OPEN-FILE REPORT

GROUND WATER MANAGEMENT AREAS IN IDAHO:
OVERVIEW AS OF 1998

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INTRODUCTION

Introduction

The purpose of this report is to provide a summary of the current areas designated as Ground Water Management Areas (GWMA) and Critical Ground Water Management areas (CGWA). At present, there are 17 areas: eight CGWA and nine GWMA (Table 1 and Figure 2). This report is intended to provide a compilation of the current status of administrative actions and ground water level trends. Additionally, each section summarizes the general hydrogeology, current ground water level monitoring frequency, and a list of the primary reports and documents related to the area whether or not they are cited in the text.

This report is the first phase of a project to review, update and analyze data and develop recommendations for administration options for each management area. As you will note in the summaries, each area has unique characteristics, history, and impacts. Because of this uniqueness, data collection and management of each area must consider the localized aspects and develop individualized plans tailored to address the problems and issues of the area. These summaries will provide a foundation from which to build these plans.

The next phase will evaluate the technical aspects and activities within each area to determine the needs for additional data and follow up with updating or acquiring data. Water rights, land use changes, and other impacts will be analyzed. Water budgets and conceptual models will be developed for the most critical areas. The final phase of the project will develop recommendations for administrative and technical actions to alleviate ground water declines.

Statutory Authority

The authority for designating areas for regulating ground water withdrawals from aquifers subject to insufficient supplies was first granted in 1953 through amendments to Idaho's Ground Water Act. However, it was not until 1962 that the first CGWAs were designated in the Oakley Fan area. Amendments to the Act in 1982 granted authority for designating ground water management areas. The Grandview-Bruneau area, designated in 1982, was the first GWMA.

The Director of Idaho Department of Water Resources (IDWR) is granted the authority to designate "critical ground water areas" and "ground water management areas" under Idaho Code Title 42, Chapter 233a and 233b, respectively. These sections codify the definitions and bases for designating these special management areas.

A CGMA is all or part of a ground water basin that does not have sufficient ground water to provide a reasonably safe supply for irrigation or other uses at the current or projected rates of withdrawal. The Director of IDWR can deny an application for a proposed use if the point of diversion lies within the designated area and may require water users to report diversions or other information.

A GWMA is all or part of a ground water basin that may be approaching the conditions of a CGMA. Applications for new water appropriations may be approved only after it is

determined that sufficient supply is available and other prior water rights will not be injured. The director may require reporting of water use by water users within the area.

The Order designating the Southeast Boise GWMA in 1994 was the first time an advisory committee was required as a part of the initial formation of a GWMA. Since that time, orders requiring the formation of advisory committees have been issued subsequent to the initial formation of the management areas. These committees are to assist in the management of ground water resources through development of management plans, establishing processes for dispute resolution and acting as a forum for discussion and communication.

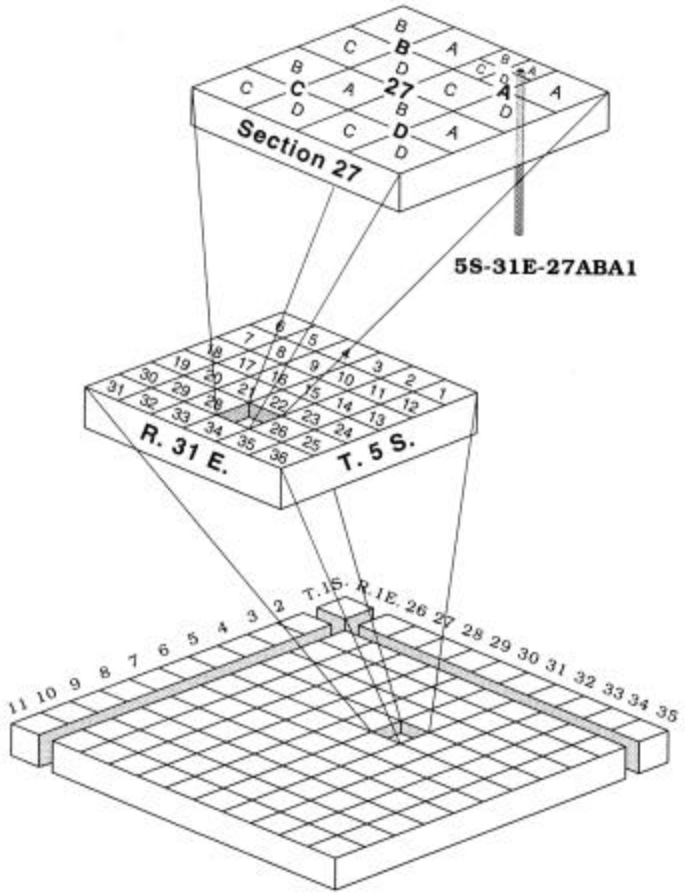

Figure 1: Well Numbering System

IDWR uses this well numbering system to indicate the location of wells within the Public Land Survey, as shown in the example above. The first two segments designate the township and range, the third section indicates the section. Quarter sections are designated by letters A,B,C, and D in counterclockwise order from the northeast quarter. Forty-acre and 10-acre tracts within each quarter section are lettered in the same manner. Well 5S-31E-27ABA1, for example, is in the NE1/4NW1/4NE1/4, section 27, Township 5 South, Range 31 East.

Management Area	Date Designated
CRITICAL GROUND WATER AREAS (CGWA)	
Blue Gulch	12/9/1970
Cinder Cone Butte	5/7/1981
Curlew Valley	3/15/1976
Oakley Fan	
Artesian City	1/16/1962
Cottonwood	1/16/1962
Oakley-Kenyon	1/16/1962
West Oakley Fan	1/19/1982
Raft River	7/23/1963
GROUND WATER MANAGEMENT AREAS (GWMA)	
Banbury Hot Springs	4/12/1983
Bancroft Lund	10/21/1991
Big Wood River	6/28/1991
Boise Front	6/15/1987
Grandview-Bruneau	10/29/1982
Lindsay Creek	3/5/1992
Mountain Home	11/9/1982
Southeast Boise	10/14/1994
Twin Falls	7/24/1987

Table 1: List of Critical and Ground Water Management Areas

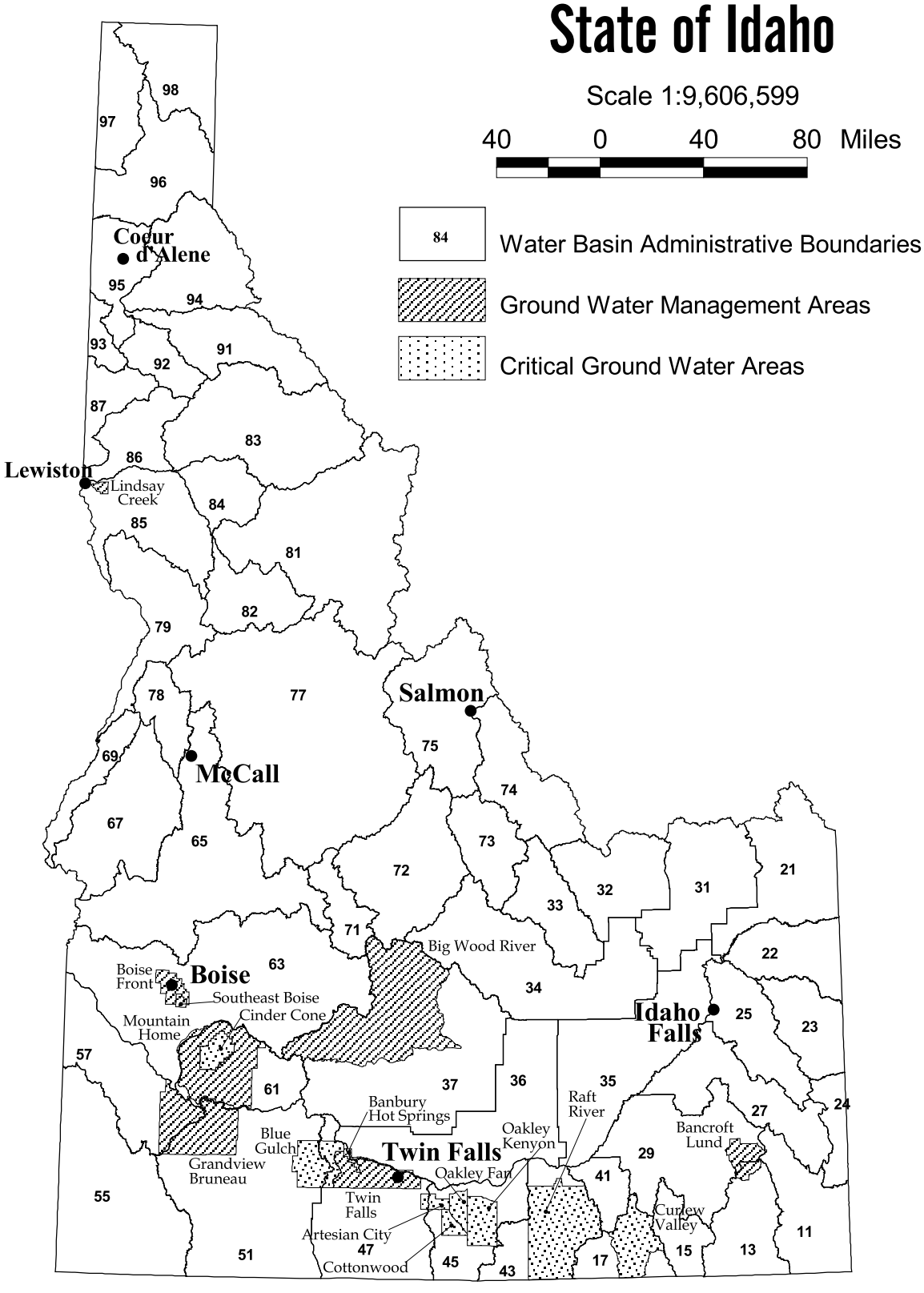

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Figure 2

BANBURY HOT SPRINGS GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Banbury Hot Springs Ground Water Management Area (GWMA) is located in Twin Falls County in southern Idaho (Figure 3). The GWMA was established on April 12, 1983. The resource was declared a GWMA because of declining artesian pressures and concern that over-utilization was being approached.

On December 4, 1985, an order was issued staying the approval of pending water right applications and suspending further development under existing permits. This action essentially established a moratorium on further development. New water appropriations are allowed for domestic uses only.

In April, 1998, a public meeting was held to discuss the status of the GWMA, ground water conditions, and the possible creation of an advisory committee. In November 1998, an advisory committee was formally established with the appointment of 11 people. The objectives of the Advisory Committee are (1) to serve as a forum for collecting and reviewing data; (2) serve as a forum for mediating water related issues within the GWMA; and, (3) develop a ground water management plan for the GWMA.

Hydrogeology

The geothermal aquifer occurs in the Idavada Volcanics and Banbury Basalt. It is a confined system with shut-in pressures ranging from 14 to 250 pounds per square inch or equivalent to 32 to 575 feet above land surface (Street and DeTar, 1987). The recharge area is probably the Cassia Mountains southeast of the area (Street and DeTar, 1987).

A conceptual model developed by Street and DeTar (1987) concluded that the Banbury geothermal system and the Twin Falls geothermal system to the east were hydrologically connected. This opinion was based on well test and monitoring data, water chemistry, and lack of barriers to thermal ground water flow. However, this conceptual model has not been confirmed through data collection or additional modeling. Further analysis of hydrographs is needed to confirm similarity of trends and degree of connection. Barriers to ground water flow occur as northwest-trending faults in the southwest part of the area (Lewis and Young, 1980).

Current Ground Water Conditions

Hydrographs of ground water levels in wells in the Banbury GWMA are shown in Figure 4. Although similar long-term trends are not apparent among all wells, some general observations can be made. From the late 1970s to mid-1980s, declines in water levels were significant (greater than or equal to 10 feet per year). From mid-1980 to mid-1990, most wells indicated stable water level trends, except for well 09S14E-14BDB1, showed a significant decline during this period (approximately 10 feet per year). From

mid-1990s to current, wells in the northwest portion depict declining trends while wells in the southeast portions appear to be relatively stable.

Six wells are monitored within the GWMA. IDWR monitors three wells on a quarterly basis. USGS monitors two wells bi-monthly and one well on a monthly basis. The oldest monitoring data is from about 1980. An additional well outside of the GWMA, known as the Filer Test well (09S16E-20ADD1), is also monitored as an indicator of the geothermal trends in the Banbury and Twin Falls areas.

REFERENCES

Lewis, R. E., and H. W. Young, 1980, Geothermal Resources in the Banbury Hot Springs Area, Twin Falls County, Idaho, USGS Water-Resources Investigations Open File Report 80-563, 35 pages.

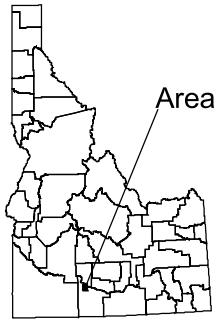
Street, Leah V., and Robert E. DeTar, 1987, Geothermal Resource Analysis in Twin Falls County, Idaho, IDWR Water Information Bulletin No. 30, Part 15, 46 pages.

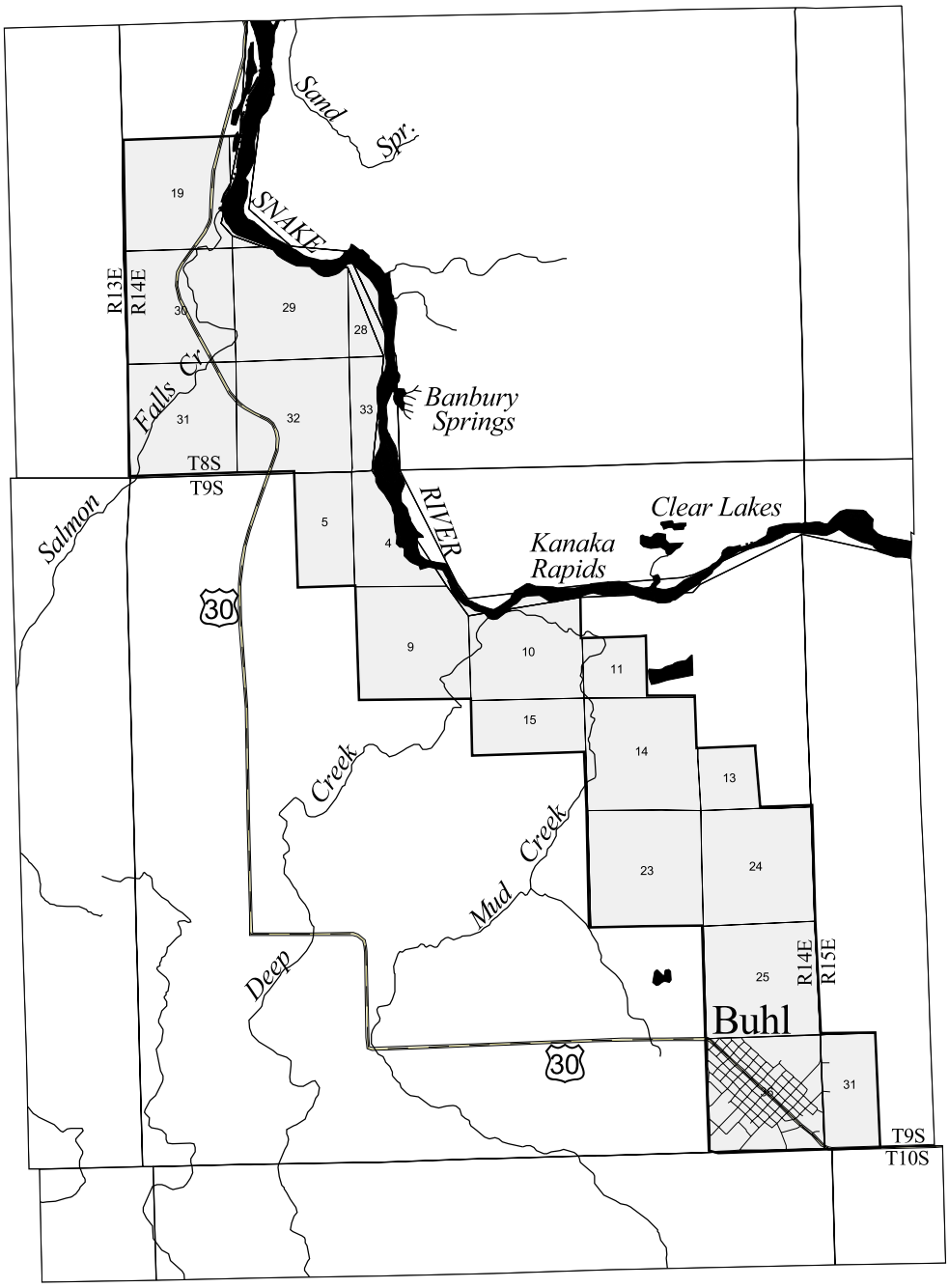
Banbury Hot Springs

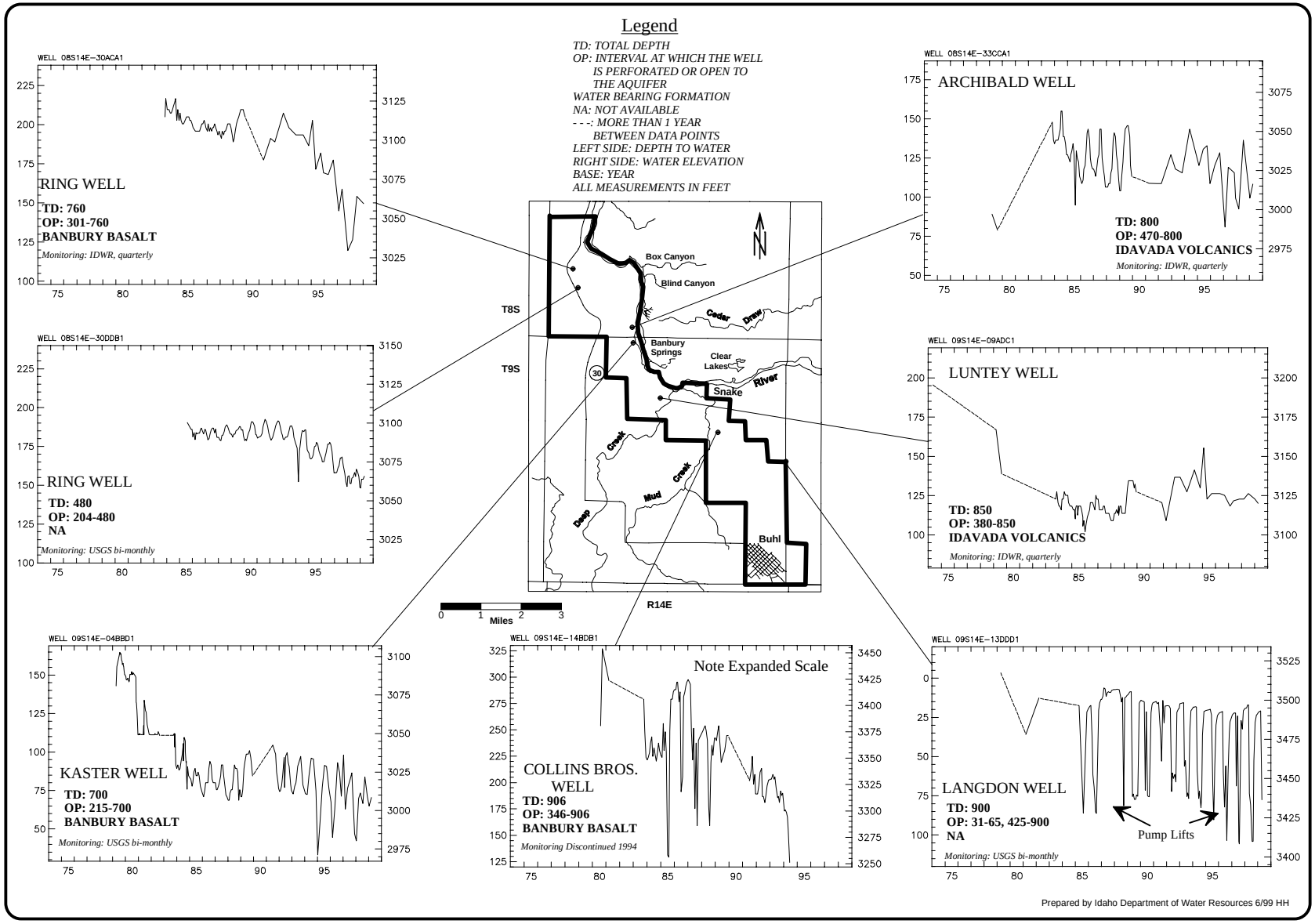
Ground Water Management Area

Scale 1:183,624

1 0 1 Miles







BANBURY HOT SPRINGS GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs

FIGURE 4

BANCROFT-LUND GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Bancroft-Lund Ground Water Management Area is located in southeastern Idaho in Caribou County (see Figure 5). The area was declared a GWMA on October 21, 1991. The basis for the declaration was the interrelationship between ground water and spring flow into the Bear River at Black Canyon (Bendixsen, 1994) and concern that proposed ground water development would deplete spring flows. There were also public concerns of well interference problems.

