

Laramie County Control Area Groundwater Management Plan

Laramie County Control Area Steering Committee
Report to the Laramie County Board of Commissioners
March 2016

Laramie County Control Area Groundwater Management Plan

Contents

Background.....	1
Geographic Descriptions	2
Laramie County Control Area	2
Groundwater Management Areas	3
Purpose of the Groundwater Management Plan.....	6
Goals and Objectives	7
Plan Goal.....	7
General Plan Objectives	7
Prevent the emergence of new Drawdown Areas inside the Control Area.....	7
Develop a financial incentive program.....	7
Groundwater Management Area Objectives	8
Public and Stakeholder Involvement and Coordination	8
Public and Stakeholder Involvement and Coordination	8
Well Spacing and static water level reporting	8
Well spacing for the Drawdown Area	9
Well spacing for the Conservation Area.....	9
Well spacing for the Unaffected Area	10
Well spacing for Underlying Units.....	10
Well spacing for all new wells	11
Financial Incentive/Buyout Program.....	11
Goal.....	11
Administration.....	11
Wells to target.....	11
Funding, Government assistance, and matching programs.....	11
Fee Structure	11
Land use after groundwater right buyout.....	12

Laramie County Control Area Groundwater Management Plan

Background

The Laramie County Control Area (LCCA or Control Area) comprises approximately the eastern two-thirds of Laramie County from Cheyenne east to the Nebraska border, south to the Colorado border, and north to Platte and Goshen Counties. Figure 1.1 is a general location map. The High Plains Aquifer system underlying most of Laramie County has been heavily appropriated since the 1970s. As a result, the Control Area was established by the Board of Control in 1981.

Responding to mounting concerns over increasing development and use of groundwater resources in southeast Wyoming, the State Engineer issued a *Temporary Order Adopting Well Spacing Requirements within the Laramie County Control Area* on April 11, 2012. The Order temporarily limited groundwater development in the Laramie County Control Area. The Order established well spacing restrictions (horizontally and vertically), as well as use limitations for most new groundwater applications in the Control Area. The Temporary Order was extended until April 1, 2015 (to be included in Appendix 5).

In August 2012 the Wyoming State Engineer's Office contracted with AMEC Environment & Infrastructure, Hinckley Consulting, and HDR, Inc. to conduct a hydrogeologic study to inform and provide a scientific basis for future groundwater management decisions. The study noted three main areas of groundwater decline including Pine Bluffs/Carpenter, Albin, and around Cheyenne. In general, the modeling correlated Pine Bluffs/Carpenter and Albin water-level declines to large-scale irrigation withdrawals and the Cheyenne water-level declines to a combination of municipal, industrial, and domestic development. The Study noted that much of the Control Area has not experienced significant drawdown from the Ogallala and Arikaree Formations and absent unforeseen development, probably would not experience significant drawdown over the modeled period (through 2060).

Wyoming state law, SS41-3-915 also provides the opportunity for water users in the control area to develop their own alternative to a state engineer's order. A local agreement can invoke the tools available to the State Engineer, but is far more flexible and could include incentives, programs and other creative options to reduce water use in ways that the State Engineer is not empowered to do. A requirement in statute is that a locally led agreement must not injure any party not signatory to it, nor be detrimental to the public interest.

In October 2014, the Laramie County Commissioners created the Laramie County Control Area Steering Committee and appointed 29 members representing water users in the county, economic development interests, water conservation interests, and experts in water use and allocation. The Commissioners charged the Steering Committee to develop creative and effective options for reducing water use in the Control Area. The Steering Committee met twice monthly, developing a set of recommendations to the State Engineer to incorporate into a new Order, due for April 1, 2015.

On April 1, 2015 a new Order of the State Engineer for the Laramie County Control Area was issued. The Order established well spacing requirements (horizontal and vertical), requirements for metering on all irrigation, industrial, and miscellaneous use underground water appropriations within the High Plains Aquifer, and static well level reporting requirements.

The Steering Committee continued to meet after the issuance of the April 1, 2015 Order and worked to develop a groundwater management plan for the Control Area. This document provides a framework for the development of a groundwater management plan for the Control Area.

