east-west section line of Section 28 and 33, Township 3 North, Range 1 East, Boise Meridian to the common section corner of Sections 27, 28, 33 and 34, Township 3 North, Range 1 East, Boise Meridian;

thence southerly approximately 2-1/2 miles along the common north-south section line of said Sections 33 and 34, Township 3 North, Range 1 East, Boise Meridian and Sections 3, 4, 9, and 10, Township 2 North, Range 1 East, Boise Meridian to the east-west 1/2 section line of said Section 10, Township 2 North, Range 1 East, Boise Meridian;

thence easterly approximately 3/4 mile along the said east-west 1/2 section line of said Section 10, Township 2 North, Range 1 East, Boise Meridian to the center line of the New York canal;

thence southerly along said centerline of the New York Canal to the common section line between Sections 10 and 15, Township 2 North, Range 1 East, Boise Meridian;

thence eastward along the east-west section line common to Sections 10 and 15, Township 2 North, Range 1 East, Boise Meridian, to the section corner common to Sections 10, 11, 14 and 15, Township 2 North, Range 1 East, Boise Meridian;

thence southward approximately 2 miles along the north-south section line common to Sections 14, 15, 22 and 23, Township 2 North, Range 1 East, Boise Meridian, to the common section corner of Sections 22, 23, 26 and 27, Township 2 North, Range 1 East, Boise Meridian;

thence eastward approximately 9 miles along the east-west section line common to Sections 23, 24, 26 and 25, Township 2 North, Range 1 East, Boise Meridian, Sections 19, 20, 21, 22, 23, 24, 30, 29, 28, 27, 26 and 25, Township 2 North, Range 2 East, Boise Meridian, and Sections 19 and 30, Township 2 North, Range 3 East, Boise Meridian, to the common section corner of Sections 19, 20, 29 and 30, Township 2 North, Range 3 East, Boise Meridian;

thence northward approximately 1 mile along the north-south section line common to Sections 19 and 20, Township 2 North, Range 3 East, Boise Meridian, to the common section corner of Sections 19, 20, 17 and 18, Township 2 North, Range 3 East, Boise Meridian;

thence eastward approximately 2 miles along the east-west section line common to Sections 17, 16, 20 and 21, to the common section corner of Sections 15, 16, 21 and 22, Township 2 North, Range 3 East, Boise Meridian;

thence northward approximately 2-1/2 miles along the north-south section line common to Sections 15, 16, 9, 10, 3 and 4, Township 2 North, Range 3 East, Boise Meridian, to the centerline of the New York Canal;

thence northwesterly along the centerline of the New York Canal to the common north-south section line of Sections 32 and 33, Township 3 North, Range 3 East, Boise Meridian;

thence northward approximately 1/2 mile along the north-south section line common to Sections 32 and 33, Township 3 North, Range 3 East, Boise Meridian, to the common section corner of Sections 32, 33, 29 and 28, Township 3 North, Range 3 East, Boise Meridian;

thence eastward approximately 1/2 mile along the common east-west section line of Sections 28 and 33, Township 3 North, Range 3 East, Boise Meridian to the north-south centerline of said Section 28, Township 3 North, Range 3 East, Boise Meridian;

thence northward approximately 1 mile along the said north-south centerline of said Section 28, Township 3 North, Range 3 East, Boise Meridian to

the common east-west section line of said Section 28 and Section 21, Township 3 North, Range 3 East, Boise Meridian;

thence westward approximately 1 mile along the said east-west section line of said Sections 28 and 21 and Sections 29 and 20, Township 3 North, Range 3 East, Boise Meridian to the north-south centerline of said Section 20, Township 3 North, Range 3 East, Boise Meridian;

thence northward approximately 1 mile along the said north-south centerline of Section 20, Township 3 North, Range 3 East, Boise Meridian to a point on the common east-west section line of Sections 17 and 20, Township 3 North, Range 3 East, Boise Meridian;

thence westward approximately 1/2 mile along the said common east-west section line of Sections 17 and 20 to the common section corner of Sections 17, 18, 19 and 20, Township 3 North, Range 3 East, Boise Meridian;

thence northward approximately 1/2 mile along the common north-south section line of Sections 17 and 18, Township 3 North, Range 3 East, Boise Meridian to the 1/4 corner common to said Sections 17 and 18, Township 3 North, Range 3 East, Boise Meridian;

thence westward approximately 1 mile along the east-west half section line of Section 18 to a point on the common north-south section line of Section 18, Township 3 North, Range 3 East, Boise Meridian, and Section 13, Township 3 North, Range 2 East, Boise Meridian;

thence northward approximately 1/2 mile along the north-south common Section Line of Section 13, Township 3 North, Range 2 East, Boise Meridian, and Section 18, Township 3 North, Range 3 East, Boise Meridian, to the section corner common to Sections 12 and 13, Township 3 North, Range 2 East, Boise Meridian, and Sections 7 and 18, Township 3 North, Range 3 East, Boise Meridian;

thence eastward approximately 2,640 feet along the east-west section line between Sections 7 and 18, Township 3 North, Range 3 East, Boise Meridian;

thence northward along the center section line of Section 7, Township 3 North, Range 3 East, Boise Meridian, for approximately 1 mile to the north section line of said Section 7;

thence westward approximately 1-1/2 miles along the north section line of Section 7, Township 3 North, Range 3 East, Boise Meridian, and Section 12, Township 3 North, Range 2 East, Boise Meridian, to the section corner common to Sections 1, 2, 11 and 12, Township 3 North, Range 2 East, Boise Meridian;

thence north along the common north-south section line between said Sections 1 and 2 and continuing North along the north-south section line common to Sections 35 and 36 and Sections 25 and 26, Township 4 North, Range 2 East, Boise Meridian, to the section corner common to Sections 23, 24, 25 and 26, Township 4 North, Range 2 East, Boise Meridian, THE REAL POINT OF BEGINNING.

Subject to the Exclusions and Additions attached hereto.

EXCLUSIONS FROM CERTIFICATE OF CONVENIENCE AND NECESSITY NO. 143 THIRTY-SECOND AMENDED

Case No. U-1080-9
Order No. 16988
Certificate No. 239
Fourth Amended
Dated February 26, 1982

1) CAPITOL WATER CORPORATION

Commencing at the Northwest Corner of Section 6, Township 3 North, Range 2 East, Boise Meridian; thence South along the Section Line to a point that is the Southwest Corner of Westgate Acres Subdivision; thence East along the South boundary of Westgate Acres Subdivision to the centerline of Allumbaugh Street; thence North along the centerline of Allumbaugh Street; thence East along the centerline of Northview Street to the centerline of Curtis Road; thence North along the centerline of Curtis Road to the centerline of Mountain View Drive; thence Northwesterly along the centerline of Mountain View Drive to the centerline of Ustick Road; thence West along the centerline of Ustick Road to the Point of Beginning; also,

The South 1/4 of the South 1/2 of Section 36, Township 4 North, Range 1 East, Boise Meridian, and the North Half of Section 1, Township 3 North, Range 1 East, Boise Meridian, Ada County, Idaho, also,

The North 3/4 of the Southeast 1/4 of Section 36, Township 4 North, Range 1 East, Boise Meridian, in Ada County, Idaho,

also,

Commencing at the Southwest Corner of Section 36, Township 4 North, Range 1 East, Boise Meridian, thence South 89E46'32" East 1327.63 feet along the South Line of said Section to a 1/16 Corner; thence North 00E25'38" East 663.57 feet to the Point of Beginning; thence North 89E46'43" West 599.27 feet to a point; thence North 00E30' 54" East 276.46 feet to a point; thence South 89E46' 32" East 598.87 feet to a point; thence South 00E25' 58" West 276.43 feet to the POINT OF BEGINNING.

also,

The Northview Subdivision located in Section 6, Township 3 North, Range 2 East, Boise Meridian, Ada County, Idaho.

Attachment 2

ADDITION TO
CERTIFICATE OF CONVENIENCE AND NECESSITY NO. 143
THIRTY-SECOND AMENDED

Case No. EUW-W-94-1
Order No. 26524 & 26337
Dated July 19, 1996 & March 5, 1996

1) An area bounded on the south by East Floating Feather Road, on the west by Linder Road, on the north by East Beacon Light Road and on the east by a line approximately 1/2 mile west of North Eagle Road.

2) An area bounded on the south by a line generally 1/4 mile south of State Highway 44, on the west by Linder Road, on the north by East Floating Feather Road and on the east by Ballantyne Lane extended.

3) An area generally bounded on the north by the Boise River, on the east by North Edgewood Lane extended, generally on the south by the change in elevation between the bench and the Boise River flood plain and on the west by a line 1/4 mile east of Ballantyne Lane extended.

4) An area bounded on the north by Floating Feather Road, on the west by Ballantyne Lane, on the south by the south line of the north half of the south half of Section 7, Township 4 North, Range 1 East, Boise Meridian, and on the east by the north-south section line common to said Section 7 and Section 8, Township 4 North, Range 1 East, Boise Meridian.

Attachment 3

ADDITION TO
CERTIFICATE OF CONVENIENCE AND NECESSITY NO. 143
THIRTY-SECOND AMENDED

Case No. UWI-W-99-1
Order No. 27976
Dated March 29, 1999

1) Carriage Hill Subdivision No. 1 located in the South 1/2 of Section 31, Township 3 North, Range 2 West, Boise Meridian, and recorded in Book 26 of Plats at Page 29, records of Canyon County, Idaho;

2) Coventry Place No. 1 Subdivision located in the Northwest 1/4 of the Southeast 1/4 of Section 10, Township 2 North, Range 2 West, Boise Meridian, and recorded in Book 24 of Plats at Page 42, records of Canyon County, Idaho;

3) Coventry Place No. 2 Subdivision located in the Northwest 1/4 of the Southeast 1/4 of Section 10, Township 2 North, Range 2 West, Boise Meridian, Canyon County, Idaho.

Attachment 4

ADDITION TO
CERTIFICATE OF CONVENIENCE AND NECESSITY NO. 143
THIRTY-SECOND AMENDED

Case No. UWI-W-00-2
Order No. 28377
Dated 5-16-2000

Saddle Ridge and Danskin Ridge Subdivisions located in the South 1/2 of the South 1/2 of Section 3, Township 2 North, Range 1 West, Boise Meridian, the North 1/2 of the North 1/2 of Section 10, Township 2 North, Range 1 West, Boise Meridian and the Northwest 1/4 of Section 11, Township 2 North, Range 1 West, Boise Meridian, Ada County, Idaho.

Attachment 5

ADDITION TO
CERTIFICATE OF CONVENIENCE AND NCESSITY NO. 143
THIRTY-SECOND AMENDED

Case No. UWI-W-00-3
Order No. 28418
Dated 9-26-2000

M & M Mountain View Acres located in the Southwest 1/4 of the Northwest 1/4 of Section 8, Township 2 North, Range 1 West, Boise Meridian and recorded in Book 11 at Page 13, records of Canyon County, Idaho.

Attachment 6

ADDITION TO
CERTIFICATE OF CONVENIENCE AND NCESSITY NO. 143
THIRTY-SECOND AMENDED

Case No. UWI-W-01-03
Order No. 28885
Dated November 6, 2001

DESCRIPTION FOR
BELMONT HEIGHTS SUBDIVISION

A parcel of land located in the South 1/2 of Section 20, Township 3 North, Range 1 West, Boise Meridian, Canyon County, Idaho more particularly described as follows:

Commencing at an aluminum cap monument marking the Southeast corner of said Section 20 from which a brass cap monument marking the South 1/4 corner of said Section 20 bears North 89°16'00" West, 2668.54 feet;

thence along the south boundary line of said Section 20 North 89°16'00" West, 1334.14 feet to a brass cap monument marking the East 1/16 corner of said Section 20, said point also being the REAL POINT OF BEIGINNING;

thence continuing along said South boundary line North 89°16'00" West. 521.51 feet;

thence leaving said South boundary line North 20°52'49" West, 458.24 feet to a point on the centerline of the Ridenbaugh Canal;

thence along said centerline the following four courses:

North 80°27'24" West, 24.77 feet to the beginning of a curve to the left;

thence along said curve 281.06 feet, said curve having a radius of 250.00 feet, a central angle of 64°24'48" and a long chord of 266.49 feet which bears South 67°20'12" West to the point of tangency;

thence South 35°07'48" West, 46.81 feet;

thence South 11°53'53" West, 67.08 feet to the point of intersection of the centerline of the Ridenbaugh Canal and the centerline of the Dewey Lateral;

thence along the centerline of the Dewey Lateral the following courses:

North 75°20'08" West, 110.90 feet;

thence North 45°12"02" West, 219.72 feet to the beginning of a curve to the right;

thence along said curve 100.41 feet, said curve having a radius of 400.00 feet, a central angle of 14°23'00" and a long chord of 100.15 feet which bears North 38°00'32" West to the point of tangency;

thence North 30°49'02" West, 42.53 feet to the beginning of a curve to the right;

thence along said curve 86.24 feet, said curve having a radius of 200.00 feet, a central angle of 24°42'24" and a long chord of 85.58 feet which bears North 18°27'50" West to the point of tangency;

thence North 06°06'38" West, 68.82 feet;

thence North 11°48'38" West, 280.50 feet;

thence North 33°10'50" West, 321.11 feet to the beginning of a curve to the left;

thence along said curve 111.69 feet, said curve having a radius of 250.00 feet, a central angle of 25°35'54" and a long chord of 110.77 feet which bears North 45°58'47" West to the point of tangency;

thence North 58°46'44" West, 102.20 feet to a point on the East-West centerline of the Southwest 1/4 of said Section 20;

thence leaving the centerline of the said Dewey lateral and along said East-West centerline South 89°11'18" East, 448.44 feet to the Center-South 1/16 corner of said Section 20;

thence along the North-South centerline of said Section 20 North 00°14'13" East, 863.30 feet;

thence leaving said North-South centerline South 79°04'56" East, 438.52 feet;

thence North 32°09'04" East, 200.00 feet;

thence North 00°23'04" East, 200.00 feet;

thence North 17°50'04" East, 91.00 feet;

thence North 16°52'56" West, 89.23 feet to a point on the East-West centerline of said Section 20;

thence along said East-West centerline South 89°06'56" East, 794.78 feet to the Center-East 1/16 corner of said Section 20;

thence along the North-South centerline of the Southeast 1/4 of said Section 20 South 00°12'39" West, 2656.50 feet to the REAL POINT OF BEGINNING, containing 71.94 acres more or less.

ADDITION TO
CERTIFICATE OF CONVENIENCE AND NECESSITY NO. 143
THIRTY-SECOND AMENDED

Case No.
Order No.
Dated

NAMPA CHARTER SCHOOL

The legal description of a two hundred foot wide area for the proposed installation of local water services; being over and across parcels of land being more particularly described as follows:

An area generally being in portions of the South 1/2 of Section 10; and, portions of the North 1/2 of the North 1/2 of Section 15, all in Township 2 North, Range 2 West; Boise Meridian; Canyon County, Idaho;

Said area particularly being the one hundred foot (100.00') wide margin lying northerly of, and adjoining, the following described line:

Beginning at a point marking the East 1/16 Corner common to said Sections 10 and 15; said point also being on the centerline of the right-of-way of Lewis Lane;

thence, along the said section line common to Sections 10 and 15, also being the said centerline of Lewis Lane, N 89°13'44" W 640.00 feet to a point;

thence, said area continuing, but being two hundred feet wide with one hundred foot (100.00') wide margins centered along and respectively lying both northerly and southerly of, and adjoining, the following described line:

along the said section line common to Sections 10 and 15, also being the said centerline of Lewis Lane, N 89°13'44" W 683.68 feet to a point marking the Quarter Section Corner common to said Sections 10 and 15; also, being the intersection of the right-of-way centerlines of said Lewis Lane and Sunnyridge Road;

thence, said area continuing and being two-hundred feet wide with one hundred foot (100.00') wide margins centered along and respectively lying both easterly and westerly of, and adjoining, the following described line: leaving said centerline of Lewis Lane and running along the said centerline of Sunnyridge Road; also, being the north-south center of section line for said Section 10, N 0°11'21" E 1322.73 feet to a point marking the Center South 1/16 Corner of said Section 10;

thence, continuing along said center of section line and centerline of Sunnyridge Road, N 0°12'02" E 500.00 feet to a point in the centerline of Sunnyridge Road lying N 89°49'27" W 40.00 feet distant from the Real Point of Beginning of the Coventry Place No. 1 Subdivision, as

recorded in Canyon County Instrument No. 9735984; Records of Canyon County, Idaho; being the terminus of said centerline of the herein described area.

ALSO, including all of the east 640.00 feet of the Northwest 1/4 of the Northeast 1/4 of said Section 15, Township 2 North, Range 2 West; Boise Meridian; Canyon County, Idaho.

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Department of Water Resources

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BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF INTEGRATED MUNICIPAL APPLICATION PACKAGE (CONSISTING OF 99 APPLICATIONS FOR TRANSFERS OF WATER RIGHTS, AND 13 APPLICATIONS FOR AMENDMENT OF PERMITS) IN THE NAME OF UNITED WATER IDAHO, INC.	**REQUEST FOR ADDITIONAL INFORMATION**

ORIGINAL

Pioneer Irrigation District ("Pioneer") and Settlers Irrigation District ("Settlers"), by and through their counsel of record Moffatt, Thomas, Barrett, Rock & Fields, Chtd., Nampa & Meridian Irrigation District ("NMID"), by and through its counsel of record Ringert, Clark, Chtd., and the Boise Project Board of Control ("BPBC"), by and through its counsel of record Barker, Rosholt & Simpson, LLP, (collectively "Irrigation Entities") and in accordance with the PreHearing Order dated October 11, 2002, hereby file this request for additional information.[1] Before preparing this Request, counsel reviewed the information which has been provided by United Water Idaho ("UWID") to date, and have endeavored to avoid asking for duplicative information.

Irrigation Entities hereby request the following:

1. Please provide all documents, including but not limited to communications, which pertain to discussions UWID had with Treasure Valley local governments regarding

   a. The current and planned areas of city impact for each city;

   b. The comprehensive plan (both current and future) for each city;

   c. The relationship of items (a) and (b) to any planned or potential extensions of UWID's service area.

2. Please state your planning projections for service into the areas south and east (and southeast) of the City of Boise. By this request, Irrigation Entities also seek any communications or agreements UWID may have had with landowners in the areas south and east (and southeast) of the City of Boise regarding future land development into those areas.

3. Please provide all documents, including but not limited to communications, which pertain in any way to discussions UWID had with Ada or Canyon counties regarding the comprehensive plan (both current and future) for each county, and the relationship of the comprehensive plan (both current and future) to any planned or potential extensions of UWID's service area.

---

[1] It is not clear from the PreHearing Order whether a Request for Additional Information should be filed with the Department. The Irrigation Entities have chosen to do so.

4. Please provide any communications between UWID and any individual or entity with whom UWID has entered into an agreement in order to avoid or resolve a protest in this matter. By this request, Irrigation Entities request communications and agreements.

5. Please provide any communications between UWID and any entity or individual with whom UWID has not yet signed an agreement, which agreement would avoid or resolve a protest in this matter.

6. Please provide pumping records for each and every well owned by UWID, and/or which serves as a point of diversion for a UWID-owned water right for its complete history of operation. By this request, the Irrigation Entities seek:

   a. Pumping records for each above-described well;

   b. Electrical records for each above-described well and/or pump;

   c. The size and horse power of each pump for each above-described well;

   d. The diameter of the discharge pipe for each pump.

7. Please provide copies of all hydrologic data, studies, or reports upon which UWID relies as support for the IMAP or any component thereof. By this request, the Irrigation Entities also seek all hydrologic data, studies, or reports which UWID or its agents may have reviewed, relied upon, or considered in preparing the IMAP. By this request, the Irrigation Entities also seek the following:

   a. All interference studies that examine, but are not limited to, all current impacts on wells and future impacts on wells of the IMAP, if approved;

   b. All studies that examine both current and future impacts to surface water (including the Boise River, drains and canals) of the IMAP, if approved;

8. Please provide a comparison of the John Church population projections to the "real population" numbers for the past two years.

9. A comparison of the John Church water usage projections to the "real water use" numbers for the past two years.

10. Please provide a map of all UWID wells labeled with the currently associated water right(s), as well as an identification of wells that are no longer operating, or are operating at less than originally licensed capacity. If unavailable, map of all UWID wells with information that is available.

11. Please provide copies of all of UWID's Certificated Service Agreements

12. Please provide all documents used or prepared to analyze the "Stepwise Function Exercise" referred to at p. 6 of the September 1, 1997 memo from UWID (revised October 7, 1997).

13. Please provide all documents showing measurements of volumes and/or flow rates diverted from any of UWID's wells that are subject to IMAP from 1934 to the present.

14. Please provide a list of "replaced" wells referred to on Page 4 of Memorandum to Ed Squires from Jeffrey C. Fereday and Christopher H. Meyer dated September 1, 1997 (Revised Oct. 9, 1997 for release to IDWR).

15. Please provide the "global" description of UWID's service area referred to on Page 7 of Memorandum to Ed Squires from Jeffrey C. Fereday and Christopher H. Meyer dated September 1, 1997 (Revised Oct. 9, 1997 for release to IDWR).

16. Please provide copies of "the historical production data for comparison with water rights [sic] priority dates as suggested by Dave Tuthill," identified in the memorandum from Edward Squires to Norman Young, dated October 9, 1997.

17. Please provide copies of "the historical record of our water rights acquisitions, the corresponding yearly production data, and the 'installed' capacity of our system as suggested by Dave Tuthill," as described in the memorandum from Edward Squires to Norman Young, dated August 10, 1998.

18. Please provide copies of "the draft graph Edward Squires and his staff prepared showing, for each year UWID's system capacity compared to total water rights," identified in correspondence to Norman Young from Christopher Meyer.

19. Please provide copies of the "maps which expressly show that UWID is now serving as far away as Nampa and beyond," referenced in the January 19, 1999 memorandum from Edward Squires to Steve Lester.

20. Please provide copies of the "draft chart . . . showing on a well-by-well basis how much additional capacity is achievable, and what steps would be required to achieve it," described in September 24, 1999 correspondence from Christopher Meyer to Karl Dreher.

21. Please provide copies of "information about the current and projected shape of the Company's overall production curve for the agency's planning purposes," identified in October 26, 1999 correspondence from Christopher Meyer to Karl Dreher.

22. Please provide copies of Christopher Meyer's "original draft of the bill (dated November 17, 1995)," identified in October 26, 1999 correspondence from Christopher Meyer to Karl Dreher.

23. Please explain how Applicant determined the peak rate of flow currently used by UWID. See Table 11 on page 50 of IMAP . . . "rights in current portfolio used to support immediate demand = 147.5 cfs."

24. What is the historic annual volume associated with the current use?

25. Please provide any information to verify the elements of beneficial use rights included with IMAP. These include Nos. 63-4015, 63-4395, 63-4414, 63-44254 and 63-4752. Verification of the elements should include evidence supporting priority dates, pump curves and other data regarding the rate of flow and the historic annual volume per well, confirmed well locations (perhaps GPS data and a related map?), and information validating beneficial use of water as described by each water right. In other words, information expected in support of adjudication claims for these beneficial use water rights should be provided.

26. Please provide documentation of the current pumping capacity by UWID's system vs. actual diversions of groundwater. Also include documentation of current diversion capacity of surface water diversions vs. actual diversions (both peak flow and annual volume).

27. Please provide all system planning documentation including filings with the PUC and local governmental entities which relate in any way to UWID's local service area, current needs and future growth and demands.

28. Please describe the improvements that have been made, the investment in those improvements to accommodate future needs above current demand, between current demand and the UWID "paper rights," and above the "paper rights."

29. Karl Dreher's letter of June 14, 1999, to you at pp. 3 - 4, requests that UWID submit seven categories of information:

    a. overall detailed design of full capacity system;

    b. financial plan demonstrating ability to pay the full cost of constructing the full capacity system to meet future needs;

    c. completed environmental studies for the full capacity system;

    d. acquisition of land for wells, pump stations etc. needed for full capacity system;

    e. substantial construction of distribution mains for full capacity system;

    f. construction of distribution system and storage consistent with design of full capacity system; and

g. development of operations protocol and infrastructure needed for full capacity system.

Please provide that information.

30. Please provide all planning documents for interconnection of UWID wells, surface diversions, mains, treatment facilities, storage and distribution system and service area.

31. Please provide all water conservation plans of UWID and all studies comparing water usage by UWID customers with other western cities.

32. Please provide all studies showing how much water is utilized per acre or per square foot by UWID customers on lawns, gardens and other irrigation uses.

33. Please provide a list of UWID wells, by legal description and water right number, which are no longer producing or producing at less than installed capacity.

34. Please provide comprehensive plans of municipalities served by UWID and all documentation examining how the IMAP compares with those comprehensive plans.

35. Please provide proof of beneficial use for all licenses, including all post-1987 licenses.

DATED this 26th day of November 2002.

MOFFATT, THOMAS, BARRETT, ROCK & FIELDS, CHARTERED

By _____
Scott L. Campbell - Of the Firm

By _____
Angela Schaer Kaufmann - Of the Firm
Attorneys for Pioneer Irrigation District
and Settlers Irrigation District

DATED this 26th day of November 2002.

RINGERT CLARK, CHARTERED

By: _____
Charles L. Honsinger
Attorneys for Nampa & Meridian Irrigation District

DATED this 26th day of November 2002.

BARKER, ROSHOLT & SIMPSON

By: _____
Albert P. Barker
Attorneys for Boise Project Board of Control

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on the 26th day of November 2002, I caused a true and correct copy of the foregoing **REQUEST FOR ADDITIONAL INFORMATION** to be served by the method indicated below, and addressed to the following:

Director Idaho Department of Water Resources PO Box 83720 Boise, ID 83720 Fax: 327-5400	(✓) U.S. Mail, Postage Prepaid ( ) Hand Delivered ( ) Overnight Mail ( ) Facsimile
Peter Anderson, Hearing Officer Idaho Department of Water Resources PO Box 83720 Boise, ID 83720	(✓) U.S. Mail, Postage Prepaid ( ) Hand Delivered ( ) Overnight Mail ( ) Facsimile
Gary L. Spackman, Regional Manager Idaho Department of Water Resources Western Region Office 2735 Airport Way Boise, ID 83705	(✓) U.S. Mail, Postage Prepaid ( ) Hand Delivered ( ) Overnight Mail ( ) Facsimile
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Bureau of Reclamation E. Gail McGarry, PN-3100 1150 N. Curtis Road, Suite 100 Boise, ID 83706-1234	(✓) U.S. Mail, Postage Prepaid ( ) Hand Delivered ( ) Overnight Mail ( ) Facsimile
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Counsel for Applicant United Water Idaho Inc.

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Department of Water Resources

BEFORE THE
IDAHO DEPARTMENT OF WATER RESOURCES

In the Matter of Integrated Municipal Application Package ("IMAP") of United Water Idaho Inc.	**UWID'S INITIAL DISCLOSURES**

Pursuant to the Hearing Officer's *Prehearing Order* of October 11, 2002, United Water Idaho Inc. ("UWID," the "Company," or the "Applicant") submits these *Initial Disclosures* to the parties in this matter.

I. THE NAME, ADDRESS AND TELEPHONE NUMBER OF EACH LAY WITNESS THE APPLICANT MAY CALL TO TESTIFY IN SUPPORT OF THE IMAP, AND A SUMMARY OF THEIR TESTIMONY

At this time, in order to make out its prima facie case, UWID intends to call the following lay witnesses:

A. Gregory P. Wyatt

Mr. Wyatt is President of United Water Idaho Inc. His address and telephone number are: 8248 W. Victory Road, Boise, ID 83707, 208-362-7325.

Mr. Wyatt's testimony will support and explain the IMAP, including information on how the IMAP was developed. Mr. Wyatt will provide a broad overview and history of UWID, as

well as information on its long term plans and expectations. In particular, he will discuss the nature and design of UWID's supply system, UWID's conservation programs, the relationship of UWID to other water supply entities in the region, the supply obligations of the Company as a regulated public utility, and the Company's planning efforts and how the IMAP fits into those efforts. Mr. Wyatt's testimony may also extend to any of the subjects identified for Mr. Rhead below.

B. H. Scott Rhead

Mr. Rhead is Director of Special Projects for United Water Idaho Inc. His address and telephone number are: 8248 W. Victory Road, Boise, ID 83707, 208-362-7325.

Mr. Rhead will testify about the process UWID has gone through in formulating the IMAP and the specific goals of the IMAP. Mr. Rhead's testimony will include an explanation of how UWID delineated the planning area described in the IMAP and the planning horizon identified in the IMAP. Mr. Rhead also will testify about UWID's current portfolio of water rights as described in the IMAP and the sources of supply the Company will look to in order to meet future anticipated demands. Mr. Rhead's testimony may also extend to any of the subjects identified for Mr. Wyatt above.

II. A COPY OF ALL DOCUMENTS, DATA COMPILATIONS, AND TANGIBLE THINGS THE APPLICANT MAY OFFER AS EVIDENCE IN SUPPORT OF THE IMAP

At this time, in order to make out its prima facie case, UWID intends to offer the following documents:

A. Integrated Municipal Application Package ("IMAP") (May 4, 2001, as amended March 20, 2002), including its Appendices

The IMAP is an extensive document with detailed explanations of the IMAP's foundation and purposes. It identifies each of the water rights involved, both as currently described and as proposed to be changed. It includes a detailed explanation of calculations made in developing

the reasonably anticipated future needs of the Company. Unlike typical water right applications, the IMAP constitutes a detailed roadmap through the Applicant's prima facie case.

We are not attaching a copy of the IMAP with these *Initial Disclosures*. The IMAP, including its appendices, is already a part of the record in this matter. To UWID's knowledge, all parties already have been provided a copy of the IMAP. Moreover, the IMAP is available on the Department's Internet site. Upon request, UWID will provide a copy of the IMAP to any party who does not have one.

B. *Municipal Service Area Description (MSAD) for United Water Idaho Inc.* (October 21, 2002)

This document contains the most recent description of UWID's service area as required under the Municipal Water Rights Act of 1996. This document was submitted by UWID to the Idaho Department of Water Resources on October 28, 2002.

It should be noted that the projections for future water demand contained in UWID's IMAP, are not premised upon this "service area." Rather, they are premised upon a "planning area" described in the IMAP. Consequently, the service area description is provided for background and informational purposes in order to assist the Department and the parties in understanding UWID's system and to understand how the service area relates to the planning area.

A copy of this document is included as an Appendix to these *Initial Disclosures*.

C. *Water for Tomorrow: The History, Results, and Projections of the Integrated Resource Plan* (July 1997), together with *Demand Forecast Technical Appendix*

As part of the future demand studies behind the IMAP, UWID discussed with other Western cities the planning strategies and planning horizons they have employed in projecting future water demand. The above-named document from the City of Denver is an example.

UWID is currently in the process of collecting additional materials from these and other Western cities summarizing these cities' planning processes. Additional documents will be provided as they are obtained by UWID.

A copy of this document is included as an Appendix to these *Initial Disclosures*.

D. *An Overview of United Water's "IMAP" Including an Explanation of the "Integrated Points of Diversion" Issue* (July 15, 2002)

This document was previously submitted to the Department. It contains further explanation of the functioning of UWID's system and how the IMAP would be implemented if approved. Appendix A to this document sets out a set of proposed conditions, which is no longer up to date. These conditions are the subject of continuing discussions with various Protestants. A new set of conditions is now in draft form, and is being explored in ongoing discussions with various Protestants. As soon it appears that the conditions have been settled upon, it will be submitted as part of the record.

A copy of this document is included as an Appendix to these *Initial Disclosures*.

III. THE NAME, ADDRESS AND TELEPHONE NUMBER OF EACH EXPERT WITNESS THE APPLICANT MAY CALL TO TESTIFY IN SUPPORT OF THE IMAP, ACCOMPANIED BY A WRITTEN REPORT PREPARED AND SIGNED BY THE WITNESS CONTAINING A COMPLETE STATEMENT OF ALL OPINIONS TO BE EXPRESSED AND THE BASIS AND REASONS THEREFORE

At this time, in order to make out its prima facie case, UWID expects to call the following expert witness:

A. John S. Church

Mr. Church is President of Idaho Economics, an economic consulting firm. Mr. Church's address and telephone number are: 6015 Poplar, Boise, ID 83711, 208-323-0732.

Mr. Church will testify in support of UWID's population projections within its planning area through the year 2050 and in support of UWID's projections by that population's demand

for municipal water. His opinions are summarized in Sections E.5 and E.6 in the IMAP. Appendix A of the IMAP contains the materials supporting Mr. Church's opinions. Additionally, UWID is including a certification signed by Mr. Church indicating that his opinions related to the IMAP are summarized in the IMAP and supported by the materials contained in Appendix A of the IMAP.

Mr. Church's resume and a copy of his report are included as appendices to these *Initial Disclosures*.

IV. ADDITIONAL WITNESSES AND DOCUMENTS

UWID reserves the right to identify other lay and expert witnesses, and to identify further documents and evidence, as may be required to respond to issues raised during the course of these proceedings.

For instance, at this time we do not anticipate a need for Mr. Wyatt or Mr. Rhead to be qualified as experts in order to make out UWID's prima facie case. However, in the course of discovery and the identification of issues by Protestants, it could become apparent that they will be required to provide expert testimony of some sort as well as the anticipated lay testimony described above.

In any event, as additional witnesses, documents or other evidence are identified, they will be disclosed as soon as practicable. UWID also reserves the right to call rebuttal lay and expert witnesses as may be necessary to respond to the evidence presented by others at hearing.

DATED this 31st day of October, 2002.

GIVENS PURSLEY LLP

By: Christopher H. Meyer

By: John M. Marshall

Attorneys for Applicant
United Water Idaho Inc.

CERTIFICATE OF SERVICE

I hereby certify that on this 31st day of October, 2002, I caused to be served a true and correct copy of the foregoing by the method indicated below, and addressed to the following:

Idaho Department of Water Resources State Office 1301 N. Orchard Street P.O. Box 83720 Boise, ID 83720-0098	____ U.S. Mail ____ Facsimile __✓__ Hand Delivery ____ Overnight Mail
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Gary L. Spackman Regional Manager Idaho Department of Water Resources Western Regional Office 2735 Airport Way Boise, ID 83705	__✓__ U.S. Mail ____ Facsimile ____ Hand Delivery ____ Overnight Mail
Kathleen Marion Carr, Esq. Office of the Field Solicitor U.S. Department of the Interior 550 West Fort Street Boise, ID 83724	__✓__ U.S. Mail ____ Facsimile ____ Hand Delivery ____ Overnight Mail
Mr. Edward Squires Hydro Logic, Inc. 988 South Longmont Ave., Ste. 200 Boise, ID 83706	__✓__ U.S. Mail ____ Facsimile ____ Hand Delivery ____ Overnight Mail
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Charles L. Honsinger, Esq. Daniel V. Steenson, Esq. Ringert Clark, Chart 455 S. Third Street P.O. Box 2773 Boise, ID 83701-2773	✓ U.S. Mail ____ Facsimile ____ Hand Delivery ____ Overnight Mail
Matt J. Howard, Esq. Attorney At Law 2125 South Sumpter Way P.O. Box 190012 Boise, ID 83719	✓ U.S. Mail ____ Facsimile ____ Hand Delivery ____ Overnight Mail
Scott L. Campbell, Esq. Angela D. Schaer, Esq. Moffatt Thomas Barrett Rock & Fields, Chartered 101 S. Capital Blvd., 10th Floor P.O. Box 829 Boise, ID 83701-0829	✓ U.S. Mail ____ Facsimile ____ Hand Delivery ____ Overnight Mail
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Josephine P. Beeman, Esq. Beeman & Associates PC 409 West Jefferson Boise, ID 83702-6049	✓ U.S. Mail _____ Facsimile _____ Hand Delivery _____ Overnight Mail
Mr. Michael Chase 70 W. Floating Feather Rd. Eagle, ID 83616-3802	✓ U.S. Mail _____ Facsimile _____ Hand Delivery _____ Overnight Mail

Christopher H. Meyer

Index to Appendices

1. *Municipal Service Area Description (MSAD) for United Water Idaho Inc.* (October 21, 2002).

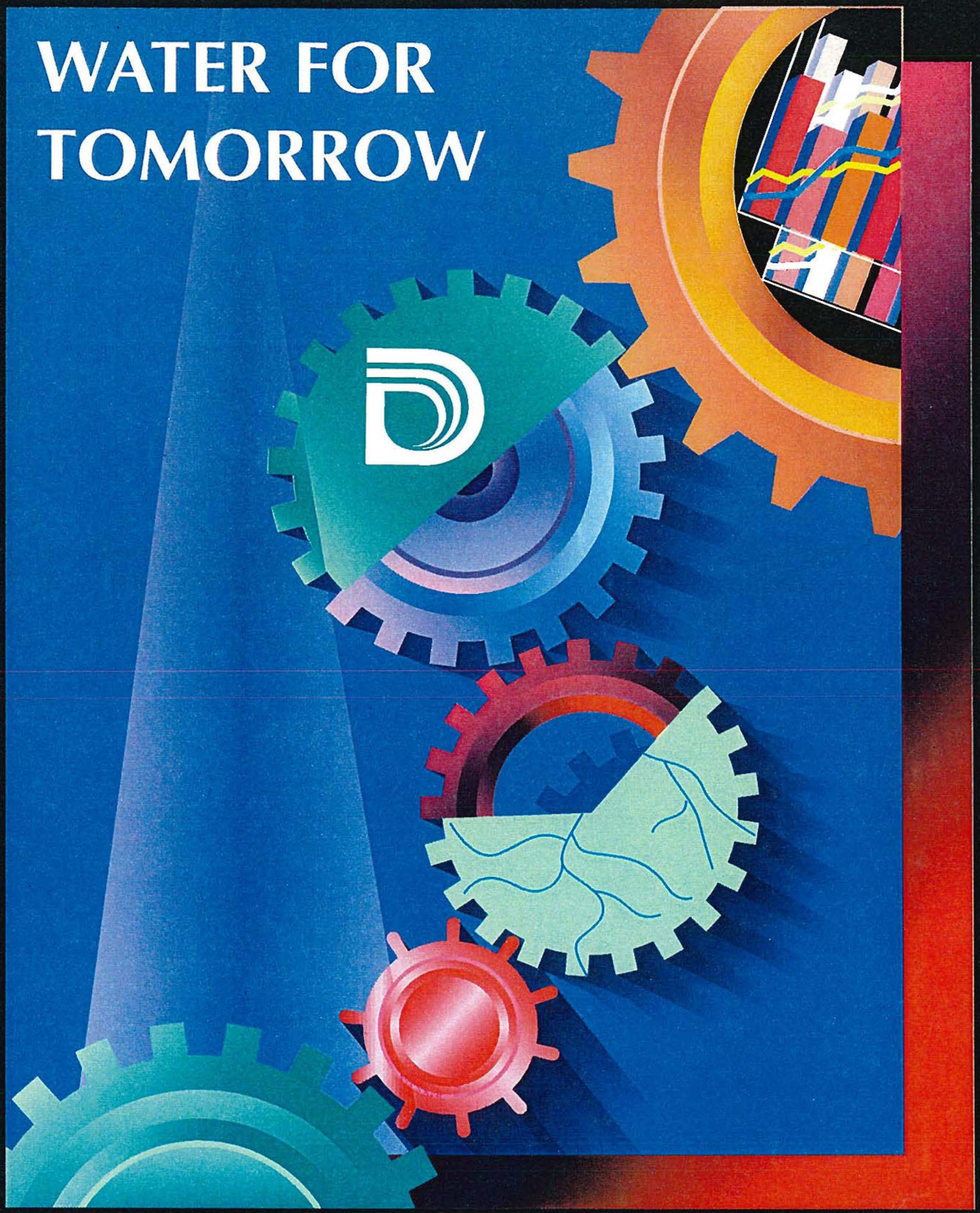
2. *Water for Tomorrow: The History, Results, and Projections of the Integrated Resource Plan* (July 1997), together with *Demand Forecast Technical Appendix.*

3. *An Overview of United Water's "IMAP" Including an Explanation of the "Integrated Points of Diversion" Issue* (July 15, 2002).

4. Resume of John S. Church.

5. Report of John S. Church.

WATER FOR TOMORROW



The History, Results, and Projections of the

Integrated Resource Plan

Denver Board of Water Commissioners - July 1997

History is lived forward, but it is written in retrospect. We know the end before we consider the beginning, and we can never wholly recapture what it was to know the beginning only.

C.V. Wedgwood

Water for Tomorrow

An Integrated Water Resource Plan
Denver Water - July 1997

Dedicated
to
Jay Britton
(1946-1996)
Denver Water
(1969-1996)

Table of Contents

List of Appendices i

List of Figures ii

List of Tables iii

Executive Summary iv

I. Introduction 1

Denver Water's Different Role 1

Geography and History: The Early Years 2

The 1970s and 1980s 3

II. Integrated Resource Planning Process: Overview 6

The Integrated Resource Planning Approach 7

III. Denver's Water System 10

Water Collection System 10

Operations 12

System Yield 13

Simulated Operations 15

Reusable and Non-reusable Water 15

Exchanges and Transfers 16

Hydropower 16

Treated Water System 17

Treatment Plants 20

Transmission and Distribution System 20

Treated Water Service Area Obligations 22

Changing Patterns of Use 23

IV. Future Water Demand 24

Future Growth Within Denver's Service Area 24

Water Usage Factors and the Demand Forecast Model 26

Additional Denver Build-Out Requirements 28

Fixed/Special Contract Commitments 29

Denver Water Demand Forecast 29

V. Water System Analysis 32

Future Supply Options 32
Functional Categories *33*
Treated Water System 37
Need for Additional Treatment Capacity 38
Transmission System Capacity 39
Effective Use of Moffat Treatment Capacity 40

VI. Water Conservation 42

Historical Precedent 42
The Conservation Planning Process 43
Citizen Advisory Committee Evaluation Criteria 43
Designing and Evaluating Potential Conservation Programs 44
Public Attitudes and Conservation 45
The Next Step in Conservation 47

VII. Creating and Selecting Resource Strategies 48

What is a Resource Strategy? 48
The Strategy Development Process 49
Strategy Adoption 55
Financial Impacts of Board Strategy 58

VIII. Public Involvement 60

Communicating the IRP Process 60

IX. Outcomes of the IRP Process 62

The Board's Resource Statement: An In-Depth Look 63
"Cooperative Actions" With Those Outside the Board's Service Area 67
Implementation of the Board's "Near-Term" IRP Strategy 69
And in Conclusion ... 70

Board Resource Statement

List of Appendices

(Available separately from this report)

Title of Appendix

IRP Scope of Work
Public Information and Involvement
Treated Water System
Raw Water Collection and Supply
Denver Water's Demand Forecast to the Year 2045
Conservation Programs and Customer Surveys
Financial Analysis

List of Figures

Figure No.	Title of Figure	Page #
Figure I-1	Board's Combined Service Area	3
Figure III-1	Water Collection System	12
Figure III-2	Year-by-Year Water Use	14
Figure III-3	Modeled Reservoir Contents at 345,000 acre-feet/year	16
Figure III-4	Major Distribution Features	19
Figure III-5	Treatment Plants, Reservoirs and Pump Stations, Pressure Zones and Pump Lifts	20
Figure III-6	Maximum Day Hydrograph	24
Figure IV-1	Denver's Service Area vs. Six-County Area	26
Figure IV-2	Population - 2045 Treated Water Service Area	27
Figure IV-3	Demand Model and Single-Family Residential Metered Demand	29
Figure IV-4	Denver Water Demand Forecasts	32
Figure IV-5	Demand and Supply	32
Figure V-1	Water Demand at the Treatment Plants	38
Figure V-2	Treatment Capacity Used	39
Figure VI-1	Conservation Savings by Customer Category	47
Figure VII-1	Resource Strategy Triangle	51
Figure VII-2	Resource Strategies	56
Figure VII-3	Composite Strategy Yield	59
Figure VII-4	Near-Term Strategy	60
Figure IX-1	Near-Term Strategy	71

List of Tables

Table No.	Title of Table	Page #
Table III-1	Collection System Hydropower Plants	18
Table III-2	Backbone System	22
Table III-3	Treated Water Service Obligation	23
Table IV-1	Usage Factors	28
Table IV-2	Additional Denver Build-Out Requirements	30
Table IV-3	Fixed/Special Contract Commitments	31
Table V-1	Functional Approach to Supply Option Evaluation	36
Table V-2	Supply Options	37
Table VI-1	Potential Water Savings	45
Table VII-1	Resource Strategies	55
Table VII-2	Resource Strategy Time Lines	58
Table VII-3	Near-Term Strategy	60

Executive Summary

Denver Water's mission historically has been to provide its customers in the City and County of Denver and its contract distributors with high quality water and excellent service at the lowest possible price. While this mission continues, Denver's approach to water supplies has undergone profound change the past several years. In part, this change resulted from a new and complex political and regulatory environment that culminated in the federal government's veto of the Two Forks dam and reservoir project in 1989. That project was designed to capture and store an additional 1.1 million acre-feet of water and would have provided for the needs of much of Metropolitan Denver well into the 21st Century.

With the project's veto, Denver Water moved to redefine the limits of its service area and to reassess its traditional assumptions for providing the water supplies needed to meet customer demand in that area. This challenge required a new approach to planning. By 1993, it was clear that a technique adapted from the electric utility industry—Integrated Resource Planning (IRP)—could help address the challenge. IRP includes techniques to factor in changing public and regulatory sentiment and new technologies, as well as traditional engineering and financial aspects of water utility planning. Using an IRP process, Denver launched a three-year intensive study of the capacities and potential of its water supply network. Significantly, this effort included extensive participation from the public and outside interests who have a stake in how Denver approaches present and future water supplies. While this new planning methodology is designed to be open-ended and evolutionary as new information or conditions warrant, by the end of 1996 the extended analysis arrived at conclusions that now form the basis of a near-term and a long-term strategy for Denver Water.

A principal policy decision made in the context of the IRP process is that Denver Water will not attempt to extend its service area by creating new distributors outside that service area. This clearly defined "Combined Service Area" consisting of the City of Denver and its 75 suburban contract distributors makes manageable the forecasting needed to anticipate Denver Water's needs as growth and development within that area proceed to "build-out." An ever-expanding service area would have meant aiming at a moving but constantly increasing target.

At present, about 265,000 acre-feet of water is needed annually by all of the various types of residential, commercial and public users in Denver's service area. With reliable annual supplies of 345,000 acre-feet, Denver now has an 80,000 acre-foot annual surplus in its water storage system. An acre-foot of water is about 325,000 gallons and typically is estimated to serve a family of four when all attendant commercial, industrial, and public uses are apportioned across the residential use.

Results of the IRP process show that if nothing is done to enhance system supplies or reduce demand, future system demand will catch up with available supply by the year

2013. By 2045, an additional 100,000 acre-feet, or a total of 445,000 acre-feet of water, will be needed for customers in the service area. This includes a 30,000 acre-feet "safety factor" as a hedge against potential loss of yield from catastrophic occurrences, faulty projections, or regulatory requirements.

The results of the IRP reveal Denver Water can add 100,000 acre-feet from its own resources to build out its service area. That is, Denver need not depend on outside water rights, facilities, money, or management capability to meet its future obligations. In the near term, Denver can implement strategies involving conservation, reuse of water, system refinements, and potential cooperative arrangements with other regional water interests to provide additional system efficiencies, demand management, and water storage. These actions can yield an additional 55,000 acre-feet of water, extending the timeline when demand will meet supply from the year 2013 to approximately 2030. Through continuance of these strategies and with development of some of its conditional water rights, Denver Water has the capacity to develop the remaining 45,000 acre-feet of water it will need by 2045.

Since the year 2030 is a generation away, Denver's present Board of Water Commissioners felt it was best left to future boards and managers to identify the specific means needed to develop the long-term 45,000 acre-feet ultimately needed in its service area. New demand management tools, reuse techniques, treatment technologies, consumption patterns, storage additions, and changing political sentiments or jurisdictions are too remote to anticipate. By limiting its water development and service to its mandated city core area and current distributors, Denver Water believes its customers will be assured of lowest cost and highest quality water for tomorrow's development and use.

While the IRP process is on-going, the synopsis contained in this Integrated Resource Planning report explains aspects of Denver's present water system, practices, programs, and the planning methodologies that sustain its conclusions. Technical appendices supporting the diverse subject covered in this report are available upon request.

I. Introduction

From the perspective of 1997, it seems almost inevitable that EPA in the late 1980s would veto the proposed Two Forks dam and reservoir project. The mammoth project—1.1 million acre-feet in storage—would have inundated dozens of relatively pristine miles of trout stream in a pastoral valley setting, at a cost of about half a billion dollars. No matter that the dam site, a natural for a reservoir, had been on Denver's drawing board for almost a century, or that 44 Metro Denver communities and four counties cooperated to design this locally funded project, or even that all state and federal agencies, including the regional EPA office, had agreed to the project. Despite all this, Two Forks was vetoed, and its veto helped signal that the values of a nation and region had changed, that water was viewed by many as more valuable in the stream than stored or moved to other locations, and that the high tide of massive on-stream storage projects had receded, leaving other alternatives as the people's choice.

When it became clear in 1989 that the Two Forks project would receive an EPA veto, Denver Water Commissioners issued a set of policy positions to address the anticipated changed circumstances. Two years later, after the EPA veto became final, the Board enunciated a "new path" policy which said that:

> *... Denver's Water Board may no longer serve a central planning role for water supply under current institutional and political constraints. Having assessed Denver assets and obligations in light of current events, the Water Board is preparing for a different role in metropolitan water supply and development.*

Denver Water's Different Role

Historically, the suburban areas growing up around Denver chose annexation into the city, thus obtaining the right to water supplied by Denver. Many other suburban areas not seeking Denver annexation were offered Denver water supply by contract. As late as 1960, virtually all water planning for the Denver metro area centered on the Denver Water Board.

But a series of circumstances, culminating in the veto of Two Forks, served to change this historical pattern. Most significant was the 1974 passage of the Poundstone Amendment to the state constitution, which effectively precluded Denver from annexing further land to expand its boundaries.

Furthermore, as the best water storage sites were claimed and used, fewer locations were available for water storage development. In addition, over time, the public came to place increased value on preserving streamflows and avoiding dams. The result was a series of regulatory requirements which severely limited water storage development, escalating both costs and risks for such development. With the veto of Two Forks, it became clear the Board could no longer take upon itself responsibility for the water supply future of a rapidly expanding Denver Metro Area. There were simply too many political, legal,

economic and other constraints, and too few opportunities to develop significant new water supplies for the benefit of those outside its service area.

What the Board could do is focus on the build-out of its own "Combined Service Area." That service area, consisting of the City and County of Denver plus 75 contractual distributors in its suburbs, would become the basis for the Board's long-range resource planning efforts. Figure I-1 shows the Board's Combined Service Area. Providing for that service area remains the foremost obligation of Denver Water. Only secondarily would it look outside its service area boundary for potential efforts which might prove mutually beneficial to both Denver's service area and metro regions beyond.

Geography and History: The Early Years

The years before the 1970s were marked by relatively unbroken population and economic growth in the Denver Metro Area, and Denver's water system followed suit. With a semi-arid climate averaging only 15 inches of rainfall annually, it did not take long for early settlers to determine that to survive here, a way had to be found to store and divert water from the rivers and streams to where it could be used. As early as 1868, a "City Ditch" was being built to run from the South Platte River to the city. In 1873, work began on the High Line Canal, a water source linked to a private real estate venture.

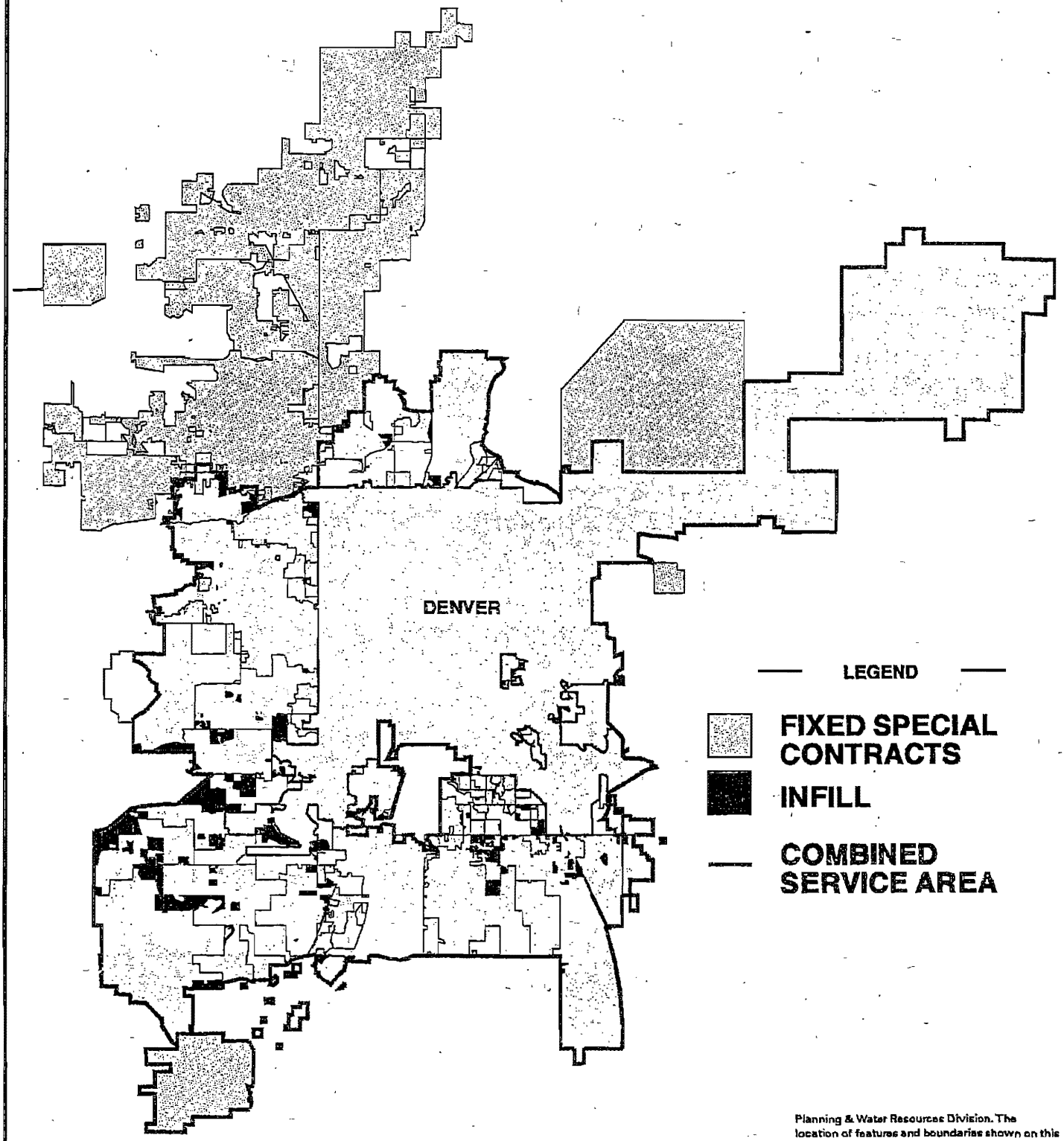
Diverting the raw water was not enough; it had to be treated to eliminate contaminants. Thus began Kassler Treatment Plant in 1890, the first English-style slow sand filter east of the Mississippi River. Treatment, in turn, necessitated some means of storing the water until it could be treated, leading to the construction first of Platte Canyon Reservoir, and then in 1903 Cheesman Reservoir, higher in the South Platte Basin.

From 1868 to 1918, water utility development in the city was divided among numerous private water entities characterized by in-fighting, price gouging, and unsavory competitive practices. While the private utilities laid a sound engineering base for a water supply system, their conflicts ultimately led Denver citizens to approve a city-owned water utility which would be non-political, autonomous from other city interests and agencies, and instructed by amendment to the city charter to charge the lowest rates possible consistent with good service. That mandate still shapes Denver's approach to water rate setting.