Several applications for permit to appropriate additional ground water were pending at the time the area was declared a GWMA. There were not enough data available to determine if ground water supply was adequate to fill the proposed uses. The order stated that proposals for new consumptive uses required the applicant to demonstrate that there would be no injury or depletions would be mitigated.

On October 17, 1995, an order was issued by IDWR creating Water District 13T in the Bancroft-Lund GWMA. The water district includes all water uses for irrigation from ground water within the boundaries of the Bancroft-Lund GWMA. Creation of the district allows for regulation of ground water rights. A management plan has not been adopted; however, an advisory committee has been established through Water District 13T.

Hydrogeology

Geology in the Gem Valley consists of lake sediments, stream deposits, and basalts from cones and fissures. Basalt flows in the basin caused damming of historic Lake Thatcher and changes in surface drainages during the last 30,000 years. Sand and gravel deposits occur along basin margins and mouths of streams (Bright, 1963 and Norton, 1981).

Ground water flow in the Bancroft-Lund area are unconfined except where saturated porous basalts are encountered beneath clay layers of lake bed deposits (Norton, 1981). A ground water divide occurs near the center of the area. Ground water north of the divide flows toward the Portneuf River to the northwest; ground water south of the divide flows south into the Bear River drainage. Springs in Black Canyon on the Bear River discharge as much as 22 cubic feet per second (cfs). The most productive wells in the area are completed in basalts while wells completed in the lake bed sediments are poorer producers (Norton, 1981).

Recharge occurs from precipitation on the valley floor and surface runoff from the surrounding mountains. Ground water flow through Ten Mile Pass and through the gap at Soda Point also provides recharge. Further recharge occurs from irrigation canals and infiltration from excess irrigation (Norton, 1981). There is limited natural surface flow across the valley floor.

Current Ground Water Conditions

Hydrographs (Figure 6) for the area indicate a generally stable ground water table with fluctuations attributed mainly to climatic wet and dry cycles. Above normal precipitation in the mid 1980s and mid 1990s and the declines in wells during the late 1970s and early 1980s and drought of 1987 to 1992 are depicted with corresponding rises and declines on hydrographs. No overall downward trends are apparent.

Current ground water level monitoring is conducted by the USGS at five wells on a quarterly basis. Data dates back to the 1960's with the exception of one well which has data dating back to 1928. Beginning in 1996, two wells have been measured by the IDWR Water Distribution Section on a yearly basis.

REFERENCES

Baker, S. J., 1990, Memo to Dave Shaw, Adjudication Bureau Chief, IDWR, Long Term Ground Water Trends in Gem Valley, 3 pages.

Baker, S. J., 1989, Memo to Dave Shaw, Adjudication Bureau Chief, IDWR, Analyses of Factors Effecting spring flow along the north side of Black Canyon, 6 pages.

Bendixsen, Shane, 1994, Summary of Ground Water Conditions in the Bancroft-Lund Ground Water Management Area, 13 pages.

Bright, Robert C., 1963, Pleistocene Lakes Thatcher and Bonneville, Southeastern Idaho, A Thesis submitted to the faculty of the Graduate School of the University of Minnesota, 292 pages.

Dion, N. P., 1981, Investigation of the Ground Water Flow System in Gem Valley, IDWR, Open File Report, 66 pages.

Norton, M. A., 1981, Investigation of the Ground Water Flow System in Gem Valley, IDWR, Open File Report, 29 pages.

Norvitch, R. F., and Larson, A. L., 1970, A reconnaissance of the Water Resources in the Portneuf River Basin, Idaho Water Information Bulletin No. 16, 58 pages.

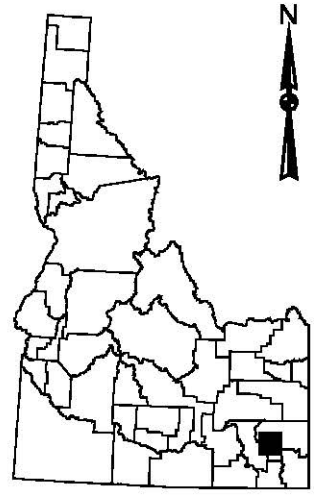
Young, H. W., 1984, Water-Table Contours, Directions of Ground-Water Movement and Ground-Water Divide, October 1983, in Gem Valley, Southeastern Idaho, USGS Water Resources Investigations, Report 84-4036.

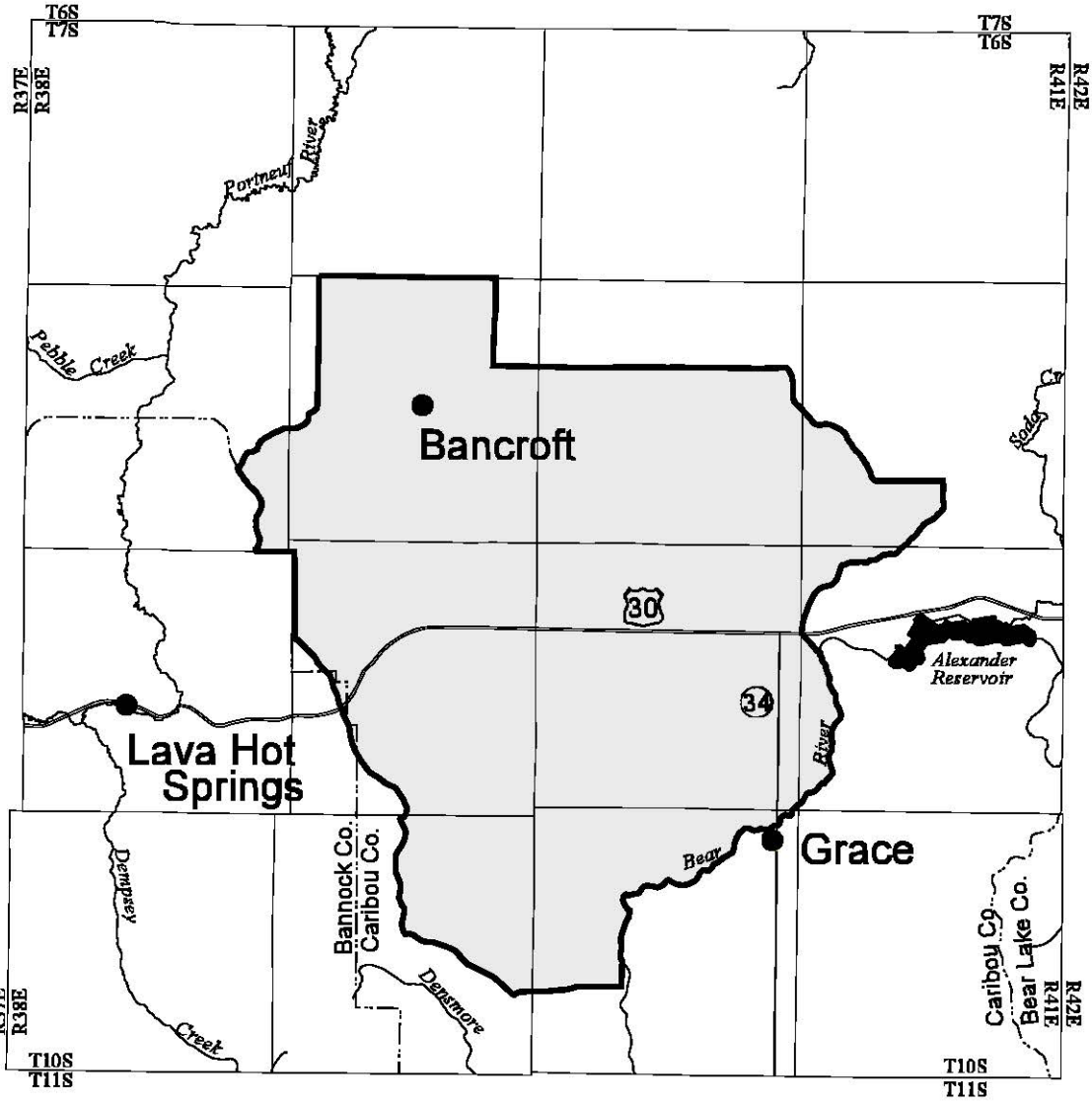
Bancroft Lund

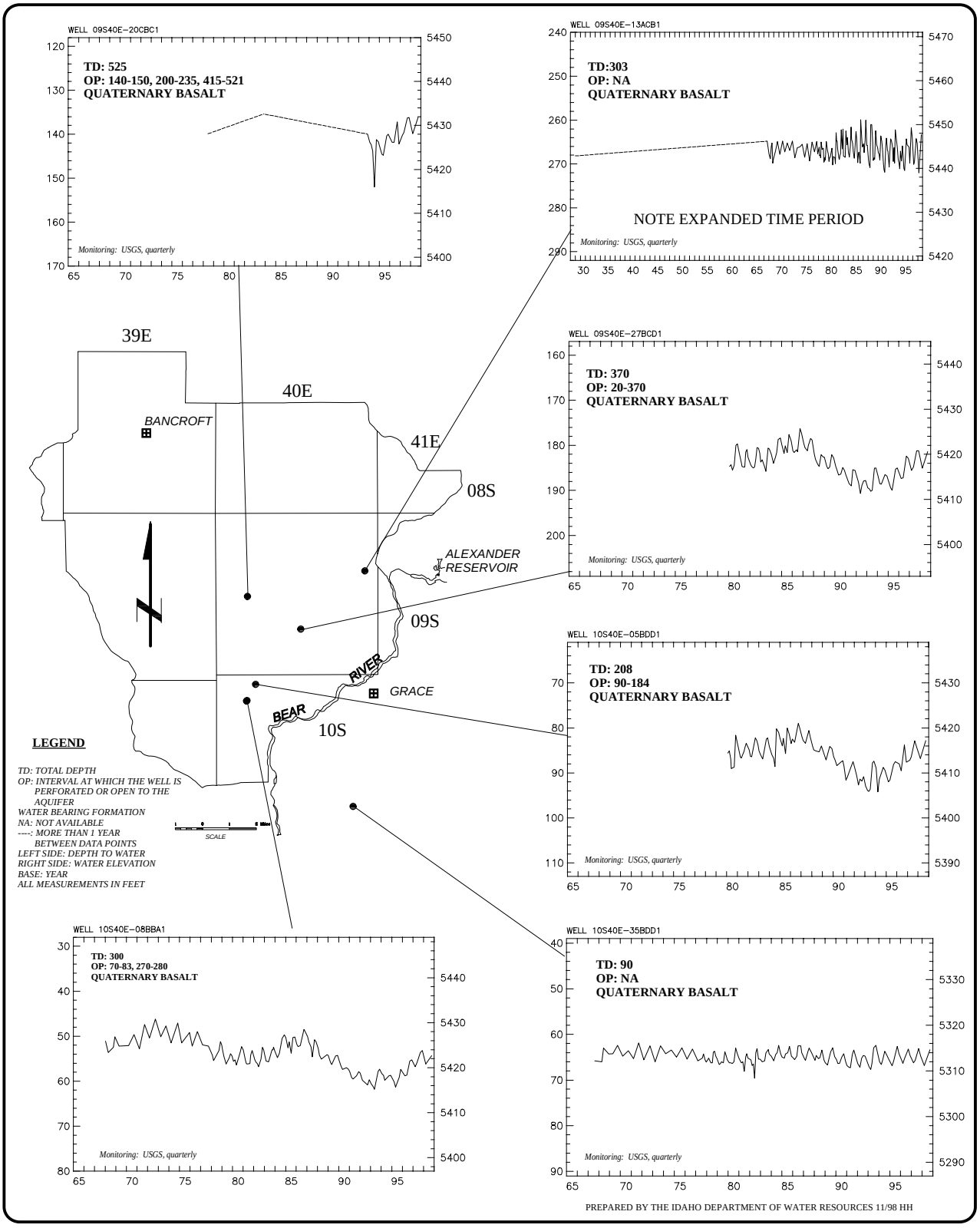
Critical Ground Water Area

Scale 1:314,643

1 0 1 2 3 4 5 Miles







BANCROFT-LUND GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs

FIGURE 6

BIG WOOD RIVER GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Big Wood River GWMA is located in southcentral Idaho in Blaine, Camas, Elmore, and Gooding counties (Figure 7). The Big Wood River GWMA was designated by Order of the Director on June 28, 1991. The area was designated to address the connection between ground and surface water within the Camas Creek, Silver Creek, and Upper Big Wood River drainages above Magic Reservoir. IDWR determined that junior ground water diversions were depleting senior surface water flows in the Big Wood River and Silver Creek.

The Silver Creek and Big Wood River drainages had previously been designated as a CGWA on June 21, 1961; however, the designation was rescinded on January 26, 1966, at the request of local water users.

The management policy associated with the current designation allows for the consideration of new ground water diversions; however, applicants are required to demonstrate there will be no injury or can provide acceptable mitigation to prior rights. An advisory committee has not been established.

Currently, a ground water model is being developed by the University of Idaho, Agricultural Research Service, and The Nature Conservancy. The model will encompass the basin from Hailey to Stanton Crossing, east to the area around Picabo. The final report is expected by September, 1999.

Hydrogeology

The aquifers of the Upper Big Wood River, Silver Creek, and Camas Creek area consist of valley and lake sediments underlain by basalts and bedrock. Sediments were deposited within the valley when the Big Wood River and Camas Creek were blocked by lava flows which occurred intermittently near Picabo in the southeast corner of the basin and near Stanton Crossing in the center portion of the basin. Lake deposits consist of discontinuous layers of fine-grained sediments intermixed with coarse sands and gravels. The fine-grained layers become more continuous in the southern part of the basin (Moreland, 1977).

Water occurs unconfined in the northern portion of the basin where only one aquifer is identifiable. In the southern part of the basin, there are extensive silt and clay layers forming confining layers and producing artesian conditions. Springs and seeps which discharge to Silver Creek and other tributaries occur where shallow ground water overrides discontinuous fine-grained layers (Moreland, 1977). The direction of ground water flow is from north to south.

Ground water in the Camas Creek basin mainly occurs under confined conditions. However, water table conditions occur in some of the shallow alluvial deposits. Many wells flow at the land surface, but the flow is usually less than 1 gallon per minute.

Ground water flow direction is generally eastward with discharge occurring into Camas Creek and Magic Reservoir (Walton, 1962).

Current Ground Water Conditions

Figure 8 shows ground water hydrographs. Seasonal fluctuations can vary from a few feet to as much as 40 feet per year. Long-term fluctuations appear to mirror wet and dry climatic cycles, as evidenced by rise in water levels in mid 1980s and mid 1990s. Declines during the 1987-1992 drought are apparent in the hydrographs. No overall downward trend is apparent.

Ten wells are currently monitored by the USGS: two on a bi-monthly basis; four on a quarterly basis; and four on a semi-annual basis. The data in the Bellevue-Hailey area date back to the 1950's. Data in the Camas Creek-Fairfield area date back to the 1970's, with the exception of one well where the data date back to 1944.

REFERENCES

Castelin, Paul M., and Sherl Chapman, 1972, Water Resources of the Big Wood River-Silver Creek Area, Blaine County, Idaho, IDWR Water Information Bulletin No. 28, 44 pages.

Moreland, Joe A., 1977, Ground Water-Surface Water Relations in the Silver Creek Area, Blaine County, Idaho, IDWR Water Information Bulletin No. 45, 42 pages.

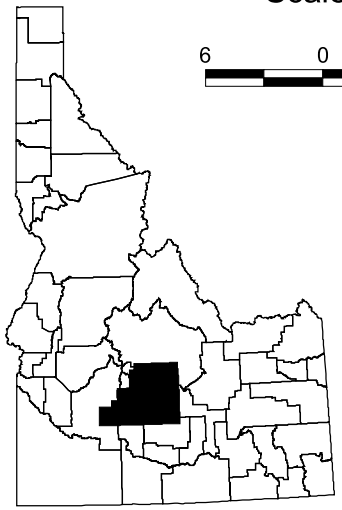
Walton, W. C., 1962, Ground-water resources of Camas Prairie, Camas and Elmore Counties, Idaho, USGS Water-Supply Paper 1609, 57 pages.

Big Wood River

Ground Water Management Area

Scale 1:733,630

6 0 6 12 Miles



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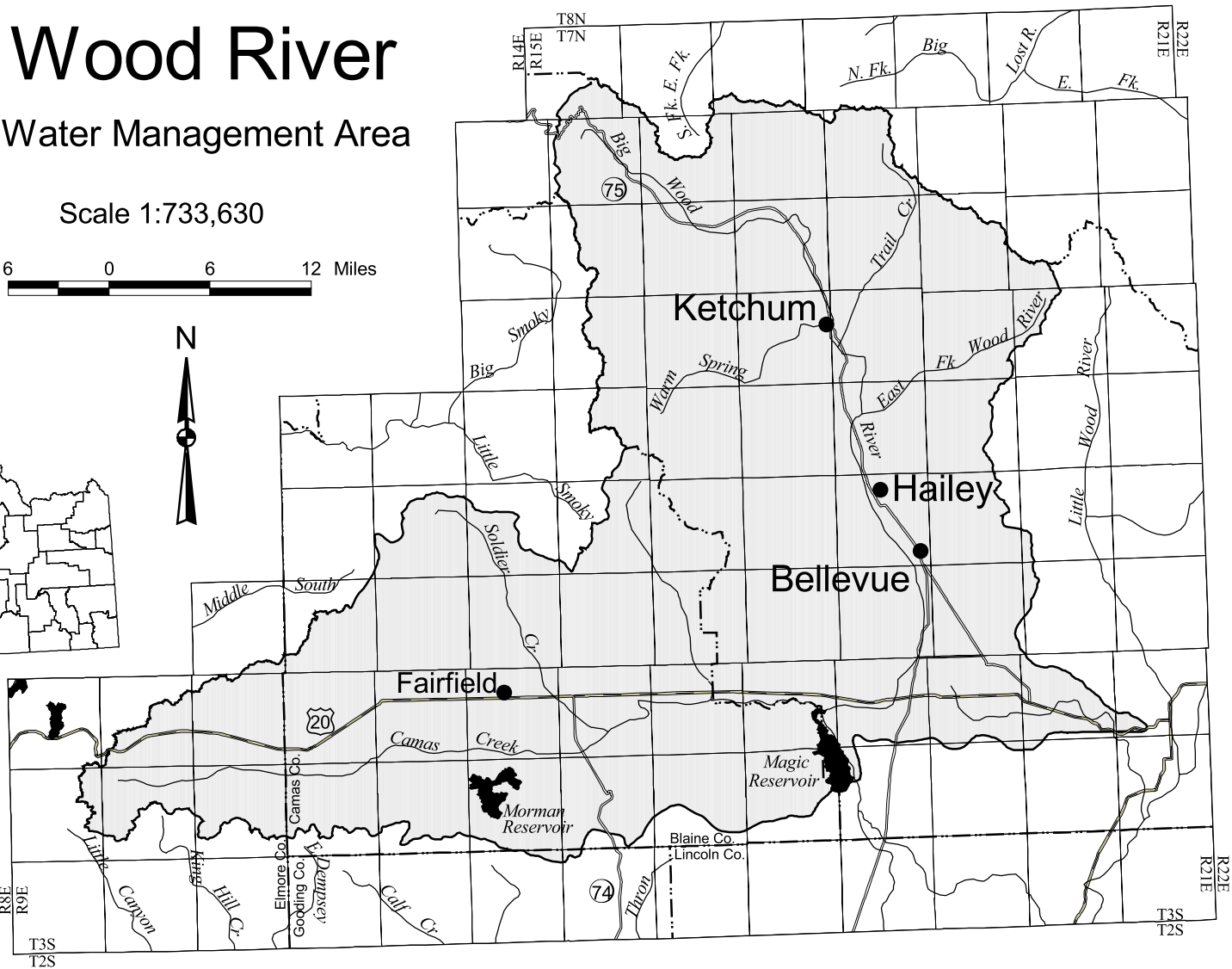
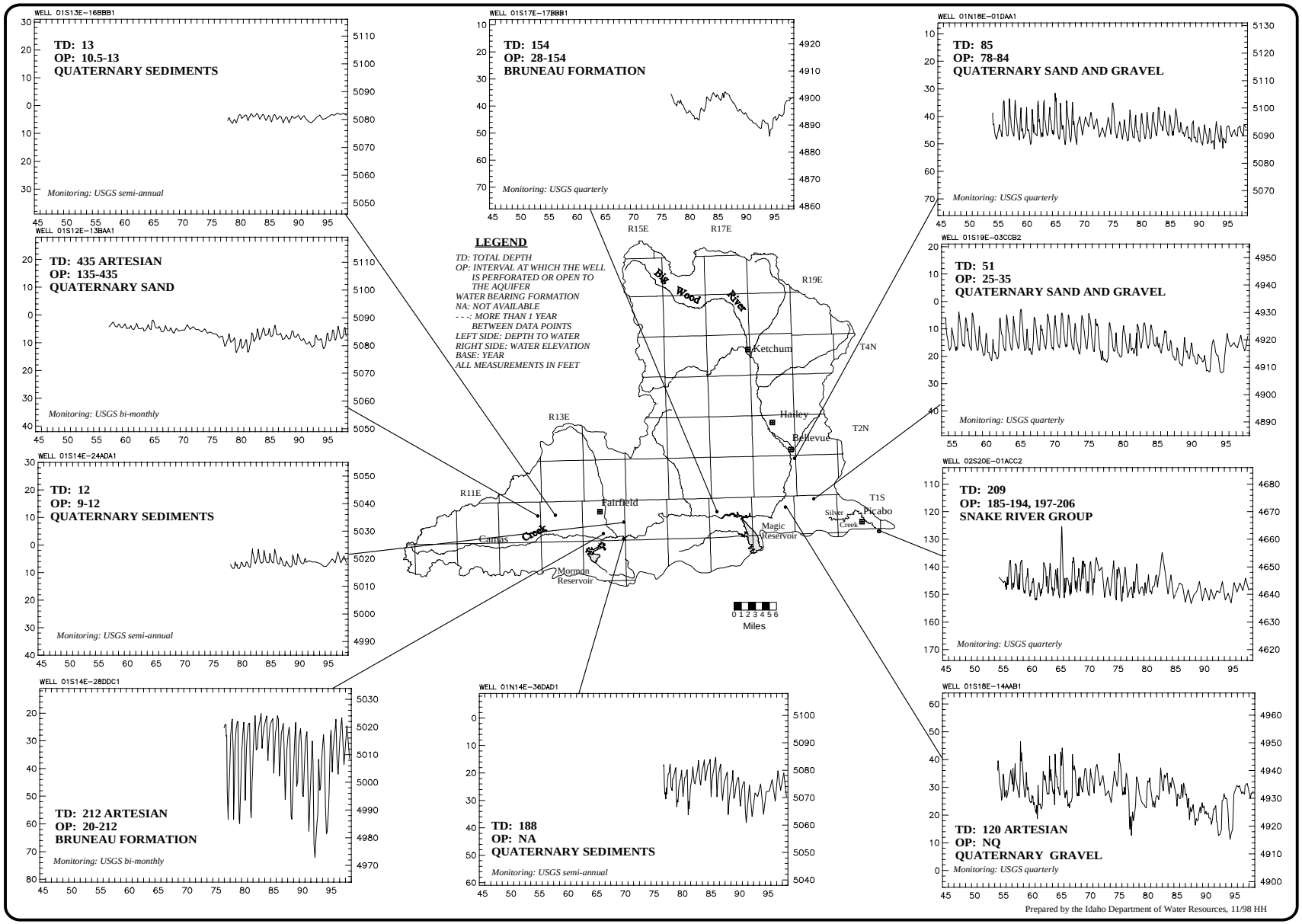