Geographic Descriptions

Laramie County Control Area

The LCCA encompasses approximately 1,680 square miles. The LCCA starts on the eastern edge of the City of Cheyenne and extends east to the Nebraska border, south to Colorado border, and north to the Platte and Goshen County lines. The area generally encompasses the eastern two-thirds of Laramie County.

The hydrogeology underlying the LCCA includes the High Plains Aquifer. Almost all groundwater production within the LCCA is from the High Plains Aquifer. The High Plains Aquifer consists of the White River Formation (where permeable and hydraulically connected to overlying units), the Arikaree Formation, the Ogallala Formation, and any water-bearing Quaternary age deposits. The presence of these formations is not uniform throughout the LCCA.

- a) In the Albin area, the principally exploited water bearing zones consist of Ogallala and Arikare Formations.
- b) In the Pine Bluffs area, the principally exploited water bearing formations are Quaternary-age alluvium and the “fractured Brule” (upper White River Formation).
- c) In the Carpenter area, the terrace deposits and the upper White River Formation are hydrologically interconnected. East of Crow Creek, the terrace deposit is the principle aquifer, while west of Crow Creek, the White River Formation is the principal aquifer, even though some groundwater is available in the terrace deposit.
- d) Generally, in the rest of the LCCA, the High Plains Aquifer consists of the Arikaree Formation and the Ogallala Formation.

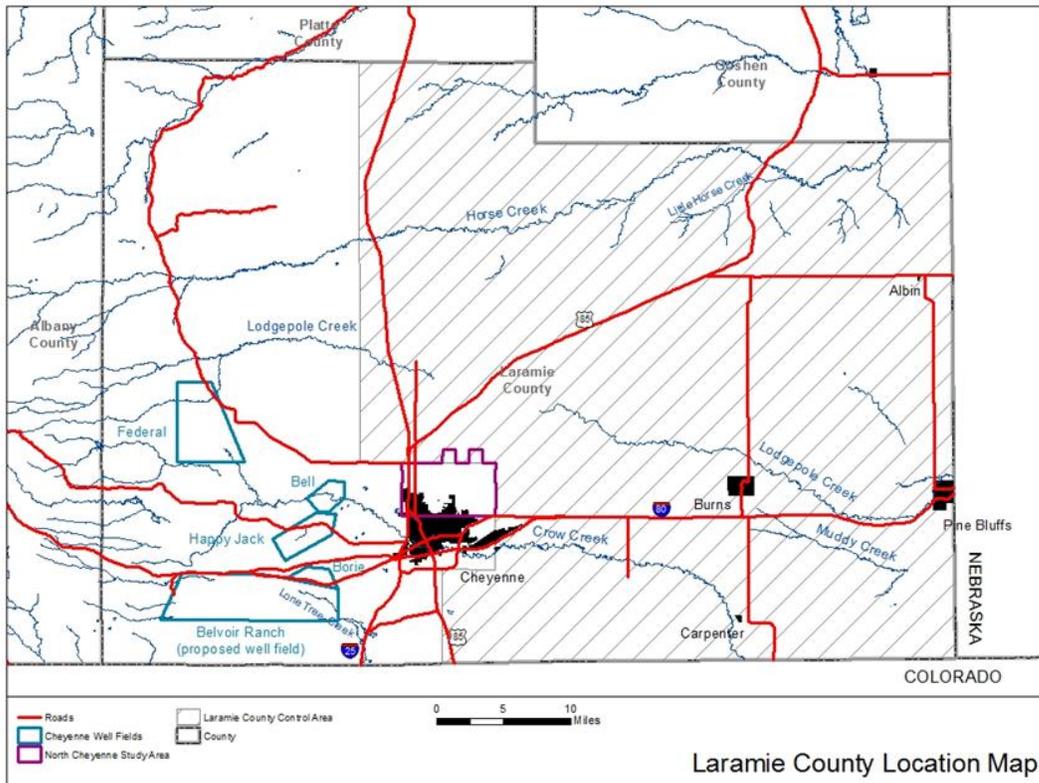


FIGURE 1.1 LARAMIE COUNTY CONTROL AREA.

Groundwater Management Areas

Groundwater management areas were developed by the Control Area Steering Committee using the areas developed by the State Engineer, further defined with watershed boundaries within the Control Area. The watershed boundaries were developed using the Hydrologic Unit Coding hierarchy established by the United States Geologic Survey. The areas that were defined are shown in Figure 1.2.