Cheesman Reservoir was soon followed by other storage reservoirs and by tunnels to carry water to Denver. In order, they were: Antero Reservoir built in 1909 and acquired by Denver later in the 1920s; Eleven Mile Reservoir in 1931; the Moffat Tunnel Collection System, also known as the Fraser System, in 1934; Williams Fork Reservoir in 1947 and enlarged in 1959; Gumlick Tunnel in 1948; Gross Reservoir in 1954; Roberts Tunnel in 1959; Dillon Reservoir in 1963; and Strontia Springs Reservoir in

Figure I-1 (Board's Combined Service Area)

Figure I-1
Denver Water's Primary Service Obligations



Planning & Water Resources Division. The location of features and boundaries shown on this map are approximate and intended for planning purposes only. This map is not intended to be used for survey, engineering, or legal purposes.

DENVER WATER

December 1997

1983. New water treatment plants were brought on line in tandem with reservoirs. The Marston Treatment Plant was built in 1928; Moffat Treatment Plant in 1937; and Foothills Treatment Plant in 1983. Similarly, as water collection and treatment facilities went forward, so did major transmission facilities. Mammoth conduits, some in excess of 100 inches in diameter, now form a backbone distribution system from the treatment plants, a system in which pumping is significantly reduced by virtue of water generally being conveyed to users by gravity.

In the era before environmental regulation, Denver's planning consisted largely of turning to the next least costly, highest-yielding structural project to meet increased water demand. What succeeding water officials from 1868 to 1968 knew was how to build a system, and how to do it well. The water was available to the system in the spring snow-melt of May, June, and July. The challenge was to capture it, store it, treat it, and distribute it as a permanent, reliable, high quality supply twelve months a year.

"Reliability" of supply became an overriding consideration in the Denver system. Denver Water had experienced periodic drought, including a devastating three-year dry period in the 1950s that reduced its reservoir storage to minor pools of water. This mid-1950s' drought became the "drought of record" for the Denver system, with all raw water modeling and dry-year yields taking that period as their point of departure. The 1950s' episode pointed up a principal challenge of water supply planning: to reduce risk of water supply shortages to the lowest feasible level. That challenge was often resolved by engineering and money. By carefully deploying both, Denver built a system of 11 storage reservoirs; 4 sizable tunnels through the mountains; 3 treatment plants; 2,500 miles of pipe; 24 pump stations; 18 treated water reservoirs; a state-of-the-art water quality lab; and a successful potable reuse demonstration plant. The Denver system now serves a customer base of almost a million people.

Denver's water system can store 570,000 acre-feet; it annually yields an average of 485,000 acre-feet, with a reliable or firm yield of 345,000 acre-feet. The system has a maximum treatment capacity of approximately 700 million gallons per day. Were the need to arise and the dollars be available, that treatment capacity could be expanded to almost one billion gallons a day by doubling the size of the Foothills Plant. Overall, the replacement cost of the collection, storage, treatment, and distribution system has variously been estimated at anywhere between $3 billion and $6 billion; in reality, Denver's system is essentially irreplaceable.

The 1970s and 1980s

By the early 1970s, with the enactment of the National Environmental Policy Act (NEPA), the Clean Water Act (CWA), the Forest Land Policy Management Act (FLPMA), the Endangered Species Act (ESA), the Safe Drinking Water Act (SDWA), the Wilderness Act, and the Wild and Scenic Rivers Act, Denver Water was faced with a regulatory environment that would forever change its way of doing business. This new alphabet soup of federal regulation meant that utilities were initially set adrift in

uncharted regulatory waters. The 1970s' controversy over building Foothills Treatment Plant and Strontia Springs Dam signaled the end of Denver Water making decisions with little public or regulatory scrutiny.

The ink had scarcely dried on the new federal laws when the resulting regulations were being tested on the proposed Foothills and Strontia projects. Federal regulators from the Forest Service, the Army Corps of Engineers, the Bureau of Land Management, and the Environmental Protection Agency intervened to determine if the intended activity was to be permitted and, if so, how it was to proceed. The ensuing confusion carried over to state agencies with a role in the new federal legislation. The regulatory chess game ended after a half dozen years with a negotiated settlement, complete with court approval, in late 1978 and early 1979.

After the protracted and costly delays, Foothills and Strontia were constructed and placed on line in 1983. But the negotiated settlement also carried some interesting conditions for Denver Water's future. Denver had to agree that before building any future supply facilities, it would conduct a systemwide environmental impact study to evaluate general system options and alternatives for future water supply and demand. Denver also had to commit to implementing a water conservation program intended to reach certain targeted levels over the next two decades. To determine whether the levels were reached, the EPA would monitor the conservation efforts. And finally, a Citizens Advisory Committee to the Denver Water Board was mandated and created to bring public involvement into Denver Water policy and planning deliberations.

All of these conditions marked a major departure from the traditional water utility pattern. Denver had normally pursued the least cost structural alternative. Now it would have to consider a variety of alternatives, including non-structural variables such as conservation and environmental impact, before proceeding with a project. Water conservation would have to become an integral part of Denver's new supply equation, not just a contingency in times of drought.

In large measure, Denver became a water utility test case for the new regulatory environment. Nowhere else had federal agencies conducted a system-wide environmental impact statement. Nowhere else had the newly created EPA, with no experience in water issues, taken on responsibility for ensuring that a local water utility was satisfactorily implementing conservation measures. Nowhere else had federal agencies so deeply and firmly involved themselves in a local water utility's future supply and demand planning.

For Denver Water, as well as for other Metro Denver area water entities, the 1980s were marked by a determined effort to fit the proposed Two Forks Dam and Reservoir Project into niches within the new federal regulations. The effort began in 1981 when Denver approached the Army Corps of Engineers to outline a "scope of work" for the system-wide environmental impact study of Denver's total water system. It continued in 1982 with an agreement between Denver and 44 other Denver-area water suppliers to help finance that study of general water supply options for the long-term future. It then proceeded in 1984 when the system-wide impact statement was combined with a full-

scale environmental impact statement on the proposed Two Forks project itself. Almost a decade and some 37 million study dollars later, after the last of a long series of necessary local, state, and federal approvals had been obtained, the project was preliminarily vetoed in EPA's Washington office. With these circumstances as the backdrop, Denver Water began the reassessment which would take it on its new path for the future.

II. Integrated Resource Planning Process: Overview

In 1993, Denver Water turned to formulating more precisely its long-range resource plans for building out its service area. That meant exploring a series of options and alternatives for water supply and demand on the Denver system. The primary objective of the Integrated Resource Planning (IRP) process called for putting together an overall plan defining the additional supplies Denver Water would have to develop or demand management measures it would have to institute to meet the future water needs of customers in its service area.

The cost and complexity of water supply planning today require that water utilities periodically revisit their assumptions and options so that these are better able to meet the exigencies of the day. As the 1980s drew to a close, it became abundantly clear that "business as usual" could no longer be usual. The old assumptions would have to be examined anew; proposed projects which had long held an honored position on the drawing board would have to be reassessed. Rather than the single focus, utility dictated strategy of a bygone day, the new era required a delicate balancing of projects, interests, values, politics, geography, economics, social concerns, and the legal issues involved. When all of these were carefully weighed, measured, and sorted out, the ensuing mix of projects would have to be assessed against the water demands on the system. And all of this would have to be done in the light generated by the public eye, with interested parties being heard and having an opportunity for full participation. The whole IRP process would have to proceed in a logical fashion so that it could be replicated, reviewed, and revised periodically. The result would ultimately be a blend of conservation, reuse, system modification, conjunctive use, and cooperative action projects the likes of which Denver Water had never addressed as a package before.

The role of IRP for water utilities is relatively new. Its use has come from the electrical energy industry. There are, of course, some marked differences between electric and water utility planning. The starkest of these is that when a western water utility is short of water, it cannot simply turn to a regional or other network to buy water until the shortage is alleviated. A water utility only has available that water to which it has rights, for which it has constructed facilities to divert and store the water, and for which nature decides to provide. Its obligation at that point is to use the water as efficiently as possible. Since in the West a water shortage is likely to affect many water suppliers simultaneously, there is no quick bailout if planning has fallen short. An electric utility, in contrast, can buy power from the inter-connected regional and national grids.

An electric utility may also view power conservation and a resulting decline in demand differently from a water utility. If an electric utility buying power off the grid sees demand falling, it can discontinue buying or producing power. That cuts the utility's expenses as a reflection of the declining demand because it costs money to acquire electrical power. Given rights to it, water has no cost in itself; but there is cost in its storage, transmission, treatment, system operations and maintenance, and overhead involved in distributing it to the customer. Thus, the fact customers use less water during

a given time frame does not necessarily save a water utility significant money because fixed system costs remain relatively the same over the short term, however much or little water customers use.

The Integrated Resource Planning Approach

As Denver Water began the IRP process, it had no preconceptions or preferred projects it wished to pursue. While it was clear aggressive conservation measures would have to be a part of any future resource scenario, the slate was otherwise wiped clean. All previously proposed projects were to be reviewed, as were the assumptions underlying those proposals. Denver Water was ready to embrace those options and alternatives which ultimately would prevail in the public process after numerous screenings subjected each proposal to extensive examination. So little was preconceived in the process that some of the preferred project proposals which have ultimately emerged from the IRP—for example, private initiatives in outdoor conservation or conversion of certain Denver Water ditch rights—were scarcely mentioned in early IRP discussions.

With the completion of the IRP "Scope of Work" in mid-1994, Denver officially initiated the three-year IRP process. That Scope of Work defined the ten tasks which would be central to the conduct of the IRP. The ten tasks are:

Task 1 - Study Objectives/Scope of Work
Task 2 - Resource Decision Guidelines/Evaluation Criteria
Task 3 - Treated Water System Analysis
Task 4 - Evaluation and Selection of Supply Options
Task 5 - Water Demand Forecast
Task 6 - Evaluation and Selection of Demand Management Options
Task 7 - Resource Strategy Formulation and Evaluation
Task 8 - Development of Options for Remaining Resources
Task 9 - Report Preparation and Review
Task 10 - Public Information and Involvement Program

While the "Public Information and Involvement Program" is listed tenth among the tasks, staff working on the project realized that this task had to be central to all that transpired in the IRP. It was clear that unless the products of the IRP had public understanding and support, those products would not be credible and would end up on the cutting room floor. As a result, throughout the IRP, staff engaged in numerous rounds of meetings with interested groups and citizens. These included four general public meetings, active task forces within the Citizens Advisory Committee to the Water Board, and literally scores of meetings with entities such as environmental groups, the Governor's Front Range Water Forum, Denver Water's distributors, the Colorado River Water Conservation District and other Western Slope groups, the Northern Colorado Water Conservancy District, and suburban entities outside Denver's service area. The result was that while differing opinions and project preferences were present throughout the IRP, the final Board Resource Statement was supported by a general consensus among those groups which had participated throughout the process.

The Scope of Work called for a three year project. The reason for the lengthy time frame was that the substantive work of the IRP was to be done by existing staff in various divisions of Denver Water at the same time they were performing their normal duties. Using existing staff would maximize the budget and build a knowledge base within Denver Water. Consulting assistance was retained for advisory expertise, technical guidance, and the development of a computer model of Denver's collection system.

With the completion of the Scope of Work, effort turned to creating resource decision guidelines and evaluation criteria. Resource options were to be weighed and assessed against the criteria to determine how well each option conformed to the guidelines. Guidelines and evaluation criteria went through several iterations as staff struggled to find the proper blend of policy and quantitative precision. The effort led to an understanding of the myriad of complex and sometimes competing or conflicting policy objectives underlying various resource alternatives. Though the guidelines and evaluation criteria never came to play the explicit empirical or quantitative role first envisioned, they remained underlying values and guideposts demarcating the boundaries of various Board policy decisions. All participants knew, for example, that for any alternative to be viewed as realistic, it had to pass the test of providing a safe drinking water supply to Denver Water's customers, thereby meeting or exceeding all applicable drinking water standards.

The "homework" of the IRP was accomplished in Tasks 3, 4, 5, and 6. Task 3 focused on Denver Water's Treated Water System; the existing state of that system was described, and then specific investigations of future issues pertinent to the IRP analysis were conducted. Such examinations included a look at system losses, hydraulic considerations such as pressure levels, and future distribution needs. It was determined, for example, that while Denver Water currently has excess treatment capacity, the build-out of the Denver service area would require an additional increment of Denver's largest and most modern treatment plant, Foothills.

Task 4 described Denver Water's existing water collection system, and then looked at various options to add water to the system. To avoid missing an opportunity, staff members, drawing on a wide range of input from outside sources, had brainstorming sessions that produced over 200 possible projects without regard to cost, feasibility, or other limitations. The options were then subjected to a "fatal flaw" screening, with 44 dropping out. Thirty-four of the possible projects were moved to a metro area water study being conducted by the State of Colorado. The remaining 154 options were divided into five functional categories. A few select options which best represented each category were analyzed for water yield, cost, and environmental impacts before being presented to the Board. The rationale was that if the Board selected one of the representative options from a functional category, all of the other feasible options from that category would then require analysis and presentation to the Board for consideration.

To determine future demand on the Denver Water system, Task 5 examined population projections, water use patterns, and other data to arrive at projected demand at the time of build-out of the Denver system. An arbitrary date of 2045 was selected for build-out;

even though full build-out might come earlier or later, the demand projections are not expected to change dramatically.

Task 6 examined the conservation or demand management techniques needed to contain or reduce demand on the Denver system. This particular task was an outgrowth of on-going Denver Water conservation activities dating back to 1979 when Denver was adding the last major structural components to its system, Foothills and Strontia Springs Dam. Since that time, Denver Water has worked with the Board's Citizens Advisory Committee to create and refine a conservation program now nationally recognized among water utilities. The IRP picked up on that effort to reexamine the demand management alternatives to be included in proposed resource strategies.

The heart of the analyses came in Task 7, which sought to take the various supply, demand, conservation, and hydraulics or treated water elements, and then formulate them into resource strategies which could be assessed both against each other and against the resource guidelines and evaluation criteria utilized by the Board. In a series of Board discussions, various resource strategies were discussed extensively. In the context of those discussions, the Board also spent considerable time examining Task 8, a task which sought to address the relationship Denver Water would have with those municipal entities outside its service area.

The result of this internal strategic analysis was that on October 15, 1996, the Board issued its "Board Resource Statement" which set forth a series of policies and preferred strategies for the future. The resource statement articulates various critical Board policies: that its foremost obligation is to serve the City of Denver to build-out; that it will also supply to build-out those suburban contract distributors within its service area; that a near-term strategy can be crafted which centers on conservation, non-potable reuse, and system refinements to meet its customers needs through the year 2030; and that having attended to its principal obligations, Denver Water would be willing to work with metro entities outside its service area to determine whether there are projects which would provide joint benefits and would better help Denver Water meet its commitment to its city and its contract distributors. Through the resource statement, the Board directed staff to begin a two-year examination of possible options with those outside its service area so the Board could assure itself that favorable alternatives would not be overlooked.

III. Denver's Water System

Water Collection System

Denver's water operation consists of two separable, but interrelated components: the water collection system and the treated water system.

The water collection system is defined as all diversion, collection and transmission facilities which store and distribute raw water prior to treatment. There are three such systems: The South Platte Collection System, the Roberts Tunnel Collection System, and the Moffat Tunnel Collection System. Relative locations of these facilities are shown on Figure III-1. These can be divided into:

- the South System, which is comprised of the Roberts Tunnel Collection System (including Dillon Reservoir) and the South Platte Collection System; and
- the North System, which is comprised of the Moffat Tunnel Collection System.

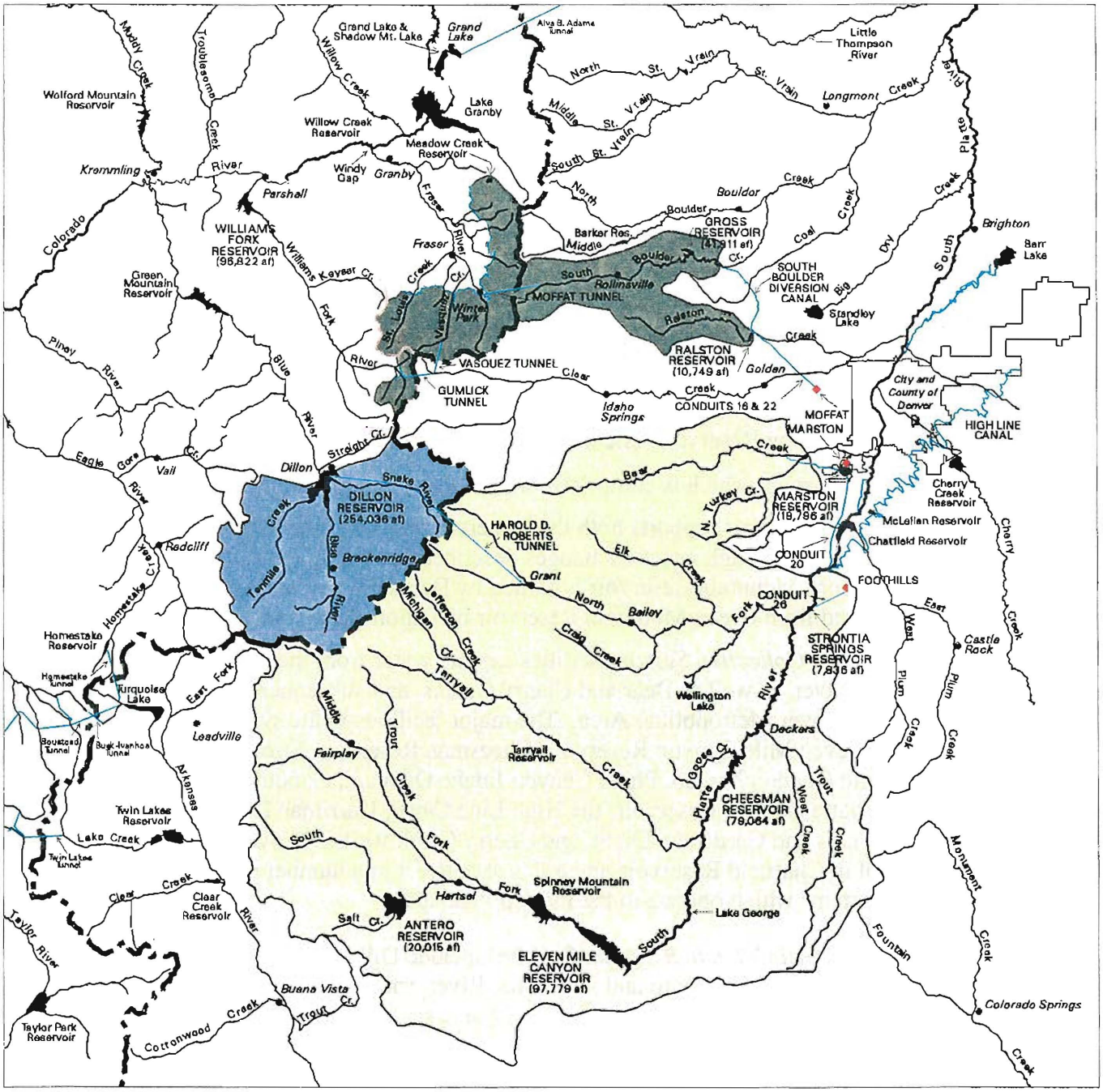
Williams Fork Reservoir supports both the Roberts Tunnel and the Moffat Tunnel collection systems through water exchanges described later in this chapter. Some of the water in Wolford Mountain Reservoir is owned by Denver Water and is used to replace water borrowed from Green Mountain Reservoir by Dillon Reservoir.

The South Platte Collection System facilities capture water from the mainstem of the South Platte River, as well as Bear and Cherry Creeks, and subsequently deliver this water to the Denver Metropolitan Area. The major facilities in the system include Antero Reservoir, Eleven Mile Canyon Reservoir, Cheesman Reservoir, Strontia Springs Reservoir and Conduit No. 26, Platte Canyon Intake Dam and Conduit No. 20, Marston Reservoir, Platte Canyon Reservoir, the High Line Canal, Harriman Ditch and Conduit No. 15, Farmers and Gardeners Ditch, and Cherry Creek wells. Denver Water also has a storage pool in Chatfield Reservoir and holds an interest in a number of ditch companies and ditch systems which operate in the metropolitan area.

The Roberts Tunnel Collection System facilities include Dillon Reservoir and Roberts Tunnel. These facilities capture and store Blue River water and subsequently deliver this water to the eastern slope and down the South Platte system for use in the Denver Metropolitan Area.

The Moffat Tunnel Collection System facilities capture water from the Williams Fork River, the Fraser River, South Boulder Creek and Ralston Creek, and subsequently deliver this water to the Denver Area for use. The major facilities in the system include the Williams Fork Collection System, August P. Gumlick Tunnel (Jones Pass Tunnel),

City and County of Denver
Board of Water Commissioners
Water Collection System



LEGEND

- South Platte Collection System
- Roberts Tunnel Collection System
- Moffat Collection System
- Williams Fork Reservoir Watershed
- Denver Water Treatment Plant
- Continental Divide
- Major Stream or River
- Major Canal or Tunnel
- Major Lake or Reservoir
- Town

N

S

Scale 1:1,000,000

0 5 10 20 40

Miles

Vasquez Tunnel, the Fraser River Collection System, the Cabin-Meadow Creek Collection System, Moffat Tunnel, Gross Reservoir, South Boulder Diversion Canal, Ralston Reservoir, and Long Lakes.

Williams Fork Reservoir is located on the Williams Fork River near its confluence with the Colorado River at Parshall, Colorado. The reservoir is used as a replacement facility for Denver's transmountain diversion projects. Williams Fork Reservoir is used to exchange water to the Fraser and Williams Fork Collection Systems, the Roberts Tunnel Collection System, and the Cabin-Meadow Creek Collection System, and on occasion is used as a substitution source for Denver Water's obligation to Green Mountain Reservoir. Williams Fork Dam was the first Denver Water facility with a power generation unit. Historically, most of the power generated at Williams Fork was delivered to the U.S. Department of Energy as partial payment for power generation interference caused to Green Mountain Reservoir Power Plant by Denver's upstream depletions of the Blue River at Dillon Reservoir; a portion of the power is used for station service requirements, while the remainder is presently being sold to an electric utility.

Operations

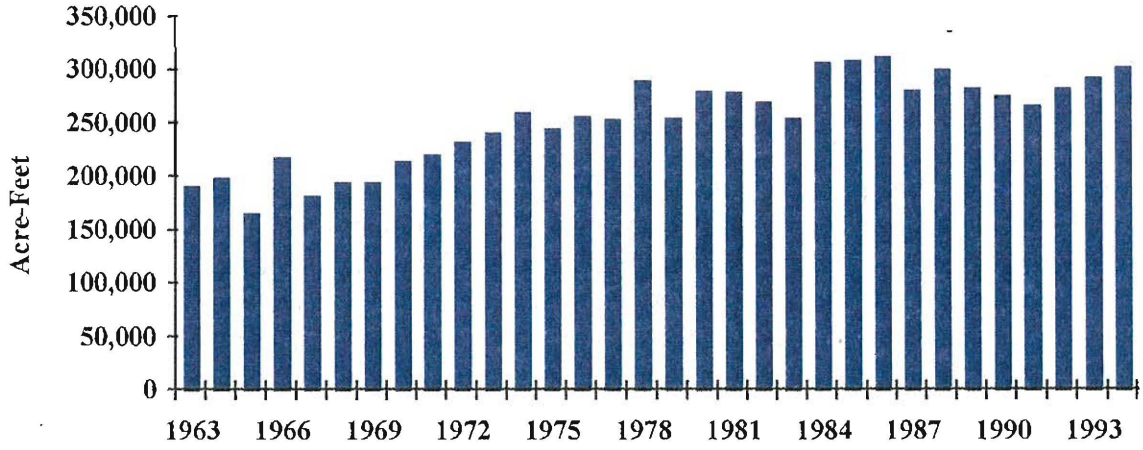
The primary goal of collection system operations is to supply a reliable, high quality water supply to Denver's customers. Ultimate delivery of most of the collected water is to Denver's water treatment plants at Moffat, Marston and Foothills, but some goes for irrigation and industrial purposes, or is provided to local suppliers such as the City of Arvada under special limited contracts. In addition to the primary goal, there are several secondary considerations, such as environmental enhancement and recreation, as well as maximizing hydropower revenue and minimizing treatment and distribution costs. In some instances, the collection system is used for flood reduction for local communities.

To optimize the yield of the collection system, all storage reservoirs must be full at the beginning of a drought period and no water can be spilled during the drought. To attain these conditions, divertible yields of all sources must be forecast or estimated. The reservoirs must be operated to provide space to capture spring runoff so that no reservoir spills water while others fail to fill. Construction projects, maintenance activities, water quality considerations, contractual obligations and special events also influence how the collection system is operated.

In most years, more water is available to the collection system during the runoff season than can be consumed or stored; however, during the winter months and in dry years the available water from streams is less than the demand for water, with the result that water must be withdrawn from storage. Current water use averages about 265,000 acre-feet annually, although there is considerable year-to-year variability as shown in Figure III-2.

Figure III-2

Year-by-Year Water Use



Typically, direct flow (run-of-the-river) rights are the first water rights used to meet demand. The next increment of supply usually comes from exchanges using reusable return flows (exchanges are explained later in this chapter). The remaining water demand, if any, is normally supplied with storage water from Strontia Springs, Marston, or Ralston reservoirs. Most of the water in Marston and Strontia Springs is transferred from Dillon and Cheesman reservoirs or stored in Strontia by exchange; Ralston Reservoir water is primarily transferred from Gross Reservoir. The water stored in Antero and Eleven Mile reservoirs is normally reserved for use in droughts, while Williams Fork Reservoir water is used for replacement for out-of-priority diversions elsewhere in the system.

In 1993, Denver Water staff prepared a Drought Response Plan to be used as a guideline for Denver Water in managing water supply and use during a severe or multi-year drought. The plan has been updated and is being issued separately from this report.

System Yield

The concept of *yield* is critical to any analysis of Denver Water supplies. It enables staff to compare existing and new resources on an equivalent basis. It also permits the comparison of available supply and customer demand. Thus, a prerequisite to evaluating alternative resource strategies is an understanding of the manner in which Denver Water quantifies system yield.

Denver's approach to determining the yield of its existing water collection system is based on calculating the water demand that could be met during a representative study period. This approach assumes that current Denver Water facilities existed over that historical period and further assumes the current status of Denver's water rights ownership and operations. To accomplish this analysis, Denver relies on a detailed

digital computer model called the Platte and Colorado Simulation Model (PACSM) to simulate the components, operations, and yields of the water collection system. PACSM simulates streamflows, reservoir operations and water supply in the South Platte River and Colorado River basins.

The selection of a study period is important because it determines the number and type of extreme hydrologic events which will be simulated and can influence the conclusions drawn from an analysis. For example, a water supply system may perform suitably under average hydrologic conditions, but may fail completely during severe conditions, such as the Colorado drought of 1953-1956. The most important hydrologic event to a water supply study is the critical drought period. That period is calculated as the span from the last time the storage reservoirs are full to the time the reservoir storage is completely depleted and the reservoirs begin to refill, ultimately to their full levels. Since the critical period varies with the sustainability of a given water supply system, the modeled duration must be long enough to encompass critical drought periods for all collection systems studied. A study period from 1947 through 1991 was selected by Denver Water as representative of the long-term conditions for the river basins of concern. Not only is there available detailed streamflow data, but the period encompasses the critical drought periods for all watersheds under consideration.

The 1947 through 1991 weather patterns and the resulting streamflows are then applied to existing and proposed operating conditions. For example, PACSM will simulate the operations of Dillon Reservoir in the 1950s' drought, even though the reservoir was not constructed until the early 1960s. Similarly, PACSM can model how potential supply additions would have operated during the study period. This enables water resource planners to better understand how much water would be available to Denver's customers during drought conditions from various water supply options and how these options alter streamflows.

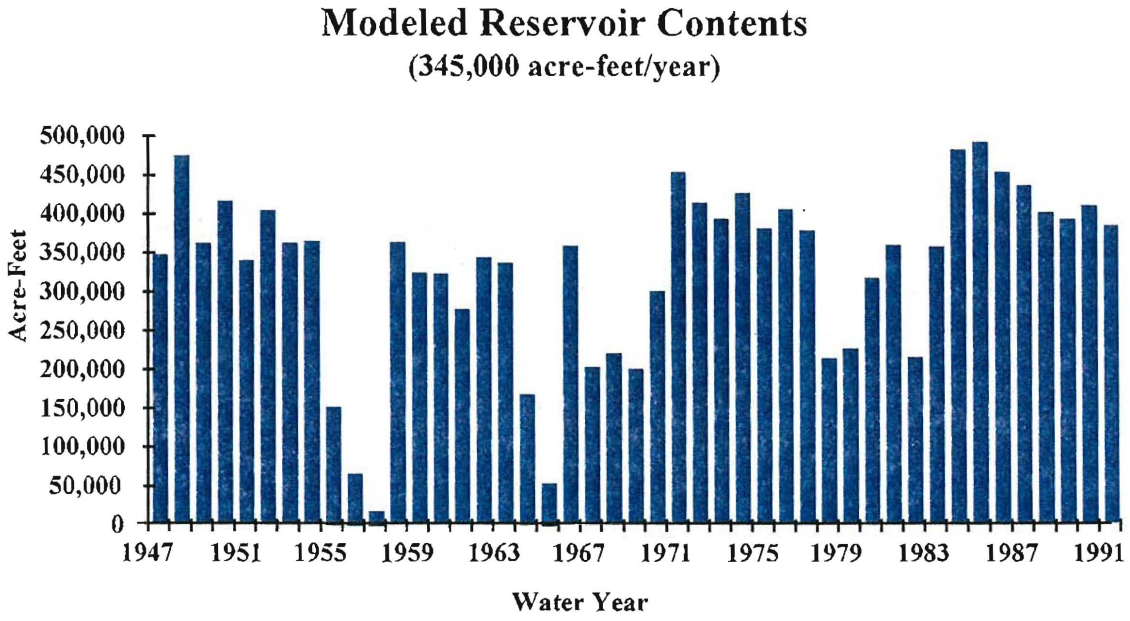
PACSM simulates the operation of the water collection system to determine the maximum amount of water the system could provide to meet demand without shortages through the study period. Although this water demand is reported as a fixed number expressed in acre-feet per year, the actual modeled water supply varies from day-to-day, month-to-month, and year-to-year. In a normal year, water demand in a summer month exceeds demand in a winter month by a factor of about three to one. Also, total annual water demand will be as much as 32% greater in a hot, dry year than in a cool, wet year. These variations in water demand are largely attributable to outdoor uses of water, most notably lawn irrigation.

For example, over the study period, as simulated by the model under conditions where average system demand were to be equal to Denver's 345,000 acre-foot baseline supply, the delivered water ranged from approximately 375,000 acre-feet in the dry year of 1954 to as low as 295,000 acre-feet in the wet year of 1967. That is, customer demand was 80,000 acre-feet higher in the dry year than the wet year. Likewise, monthly and seasonal variations of as much as three to one from summer to winter are accounted for in the model.

Simulated Operations

To determine system yield, the model is run over the study period at a trial level of customer water demand. If the simulation ends with surplus water in the storage reservoirs throughout the time period, the run is repeated at an increased level of customer water demand. Conversely, if the simulation indicates that the trial level of customer water demand cannot be met at all times, the run is repeated at a reduced level of demand. This iteration continues until the model simulation shows the reservoir storage dropping to zero and immediately thereafter beginning to refill without causing any shortfall in meeting demand. Modeled reservoir contents for the existing collection system are shown in Figure III-3. This figure shows the combined end-of-month contents for Denver Water's storage reservoirs for each April from 1947 through 1991. April is shown because it is generally the month in which Denver's reservoirs are at their lowest level. The model simulation using today's 345,000 acre-foot baseline supply shows the reservoirs were empty sometime within the month of April 1957 and then began to refill; all demands were met. The customer water demand on which this pattern of reservoir levels is based is 345,000 acre-feet per year which defines Denver Water's current system yield. Thus, the current collection system can meet a customer water demand of 345,000 acre-feet, assuming a hydrologic and climatological cycle identical to that of water years 1947 through 1991.

Figure III-3



Reusable and Non-reusable Water

All water delivered to Denver's customers can be classified as reusable or non-reusable. Reusable water can be successively reused and is fully consumable, meaning that no

portion of it need be returned to the stream after use. Return flows from non-reusable water, on the other hand, belong to the receiving stream after initial use and cannot be reused. Typically, reusable water is imported to the South Platte Basin from another basin or comes from water rights that were originally used for agriculture and have changed to municipal use. Reusable water that is treated at one of Denver's water treatment plants is tracked until it returns to a stream through a wastewater treatment plant or by groundwater return flow from lawn irrigation. The opportunity frequently exists for Denver Water to exchange reusable return flows for water diverted at a facility upstream. The primary sources of reusable water in the collection system come from the Roberts Tunnel Collection System, the Cabin-Meadow Creek Collection System, and former agricultural water rights.

Exchanges and Transfers

In an exchange, reusable water is added to a stream at a downstream point to enable diversion of the same amount at an upstream location. In a transfer, water is released from an upstream reservoir so it can be stored in a downstream reservoir or delivered to a water treatment plant. Exchanges increase the amount of water that can be legally diverted at an upstream location. Exchanges that would injure a senior water right between the replacement and diversion point cannot be performed. An important source of replacement water for Denver's exchanges is the reusable water returning to the South Platte as effluent from specific Denver area wastewater treatment plants.

Exchanges and transfers give water operators the flexibility needed to move water from place to place within the collection system. For example, if operators want to store water in Dillon Reservoir when such storage is out-of-priority, they can perform a Williams Fork-to-Dillon water exchange. The exchange would be accomplished by releasing water out of Williams Fork for use by downstream senior water rights and storing a like amount of water in Dillon. An example of a transfer is the conveyance of water from Gross Reservoir to Ralston Reservoir to meet water needs at the Moffat Water Treatment Plant.

Some of the exchanges commonly performed within the collection system are listed below:

- Williams Fork Reservoir to Dillon Reservoir
- Metro Wastewater Treatment Plant to Strontia Springs Reservoir
- Bi-City Wastewater Treatment Plant to Strontia Springs Reservoir
- Williams Fork Reservoir to Moffat Tunnel
- Chatfield Reservoir to Cheesman Reservoir

Hydropower

There are five hydroelectric power plants associated with the raw water collection system. Key features of these power plants are given in Table III-1 below:

Table III-1
Collection System Hydropower Plants

Name	Location	Capacity [Kilowatts]
Williams Fork	Williams Fork Dam	3,000
Dillon	Dillon Dam	1,700
North Fork	E. Portal Roberts Tunnel	5,500
Strontia Springs	Strontia Springs Dam	1,000
Foothills	Headworks of Foothills Plant	3,000

A secondary consideration of Denver's collection system operations is generating as much hydropower revenue as possible without jeopardizing water supply. For this reason, the effect of operating decisions on power revenue is a continuing concern.

Treated Water System

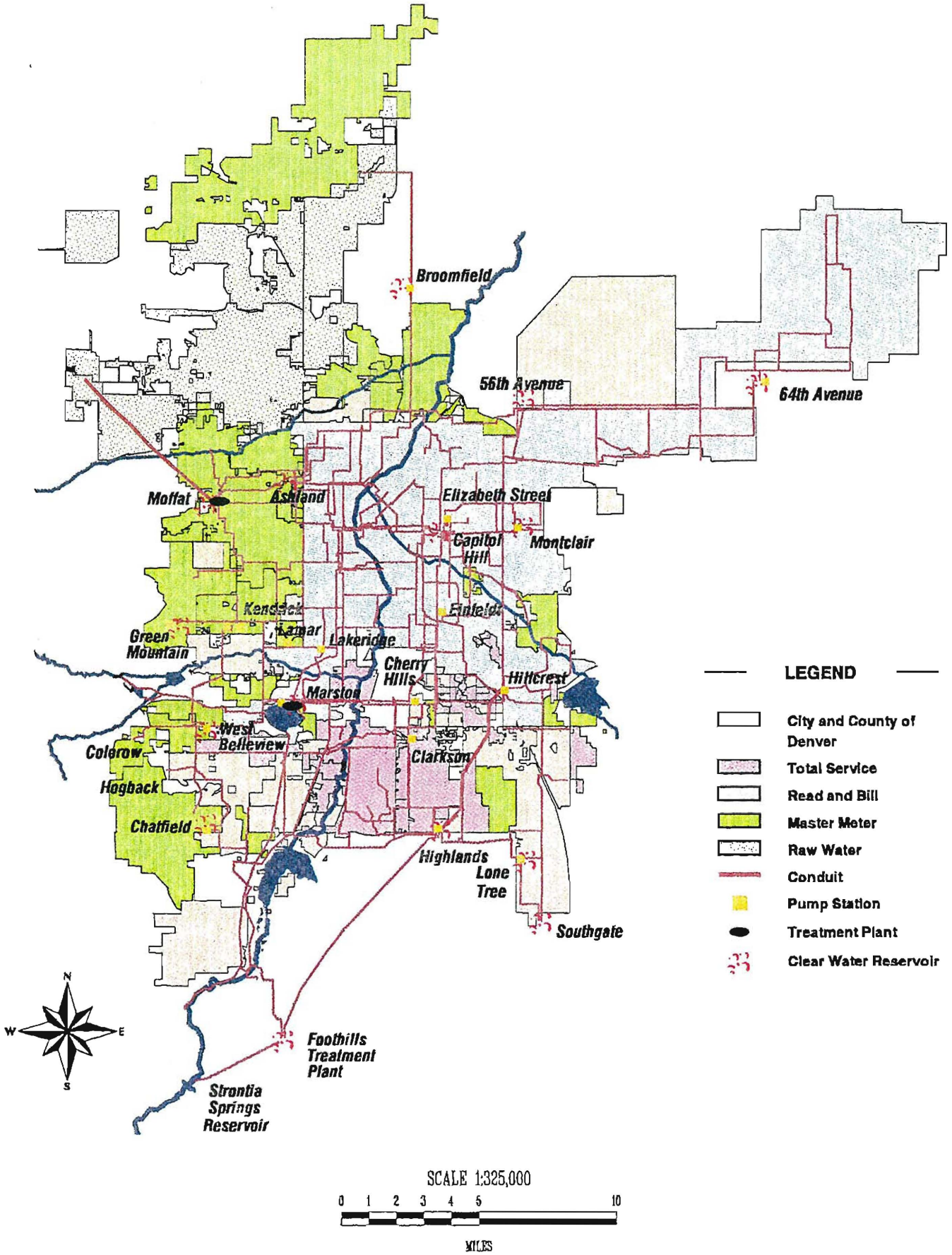
The water collection system feeds water to the treated water system which, in turn, must provide high-quality water at appropriate pressures to Denver Water's retail and contract customers. The system must be able to serve the daily and hourly demand variations which are typical of urban service areas.

Treated water facilities owned and operated by Denver Water include:

- 3 treatment plants with a combined production capacity of 645 million gallons per day (mgd);
- 17 pump stations with a pumping capacity of 1,100 million gallons per day;
- 29 treated water storage reservoirs in 17 locations totaling 381 millions gallons; and
- 2,464 miles of pipe, 35,022 valves, and 13,298 hydrants.

General locations of these facilities are shown in Figure III-4. A more detailed map is contained in a separately available appendix. Figure III-5 illustrates associated grade lines and capacities for treatment, pumping, and storage facilities.

Figure III - 4
Major Distribution Features



Treatment Plants
Reservoirs and Pump Stations
Pressure Zones and Pump Lifts

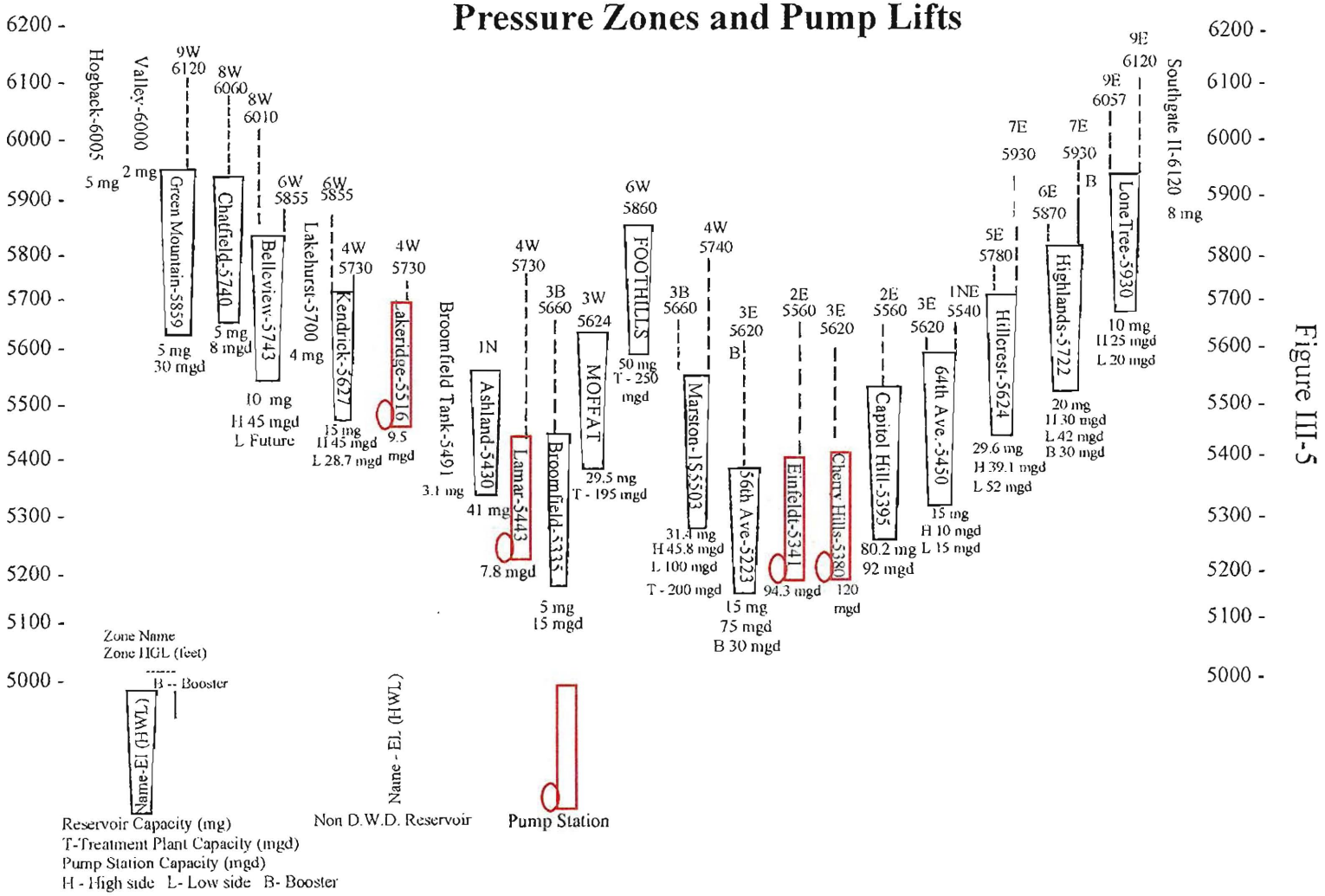


Figure III-5

Treated Water Service Area Obligations

Treated water facilities serve an area consisting of the City of Denver and 75 suburban distributors with "Total Service," "Read and Bill," or "Master Meter" contracts. Currently, Denver serves treated water to 270,000 accounts and a population of about 1,000,000. Raw Water is served through special contracts and arrangements, increasing the population served. Some 52% of the Treated Water accounts are within the City of Denver. In an average day, Denver's treated water customers use about 200 million gallons of water. Winter treated water use is about 120 million gallons per day (mgd). Treated water consumption on the peak summer day may exceed 500 million gallons. Denver Water's service obligation is summarized in Table III-3:

Table III-3
Treated Water Service Obligation

Service Category	No. of Contracts	Area in Square Miles
City and County of Denver	-	155
Total Service	29	35
Read and Bill	21	46
Master Meter	25	88
Total	*75	*324

*Excludes fixed special contracts.

Under a Total Service contract, Denver Water reads the contracting district's customer meters, bills the customer, and provides full maintenance of the distribution system. The level of service is the same as that provided to Denver Water customers inside Denver city limits. Denver Water currently has 29 Total Service Contracts serving about 30,000 accounts.

Under a Read and Bill contract, Denver Water reads the meter and bills the individual customer for its water use. The only service provided by Denver is maintenance of the water meter. In general, all other distribution system operation and maintenance services are provided by the contracting water district; however, Denver Water usually owns and operates the major facilities such as pumping, storage and conduits within the district that are used to serve the district or consecutive distributors. Denver Water currently has 21 Read and Bill contracts serving some 34,000 accounts.

Under a Master Meter contract, Denver Water reads the contracting water district's master meters and bills the district for wholesale water use. The district establishes its own water rates and bills the individual customers. Denver Water maintains the master meters but the district is responsible for master meter replacement and all district

distribution system operation and maintenance. Denver Water currently has 25 Master Meter contracts serving approximately 69,000 accounts.

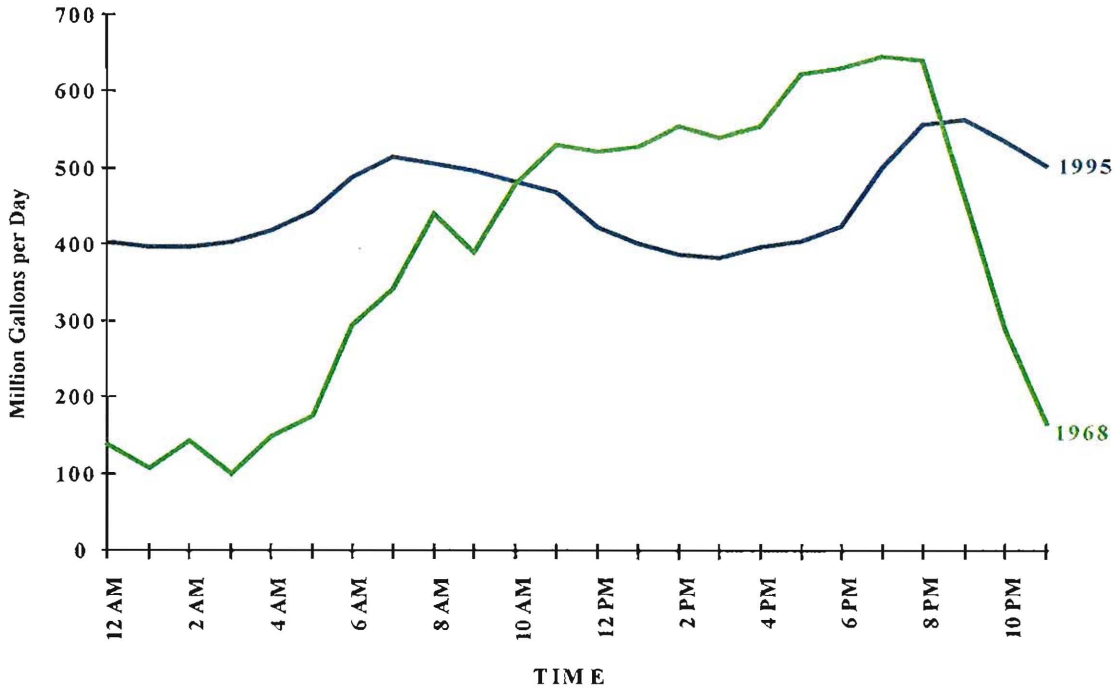
Changing Patterns of Use

The pattern of water use is changing. Daily and hourly peaks are declining relative to average demands, probably a result, in large measure, of increased use of automatic sprinkler systems as well as Denver Water's conservation programs and education about the value of water as a precious resource. This "smoothing" of demands has particular implications for the treated water system because most facilities are sized to meet either daily or hourly peaks.

The daily load shape is driven largely by usage patterns of single-family residential customers. Historically, the typical summer daily hydrograph had a single, large afternoon peak, caused by outdoor watering demand, and a smaller morning peak. Today, daily demands exhibit two fairly equally-sized peaks. The afternoon peak is lower and early morning use is now much higher than has historically been the case. These differences are illustrated in Figure III-6.

Figure III-6

Maximum Day Hydrograph



IV. Future Water Demand

A key underpinning of Denver Water's long-range plan is a forecast of water demand over the planning horizon. The forecasting of water demand is primarily a function of two variables: future growth within the service area boundary and the rates of water usage for the various categories of water consumers within the service area. The growth within the service area is dependent upon regional demographic forecasts of population, households, and employment, along with estimates of where growth would occur. The usage rates emerged from a detailed analysis of historical consumption patterns. Based on this analysis, Denver Water developed a model to forecast population projections and demand to the build-out of the Combined Service Area, which is assumed to occur by the year 2045.

The model results, which were examined with the help of an expert peer review group, including the State Demographer, were then modified to reflect four additional factors:

- conservation achieved to date;
- "natural replacement" of plumbing fixtures and other water using appliances;
- additional requirements associated with City of Denver build-out, such as development around the new Denver International Airport; and
- the small number of fixed and special contracts which obligate Denver Water to provide service to some contractors beyond the service area boundary.

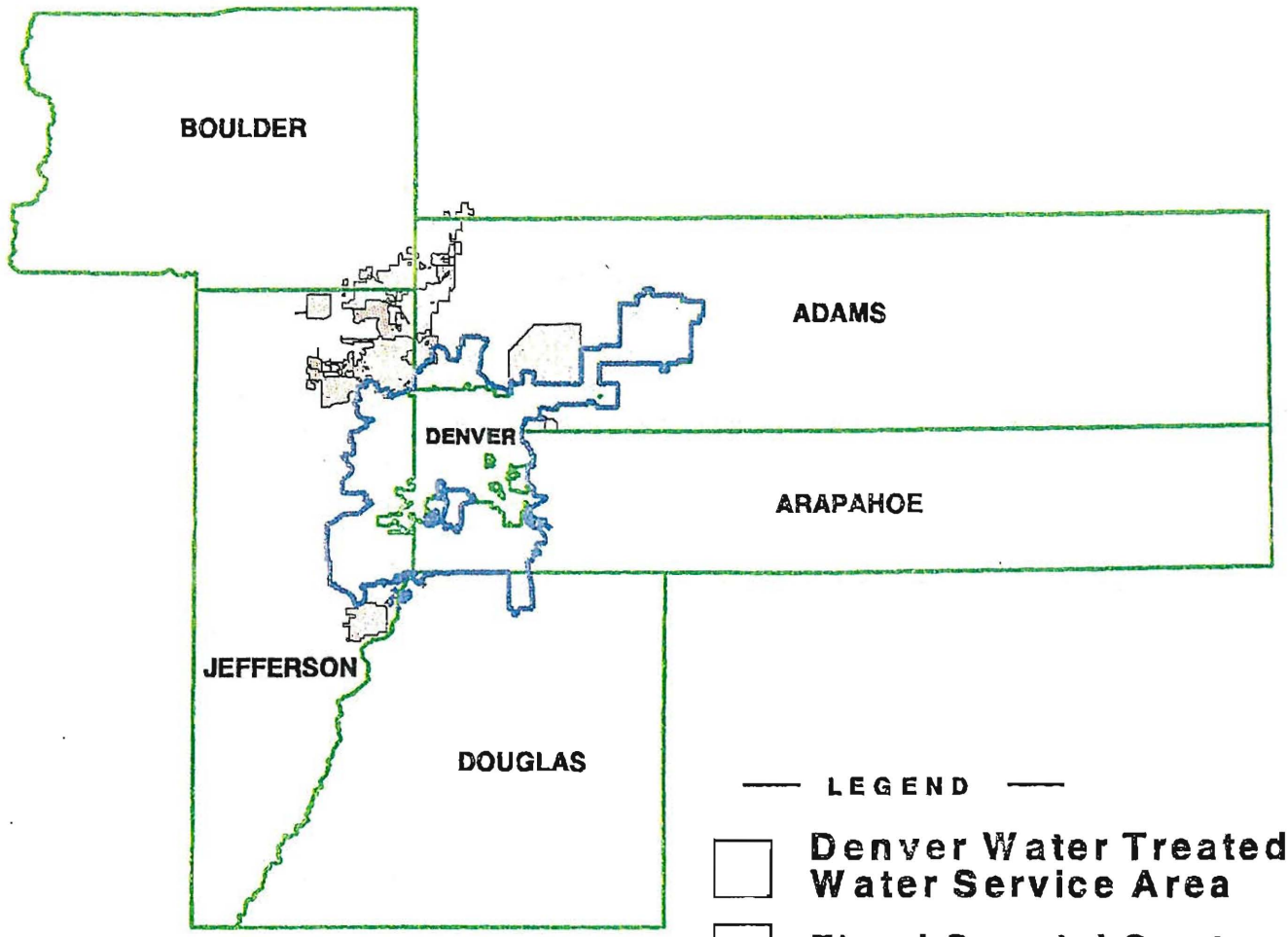
Future Growth Within Denver's Service Area

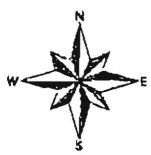
Denver Water based growth forecasts within its service area boundary on the Vision 2020 process of the Denver Regional Council of Governments (DRCOG). As part of that process, DRCOG assembled a Regional Economic Forecasting Task Force, including staff from Denver Water, to develop a forecast of population, households, and employment for the six-county Denver Metro region through the year 2020. As shown in Figure IV-1, Denver's service area is only a portion of this region, so the DRCOG forecast had to be adapted to Denver's service area boundary.

The uncertainty of future development patterns caused DRCOG to develop four growth scenarios:

Dispersed	Continuation of urban sprawl
Corridor	Concentration of new growth along transportation corridors
Satellite	Concentration of new growth in satellite city centers
Compact	Concentration of new growth where existing infrastructure is already in place, predominantly in the Central Metro area

Figure IV-1
Denver Water Service Area vs. Six County Area





July 1997

Scale 1:1,000,000

0 10 20 40

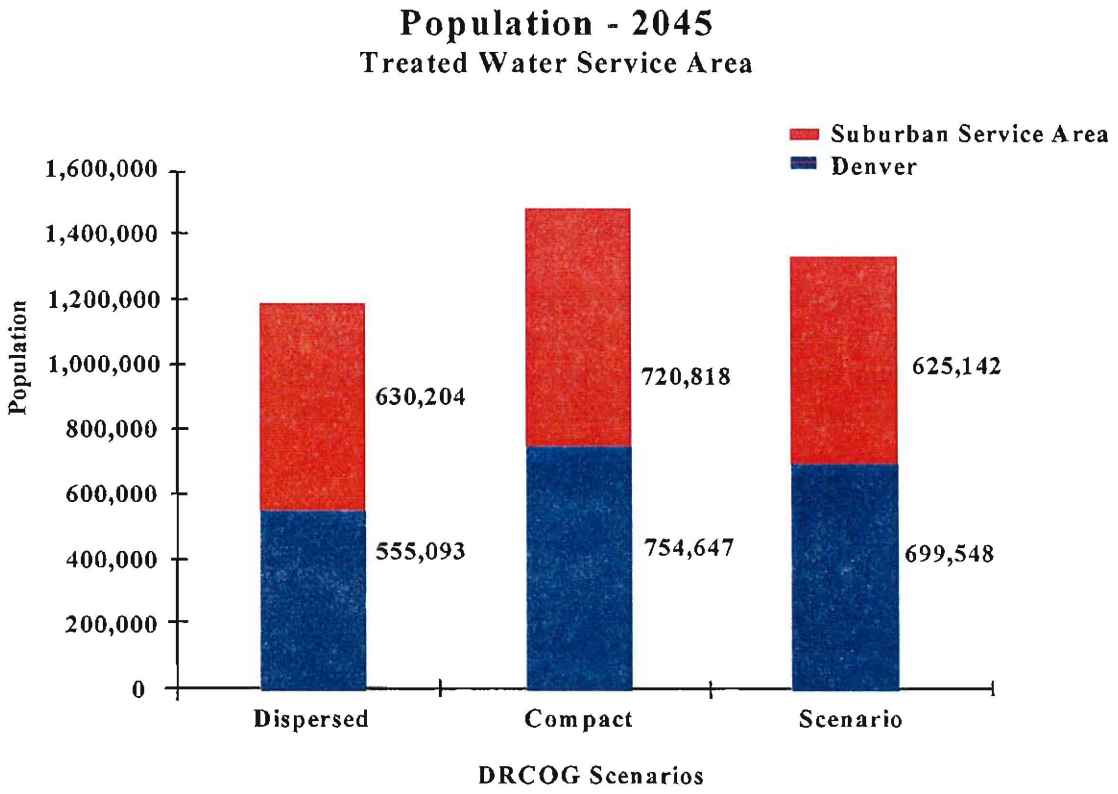
Miles

DENVER WATER

Each scenario has differing implications for growth patterns within Denver's service area. Of the four, the "compact" growth scenario predicts the most rapid growth within Denver's service area, while the "dispersed growth scenario" leads to the slowest growth because most growth would be taking place outside Denver's service area. Denver Water chose these scenarios to bracket the expected growth of its customers.

