Hydrogeologic Study

Feasibility of Spring Creek Basin Designation

Prepared for

Northern Colorado Water Association

HRS Water Consultants, Inc.

08-19
June, 2009

Certification

Hydrogeologic Study
Feasibility of Spring Creek basin Designation

Prepared for
Northern Colorado Water Association

June 8, 2009

HRS Project No. 08-19

The technical analysis, opinions, and recommendations in this report were prepared by or under the direct supervision of the undersigned, whose seal as a registered Professional Engineer is affixed below.

____

Eric J. Harmon, P.E.
Principal

Staff members of HRS Water Consultants, Inc. who contributed to the analysis and documentation as presented in this report are:

G. Eric Saenger, CPG	Senior Hydrogeologist
Peter D. Boddie	Senior Hydrologist
Steven K. Barrett	Water Resources and GIS Specialist

Executive Summary

HRS Water Consultants, Inc. has completed its evaluation of the Spring Creek basin and its associated alluvial aquifer. The work was done on behalf of Northern Colorado Water Association ("NCWA"). This report documents the work done and our results and conclusions.

Based on the results of this study as presented in this report, we believe the technical and statutory conditions for basin designation are met, and designation of the upper Spring Creek basin, above the Larimer County – Weld County line, is feasible. The required information has been developed, and is explained and documented in this report and the attached figures.

From our analysis, based on travel time calculations and Glover depletion estimates, any impact from well pumping in the proposed Upper Spring Creek designated basin will be immeasurably small to the nearest ground water connected surface water rights even after 100 years of pumping in the proposed designated basin. Therefore we conclude that any impact from well pumping within the proposed designated basin will meet the *de minimis* standard as the Courts have specified.

From this study, we conclude that approximately 900 ac-ft/y of ground water is available in the alluvial aquifer in the proposed designated basin without creating a "mining" situation. Appropriations up to this amount in the proposed designated basin will not unreasonably impair existing water rights.

Based on our study, and the results as documented in this report, our primary recommendation is that NCWA should move forward with a petition to designate the Upper Spring Creek alluvial aquifer, upgradient (northwest) of the Larimer County – Weld County line.

Table of Contents

Table of Contents…continued

1.0 Introduction

HRS Water Consultants, Inc. (HRS) has completed its evaluation of the Spring Creek basin and its associated alluvial aquifer. The work was done by HRS acting in the capacity of Consulting Expert for this evaluation on behalf of Northern Colorado Water Association ("NCWA"). This report describes our evaluation of the hydrogeology of the basin, with emphasis on the area within and surrounding NCWA's wellfield. The study has included an evaluation of the technical feasibility of designating a portion of the Spring Creek basin under the Colorado statute governing this action.

Because one of our primary conclusions from the study is that the technical criteria for designation can be met, we have included specific technical data and analysis that should provide the necessary information, should NCWA choose to proceed with a petition for designation.

1.1 Study Objectives

The objectives of the Spring Creek feasibility study are as follows:

- Define the hydrogeologic characteristics of the alluvial aquifer Spring Creek basin, including its alluvial aquifer.
- Determine whether ground water in the Spring Creek basin is available and required for the fulfillment of surface water rights.
- Determine whether there is a flowing natural stream adjacent to, or associated with, the ground water of the Spring Creek alluvial aquifer.
- Determine what water rights are in use in the Spring Creek basin.
- Make a recommendation as to whether we believe it is feasible to go forward with a petition to designate all, or a portion, of the Spring Creek basin and if so, recommend the basin boundaries to be designated.
- Estimate the water balance of the recommended Upper Spring Creek designated basin, and determine whether the appropriation of water within the recommended designated basin would unreasonably impair existing water rights or create unreasonable waste.

Each of these objectives is addressed in this report.

1.2 Study Area Location

The Spring Creek basin rises in southern Laramie County, Wyoming, but the majority of the basin is located in Larimer County and Weld County, Colorado (see Figure 1), contained in a pocket at the back of this report). The NCWA wellfield is located in Larimer County, approximately one to two miles northwest of the Larimer – Weld county line.

1.3 Scope of Study

The scope of this feasibility study has included the following tasks:

- Research, review, and evaluation of pertinent documents and records.
- Research and tabulation of surface and ground water rights.
- Field observations of hydrogeology, surface hydrology, and water use.
- Pumping test of NCWA Wells 1 and 2.
- Travel-time analysis and Glover-type depletion timing analysis.
- Estimation of in-basin water use.
- Meeting with Ground Water Commission staff.
- Water budget analysis of recommended area for basin designation.

These tasks and the results are discussed in appropriate sections of this report.

1.4 Authorization

HRS received authorization on August 19, 2008, from NCWA's Manager, Mr. Rich Patterson, P.E., to proceed with this study pursuant to an August 13, 2008 Scope of Work by HRS (later modified by two change orders). HRS initiated activities on the authorization date. The work was completed under the direction of Eric J. Harmon, P.E., Project Manager. G. Eric Saenger, CPG, Senior Hydrogeologist, worked on hydrogeologic research and characterization of the Spring Creek basin. Steven K. Barrett, GIS and Water Resources Specialist, defined the topographic boundary of the

Spring Creek basin in the ArcGIS®[1] environment, designed the database structure, queried the Colorado State Engineer's Office databases for records of water rights and permitted wells in Spring Creek, researched and processed precipitation records, and developed maps of wells and water rights for the study area. Peter D. Boddie, Senior Hydrologist, was consulted on water rights matters.

[1] Note: use of registered trademarks or brand names in this document is for descriptive purposes only and does not constitute endorsement by HRS Water Consultants, Inc.

2.0 Methods of Investigation

This study of the Spring Creek basin included research and evaluation of available data, and also collection and analysis of new data in the form of a pumping test of NCWA Wells 1 and 2. No test drilling was done as part of this study. Existing well logs and test hole data were judged to be sufficient to complete the evaluation as scoped.

2.1 Data Research, Evaluation, and Management

The data research activities by HRS consisted of gathering existing data, and reviewing and evaluating the data to arrive at our current hydrogeologic interpretation of the Spring Creek alluvial aquifer. The water rights and well permit data were compiled into an ArcGIS project to facilitate plotting these data on a topographic base map of the study area.

2.2 Data Sources

HRS collected and evaluated data available from NCWA and from public-record sources including the following:

- Published geologic maps relevant to the Spring Creek basin study area.
- Colorado Division of Water Resources State Engineer's Office (SEO) well permit database and water rights database.
- Diversion records for water rights in the study area.
- USGS topographic map coverages.
- Satellite imagery available free of charge (Terraserver and Google Earth).
- Orthophotoquads of the study area.
- Soil surveys of Larimer County and Weld County that encompass the study area.
- Climate data from the Western Regional Climate Center.

- Well pumping records and water level records from NCWA for the NCWA wells and Three Peaks Water (TPW) wells.
- Test hole drilling records provided to HRS by NCWA.
- A hydrogeologic and water-balance study of the Upper Crow Creek basin (Colorado Geological Survey, Kirkham and Rold, 1984).
- A preliminary letter-report done for NCWA by Martin & Wood (5/22/2008).
- A consultant's report done for the City of Fort Collins by Camp, Dresser & McKee regarding the feasibility of land application of biosolids on a large ranch property owned by the City, that is located in the general vicinity of NCWA's wellfield.

2.3 Field Investigations and New Data Collection

Several field investigations were performed as part of the Spring Creek study. These included three separate field trips to observe the surface geology, hydrology, and water use in the entirety of the Spring Creek basin in Colorado, from the Colorado – Wyoming state line, the NCWA wellfield area, downstream to the Spring Creek – Lone Tree Creek confluence, and further downstream to the Lone Tree Creek – South Platte River confluence approximately 40 miles from the NCWA wellfield. The field investigations have allowed us to observe many characteristics of the Spring Creek basin, including the following:

- Reaches of Spring Creek and Lone Tree Creek where surface water exists and does not exist.
- Reaches where surface water is in use.
- Evidence of recent or historical surface stream flow and surface water use.
- Evidence of use of ground water for irrigation and other uses.
- Evidence of bedrock outcrops in the Spring Creek basin and surrounding area.
- Observation of the type of material present in the Spring Creek alluvium.

In addition, with the assistance of NCWA personnel, HRS conducted a pumping test of NCWA Well No. 1 and NCWA Well No. 2 to ascertain the transmissivity of the alluvial aquifer at that location. The testing and results are discussed in a later section of this report.

2.4 Data Analysis and Hydrogeologic Interpretation

In addition to the research and field activities discussed above, HRS has performed the following data analysis and interpretation tasks and other activities as part of this study.

- Hydrogeologic mapping of bedrock, water level, and saturated aquifer thickness of the NCWA area of the Spring Creek alluvial aquifer.
- Construction of a geologic cross-section across the Spring Creek alluvial aquifer in the Larimer County – Weld County line area.
- Meeting with GW Commission staff and NCWA representatives to discuss data needs and application procedures, should NCWA choose to go forward with a petition to designate a portion of the Spring Creek basin.
- A water budget analysis of the portion of the Spring Creek basin upstream of the Larimer County – Weld County line.
- An analysis of the time of travel from the NCWA wellfield to the South Platte River.

The results of these tasks are discussed in subsequent sections of this report.

3.0 Water Rights and Water Use in the Spring Creek basin

This section of the report describes the water rights found to exist in the Spring Creek basin based on our research, and also describes the water use in the basin based on the available records, and also based on our field observations.

3.1 Water rights in the Spring Creek basin

HRS has researched the water rights in the Spring Creek basin. From the information we obtained from the State Engineer's Office water rights database, we have plotted the water rights and wells on a topographic base map of the Spring Creek basin within a GIS environment (see Figure 2, in pocket). This section discusses this research and analysis task.

3.1.1 Water rights research and tabulation

A basin-wide boundary, encompassing 103 square miles (66,100 acres), was defined for the Spring Creek watershed from its headwaters in Laramie County, Wyoming, downstream to the Spring Creek – Lone Tree Creek confluence. This was done by examining drainages and contours on topographic maps. This boundary was then digitized into the project's geographic information system ("GIS"). Initially, this boundary served as the primary area of focus for research and tabulation of water rights in the Spring Creek basin. A second basin boundary, consisting of the watershed boundary or the proposed designated basin, (a subset of the Spring Creek basin) was established using similar methods to those described above. The proposed designated basin boundary covers 13.75 square miles (8,800 acres) as determined by GIS analysis, and overlaps the northern portion of the previously defined Spring Creek drainage basin. Water rights were researched and tabulated for both basins using the Colorado Decision Support System's (CDSS) and State Engineer's well permit database.

GIS Development: U.S. Geological Survey (USGS) topographic maps of the Spring Creek basin were used as a base layer in the GIS (also included were: roads, rivers, sections, Township & Range, and cities layers). Then, a diversion structures GIS layer, along with permitted (for both Weld and Larimer Counties) and decreed wells GIS layers were taken from the CDSS geodatabase and SEO permit databases and input into the GIS project for this study. From these four layers, those wells and structures that exist within the defined basin-wide boundary were selected for review. All shapefile coordinates used the UTM Zone 13 (NAD 83) projection.

Basin-Wide Water Rights Tabulation: An Excel spreadsheet was created from each diversion and well layer noted above. These permitted and decreed well spreadsheets were further divided into four categories based upon well use and production rate:

1. Small capacity decreed wells.
2. Small capacity permitted wells.
3. Large capacity decreed wells.
4. Large capacity permitted wells.

Small capacity permitted wells were defined for the purposes of this study as those permitted domestic and stock wells producing less than 50 gpm. The small capacity decreed wells were defined as those decreed domestic & stock wells producing less than 50 gpm. Large capacity permitted wells were defined as those wells producing greater than 50 gpm which have uses other than domestic and stock (e.g.. municipal, irrigation, industrial, etc). Large capacity decreed wells were defined as those wells greater than 50 gpm which have uses other domestic & stock (i.e. municipal, irrigation, industrial, etc). All permitted wells were further sorted by eliminating any expired, cancelled, or abandoned well permits from the tabulated lists. Table 1, below, provides a summary of the diversions and wells that have been tabulated as existing inside the Spring Creek basin boundary. A tabulation of all wells found in the basin is included as an Appendix to this report. Table 2 provides a breakdown of general well use percentages. This was determined by evaluating the use code for each well. Diversion & decreed well data are current as of 9/1/2007 and permitted well data are current as of 6/1/2007.

Table 1. Basin-Wide Summary Tabulation

Summary Tabulation: Water Rights and Permitted Wells Spring Creek basin Upstream of Lone Tree Creek confluence					
	Structure Count	Estimated Actual	Amount Tabulated	Unit	Comments
Diversion Structures	7	2 to 4?	(not estimated)	---	Majority of diversions do not appear to be in Spring Creek, or to be reported in reasonable amounts
Small Capacity Decreed Wells (< 50gpm)	64	64 +/-	2.20	cfs	
Small Capacity Permitted Wells (< 50gpm)	284	284 +/-	(not estimated)		
Large Capacity Decreed Wells (> 50 gpm)	211	211 +/-	102.70	cfs	Very few wells total, and even fewer in use were noted on the field reconnaissance trips.
Large Capacity Permitted Wells (> 50 gpm)	96	96 +/-	>300	ac-ft/yr	
Source: CDSS & SEO permit database					

Table 2. Basin Wide Well Use

Basin-Wide Well Use Percentage				
Type of Use	Small Capacity Permitted	Small Capacity Decreed	Large Capacity Permitted	Large Capacity Decreed
Domestic & Stock	99%	99%	4%	3%
Irrigation			80%	82%
Municipal, Industrial, & Other	1%	1%	16%	15%

*** Percentages estimated by Use Code, not by amount diverted**

3.1.2 Water Rights in the Spring Creek basin

The Colorado Decision Support System (CDSS) website and Colorado State Engineer's permit database were the only sources for well and water rights data within the Spring Creek basin. Based on the fact that these were current data sources, and also from our field observations that no new or recent water uses appear to exist within the basin, these data are believed to complete and accurate. The CDSS allowed us to research both surface and ground water rights in and around the defined basin by source and location to ensure the entire basin area was covered.

Decreed surface diversion structures and ground water diversions both exist within the basin. Diversion structures are very limited in the Spring Creek basin due to the fact that little or no surface water is available. Figure 2, in pocket, shows the diversion structures within the Spring Creek basin. There are currently 11 surface diversion structures located within the entire Spring Creek basin above the Lone Tree Creek confluence. Seven of these structures are listed as active, two are listed as abandoned, and two are augmentation plans in the State's water rights database (note that this count includes all structures, whether or not a water right is associated with a structure). Of the seven diversion structures, only two (not including NCWA's proposed augmentation plan) are listed as being located in the proposed designated basin above the Larimer – Weld county line   Of the two structures within the proposed basin, one is questionable as to whether it has been used at all for many years.

No diversion records were found in CDSS for any of the diversion structures located within the proposed designated basin. HRS has observed no evidence of recent use of any of these structures. Mr. Brent Schantz, District 1 Water Commissioner, told HRS via email that use of these rights “fall into the infrequent class of water rights”, and they are not actively administered. Mr. Schantz also stated that at least one structure, the Boyd McLellan Ditch, was abandoned. The District 3 Water Commissioner, Mr. George Varra, made similar statements in a phone conversation with HRS. He stated that these rights are not actively administered and that no annual reports of diversion amounts are reported to him.

Our field observations between of the Spring Creek – Lone Tree Creek confluence and the Larimer-Weld County Line showed little evidence of ground water use. From Lone Tree Creek confluence to the Pierce area, there is some surface evidence of ground water use. Upstream of Pierce, as far as the Larimer-Weld County Line, there are only a few non-exempt wells that appear to have been used in recent years. Upstream of the Larimer-Weld County Line, there was no use observed other than NCWA’s own well use and a few exempt uses (livestock and domestic).

Ground water is the main source of water within the Spring Creek basin at the present time, and this also appears to be the case for at least the past 15 years, based on the lack of diversion records, the lack of evidence of surface flow or diversions in or from Spring Creek, and the small number of surface diversions listed in the CDSS database. Both alluvial and bedrock wells exist in the basin. Our focus in this study was primarily on the alluvial wells in the area (see Figure 3, Permitted Wells). As shown in Figure 3, there are hundreds of wells that are permitted within the Spring Creek basin boundary, and far fewer in the proposed designated basin area. The majority of these wells are domestic and stock wells using less than 1 Acre-Foot per Year (ac-ft/yr). Of the wells tabulated, many appear to be no longer in use. The number of wells drops significantly in the proposed designated basin, upgradient of the Larimer County – Weld County line, as compared to the entirety of the Spring Creek basin upstream of its confluence with Lone Tree Creek. A total of thirty two wells exist in the proposed designated basin, according to State records. Of these at least 25% are judged to have been used sporadically, or not at all, for the past several decades, based on our conversations with Mr. Rich Patterson, Manager of NCWA. It should be noted that NCWA has purchased the Three Peaks wells, and intends to convert certain of these wells for use in its domestic water supply system outside of the Spring Creek basin. Only one Three Peaks well, No. 5 (Permit No. 42164, aka Busteed Well 5) has been in use in recent years, and that has been by NCWA under lease from Three Peaks before its purchase by NCWA. The historic use of water by NCWA is discussed in a later section of this report.

3.2 Water Use in the Spring Creek basin

This section of our report discusses the observed water uses in the Spring Creek drainage basin.

3.2.1 Surface water rights in use

As previously noted, surface water use in the Spring Creek drainage basin is minimal. Seven structures reportedly exist according to the State's database, basin-wide, downstream as far as the Spring Creek – Lone Tree Creek confluence, but little or no diversion records for these structures are found in the CDSS. This indicates that many of these structures may have been abandoned. A complete list of the wells and diversions in the basin are contained in the Appendix to this report. Figure 2 shows the structures listed as active according to the CDSS database. These diversion structures consist of springs, ditches, and seeps which are scattered from the northern to the southern end of the Spring Creek drainage. As discussed above, HRS has observed no evidence of recent use of any of these structures. Mr. Brent Schantz, District 1 Water Commissioner, told HRS via email that use of these rights "fall into the infrequent class of water rights", and they are not actively administered. Mr. Schantz also told us at least one structure, the Boyd McLellan Ditch, was abandoned.

3.2.2 Ground water rights in use

Figure 3 is a map of the entire Spring Creek basin to the confluence with Lone Tree Creek, along with the proposed designated basin. The map shows all of the permitted and decreed wells within these basins. As can be seen from Figure 3, most of the basin-wide well use is concentrated south of the town of Nunn, in the lower half of the Spring Creek basin. Within the proposed designated basin, all well use occurs in the southern (downgradient) half of the basin (primarily NCWA's use) with no activity in the northern (upgradient) half.

3.2.3 NCWA water use

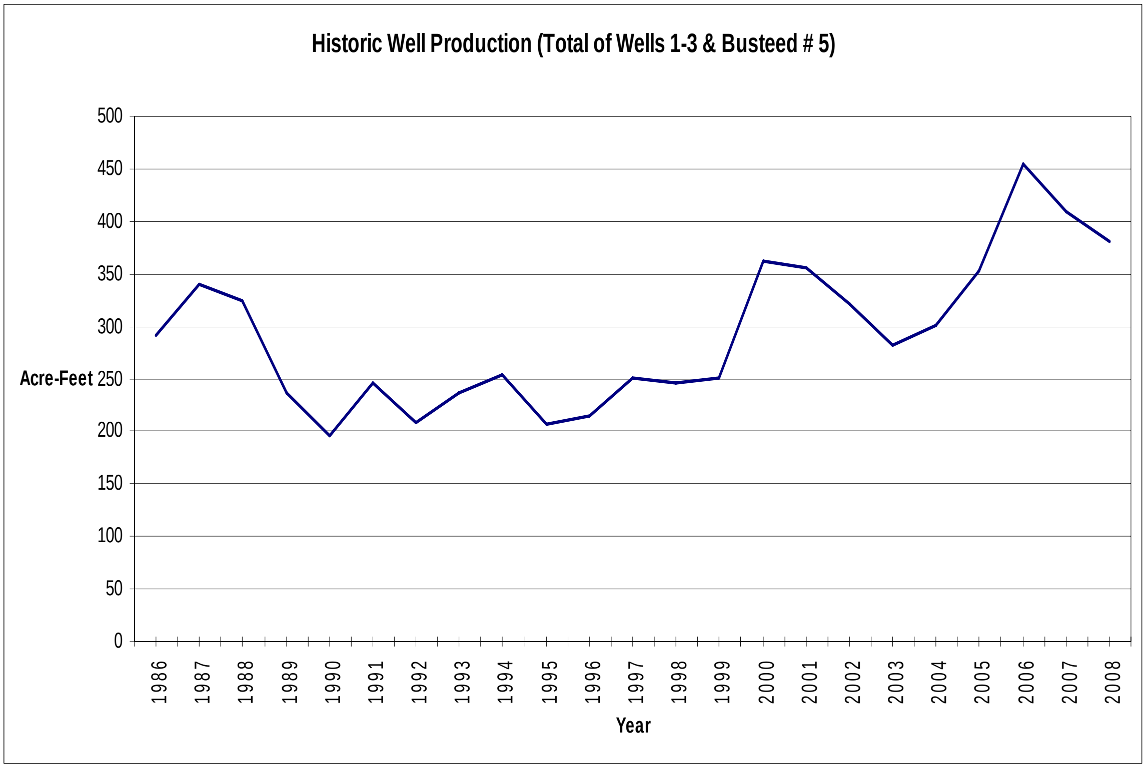
NCWA has three wells that are used to supply water to its customers, all of whom are located outside of the Spring Creek basin. There are no customers in, and no return flows to, the Spring Creek basin. Therefore all NCWA pumping is 100% consumptive as to the Spring Creek basin.

Well 1 (Permit No. 4862-F) and Well 2 (Permit No. 13429-F) have been in continuous production since before 1986. Well 3 (Permit No. 60767-F) was drilled in early 2005 with first production in June 2005. NCWA has leased the Three Peaks Water, Inc. Busteed Well 5 (Permit No. 42164) since 1973 according to Mr. Rich Patterson. NCWA purchased all of the wells and land from Three Peaks Water in August, 2008, which effectively retired those wells from any further in-basin irrigation use (for which they had not been used for many years previously). Below is a table summarizing the historic well production of NCWA's four above-referenced wells. These four wells account for nearly all of NCWA's annual well production since 1986. Table 3 below summarizes NCWA's well pumping from 1986 through 2008. Figure 4 shows graphically the historic NCWA ground water pumping since 1986.

Table 3. Summary of NCWA Historic Well Pumping

NCWA Annual Well Production in Acre-Feet					
Year	**Well # 1**	**Well # 2**	**Well # 3**	**Busteed # 5**	**Total of all 4 wells**
1986	128.26	161.44	0.00	1.90	291.60
1987	156.18	176.53	0.00	7.76	340.46
1988	143.80	179.07	0.00	1.32	324.19
1989	105.20	132.01	0.00	0.00	237.21
1990	85.02	103.13	0.00	7.66	195.81
1991	102.04	128.14	0.00	15.89	246.07
1992	84.51	106.20	0.00	17.09	207.80
1993	83.97	135.04	0.00	17.43	236.44
1994	82.71	155.68	0.00	15.05	253.43
1995	81.46	111.12	0.00	14.96	207.53
1996	89.61	112.52	0.00	13.00	215.12
1997	101.84	136.48	0.00	12.57	250.89
1998	96.76	135.22	0.00	14.13	246.10
1999	98.14	137.77	0.00	15.33	251.24
2000	151.70	196.15	0.00	14.10	361.95
2001	145.22	193.98	0.00	15.97	355.17
2002	172.48	110.70	0.00	37.75	320.93
2003	113.27	142.05	0.00	27.04	282.36
2004	126.31	166.61	0.00	8.29	301.21
2005	140.44	157.59	43.60	10.96	352.58
2006	189.85	177.47	8.93	77.91	454.16
2007	162.31	130.56	90.67	25.16	408.70
2008	150.47	130.42	57.90	42.10	380.89
Average 1986-2008	**121.37**	**144.17**	**8.74**	**17.97**	**292.25**
Average % 1986-2008	**41.53%**	**49.33%**	**2.99%**	**6.15%**	

Figure 4.   Summary Graph of NCWA Historic Well Pumping



A review of the NCWA well permits shows that NCWA Wells No. 1 and No. 2 were limited to a combined total of 400 ac-ft/yr (more specifically, this is a condition of approval for well permit no. 13429F-R). NCWA Well No. 3, since it was drilled in 2003, has always been pumped under a Substitute Water Supply Plan (SWSP). The most recent NCWA SWSP renewal application, for 2009, projects the April 2009 – March 2010 combined total for Wells 1, 2 and 3 to be 298.7 ac-ft/yr (or up to 500 ac-ft/yr for NCWA Wells 1 through 5 combined).

3.2.3.1 Summary of annual NCWA diversions for past 5 years

After NCWA Well 3 (Permit No. 60767-F) was constructed in 2005, overall NCWA ground water pumping has increased from previous years, and has averaged 399 Ac-ft/yrr since Well 3's construction. Table 4, below, shows NCWA's well production from 2005 through 2008.

Table 4. Annual NCWA Well Production Since 2005

Annual Well Production Since 2005 (Acre-Feet)					
Year	**Well # 1**	**Well # 2**	**Well # 3**	**Busteed # 5**	**Total of all 4 wells**
2005	140.44	157.59	43.60	10.96	352.58
2006	189.85	177.47	8.93	77.91	454.16
2007	162.31	130.56	90.67	25.16	408.70
2008	150.47	130.42	57.90	42.10	380.89
Average	**160.77**	**149.01**	**50.27**	**39.03**	**399.08**
Average %	**40.28%**	**37.34%**	**12.60%**	**9.78%**	

3.2.3.2 TPW wells (now NCWA): no recent use

NCWA closed on its purchase of all of the Three Peaks Water, Inc. (TPW) wells and land in August, 2008. Except for NCWA's use of Well 5, none of the other TPW wells are currently being used. The pumping results of Well 5 ("Busteed" well) is shown in Table 3 above. Since 1986, Well 5 has accounted for 6% of NCWA's average annual well production; and approximately 10% of NCWA's total annual production over the last 4 years.

TPW Wells No. 2, 5, 6 and 8, (of which NCWA proposes to use TPW wells No. 2 & 5), have a decreed combined total annual limit of 805 ac-ft and a consecutive 10-yr limit of 4,960 ac-ft/yr (an annual average of 496 ac-ft/yr).

3.2.4 Summary of estimated water use in the basin

The basin-wide summary of water use is displayed above in Table 1. Many of these structures are domestic and stock wells which, from our observations, are likely to produce 0.50 ac-ft/yr or less. However, many of these wells may no longer be in use making it difficult to estimate the total amount of water being used basin-wide. The wells and diversions within the proposed designated basin, upgradient of the Larimer – Weld county line, are included as an appendix to this report and are summarized in Table 5 below. Table 6, also shown below, is a tabulation of the wells located in the proposed designated basin.

From this analysis, we estimate that NCWA's ground water pumping constitutes approximately 97% of the total well pumping within the proposed designated basin. The remaining 3% is ground water pumped by wells for domestic and stock use.