Horse Creek Basin (District 4)

Horse Creek Basin is in the northern quarter of the Control Area. This area also includes a small portion of Pumpkin Basin in the north eastern corner of the Control Area. Within Horse Creek Basin, there is no area identified as a “Long Term Groundwater Drawdown Area,” as defined in the State Engineer’s April 1, 2015 Order. The lower half of Horse Creek Basin is classified as a Conservation Area. The northern area is outside of the groundwater model boundary and is classified as an Unaffected Area.

Long-Term Groundwater Conservation Area (Conservation Area)

The High Plains Aquifer within the LCCA, south of Horse Creek and north of Lone Tree Creek topographic/groundwater divide, which does not satisfy the definition of a Drawdown Area and is shown on Figure 1.2.

Unaffected Groundwater Area (Unaffected Area)

The High Plains Aquifer and Underlying Units within the LCCA outside the model domain, north of Horse Creek and south of the Lone Tree Creek topographic divide and is shown in Figure 1.2.

[Underlying Units throughout the LCCA \(Underlying Units\)](#)

Any water-bearing unit deeper than the High Plains Aquifer within the geographic area of the LCCA, excluding the Unaffected Area. These water-bearing units (aquifers) are below the Brule Formation, and include the Chadron Formation, the Lance Formation, the Fox Hills Sandstone, and deeper units.

[Albin Area \(Name to be determined\) \(District 5\)](#)

Lower Lodgepole Basin is in the northeastern quadrant of the Control Area and includes the town of Albin. The eastern portion of this basin is classified as being in the Drawdown Area. The remainder of the basin is classified as a Conservation Area.

[Long Term Groundwater Drawdown Area \(Drawdown Area\)](#)

The High Plains Aquifer within the LCCA where the AMEC Report Management Scenario 4 predicts declines in saturated thickness equal to or greater than 25 percent by 2060 and is shown on Figure 1.2.

[Long-Term Groundwater Conservation Area \(Conservation Area\)](#)

The High Plains Aquifer within the LCCA, south of Horse Creek and north of Lone Tree Creek topographic/groundwater divide, which does not satisfy the definition of a Drawdown Area and is shown on Figure 1.2.

[Unaffected Groundwater Area \(Unaffected Area\)](#)

The High Plains Aquifer and Underlying Units within the LCCA outside the model domain, north of Horse Creek and south of the Lone Tree Creek topographic divide and is shown in Figure 1.2.

[Underlying Units throughout the LCCA \(Underlying Units\)](#)

Any water-bearing unit deeper than the High Plains Aquifer within the geographic area of the LCCA, excluding the Unaffected Area. These water-bearing units (aquifers) are below the Brule Formation, and include the Chadron Formation, the Lance Formation, the Fox Hills Sandstone, and deeper units.

[Upper Lodgepole Creek Basin \(District 1 and District 3\)](#)

Upper Lodgepole Creek Basin is located in the central portion of the Control Area and is divided into two districts. The basin includes the towns and communities of Burns, Egbert, Hillsdale, and Pine Bluffs. The eastern part of Upper Lodgepole Creek Basin is classified as in the Drawdown Area. The western portion of the basin is classified as a Conservation Area.

[Long Term Groundwater Drawdown Area \(Drawdown Area\)](#)

The High Plains Aquifer within the LCCA where the AMEC Report Management Scenario 4 predicts declines in saturated thickness equal to or greater than 25 percent by 2060 and is shown on Figure 1.2.

Long-Term Groundwater Conservation Area (Conservation Area)

The High Plains Aquifer within the LCCA, south of Horse Creek and north of Lone Tree Creek topographic/groundwater divide, which does not satisfy the definition of a Drawdown Area and is shown on Figure 1.2.

Unaffected Groundwater Area (Unaffected Area)

The High Plains Aquifer and Underlying Units within the LCCA outside the model domain, north of Horse Creek and south of the Lone Tree Creek topographic divide and is shown in Figure 1.2.

Underlying Units throughout the LCCA (Underlying Units)

Any water-bearing unit deeper than the High Plains Aquifer within the geographic area of the LCCA, excluding the Unaffected Area. These water-bearing units (aquifers) are below the Brule Formation, and include the Chadron Formation, the Lance Formation, the Fox Hills Sandstone, and deeper units.