BIG WOOD RIVER GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs

FIGURE 8

BLUE GULCH CRITICAL GROUND WATER AREA

Overview of Current Management Status

The Blue Gulch area, located in eastern Owyhee and western Twin Falls counties, was declared a CGWA on December 9, 1970 (Figure 9). This declaration was based on a report by Chapman and Ralston (1970) which stated that discharge was exceeding recharge.

At the time, the area was being considered for increased agricultural development through the federal Desert Land Entry program. This would have increased ground water diversions for irrigation. Outstanding water appropriation permits at the time were anticipated to divert over four times the usage. Designation as a CGWA stopped the processing of new applications while allowing the development of existing permits. A management plan has not been developed nor has an advisory committee been formed.

Hydrogeology

Two aquifers provide ground water in the Blue Gulch area. The Idavada Volcanics form the primary aquifer. The Idavada Volcanics composed mainly of silicic, welded ash flows and predominates the surface geology in the southern half of the area. The Banbury Basalt, consisting of three members, occurs in the area. The middle and upper members are important sources of ground water (Chapman and Ralston, 1970).

Depth to ground water varies from approximately 50 to 450 feet. Ground water flows from southeast to northwest with a gradient of approximately 11 feet per mile (Bendixsen, 1993). Ground water discharge occurs to the Salmon Falls Creek and Snake River. Recharge is from precipitation on uplands and the Jarbidge Mountains to the south.

Current Ground Water Conditions

Hydrographs of most wells in the area (Figure 10) depict the effects of agricultural development that began in 1960s. Ground water levels declined in the Blue Gulch area as agricultural development continued through the 1970's. Government programs in the early 1980's encouraged land to be taken out of production. These programs resulted in a decrease of more than 80% of previously irrigated acreage. Ground water levels began recovering in 1986 with the implementation of the Conservation Recovery Program (CRP). These lands were contracted to be out of production for 10 years. Lands are now being put back into production; it is unknown how much land will be returned to production and if current changes will impact ground water levels.

Water levels in the northwest portion of the area remained unchanged. Shallow wells near Magic Water Canal (08S13E-23CCD1) appear stable. Probably due to its shallow depth, it receives recharge directly from the canal.

Ground water levels are monitored in ten wells. USGS monitors six wells: two on a bi-monthly basis, and four on a semi-annual basis. Prior to 1998, IDWR monitored wells on a semi-annual basis. Beginning in 1998, IDWR began monitoring on a quarterly basis. Data for most wells date back to the late 1960's.

REFERENCES

Bendixsen, Shane, 1993, Summary of Ground-Water Conditions in the Blue Gulch Critical Ground Water Area Eastern Owyhee and Western Twin Falls Counties, Idaho, Idaho Department of Water Resources Open File Report, 22 pages.

Chapman, S. L., and Ralston, D. R., 1970, Ground Water Resources of the Blue Gulch Area in eastern Owyhee and western Twin Falls Counties, Idaho: Water Information Bulletin No. 20, Idaho Department of Water Administration, 36 pages.

Shaff, D., 1979, Memorandum to Norm Young, re: Blue Gulch C.G.A. Irrigation Data, Idaho Department of Water Resources, 3 pages.

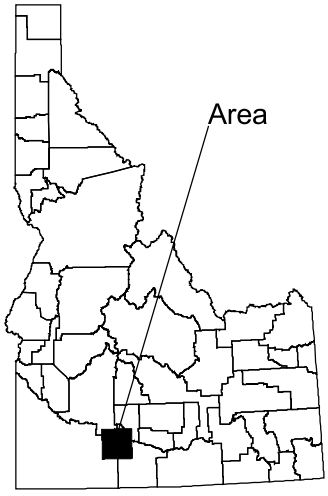
Blue Gulch

Critical Ground Water Area

Scale 1:469,203

3 0 3 Miles

N



T6S T7S R10E R9E

T6S T7S R15E R14E

Twin Falls Co.
Owyhee Co.

Deadman

Sailor

Creek

Pothole Creek

Thousand Springs

Banbury Springs

Falls Creek

30

Buhl

Salmon Creek

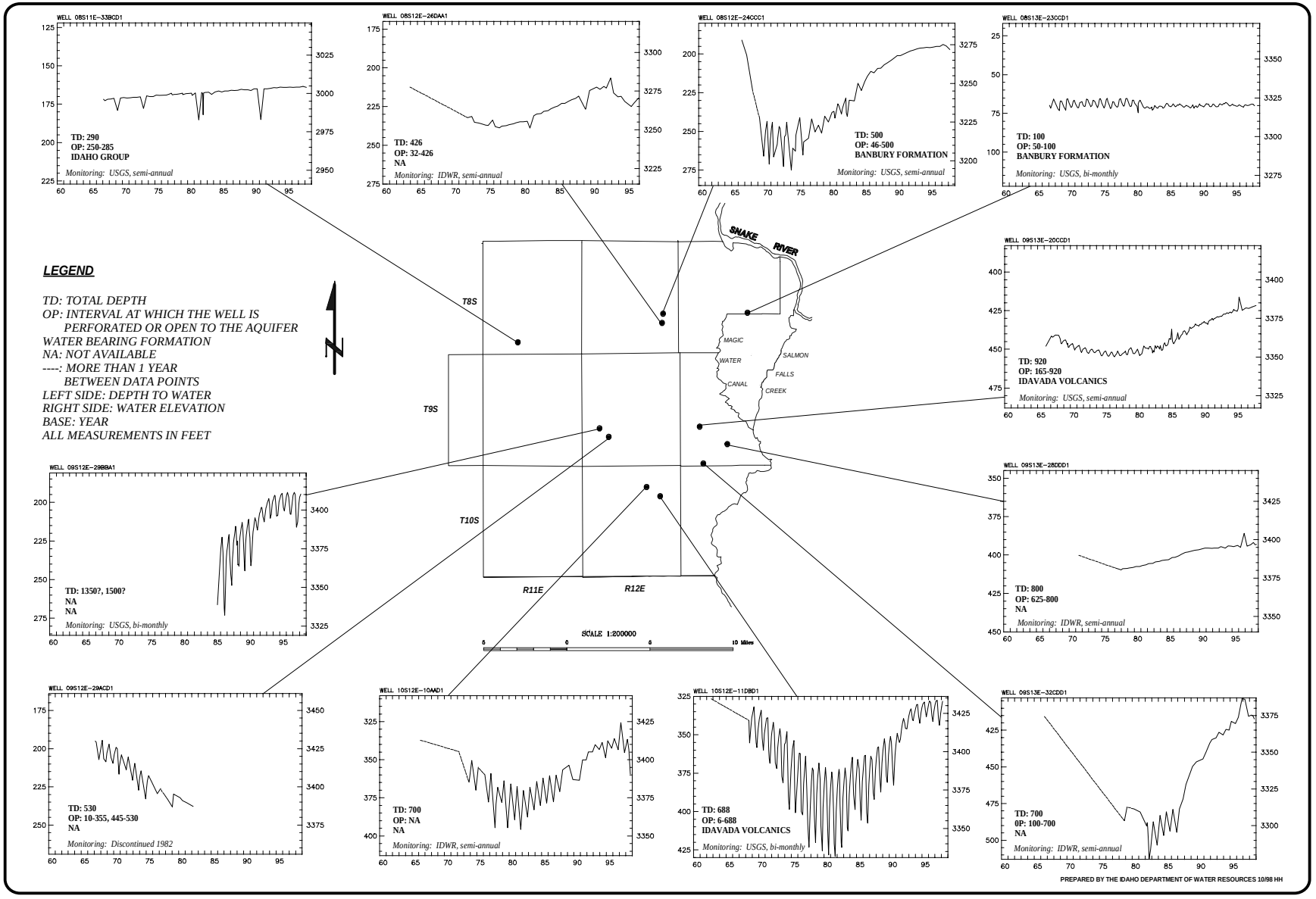
Castleford

Devil Cr

Dead

T11S T12S R10E R9E

T11S T12S R15E R14E



BLUE GULCH CRITICAL GROUND WATER AREAS

Ground Water Hydrographs

FIGURE 10

BOISE FRONT LOW TEMPERATURE GEOTHERMAL RESOURCE GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Boise Front Low Temperature Geothermal Resource (BF GWMA) is located in Boise City and Ada County in southwestern Idaho (see Figure 11). The area was designated on June 15, 1987. The order identified the resource of concern to be ground water from a depth greater than 300 feet and/or a temperature greater than 85° fahrenheit (F).

The geothermal resource has been used for heating for over 100 years. However, increased development during the mid-1980's more than doubled the diversion volume from pre-1983 levels (Neely, 1998). Water level declines of up to 30 feet from 1983 to 1987 have been documented in some of the geothermal wells.

The Director signed a Management Policy for the Boise Front Ground Water Management Area on June 3, 1988. The policy identified specific goals and actions. The goals are (1) Protect the existing users; (2) Allow full use of the geothermal resource; (3) Provide clear management policies; and, (4) Stabilize depletions. An advisory committee has not been formed. IDWR works closely with the major geothermal users within the area and regularly reviewed ground water data.

An order establishing a five-year moratorium, an action identified in the Management Policy, was issued on June 11, 1988 preventing new development or increased use of the resource. The moratorium was extended in 1993 and 1998; it is currently in place until September 1, 2003.

Hydrogeology

The Boise area is underlain by three aquifer systems: a shallow cold water system, an intermediate cold water artesian system, and a deep low temperature geothermal artesian system. Not all aquifers exist in all areas. (Higginson, 1988). The BF GWMA applies only to the deep geothermal aquifer.

It is generally believed that the Boise Front Fault zone brings the thermal water to shallow depth, where it is confined in the horizontally layered volcanic rocks and sediments hydraulically connected to the fault zone (Castelin, 1987). It is also believed that the system is "compartmented by cross-cutting faults, creating a highly complex flow system" (Castelin, 1987).

Current Ground Water Conditions

Ground water hydrographs are shown in Figure 12. Ground water levels in the northern portion of the area show significant recovery as depicted in 04N02E-29ACDB1. A review of the geothermal ground water conditions was recently conducted by Neely (1998), to determine if the moratorium should be extended, modified or cancelled. The

report determined that the system appears to have reached equilibrium, although the reasons are not fully understood (Neely, 1998).

Production, wellhead pressures and temperatures are monitored by the major producers and data are submitted to IDWR regularly. These users are: Idaho Department of Administration, Division of Public Works; Boise Warm Springs Water District; City of Boise; and Veterans Administration Medical Center.

The City of Boise drilled an injection well in Spring, 1998, for use as the primary disposal site for spent geothermal water from its heating system. The injection well went into service in February 1999 (Kent Johnson, City of Boise, personal communication).

REFERENCES

Castelin, Paul, 1987, IDWR Memorandum to John Beal and Norm Young, subject: Response to Work Request Dated March 19, 1987, dated April 8, 1987, 3 pages.

Neely, Kenneth W., 1998, Production, Temperature, and Water Level Data for the Four Heating System in the Boise Front Low Temperature Geothermal Resource Area, 1977-1997, Idaho Department of Water Resources Open-File Report, 31 pages.

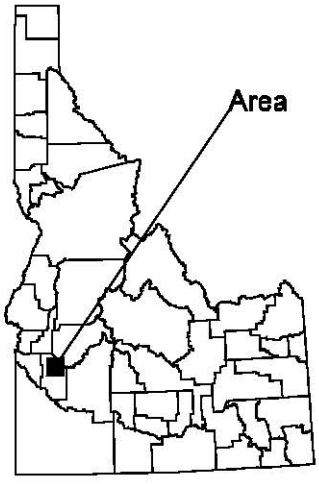
Higginson, R. Keith, June 3, 1988, "Management Policy for the Boise Front Ground Water Management Area, 12 pages and attachments.

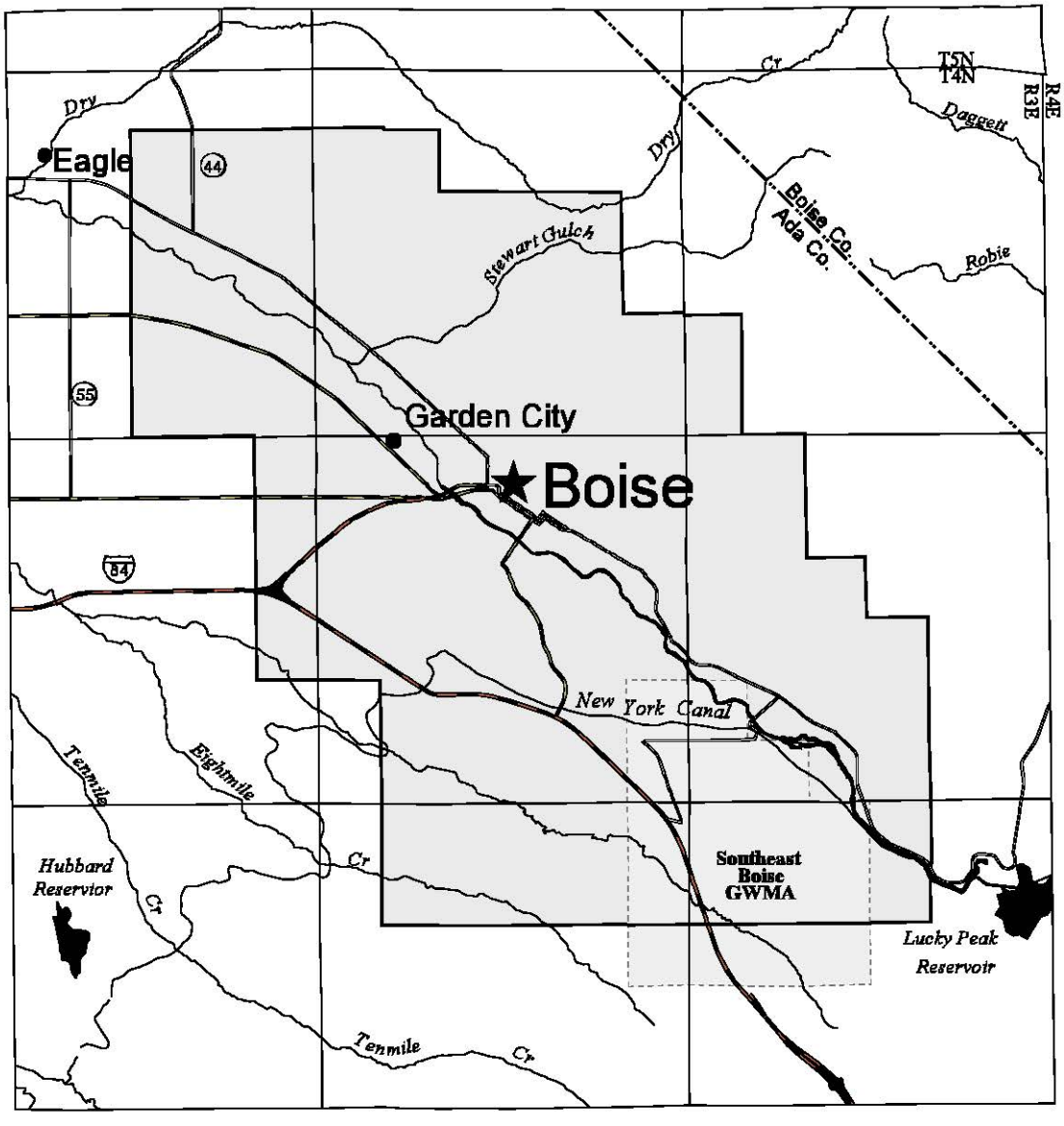
Boise Front
Ground Water Management Area
and Southeast Boise
Ground Water Management Area

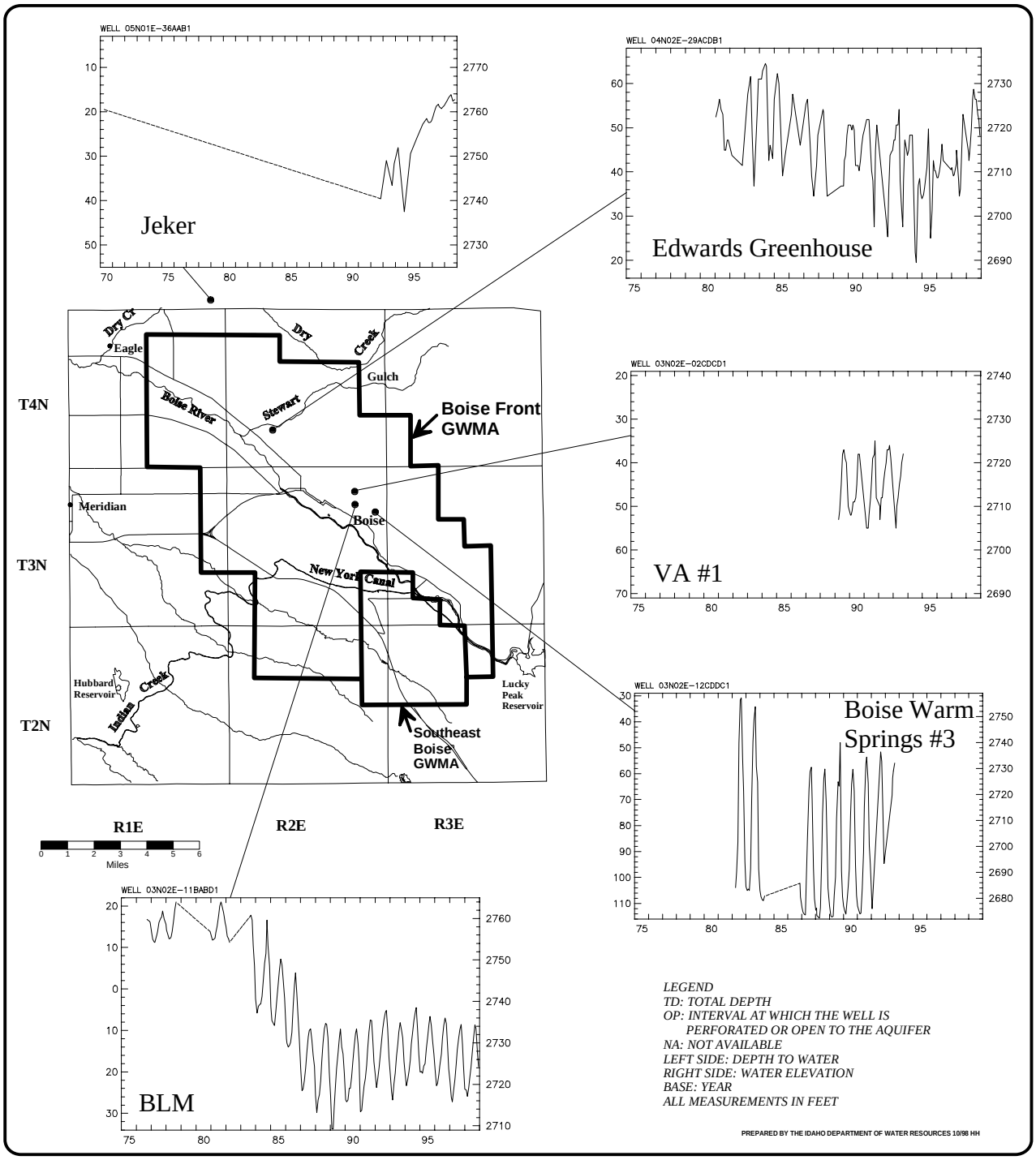
Scale 1:270,150

2 0 2 Miles

N







BOISE FRONT GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs

FIGURE 12

CURLEW VALLEY CRITICAL GROUND WATER AREA

Overview of Current Management Status

Curlew Valley is located in southeastern Idaho in Oneida and Power counties and extends south into Utah (Figure 13). The Curlew Valley CGWA was designated on March 15, 1976. Designation was based on concern that there was not sufficient ground water supply for existing irrigation uses or to fulfill pending applications and permits.