To extend the DRCOG forecast from 2020 to 2045, projected national census growth rates for the 1990-2020 period were compared to the DRCOG regional growth rates. The ratio between the two was used to adjust projected national census growth rates through 2045 to estimate regional growth during that period. Figure IV-2 compares the population forecasts for the service area under the "compact," "dispersed," and "final" growth scenarios for Denver's Combined (Treated Water) Service Area. There currently are another 100,000 people beyond this service area supported with raw water Denver is supplying through fixed/special contracts (see below). That population will expand to roughly 200,000 people by 2045, resulting in a total of 1.5 to 1.6 million people on Denver's water by that time.

Figure IV-2



Water Usage Factors and the Demand Forecast Model

Denver's demand forecasting model was originally developed as part of the Metropolitan Denver Water Supply Environmental Impact Statement in the 1980s. Denver staff and

outside consultants engaged in extensive study of historical customer usage patterns to estimate current and future usage factors. This permitted staff to develop an econometric model to forecast future demands. Table IV-1 presents the usage factors. The demand model is displayed in Figure IV-3. For metered, single-family residential customers, the model is much more informative and complex because of the additional data available for this class of customers. The wealth of data leads to better predictive power. While the model forecasts annual demands under average weather conditions, demand for outdoor uses will vary with temperature, precipitation, and conservation achieved to date.

Table IV-1
Usage Factors
(at the meter)

	1990 Gross	2045 Gross	2045 Net[2]	
Single-Family Household[1]	508	538	447	Gallons per household/day
Multifamily Household		217	180	Gallons per household/day
Commercial/Industrial		45	35	Gallons per employee/day
Public		14	14	Gallons per person/day

[1]Composite result of single-family usage factors for lot size, marginal price, median family income, and persons per household
[2]Net of Conservation and Natural Replacement

Although Denver Water has always encouraged efficient water use, 1980 marked the start of rigorous efforts to promote water conservation. By the end of 1994 Denver Water customers had saved approximately 30,000 acre-feet annually based upon the decline in gallons per account per day. The effect of these savings was incorporated into the demand forecast.

Figure IV-3
Demand Model

$$D = f*SFM + 630*SFF + 217*MF + 45*E + 14*P$$

Metered Single-Family Residential	Flat Rate Residential	Multi-Family Residential	Commercial Industrial Sector	Public Sector

Where:
- SFM = Metered Single-Family Households
- SFF = Unmetered Single-Family Households
- MF = Multi-Family Households
- E = Employment
- P = Population
- R^2 = 0.998

Single-Family Residential
Metered Demand
(gal/HH/day)

$$f = 478 + 427(A - A_{avg}) - 141(mP - mP_{avg}) + 6(I - I_{avg}) + 39.4(p/HH - p/HH_{avg})$$

Where:
- A = Lot Area (Acres)
- mP = Marginal Price of Water
- I = Median Family Income (Thousands)
- p/HH = Persons/Household

As a result of legal and regulatory changes as well as advances in technology, it can be anticipated that usage factors will decline in the future. This phenomenon is referred to as "natural replacement"; it occurs, for example, when a customer buys a low-flow toilet to replace one of higher flows. This reduction in water consumption is independent of any conservation programs implemented by Denver Water. Since future natural replacement is not captured in the demand model, staff reduced the model-predicted 2045 demand line by about 25,000 acre-feet per year to account for this phenomenon.

Additional Denver Build-Out Requirements

There are several major new developments in the City of Denver that are not fully reflected in DRCOG's 2020 forecasts. As an example, significant growth is expected in the vicinity of Denver's new international airport as well as at the redeveloping Stapleton Airport site. Those demands, which are shown in Table IV-2, must be added to the model predictions. This adds another 15,000 acre-feet per year of demand to the forecast in 2045.

Table IV-2
Additional Denver Build-Out Requirements

	Low/ Dispersed Forecast (acre-feet/yr.)	High/ Compact Forecast (acre-feet/yr.)	"Best Estimate"/Final Forecast (acre-feet/yr)
Denver International Airport	2,543	2,539	
Gateway/Green Valley Ranch	8,023	8,383	
Stapleton Redevelopment	6,819	0	
Lowry Redevelopment	838	0	
Central Platte Valley	1,749	0	
Total	19,972	10,922	15,447

Fixed/Special Contract Commitments

Denver Water has special contracts with several entities outside the service area which obligate it to provide additional water, generally raw rather than treated. As shown in Table IV-3, the total unused commitment under these contracts adds another 40,000 acre-feet per year to the 2045 demands.

Denver Water Demand Forecast

Figure IV-4 presents the compact, dispersed, and "best estimate" demand forecasts through the year 2045. The low or dispersed scenario demand in 2045 is forecast at 392,000 acre-feet per year. The high or compact scenario demand in 2045 is 436,000 acre-feet. Denver Water determined that the "best estimate" of 2045 demand is 415,000 acre-feet per year (445,000 acre-feet with the Board's 30,000 acre-foot safety factor), the demand figure used in the IRP. This "best estimate" is based upon the final scenario adopted by DRCOG in the Vision 2020 process. This DRCOG offering is a hybrid between the compact city, corridor, and satellite scenarios. As is the case with any forecast of future demands, Denver Water must monitor changes in population estimates and will make necessary adjustments to the demand line used in the resource strategies.

Table IV-3

Fixed/Special Contract Commitments

	Contract Commitments	1990 Average Use	Unused Contract Commitments
Arvada	19,660	14,200	5,460
North Table Mountain	6,000	1,585	4,415
Westminister	4,500	0	4,500
Englewood (delivered via City Ditch)	2,300	0	2,300
Other Englewood	900	0	900
PSCo. / Cherokee Plant	5,361	5,500 (1)	5,361
PSCo. / Arapahoe Plant	3,650	730	2,920
City Park / Wash. Park / Denver CC	2,800	0	2,800
Others / Cherry Hills CC, etc.	1,100	0	1,100
Centennial W&S District	1,000	0	1,000
East Cherry Creek W&S	756	0	756
Rocky Flats (EG&G)	600	360	240
Antero	500	500	0
Consolidated Mutual	443	0	443
Fairmont Cemetery	413	0	413
Long Lakes	400	174	226
Agricultural Ditches	200	200	0
Miscellaneous	1,100	12	1,088
TOTAL RAW WATER	51,683	17,761 (1)	33,922 (1)
TREATED WATER:			
Broomfield	6,500	2,000	
Special contracts / Fitzsimmons & RM Arsenal	1,440	1,200	
TOTAL TREATED WATER	7,940	3,200	
Firm Annual Yield	8,447	3,404	5,043
P & CRSPPA ROLLOVER TAPS - NON-DISTRIB. PROVIDERS:			
	3,600		3,600
TOTAL RAW & TREATED	63,730	21,165 (1)	42,769 (1)

(1) = Though Public Service's current average use is about 5,400 acre-feet per year, its contract expires in 2006. A potential new reuse contract with Public Service contemplates permanent demand on Denver's system at an amount about equal to the existing temporary contract amount of almost 5,400 acre-feet.

Figure IV-4

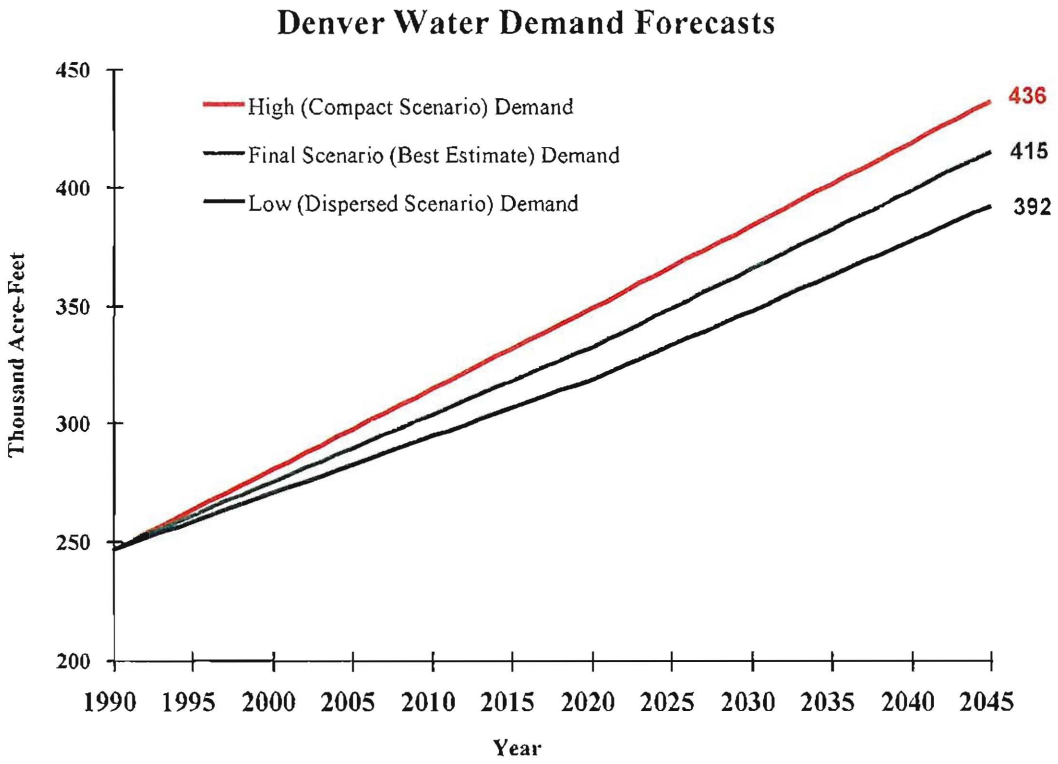
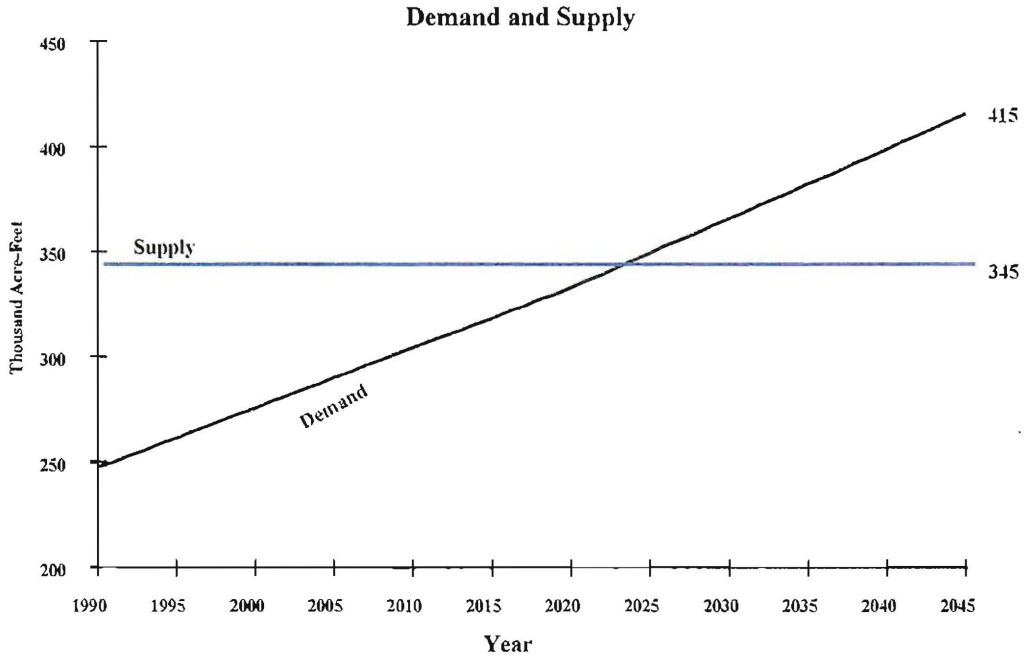


Figure IV-5 displays the final "best guess" demand forecast with Denver Water's existing supply of 345,000 acre-feet presently available from the collection system.

Figure IV-5



V. Water System Analysis

Future Supply Options

The current Denver Water system, while having more than sufficient capacity to reliably provide high-quality service to current customers, will require additions and upgrading to supply the projected service area build-out demand many years from now.

During the IRP, the analysis of options to add additional water to the Denver system proceeded in several steps:

1. defining supply option possibilities;
2. screening options;
3. categorizing remaining options; and
4. selecting and analyzing representative options from each category.

To help ensure that no potentially viable supply alternative was inadvertently omitted from IRP consideration, the analytical process began by defining a reasonably inclusive list. Select staff from all Denver Water divisions were convened in brainstorming sessions to develop a list based on the staff's knowledge of projects and proposals studied and discussed over the years.

The list included an extensive assortment of supply options from the Metropolitan Water Supply Environmental Impact Statement of the early 1980s. These were supplemented by input from numerous stakeholder groups, including the Citizens Advisory Committee, an Eastern Slope stakeholder group, a Western Slope stakeholder group, and various individuals knowledgeable in water supply throughout Colorado. A list of more than 200 possibilities was identified; it included different types of structural and non-structural alternatives without regard to cost, technical feasibility, or other potential limitations. Particular care was taken to see that all possible adjustments to, and efficiencies in, Denver's water system were included as well.

The options were then subjected to a "fatal flaw" screening. A fatal flaw in a given project could include site limitations, insufficient gross water yield, inability to deliver water where needed, extremely negative outside perception, unacceptable environmental effects, or insurmountable institutional obstacles. The first screening resulted in 44 options being rejected. Another 34 were expected to require cooperative effort between Denver Water and one or more metropolitan area water suppliers outside Denver's service area. Since the Governor's Metropolitan Water Supply Investigation was concurrently examining potential cooperative action projects between Denver and entities outside its service area, it was determined to leave such projects to that process.

The remaining 154 options were retained for further study and fell into five functional categories: effluent reuse, south system storage, north system storage, new stream diversions, and miscellaneous or "system refinements." By using a functional approach, staff was able to select a few representative options for each category to analyze for water

yield, cost, and environmental impacts. This helped staff avoid the impossible task of attempting to analyze extensively all 154 options. The five functional categories are described below.

The yields for representative projects were derived through use of Denver's Platte and Colorado Simulation Model (PACSM). Project costs were estimated at their present value. A nominal real interest rate of 3.38% was used. Operation and maintenance costs had a 54% loading for Denver Water overhead, with a 15% addition for engineering costs and a 25% contingency. Expenditures for water rights, engineering, litigation, environmental mitigation, and permitting are included in the project costs. These costs are estimated by staff based on Denver Water's past experience. They generally represent the direct costs of the project to Denver Water; however, the figures do not include indirect and intangible costs such as social impacts and other externalities.

Functional Categories

Effluent Reuse. The use of Denver's water ultimately leads to "effluent" discharged at some Denver area wastewater plants. In certain instances, Denver has the right to reuse such water. Staff developed three variations for using Denver's reusable effluent at the Metro Wastewater Reclamation District Plant: non-potable, indirect potable, and direct potable reuse. Non-potable reuse has three proposed phases yielding a total of 15,100 acre-feet per year. Major use would be expected to occur at Public Service Company's Cherokee Power Station, the Stapleton and Lowry Redevelopment areas, the Gateway area, and at Denver International Airport.

One method of indirect potable reuse would be to treat effluent to drinking water standards and blend it with the raw water supplies at Ralston Reservoir. The blended water would undergo conventional treatment and be distributed in the potable system. In a second method involving Barr Lake, indirect potable reuse would be accomplished by taking effluent and blending it with the lake water. The blended water would undergo advanced water treatment to potable quality and would be injected into the treated water system.

Direct potable reuse means injecting effluent treated to drinking water standards into the treated water system without blending in a raw water reservoir. Though factors such as high cost and public acceptability must be considered in evaluating potable water proposals, the potential yield for potable projects, whether direct or indirect, in the Denver system could be in excess of 35,000 acre-feet per year, making the total yield of effluent reuse projects over 50,000 acre-feet per year if effluent is reused to ultimate capacity.

South System Storage. Additional surface storage could be developed on the South Platte and Blue Rivers. Staff considered enlarging existing system reservoirs, such as Antero, Eleven Mile, and Dillon, and examined new reservoir possibilities such as Estabrook, Geneva Park, and a small Two Forks. In addition to surface storage, this category includes the possibility of conjunctively using the deeper groundwater aquifers under the City of Denver to store water. Water would be injected into the ground in wet

years and withdrawn during droughts. A conjunctive use project of 20,000 acre-feet per year yield was studied.

North System Storage. Additional storage in the Moffat Collection System could include enlargement of Gross Reservoir, a new offstream reservoir just north of Ralston Reservoir, and a possible new joint or cooperative reservoir in or near the Fraser Valley on the Western Slope.

New Stream Diversions. Staff considered options that would divert Western Slope water under Denver-held conditional water rights from the Eagle, Piney, and Colorado Rivers. The pumpback of water from Green Mountain Reservoir to Dillon Reservoir was also studied. A number of options for diverting more water from the Williams Fork River were investigated, as well as diversions from Straight Creek into Dillon Reservoir.

System Refinements or Modifications. These are miscellaneous projects which for the most part have relatively small yields, costs, and impacts. They are divided into three subcategories: 1) system management, which looks at projects such as recovering fish flows from Strontia Springs Reservoir or integrating the High Line Canal and Platte Canyon Reservoir into the treated water system; 2) park conversion to non-potable water supply options, which would enable up to 48 parks in Denver's service area to be supplied with a new raw water supply rather than treated water, though cost of such conversion can be high; and 3) water rights acquisition, which included examination of eight representative water rights acquisition efforts.

Table V-1 shows a preliminary grouping of different water system functions that were used to develop the five different categories, and Table V-2 is a handout from public meetings that also summarizes the supply and reuse options, including their preliminary yield and cost estimates.

By using water supply categories, staff was able to compare issues and tradeoffs between similar water supply options without having to choose between individual projects. For example, tapping new streams with more storage may cause more depletions to the Western Slope, which would be opposed by Western Colorado; but that course may be preferred by those water users downstream of Denver who benefit from the return flows or effluent. Conversely, reuse may reduce return flows to the South Platte which may cause concern to water users downstream, the environmental community, and the Fish and Wildlife Service interested in endangered species in Nebraska. However, the Western Slope would prefer that Denver reuse water imported from Western Colorado so as to reduce the amount required to be diverted from the Western Slope. As for potable reuse, there may be public perception problems related to health and safety concerns.

Table V-1
Functional Approach to Supply Option Evaluation

What	Where	How (Functional Options)
1. North System Storage	Moffat System	West Slope Storage; East Slope Storage; Conjunctive Use
2. South System Storage	Blue River	Blue River Storage; North Fork Storage; South Fork Storage; Conjunctive Use
	South Platte River	New South Platte Storage; North Fork Storage; Bear Creek Storage; Clear Creek Storage; S. Boulder Creek Storage; Offstream Storage; Downstream Storage; Enlargement of Existing Storage; Conjunctive Use
3. New Stream Diversions	Eagle River	Denver's Water Rights; Joint Development with Others
	Colorado River	Pumpback Facilities; Storage Development & Operations; Call Reductions
	Williams Fork River	Denver's Water Rights; Downstream Pumpback; Joint Use with Others
	Blue River	Tributaries below Dillon; Pumpback from Green Mountain
	Metro Area	New Supply to Meet Contractual Obligation and Park Irrigation; Storm Water Detention; Nontributary Ground Water Development
	Others	
4. Effluent Reuse	Metro Area	Exchange of Reusable Effluent & Return Flow; Pumpback of Reusable Effluent & Return Flow; Effluent Storage & Management; Non-potable Reuse; Potable Reuse
5. System Refinements	System Management	Collection System Loss Reduction; Enhanced Management and Accounting; Increased Usable Reservoir Capacity; Use Terminal Reservoirs for Water Supply Recapture Fish Flows
	Park Conversions	Converting parks from treated water to non-potable water
	Water Right Acquisition	Acquiring water rights that add yield to the collection system

Table V-2
Supply Options

	Yield Acre-Feet/Yr.	Unit Cost Per S/Acre-Foot*	Issues
System Refinements:			
Reservoirs			
New Gravel Pits	1,700	6,200	
Platte Canyon Reservoir Outlet	200	1,000	
Irrigate Parks with Raw Water			
30 Separate Projects	3,800	6,000 to 41,000	Some are costly
Water Rights Purchase and Transfers		300 to 7,500	
7 Ditches and Reservoirs	60 to 3,000		
Local Pump Stations	2,000 to 2,200	2,600 to 3,200	
Store Water Underground:			
Conjunctive Use	20,000	5,400?	May replace need for new dam Technology unproven
Enlarge Dams:			
South Platte River			
Antero	1,000	19,600	Environment, recreation, inundation
Eleven Mile	5,000	1,400	but less than with new dams
Dillon	5,000	2,700	
Northern System			
Gross I	7,000	3,900	Environment, recreation, inundation
Gross II	20,000	6,600	but less than with new dams
Build New Dams or Collection Systems:			
South Platte River			
Small Two Forks	57,000	4,300	Fishing, environment
Estabrook I	12,000	14,400	Relocate Bailey
Estabrook II	42,000	7,100	Relocate Bailey
Geneva Park	10,000	10,800	
Northern System			
South Boulder Creek	15,000	9,600	
Ranch Valley	6,000	7,400	
Williams Fork	13,000	10-12,000	
Dillon/Roberts Tunnel System			
Eagle/Piney	170,000	8,500	Wilderness area
Green Mountain Pumpback	100,000	3,700	Red tape, rights
Straight Creek Diversion	3,000	6,400	Water quality
Reuse Options:			
Non-potable			
Industrial/Irrigation Phase I	6,600	4,900	w/nearby customers
Industrial/Irrigation Final Project	15,100	6,800	
Indirect Potable (blends with stream water)			
Ralston	25,000	9,600	Public acceptance
Barr Lake	25,000	9,000	
Ultimate	>70,000	9,000	
Direct Potable (returns directly to treated water)			
Size I	25,000	7,900	Public acceptance
Size II	45,000	7,700	
Ultimate	>70,000	7,700	

*Costs are preliminary. Includes estimates of permitting, mitigation, engineering, construction, and operation and maintenance costs. Reuse includes cost of delivery to customer.

Treated Water System

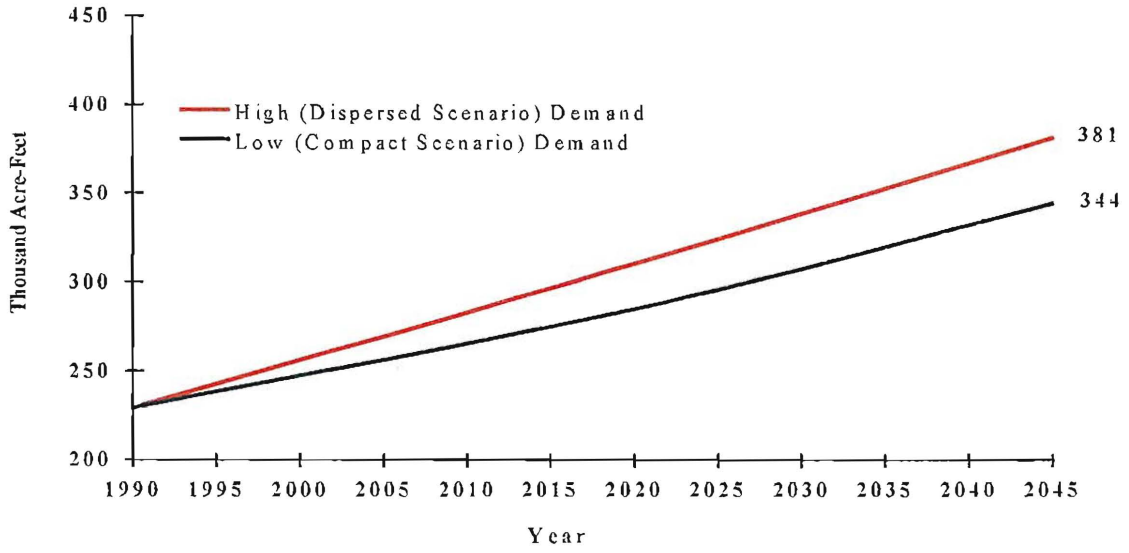
In response to future water demand, not only must Denver Water develop new supplies; it must also augment its treated water system, which consists of the water treatment plants and all of the facilities—reservoirs, pump stations, and conduits—that distribute treated water to customers.

The treated water distribution system has been analyzed with highly specialized software applications on a continuous basis. A network analysis software package was purchased by Denver Water to enhance Denver's ability to perform such analyses. In addition, through Geographical Information System (GIS) technology, Denver's current efforts are focused on expanding these capabilities by developing databases linked geographically to define better the ever-changing distribution system. This effort allows more precise analysis of the system to optimize planned system improvements. Ideally, this enhances Denver's ability to: better define system improvements; recommend operational modifications to optimize pumping requirements; and reduce power consumption; monitor water quality concerns; and continuously maintain the model database through a more automated process.

As with the water collection system, demand forecasts were used to determine treated water needs. However, only the demand for treated water affects the treated water system, since some of Denver's water supply goes to fulfill raw water contracts. The high and low treated-water demands are displayed in Figure V-1. To assess the adequacy of treated-water system capacities, a mid-range build-out treated water demand of 360,000 acre-feet was used.

Figure V-1

Water Demand at the Treatment Plants



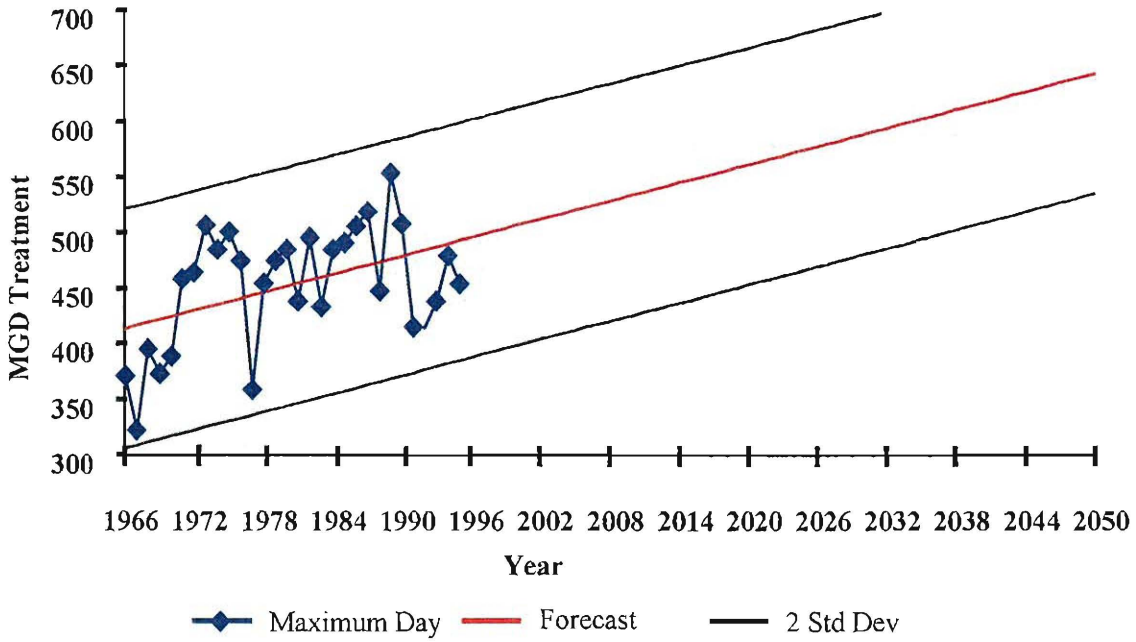
Need for Additional Treatment Capacity

Water treatment plant capacity expansion is principally driven by two factors: the need to serve growing demand, and the requirement for redundancy in the system for coping with catastrophic events.

Figure V-2 shows total annual demand at the treatment plants. Water treatment plants are sized to meet maximum day demands. Based on historical data, Denver Water has developed factors to estimate expected maximum day demands for each level of annual demand. In recent years, the values of these factors have been declining as a result of peak-reducing conservation behavior by customers. The actual maximum day demand in any year depends heavily on the weather. Figure V-2 shows historical peak-day demands, upper-bound, and lower-bound forecasts of maximum day demand. Figure V-2 also shows the average annual treatment-plant demand.[1] The upper and lower bounds are calculated based on two standard deviations so that there is a 95% likelihood the actual maximum day demand in any year will fall within this range.

Figure V-2

Treatment Capacity Used



With the current treatment capacity of 645 mgd, Figure V-2 indicates that additional capacity is needed by 2015 to meet the upper-bound maximum day demands. It is important to note that, to the extent the trend in declining peaking factors exceeds expectations, this date could be pushed further into the future. Also, added conservation or development of a project such as conjunctive use of wells will extend Denver Water's

[1] One million gallons per day (mgd) is equivalent to about 3 acre-feet per day or 1,120 acre-feet per year.

ability to deliver water or reduce treatment without expansion of conventional treatment plants.

Based on forecasted "average" build-out demand of 321 mgd (equivalent to 360,000 acre-feet a year of treated water), ultimate treatment plant capacity requirements are about 770 mgd, which exceeds Denver Water's existing treatment plant capacity by 125 mgd. It can therefore be expected that an additional 125 mgd of capacity will be required at build-out without any changes to demand from conservation or reuse.

A decision on the location of this expansion must weigh two important resource decision guidelines in the IRP. If the key objective is to minimize rate payer cost, the Foothills plant should be expanded. Capital costs of expansion at all three sites are comparable. But as a result of its higher elevation, Foothills can supply most of the service area by gravity. The minimal pumping requirement means significantly lower operating costs.

However, the need to "ensure high reliability in the ...treated water system" points to another solution. Foothills is the largest component of the treatment system. Moreover, as the 1996 Buffalo Creek summer fire, flood and resulting ash debris in South Platte water show, all treatment plant facilities are vulnerable to adverse impact by catastrophic failure, even if the facilities are far removed from the catastrophe. Thus, reliability considerations may dictate expansion at Marston. The decision on expanded capacity also depends on the manner in which the collection system is expanded, since the location and nature of new water supply sources also impacts the treated water system.

Transmission System Capacity

Required transmission system capacity—reservoirs, pump stations, conduits—is determined through hydraulic modeling. Unlike treatment plant capacity, which is a function of maximum day demand, transmission system capacity is largely a function of maximum hourly demands. Build-out maximum hourly demand is estimated at 1076 mgd. Based on the anticipated location of these hourly demand increases, additions and enhancements must be made to the system to maintain optimum operational conditions (pressures and flows) throughout the system. Denver Water's analysis indicates that a variety of transmission system additions and expansions will be required to adequately serve anticipated build-out demand.

The potential additions and expansions which may be needed include:

Treated Water Reservoirs:

- Colorow
- Hogback
- Montclair (relocated)
- Expansions include:
  - 56th Avenue
  - 64th Avenue
  - Lone Tree
  - Chatfield
  - Highlands
  - Belleview

Pump Stations:

- Chatfield Low Side
- Belleview Low Side
- 64th Avenue Low and High Sides
- Montclair Pump Station is moved and reactivated
- 56th Avenue

Conduits:

- C151 (Stapleton Conduit
- Conduit "H"
- C129-IR
- C129-II
- C138-II
- C139
- Conduit 89
- Conduit I
- Conduit 74 III
- Conduit 74 IV
- Conduit 135 II
- Conduit 135 III

All of the foregoing treatment plant and transmission system additions are preliminary and have substantial uncertainties associated with them. Their timing is dependent on the region's rate of growth and the spatial distribution of that growth. Final decisions on these additions require further discussion and review within and outside Denver Water.

Effective Use of Moffat Treatment Capacity

In the future, particularly in dry years, it will become increasingly difficult for Denver Water's north end system, after meeting its raw water contract commitments, to provide adequate inflow to the Moffat Treatment Plant to meet treated water demand. Current storage capacity on Denver's north system is relatively low. As the service area approaches build-out, this inability to fully utilize Moffat capacity will become a source of major concern.

Short of future usage restrictions, there are several ways to address this problem:

Raw Water Load Shifting: Build a raw water conduit and pumping facilities to transmit raw water from the south side supply (Marston Lake) to Moffat, or from the South Platte to the Moffat Treatment plant. The cost of these facilities is estimated at $40 million.

Treated Water Load Shifting: Build conduits, pumping, and treated water storage in sufficient quantities to transmit treated water from Foothills or Marston to the area normally served by Moffat. This would also require redundant treatment capacity at Foothills or Marston. The cost of these facilities is estimated at $200 million.

Interconnects for Winter Treated Water: Create interconnects between raw water contract areas (Arvada and North Table Mountain) and the treated water system. This

would allow Denver Water to reserve north system supply by feeding north side users with treated water from the south during the winter when transmission and treatment capacity is available. The cost of these facilities is estimated at a low end of approximately $4 million, though it could run as high as $10 million. A potential problem is that winter interconnects may not be able to replace nearly enough water to cover summer demand.

Expansion of North System Supplies: The addition of north system supply would alleviate the north side shortage. These options include projects such as the expansion of Gross Reservoir, Leyden Gulch, Indirect Potable Reuse using Ralston Reservoir, and others.

Because of its excessive cost, the treated water load shifting alternative does not appear attractive. A final decision on which of the options will be implemented will be deferred until after Denver decides on the near-term "Cooperative Action" resource projects it will undertake. It is only in light of those decisions that an action plan to ensure effective use of Moffat treatment capacity can be developed.

VI. Water Conservation

Historical Precedent

Since the early 1900s, Denver Water has consistently encouraged wise water use. For many years the primary emphasis was on managing the water supply, although occasional restrictions were placed on the demand for water in response to supply or treatment shortages. Now conservation is considered a significant means to develop new "sources" of water supplies.

By the late 1970s, periodic conservation limitations had evolved into the more refined concept of demand management. Thereafter, Denver Water has taken a leadership role among water utilities by adopting a formal plan for water conservation and setting specific goals for the public to reduce demand. Part of this process has been to look for innovative ways to increase public awareness and participation in water conservation. The chart below lists some of the conservation measures implemented the past 20 years:

Program	Started
Schools Program	1976
Every-third-day lawn watering restrictions (now voluntary)	1977
Evapo-transpiration (ET) rates	1981
Sonic leak detection	1981
Xeriscape demonstration garden	1981
Formation of Metro Water Conservation, Inc. (MWCI)	1985
Founding of the National Xeriscape Council, Inc.	1986
Residential audit/retrofit program	1987
Meters replace flat rate billing	1987
Alternative source irrigation	1990
Ultra low volume (ULV) toilet rebate program	1990
RTD bus boards	1990
Commercial and Industrial audit program	1990
Conservation Hotline	1991
Conservation rate structure	1991
Multifamily audit/retrofit program	1992
City and County of Denver plumbing code	1992
Board approves "Ten-acre Irrigation Rule"	1993
Contract with ECA to do low-income audits	1994
Commercial and Industrial incentive program initiated	1996

The Conservation Planning Process

While Denver Water has had extensive experience with conservation programs, the IRP was new to both Denver Water and to the field of conservation. The initial approach to the IRP was to divide Denver Water's customer base into the following categories: single and multi-family residential, commercial and industrial, and public sector. For each category, a comprehensive list of all known water-using processes and equipment was developed. The purpose was to identify the savings potential of each process and piece of equipment, and to develop conservation measures to address each.

This approach worked well on the residential side, where water use is relatively standard. But the diversity of commercial and industrial users presented a problem. To address this, an intensive water audit of 36 of Denver Water's largest commercial and industrial customers, representing nine different types of water use, was conducted. These audits discovered several areas of potential savings, but a follow-up survey found that only a handful of the enterprises had actually implemented any of the recommended conservation measures. To better understand what would motivate a business to implement water conservation, focus groups were convened with the three top commercial and industrial user categories: hotels and restaurants; hospitals; and food and beverage processors. As the focus group information was analyzed, it became apparent that water use patterns and the level of existing conservation practices were so diverse that even within the same industry the savings potential varied widely from site to site.

Compounding the problem, Denver Water's customer data base made it difficult to get account consumption data by industry type. Commercial, industrial, and multi-family dwellings were categorized together. The only way to identify a specific type of business was to look at the individual account and hope it was representative. Since there are approximately 20,000 commercial and industrial accounts, this was not a realistic option.

Citizen Advisory Committee Evaluation Criteria

During this time, the Citizens Advisory Committee to the Water Board convened a task force to study conservation issues and conduct workshops on the public perception and acceptance of potential new conservation programs. The committee met several times, and one result was the following list of criteria to evaluate conservation options:

- Is the program feasible?
- Can the results of the program be tracked?
- Are the water savings from the program reliable and lasting?
- Is the option cost-effective to Denver Water and its customers?
- Does the program fit with area goals and values?
- Is Denver Water the best vehicle to implement the program?
- Is a program needed to achieve water savings?

With these evaluation criteria and a new recognition of the scope of the conservation problem, a revised approach was taken to the conservation study. Using a general breakdown of water demand by customer class and a more detailed breakdown of water usage within the residential sector, major areas where water could be saved were identified. For instance, single-family residential customers account for more than half of the system's water demand; of this residential usage, more than half of the water is used for landscape irrigation. Thus, devising acceptable ways to continue to reduce irrigation use became vitally important to the overall conservation strategy.

Increased research into other utilities' experience with landscape conservation programs produced mixed results. California studies on savings resulting from Xeriscape, or low water use landscaping, were not comparable to Denver's because of climatic differences. At the time, there was no formal study on potential Xeriscape savings in Colorado. Good data existed on savings from toilet and showerhead replacement programs, but little on other types of indoor water usage.

Designing and Evaluating Potential Conservation Programs

Using the best available information, an estimate was made of the total amount of water available to be saved (Table VI-1). This helped to identify target areas for potential conservation programs. At the same time, studies were underway to predict the extent to which customers would participate in a given conservation program. This was necessary to accurately estimate the potential water savings.

Table VI-1
Potential Water Savings

Type of Use	Customer Group	AF Water Available to be Saved	Assumptions
Indoor	SF & MF Res.	10,163	100% conversion to efficient washers
	New MF Res.	654	sub-metering of all new complexes
	C/I	2,430	14% reduction of all non-domestic use
	Government	0	domestic usage already accounted for
Outdoor	All sectors	59,088	100% Xeriscape (40% reduction of outdoor use)
Total		72,335	

Groups outside of Denver Water were invited to comment upon an initial list of potential programs. The objectives were to determine if the measures were feasible, if there were potential problems that were not identified, and if savings and participation estimates were realistic. It was also important to know how the proposed programs could be improved. Based on the information received, the list of programs was revised, along with the estimated unit savings and participation rates. Costs were calculated for each program, and the programs were then segmented into three levels:

1. Level One emphasized education and public awareness. These approaches were aimed at customers who were ready to conserve because they believed it was the right thing to do, but who needed information on how to conserve.
2. Level Two called for rebates, give-aways and discounts aimed at customers who needed some type of incentive to motivate them.
3. Level Three primarily consisted of mandates imposed by the utility, and were aimed at those customers who would not conserve unless they were required to do so.

The programs were then screened, using the evaluation criteria identified by the Citizens Advisory Committee. Programs that did not score well were modified or replaced. This proved to be a particular problem with many of the initial Level Two programs. The combination of rebates and discounts raised the program costs well above the target goal of less than $5,000 per acre-foot (the estimated cost of the next new supply project). These programs were reworked to be more economical.

Program details, costs and savings estimates were then put through a series of detailed analytical sessions. They were reviewed internally at Denver Water and externally by both the Citizens Advisory Committee and a group of outside water conservation experts. During the course of this review, it was determined that some Level Three programs called for mandated actions that exceeded Denver Water's charter authority. These programs were revised to eliminate the mandates, which significantly lowered the projected savings. For instance, implementing a conservation-oriented rate structure for new residential customers would have realized a water savings of about 6,400 acre-feet annually. The revised program offering only public education and a small incentive reduced the water savings by 40% to about 2,500 acre-feet.

This cycle of review, comment and revision continued through several iterations until it was completed to the satisfaction of the majority of participants.

Public Attitudes and Conservation

Consistent with other aspects of the IRP, a critical step was to try to determine what the public thought about conservation. In 1993 Denver Water conducted a telephone survey of its residential customers, asking for opinions on a variety of residential conservation issues and options. This was followed by a second survey in early 1995, which dealt primarily with outdoor water practices and uses. Participants in the second survey were also asked if they would be interested in attending a focus group to probe conservation issues more deeply. Those who said "yes" were invited to participate in a one of a series of focus groups held in mid-1995. Additional focus group participants were recruited from neighborhood and homeowner associations.

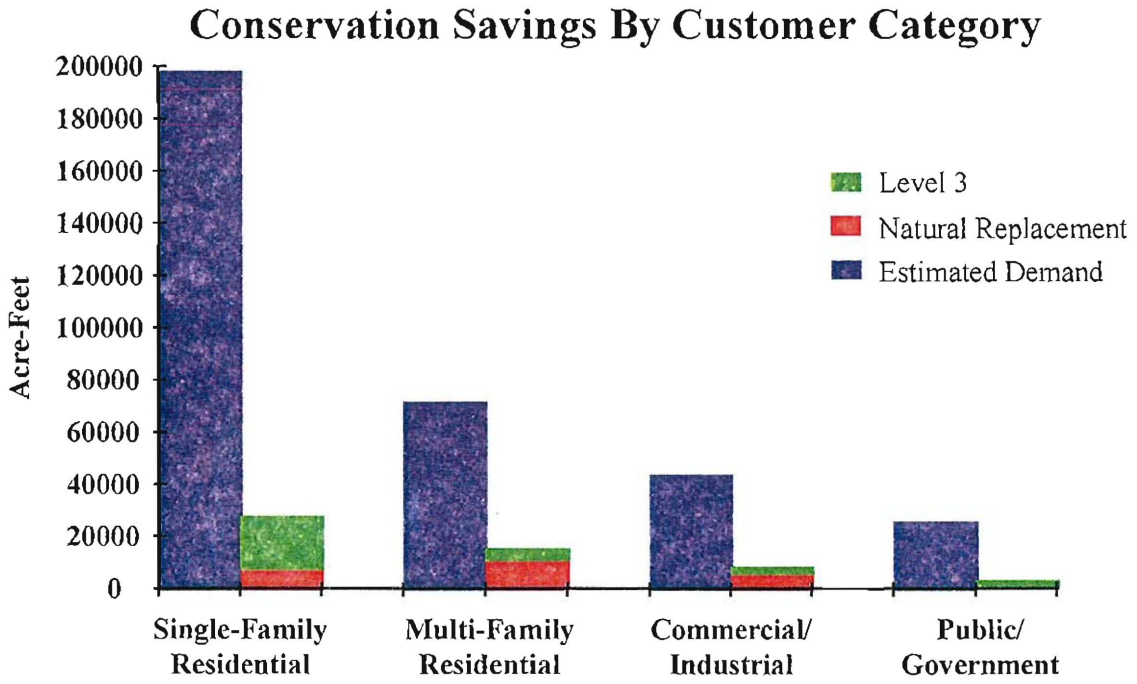
The primary objective of the surveys and focus groups was to determine what type of information, incentives and mandates would be most acceptable to the public. The

responses also served as a test of estimated participation rates for proposed conservation programs. Several interesting facts were discovered:

- almost half of the people in the focus groups were already committed to the concept of Xeriscape, and wanted Denver Water to provide more information on how to Xeriscape;
- the preferred incentives for Xeriscape were design assistance and discounts for plant materials;
- raising the amount of an incentive did not significantly raise the participation rate.

One theme repeated in all the focus groups was that the responsibility of achieving conservation savings should be spread among all sectors of the population. Denver Water was also very concerned that any conservation strategy address not only residential, but also commercial, industrial and governmental customers. As shown in Figure VI-1, the proposed programs, combined with predicted savings through the natural replacement of toilets and showerheads, result in savings proportionate to usage throughout customer groups.

Figure VI-1



One innovative suggestion that came out of the public review process was that of "performance contracting" for conservation. This suggestion proposed offering lower water rates for customers who contract to save specific amounts of water from their historical patterns. While commonplace in the gas and electric industries, this idea was new to the water industry, and there was no historical industry information to help estimate costs or savings. Also, Denver's relatively low water rates raised doubts about

how attractive the proposition would be to the public. Therefore, instead of adding performance contracting to one of the program levels, a parallel track ten-year test period was planned that would run concurrently with other 10-year strategies in the IRP. This test period would allow time to investigate both performance contracting and other new technologies.

The Next Step in Conservation

The three years spent working on the IRP process compelled Denver Water to approach conservation in a more detailed and scientific way than it had in the past. It also brought into focus one of the primary differences between conservation and traditional supply-side projects: getting people to conserve water in their homes and businesses involves attempting to modify their behavior and habits. At this juncture, such behavior modification remains a very inexact science.

The current list of programs represents a general consensus on how best to implement conservation and at what cost. It will take an extended period of actual monitoring and evaluation of these program levels to prove projected water saving estimates. Since the IRP process is continual, there continue to be minor adjustments to individual programs. Now, with the three program levels initially set, Denver Water's priority is to pursue the programs that can produce significant water savings, while still looking for even better conservation opportunities. For purposes of the IRP, it is projected that in addition to the 25,000 acre-feet annually which will result in year 2045 savings through "natural replacement," another 29,000 acre-feet per year will be conserved by 2045 through the various conservation programs.

VII. Creating and Selecting Resource Strategies

The preceding chapters have described all of the prerequisite tasks to what was labeled "Task 7," developing and deciding among alternative resource strategies. Key tasks included:

- Development of resource decision guidelines and evaluation criteria;
- Identification and evaluation of alternative raw water sources;
- Identification and evaluation of treated water system needs;
- Development of a demand forecast; and
- Assessment of conservation options.

To some extent, resource strategies were being discussed from the inception of the IRP process. As other tasks were proceeding, the Board and staff members were discussing resource strategy alternatives. In some ways, the course of the resource strategy process differed from what was initially contemplated. Yet the ability to adapt the IRP process to changing needs is crucial to a successful resource plan.

What is a Resource Strategy?

Denver Water staff defined a resource strategy as a path of resources and facility development that provides for the service area to the end of the planning period—that is, build-out by the assumed 2045 date. Components of a resource strategy might include development of water supplies, refinements to the Denver system, additions to the treated water system, conservation programs, reuse projects, and cooperative actions with other water suppliers.

The path laid out by a resource strategy can be multi-branched, explicitly reflecting the uncertainties that characterize the future. Any resource strategy must be flexible and able to adapt to such uncertainties. No such strategy should irrevocably lock a utility into a course of action over the next 50 years.

The choice of a resource strategy is ultimately that of the Board. Denver Water staff determined early on that it is essential to involve Board members throughout the IRP process. This served three functions:

- to obtain ongoing input, advice, and direction from the Board at crucial junctures;
- to ensure that the Board was comfortable with the content of proposal plans; and
- to enhance Board members' understanding of the planning process so that they could ultimately make better-informed decisions.

The resource strategy development process focused primarily on the water collection system, rather than on treated water components. In part, this emphasis was a predictable outgrowth of the intense controversy and conflict caused by Denver's water resource

decisions of the recent past, as in the case of the effort to build Two Forks Reservoir. But the emphasis was also a function of the fact that many treated water additions such as enlarging pump stations or extending transmission lines tend generally to be low profile and routine. Since major treated water system requirements do not appear to require resolution until 20 years or more out into the future, the need to do so in the context of this phase of the IRP was far less compelling.

The Strategy Development Process

During the IRP, the Board president appointed a three-member Board IRP Committee. This committee was the primary point of contact for staff throughout the strategy development process. The committee first met in October 1995. At this initial meeting, staff briefed committee members on what the Board and committee should expect for the remainder of the IRP effort. Additionally, the committee reviewed and modified the draft resource decision guidelines and discussed the associated draft evaluation criteria.

At the meeting, staff introduced the concept of "pure theme" or value resource strategies. A "pure theme" strategy is one that is designed to emphasize a single objective, to the exclusion of all others. The purpose of this pure theme approach was to help the Board begin to crystallize and wrestle with the important tradeoffs to be made. The four pure themes used in the analysis were: 1) maximizing conservation, 2) minimizing environmental impacts, 3) minimizing dollar costs, and 4) maximizing reliability. Each theme has its own benefits and limitations.

Staff also presented some major issues for the Board to consider in 1996, including:

- What are the best options for meeting the Board's charter and contract obligations to its service area?
- Should the Board plan to depend on curtailing water use during a drought as a way to serve additional demand within the service area, even though doing so means there is less water supply reliability and a decreased margin of safety?
- How should resources remaining beyond those needed for the service area be used?
- If the Board allows the use of any remaining resources outside the service area, what policies would it establish to govern those uses?

In November and December 1995 and January 1996, staff briefed the committee on three occasions concerning results of the tasks already completed, including the demand forecast, the study of the treated water system, the conservation analysis, the examination of supply sources, and the financial issues related to various options. Following these briefings, the full Board met in a work session during February 1996.

The goals of the work session were threefold:

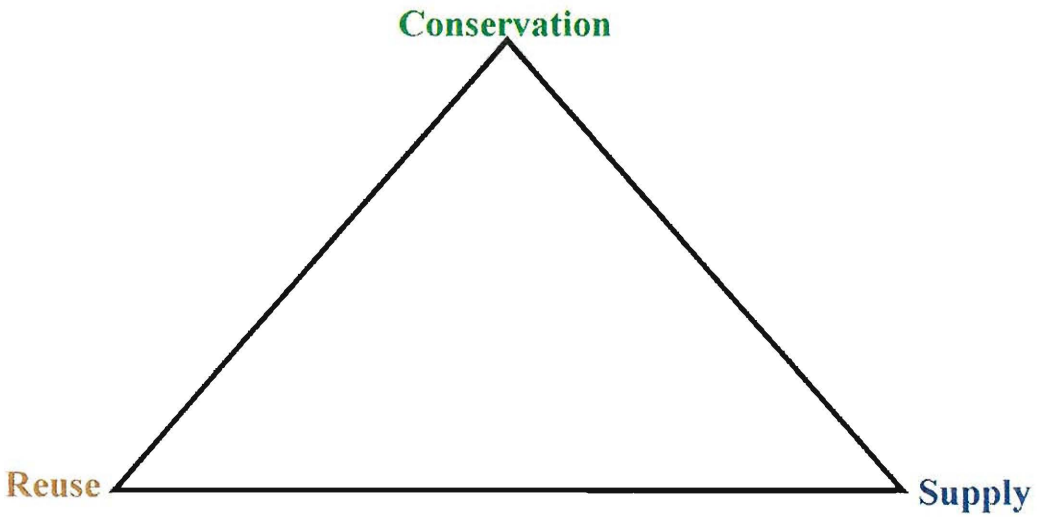
- To understand the IRP process and where that process stood;
- To provide Board guidance on combining individual options and alternatives into broader resource strategies; and

- To develop Board understanding of the concepts of baseline yield and safety margins.

To help the Board provide general guidance on how to combine conservation, reuse, and supply options into resource strategies, staff asked each Board member to indicate where in a "conservation-reuse-supply triangle" he or she would place their priorities. This simple triangle exercise, which is illustrated in Figure VII-1, resulted in a consensus that significant new storage supplies must be preceded by a reasonable conservation program followed by non-potable reuse. This guidance from the Board was critical to the staff's subsequent development of resource strategies.

Figure VII-1

Resource Strategy Triangle



A second major outcome of this work session was the Board's directive to maintain system reliability by continuing the historical 30,000 acre-foot per year "safety factor" of supply above demand. Additionally, the Board did not want to treat drought-year usage restrictions as a "resource," a step which would have moved the Board from its past posture of system reliability in a drought to dependence on restrictions in a dry period. Such restrictions were to be used only in emergency conditions, not as a normal dry-year resource replacing adequate supply.

Based upon Board direction during this work session, staff moved to develop resource strategies that began with a reasonable degree of conservation followed by reuse. Additionally, miscellaneous system refinements and supply options were also included in resource strategy development. Once staff combined a reasonable amount of conservation with components of non-potable reuse and system refinement, it became

clear that, even with the retention of the 30,000 acre-feet safety factor, major new supply additions would not be needed until at least the year 2023.

When this realization was coupled with the fact that significant additions to the treated water system would not be required until at least 2015, Board members felt it premature to commit to large-scale collection system or treated water system additions during this IRP cycle. The Board felt that making such decisions now would unwisely limit its future flexibility as conditions change. Thus, the Board felt it appropriate to defer for a period of time some difficult long-term decisions involving major policy trade-offs. Because of this, the focus of the planning effort concentrated on developing strategies involving conservation, reuse of water, system refinements, potential cooperative actions with other regional water interests, and small water storage projects.

Staff then developed five resource strategies using different combinations of these water sources. Depending on how the resources were combined, the time when the demand line intersected the supply line varied from 2020 to beyond 2030. Therefore, the definition of "near term" was different for each of the five resource strategies. These strategies were presented to the Board's IRP Committee in April 1996 and to the full Board in May 1996. The major components of the five near-term strategies are as follows:

Conservation: Staff developed three possible conservation levels reflecting differing magnitudes of aggressiveness. Those levels resulted in the following projected savings at build-out of the service area:

Level 1: Moderate savings of 16,000 acre-feet per year (4% of 2045 demand).
Level 2: Greater savings of 24,000 acre-feet per year (6% of 2045 demand).
Level 3: Greatest savings of 29,000 acre-feet per year (7.2% of 2045 demand).

There is some uncertainty associated with these savings estimates and the durability of the savings. However, since Denver Water's demand will not exceed existing supplies for an extended period of time, the Board felt it could experiment with new conservation programs. If need be, other resource strategies can be modified as to their timing and content should the new conservation programs exceed or fail to meet expectations.

Non-Potable Reuse: Three reuse levels were addressed in designing the resource strategies. The main variable among the levels is the future demand of Public Service Company for reclaimed water. The three non-potable reuse options are:

- Level 1: No Public Service demand; total non-potable reuse of 9,900 acre-feet per year.
- Level 2: Public Service demand of 5,200 acre-feet per year; total non-potable reuse of 15,100 acre-feet per year.
- Level 3: Public Service demand of 9,200 acre-feet per year; total non-potable reuse of 19,100 acre-feet per year.

The Level 2 Public Service demand is assumed to be the actual quantity needed, though Public Service Company participation is not essential to the implementation of a reuse project.

System Refinements: As with conservation, water supply yields from the system refinements cannot be projected with total confidence at this time. The yields from these options are relatively small, as in the case of park conversions to non-potable sources. For purposes of strategy development, a total of 5,000 acre-feet yield was assumed from this category. Adjustments in other strategy components will be made if actual yields vary from this estimate.