Crow Creek Basin (District 2)

Crow Creek Basin is located in the lower quarter of the Control Area. It includes the town of Carpenter. The eastern quarter of the basin is classified as a Drawdown Area. The western portion is classified as a Conservation Area.

Long Term Groundwater Drawdown Area (Drawdown Area)

The High Plains Aquifer within the LCCA where the AMEC Report Management Scenario 4 predicts declines in saturated thickness equal to or greater than 25 percent by 2060 and is shown on Figure 1.2.

Long-Term Groundwater Conservation Area (Conservation Area)

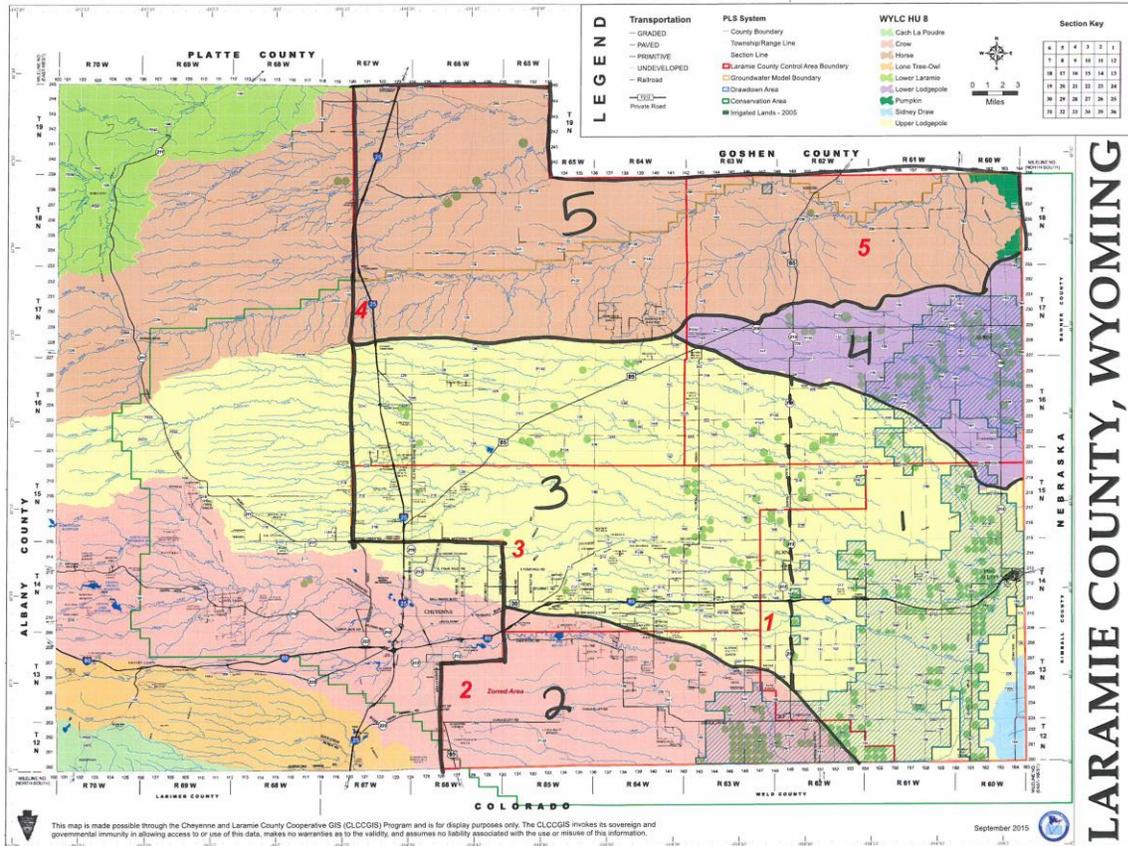
The High Plains Aquifer within the LCCA, south of Horse Creek and north of Lone Tree Creek topographic/groundwater divide, which does not satisfy the definition of a Drawdown Area and is shown on Figure 1.2.

Unaffected Groundwater Area (Unaffected Area)

The High Plains Aquifer and Underlying Units within the LCCA outside the model domain, north of Horse Creek and south of the Lone Tree Creek topographic divide and is shown in Figure 1.2.

