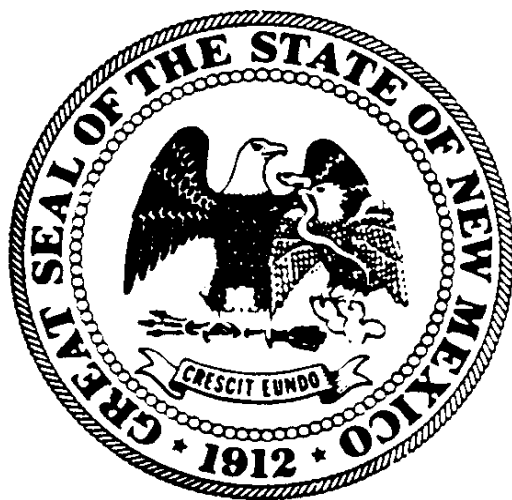


**ESTANCIA UNDERGROUND WATER BASIN
GUIDELINES FOR REVIEW OF WATER RIGHT
APPLICATIONS**

**PREPARED BY
THE OFFICE OF THE NEW MEXICO STATE ENGINEER
FOR INTERNAL USE**



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June 20, 2002**

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OFFICE OF THE STATE ENGINEER

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INTRODUCTION

The purpose of this document is to provide guidelines to Office of the State Engineer (OSE) personnel on general procedures to follow for processing pending and future water rights applications filed within the Estancia Underground Water Basin (EUWB, shown in Figure 1). Certain provisions also apply to permits that have been granted, but have not been fully exercised.

The OSE has developed administrative guidelines in order to assure the orderly development of water resources within the EUWB, while meeting statutory obligations regarding non-impairment to existing water rights, availability of unappropriated water, conservation of water within the state, and public welfare of the state.

The Estancia Underground Water Basin (EUWB) was declared by the OSE on January 31, 1950. Extensions were made to the basin on March 28, 1975 and March 14, 1994. The EUWB covers portions of Bernalillo, Santa Fe, Tarrant and San Miguel Counties as shown in Figure 1. The central portion of the EUWB has been administered for several decades as a mined basin using a block-inventory system. Effects of new groundwater appropriations and transfers have been

calculated using the Theis analytic solution.

Portions of the basin are experiencing large rates of water level decline relative to available water columns existing in wells and available saturated thickness of the aquifer. Available data also suggest that saline water may be migrating into areas with better water quality. Pumping effects transmitted from one formation to another are important to consider in the administration of the EUWB and are difficult to quantify using past computational procedures. New computational tools have been developed to assess groundwater level declines within the EUWB. Revision of the basin policies developed several decades ago are necessary to incorporate these tools and to better address current issues while meeting statutory responsibilities.

SUMMARY OF THE GUIDELINES

The OSE adopted administrative procedures for the Estancia Basin in the mid-1960s. Since that time, significant advances have been made in knowledge of the basin water resources and computation methods to assess pumping impacts. Guidelines based on these new methods have been developed to protect existing water rights and to extend the life of the basin water resources.

The proposed guidelines are based upon results of a numerical groundwater flow model, which is used to estimate future water level declines and saturated thickness remaining at the end of the 40-year planning period. The OSE has assumed the full exercise of all existing water rights for 40 years (end of year 2040) in the model to make these estimates. Available information suggests that about one-third of the permitted and declared water rights may be in use at the present time. Because the extent to which legitimate water rights may be used in the future is unknown, it is necessary to assume full exercise of all water rights.

To facilitate more accurate future water use scenarios, requests for extensions of time will be evaluated using these guidelines. Use of these guidelines for extensions of time shall apply to existing permits and applications for entities that do not meet the 40-year planning provisions of NMSA Section 72-1-9. Upon review of the proof of beneficial use, the OSE shall update future pumpage estimates within the model. Future pumpage estimates shall

also be updated by the OSE based on other proof that existing rights will no longer be fully utilized.

The primary objective of these guidelines is to protect existing water rights. To accomplish this objective, the OSE issued an Order on July 24, 2001 denying new groundwater appropriations in the EUWB and has set limits on groundwater level declines. Both regional and local water level decline analyses and limits are necessary to protect existing water rights. Regional administration is required to control wide reaching impacts by considering average basin-wide conditions (such as the representative water column in existing wells). Local analyses must also be performed by taking into consideration well conditions in the immediate vicinity of an application.