Table 5. Summary of Wells & Diversions in Proposed Designated Basin

Water Use Summary in Proposed Designated Basin									
PERMITNO	**ACTDATE**	**ACTCODE**	**DIVISION**	**WD**	**WATER USERS**	**USE MADE OF WATER (usecodes)**	**CASE NO**	**AVG QUANTITY (yield)**	**COMMENTS**
42164	7/17/1970	NP	1	01	NCWA: ALIND CATTLE COMPANY	9	81CW208	800	Now owned by NCWA, aka Busteed No. 5
14262-F			1	01	NCWA: AMERICAS PUREWATER INC	1		900	Now owned by NCWA, aka Busteed No. 6
15888-R			1	01	NCWA: AMERICAS PUREWATER INC	1	W 5910	120	Now owned by NCWA, aka Busteed No. 8
** 42164-A	3/16/1973	NP	1	03	NCWA: AMERICA'S PUREWATER INC	89L	W-5910	800	Now owned by NCWA, aka Busteed No. 5
50399-F	6/15/1998	NP	1	03	NCWA: CASTLE ROCK CONST COMPANY	4	W5910	0	Now owned by NCWA, aka Busteed No. 10 & 11
50412-F	6/15/1998	NP	1	03	NCWA: CASTLE ROCK CONST COMPANY	4	W5910	0	Now owned by NCWA, aka Busteed No. 9
14263-F	8/15/1969	NP	1	03	NCWA: NAUGHTON GROUP DBA PURE CO INC	1	81CW208	1100	Now owned by NCWA, aka Busteed No. 2
13429-FR	5/18/1993	NP	1	03	NORTHERN COLORADO WATER ASSOCIATION	3	W-3626	365	
** 13429-F			1	01	NORTHERN COLORADO WATER ASSOCIATION	2	W 3626	450	NCWA's well no. 1
** 4862-F			1	01	NORTHERN COLORADO WATER ASSOCIATION	2	W 3626	450	NCWA's well no. 2
** 60767-F	9/5/2003	NP	1	01	NORTHERN COLORADO WATER ASSOCIATION	2		425	Well No. 3, 2003CW268(pending)-included in the NCWA
245852	11/18/2002	NP	1	03	NORTHERN COLORADO WATER ASSOCIATION	Q M		350	
9383-F			1	03	THREE PEAKS WATER INC	1		800	CA permit No longer in use
14293-F			1	01	NCWA: THREE PEAKS WATER INC	1	W 5910	720	Now owned by NCWA, aka Busteed No. 3, No longer in use
15562-F	7/17/1970	NP	1	01	NCWA: THREE PEAKS WATER INC	1	W 5910	250	Now owned by NCWA, aka Busteed No. 4, No longer in use
15886-R			1	01	NCWA: THREE PEAKS WATER INC	1		300	Now owned by NCWA, aka Busteed No. 9, No longer in use
15887-R			1	01	NCWA: THREE PEAKS WATER INC	1	W 5910	250	Now owned by NCWA, aka Busteed No. 10 & 11, No longer in use
191702	11/17/1995	NP	1	03	BAUER LARRY & KATHY	8 L		15	
251706	7/1/2003	NP	1	01	FORTENBERRY SCOTT A & CHRISTINE J	8 L		15	
196630	6/24/1996	NP	1	03	FT COLLINS CITY OF	89		15	
26543			1	01	MEADOW SPRINGS ASSOC	9	W 1413	10	
26548			1	01	MEADOW SPRINGS ASSOC	9	W 1413	15	
158279	7/23/1990	NP	1	01	MEADOW SPRINGS GRAZING ASS'N	9 L		6	
174814	10/5/1993	NP	1	01	MORRISON BO & SHARI	8 L		18	
187640	6/1/1995	NP	1	03	SCHMIDT GARY	8 L		0	
187641	11/25/1994	NP	1	01	SCHMIDT GARY	8 L		6	
39645		NP	1	03	NCWA: THREE PEAKS WATER INC	9	W 5910	10	Now owned by NCWA, aka Busteed No. 7
47853			1	01	NCWA: THREE PEAKS WATER INC	9	W 5910	15	Now owned by NCWA, aka Busteed No. 1
36246			1	03	WORTHINGTON JOHN L & JACKIE H	9	W 3875	20	
Unpermitted Wells & Structures									
Permit No.	**RRDIV1_WD**	**STRTYPE**	**DIVISION**	**WD**	**WATER USERS**	**USE MADE OF WATER (usetype)**	**CASE NO**	**AVG QUANTITY (yield)**	**COMMENTS**
NA	003_5925	W	1	03	MEADOW SP WELL 11	S	W 1413	NA	
NA	003_5926	W	1	03	MEADOW SP WELL 13	S	W 1413	NA	
NA	003_1404	D	1	03	GRAVES CREEK DIVR	S	W 1412	2 cfs	Appropriation Date 07/31/1940
NA	003_1546	S	1	03	WINDY ACRES SPRING	I	85CW302	0.334 cfs	Appropriation Date 06/30/1927
NA	003_3503	R	1	03	WINDY ACRES POND	I	85CW302	7 AF	Apprporiation Date 11/20/1950

USES: 0-Storage, 1-Irrigation, 2-Municipal, 3-Commercial, 4-Industrial, 5-Recreation, 6-Fishery, 7-Fire, 8-Domestic, 9-Stock, L-Livestock, M-Municipal, Q-Other, S-Stock

**** Note - NCWA production wells - Production summarized in Tables' 3 & 4**

Table 6: Well Tabulation - Proposed Upper Spring Creek Designated Basin

Large Capacity Wells																			
PERMITNO	**ACTDATE**	**ACTCODE**	**DIVISION**	**WD**	**NAME**	**UTM_X**	**UTM_Y**	**PM**	**RANGE**	**TOWNSHIP**	**SECTION**	**QTR160**	**QTR40**	**USECODES**	**CASENO**	**YIELD**	**DEPTH**	**LEVEL**	**COMMENTS**
42164	7/17/1970	NP	1	01	NCWA: ALIND CATTLE COMPANY	502975.9	4529778.9	S	0680W	110N	14	SE	NE	9	81CW208	800	64	35	Now owned by NCWA, aka Busteed No. 5
14262-F			1	01	NCWA: AMERICAS PUREWATER INC	502305.2	4529891.9	S	0680W	110N	14	SE	NW	1		900	74	28	Now owned by NCWA, aka Busteed No. 6
15888-R			1	01	NCWA: AMERICAS PUREWATER INC	502571.3	4529375.9	S	0680W	110N	14	SE	SW	1	W 5910	120	29	21	Now owned by NCWA, aka Busteed No. 8
42164-A	3/16/1973	NP	1	03	NCWA: AMERICA'S PUREWATER INC	502880.2	4529721.9	S	0680W	110N	14	SE	NE	89L	W-5910	800	63	38	Now owned by NCWA, aka Busteed No. 5
50399-F	6/15/1998	NP	1	03	NCWA: CASTLE ROCK CONST COMPANY	503895.8	4529185.4	S	0680W	110N	13	SW	SE	4	W5910	0	0	0	Now owned by NCWA, aka Busteed No. 10 & 11
50412-F	6/15/1998	NP	1	03	NCWA: CASTLE ROCK CONST COMPANY	503087.3	4529781.9	S	0680W	110N	14	SE	NE	4	W5910	0	0	0	Now owned by NCWA, aka Busteed No. 9
14263-F	8/15/1969	NP	1	03	NCWA: NAUGHTON GROUP DBA PURE CO INC	501960.4	4530377.4	S	0680W	110N	14	NW		1	81CW208	1100	95	41	Now owned by NCWA, aka Busteed No. 2
13429-FR	5/18/1993	NP	1	03	NORTHERN COLORADO WATER ASSOCIATION	503011.4	4529556.9	S	0680W	110N	14	SE	SE	3	W-3626	365	51	26	
13429-F			1	01	NORTHERN COLORADO WATER ASSOCIATION	502976.4	4529374.9	S	0680W	110N	14	SE	SE	2	W 3626	450	51	29	NCWA's well no. 1
4862-F			1	01	NORTHERN COLORADO WATER ASSOCIATION	503028.7	4529641.9	S	0680W	110N	14	NW	SW	2	W 3626	450	51	23	NCWA's well no. 2
60767-F	9/5/2003	NP	1	01	NORTHERN COLORADO WATER ASSOCIATION	504056.3	4528864.9	S	0680W	110N	24	NE	NW	2		425	48	28	Well No. 3, 2003CW268(pending)-included in the NCWA
245852	11/18/2002	NP	1	03	NORTHERN COLORADO WATER ASSOCIATION	504056.3	4528864.9	S	0680W	110N	24	NE	NW	Q M		350	48	28	
9383-F			1	03	THREE PEAKS WATER INC	502975.9	4529778.9	S	0680W	110N	14	SE	NE	1		800	64	35	CA permit No longer in use
14293-F			1	01	NCWA: THREE PEAKS WATER INC	504782.7	4528515.3	S	0680W	110N	24	NE	SE	1	W 5910	720	39	11	Now owned by NCWA, aka Busteed No. 3, No longer in use
15562-F	7/17/1970	NP	1	01	NCWA: THREE PEAKS WATER INC	503984.4	4528761.4	S	0680W	110N	24	NW	SE	1	W 5910	250	41	21	Now owned by NCWA, aka Busteed No. 4, No longer in use
15886-R			1	01	NCWA: THREE PEAKS WATER INC	502975.9	4529778.9	S	0680W	110N	14	SE	NE	1		300	50	25	Now owned by NCWA, aka Busteed No. 9, No longer in use
15887-R			1	01	NCWA: THREE PEAKS WATER INC	503895.8	4529185.4	S	0680W	110N	13	SW	SE	1	W 5910	250	51	19	Now owned by NCWA, aka Busteed No. 10 & 11, No longer in use
Small Capacity Wells																			
191702	11/17/1995	NP	1	03	BAUER LARRY & KATHY	504019.1	4528505.4	S	0680W	110N	24	NE	SW	8 L		15	200	15	
251706	7/1/2003	NP	1	01	FORTENBERRY SCOTT A & CHRISTINE J	504711.8	4529647.9	S	0680W	110N	13	SE	NE	8 L		15	240	67	
196630	6/24/1996	NP	1	03	FT COLLINS CITY OF	504519.2	4529223.4	S	0680W	110N	13	SE	SE	89		15	120	29	
26543			1	01	MEADOW SPRINGS ASSOC	502568.7	4531392.5	S	0680W	110N	11	SE	NW	9	W 1413	10	50	39	
26548			1	01	MEADOW SPRINGS ASSOC	502977.7	4528577.9	S	0680W	110N	23	NE	SE	9	W 1413	15	45	25	
158279	7/23/1990	NP	1	01	MEADOW SPRINGS GRAZING ASS'N	504123.8	4527800.8	S	0680W	110N	24	SE	SW	9 L		6	41	16	
174814	10/5/1993	NP	1	01	MORRISON BO & SHARI	503429.5	4529049.4	S	0680W	110N	24	NW	NW	8 L		18	50	22	
187640	6/1/1995	NP	1	03	SCHMIDT GARY	504148.1	4529077.9	S	0680W	110N	24	NE	NW	8 L		0	0	0	
187641	11/25/1994	NP	1	01	SCHMIDT GARY	504605.2	4529015.9	S	0680W	110N	24	NE	NE	8 L		6	100	32	
39645		NP	1	03	NCWA: THREE PEAKS WATER INC	500958.6	4531390.0	S	0680W	110N	10	SE	NW	9	W 5910	10	94	45	Now owned by NCWA, aka Busteed No. 7
47853			1	01	NCWA: THREE PEAKS WATER INC	503782.5	4528574.4	S	0680W	110N	24	NW	SE	9	W 5910	15	41	21	Now owned by NCWA, aka Busteed No. 1
36246			1	03	WORTHINGTON JOHN L & JACKIE H	501519.4	4530646.0	S	0680W	110N	15	NE	NE	9	W 3875	20	57	36	
Decreed wells with no permit no.																			
Permit No.	**RRDIV1_WD**	**STRTYPE**	**DIVISION**	**WD**	**NAME**	**UTM_X**	**UTM_Y**	**ADJTYPE**	**ADJDATE**	**APRODATE**	**DCRAMT**	**DCRUNITS**	**GPM**	**USETYPE**	**CANO**				**COMMENTS**
NA	003_5925	W	1	3	MEADOW SP WELL 11	504584	4527374	O	12/31/1971	06/01/1940	0.009000	C	4	S	W 1413				
NA	003_5926	W	1	3	MEADOW SP WELL 13	500555	4532610	O	12/31/1971	06/01/1940	0.009000	C	4	S	W 1413				

**** Any overlap among permitted & decreed wells has been eliminated**

4.0 Spring Creek Alluvial Aquifer Characteristics

4.1 General Spring Creek watershed characteristics

The Spring Creek alluvial aquifer is bounded on the northeast and east by the Lone Tree Creek drainage and on the southwest and west by the Spottlewood Creek drainage (see Figure 1, in pocket). The Spring Creek drainage originates in southern Laramie County, Wyoming, where it rises in a narrow valley incised into the Ogallala Formation and, near the state line, into the White River Formation according to available geologic mapping of the area. Just south of the Colorado-Wyoming state line Spring Creek exits the narrow valley and spreads out onto a pediment surface where the surface drainage is not well defined.

Within the Spring Creek surface drainage basin there are several small subdrainages and ephemeral surface stream channels that appear and disappear within the pediment area between the state line and the Larimer County – Weld County line, a distance of approximately 6 ½ miles. To the southeast, from the Larimer – Weld county line downgradient to the vicinity of the Spring Creek – Lone Tree Creek confluence, a measured distance of 29.9 miles, the Spring Creek drainage boundaries becomes better defined overall, although from our observations in the field and of aerial imagery in the majority of this reach, dry surface channels appear and then disappear within the Spring Creek valley. We attribute this to the ephemeral nature of flow in the Spring Creek drainage, and to the fact that much of the Spring Creek surface channel downgradient of the Larimer County – Weld County line has been obliterated by field cultivation.

From our research, we could find no record of there ever having been a stream gauge, a peak flow measuring device, or individual observations of flow in Spring Creek above its confluence with Lone Tree Creek approximately 3 ½ miles East-Southeast of the town of Ault. We observed no surface flow in Spring Creek from the state line downgradient approximately 36 miles. The first point at which we observed surface flow in Spring Creek in the late summer and fall of 2008 was on the north side of Highway 14 approximately two miles east of the town of Ault (see Figure 1). From that point downstream flow was intermittent, appearing and disappearing several times until its confluence with Lone Tree Creek. Downgradient of that point, the flow of Spring Creek / Lone Tree Creek (and also Owl Creek, which joins Lone Tree Creek a few miles downstream of the Spring Creek confluence) flow also was observed to be intermittent. Relatively steady surface flow was observed to take place in the creek (which from that point downstream is called Lone Tree Creek) starting at a point approximately two miles due East of the town of Eaton. However, comparison of stream level with water levels in wells in the area indicate that stream-aquifer connection most likely does not occur until a point approximately 1 to 1 ½ miles upstream of the Lone Tree Creek – South Platte River confluence. The intermittent surface flow observed in Spring Creek and Lone Tree Creek appeared to be a result of irrigation runoff in the cultivated area generally located southeast of the town of Pierce.

4.2 Spring Creek aquifer characteristics and hydrogeology

The Spring Creek alluvial aquifer consists primarily of sand and gravel, with clay lenses or layers. In the area upstream of the Larimer – Weld county line, the alluvium appears to overlie siltstone bedrock of the White River Formation. Total thickness of the alluvial material ranges from zero feet at the edges of the aquifer, up to a maximum of approximately 95 feet according to available driller's logs of well. The thickest alluvium of Spring Creek has been deposited in a relatively well-defined paleochannel in the part of the aquifer located upgradient of the Larimer – Weld county line (see Figure 5). The aquifer material is richer in clay away from the paleochannel toward the edges of the alluvial valley. Based on the available records of existing wells and test hole logs, the deeper portion of the paleochannel is at most 1,000 feet wide in this area. The thickness of the aquifer within the paleochannel decreases in a downgradient (southeasterly) direction and is approximately 35 feet where it crosses the Larimer-Weld county line.

Downstream of the county line the alluvial thickness is not more than approximately 53 feet, and averages about 15 feet.

In the vicinity of the NCWA water supply wells, the location of the paleochannel has been defined by the drilling of water supply wells and test holes. Outside of this area the paleochannel has not been as well defined due to fewer wells. If an identifiable paleochannel exists downgradient of the county line, its location cannot be determined from observation of the land surface or from aerial photo coverage. Current surface drainages, where they can be identified, may or may not overlie a paleochannel.

4.2.1 Estimation of Transmissivity from specific capacity

Transmissivity (T) is a term used to describe the ease or difficulty with which water can flow through the entire saturated thickness of an aquifer. T is the product of the hydraulic conductivity (K) of a material multiplied by the saturated thickness (m) of the aquifer. Transmissivity (T) can be estimated from specific capacity (Sc). Specific capacity is defined as the pumping rate in gallons per minute from a pumping test divided by the feet of drawdown at that pumping rate. This technique for estimation of transmissivity is used when well-controlled pumping tests are not available for detailed analysis. Driller’s or pump installer’s completion reports for wells located within the Spring Creek drainage basin, upgradient of the Spring Creek - Lone Tree Creek confluence, were obtained from the State Engineer’s well database. The well records selected for specific capacity analysis reported, at a minimum, a total depth, pumping rate, static water level, pumping water level, and borehole diameter. Also, only wells with a reported pumping rate greater than 50 gpm were used, as low-capacity wells oftentimes do not stress the aquifer sufficiently to permit reliable use of this technique.

Table 7 lists the wells used and the calculated estimates of T and average K values for the Spring Creek alluvial aquifer.   The calculation of the estimated transmissivity involved the following steps, using a standard and well-accepted methodology[2]:

1. Calculate an initial estimate of T = Sc x 1500 (for an alluvial aquifer).
2. Input this initial estimated T value into the following formula: $(0.3 \times T \times t)/ (r^2 \times Sy)$ where t is the length of the test period in days, r is the radius of the borehole in feet and Sy is the estimated specific yield of the aquifer material. If the duration of the pumping test was not specified, a value of 2 hours (0.08333 days) was estimated, as this duration is commonly seen in older driller's records in Colorado. The specific yield for this alluvial aquifer was estimated to be 0.20 based on the materials reported on the driller's logs.
3. Calculate the base 10 log (Log10) of the value calculated in Step 2 and multiply by 264, a unit-conversion coefficient.
4. Recalculate the estimated value of T and round the result to the nearest 100 by multiplying the Sc times the value calculated in Step 3.

The average T and K values for the reaches of the Spring Creek alluvial aquifer above and below the Larimer – Weld county line are shown in detail in Table 7, and are summarized in an easier to read summary format in Table 8.

[2] Driscoll, F.G., 1986, Groundwater and Wells. Johnson Division, p. 1021.

Table 7: Estimates of Transmissivity from Specific Capacity, Spring Creek Alluvial Aquifer

Reported Production Test Characteristics of Existing Wells >50gpm in the Spring Creek Alluvial Aquifer

Permit	Owner / Permittee	1/4 40	1/4 160	Sec	Twp	Rng	Total Depth	Borehole Diameter (ft)	Borehole Radius (ft)	Saturated Aquifer Thickness (ft)	Pumping Rate (gpm)	Static Water Level (ft)	Pumping Level (ft)	Test Duration (hours)	Date Measured	Test Method	Estimated Specific Capacity (gpm/ft)	Estimated Transmissivity (gpd/ft)	Estimated Average Hydraulic Conductivity (ft/day)	Comments
11304-R	Jones, T.	NE	NE	22	8N	66W	32	2.67	1.34	18	400	14	30	not rept.	5/1944	pump	25.0	22,600	170	1 mile N of Pierce. No driller's log.
9190-F	Kerbs, E.	NW	NW	34	8N	66W	54	3.5	1.75	34	250	19	54	'sevl. hours'	5/1965	pump	7.1	5,000	20	1 mile SW of Pierce
R12746	Scheller, S.	NW	SW	10	8N	66W	41	3.33	1.67	13	140	28	33	not rept.	4/1960	pump	28.0	24,200	250	Betw. Pierce & Nunn
RF698	Scheller, S.	NW	SW	10	8N	66W	40.5	4.17	2.09	11	140	28	39	2.5	6/1969	pump	12.7	9,500	120	Betw. Pierce & Nunn
14360	Eichheim, J.	NE	NW	18	9N	66W	28	2.5	1.25	6	60	22	26	not rept.	4/1960	pump	15.0	12,900	290	4 miles NW of Nunn. Handwritten note '480 gpm' questionable; earlier 60gpm rate honored instead.
R15125RF	Utley, R.	SW	NW	1	9N	67W	36	2.5	1.25	10.3	150	24.67	35	5	11/1977	pump	14.5	14,000	180	5 miles NW of Nunn. No driller's log.
28688	Chadwick, L.	NE	SE	22	10N	67W	14	"sump"	---	6	200	8	14	not rept.	8/1960	pump	not calculated	not calculated	not calculated	No log. Partially penetrating. Casing "none": reported as a sump. Specific capacity questionable.
3705-F	Industrial Pipelines Inc.	SW	NW	19	11N	67W	51	3.33	1.67	42	700	6	40	not rept.	9/1962	pump	20.6	17,100	50	Replaced with 4768-F
										17.5	**255**	**Average Downstream of Larimer-Weld Line**					**17.6**	**15,043**	**154**	
14263-F	TPW 2 (NCWA)	C	NW	14	11N	68W	95	2.5	1.25	45	1100	41	85	8	Sep-69	pump	25.0	26,900	80	Three Peaks no. 2 (NCWA)
42164	TPW 5 (NCWA)	NE	SE	14	11N	68W	63	2.5	1.25	25.3	800	37.7	62.5	17	Mar-73	pump	32.3	38,500	200	Three Peaks no. 5 (NCWA)
9383-F	Alind Cattle Co	NE	SE	14	11N	68W	64	3.5	1.75	30	800	35	54	12	5/1960	pump	42.1	46,600	210	former owner W. Shaw
4862-F	NCWA (Well 1)	NE	SE	14	11N	68W	51	3.33	1.67	26	450	23	48	168	8/1963	pump	18.0	23,800	120	NCWA Well 1
13429-F-R	NCWA (Well 2)	SE	SE	14	11N	68W	51	2.33	1.17	21.5	365	26.5	38	not rept.	7/1993	pump	31.7	30,500	190	NCWA Well 2 (replacement)
15887-RR	Shaw, F.	SE	SW	13	11N	68W	51	2.67	1.34	29	250	19	35	4	Dec-66	pump	15.6	13,300	60	
14293-F	Alind Cattle Co	SE	NE	24	11N	68W	39	2.67	1.34	26.5	720	11.5	35	8	Feb-70	pump	30.6	28,400	140	
15562-F	Alind Cattle Co	SE	NW	24	11N	68W	41	2.5	1.25	17.5	250	21.5	40	8	Feb-70	pump	13.5	11,500	90	
60767-F	NCWA (Well 3)	NW	NE	24	11N	68W	48	2.17	1.09	14	350	28	36	8	1/2003	pump	43.8	51,300	490	NCWA Well 3 (converted from MW permit 245852)
										26.1	**565.0**	**Average Upstream of Larimer-Weld Line**					**28.1**	**30,089**	**176**	

Table 8: Summary of aquifer characteristics for the Spring Creek alluvial aquifer

T and K estimates from Specific Capacity for Wells > 50 gpm	
Upgradient of Larimer - Weld County Line	
Average saturated aquifer thickness (ft)	26.1
Average pumping rate (gpm)	565
Specific Capacity (gpm/ft drawdown)	28.1
Average T (gpd/ft)	30,089
Average K (ft/day)	176
Larimer - Weld County Line to Lone Tree Creek Confluence	
Average saturated aquifer thickness (ft)	17.5
Average pumping rate (gpm)	255
Specific Capacity (gpm/ft drawdown)	17.6
Average T (gpd/ft)	15,043
Average K (ft/day)	154

4.2.2 Observed changes in hydrogeology in a downgradient direction

From the specific capacity estimates of T discussed above (Table 7), and summarized in Table 8, it is evident that the average physical characteristics of the aquifer show significant differences from upstream to downstream.

With several exceptions that we have observed, most well drillers' logs do not indicate significant changes in the alluvial material type in the Spring Creek alluvium in a downstream direction, as we see from the specific capacity analysis, because the logs generally do not describe in sufficient detail the grain sizes of the alluvial material penetrated. Some of these logs do, however, indicate a general trend of finer grain size in a downstream direction in the Spring Creek aquifer, at least as far downstream as the Pierce - Ault area.

Based on standard geologic principles the average grain size of the alluvial material generally will decrease in a downstream direction due to the decrease in sediment carrying capacity of the stream[3]. This is a direct result of the stream gradient being steeper near its headwaters and less steep further downstream. The Spring Creek

[3] Leet, L.D., Judson, S., 1971, Physical Geology. p. 134.

drainage starts in Wyoming and trends in a generally southeast direction toward the confluence of Lone Tree Creek and the South Platte River. Thus one would expect that the size of the alluvial material would decrease to the southeast. In general decreasing grain size translates into a decrease in hydraulic conductivity. The results shown on Table 8 illustrate this outcome.

In addition, the source material that comprises the dominant alluvial material in the area of the proposed designated basin is from the Sherman granite, the Ogallala formation, and reworked clasts (rock fragments) eroded from the White River formation. These materials also are present downgradient of the proposed designated basin. However, the side drainages that have contributed material to the Spring Creek alluvium approximately downstream of the NCWA wells, near the county line, are eroding into weathered shale and claystone of the Laramie Fm., which adds a component of finer-grained material in the area generally downstream of the Larimer – Weld county line.

The saturated thickness of the Spring Creek aquifer is greatest within the paleochannel and thins toward the edge of the aquifer (see Figure 6). Based on the drillers' logs, the aquifer saturated thickness generally decreases in the downgradient direction. A decrease in saturated thickness coupled with a decrease in the hydraulic conductivity translates to a decrease in transmissivity in a downgradient direction. This is seen in Table 7 and summarized in Table 8, where the highest transmissivity values generally are found in the part of the drainage basin in T11N, R68W, upgradient of the county line.

In the area downgradient of the Spring Creek – Lone Tree Creek confluence, we have not relied on specific capacity tests to estimate the aquifer characteristics, as there are a number of pumping tests published that give us an estimate of T and K. Table 9 is a summary of the pumping tests in this area from CWCB Circular 11, which is a compilation of pumping tests in Colorado. Some of these values are reported as being in the "Spring Creek Valley" but from their locations it is more likely that these are Lone Tree Creek or ancestral Poudre River deposits.

Table 9: Pumping Tests downstream of Spring Creek – Lone Tree confluence

Pumping Test Results for Lone Tree Creek alluvium (source: CWCB Circular 11, Pumping Tests in Colorado)			
Location	Reported K (gpd/ft^2)	Reported K (ft/day)	Comments
7 - 66 - Sec 10 dbb	700	94	"valley-fill deposits, Spring Creek valley" (located 3 miles +/- S of Pierce)
8 - 65 - Sec 29 bba2	2,100	281	"valley-fill deposits, Lone Tree Creek valley"
7 - 66 - Sec 4 aad	3,000	401	"valley-fill deposits, Spring Creek valley" (located 2 miles +/- S of Pierce)
7 - 65 - Sec 8 bbb2	4,400	588	"valley-fill deposits, Lone Tree Creek valley"
7- 65 - Sec 33 dab2	4,400	588	"valley-fill deposits, Lone Tree Creek valley"
7 - 66 - Sec 36 cbb	6,400	856	"valley-fill deposits, Spring Creek valley" (located near Eaton; not in Spring Crk)
8 - 66 - Sec 26 abb	10,000	1,337	"valley-fill deposits, Spring Creek valley" (located near Pierce)
Average	4,429	592	

As shown in Table 9, there is a range in K in the area downstream of the Spring Creek - Lone Tree Creek confluence, although this is commonly seen in alluvial aquifers. Overall the average K in this downstream reach is higher than most values seen in the Spring Creek alluvium itself. We believe this is due to the fact that much of this area was subject to alluvial deposition by ancestral channels of the Cache la Poudre River. The alluvial material in this area is generally coarser and better-sorted than is seen in the Spring Creek alluvium, and therefore the higher average K is not surprising.

4.3 Estimation of Transmissivity at the NCWA wellfield area

In order to develop a more accurate transmissivity value of the Spring Creek alluvial aquifer in the vicinity of the NCWA well field and the area of the proposed designated basin, HRS performed a pumping test on the NCWA Well 2. Well 1 is 245 feet to the south of Well 2 (see Figure 7). The electrical controls on these two wells are configured such that the Well 1 pump must be running for the Well 2 pump also to be running. Well 1 does not have a water level measurement access port into which a PVC tube could be installed for protection of a pressure transducer, while Well 2 does have such an access port. Thus water levels during the testing were measured in Well 2.

4.3.1 Pumping test of NCWA Wells 1 and 2

On December 11, 2008 HRS personnel, with the assistance of NCWA, installed a pressure transducer in Well 2. The transducer was connected to an In-Situ Hermit® data logger programmed to take a measurement once per minute. At the time of installation Well 2 had been off for less than one hour and Well 1 had been pumping for approximately 12 hours. The controls for both wells were set to manual mode to avoid unplanned truncation of the tests. Well 1 was allowed to continue to pump for 97 hours after installation of the transducer. Well 1 pumping rate during this period averaged 186 gpm. On December 15, the Well 1 pump was shut off and the recovery of Well 1 was recorded at Well 2, which had been off during the entire Well 1 test period. After 26.75 hours of recovery, the Well 1 pump was turned back on. After the Well 1 pump was on for 20 hours, and we judged that the water level had nearly stabilized, the Well 2 pump was turned on. After Well 2 had pumped continuously for 22.78 hours, the Well 2 pump was turned off and the water level was allowed to recover. During the pumping and recovery periods of the Well 2 test, Well 1 was pumping at a very constant rate averaging 189 gpm. Well 2 pumped at an average rate of 202 gpm during its test period.

The water level in Well 2 with Well 1 pumping but before Well 2 began to pump was 35.6 feet below the measuring point (top of access port). With Well 1 and Well 2 both pumping, the water level in Well 2 reached 44.8 feet below the measuring point.