Underlying Units throughout the LCCA (Underlying Units)

Any water-bearing unit deeper than the High Plains Aquifer within the geographic area of the LCCA, excluding the Unaffected Area. These water-bearing units (aquifers) are below the Brule Formation, and include the Chadron Formation, the Lance Formation, the Fox Hills Sandstone, and deeper units.



Purpose of the Groundwater Management Plan

The purpose of the groundwater management plan is to provide a framework for coordinating groundwater management activities in the Laramie County Control Area into a set of management objectives and implementing the actions necessary to meet those objectives. This plan provides action items that, when implemented, will manage groundwater levels.

This document presents a locally developed, stakeholder-driven groundwater management plan that reflects current State law and defines actions for developing projects and management programs to monitor the operation of groundwater and to improve the long-term sustainability of groundwater resources in the Laramie County Control Area. This plan aims to reduce current and potential conflicts over groundwater resources in the Control Area.

This plan is being developed under WS 41-3-915(c-d).

(c) Appropriators of underground water from a control area may agree to any method or scheme of control of withdrawals, well spacing, apportionment, rotation or proration of the common supply of underground water. The state engineer shall encourage and promote such agreements and supply the parties with information and advice. When the state engineer, with the advice of the control area advisory board, shall find that any such agreement, executed in writing and filed in his office, is consistent with the intent, purposes and requirements of this act

[§§ 413901 through 413938], and would not be detrimental to the public interest or to the rights of other persons not parties to the agreement, he shall approve the agreement, and thereafter such agreement shall control, until terminated as hereinafter provided, in lieu of any order issued pursuant to subsection (a) of this section.

(d) Any agreement approved by the state engineer may be terminated by the terms of the agreement, by the consent of the parties, or by order of the state engineer if he finds, after investigation and a public hearing before the control area advisory board, held at least two (2) weeks after one (1) published notice in a newspaper of general circulation in each county in which a part of the control area lies, that the agreement is not being substantially complied with by the parties, or that changed conditions have made the agreement inequitable, or that the continuance of the agreement is no longer consistent with the intent, purpose and requirements of this act, or is a detriment to the public interest or to the rights of other persons not parties to the agreement.

Goals and Objectives

Groundwater management involves understanding the available groundwater resources in order to make informed decisions about meeting existing and future water needs. This section establishes the goals and objectives that will be used to direct groundwater management activities in the Control Area.

Plan Goal

The goal of the groundwater management plan is to locally manage, and to protect and conserve ground water resources in a long-term sustainable, economical, and equitable manner. The plan will not be detrimental to the public interest or to the rights of other persons not parties to the agreement. This Plan builds on the April 1, 2015 Order issued by the State Engineer and aims to improve it.

General Plan Objectives

1. Prevent the emergence of new Drawdown Areas inside the Control Area

Groundwater levels in the Control Area generally reflect the overlying level of development of all use types (agriculture, municipal, industrial, domestic, and miscellaneous). Groundwater levels have experienced the greatest levels of decline in the areas with the highest level of development.

Drawdown Areas are defined as areas in the High Plains Aquifer within the LCCA where the AMEC Report Management Scenario 4 predicts declines in saturated thickness equal to or greater than 25 percent by 2060. This objective is intended to ensure that the overall groundwater levels in the Control Area are managed to provide long-term reliable sources of water for the economic well-being of the area and to prevent the development of new Excessive Drawdown Areas.

2. Develop a financial incentive program

Retirement of groundwater rights provides an opportunity to reduce overall use and improve groundwater conditions through market-based approaches that encourage economic growth and

development within the Control Area. A financial incentive program could entail contracts with between land owners and an organization with taxing authority (i.e. Conservation Districts) that will result in the permanent reduction of part or all of a groundwater appropriator's historic consumptive use. Funding for such a program could come from federal or state programs, or from other sources that may include assessments of fees to groundwater appropriators within a defined area. The amount paid by the entity could be established per acre-foot of historic consumptive use made available under the water right to be dismissed or permanently reduced. The details of such programs will be determined by the administrator of a buyout program and the specific needs of the area pursuing a program.

Groundwater Management Area Objectives

This section describes the identification of objectives for the groundwater management areas within the Control Area.

Using this groundwater management plan as a framework, each management area will be able to decide on a management objective that is unique to the needs and hydrologic conditions of that area.

Management objectives for each management area could include: stabilize groundwater levels, manage drawdown, or recover groundwater levels to a specific level on a certain date.