Two methods to administer regional water level declines may be applied. One method, which is used for aquifers that are relatively thin, is to allow water level declines down to a prescribed aquifer thickness. The other method is to allow the rate of water level decline to reach a certain limit. Because the Estancia Basin has multiple aquifers with a large variation in aquifer thickness, both methods will be applied to administer water level declines. Figure 2 provides cross-sections of the aquifer showing both of these methods.

Portions of the valley fill aquifer are thin and are predicted to lose additional saturated thickness. Water level decline and

well completion data suggest 80.00 feet of saturated thickness may be adequate for many domestic wells to achieve a 40-year supply. Reducing new impacts to these areas with limited saturated thickness is desirable to extend the supply beyond the 40-year administrative period. Provisions are included in the guidelines to restrict additional water level declines in those areas predicted to reach a saturated thickness of 80.00 feet or less at the end of the 40-year administrative period.

In addition to protecting areas of limited saturated thickness, there is also a need to protect wells in areas with a greater saturated thickness. For all aquifers with a predicted saturated thickness exceeding 80.00 feet by the end of 2040, the review of water rights applications will consider the rate of water level decline. A survey of domestic well completions in the Estancia Basin indicates an average water column of about 100 feet. A water level decline rate of 1.50 feet per year, or 60 feet over 40 years, is deemed to be the maximum allowable rate so typical domestic wells will have sufficient water column to maintain production during the 40-year management period. Provisions are also included in the guidelines to restrict additional water level declines in those areas predicted to reach an average water level decline rate exceeding 1.50 feet per year.

Areas within the valley fill aquifer with a predicted saturated thickness of 80.00 feet or less in year 2040, or areas

with a predicted rate of decline exceeding 1.50 feet per year, are defined as a Critical Management Area (CMA). A CMA is an area that deserves heightened protection because the water resources may be inadequate for sustained well production. CMAs are protected by:

- denying additional appropriations in the CMA's proposed under NMSA Section 72-12-3;
- denying additional appropriations in the CMA's due to changes in location of a well and place or purpose of use from sites located outside of the CMA (non-CMA); and
- limiting water level declines upon the CMA's from proposed non-CMA wells associated with certain types of applications.

Since wells located in the non-CMA will impact the CMA, an allowable decline rate is necessary to control declines in these heavily stressed areas. A maximum allowable rate of additional water level decline of 0.10 feet per year on any CMA cell has been selected. Allowable decline rates similar to this value have been adopted by the OSE for other basins.

In addition to the two types of CMAs described above, the OSE may identify, when necessary, additional model cells as critical. These areas may include areas in which well productivity is highly uncertain or areas in which the model under-predicts observed water level declines. These areas are referred to as the "Model Caution Areas."

When evaluating an application, local impact investigations will also be performed to evaluate effects on near-by wells. The OSE shall conduct local impact analyses on a case-by-case basis to evaluate water level declines and potential changes to water quality. If the regional groundwater model is found to be inappropriate in characterizing the site-specific conditions for an application, OSE reviewers will perform other appropriate analyses. While detailed guidelines are not presented in this document to describe all analyses, which may be potentially required, staff will perform the analyses required to ensure statutory requirements are met. These considerations may include surface water impacts, impairment, water conservation, public welfare, impacts from the diversion of non-potable water, changes to water quality and the preservation and continuation of senior water rights; or other considerations as needed.

ADMINISTRATIVE GUIDELINES

1. WATER RIGHTS APPLICATIONS.

a. Pursuant to the adoption of these guidelines, the following types of applications will be reviewed on a case-by-case basis:

- pending applications, including applications filed under NMSA Section 72-12-3, will be processed in accordance with these guidelines;
- applications filed under NMSA Section 72-12-1 for prospecting, mining or construction of public works, highways and roads or drilling operations;
- applications for change in place of use and/or purpose of use;
- applications to change point of diversion from within a non-CMA to a non-CMA;
- applications to change point of diversion of water rights from within a CMA to any location in the EUWB(non-CMA or CMA); and
- applications to replace, repair, deepen or supplement existing wells.

b. Pursuant to the adoption of these guidelines, the following types of groundwater applications will be

denied:

- NMSA Section 72-12-3 applications to appropriate ground water filed on or after July 24, 2001;
- NMSA Section 72-12-3 applications filed before July 24, 2001 proposing to increase diversions from a CMA;
- all applications, pending and new, to change location of well and place or purpose of use from the non-CMA to the CMA; and
- applications contrary to statute.