The geographic and hydrogeologic boundaries extend into Utah. In the southern part of the basin, Locomotive Springs is an area of discharge for the aquifer and a Utah state wildlife management area. The State of Utah expressed concern that increased ground water withdrawals in Idaho were impacting the spring flows.

No further studies have been conducted since designation of the CGWA to determine adequacy of supply or impacts on spring flows. A management plan has not been developed for the area nor has an advisory committee been formed.

Hydrogeology

Aquifers in the Curlew Valley area consist primarily of unconsolidated sediments of alluvium and lakeshore deposits that may be as much as 5,000 feet thick. Minor amounts of ground water are found in consolidated Paleozoic rocks that form the surrounding hills and mountains (Chapman and Young, 1972). Ground water discharge from basalt flows in the basin which have been suggested as the source for Holbrook Springs, a large spring which contributes to the base flow of Deep Creek (Baker, 1974).

Ground water flow is primarily from north to south with unconfined conditions in the northern part and semi-confined conditions toward the south (Baker, 1974). Recharge is from precipitation in the valley and surrounding mountains (Chapman and Young, 1972).

Current Ground Water Conditions

Hydrographs (Figure 14) of the three monitoring wells appear to reflect climatic wet and dry cycles. During the drought periods of the late 1970s-early 1980s and late 1980s, a water level declines. During the above normal precipitation periods in the mid-1980s, water levels rose. However, since the early 1990s, precipitation has been at or above normal, but the water levels indicate stable or declining trends.

Three wells are currently monitored by the USGS, Utah Office on a semi-annual basis. Data dates back to 1970. Two additional wells within the hydrogeologic basin are located in Utah and are monitored on an annual basis by the USGS. Data from these wells are useful in evaluating basin-wide trends.

REFERENCES

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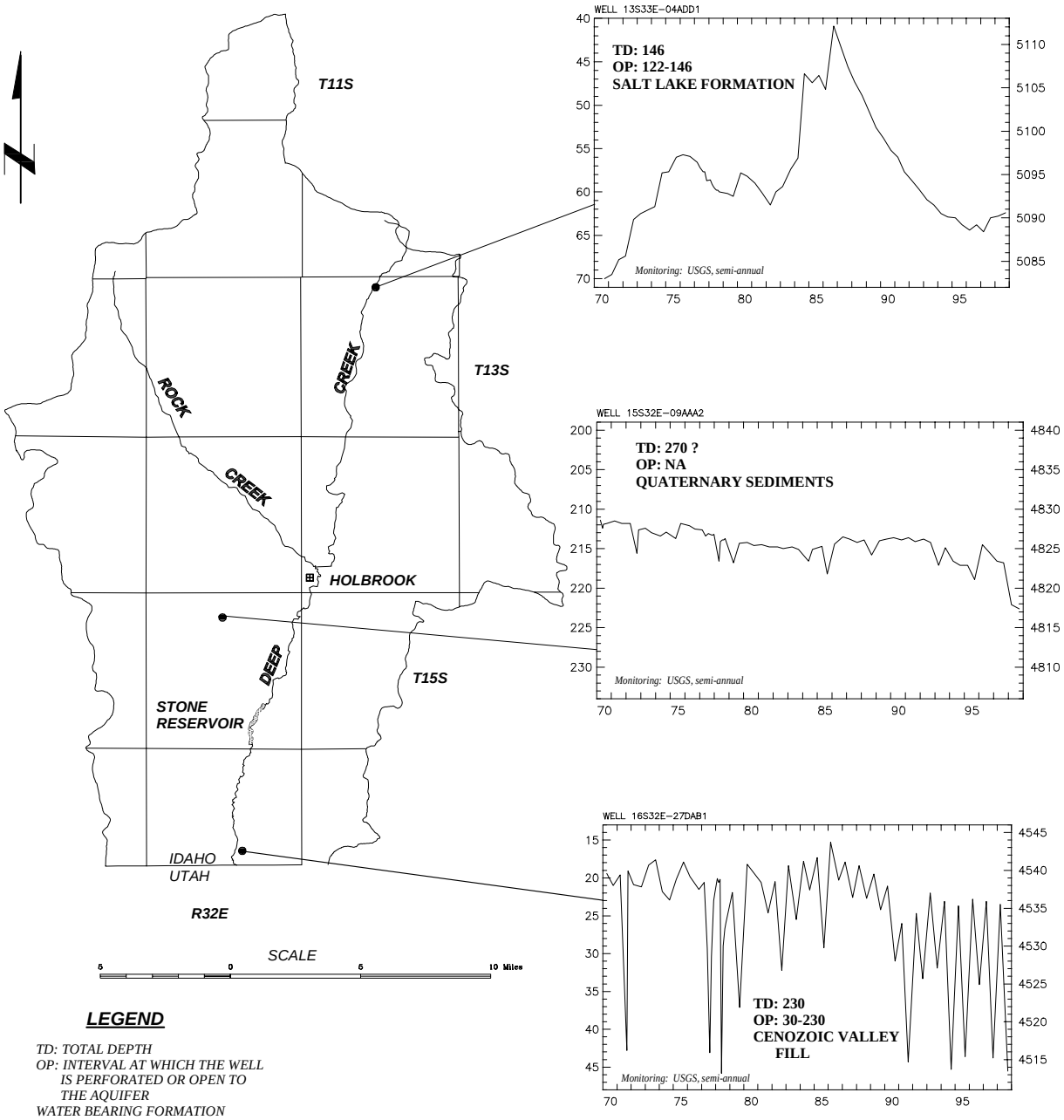
Curlew Valley
Critical Ground Water

Scale 393,503

4 0 4 Miles

T10S
T11S
R30E
R31E
R34E
R35E
Arbon
Power Co.
Oneida Co.
Cr
Rock
Bannock
Daniels
Reservoir
S Fk
Rock
Cr
37
Holbrook
Cr
Stone
Reservoir
Holbrook Springs
Deep
84
Stone
IDAHO
UTAH
T16S
T17S



LEGEND

TD: TOTAL DEPTH
OP: INTERVAL AT WHICH THE WELL IS PERFORATED OR OPEN TO THE AQUIFER
WATER BEARING FORMATION
NA: NOT AVAILABLE
- - -: MORE THAN 1 YEAR BETWEEN DATA POINTS
LEFT SIDE: DEPTH TO WATER
RIGHT SIDE: WATER ELEVATION
BASE: YEAR
ALL MEASUREMENTS IN FEET

PREPARED BY THE IDAHO DEPARTMENT OF WATER RESOURCES, HH 11/98

CURLEW VALLEY CRITICAL GROUND WATER AREA
Ground Water Hydrographs
FIGURE 14

GRANDVIEW-BRUNEAU GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Grandview-Bruneau GWMA is located in north-central Owyhee County, south of the Snake River (see Figure 15). The management area was designated on October 29, 1982, due to increased and projected increases in ground water withdrawal and declines in spring flows from the geothermal aquifer system.

Since designation, the only new ground water diversions have been for domestic use and a Desert Land Entry development that had been pending. The Department has also worked with well owners to eliminate leakage or unrestricted flow (State of Idaho, 1998). A management plan has not been developed nor has an advisory committee been formed.

The impact of ground water development on spring flows has been studied by various researchers as a result of the listing of the Bruneau Hot Springs snail as an Endangered Species in 1993. The snail's dependency on hot springs for its habitat has resulted in studies to evaluate the impact of ground water pumping on spring discharges.

Hydrogeology

Several aquifers are found in the area. The major aquifers are found in the Tertiary silicic volcanics, Poison Creek Formation, Banbury Basalt, and the sedimentary Glenns Ferry Formation. The Banbury Basalt is the most productive aquifer with yields of greater than 2,000 gpm (Ralston and Chapman, 1969). These aquifers are warm to hot, ranging from 80 to 176 degrees F. Shallow cold water alluvial aquifers are found along streams. These aquifers have limited areal extent (Berenbrock, 1993). Aquifer properties vary considerably because of the heterogeneous nature of the rocks and sediments.

Recharge is from precipitation on the Owyhee Mountains (Ralston and Chapman, 1969). The deep volcanics are believed to recharge the shallower geothermal aquifers (Banbury Basalt and Glenns Ferry Formation) through upward ground water movement. Ground water flow is generally south to north. The direction of water movement has been modified, however, by ground water pumping (Berenbrock, 1993).

Current Ground Water Conditions

Figures 16 and 17 show hydrographs of ground water levels in the Grandview-Bruneau GWMA. Figure 16 shows ground water levels in the eastern portion of the management area around Hot Creek. These data reflect recent trends with most of the historic data dating back only to the late 1980's. Water levels appear to be stable.

Figure 17 shows hydrographs for the western portion and also include wells with long term data in the eastern portion. Well 06S03E-14BCB1 in the northwest area shows significant declines of almost 40 feet since the 1950s but appears to be relatively stable

since the 1970s. Declines ranging from a few feet to as much as 30 feet have also occurred. Currently, the overall system appears relatively stable.

Currently, USGS monitors 20 wells within the GWMA. Four are through the IDWR-USGS Cooperative Program. The remainder is funded through the US Fish and Wildlife Service. Six wells have continuous recorders, ten wells are monitored monthly, three wells are monitored bi-monthly, and one well is monitored semi-annually. Data dates as far back as early 1950s for some wells. Nine new wells were drilled in 1990 by the USGS as a part of the Bruneau Hot Springs Snail studies. Continuous recorders were installed in six wells and three are measured on a monthly basis.

REFERENCES

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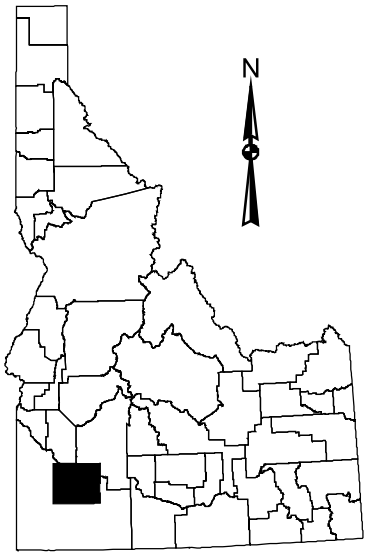
Grandview-Bruneau

Ground Water Management Area



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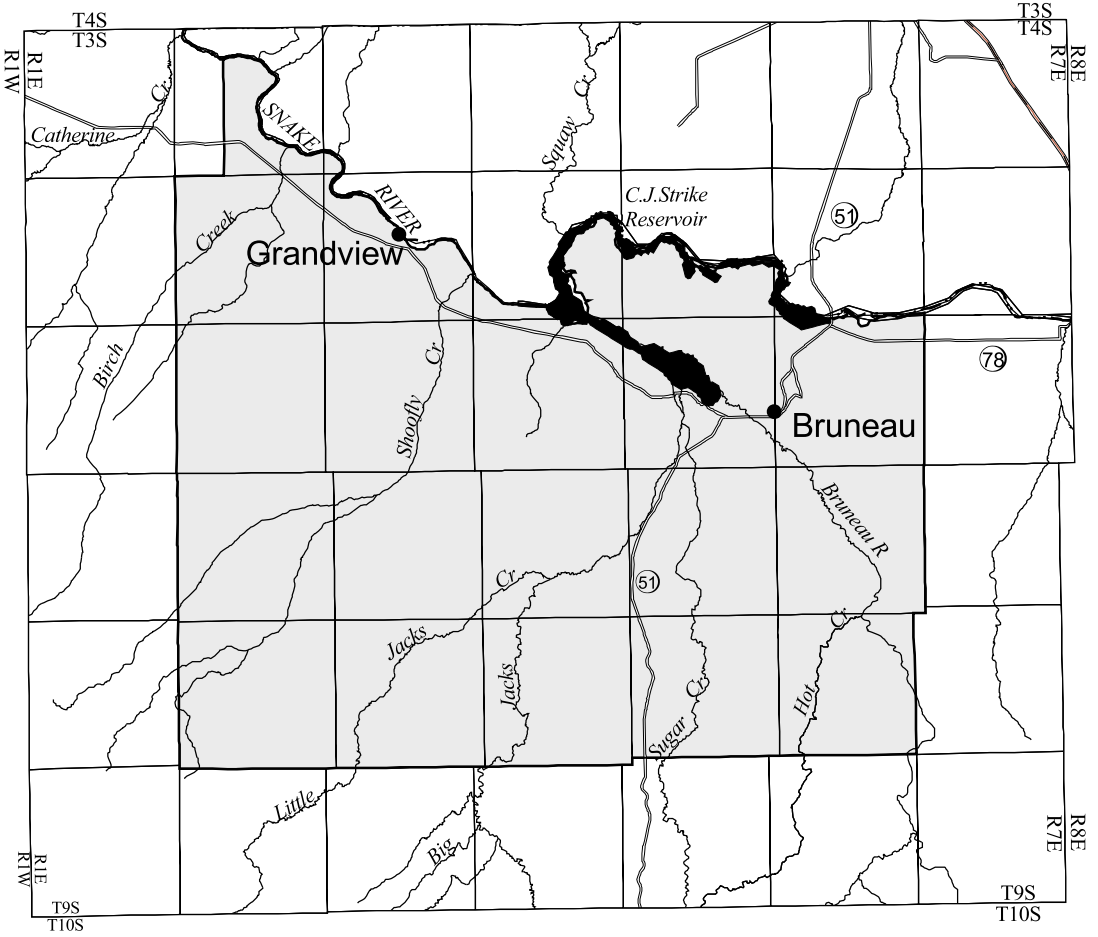
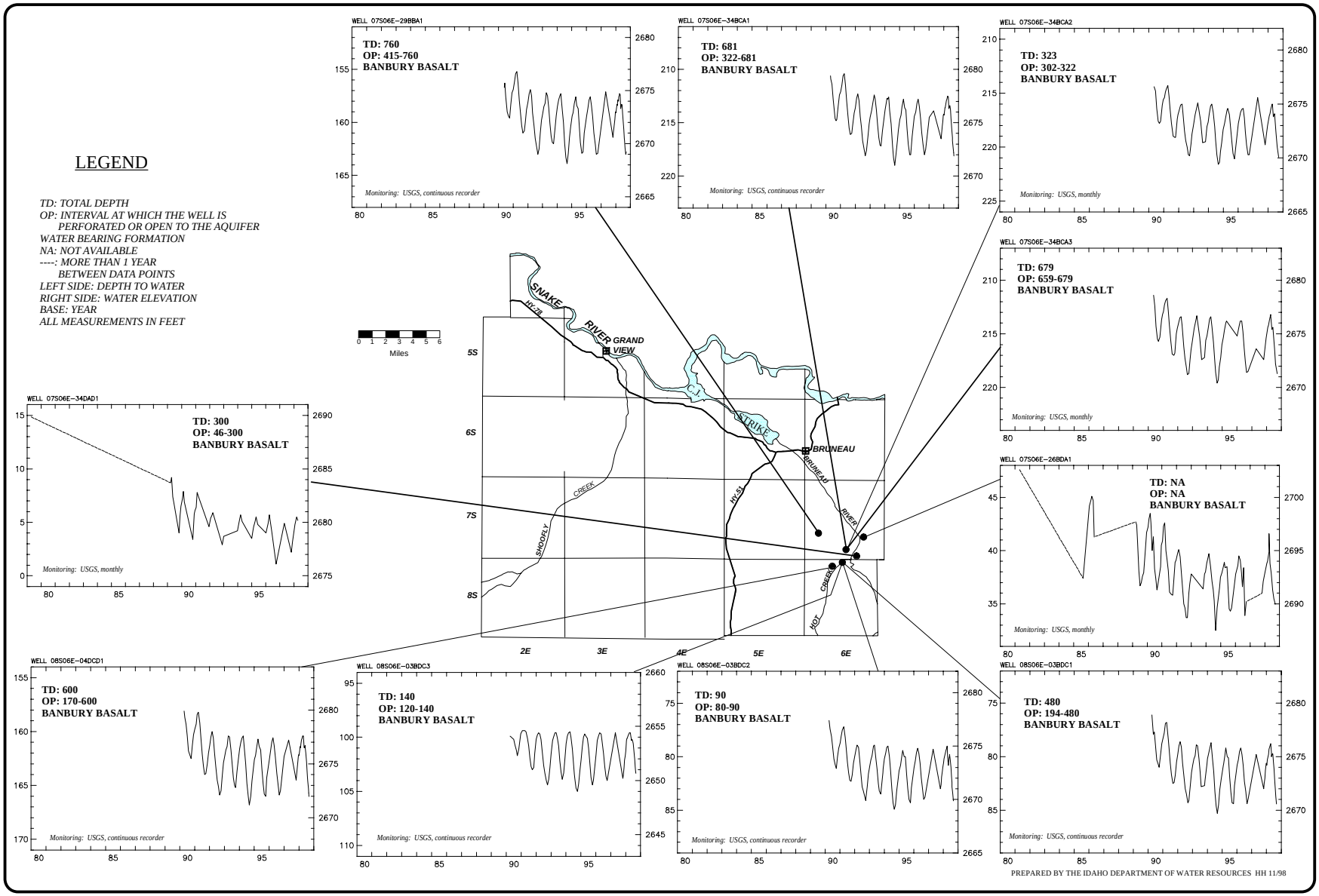
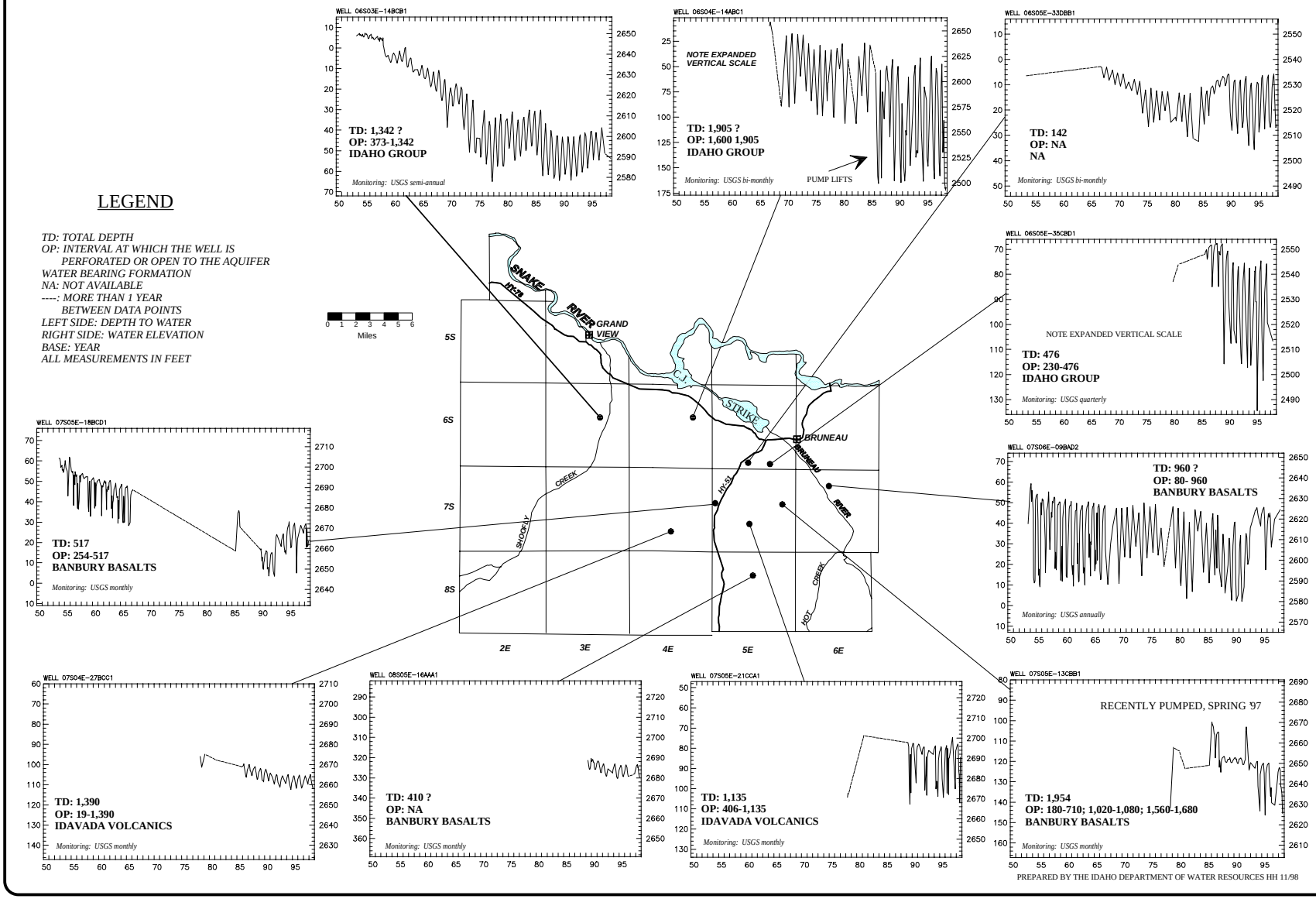




GRANDVIEW-BRUNEAU GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs - East Area

FIGURE 16



GRANDVIEW-BRUNEAU GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs - West Area

FIGURE 17

LINDSAY CREEK GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Lindsay Creek GWMA is located in Nez Perce County, south of the Clearwater River and east of Lewiston, Idaho (see Figure 18). The Idaho Department of Water Resources designated the Lindsay Creek GWMA on March 5, 1992. The designation was made based on the limited recharge and potential increased use of a portion of the shallow upper aquifer. Most domestic wells are completed in the shallow portion of the upper aquifer.