Figure 8 is a linear timeline graph of all the depth to water data recorded by the data logger during the Well 1 and Well 2 testing periods. Analysis of the drawdown and recovery data for the different pumping and recovery periods shows that the drawdown data needed to be corrected for the reduction in transmissivity due to the cones of depression created during pumping. In our judgment the best data from this testing is the recovery data (see Figures 9 and 10) due to less effect from frictional losses in the wellbore, and from the fact that there is less need to correct the data for the dewatering in the cone of depression. Table 10 summarizes the results of the recovery tests from Well 1 and Well 2:

Figure 8: linear timeline during pumping test

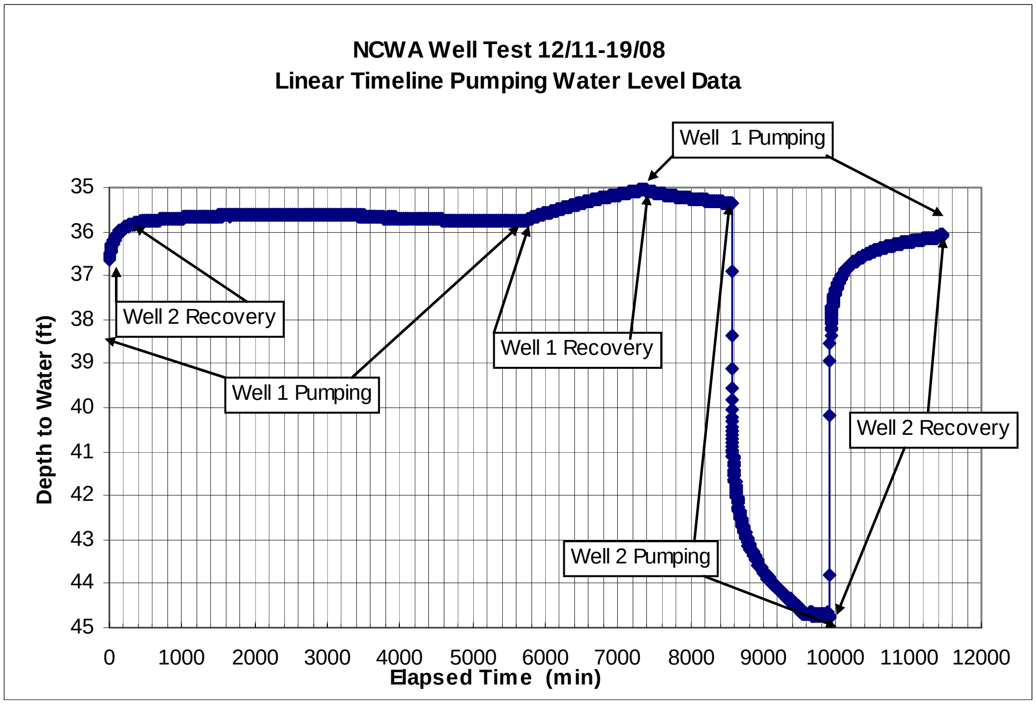


Figure 9: Time- Recovery for Well 1 (measured at Well 2)

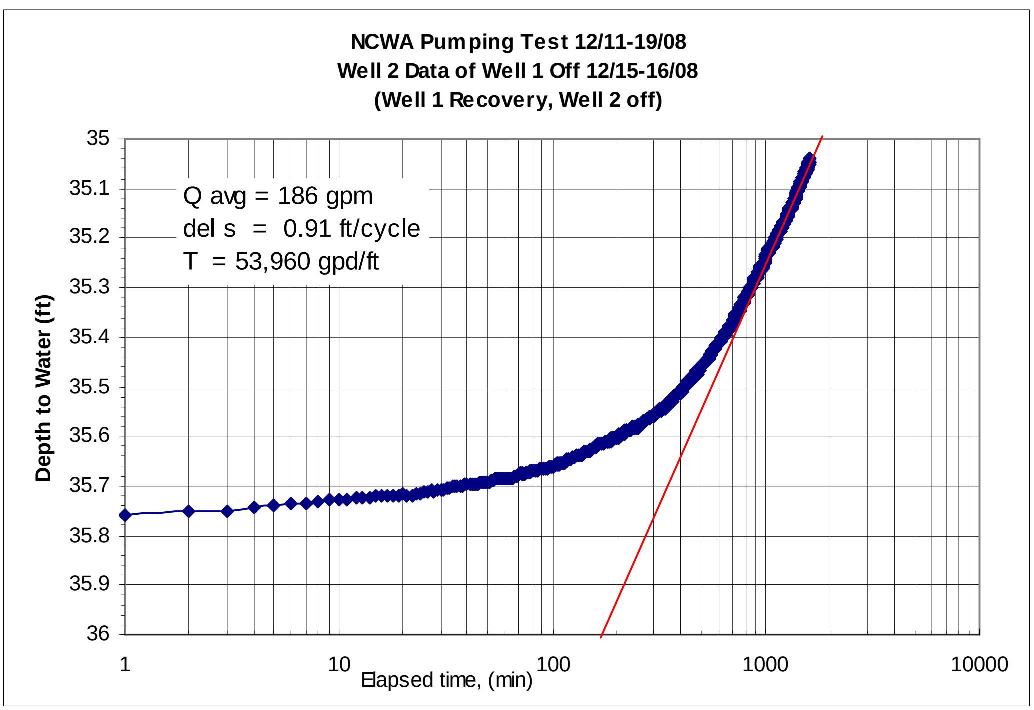


Figure 10: Time- Recovery for Well 2 (measured at Well 2)

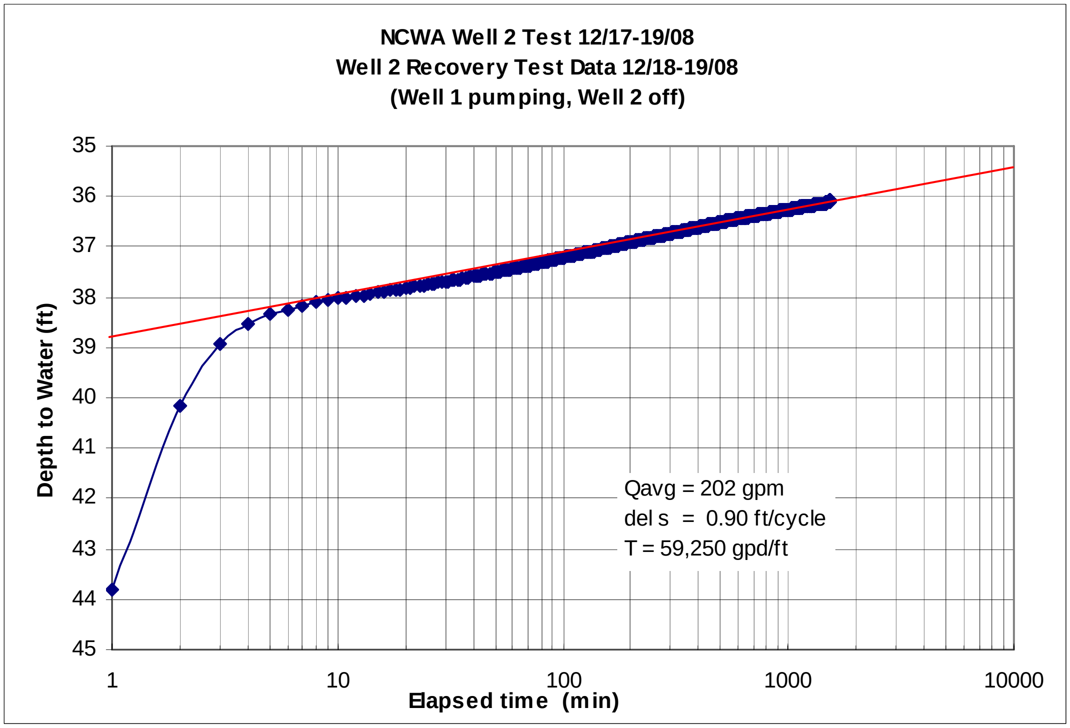


Table 10: Recovery test results compared to specific capacity results

Summary: Recovery tests of NCWA Wells 1 and 2				
Well	Q (gpm)	T (gpd/ft)	saturated thickness (ft est)	K (ft/day)
test results				
NCWA 1	186	53,960	26	277
NCWA 2	202	59,250	21.5	368
Average		56,605		323
Specific capacity estimates when wells were drilled				
NCWA 1	450	48,200	26	250
NCWA 2	365	58,700	21.5	370
Average		53,450		310

Analysis of the recovery periods (see Figures 9 and 10) yields an average transmissivity of 56,605 gpd/ft (7,568 ft^2/day). With a fully-recovered aquifer saturated thicknesses of 26 feet and 21.5 feet at Well 1 and Well 2 respectively, an average hydraulic conductivity (K) value of 323 feet/day was calculated. This value is approximately twice the average K value of 155 calculated from the specific capacity for NCWA Wells 1 and 2. The specific capacity estimate of K from NCWA Well 3, drilled in 2003, which is located approximately one mile downgradient (southeast) of Wells 1 and 2 at a point nearly on the Larimer – Weld county line, indicates a value of K in the range of 490 ft/day. The Well 3 estimate indicates a productive well is likely in a deep part of the paleochannel, but this value is probably not reflective of average aquifer conditions in this area.

The best representative value of K for the NCWA area of the alluvial aquifer is judged to be approximately 323 ft/day, based on the pumping test values of NCWA Wells 1 and 2. This value of K is estimated to be a representative K for use in water budget evaluation of the proposed designated basin.

4.4 Estimation of Specific Yield and Effective Porosity

Specific yield (Sy) is the volume of water that is drainable by gravity from a unit volume of a saturated material. Due to molecular and surface tension forces, some water within a saturated material will not drain from the material by gravitational forces alone. Specific yield can be estimated based upon the aquifer materials present. A mix of sand and gravel generally has a range of specific yield of 15% to 25%. Clay generally has a specific yield range of 1% to 10%. A reasonable estimate of Sy for the Spring Creek alluvium is in the range of 20% to 25%.

Porosity of an earth material is the percentage of the material that is void space. The void space in a granular material is composed of the interstices (i.e. the open area) between the individual grains of the material. An alluvial aquifer contains water within the porosity of a granular material. Porosity of a sand and gravel mix may range from approximately 20% to nearly 50% depending on the mix of materials present, and how well sorted the material is[4]. The effective porosity is the porosity available for fluid flow; that is, the porosity that is open to fluid movement between pore spaces. Effective porosity can be no greater than total porosity, and is generally less. In the Spring Creek alluvial aquifer, the relatively well-sorted nature of the material leads us to estimate that total porosity is probably in the 30% to 40% range and a representative value of effective porosity is probably no more than about 35%. To the best of our knowledge there have been no site-specific technical studies on the porosity of the in-place alluvial sediments of the Spring Creek aquifer.

[4] Fetter, C.W., 1988, Applied Hydrogeology, pp. 64-68.

5.0 Water Budget Analysis of Proposed Upper Spring Creek Designated Basin

In order to provide an estimate of whether, and how much, unappropriated water is available in the proposed Spring Creek designated basin, HRS has made estimates of average annual values of the major inflow and outflow components of water to and from the portion of the Spring Creek basin in Colorado that is upgradient (northwest) of the Larimer County – Weld County line (in this area this is the line between Range 7 West and Range 8 West).

The components of inflow are:

- Alluvial ground water underflow from the Wyoming portion of the watershed.
- Percolation of precipitation into the alluvial aquifer.

The components of outflow are:

- Alluvial ground water underflow across the Larimer County – Weld County line.
- Well pumping by NCWA, all of which leaves the Spring Creek basin.
- Well pumping for minor uses such as livestock and domestic wells.
- Evapotranspiration (ET) of ground water by open water surfaces and native plants or subirrigated hay meadow (ET in this basin is a small amount, but an estimate is made based on aerial photo analysis.)

From our observations, the surface inflow to the Colorado portion of the basin from Wyoming is so small and infrequent as to be negligible. The same is true at the Larimer – Weld county line: surface outflow is so small and infrequent as to be negligible. Also, as discussed in this section, although there may be some small amount of hydrologic communication between the alluvial aquifer and the underlying bedrock, this is estimated to be a very small volume.

5.1 Estimated basin inflow: recharge from precipitation

There are no precipitation gauges known within the Spring Creek basin upstream of the county line. There is a precipitation gauge at the Rawhide power plant, a few miles south of the basin, but the period of record is short and therefore was not considered representative. There was a precipitation gauge at the town of Nunn that had a considerable period of record (1948 – 1998 inclusive) showing an annual average precipitation of 13.3 inches/year. However, that gauge is at an elevation of 5,185 feet and is therefore considerably lower than the 5,900 feet to 6,300 feet average elevation of the Spring Creek basin upgradient of the Larimer – Weld county line. For this analysis, the Cheyenne, WY, precipitation gauge records were estimated to be representative. The Cheyenne gauge is at an elevation of 6,130 feet, and has an available period of record from 1915 – 2005, inclusive. For this period of years, annual average precipitation was 15.17 inches.

The entirety of the Spring Creek basin upgradient of the county line has an area of 13.75 square miles (8,800 acres) as determined from the GIS for this project. Of this total, 2.03 square miles (1,300 acres) or 14.8%, are within Wyoming and 7,500 acres (85.2%) are in Colorado. For the entirety of the basin upgradient of the county line, total precipitation volume is estimated to be 11,125 acre-feet per year (8,800 acres multiplied by 15.17 inches).

From our observations, effectively none of the inflow to the Spring Creek basin upstream of the county line enters as surface flow. Likewise, none of the outflow from the basin past the county line has been observed to exit as surface flow. The only exceptions would be during torrential thunderstorms, when very rapid rainfall and runoff may occur for a short duration.

A percentage of the total precipitation percolates downward and recharges the alluvial aquifer. At an estimated 5% to 10% of the precipitation, based on a survey of published literature, the total recharge to the Spring Creek basin is estimated to be between 550 ac-ft/yr and 1,100 ac-ft/yr (rounded to the nearest 50 ac-ft/yr). Of this, an estimated 100 to 150 ac-ft/yr (rounded to the nearest 50 ac-ft/yr) enters the Colorado part of the Spring Creek basin from Wyoming, as there is virtually zero water used in the Wyoming portion of the basin according to records of the Wyoming State Engineer's Office.

By comparison, the portion of the Spring Creek basin downgradient of the Larimer County – Weld County line as far as the Spring Creek confluence with Lone Tree Creek has an area of 57,300 acres. Using the same 7.9% estimated inflow a the upper portion of the basin, and estimating 13.3 inches of precipitation per year for this lower area based on available records for the weather station at Nunn, we arrive at an estimate of approximately 5,020 ac-ft/yr of recharge to the alluvial aquifer downgradient of the county line. This is approximately 5.6 times the estimated total inflow to the upper Spring Creek basin above the county line.

5.2 Estimated basin outflow

5.2.1 Well pumping: NCWA and other wells

As shown in Table 3, NCWA's well pumping historically has averaged 292 ac-ft/y. This is approximately 97% of the water pumped from the Spring Creek basin upgradient of the Larimer – Weld county line. All of the NCWA pumping is conveyed out of the Spring Creek basin to supply its customers with domestic water. No return flows from NCWA pumping accrue to the Spring Creek basin. The other water uses, such as livestock and domestic wells, as tabulated from the well permit records, are estimated to total only about 7.5 acre-feet/year. NCWA has recently (August, 2008) purchased the Three Peaks wells, and there is no ground water pumped for irrigation use in the basin. For the past four years (2005-2008 inclusive), NCWA pumping has been higher (399 ac-ft/y) than the average of the previous years (292 ac-ft/y) (see Table 4). Therefore the average annual outflow from pumping is estimated to be 400 ac-ft/y for the purposes of this water balance analysis.

5.2.2 Other components of basin outflow

From evaluation of aerial imagery, we have found a total of approximately 15 to 20 acres in the upper portion of the Spring Creek basin that appear as if they may be sporadically-subirrigated hay meadow. At an estimated consumptive use of 1.5 to 2.0 acre-ft/acre/years, this represents an estimated outflow component of approximately 22.5 ac-ft/yr to 40 ac-ft/yr.

There is a spring-fed pond (Windy Acres Pond, Case No. 85CW302) with a surface area estimated at 1.5 acres located approximately ½ mile east of the NCWA Wells 1 and 2. This pond is fed from a spring whose source is estimated to be from the White River Fm, or possibly the Laramie Fm., at the base of a bluff in that area. Therefore, seepage from this pond most likely represents a net inflow to the alluvial aquifer, and its evaporation component is from bedrock water, not alluvial ground water. We have considered this pond and its source spring to be negligible as to inflow or outflow in the water budget estimates.

5.2.3 Alluvial underflow out of proposed designated basin

A geologic cross-section (Figure 11) was constructed through Section 24, T11N, R68W, using the available drillers logs from existing wells. The purpose of the cross-section was to ascertain the geometry of the alluvial valley, and to enable us to estimate the cross-sectional area of aquifer through ground flow moves downgradient, past the Larimer – Weld county line. The section starts in the SW/4 SE/4 of Section 24 and trends north to the old highway then northeast into the SE/4 of Section 13. Figure 6 shows the location of the cross-section and the wells in the area. This cross-section is approximately coincident with the Larimer – Weld county line. The vertical scale is 20 feet per inch and the horizontal scale is 200 feet per inch. The ground level, the top of the bedrock, and the alluvial aquifer water level are shown on the cross-section. Also shown is a brief description of the lithology penetrated by each well and the total depth of the well. For the bedrock wells, the cemented and screened intervals and the water level in the well when drilled are also shown.

5.2.3.1 Calculation of alluvial underflow

The cross-sectional area between the water level and top of bedrock on the geologic cross-section (Figure 11) was calculated to be approximately 21,900 square feet. The cross-section is approximately at a right angle to the water table gradient in the alluvium of Spring Creek. The underflow components through the cross-sectional areas of the northern and southern portions of the cross-section, where they deviate from being nearly perpendicular to the water table gradient, were adjusted by multiplying the calculated area by the cosine of the angle between the perpendicular line and the actual line of the section.

The underflow through this section was calculated using Darcy's Law, where the rate of underflow (Q, in ac-ft/y) is computed by multiplying the cross-sectional area (A), the water table gradient (dh/dL), and the estimated hydraulic conductivity (K) of the aquifer.

The gradient of the water table in this area is approximately 0.009 ft/ft. The representative hydraulic conductivity of the aquifer material was chosen as 323 feet/day based on our pumping test analysis (see Table 10). From these inputs, we have computed an estimated underflow at the Larimer – Weld county line of 550 ac-ft/yr (rounded to the nearest 50 ac-ft/yr).

5.2.4 Water levels in the proposed designated basin

HRS was provided a time-series of water level measurements by NCWA for its Wells 1, 2, 3, and for TPW Wells 2 and 5. The NCWA water level records were for 1989 – 2008, inclusive. The TPW water level records were for 2006 through 2008. The water level time-series is shown in graphical form in Figure 12 (water levels during pumping) and Figure 13 (water levels during a non-pumping period).

Figure 12: Time series of water levels during non-pumping times

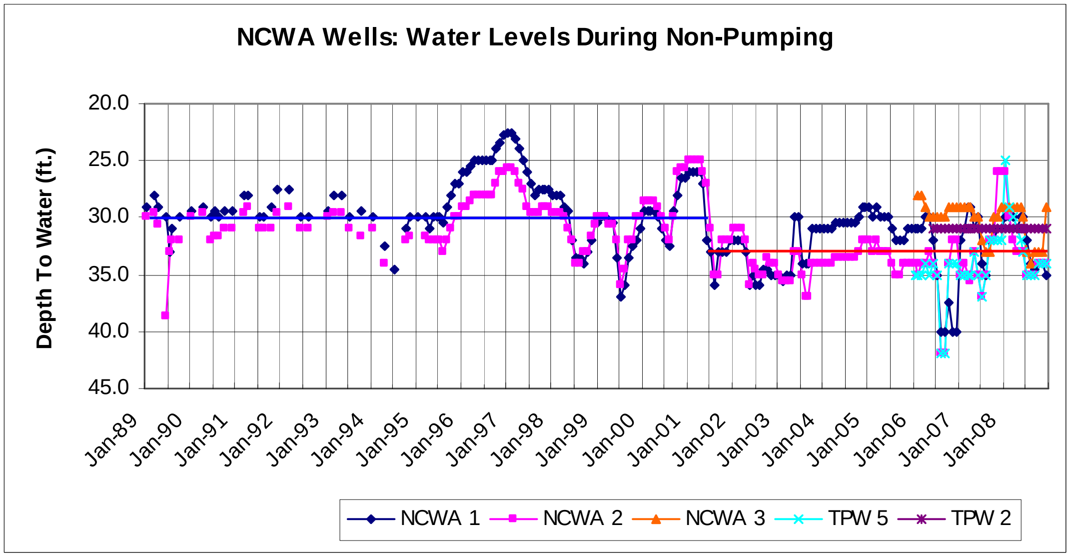
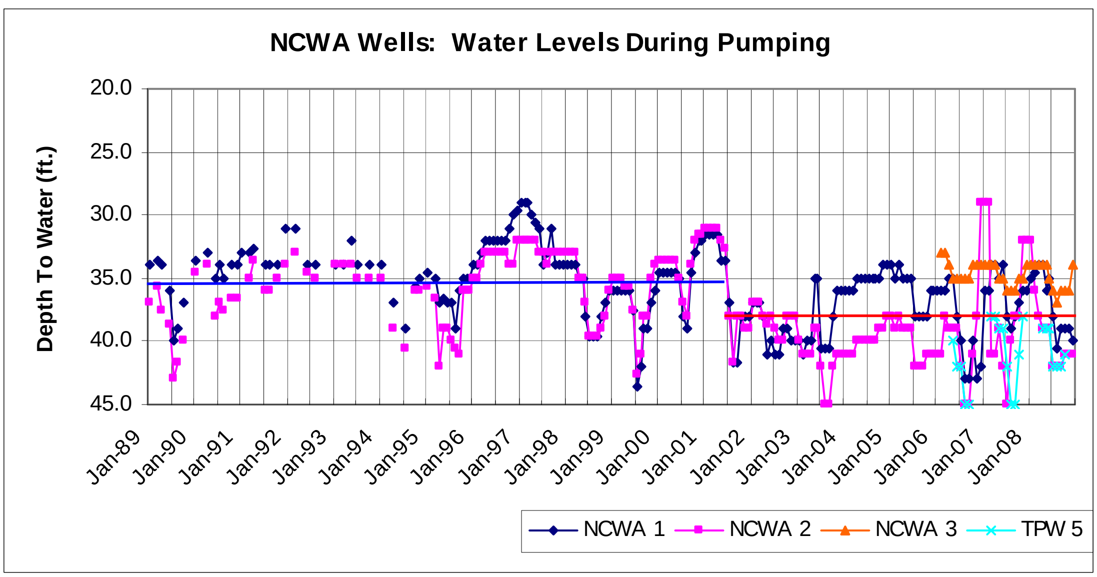


Figure 13: Time series of water levels during pumping



From Figures 12 and 13, several conclusions can be reached:

- The difference in water levels between pumping and non-pumping periods averages approximately four to five feet for the NCWA and TPW wells. (Note:

we have termed the latter “non-pumping” instead of the commonly-used term “static” because the time following pumping was not documented, and it is not known whether the measurements represent a fully recovered condition.)

- During the period 1989 through approximately January, 2002, the pumping and non-pumping levels, although variable, do not show any identifiable upward or downward trend. This was during the period when NCWA pumping averaged approximately 292 ac-ft/yr.
- Between January, 2002, and the end of 2008, the pumping and water levels, although variable, still do not show any identifiable upward or downward trend. This was when NCWA pumping averaged approximately 400 ac-ft/yr.
- From the earlier period (1989-2001) to the later period (2002-2008) both the pumping water levels and the non-pumping water levels show a difference of approximately 2.5 to 3.0 feet.
- This indicates that neither the earlier (1989-2001) period of lower demand, nor the higher annual demand in the post-2002 period has resulted in an identifiable downward trend that would lead us to conclude that water is being drawn from aquifer storage and not replaced by annual or seasonal recharge.
- For the purposes of the water budget, we conclude that it is appropriate to estimate zero annual change in storage in the aquifer, either up or down.
- From this evaluation, we conclude that this portion of the basin is not overappropriated, and there is water available for appropriation in the upper Spring Creek alluvial aquifer in the vicinity of the NCWA and TPW wells.

5.2.5 Water Budget: comparison of inflow and outflow

From the estimates of inflow and outflow discussed above, and from the historical record of time-series water levels that provides an estimate of zero ac-ft/yr of change in aquifer storage, Table 11, below, is the estimated water budget, based on the best input numbers from available data.

Table 11: Annual Average Water Budget, Spring Creek aquifer upstream of Larimer – Weld County Line

Annual Average Water Budget Spring Creek Aquifer in Colorado upstream of Larimer-Weld County Line	
	(Ac-Ft/y)
Outflow Components	
Spring Creek Aquifer underflow	550
NCWA pumping (post-2001 average)	400
other pumping (livestock & domestic)	7.5
loss to bedrock formations (estimated)	0
ET from ground water	40
Total outflow (rounded to nearest 50 ac-ft/y)	900
Inflow Components	
Alluvial aquifer underflow from Wyoming	150
Recharge from precipitation	750
(calculated to balance the budget equation)	900
Estimated Change in Aquifer Storage	0

From this estimated water budget, it can be seen that to balance the outflow side of the equation, and by estimating 150 ac-ft/yr of ground water inflow from Wyoming, then an estimated 750 ac-ft/yr recharges the portion of the aquifer in Colorado by precipitation. This means that an average of 0.10 feet per year (= 1.2 inches per year) of precipitation recharges the 7,500 acres of the aquifer in Colorado. This is equivalent to approximately 7.9% of the 15.17 inches per year of precipitation estimated to fall in the Spring Creek basin on average. Studies in other basins on the Colorado High Plains have shown precipitation recharge ranging from lows of 3% to 5% where a higher percentage of the land is exposed bedrock or soils derived from bedrock formations, up to highs of 15% or more in relatively sandy basins where little surface runoff is observed.

The total estimated annual inflow and outflow from the proposed designated basin is 900 ac-ft/yr. We believe this is a conservative estimate, although it could be refined by further testing and water-level monitoring. Of this 900, approximately 450 ac-ft/yr is

pumped from wells or is lost to ET, and 550 ac-ft/y leaves the proposed designated basin as alluvial underflow. Changes in aquifer storage, and losses or gains from bedrock formations, are considered to be negligible based on the available evidence.
A review of the NCWA well permits shows that NCWA Wells No. 1 and No. 2 were limited to a combined total of 400 ac-ft/yr. NCWA Well No. 3, since it was drilled in 2003, has always been pumped under a Substitute Water Supply Plan (SWSP). The most recent SWSP approval, for 2008, limits the combined total for 1, 2 and 3 to 406 ac-ft/yr.[5]

NCWA water use has averaged 399 ac-ft/yr in the years 2002-2008 inclusive, as discussed above. TPW Wells No. 2, 5, 6 and 8 (of which NCWA proposes to use TPW wells No. 2 & 5), have a combined total annual volumetric limit of 805 ac-ft and a consecutive 10-yr limit of 4,960 ac-ft/yr (an annual average of 496 ac-ft/yr), based on the decree for those wells.[6] The NCWA 400 ac-ft/yr average historic withdrawal for 2002-2008, plus the average annual volumetric limitation of 496 ac-ft/yr for the TPW wells, sums to 896 ac-ft/yr, which is very close to the 900 ac-ft/yr annual basin inflow from our water budget analysis (see Table 11). Well pumping for stock and domestic purposes, and ET, are estimated to require approximately 50 acre-feet total. So long as the total NCWA well pumping, including the NCWA wells plus the TPW wells, is limited to 850 ac-ft/yr as a long-term average, per our water budget analysis, we believe the proposed designated basin will be in balance: that is, there will be no remaining unappropriated water, but pumping will not create a deficit situation and draw down the aquifer from storage.

5.2.6 Estimated volume of recoverable ground water in storage

The basin area being considered for designation, plus the Wyoming portion of the basin, encompasses 13.75 square miles or 8,800 acres. Of the total basin upgradient of the Larimer – Weld county line, 2.03 square miles (1,300 acres) of the basin are in Wyoming. There are 7,500 acres within Colorado which comprise the proposed

[5] Rich Patterson, verbal communication, February 2009.
[6] Ibid.

designated basin area. In the upper portion of this upper basin area there is little data with which to estimate saturated aquifer thickness in the Spring Creek alluvium. Based on existing well records, the range of average saturated aquifer thickness is believed to be 15 to 25 feet. Using an estimated effective porosity of 30% and an average saturated thickness of 25 feet, the volume of ground water in storage is approximately 56,250 acre-feet. If the average saturated thickness is 15 feet across the entirety of the aquifer then the amount of ground water in storage is approximately 33,750 acre-feet. With the well records presently available, we estimate that the lower end of this range, 33,750 ac-ft of ground water in storage, is a reasonable estimate that is supported by the available data.

The amount of water recoverable from an aquifer is always less than the amount of water in storage due to the specific yield being less than the total or effective porosity of the aquifer. If the average specific yield is 0.20, as is typical of this type of aquifer, then the amount of water recoverable is estimated to be approximately 22,500 acre feet for an aquifer with an average of 15 feet of saturated thickness.

The amount of water economically recoverable is always less than the water recoverable by gravity drainage due to the physical limitations of not being able to pump all the water from a well or a set of wells. Even if a pump is set below the base of the aquifer, it is not possible to pump the well such that the water level everywhere in the aquifer is at the bottom of the aquifer. There will be some water that remains within the aquifer between the cones of depression of pumped wells. It is estimated that approximately 80% of the recoverable water within an aquifer can be economically recovered. Thus, we estimate there is approximately 18,000 acre-feet in aquifer storage that would be economically recoverable by well pumping, although this amount of recovery would require more wells than currently exist in the area of the aquifer upgradient of the county line. This estimate of 18,000 ac-ft/yr represents approximately 45 years of water supply for NCWA at its present average rate of annual withdrawal (400 ac-ft/yr), if this ground water in storage is withdrawn in a managed way, over and above the estimated annual rate of recharge to the aquifer.

It should be understood that the volume of ground water in storage may be considered relatively constant, but it is not static. If the ground water is not intercepted by cones of depression and removed from the aquifer by pumping, it moves downgradient and would be counted as part of the alluvial underflow moving out of the proposed designated basin area. That ground water would be replaced by water recharged by precipitation and underflow from the Wyoming portion of the upper basin.

5.3 Bedrock aquifers

The Upper Spring Creek alluvial aquifer (that is, the aquifer area upgradient of the Larimer – Weld county line) overlies the bedrock White River Formation. The White River Formation in this area consists of multi-colored clayey siltstone and minor sandstone which is poorly to moderately cemented. Wells completed in the White River Fm. in the vicinity of the NCWA wells generally yield enough water for domestic or stock use. This formation typically is of relatively low permeability and thus does not transmit water readily.

The Laramie-Fox Hills Formation outcrops on the southwest side of the Spottlewood Creek valley and may be faulted in that area. No water wells within the Upper Spring Creek valley have penetrated this aquifer, according to available driller’s logs.

5.3.1 No bedrock aquifers to be included in designation

Due to the fact that the Spring Creek alluvium is the only aquifer in the upper basin with moderate to good hydraulic conductivity, and from which water can be produced in economic amounts for any but the smallest uses, we recommend that no bedrock aquifers be included in the designation of the Upper Spring Creek aquifer.