2. CRITICAL MANAGEMENT AREA.

A CMA shall include those model cells in any model layer that meet any one of the following conditions:

- a. the predicted saturated thickness of the valley fill, at the end of year 2040, is 80.00 feet or less; or
- b. the observed or predicted average rate of water level decline through year 2040 exceeds 1.50 feet per year in the valley fill, San Andres/Glorieta, Abo/Yeso or Madera formations; or
- c. the OSE has identified the model cell to be critical for reasons other than the conditions above (referred to as the "Model Caution Area" on Figures 3-6).

The CMA boundaries presently defined by the OSE for the valley fill, San Andres/Glorieta, Abo/Yeso and Madera are shown in Figures

3, 4, 5 and 6, respectively. The OSE has the sole responsibility to determine the boundaries of the CMA and will modify these boundaries as applications are processed or as new data become available.

3. PERMIT AND DECLARATION LIMITS.

For permits and declarations for water rights other than those that meet the provisions of NMSA Section 72-1-9, the OSE factual determination of the actual amount of ground water historically placed to beneficial use will be the limit of any subsequent permit. Adequate demonstration by the applicant of declared waters placed to beneficial use shall include documentation showing the water was applied to beneficial use prior to the declaration of the basin, and that beneficial use has continued to the present.

4. EXTENSIONS OF TIME.

The provisions in this section shall not apply to well permits and applications under NMSA Section 72-12-1, and those for municipalities, counties, state universities, public utilities supplying water to municipalities or counties, or member-owned community water systems which meet the provisions of NMSA Section 72-1-9. All other existing well permits, and applications approved following the adoption of these guidelines, shall be limited to no more than two extensions of time following the adoption of these guidelines. The following provisions shall apply to all requests for extension of time:

- a. requests for extension of time will be granted only

upon demonstration by the applicant that an acceptable portion of the permit has been placed to beneficial use;

b. demonstration for the first extension of time following the adoption of these guidelines shall include proof that at least 25 percent of the permitted amount has been beneficially used;

c. if approved, the first extension of time will require submission of proof of beneficial use within three years;

d. at the end of this three-year period, if rights have not been fully placed to beneficial use, a final three-year extension of time may be approved if at least 50 percent of the amount permitted has been beneficially used;

e. after evaluation of the proof of beneficial use filed within the required time period, a license may be granted; and

f. failure to submit acceptable proof of beneficial use as required could result in cancellation of that part of the permitted right that was not placed to beneficial use.

5. REGIONAL WATER LEVEL DECLINE RESTRICTIONS.

The guidelines that follow in this section and item 6 below shall apply to:

- a. pending non-CMA applications filed under NMSA Section 72-12-3 before July 24, 2001;
- b. applications to change location of well and place or purpose of use to a location within the non-CMA; and
- c. applications to change location of well and place or purpose of use from the CMA to sites within the CMA.

These types of applications may be permitted to induce impacts on non-CMA cells up to the limits specified for CMA cells in item 2 above, plus an additional allowable average rate of water level decline up to 0.10 feet per year through the end of year 2040 on any model cell. The computed effects due to an application on any CMA cell existing prior to the review of that application, may not exceed the allowable average rate of decline of 0.10 feet per year through the end of year 2040. In addition to satisfying these provisions, the application may be approved if it meets other applicable guidelines and is not contrary to statute.