The designation of the Lindsay Creek GWMA does not preclude the approval of new ground water diversions. However, new proposed uses are required to use the deeper aquifer. If the shallow aquifer is desired, the applicant is required to demonstrate that other rights will not be injured or provide acceptable mitigation to prior rights. A Management Policy was developed and issued with the Order designating the GWMA. The policy sets out the criteria for processing pending and future applications for permit for water rights. A management plan has not been developed nor has an advisory committee been formed.

Hydrogeology

Multiple aquifers underlie the Lewiston Orchards area and occur within basalt flows of the Columbia River Group. Lacustrine and fluvial sediments of the Latah Formation are interbedded between the basalt flows. Ground water beneath the Lindsay Creek GWMA occurs in three aquifers: Upper, Intermediate, and Lower (Ralston and Bond, 1978).

The Upper Aquifer is associated with water bearing zones and sediments to a depth of approximately 700 feet below land surface. Primary source of recharge appears to be underflow that enters from the east (Baker, 1991). The Intermediate Aquifer occurs at a depth from 700 to 1100 feet below ground surface. Recharge is through outcrops of the basalt interflow zones in the channel and flood plain area of the Snake River, Clearwater River, Lapwai Creek, and through ancestral channels buried by Upper Yakima Valley filling flows. The Lower Aquifer occurs below a depth of 1100 feet. Recharge occurs mostly from the Clearwater River, Snake River and Lapwai Creek (Ralston and Bond, 1978).

The top of the shallow aquifer occurs at approximately 120 to 150 feet below land surface. The base of the shallow aquifer is encountered at approximately 250 feet. Basalt is the major rock type. Yields from wells are usually less than 25 gallons per minute. Aerial extent is limited (Baker, 1991). Ground water flow is mostly westward with a slight northwest component and follows the slope of the land.

Current Ground Water Status

Figure 19 shows two ground water hydrographs of water levels in wells located within the Lindsay Creek GWMA and one for a well located southwest of the management area. Historic ground water monitoring data within the area dates back only to 1992. Though no overall downward decline is indicated, seasonal fluctuations can exceed 20 feet.

Ground water monitoring is limited to two wells measured by USGS on a monthly basis since 1991. One additional well, located southwest of the GWMA, is also measured on a monthly basis dating back to 1970.

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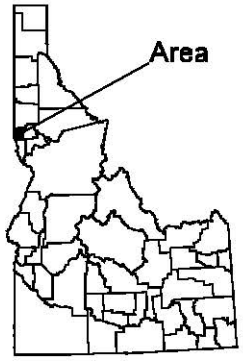
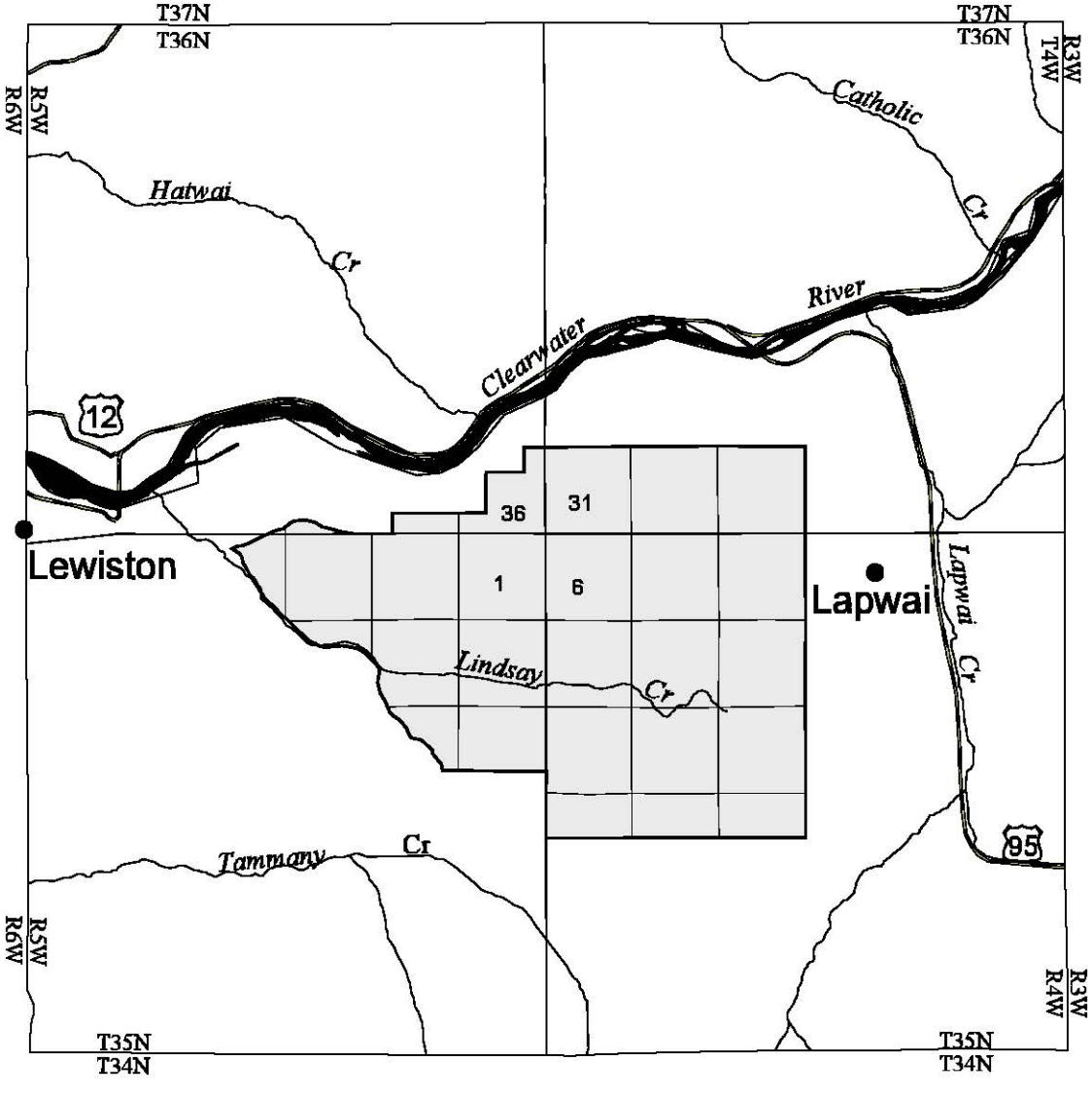
Lindsay Creek

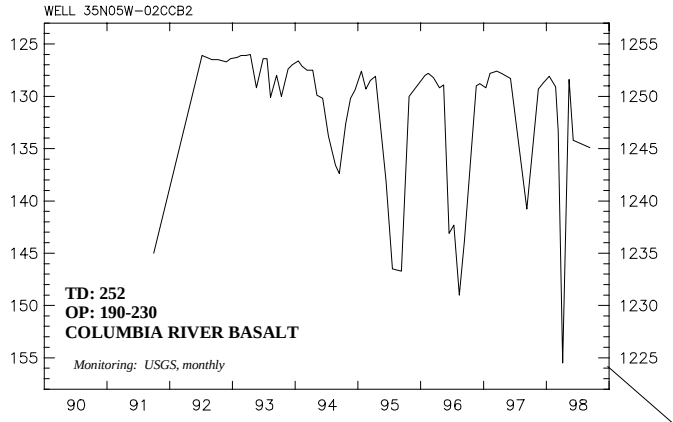
Ground Water Management Area

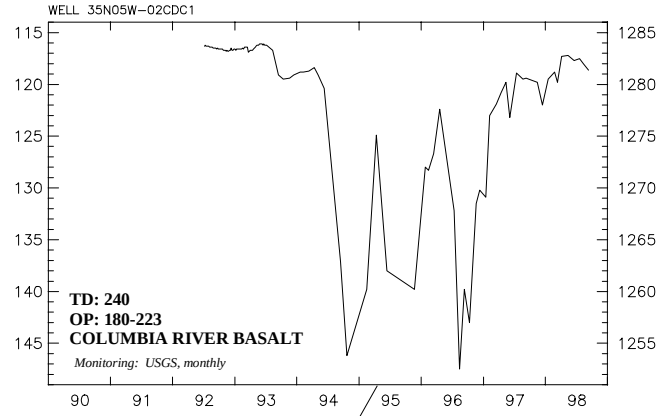
Scale 1:190,180

1 0 1 Miles



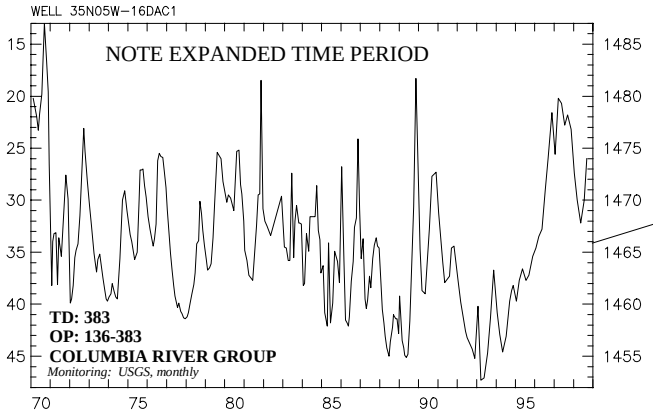


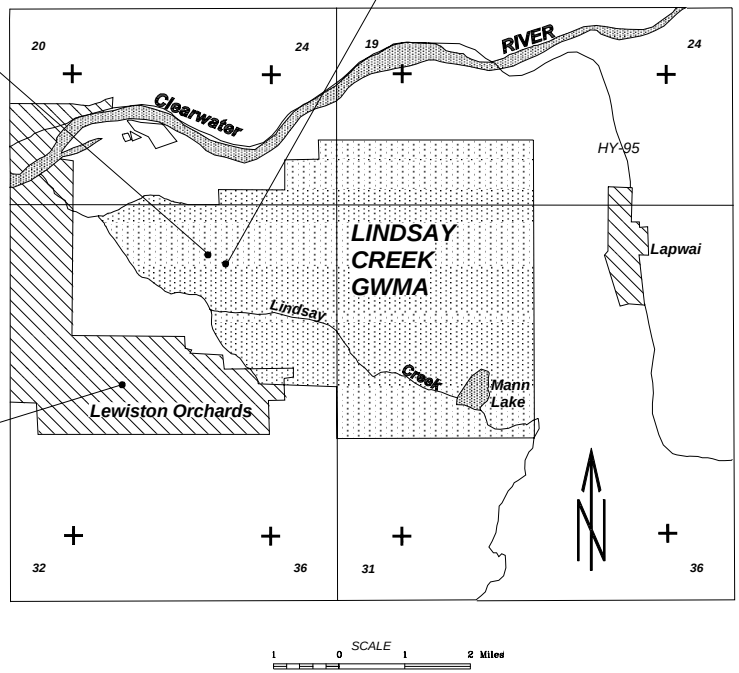




LEGEND

TD: TOTAL DEPTH
OP: INTERVAL AT WHICH THE WELL IS PERFORATED OR OPEN TO THE AQUIFER
WATER BEARING FORMATION
NA: NOT AVAILABLE
----: MORE THAN 1 YEAR BETWEEN DATA POINTS
LEFT SIDE: DEPTH TO WATER
RIGHT SIDE: WATER ELEVATION
BASE: YEAR
ALL MEASUREMENTS IN FEET





PREPARED BY THE IDAHO DEPARTMENT OF WATER RESOURCES, 12/98 HH

LINDSAY CREEK GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs

FIGURE 19

Mountain Home Ground Water Management Area and Cinder Cone Butte Critical Ground Water Area

Overview of Current Management Status

The Cinder Cone Butte area, located in Elmore County, was declared a CGWA on May 7, 1981 (Figure 20). Following the declaration, a study was conducted to evaluate the entire Mountain Home area. As a result of that study by Norton and others (1982), the Mountain Home GWMA, which surrounds the Cinder Cone Butte area, was designated on November 9, 1982. The Mountain Home GWMA is located in Elmore and western Ada counties. The areas were designated due to declining ground water levels.

New ground water appropriations are not allowed in the Cinder Cone Butte CGWA. The order declaring the Mountain Home area a GWMA states that the area is approaching critical, "although there appear to be subareas where new appropriations could be authorized without injuring existing water rights."

A management policy was not included in the designation of either area. On June 6, 1996, the Director issued an order establishing an advisory committee. The Committee has the following objectives:

a. Collect and review data;
b. Mediate water related issues involving water users;
c. Develop draft ground water management plan;
d. Develop and propose implementation of a ground water recharge program;
e. Serve as a forum for communication of water related issues.

The composition of the Committee is specified in the order. The Committee does not have any formal enforcement authority.

Hydrogeology

The Mountain Home area contains a regional aquifer system that flows west-southwest. Depth to water in the regional system is usually in excess of 300 feet. Two perched aquifer systems are found in the area: one system in the area in and around the City of Mountain Home, and another system northwest of Mountain Home in Township 2 South, Range 5 East (Young, 1977). Water in the perched areas range from a few feet to several hundred. Ground water flow direction is south to southwest.

Major geologic units in the area are, from youngest to oldest: 1) alluvium and terrace gravels; 2) Snake River Group; 3) Idaho Group; 4) Idavada Volcanics, and 5) Idaho Batholith. The regional aquifer is found primarily in the Bruneau Formation, a unit in the Idaho Group that consists of fluvial-lake deposits, layers of ash, and basaltic lava flows (Ralston and Chapman, 1968). Two northwest trending faults pass through the northeast part of the area (Bond, 1978). The perched aquifers occur primarily in the alluvium and terraces.

Recharge to the perched system in the Mountain Home area is from Rattlesnake and Canyon creeks, local irrigation, and leakage from Mountain Home Reservoir. Recharge to the perched system northwest of Mountain Home is from percolation from intermittent streams. Recharge to the regional system occurs mainly from downward flow from the perched system, precipitation from the uplands and underflow from the north. It has been suggested that the regional system is quite old based on isotope composition (Young, 1977).

Current Conditions

Ground water levels in the regional system in the southern and eastern portions of the area near the Mountain Home Air Force Base show declines of more than 50 feet since 1968 (Figures 21 and 22). Steep declines occurred during the late 1960s and early1970s. Water levels appeared to stabilize in several wells during the mid-1970s and early 1980s. However, declines began again in the mid to late 1980s and have continued to present. In the northcentral part of the Cinder Cone Butte CGWA, water levels have declined as much as 60 feet since 1976. In the north and northwest parts of the area, ground water levels appear to be stable and have increased by as much as 3 to 4 feet since 1966.

The perched system in and surrounding Mountain Home fluctuates in response to seasonal and climatic cycles. Fluctuations can be as much as 50 feet. Overall water levels appear to be relatively stable based on data collected since 1975.

The IDWR monitors 15 wells on a monthly basis. Prior to June 1998, these wells were monitored on a semi-annual basis. USGS monitors 9 wells, two semi-annually and seven bi-monthly. In November 1997, IDWR contracted for seven additional wells to be monitored on a monthly basis by a private consultant.

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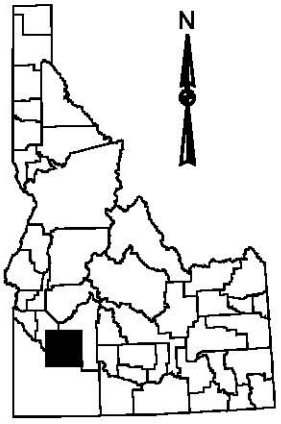
Mountain Home