Public and Stakeholder Involvement and Coordination

Public and Stakeholder Involvement and Coordination

In the development of the plan, groundwater users in each of the groundwater management areas will be consulted with through public meetings organized by members of the Steering Committee. The meetings and conversations will help in the development of area objectives and management strategies and activities. Public and groundwater users will inform the committee on preferences, feasibility of management strategies, and groundwater level targets for each area. The steering committee will be the final decision makers in the development of the groundwater management plan.

Well Spacing and Static Water Level Reporting

Spacing requirements are adopted pursuant to Wyoming Statute SS 41-3-915 for all new underground water appropriations (including enlargements), where the point of diversion (well location) is located in the LCCA. The spacing requirements are tailored to reflect varying hydrogeologic conditions across the LCCA.

Long Term Groundwater Drawdown Area (Drawdown Area)

The High Plains Aquifer within the LCCA where the AMEC Report Management Scenario 4 predicts declines in saturated thickness equal to or greater than 25 percent by 2060 and is shown on Figure 1.2.

Long-Term Groundwater Conservation Area (Conservation Area)

The High Plains Aquifer within the LCCA, south of Horse Creek and north of Lone Tree Creek topographic/groundwater divide, which does not satisfy the definition of a Drawdown Area and is shown on Figure 1.2.

Unaffected Groundwater Area (Unaffected Area)

The High Plains Aquifer and Underlying Units within the LCCA outside the model domain, north of Horse Creek and south of the Lone Tree Creek topographic divide and is shown in Figure 1.2.

Underlying Units throughout the LCCA (Underlying Units)

Any water-bearing unit deeper than the High Plains Aquifer within the geographic area of the LCCA, excluding the Unaffected Area. These water-bearing units (aquifers) are below the Brule Formation, and include the Chadron Formation, the Lance Formation, the Fox Hills Sandstone, and deeper units.

Well spacing for the Drawdown Area

- i. For stock and domestic use wells, and miscellaneous use wells appropriating less than or equal to five (5) acre-feet per year, the following horizontal well spacing is adopted:
 1. No more than one well for stock use, or one well for domestic use, or one well for stock and domestic use per each lawfully subdivided lot, or per ten (10) acres of any other legal parcel of land.
- ii. Miscellaneous use wells shall be a minimum of one-half mile distant from any other miscellaneous, industrial, municipal, or irrigation use well. Owners of wells developed under this section shall submit to the SEO Ground Water division by June 1 at least one static water-level measurement collected during March, April, or May of each year. Water level data shall be collected according to procedures provided by the SEO Ground Water Division
- ii. For all wells other than the stock, domestic and miscellaneous use wells identified above, appropriation of groundwater from the High Plains Aquifer are prohibited.

Well spacing for the Conservation Area

- i. For stock and domestic use wells, and miscellaneous use wells appropriating less than or equal to five (5) acre-feet per year, no more than one well for stock use, or one well for domestic use, or one well for stock and domestic use, or one well for miscellaneous use per each lawfully subdivided lot or per each ten (10) acres of any other legal parcel of land.
- ii. For miscellaneous, municipal, irrigation, and industrial use wells appropriating more than 5 and less than 40 acre-feet per year, no more than one well per each 40-acre, quarter-quarter section (or Government Lot) as defined by the current PLSS.
 1. Owners of wells developed under this section shall submit to the SEO Ground Water Division by June 1 at least one static water-level measurement collected during March, April, or May of each year. Water level data shall be collected and reported according to procedures provided by the SEO Ground Water Division (Appendix 4). Reduction of the water column in excess of 20 percent of that available to the well at the time of original development, as determined by the SEO, is prohibited. Water-level measurements shall be collected from either the production well or from a dedicated ground-water monitoring well as described in the paragraph below. The SEO will determine whether an individual well must be accompanied by a dedicated monitoring well at the time of permitting.

- iii. Higher capacity wells shall be developed at least 1.5 miles from each other and from any other existing higher capacity wells.
 - 1. Wells developed under this section shall have a separate, dedicated groundwater-monitoring well, screened in the same interval as the production well, and located no more than 500 lateral feet from the production well. Owners shall submit to the SEO Ground Water Division by June 1 at least one static water-level measurement from the groundwater- monitoring well collected during March, April, or May or each year. Water level data shall be collected and reported according to the procedures provided by the SEO Groundwater Division. Reduction of the water column in excess of 20 percent of that available to the well at the time of original development, as determined by the SEO, is prohibited.