6. REGIONAL CALCULATION METHODS.

Groundwater applications identified in item 5 above may be evaluated using the OSE Modified Balleau Model (Balleau, 1998), as described in Keyes and Frost (2001), or other subsequent model versions approved by the OSE. Applications in areas which the model is deemed inappropriate by the OSE and applications adjacent to the

model area, will be processed on a case-by-case basis. Water level decline calculations will be made by assuming full production of proposed wells beginning in the year the calculations are performed, to the end of year 2040, unless the applicant has filed a pumping schedule acceptable to the OSE. Computed drawdowns at the end of year 2040, from existing and proposed uses, shall be divided by the number of years used in the predictive scenario to obtain the average annual rate of water level decline. If a reasonable pumping schedule has been proposed for the application and existing permits under the control of the applicant, analyses will then be performed in accordance with the schedule. The full exercise of existing permits and declarations will be assumed up to the end of year 2040. If the OSE modifies the amount permitted or found valid, these modifications shall be incorporated into future model calculations. If a pumping schedule has been proposed, the permit shall be conditioned to limit pumpages in accordance with the schedule. For all applications, diversion rates will be used in the model calculations. For the purpose of predicting pumping impacts for irrigation applications, 100 percent of the farm delivery requirement shall be used for model calculations. For a proposed irrigation appropriation, the accepted farm delivery requirement is 2.13 acre-feet per acre per annum (assuming a 60 percent farm efficiency), with a consumptive irrigation requirement of 1.28 acre-feet per acre per annum (Wilson, 2001). Residual effects

associated with historical diversions from the original well shall be added to the impacts due to new wells. From time to time, the model will be updated to take into account canceled permits and newly approved applications, including NMSA Section 72-12-1 wells.

7. CALCULATION OF LOCAL IMPACTS.

Applications other than those requested under NMSA Section 72-12-1, shall be evaluated to assess impacts to nearby senior wells of other ownership, and all wells owned by parties that have filed a valid protest to an application. Local impact assessments will evaluate declines for at least 40 years from the OSE evaluation date and will be performed on a case-by-case basis taking into consideration available water columns, principal water bearing formations and well screen placements in wells, impacts from existing and proposed uses, the possibility of deepening wells to sustain a freshwater supply, priority of water rights of nearby wells of record, residual effects, and other site-specific information. Calculations may be performed using the OSE Modified Balleau Model or the Theis equation. The most realistic method resulting in the greater impact will govern. Aquifer parameters used to calculate drawdowns on nearby wells may be obtained from accepted groundwater flow models or from reasonable site-specific information. Well records, declarations and existing permits or licenses on file with the OSE will be used to factually determine priorities. Applications to change location of a well and place or

purpose of use will retain the original priority date of the associated valid water rights. These applications will be allowed to impact junior nearby wells by any amount. Applications that are junior to nearby wells shall not be granted if their predicted rates of water level decline exceed 0.10 feet per year on senior wells that have a model predicted life expectancy of less than 40 years. In general, to achieve a 40-year life for senior wells, it may be assumed that 40-year water level declines must not exceed 70 percent of the current water column, or fall to a level within 20.00 feet above the base of the principal water bearing formation or perforated interval identified in the well log, whichever is more conservative. The more protective provision, either the 70 percent or 20-foot guide, shall be applied to identify wells with senior rights with a life expectancy of less than 40 years. More stringent drawdown limitations may be necessary to extend the productive life of senior wells if the estimated productive life is less than 20 years.

8. APPLICATIONS TO SUPPLEMENT, REPLACE, REPAIR OR DEEPEN.

Applications under this section to provide for the full diversion of valid senior water rights may be allowed to impact junior users by any amount. Permits approved for applications under this section will retain their original priority date. If there are senior water rights near an application, the rate of decline restrictions presented in item 7 must be met.

9. WATER QUALITY.

Water quality is marginal for some purposes in the basin and may be deteriorating further. Consequently, groundwater quality assessments may be performed when necessary and will consider groundwater capture and migration patterns. The evaluation technique to assess potential water quality degradation will be selected on a case-by-case basis. Beneficial and negative impacts associated with applications proposing to divert non-potable water will be taken into consideration when assessing the application. OSE personnel may seek consultation with the New Mexico Environment Department (NMED) on water quality assessments. Permits may be conditioned to comply with water quality standards imposed by the New Mexico Water Quality Control Commission, OSE, NMED, or any federal requirements.