5.3.2 Negligible communication between bedrock and the alluvial aquifer

Reported water levels for wells completed in the bedrock White River formation below the Spring Creek alluvial aquifer or just on the edges of the Spring Creek alluvial aquifer indicate that bedrock water levels are, on average, approximately 5 to 10 feet below the water level in the alluvial aquifer. This, coupled with evidence of low hydraulic conductivity in the bedrock, indicates that there is little communication between the alluvial aquifer and underlying the bed rock aquifer. The deeper bedrock water level indicates that water in the alluvial aquifer may recharge the bedrock aquifer; however there is not sufficient data to be able to quantify this. Thus there may be some slight outflow from the alluvial aquifer into the bedrock aquifer. Because the basin water budget balances to a reasonable rate of precipitation inflow, we conclude that the amount of any net gain or loss to or from the bedrock that underlies the alluvium is negligible for the purposes of the basin water budget.

6.0 *de minimis* Impact Analysis of Proposed Spring Creek Designated Basin

Based on recent court decisions, designated ground water cannot impact surface flows more than a *de minimis* amount, and any ground water that does show more than a *de minimis* amount of impact cannot be designated ground water.[7] Also, in the Pioneer case (06CV31), the Court decided that although a *Kuiper vs. Lundvall* 100 year travel-time analysis is a useful test, the primary focus is whether the ground water, in its natural course (i.e. undisturbed) would or would not be available for the fulfillment of surface water rights. HRS has done an analysis of travel time based on the available data from driller's reports and pumping tests in the Spring Creek alluvial aquifer.

6.1 Travel time analysis

As an aid in deciding whether pumping from the alluvial aquifer upgradient of the lower boundary of the proposed designated basin is tributary or whether it should be considered *de minimis*, HRS has performed a set of calculations of advective travel time[8] using the aquifer characteristics of the Spring Creek alluvial aquifer. From our evaluations done as part of this study, we believe it is more accurate to break the aquifer up into segments, each represented by a set of aquifer characteristics, than it would be to try to use an averaged set of characteristics over the entire Spring Creek basin.

For the part of the basin upgradient of the Larimer County – Weld County line we have used the characteristics developed from our pumping tests of NCWA wells 1 and 2 (see Figures 9 and 10). For the segment of the basin between the county line and the Spring Creek confluence with Lone Tree Creek, we have used the characteristics developed from analysis of specific capacity from driller's logs (see Tables 7 and 8). For the segment below the Lone Tree confluence, downgradient to the first estimated point at which there appears to be connection between surface flow and the alluvial water table

---

[7] Pioneer Irrigation District v. Colorado Ground Water Commission, Case No. 06CV31, at C.

[8] Advection is a mechanism of movement of ground water due to the hydraulic (i.e. head) gradient acting on the saturated aquifer material.

(approximately 1.5 miles upstream of the Lone Tree Creek – South Platte confluence, we have used characteristics from CWCB Circular 11 (see Table 9). The inputs and the results of these calculations are summarized in Table 12. Note that the calculations were done twice: once for 30% porosity, and once for 35% porosity. Both are representative numbers from the literature, as there is no onsite data on this parameter for the Spring Creek basin.

Table 12: Travel Time Analysis of three segments of Spring Creek alluvial aquifer

Spring Creek Alluvial Aquifer Travel Time Analysis				
Segment 1: NCWA to Larimer / Weld County Line				
Hydraulic conductivity (K) =	323	323	ft/day	HRS tests: NCWA wells 1 & 2
Effective porosity (n) =	30%	35%		
Upstream elev =	5,902	5,902		near NCWA wellfield
Downstream elev =	5,805	5,805		at County Line
Elevation change =	97	97	ft	
Distance =	1	1	miles	average (range 0 to approx. 3)
Distance =	5,280	5,280	ft	
dH / dL (gradient) =	0.0090	0.0090		HRS analysis of local water levels
Avg Velocity =	9.7	8.3	ft/day	
	3,539	3,034	ft/year	
	0.67	0.57	miles/year	
Segment traveled in:	**1.5**	**1.7**	years	
Segment 2: Larimer / Weld County Line to Lone Tree Creek confluence				
Hydraulic conductivity (K) =	154	154	ft/day	specific capacity analysis
Effective porosity (n) =	30%	35%		
Upstream elev =	5,805	5,805		at County Line
Downstream elev =	4,840	4,840		at Lone Tree / Spg Crk confluence
Elevation change =	965	965	ft	
Distance =	29.9	29.9	miles	
Distance =	157,872	157,872	ft	
dH / dL (gradient) =	0.0061	0.0061		
Avg Velocity =	3.1	2.7	ft/day	
	1,146	982	ft/year	
	0.22	0.19	miles/year	
Segment traveled in:	**138**	**161**	years	
Segment 2: Lone Tree Creek confluence to 1.5 miles North of S. Platte River				
Hydraulic conductivity (K) =	592	592	ft/day	CWCB Circular 11 test data
Effective porosity (n) =	35%	35%		
Upstream elev =	4,840	4,840		at Lone Tree / Spg Crk confluence
Downstream elev =	4,600	4,600		at S. Platte / Lone Tree Crk confluence
Elevation change =	240	240	ft	
Distance =	8.7	8.7	miles	
Distance =	45,936	45,936	ft	
dH / dL (gradient) =	0.0052	0.0052		
Avg Velocity =	8.8	8.8	ft/day	
	3,228	3,228	ft/year	
	0.61	0.61	miles/year	
Segment traveled in:	**14**	**14**	years	
Total Distance Segments 1 + 2 + 3:	39.6	39.6	miles	
Total: Segments 1 + 2 + 3 travel time:	**153**	**177**	years	

From the travel time estimates shown in Table 12, based on the best data available, it can be seen that the travel time from the area of the NCWA wells to the point at which there is connection between the aquifer and the surface flow in Lone Tree Creek ranges from 153 to 177 years. This estimate may change if new data becomes available. This estimate, based on the range of representative aquifer parameter values, provides evidence that the travel time is so long from NCWA wells to the nearest aquifer-connected surface stream, that any impacts would be immeasurably small even after 100 years. We believe this meets the *de minimis* criterion as prescribed by the Courts for designated ground water.

6.2 Depletion timing based on Glover (AWAS) analysis

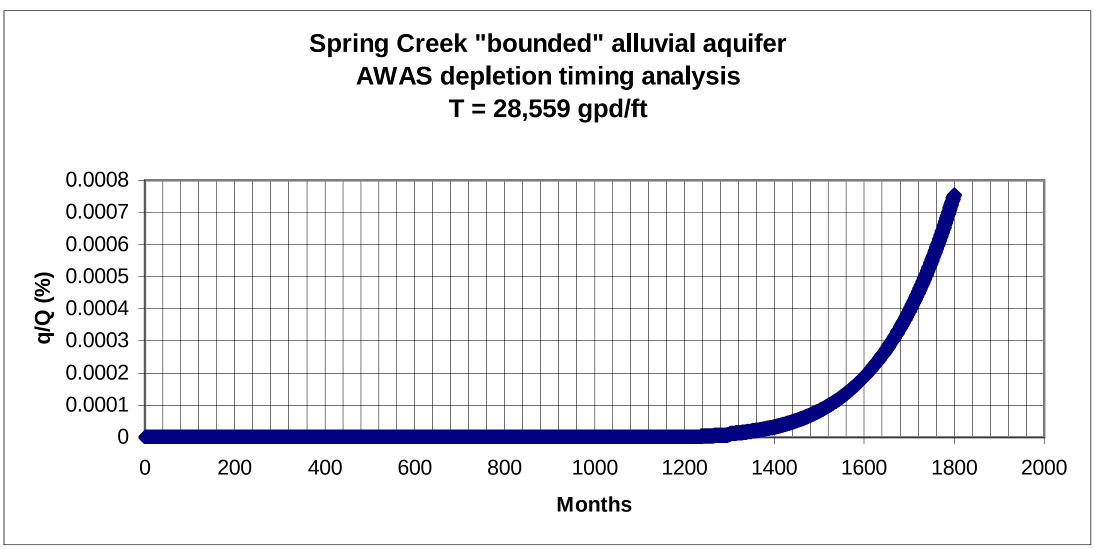
As another method of evaluating whether or not pumping in the proposed designated basin area should be considered *de minimis*, a depletion timing analysis was performed using the Glover stream-depletion methodology as used in CSU's AWAS program[9]. The AWAS program requires the following inputs: type of aquifer, pumping rate (gpm), transmissivity (gpd/ft), distance (feet) from well to point of depletion, and specific yield. The aquifer type was chosen as a bounded alluvial (i.e. a no-flow boundary was simulated at a distance of 39.6 plus 0.5 miles from the stream). The pumping rate used as input was 100 gpm (this is a nominal number used for ease of calculation, because depletion rate is not a function of pumping rate in a Glover evaluation) and specific yield of 20% (0.20). The distance from the NCWA well pumping center to the point of depletion at the South Platte/Lone Tree Creek confluence was measured to be 39.6 miles. A weighted average hydraulic conductivity value was calculated using the hydraulic conductivity values and the distances as shown in Table 12. The weighted average hydraulic conductivity value calculated for the entire Spring Creek reach was 254.5 ft./day based on the K values and distances in Table 12. An average saturated thickness of 15 feet over the entire 39.6 miles was used to calculate a transmissivity of 28,559 gpd/ft. The AWAS calculation time was 150 years with one month time steps. The

9 http://www.ids.colostate.edu/index.html?/projects/idsawas/ (as of 2/4/2009)

output from the AWAS calculations for each time step is: depletion rate (cfs), cumulative volume of depletion (af), and volume of depletion for the time step (af). The depletion rate for each time step was divided by the pumping rate to arrive at a depletion rate, q/Q, as a percentage for each step. Figure 14 is a graph of the q/Q rate as a percent versus time in months since the onset of pumping.

Depletion in any calculable amount in the Glover analysis does not even reach the point of depletion until 103.2 years after pumping starts, at which time the rate of depletion as q/Q is 0.0000036% (3.55E-06%). At 100 years the depletion rate (q/Q) is calculated to be zero (0.00000%). For example, if it were physically possible to pump the entire 900 ac-ft/yr (559 gpm at a constant rate) of water estimated to be the annual inflow of the upper Spring Creek basin (which is not physically possible), the rate of depletion at the stream after 100 years of pumping would be zero, and after 103.2 years would be only 559 x 0.0000036% = 0.000020 gpm, which is a rate far too small to be measurable.

Figure 14: 100-year Glover stream depletion timing analysis



.

6.3 Summary of *de minimis* impact analysis

From the Glover calculation shown above, the rate of depletion after 100 years would result in the upper Spring Creek aquifer meeting the Senate Bill 5 Statewide rules as nontributary, because the rate of depletion is less than 1/10 of 1 percent after 100 years. Although we discussed this possibility with NCWA and also with Ground Water Commission personnel, the current statutes were developed for confined bedrock aquifers, and are not applicable for the Spring Creek alluvial aquifer.

Based on the travel time analysis and the Glover analysis, it is clear that the travel time is so long, and the rate of depletion is so small, from the upper Spring Creek area at and above the Larimer – Weld county line downgradient to the nearest aquifer-connected surface stream, that any impacts would be immeasurably small even after 100 years. We believe this meets the *de minimis* criterion as prescribed by the Courts for designated ground water.

It should be noted that NCWA currently operates its wells under an approved SWSP based on a Glover timing analysis (done by others on behalf of NCWA) similar to the Glover analysis done for this study. The inputs used in this analysis are updated and refined from the analysis used for the SWSP.

7.0 Upper Spring Creek Alluvial Aquifer Proposed Designated Basin Characteristics

This section of our report is a summary of the characteristics of the upper Spring Creek alluvial aquifer that we believe meets the criteria for designation. Most of the information in this section has been presented in earlier sections of this report or on figures contained herein. It is presented here in summary fashion to provide, in a concise form, the information specified in 37-90-106 and 37-92-106(1) (CRS).

7.1 General location of the Spring Creek basin

The majority of the Spring Creek basin is located in Weld County and Larimer County, Colorado. A small portion, comprising the headwaters of the basin, is located in Laramie County, Wyoming (see Figure 1).

7.2 Geographic extent of the Spring Creek basin

The Spring Creek basin extends from southern Laramie County, Wyoming, a distance of approximately 40 miles, generally trending from northwest to southeast, to its identified terminus at its confluence with Lone Tree Creek, an intermittently-flowing tributary of the South Platte River. From its headwaters in Wyoming downgradient to its confluence with Lone Tree Creek the Spring Creek basin contains 66,100 acres (approximately 103 square miles). The portion of the basin downgradient (southeast) of the Larimer County – Weld County line, which is NOT proposed for designation, downgradient to the Spring Creek basin confluence with Lone Tree Creek, has an area of 57,300 acres (89.5 square miles; 87% of total basin area). See Figure 1.

The upper Spring Creek basin upgradient of the Larimer-Weld county line, including the headwaters area in Wyoming, has an area of 13.75 square miles (8,800 acres). Of this total, 2.03 square miles (1,300 acres) are within Wyoming. The Colorado portion between the Wyoming line and the Larimer-Weld county line, which is the basin area proposed for designation, contains 11.72 square miles (7,500 acres; which is 85.2% of the upper basin or 11% of the total Spring Creek basin area). See Figure 7.

7.3 Description of the geology and hydrology of the Spring Creek basin

This section provides a description of the geology and hydrology of the Spring Creek basin, as specified in 37-92-106(1)(a) and 37-90-106 (1)(b). The description below has been excerpted from Section 4 of this report. More detail on the geology and hydrology of the Spring Creek basin, including the proposed designated basin, can be found in Section 4 and Section 5 of this report and on the figures contained herein.

The Spring Creek basin, and the alluvial aquifer of Spring Creek, are bounded on the northeast and east by the Lone Tree Creek drainage and on the southwest and west by the Spottlewood Creek drainage (see Figure 1, in pocket). Spring Creek originates in southern Laramie County, Wyoming.

Within the Spring Creek surface drainage basin there are several small subdrainages and ephemeral surface stream channels that appear and disappear. To the southeast, from the Larimer – Weld county line downgradient to the vicinity of the Spring Creek – Lone Tree Creek confluence, a measured distance of 29.9 miles, the Spring Creek drainage boundaries becomes better defined overall, although in this reach dry surface channels appear and then disappear within the Spring Creek valley due to the ephemeral nature of flow. In much of this area any Spring Creek surface channels have been obliterated by field cultivation.

We could find no record of there ever having been a stream gauge, a peak flow measuring device, or individual observations of flow in Spring Creek above its confluence with Lone Tree Creek. Downgradient of that point, flow was observed to be ephemeral to intermittent. Intermittent surface flow was observed to take place in Lone Tree Creek starting at a point approximately two miles due East of the town of Eaton. Stream-aquifer connection most likely does not occur until a point approximately 1 to 1 ½ miles upstream of the Lone Tree Creek – South Platte River confluence. The intermittent surface flow observed in Lone Tree Creek appeared to be a result of irrigation runoff in the cultivated area generally located southeast of the town of Pierce.

7.4 Spring Creek ground water availability for decreed surface rights

Spring Creek ground water contained in the alluvial aquifer in the area proposed for designation, upgradient of the Larimer County – Weld County line, is not available to, nor is it required for, fulfillment of decreed surface rights. The only surface right in use within the proposed designated basin area is a spring ("Windy Acres Spring"; see Figure 2) that is fed by discharge from a bedrock formation. Within one mile downgradient of the county line there are two surface rights listed in the State's CDSS water rights listing, called Meadow Spring 1 and Meadow Spring 2 that may, based on site observation, be used sporadically for irrigation of hay meadow when there is runoff or when water table is unusually high. However there are no diversion records for these structures. It is not known whether ground water discharge is a significant portion of the water used by those structures, or even whether those structures are still in use.

Further downgradient, in Townships 10N and 11N, Range 67W, there are listings in the CDSS for three structures: Spring Creek Ditch No. 1, Noah Spring, and Boyd McLellan Ditch No. 1 (see Figure 2). There are no diversion records for any of these structures, none appear to have been used for several decades, and none appear to be in connection with, or to receive water from, the alluvial aquifer of Spring Creek. These structures are from 6 to 12 miles downgradient from the Larimer-Weld county line. The Boyd McLellan Ditch has been abandoned, according to the State's database of water rights and the District 1 Water Commissioner.

Yet further downgradient, the only structure that appears to be located in the Spring Creek basin is the Widmaier Seepage Ditch, located approximately 1.5 miles northeast of the town of Ault. This is approximately 24 miles downgradient from the Larimer-Weld county line. There are no diversion records for this structure, and from our field observations this structure appears to receive water from irrigation runoff, and none at all from ground water.

Overall, from the available data there do not appear to be any water rights in the Spring Creek drainage either within, or downgradient of, the proposed designated basin, that are active and for which water is available from the Spring Creek alluvial aquifer. Of the few surface water rights that exist in the basin, all appear to have been used, at best, on a sporadic basis from occasional high runoff or, in the case of the Widmaier Seepage Ditch, from irrigation runoff.

7.4.1 Is Spring Creek ground water not adjacent to a flowing natural stream?

The ground water in the Spring Creek alluvial aquifer is not adjacent to a flowing natural stream either in the proposed area for designation, or downgradient for approximately 38.5 miles, where Lone Tree Creek becomes a perennially flowing natural stream that is in connection with the water table. Upgradient of that location there are no perennial streams in the Spring Creek drainage, and from the available data there is no point at which the ground water is adjacent to, or in hydrologic connection with, any natural stream, whether ephemeral or intermittent.

7.4.2 Has ground water constituted the principal usage for at least 15 years?

In the proposed designated basin upgradient of the Larimer – Weld county line, ground water has constituted the principal, and indeed virtually the only, use of water, for at least the last 15 years. This is shown in the water budget analysis of the upper Spring Creek basin (see Section 5 of this report and Table 11).

7.4.3 Name of the aquifer being considered for designation

The name of the aquifer being considered for designation is the Upper Spring Creek Alluvial Aquifer.

7.4.4 Boundaries of the aquifer being considered for designation

The boundaries of the aquifer being considered for designation consist of the following, and are shown on Figure 6:

- Northwest (upgradient) boundary: the Colorado – Wyoming state line
- Southeast (downgradient) boundary: the county line between Larimer County and Weld County, which is coincident with the Township line between T 67 W and T 68 W.
- Southwest boundary: the natural topographic watershed divide between Spring Creek and Spottlewood Creek or its tributaries.
- Northeast boundary: the natural topographic watershed divide between Spring Creek and Lone Tree Creek or its tributaries.

7.4.4.1 Written description of the boundaries

The following is a description of the sections and portions of sections that are proposed for inclusion in the proposed Upper Spring Creek Designated Basin (see Figure 7):

Township 12 North, Range 68 West, 6th PM
Section 20: E ½ E 1/2
Section 21: W 1/2, W 1/2 E 1/2, and SE 1/4 SE 1/4
Section 27: W 1/2 NW 1/4, SW 1/4, W 1/2 SE 1/4, and SE 1/4 SE 1/4
Section 28: E 1/2, E 1/2 NW 1/4, and NW 1/4 NW 1/4
Section 33: E 1/2
Section 34: All
Section 35: SW 1/4 NW 1/4, W 1/2 SW 1/4, and NE 1/4 SW 1/4

Township 11 North, Range 68 West, 6th PM
Section 1: SW 1/4 SW 1/4
Section 2: W 1/2, SW 1/4 NE 1/4, and SE 1/4
Section 3: All
Section 4: N 1/2 NE 1/4, SE 1/4 NE 1/4, and NE 1/4 SE 1/4
Section 10: E 1/2, N 1/2 NW 1/4, SE 1/4 NW 1/2, and NE 1/4 SW 1/4
Section11: All
Section 12: W 1/2
Section 13: NW 1/4, SW 1/4 NE 1/4, and S 1/2
Section 14: NE ¼, NW ¼, SE ¼, and NE ¼ SW ¼, NW ¼ SW ¼, SE ¼ SW ¼
Section 15: E 1/2 NE 1/4
Section 23: NE 1/4 NW 1/4, NE 1/4, N 1/2 SE 1/4, and SE 1/4 SE 1/4
Section 24: All
Section 25: NE 1/4 NE 1/4

7.4.4.2 Map showing the boundaries

A map showing the proposed boundaries of the Upper Spring Creek Designated Basin is included with this report as Figure 7.

7.4.5 No bedrock aquifers are being considered

There are bedrock formations that underlie the alluvium of Spring Creek inside the proposed designated boundary. However, hydrologic communication between these formations and the overlying alluvial aquifer of Spring Creek is minimal owing to the relatively low permeability of the bedrock formations.

No bedrock aquifers are proposed to be included as part of the proposed designation. See Section 5 of this report for discussion of this topic.

7.4.6 Estimated use of ground water in the area being considered for designation

The use of ground water in the area being considered for designation is as follows:

- Ground water use by NCWA as part of its water supply to provide water to its customers in the area of Larimer and Weld counties immediately south of the Spring Creek watershed.
- Exempt uses by several existing livestock and domestic wells in the upper Spring Creek basin.

- One spring, called the Windy Acres Spring, supplies water to Windy Acres Pond for irrigation, livestock or other uses, and whose source is a bedrock formation and not the alluvial aquifer of Spring Creek.

No other uses of water exist in the proposed area being considered for designation. Although previously there were several wells listed for irrigation uses, these are either abandoned, or, in the case of the Three Peaks Water (TPW) wells, have been sold to NCWA.

7.4.7 Description and amount of uses of ground water

A summary description of the type and amount of ground water use in the proposed designated basin area is as follows:

- Municipal and domestic water pumped for use in an integrated water supply system by NCWA: 400 ac-ft/y on average (2005-2008 inclusive) (see Section 3.2 of this report for a detailed discussion).
- Livestock and domestic (exempt) uses estimated to total 7.5 ac-ft/yr as consumptive use (see Table 11 and Section 5.2 of this report).
- Natural evapotranspiration totaling an estimated 25 to 40 ac-ft/yr.

Total consumptive ground water use in the proposed designated basin area is estimated at 450 ac-ft/yr (see Table 11 of this report).

7.4.7.1 NCWA ground water use

NCWA water use has averaged 399 ac-ft/yr in the years 2005-2008 inclusive. NCWA water use for 1986 – 2008 inclusive has averaged 292 ac-ft/yr. (NCWA water use is discussed above, and in detail in Section 3.2 of this report.)

7.4.8 Estimated quantity of ground water in storage in the area being considered

There are 7,500 acres within Colorado which comprise the proposed designated basin area. Based on existing well records, the range of average saturated aquifer thickness is believed to be 15 to 25 feet. Using an estimated effective porosity of 30% and an average saturated thickness of 15 feet, the estimated quantity of ground water in storage is approximately 33,750 acre-feet. With an estimated average specific yield of 0.20, as is typical for this type of aquifer, then the amount of water recoverable is estimated to be approximately 22,500 acre-feet. This topic is discussed in detail in Section 5.2.6 of this report.

7.4.9 Estimated annual rate of recharge

The estimated annual average rate of recharge to the proposed designated basin area is as follows:

Recharge from percolation of precipitation:	750	
Recharge from underflow from Wyoming:	150	
Total estimated annual average recharge:	900	acre-feet per year

This topic is discussed in detail in Section 5 of this report.

8.0 Summary and Conclusions

HRS has completed its study of the Spring Creek basin of Larimer and Weld Counties, Colorado. The objectives of the Spring Creek feasibility study are as follows:

- Define the hydrogeologic characteristics of the alluvial aquifer of the Spring Creek basin.
- Determine whether ground water in the Spring Creek basin is available and required for the fulfillment of surface water rights.
- Determine whether there is a flowing natural stream adjacent to, or associated with, the ground water of the Spring Creek alluvial aquifer.
- Determine what water rights are in use in the Spring Creek basin.
- Make a recommendation as to whether we believe it is feasible to go forward with a petition to designate all, or a portion, of the Spring Creek basin and if so, recommend the basin boundaries to be designated.
- Estimate the water balance of the recommended Upper Spring Creek designated basin, and determine whether the appropriation of water within the recommended designated basin would unreasonably impair existing water rights or create unreasonable waste.

Each of these objectives is addressed in this report.

Our conclusions as a result of the Spring Creek study are as follows:

1. <u>No surface water is available or required for the fulfillment of surface water rights:</u> Based on the results of this study and the available evidence, there is no surface flow available to any surface water rights: in the proposed designated basin no surface water exists with the exception of occasional flow from torrential storms, and in many places there is no stream channel present. Surface flow is not required for the fulfillment of surface water rights as there are few, if any, surface water rights that exist in the proposed designated basin: the only surface water right for which we observed any use, is sourced from a spring believed to be from a bedrock formation.

2. <u>Travel time:</u> Based on the results of our analysis, using the best data available, the undisturbed travel time between the NCWA wells downgradient to the first point at which a surface stream is in hydrologic connection with the aquifer is between 153 years and 177 years.

3. <u>Impact will be *de minimus*:</u> From our analysis based on travel time calculations and Glover depletion estimates, the impact to the nearest surface water rights is calculated to be zero, and thus will be immeasurably small even after 100 years of pumping in the proposed designated basin. Therefore we conclude that any well pumping impact from the proposed designated basin will be *de minimis*.

4. <u>Information has been provided per the statutes:</u> The information contained in this report, as summarized in Section 7, provides the information specified in 37-90-106 and 37-92-106(1) (CRS) with regard to designation of new basins or altering the boundaries of existing designated basins.

5. <u>Ground water is not available to, or required for, fulfillment of decreed surface rights:</u> From this study, Spring Creek ground water contained in the alluvial aquifer in the area proposed for designation, upgradient of the Larimer County – Weld County line is not available to, nor is it required for, fulfillment of decreed surface rights. This is discussed in Section 7.1.1, and detailed in other sections of this report.

6. <u>Spring Creek ground water is not adjacent to a flowing natural stream:</u> The ground water in the Spring Creek alluvial aquifer is not adjacent to a flowing natural stream either in the proposed area for designation, or downgradient a distance of approximately 38.5 miles, where Lone Tree Creek becomes a perennially flowing natural stream that is in connection with the water table.

7. Ground water has constituted the principal usage for at least 15 years:
   In the proposed designated basin ground water has constituted the principal, and indeed virtually the only, use of water, for at least the last 15 years. This is shown in the water budget analysis of the upper Spring Creek basin (see Section 5 of this report and Table 11).

8. The proposed designated basin is approximately in balance: From this study, we conclude that approximately 900 ac-ft/y of ground water is available in the alluvial aquifer in the proposed designated basin without creating a "mining" situation. Appropriations up to this amount in the proposed designated basin will not unreasonably impair existing water rights. There is effectively one user in the basin (NCWA). That fact should not preclude approval of designation. The NCWA 400 ac-ft/yr average historic withdrawal for 2002-2008, plus the decreed average annual volumetric limitation of 496 ac-ft/yr for the TPW wells, sums to 896 ac-ft/yr, which is very close to the 900 ac-ft/yr annual basin inflow estimated from our water budget analysis (see Table 11). Well pumping for stock and domestic purposes, plus ET, are estimated to require approximately 50 acre-feet total. So long as the total NCWA well pumping, including the NCWA wells plus the NCWA-owned TPW wells, is limited to 850 ac-ft/yr as a long-term average, we believe the proposed designated basin will be in balance. That is, pumping up to approximately 900 ac-ft/yr, in total, will not create a deficit or "mining" situation and draw down the ground water in storage in the aquifer on a permanent or long-term basis.

9. Designation is feasible for the Upper Spring Creek alluvial aquifer: Based on the results of this study, as summarized in the conclusions enumerated above, we believe the technical and statutory conditions for designation are met. The required information has been developed, and the basin meets the definition of a designated basin.

9.0 Recommendations

Based on the results of this study, as summarized in the conclusions in Section 8 above, we believe the conditions for basin designation are met, and the required information has been developed. Our recommendations are as follows:

1. NCWA should move forward with a petition to designate the Upper Spring Creek alluvial aquifer in Colorado, upgradient (northwest) of the Larimer County – Weld County line.

2. This report should accompany NCWA's submittal to the Ground Water Commission to provide the technical background that will be necessary for the Commission's staff to evaluate the petition for designation.