Joint-Use or "Cooperative Actions": There is a likelihood that one or more cooperative actions with entities outside Denver's service area could begin in the near term. Development of such actions would not be driven by Denver Water's need for near-term supply, but by Denver's desire to take advantage of time-limited opportunities. It is premature at this time to specify which action(s) might be developed. For purposes of illustration and discussion, Leyden Gulch Reservoir, located in the northwest Metro Denver area, was assumed to be a representative cooperative action. Of the 15,000 acre-foot presumed yield of this project, it was assumed Denver Water would receive 10,000 acre-feet, with the remaining 5,000 going to one or more water supply partners in the project. The actual yield from potential cooperative action will be verified as the near-term period progresses.

Supply Projects: In one of the five strategies (Strategy 5), it was assumed the Board would decide to develop certain supply projects early in the near-term time line, reserving non-potable reuse for later. Two representative projects were used for analytical purposes:

Eleven Mile Reservoir Enlargement	5,000 acre-feet yield
Leyden Gulch Reservoir	15,000 acre-feet yield
Total Yield	20,000 acre-feet yield

To give the Board a feel for potential "long-term" resource strategies, a variety of supply projects were combined to demonstrate the alternative approaches the Board could ultimately take to satisfy build-out demand. For Strategy 1, three representative approaches were developed to yield a hypothetical 60,000 acre-feet per year needed beyond near-term additions. These representative approaches were labeled "Diversify," "Maximize Reuse," and "Heavy Western Slope Use":

Diversify:	
Potable Reuse	35,000 acre-feet
Eleven Mile Enlargement	5,000 acre-feet
Conjunctive Use	20,000 acre-feet
Maximize Reuse:	
Potable Reuse	60,000 acre-feet
Heavy West Slope Use:	
Conjunctive Use	5,000 acre-feet
Dillon Enlargement	5,000 acre-feet
Eleven Mile Enlargement	5,000 acre-feet
Gross Enlargement	7,000 acre-feet
Straight Creek	3,000 acre-feet

Eagle Piney 35,000 acre-feet

Certain assumptions were common to all five strategies:

- projected service area demand will exhaust existing supply by the year 2023. When the 30,000 acre-feet safety factor is included, this "crossover" of the supply and demand lines—the time when supply would equal demand—occurs in 2013;
- the assumed yield from the system refinement category is 5,000 acre-feet at a cost of $5,000 per acre-foot. But all of the specific projects in this category were not yet identified at the time of the Board's deliberations; and
- in all but one strategy, the 30,000 acre-foot per year safety factor is assumed to remain intact. Strategy 4 assumes the safety factor will be reduced to 20,000 acre-feet per year by the end of the near-term period and to 15,000 acre-feet per year at build-out.

The five resource strategies ultimately developed include the following package of options:

- **Strategy 1** contains the smallest conservation and non-potable reuse levels, as well as 5,000 acre-feet of system refinement and 10,000 acre-feet of cooperative actions;
- **Strategy 2** contains the medium conservation and non-potable reuse levels, as well as 5,000 acre-feet of system refinement and 10,000 acre-feet of cooperative actions;
- **Strategy 3** contains the largest conservation and non-potable reuse levels, as well as 5,000 acre-feet of system refinement and 10,000 acre-feet of cooperative actions;
- **Strategy 4** contains the medium conservation and non-potable reuse levels and 5,000 acre-feet of system refinement. In addition, it was assumed the safety factor is reduced from 30,000 acre-feet per year to 20,000 acre-feet per year; and
- **Strategy 5** fundamentally differs from the remaining strategies. This strategy begins with the smallest conservation level followed by 20,000 acre-feet of supply projects. No non-potable reuse, system refinement, or cooperative actions are included.

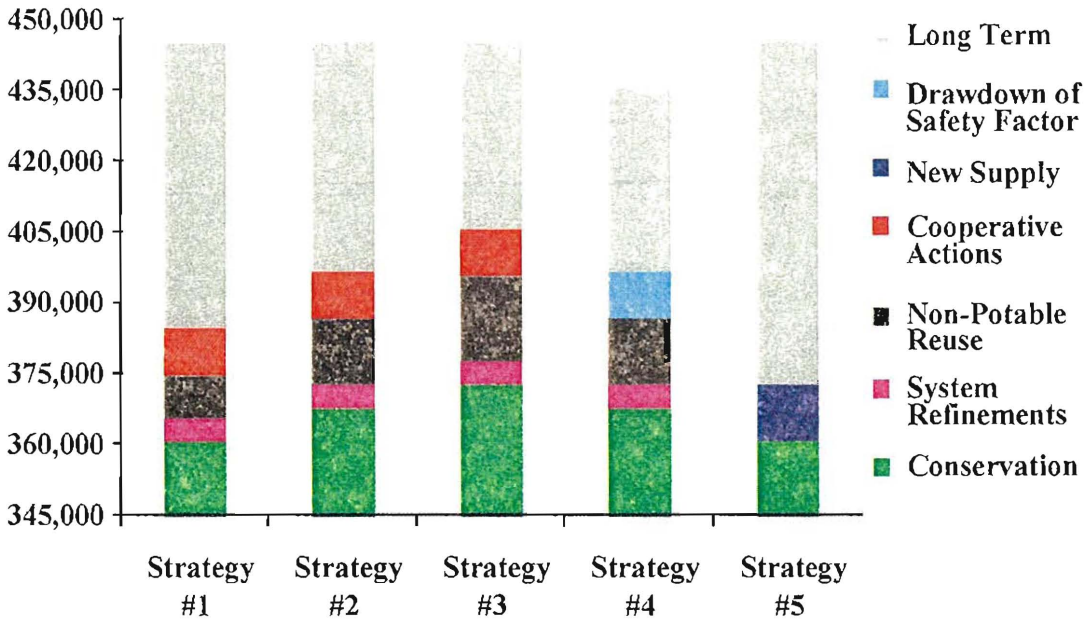
Table VII-1 summarizes the five resource strategies. Figure VII-2 illustrates the differences in strategy composition.

Table VII-1
Resource Strategies
All figures in 1,000 acre-feet

	Strategy 1	Strategy 2	Strategy 3	Strategy 4	Strategy 5
Demand (2045):					
Demand in 2045	415	415	415	415	415
Safety Factor	30	30	30	20	30
Demand with Safety Factor	445	445	445	435	445
Supply	345	345	345	345	345
Unmet Demand in 2045	100	100	100	90	100
Conservation:					
Conservation in 2045	16.0	23.5	28.5	23.5	16.0
Percent of 2045 Demand	4%	6.0%	7.2%	6.0%	4.0%
Conservation Savings in 2007	1.5	3.0	3.9	3.0	1.5
Conservation Savings in 2013	2.5	4.8	6.2	4.8	2.5
Conservation Savings in 2023	8.0	12.0	14.6	12.0	8.0
Near Term:					
Conservation (at 2013)	2.5	4.8	6.2	4.8	2.5
System Refinements	5	5	5	5	0
Non-Potable Reuse	10	15	19	15	0
Cooperative Actions	10	10	10	0	0
Supply Projects	0	0	0	0	20
Drawdown of Safety Factor	0	0	0	10	0
Total	28	35	40	35	23
Long Term:					
Deficit	73	65	60	55	78
Conservation	14	19	22	19	14
Target Yield	59	47	38	37	64

Figure VII-2

Resource Strategies



Strategy Adoption

At a May 10, 1996 work session, the full Board agreed to the near-term focus. Upon reviewing the five strategies, the Board decided to:

- adopt a strategy with a heavy emphasis on conservation;
- eliminate Public Service Company from consideration in the reuse plan because it was uncertain whether the company would participate. This reduced the amount of reuse for the near-term strategy to 9,900 acre-feet;
- assume that 5,000 acre-feet of system refinements would be developed at a cost of $5,000 per acre-foot;
- assume that cooperative actions yielding 10,000 acre-feet would be developed during the near term;
- display the need for additional surface storage supply toward the end of the near term, though the exact supply project was not specifically identified; and
- maintain the 30,000 acre-foot safety factor, at least during the near term.

The Board observed that determining with precise accuracy the yield for both conservation and system refinements is very difficult. It therefore decided to implement a ten-year program to establish and "prove-up" the yield for both. At the end of the ten years, the yields for both programs would be adjusted based upon results of appropriate monitoring and evaluation.

In spite of uncertainty about conservation savings, the Board directed staff to rely on the projected conservation savings for planning purposes during development of the near-term strategy. The Board believes the importance of water conservation to the community makes it imperative for the projected conservation savings to be viewed as attainable until proven otherwise by Denver Water's monitoring and evaluation program.

After the Board work session, staff further developed two strategies incorporating the Board's guidance. These strategies included features of the original five, but because of the additional surface storage supply to be added towards the end of the near term, differed from all of them. Both strategies move the near-term time line almost to the year 2030. Both include:

- 9,900 acre-feet of non-potable reuse;
- 5,000 acre-feet of system refinements; and
- 10,000 acre-feet of cooperative actions with other water suppliers.

The two strategies differ in the amount of conservation and surface water supply. Strategy 1 includes conservation level 2 ("greater" savings), a 5,000 acre-foot conjunctive use pilot project, and a 5,000 acre-foot supply project. Strategy 2 consisted of conservation level 3 ("greatest" savings) and a 5,000 acre-foot supply project. Strategies 1 and 2 are summarized in tabular and graphical form in Table VII-2 and Figure VII-3, respectively.

Table VII-2

Resource Strategy Time Lines

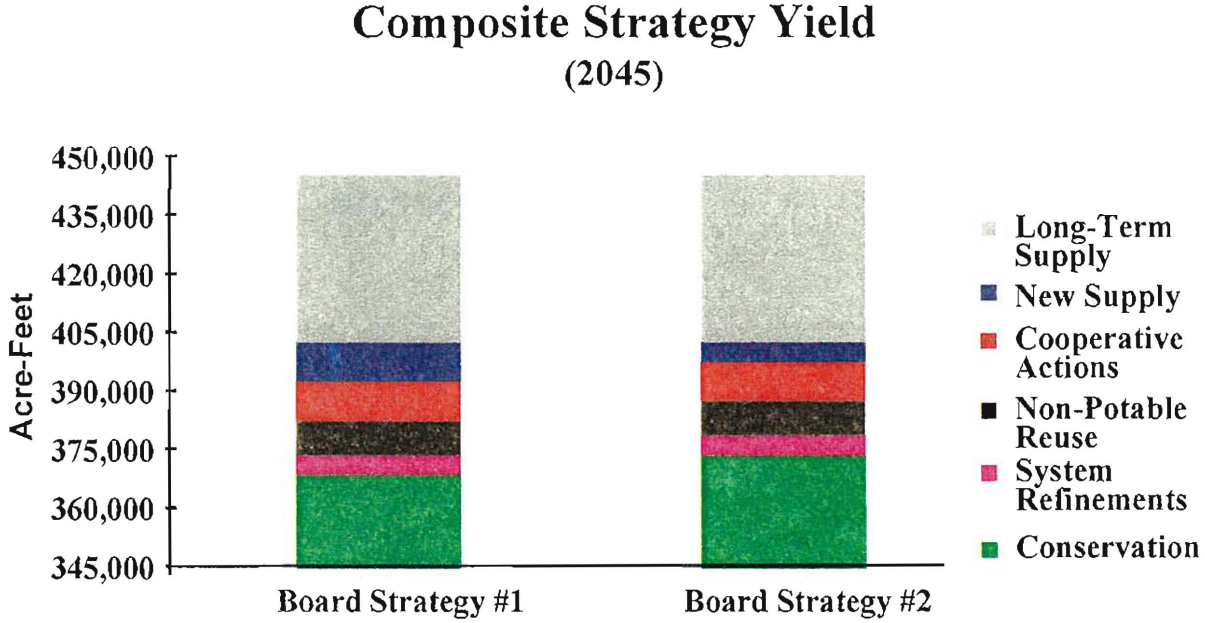
STRATEGY #1

Option	AF Yield	Lead time	Constr Starts in	Supply/Demand lines now cross in
Conservation Level 2	14,000	n/a	1997	2015
System Refinements	5,000	n/a	1997	2017
Conjunctive Use Pilot	5,000	3 yr	2012	2019
Non-Potable Reuse	9,900	3 yr	2016	2021
Cooperative Actions	10,000	5 yr	2016	2025
Supply Project	5,000	3 yr	2022	2027
Near-Term Yield	48,900			

STRATEGY #2

Option	AF Yield	Lead time	Constr Starts in	Supply/Demand lines now cross in
Conservation Level 3	16,000	n/a	1997	2016
System Refinements	5,000	n/a	1997	2018
Non-Potable Reuse	9,900	3 yr	2015	2021
Cooperative Actions	10,000	5 yr	2016	2024
Supply Project	5,000	5 yr	2019	2026
Near-Term Yield	45,900			

Figure VII-3



At a June 1996 work session, the Board adopted its near-term strategy, a variant of Strategy 2. The single difference between the adopted strategy and Strategy 2 was the inclusion of an additional 10,000 acre-feet of new supply projects on top of the initial 5,000 acre-feet of supply at the end of the near-term period, rather than deferring that supply addition to the long term. This brought the total new supply projects to 15,000 acre-feet. This is in addition to the system refinement actions and cooperative actions already included in Strategy 2.

The adopted near-term strategy, as shown in Figure VII-4, was expected to produce about 55,000 acre-feet and extend the near-term time line beyond 2030.

Financial Impacts of Board Strategy

Significant costs are associated with the Board's adopted strategy. Table VII-3 shows the cost of each strategy component. For purposes of this cost analysis, it was assumed the 15,000 acre-feet of supply included in this strategy consists of 10,000 acre-feet of cooperative action effort and 5,000 acre-feet from an enlargement of Eleven Mile Reservoir. These are used for illustrative purposes only; the final decision on which projects will be developed has not been made by the Board.

It should also be noted that Table VII-3 includes an additional 125 million gallons daily (mgd) at the Foothills Treatment Plant. While Denver Water will need additional treatment capacity and Foothills is the likely location for some or all of that new capacity, a final decision on such treatment additions has not been made by the Board.

Table VII-3 presents the resource strategy costs in several different ways. Total costs—including capital, operations and maintenance, permitting, and water rights litigation—over the planning horizon, and the present value of the stream of annual revenue requirements, are shown first. Then each of these is expressed on a per-acre-foot-yield basis.

Figure VII-4

Near-Term Strategy

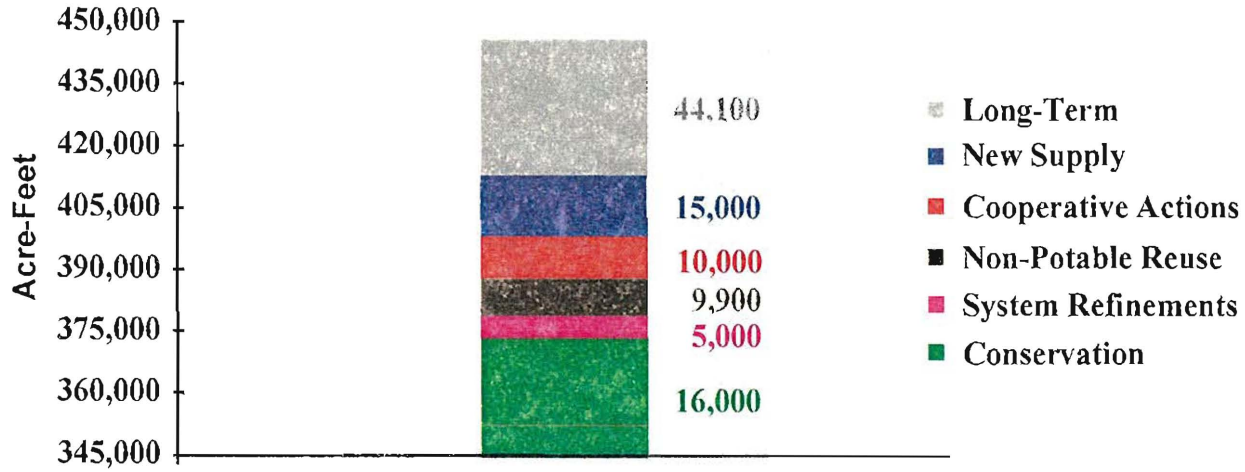


Table VII-3
Near-Term Strategy

Component	Type	Acre-Feet	Present Value-Total Cost	Present Value-Acre-Feet
System Refinements	Supply	5,000	19,579,666	3,916
Non-potable Reuse	Reuse	9,900	70,077,288	7,079
Cooperative Actions	Supply	10,000	94,637,902	9,464
New Supply	Supply	15,000	13,222,742	882
Conservation*	Conservation	19,654	61,745,359	3,142
Subtotal		59,554	259,262,957	4,367
Foothills III			836,380	
Total			260,099,337	

VIII. Public Involvement

Communicating the IRP Process

Historically, Denver Water had conducted its business assuming that its activities always had broad public support. The public was often informed of decisions and projects as they left the drawing board and construction began.

That idea changed radically after the veto of Two Forks. Public involvement became a high priority. The IRP has been viewed as a means to further enhance communications between Denver Water and its many public constituencies.

Early in the IRP process, staff knew that a "planning story" was not going to generate much attention with print and electronic news outlets. Planning was something that was always supposed to happen at a water utility. Even so, reporters, editors, and columnists at newspapers and magazines, as well as program and public affairs directors at radio and television stations, were sent news releases to solicit public participation in Citizens Advisory Committee workshops on the IRP process. Paid advertising augmented this invitation to talk with Denver Water planners. In addition to news releases, a number of informal briefings were provided to reporters, and meetings were held periodically with the editorial boards of both Denver daily newspapers.

Through publicly-announced workshops, the public was asked to express its concerns, opinions, and values on the full range of IRP issues. The effort reached out into the community through meetings at convenient locations in the metropolitan area as well as at Denver Water facilities. Meetings with a large number of interested organizations became an extension of the process by Denver Water's staff. Senior management of Denver Water personally hosted, conducted, and listened at many of these open workshops during 1995 and 1996 as initial IRP planning coalesced. Staff experts for the water topic under discussion also participated in the public give-and-take.

In late 1995, to reach people who could not or did not attend the workshops, a scientifically designed telephone survey was made to further check public opinion and perceptions about water issues. The survey was culled from random households, as well as people who had previously contacted Denver Water's customer relations office about a water-related issue. The final survey group consisted of 500 customers equally divided between Denver and its suburbs. After this survey, a representative sample of people wishing to participate further in the process was organized into focus groups and scheduled to probe deeply into the perceptions discovered by the telephone survey. The survey and focus groups asked customers about conservation, supply, concerns for the environment, watering restrictions, growth of the service area, water quality, and other issues.

Public involvement also included direct meetings with a host of interest groups that covered the spectrum from the Environmental Defense Fund, Sierra Club, Denver Mayor's office, homebuilders' associations, farmers, and Western Slope interests to downstream water users in Nebraska. In this context, staff also developed a diverse set of presentation materials about substantive water planning issues and the IRP process to deliver to outside groups that wanted the information for discussion as an agenda item at their own meetings.

In addition, staff compiled a list of approximately 2,000 people who had direct and indirect interest in Eastern and Western Slope water issues. In November 1994, a quarterly newsletter entitled "Water for Tomorrow - Denver Water's Integrated Resource Planning Process" was produced and circulated to this group. Readers included individual water experts, firms, and consultants, as well as local, state, and federal officials, neighborhood associations, and other interested individuals and public groups. The newsletter described the IRP process, called attention to community workshops and meetings, solicited participation, and reported the evolving process through the fall of 1996.

Throughout the IRP public involvement process, every effort was made to clarify and simplify complex engineering, legal, or social issues about water supply into an easy-to-understand description of the present and future ramifications of water policy choices. The IRP also provided opportunities for direct contact and communications with the Water Board members, usually at milestones in the planning process. The Board solicited and heard comments from the public during regularly scheduled board meetings as well. Then, in October 1996, the Board issued a policy statement that articulated its position about Denver's newly defined role in water planning and delivery in the Denver Metropolitan Area.

IX. Outcomes of the IRP Process

Denver Water has arrived at the stage where the IRP process has identified proposed projects and future directions. These will be fine-tuned through continuation of the IRP in coming years. Indeed, as Denver takes the IRP package of projects and seeks to budget, schedule, and implement it in increments through its "10-Year Capital Program" process, the projects will undergo revision and modification.

In October 1996, the Board concluded the present phase of the IRP by issuing its resource statement, the complete text of which is found at the end of this report. The October statement both supersedes and expands upon one issued in April 1989 in the heat of the Two Forks controversy and subsequent veto. The statement (see Attachment 1) identifies the basic parameters within which the Board will allocate its water resources in the foreseeable future. While the statement is subject to future modification, the Board's long deliberation over the policy ideas during the three years of the IRP, including extensive input from public groups and other water entities, means that the Board and its staff would propose to modify the positions set forth in the resource statement only with the greatest of care and consideration.

The importance of the Board Resource Statement is that it:

- constitutes a major policy declaration guiding the Board's future decision-making on allocating water resources;
- reaffirms that the foremost obligation of the Board is to serve the City of Denver to build-out;
- defines the Board's service area to include Denver and its suburban contract distributors, with the Board serving to build-out within that area, but not taking responsibility for water supply outside that area;
- indicates the Board has 345,000 acre-feet of yield at present, enough to provide for growth within its service area to the year 2013 when the Board's supply and demand lines would cross, assuming no new supplies were developed or demand were lowered, and that a 30,000 acre-foot "safety factor" is retained;
- notes that the Board's service area build-out will require 445,000 acre-feet, assuming a 30,000 acre-foot "safety factor" is retained (with build-out premised on a 50-year time horizon);
- emphasizes that the Board will meet the shortfall between its build-out demand of 445,000 acre-feet and its present yield of 345,000 acre-feet by depending principally on conservation, reuse, and small-scale system refinements in the "near term";
- explains that in the near term, the Board has the potential to develop identified projects totaling approximately 55,000 acre-feet of water, thus pushing the time when the Board's supply and demand lines will cross out beyond the year 2030;
- indicates that since the Board's near-term strategy pushes the crossing of the supply and demand lines so far out in the future, there is no reason for the Board to identify today the "long-term" projects—whether added conservation, potable reuse, conjunctive use, or one or more surface storage or expansion efforts—which will be

needed to develop the remaining 45,000 acre-feet needed to build out the Board's service area;

- points to the use by the Board, for the first time, of conservation savings in planning forecasts on an equal footing with traditional supply sources;
- maintains a "placeholder" future supply storage project or projects, including possible reservoir enlargements, in the event conservation, reuse, and small-scale efforts do not suffice;
- reserves all Board water rights for ultimate use since the Board does not know which water rights would be required for added yield, and which of those rights might lend themselves to development;
- notes that the Board will proceed in all instances in an environmentally sensible manner;
- emphasizes that the Board has sufficient potential yield from its own resources to build out its service area, without having to depend on the resources of those outside its service area, though it must develop that added capacity in the midst of regulatory, catastrophic, or other potential limitations to its existing or future yield and infrastructure;
- indicates that the Board, without necessarily taking a lead position on any future cooperative action, will work with suburban entities outside its service area on cooperative efforts, while ensuring appropriate suburban attention to conditions such as compensation to the Board, regard for South Platte stream flows, relations with Western Colorado, and other considerations;
- points out that since all of the Board's capacity is needed to build out its service area, it cannot dedicate yield or infrastructure assets permanently to those outside its service area, though it will lease water and capacity temporarily, and it will use its assets to further joint cooperative efforts carried out on a regional basis when its service area receives major benefit; and
- stresses the Board's desire to work cooperatively with Western Colorado and other areas and interests in the state, though the Board recognizes that full use of its system will place a greater draw on existing facilities such as Dillon Reservoir or the South Platte River.

The Board's Resource Statement: An In-Depth Look

While the Board through its actions at its regular bimonthly meetings sets incremental policy, it had never enunciated a comprehensive approach to its future resource allocation responsibilities. The resource statement constitutes a far-reaching statement of the Board's approach to those responsibilities.

The centerpiece of that approach is the Board's obligation to serve the City of Denver until build-out is accomplished. The Board's system belongs to the citizens of Denver, and it is they who have the paramount claim on water from that system. While it appeared in the 1970s that Denver was being "landlocked" by the Poundstone Amendment, developmental opportunities at the new Denver International Airport and redevelopment opportunities at the old Stapleton Airport, the former Lowry Air Force

Base, and the Central Platte Valley provide significant growth potential for Denver's future. Indeed, projections indicate that of the approximately ½ million of new population which can be expected in the Board's service area at build-out, almost half will be in the City of Denver.

A second critical Board obligation is to provide water for build-out of the Board's service area outside Denver. To determine the dimensions of that obligation, the Board had first to define its service area boundary. Until the veto of Two Forks, it was generally assumed the Board would continue to add distributors when appropriate. Through the resource statement, the Board makes clear its service area is fixed. While the Board emphasizes it will serve water for building out its suburban distributors, it will not take responsibility for water supply outside its service area.

By fixing its service area boundary, Denver Water is able to determine with a higher degree of accuracy the population it will be serving at build-out. Given those population projections, the Board determined it would require 445,000 acre-feet to build out its service area. The 445,000 acre-foot figure includes a 30,000 acre-foot safety factor as a hedge against a shortfall in yield. Given that the Board's present demand is 265,000 acre-feet, future demand can be expected to increase substantially in the system.

To meet that demand, the Board presently has 345,000 acre-feet of yield available. That means a present excess of 80,000 acre-feet of supply over demand; but it also means a shortfall of 100,000 acre-feet to meet the 445,000 acre-feet build-out figure. The Board's present 345,000 acre-foot yield is sufficient to serve its increasing demand until the year 2013, at which time Denver Water's demand and supply lines will cross if no further supplies have been added or no further demand reductions have been made.

Where, then, is that extra 100,000 acre-feet to be found? Prior to the 1990s, the answer would have been easy: the least-cost structural storage project—that is, a dam and reservoir—next on the drawing board would be built. However, the answer is no longer so simple, given the present climate of public attitudes and values, and given the regulatory climate within which utilities must operate. Instead, the Board's answer in its resource statement is that conservation, reuse, and small-scale system refinements be utilized in the near term to close the gap, with structural storage efforts to be called upon generally if the other approaches do not work or are insufficient, and only toward the latter part of the near-term time frame. The exception would be a time-limited cooperative opportunity which might never recur. Additionally, the list of system refinement projects includes such items as gravel pit storage and other limited structural measures.

In the Board's statement, it is acknowledged that the point at which the supply and demand lines cross without further supply additions or demand reductions is the year 2013. However, in the near term, the Board has the potential to develop demand reduction and supply projects it has identified which total some 55,000 acre-feet of water. Such a change to the supply and demand lines pushes out the time when the lines cross to the year 2030.

At the time it formulated its resource statement, the Board had agreed on an IRP package which included 16,000 acre-feet of conservation; 9,900 acre-feet of non-potable reuse; 5,000 acre-feet of system refinements or efficiencies in the existing system; 10,000 acre-feet from cooperative actions with those outside the Board's service area; and a placeholder for 15,000 acre-feet from other supply projects such as limited dam construction or modifications. Yet as the Board has moved to budget, schedule and implement the package, the dynamics of the IRP process have already occasioned some change in the nature of that package.

With respect to the long term, the Board determined that since its near-term strategy pushes the crossing of the supply and demand lines so far out in the future—that is, the year 2030—there is little reason for it to identify today what actions it believes a future board should take 30 years hence. The IRP process identifies a promising list of future projects ranging from added conservation to significant potential for future potable reuse to continued opportunities for conjunctive use to a long list of possible surface storage additions (whether enlarged facilities or new ones) which future boards would have decades to consider so as to accumulate an additional 45,000 acre-feet of water.

Vital to the Board's strategy is the role of future water conservation. For the first time, the Board explicitly includes conservation savings as a part of planning forecasts on a par with traditional supply sources. For years, water utilities across the country have increased their efforts in the field of conservation. But few have been willing to provide water conservation savings the same credibility in their planning and forecasting as occupied by conventional water supplies. The fear among utility planners has been that while conservation savings might be present one year, given their dependence on public attitudes, practices, and weather which are subject to change, these savings could disappear the next year. If the "next year" happened to be a dry one in which conservation savings were to be depended upon, what was the utility to do for water?

The Board, by its action in its resource statement, affirmed its confidence in the permanent presence of conservation savings within its system. And indeed, even while Denver Water has saved over 25,000 acre-feet annually through conservation in the past decade and a half, Denver Water expects an added savings of almost 30,000 acre-feet more a year apart from "natural replacement" prior to build-out in its system.

In implementing the IRP package, including the conservation portion of it, the Board indicates it will always proceed in an environmentally sensible manner. For Denver Water, that guideline has become axiomatic. It believes that in all of its actions, good environmental practices are good public and water policy.

Not only did the Board signal that conservation would be treated on an equal footing for planning purposes with structural supply sources; in addition, the Board put conservation at the head of the line when considering how to meet future water demands. That is, even as larger-scale surface storage projects are relegated to later time frames, conservation projects will go on unceasingly and will be expanded upon. Similarly, non-potable reuse of water and system refinement projects which make the Denver system more efficient will also have priority. It is not that major surface storage efforts will never again be

built by Denver Water; it is that apart from "cooperative action" efforts with those outside the Board's service area, such projects will be seriously considered only after Denver Water has first developed conservation, reuse, and small-scale refinement efforts.

Since there is no way to be certain significant surface storage projects will remain unneeded, the Board indicates in its statement that it reserves for its use all of its water rights, both conditional and absolute. That is, the Board cannot be certain that conservation, reuse, and system refinements will suffice in meeting all of Denver Water's future demand. If they do not, then the Board must reserve its water rights so that future storage efforts can be undertaken. Since it is impossible to say with certainty which conditional water rights might ultimately succeed in being developed, all water rights must be protected. Given the uncertain nature of accomplishing structural storage projects as a result of stringent regulation, environmental impact, high cost, politically charged issues, and the diminishing nature of attractive reservoir sites, the Board believes it necessary to make clear that all of its water rights are reserved for future use.

It is important to recognize that the Board believes it can find the 100,000 acre-feet to build out its service area from its own resources. That is, the Board is not dependent on resources—whether water rights, facilities, or dollars—from those outside its service area to find the added water supply or demand reduction needed to meet its future obligations in the service area. The combination of Denver Water's infrastructure and extensive conditional water rights puts it in an enviable position in terms of preparation for its future.

However, the Board realizes there may be economies and efficiencies to be gained by pooling its efforts and resources with those outside its service area. While the Board recognizes it can get there alone, it also believes it may be more beneficial to achieve its objective cooperatively with others, so long as the efforts undertaken prove to be mutually beneficial.

The Board Resource Statement makes clear Denver Water will engage in cooperative actions with those outside its service area. However, the Board is not willing to dedicate permanently to those outside its service area its infrastructure or water rights capacity in circumstances where neither its own infrastructure nor its water yield is benefited. The distinction is a subtle one. The Board is open to finding joint or cooperative projects where its water yield or infrastructure capacity is benefited even as it permanently contributes some of its conditional water rights or infrastructure capacity for use by others; what the Board is not willing to do is to contribute those assets for the use of others outside its service area without receiving yield, infrastructure, or commensurate benefit. On many occasions, Denver Water has been called upon to offer its system to move water from party A to party B, with Denver receiving a small stipend for use of its facilities. What the Board has determined is that it will need all of its water rights and infrastructure assets to meet the long-term needs of its service area. To parcel those assets out on a piecemeal basis to users outside the service area without receiving any added yield or infrastructure benefits in return simply results in those water rights and infrastructure being used up before Denver is able to provide fully for its own service area. That would mean, in turn, that when growth pressures in its service area require

those assets, Denver Water will have to replicate at incredibly high cost that capacity it has relinquished.

Nonetheless, the Board indicates in its resource statement that it is willing to lease its water and capacity on a temporary or short-term basis. So long as the Denver system continues to enjoy an excess of supply over demand, Denver Water is ready to make short-term leases of no more than five years in duration; however, the Board has indicated that at the lease termination date, it is willing to explore five-year renewals.

Throughout its IRP deliberations, the Board stressed the importance of working cooperatively not only with other water utilities, but with non-water utility interests outside Metro Denver. For example, the resource statement indicates that "any future structural projects located on the West Slope should be developed cooperatively with West Slope entities for the benefit of all parties." Yet the Board recognizes that full utilization of its system will place a greater demand on its facilities both within and outside the Denver area. To illustrate, the Board acknowledged that full use its facilities will demand more of the Dillon Reservoir system. It also understands that added South Platte river projects such as non-potable reuse will mean flow changes on that river. In both cases the increased use is of Denver Water's existing infrastructure or assets—that is, using Dillon Reservoir for municipal water supply purposes as was intended in its appropriation of water rights and subsequent construction of facilities, and reusing wastewater effluent from the transmountain flows Denver brings to the South Platte basin as good practice, efficiency, and Colorado water policy dictate.

In summary, through its resource statement and adopted resource strategy, the Board has crafted a sound road map to help it navigate through an uncertain future. Through careful deliberation, the Board has made major progress toward bringing some certainty to that future.

"Cooperative Actions" With Those Outside the Board's Service Area

Throughout the IRP process, the Board struggled with the issue of how it should relate to those outside its service area. Clearly Denver Water does not need to accept regional responsibility for meeting the water needs for exploding Metro Denver growth from the El Paso County line on the south to the Northern Colorado Water Conservancy District boundary on the north. It can manage its own future water needs by itself.

Yet, the Board recognizes it is not an island—that it is economically and socially integrated to a larger metro area, much of which exists outside its service area. The health of that area is linked to the future fortunes of the City of Denver. In its resource statement, the Board opted for a cooperative role, rather than one involving responsibility or leadership for the water needs of those outside its service area. At the time the Board issued its statement, it also issued a policy message entitled "Cooperative Actions with Metropolitan Water Suppliers Outside the Board's Service Area." (See Attachment 1.)

In that policy statement, the Board indicated it has no plans to expand its service area or to assume responsibility for water supply to areas outside its service area. But the Board went on to say that

> *... cooperative arrangements with existing metropolitan water suppliers outside the service area may benefit customers within the service area and may improve provision of water service within the Denver Metropolitan Area. Accordingly the Board's Resource Statement directs Denver Water staff to evaluate potential cooperative actions that may be proposed by other metro area water suppliers.*

The Board noted it intends to fulfill its primary responsibility to its service area by implementing the near-term strategy outlined in the statement. That being the case, the "cooperative actions" effort is a secondary priority. Denver Water staff anticipate that the process of developing and evaluating cooperative actions will require two years to complete.

The Board also set forth guidelines which proposed cooperative actions should observe if such proposals are to be considered seriously. A qualified proposal should:

- provide both significant water and financial benefits to the Board;
- minimize the Board's regulatory, financial, legal, and political risk;
- limit the Board's obligations to the customers of the proposing agency to a particular amount of water;
- assure that the proposing agency will implement an effective water conservation program;
- ensure that the proposing agency will pursue available non-potable reuse options for efficient use of water;
- maximize use of Denver Water's existing water rights;
- consolidate water supply proposals initiating from the same geographic region or sub-region so that the Board need not analyze and evaluate an unending stream of parochial proposals;
- foster environmental protection, including maintaining "boatable" river flows through Denver;
- demonstrate an effort by the proposing entity to gain acceptance of the proposal from those who might be impacted outside the Denver Metro Area;
- ensure that groundwater resources are sustainable if the proposal relies on aquifers; and
- provide visible benefits to the citizens of Denver, which could include such steps as purchase and dedication to open space.

Following the Board's directive, staff has moved to implement a series of meetings with the "Southern Cooperative Subregion" comprised of parts of Douglas and Arapahoe counties; the "Northwest Cooperative Subregion" consisting of the cities of Arvada, Broomfield, Westminster, and the Consolidated Mutual Water Company; the "Northeast Cooperative Subregion" made up of the South Adams County Water District, Thornton, Brighton, the Farmers' Reservoir and Irrigation Co. (FRICO), Metro Wastewater, Public Service Co., and the Rocky Mountain Arsenal (Army); and with the City of Aurora, with

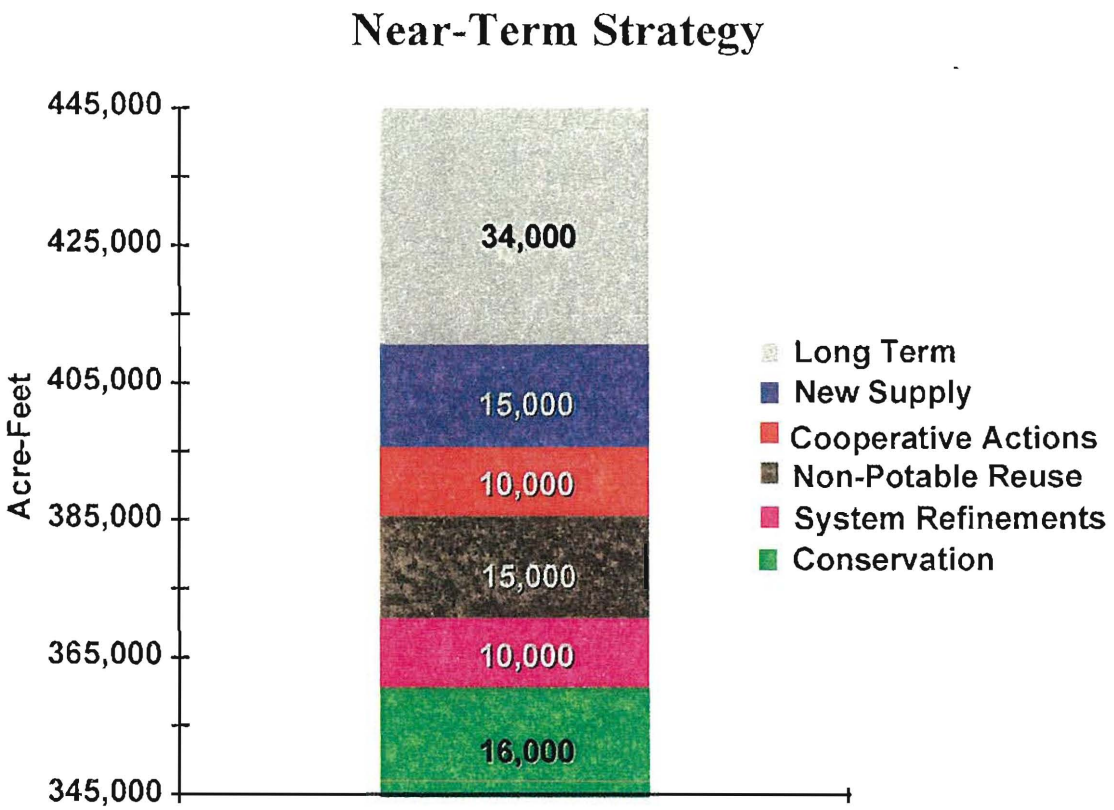
whom Denver Water has a separate 1995 Agreement outlining a possible cooperative project concerning Denver's Antero Reservoir. Through these cooperative discussions, staff hopes to bring to the Board prior to the end of 1998 several potential projects which the Board can then evaluate. The Board at that time will determine whether any of the proposed cooperative actions should be pursued.

Implementation of the Board's "Near-Term" IRP Strategy

While Denver Water takes very seriously its "cooperative actions" initiatives, its first priority is implementation of the IRP near-term strategy. The challenge is to take that strategy from the conceptual realm and turn it into active projects which then become part of Denver Water's system. That process, in turn, is a dynamic one which runs through the Board's "10-Year Capital Program," and is then considered in light of the Board's "10-Year Operating Program" and "10-Year Financial Program" before being placed into a part of each year's annual budget. Most of the IRP projects will appear in the annual budget for the first time in 1998. Preliminarily, the Board has budgeted $85 million in its 10-Year Capital Program for implementation of initial elements of its resource strategy, principally for non-potable reuse, system refinements, and conservation.

These various processes reveal the dynamic nature of the IRP. To illustrate, yields and costs of the near-term package have already undergone further revision such that the package now includes by the year 2030: 16,000 acre-feet in conservation; 15,000 acre-feet of non-potable reuse (with Public Service Co. presently expected to participate in the project); up to 10,000 acre-feet of system refinements or efficiencies as a result of several significant additions; 10,000 acre-feet of cooperative action projects; and a continued "placeholder" of 15,000 acre-feet of new supply projects by Denver through some combination of conjunctive use, enlargement of existing reservoirs, or the building of new small-scale reservoirs. The total of 66,000 acre-feet is 11,000 acre-feet more than that projected at the time of the issuance of the Board's Resource Statement. The new near-term strategy yields are displayed in Figure IX-1.

Figure IX-1



And in Conclusion ...

The Board recognizes the IRP must be an ongoing planning process. It has an obligation to continue to monitor the course of future events and make mid-course planning corrections. This permits the Board to assess programs against changing criteria and public attitudes so as to ensure the path chosen is the most reasonable given the operative circumstances.

The IRP has been a three-year effort to try to determine how best to supply Denver and the Board's service area with water over the coming half century. As such, the IRP is dependent on an ability to look at current conditions and historical circumstances in such matters as population projections, conservation attitudes, weather patterns, and future streamflows so as to make judgments pertaining to an uncertain future. While the Board's IRP sets a sound direction for that future, the direction must be revisited continually to assure the Board's customers receive in perpetuity the same high quality, reliable water supply they have come to expect.

ATTACHMENT 1

Board Resource Statement

October 15, 1996

I. Introduction

A. This policy statement guides the future allocation of Denver Water's resources to meet the water needs of customers within our service area.

B. This policy statement promotes productive interaction with entities outside the Board's service area.

C. This statement is a result of the Board's Integrated Resource Planning process and supersedes the April 4, 1989 Statement of the Board of Water Commissioners.

II. Statement of Current Resource Situation

A. Under the assumptions contained in the Integrated Resource Plan, Denver Water's presently available water supply of 345,000 acre feet will meet projected demand until approximately the year 2013.

B. The Board cannot rely completely on this projection because of a number of risk factors associated with its supply, including:

1. Developing and maintaining municipal water supplies today is more challenging than in the past due to a combination of political forces and the federal government's increased regulatory role.
2. Water supply in semi-arid regions is highly unpredictable.

III. The Board's Current Water Supply Obligations

A. The Board is obligated under the Charter to provide an adequate supply of water to the people of the City and County of Denver, consistent with the City's quality-of-life and planning goals.

1. The Board's assets are owned by the people of Denver.
2. The Board is committed to the responsible financial management of those assets.

B. The Board is permitted by Charter to lease water for use outside Denver. The Board is obligated by contract to provide treated water service to the Combined Service Area (CSA), which is the geographic area composed of the service areas of all the Distributors who rely solely on the Board's treated water for their water supply.

1. For the foreseeable future, the Board will not undertake responsibility for water supply for areas outside the CSA.
2. For distributors who have signed the new distributor contract, the Board is committed to providing all water necessary to serve the full development of all land within the distributors' service areas, and to imposing water use restrictions, when necessary, in the same manner as imposed inside Denver.

3. For current distributors who do not sign the new contract, the Board reserves the right, pursuant to the contracts of these distributors, to impose a tap allocation program and water use restrictions that may be different than those imposed within Denver.
4. As required by the Charter, rates and charges for Distributors outside the city will differ from inside-Denver rates, and will be designed to fully reimburse the people of Denver for the cost of furnishing the service, plus a reasonable return.
5. The Board also has contract obligations for fixed amounts of treated or raw water to suburban entities who are not Distributors.

C. The Board has adequate water resources and options, including opportunities for conservation, reuse and development of its water rights, to fulfill its obligations, including service for the CSA through build-out. Nevertheless, the Board recognizes that cooperative arrangements with entities outside the CSA may benefit customers within the CSA.

IV. Future Strategy

A. No single resource strategy is sufficient to meet the Board's water service obligations, and each strategy has its own environmental and other consequences. The Board intends to invest in and manage a diverse portfolio of resources to meet its future needs and minimize risks. The Board will pursue opportunities that increase supply through conservation, reuse and water rights development, either alone or in cooperation with others.

B. When meeting future water needs, including development of cooperative projects with others, the Board will pursue resource development in an environmentally responsible manner.

C. The Board acknowledges that its treatment, transmission, and distribution system will need to be maintained and expanded as growth occurs in the Board's service area and as federal regulatory requirements change.

D. For the foreseeable future, the Board will maintain a safety factor of 30,000 acre feet to protect against risks the Board faces in meeting its customers needs. Potential risks include:
1. catastrophic events
2. unexpected build-out demand
3. lower than expected yield from programs, projects, or existing facilities
4. a longer than anticipated drought

V. Near-Term Strategy

A. The Board's near-term strategy is designed to produce approximately 55,000 acre feet of additional water in order to extend its water supply beyond the year 2013 to the year 2030. The resources in the near-term

strategy will be diverse and will contain conservation, non-potable reuse, small-scale system modifications, and supply projects, including potential cooperative projects with others and private sector involvement.

B. The Board will maintain a strong water conservation ethic and will invest in additional cost-effective water conservation, including investments that provide opportunity for private sector participation. The Board will rely on a volume of savings from conservation in its planning, and will refine the projected volume of savings based on actual results obtained.

C. Beginning in 1997, the Board will move forward with system management techniques and may acquire small water rights as they become available.

D. The Board will develop non-potable reuse of water as demand increases and as opportunities arise.

E. The Board believes that new surface water storage will be needed at the end of the near-term timeline. The Board cannot determine at this time which of its water rights will be required for this surface water supply, so the Board intends to preserve its conditional water rights.

F. Opportunities for cooperative actions which will benefit the CSA are certain to arise. The Board is adopting a cooperative posture toward these opportunities.

VI. Long-Term Strategy:

A. The long-term strategy is designed to produce the final 45,000 acre feet to make up the difference between the total system supply after completion of the near-term strategy (400,000 acre feet) and the supply needed to serve the CSA to buildout (445,000 acre feet).

B. Various options exist for the long-term and the Board, in the interest of maintaining flexibility, need not make project-specific commitments at this juncture. Some of these options include additional conservation, expanded reuse and the development of water rights with new or enlarged surface water structures. The Board cannot determine at this point which water rights will be required, so the Board must preserve its water rights to assure their availability in the future and to maintain flexibility in the ever-changing and complex world of water supply.

VII. Metropolitan Role

A. The Board recognizes that the Denver metropolitan area is a socially and economically integrated whole. In that light the Board recognizes that cooperative actions with other metropolitan entities should be explored, in order to enhance the Board's near-term and long-term strategies.

B. When a potential project primarily benefits Denver and the CSA, the Board will consider assuming a major role in the regulatory, financial, political, and legal risks of the project. The Board is interested in minimizing the risk to the existing yield of its water system in undertaking any cooperative project.

C. The Board's staff is directed to explore cooperative actions with water suppliers outside the CSA based upon a set of guidelines to be developed by the Board.

D. The Board has determined that it cannot permanently dedicate to entities outside the CSA capacity within its system because all of the Board's existing infrastructure and more will be needed to meet the Board's water supply obligations.

E. The Board will consider short-term leases of water under the following conditions:

1. The lease is five years or less in duration;
2. The Board's system suffers no adverse impact;
3. Reliance on Denver Water is truly temporary, meaning that the lessee will identify in the agreement a substitute for Board-supplied water;
4. Proper compensation is made to the Board using a cost-based formula;
5. The lease is consistent with the Board's water right decrees.

VIII. Beyond the Metro Area

A. The Board will emphasize aggressive conservation, efficient reuse, and small-scale system modifications.

B. In order to meet demand between now and 2013, the Board will be required to maximize use of its existing supply of 345,000 acre feet, causing, among other impacts, reduced return flows north of Denver as a result of aggressive conservation and reuse programs and increased fluctuation of water levels at the Board's reservoirs, including Dillon Reservoir.

C. Any future structural projects located on the West Slope should be developed cooperatively with West Slope entities for the benefit of all parties. The Board believes that Wolford Mountain Reservoir and the Clinton Reservoir-Fraser River Agreement are useful examples of East Slope-West Slope cooperation.

Cooperative Actions With Metropolitan Water Suppliers Outside The Board's Service Area

October 15,1996

The Denver Board of Water Commissioners has issued, as a result of its Integrated Resource Planning process, a Resource Statement to guide future allocation of Board resources. In the Resource Statement, the Board acknowledges its primary responsibility to provide an adequate supply of water to the Combined Service Area (CSA), consisting of the City and County of Denver as well as the suburban contract distributors currently served by the Board. The Board has adequate water resources and options, including opportunities for conservation, reuse and development of water rights, to fulfill its obligations to serve the CSA through build-out. The Board has no plans to expand the CSA or to assume responsibility for water service to areas outside the CSA.

Nevertheless, the Resource Statement recognizes that cooperative arrangements with existing metropolitan water suppliers outside the CSA may benefit customers within the CSA and may improve provision of water service within the Denver Metropolitan Area. Accordingly, the Board's Resource Statement directs Denver Water staff to evaluate potential cooperative actions that may be proposed by other metro area water suppliers. To evaluate cooperative actions appropriately, the staff will consider a number of factors, which are listed below. The staff will present to the Board for further consideration only those proposals that best respond to the listed factors. The Board will then determine whether any of the proposed cooperative actions should be pursued.

The Board intends to fulfill its primary responsibilities to the CSA by implementing the near-term strategy outlined in the Resource Statement. Therefore, the effort to identify potential cooperative actions with others is a secondary priority. The staff anticipates that the process of developing and evaluating cooperative actions will require at least two years to complete.

To be considered by the Board, a proposed cooperative action should provide a tangible benefit to the Board and address the factors listed below. A proposal is most likely to receive consideration by the Board if it:

A. Provides both a significant water benefit and a significant financial benefit to the Board. A water benefit could include a significant water yield or water saving for use within the CSA; improved operational efficiency for the Board's water system; or better use of the Board's existing water rights.

B. Minimizes the Board's regulatory, financial, legal and political risk. A proposal should not pose a risk to the Board's existing yield or to the prospective yield or effective operation, integrity, and water quality of the Board's system.

C. Limits the Board's obligations to the customers of the proposing agency to a particular amount of water. The Board does not intend to become responsible for water service to areas outside the CSA.

D. Assures that the proposing agency will implement an effective water conservation program in its service area. The most desirable water conservation program would be comparable to that which Denver Water practices.

E. Ensures that the proposing agency will pursue available non-potable reuse options to maximize the efficient use of water within its service area.

F. Maximizes the use of the Board's existing water rights rather than requiring development of new water rights by the Board.

G. Consolidates water supply proposals initiating from the same geographic region or sub-region.

H. Fosters environmental protection, including maintaining "boatable" river flows through Denver, protecting and enhancing wetlands, and protecting and enhancing wildlife and aquatic habitats.

I. Demonstrates an effort by the proposing entity to gain acceptance of the proposal from those outside the Denver Metro Area who might be impacted by the proposal. This would include efforts to mitigate those impacts.

J. Ensures that groundwater resources are sustainable if the proposal relies on groundwater.

K. Provides visible benefits to the citizens of Denver, which could include purchase and dedication to open space or to parks of lands at Lowry Air Force Base, Stapleton Airport or the South Platte River Corridor through Denver.

Staff will explore cooperative actions with existing water suppliers in the Metro Area before considering proposals from water brokers. There is no deadline for submission of cooperative actions by existing water suppliers, and no commitment to review or respond within a specific time period. Once proposals from existing water suppliers have been evaluated and the Board has decided which, if any, cooperative actions to pursue, the Board may direct staff to consider proposals from water brokers that address the above factors.

In the space of one hundred and seventy-six years, the Lower Mississippi has shortened itself 242 miles. That is an average of a trifle over one mile and a third per year. Therefore, any calm person who is not blind or idiotic can see that in the old Oolitic Silurian Period, just a million years ago next November, the Lower Mississippi River was upward of one million three hundred thousand miles long. By the same token any person can see that seven hundred and forty-two years from now the Lower Mississippi will be only a mile and three quarters long. There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling of fact.

Mark Twain

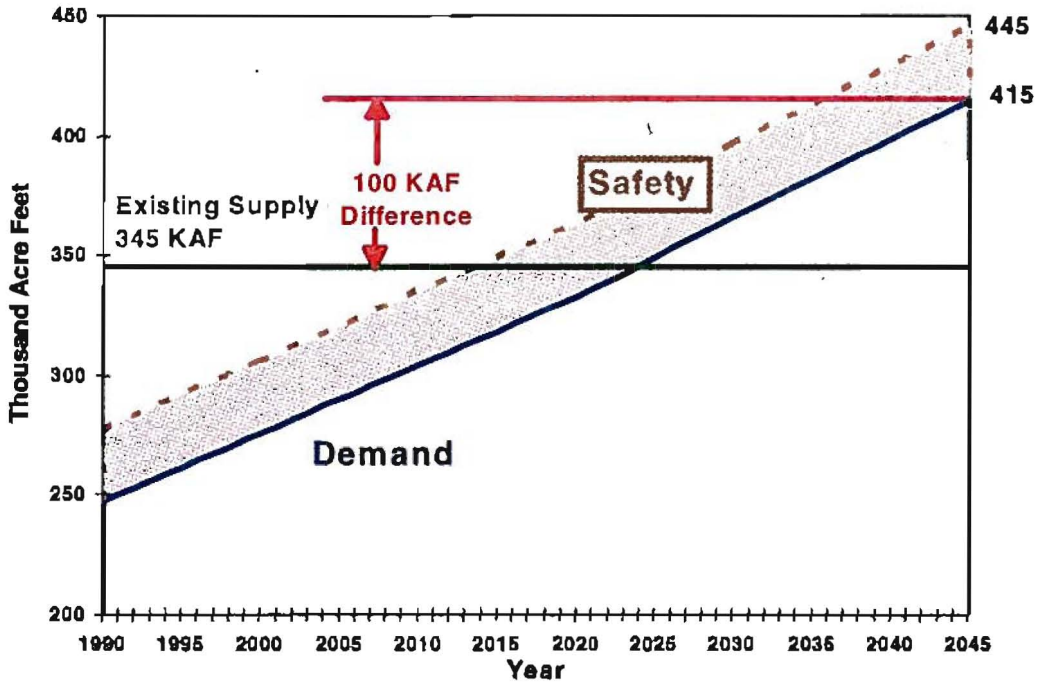
Demand Forecast
Technical Appendix

I. Introduction and Summary

The demand forecast is an integral component of any long-range planning process. It defines how much additional water a utility will need beyond its existing supplies and when that water will be needed.

Denver Water has continuously forecasted its long-term demand as a part of its long-range planning processes. As a component of the Integrated Planning Process Denver Water redeveloped its long-term demand forecast. That forecast of long-term demand is summarized in Figure I-1. This forecast indicates that

Figure I-1
Denver Water Service Area
Demand Forecast and Existing Supply



Denver Water currently has a large reserve of existing capacity (80,000 a.f.) which is not required to meet current demands (265,000 a.f.). However the forecast also indicates that demand will grow by 150,000 a.f. in the future. This will result in a substantial need for additional water supplies or demand management (100,000 a.f. with a 30,000 a.f. safety margin) by the year 2045. Though this need is

somewhat distant in the future (demand will not overtake existing supplies until 2013), Denver Water can not delay its pursuit of resource strategies to meet that need. There are a number of future risk factors associated with Denver Water's existing supplies. And there can also be substantial delays in seeing the fruits of future projects and programs due to construction complexities, regulatory processes, and program implementation limitations.

II. How the Demand Forecast was Developed

The new demand forecast was developed in an extensive public involvement and information process. Much of that process focused around two groups which were formed specifically to review and comment on the demand forecast. Those groups were a Technical / Stakeholder Group and a Demand Forecast Work Group, the later of which was formed under the auspices of the Citizens Advisory Committee. Department staff met several times with both of these groups from November 1994 through August 1995 in conjunction with the technical development of the new demand forecast. There was also substantial interaction with other groups and public forums during 1995 and 1996 on the demand forecasts. The full extent of this public involvement and information process is described in the summary in Attachment 1. That summary details the meetings and presentations on the demand information since September 1994. There are two volumes of presentation exhibits and materials which were distributed to the public during the development of the demand forecast. This information is available at Denver Water's Central Records for further review by the public and interested citizens.