Ground Water Management Area

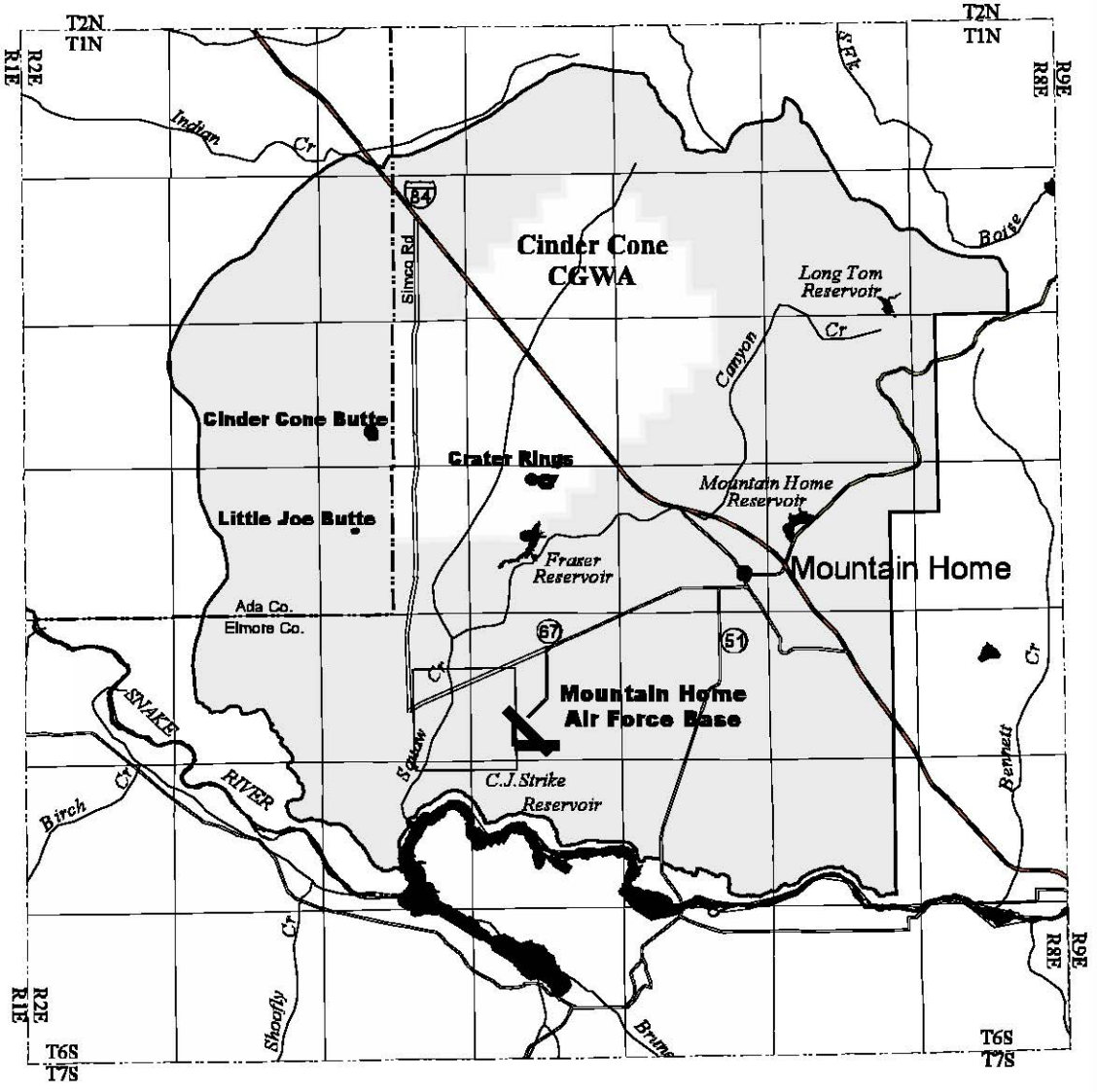
and Cinder Cone Butte

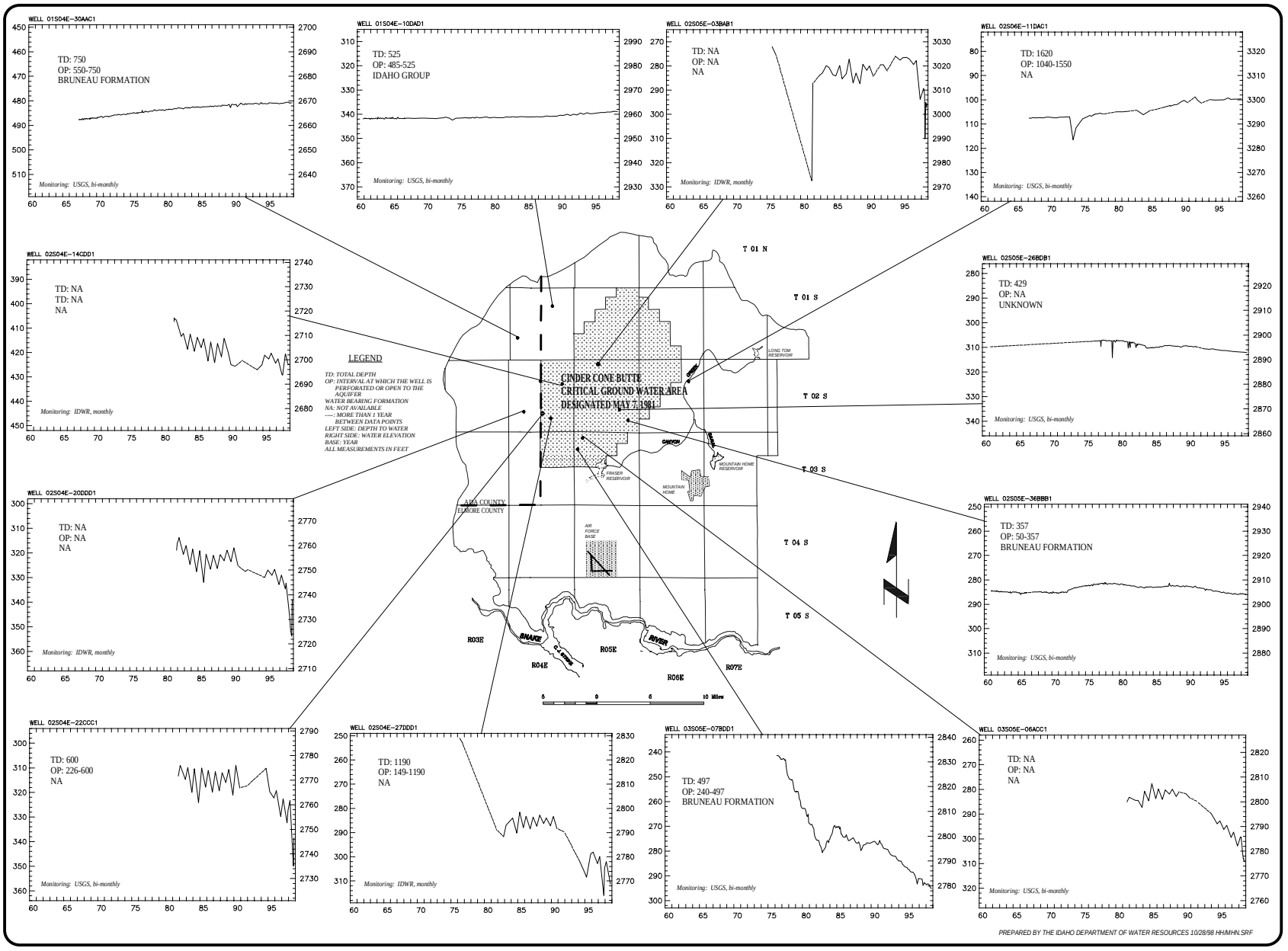
Critical Ground Water Area



Scale 1:493,190

4 0 4 Miles

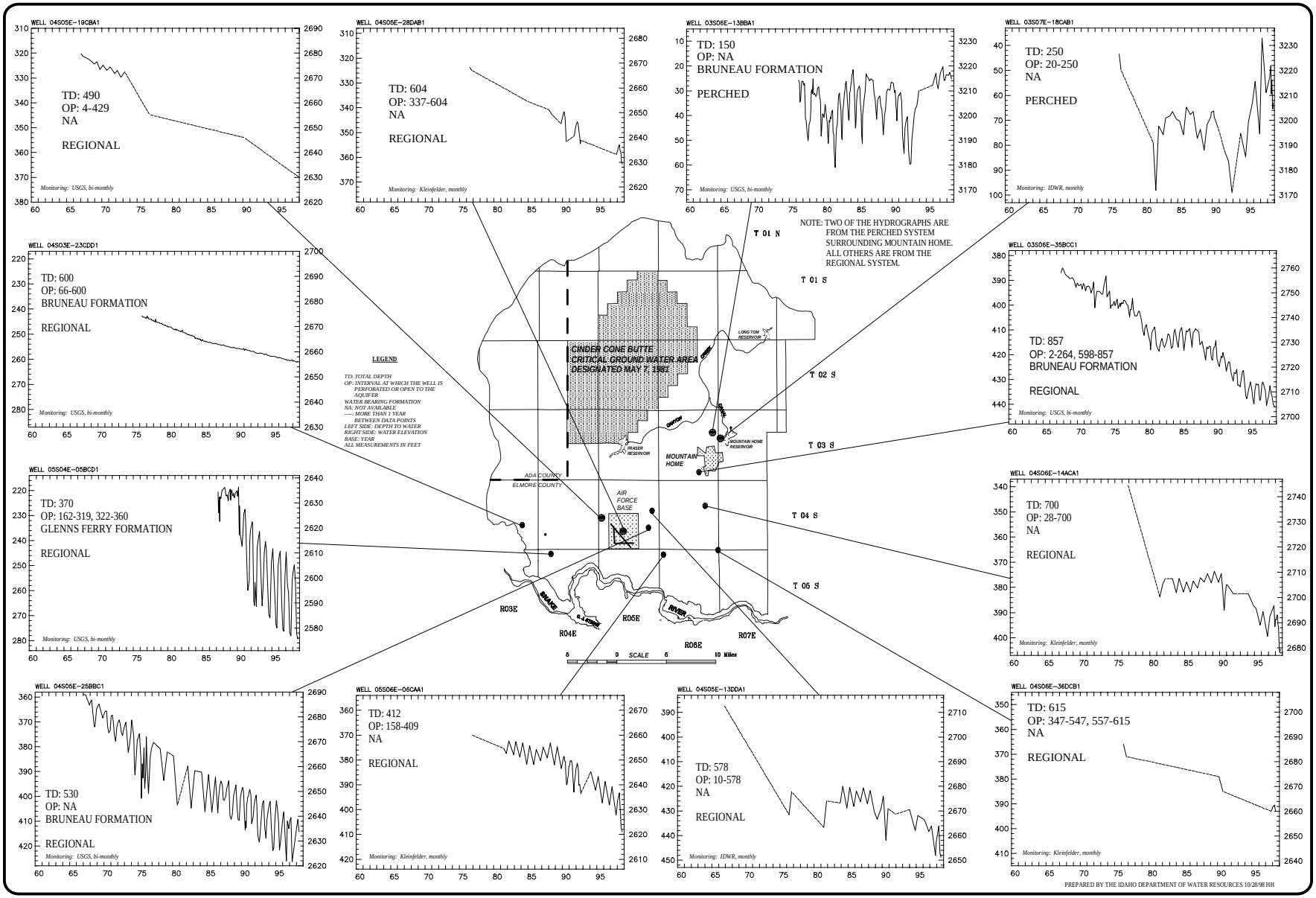




MOUNTAIN HOME GROUND WATER MANAGEMENT AREA AND THE CINDER CONE BUTTE CRITICAL GROUND WATER AREA

Ground Water Hydrographs - North Area

FIGURE 21



MOUNTAIN HOME GROUND WATER MANAGEMENT AREA AND THE CINDER CONE BUTTE CRITICAL GROUND WATER AREA

Ground Water Hydrographs - South Area

FIGURE 22

OAKLEY FAN CRITICAL GROUND WATER AREAS

Overview of Current Management Status

The Oakley Fan is located in northeastern Twin Falls and western Cassia Counties (see Figure 23). Originally declared as the Goose Creek-Rock Creek CGWA on January 16, 1962, the boundaries were modified on September 6, 1967, creating three separate CGWAs: Artesian City, Cottonwood, and Oakley-Kenyon. On January 19, 1982, the West Oakley Fan CGWA was established. The four areas create a contiguous tract and have been managed as a single unit.

The order modifying the boundaries and establishing the initial three areas stated "there does not appear to be available unappropriated ground water within the boundaries of the three designated areas. Therefore, new appropriations of water shall not be allowed." The West Oakley Fan order did not specifically prohibit new diversions; however, the order stated that a study had indicated that the available ground water was limited. A management plan has not been developed nor has an advisory committee been formed.

A ground water recharge demonstration project has been ongoing in the region since the early 1990's; however, only limited volumes have been recharged.

Hydrogeology

There are four main aquifers in the Oakley Fan area: limestone, rhyolite, basalt and alluvium (Bendixsen, 1994). The limestone aquifer is confined and yields large supplies. The rhyolite aquifer is confined with yields of small to moderate amounts. Small to large quantities of ground water are supplied from the unconfined basalt aquifer. The unconfined alluvial aquifer yields small to moderate supplies of ground water (Crostwaite, 1969). There are several perched aquifers that are probably the result of surface runoff, storage facilities and surface irrigation.

Faults and surface water bodies affect the ground water flow direction. Ground water flow direction between two northwest trending faults is north to northwest with probable flow restrictions across the faults (Bendixsen, 1994). Murtaugh Lake gains or loses water apparently related to ground water pumpage. The area is bounded on the north by the Snake River. However, river elevations and ground water levels indicate that flow passes under the Snake River to join the Eastern Snake Plain Aquifer at some point between Milner Dam and a point north of Murtaugh Lake (Bendixsen, 1994).

Recharge to the Oakley Fan comes from runoff from streams flowing from the south, surface irrigation, and the Snake River.

Current Ground Water Conditions

Figures 24 through 27 present ground water hydrographs for the four areas. The overall trend in ground water levels thoughout the Oakley Fan is downward. However, individual wells reflect different degrees of responsiveness to climatic fluctuations relating to dry and wet periods.

Water levels in most wells in the Oakley-Kenyon area reflect the wet period in early-mid 1980s. Declines are evident during the drought of 1987-1992. Water levels in this area have stabilized or slightly increased during the recent wet period from 1995 to present.

Water levels in the Artesian City are less responsive to wet and dry periods than water levels in other areas. Most levels in the southern and eastern parts of the area reflect steep declines, while most levels in the north and west parts are more stable.

Water levels in the West Oakley are less sensitive to climatic changes, but are still evident on a smaller scale.

Steep declines in water levels in the Cottonwood area during the 1960s stabilized in the 1970s. However, declines began again in the 1980s and have continued at a less severe rate coinciding with the drought of the late 1980s and early 1990s.

While declines are not as significant as in other areas, water levels in the West Oakley area reflect wet (early-mid 1980s and 1995 to present) and dry cycles (1987-1992).

IDWR monitors 20 wells on a quarterly basis. USGS monitors 14 wells: two wells monthly, nine wells bi-monthly, and three wells semi-annually.

REFERENCES

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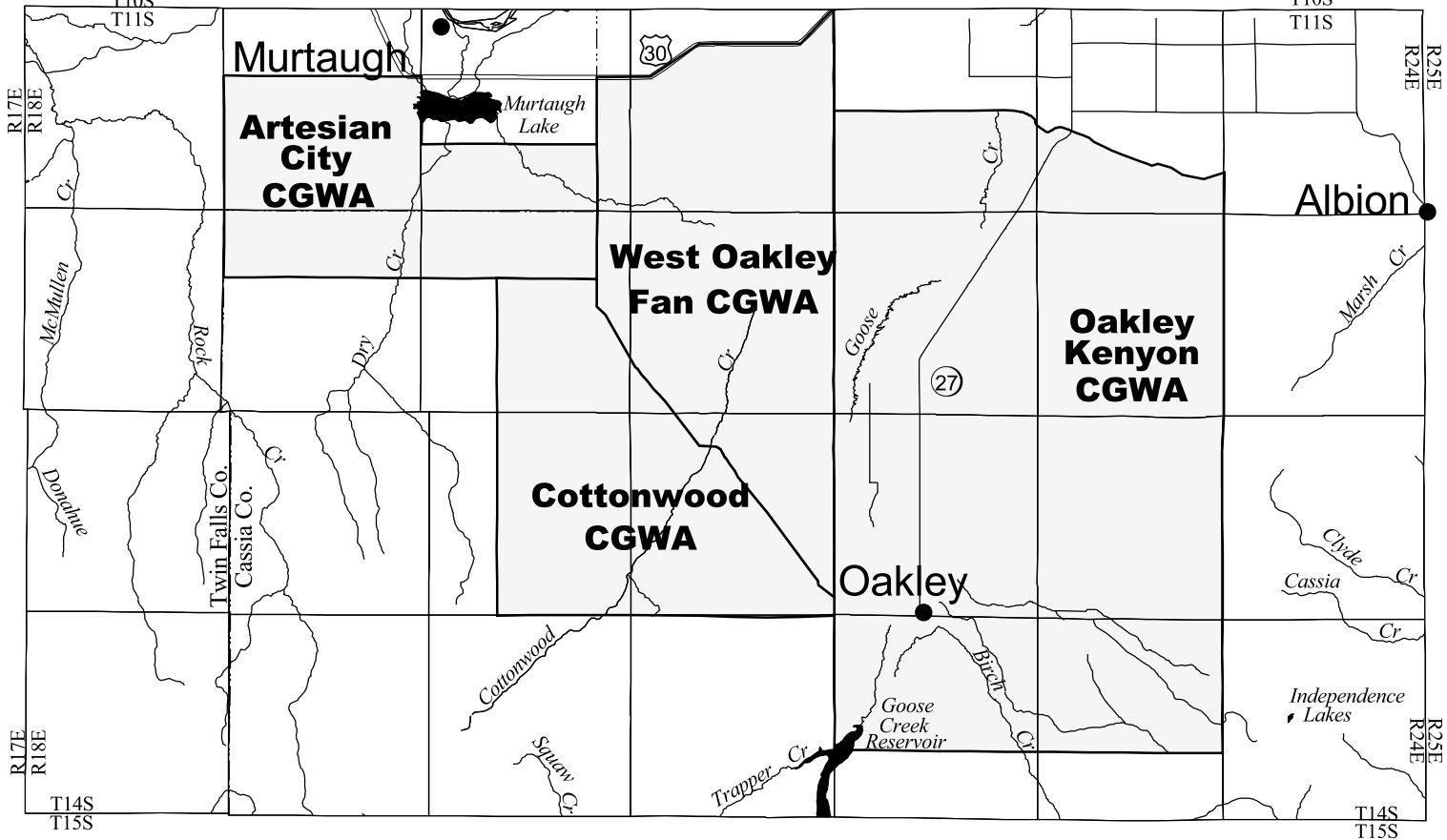
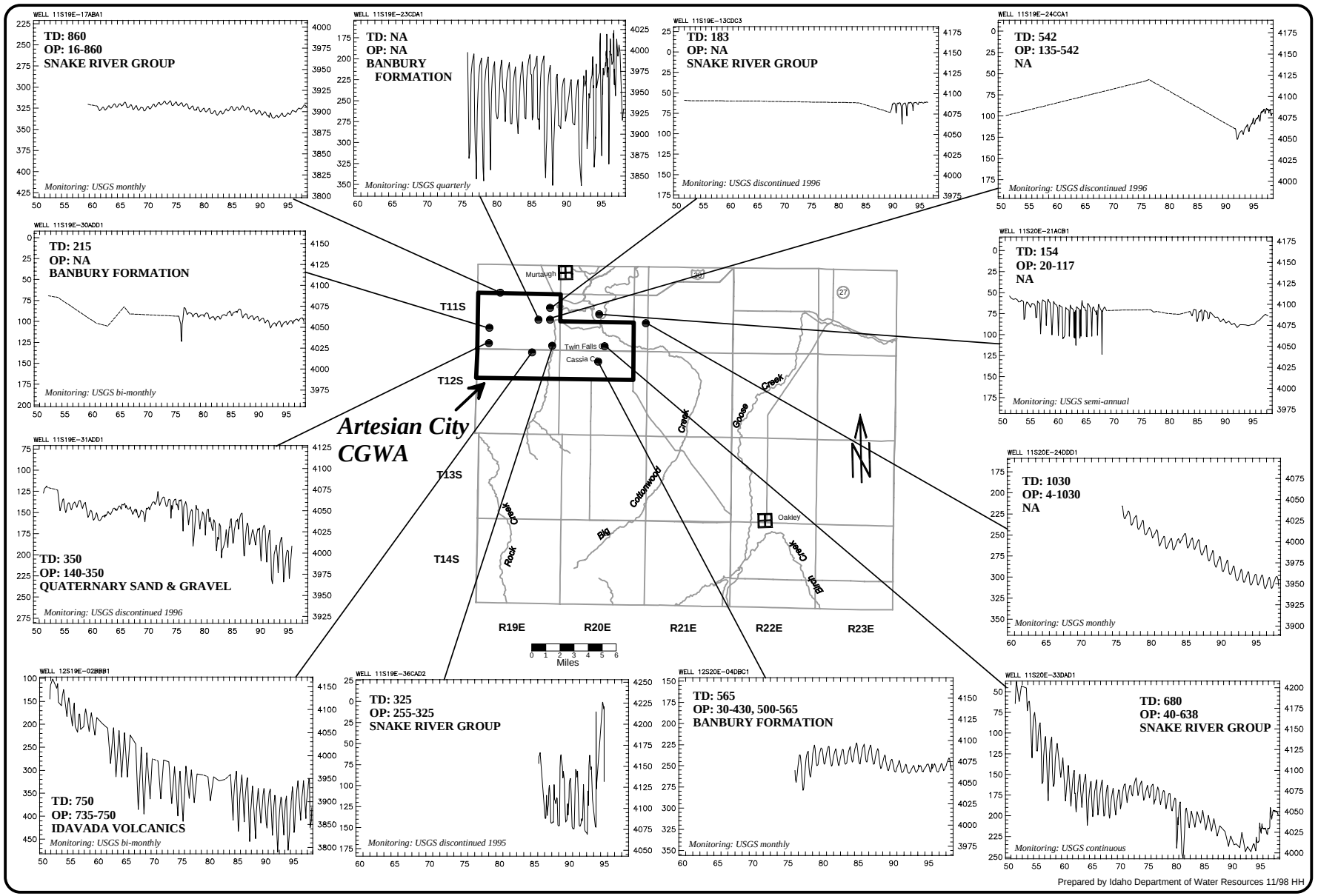
Oakley Fan

Critical Ground Water Areas (CGWA)