APPENDIX A

Basin Wide Well & Diversion List

Permit #	ACTDATE	ACTCODE	DIV	WD	NAME	UTM_X	UTM_Y	PM	RANGE	TOWNSHIP	SECTION	QTR160	QTR40	USECODE	ACREFT	CASENO	YIELD	DEPTH	LEVEL	ACREIRR	ADJTYPE	ADJDATE	APRODATE	DCRAMT	DCRUNITS	COMMENTS
13086-R			1	01	AKAHOSHI ROBERT	527503.7	4492178.8	S	0650W	070N	16	NW	NW	1	0	11217	200	24	8	0	S	09/10/1953	04/20/1951	0.45		1430
NA			1		AKAHOSHI ROBERT IRR W 3	527804	4491871							I		11217	202				S	09/10/1953	06/14/1933	0.45	C	1430
25438			1		BROWN PUMP S 3 W 1-25438	524144	4495599							I		11217	202				S	09/10/1953	12/31/1944	0.45	C	1896 THREE WELLS REG NO 25438-F
25439			1		BROWN PUMP S 3 W 2-25439	524144	4495599							I		11217	399				S	09/10/1953	05/31/1940	0.89	C	1896 REG NO 25439-F
25440			1		BROWN PUMP S 3 W 3-25440	524144	4495599							I		11217	202				S	09/10/1953	10/31/1948	0.45	C	1896 REG NO 25440-F
25441			1		BROWN PUMP S 3 W 4-25441	524146	4495397							I		11217	202				S	09/10/1953	04/30/1948	0.45	C	1896 REG NO 25441-F
25442			1		BROWN PUMP S 3 W 5-25442	524147	4495195							I		11217	350				S	09/10/1953	02/28/1946	0.78	C	1896 REG NO 25442-RF
10530-R			1		CHANDLER WEAVER 3-10530R	528194	4490667							I		11217	247				S	09/10/1953	05/15/1949	0.55	C	1400 TWO WELLS
23288-F			1		CHANDLER WEAVER P 23288F	528194	4490667							I		11217	498				S	09/10/1953	05/01/1921	1.11	C	1400
NA			1		FOUR MILE IT BOULD L H D	527997	4490671							I		11217	350				S	09/10/1953	04/23/1951	0.78	C	2099 TWO WELLS
NA			1		GEIB SUMP WELL 359D	521709	4499550							I		11217	987				S	09/10/1953	05/21/1953	2.2	C	2121
NA			1		GEIB WELL NO 1	521709	4499550							I		11217	148				S	09/10/1953	09/30/1950	0.33	C	2121 THREE WELLS
NA			1		GEIB WELL NO 2	521709	4499550							I		11217	148				S	09/10/1953	09/30/1950	0.33	C	2121
NA			1		GEIB WELL NO 3	521709	4499550							I		11217	148				S	09/10/1953	09/30/1950	0.33	C	2121
NA			1		GEIB WELL NO 4	521709	4499357							I		11217	148				S	09/10/1953	09/30/1950	0.33	C	2121
NA			1		HENDERSON P P W Q LINES	527799	4490674							I		11217	148				S	09/10/1953	04/23/1951	0.33	C	2099 TWO WELLS
NA			1		HENDERSON P P W Q LINES	527799	4490674							I		11217	175				S	09/10/1953	03/31/1950	0.39	C	2099
NA			1		OLIN W VENABLE IRR W 4	521206	4499242							I		11217	296				S	09/10/1953	03/01/1910	0.66	C	1321
NA			1		OLIN W VENABLE WELL 1	521305	4498760							I		11217	296				S	09/10/1953	03/01/1910	0.66	C	1317
NA			1		OLIN W VENABLE WELL 2	521103	4498752							I		11217	296				S	09/10/1953	03/01/1910	0.66	C	1317
NA			1		OLIN W VENABLE WELL 3	520902	4498745							I		11217	296				S	09/10/1953	05/15/1936	0.66	C	1317
NA			1		PETERSON WELL	520707	4498143							I		11217	301				S	09/10/1953	01/31/1931	0.67	C	1484
NA			1		ROBERT AKAHOSHI WELL 1	527403	4492282							I		11217	148				S	09/10/1953	03/16/1928	0.33	C	1430
NA			1		SALBERG IRR WLL DR S SMP	526606	4493917							I		11217	301				S	09/10/1953	04/01/1935	0.67	C	1683
NA			1		SALBERG IRR WLL DR S SMP	526606	4493917							I		11217	301				S	09/10/1953	10/25/1952	0.67	C	1683
5816-R			1	01	WOLF MIKE & MARTHA	523845	4494692.8	S	0660W	070N	01	SE	NE	1	0	11217	700	38	15	0	S	09/10/1953	04/15/1951	1.33	C	1860
12326			1		STEWART WELL 12326	521124	4497157							I		16704	99				S	03/26/1971	05/31/1948	0.22	C	E169
12328			1		STEWART WELL 12328	521124	4497157							I		16704	148				S	03/26/1971	05/31/1948	0.33	C	E165
52345-F	3/12/1999	NP	1	01	BESS JERRY & JEANNIE	526667.5	4493000.8	S	0650W	070N	08	SE	NW	6	0	2003CW189	0	0	0	0						
52346-F	3/12/1999	NP	1	01	BESS JERRY & JEANNIE	526651.1	4492975.8	S	0650W	070N	08	SE	NW	6	0	2003CW189	0	0	0	0						
52347-F	3/12/1999	NP	1	01	BESS JERRY & JEANNIE	526624	4492927.3	S	0650W	070N	08	SE	NW	6	0	2003CW189	0	0	0	0						
52348-F	3/12/1999	NP	1	01	BESS JERRY & JEANNIE	526575.3	4492852.8	S	0650W	070N	08	SE	NW	6	0	2003CW189	0	0	0	0						
52349-F	3/12/1999	NP	1	01	BESS JERRY & JEANNIE	526554	4492814.8	S	0650W	070N	08	SE	NW	6	0	2003CW189	0	0	0	0						
25434-F			1	01	SAUTER JR J. RALPH A.	520885.8	4500376.9	S	0660W	080N	23	NW	NW	1	63	80 CW 255	194	40	25	25	S,C	12/31/1980	01/01/1930	0.44	C	89CW017
25433-F			1	01	SAUTER JR J. RALPH A. .	520828.2	4500374.9	S	0660W	080N	23	NW	NW	1	63	80 CW 255	115	40	24	25						MADE ABS 04/25/1985
25436-FR	2/23/1989	NP	1	01	SAUTER J RALPH JR	521039.6	4500382.9	S	0660W	080N	23	NW	NW	1	60	80CW 255	100	60	0	80						ACRE FEET COMBINED WITH OTHER WELLS
25435-FR	7/6/1981	NP	1	01	MENDELL C.E.	521012.3	4500198.4	S	0660W	080N	23	NW	NW	1	0	80CW255	142	45	23	0						
25435-F			1	01	MENDELL CLARENCE E. & RUBY E.	520973.8	4500380.4	S	0660W	080N	23	NW	NW	1	0	80CW255	0	40	0	0	S,C	12/31/1980	01/01/1930	0.33	C	89CW017
25436-F			1	01	MENDELL CLARENCE E. & RUBY E.	521039.6	4500382.9	S	0660W	080N	23	NW	NW	1	0	80CW255	0	40	0	0	S,C	12/31/1980	01/01/1930	0.33	C	89CW017
25434-FR	12/6/1995	NP	1	02	SAUTER J RALPH A JR	520919.4	4500359.9	S	0660W	080N	23	NW	NW	1	0	80CW255	138	45	23	0						
25436-FR	12/6/1995	NP	1	02	SAUTER J RALPH A JR	521047	4500364.4	S	0660W	080N	23	NW	NW	1	0	80CW255	180	45	23	0						
42164	7/17/1970	NP	1	01	ALIND CATTLE COMPANY	502975.9	4529778.9	S	0680W	110N	14	SE	NE	IM	0	81CW208	800	64	35	0	O,C,AP	12/31/1972	02/21/1951	0.268	C	ALT PT TO BUSTEED WELL 8-15888R
15888-R			1	01	AMERICAS PUREWATER INC	502571.3	4529375.9	S	0680W	110N	14	SE	SW	1	0	81CW208	120	29	21	0	O,C,AP	12/31/1972	09/15/1969	2.44	C	ALT PT TO BUSTEED WELL 2-14263F
14262-F			1	01	AMERICAS PUREWATER INC	502305.2	4529891.9	S	0680W	110N	14	SE	NW	1	0	81CW208	900	74	28	0	O,AP	12/31/1972	09/15/1969	2.444	C	ALT PT TO BUSTEED WELL 8-15888R
14263-F	8/15/1969	NP	1	03	NAUGHTON GROUP DBA PURE CO INC	501960.4	4530377.4	S	0680W	110N	14	NW		1	0	81CW208	1100	95	41	0	O,AP	12/31/1972	02/21/1951	0.268	C	ALT PT TO BUSTEED WELL 8-15888R
89412	3/17/1977	NP	1	01	TOLLE L	510141.6	4520964.5	S	0670W	100N	15	NW	NE	8	0	82CW008	0	0	0	0	S	12/31/1982	05/15/1980	0.016	C	
9675-F			1	03	MARTINEZ TRINIDAD	520613.7	4497445.9	S	0660W	080N	27	SE	SE	1	0	85CW193	140	35	21	0	S	12/31/1985	06/22/1965	0.24	C	LTD TO IRR 15 ACRES IN SEC 27
34407-F	9/21/1987	NP	1	01	UNION PACIFIC R R / PIERCE TOWN OF	520920.1	4498460.9	S	0660W	080N	26	NW	NW	2	0	87 CW 299	199	43	0	0						A field inspection performed by Mark Simpson on 19 July 2001 gave a
4768			1		L G EVERIST CARR W 4768	505072	4528672							C		94CW213	200				S	12/31/1994	07/31/1963	0.4456	C	LTD 80AF PER YR
52421-F	8/10/1999	SA	1	01	LG EVERIST INC	505153.1	4528594.3	S	0670W	110N	19	NW	SW	4	0	94CW213	0	0	0	0						dust control and aggregate production, Andesite Rock Company SSP
46182-FR	1/30/1996	NP	1	01	FABRIZIUS LOUIE S GINA D	528126.2	4490734.2	S	0650W	070N	21	NE	NW	1	0	CA11217	200	23	5	0						
53731-FR	4/29/2005	NP	1	01	FABRIZIUS LOUIE S GINA D	528199.4	4490734	S	0650W	070N	21	NE	NW	1	0	CA11217	350	25	12	0						This is a pond thus no well construction report is required. The re
25438-F		NP	1	01	MACKEY GARY VICKY BRYON & JAMIE	524176.7	4495668.3	S	0650W	070N	06	NW	NW	1	0	CA11217	202	33	0	0						
25442-FR	7/21/1981	NP	1	01	MACKEY GARY VICKY BRYON & JAMIE	524053.6	4495256.3	S	0650W	070N	06	NW	SW	1	0	CA11217	350	41	19	0						
10529-R		NP	1	01	PETERSON ARTHUR R & JUDITH T TRUST	528293.8	4490572.2	S	0650W	070N	21	NE	NW	1	0	CA11217	150	28	9	0						THIS WELL TO BE USED IN COMBINATION WITH 53731-F FOR IRRIGATION OF
23278-F		NP	1	01	PETERSON TRUST ARTHUR & JUDITH	528092.4	4490733.2	S	0650W	070N	21	NE	NW	1	0	CA11217	498	28	0	0						THIS WELL TO BE USED IN COMBINATION WITH 53731-F FOR IRRIGATION OF
359-RD			1	01	GEIB EVELYN & MELVIN	521809.3	4499457.4	S	0660W	080N	23	SE	NW	1	0	CA-11217	1000	32	0	0						
333-RDA			1	01	GEIB MELVIN & EVELYN	521809.3	4499457.4	S	0660W	080N	23	SE	NW	1	0	CA-11217	148	32	28	0						
333-RD			1	01	GEIB MELVIN & EVELYN	521809.3	4499457.4	S	0660W	080N	23	SE	NW	1	0	CA-11217	150	32	28	0						
333-RDB			1	01	GEIB MELVIN & EVELYN	521809.3	4499457.4	S	0660W	080N	23	SE	NW	1	0	CA-11217	150	32	28	0						
333-RDC			1	01	GEIB MELVIN & EVELYN	521809.3	4499457.4	S	0660W	080N	23	SE	NW	1	0	CA-11217	150	32	28	0						
342-RD			1	01	HENDERSON HARVEY & VIRGINIA	527898.6	4490579.2	S	0650W	070N	21	NW	NE	1	0	CA-11217	150	25	12	0						
342-RDAR			1	01	HENDERSON VIRGINIA J	528050.1	4490750.7	S	0650W	070N	21	NW	NE	1	0	CA-11217	250	26	15	160						
9-RDBR			1	01	LEBSACK HAROLD	521068.4	4498829.4	S	0660W	080N	26	NW	NW	1	0	CA-11217	297	34	22	61						
354-RD			1	01	SALBERG F OSCAR & JEANNETTE	526704.3	4493410.8	S	0650W	070N	08	NE	SW	1	0	CA-11217	0	0	0	0						
100-RDA			1	01	SALBERG F OSCAR & JEANNETTE	526704.3	4493410.8	S	0650W	070N	08	NE	SW	1	0	CA-11217	300	22	5	0						
121-RD			1	01	VENABLE OLIN W	521407.4	4498663.9	S	0660W	080N	26	NW	NE	1	0	CA-11217	300	28	17	0						
9-RDA			1	01	VENABLE OLIN W	521003.7	4498648.9	S	0660W	080N	26	NW	NW	1	0	CA-11217	300	28	17	0						
9-RDCR			1	01	VENABLE OLIN W	521002.9	4499041.4	S	0660W	080N	23	SW	SW	1	0	CA-11217	300	40	26	0						
14581-R			1	01	WILKINSON GEORGE A	520220.4	4504847	S	0660W	080N	03	NE	NW	1	0	W 122	500	19	9	0	O	12/31/1970	12/31/1944	0.89	C	TWO WELL SYSTEM
14355			1		EICHHEIM BATTERY 1-14355	515603	4509444							I		W 268	399				O	12/31/1970	05/31/1954	0.89	C	4 WELLS
14356			1		EICHHEIM BATTERY 2-14356	515603	4509444							I		W 268	123				O	12/31/1970	12/31/1918	0.275	C	1 WELL
14357			1		EICHHEIM BATTERY 3-14357	515603	4509444							I		W 268	197				O	12/31/1970	05/31/1938	0.44	C	2 WELLS
14358			1		EICHHEIM BATTERY 4-14358	515603	4509444							I		W 268	597				O	12/31/1970	12/31/1918	1.33	C	1 WELL
14359			1		EICHHEIM BATTERY 5-14359	515401	4509652							I		W 268	637				O	12/31/1970	11/30/1954	1.42	C	8 WELLS
14360			1		EICHHEIM BATTERY 6-14360	514802	4511093							I		W 268	476				O	12/31/1970	12/31/1956	1.06	C	8 WELLS
14361			1		EICHHEIM BATTERY 7-14361	513985	4512711							I		W 268	350				O	12/31/1970	12/31/1914	0.78	C	7 WELLS
11304			1		JONES WELL 11304	519584	4498850							I		W 296	399				O	12/31/1970	12/31/1942	0.89	C	
11305			1		JONES WELL 11305	519434	4499334							I		W 296	206				O	12/31/1970	12/31/1954	0.46	C	
12869			1		BATMAN WELL 12869	521590	4497283							I		W 302	148				O	12/31/1970	04/18/1940	0.33	C	
12870			1		BATMAN WELL 12870	521552	4497284							I		W 302	148				O	12/31/1970	05/01/1940	0.33	C	
4877-F			1	01	US FHA	521811	4498679.4	S	0660W	080N	26	NE	NW	1	0	W 302	900	27	14	0	O	12/31/1970	12/31/1964	2	C	
NA			1		SCHOOL RE-9 WELL 2	520701	4498740							I		W 331	100				O	12/31/1970	05/15/1950	0.2222	C	
12157-F	5/15/1967	NP	1	01	SCHELLER SAM L & RUBY	519408.2	4502538.5	S	0660W	080N	10	SW	NW	1	0	W 406	400	34	14	0	O	12/31/1970	08/04/1952	0.89	C	
12746			1		SCHELLER WELL 1-12746	519308	4502636							I		W 406	139				O	12/31/1970	12/31/1939	0.31	C	
12747			1		SCHELLER WELL 2-12747	519509	4502638							I		W 406	301				O	12/31/1970	12/31/1939	0.67	C	
12748			1		SCHELLER WELL 3-12748	519509	4502638							I		W 406	197				O	12/31/1970	12/31/1939	0.44	C	
12749			1		SCHELLER WELL 4-12749	519509	4502638							I		W 406	148				O	12/31/1970	12/31/1935	0.33	C	
12750			1		SCHELLER WELL 5-12750	519709	4502640							I		W 406	148				O	12/31/1970	12/31/1935	0.33	C	
6936			1		PETERSON WELL 6936	520403	4498442							I		W 457	498				O	12/31/1971	05/01/1955	1.11	C	
12686-F			1	03	HAWKINS ROY I & RUTH	520609.7	4497844.4	S	0660W	080N	27	SE	NE	1	0	W 472	200	42	25	0	O	12/31/1971	05/31/1950	0.445	C	
3486-F			1		MORITA WELL 1-3486-F	521489	4496880							I		W 587	175				O	12/31/1971	12/31/1940	0.39	C	
3487			1		MORITA WELL 2-3487	521419	4496935							I		W 587	184				O	12/31/1971	05/11/1942	0.41	C	
3488			1		MORITA WELL 3-3488	521510	4496952							I		W 587	238				O	12/31/1971	04/07/1952	0.53	C	
10059			1		BROWN WELL 1-10059	526600	4492307							I		W 757	99				O	12/31/1971	06/30/1955	0.22	C	
10060			1		BROWN WELL 2-10060	526800	4492301							I		W 757	99				O	12/31/1971	06/30/1955	0.22	C	
10061			1		BROWN WELL 3-10061	526800	4492301							I		W 757	117				O	12/31/1971	06/30/1955	0.26	C	
10062			1		BROWN WELL 4-10062	526800	4492301							I		W 757	99				O	12/31/1971	08/31/1955	0.22	C	
10063			1		BROWN WELL 5-10063	526800	4492301							I		W 757	117				O	12/31/1971	08/31/1955	0.26	C	
6563-F	12/16/1964	NP	1	01	DEHAAN MARGARET J	526699.9	4492203.5	S	0650W	070N	17	NE	NW	1	0	W 757	300	21	6	0	O	12/31/1971	01/10/1965	0.29	C	
8700-R			1		KINOSHITA WELL 1-R-8700	526841	4493931							I		W 788	1019				O	12/31/1971	10/04/1905	2.27	C	
NA			1		LEMONDS WELL 1	520163	4505136							I		W 1025	126				O	12/31/1971	04/30/1910	0.28	C	
1577			1		DEANE WELL 1-1577	524854	4494058							I		W 1083	404				O	12/31/1971	04/15/1933	0.9	C	
1578			1		DEANE WELL 2-1578	524854	4493974							I		W 1083	296				O	12/31/1971	04/01/1934	0.66	C	
1579			1		DEANE WELL 3-1579	524854	4493894							I		W 1083	301				O	12/31/1971	04/01/1934	0.67	C	
13989			1		146 CO WELL 1-13989	524038	4494902							I		W 1360	249				O	12/31/1971	05/15/1937	0.555	C	
13990			1		146 CO WELL 2-13990	524006	4494902							I		W 1360	149				O	12/31/1971	05/15/1937	0.333	C	
26543			1	3	MEADOW SP WELL 1- 26543	502873.0	4531091.0														O	12/31/1971	03/31/1971	0.010	C	
26538			1	01	MEADOW SPRINGS ASSOC	504948.2	4524165.2	S	0670W	100N	06	NW	NW	9	0	W 1410	15	316	30	0	O	12/31/1971	03/31/1966	0.01	C	
26537			1	01	MEADOW SPRINGS ASSOC	504961.2	4522530.7	S	0670W	100N	07	NW	NW	9	0	W 1411	6	322	170	0	O	12/31/1971	03/31/1966	0.007	C	
26536			1	01	MEADOW SPRINGS ASSOC	507307	4526974.8	S	0670W	110N	29	NE	SW	9	0	W 1411	15	251	90	0	O	12/31/1971	03/31/1966	0.01	C	

Permit #	ACTDATE	ACTCODE	DIV	WD	NAME	UTM_X	UTM_Y	PM	RANGE	TOWNSHIP	SECTION	QTR160	QTR40	USECODE	ACREFT	CASENO	YIELD	DEPTH	LEVEL	ACREIRR	ADJTYPE	ADJDATE	APRODATE	DCRAMT	DCRUNITS	COMMENTS
NA			1		MEADOW SP WELL 11	504584	4527374							S		W 1413	4				O	12/31/1971	06/01/1940	0.009	C	
NA			1		MEADOW SP WELL 13	500555	4532610							S		W 1413	4				O	12/31/1971	06/01/1940	0.009	C	
26549			1	01	MEADOW SPRINGS ASSOC- well 2	503382.7	4526178.8	S	0680W	110N	25	SW	SW	9	0	W 1413	10	510	160	0	O	12/31/1971	03/31/1966	0.007	C	
26548			1	01	MEADOW SPRINGS ASSOC- Well 9	502977.7	4528577.9	S	0680W	110N	23	NE	SE	9	0	W 1413	15	45	25	0	O	12/31/1971	03/31/1966	0.01	C	
4148-F			1		KINDSFATHER WELL 1-4148F	523334	4495596							I		W 1676	498				O	12/31/1971	05/01/1925	1.11	C	
4106-F	4/22/1963	NP	1	01	THORNTON CITY OF	523435	4495496.3	S	0660W	070N	01	NE	NW	1	0	W 1676	250	30	16	0	O	12/31/1971	05/01/1925	0.6	C	
4147-F	5/13/1963	NP	1	01	THORNTON CITY OF	523435	4495496.3	S	0660W	070N	01	NE	NW	1	0	W 1676	500	29	0	0	O	12/31/1971	05/01/1925	1.11	C	AMOUNT 2.22 CFS SHARED WITH WELL 1-4148F
6765			1		AKAHOSHI WELL 6-6765	527403	4492081							I		W 1677	226				O	12/31/1971	05/19/1955	0.503	C	
2693-F	8/8/1960	NP	1	01	RUHL AL & ELAINE TRUST	527503.7	4492178.8	S	0650W	070N	16	NW	NW	1	0	W 1677	250	53	13	0	O	12/31/1971	08/08/1960	0.555	C	
18854			1		SPRING CREEK SUMP 18854	508031	4523449							IDS		W 2199	449				S	12/31/1972	09/30/1936	1	C	IRR OF 50 ACRES
NA			1		SPRING CREEK WELL 1	508054	4522233							S		W 2199	1131				O	12/31/1972	12/31/1934	2.52	C	
NA			1		SPRING CREEK WELL 2	509453	4519443							D		W 2199	754				O	12/31/1972	12/31/1940	1.68	C	
NA			1		SPRING CREEK WELL 3	508252	4522842							S		W 2199	754				O	12/31/1972	12/31/1934	1.68	C	
NA			1		SPRING CREEK WELL 4	507858	4522840							S		W 2199	1131				O	12/31/1972	12/31/1942	2.52	C	
NA			1		SPRING CREEK WELL 5	505628	4525273							S		W 2199	1319				O	12/31/1972	08/31/1951	2.94	C	
NA			1		SPRING CREEK WELL 7	507861	4522637							DS		W 2199	40				O	12/31/1972	12/31/1952	0.089	C	
NA			1		SPRING CREEK WELL 8	507861	4522637							DS		W 2199	35				O	12/31/1972	12/31/1952	0.078	C	
NA			1		STEVENS WELL 1 SUMP	526808	4494114							I		W 2278	399				O	12/31/1972	10/31/1967	0.888	C	ADD SOURCE
20914			1		STEVENS WELL 2-20914	526808	4494114							D		W 2278	24				O	12/31/1972	12/31/1964	0.053	C	
4312-F			1	01	TROUDT ALBERT	524244.6	4496288.8	S	0650W	080N	31	SW	NW	1	0	W 2293	300	33	0	0	O	12/31/1972	06/15/1963	0.888	C	
NA			1		TROUDT WELL 2	524147	4495195							S		W 2293	30				O	12/31/1972	12/31/1919	0.066	C	
NA			1		TROUDT WELL 3	524147	4495195							D		W 2293	30				O	12/31/1972	12/31/1919	0.066	C	
5810			1		STUEHM WELL 4-5810	524153	4494387							I		W 2425	637				O	12/31/1972	12/31/1942	1.42	C	
5811			1		STUEHM WELL 5-5811	524153	4494387							I		W 2425	199				O	12/31/1972	12/31/1921	0.444	C	
5812			1		STUEHM WELL 6-5812	524053	4494850							I		W 2425	324				O	12/31/1972	12/31/1943	0.722	C	
5813			1		STUEHM WELL 7-5813	524151	4494589							I		W 2425	224				O	12/31/1972	12/31/1950	0.5	C	
NA			1		HIGHLAND WELL 4	520912	4497948							D		W 2445	149				O	12/31/1972	12/31/1943	0.333	C	
13615-F			1	01	WOODS AND DEFFKE	521014	4497851.9	S	0660W	080N	26	SW	NW	1	0	W 2445	250	43	27	0	O	12/31/1972	12/31/1945	0.555	C	HIGHLAND MOBILE HOME INC
13616-F			1	01	WOODS AND DEFFKE	521014	4497851.9	S	0660W	080N	26	SW	NW	1	0	W 2445	250	43	27	0	O	12/31/1972	12/31/1920	0.555	C	
13617-F			1	01	WOODS AND DEFFKE	521014	4497851.9	S	0660W	080N	26	SW	NW	1	0	W 2445	250	43	27	0	O	12/31/1972	06/30/1951	0.555	C	
621			1		SAMESHIMA WELL 1-621	525797	4493937							I		W 2605	259				O	12/31/1972	05/31/1950	0.578	C	
622			1		SAMESHIMA WELL 2-622	525797	4493937							I		W 2605	234				O	12/31/1972	05/31/1950	0.522	C	
NA			1		SAMESHIMA WELL 4	525797	4493336							D		W 2605	10				O	12/31/1972	01/01/1925	0.022	C	
6856-F	2/16/1965	NP	1	01	THORNTON CITY OF	525898	4493834.3	S	0650W	070N	08	NW	NW	1	0	W 2605	250	27	6	0	O	12/31/1972	03/17/1965	0.489	C	
NA			1		BALMER WELL 2	513678	4514619							D		W 2644	10				O	12/31/1972	12/31/1934	0.022	C	COMBINED WITH W-8065
11633			1		DYER WELL 1-11633	524023	4495987							I		W 2743	148				O	12/31/1972	06/20/1931	0.33	C	
11634			1		DYER WELL 2-11634	523952	4495986							I		W 2743	197				O	12/31/1972	06/20/1932	0.44	C	
11635			1		DYER WELL 3-11635	523873	4495986							I		W 2743	197				O	12/31/1972	06/20/1932	0.44	C	
11636			1		DYER WELL 4-11636	524022	4496272							I		W 2743	197				O	12/31/1972	05/05/1956	0.44	C	
NA			1		TATEYAMA WELL 6	527396	4492776							S		W 2923	25				O	12/31/1972	12/31/1929	0.055	C	
NA			1		TATEYAMA WELL 7	527336	4492795							D		W 2923	25				O	12/31/1972	12/31/1929	0.055	C	
5166-F			1		TATEYAMA WELL 8-5166-F	527314	4493039							I		W 2923	149				O	12/31/1972	12/31/1964	0.333	C	
5165-F			1		TATEYAMA WELL 9-5165-F	527313	4493000							I		W 2923	149				O	12/31/1972	12/31/1964	0.333	C	
10939-F			1	01	CHEVRON OIL COMPANY	520605.4	4499421.4	S	0660W	080N	22	SE	NE	4	0	W 2953	225	40	23	0	O,CA	12/31/1970	05/16/1966	0.23	C	MADE ABS 09/30/1975
10940-F			1	01	CHEVRON OIL COMPANY	520610.7	4500587.9	S	0660W	080N	15	SE	SE	4	0	W 2953	225	36	21	0	O,CA	12/31/1970	05/16/1966	0.23	C	MADE ABS 09/30/1975
12286-F			1	01	ISAKSON ROBERT D	521626.2	4498261.4	S	0660W	080N	26	NE	SW	4	0	W 2953	100	32	17	0	O,CA	12/31/1970	09/05/1967	0.23	C	MADE ABS 09/30/1975
NA			1		QUAYLE WELL 1	525802	4495749							D		W 3216	20				O	12/31/1972	12/31/1909	0.044	C	
NA			1		BETTGER WELL 1	520500	4498740							D		W 3225	16				O	12/31/1972	12/31/1910	0.0355	C	
NA			1		SCHROEDER WELL 1	511064	4518244							ID		W 3287	15				O	12/31/1972	06/30/1971	0.033	C	LAWN AND GARDEN IRR
NA			1		SCHROEDER WELL 3	510865	4518242							ID		W 3287	15				O	12/31/1972	07/31/1935	0.033	C	LAWN AND GARDEN IRR
NA			1		SCHROEDER WELL 4	510055	4519448							ID		W 3287	15				O	12/31/1972	08/31/1925	0.033	C	LAWN AND GARDEN IRR
NA			1		LEBSACK WELL 1	522355	4497835							I		W 3372	197				O	12/31/1972	01/08/1957	0.438	C	
NA			1		LEBSACK WELL 2	520907	4498346							D		W 3372	12				O	12/31/1972	12/31/1906	0.027	C	
NA			1		ERFERT WELL 1	525717	4495665							I		W 3373	114				O	12/31/1972	12/31/1927	0.255	C	
NA			1		DUVALL PUMP SYS	520505	4499520							I		W 3390	449				O	12/31/1972	12/31/1908	1	C	
13429-F			1	01	NORTHERN COLO WATER ASSOCIA	502976.4	4529374.9	S	0680W	110N	14	SE	SE	2	0	W 3626	450	51	29	0	O	12/31/1972	05/09/1969	0.8	C	
4862-F			1	01	NORTHERN COLORADO WATER ASSOCIATION	503028.7	4529641.9	S	0680W	110N	14	NW	SW	2	0	W 3626	450	51	23	0	O	12/31/1972	08/10/1964	0.95	C	
4590			1		WOLF WELL 1-4590	524019	4496650							I		W 3668	249				O	12/31/1972	12/31/1953	0.555	C	
4591			1		WOLF WELL 4591	524020	4496722							I		W 3668	249				O	12/31/1972	12/31/1953	0.555	C	
4592			1		WOLF WELL 4592	524021	4496832							I		W 3668	249				O	12/31/1972	12/31/1953	0.555	C	
NA			1		AKAHOSHI WELL 1	527841	4491488							I		W 3669	498				O	12/31/1972	04/19/1972	1.11	C	
NA			1		JOHNSON WELL 1	511452	4521062							D		W 3671	10				O	12/31/1972	12/31/1909	0.022	C	
NA			1		JOHNSON WELL 2	511452	4521062							D		W 3671	15				O	12/31/1972	12/31/1947	0.033	C	
12713-F			1	01	CHALK WINFORD	522625.1	4498296.9	S	0660W	080N	25	NW	SW	1	0	W 3737	250	28	7	0	O	12/31/1972	07/30/1968	0.66	C	IRR OF 30 ACRES
13801			1		PRIDDY WELL 13801	522396	4497768							ID		W 3870	197				O	12/31/1972	12/20/1908	0.44	C	IRR OF 10 ACRES LAWN GARDEN SHRUBS AND TREES
36246			1		ROMAN WELL 4-36246	501458	4530676							S		W 3875	13				O	12/31/1972	12/31/1964	0.03	C	
56038	3/27/1972	NP	1	01	PETTIT LEE F	520734.1	4498589.9	S	0660W	080N	27	NE	NE	8	0	W 3939	15	35	26	0	O	12/31/1971	05/29/1971	0.03	C	
NA			1		SIDWELL WELL 5	515300	4508947							D		W 3951	9				O	12/31/1972	05/30/1930	0.02	C	
12117			1		BARNES WELL 1-12117	514495	4512411							I		W 4247	90				O	12/31/1972	04/30/1952	0.2	C	
12118			1		BARNES WELL 2-12118	514495	4512411							I		W 4247	90				O	12/31/1972	04/30/1952	0.2	C	
12119			1		BARNES WELL 3-12119	514497	4512010							I		W 4247	90				O	12/31/1972	04/30/1952	0.2	C	
12120			1		BARNES WELL 4-12120	514497	4512010							I		W 4247	90				O	12/31/1972	04/30/1952	0.2	C	
NA			1		BARNES WELL 5	515112	4512199							I		W 4247	135				O	12/31/1972	04/15/1955	0.3	C	
NA			1		QUAYLE WELL 1	525802	4495749							D		W 4357	25				O	12/31/1972	12/31/1907	0.0556	C	
NA			1		WIDMAIER WELL 8	525388	4493949							D		W 4373	10				O	12/31/1972	12/31/1945	0.022	C	
NA			1		WIDMAIER WELL 9	524976	4494363							D		W 4373	12				O	12/31/1972	12/31/1950	0.026	C	
NA			1		RODENBAUGH WELL 1	512846	4521258							DS		W 4376	20				O	12/31/1972	12/31/1922	0.044	C	
12084-F	5/22/1967	NP	1	01	ALA FARMERS COOPERATIVE	522449.5	4497043.9	S	0660W	080N	36	NW	NW	1	0	W 4377	150	24	8	0	O	12/31/1972	05/20/1955	0.333	C	
12085-F	5/22/1967	NP	1	01	ALABAMA FARMERS COOPERATIVE	522453.7	4497098.9	S	0660W	080N	36	NW	NW	1	0	W 4377	250	24	8	0	O	12/31/1972	04/20/1955	0.555	C	
12086-F	6/7/1967	NP	1	01	ALABAMA FARMERS COOPERATIVE	523035.3	4496691.9	S	0660W	080N	36	NW	SE	1	0	W 4377	500	22	12	0	O	12/31/1972	05/15/1932	1.111	C	
NA			1		COLO STATE WELL 5	522495	4497180							D		W 4377	15				O	12/31/1972	05/10/1925	0.033	C	
11545			1		TATEYAMA WELL 1-11545	526400	4492716							I		W 4378	100				O,CA	12/31/1972	06/30/1940	0.222	C	MADE ABS 04/16/1980
NA			1		TATEYAMA WELL 2	526400	4492716							I		W 4378	100				O	12/31/1972	06/30/1940	0.222	C	
NA			1		TATEYAMA WELL 3	526518	4493783							ID		W 4378	100				O	12/31/1972	06/30/1940	0.222	C	
11546			1		TATEYAMA WELL 4-11546	526400	4492917							I		W 4378	149				O	12/31/1972	05/30/1955	0.333	C	
11547			1		TATEYAMA WELL 5-11547	525998	4492729							I		W 4378	149				O	12/31/1972	05/30/1955	0.333	C	
11548			1		TATEYAMA WELL 6-11548	526601	4492710							I		W 4378	149				O	12/31/1972	06/25/1945	0.333	C	
11549			1		TATEYAMA WELL 7-11549	526602	4493112							I		W 4378	149				O	12/31/1972	08/30/1950	0.333	C	
11550			1		TATEYAMA WELL 8-11550	526602	4492911							I		W 4378	149				O	12/31/1972	08/30/1950	0.333	C	
11551			1		TATEYAMA WELL 9-11551	526602	4492911							I		W 4378	149				O	12/31/1972	08/30/1950	0.333	C	
NA			1		SHAULL WELL 1	518749	4505342							ID		W 4988	15				O	12/31/1972	05/31/1930	0.033	C	
NA			1		LESH WELL 1	517494	4502640							IDS		W 5167	35				O	12/31/1972	12/31/1948	0.077	C	
NA			1		LESH WELL 2	517494	4502640							IDS		W 5167	39				O	12/31/1972	12/31/1941	0.088	C	
NA			1		LESH WELL 3	515929	4504950							IDS		W 5167	39				O	12/31/1972	12/31/1941	0.088	C	
NA			1		LESH WELL 4	515673	4502464							IDS		W 5167	35				O	12/31/1972	12/31/1962	0.077	C	
NA			1		LESH WELL 7	520300	4498739							IDS		W 5169	39				O	12/31/1972	12/31/1908	0.088	C	
NA			1		VAN WHY WELL 1	520703	4498541							D		W 5187	10				O	12/31/1972	10/31/1949	0.022	C	
1489			1		KLEBER WELL 1-1489	527459	4492385							I		W 5190	498				O	12/31/1972	08/10/1940	1.11	C	
1491			1		KLEBER WELL 3-1491	527313	4492405							I		W 5190	390				O	12/31/1972	07/08/1950	0.87	C	
1492			1		KLEBER WELL 4-1492	527316	4492519							I		W 5190	174				O	12/31/1972	04/05/1955	0.388	C	
36827			1		DIEHL WELL 4-36827	508875	4516226							S		W 5326	8				O	12/31/1972	03/21/1969	0.018	C	
NA			1		DIEHL WELL 1	510852	4520662							I		W 5327	597				O	12/31/1972	12/31/1940	1.33	C	
NA			1		DIEHL WELL 2	507258	4518212							S		W 5327	5				O	12/31/1972	12/31/1950	0.011	C	
NA			1		DIEHL WELL 3	511256	4520058							S		W 5327	10				O	12/31/1972	12/31/1922	0.022	C	
40350			1		HUTCHINSON WELL 2-P40350	512668	4517216							S		W 5605	10				O	12/31/1972	02/10/1970	0.0222	C	
82298			1		HUTCHINSON WELL 3-82298	512669	4516610							S		W 5605	0				O	12/31/1972	01/01/1930	0.0011	C	
82299	1/19/1976	NP	1	01	HUTCHISON THELMA	513457.9	4518798.9	S	0670W	100N	24	NW	SE	89	0	W 5605	0.5	0	0	0	O	12/31/1972	01/01/1930	0.0111	C	
82294			1	01	HUTCHISON THELMA	512756.3	4516280.9	S	0670W	100N	35	NE	NE	9	0	W 5605	10	0	0	0	O	12/31/1972	01/01/1950	0.0222	C	
82295			1	01	HUTCHISON THELMA	512748.1	4516254.9	S	0670W	100N	35	NE	NE	9	0	W 5605	10	0	0	0	O	12/31/1972	01/01/1950	0.0222	C	
82297			1	01	HUTCHISON THELMA	512710.4	4516239.9	S	0670W	100N	35	NE	NE	9	0	W 5605	10	0	0	0	O	12/31/1972	01/01/1950	0.0222	C	
82296			1	01	HUTCHISON THELMA	512741.1	4516250.9	S	0670W	100N	35	NE	NE	S	0	W 5605	10	0	0	0	O	12/31/1972	01/01/1950	0.0222	C	