The Technical / Stakeholder group was composed of the individuals listed in Attachment 2. This group included many experts in the field of forecasting including the State Demographer, representatives for the Denver Regional Council of Governments, and a representative from the Center for Business and Economic Forecasting. This group also included interested "stakeholders" such as representatives from the Environmental community, a representative from the Homebuilders, and representatives from Denver Water's distributor community. The Demand Forecast Work Group was formed by the Citizens Advisory Committee and was open to any interested citizens. There were several citizens who routinely attended this group's meetings throughout the review of the demand forecast (see list per Attachment 3).

Both of these groups contributed very constructive criticism to the demand forecasting effort and many of their comments were incorporated into the final demand forecast. Denver Water staff would like to express their gratitude to these groups and their membership for their time, interest, and involvement in the development of the demand forecast.

Aside from the public review processes related to the demand forecast, the development of the demand forecast was fundamentally a technical endeavor. It actually began in earnest in March of 1994 with procurement of Geographic and Demographic Information services from the Denver Regional Council of Governments. As explained later in this appendix, Denver Water's service area does not conform to any specific geo-political boundaries that would easily correspond to accessible data bases for demographic information. Extensive effort was necessary to procure even elementary baseline information.

The development process also included an early assessment of demand forecasting methodologies in selecting the final demand forecast method. The Department was assisted by a consulting firm in this assessment along with employing that firm's expertise throughout the technical development and review of the demand forecast.

III. Primary Service Obligations and Service Area

The amount of water that Denver Water's customers will need in the future is directly related to the portion of the Denver Metro Area which Denver Water is committed to serve in the future, along with its contracts to provide fixed quantities of water. The following is a brief description of the primary service obligations Denver Water has to serve in the future.

Denver Water's primary service obligations are comprised of:

A Charter requirement to provide for all uses within the City and County of Denver. Since Denver Water is committed to the ultimate build-out of the City and County of Denver the Department has consistently looked at the resources required to meet that need in its long-range planning processes. Ultimate build-out of the City and County of Denver has been provided for in the new demand forecast.

Seventy-five treated water distributor contracts leasing water to districts outside the City and County of Denver. As indicated in the discussion of the Combined Service Area below, Denver Water is effectively committed to provide for the build-out of the distributors under the new contract and expects to convert virtually all its distributors to the new contract over time.

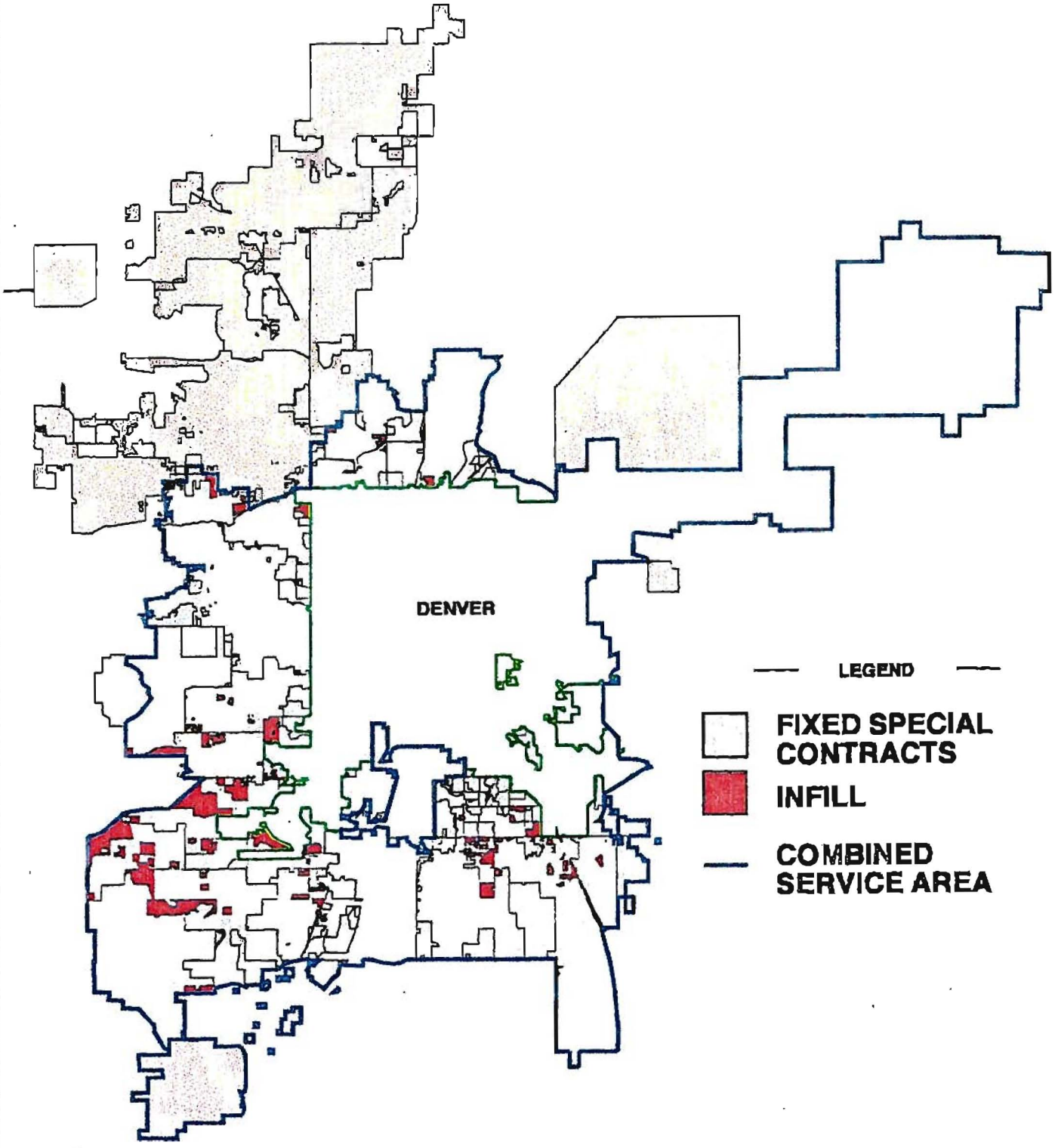
Several fixed/special contracts which lease fixed quantities of water outside the City and County of Denver. The quantities of water committed in these contracts are not directly related to the area served by the contracting entity.

A. Combined Service Area

Figure III-1 geographically displays Denver Water's primary service obligations along with the Combined Service Area. As indicated in Figure III-1 the Combined Service Area is not much different from the existing service area and reflects the Department's policy to "limit" future service commitments.

The Combined Service Area is an area outside the City and County of Denver which Denver Water has committed to serve similarly to the City and County of Denver under its new standard distributor contract. Under that new contract "the Board is committed to providing all water necessary to serve the full development of all land within the distributors' service areas" within the Combined Service Area. As further indicated in the Board's October 15, 1996 Resource Statement, Denver Water "will not

Denver Water's
Primary Service Obligations



March 1997

DENVER WATER

undertake responsibility for water supply for areas outside the Combined Service Area for the foreseeable future."

The Combined Service Area is assumed to be Denver Water's future service area and the demand forecast is in part based upon that assumption.

B. Other Service Area Background

1. Treated Water Distributor Contracts

Denver Water has three forms of contracts to lease water outside the City and County of Denver which vary according to the level of service provided. The Total Service contract provides full service similar to that provided in the City and County of Denver. The Read & Bill / Retail contract provides full service except that the district maintains their own distribution system within their district boundaries. Under the Master Meter / Wholesale contract the district does their own meter reading and billing in addition to maintaining their own distribution system within their district boundaries.

2. Service Area Size

Denver Water's total Combined Service Area at the end of 1996 is 324 square miles. It is composed of the City and County of Denver (155 square miles) and the service area outside the City and County of Denver (169) square miles. The City and County of Denver includes 43 square miles that were annexed when Denver International Airport was approved.

Table III-1 is a breakdown of the types of distributor contracts at the end of 1996 and related areas of service:

Table III-1
Treated Water Service Obligation

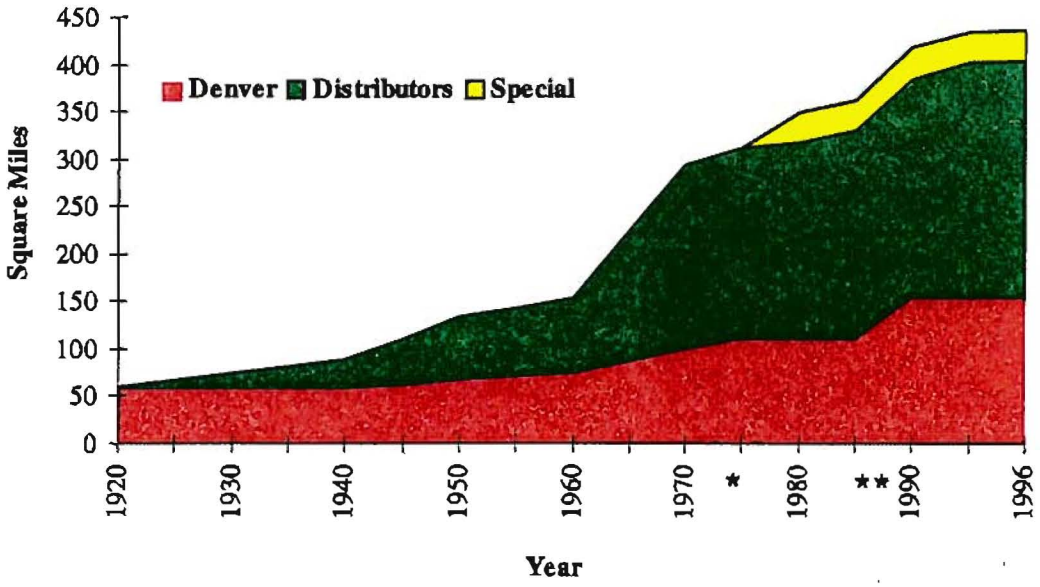
Service Category	No. of Contracts	Area in Square Miles
City and County of Denver	-	155
Total Service	29	35
Read and Bill	21	46
Master Meter	25	88
Total	*75	*324

*Excludes fixed special contracts.

3. Historical Development of Service Area

Denver Water's service area has grown since its inception in 1918. Figure III-2 displays that growth over time. Though Denver Water's demand is ultimately dependent on its service area size there can be a substantial delay between when Denver Water experiences demand in an area and when that area was added to Denver Water's service area. Generally areas are added well in advance to development and water demand does not occur until later after development has occurred. Though Denver Water's Service Area is not projected to expand in the future Denver Water will still experience substantial growth in its demand as the undeveloped portions of its service area are developed.

Figure III-2
Denver Water Service Area Growth



* Poundstone Amendment -1974 ** DIA - 1988

4. Undeveloped Land in the Combined Service Area

Additional future demand is directly related to the amount of undeveloped land in the service area. Table III-2 displays the amount of undeveloped area by types of distributors at the end of 1996. In addition to these areas the City and County of Denver currently has one of the largest inventories of undeveloped land in its history. This in part is due to the annexation of land for Denver International Airport (43 sq. miles), along with the redevelopment of the old Stapleton Airport site (7 sq. miles), the former Lowry Air Force Base (3 sq. miles), and the Central Platte Valley. This is in addition to the other dispersed undeveloped land (5 sq. miles) within the City and County of Denver.

Table III-2
Undeveloped Land / Outside City
(Square Miles)

Total Service	7
Read & Bill	12
Master Meter	10
Total	**29**

(do these numbers correspond to 1996 or 1995? - update to 1996)

Combined with the undeveloped land within the City and County of Denver, roughly one fourth of the Combined Service Area is still undeveloped at the end of 1996.

C. Proportion of Denver Metro Area's population served

Figure III-3 displays the proportion of the total Denver Metro Area served by Denver Water over time. Beginning in the 1950's various entities in the Denver Metro Area developed water systems independent from Denver Water. These entities were primarily in the Northern and Eastern suburbs of the Metro area. Those areas attracted a substantial part of the Metro area's growth resulting in Denver Water serving a diminishing share of the Metro area since 1950. Since the late '70's there has been a good degree of Metropolitan growth in areas supported by groundwater systems beyond Denver Water's service area. The overall effect is that an increasing proportion of the Denver Metro's growth has been outside Denver Water's service area since the early '70's.

Figure III-3
Population Growth in the Denver Metro Area

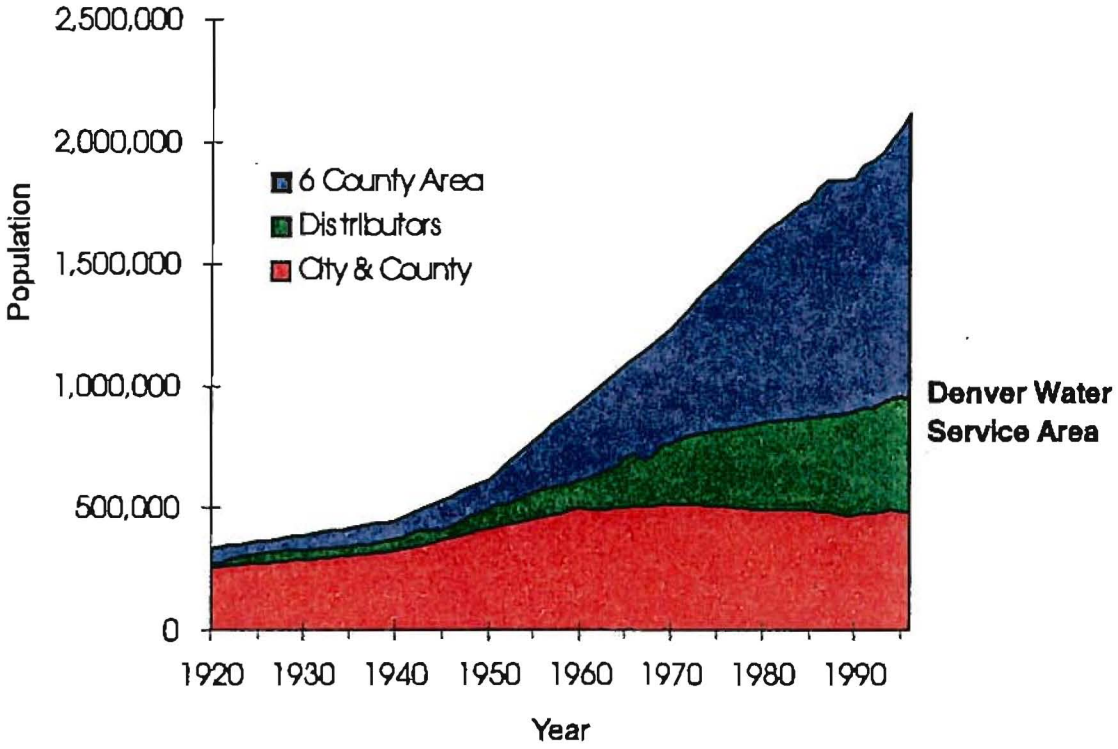
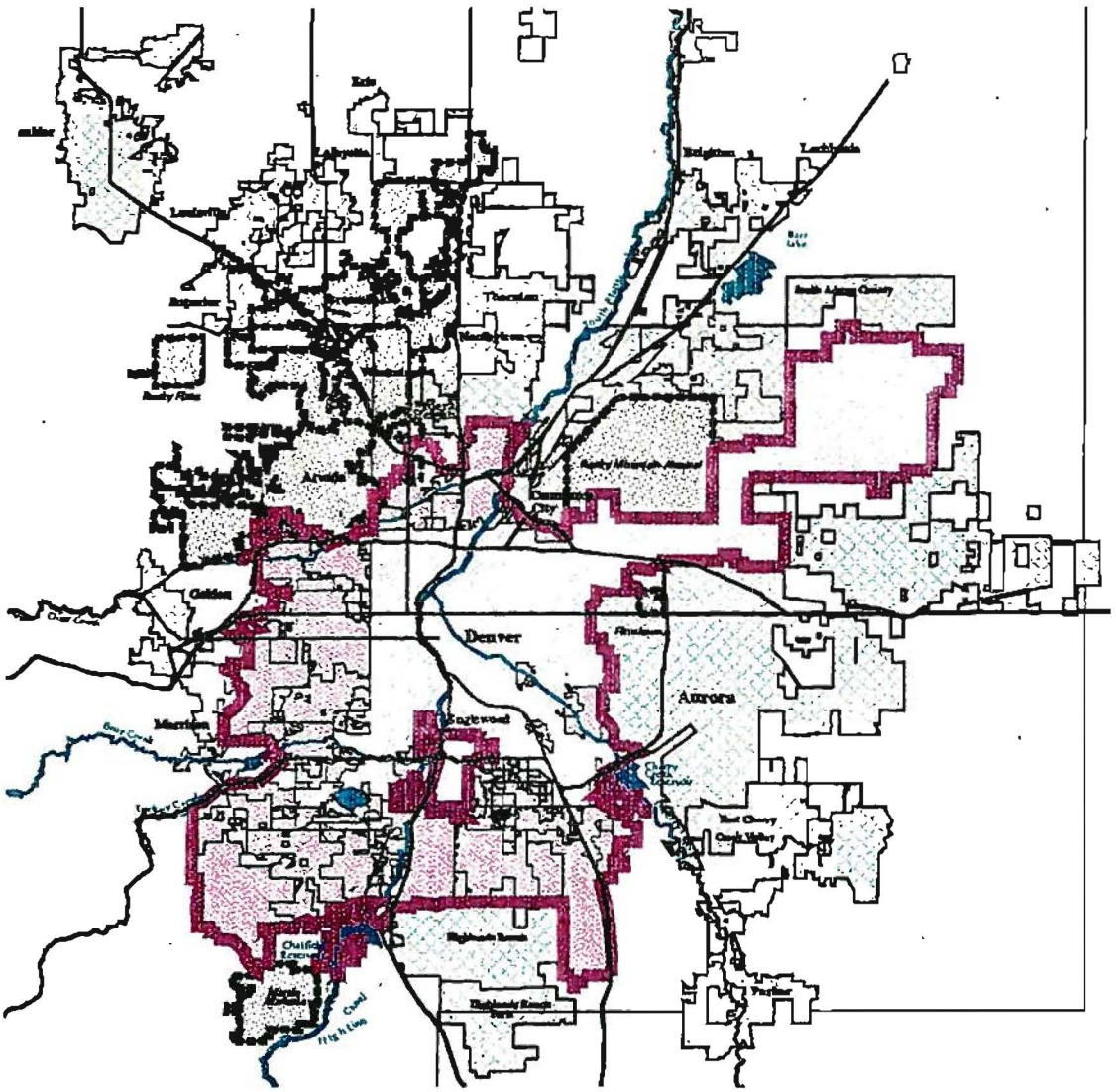


Figure III-4 displays Denver Water's service area in relation to other Metropolitan entities and water districts which are partially or fully independent of Denver Water. Attachment 4 summarizes population growth projected for these other Metro entities between 1990 to 2020.

Denver Water

Service Area and Metro Cities



LEGEND

- City and County of Denver
- Denver Water Distributors
- Fixed Special Contracts
- Outside Denver Water Service Area
- Combined Service Area

Scale 1:500,000

0 5 10 20

Miles

Planning & Water Resources Division. The location of features and boundaries shown on this map are approximate and intended for planning purposes only. This map is not intended to be used for survey, engineering, or legal purposes.

DENVER WATER

November 1997

IV. Fixed / Special Contracts and Raw Water Delivery Commitments

The Board has several fixed/special contracts to lease fixed quantities of water to entities outside of the Combined Service Area. Most of these entities are substantially independent from Denver Water and have their own sources of water. However these entities supplement their water supplies with contracts with Denver Water. Table IV-1 is a summary of the contracts the Board has for fixed quantities

Table IV-1

Fixed/Special Contract Commitments

	Contract Commitments	1990 Average Use	Unused Contract Commitments
Arvada	19,660	14,200	5,460
North Table Mountain	6,000	1,585	4,415
Westminister	4,500	0	4,500
Englewood (delivered via City Ditch)	2,300	0	2,300
Other Englewood	900	0	900
PSCo. / Cherokee Plant	5,361	5,500 (1)	5,361
PSCo. / Arapahoe Plant	3,650	730	2,920
City Park / Wash. Park / Denver CC	2,800	0	2,800
Others / Cherry Hills CC, etc.	1,100	0	1,100
Centennial W&S District	1,000	0	1,000
East Cherry Creek W&S	756	0	756
Rocky Flats (EG&G)	600	360	240
Antero	500	500	0
Consolidated Mutual	443	0	443
Fairmont Cemetery	413	0	413
Long Lakes	400	174	226
Agricultural Ditches	200	200	0
Miscellaneous	1,100	12	1,088
TOTAL RAW WATER	51,683	17,761 (1)	33,922 (1)
TREATED WATER:			
Broomfield	6,500	2,000	
Special contracts / Fitzsimmons & RM Arsenal	1,440	1,200	
TOTAL TREATED WATER	7,940	3,200	
Firm Annual Yield	8,447	3,404	5,043
P & CRSPPA ROLLOVER TAPS - NON-DISTRIB.	3,600		3,600
TOTAL RAW & TREATED	63,730	21,165 (1)	42,769 (1)

(1) = Though Public Service's current average use is about 5,400 acre-feet per year, its contract expires in 2006. A new reuse contract with Public Service contemplates permanent demand on Denver's system at an amount abo equal to the existing temporary contract amount of almost 5,400 acre-feet.

of water outside the Combined Service Area. Most of the Board's fixed/special contracts commit the Board beyond the existing level of demand. As shown in Table IV-1, the total unused commitment under these contracts adds another 43,000 acre-fee per year to the 2045 demands.

V. Profile of System Demand

A. System Demand in 1996

Table V-1 provides a breakdown of total 1996 system demand and raw water deliveries.

(embed & refont this table to conform to others)

Table V-1
Current System Demand
(Acre Feet)

City & County of Denver	123,100
Outside City Treated Water	
Total Service	24,700
Read & Bill	32,400
Master Meter	49,600
Fixed/Special Contracts	39,300
Total	**269,100**

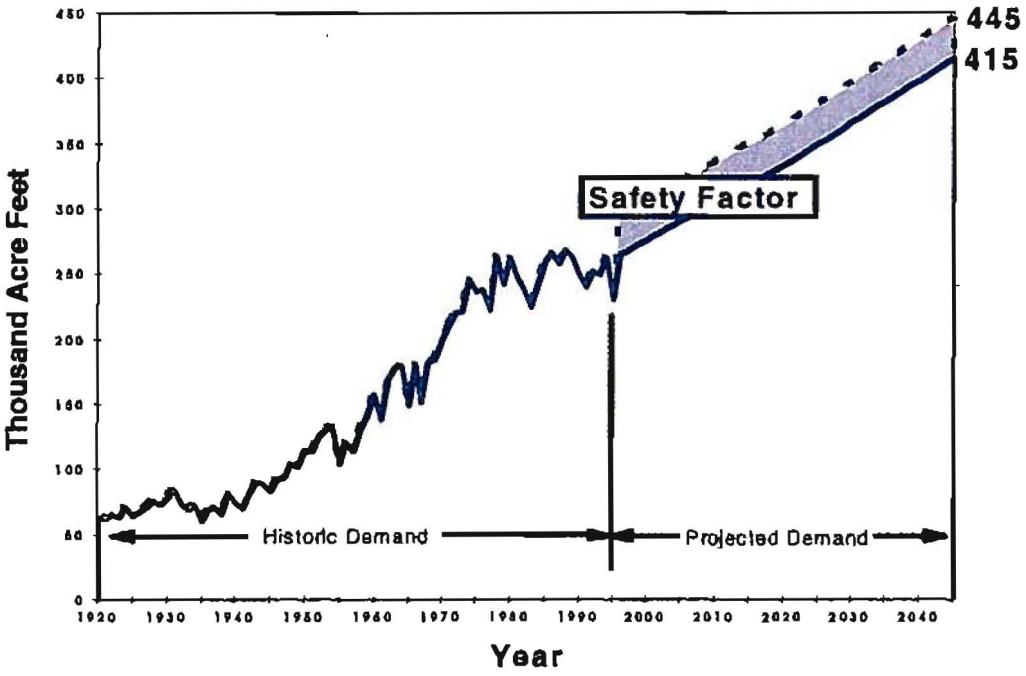
B. Historical Demand

Figure V-1 displays the history of Denver Water's demand. As indicated by the exhibit Denver Water has experienced consistent growth in demand since its inception, experiencing fairly rapid growth since the end of World War II. The demand history for Exhibit V-1 is contained in Attachment 5. The growth in demand has flattened somewhat since the late 70's due to restriction and conservation programs. Attachment 6 displays the growth rates decade by decade since 1925.

C. Customer Classes

Single family residential households make up the greatest portion (53%) of Denver Water's demand. They also make up the greatest proportion of customers. Figure V-2 summarizes the proportions of accounts and consumption for the residential, commercial, public and wholesale/master meter sectors in 1996. Denver water has significant commercial and

Figure V-1
Future vs. Historical Demand



public sector demand. Figure V-3 shows the different proportions of use by the different classes of customers on Denver Water's system, including the multi-family sector which has historically been embedded in Denver Water's commercial customer class. Attachment 7 summarizes total treated water use by the different classes of customers on Denver Water's system from 1960 - 1996. This attachment demonstrates the growth in the proportion of commercial and public sector consumption since 1960.

Figure V-2
1996 Accounts vs. Consumption

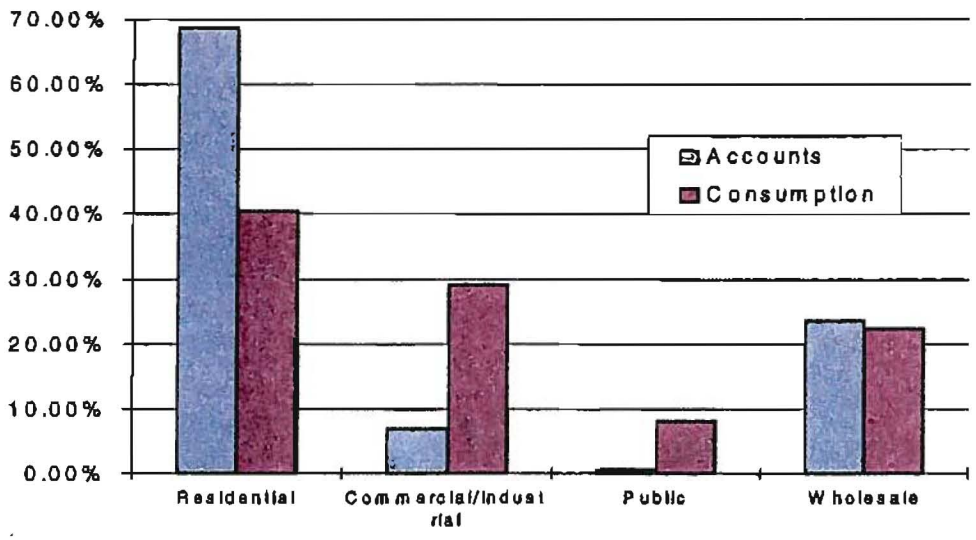
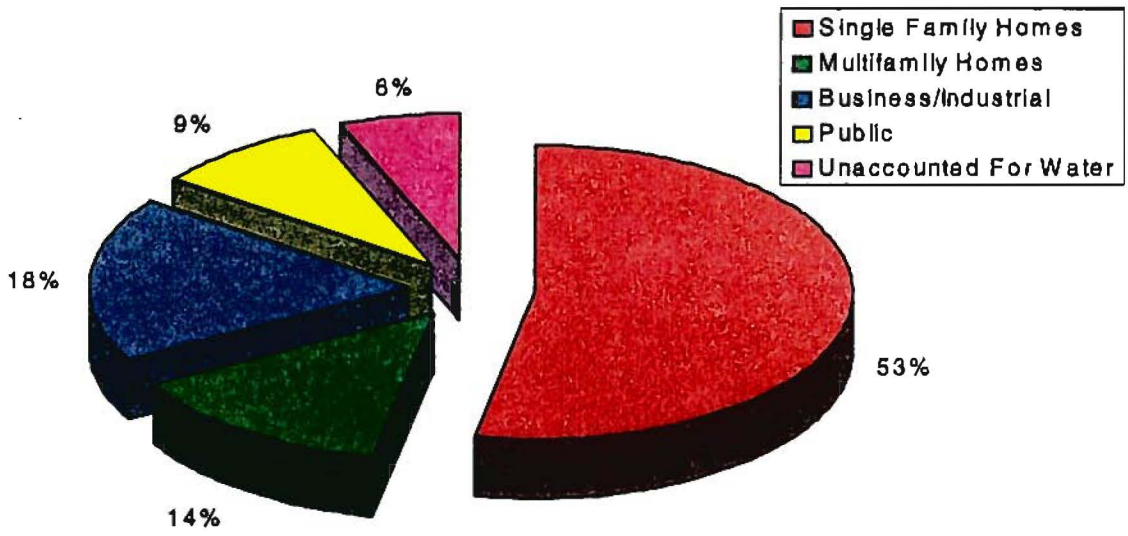


Figure V-3
Water Use by User Category



1. Typical End Uses

Typical water end uses by single-family households are demonstrated in Figure V-4. Over 50% of single-family household use is related to landscape irrigation. This greatly influences the heavy seasonal demand load Denver Water experiences during the Spring/Summer/and early Fall. Attachment 8 summarizes the monthly treated water demand on Denver Water's system. Typical end uses for Business and Institutional customers is presented in Attachment 9. This sector has significant cooling uses beyond their landscape uses which contribute to their seasonal load. Though their seasonal loads are significantly less than the residential class (see Figure V-5), Business and Institutional customers still have a fairly pronounced seasonal load which contributes to Denver Water's overall seasonal demand pattern. The public sector has the greatest seasonal load pattern as demonstrated by Attachment 10 which summarizes the categories of public water use in Denver.

Figure V-4
Residential Water Use

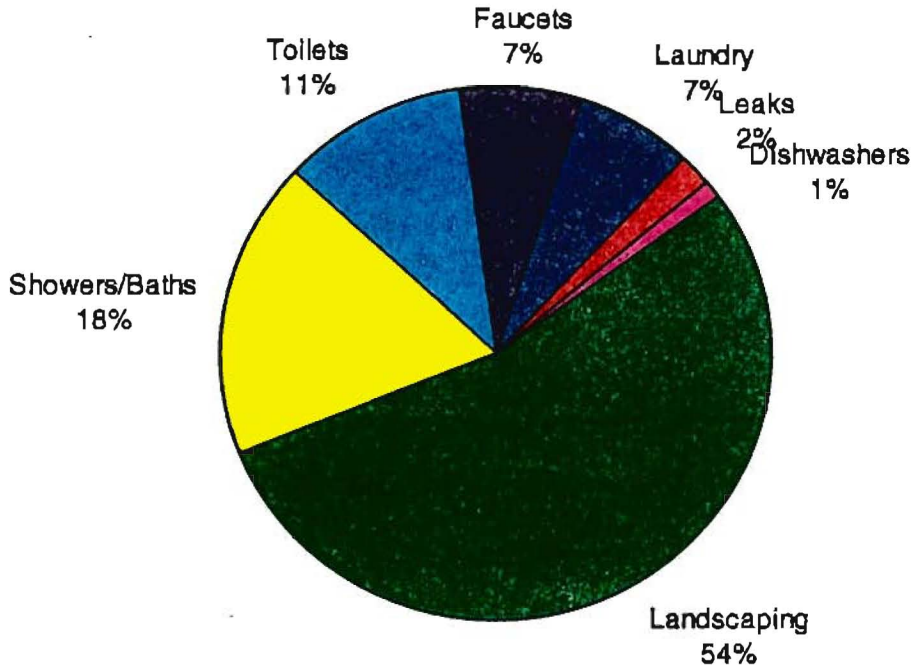
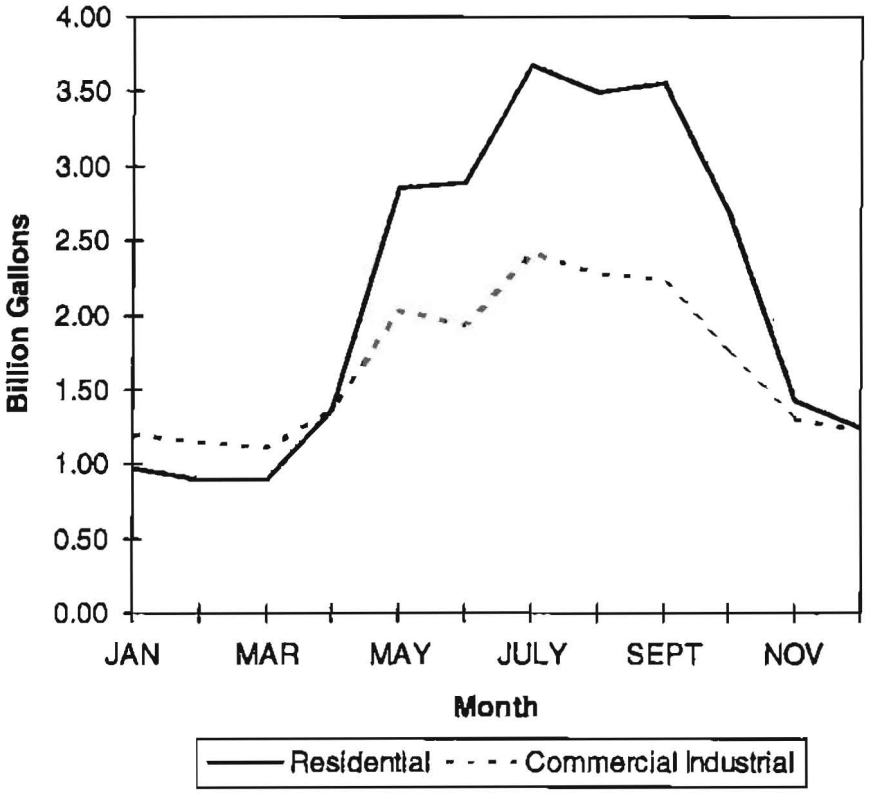


Figure V-5
Monthly Water Consumption



D. Annual, monthly, daily, and hourly variation of system demand

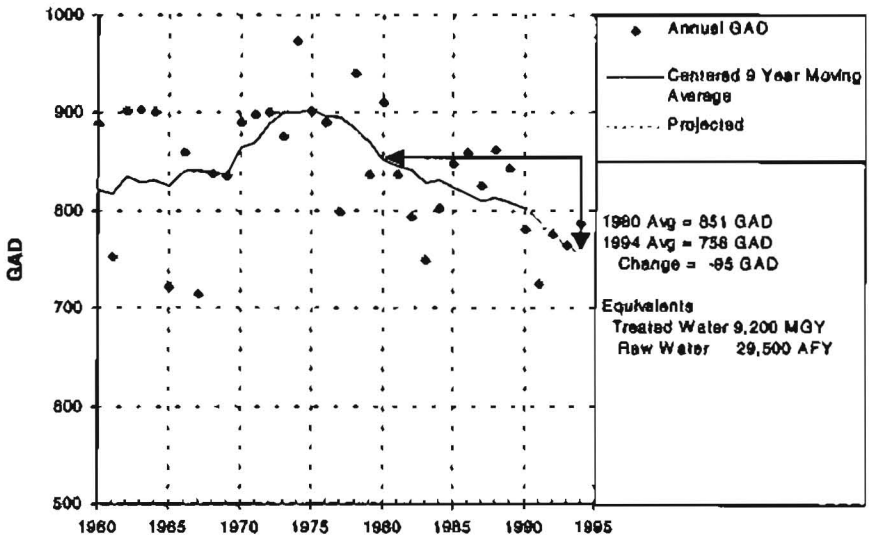
Denver Water experiences substantial annual, monthly, daily, and hourly variation in its demand. Graphical examples of that variation are contained in Attachments 11 through 13. Most of this variation is directly related to weather though the daily and hourly pattern can also be heavily influenced by customer water use behavioral patterns. Over the last few decades the max hour and max day relationships have been shifting downward (see Appendix 4, Treated Water System, for more information). These shifts have been related to the every third day watering restrictions and the conservation programs implemented since the late '70's. These shifts can also be driven by more subtle factors such as the shift of customers to automated sprinkler systems.

VI. Conservation Achieved To Date and Natural Replacement

There has also been substantial volume savings due to our customers' conservation efforts since 1980. Though Denver Water had always encouraged efficient water use, 1980 marked the initiation of more rigorous and significant efforts on the part of Denver Water to promote conservation. Attachment 14 lists the progression of conservation programs implemented by Denver Water since 1980. Denver Water expended approximately $52 million on conservation programs since 1980, including $38 million to meter all remaining previously unmetered customers on its system (see Table VI-1)

At the end of 1994 Denver Water estimates that its customers have saved approximately 30,000 acre feet (over 11% of current demand levels). This estimate is based upon the decline in gallons per account per day per Figure VI-1. This methodology of determining the overall effect of conservation on Denver Water's system was devised in the last Foothills Stipulation Review by the Environmental Protection Agency in 1989.

Figure VI-1
Water Conservation Impact
1980 to 1994
Average Daily Water Use per Customer



The Foothills Stipulations grew out of a settlement in the late '70's which ended a legal dispute concerning the construction of Denver Water's Foothills Treatment Complex. In that agreement Denver Water was required to implement an

Table VI - 1
Denver Water
Conservation And Natural Replacement Savings And Costs
1980 - 1994

Conservation Program	Years	Total Cost (Dollars) [1]	Total Savings (Acre Feet)	Cost/a. f
CONSERVATION PROGRAMS				
Metering	87-92	38,35,000	13,475	2,846
ULV Rebates	90-94	1,748,000	455	3,842
Residential Audit/Retrofits	87-94	916,000	233	3,931
Commercial & Public Audits/Retrofits	90-93	380,000	571	666
Leak Detection	80-94	2,043,000	1,300	1,572
ALL OTHERS [2]				
Xeriscape	81-94	1,921,000		
ET	82-92	99,000		
Waste Busters	89-93	329,000		
Education/Schools	80-94	692,000	5,666	1,501
MWCI	86-94	83,000		
Public information	80-94	2,151,000		
Rate Modification Studies	86-94	525,000		
General/Miscellaneous	80-94	2,702,000		
NATURAL REPLACEMENT	80-94	0	7,800 [4]	
Totals		**$51,944,000**	**29,500 a.f.**	**$1,760**

Footnotes

1 Only includes the expenditures of Denver Water.

2 The "All Other" category of activities of Denver Water cannot be associated directly with specific savings by program. The residual difference between the total estimated savings to date and the savings attributed to specific programs can be attributed to the "All Other" category of savings.

3 The estimated overall unit cost is somewhat misleading, in that continual effort and expenditures for many of the "All Other" programs are required to maintain existing levels of savings.

4 Less efficient plumbing fixtures are being naturally replaced with more efficient plumbing fixtures by Denver Water's customers. The figure represents the water saved from natural replacement from 1980 - 1994.

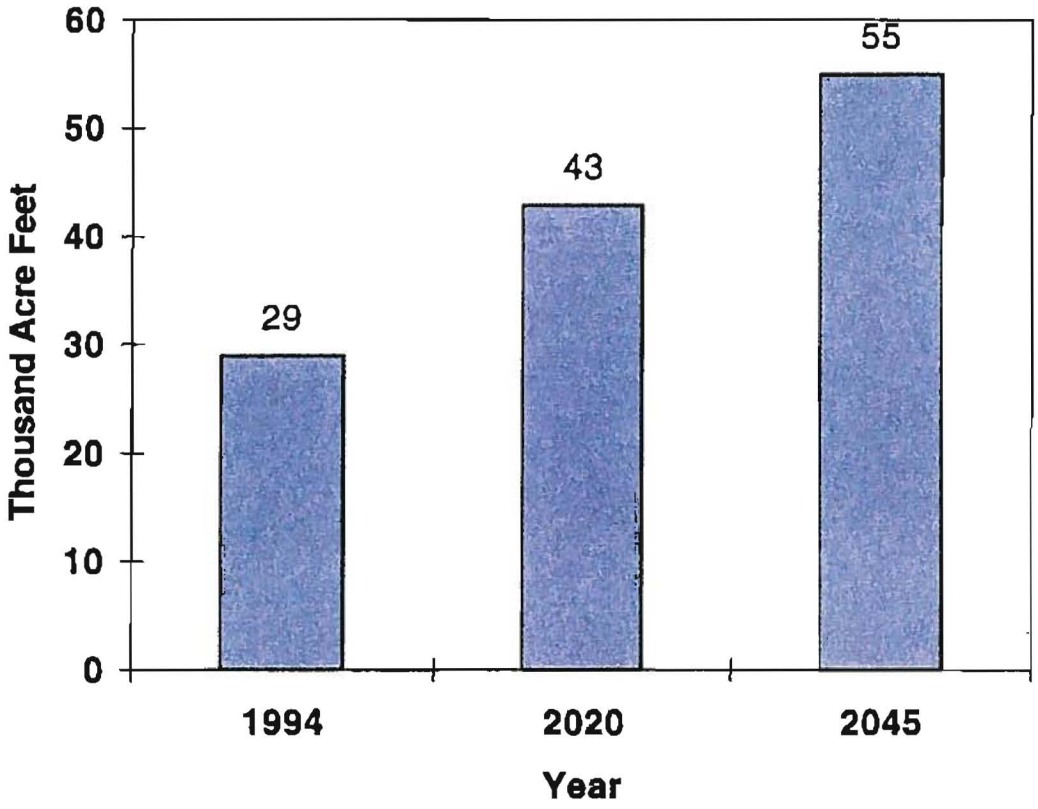
"institutionalized" conservation program and attempt to meet various conservation savings goals in the future. The EPA was charged with reviewing

Denver Water's progress in meeting those goals and the last review took place in 1989.

Additional estimates of savings from particular Denver Water conservation programs are also contained in Table VI-1. A good deal of the overall effect can not be directly associated back to specific conservation programs. This is because some general conservation programs like education and advertising are not directly traceable back to individual customer impacts.

Some of the savings since 1980 are the result of "natural replacement" of less efficient plumbing fixtures with more efficient plumbing fixtures over time.

Figure VI-2
Savings from Existing Conservation
Progressive and Natural Replacement



Natural replacement was greatly enhanced with the passage of the '92 Energy Policy Act which required the manufacture of more efficient plumbing fixtures like 1.6 gallon toilets in the future. The savings from natural replacement are expected to increase on Denver Water's system in the future due to the Energy

Policy Act. The future demand projection has been lowered by another 25,000 acre feet by 2045 for the effect of this additional natural replacement. Figure VI-2 summarizes the total savings by which the demand forecast has been reduced for conservation to date (1994) and natural replacement at 2020 and 2045.

VII. Additional Denver Build-Out Requirements

Denver Water has been concerned with planning for the ultimate build-out of Denver through out its planning processes since the Charter requires the Board to serve all the uses of water inside the City and County of Denver. In an effort to define any additional Denver build-out requirements beyond those identified in the demand modeling effort, Denver Water staff reviewed Denver Planning's comprehensive plans for all major future development and redevelopment areas within the City and County of Denver. The results of modeling effort were then compared to ultimate build-out requirements of those areas as defined in their comprehensive plans. Any additional requirements for water beyond those identified in the modeling effort were added into the demand forecast to comply with the Board's intent to plan for the ultimate build-out requirements for the City and County of Denver.

Table VII-1
Additional Denver Build-Out Requirements

	Low/ Dispersed Forecast (acre-feet/yr.)	High/ Compact Forecast (acre-feet/yr.)	"Best Estimate"/Final Forecast (acre-feet/yr)
Denver International Airport	2,543	2,539	
Gateway/Green Valley Ranch	8,023	8,383	
Stapleton Redevelopment	6,819	0	
Lowry Redevelopment	838	0	
Central Platte Valley	1,749	0	
Total	**19,972**	**10,922**	**15,447**

VIII. Other Major Demand Assumptions:

As indicated previously Denver Water has continuously forecasted future demand to perform its long-range planning. These forecasting efforts have varied over time in terms of their effort and degree of sophistication. Attachment 15 summarizes the history of long-term demand forecasting at Denver Water.

The current integrated resource planning process was a major departure from previous long-term Denver Water planning. It embarked from a point where Denver Water's previous planning processes had failed (the Two Forks veto) to map out new strategies to meet the changed planning and operational environment Denver Water would face beyond Two Forks. The IRP emphasized greatly

expanded public involvement processes along with equal consideration of demand management and reuse alternatives to supply. Denver Water believed it was necessary to redevelop its long-range demand forecast because of the significance of the integrated resource planning process, the amount of time that had passed since the last significant update of the demand forecast (the Two Forks EIS process) and the potential degree of change from the previous conditions of long-range planning at Denver Water.

A. Demand Forecast Methodology

1. Selection of methodology

A primary component of any demand forecast is the methodology utilized to produce the demand forecast. The fundamental methods utilized in the water utility industry are extrapolation from demand time series data, econometric/usage factor modeling, and end use / conditional demand analysis modeling.

Demand methodologies were studied extensively in the Two Forks EIS process and re-evaluated in the IRP to determine if the technologies had changed enough to warrant use of a new methodology for forecasting future Denver Water demand. Denver Water retained a consulting firm with expertise in demand modelling to assist in the evaluation of alternative modelling technologies. Denver Water staff concluded that the final EIS demand forecasting methodology was still the best choice for forecasting Denver Water's demand.

The demand forecasting method used in the new demand forecast is based upon an econometric usage factor model. Due to the complexity of Denver Water's demand function this method is superior to the single variant time series extrapolation models. The econometric usage factor model also has a superior historical data set in comparison to the end use model to serve as the basis for long-range demand forecasts.

The end use model was an attractive alternative in explaining or reacting to changes in the causual/driving factors of water use. This can be particularly useful in forecasting changes related to future conservation programs, etc. However the end use modeling techniques lack significant historical data sets required to provide an adequate basis for an overall long-range demand forecast. Denver Water will continue to examine the end use methodology in the future, particularly as it applies to conservation monitoring and evaluation. In line with that interest Denver Water is currently

participating in a joint project with the American Water Works Association's Research Foundation to gain better end use information for later end use forecasting efforts.

2. Description of methodology

The econometric usage factor model projects future water use on the basis of projections in demographic factors (such a households, population, etc.), multiplied against usage factors for single family households, etc. The usage factors used in the model were developed through extensive cross sectional regression analysis performed in the EIS, with the model results re-calibrated to actual/normalized 1990 usage.

This model effectively divides and disaggregates Denver Water's demand into four components. Those components are the demand from single-family (detached) residential households, multi-family residential households, commercial, and public sectors. The demand related to unmetered single family households was also estimated separately, but these households ceased to exist on Denver Water's system beyond 1992. Within these sectors there was further disaggregation into Denver, Total Service, Read & Bill, and Master Meter forecasts. Usage factors sometimes vary within these other disaggregations. For instance Denver has a higher public usage factor.

The single-family household demands were forecasted on the basis of lot size, marginal price (the second rate block), median family income, and persons per household. The model effectively applies usage factors against changes to these demographic values over time. That is to say that as smaller lot sizes are forecasted in the future, demand for a single family house would drop by 427 gallons per household per day per acre reduction in lot size area. Similar though different usage factors applied to the changes in the other demographic values. A more detailed description of the single family model is contained in Table VIII-1

Table VIII-1
Single-Family Residential
Metered Demand
(gal/HH/day)

$$f = 478 + 427(A - A_{avg}) - 141(mP - mP_{avg}) + 6(I - I_{avg}) + 39.4(p/HH - p/HH_{avg})$$

Where:

A	=	Lot Area (Acres)
mP	=	Marginal Price of Water
I	=	Median Family Income (Thousands)
p/HH	=	Persons/Household

Another component of the model is the multi-family household sector. Multi-family households use 40-45% of the water that a single family household uses. A reduction in average overall household usage occurs as a greater and greater proportion of households are forecasted to be multi-family households in the future.

The commercial sector demand is forecasted on the basis of number of employees times its related usage factors, and the public sector is forecasted based on overall population.

A more detailed description of the model is contained in Table VIII-2.

Table VIII-2
Demand Model

D =	f*SFM	+	630*SFF	+	217*MF	+	45*E	+	14*P
	Metered Single-Family Residential		Flat Rate Residential		Multi-Family Residential		Commercial Industrial Sector		Public Sector

Where:

SFM	=	Metered Single-Family Households
SFF	=	Unmetered Single-Family Households
MF	=	Multi-Family Households
E	=	Employment
P	=	Population
R^2	=	0.998

3. Procurement of the Raw Data and Geographic Disparities

As indicated earlier Denver Water's combined service area does not correspond to any conventional geo-political boundaries which are convenient in aggregating demographic data. Attachments 16 through 18 highlight the disparity of Denver Water's service area in respect to cities, counties, and multiple districts even within a common city (Lakewood). This non-correspondence to common geo-political boundaries means that a lot of "slicing and dicing" has to take place on demographic data bases to correspond their information into Denver Water's service area. This meant that Denver Water had to go through an extensive effort to gather fundamental demographic baseline (1990) and forecast information in correspondence to Denver Water's service area boundaries.

This effort began in March 1994 with a contract for Geographic and Demographic services from the Denver Regional Council of Governments. This contract developed the initial set of data necessary to generate the preliminary demand forecast results distributed in January 1995. It also established the geographic correspondence necessary for developing updated and additional demographic information for use throughout the demand forecasting effort.

Other Demand Forecast Assumptions

There are several other primary assumptions beyond the demand forecasting methodology that form the basis for the demand forecast. A brief summary of them follows.

B. The Forecast Horizon

Fifty years was chosen as Denver Water's long-range planning horizon. This period of time seemed adequate to display significant effects of service area build-out along with providing adequate time to evaluate the potential supply, reuse, and demand management options Denver Water currently has to chose from. As the IRP unfolded with answers to such matters as the amount of existing supply, this period of time ultimately was separated into "near-term" and "long-term" planning horizons. However the fifty year time horizon was necessary to fully identify the extent of ultimate service commitments which Denver Water would be responsible to serve in the future. And the longer time horizon also

effectively complimented the shorter "near-term" planning horizon which ultimately evolved in the IRP process.

C. Metro Area Demographic Growth Forecast

A fundamental driver of Denver Water's new demand forecast is the primary demographic forecasts it is based upon. That forecast is the Denver Regional Council of Governments (DRCOG) Outlook 2020 Long-Range Growth Forecast for the Denver Region. This forecast predicts that the Denver Metro area's population will increase by 50% between 1990 and 2020. It further predicts that the area's employment will also increase by almost 60% over that same period. Though not all this growth will be in Denver Water's service area, the overall Metro area forecast fundamentally "drives" the growth Denver Water can expect in the future.

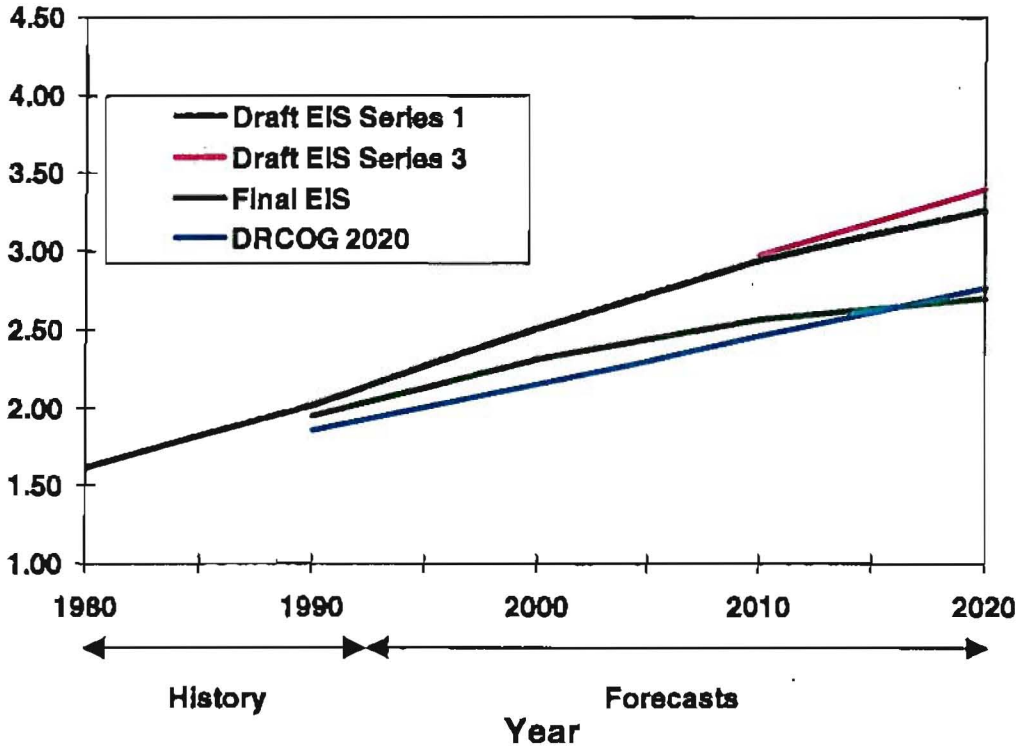
The Outlook 2020 Forecast was developed in a process that was completely independent from Denver Water and our Integrated Resource Planning Process. And though this forecast was quite useful to us in development of our demand forecast, it was primarily developed by DRCOG to meet its long-range transportation planning needs.

DRCOG's Outlook 2020 Forecast was developed in conjunction with an Economic Forecasting Task Force which DRCOG formed to develop and review this forecast. A summary report on this forecast in included in Attachment 19, including the list members of the Economic Forecasting Task Force. This group was composed of professionals in the field of forecasting from various private and public entities throughout the Denver Metro area.

The State Demographer and the Center for Business and Economic Forecasting collaborated with DRCOG in the development of the Outlook 2020 forecast. This forecast has formed the basis for DRCOG's subsequent Vision 2020 and long-term transportation and air pollution compliance planning. This forecast is universally accepted in the Denver Metro area as "the" demographic forecast to use in long-range planning in this region.

Figure VIII-1 compares the Outlook 2020 Forecast to Metro area forecasts previously used by Denver Water in the Two Forks EIS process. That process began with the Series 1 and 3 forecasts. These initial forecasts were criticized as overly optimistic. Ultimately the EIS forecast was lowered to the Final EIS line depicted in Figure VIII-1. DRCOG's 2020 Forecast lags a little behind the Final EIS until about 2015. The two forecasts converge at 2020.

Figure VIII-1
Metro Area Population



D. Location of Metro Growth in respect to Denver Water's Service Area

The location of Metro area growth in respect to Denver Water's Service Area is also a critical "driver" to Denver Water's demand forecast. As previously indicated in Figure III-1, greater and greater proportions of the Denver Metro area's population have been locating outside of Denver Water's service area since 1950.

Denver Water relied on DROCG's Vision 2020 process to determine the location of growth in the Denver Metro area. DRCOG's Vision 2020 process is the basis for the new regional plan for the Denver Metro area. Again DRCOG's Vision 2020 process was independent of Denver Water's IRP process, and the Vision 2020 process was also concerned with objectives (transportation planning, etc.) quite dissimilar from the objectives Denver Water was attempting to resolve in its IRP process.