Scale 1:436,689

6 0 6 Miles





OAKLEY FAN CRITICAL GROUND WATER AREAS

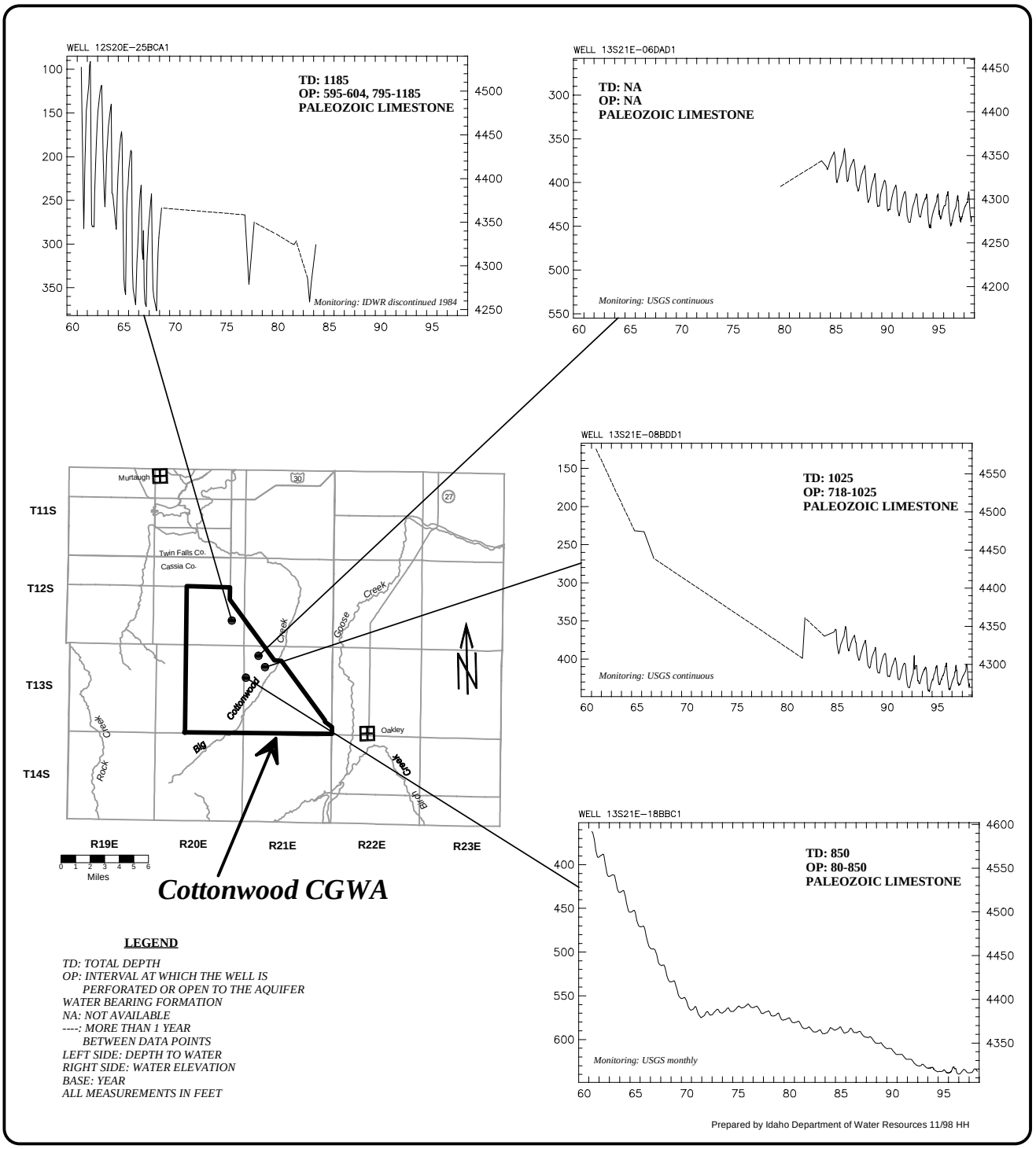
Artesian City Critical Ground Water Area

Ground Water Hydrographs

FIGURE 24

LEGEND

TD: TOTAL DEPTH
OP: INTERVAL AT WHICH THE WELL IS PERFORATED OR OPEN TO THE AQUIFER WATER BEARING FORMATION
NA: NOT AVAILABLE
- - -: MORE THAN 1 YEAR BETWEEN DATA POINTS
LEFT SIDE: DEPTH TO WATER
RIGHT SIDE: WATER ELEVATION
BASE: YEAR
ALL MEASUREMENTS IN FEET

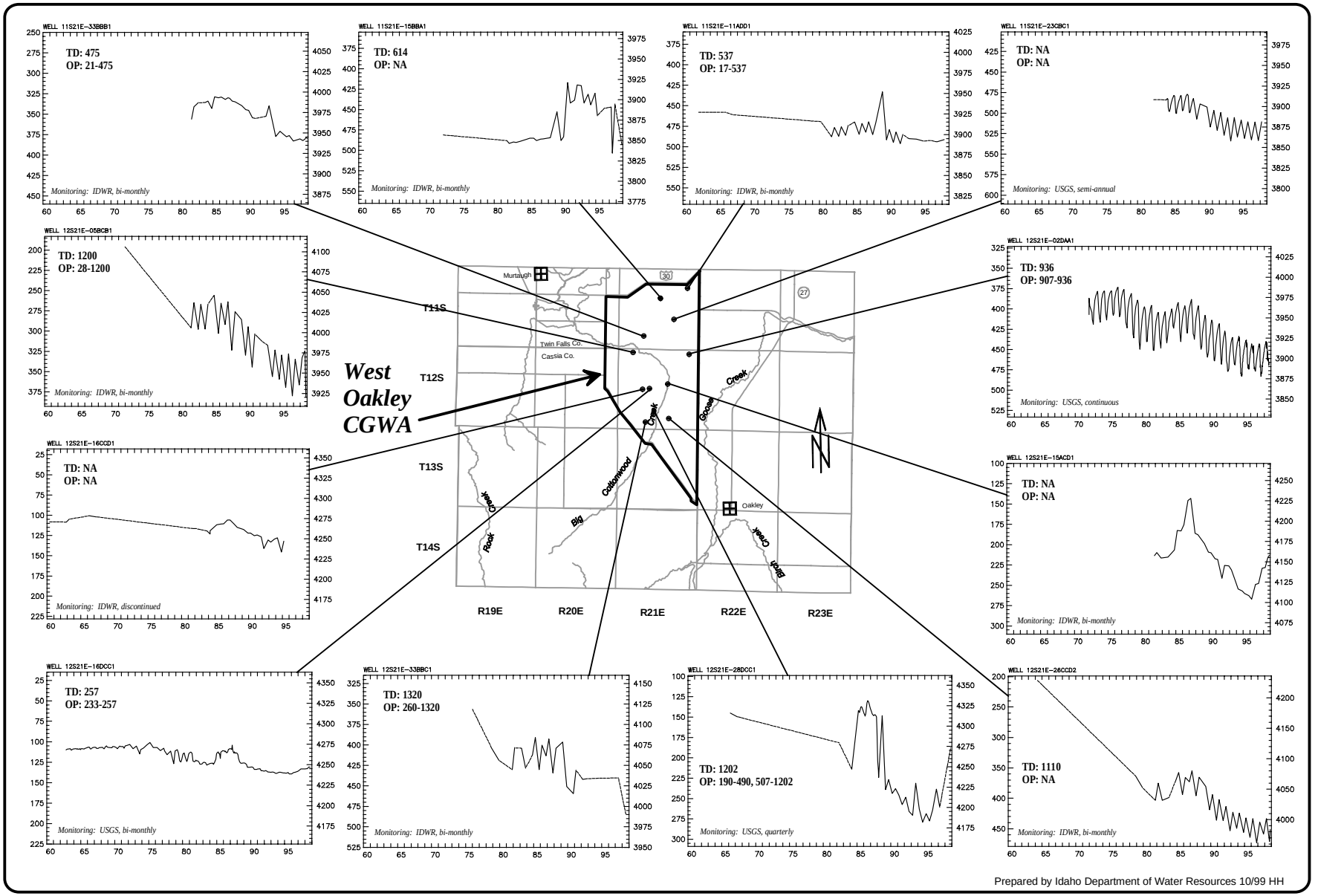


OAKLEY FAN CRITICAL GROUND WATER AREAS

Cottonwood Critical Ground Water Area

Ground Water Hydrographs

FIGURE 25



Prepared by Idaho Department of Water Resources 10/99 HH

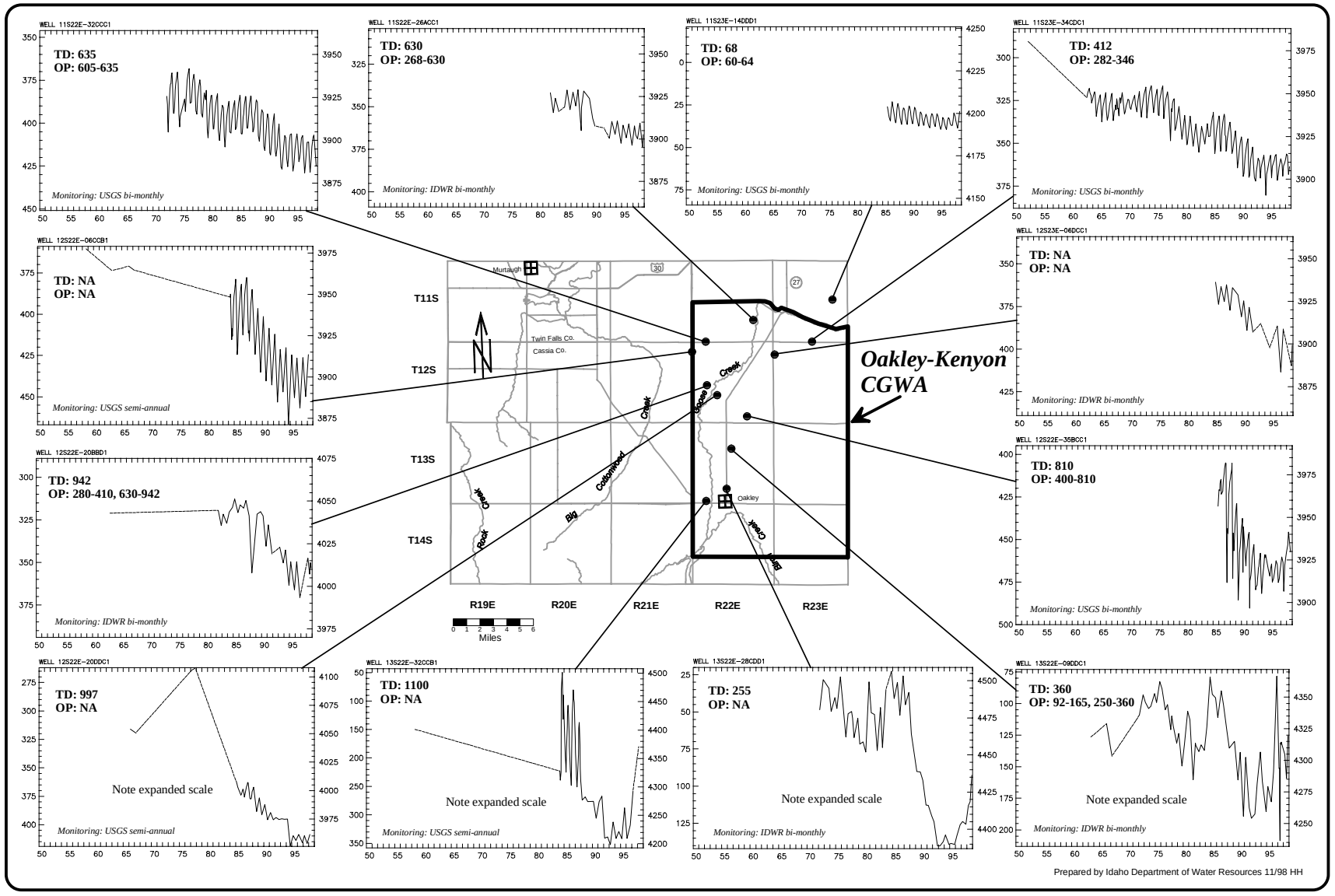
OAKLEY FAN CRITICAL GROUND WATER AREAS

West Oakley Critical Ground Water Area

Ground Water Hydrographs

Legend

TD: TOTAL DEPTH
OP: INTERVAL AT WHICH THE WELL IS PERFORATED OR OPEN TO THE AQUIFER
WATER BEARING FORMATION
NA: NOT AVAILABLE
---: MORE THAN 1 YEAR BETWEEN DATA POINTS
LEFT SIDE: DEPTH TO WATER
RIGHT SIDE: WATER ELEVATION
BASE: YEAR
ALL MEASUREMENTS IN FEET



OAKLEY FAN CRITICAL GROUND WATER AREAS

Oakley-Kenyon Critical Ground Water Area

Ground Water Hydrographs

FIGURE 27

LEGEND

TD: TOTAL DEPTH
OP: INTERVAL AT WHICH THE WELL IS PERFORATED OR OPEN TO THE AQUIFER WATER BEARING FORMATION
NA: NOT AVAILABLE
- - -: MORE THAN 1 YEAR BETWEEN DATA POINTS
LEFT SIDE: DEPTH TO WATER
RIGHT SIDE: WATER ELEVATION
BASE: YEAR
ALL MEASUREMENTS IN FEET

RAFT RIVER CRITICAL GROUND WATER AREA

Overview of Current Management Status

The Raft River Critical Ground Water Area (CGWA) is located in southern Idaho in Cassia County (Figure 28). The area was originally designated a CGWA on July 23, 1963. Subsequent orders modified the boundaries, eliminating an area on the extreme northern boundary (August 2, 1965), the Albion basin (September 19, 1966), and the area north of the Yale-Cotteral Road (November 3, 1970).

Large-scale ground water pumping in the Raft River valley began in 1950 and increased through the 1950s. USGS documented declining water levels and decreased stream flow in the Raft River from 1956 through 1960 (Mundorff and Sisco, 1963). By 1963, concern over the potential effects of new and increased ground water use caused the designation as a CGWA. Creation of the management area did not include formation of advisory committee or development of a management plan.

Hydrogeology

Aquifers in the Raft River Basin consist of lake and volcanic deposits, alluvial deposits, and basalt. Ground water occurs in both water table and artesian conditions. Interbedded lenses and tongues of silt and clay support localized perched zones (Nace, 1961).

Ground water flows south to north toward the Snake River, generally following the direction of surface water flow. Recharge occurs principally from precipitation, infiltration from streams, and irrigation water (Nace, 1961).

Current Ground Water Conditions

Figure 29 presents ground water hydrographs for the areas Most hydrographs reflect the following similar trends, although the trends are more subdued in the southern part of the valley. Declining trends are evident during the period of development, beginning in the 1950s until the late 1970s. Water levels were stable or rising during the wet period of the early-mid 1980s. Declines have continued from the late 1980s to present.

Currently, 23 wells are monitored within the Raft River basin. USGS monitors four wells: two wells are monitored bi-monthly and two wells are monitored quarterly. The remaining 19 wells are monitored by IDWR on a quarterly to semi-annual basis. Data dates back to the early 1950s.

REFERENCES

Bendixsen, Shane, 1994, Summary of Ground Water Conditions in the Raft River Area, IDWR Open File Report, 15 pages.

Mundorff, M. J., and Sisco, H. G., 1963, Ground water in the Raft River basin, Idaho, with special reference to irrigation use, 1956-1960, USGS Water-Supply Paper 1619-CC, 23 pages.

Nace, R. L., and others, 1961, Water Resources of the Raft River Basin, Idaho-Utah: USGS Water-Supply Paper 1587, 138 pages.

Walker, E. H., L. C. Dutcher, SO. O. Decker, and K. L. Dyer, 1970, The Raft River Basin, Idaho-Utah, as of 1966: A Reappraisal of the Water Resources and Effects of Ground-Water Development, IDWR Water Information Bulletin No. 19, 95 pages.

Raft River

Critical Ground Water Area

Scale 1:524,784

2 0 2 4 6 Miles

N

T9S
T10S

R24E
R25E

T9S
T10S

R31E
R30E

Albion

Malta

81

77

84

Marsh Cr

Raft

Canyon

Shirley Cr

Fall Cr

N Fk Sublett Cr

S Fk

Sublett Cr

Conner Cr

Cassia Cr

Parks Cr

Cottonwood Cr

Grade Cr

Raft R

Clear Cr

Johnson Cr

One Mile Cr

Cassia Co.

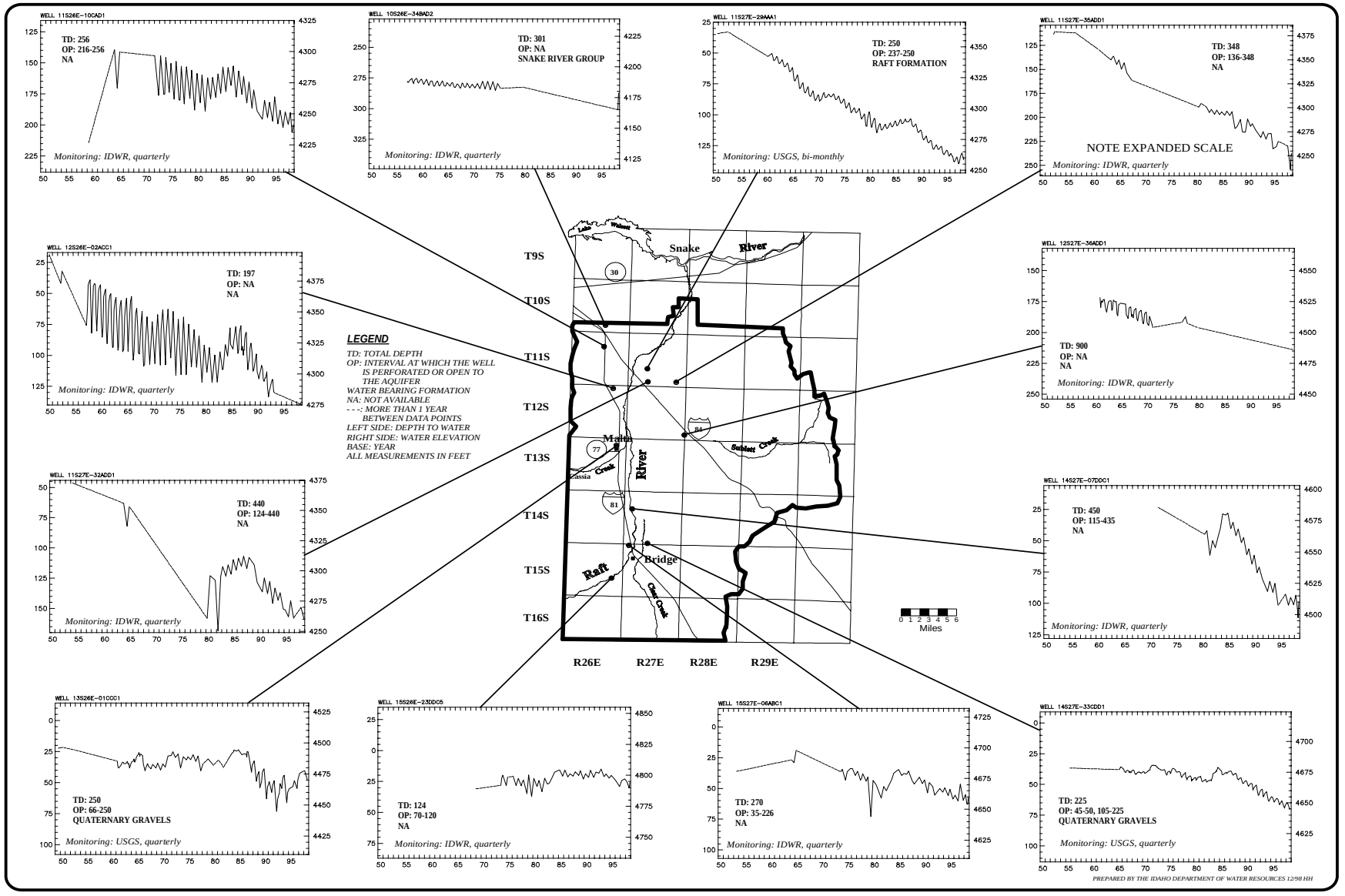
Oneida Co.

T16S
T17S

R30E
R31E

IDAHO
UTAH

T16S
T17S



RAFT RIVER CRITICAL GROUND WATER AREA

Ground Water Hydrographs

FIGURE 29

SOUTHEAST BOISE GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Southeast Boise GWMA, located in Ada County, was established by the Director, IDWR, on October 14, 1994 (Figure 30). The Order establishing the management area and included the requirement for the formation of an advisory committee. This precedent-setting requirement delineated the responsibilities and membership for the advisory committee. The advisory committee is required to develop a management policy and work toward informally resolving ground water disputes.

The Order also required that all ground water users diverting more than 0.20 cubic feet per second (cfs) submit annual reports of water use to IDWR. A separate Order requiring measuring devices, signed on April 4, 1995, was issued to 17 ground water users holding a total of 28 water rights diverting more than 0.20 cfs.

The Southeast Boise GWMA is the second ground water management area in the Treasure Valley. The Boise Front Geothermal GWMA was designated in 1987. The boundaries partially overlap, however, the Boise Front Geothermal GWMA is designated for ground water with temperatures greater than 85 degrees F. The Southeast Boise GWMA designates a specific cold water aquifer unit, commonly described as the Boise-Fan aquifer (Squires, 1992).

IDWR Western Region has been working with the advisory committee since its formation. The Committee has resolved a dispute within the management area, and has developed a dispute resolution process. The advisory committee is also directed to develop a water budget and determine reasonable pumping lift.

Hydrogeology

Rocks underlying the Southeast Boise GWMA consist of Boise fan sediments (Squires, 1992). They are considered to represent a buried alluvial fan-fan delta system. The fan deposits are rarely exposed and overlain by Pleistocene gravels that have interfingering basalt flows (Dion, 1972). A deep geothermal system can be encountered with water temperatures above 85 degrees F at depths 900 to 1100 feet below land surface (Squires, 1993).

Ground water flows to the south and southwest and depth to water ranges from a few feet in the northern part of the management area to over 400 feet in the southern part. Ground water is usually under water table conditions. South of the management area, no data are available. To the east, the area is bounded by siliceous volcanics that extend southward beyond the management area boundary. To the north, the area is bounded by the Boise River. Recharge is believed to be primarily from the Boise River and leakage from the New York Canal.