Basin-Wide Well List

Permit #	ACTDATE	ACTCODE	DIV	WD	NAME	UTM_X	UTM_Y	PM	RANGE	TOWNSHIP	SECTION	QTR160	QTR40	USECODE	ACREFT	CASENO	YIELD	DEPTH	LEVEL	ACREIRR	ADJTYPE	ADJDATE	APRODATE	DCRAMT	DCRUNITS	COMMENTS
NA			1		GEIB WELL 5	520710	4497944							I		W 5666	35				O	12/31/1972	06/01/1954	0.0777	C	
13109			1		NUNN WELL 1-R13109	518138	4505540							M		W 5844	103				O	12/31/1972	09/01/1949	0.23	C	
13110			1		NUNN WELL 2-R13110	517934	4505539							M		W 5844	103				O	12/31/1972	09/03/1921	0.23	C	
47853			1	01	THREE PEAKS WATER INC	503782.5	4528574.4	S	0680W	110N	24	NW	SE	IS	0	W 5909	15	41	21	0	O	12/31/1972	08/03/1971	0.0333	C	
15887			1		BUSTEED WELL 10-15887	503682	4529272							IS		W 5910	249				O	12/31/1972	02/24/1951	0.555	C	
52164			1		BUSTEED WELL NO 5-42164	502875	4529678							IS		W 5910	20				O	12/31/1972	07/17/1970	0.0446	C	
39645			1		BUSTEED WELL NO 7-39645	500859	4531492							IS		W 5910	10				O	12/31/1972	10/21/1969	0.022	C	
15562-F	7/17/1970	NP	1	01	THREE PEAKS WATER INC	503984.4	4528761.4	S	0680W	110N	24	NW	SE	1	0	W 5910	250	41	21	0	O,C	12/31/1972	05/03/1971	0.555	C	84CW677
15886-R			1	01	THREE PEAKS WATER INC	502975.9	4529778.9	S	0680W	110N	14	SE	NE	1	0	W 5910	300	50	25	0	O	12/31/1972	02/21/1951	0.667	C	
14293-F			1	01	THREE PEAKS WATER INC	504782.7	4528515.3	S	0680W	110N	24	NE	SE	1	0	W 5910	720	39	11	0	O,C	12/31/1972	02/04/1970	1.6	C	84CW677
14944			1		PIERCE TOWN WELL 1-14944	520705	4498342							M		W 6096	174				O	12/31/1972	08/15/1953	0.388	C	
14943			1		PIERCE TOWN WELL 2-14943	520703	4498541							M		W 6096	279				O	12/31/1972	06/30/1921	0.622	C	
857-RF			1		PIERCE TOWN WELL 3-RF857	521111	4498154							M		W 6096	135				O	12/31/1972	12/31/1924	0.3	C	
34407			1		PIERCE TOWN WELL 4-34407	520904	4498545							M		W 6096	199				O	12/31/1972	12/31/1920	0.444	C	87CW299 LOC CORR
NA			1		I R BOOTH & SON WELL 10	525997	4492327							S		W 6164	20				O	12/31/1972	06/01/1957	0.044	C	
NA			1		I R BOOTH & SON WELL 7	525997	4492327							S		W 6164	29				O	12/31/1972	05/01/1954	0.064	C	
NA			1		I R BOOTH & SON WELL 8	525997	4492327							S		W 6164	20				O	12/31/1972	05/15/1955	0.044	C	
NA			1		I R BOOTH & SON WELL 9	525997	4492327							S		W 6164	20				O	12/31/1972	06/01/1957	0.044	C	
62185	6/13/1972		1	01	GIFFIN MURRAY E	517964.1	4505751.1	S	0660W	090N	33	SW	NW	1	0	W 6959	18	0	0	2	S	12/31/1972	06/01/1961	0.04	C	
NA			1		HABERMAN WELL 1	517529	4505924							IDS		W 7305	2				S	12/31/1973	07/01/1907	0.005	C	
NA			1		HABERMAN WELL 2	517529	4505924							IDS		W 7305	2				S	12/31/1973	10/15/1944	0.004	C	
14913			1		NOAH WELL 14913	509586	4518742							I		W 7372	197				S	12/31/1973	06/21/1940	0.44	C	
6747			1		SALBERG WELL 6747	527304	4493030							I		W 7421	299				S	12/31/1973	03/15/1957	0.666	C	
15125			1		BALMER WELL 1-15125	512870	4514217							IS		W 8065	449				O	12/31/1972	12/31/1939	1	C	W-2644 AMT CORR
12746-RR	3/4/1991	NP	1	01	SCHELLER SHARON R	519226.5	4502742	S	0660W	080N	10	SW	NW	1	0	W0406	150	43	22	0						
12685-F	11/21/1967	NP	1	03	PIERCE TOWN OF	520609.7	4497844.5	S	0660W	080N	27	SE	NE	2	0	W0472	200	41	25	0	O	12/31/1971	05/31/1950	0.44	C	PERMIT #12685-F-R ISSUED 6-10-1976, REPL WELL NOT CONST? WELL LOCAT
1620-RR	2/9/1977	NP	1	01	THORNTON CITY OF	521705	4496868.9	S	0660W	080N	35	NE	SW	1	0	W0623	0	41	0	0						
1620-R			1	01	THORNTON CITY OF	521829.8	4496676.9	S	0660W	080N	35	NE	SW	1	0	W0623	450	45	12	0						
8700-RR	6/22/2000	NP	1	08	BURD RICHARD	526168.6	4492507.8	S	0650W	070N	08	SW	SE	1	0	W0788	480	25	8	0						VARIANCE REQUEST NO. 2000-89A
4148-FR	1/24/2000	NP	1	01	THORNTON CITY OF	523248.4	4495509.8	S	0660W	070N	01	NE	NW	1	0	W1676	175	35	15	0						
5813-RR	3/13/1981	SA	1	01	THORNTON CITY OF	524061	4494568.8	S	0650W	070N	06	SW	NW	1	0	W2425	80	26	15	0						
5812-RR	5/4/1998	SA	1	01	THORNTON CITY OF UTILITIES DEPART	524058.5	4494870.8	S	0650W	070N	06	SW	NW	1	0	W2425	0	0	0	0						
13429-FR	5/18/1993	NP	1	03	NORTHERN COLO WATER ASSOC	503011.4	4529556.9	S	0680W	110N	14	SE	SE	3	0	W-3626	365	51	26	0						
12713-FR	4/27/1989	NP	1	01	NORTHERN FRONT RANGE FARMS	522530.4	4498108.4	S	0660W	080N	25	NW	SW	1	0	W3737	300	28	12	0						
13801-R	4/30/1960		1	01	GLOOR RUSSELL C & NANCY L	522395.9	4497768.4	S	0660W	080N	26	NW	NW	1	0	W3870	500	40	18	0						WELL LOC-608 1ST ST-PIERCE CO-80650
12083-F	5/22/1967	NP	1	01	ALABAMA FARMERS COOPERATIVE	522461.3	4497260.5	S	0660W	080N	36	NW	NW	1	0	W4377	500	20	17	0	O	12/31/1972	05/15/1930	1.111	C	No driller-dug for gravel originally. First use was sometime in 19
11546-RR	5/1/2002	NP	1	01	BESS JERRY T	526530.5	4492773.3	S	0650W	070N	08	SE	SW	1	0	W4378	0	0	0	160						INCLUDED IN THE CACHE LA POUDRE AUGMENTATION PLAN.
11547-R	4/4/1960	NP	1	01	BESS JERRY T & JEANNIE	526556.7	4492814.8	S	0650W	070N	08	SE	NW	1	0	W4378	150	24	0	0						USE OF THIS WELL EXPANDED FOR PISCATORIAL USE UNDER PERMIT NO. 5234
11547-RR	5/10/2002	NP	1	01	FABRIZIUS LOUIS SHERMAN & GINA D	526552.4	4492808.3	S	0650W	070N	08	SE	SW	1	0	W4378	0	0	0	160						
11546-R	4/4/1960	NP	1	01	FABRIZIUS LOUIS SHERMAN & GINA D	526624	4492927.3	S	0650W	070N	08	SE	NW	1	0	W4378	150	24	0	0						USE OF THIS WELL EXPANDED FOR PISCATORIAL USE UNDER PERMIT NO. 5234
11548-R	4/4/1960	NP	1	01	FABRIZIUS LOUIS SHERMAN & GINA D	526575.3	4492852.8	S	0650W	070N	08	SE	NW	1	0	W4378	150	24	0	0						USE OF THIS WELL EXPANDED FOR PISCATORIAL USE UNDER PERMIT NO. 5234
11550-R	4/4/1960	NP	1	01	FABRIZIUS LOUIS SHERMAN & GINA D	526667.5	4493000.8	S	0650W	070N	08	SE	NW	1	0	W4378	150	17	0	0						USE OF THIS WELL EXPANDED FOR PISCATORIAL USE UNDER PERMIT NO. 5234
11551-R	4/4/1960	NP	1	01	FABRIZIUS LOUIS SHERMAN & GINA D	526651.1	4492975.8	S	0650W	070N	08	SE	NW	1	0	W4378	150	17	0	0						USE OF THIS WELL EXPANDED FOR PISCATORIAL USE UNDER PERMIT NO. 5234
82285	1/19/1976	NP	1	01	RIVER VIEW ESTATES LLC	525653.6	4492956.8	S	0650W	070N	07	SE	NE	89	0	W5540	15	0	0	0	O	12/31/1972	06/30/1887	0.033	C	1ST USE JUNE 30 1887
50399-F	6/15/1998	NP	1	03	CASTLE ROCK CONST COMPANY	503895.8	4529185.4	S	0680W	110N	13	SW	SE	4	0	W5910	0	0	0	0						
50412-F	6/15/1998	NP	1	03	CASTLE ROCK CONST COMPANY	503087.3	4529781.9	S	0680W	110N	14	SE	NE	4	0	W5910	0	0	0	0						
42164-A	3/16/1973	NP	1	03	AMERICA'S PUREWATER INC	502880.2	4529721.9	S	0680W	110N	14	SE	NE	89L	0	W-5910	800	63	38	0						
14606-F	1/28/1970	NP	1	01	PIERCE TOWN OF	521053.1	4498306	S	0660W	080N	26	NW	SW	2	17	W6096	300	35	25	17						A field inspection performed by Mark Simpson on 19 July 2001 gave a
14943-F	1/28/1970	NP	1	01	PIERCE TOWN OF	520601.6	4498641	S	0660W	080N	27	NE	NE	2	0	W6096	300	35	0	0						A field inspection performed by Mark Simpson on 19 July 2001 gave a
14944-F	1/28/1970	NP	1	01	PIERCE TOWN OF	520605.6	4498242.5	S	0660W	080N	27	NE	SE	2	0	W6096	300	35	25	0						A field inspection performed by Mark Simpson on 19 July 2001 gave a
14913-R	4/30/1960	NP	1	01	MURRY DENNIS P & LAURA L	510962.6	4518545	S	0670W	100N	22	SE	NE	1	0	W7172	200	14	8	0						
236581	9/20/2001	NP	1	01	HESSE LAURIE R	517585.7	4505895.1	S	0660W	090N	32	NE	SE	8	0	W7305	1.8	36	0	1						register per decree; domestic, stock watering & lawn/garden irrigat
236580	9/20/2001	NP	1	01	HESSE LAURIE R	517537.3	4505925	S	0660W	090N	32	NE	SE	8	0	W7305	2.24	32	0	1						register per decree; domestic, stock watering & lawn/garden irrigat
191103	9/18/1995	NP	1	01	ADAMS SCOTT & SANDY	519151.7	4507014.1	S	0660W	090N	28	SE	SE	8 L	0		5	192	38	0						
13085-R			1	01	AKAHOSHI ROBERT	527503.7	4492178.8	S	0650W	070N	16	NW	NW	1	0		100	18	6	0						
6765-R	2/6/1959	NP	1	01	AKAHOSHI ROBERT	527503.7	4492178.8	S	0650W	070N	16	NW	NW	1	0		225	31	12	204						
13087-R			1	01	AKAHOSHI ROBERT	527503.7	4492178.8	S	0650W	070N	16	NW	NW	1	0		300	28	8	0						
244386	7/30/2002	NP	1	01	ANDERSON GORDON E	512693	4515801	S	0670W	100N	35	NE	SE	8 L	0		3	450	445	1						
10920-R			1	01	ANDRE ALICE & DURWARD ANNETTA & JOH	520605.4	4499421.4	S	0660W	080N	22	SE	NE	1	0		450	40	24	0						
244385	7/30/2002	NP	1	01	ARNOLD JAMES	512693.4	4515605.5	S	0670W	100N	35	NE	SE	H L	0		4	700	168	1						
271974	9/26/2006	NP	1	01	AYERS DIANA M	519355.8	4504947	S	0660W	080N	03	NW	NW	8 L	0		0	0	0	0						
267136	12/8/2005	NP	1	01	AYERS DIANA M	519909	4504945	S	0660W	080N	03	NW	NE	89L	0		0	0	0	1						
267137	12/8/2005	NP	1	01	AYERS DIANA M	519721.6	4504945.5	S	0660W	080N	03	NW	NE	89L	0		0	0	0	1						
267307	1/11/2005	NP	1	01	AYERS DIANA M	520721	4504539	S	0660W	080N	03	NE	SE	89L	0		0	0	0	1						
267308	1/11/2005	NP	1	01	AYERS DIANA M	520720.7	4504305	S	0660W	080N	03	NE	SE	89L	0		0	0	0	0						
271975	9/26/2006	NP	1	01	AYERS DIANA M	519515.8	4504946.5	S	0660W	080N	03	NW	NW	H L	0		0	0	0	0						
271617	11/17/2006	NP	1	03	AYERS DIANA M.	520705.2	4504138.5	S	0660W	080N	03	SE	NE	H	0		0	0	0	0						
100639	7/13/1978	NP	1	01	AYERS K EUGENE	517743.1	4505767.1	S	0660W	090N	33	SW	NW	8	2		5	30	14	1						
158923-A	11/16/1990	NP	1	01	AYERS K EUGENE	519166.3	4505771	S	0660W	090N	33	SE	NE	8	0		38	36	16	0						
158923	11/16/1990	NP	1	01	AYERS K EUGENE	518760.6	4505907.1	S	0660W	090N	33	NE	SW	8	3		48	38	0	0						
251487	6/20/2003	NP	1	03	AYERS K EUGENE & DIANA M	520705.1	4504138	S	0660W	080N	03	SE	NE	8	0		0	0	0	1						
232599	3/12/2001	NP	1	01	AYERS K EUGENE & DIANA M	520689	4503406.5	S	0660W	080N	10	NE	NE	8	0		8	420	100	1						EXT. REQUEST WAS SENT IN ON TIME. SEE FILE FOR THE CASHED CHECK & T
232600	3/12/2001	NP	1	01	AYERS K EUGENE & DIANA M	520689.2	4502846	S	0660W	080N	10	NE	SE	8	0		8	420	80	1						EXT. REQUEST WAS SENT IN ON TIME. SEE FILE FOR CASHED CHECK AND LET
251484	6/20/2003	NP	1	03	AYERS K EUGENE & DIANA M	520704.4	4503635.5	S	0660W	080N	03	SE	SE	8	0		12	510	200	1						
87462			1	01	BARNABY GALEN W	517674	4506150	S	0660W	090N	33	NW	SW	8	0		8	53	32	10						
235876	8/3/2001	NP	1	01	BARNES BOB	514278.5	4508340.2	S	0670W	090N	24	SE	SE	8	0		0	0	0	1						
237317	9/14/2001	NP	1	01	BARNES BOB	513501.1	4508403.2	S	0670W	090N	24	SW	SE	8	0		10	500	96	1						
199608	10/21/1996	NP	1	01	BARNES FAMRS INC	510406.5	4508370.7	S	0670W	090N	22	SE	SW	89L	0		10	400	280	0						
72617-A	10/13/1973	NP	1	01	BARNES FARMS INC	514031.9	4508309	S	0670W	090N	24	SE	SE	89	0		10	425	74	0						1ST REPLACEMENT
199607	10/21/1996	NP	1	01	BARNES FARMS INC	511089.1	4508363.2	S	0670W	090N	22	SE	SE	89L	0		10	406	175	0						
72617	10/24/1973	NP	1	01	BARNES FARMS INC	513852.1	4508319	S	0670W	090N	24	SE	SW	89	0		15	100	0	320						
12117-R			1	01	BARNES OSCAR A	514597.5	4512509.2	S	0660W	090N	07	NW	SW	1	0		100	34	24	0						
12118-R			1	01	BARNES OSCAR A	514597.5	4512509.2	S	0660W	090N	07	NW	SW	1	0		100	34	24	0						
12119-R			1	01	BARNES OSCAR A	514599	4512107.7	S	0660W	090N	07	SW	NW	1	0		100	32	22	0						
12120-R			1	01	BARNES OSCAR A	514599	4512107.7	S	0660W	090N	07	SW	NW	1	0		100	32	20	0						
206215	9/17/1997	NP	1	01	BARNES RICHARD	522470	4500379.9	S	0660W	080N	24	NW	NW	8 L	0		0	0	0	0						
207920	12/12/1997	NP	1	01	BARNES RICHARD	522456.8	4499709.4	S	0660W	080N	24	NW	SW	8 L	0		0	0	0	0						EXPIRED 169456
228946	8/7/2000	NP	1	01	BARNES RICHARD O	515915.8	4512564.5	S	0660W	090N	07	NE	SE	8 L	0		10	620	197	1						
203714	5/20/1997	NP	1	01	BARTSCH RAOUL & KIM	504071.3	4528744.4	S	0680W	110N	24	NE	SW	8 L	0		8.6	200	15	0						
8751			1	01	BATMAN F A	521811	4498679.4	S	0660W	080N	26	NE	NW	8	0		12	26	20	0						
191702	11/17/1995	NP	1	03	BAUER LARRY & KATHY	504019.1	4528505.4	S	0680W	110N	24	NE	SW	8 L	0		15	200	15	0						
217460-A	10/7/2002	NP	1	01	BELFRAGE JOHN	524061.8	4496852.9	S	0650W	080N	31	NW	SW	8	0		15	400	160	0.75						
217460	5/4/1999	NP	1	01	BELFRAGE JOHN B	524061.5	4496913.4	S	0650W	080N	31	NW	NW	8	1		15	350	0	0.75						SEE 217460-A REC#0500014
60122-A	3/2/2007	NP	1	01	BELLMORE LEROY	516799.1	4506535.5	S	0660W	090N	32	NW	NE	8	0		2	40	20	1						1st replacement, also see 60122-A Rec# 3613885. ADB 3-8-07
60122	4/28/1972	NP	1	01	BELLMORE WALDO T	516625.8	4506406.5	S	0660W	090N	32	NW	NE	8	0		0	45	24	0						Also see 60122-A Rec#3613885 2nd replacement. ADB 3-8-07
339-WCB		NP	1	01	BENSON AXEL	526500.9	4491608.5	S	0650W	070N	17				0		0	43	0	0						
52340-F	6/3/1999	NP	1	01	BESS JERRY & JEANNIE	526819.4	4493058.8	S	0650W	070N	08	SE	NW	R	0		0	0	0	0						RECHARGE POND
219647	6/10/1999	NP	1	01	BESS JERRY T & JEANNIE	527066.4	4493488.3	S	0650W	070N	08	NE	SE	8 L	0		0	0	0	1						
152259	8/26/1988	NP	1	01	BESTUL EARL	515187.3	4508182.2	S	0660W	090N	30	NW	NE	8	0		56	25	17	0						
236313	8/23/2001	NP	1	01	BIVENS DAWN	513335.4	4519237.4	S	0670W	100N	24	NW	NE	8	0		15	200	68	1						
272817	2/13/2007	NP	1	01	BIVENS JASON & DAWN	512784.6	4519509	S	0670W	100N	24	NW	NW	H	0		0	0	0	0						
39027			1	01	BOEHM CAROLE J	518639.9	4506835.6	S	0660W	090N	28	SE	SW	8	0		5	184	18	0						
240309	4/3/2002	NP	1	01	BROOKS DOUGLAS M	514278.5	4508340.2	S	0670W	090N	24	SE	SE	8 L	0		10	440	61	1						
482-WCB		NP	1	01	BROWN JIM	526500.9	4491608.5	S	0650W	070N	17				0		0	31	0	0						
483-WCB		NP	1	01	BROWN W J	526500.9	4491608.5	S	0650W	070N	17				0		0	23	0	0						
486-WCB		NP	1	01	BROWN W J	526500.9	4491608.5	S	0650W	070N	17				0		0	17	0	0						
529-WCB		NP	1	01	BROWN W J	526500.9	4491608.5	S	0650W	070N	17				0		0	20	0	0						
5819	5/9/1960	NP	1	01	BROYLES ART	526298.2	4492216.3	S	0650W	070N	17	NW	NE	9	0		75	22	9	0						
256584	4/9/2004	NP	1	01	BURKHART CYNTHIA & DARYL	509908	4510138.5	S	0670W	090N	15	SW	SW	8 L	0		10	640	250	1						
28688			1	01	CHADWICK GEORGE	511371.3	4516929.9	S	0670W	100N	26	SW	NW	9	0		30	60	10	0						
4186-F			1	01	CHALK WINFORD	522636.7	4497494.9	S	0660W	080N	25	SW	SW	1	0		800	23	0	0						