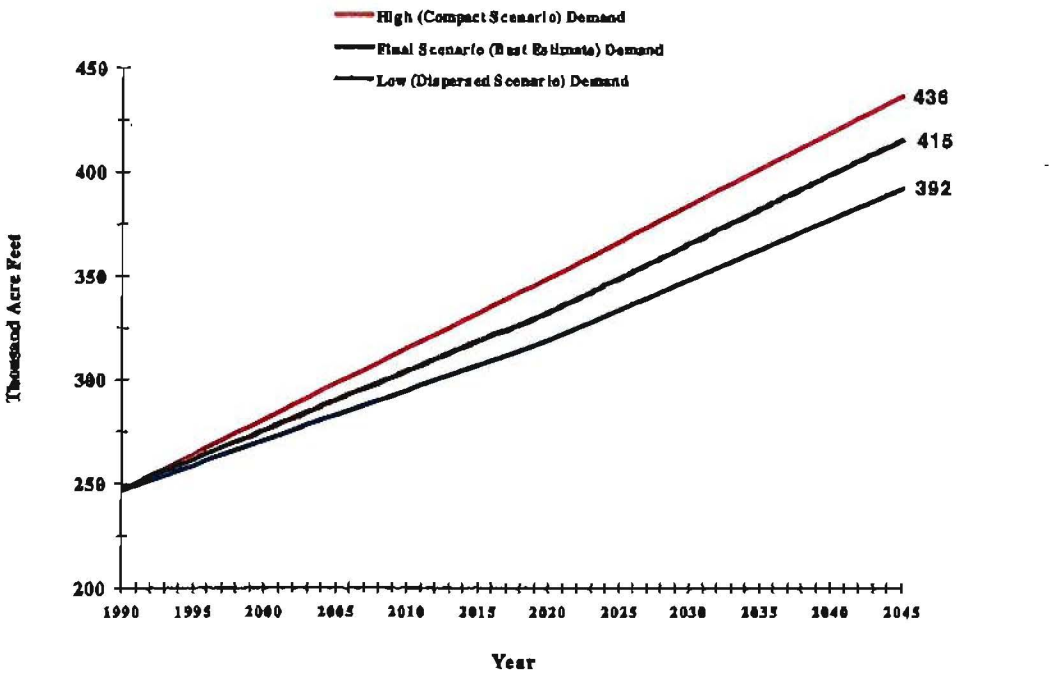
The uncertainity of future development patterns caused DRCOG to develop four growth scenarios in its Vision 2020 process:

Dispersed	Continuation of urban sprawl
Corridor	Concentration of new growth along transportation corridors
Satellite	Concentration of new growth in satellite city centers
Compact	Concentration of new growth where existing infrastructure is already in place, predominantly in the Central Metro area

Throughout 1995 DRCOG reviewed these different scenarios with its participating member city and county governments. An overall final scenario was accepted by DRCOG's Board towards the end of 1995. It is a hybrid of the Compact, Satellite, and Corridor scenarios.

Denver Water originally selected the Dispersed and Compact City scenarios to develop a range of demand forecasts. These two scenarios

Figure VIII-2
Denver Water Demand Forecasts



were viewed as the extremes in respect to the possible location of growth within Denver Water's service area. The Dispersed (Continuation of

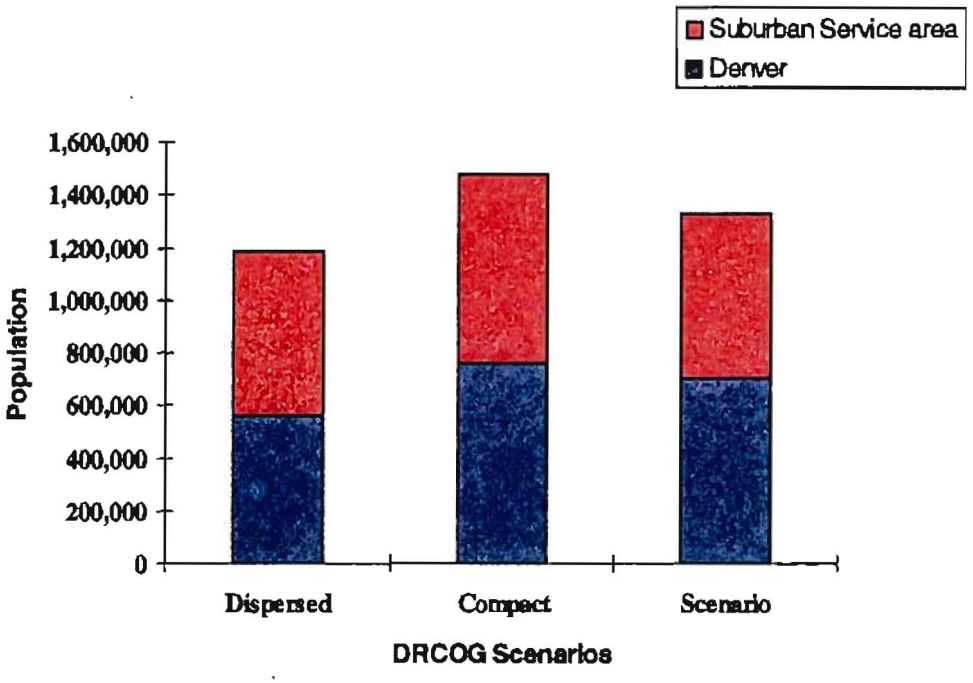
Urban Sprawl) scenario placed more Metro area growth beyond Denver Water's service area, which generally corresponds to the core of the Metro area. The Compact City scenario placed the most Metro area growth within Denver Water's service area. These two scenarios gave Denver Water the extremes of future demand forecasts (see Figure VIII-2).

Denver Water used DRCOG's final scenario for our final Demand Forecast. This final demand forecast is almost exactly in the middle of the range between the Dispersed and Compact scenario demand forecasts. Both the Technical / Stakeholder Group and the CAC Demand Forecast Work Group favored the middle of the range of demand forecasts when they reviewed them in July/August of 1995.

E. Extension of the Demographic Forecasts Beyond 2020

DRCOG's Outlook 2020 Forecast and Vision 2020 process did not extend to the end of Denver Water's IRP planning horizon (2045). The process of

Figure VIII-3
Population - 2045
Treated Water Service Area



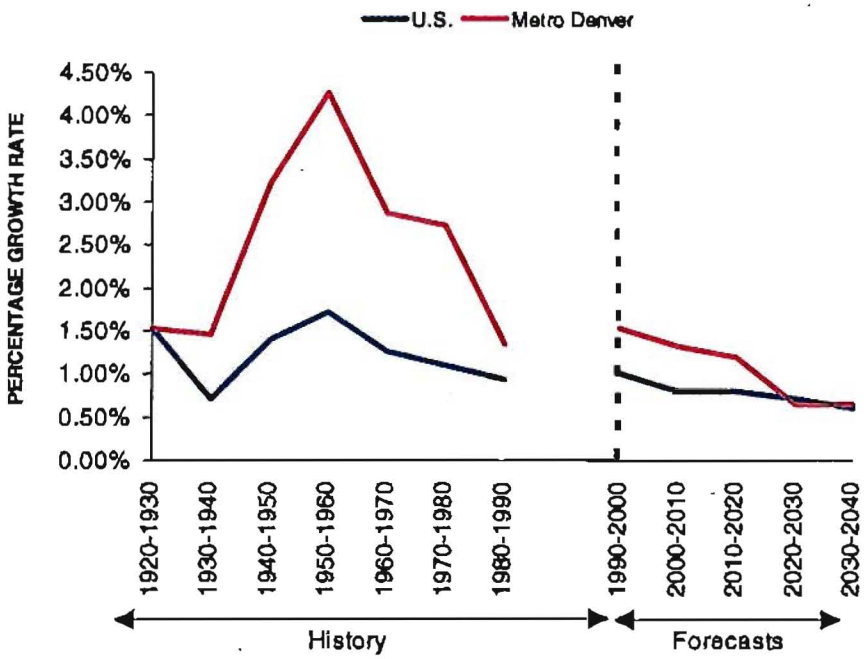
extending DRCOG's demographic forecasts beyond 2020 was reviewed in depth with both the Technical / Stakeholder Group and the CAC Demand

Forecast Work Group. After consultation with these groups Denver Water extended these forecasts on the basis of the "middle" U. S. Census forecast of growth for the United States at large. This was consistent with the recommendation of the Technical / Stakeholder Group.

Figure VIII-3 compares the 2045 population forecasts for the service area under the compact, dispersed, and final growth scenarios for Denver's Combined (Treated Water) Service Area. There currently is another 100,000 people beyond this service area supported with raw water Denver is supplying through fixed/special contracts. That population will expand to roughly 200,000 people by 2045, resulting in a total of 1.5 to 1.6 million people on Denver's water by that time.

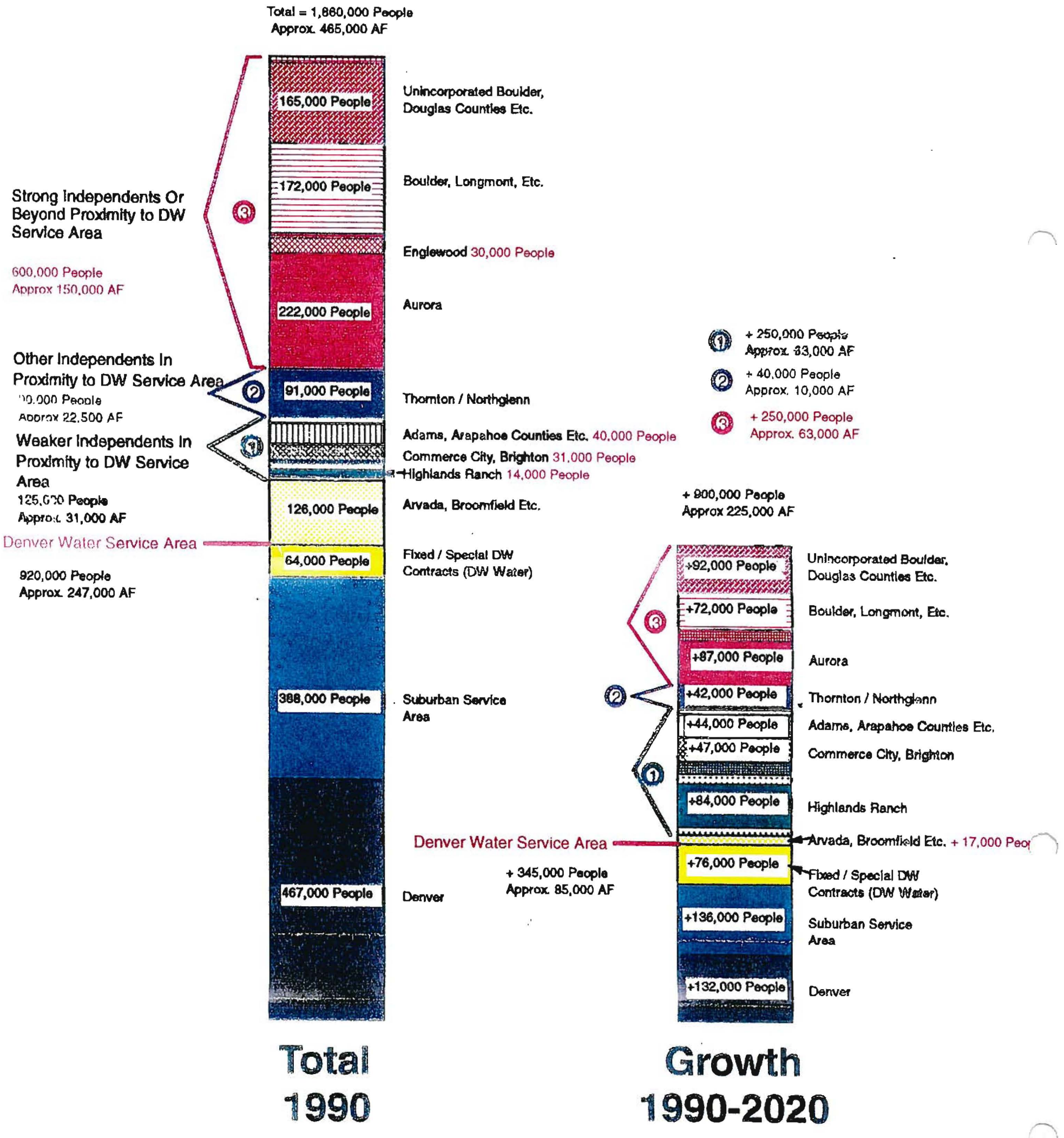
Though the Denver Metro region's past growth rates have been significantly different than the growth rates of the United States in whole (see Figure VIII-4), there was general agreement that the Metro area's growth rate would converge to the national growth rate in the future. The final demand forecast incorporates that convergence after 2020.

Figure VIII-4
Growth Rates - DRCOG
2020 Forecast vs. Historic Population



ATTACHMENT 4

Population



N:GENPLANPRESENTAIRPTASKSAREAPOP.PRE 2/6/96

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	N:\GENPLAN\BASEDATA\MASTCONS.XLS												
2													
3	Consumption Data from annual Reports 1957 to 1994												
4	Treated Sales Data from 1920 to 1956 from table in 1957 annual report page 40												
5													
6													
7						Raw Water					FAY(2)		
8		Treated	Unaccount.	Total Trted	Raw	Other	Calc	Calc	9yr rolling	9yr rolling	Adj to 1994	9yr rolling	Calc
9	Year	Sales	Water	Water Del	Sales	Deliveries	FAY(2)	FAY(2) - AF	average	avg - AF	Accts	average	FAY(1)
10	1920	19,451,709		19,451,709	0	814,628	20,266,337	62,195					21,279,653
11	1921	19,247,717		19,247,717	0	814,628	20,062,345	61,569					21,065,462
12	1922	20,405,051		20,405,051	0	814,628	21,219,679	65,121					22,280,662
13	1923	19,622,376		19,622,376	0	814,628	20,437,004	62,719					21,458,854
14	1924	22,086,185		22,086,185	0	814,628	22,900,813	70,280	21,731,953	66,693			24,045,853
15	1925	20,149,123		20,149,123	0	814,628	20,963,751	64,336	22,070,299	67,731			22,011,938
16	1926	21,101,528		21,101,528	0	814,628	21,916,156	67,258	22,682,622	69,611			23,011,963
17	1927	22,240,310		22,240,310	0	814,628	23,054,938	70,753	23,371,110	71,724			24,207,684
18	1928	23,951,930		23,951,930	0	814,628	24,766,558	76,006	23,748,223	72,881			26,004,885
19	1929	22,496,820		22,496,820	0	814,628	23,311,448	71,540	23,674,307	72,654			24,477,020
20	1930	24,758,630		24,758,630	0	814,628	25,573,258	78,482	23,937,554	73,462			26,851,920
21	1931	26,601,440		26,601,440	0	814,628	27,416,068	84,137	23,696,472	72,722			28,786,871
22	1932	23,016,390		23,016,390	0	814,628	23,831,018	73,135	23,568,972	72,331			25,022,568
23	1933	21,420,940		21,420,940	0	814,628	22,235,568	68,239	23,399,446	71,810			23,347,346
24	1934	22,518,350		22,518,350	0	814,628	23,332,978	71,606	23,158,277	71,070			24,499,626
25	1935	18,931,790		18,931,790	0	814,628	19,746,418	60,600	23,250,372	71,353			20,733,738
26	1936	21,092,810		21,092,810	0	814,628	21,907,438	67,232	22,905,032	70,293			23,002,809
27	1937	22,369,500		22,369,500	0	871,326	23,240,826	71,324	22,800,554	69,973			24,402,867
28	1938	20,269,600		20,269,600	0	871,326	21,140,926	64,879	23,297,617	71,498			22,197,972
29	1939	25,530,790		25,530,790	0	871,326	26,402,116	81,025	23,958,750	73,527			27,722,221
30	1940	23,436,680		23,436,680	0	871,326	24,308,006	74,599	24,981,058	76,664			25,523,406
31	1941	22,019,390		22,019,390	0	871,326	22,890,716	70,249	25,524,590	78,332			24,035,251
32	1942	25,837,810		25,837,810	0	871,326	26,709,136	81,968	26,282,290	80,658			28,044,592
33	1943	28,411,850		28,411,850	0	871,326	29,283,176	89,867	27,290,668	83,752			30,747,334
34	1944	28,075,860		28,075,860	0	871,326	28,947,186	88,836	28,140,720	86,361			30,394,545
35	1945	25,927,900		25,927,900	0	871,326	26,799,226	82,244	29,130,501	89,398			28,139,187
36	1946	29,188,800		29,188,800	0	871,326	30,060,126	92,251	30,740,498	94,339			31,563,132
37	1947	29,345,000		29,345,000	0	871,326	30,216,326	92,731	31,898,548	97,893			31,727,142
38	1948	33,181,260		33,181,260	0	871,326	34,052,586	104,504	33,162,724	101,773			35,755,215
39	1949	32,344,710		32,344,710	0	871,326	33,216,036	101,937	34,664,719	106,382			34,876,837
40	1950	36,509,360		36,509,360	0	871,326	37,380,686	114,717	36,508,059	112,039			39,249,720
41	1951	36,260,260		36,260,260	0	871,326	37,131,586	113,953	36,930,747	113,337			38,988,165
42	1952	39,789,440		39,789,440	0	871,326	40,660,766	124,784	37,936,772	116,424			42,693,804
43	1953	41,593,810		41,593,810	0	871,326	42,465,136	130,321	38,239,228	117,352			44,588,392
44	1954	42,517,960		42,517,960	0	871,326	43,389,286	133,157	39,254,038	120,467			45,558,750
45	1955	32,992,990		32,992,990	0	871,326	33,864,316	103,926	40,183,483	123,319			35,557,531
46	1956	38,399,230		38,399,230	0	871,326	39,270,556	120,517	41,740,054	128,096			41,234,083
47	1957	35,864,910		35,864,910	0	909,776	36,774,686	112,858	42,228,701	129,596	68,818,733		38,613,420
48	1958	40,525,070	500,000	41,025,070	0	1,324,258	42,349,328	129,966	43,625,273	133,881	77,833,895		44,466,795
49	1959	43,542,970	550,000	44,092,970	0	1,652,716	45,745,686	140,389	45,242,807	138,846	82,689,268		48,032,971
50	1960	47,575,760	630,000	48,205,760	1,129,099	1,805,866	51,140,725	156,946	47,962,537	147,192	91,525,481		53,697,762
51	1961	39,851,060	1,660,000	41,511,060	1,744,272	1,803,259	45,058,591	138,280	48,976,867	150,305	79,056,959	84,514,563	47,311,521
52	1962	49,645,830	1,660,000	51,305,830	1,987,108	1,741,348	55,034,286	168,895	51,453,535	157,906	93,669,969	86,998,358	57,786,000
53	1963	50,091,700	2,500,000	52,591,700	3,376,167	1,979,219	57,947,086	177,834	52,205,203	160,212	96,339,928	86,893,099	60,844,440
54	1964	50,118,379	3,096,404	53,214,783	3,302,989	1,824,114	58,341,886	179,045	53,724,051	164,874	94,984,242	87,915,887	61,258,980
55	1965	42,013,009	2,567,821	44,580,830	2,239,300	1,579,400	48,399,530	148,533	54,693,021	167,847	75,712,590	87,499,173	50,819,506
56	1966	50,369,661	3,232,319	53,601,980	3,507,939	1,954,780	59,064,699	181,263	56,871,956	174,534	91,172,889	89,051,704	62,017,934
57	1967	41,546,430	2,651,900	44,198,330	2,409,562	2,506,446	49,114,338	150,727	58,363,458	179,111	76,886,566	89,264,136	51,570,055
58	1968	50,830,764	3,244,516	54,075,280	2,885,726	2,454,310	59,415,316	182,339	59,861,360	183,708	91,894,358	89,236,724	62,386,082
59	1969	51,840,295	3,308,955	55,149,250	2,250,407	2,461,804	59,861,461	183,709	61,356,688	188,297	87,775,054	89,142,710	62,854,534
60	1970	55,996,834	3,574,266	59,571,100	2,500,219	2,597,684	64,669,003	198,462	64,894,082	199,153	93,029,745	92,302,667	67,902,453
61	1971	58,124,712	3,710,088	61,834,800	3,450,842	3,172,159	68,457,801	210,090	66,870,849	205,220	95,581,856	93,131,034	71,880,692
62	1972	60,292,634	3,848,466	64,141,100	3,836,018	3,451,088	71,428,206	219,206	70,020,716	214,886	96,093,219	95,368,395	74,999,616
63	1973	60,369,121	3,846,264	64,215,385	4,135,646	3,448,807	71,799,838	220,346	71,454,612	219,287	94,138,118	95,031,290	75,389,830
64	1974	67,955,954	4,327,259	72,283,213	4,990,548	2,962,311	80,236,072	246,236	74,320,359	228,082	104,152,198	96,706,584	84,247,876
65	1975	63,823,910	4,066,259	67,890,169	4,887,087	4,078,351	76,855,607	235,862	75,909,096	232,957	98,628,189	96,696,910	80,698,387
66	1976	64,426,032	4,105,837	68,531,869	5,227,647	3,703,622	77,463,138	237,726	77,801,431	238,765	97,022,822	97,085,713	81,336,295
67	1977	58,918,499	3,755,964	62,674,463	5,260,615	4,385,303	72,320,381	221,944	78,816,565	241,880	88,860,413	96,694,676	75,936,400
68	1978	71,038,235	4,527,037	75,565,272	5,849,239	4,238,670	85,653,181	262,861	79,415,865	243,719	102,852,696	95,951,318	89,935,840
69	1979	64,300,143	4,126,120	68,426,263	5,860,850	4,680,524	78,967,637	242,344	78,616,769	241,267	92,942,684	93,417,331	82,916,019
70	1980	71,116,330	4,594,670	75,711,000	6,437,844	3,339,973	85,488,817	262,356	78,846,189	241,971	99,081,082	92,184,176	89,763,258
71	1981	66,823,506	4,328,160	71,151,666	6,476,179	2,936,569	80,564,414	247,244	79,603,354	244,294	92,573,886	91,640,260	84,592,635
72	1982	64,255,755	4,164,900	68,420,655	5,623,206	3,149,676	77,193,537	236,899	81,168,592	249,098	87,447,890	92,150,226	81,053,214
73	1983	61,978,826	3,948,947	65,927,773	4,642,900	2,473,535	73,044,208	224,165	80,956,381	248,447	81,346,317	90,724,562	76,696,418
74	1984	66,676,040	4,255,831	70,931,871	5,381,055	2,607,460	78,920,386	242,199	81,905,307	251,359	87,529,792	90,817,434	82,866,405
75	1985	71,411,180	4,458,160	75,869,340	5,758,144	2,650,146	84,277,630	258,639	81,879,083	251,278	92,127,581	89,816,296	88,491,512
76	1986	73,217,704	4,673,470	77,891,174	5,667,758	2,848,589	86,407,521	265,176	81,937,528	251,458	93,450,108	88,985,970	90,727,898
77	1987	70,652,741	4,509,749	75,162,490	5,508,337	3,072,449	83,743,276	256,999	82,042,787	251,781	90,021,714	88,301,309	87,930,440
78	1988	73,995,437	4,723,113	78,718,550	5,730,659	3,058,763	87,507,972	268,553	83,016,044	254,768	93,778,535	88,608,118	91,883,371
79	1989	72,697,859	4,640,289	77,338,148	4,960,814	2,953,839	85,252,801	261,632	83,251,305	255,490	90,070,844	88,009,434	89,515,441
80	1990	67,721,304	4,322,636	72,043,940	5,613,318	3,433,166	81,090,424	248,858	83,369,814	255,853	85,100,951	87,255,726	85,144,945
81	1991	63,389,755	4,046,155	67,435,910	7,436,994	3,267,960	78,140,864	239,806	82,111,189	251,991	81,285,943		82,047,907
82	1992	67,565,025	5,478,245	73,043,270	5,281,139	3,479,111	81,803,520	251,047	82,548,685	253,333	84,107,599		85,893,696
83	1993	67,095,803	5,466,297	72,562,100	5,411,008	3,064,629	81,037,737	248,696			82,141,631		85,089,623
84	1994	71,803,100	3,317,746	75,120,846	6,042,373	4,180,994	85,344,213	261,913			85,344,213		89,611,424
85	1995	62,524,754	2,743,156	65,267,910	6,019,404	3,792,580	75,079,894	230,412					78,833,888
86	1996	73,856,420	2,347,540	76,203,960	7,339,047	4,137,734	87,680,741	269,083					

F. Usage Factors Applied in the Model

The usage factors incorporated into the model were derived through extensive cross sectional regression analysis during the Two Forks EIS. That development is discussed in Appendix 2 and the Addendum to Technical Appendix 2 on Future Water Demands in the Final EIS report (Volume VI). The usage factors are summarized in Exhibit VIII-4. The demand forecast was then calibrated to 1990 actual/normalized demand in conjunction with updating the model with actual 1990 census demographic information.

Table VIII-3
Usage Factors
(at the meter)

	1990 Gross	2045 Gross	2045 Net[2]	
Single-Family Household[1]	508	538	447	Gallons per household/day
Multifamily Household		217	180	Gallons per household/day
Commercial/Industrial		45	35	Gallons per employee/day
Public		14	14	Gallons per person/day

[1]Composite result of single-family usage factors for lot size, marginal price, median family income, and persons per household

[2]Net of Conservation and Natural Replacement

IX. Record of Proceedings

A full record of the development process for the demand forecast is contained in two volumes of presentation exhibits and materials distributed to the public during the development of the demand forecast. This information is available for further review by the public and interested citizens at Denver Water's Central Records.

ATTACHMENT 1
Demand Forecasts
Public Involvement & Information Process

Table of Contents-Page 1

Meeting Date	Item
	Membership of the Technical/Stakeholder Group
7/2/96	Governor's Front Range Forum MWSI Meeting Denver System
6/12/96	Citizens Advisory Committee Workshop
6/7& 5/20/96	Denver Water Employee Forums on the IRP process
5/22/96	Distributor and Other Metro Area Water Suppliers Meeting
5/14/96	Meeting with Denver Planning and Community Development Staff
5/3/96	Presentation by Commissioner Farbes at the Thornton Symposium on Water
4/29/96	Water Committee Meeting – Home Builders Association of Metropolitan Denver
3/30/96	Citizens Advisory Committee Workshop
2/9/96	Meeting of the Denver Board of Water Commissioners
1/30/96	Distributor and Other Metro Area Water Suppliers
1/10/96	Final DRCOG Scenario – generation of final demand forecast for the IRP
	[Final Forecast – Final DRCOG Scenario]
1/3/96	Presentation by Commissioner Shoemaker to the Colorado Forum
11/07/95	Board IRP Committee Presentation
10/07/95	Citizens Advisory Committee Workshop
9/5/95	Inclusion of demand forecasts to date in the '96 Tap Availability Resolution approved at the meeting of the Board of Water Commissioners
8/14/95	Technical/Stakeholder Group Meeting & CAC Water Demand Forecasting Work Group Meeting
07/17/95	Planning Briefing to the new Board Members

06/19/95	Technical/Stakeholder Group Meeting & CAC Water Demand Forecasting Work Group Meeting
	[Final Forecast Range/Detail Calculations]
04/17/95	Technical/Stakeholder Group Meeting & CAC Water Demand Forecasting Work Group Meeting
04/11/95	Citizens Advisory Committee Workshop
03/13/95	CAC Water Demand Forecasting Work Group Meeting
03/13/95	Technical/Stakeholder Group Meeting
02/11/95	Task 6 – Demand Management Options Presentation
01/23/95	CAC Water Demand Forecasting Work Group Meeting
01/21/95	CAC Task 6A Objectives Presentation
01/19/95	Technical/Stakeholder Group Meeting
	[Initial/Preliminary results superseded]
01/05/95	CAC Water Demand Forecasting Work Group Meeting
11/19/94	Citizens Advisory Committee Workshop
11/13/94	Technical/Stakeholder Group Meeting
09/09/94	Denver Water Leadership Workshop

ATTACHMENT 2

Membership of the Technical / Stakeholder Group

Tim Sheesley — phone = 480-6759
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Steve Wilson, Governmental Affairs
Home Builders Association of
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1400 So. Emerson
Denver, CO 80210

phone = 778-1400

Bob Jeavons
President, Cherry Creek
Village Water Dist
Citizens Advisory Committee
4960 So. Boston St.
Greenwood Village, CO 80111

phone = 771-4774

Tim Flynn
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3333 So. Bannock St.
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Englewood, CO 80110

phone = 762-8030

Tony Gengaro
Home Builders Assocation of Metro Denver Water
Citizens Advisory Committee
155 So. Madison St.
Suite 300
Denver, CO 80209

Attachment 3
Public Involvement & Information Process

Mr. Craig Tessmer 4955 E. 74th Ave. Commerce City CO 80022	Mr. Tim Flynn 3333 S. Bannock St., Ste. 500 Englewood CO 80110
Mr. Bob Jeavons 4960 S. Boston St. Greenwood Village CO 80111	Ms. Gail Schands 5995 S. Kenton St. Englewood CO 80111
Mr. Joe Herring 5700 Happy Canyon Drive Englewood CO 80111	Ms. Paula Stokes 4901 S. Windemere Littleton CO 80120
Ms. Sue Blosten 6151 S. Aberdeen St. Littleton CO 80120	Mr. Pat Fitzgerald 8739 West Coal Mine Ave. Littleton CO 80123-4001
Mr. Carmine Iadorola 45 Mule Deer Trail Littleton CO 80127	Mr. Jack Dempsy 12275 S. HWY 121 Denver CO 80127
Mr. Herrick Roth 1512 Larimer St. Denver CO 80202-1613	Mr. Brad Whetstone 1060 Washington St. #2 Denver CO 80203
Ms. Chris Bridges 1313 Sherman Denver CO 80203	Mr. Don Thompson 1380 Lawrence, #1050 Denver CO 80204-2058
Mr. Bob Rolander 845 Cook St. Denver CO 80206	Ms. Cathy Kuykendall 3417 E. 14th Ave. #3 Denver CO 80206
Mr. Larry Beer 2291 Ivanhoe Denver CO 80207	Mr. Frank Sullivan 4310 E. 25th Ave. Denver CO 80207
Mr. J.D. MacFarlane 2080 Bellaire St. Denver CO 80207	Ms. Christy Stackpoll 2678 Ash St Denver CO 80207
Ms. Sue Lawson 2065 Ash St. Denver CO 80207	Mr. John Wright 418 S. Vine St. Denver CO 80209
Mr. Anthony Gengaro 155 S. Madison St., Ste. 300 Denver CO 80209	Ms. Judy Arnold 640 S. University Blvd. Denver CO 80209
Ms. Pam Bloch 927 E. Cedar Ave. Denver CO 80209	Mr. Ron Lehr 934 S. Gilpin St. Denver CO 80209
Mr. Ken Brown 922 S. Cove Way Denver CO 80209	Ms. Karen Scherger Steeper 332 S. Gilpin St. Denver CO 80209
Mr. Bob Zoeteway 1756 S. Garfield St. Denver CO 80210	Mr. Jeff Poe 2385 S. Clayton Denver CO 80210

Ms. Kate Nelligan 2212 S. Franklin Denver CO 80210	Mr. Tim Olsen 1428 S. Humboldt Denver CO 80210
Ms. Barbara Foster 2434 S. Humboldt Denver CO 80210	Ms. Pat Zink 1595 S. Steele Denver CO 80210
Ms. Noreen Meatheringham 2020 Hooker St. Denver CO 80211	Ms. Marilyn Devlin 3749 Quitman Denver CO 80212
Ms. Sharon Russon 2621 Yates Denver CO 80212	Ms. Sally Schuff 700 Kipling, Ste. 4000 Lakewood CO 80215
Mr. Gary Finstad Parfet, Room E300 Lakewood CO 80215-5517	Mr. Jack Jones 1038 E. 6th Ave. Denver CO 80218
Mr. Alva Uhl P.O. Box 18722 Denver CO 80218	Ms. Dorothy Borland 10 Yates St. Denver CO 80219
Mr. Alex Ball 1945 S. Cherry St. Denver CO 80222	Ms. Kelly Webb 1901 S. Newport Denver CO 80224
Mr. Dick Plastino 445 S. Allison Pkwy Lakewood CO 80226	Ms. Lorna Columbia 9225 W. Jewell Place Lakewood CO 80227
Mr. David B. Romero 3036 S. Upham St. Denver CO 80227	Mr. Thomas Donkle 9500 Civic Center Dr. Thornton CO 80229
Mr. John Van Royan 6450 York Denver CO 80229	Mr. Mark Koliber 9500 Civic Center Drive Thornton CO 80229
Mr. John Warford E. Illif Denver CO 80231	Mr. Cecil Oliver 3783 S. Fenton Way Denver CO 80235
Ms. Gary Schaefer 9135 E. Mansfield Ave. Denver CO 80237	Mr. John Kleinheksel 1823 Stout St. Denver CO 80257
Mr. Gordon McCurry 1200 Albion Way Boulder CO 80303	Mr. Dennis Wigert 1100 Jefferson County Pkwy, Ste 5535 Golden CO 80419
Mr. Boyd Mitchell P.O. Box 38 Keystone CO 80435	

ATTACHMENT 6
Historical Growth Rates in Demand

in FAY2, i.e. 6%

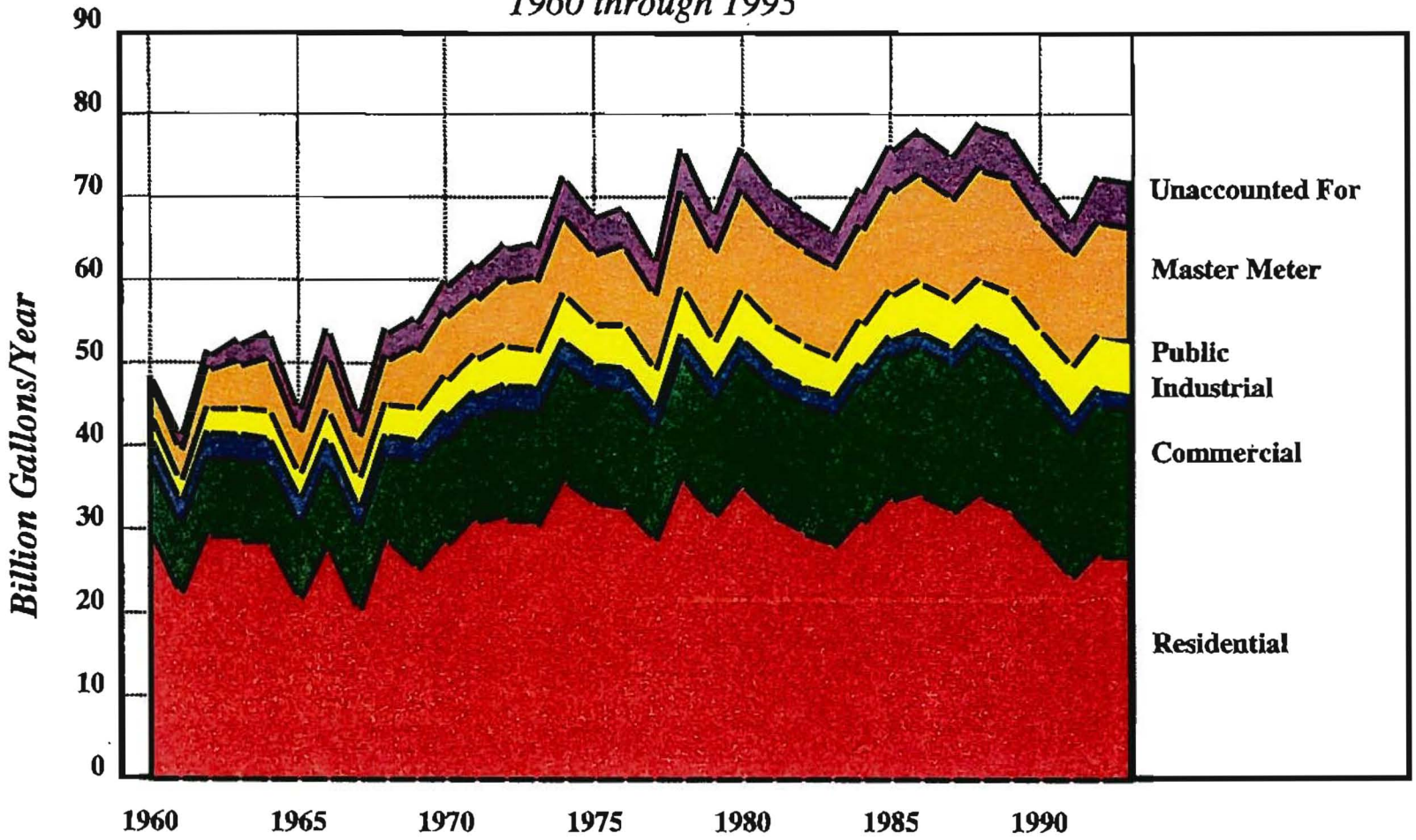
	Demand		Growth rates / by spans of time / years						
Year	9 yr. wghtd. average MGal.	Acre-Feet	10	20	30	40	50	60	70
1925	22,612,416	69,395							
1935	23,847,708	73,186	0.53%						
1945	30,062,953	92,260	2.34%	1.43%					
1955	41,546,884	127,503	3.29%	2.81%	2.05%				
1965	53,024,632	162,727	2.47%	2.88%	2.70%	2.15%			
1975	72,120,310	221,329	3.12%	2.80%	2.96%	2.81%	2.35%		
1985	79,015,740	242,490	0.92%	2.01%	2.17%	2.45%	2.42%	2.11%	

			Growth rates / by spans of time / years						
			5	15	25	35	45	55	65
1990	79,987,232	245,472	0.24%	0.69%	1.66%	1.89%	2.20%	2.22%	1.96%

ATTACHMENT 7

Total Treated Water Use by Customer Class

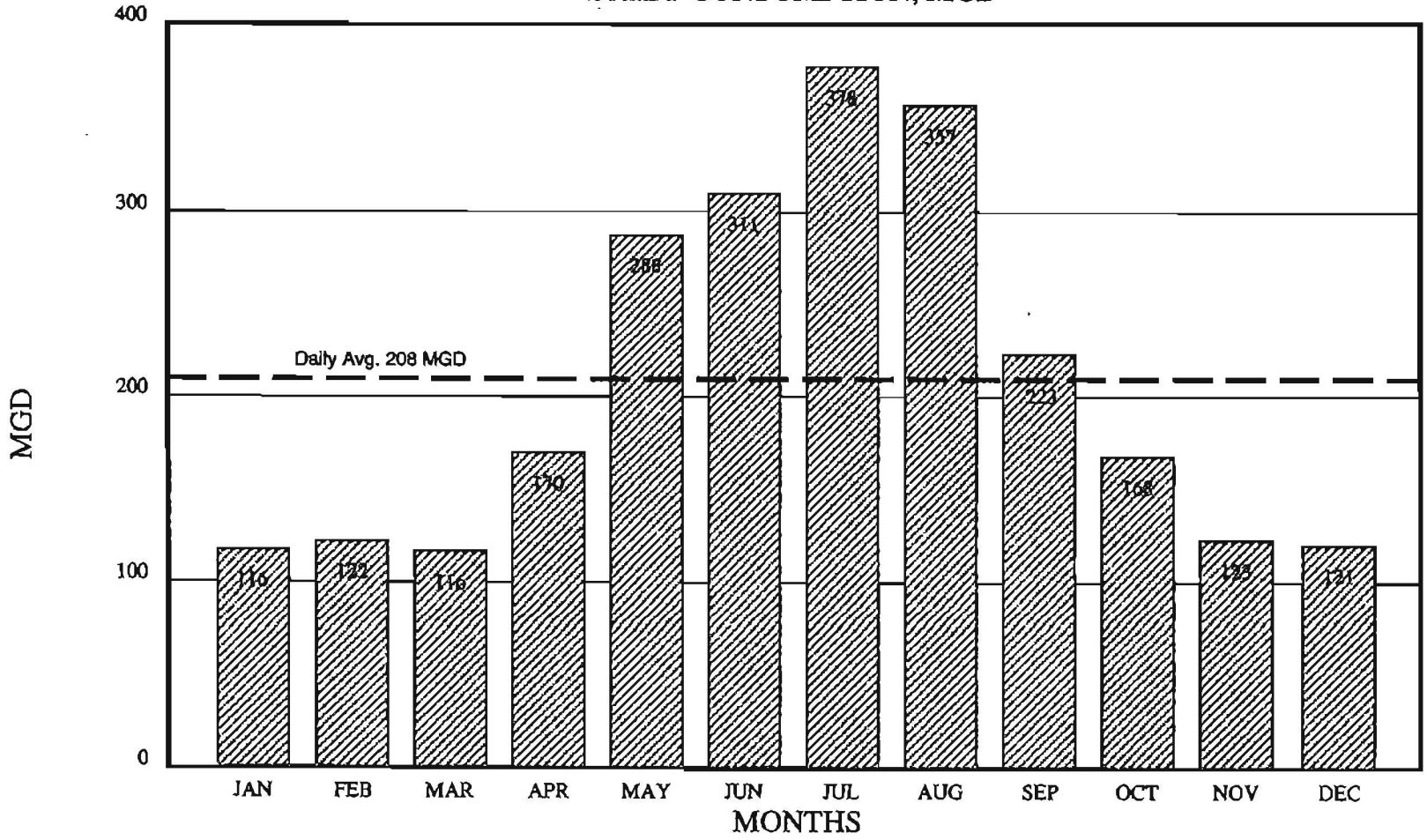
1960 through 1993



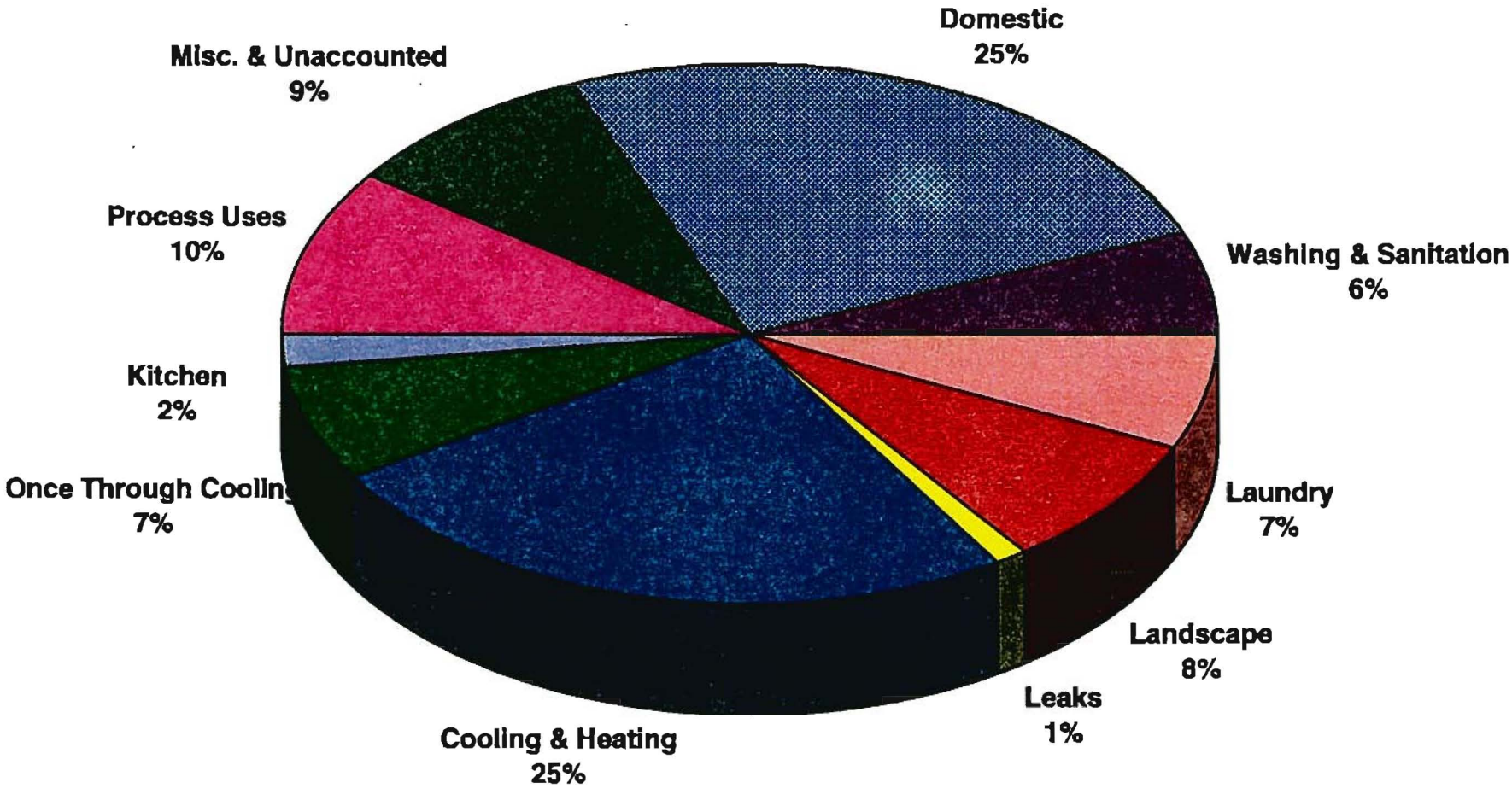
ATTACHMENT 8

1996 MONTHLY TREATED WATER DEMAND

DAILY CONSUMPTION, MGD

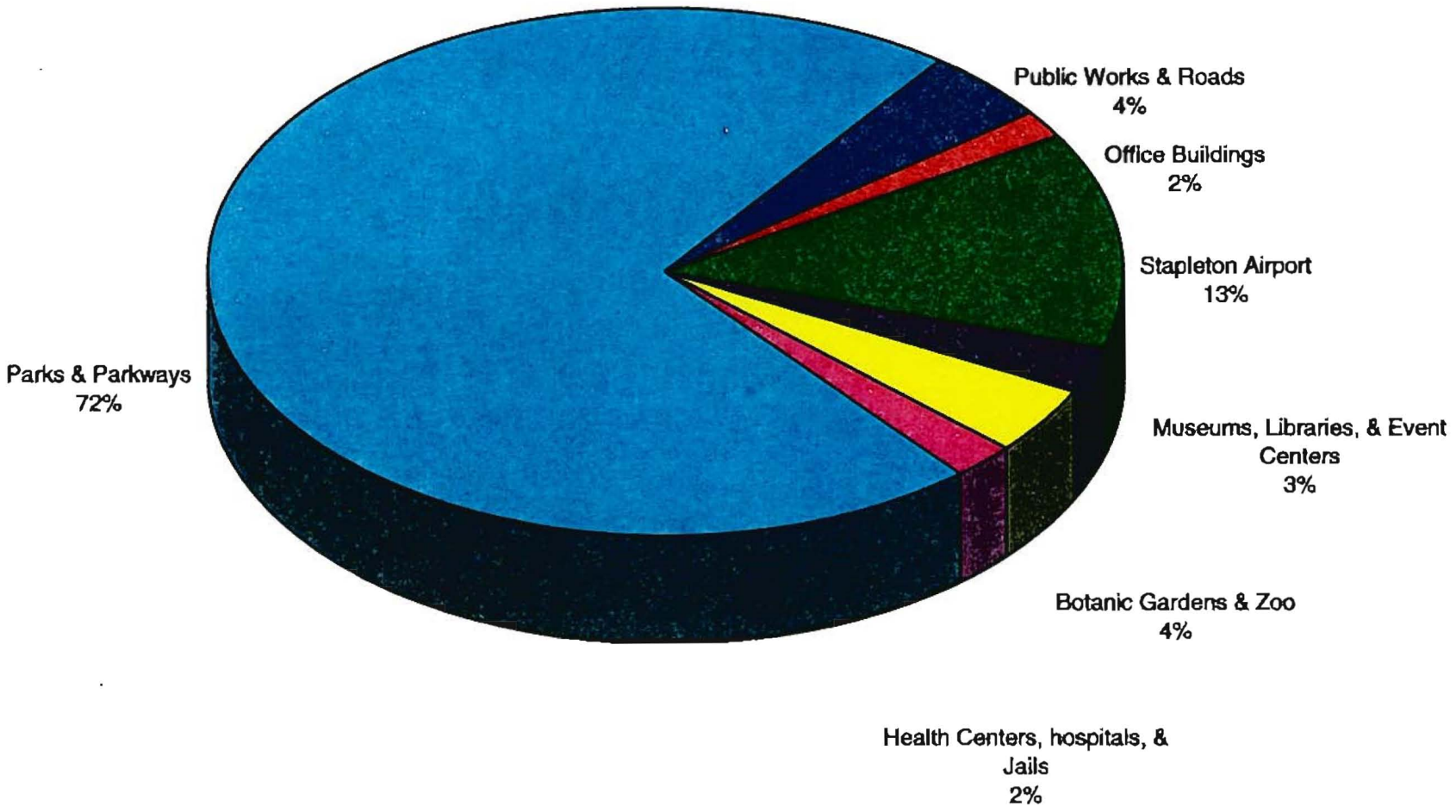


ATTACHMENT 9
Categories of Business and Institutional Water Uses

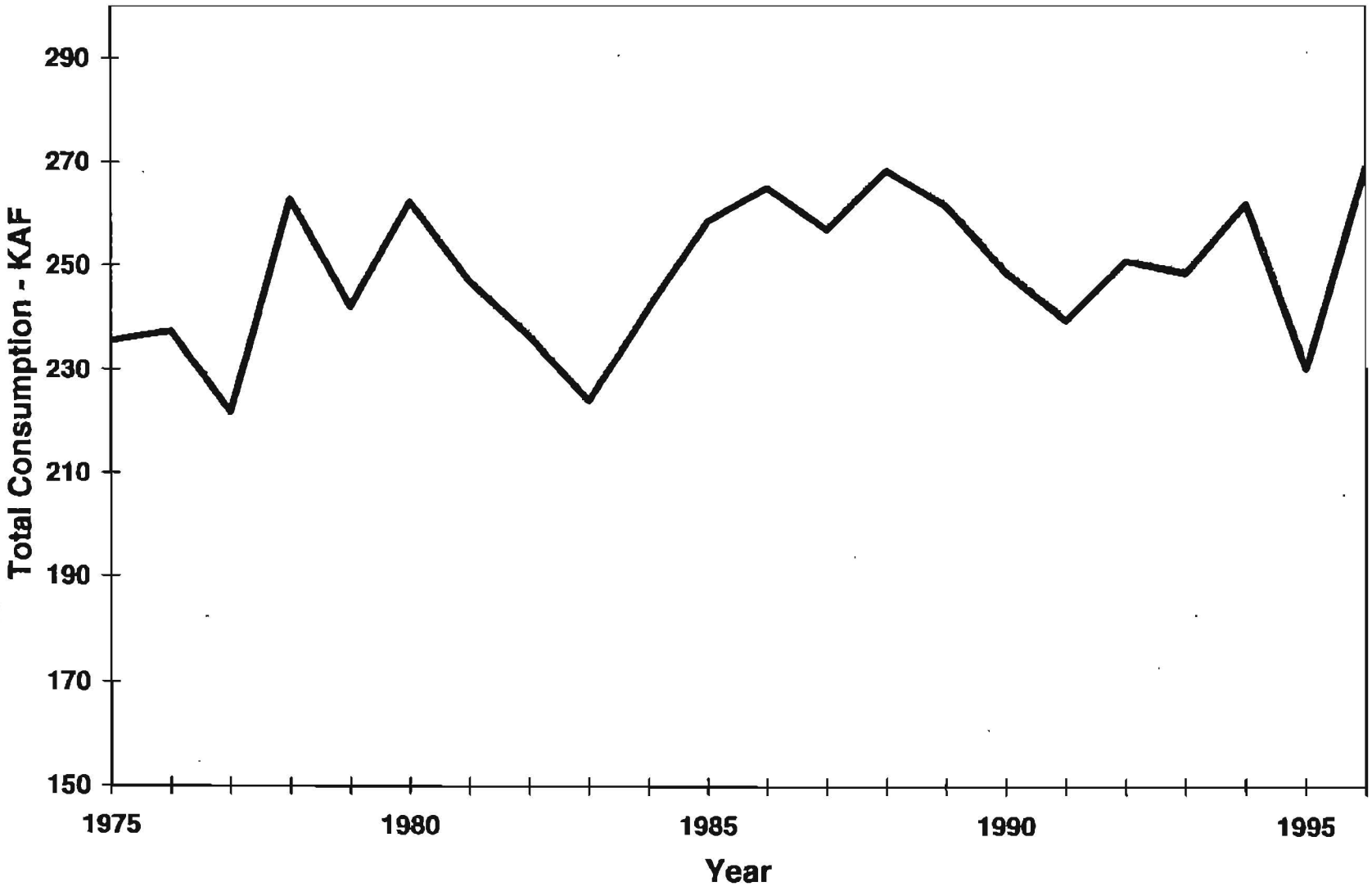


(all percentages are based on water uses from the nonresidential audit program)

ATTACHMENT 10
Categories of Public Water Use
In Denver



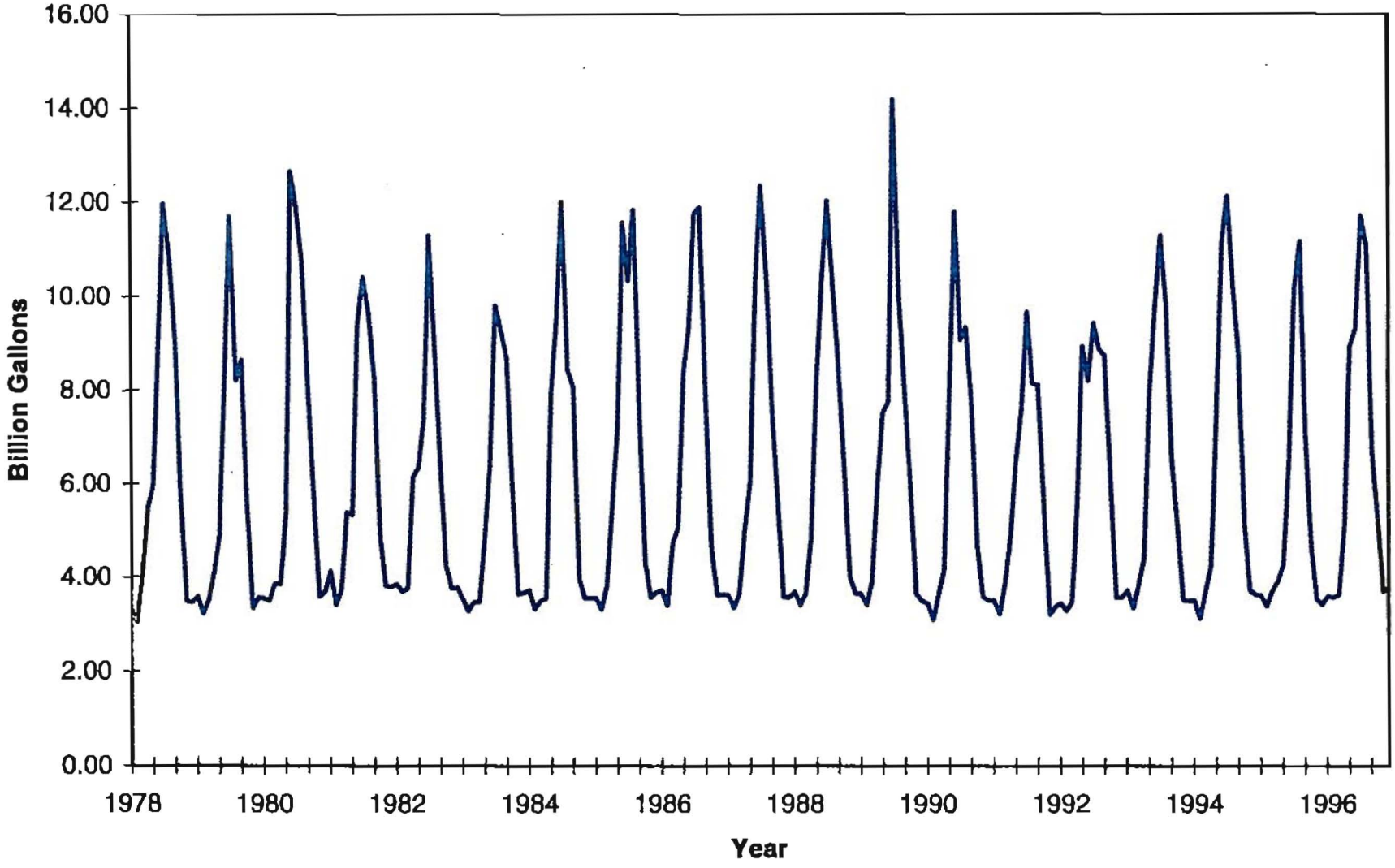
ATTACHMENT 11
Annual Consumption



2/18/97

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ATTACHMENT 12
Monthly Consumption