Current Ground Water Conditions

Figure 31 presents ground water hydrographs for the area. Ground water level declines have been in excess of 70 to 80 feet since 1975 based on data from the KOA well (Figure 31). Other wells in the area show declines during the same time period ranging generally from 50 to 70 feet, but up to 100 feet in one well (02N02E-12AAC1). Water levels in wells west of the management area do not show similar declines.

Ground water levels are monitored with continuous recorders in two wells by United Water. The USGS monitors six wells: five wells are monitored monthly, and one well is monitored intermittently.

REFERENCES

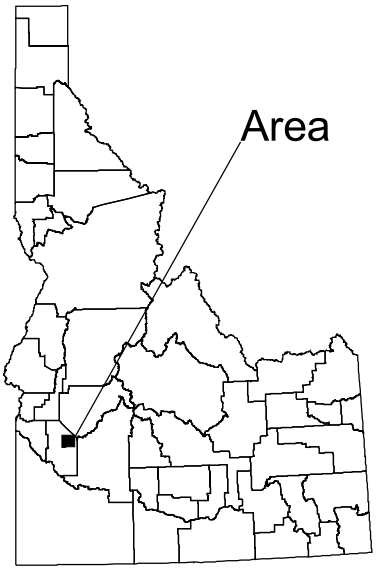
Dion, N. P., 1972, Some Effects of Land-Use Changes on the Shallow Ground-Water System in the Boise-Nampa Area, Idaho, IDWR Water Information Bulletin No. 26, 47 pages.

Squires, Edward, Wood, Spencer H., and Osiensky, James L., 1992, Hydrogeologic Framework of the Boise Aquifer System Ada County, Idaho, Research Technical Completion Report, Idaho Water Resources Research Institute, University of Idaho, 114 pages.

Squires, Edward, Wood, Spencer H., Osiensky, James L., and Dittus, Roger D., 1993, Groundwater Conditions and Hydraulic Testing of the Boise-Fan Aquifer of Southeast Boise River Valley Ada County, Idaho, A report prepared for Boise Water Corporation, 79 pages.

Southeast Boise

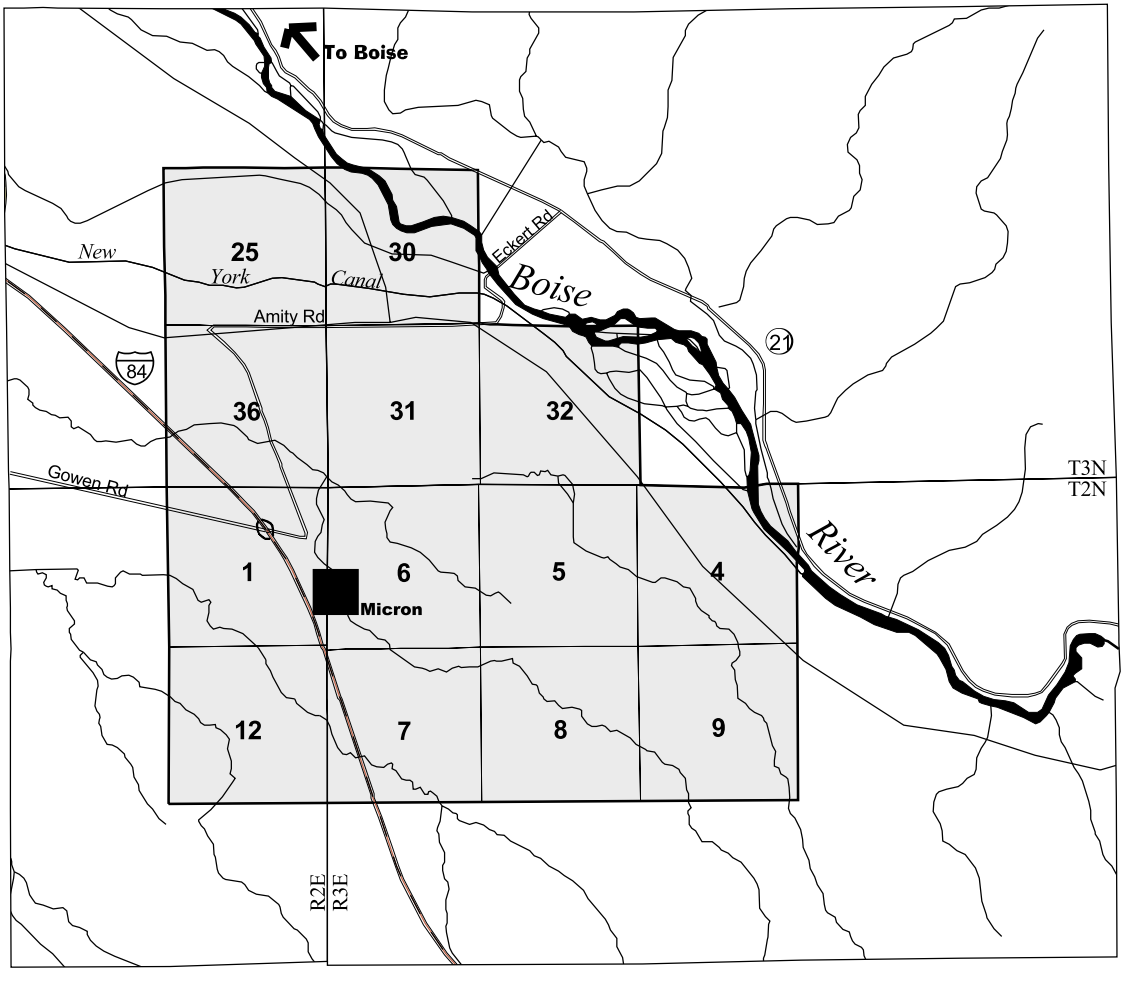
Ground Water Management Area



N

Scale 1:113,619

1 0 1 Miles



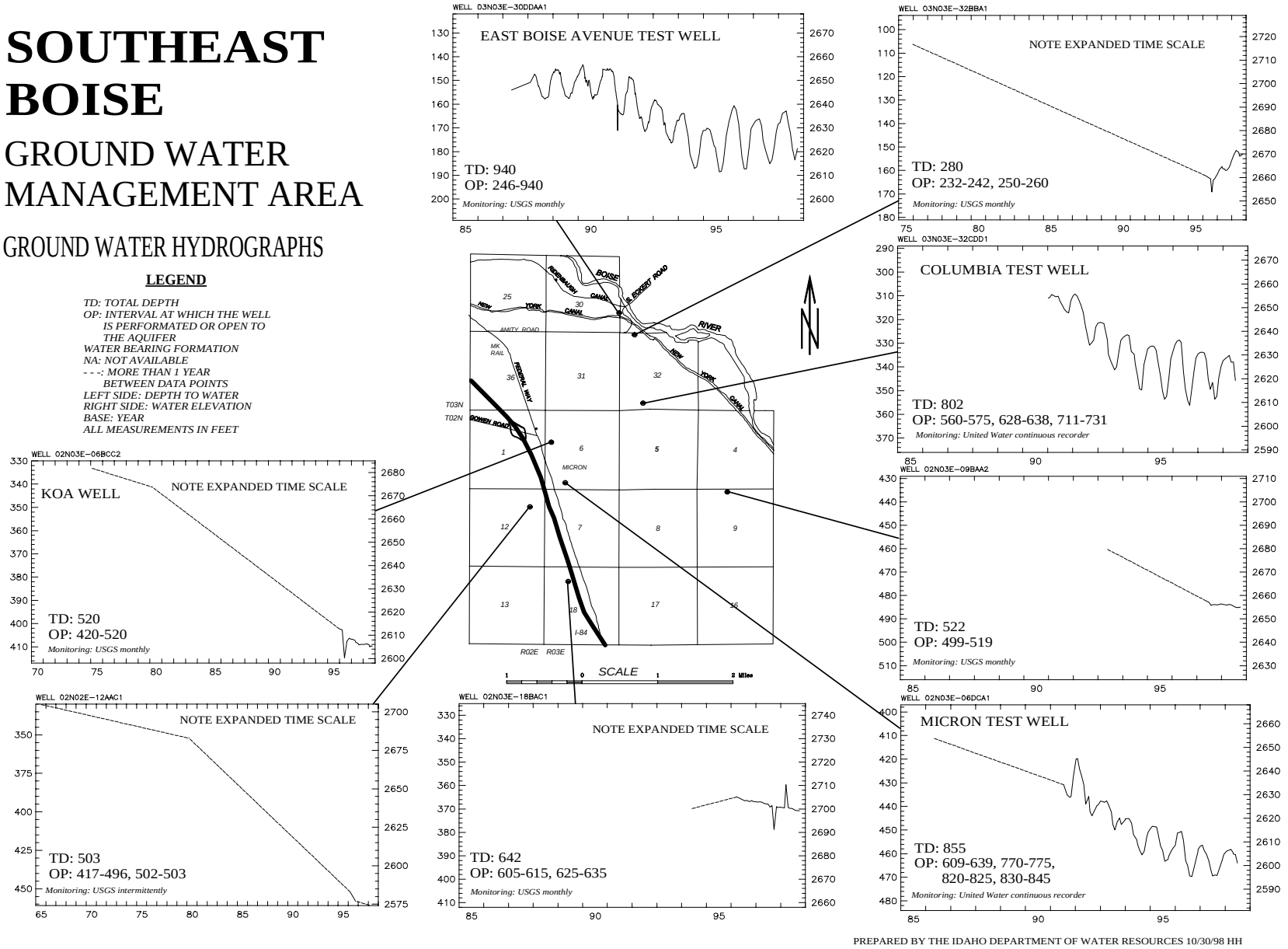
SOUTHEAST BOISE

GROUND WATER MANAGEMENT AREA

GROUND WATER HYDROGRAPHS

LEGEND

TD: TOTAL DEPTH
OP: INTERVAL AT WHICH THE WELL IS PERFORMATED OR OPEN TO THE AQUIFER
WATER BEARING FORMATION
NA: NOT AVAILABLE
- - -: MORE THAN 1 YEAR BETWEEN DATA POINTS
LEFT SIDE: DEPTH TO WATER
RIGHT SIDE: WATER ELEVATION
BASE: YEAR
ALL MEASUREMENTS IN FEET



PREPARED BY THE IDAHO DEPARTMENT OF WATER RESOURCES 10/30/98 HH

FIGURE 31

TWIN FALLS GROUND WATER MANAGEMENT AREA

Overview of Current Management Status

The Twin Falls GWMA is located in Twin Falls County in southern Idaho (Figure 32). The Twin Falls GWMA was established on January 11, 1984, based on concern that the thermal system was approaching a critical condition evident by declining pressures and well interference may occur. The order specifically excluded the Banbury Hot Springs GWMA.

A moratorium on new geothermal development was established on July 24, 1987, for a limited area within the GWMA. The moratorium was extended in 1992 and again in 1997 because equilibrium had not been established in the geothermal system. A management plan has not been developed nor has an advisory committee been formed.

Hydrogeology

Both cold and geothermal aquifers occur in the area; however, the Twin Falls GWMA covers only the geothermal aquifer. The geothermal aquifer occurs in the Idavada Volcanics with upward ground water movement into the overlying Banbury Basalt. Water temperatures range from 68 to 111 F° (Lewis and Young, 1989).

Ground water flow direction is northwest (Lewis and Young 1989). Recharge is believed to come from the mountains to the south. A conceptual model of the geothermal aquifer developed by Street and DeTar (1987) described a hydrologic connection with the Banbury geothermal aquifer, although it appears to be poorly understood.

Current Ground Water Conditions

Figure33 presents ground water hydrographs for the areas. In 1990, Baker and Castelin concluded that an equilibrium has occurred between recharge and discharge in the geothermal system. However, water level declines occurred in most wells in the early 1990s, the result of increased pumpage. The USGS Filer Test well (09S16E-20ADD1) is used as an indicator of conditions in the Twin Falls and Banbury geothermal system. Major declines in shut-in pressures in the Filer Test well in the early 1990s have ceased (Neely, 1998). Annual production by geothermal users appears to have stabilized. However, it is not conclusive whether water conditions have stabilized.

A monitoring program was developed when the Twin Falls GWMA was established. USGS, IDWR, and users have collected data since 1984. USGS monitoring was discontinued in 1994. IDWR-Southern Region has been collecting monthly data since 1994 at three wells. The College of Southern Idaho submits monthly monitoring data to IDWR for its two geothermal production wells.

REFERENCES

Baker, Steven J., and Paul M. Castelin, 1990, Geothermal Resource Analysis in Twin Falls County, Idaho, Part 2, IDWR Water Information Bulletin No. 30, Part 16, 36 pages.

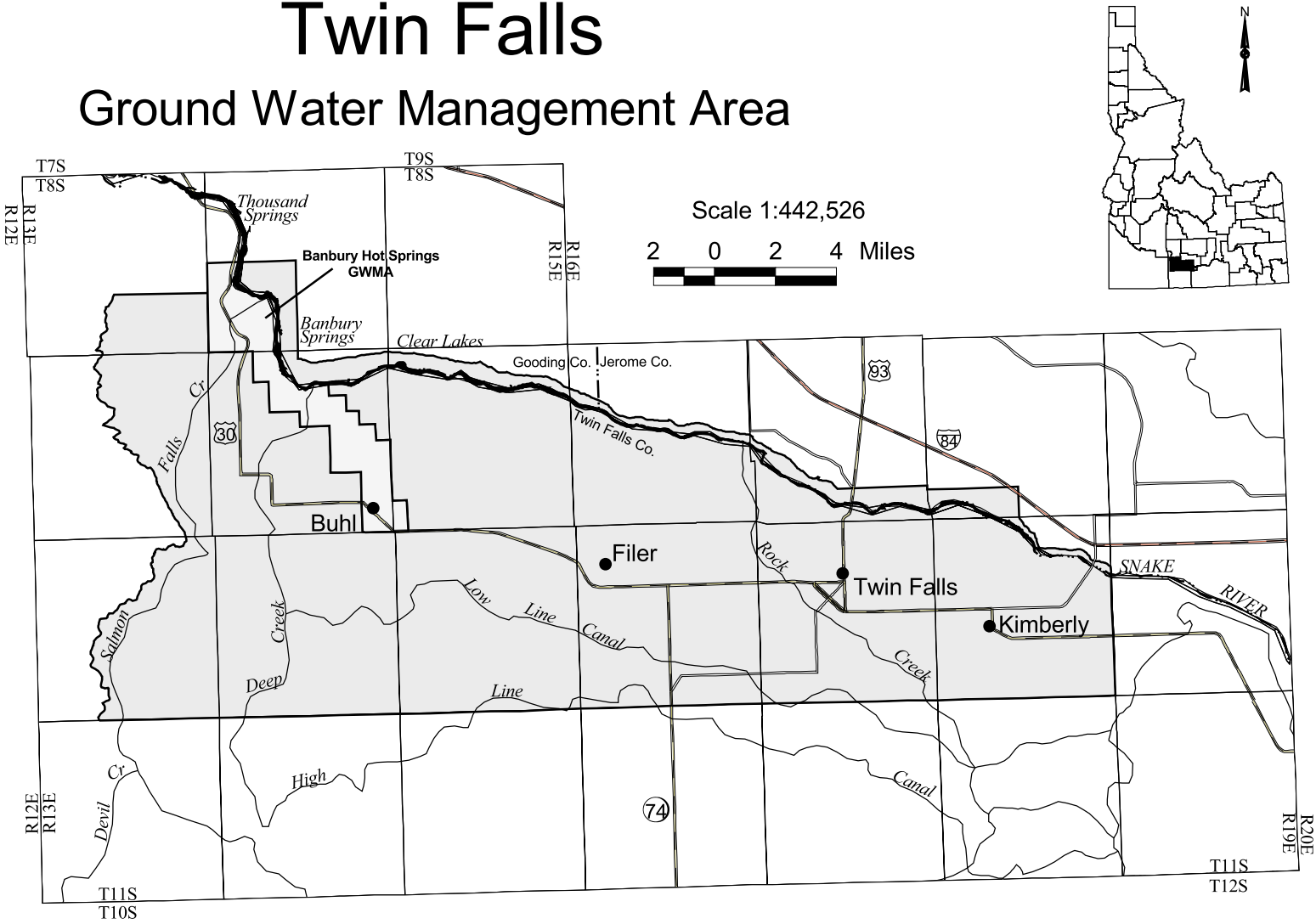
Lewis R. E., and H. W. Young, 1989, The Hydrothermal System in Central Twin Falls County, Idaho, USGS Water-Resources Investigations Report 88-4152, 44 pages.

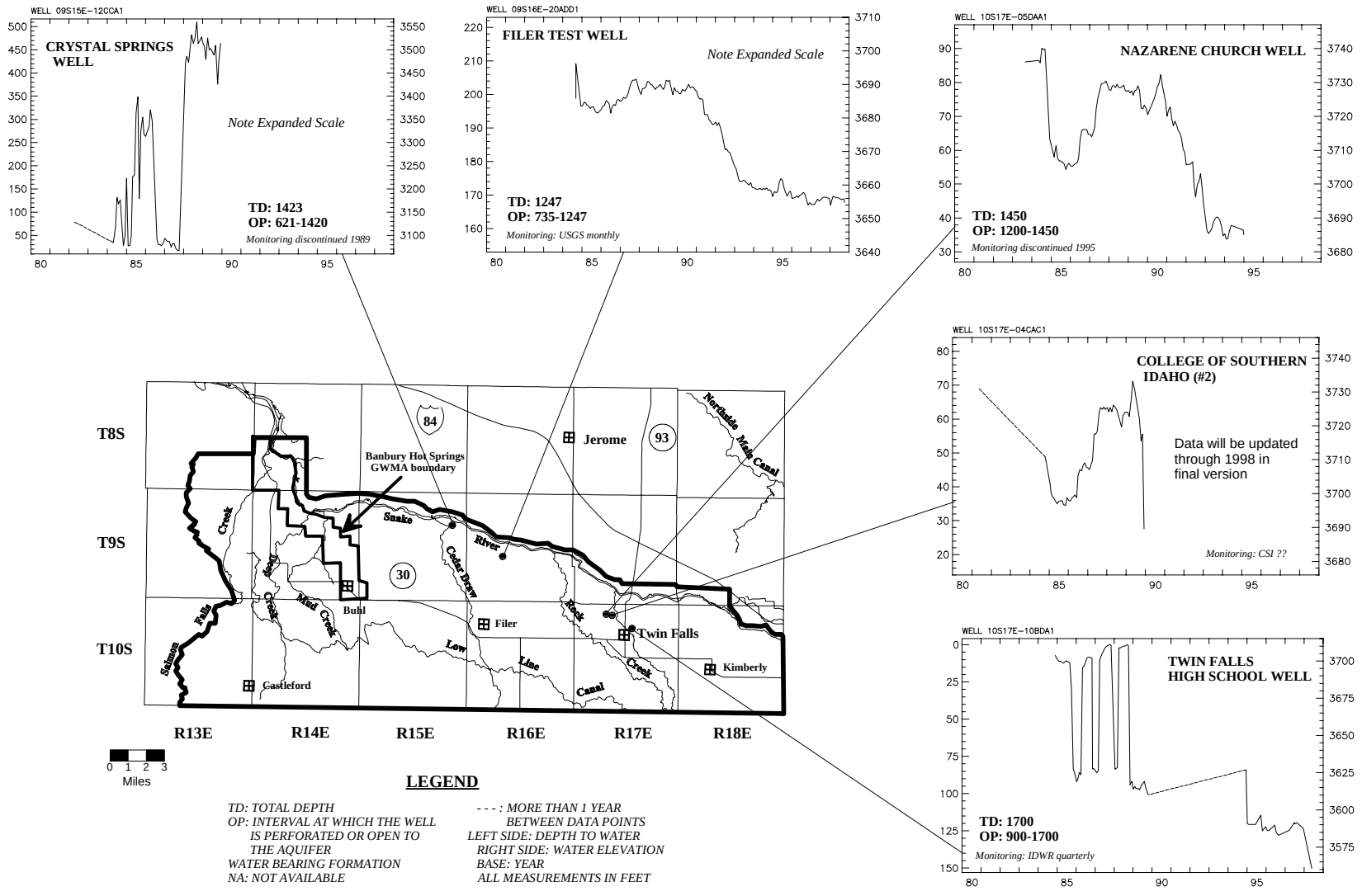
Neely, Ken, 1998, Memo to Tim Luke, Subject: Twin Falls Geothermal, dated May 22, 1998, IDWR Internal Memo, 6 pages.

Street, Leah V., and Robert E. DeTar, 1987, Geothermal Resource Analysis in Twin Falls County, Idaho, IDWR Water Information Bulletin No. 30, Part 15, 46 pages.

Twin Falls

Ground Water Management Area





TWIN FALLS GROUND WATER MANAGEMENT AREA

Ground Water Hydrographs

FIGURE 33