Permit #	ACTDATE	ACTCODE	DIV	WD	NAME	UTM_X	UTM_Y	PM	RANGE	TOWNSHIP	SECTION	QTR160	QTR40	USECODE	ACREFT	CASENO	YIELD	DEPTH	LEVEL	ACREIRR	ADJTYPE	ADJDATE	APRODATE	DCRAMT	DCRUNITS	COMMENTS
39349-A	2/17/2005	NP	1	01	CHAMBERS LOREN	511147.2	4518425.5	S	0670W	100N	22	SE	NE	9	0		10	120	45	0						
219459	6/18/1999	NP	1	01	CHAMBERS LOREN	510513.5	4521090	S	0670W	100N	15	NE	NW	89L	0		10	220	72	1						location correction returned for correction 7/23/01. Contractor su
233023	3/19/2001	NP	1	01	CHAMBERS LOREN FLP	511059.9	4518841.5	S	0670W	100N	22	NE	SE	8	0		0	0	0	1						
233024	3/19/2001	NP	1	01	CHAMBERS LOREN FLP	511058.5	4519122	S	0670W	100N	22	NE	SE	8	0		0	0	0	1						
233025	3/19/2001	NP	1	01	CHAMBERS LOREN FLP	511057.8	4519280.5	S	0670W	100N	22	NE	NE	8	0		0	0	0	1						
233026	3/19/2001	NP	1	01	CHAMBERS LOREN FLP	511056.9	4519463	S	0670W	100N	22	NE	NE	8	0		24	240	59	1						
82718	2/24/1976	NP	1	01	CHAS M VANWHY & SON INC	521046	4497411.4	S	0660W	080N	26	SW	SW	3	0		10	47	27	5						
251058	6/2/2003	NP	1	01	CIENFUEGOS RYAN	511056.3	4516652.4	S	0670W	100N	27	SE	SE	8	0		0	0	0	8700						
237318	9/14/2001	NP	1	01	CLAYCOMB SHAWN	513295.7	4508407.7	S	0670W	090N	24	SW	SE	8 L	0		20	500	100	1						
238614-A	1/7/2002	NP	1	01	CLAYTON HOMES	518601.1	4506557.1	S	0660W	090N	33	NE	NW	8	0		5	640	137	1						
12082-F			1	01	CO BOARD OF LAND COMMISSIONERS	522638.3	4497094.4	S	0660W	080N	36	NW	NW	1	0		200	24	10	0						
248343	2/14/2003	NP	1	01	COALSON JULIANA L	517657	4502948	S	0660W	080N	09	NW	SW	8 L	0		10	600	42	1						
241014	3/18/2002	NP	1	01	CORONDADO MIGUEL& TAMMANIKA	520904.4	4504972	S	0660W	080N	02	NW	NW	8 L	0		0	0	0	0						
209651	4/8/1998	NP	1	01	COTTREL JOHN	511199	4515699.4	S	0670W	100N	35	NW	SW	89L	0		12	340	53	0						MH-32976
205509	8/21/1997	NP	1	01	COUTURE THERESA	510123.6	4508739.7	S	0670W	090N	22	SW	NE	8 L	0		10	460	220	0						
2077			1	01	CRIST TOM	515001.9	4508047.2	S	0660W	090N	30	NW	NE	8	0		1	30	19	0						
249233	3/3/2003	NP	1	01	DAVEY DANIEL W	515833.4	4508167	S	0660W	090N	30	NE	NE	8 L	0		15	380	100	1						
157427	2/23/1990	NP	1	01	DAVIS JACK	518390	4506145.6	S	0660W	090N	33	NW	SE	8	3		35	40	0	0						
236307	7/20/2001	NP	1	01	DAVIS ROBERT H	515895.4	4511784.2	S	0660W	090N	07	SE	SE	8	0		10	540	232	1						
758-WCB		NP	1	01	DEANE H	524878.7	4493258.5	S	0650W	070N	07				0		0	39	0	0						
251399	6/23/2003	NP	1	01	DEGROFF TIMOTHY & SALLIE	512831	4517198.4	S	0670W	100N	25	NW	SW	8	0		0	0	0	0.5						
10059-R	3/11/1960	NP	1	01	DEHAAN MARGARET J	526699.9	4492203.5	S	0650W	070N	17	NE	NW	1	0		180	20	6	0						
10061-R	3/11/1960	NP	1	01	DEHAAN MARGARET J	526699.9	4492203.5	S	0650W	070N	17	NE	NW	1	0		180	20	6	0						
10060-R	3/11/1960	NP	1	01	DEHAAN MARGARET J	526699.9	4492203.5	S	0650W	070N	17	NE	NW	1	0		200	31	3	0						
10062-R	3/11/1960	NP	1	01	DEHAAN MARGARET J	526699.9	4492203.5	S	0650W	070N	17	NE	NW	1	0		200	21	5	0						
10063-R	3/11/1960	NP	1	01	DEHAAN MARGARET J	526699.9	4492203.5	S	0650W	070N	17	NE	NW	1	0		200	21	5	0						
152546	9/6/1988	NP	1	01	DEPLAZES PATTY	520902.6	4502634	S	0660W	080N	11	SW	NW	8 L	0		0	0	0	0						
217555	4/7/1999	NP	1	01	DEPLAZES PATTY	514458.3	4514794.8	S	0660W	100N	31	SW	SW	8 L	0		7	500	75	0						
219458	6/18/1999	NP	1	01	DERR VICTORIA K R	511077.9	4520859.5	S	0670W	100N	15	NE	NE	89L	0		10	200	90	1						Contractor submitted an amended report to correct hole size for sur
66094	8/7/1972		1	01	DIEHL JUNIOR W	507914.5	4524375	S	0670W	110N	33	SW	SW	9	0		10	50	15	640						
68401	3/27/1973		1	01	DIEHL JUNIOR W	508753.7	4524047	S	0670W	100N	04	NE	NW	9	0		15	50	35	0						
36827			1	01	DIEHL M J & SONS INC	508975.2	4516125.9	S	0670W	100N	33	NE	NW	9	0		8	259	180	0						
243719	7/10/2002	NP	1	01	DIFRANCESCO KAREN	514978.3	4513623.3	S	0660W	090N	06	SW	NE	H	0		0	0	0	0						SEE CLAUDIA'S NOTE ON REC#0482068 ADS-7-15-02
238800	12/5/2001	NP	1	01	DIFRANCESCO KAREN	514979	4513410.3	S	0660W	090N	06	SW	SE	8 L	0		8.75	580	121	1						amendment of location, legal and uses ALSO SEE 225222 REC#0458131
260750	10/12/2004	NP	1	01	DILL STEVEN & JUSTINE	520249.6	4505204	S	0660W	090N	34	SE	SW	H L	0		15	28	14	0						Verbal approval for construction variance on November 22, 2006. Ty
20914			1	01	DINGES GEORGE	526707.3	4494217.3	S	0650W	070N	05	SE	SW	8	0		24	16	5	0						
224131	2/28/2000	NP	1	01	DOWNING DAN	514636.4	4513761.3	S	0660W	090N	06	SW	NW	8	0		7	632	226	1						
6913-F			1	01	DRAKE GENE & DENNIS	522636.7	4497494.9	S	0660W	080N	25	SW	SW	1	0		500	21	6	0						
106098	4/30/1979	NP	1	01	E E FOSTER & SONS	514749	4514673.8	S	0660W	090N	06	NW	NW	89	0		0.75	75	61	1						
106098-A	4/30/1979	NP	1	01	E E FOSTER SON	514585.8	4514518.8	S	0660W	090N	06	NW	NW	89	0		0	0	0	0						
14355-R			1	01	EICHHEIM JEAN H	515804.4	4509641.2	S	0660W	090N	19	NE	NE	1	0		100	34	18	0						
14361-R			1	01	EICHHEIM JEAN H	513779.7	4512910.8	S	0670W	090N	12	NE	NW	1	0		350	25	20	0						
14360-R			1	01	EICHHEIM JEAN H	515007.9	4511292.7	S	0660W	090N	18	NW	NE	1	0		480	28	22	0						
149816	11/10/1981	NP	1	01	EICHHEIM TRACY	514998.5	4510068.2	S	0660W	090N	18	SW	SE	8	0		0	0	0	0						
149817-A	5/25/2006	NP	1	01	EICHHEIM TRACY	514955.1	4509911.5	S	0660W	090N	18	SW	SE	8 L	0		0	0	0	1						
149818-A	10/15/1997	NP	1	01	EICHHEIM TRACY A	515065.9	4509875.2	S	0660W	090N	18	SW	SE	8 L	0		12	48	21	0						
149817	11/10/1981	NP	1	01	EICHHEIM TRACY A.	514970.4	4509911	S	0660W	090N	18	SW	SE	8 L	0		15	39	23	1						
70477-A	6/11/1993	NP	1	01	ERICKSON LARRY	515974.4	4504647.1	S	0660W	080N	06	NE	NE	8	0		1	50	24	0						REPL; 2.8 AC EX A; 1SF, 1AC LAWN IRR, DOM ANIMALS
263014	4/5/2005	NP	1	01	FABRIZIUS BRIAN R.	517544	4506153	S	0660W	090N	32	NE	SE	8	0		15	40	0	1						
270157	7/19/2006	NP	1	01	FABRIZIUS LOUIE & GINA	528285.1	4490453.5	S	0650W	070N	21	NE	NW	89	0		13	440	86	1						
11549-R	4/13/1960	NP	1	01	FABRIZIUS LOUIS SHERMAN & GINA D	526685.6	4493022.8	S	0650W	070N	08	SE	NW	1	0		150	17	0	0						
235248	6/4/2001	NP	1	01	FARYNA WILLIAM L	511005.6	4509177.7	S	0670W	090N	22	NE	SE	8	0		7	440	210	1						
11545-R	4/4/1960	NP	1	01	FEBRIZIUS LOUIS SHERMAN & GINA D	526518	4492730.3	S	0650W	070N	08	SE	SW	1	0		150	24	0	0						
312-WCB		NP	1	01	FELTE HENRY	513589	4504330	S	0670W	080N	01				0		0	51	0	0						
257045	4/30/2004	NP	1	01	FISCHER GENE E	510741.9	4514778.9	S	0670W	100N	34	SE	SW	8 L	0		0	0	0	0						reconfigured parcel down to square 40 from permit 224584: No constr
251706	7/1/2003	NP	1	01	FORTENBERRY SCOTT A & CHRISTINE J	504711.8	4529647.9	S	0680W	110N	13	SE	NE	8 L	0		15	240	67	1						
196630	6/24/1996	NP	1	03	FT COLLINS CITY OF	504519.2	4529223.4	S	0680W	110N	13	SE	SE	89	0		15	120	29	0						
255311-A	2/13/2004	NP	1	01	FUENTES JOAQUIN & MARCELLA G	519894.1	4501977	S	0660W	080N	10	SW	SE	89	0		16	48	22	1						
251486	6/20/2003	NP	1	03	FULLER JR LOUIS H & SANDRA J	520690.9	4504829.5	S	0660W	080N	03	NE	NE	8	0		15	450	120	1						
251485	6/20/2003	NP	1	03	FULLER WESLEY PAUL & LOUIS H SR	520334.4	4504913	S	0660W	080N	03	NE	NW	8	0		0	0	0	1						
62992	6/12/1972		1	01	GALLATIN BEN	520546.8	4498576.4	S	0660W	080N	27	NE	NE	8	0		11	38	28	0						
238833	11/23/2001	NP	1	01	GALLO SHAWN JUANITA	511930.6	4514801.4	S	0670W	100N	35	SW	SE	8	0		10	640	140	1						
55153-A	8/20/2004	NP	1	01	GOBELI ROGER	524499.1	4495734.3	S	0650W	080N	31	SW	SE	8 L	0		3	40	18	1						Expired replacement permit was issued in 1995
244815	7/30/2002	NP	1	01	GOLD STONE CENTER LLC	519619.1	4506709.1	S	0660W	090N	27	SW	SW	8 L	0		0	0	0	1						
273-WCB		NP	1	01	GRAEFE BILL	521620	4502759	S	0660W	080N	11				0		0	46	0	0						
262745	3/3/2005	NP	1	01	GRAVES KENNETH W & LORI	511222	4520147	S	0670W	100N	14	SW	NW	8 L	0		0	280	30	1						
266442	9/16/2005	NP	1	01	GRUBER SHEN	510650.5	4510781.5	S	0670W	090N	15	NE	SE	89L	0		13	425	200	0						
266443	9/16/2005	NP	1	01	GRUBER SHEN	511078.3	4511025.5	S	0670W	090N	15	NE	SE	89L	0		13	370	210	0						au file in with 0543673
253895	10/28/2003	NP	1	01	GUEVARA CIRINO REYES	516181.5	4511385.5	S	0660W	090N	17	NW	NW	8 L	0		13	520	220	1						
68919	4/10/1973		1	01	HANSEN MERRILL	518275	4505688.5	S	0660W	090N	33	SW	NE	8	0		18	45	30	1						
246887	1/3/2003	NP	1	01	HANSEN SCOTT J	512688.3	4507596.5	S	0670W	090N	26	NE	SE	89L	0		0	0	0	1						
246886	1/3/2003	NP	1	01	HANSEN SCOTT J	512460.6	4508221.5	S	0670W	090N	26	NE	NE	89L	0		60	540	168	1						
241517	5/17/2002	NP	1	01	HART ANGELA D	512304.6	4506780	S	0670W	090N	26	SE	SW	8 L	0		15	300	65	1						a 15 gpm dole valve was installed to regulate maximum water flow.
258346	6/28/2004	NP	1	01	HART JEFF	520262.8	4502032.5	S	0660W	080N	10	SE	SW	8 L	0		10	40	24	1						PERMIT COPIES CAME BACK SAYING "TEMPORARILY AWAY". ADB 8-4-04
40675			1	01	HECKMAN ALLEN	528295.1	4490957.7	S	0650W	070N	16	SE	SW	8	0		15	38	10	1						
13384-R			1	01	HECKMAN JAKE & HENRIETTA C	527901.4	4491367.3	S	0650W	070N	16	SW	NE	1	0		200	20	10	0						
13385-R			1	01	HECKMAN JAKE & HENRIETTA C	527901.4	4491367.3	S	0650W	070N	16	SW	NE	1	0		200	18	10	0						
209166	3/5/1998	NP	1	01	HEDIGER RANDOLPH	518086.3	4505568.6	S	0660W	090N	33	SW	NE	8	3		15	38	0	0						
46609			1	01	HENDERSON VIRGINIA	527898.6	4490579.2	S	0650W	070N	21	NW	NE	8	0		15	32	11	0						
58740	4/14/1972		1	01	HERMAN JOE W	520202.5	4498239.9	S	0660W	080N	27	NE	SW	8	0		3	32	21	0						
243501	7/19/2002	NP	1	01	HIGLEY SEAN A	524759	4496283.8	S	0650W	080N	31	SW	NE	G	0		0	0	0	0						
238836	8/23/2001	NP	1	01	HILL LELAND	511194.6	4519844.5	S	0670W	100N	14	SW	SW	H	0		0	400	19	0						
48409			1	01	HOSIER NORMAN G	524244.6	4496288.8	S	0650W	080N	31	SW	NW	8	0		0	300	0	0						
46478			1	01	HOVEL ROGER	524838.9	4495714.8	S	0650W	080N	31	SW	SE	89	0		15	379	82	0						
220787	7/20/1999	NP	1	01	HUTCHISON DONALD W	512677	4516398.4	S	0670W	100N	26	SE	SE	8 L	0		15	42	20	1						This property is no longer a 40 acre parcel. It is currently 20 acr
222657-A	11/12/1999	NP	1	01	HUTCHISON H GLEN	511446.7	4516847.4	S	0670W	100N	26	SW	NW	9	0		10	40	12	0						
72352	10/16/1973		1	01	HUTCHISON H GLENN	510326.3	4514689.5	S	0670W	090N	03	NW	NE	89	0		15	197	63	1						
40350			1	01	HUTCHISON WAYNE & THELMA	512567.7	4517317.9	S	0670W	100N	26	NE	SE	9	0		10	87	38	0						
3705-F			1	01	INDUSTRIAL PIPE LI	504976.6	4528571.3	S	0670W	110N	19	NW	SW	4	0		700	51	6	0						
240310	2/25/2002	NP	1	01	INSKEEP FRANK & MONA	514276.1	4508742.7	S	0670W	090N	24	SE	NE	8 L	0		10	400	81	1						
230462	8/7/2000	NP	1	01	JACKSON DENNIS	515626.5	4512606.7	S	0660W	090N	07	NE	SE	8 L	0		0	0	0	1						
98042	3/21/1978	NP	1	01	JAMES KELLEE C & JOHN A	513639.8	4514597.8	S	0670W	090N	01	NE	NW	9	0		0.3	31	25	0						
15125-RR	3/14/1977	NP	1	01	JAMES KELLEE C & JOHN A	512909.1	4514183.5	S	0670W	090N	01	NW	SW	1	0		150	40	25	59						
263481	2/1/2005	NP	1	01	JOHNSON MIKE	518606.3	4506730	S	0660W	090N	28	SE	SW	3	0		0	0	0	0						
266280	10/17/2005	NP	1	01	JOHNSON MIKE	518638	4506876	S	0660W	090N	28	SE	SW	H	0		0	0	0	0						
106728-A	5/3/1979	NP	1	01	JONES EVERETT	520611.9	4500197.4	S	0660W	080N	22	NE	NE	H	0		15	39	28	0						
11305-R			1	01	JONES EVERETT	520611.9	4500197.4	S	0660W	080N	22	NE	NE	1	0		200	35	14	0						
11304-R			1	01	JONES EVERETT	520611.9	4500197.4	S	0660W	080N	22	NE	NE	1	0		400	32	14	0						
11303-R			1	01	JONES EVERETT	520695.7	4500375.9	S	0660W	080N	22	NE	NE	1	0		410	33	22	160						
92263-A	7/8/1977	NP	1	01	KERSEY C W	506449.7	4527604.5	S	0670W	110N	20	SW	SW	9	0		5	150	0	0						
92263	7/25/1977	NP	1	01	KERSEY C WW.	506449.7	4527604.5	S	0670W	110N	20	SW	SW	9	0		5	150	70	0						
632-WCB		NP	1	03	KINDSFATER PETE	515173.5	4502783.5	S	0660W	080N	07				0		0	29	0	0						
2833			1	01	KINDSFATHER LYDIA & PETE	523838.7	4495499.3	S	0660W	070N	01	NE	NE	8	0		20	34	13	0						
253898	10/28/2003	NP	1	01	KING IKE L & LURENA A	516160.6	4509929.5	S	0660W	090N	17	SW	SW	8 L	0		12	450	41	1						
232661	3/16/2001	NP	1	01	KING KENNETH M & COUPER LINDA M	516072.2	4502842.1	S	0660W	080N	08	NW	SW	8 L	0		10	400	78	1						
263633	5/11/2005	NP	1	01	KOHL CLIFTON & LINDA	515362	4512984	S	0660W	090N	07	NE	NW	89	0		13	480	105	1						
63540	8/9/1972		1	01	KUENNECKE BARBARA	509848.7	4522037.6	S	0670W	100N	10	NW	SW	9	0		10	50	10	320						
4768-F		NP	1	01	L G EVERIST INC	504976.6	4528571.3	S	0670W	110N	19	NW	SW	3	0		500	54	15	0						LOCATION CORRECTED 5/16/95
237321	9/17/2001	NP	1	08	LARA PATRICIA & BOURQUE JOSEPH	512872.1	4508691.2	S	0670W	090N	24	SW	NW	8	0		15	500	125	1						
238799	1/18/2002	NP	1	01	LAUGHLIN RUSS	511443	4514813.9	S	0670W	100N	35	SW	SW	8 L	0		8	618	242	1						COPY OF PERMIT CAME BACK UNDELIVERABLE AS ADDRESSED. TRIED TO CALL
9-RDD	9/29/1980	NP	1	01	LEBSACK H	521407.4	4498663.9	S	0660W	080N	26	NW	NE	1	0		0	0	0	0						