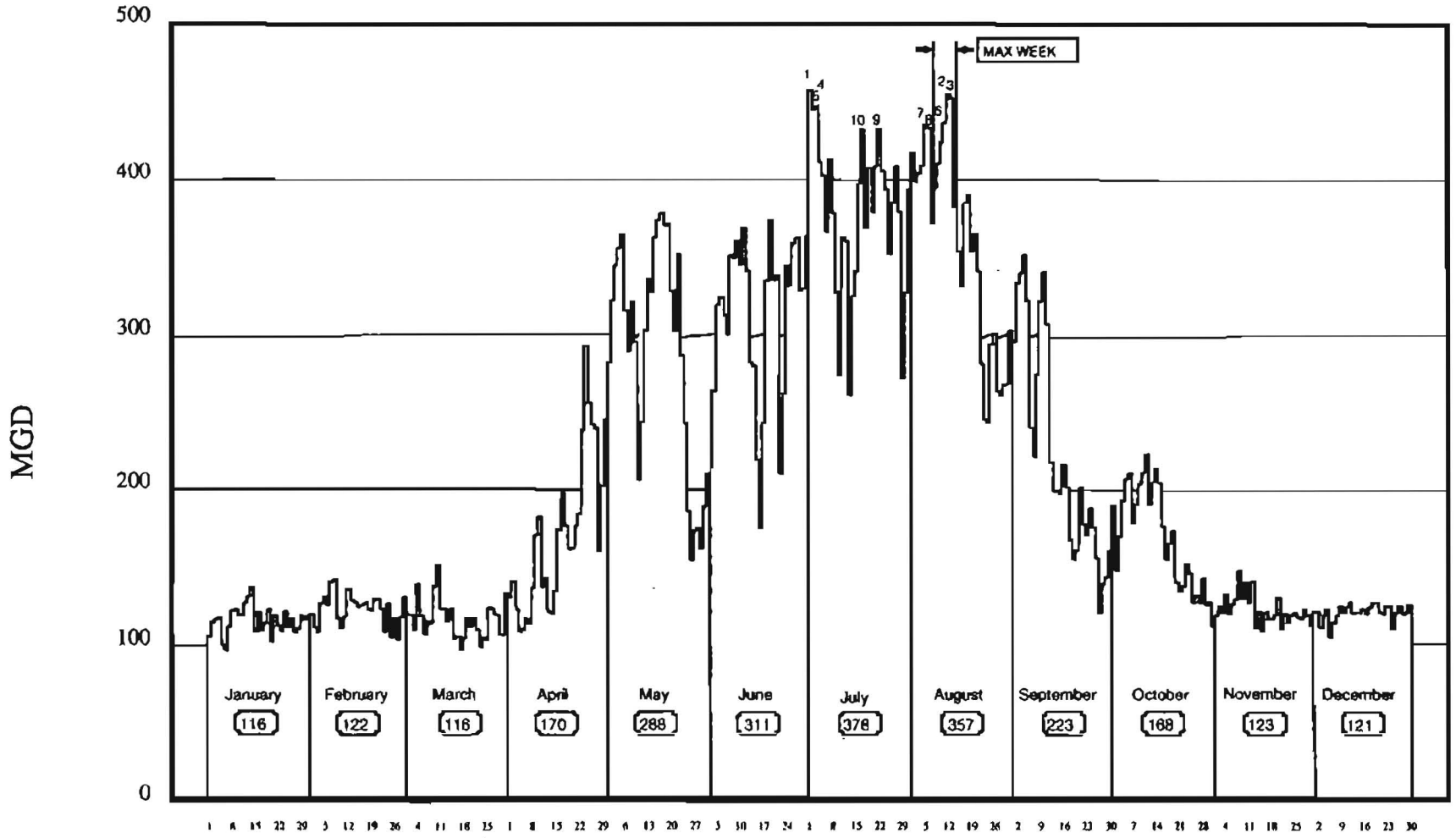
2/11/95

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ATTACHMENT 13

1996 TOTAL SYSTEM

DAILY CONSUMPTION, MGD



ATTACHMENT 14

Denver Water Conservation Programs	Dates
Schools Program	1976-94
● ■ ◆ (every-third-day irrigation guidelines)	1977-ongoing
Evapotranspiration (ET) rates	1981-ongoing
Sonic leak detection	1981-ongoing
Xeriscape Demonstration Garden	1981-ongoing
Residential audit/retrofit program	1987-ongoing
Universal Metering	1987-92
Alternative source irrigation	1990-ongoing
Ultra low volume (ULV) toilet rebate program	1990-93
Mass media advertising	1990-ongoing
Commercial/Industrial audit program	1990-ongoing
Denver Parks computerized irrigation assistance	1991-1993
Conservation Hotline	1991-ongoing
City & State audit program	1991-95
Multifamily audit/retrofit program	1992-ongoing
Conversion of DW properties to Xeriscape	1992-ongoing
Low-income audits/retrofits	1994-ongoing
Commercial/Industrial incentive program	1996-ongoing
Irrigation efficiency incentive program	1997-ongoing

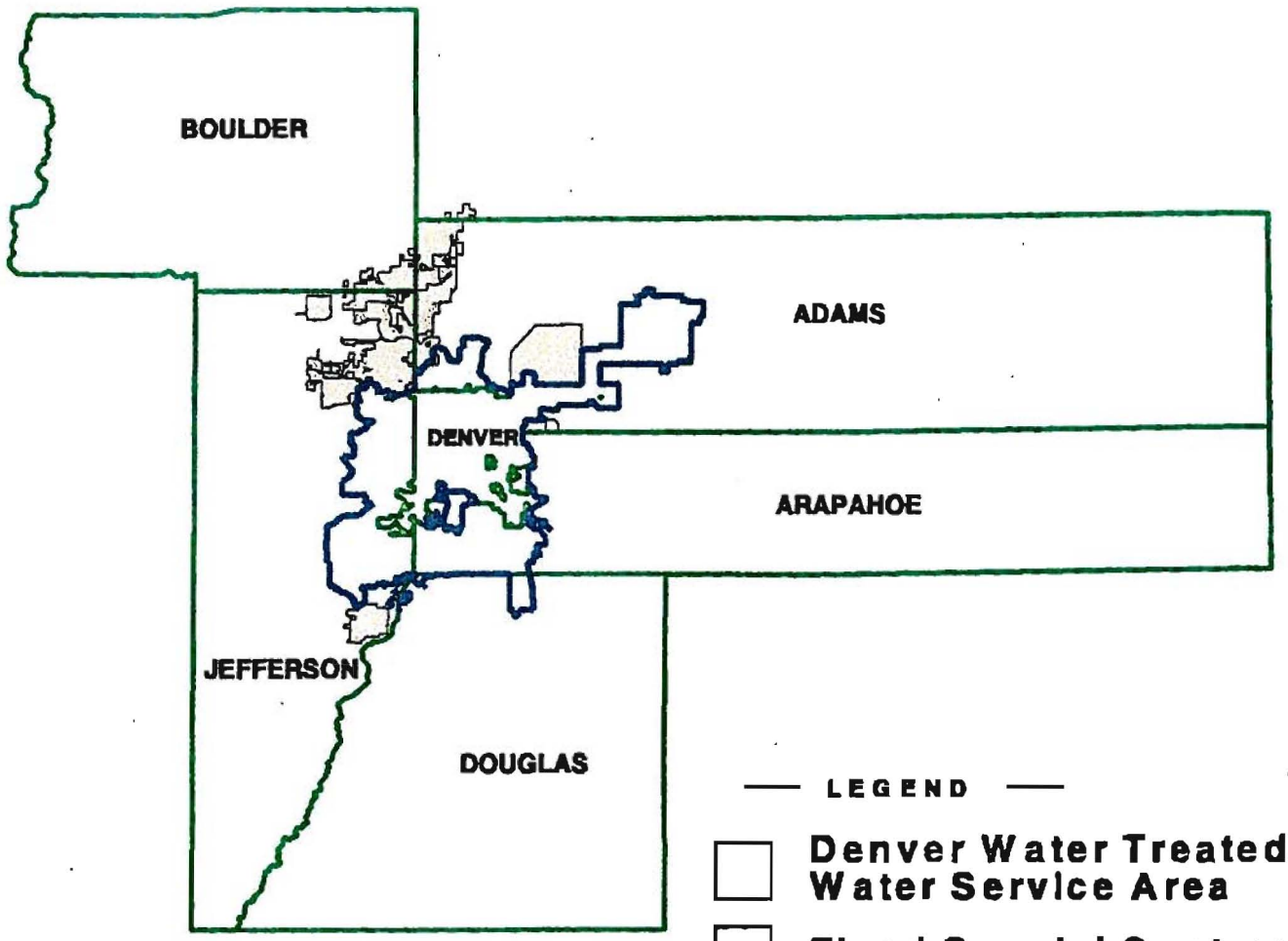
ATTACHMENT 15
Water Demand Forecasting Method
Used by Denver Water
1970 through 1993

Study	Forecasting Method	Variables	Data Sources or Assumptions
DW Planning Reports 1969-1970	Single Coefficient	GCD Population	Projected GCD increase - 1 GCD/yr DW Land Use Study & DRCOG regional forecast
DW Planning Reports 1972-1973	Single Coefficient	GCD Population	Projected GCD increase - 0.5 GCD/yr Metro Water Study, 1970 Census & DRCOG regional forecasts
1975 Metro Water Study	Single Coefficient	GCD Population	Projected GCD increase - decreasing rate Metro Water Study, 1970 Census & DRCOG regional forecasts
1975 DW Planning Report	Multiple Coefficient	GCD Population Precipitation Temperature	Projected GCD increase - decreasing rate Metro Water Study, 1970 Census & DRCOG regional forecasts NOAA
1981 DW Planning Report & Black and Veatch Treated Water Planning Study	Use factor	SF households Land use, acres	1970 Census, service requests, DW Land Use Study, local land use plans, and DRCOG forecasts
FEIS Forecast	Use Factor / Multiple Coefficient	SF households Lot size Pop/hh Income Marg. price MF households Employees Population	Survey of participating utilities COE projections based on CDLG and OBERS forecasts
1991 to 1993 Forecast Updates	Use factor	Undeveloped Land	Land use studies, local land use plans

ATTACHMENT 16

~~Figure IV-1~~

Denver Water Service Area vs. Six County Area



LEGEND

- Denver Water Treated Water Service Area
- Fixed Special Contracts
- County Boundary

July 1997

Scale 1:1,000,000

0 10 20 40

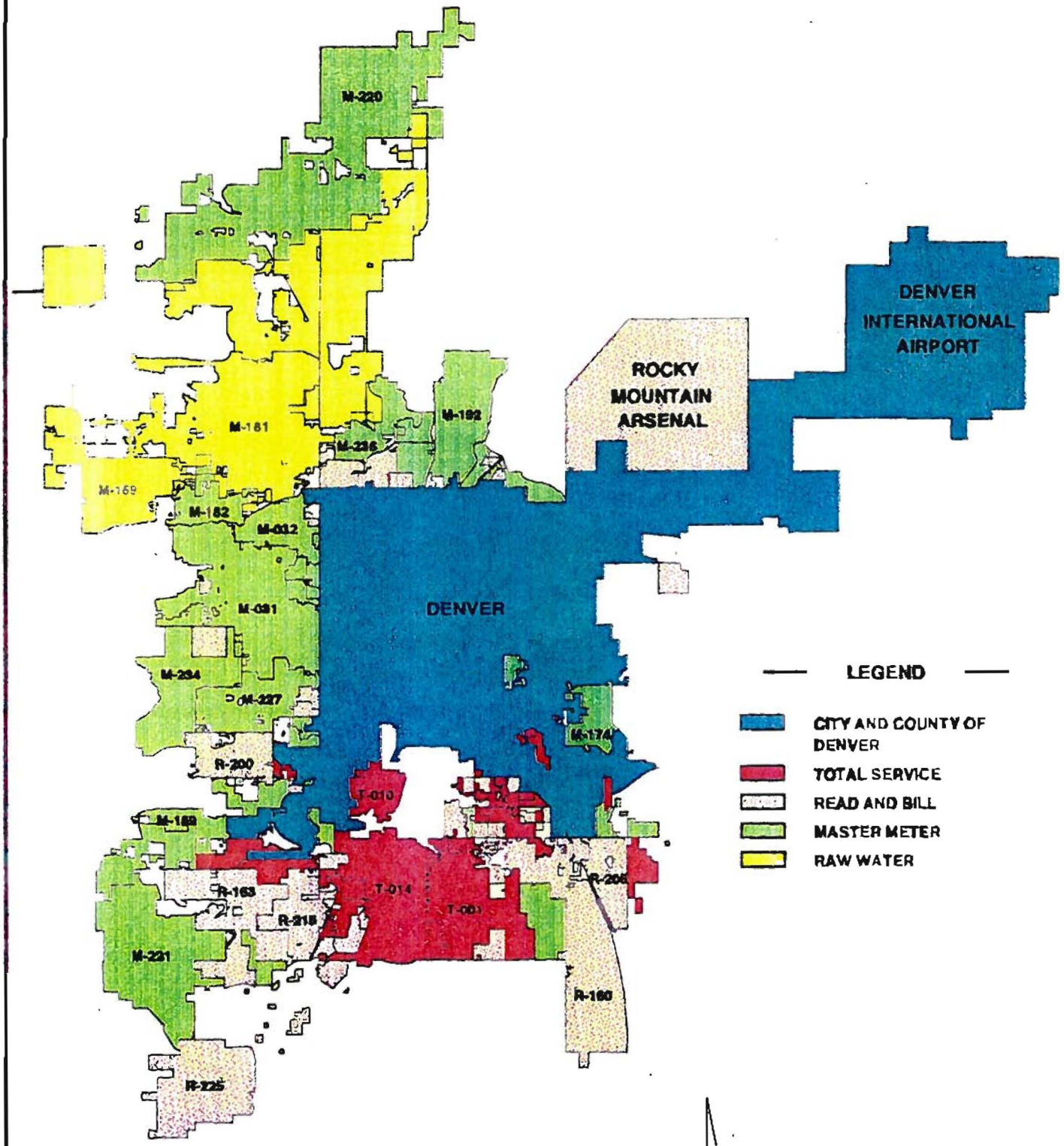
Miles

DENVER WATER

ATTACHMENT 17

Denver Water

Present Service Area



December 1996

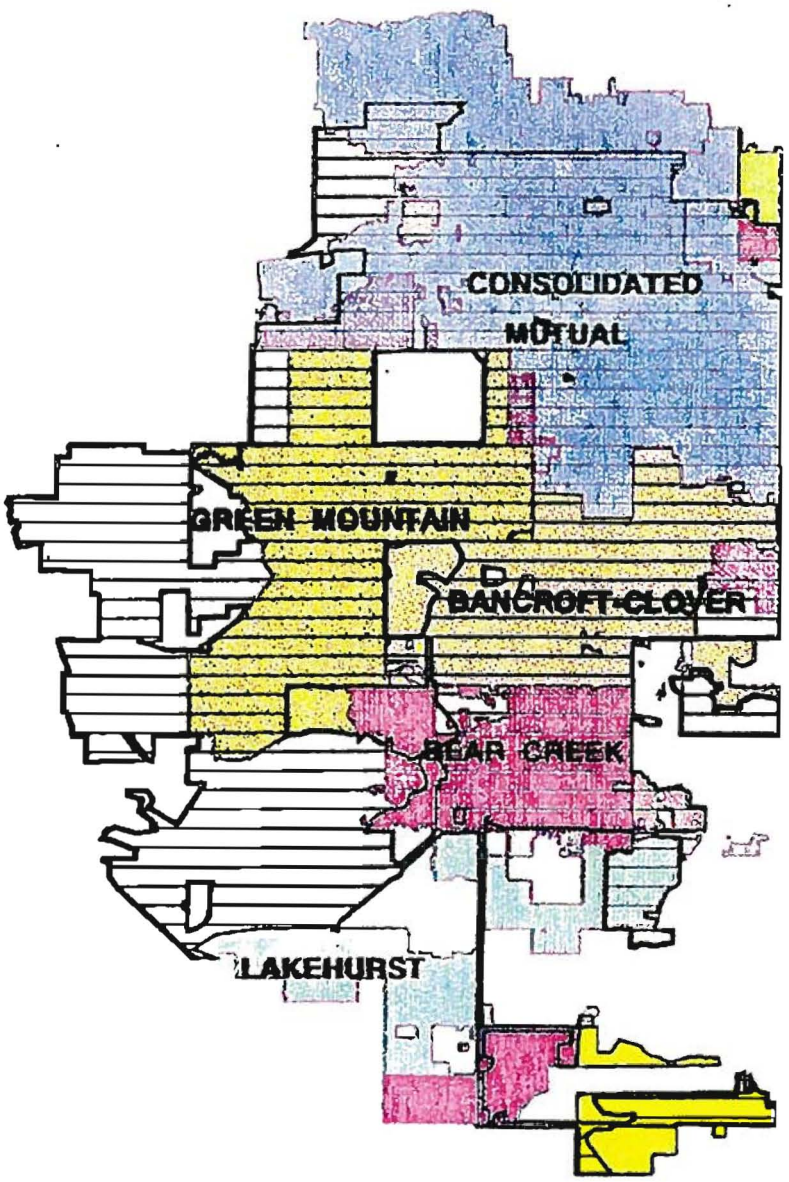
DENVER WATER

EXHIBIT 1

Denver Water
Districts Serving The City Of Lakewood

LEGEND

City of Lakewood

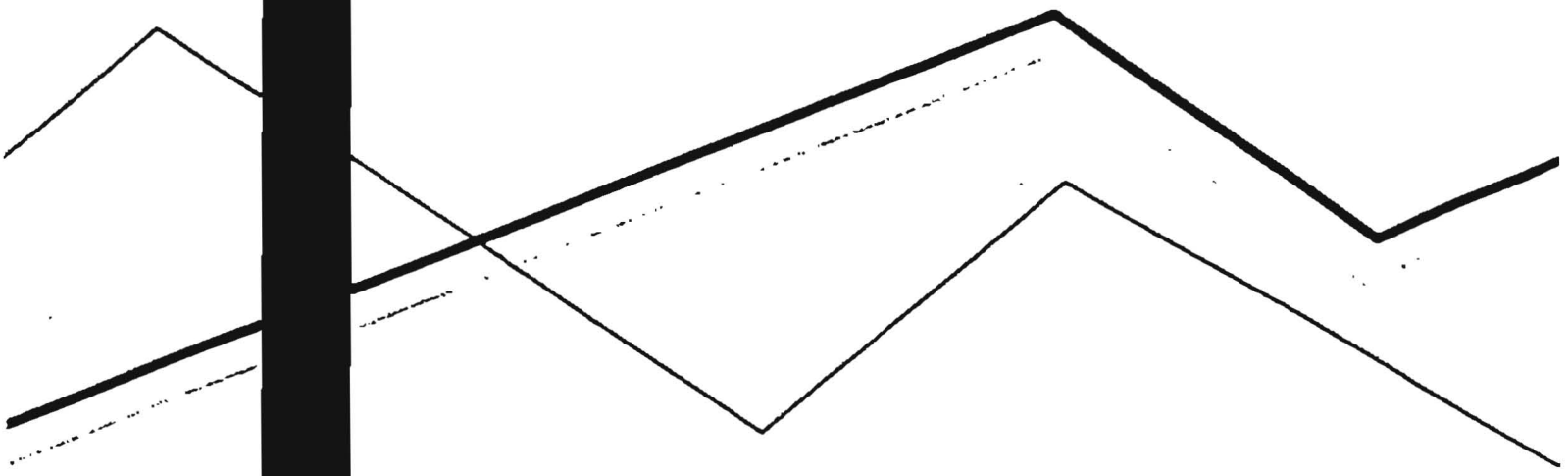


November 1994

SCALE 1:25,000

DENVER WATER

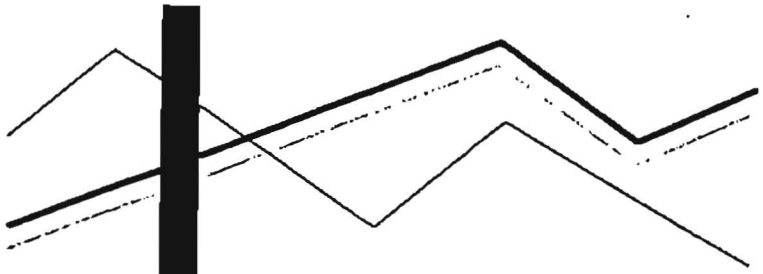
ATTACHMENT IX
19



Denver Regional Council of Governments

2020 OUTLOOK

A Long-Range Growth Forecast for the Denver Region



OUTLOOK 2020

TABLE OF CONTENTS

Preface 1

Introduction 2

Approach 2

Key Assumptions 3

Forecast Summary 5

-Employment 5

-Labor Force 7

-Population 9

-Households 10

The Next Step 10



PREFACE

The Denver Regional Council of Governments (DRCOG) periodically prepares a long-range growth forecast to serve as a basis for its planning functions. To that end, the agency assembled a Regional Economic Forecasting Task Force to assist in preparing and reviewing the forecast. The task force members provided valuable guidance on regional economic conditions and national and global trends. Their insight was instrumental in forecasting appropriate levels of population and employment for the region to the year 2020.

Economic Forecasting Task Force

Tucker Hart Adams
Central Banks of Colorado

Marilyn Eliason
City of Aurora

Mary Hoddinott
John Loughery
Denver Water Department

Manlio Huacuja
Office of State Planning and Budgeting

David Keen
Browne, Bortz & Coddington

Wilson D. Kendall
Center for Business and Economic Forecasting – Regis University

Stella Krawiec
Public Service Company of Colorado

David Larson
Colorado Department of Labor and Employment

Nancy McCallin
Colorado Legislative Council

Tom Miller
City of Boulder

Reid Reynolds
Colorado State Demographer

Paula J. Samis
U.S. West Communications

Lee Sammons
Hammer, Siler, George Associates

Patricia Silverstein
Greater Denver Chamber of Commerce

Bonnie Turner
Denver Office of Economic Development

Jim Westkott
Colorado State Demographer's Office

Richard L. Wobbekind
University of Colorado/Boulder

DRCOG STAFF

Larry G. Mugler
Director of Development Services

Sue Piatt
Economic/Demographic Analyst

OUTLOOK 2020

INTRODUCTION

With the 21st century less than a decade away, DRCOG is looking well into the new century in terms of its regional planning efforts.

As a result, the agency has prepared a long-range growth forecast covering the period from 1990 to 2020. Its major components are employment, population and household projections for the six-county Denver-Boulder metropolitan area plus Clear Creek and Gilpin counties.

The forecast will serve as the basis for DRCOG's regional planning efforts in such areas as transportation, water supply and wastewater treatment. In addition, it will provide a regional framework for local governments' planning functions and a useful planning and marketing tool for existing and prospective businesses in the region.

APPROACH

In preparing the forecast, the first step was to develop a set of assumptions about the U.S. and world economies. Within this context, a forecast for the state of Colorado was generated, after which the Denver region's share of state growth was projected.

The forecasts for population and employment in 2020 were created using a labor force supply and demand approach. In this approach, the level of economic activity—based on the region's projected share of growth, its competitive advantage and its economic structure—is translated into jobs available. By applying a labor force participation rate to the projected working age population, a labor surplus or shortage is calculated.

In its simplest form, a labor surplus means people will leave the region, while a labor shortage will attract migrants to the region. Jobs may also be filled by people entering the labor force for the first time, re-entering the labor force, or taking on multiple jobs.

People may also migrate to a region for other reasons, such as attending college or moving closer to family. However, these have a relatively minor impact compared to the importance of economic opportunity as an impetus to migration.

Once employment has been projected, total population and household projections follow. Several versions of a regional forecast, based on different national and local factors, are developed. The final forecast represents a consensus among key experts about what will be the most likely scenario for the region over the next three decades.

KEY ASSUMPTIONS OF THE FORECAST

U.S. ECONOMY (SHORT TERM)

Based on the assumption that a slow national economic recovery began in mid-1991:

- Real Gross Domestic Product (GDP) growth is expected to average 2.5 percent through 1996.
- Nonagricultural wage and salary employment is expected to grow at a rate of 1.5 percent between 1991 and 1996.

U.S. ECONOMY (LONG TERM)

- Population will continue to increase through 2020, while employment and labor force participation will show small declines after 2010 as the population ages.
- Real output will continue to increase over the 30-year period, but at a slower rate.

OUTLOOK 2020

COLORADO

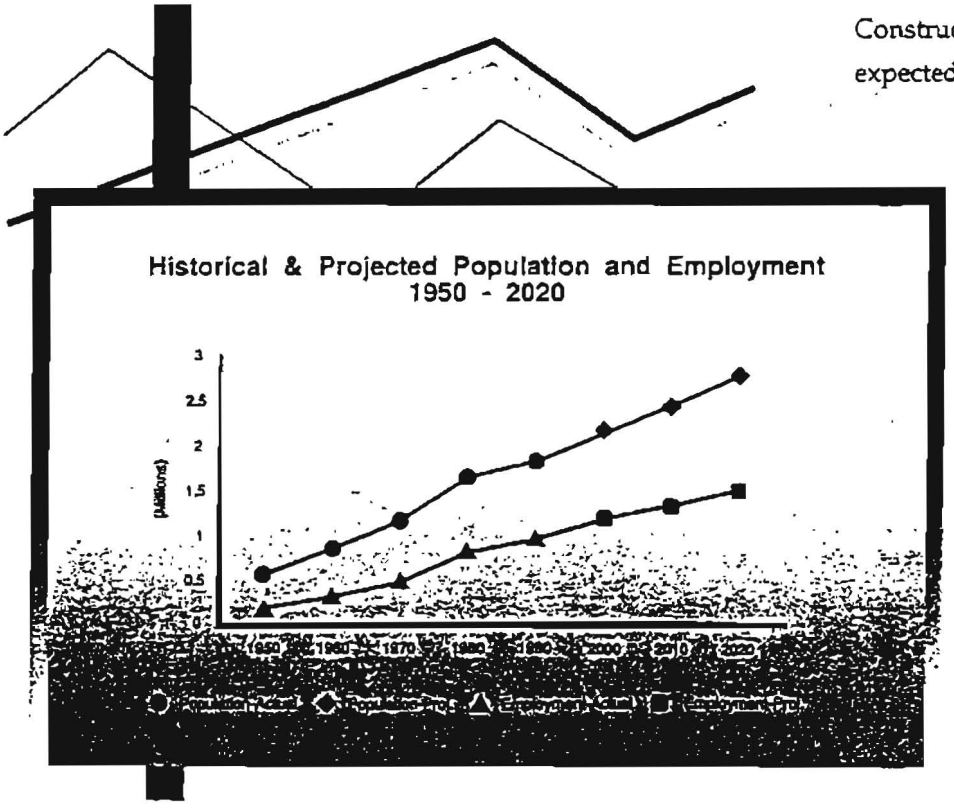
- The state's share of the national economy will continue to increase gradually, from about 1.5 percent in 1990 to 1.7 percent in 2020. This assumption reinforces the belief that Colorado's competitive position relative to the nation will be at least maintained and more likely enhanced.

REGION

- Thanks to a skilled labor force, a reasonable cost structure and an improved transportation system (with particular emphasis on the new Denver International Airport), the Denver metro region is expected to maintain its competitive position and post growth rates above the national rate, although the margin will narrow over the forecast period to 2020.
- A very modest increase in metro Denver's share of total state economic activity is predicted.
- The effects of several specific regional events have been incorporated into the forecast. They are:

1. Construction and completion of Denver International Airport. Construction employment is expected to increase from an early 1992 level of 2,500 to a peak level of 9,000 prior to the airport opening, scheduled for October 1993.

2. Reductions at Lowry Air Force Base. The closure of Lowry Air



Force Base will result in a loss of 1,900 civilian jobs, 2,200 active military and 2,500 students in the fall of 1994.

3. Expansion of United Airlines' reservations center. Plans call for 2,000 new jobs, with hiring projected to begin in 1992.

4. Reductions at Rocky Flats. An employment reduction of 4,000 is anticipated to begin in 1996.

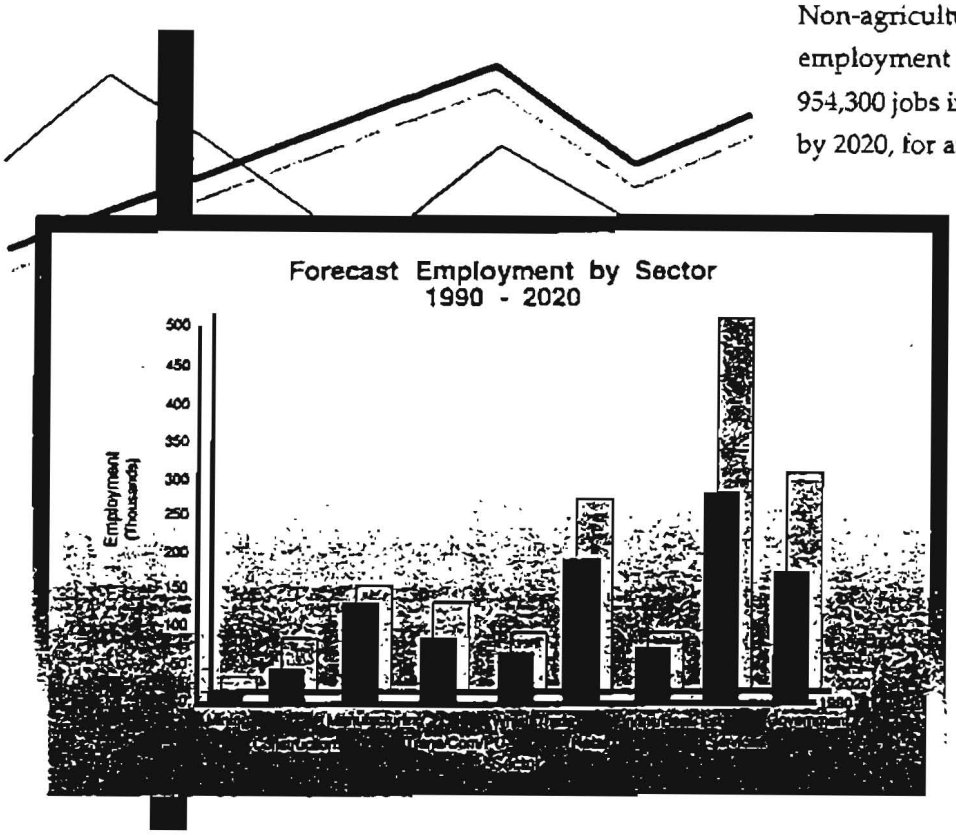
5. A stable tourism/gaming industry in Central City and Black Hawk.

FORECAST SUMMARY

Forecast Population and Employment to 2020

	1990	2000	2010	2020
Population	1,856,000	2,159,000	2,459,000	2,769,000
Employment	1,075,000	1,323,000	1,517,000	1,694,000

EMPLOYMENT



Non-agricultural wage and salary employment is forecast to grow from 954,300 jobs in 1990 to 1,505,800 jobs by 2020, for an annual average growth rate of 1.9 percent over the 30-year period.

Employment is projected to increase at an annual average of 2.3 percent for the first five years of the

forecast (1990-1995), then taper off to approximately 1 percent per year in the last decade of the forecast period (2010 to 2020).

Industry Sector Highlights

The largest absolute gain in employment occurs in the Services sector of the economy, which will account for almost 42 percent of all new jobs in the next 30 years. Health services and business services will enjoy particularly strong growth along with tourism, which has already benefited from the new employment base created as a result of gaming operations in Central City and Black Hawk.

The Transportation, Communications and Utilities sector is expected to experience healthy growth due to the opening of the new Denver International Airport, continuing technological advances in the communications field, and a significantly larger population requiring utilities.

Wholesale Trade shows some growth due to the region's larger population base and its function as a distribution center for the Rocky Mountain region.

Employment by Sector, 1990 and 2020

Sector	1990	2020
Mining	11,200	14,800
Construction	36,100	65,100
Manufacturing	125,100	131,600
Trans/Com/PU	72,000	116,200
Whlsl Trade	61,900	78,600
Retail	168,000	246,200
Fin/Ins/Real Est	68,900	78,900
Services	259,000	488,800
Government	62,300	22,500

Retail will continue to grow, but at a more modest rate than in the past, due to increased emphasis on mail order and TV shopping and market saturation in sub-sectors such as eating and drinking places and specialty retail.

The Government sector also will experience strong growth, not only because it will serve a larger population base, but also because certain services will be expanded to accommodate the increasing elderly population after 2010.

Mining is expected to increase by only 3,600 jobs over the forecast period and account for only 1 percent of the region's jobs.

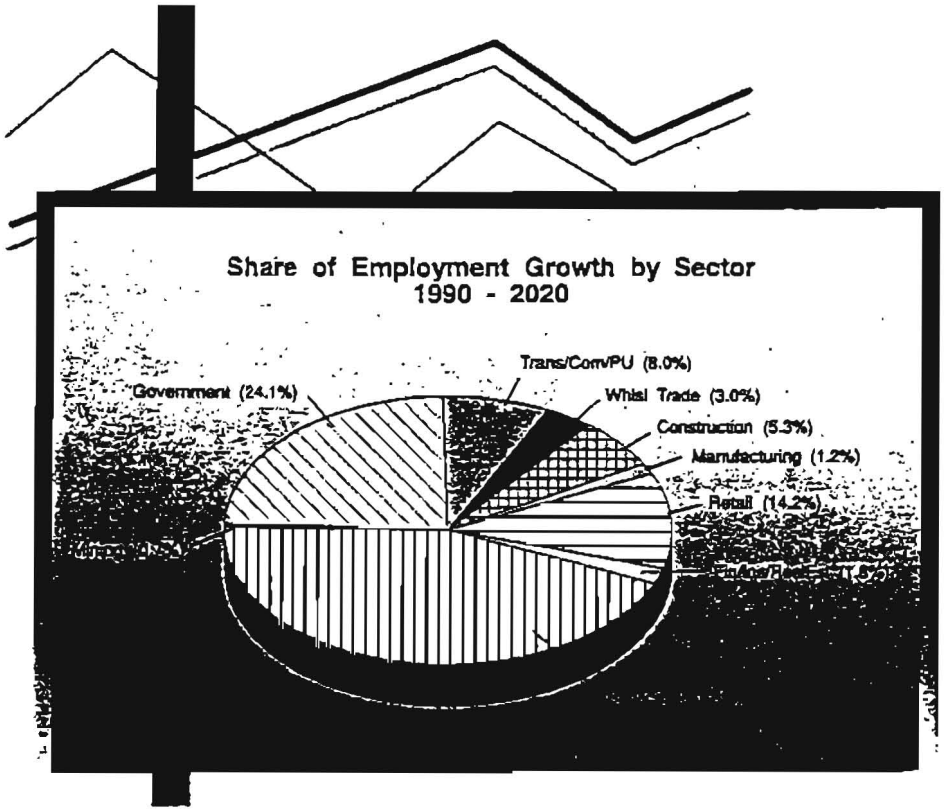
Construction is an inherently volatile sector, but is expected to show long-term growth in building residences for new population and new and replacement infrastructure.

The only area in which an absolute decline is anticipated over the next three decades is durable goods manufacturing (a sub-sector of Manufacturing). This minor loss of less than 3,000 jobs over a 30-year period is primarily due to defense industry cutbacks. Growth in non-durable goods manufacturing will offset this trend to result in a slight increase in the Manufacturing sector over the forecast period.

LABOR FORCE

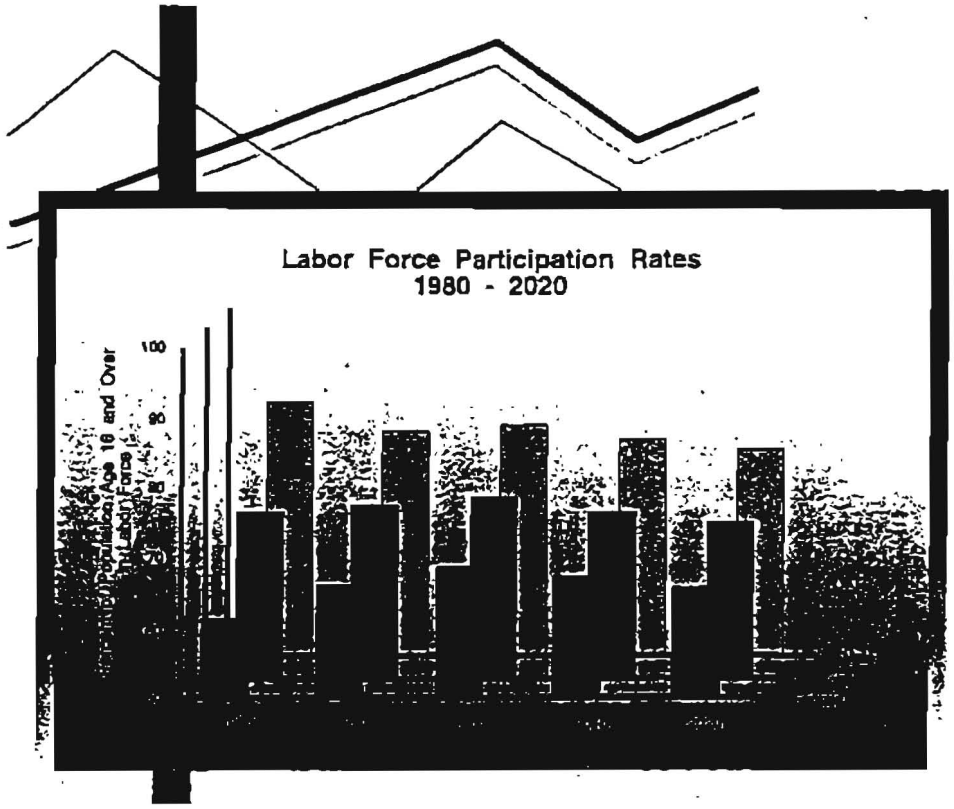
The labor force includes all of the population age 16 or over who are either employed or seeking employment. Labor force participation is the percent of total persons in that age group who fall into those categories.

In 1990, the region's overall labor force participation rate was 74.1 percent, compared to the national rate of 65.5 percent. This reflects the relative youthfulness of the Denver area's population and the stronger likelihood of women being in the labor force in this region.



The regional labor force participation rate is expected to peak at 76.8 percent in 2000, when most of the baby boom generation will still be in the labor force, after which it will decrease to 73.8 percent in 2020.

The labor force forecast assumes greater labor force participation by older workers, either out of economic necessity or by choice. The number of older women in particular will increase, since they are currently in the labor force in greater numbers and are more likely to remain there. The 1990 census shows the beginnings of a convergence of male and female labor force participation rates; in fact, male participation decreased between 1980 and 1990, a trend that is expected to continue into the future.

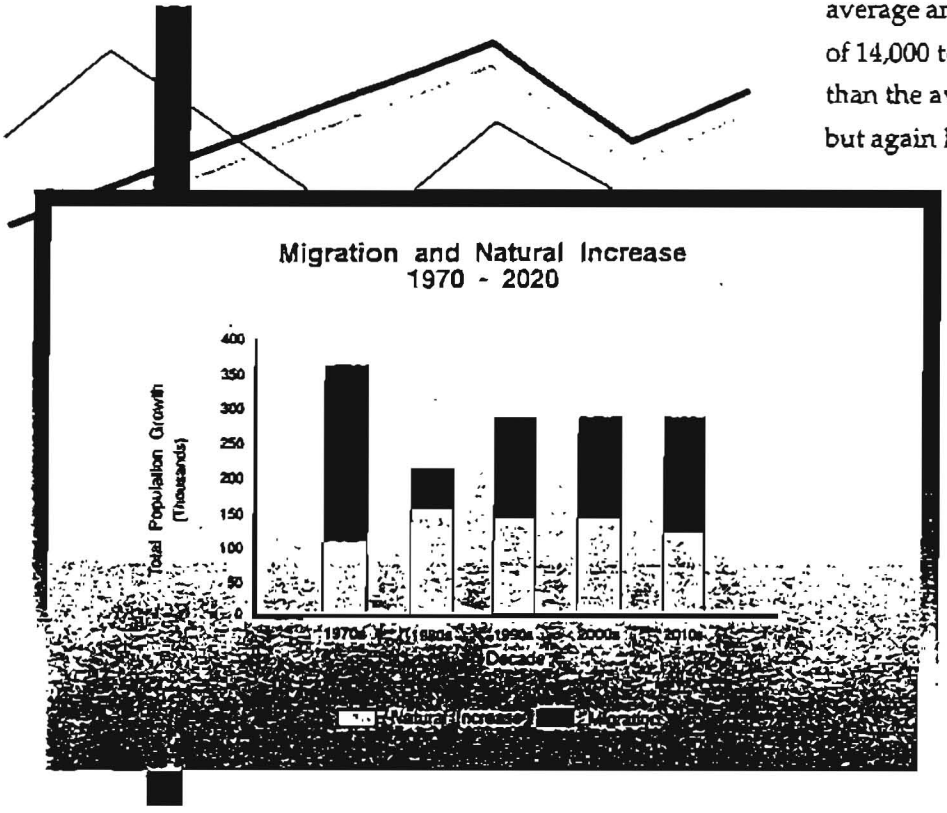


POPULATION

The region's population is expected to reach 2,769,000 by the year 2020, an average annual increase of just over 1.5 percent. This is an addition of more than 900,000 persons during the forecast period. This rate of growth exceeds the national growth rate by 50 percent and is higher than the average annual population growth during the 1980s (although it is lower than the 1950s, 1960s and 1970s). The average annual net migration of 14,000 to 15,500 is higher than the average for the 1980s, but again lower than the previous three decades.

Components of Population Change, 1970-2020

Decade	Total Population Change	Natural Increase (Number/Percent)	Migration (Number/Percent)
1970-1980	380,000	127,000 (33%)	253,000 (67%)
1980-1990	231,000	175,000 (76%)	55,000 (24%)
1990-2000	303,000	163,000 (54%)	140,000 (46%)
2000-2010	300,000	160,000 (54%)	140,000 (46%)
2010-2020	310,000	145,000 (47%)	165,000 (53%)



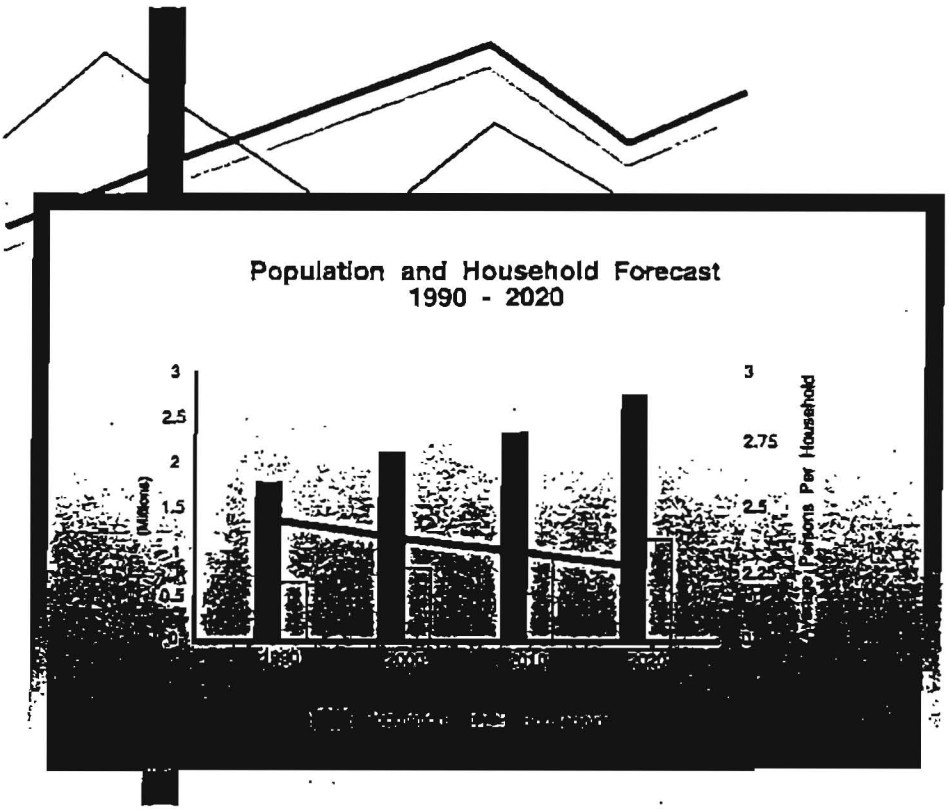
HOUSEHOLDS

The region will add more than 455,000 new households over the projection period, a 2 percent average annual growth rate. At that level, households will grow faster than the population, indicating a continuation of the trend toward smaller average household sizes. While the average household size in the region in 1990 was 2.46, it is projected to decline to 2.29 by 2020.

THE NEXT STEP

These forecasts will be assessed annually to determine how closely they match actual annual estimates. When necessary, adjustments may be made if assumptions or economic conditions warrant.

DRCOG will produce forecast allocations of both population and employment to the county and sub-county (regional statistical area) levels in order to make this forecast more useful for sub-regional planning. These are scheduled for completion in 1993.





BOARD OFFICERS

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Immediate Past Chairman

Robert D. Farley
Executive Director

The Denver Regional Council of Governments (DRCOG) is a voluntary association of 45 county and municipal governments working together to address issues of regional concern. Those issues include transportation, the environment, provision of services to the region's aging population, and analysis of economic and development trends. Besides promoting regional cooperation and coordination among local governments, DRCOG resolves common problems, performs regional planning, encourages orderly development and provides services to its members.

John S. Church

Economic Consultant
Idaho Economics
P.O. Box 45694
Boise, Idaho 83711-5694
(208) 323-4320

Summary of Qualifications

Corporate Economist, Idaho Power Company, Boise, Idaho. 1980 - 1997

Author of detailed Regional Economic and Demographic Forecasts

Visiting Assistant Professor, Boise State University

Member of The Western Blue Chip Economic Forecast Panel, published by Arizona State University

Professional Experience

Corporate Economist, Idaho Power Company, Boise, Idaho. 1980 - 1997

Mr. Church has nearly 20 years of experience in the energy industry. For the past fifteen years, Mr. Church has annually prepared regional economic forecasts as an integral part of long-term utility resource and financial planning. These forecasts included the preparation of economic and demographic forecasts for the state of Idaho and the Idaho Power Company service area. In this role, Mr. Church developed a Regional Econometric Model of the state of Idaho. The model, a simultaneous equation Economic-Demographic model, provides projections of output and employment for the major industries in Idaho, and population (by age cohort and sex), households (by age of head of household and household size), industry average wages and salaries (for major industries in the state) and personal income (by income component) for the state of Idaho and the Idaho Power Company service territory.

These forecasts have proven to be quite accurate. Earning Mr. Church the honor of being the most accurate economic forecaster in the Western Blue Chip Economic Forecast Panel, with zero percent error, for the past two years.

Mr. Church developed a further enhancement to his State of Idaho Economic Forecast with a forecast of economic activity for each of the forty-four counties in the state of Idaho. This analysis was initially used in the spatial evaluation of Idaho Power Company's human and equipment resource needs in preparation for future customer growth. The county forecasts have been widely accepted by the business and government communities. These forecasts are currently used by many private firms and by state and local government entities as a future planning tool.

Mr. Church also had past responsibilities for the preparation and analysis of the Company's annual electricity sales and load forecasts, as well as forecasts of system peak electricity loads. These forecasts allowed the detailed analysis of electricity sales and loads by customer classification for each month during a twenty-year forecast horizon. These economic projections were the basis for forecasts of future revenue, forecasts of power plant operation and future fuel procurement needs, as well as forecasts of the needs for future electricity supply. Mr. Church also developed a methodology for the Weather Normalization of Electricity Sales which has been used successfully in internal financial analysis and utility regulatory proceedings.

In other areas of economic forecasting, Mr. Church developed a methodology for forecasting future coal prices for the Company's existing long-term fuel supply contracts. These forecasts provided improved accuracy in the Company's budgeting of operating expenses. In similar areas, forecasts of the monthly and annual utilization of some commonly used materials of the electric utility industry allowed the Company to minimize inventory expenses.

Mr. Church played an integral role in the evaluation, negotiation, and litigation of the Company's long-term fuel supply contracts. Made recommendations on strategies to overcome particular negotiation sticking-points that allowed both parties to capture the economic benefits desired. Further, the coal price forecasting capability developed by Mr. Church allowed timely and detailed economic cost-benefit analysis of negotiating positions and proposals.

As a member of the Company's strategic planning team Mr. Church participated on many projects. These ranged from the evaluation of the financial and operational impacts of office consolidation and downsizing initiatives, to the evaluation of national and international markets for various types of renewable energy supplies, to the evaluation and analysis of potential acquisition candidates. For the Company's restructuring and downsizing initiatives he completed a scenario analysis of differing outcomes. Similarly, he participated in an analysis of the possible impacts of the deregulation of electric services. He also performed studies on the impact of differing energy tax proposals on Idaho Power Company operating costs as well as an analysis of the effects upon the operating costs of competitor utilities in the Pacific northwest.

In 1996 and early 1997, Mr. Church developed an extensive country screening methodology for evaluating foreign investments. This methodology permits a broad first phase macroeconomic screening to eliminate many countries from further evaluation, therefore minimizing the expenses of additional market research or ongoing sales activities in areas that may have poor profit potential or future market growth.

Mr. Church has also prepared and presented testimony to utility regulatory agencies and in state and federal courts. Further, as a well known economist, he made numerous presentations and speaches to private, government, and civic organizations throughout Idaho and the region. In the past five years, his total annual audience, while speaking to groups of various sizes, averaged nearly five thousand. Often asked by the news media for comments on the current economic environment, Mr. Church has been frequently quoted in the local Idaho print and television media and has also been cited in national publications such Newsweek, Time, The Kiplinger Washington Letter, and The Wall Street Journal.

Education

University of Idaho 1979 - 1981
Moscow, ID
Major: Economics, MS degree.

Boise State University 1976 - 1979
Boise, ID
Major: Business Administration, Minor: Economics, BBA degree

University of Washington 1967 - 1971
Seattle, WA
Major: Civil Engineering, Minor: Mathematics

Selected Publications and Presentations

"An Evaluation of Third-Party Costs Resulting from Water Transfers", Masters Thesis, University of Idaho, 1981

"The Sagebrush Rebellion: A Preliminary Evaluation of Efficiency in Resource Usage on Public Lands", presented at the Pacific Northwest Regional Economic Conference, Portland, Oregon, May 1980.

"The Effects of the Northwest Power Act", presented at the Idaho Governor's Economic Outlook Conference, Boise, Idaho, November 1981.

"Future Pacific Northwest Irrigated Agricultural Land Development: 1981-2001", presented at the Pacific Northwest Utilities Conference Committee's Model Input Workshop, Seattle, WA, Oct., 1981.

"Idaho's Industry Mix", panelist at the Idaho Governor's Economic Outlook Conference, November 1983.

"A Review of Idaho's Economic Performance and Near Term Outlook", presented at the Mountain States Regional Economic Conference, Phoenix, Arizona, March 1984.

Presentation to the Pacific Northwest Power Planning Council on the economic outlook for the state of Idaho, December 1985,1987, 1990, and January 1992.

"How Businesses Make Location Decisions: Why Should They Move to Idaho?" Idaho's Economy, College of Business, Boise State University, Spring 1987.

Annual economic outlook presentations for the state of Idaho to the Joint Select Committee on Revenue Projections of the Idaho State Legislature, January of the years 1983 - 1986 and 1988 - 2002.

Member of the Boise Visions Project Planning Committee. (City of Boise's Comprehensive Planning Project), and Liaison to the Boise Visions Executive Committee for the Utility and Water Planning Subcommittees, 1992

Member of the Ada Planning Association (Regional Traffic Planning Agency) Demographic Advisory Committee: 1991, 1995, 1997.

Member of the Economic Forecast Advisory Group of the Pacific Northwest Power Planning Council, Portland, OR

Keynote speaker, 1990 Vocational Education Conference, July 1990, Boise, "Idaho's Economic Outlook: New Growth and New Challenges."

Economic Outlook Presentation to Boise Chamber of Commerce Executive Retreat, Sun Valley, Idaho, Sept. 1994

Idaho Economic Outlook Presentation, Center for The New West, Denver, Colorado, June 1996.

Kick-Off speaker, Idaho Manufactured Housing Association Annual Convention , Boise, ID, Annually 1991 - 2002.

Panelist, Boise Chamber of Commerce's Annual Economic Outlook Breakfast, Annually 1991 - 2001.

Keynote speaker, Idaho Building Operators Association Annual Meeting , Sun Valley, Idaho, April 1998.

Keynote speaker, Idaho Hispanic Business Association Annual Meeting , Boise, Idaho, April 1998.

Panelist, Caldwell, Idaho Chamber of Commerce's Economic Outlook Breakfast, November 1998.

Keynote speaker, Franklin Building Supply's Contractor's Economic Outlook Forum, Boise, January 2001, 2002

Keynote speaker, D.L. Evans Bank Economic Outlook Forum, Boise, February 2001, February 2002.

Keynote speaker, Idaho Building Operators Association Annual Meeting , Boise, March 2001.

Keynote speaker, Idaho Mortgage Banker's Association, Boise, April 2002.

Speaker, Idaho Department of Transportation's, Transportation 2020 Conference, Boise, March 2000.

Columnist, Quarterly Reviews of Idaho's Economy for the Idaho Stateman, Boise, Idaho

Economic Consulting and Forecast Clients:

Boise Metro Chamber of Commerce
City of Boise, Idaho
City of Hailey, Idaho
CH2M Hill
Community Planning Association of Southwest Idaho (COMPASS)
Farmers and Merchant's State Bank
Goldman Sachs
Idaho Department of Water Resources
Idaho Power Company
Intermountain Gas Company
Magic Valley Regional Medical Center
Northwest Research Group
Power Engineers
St. Lukes Regional Medical Center
United Water Idaho

Additional Professional Activities

Visiting Assistant Professor, Boise State University
Mr. Church has been an instructor in undergraduate economic principles classes from 1986 to the present.

EXHIBIT A – Summary of John Church's Opinions Related to the IMAP

The following is a summary of my opinions regarding the IMAP. These opinions are more fully set out in the IMAP and the appendices thereto. The reader is referred to that document for a more complete explanation of these opinions.

1. Idaho's Treasure Valley will continue to experience population growth for the foreseeable future.

2. The population of Ada County in the year 2050 will be approximately 813,970. The chart on pages 90-92 of IMAP Appendix A gives a detailed breakdown of the population projections for Ada County by year. An explanation of the econometric model I used to make the population forecast, that is, the basis of my opinion of Ada County's future population, is contained in Tab 6 of IMAP Appendix A.

3. The econometric model used to forecast future population, households and economic activity is the most accurate methodology available for this task. In addition, it is the only forecasting model in the State of Idaho that has the ability to forecast these concepts at the level of detail required for this analysis.

4. The population within United Water's planning area, which occupies only the eastern portion of Ada County, will be approximately 540,020. To arrive at this number, I allocated the distribution of Ada County's future population across the county using Traffic Analysis Zones ("TAZs") previously established by COMPASS, as explained more fully in Section E.5.b of the IMAP. The use of TAZs builds upon the extensive wok COMPASS has done to define population, household and employment in these small geographic areas. In addition, the aggregation of these small TAZs allow one to most accurately forecast the geographic area that comprises United Water's planning area.

5. I forecasted the water demand within United Water's planning area through the year 2050 by using a statistical modeling process that forecasts demand for several classes of water customers. This is the most accurate way to forecast future water demand for a particular area. In addition, this methodology allows the level of disaggregation necessary so that differing water use characteristics of the customer classes can be evaluated so as to not "overforecast" future water demands.