Well spacing for the Unaffected Area

This plan does not impose well spacing requirements for this area at this time.

- i. Owners of miscellaneous, municipal, irrigation, and industrial use well appropriating more than 5 acre-feet per year shall submit to the SEO Ground Water Division by June 1 at least one static water-level measurement collected during March, April, or May of each year. Water level data shall be collected and reported according to procedures provided by the SEO Ground Water Division.

Well spacing for Underlying Units

- i. For stock and domestic use wells, and miscellaneous use wells appropriating less than or equal to five (5) acre-feet per year, no more than one well for stock use, or one well for domestic use, or one well for stock and domestic use, or one well for miscellaneous use per each lawfully subdivided lot, or per each ten (10) acres of any other legal parcel of land.
- ii. For miscellaneous, municipal, irrigation, and industrial use wells appropriating more than 5 and less than 40 acre-feet per year, no more than one well per each 40-acre, quarter-quarter section (or Government Lot) as defined by the current Public Land Survey System.
 - 1. Owners of wells developed under this section shall submit to the SEO Ground Water Division by June 1 at least one static water-level measurement collected during March, April, or May of each year. Water level data shall be collected and reported according to procedures provided by the SEO Groundwater Division. Reduction of the water column in excess of 20 percent of that available to the well at the time of original development, as determined by the SEO, is prohibited. Water-level measurements shall be collected from either the production well or from a dedicated groundwater-monitoring well as described below. The SEO will determine whether an individual well must be accompanied by a dedicated monitoring well or wells at the time of permitting.
- iii. Higher capacity wells not described above shall be developed at least 1.5 miles from each other and from any other existing higher capacity wells not described above.
 - 1. Wells developed under this section shall have a separate, dedicated groundwater-monitoring well, screened in the same interval as the production well, located no more than 500 lateral feet from the production well. The SEO may require an additional, shallower monitoring well. Owners shall submit to the SEO Ground Water Division by June 1 at least one static water level measurement from the groundwater-monitoring well collected during March, April, or May of each year. Water level data shall be collected and reported according to procedures provided by the SEO Ground Water Division. Reduction of the water column in excess of 20 percent of

that available to the well at the time of original development, as determined by the SEO is prohibited.

Well spacing for all new wells

No new wells to be completed within alluvial areas that will have an impact on stream flows.

Financial Incentive/Buyout Program

In the open letter to the LCCA Steering Committee, the State Engineer asked the Steering Committee to “... continue your work on the financial incentives for removing demand from the High Plains Aquifer.”

The specifics of a financial incentive or buyout program in the Control Area will depend on the administrator, funding sources, and management area where a program is being developed.

Goal

The goal of a financial incentive program is to manage/reduce stress on the aquifer.

Administration

Possible administrators of a buyout program include:

- Wyoming Water Development Commission
- Land trusts
- Special improvement districts
- Conservation districts
- County commissioners

Wells to target

The program could be a voluntary seller and buyer program for high capacity wells within the High Plains Aquifer.

- Target high capacity wells, any well greater than 25 gallons per minute
- Target wells in the drawdown area
- Allow for buyouts of wells outside the drawdown areas that are completed in alluvial areas that are having an impact on stream flows

Funding, Government assistance, and matching programs

Programs and funding options include:

- NRCS programs
 - Regional Conservation Partnership Program (RCP)
 - Agricultural Water Enhancement Program (AWEP)
 - Environmental Quality Incentives Program (EQIP)
- Fees on new wells
- Water development commission

Fee Structure

The fee structure would depend on the administration of the program. The committee wants to see any compensation based on a quantifiable reduction of water use, not based on acres of land currently being irrigated. In the development of a fee structure the water right holder’s volume of water being retired, the historical water use, acres that are being retired, and land productivity.

Land use after groundwater right buyout

Depending on the funding source the land use after water right retirement is defined. Land with retired irrigated acres could be converted to dryland farming or pasture land.

To ensure that a water right holder cannot sell their water right and then apply and receive a new water right, the funding agency should require a change in the land owner's deed to ensure that the land is not irrigated.