Permit #	ACTDATE	ACTCODE	DIV	WD	NAME	UTM_X	UTM_Y	PM	RANGE	TOWNSHIP	SECTION	QTR160	QTR40	USECODE	ACREFT	CASENO	YIELD	DEPTH	LEVEL	ACREIRR	ADJTYPE	ADJDATE	APRODATE	DCRAMT	DCRUNITS	COMMENTS
259634	8/12/2004	NP	1	01	LEGLER JASON & KARI	517691	4501274.5	S	0660W	080N	16	NW	SW	8 L	0		0	0	0	1						
121721	8/5/1981	NP	1	01	LEHR J	505342.2	4525373.2	S	0670W	110N	31	NW	SE	9	0		0	0	0	0						
133789			1	01	LEHR JUNE	505156.2	4524764.7	S	0670W	110N	31	SW	SW	9	0		5	260	25	0						
121720			1	01	LEHR JUNE	509402.2	4519391	S	0670W	100N	21	NE	NE	9	0		10	165	0	0						
44764			1	01	LEMONDS W P	520665.2	4505234.5	S	0660W	090N	34	SE	SE	8	0		20	36	17	0						
259249	8/20/2004	NP	1	01	LENHARDT JAMES R & SANDRA L	510058.5	4511146	S	0670W	090N	15	NE	NE	89L	0		0	375	80	1						permit has been amended with new location and the correct acreage.
2075			1	01	LESH ED	520200.3	4498638.9	S	0660W	080N	27	NE	NW	8	0		20	28	17	0						
49174			1	03	LESH ED SR	519799.1	4498637.4	S	0660W	080N	27	NW	NE	8	0		5	24	17	0						
90296-A	4/28/1977	NP	1	01	LESH EDWIN D	520192.8	4498609.5	S	0660W	080N	27	NE	NW	8	0		40	45	19	0						
90296	4/28/1977	NP	1	01	LESH EDWIN D	520192.6	4498625	S	0660W	080N	27	NE	NW	8	0		45	32	0	1						
186577-A	3/7/1995	EX	1	01	LESH EDWIN D & BILLIE B	520318.1	4498780.4	S	0660W	080N	27	NE	NW	8	0		15	39	25	0						RPL 1919 WELL; 16 ACRES; 1SF, DOM ANIM, 1 ACRE IRRG
128448			1	01	LESH ESTHER	519977.9	4498486.9	S	0660W	080N	27	NW	NE	8	0		35	465	87	1						
70163	6/29/1973		1	01	LESH VIRGINIA	515892.1	4503247.5	S	0660W	080N	07	NE	NE	9	0		5	160	70	320						
82352-A	1/9/1976	NP	1	01	LESH VIRGINIA	517580	4502646.5	S	0660W	080N	08	SE	NE	89	0		10	375	80	0						
70477	7/17/1973	NP	1	01	LESH VIRGINIA	515928.7	4504647.5	S	0660W	080N	06	NE	NE	8	1		15	30	0	1						1ST USE 1902
12329-R			1	01	LEWIS MARY I MRS	521427	4497065.9	S	0660W	080N	35	NW	NE	1	0		500	36	20	0						
240426	4/16/2002	NP	1	01	LOVATA MELVIN & BERNICE	511966.8	4508166.2	S	0670W	090N	26	NE	NW	8 L	0		0	700	150	1						ISSUANCE OF THIS PERMIT CANCELS PERMIT #224133. QUAD MAP MISSING,
241518	5/17/2002	NP	1	01	LOVATA MELVIN & BERNICE	512656.6	4506774.7	S	0670W	090N	26	SE	SE	8 L	0		12	275	33	1						
36827-A	1/24/1979	NP	1	01	M J DIEHL SONS	509370	4514908.9	S	0670W	100N	33	SE	SE	9	0		0	0	0	0						
25440-F			1	01	MACKEY GARY VICKY BRYON & JAMIE	524063.9	4495488.8	S	0650W	070N	06	NW	NW	1	0		202	30	0	0						
25441-F			1	01	MACKEY GARY VICKY BRYON & JAMIE	524064.9	4495366.8	S	0650W	070N	06	NW	NW	1	0		202	33	0	0						
25439-F		NP	1	01	MACKEY GARY VICKY BRYON & JAMIE	524070	4495671.3	S	0650W	070N	06	NW	NW	1	0		400	37	0	0						
187057	4/10/1995	NP	1	01	MAGNUSON DONALD O	527242.5	4491642.8	S	0650W	070N	17	NE	SE	8 L	0		0	415	0	0						
230559	11/17/2000	NP	1	01	MARTINEZ PAULA & CLAYCOMB JAMES	512565.9	4507263.7	S	0670W	090N	26	SE	NE	8	0		10	600	85	1						
25272			1	01	MARTINEZ TRINIDAD	520613.7	4497445.9	S	0660W	080N	27	SE	SE	8	0		35	37	32	0						NO SUB. LISTED
64600	9/5/1972		1	01	MATUSKA FLOYD O	506419.1	4521210	S	0670W	100N	08	SW	SW	8	0		15	325	76	1						
179820-A	9/7/1999	NP	1	01	MCCAY BENJAMIN A	520190	4498590.9	S	0660W	080N	27	NE	NW	8	0		10	36	21	32000 sq ft						domestic animals and irrigation only
179820	5/6/1994	NP	1	01	MCCAY BENJAMIN A	520189.9	4498594.4	S	0660W	080N	27	NE	NW	8	3		25	30	0	0						1ST USE 39;WATERING OF POULTRY; 32,000 SQFT IRR; NO HU;
261646	1/26/2005	NP	1	08	MCCRERY MICHAEL	509660.6	4511041.5	S	0670W	090N	15	NW	SW	89L	0		0	0	0	1						
256209	3/15/2004	NP	1	01	MCCRERY MICHAEL	511057.7	4509049	S	0670W	090N	22	SE	NE	89L	0		7	700	247	1						
249236	3/3/2003	NP	1	01	MCDONALD L JAY & NANCY	515544.3	4508143	S	0660W	090N	30	NE	NW	8 L	0		15	380	60	1						
171998-A	9/30/1992	NP	1	01	MCFARLIN CHARLES & CAROL	518427.9	4506249.6	S	0660W	090N	33	NW	NE	8	0		0	0	0	0						REPL 1915 WELL;4.5 AC @ 781 1ST ST, NUNN;20,000 SQFT LAWN IRR ONLY
171998	9/30/1992	NP	1	01	MCFARLIN CHARLES & CAROL	518427.9	4506249.6	S	0660W	090N	33	NW	NE	8	2		15	40	0	0						1ST USE 1915;4.5 AC @ 781 1ST ST NUNN; 20,000 SQFT LAWN/GARDEN ONLY
270527	8/9/2006	NP	1	01	MCWILLIAMS GAROLD T & SUZANNE	511454.3	4506550.5	S	0670W	090N	35	NW	NW	89L	0		0	0	0	1						
244793	9/6/2002	NP	1	03	MCWILLIAMS GAROLD T & SUZANNE L	511759.1	4506545.2	S	0670W	090N	35	NE	NW	89L	0		0	0	0	1						
244794	9/6/2002	NP	1	03	MCWILLIAMS GAROLD T & SUZANNE L	512584.3	4506532.2	S	0670W	090N	35	NE	NE	89L	0		0	0	0	1						
244796	9/6/2002	NP	1	03	MCWILLIAMS GAROLD T & SUZANNE L	511759.1	4506545.2	S	0670W	090N	35	NW	NE	89L	0		0	0	0	1						
672-WCB		NP	1	01	MEAD EDGAR A	523242.5	4496497.5	S	0660W	080N	36				0		0	34	0	0						
26543			1	01	MEADOW SPRINGS ASSOC	502568.7	4531392.5	S	0680W	110N	11	SE	NW	9	0		10	50	39	0						
158279	7/23/1990	NP	1	01	MEADOW SPRINGS GRAZING ASS'N	504123.8	4527800.8	S	0680W	110N	24	SE	SW	9 L	0		6	41	16	0						
253344	9/25/2003	NP	1	01	MEYER MICHAEL D	511202.7	4513554.8	S	0670W	090N	02	SW	NW	8 L	0		40	550	27	1						
304-WCB		NP	1	01	MEYER WILLIAM	523242.5	4496497.5	S	0660W	080N	36				0		0	24	0	0						
207902	12/19/1997	NP	1	01	MILLER CRAIG S & RENEE	511828.1	4516272.4	S	0670W	100N	35	NW	NE	89L	0		10	480	43	0						
174814	10/5/1993	NP	1	01	MORRISON BO & SHARI	503429.5	4529049.4	S	0680W	110N	24	NW	NW	8 L	0		18	50	22	0						
49814			1	01	MORRISON JAMES	512143	4523776.6	S	0670W	100N	02	NE	SW	9	0		12	175	75	0						
118076			1	01	MORRISON JAMES E.	510727.6	4521546.5	S	0670W	100N	10	SE	SW	89	0		8	60	0	1						
192675-A	8/18/2004	NP	1	01	MOSS RUSS	528043.4	4490836	S	0650W	070N	16	SW	SE	8 L	0		14	40	17	1						Variance Request No. 2005-081A granted 6/3/05 (DAM).
268654	4/25/2006	NP	1	01	MUNN JAMES	521424.2	4504161.5	S	0660W	080N	02	SW	NE	89L	0		13	630	315	1						
238801	10/17/2001	NP	1	01	MURRAY SCOTT & MARY ANN	511248.3	4519645.5	S	0670W	100N	14	SW	SW	8 L	0		12	50	15	0						
173049	8/6/1993	NP	1	01	NARANJO LEO	520828.6	4499323.9	S	0660W	080N	23	SW	NW	89	3		15	41	0	0						1ST USE PRE-1952; 5AC @44340 WCR 33,PIERCE; 1SF, 1AC IRR, STOCK
99039	4/6/1978	NP	1	01	NEWBOLD DAVID PACKWOOD & GERTRUDE	506369.2	4528460.3	S	0670W	110N	20	NE	SE	89	0		3	90	25	1						
247703	11/5/2002	NP	1	01	NORTH WELD COUNTY WATER DISTRICT	523617.7	4498845.4	S	0660W	080N	25	NE	NW	Q M	0		0	40	0	0						
247704	11/5/2002	NP	1	01	NORTH WELD COUNTY WATER DISTRICT	522124.4	4497267.4	S	0660W	080N	35	NE	NE	Q M	0		0	40	0	0						
9209-F	4/14/1965	NP	1	01	NORTH WELD COUNTY WATER DISTRICT	521647.3	4497181.9	S	0660W	080N	35	NE	NW	1	0		100	40	25	0						
9210-F	4/14/1965	NP	1	01	NORTH WELD COUNTY WATER DISTRICT	521646.6	4497120.9	S	0660W	080N	35	NE	NW	1	0		100	41	25	0						
245852	11/18/2002	NP	1	03	NORTHERN COLORADO WATER ASSOCIATION	504056.3	4528864.9	S	0680W	110N	24	NE	NW	Q M	0		350	48	28	0						
60767-F	9/5/2003	NP	1	01	NORTHERN COLORADO WATER ASSOCIATION	504056.3	4528864.9	S	0680W	110N	24	NE	NW	2	0		425	48	28	0						2003CW268(pending)-included in the Northern Colorado Water Associat
380-WCB		NP	1	01	NUNN HARVEST RODEO GROUNDS	516831.9	4505823	S	0660W	090N	32				0		0	37	0	0						
46988-F	6/6/1996	NP	1	01	NUNN TOWN OF	518574.6	4505956.1	S	0660W	090N	33	NE	SW	2 5	0		23	800	144	0						
13109-R			1	01	NUNN TOWN OF	518238.8	4505637.6	S	0660W	090N	33	SW	NE	2	0		80	39	12	0						
13110-R			1	01	NUNN TOWN OF	518238.8	4505637.6	S	0660W	090N	33	SW	NE	2	0		80	55	30	0						
251488	6/20/2003	NP	1	03	O'NEIL JEFFREY JAY	520302.5	4503954.5	S	0660W	080N	03	SE	NW	8	0		0	0	0	1						
271616	11/17/2006	NP	1	03	O'NEIL JEFFREY JAY	520613.2	4503975.5	S	0660W	080N	03	SE	NE	89L	0		0	0	0	0						
240425	4/16/2002	NP	1	01	OVERTURF HOWARD E & GERALDINE M	512250.2	4508161.7	S	0670W	090N	26	NE	NW	8 L	0		7	540	140	1						QUAD MAP MISSING, PARCEL NOT PLOTTED ON MAP.
175111	11/16/1993	NP	1	01	PADILLA NIGEL	519994.2	4499195.4	S	0660W	080N	22	SW	SE	8 L	0		0	0	0	0						
264303	6/24/2005	NP	1	01	PADILLA NIGEL P & RONDA B	515986.1	4505013	S	0660W	080N	06	NE	NE	H	0		12	360	20	0						exemption plat in file; Floating location per 6.2.3
165323	6/12/1992	NP	1	01	PADILLA VICTOR	519216.5	4505183	S	0660W	090N	33	SE	SE	8	0		0	0	0	0						
165323-A	6/12/1992	NP	1	01	PADILLA VICTOR	519201.3	4505183	S	0660W	090N	33	SE	SE	8	0		12	47	23	0						
250389	3/27/2003	NP	1	03	PATRICK MALONE & JOHN HOYT	509467.1	4512042.8	S	0670W	090N	09	SE	NE	8 L	0		0	0	0	1						
244027	8/1/2002	NP	1	01	PECTIN RICK & LISA	520912.5	4505094	S	0660W	090N	35	SW	SW	8 L	0		10	640	172	1						(970)412-7655
249223	2/28/2003	NP	1	01	PERRY HENRIETTA & DARRELL	517700.9	4502229.5	S	0660W	080N	09	SW	SW	8 L	0		13	680	40	1						
275-WCB		NP	1	03	PETERSON CECIL	520004	4498046	S	0660W	080N	27				0		0	42	0	0						
12279-R			1	01	PETERSON CECIL	521831.4	4497077.9	S	0660W	080N	35	NE	NW	1	0		200	38	22	0						
6936-R			1	01	PETERSON CECIL	520200.3	4498638.9	S	0660W	080N	27	NE	NW	1	0		350	43	26	0						
32482			1	01	PETTIT WILMER A	517429.3	4505633.6	S	0660W	090N	32	SE	NE	8	0		2	34	23	0						
159167-A	8/17/1990	NP	1	01	PHILP GREGORY H & LEZLIE D	526785	4494062.3	S	0650W	070N	05	SE	SW	8	0		15	30	3	0						
159167	8/17/1990	NP	1	01	PHILP GREGORY H & LEZLIE D	526769.8	4494062.8	S	0650W	070N	05	SE	SW	8	3		45	35	0	0						
12264-R			1	01	PIERCE SCH DIST # 40	520601.6	4498640.9	S	0660W	080N	27	NE	NE	1	0		100	41	0	0						
251099	6/5/2003	NP	1	01	PILES JASON G & TARA M	519261	4503587	S	0660W	080N	03	SW	SW	8 L	0		5	460	60	1						
58467	4/11/1972		1	01	POSTON LYNN	520166.7	4498258.9	S	0660W	080N	27	NE	SW	8	0		7	30	25	1						
13802-R			1	01	PRIDDY BERTHA F	521012.3	4500198.4	S	0660W	080N	23	NW	NW	1	0		400	30	15	0						
13803-R			1	01	PRIDDY BERTHA F	521006	4499426.9	S	0660W	080N	23	SW	NW	1	0		400	30	15	0						
13804-R			1	01	PRIDDY BERTHA F	521006	4499426.9	S	0660W	080N	23	SW	NW	1	0		400	30	15	0						
319-WCB		NP	1	01	PURDY AL	524863.3	4496470	S	0650W	080N	31				0		0	38	0	0						
202609	4/4/1997	NP	1	01	RAMSAY KENNETH W	509925.1	4508711.7	S	0670W	090N	22	SW	SW	8	0		8	460	237	0						
232958	3/30/2001	NP	1	01	REEVES GREG	521115.9	4502801.5	S	0660W	080N	11	NW	SW	89	0		0	0	0	1						
257647	5/25/2004	NP	1	01	REEVES GREG	520872.1	4503731	S	0660W	080N	02	SW	SW	8 L	0		0	0	0	1						
257645	5/25/2004	NP	1	01	REEVES GREG & PATTY DEPLAZES	520871.9	4503596.5	S	0660W	080N	02	SW	SW	8 L	0		0	0	0	1						
257646	5/25/2004	NP	1	01	REEVES GREG & PATTY DEPLAZES	520872.3	4503860.5	S	0660W	080N	02	SW	SW	8 L	0		0	0	0	1						
77722-A	12/10/1974	NP	1	01	REEVES GREG R	520723	4502008	S	0660W	080N	10	SE	SE	8	0		8	95	0	0						location corrected per location amendment form. skb 12/4/03
252716	8/27/2003	NP	1	01	REEVES GREG R	514402.4	4515572.5	S	0660W	100N	31	NW	SW	8 L	0		10	400	68	1						
77722		NP	1	01	REEVES GREGORY R	520570	4502036.5	S	0660W	080N	10	SE	SE	8	0		8	95	27	1						
211303	6/8/1998	NP	1	01	REEVES PATTY DEPLAZES	514840.5	4514674.3	S	0660W	090N	06	NW	NE	8 L	0		13	500	100	0						
109978	7/27/1979	RI	1	01	RISH BILL	511357.6	4519351.5	S	0670W	100N	23	NW	NW	89	0		15	255	0	0						Well was constructed and the log was submitted incorrectly under pe
26221-F			1	03	ROCKY MOUNTAIN ENERGY	511758.2	4506693.2	S	0670W	090N	35	NW	NE	Q	0		0	233	140	0						
26199-F			1	01	ROCKY MOUNTAIN ENERGY CO.	514386.3	4503590.6	S	0670W	080N	01	SE	SE	Q	0		0	300	0	0						
114600	5/27/1980	NP	1	01	ROCKY MTN ENER	508968.6	4515314.4	S	0670W	100N	33	SE	NW	Q	0		0	0	0	0						
114601	5/27/1980	NP	1	01	ROCKY MTN ENER	508968.6	4515314.4	S	0670W	100N	33	SE	NW	Q	0		0	0	0	0						
114602	5/27/1980	NP	1	01	ROCKY MTN ENER	508968.6	4515314.4	S	0670W	100N	33	SE	NW	Q	0		0	0	0	0						
26222-F	1/10/1983	NP	1	03	ROCKY MTN ENER	511758	4506492.7	S	0670W	090N	35	NW	NE	Q	0		0	315	140	0						
24919-F	5/27/1980	NP	1	01	ROCKY MTN ENERGY	508968.6	4515314.4	S	0670W	100N	33	SE	NW	Q	0		0	0	0	0						
63923	7/3/1972		1	01	RODENBOUGH RALPH	518602.6	4505722.1	S	0660W	090N	33	SE	NW	H	0		5	120	18	0						
161751	9/17/1991	NP	1	03	ROMAN EUGENE	501924.6	4529542.9	S	0680W	110N	14	SW	SW	8	0		0	0	0	0						18100-MH
139265			1	01	ROMERO A. VINCENT	520635	4497615.4	S	0660W	080N	27	SE	SE	8	0		32	36	25	1						
139265-A	2/25/1985	NP	1	01	ROMERO A.VINCENT	520613.7	4497445.9	S	0660W	080N	27	SE	SE	8	0		0	0	0	0						
6765-FR	12/4/1973	NP	1	01	RUHL AL & ELAINE TRUST	527593.9	4491949.8	S	0650W	070N	16	NW	SW	1	0		225	31	12	0						
271955	11/2/2006	NP	1	01	S & J CO INC	510770.9	4510406	S	0670W	090N	15	SE	NE	8	0		0	400	215	1						
264566	6/6/2005	NP	1	01	S & J CO INC	510458.9	4509970.5	S	0670W	090N	15	SE	SW	89L	0		0	0	0	0						
269200	5/31/2006	NP	1	01	S & J CO INC	510952.3	4511558.5	S	0670W	090N	10	SE	SE	89L	0		0	0	0	1						
271956	11/2/2006	NP	1	01	S & J CO INC	510969.8	4510575.5	S	0670W	090N	15	SE	NE	8	0		12	420	240	1						
264565	6/6/2005	NP	1	01	S & J CO INC	511103.5	4510274.5	S	0670W	090N	15	SE	SE	89L	0		13	400	75	0						

Basin-Wide Well List

Permit #	ACTDATE	ACTCODE	DIV	WD	NAME	UTM_X	UTM_Y	PM	RANGE	TOWNSHIP	SECTION	QTR160	QTR40	USECODE	ACREFT	CASENO	YIELD	DEPTH	LEVEL	ACREIRR	ADJTYPE	ADJDATE	APRODATE	DCRAMT	DCRUNITS	COMMENTS
269199	5/31/2006	NP	1	01	S & J CO INC	511082.8	4511911.5	S	0670W	090N	10	SE	SE	89L	0		14	420	220	1						
259250	8/20/2004	NP	1	01	S & J COMPANY	511084	4511470.5	S	0670W	090N	15	NE	NE	89L	0		12	390	42	1						
267138	12/7/2005	NP	1	01	S & J COMPANY, INC	511107	4512124.5	S	0670W	090N	10	SE	NE	89L	0		13	385	185	1						
267139	12/7/2005	NP	1	01	S & J COMPANY, INC	511106.5	4512254.5	S	0670W	090N	10	SE	NE	89L	0		13	415	230	1						
6747-R			1	01	SALBERG F OSCAR & JEANETTE L	526704.3	4493410.8	S	0650W	070N	08	NE	SW	1	0		300	22	8	0						
162374	10/23/1991	NP	1	01	SALBERG J ALAN & PHYLLIS J	525741.9	4494069.3	S	0650W	070N	05	SW	SW	8	3		2.5	28	0	0						
162354	10/23/1991	NP	1	01	SALBERG KENNETH A	527137	4493968.3	S	0650W	070N	08	NE	NE	8	3		25	137	0	0						
927-WCB		NP	1	01	SALBERG OSCAR	526498.6	4493212.5	S	0650W	070N	08				0		0	22	0	0						
254304	8/27/2003	NP	1	01	SARCHET RODNEY C & LORI K	520506.6	4501990	S	0660W	080N	10	SE	SE	8 L	0		10	415	55	1						
25433-FR	7/6/1981	NP	1	01	SAUTER J. RALPH	520828.2	4500374.9	S	0660W	080N	23	NW	NW	1	0		0	0	0	0						
247352	1/21/2003	NP	1	01	SAUTER RALPH A JR	520822.5	4499640.5	S	0660W	080N	23	NW	SW	8 L	0		0	34	26	1						
247353	1/21/2003	NP	1	01	SAUTER RALPH A JR	522350.4	4499650.5	S	0660W	080N	23	NE	SE	8 L	0		0	30	22	1						
253434	6/27/2003	EX	1	01	SCHELLER RUBY	518935.8	4502664	S	0660W	080N	09	SE	NE	8 L	0		0	42	30	1						
253602	10/1/2003	NP	1	01	SCHELLER SAM	525738.3	4495134.3	S	0650W	070N	05	NW	SW	89	0		0	0	0	10000						
255311	2/13/2004	NP	1	01	SCHELLER SAM	519895.9	4502079.5	S	0660W	080N	10	SW	SE	89	0		0	0	0	1						
253602-A	10/1/2003	NP	1	01	SCHELLER SAM	525741.3	4495134.3	S	0650W	070N	05	NW	SW	89	0		13	460	113	1						
12750-R	4/21/1960	NP	1	01	SCHELLER SAM L & RUBY H	519809.1	4502542	S	0660W	080N	10	SW	NE	1	0		150	33	25	0						
12748-R	4/21/1960	NP	1	01	SCHELLER SAM L & RUBY H	519408.2	4502538.5	S	0660W	080N	10	SW	NW	1	0		200	36	25	0						
12747-R	4/21/1960	NP	1	01	SCHELLER SAM L & RUBY H	519408.2	4502538.5	S	0660W	080N	10	SW	NW	1	0		300	36	25	0						
157384	5/24/1990	NP	1	01	SCHELLER SHARON	519229.5	4503495.5	S	0660W	080N	10	NW	NW	9	1.5		15	50	0	0						
158227	5/24/1990	NP	1	01	SCHELLER SHARON	518611.1	4503984.5	S	0660W	080N	04	SE	NW	9	1.5		15	40	0	0						1ST USE 1940
157384-A	5/24/1990	NP	1	01	SCHELLER SHARON	519229.5	4503495.5	S	0660W	080N	10	NW	NW	9	0		50	50	20	0						
12749-R	4/21/1960	NP	1	01	SCHELLER SHARON R	519809.1	4502542	S	0660W	080N	10	SW	NE	1	0		150	33	25	0						
187640	6/1/1995	NP	1	03	SCHMIDT GARY	504148.1	4529077.9	S	0680W	110N	24	NE	NW	8 L	0		0	0	0	0						
187641	11/25/1994	NP	1	01	SCHMIDT GARY	504605.2	4529015.9	S	0680W	110N	24	NE	NE	8 L	0		6	100	32	0						
251482	6/20/2003	NP	1	03	SCHMIDT JASON & JANET	520308.3	4503772	S	0660W	080N	03	SE	SW	8	0		0	0	0	1						
170715-A	5/10/1993	NP	1	01	SEATON JEFF	515076.9	4509848.7	S	0660W	090N	19	NW	NE	8 L	0		38	44	23	0						REPL SPR'34 WELL; @12470 WCR 104, NUNN; 2SF, 1AC IRR, DOM ANIMALS
220186	7/20/1999	NP	1	01	SHIPP BJ & SHANNON	512274.6	4516403.4	S	0670W	100N	26	SE	SW	8 L	0		12	200	10	1						
7937			1	01	SHROEDER S H	510964.9	4518141.5	S	0670W	100N	22	SE	SE	8	0		10	107	50	0	O	12/31/1972	02/24/1961	0.033	C	LAWN AND GARDEN IRR
255010	1/7/2004	NP	1	01	SMITH DON	509650.9	4511625.3	S	0670W	090N	10	SW	SW	8 L	0		7	475	240	1						
257643	5/25/2004	NP	1	01	SMITH TIMOTHY R	509692.3	4512115.5	S	0670W	090N	10	SW	NW	8 L	0		12	500	26	0						Applicant stated on the phone that they would eventually like to pe
369-WCB		NP	1	01	SNYDER HENRY	526500.9	4491608.5	S	0650W	070N	17				0		0	312	0	0						
253118	9/24/2003	NP	1	01	SOHLER TODD & ANGIE	511056.6	4508779.5	S	0670W	090N	22	SE	NE	89L	0		0	400	180	1						
222814	11/22/1999	NP	1	01	SPAULDING TAMI K	522622.6	4500315.4	S	0660W	080N	24	NW	NW	8 L	0		0	0	0	1						
225861	4/14/2000	NP	1	01	SPAULDING TAMI K	522456.8	4499709.4	S	0660W	080N	24	NW	SW	9	0		15	525	260	0						WELL LOCATION ADDRESS: WCR 35 PIERCE, CO 80650
13383-R			1	01	STERN JACK	527901.4	4491367.3	S	0650W	070N	16	SW	NE	1	0		125	24	10	0						
12734-R			1	01	STERN JACK	527503.2	4491375.8	S	0650W	070N	16	SW	NW	1	0		900	15	3	0						
225745	4/17/2000	NP	1	01	STEVENS RANDY	523157.3	4498158.9	S	0660W	080N	25	NW	SE	8	0		15	500	150	1						
263308	5/5/2005	NP	1	01	STEVENSON NORLAN	509606	4511428	S	0670W	090N	15	NW	NW	8 L	0		6	720	287	1						
234752	6/4/2001	NP	1	01	STOLZ GEORGE & ROBIN	516063.2	4503302.6	S	0660W	080N	08	NW	NW	8	0		15	300	60	0						
254140-A	11/18/2003	NP	1	01	SURPRENANT CLAUDIA & SHAULL DAVID	518492.5	4507574.1	S	0660W	090N	28	NE	SW	89	0		0	0	0	1						
254140	11/18/2003	NP	1	01	SURPRENANT CLAUDIA & SHAULL DAVID	518492.7	4507569.6	S	0660W	090N	28	NE	SW	89	2		10	180	0	1						
195444-A	9/28/1999	NP	1	01	SURPRENANT JOE & CLAUDIA	518645.6	4507101.6	S	0660W	090N	28	SE	NW	8	0		8	340	40	1						
195444	5/15/1996	NP	1	01	SURPRENANT JOSEPH A & CLAUDIA J	518645.6	4507102.6	S	0660W	090N	28	SE	NW	8	3		7	150	0	0						1ST USE 1955
229556	9/25/2000	NP	1	03	TARBETT KENNETH	507754	4515309.9	S	0670W	100N	32	SE	NE	89	0		10	620	360	1						
295-WCB		NP	1	01	TATEYAMA ALBERT	526498.6	4493212.5	S	0650W	070N	08				0		0	22	0	0						
296-WCB		NP	1	01	TATEYAMA ALBERT	526498.6	4493212.5	S	0650W	070N	08				0		0	24	0	0						
83278			1	01	TATEYAMA HIROSHI	527315.9	4493619.3	S	0650W	070N	09	SW	SW	8	0		15	33	0	1						
215381	1/13/1999	NP	1	01	TAYLOR BENNY	512740.1	4515002.8	S	0670W	100N	35	SE	SE	8 L	0		12	31	24	0						
215382	1/13/1999	NP	1	01	TAYLOR BENNY	512740.5	4514813.3	S	0670W	100N	35	SE	SE	8 L	0		15	42	20	0						
208150	1/25/1998	NP	1	01	TAYLOR BENNY	512715.1	4515404.9	S	0670W	100N	35	SE	NE	89L	0		15	46	20	0						
254251	11/25/2003	NP	1	01	TEDESCO LEE D & ANNE M	517684.9	4501655.5	S	0660W	080N	16	NW	NW	89L	0		0	0	0	1						S1/2 of the N1/2 of the NW1/4
166963	10/5/1992	NP	1	01	THOMAS LLOYD E	507869.3	4522784.1	S	0670W	100N	05	SE	SE	9 L	0		4	25	6	0						VARIANCE #93-038
18854-R			1	01	THOMAS RUTH & WILBUR	508134.2	4523347.1	S	0670W	100N	04	SW	NW	1	0		450	20	6	0						
1007			1	01	THOMAS RUTH M & WILBUR	507758.6	4522534.6	S	0670W	100N	08	NE	NE	8	0		10	50	8	0						
12326-R	4/25/1960	NP	1	01	THORNTON CITY OF	521022.5	4497054.4	S	0660W	080N	35	NW	NW	1	0		100	30	20	0						
12327-R	4/25/1960	NP	1	01	THORNTON CITY OF	521022.5	4497054.4	S	0660W	080N	35	NW	NW	1	0		150	30	20	0						
12328-R	4/20/1960	NP	1	01	THORNTON CITY OF	521022.5	4497054.4	S	0660W	080N	35	NW	NW	1	0		150	30	20	0						
4590-R	10/21/1957	NP	1	01	THORNTON CITY OF	522631.8	4496291.9	S	0660W	080N	36	SW	NW	1	0		156	34	17	0						
4591-R	10/21/1957	NP	1	01	THORNTON CITY OF	522631.8	4496291.9	S	0660W	080N	36	SW	NW	1	0		156	33	17	0						
4592-R	10/21/1957	NP	1	01	THORNTON CITY OF	522631.8	4496291.9	S	0660W	080N	36	SW	NW	1	0		156	32	15	0						
5811-R			1	01	THORNTON CITY OF	524253.9	4494686.8	S	0650W	070N	06	SW	NW	1	0		200	27	15	0						
5812-R			1	01	THORNTON CITY OF	524253.9	4494686.8	S	0650W	070N	06	SW	NW	1	0		250	36	16	160						
622-R		NP	1	01	THORNTON CITY OF	525898	4493834.3	S	0650W	070N	08	NW	NW	1	0		260	26	8	0						
6687-F	1/11/1965	NP	1	01	THORNTON CITY OF	521829.8	4496676.9	S	0660W	080N	35	NE	SW	1	0		270	46	25	0						
621-R	9/23/1959	NP	1	01	THORNTON CITY OF	525898	4493834.3	S	0650W	070N	08	NW	NW	1	0		300	26	9	0						
4370-F	6/21/1963	NP	1	01	THORNTON CITY OF	521829.8	4496676.9	S	0660W	080N	35	NE	SW	1	0		350	42	25	0						
27169-F	3/12/1984	NP	1	01	THORNTON CITY OF	526877	4494047.8	S	0650W	070N	05	SE	SW	1	0		400	2	0	800						
5810-RR	6/3/1982	NP	1	01	THORNTON CITY OF	524256.5	4494282.8	S	0650W	070N	06	SW	SW	1	0		450	42	20	0						
5810-R			1	01	THORNTON CITY OF	524256.5	4494282.8	S	0650W	070N	06	SW	SW	1	0		640	45	19	0						
39645		NP	1	03	THREE PEAKS WATER INC	500958.6	4531390	S	0680W	110N	10	SE	NW	9	0		10	94	45	0						
15887-R			1	01	THREE PEAKS WATER INC	503895.8	4529185.4	S	0680W	110N	13	SW	SE	1	0		250	51	19	0						
9383-F			1	03	THREE PEAKS WATER INC	502975.9	4529778.9	S	0680W	110N	14	SE	NE	1	0		800	64	35	0						
228864	8/3/2000	NP	1	01	TOLLE LEO THOMAS & JAIME	509859.4	4519737	S	0670W	100N	15	SW	SW	8 L	0		12	200	20	0						
266166	9/23/2005	NP	1	01	TOLLE THOMAS & JAIME	509978.7	4520750	S	0670W	100N	15	NW	SE	8 L	0		0	0	0	1						
227081	6/29/2000	NP	1	01	TORREZ P STEVE & CYNTHIA G	512508.4	4516714.4	S	0670W	100N	26	SE	NE	8	0		15	200	60	0						
67931	3/2/1973		1	01	UNDERDOWN ERNEST R	517993.3	4506520	S	0660W	090N	33	NW	NW	89	0		6	320	60	0						
56777-F	8/20/2001	NP	1	03	UNITED STATES OF AMERICA	504065.3	4523535.2	S	0680W	100N	01	SE	NW	3 A	0		0	0	0	0						
12869-R			1	01	US FHA	521811	4498679.4	S	0660W	080N	26	NE	NW	1	0		150	25	17	0						
12870-R			1	01	US FHA	521811	4498679.4	S	0660W	080N	26	NE	NW	1	0		150	24	17	0						
272556	2/6/2007	NP	1	01	VARRA NICKOLAS A	517586.7	4506086.5	S	0660W	090N	32	NE	SE	H	0		12	465	200	0						
887-WCB		NP	1	01	VENABLE OLIN S S	521614.8	4498073.5	S	0660W	080N	26				0		0	31	0	0						
49680			1	01	VENABLE OLIN WILLIAM	521006	4499426.9	S	0660W	080N	23	SW	NW	8	0		12	37	23	0						
760-WCB		NP	1	01	WALKER PAUL	523242.5	4496497.5	S	0660W	080N	36				0		0	25	0	0						
11631-R			1	01	WALKER PAUL	523435	4496293.4	S	0660W	080N	36	SE	NW	1	0		200	20	10	0						
11632-R			1	01	WALKER PAUL	523435	4496293.4	S	0660W	080N	36	SE	NW	1	0		200	20	10	0						
11633-R			1	01	WALKER PAUL	523435	4496293.4	S	0660W	080N	36	SE	NW	1	0		200	20	10	0						
11634-R			1	01	WALKER PAUL	523435	4496293.4	S	0660W	080N	36	SE	NW	1	0		200	22	10	0						
11635-R			1	01	WALKER PAUL	523435	4496293.4	S	0660W	080N	36	SE	NW	1	0		200	22	11	0						
11636-R			1	01	WALKER PAUL	523435	4496293.4	S	0660W	080N	36	SE	NW	1	0		200	25	12	0						
263480	5/31/2005	NP	1	01	WARDLOW TINA & CARL BRIAN	518673.6	4506724.5	S	0660W	090N	28	SE	SW	H	0		6	340	50	0						
105728	4/2/1979	NP	1	01	WENG K	511759.4	4518944	S	0670W	100N	23	NW	SE	89	0		0	0	0	0						
234866	5/31/2001	NP	1	01	WHITFIELD BOBBY & MARILYN	511276.6	4520609	S	0670W	100N	14	NW	SW	8 L	0		6	200	22	0						permit was amended because the driller only needed to drill 200-300
270-WCB		NP	1	01	WIDMAIER M C	524878.7	4493258.5	S	0650W	070N	07				0		0	66	0	0						
238832	11/23/2001	NP	1	01	WILSON LEE ANN REVOCABLE TRUST	511931.4	4514966.4	S	0670W	100N	35	SW	SE	8	0		13	640	117	1						
5815-R			1	01	WOLF MIKE & MARTHA	523845	4494692.8	S	0660W	070N	01	SE	NE	1	0		300	42	15	0						
5814-R			1	01	WOLF MIKE & MARTHA	523845	4494692.8	S	0660W	070N	01	SE	NE	1	0		450	42	15	0						
36246			1	03	WORTHINGTON JOHN L & JACKIE H	501519.4	4530646	S	0680W	110N	15	NE	NE	9	0		20	57	36	0						
686-WCB		NP	1	01	WUKERT J S	524878.7	4493258.5	S	0650W	070N	07				0		0	55	0	0						
318-WCB		NP	1	01	YETTER CECIL	524863.3	4496470	S	0650W	080N	31				0		0	38	0	0						

USES: 0-Storage, 1-Irrigation, 2-Municipal, 3-Commercial, 4-Industrial, 5-Recreation, 6-Fishery, 7-Fire, 8-Domestic, 9-Stock, L-Livestock, M-Municipal, Q-Other, S-Stock

Diversion Structures

NAME	DIV_WD_ID	WATER_SOURCE	UTM_X	UTM_Y	STRTYPE	USETYPE	ADJTYPE	ADJDATE	APRODATE	CIU	DCRAMT	DCRUNITS	CASE NO	COMMENTS
GRAVES CREEK DIVR	003_1404	SPRINGS	500760.8	4536414.1	D	S	S	12/31/1971	07/31/1940	U	2	C	W 1412	
HECKMAN DIVERSION 1	001_760	WASTE	527404	4490876.7	O	I	S	12/31/1972	06/30/1967	U	2.22	C	W 1876	
MEADOW SPRING 1	003_1447	SPRINGS	505258.9	4527872.8	S	I	S	12/31/1971	07/31/1940	U	0	C	W 1410	SPRING 1 AND 2 DCR AMT 1.40 CFS
MEADOW SPRING 2	003_1446	SPRINGS	504880.2	4527671.8	S	I	S	12/31/1971	07/31/1940	U	0	C	W 1410	SPRING 1 AND 2 DCR AMT 1.40 CFS
SPRING CREEK DITCH 1	001_841	SPRING CREEK	510252.1	4519853	D	I	S	01/15/1914	05/01/1896	U	15.87	C	2142	823 ASP 1385
SPRING CREEK DITCH 1	001_841	SPRING CREEK	510252.1	4519853	D	I	S	01/15/1914	05/01/1896	U	30.15	C	2142	823 ASP 1385
WIDMAIER SEEPAGE DITCH	001_849	SEEPAGE	524977.1	4493960.3	D	I	S	12/31/1976	05/08/1969	A	2	C	W 8318	
WINDY ACRES SPRING	003_1546	SPRINGS	503681.6	4529877.4	S	I	S	12/31/1985	06/30/1927	U	0.334	C	85CW302	