6. Residential customers within United Water's planning area will increase to approximately 151,269 through the year 2050. I calculated this number using the statistical regression analysis described in the pages behind Tab 7, IMAP Appendix A.

7. Per capita residential demand for customers in United Water's planning area in the year 2050 will be approximately 459 gallons per day, which calculates into a total annual residential demand of approximately 25 billion gallons. I calculated these numbers using the statistical regression analysis described in the pages behind Tab 7, IMAP Appendix A.

8. Commercial customers within United Water's planning area will increase to approximately 26,977 through the year 2050. I calculated this number using a statistical regression analysis described in the pages behind Tab 7, IMAP Appendix A.

9. Per capita commercial demand for customers in United Water's planning area in the year 2050 will be approximately 1200 gallons per day, which calculates into a total annual commercial demand of approximately 19 billion gallons. I calculated this number using the statistical regression analysis described in the pages behind Tab 7, IMAP Appendix A.

10. The balance of future water demands on United Water's system (excluding commercial and residential customers) will be approximately 3.6 billion gallons per year. This category includes public customers, other sales, hydrant use, system losses and company use—all described more fully in the IMAP. Consult IMAP Section E.6.c for detailed explanation.

11. The total combined demand for water on United Water's system in the year 2050 will be approximately 48 billion gallons.

12. Price increases likely will affect the total demand by United Water's future customers. To account for the affect on demand by price increases, I calculated the effect of a series of six rate increases expected to coincide with major capital improvements by UWID over the next 20 years. This reduced total annual demand in 2050 from approximately 48 billion gallons to 46.8 billion gallons. Further detail and explanation is included in Section E.6.d of the IMAP.

13. Because United Water's planning area has only small areas of irrigated agricultural land, the potential reduction on the total demand on United Water's system from using non-potable water to supply residential and commercial irrigation demands is so small that it does not materially affect the forecasted total demand. Further explanation can be found in Section E.6.e of the IMAP.

14. The peak day demand on United Water's system within the United Water's planning area will be approximately 269 million gallons, or 415.7 cfs. This forecast is explained in Section E.6.f of the IMAP. The instantaneous peak would be even higher, but I have not calculated a precise number or the instantaneous peak.

Municipal Service Area Description (MSAD) For United Water Idaho Inc.

Revised October 2002

Submitted in Accordance with the
Municipal Water Rights Act of 1996

To the
Idaho Department of Water Resources
Karl J. Dreher, Director

By
United Water Idaho Inc.
8248 W. Victory Road
P.O. Box 7488
Boise, ID 83707-1488

Purpose and Applicability of this MSAD

This revised Municipal Service Area Description ("MSAD") is submitted to the Idaho Department of Water Resources ("IDWR" or the "Department") by United Water Idaho Inc. ("UWID" "United Water Idaho," "United Water" or the "Company"). The MSAD is a general, narrative description, including illustrative maps, describing the geographic area and types of water uses served by the Company.

This updated MSAD is submitted in compliance with the Municipal Water Rights Act of 1996 (the "1996 Act"). It replaces all earlier versions including those filed on January 27, 1997 and September 24, 1997.

In order to avoid confusion and to most effectively provide notice to other water users, regulatory agencies and other interested persons, UWID is providing to the IDWR this single, universal MSAD. UWID intends that this MSAD be made applicable to all municipal water rights[1] held by UWID, as well as any pending application for appropriation, transfer or other action, unless the service area for such right or application is expressly stated to be different.

The Company hereby requests that the Department review this MSAD and to confirm and acknowledge that it meets the requirements of the 1996 Act.

Description of United Water Idaho

United Water Idaho is a municipal water provider operating in the Treasure Valley of Idaho. United Water Idaho is a subsidiary of United Water Resources, incorporated in New Jersey. United Water Resources is owned by Suez S.A., a multinational energy and environmental services company based in Paris.

Since 1890, United Water and its predecessors[2] have been the principal providers of water for municipal purposes in the greater Boise metropolitan area. UWID holds a

[1] In this MSAD, the term "water rights" should be understood to include all lawful entitlements to the use of water, including, without limitation, all rights to divert, store, and/or place to beneficial use (including instream use) ground or surface waters, or a combination thereof, whether such rights are evidenced by license, permit, court decree, claim, beneficial use, ditch or canal company shares or stock certificates, contract entitlement, irrigation district authority, federal administrative action, executive order, federal court order, other federal authority or otherwise. The term "water rights" also shall encompass any contractual or other legal right (including, by way of example, contract entitlements to storage project water, the subordination of water rights, and the lease or rental of water rights through the water supply bank) to control or affect the storage and release of water or otherwise to control or affect reservoir or river operations.

[2] UWID's predecessors include the Boise Water Corporation (and its purchaser, General Waterworks Corporation), the Boise Water Company, the Boise Artesian Hot and Cold Water Company, Boise Waterworks, Inc., and the Artesian Water & Land Development Improvement Co.

substantial portfolio of municipal and other water rights, permits and other entitlements to water that it uses to serve its customers.[3]

UWID is a municipal provider as defined in Idaho Code § 42-202B(3)(b). As a regulated utility, it provides direct water service on demand to over 70,000 customers and a growing population of over 215,000 within its service area.

UWID's business address and principal officers are as follows:

United Water Idaho
8248 W. Victory Road
P.O. Box 7488
Boise, Idaho 83707-1488
Office: 208-362-1704
Facsimile: 208-362-1479

President:	Gregory P. Wyatt
Vice President:	Benjamin M. Hepler
Secretary:	Carla E. Hjelm
Treasurer:	Edward J. Imparato

Municipal Water Rights

In 1996, the Legislature enacted the Municipal Water Rights Act of 1996 (the "1996 Act"). The 1996 Act codified the common law governing municipal water rights (see Appendix A).

Among the special features of municipal water rights is that their place of use is not described with particular boundaries. Instead, the service area is typically described by simple reference to the name of the community (e.g., City of Boise) or other generic description. This contrasts with other water users, who must describe their service area with particularity.[4] The longstanding practice regarding the description of municipal service areas was codified in the 1996 Act.[5] Specifically, the Act requires that municipal providers covered by the Act shall provide a broad, narrative description of their service

[3] UWID may, from time to time, acquire water rights held by others for purposes other than municipal use within UWID's service area. These may be held in such other uses for some time, pursuant to contract or other arrangements with others, or they may be transferred to use within UWID's municipal system.

[4] In the case of irrigation rights, the water right must identify the place of use by "legal subdivisions"–that is, down to the forty acre "quarter-quarter" of a one-square-mile section. Idaho Code § 42-202(6).

[5] The 1996 Act contains several references to the service area description: Idaho Code §§ 42-202(7) (definition of service area), 42-202(2) (description of service area at time of application to appropriate water), 42-217(4) (revised description of service area at time of proof of beneficial use), 42-222(1) (description of service area in connection with change of water right to municipal).

area:

> The service area need not be described by legal description nor by description of every intended use in detail, but the area must be described with sufficient information to identify the general location where the water under the water right is to be used and the types and quantity of uses that generally will be made.

Idaho Code §§ 202(2), 222(1).

The 1996 Act also codified the principle of an evolving service area. While other water right holders must seek a change (or transfer) of their rights any time their place of use changes or expands, municipal providers have never been required to do so. The 1996 Act provides:

> "Service area" means that area within which a municipal provider is or becomes entitled or obligated to provide water for municipal purposes. For a municipality, the service area shall correspond to its corporate limits, or other recognized boundaries, including changes therein after the permit or license is issued. The service area for a municipality may also include areas outside its corporate limits, or other recognized boundaries, that are within the municipality's established planning area if the constructed delivery system for the area shares a common water distribution system with lands located within the corporate limits. For a municipal provider that is not a municipality, the service area shall correspond to the area that it is authorized or obligated to serve, including changes therein after the permit or license is issued.

Idaho Code § 42-202B(8) (emphasis supplied).

Except in one instance,[6] the 1996 Act does not expressly require municipal providers to revise and update their service area descriptions. Nor has the Department promulgated regulations specifying when to update service area descriptions. Nevertheless, doing so on a periodic basis is good policy and is consistent with the Act's objectives of informing the public in a general way of the provider's evolving service area.

[6] The 1996 Act requires a municipal provider to update its service area description when filing proof of beneficial use. Idaho Code § 42-217 (item 4).

Integrated Municipal Application Package

On May 4, 2002, United Water submitted an Integrated Municipal Application Package (or "IMAP") to the Department. The IMAP is a comprehensive change application intended to bring most of UWID's water rights within the Municipal Water Rights Act of 1996.

The IMAP, as submitted, calls for a "planning horizon" under the 1996 Act of fifty years. Accordingly, it contains projections of increased water demand over that period.

Those long term demand projections, known as the "planning horizon component," are based on a "planning area" described in the IMAP. The planning area includes (in addition to UWID's current certificated area) areas currently receiving no municipal water service where UWID appears likely to become the provider in the future. The planning area specifically excludes certain areas now served, or likely to be served, which may not be consistent with the mandate in the 1996 for coordination of planning among municipal entities. Idaho Code § 42-202B(7) (definition of "reasonably anticipated future needs").

The planning area and the calculation of the planning horizon component provide useful insight into the future direction of UWID's evolving service area. However, the reader should understand that the Company is not limited to servicing those areas included within the planning area.

Municipal Service Area Description

As a regulated public utility, United Water Idaho's authority to serve is controlled primarily by the Idaho Public Utilities Commission ("IPUC"). Generally speaking, United Water may serve only those customers within its "certificated area."[7] The IPUC has granted Certificate of Public Convenience and Necessity No. 142, as amended, to UWID. From time to time, the IPUC revises UWID's certificated area, as defined in Certificate No. 142, in response to petitions filed by the Company.

Most approved expansions are into adjacent areas that are not served by other water providers. In some instances, the IPUC may expand a water provider's service area to include one or more non-contiguous service areas. This has happened on occasion with UWID where developers have asked that service be provided to a new, non-contiguous development. United Water now serves three such small housing subdivisions in Canyon County and two in southwest Ada County on this basis.

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[7] *See* Idaho Code 61-526. Under certain circumstances, UWID may serve adjacent areas outside its IPUC certificated area. *See, e.g., Eagle Water Co., Inc. v. Idaho PUC,* 940 P.2d 1133 (1997) (discussing Idaho Code § 61-526).

Occasionally, the IPUC is called upon to resolve disputes between competing service providers, and may award to one an area previously served by another. The IPUC only regulates investor-owned companies. It does not regulate water service provided directly by municipalities, other governmental entities, cooperative or mutual nonprofit corporations.[8] However, the IPUC takes into account those areas served by municipalities when assigning certificated areas to non-municipal entities. In this way, overlaps between non-municipal entities (such as UWID) and municipalities in the water service business are avoided.

The map attached hereto as Exhibit B shows the Company's certificated area boundary as authorized today (in 2002) and as of 1996. A comparison of the two areas graphically illustrates the expansion of the service area boundary over the last six years.

United Water provides municipal water to a broad range of residential, commercial, industrial and governmental customers.

United Water Idaho is cooperating with local governments and other parties in facilitating the provision of separate, non-potable irrigation ("NPI") water for lawns, parks and common areas. United Water has generally deferred to the policy preferences of local communities in this regard.

UWID operates as a wholesale provider of water, in that it does not control or direct the end use. Virtually every conceivable use of water is made of water provided to UWID's customers. This includes domestic use, irrigation of lawns, gardens, common areas, parks and greenways, open space and recreational fields, water amenities and aesthetic uses, pools and other recreational uses, commercial and industrial uses of all types, habitat protection and improvement, environmental mitigation and remediation, ground-water recharge, traditional agricultural and stockwater uses, fire-fighting, street cleaning, use by the Company, and all other beneficial uses to which its customers apply water. All of these are deemed "municipal purposes" under the 1996 Act.[9] As with all municipal providers, a fraction of the Company's water is attributed to system losses. These include maintenance flushing, system leaks, and the like. These are deemed a cost of doing business, and are part of the municipal right.

The Company owns some interests in traditional surface storage rights. In addition, the Company is engaged in, and may expand in the future, aquifer storage/recharge ("ASR") projects, in which water is stored in underground aquifers for subsequent removal and beneficial use by those undertaking the storage.[10] These projects

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[8] Idaho Code §§ 61-104, 61-125, 61-129.

[9] Idaho Code § 42-202B(5) (definition of "municipal purposes").

[10] ASR projects should be distinguished from "public benefit aquifer recharge" (or "PBAR") projects. PBAR projects typically are undertaken with public or other broad funding for the benefit of all water users within a

may be undertaken by the Company independently or in cooperation with other entities. ASR projects may serve both water quality purposes and storage purposes.

In its recently filed IMAP, UWID estimated the quantity of water provided to various broad classes of customers. Not surprisingly, it found that the bulk of its customers (accounting for over 90 percent of water use) comes from residential and commercial customers. The current average per capita use for residential customers is under 500 gallons per day, while the average for commercial customers is over 1,700 gallons per day. The demand for residential customers varies substantially depending upon whether they irrigate lawns with municipal water or with non-potable irrigation ("NPI") water supplied by other sources. Residential customers using NPI use approximately 30 percent of the total water used by those on municipal irrigation.

The IMAP study also determined that public sector customers account for less than one percent of total residential and commercial water sales. All hydrant use (including water sold to construction contractors as well as water not sold but used for firefighting and street cleaning) accounts for less than one percent. Water for the Company's own use (e.g., system flushing) accounts for just over one percent, while system losses account for approximately five percent.

The Company's water conservation program is subject to review and approval by the IPUC. Current measures include the use of education and pricing incentives designed to promote conservation in all uses of water and, in particular, to encourage cautious use of irrigation water during the summer.

The Company's water system is designed to serve both base load and peak demand. The peak demand (driven in large part by lawn irrigation) occurs during the hot summer. Base load has been increasing steadily over the years. In contrast, the peak demand, as a function of total annual production, has declined slightly over the years. In other words, the graph of annual demand has risen as a whole, but the peak is somewhat less pronounced.

Interestingly, the relationship between peak day volume and peak month volume remains quite stable over time. (The peak day will equal roughly 4 percent of the highest monthly volume for that year.) Consequently, United Water can accurately predict future peak day volume based on projections of future monthly demand.

Certification of Accuracy

I am Gregory P. Wyatt. I serve as President of United Water Idaho. I have reviewed the above discussion and the attached map. To the best of my knowledge, they

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geographic area. In contrast, ASR projects are privately constructed and operate pursuant to water rights held for the benefit of the Company and its customers.

present a fair, accurate and complete description of the Company's service area and water uses.

In preparing this MSAD, I have relied on my staff, in particular, H. Scott Rhead, Director of Special Projects, our IMAP consultant, John S. Church, President, Idaho Economics, our water counsel, Given Pursley LLP, in particular Christopher H. Meyer and John M. Marshall, and our IPUC counsel, McDevitt & Miller LLP, in particular Dean J. Miller.

I am authorized to make this submission on behalf of United Water Idaho.

Respectfully submitted,

OCTOBER 21, 2002
Date

Gregory P. Wyatt
President
United Water Idaho Inc.

EXHIBIT A

Authorities on the Subject of Municipal Water Rights

Municipal water rights have long been accorded special treatment under the law of water rights in Idaho and throughout the West. This body of law is sometimes referred to as the "Growing Communities Doctrine."[11] The following authorities document and discuss the special treatment accorded municipal water providers.

Idaho Cases:

City of Pocatello v. Murray, 206 F. 72, 80 (D. Idaho 1913), *aff'd, Murray v. City of Pocatello*, 214 F. 214 (9th Cir. 1914).

Beus v. City of Soda Springs, 62 Idaho 1, 107 P.2d 151 (1940).

Village of Peck v. Denison, 92 Idaho 747, 450 P.2d 310 (1969).

Other Western Cases:

Holt v. Cheyenne, 137 P. 876 (1914)

City and County of Denver v. Sheriff, 96 P.2d 836 (Colo 1939).

City and County of Denver v. Northern Colorado Water Conservancy Dist., 276 P.2d 992 (Colo. 1954) ("*Blue River*").

Metropolitan Suburban Water Users Ass'n v. Colorado River Water Conservation Dist., 365 P.2d 273 (Colo. 1961), rev'd on other grounds sub nom., *Denver v. Colorado Water River Conservation Dist.*, 696 P.2d 730 (Colo. 1985).

Colorado River Water Conservation Dist. v. Vidler Tunnel Water Co., 594 P.2d 566 (Colo. 1979).

Rocky Mountain Power Co. v. Colorado River Water Conservation Dist., 646 P.2d 383 (Colo. 1982).

City of Thornton v. Bijou Irrigation Co., 926 P. 1 (Colo. 1996).

In re the Application of Plains Electric Generation and Transmission Coop., Inc., 750 P.2d 475

[11] The label "growing communities doctrine" was employed by the Washington Supreme Court in *State of Washington, Dept. of Ecology v. Theodoratus*, 135 Wash.2d 582, 957 P.2d 1241 (1998) (dissent). Although this shorthand description has not yet been adopted by the Idaho Supreme Court, and differs somewhat from the "great and growing cities doctrine" which has taken hold in Colorado, it captures the central idea behind the case law. The doctrine plainly applies to all growing communities, large and small, not just to great cities. For instance, in *Village of Peck v. Denison*, 92 Idaho 747, 751, 450 P.2d 310, 314 (1969), the doctrine was applied to a community of 200 inhabitants.

(N.M. App. 1988).

Jicarilla Apache Tribe v. United States, 657 F.2d 1126 (10th Cir. 1981).

Weaver v. Eureka Lake Co., 15 Cal. 271 (1860).

City of Beaumont v. Beaumont Irrigation Dist., 42 Cal. Rptr. 859, 867 (Cal. App. 1965), *affirmed but opinion vacated by*, 405 P.2d 377 (Cal. 1965).

State of Washington, Dept. of Ecology v. Theodoratus, 957 P.2d 1241 (Wash. 1998) (dissent).

State ex rel. State Engineer v. Crider, 431 P.2d 45 (N.M. 1967).

Reynolds v. City of Roswell, 654 P.2d 537 (N.M. 1982).

Idaho Statute:

Municipal Water Rights Act of 1996, 1996 Idaho Sess. Laws, ch. 297 (codified at Idaho Code §§ 42-202(2), 42-202B, 42-217("4."), 42-219(1) & (2), 42-222(1), 42-223(2), 43-335, 43-338).

Other Western Statutes:

Ariz. Rev. Stat. Ann. § 45-160.

Cal. Water Code §§ 106.5, 1264 (Deering 1977).

15 Colo. Rev. Stat. § 37-92-103(3)(a)(I).

Nev. Rev. Stat. § 533.030(3).

N.M. Stat. Ann. §§ 72-12-8, 72-1-9.

Or. Rev. Stat. §§ 537.230(1), 537.410(2), 537.610(2)(a), 537.260(4).

Utah Code Ann. § 73-1-4(3)(b)(iv).

Utah Code Ann. § 73-3-12(1).

Wash. Rev. Code § 90.03.260.

Commentary:

Janis A. Carpenter, *Water for Growing Communities: Refining Tradition in the Pacific Northwest*, 27 Envtl. L. 127 (1997).

A. Dan Tarlock, *Law of Water Rights and Resources* §§ 5:63, 5:66 (2002 Supp.).

A. Dan Tarlock, *The Future of Prior Appropriation in the New West*, 41 Natural Resources J. 769 (2001).

Frank J. Trelease, *Preferences to the Use of Water*, Rocky Mtn. L. Rev. 133, 138 (1955).

Waters and Water Rights, § 14.03(a) at 170-71, § 48.03(c) (Robert E. Beck ed., The Michie Company 1991).

Wells A. Hutchins, *The Idaho Law of Water Rights*, 5 Idaho L. Rev. 1, 44 (1968).

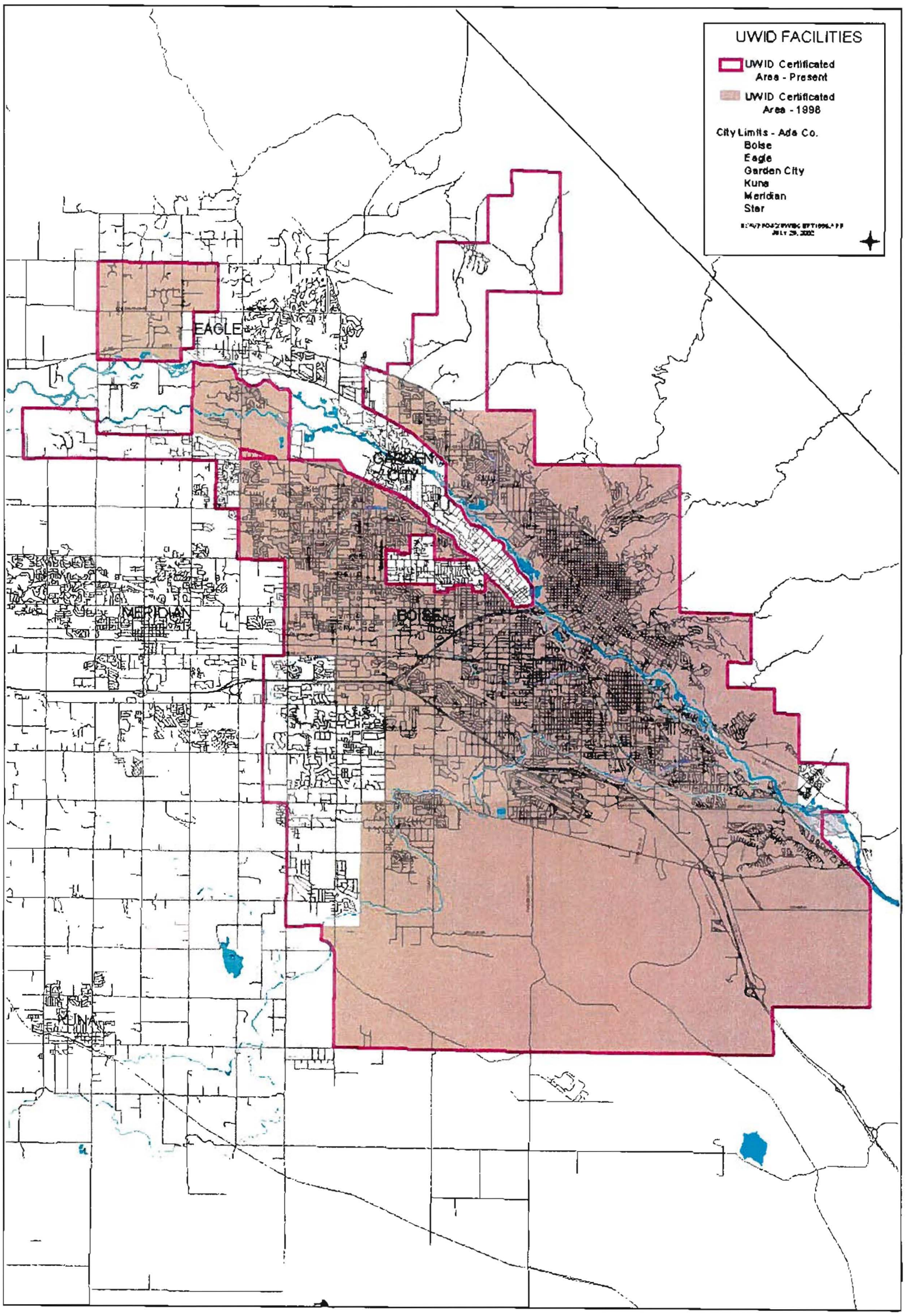
Note, Recent Developments in the El Paso/New Mexico Interstate Groundwater Controversy—The Constitutionality of New Mexico's Municipality Water Planning Statute, 29 Nat. Resources J. 223, 229-30 (1989).

Lynne Krogh-Hampe, *Injury and Enlargement in Idaho Water Right Transfers*, 27 Idaho L. Rev. 249, 294 (1990).

Jeffrey C. Fereday, Christopher H. Meyer and Michael C. Creamer, *The Idaho Water Law Handbook*, ch. J. (2002).

EXHIBIT B

1996 and 2002 Service Boundary Comparison Map (attached)


UWID FACILITIES
UWID Certificated Area - Present
UWID Certificated Area - 1998
City Limits - Ada Co.
Boise
Eagle
Garden City
Kuna
Meridian
Star
JULY 29, 2002
EAGLE
GARDEN CITY
MERIDIAN
BOISE
KUNA

LAW OFFICES

GIVENS PURSLEY LLP

AN OVERVIEW OF UNITED WATER'S "IMAP" INCLUDING AN EXPLANATION OF THE "INTEGRATED POINTS OF DIVERSION" ISSUE

Prepared on behalf of United Water Idaho Inc.

By Christopher H. Meyer
Givens Pursley LLP

July 15, 2002

This memorandum is submitted to the Idaho Department of Water Resources as part of the record in connection with United Water Idaho's pending Integrated Municipal Application Package. It is also made available to participants in the administrative process and to all interested members of the public.

For further information, do not hesitate to contact United Water Idaho (Scott Rhead at 208-362-7345) or Givens Pursley (Christopher Meyer or John Marshall at 208-388-1200).

TABLE OF CONTENTS

I. INTRODUCTION 3

II. WHAT IS SPECIAL ABOUT MUNICIPAL WATER RIGHTS? 3

III. WHAT IS THE IMAP? 5

A. How was United Water's planning area established? 5

B. How were population projections calculated? 6

C. How was future water demand calculated? 7

D. How much water will United Water need? 8

IV. WHAT DOES IPD MEAN? 9

A. Why is United Water seeking to integrate its points of diversion? 9

B. Is it common to seek integrated points of diversion? 10

C. Could the integration of United Water's points of diversion injure other water right holders? 10

D. How will the proposed conditions be implemented? 12

E. Will the IMAP protect future users as well? 13

F. Won't other water users still have to worry about the uncertainty of enforcing their rights? 13

G. What can United Water do if it needs to increase the capacity of a well? 13

H. If United Water has agreed to protect against well interference, what difference does it make to have integrated points of diversion? 13

I. Could the flexibility afforded by integrated points of diversion in responding to area-wide curtailment be disadvantageous to other water users? 15

I. INTRODUCTION

On May 4, 2001, United Water Idaho ("UWID" or "United Water") submitted its Integrated Municipal Application Package ("IMAP") to the Idaho Department of Water Resources ("IDWR" or the "Department"). An amended version of the IMAP was submitted on March 21, 2002. Notice of the IMAP (based on the amended submission) was published on April 4 and 11, 2002. A short errata sheet identifying several minor corrections to the IMAP was submitted on July 15, 2002.

The administrative review process is now underway. This memorandum provides a brief explanation and overview of the IMAP, paying particular attention to the issue of UWID's request for "integrated points of diversion" (or "IPD") for its ground water rights.

II. WHAT IS SPECIAL ABOUT MUNICIPAL WATER RIGHTS?

United Water and its predecessors have served the Treasure Valley since 1890—the same year Idaho was granted statehood. Over the course of those 112 years, United Water has acquired a substantial portfolio of water rights serving communities throughout Ada County.[1] As of 2000, United Water holds a portfolio of 112 water rights and permits totaling totals 313.2 cfs.[2] This includes 93 ground water rights, 18 ground water permits,[3] and one surface water permit from the Boise River.[4]

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[1] United Water Idaho also owns four small water rights that serve non-contiguous residential areas in Ada and Canyon County. The delivery systems for these areas are not yet integrated into United Water's main delivery system. The areas served by these rights were not included in the IMAP's planning area (and therefore did not contribute to future demand predictions), but are included in the IMAP for other purposes, such as IPD.

[2] In addition to the rights and permits included in its IMAP portfolio for transfer purposes, UWID also holds a handful of contract entitlements, exchanges and other interests in surface water rights. (See Part E7 of the IMAP.) For purposes of simplicity, these are not included in the IMAP transfer applications. All but one (held for mitigation purposes), were included nevertheless in the quantification of United Water's current portfolio of water rights (313.2 cfs). This disclosure has the conservative effect of reducing the size of United Water's Planning Horizon Component (explained in Part III.D at page 8 below).

[3] A permit is the first stage in obtaining a water right. A permit is issued upon filing an application for a water right. Once a permit holder constructs the project and thereby "proves up" his or her right, it is re-issued as a license. This process of proving up a municipal water right has been specially tailored to municipal providers under the Municipal Water Rights Act of 1996. Idaho Code § 42-219(1).

[4] The only surface water permit in UWID's portfolio is its Boise River right for the Marden Treatment Plant, No. 63-12055. Like the other surface entitlements mentioned in footnote 2, UWID has included this water right in the IMAP solely for purposes of addressing needs during the planning horizon. No surface water right or permit is included in UWID's request for integrated points of diversion. United Water also has pending (independent of this IMAP) a new application for a permit to appropriate 20.0 cfs from the Boise River for a new

Municipal water providers in Idaho and throughout the West are afforded special treatment under water law.[5] In Idaho, this common law protection is often referred to as the "growing communities doctrine."[6] In a nutshell, it allows and encourages municipal providers to acquire water rights to serve long term needs. So long as there is a reasonable basis for holding such water rights, they are deemed to be beneficially used (and thus not subject to forfeiture). This is so even if they are not pumped for years. The idea is that the very presence of a stable, long term municipal supply is essential to the success of every growing community.[7]

In 1996 the Idaho Legislature codified these longstanding common law principles

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proposed treatment plant. The point of diversion under this surface right application, if granted, would also be excluded from the request for IPD. However, United Water is requesting that this new right and United Water's existing Boise River right be made alternative points of diversion with each other.

[5] Janis E. Carpenter, *Water for Growing Communities: Refining Tradition in the Pacific Northwest*, 27 Envtl. L. 127 (1997); Wells A. Hutchins, *The Idaho Law of Water Rights*, 5 Idaho L. Rev. 1, 44 n.211 (1968); A. Lynne Krogh-Hampe, *Injury and Enlargement in Idaho Water Right Transfers*, 27 Idaho L. Rev. 249, 294-95 (1990); Frank J. Trelease, *Preferences to the Use of Water*, 27 Rocky Mtn. L. Rev. 133, 138 (1955); *State of Washington, Dept. of Ecology v. Theodoratus*, 135 Wash.2d 582, 957 P.2d 1241 (1998); *City and County of Denver v. Sheriff*, 96 P.2d 836, 841 (Colo. 1939); *City of Pocatello v. Murray*, 206 F. 72, 80 (D. Idaho 1913), *aff'd*, 214 F. 214 (9th Cir. 1914); *Village of Peck v. Denison*, 92 Idaho 747, 450 P.2d 310 (1969); *Beus v. Soda Springs*, 62 Idaho 1, 107 P.2d 151 (1940).

[6] We employ the phrase "growing communities doctrine" to capture the essential points of the case law. The phrase has now been picked up by the Washington Supreme Court, *State of Washington, Dept. of Ecology v. Theodoratus*, 135 Wash.2d 582, 957 P.2d 1241 (1998). Although this shorthand description has not yet been employed by the Idaho Supreme Court, we think it captures the idea better than the phrase "great and growing cities doctrine" which originated in Colorado. Whatever it is called, the doctrine plainly applies to all growing communities, large and small, not just to great cities. For instance, in *Village of Peck v. Denison*, 92 Idaho 747, 751, 450 P.2d 310, 314 (1969), the doctrine was applied to a community of 200 inhabitants.

[7] Some people have trouble with the idea of describing such a long term supply as a current "beneficial use" (in water law parlance). But this is not a foreign concept. In some ways, it is analogous to water stored in a reservoir. Such water might sit there for a decade or more, waiting for the next big drought. Yet no one would suggest that such stored water is not "beneficially used" or is forfeited simply because, due to fortunate weather, it is not needed now. It is easy to understand why the availability of water in a reservoir serves important present purposes, even in years it is not diverted. Its very presence provides economic security to farmers (and to their lenders). The same is true for water rights held for long term use by a municipality. Without an adequate portfolio of water rights, municipal leaders would be hard pressed to attract good businesses and plan effectively for future growth.

These principles are deeply engrained in western water law. "The storage of water for future uses has long been held to be a beneficial use." *Waters and Water Rights*, § 13.03 at 144 (Robert E. Beck ed., The Michie Company 1991) (citations omitted); "Initially, the system relented on this proposition [requiring immediate use] only with reference to the building of reservoirs to catch otherwise unusable seasonal flows and floodwaters. ... Now, of course, municipalities are allowed to acquire supplies for projected future use; indeed, in many instances are required to, for long-term growth." *Waters and Water Rights*, § 12.03(c)(2) at 108 (Robert E. Beck ed., The Michie Company 1991) (citations omitted); Samuel C. Wiel, *Water Rights in the Western States* § 378 at p. 410 (1911); 45 Am. Jur. 2d *Irrigation* § 38 (1969).

by adopting the Municipal Water Rights Act of 1996.[8] The 1996 Act preserved the special features of municipal water rights, but added a number of procedural requirements and substantive sideboards designed to prevent abuses (such as hoarding of water rights) which have occurred in other western states.[9]

III. WHAT IS THE IMAP?

The principal purpose of the IMAP is to bring United Water's portfolio of water rights within the Municipal Water Rights Act of 1996. In doing so, United Water is required to establish a long term planning horizon and estimate its water needs over that period. In its application, United Water adopted a fifty year planning horizon, consistent with those of other rapidly growing western cities.

A. How was United Water's planning area established?

The IMAP is based on projections of future demand within United Water's "planning area." This term should not be confused with United Water's "service area." United Water's service area is set by the Idaho Public Utilities Commission, and evolves over time. United Water's planning area is both larger and smaller than its service area.

This term "planning area" does not appear in the 1996 Act. Rather, the concept of a planning area was developed in pre-application consultation with the Department in order to implement the Act's requirement to quantify its long term needs under constraints imposed by the statute. Idaho Code §§ 42-202B(5) and (6).

The planning area begins with United Water's best guess as to where its service area will be in fifty years. For instance, the planning area includes some largely undeveloped desert land south of Boise that United Water anticipates will eventually be added to its service area.[10] This implements the Act's mandate that long term planning take into account not just today's service area, but areas that the municipal provider later "becomes entitled" to serve. Idaho Code § 42-202B(6). In any event, this expansion area south of Boise contributed a very small quantity of the projected future demand.

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[8] Municipal Water Rights Act of 1996, 1996 Idaho Sess. Laws, ch. 297 (codified at Idaho Code §§ 42-202, 42-202B, 42-203, 42-217, 42-219, 42-222).

[9] These requirements are explored in detail in Fereday, Meyer & Creamer, *Handbook on Idaho Water Law* (2002) (available on request from Givens Pursley).

[10] This area was included because it is likely to experience some population growth, and is virtually certain to be served by UWID. Although it is not currently part of UWID's current service area nor is it included in Boise's current area of impact, its inclusion is consistent with the 1996 Act's admonition to include areas that the applicant is expected to become entitled to serve during the planning horizon. Idaho Code § 42-202B(7).

Next, the planning area was then cut back to reflect restrictions imposed in the 1996 Act. Idaho Code § 42-202B(5). Finally, out of an abundance of caution, United Water elected to further reduce the planning area in order to eliminate areas of controversy or other uncertainty. These downward adjustments to the planning area boundaries (some required, others discretionary) include the following:

- First, the planning area is limited to Ada County, thus eliminating two water rights serving non-adjacent properties in Canyon County.

- Second, the planning area excludes communities that have their own water supply system, such as Garden City, Meridian, Kuna, Star and parts of Eagle.

- Third, the planning area excludes certain areas that are subject to unresolved planning conflicts among competing governmental entities or to competition among potential water providers. For this reason, the planning area does not include growth areas surrounding Kuna and Star, and it excludes the entire Eagle area.

- Fourth, the planning area excludes other areas that were simply deemed too speculative or controversial, such as expanded development in the foothills.

As a result of these limitations, United Water's planning area largely tracks its current service area.

B. How were population projections calculated?

Once the planning area was established, United Water retained John S. Church, President of Idaho Economics, to develop its long term water demand projections corresponding to that area.[11] In doing so, Mr. Church employed the latest economic, population and other data available in the Treasure Valley, and employed a sophisticated econometric model to analyze these data.

In any modeling exercise, a number of choices and assumptions must be made. In each case, Mr. Church's model is based on fundamentally conservative but realistic assumptions, consistent with known data and prior trends. Throughout the process, Mr. Church consulted with IDWR's technical staff to ensure that his methodologies and assumptions comported with those employed in other official planning efforts now

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[11] For many years, Mr. Church produced the population and economic forecasts for Idaho Power Company. Mr. Church is now in private practice. He is considered by many to be the top economic planner in the state.

underway in the region.

The end result of that extensive effort is a conservative but realistic prediction that the population within United Water's planning area will grow by 1.86 percent per annum over the fifty year planning horizon.[12] This conservative prediction compares with actual annual Ada County population growth of 3.50 percent in the last decade. The results are summarized in Figures 1 and 2 below:

Figure 1
Projected Population in UWID's IMAP

Geographic Area Served	Actual Population in 2000	Projected Population in 2050	Annual Increase in Population
Ada County	292,160	813,966	2.06%
UWID Service or Planning Area	214,615 (based on year 2000 service area)	540,020 (based on year 2050 planning area)	1.86%

The conservative effect of United Water's planning area delineation is evident in the fact that the projected growth of the planning area is less than the projected growth of the entire county. (See Figure 1 above.) This reflects the fact that much of United Water's planning area is already built out. As a result, future growth is expected to occur somewhat more intensively outside of United Water's planning area.

Figure 2
Recent Historical Population Growth in Ada County

Actual annual increase in Ada County population in last 30 years (1970-2000):	3.22%
Actual annual increase in Ada County population in last 10 years (1990-2000):	3.50%

C. How was future water demand calculated?

Once the predicted population was established, the next step was to calculate water demand. This is not a simple linear function based on population. Instead it is necessary to predict the answers to questions such as these: How many new jobs will the local

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[12] The average annual increase in population uses data based on UWID's service area in 2000, because no data are available for the year 2000 population within its planning area. This overstates the starting point population because parts of Eagle are included in UWID's current service area, and understates it because the planning area includes other areas not within UWID's current service area. To the extent that these discrepancies do not cancel each other out, they may lead to a slight error in the projected annual increase of 1.86 percent. However, this is of no consequence, because the year 2050 projected demand is not based on an extrapolation from current service area statistics, but is arrived at through independent population and economic modeling based on the planning area.

economy create? How much immigration will occur in response to those new jobs? How much of the new population will reside in landscaped suburban homes versus high density apartments? Will lawn sizes, and the use of xeroscaping, increase or decrease? How many of the new lawns will be served with non-potable water from secondary sources? How much new commercial water demand will there be? How will users respond to rate increases?

All of these factors were incorporated into a detailed econometric model developed by Mr. Church. The end result was that peak demand is predicted to grow from its year 2000 peak of 147.5 cfs to 416.8 cfs in the year 2050. This near tripling of water demand over fifty years reflects an annual growth rate of just 2.10 percent (see "note" at bottom the of Figure 3 below).

D. How much water will United Water need?

United Water's current portfolio of water rights is sufficient only to meet a peak demand of 313.2 cfs (see item B in Figure 3). Thus, if the IMAP is approved, United Water will then be entitled to acquire additional water rights in the amount of 103.6 cfs to meet its long term planning horizon need (see item E in Figure 3). The Planning Horizon Component (or "PHC") equals the total projected demand (for year 2050) less current demand (for year 2000). This equates to 269.3 cfs (see item F in Figure 3).[13]

[13] "PHC" and "future need water rights" are two ways of describing the same thing. Both refer to water rights not needed to meet current demand, but held (or later acquired) to meet long term needs over the planning horizon. These are sometimes referred to as "future need water rights," drawing on the language of the 1996 Act. UWID has not employed that terminology, however, because the reference to "future needs" leads some to think that these rights serve no beneficial use today. Yet, as the 1996 Act makes clear, these water rights are deemed beneficially used today, even if they are not pumped for many years. The certainty provided by the presence of these water rights in the provider's portfolio assists municipalities in achieving their comprehensive planning goals.

Figure 3

Projected Planning Horizon Needs Under UWID's IMAP

ITEM	DESCRIPTION	SOURCE / DERIVATION	QUANTITY
A	Current peak demand (year 2000)[14]	Actual	147.5 cfs
B	UWID's current portfolio of water rights	Actual	313.2 cfs
C	Total projected peak demand in year 2050 (composed of current demand plus PHC)	Projected by IMAP also C = A + F: 147.5 + 269.3	416.8 cfs
D	Rights in current portfolio held for planning horizon needs	D = B – A: 313.2 – 147.5	165.7 cfs
E	Additional rights (not currently owned by UWID) required to meet planning horizon needs	E = C – B: 416.8 – 313.2	103.6 cfs
F	The Planning Horizon Component ("PHC")	F = C – A: 416.8 – 147.5 or F = D + E: 165.7 + 103.6	269.3 cfs
NOTE: AVERAGE ANNUAL RATE OF GROWTH OVER 50 YEARS (from 147.5 cfs to 416.8 cfs): 2.10%[15]			

Note that approval of the IMAP will not add any water rights to United Water's portfolio. The effect of the IMAP is simply to authorize the company to purchase (or otherwise acquire) water rights and add them to its portfolio.

IV. WHAT DOES IPD MEAN?

A. Why is United Water seeking to integrate its points of diversion?

In addition to planning for long term needs, United Water is seeking through the IMAP to make every ground water point of diversion within its system (that is, every well) an alternative point of diversion for each other. See Part D2 of the IMAP. We refer to this as "integrated points of diversion" or "IPD." The effect of changing to IPD is to allow any water right to be pumped from any well.

As explained in footnote 4 above, United Water's IMAP portfolio includes one permit for surface water from the Boise River, and a second is proposed. However, these permits are not included for purposes of IPD. The IPD request applies only to United

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[14] The number for 2002 demand is based on actual data and reflects UWID's systemwide use within its current service area.

[15] This number reflects UWID best estimate of the projected annual increase in water demand. The starting point reflects current production in UWID's "service area" and the ending point corresponds to UWID's "planning area." For reasons of consistency, however, both include water now supplied to the City Eagle. See Part E6(f)(i) of the IMAP.

Water's ground water rights.

Historically, each time United Water drilled a new well, it would acquire a new ground water right associated with that well. The IMAP recognizes the practical reality that all of these ground water rights are operated together as part of a single, integrated delivery system. (See footnote 1 above.)

An example helps to illustrate. Suppose that in 1960 United Water drilled a well and obtained a corresponding ground water right with a 1960 priority date. For a variety of reasons, United Water might some day need to pump that 1960 water right out of another well. Doing so requires a "change" in water right.[16] United Water is seeking such a "change" on a system-wide basis at this time to ensure that it has the flexibility to respond as needed to changing circumstances in the future.

By making every point of diversion an alternative point of diversion for every other ground water right, it is not necessary for United Water to go through a formal change proceeding each time it wishes to make such a move. The practical effect is to treat the water rights in its portfolio as fungible. This way, system operators can operate the system to maximize system efficiency, paying attention to individual and aggregate pumping levels, without having to keep track of which water right is being pumped from which well.

B. Is it common to seek integrated points of diversion?

Yes, use of IPD is common. Nor is it limited in any way to municipal water rights. For instance, a farmer who is adding a new well to his or her system typically will ask the Department, at the same time, to make each point of diversion an alternative point of diversion for each well on his or her farm. These IPD requests are routinely approved by the Department, so long as there is no injury to other users. United Water seeks the same thing, but on a larger scale.

C. Could the integration of United Water's points of diversion injure other water right holders?

United Water has agreed to a set of conditions to prevent any injury resulting from IPD. The proposed conditions are set out in Appendix A to this memorandum.

In order to understand how these conditions work, it is necessary to distinguish carefully two circumstances in which the Department has authority to curtail water rights.

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[16] UWID could also claim these changes as "accomplished transfers" under Idaho Code § 42-1425.

Curtailments may occur: (1) in response to well interference (between two specific wells) and (2) in times of area-wide curtailment (such as a drought). In essence, the proposed condition allows United Water to employ IPD only in the context of area-wide curtailment. Moreover, it locks United Water into the current (pre-IMAP) diversion rate limits for each of its wells.

In the past, most water right disputes have occurred as a result of well interference. When the cones of depression from two wells overlap, one well may cause the other to go dry (or reduce its production).[17] In this case, whichever is the senior water right "wins."[18] In other words, maintaining one's senior status is critical to protecting oneself against well interference by others. Consequently, if United Water were granted an unfettered right to "swap priority dates" or "stack up water rights" in the name of implementing IPD, it could increase current levels of pumping with impunity,[19] and other water users could be injured. But, United Water is not seeking this.

A fundamental premise of the law of changes in water rights is that every other user, whether junior or senior, must be made no worse off by the change. Plainly, if United Water could defend existing injury claims on the basis of swapped priorities, or increased pumping out of a particular well to the extent of harming adjacent water rights, that would constitute an impermissible injury.

For this reason, United Water has agreed to a set of conditions flatly prohibiting both such actions. The IPD conditions provide, in essence, that United Water may not "move its water rights around" for purposes of defeating an interference claim (Condition No. 2). Nor may United Water "stack up" water rights onto a particular well in order to increase the pumping from that well beyond its originally licensed (or permitted) capacity (Condition No. 3).[20] Each of United Water's wells will retain a "memory" of the original

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[17] Pumping a well can also cause injury to a surface user, where there is a hydrological connection between the ground and surface rights.

[18] There may be exceptions to this rule. The Idaho Supreme Court seems to have held that domestic wells drilled prior to March 29, 1978 are absolutely protected from any significant drawdown by junior (i.e. post-1978) ground water diversions. *See Parker v. Wallentine*, 103 Idaho 506, 650 P.2d 648 (1982).

[19] For instance, some have expressed the concern that UWID might use its IPD to defeat a well interference claim by asserting an earlier priority from another well. Others have expressed concern that UWID might increase the capacity of one of its wells and then reallocate multiple water rights to pump out of that well. This "stacking" of water rights could increase the cone of depression associated with the well, and cause injury to other wells or surface users. Obviously, both of these actions (swapping priorities or stacking water rights) would be unfair—and impermissible under Idaho water law.

[20] UWID is entitled to its full licensed quantity irrespective of current use. This is one of the unique aspects of a municipal right, long recognized by the Idaho Department of Water Resources. A. Kenneth Dunn, IDWR,

water right associated with it. For purposes of evaluating well interference, United Water's authority to pump from that well will continue to be measured according to the diversion rate and priority date originally associated with that well (prior to the IMAP).

Indeed, the IPD condition goes two steps beyond what is required under established rules of no injury. First, it locks in existing priority dates and quantities, period, irrespective of injury. Thus, other users do not need to worry about the expense or uncertainty of proving injury. Second, the condition extends the "no stacking" protection to future users. Thus, even water rights acquired subsequent to the IMAP will have the same protection against expanding a well beyond current licensed or permitted quantity.

The bottom line is the proposed condition assures that the IPD simply will not be used in the context of well interference. Consequently, persons or entities with wells, surface diversions or canals near United Water's water rights need not fear that the IMAP's provision for IPD can be used to their disadvantage.

D. How will the proposed conditions be implemented?

A simple example illustrates how the proposed conditions would work. Suppose that United Water drilled a well in 1985 and obtained a corresponding water right for 1 cfs in that year. Suppose that the United Water well was located close to two other wells owned by other persons. The United Water well caused no injury to the first adjacent well with a 1970 water right, but is interfering to some extent with another adjacent well with a 1990 water right. (This would be permissible, because United Water's 1985 right is senior to the neighboring 1990 well.)

Next, suppose that the Department curtailed all water rights junior to 1980. Without the IMAP, this would mean that United Water would have to shut down its 1985 well. Likewise the adjacent 1990 well would be shut down. However, if United Water's request for IPD is approved, it might choose to pump 1 cfs of 1965-priority water out of its 1985 well, in order to comply with the curtailment order while keeping its best well in operation. This would be permissible under the proposed IPD conditions (Condition No. 1).

However, if United Water then sought to deepen its 1985 well, and pump 2 cfs of 1965 priority water out of the 1985 well, this would be <u>not</u> allowed, period (Condition No. 3). The only way for United Water to expand production from any of its wells beyond the licensed or permitted diversion rates would be to go through a formal change

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Administrator's Memorandum, *Licensing Procedures* (Apr. 7, 1975). *See* discussion in Fereday, Meyer & Creamer, *Handbook on Idaho Water Law*, Subchapter J-5 (2002) (available on request from Givens Pursley).

or other application process, just as is required for any other water user (Condition No. 4).

E. Will the IMAP protect future users as well?

The proposed IPD conditions (in particular the "anti-stacking" Condition No. 3) protect not only existing water right holders, but those who obtain water rights subsequent to approval of the IMAP. Thus, even someone who obtains a water right in the future may be assured that United Water will not use its IPD authority to increase pumping levels beyond those authorized for the particular well.

Note that this concession on United Water's part goes beyond anything required by law.[21] It simply recognizes and affirms that United Water's request for IPD is intended solely to maximize its flexibility in responding to a crisis or emergency, not to gain an advantage with respect to other users, current or future.

F. Won't other water users still have to worry about the uncertainty of enforcing their rights?

United Water has crafted the proposed IPD conditions so as to make them essentially automatic. In doing so, United Water went beyond what is required by law. For instance, it could have retained the right to expand production at its wells where doing so did not interfere with other users. However, this could have led to arguments (and costly battles) over injury. Instead, United Water has agreed to Condition No. 3 that imposes a flat prohibition on any expansion beyond previously authorized levels, period.

G. What can United Water do if it needs to increase the capacity of a well?

If United Water finds it necessary at some point in the future to increase the capacity of any of its wells beyond that originally authorized, it will need to go through a change proceeding or other approval by the Department, just like any other user (Condition No. 4). Such changes (or new appropriations) will be allowed only upon a showing of no injury and satisfaction of all other legal requirements.

H. If United Water has agreed to protect against well interference, what difference does it make to have integrated points of diversion?

As discussed above, there are two circumstances where the priority date of a

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[21] Fundamental principles of water law require that any change in water rights protect all existing water rights. There is no legal obligation to extend the protection to future users.

ground water right makes a difference. One is well interference and the other is an area-wide curtailment.

United Water has agreed not to use its IPD to defend well interference claims. On the other hand, IPD could make an important difference in the event that the entire aquifer (or other geographic area) was subject to curtailment or other administration.

As explained above, area-wide curtailment has nothing to do with well interference. Well interference is highly localized, and is typically caused by a particular diversion. In contrast, area-wide curtailment would be imposed in response to a change in circumstances affecting an entire aquifer, sub-aquifer or other geographic area. This might be the result of a physical change (such as an extended drought and/or over-pumping) causing across-the-board decline in ground water levels. Likewise, a curtailment order could result from stricter administration of ground and surface water rights. For instance, at some point in the future the Department could determine that ground water pumping is causing injury to senior surface rights. Under rules of conjunctive administration, the Department could issue an order curtailing the pumping of any ground water right in an area junior to some specified date. Finally, an area-wide curtailment order could result from external demands, such as federal requirements to protect endangered species.

An example may help to illustrate. Suppose water users in the Treasure Valley (including United Water) were subject to a curtailment order cutting off pumping from any ground water right junior to 1980. Suppose, for simplicity's sake, that United Water owned four water rights with priority dates in 1950, 1960, 1990 and 2000, each for 500 acre-feet per annum. The effect of the curtailment order would be to cut United Water's pumping in half: from 2,000 acre-feet to 1,000 acre-feet.

If United Water's water rights were acquired separately and associated with each of its four wells (and there were no IPD authorization), United Water would have no choice but to shut down the two newer wells. However, if United Water had the foresight to obtain IPD approval for its four water rights, it would then have the option of choosing which of its wells to shut down. Thus, if United Water's two newer wells were configured so as to optimize operation of the delivery system at partial capacity, United Water would want to keep those in operation. Or, if it allowed the system to operate more effectively, United Water might operate all four wells, put produce only 250 acre-feet from each. In any event, the company would have the flexibility to allocate as it saw fit the loss of its two junior water rights within its municipal delivery system.

Note, again, that having IPD does not bring anyone any additional water. In this example, United Water must still comply with the curtailment order, and is still out 1,000

acre-feet of water. However, the alternative points of diversion do give the company maximum flexibility in responding to the crisis.

This is essential in the operation of a modern, pressurized, interconnected delivery system such as United Water's. In addition to wells and supply lines, the system contains booster pumps, reservoirs and interties which all act to move water throughout the system to most efficiently meet the current localized demands. Unfortunately, the current water right descriptions do not recognize this flexibility—which United Water has built into its system at considerable cost and with considerable benefits to its customers.

For example, United Water uses its best and most efficient wells around the clock to meet the base demand on the system. As demand surges at different locations within the system, additional wells are electronically activated. The sequence in which the various wells are used to meet the increasing demand is a function of each well's quality and its geographic location in relation to the increased demand. The system maximizes efficiency through a complex, integrated management system which automatically responds to fluctuations in demand, maximizes production of the best wells, stores water, utilizes stored water, and transports water to different service levels.

Moreover, through IPD, the Company can move its water rights around as needed to respond to an emergency. That could be a temporary emergency, such as a broken pump, a water main break, a contamination problem, or what have you.

Whatever the case, if United Water was required to cut back its pumping (and impose use restrictions on its users), the Company would want as much flexibility as possible in selecting which wells to pump, when, and how much. This might be critical, for instance, for maintaining water pressure and satisfying other system requirements.

I. Could the flexibility afforded by integrated points of diversion in responding to area-wide curtailment be disadvantageous to other water users?

Very simply, use of IPD in response to area-wide curtailment hurts no one. United Water will be subject to the same curtailment requirements as anyone else. IPD does not get anyone off the hook.

The only difference is that, in the event of a broad curtailment order, IPD would allow United Water to respond (through use restrictions, mitigation, or a combination) swiftly, efficiently, and in the way least painful to its users—that is, the public.

APPENDIX A
Proposed Conditions on Integrated Points of Diversion

Condition No. 1 (Integrated Points of Diversion). Approval of this IMAP authorizes UWID to pump each of the ground water rights identified in Table A below from any of the points of diversion identified in that table.

Condition No. 2 (Well Interference). In the event of a claim or assertion of well interference against UWID with respect to any of the wells listed in Table A, the priority date(s) and diversion rate(s) corresponding to that well, as shown in Table A, shall establish the controlling priority (or priorities) for purposes of evaluating the interference claim. This is so irrespective of which water right(s) UWID may choose to pump from any of its wells pursuant to Condition No. 1.

Condition No. 3 (Maximum Diversion Rate). In any event, UWID may not divert from any well listed in Table A at a rate in excess of the diversion rate specified in that table for that well.

Condition No. 4 (Future Changes). The points of diversion, diversion rates and priority dates listed in Table A may be altered only upon subsequent approval of a separate application (for change, appropriation or other lawful authorization) to the Idaho Department of Water Resources.

TABLE A
INTEGRATED POINTS OF DIVERSION ("IPD")
(This abbreviated example is for illustrative purposes only)

Well No.	Well Name	Location of Well (Point of Diversion)	Water Right(s) Associated with this Well for Purposes of Well Interference Analysis (Condition No. 1) and Maximum Diversion Rate (Condition No. 2)		
			Water Right Number	Diversion Rate	Priority Date
1.	Apple Well	SE NE SE, sec. 21, T2N, R1E (Ada County)	No. 63-11111 (license)	0.2 cfs	1-12-1950
2.	Baker well	SW NW SW, sec. 23, T2N, R3E (Ada County)	No. 63-33333 (permit);	1.0 cfs	3-30-1999
			No. 63-44444 (permit)	0.5 cfs	9-9-1999
			TOTAL	1.5 cfs[22]	
3.	Candle Well	SW SE, sec. 22, T2N, R2W (Canyon County)	No. 63-22222 (license)	0.5 cfs	2-22-1970

[22] Some wells may have more than one water right associated with them. However those water rights interact under their existing licenses or permits will be reflected in this table. In some instances, the water rights may be supplemental. In such a case, the "total" pumping allowed from that well would be reduced accordingly.