10. APPLICATION FEASIBILITY.

Applications will be reviewed to determine whether the quantity of ground water requested can be reasonably diverted from the proposed well. Applications for purposes other than subdivision water supply shall be reviewed to ensure the likelihood that the wells can sustain the quantity of water sought for 40 years from the OSE review date, unless a specified length of time has been requested in the application. A determination of the long-term availability of water from a particular well will be based on

the transmissivity/storativity of the aquifer at that location, the proposed well casing diameter, the principal water bearing formations and water column in the proposed well, estimated well efficiency and the calculated future water level declines from the exercise of existing water rights. In addition, it will be assumed that an agricultural well requires 6 gallons per minute per irrigated acre. For all wells, it will be assumed that a pump cannot run more than 60% of the time, unless the applicant demonstrates that a higher percentage is reasonable and sustainable.

11. SUBDIVISIONS.

Wells intended for subdivision water supply must be capable of sustaining the required pumping rate for the duration required by the county subdivision regulations in which the subdivision is located. Applications for subdivision wells, other than those permitted under NMSA Section 72-12-1, must be accompanied by the county-required hydrologic report demonstrating sufficient well capacity to provide sustained production for the time period required by the county. If the place of use is within more than one county, the more stringent county regulations apply. These applications will not be processed unless a report demonstrating supply, which can be deemed as complete and acceptable per county regulations, has been filed with the application. Water supply reports accompanying water rights applications will be evaluated in

the same manner as they are normally processed by the OSE as required by the New Mexico Subdivision Act.

12. CONSERVATION OF WATER.

Applications for permits other than those obtained under NMSA Section 72-12-1 will be reviewed to ensure that the highest and best technology practically available and economically feasible for the intended use will be used. For subdivision wells, other than those obtained under NMSA Section 72-12-1, a water conservation plan conforming to the appropriate county subdivision regulations must accompany the application. If the place of use is within more than one county, the more stringent county regulations apply. Because it has been shown that meters are associated with more efficient water use, metering new wells, as required below, will support efforts to conserve water in the basin.

13. METERING REQUIREMENTS.

All diversion wells permitted after the adoption of these guidelines will be metered except wells used solely for livestock purposes permitted under NMSA Section 72-12-1. All existing wells that will be used in combination with a new permit will be metered and use reported as a condition of approval of the new permit.

14. NMSA SECTION 72-12-1 WELLS.

Following the adoption of these guidelines, NMSA Section 72-12-1 permits for household use shall be limited to a total diversion of water not to exceed 0.50 acre-feet per year.

Additional residences may connect to existing NMSA Section 72-12-1 household wells with permission from the well owner, providing each household obtains an approved permit from the OSE under NMSA Section 72-12-1 prior to connecting to the well. NMSA Section 72-12-1 wells serving multiple residences must not exceed a total diversion of three acre-feet per year. Domestic use may be further restricted by the courts or by municipal and county ordinances. Wells permitted under NMSA Section 72-12-1 for livestock, drinking and sanitary purposes in conjunction with a commercial operation, and in prospecting, mining or construction of public works, highways and roads or drilling operations may be allowed to divert a total quantity of water not to exceed three acre-feet per year. NMSA Section 72-12-1 wells used for a combined household and livestock purpose may divert a total quantity of water not to exceed three acre-feet per year.

15. MONITORING.

The OSE may condition permits to require water level monitoring, including the installation of monitoring wells.

16. SPECIAL WELL CONSTRUCTION PROVISION.

Due to poor water quality in some areas, all permits granted in the following described areas shall have as a condition of approval a requirement that this water be cased off, in a manner acceptable to the OSE, so that it cannot commingle with other waters found in the basin: East ½ of Township 5 North, Range 9

East; East ½ of Township 6 North, Range 9 East; East ½ of Township 7 North, Range 9 East; East ½ of Township 8 North, Range 9 East; all of Townships 5, 6, 7, and 8 North, Range 10 East, New Mexico Principal Meridian (Figure 7). An exception may be made if additional water samples at the drilling site indicate the shallow water to be acceptable for irrigation purposes. OSE representatives will determine the casing and annular seal program necessary to protect the known fresh waters. Additional well construction provisions may be required by the OSE throughout the basin as needed.

17. STATUTORY CONSIDERATIONS.

The OSE will deny any application that is contrary to statute.

18. PERMIT CANCELLATION.

An approved diversion permit will be conditioned to allow the OSE to cancel the permit if the conditions of approval are not met or if the actions of the permittee are not in accordance with the permit.

Adopted this 20th day of June, 2002.

/S/Thomas C. Turney
Thomas C. Turney
State Engineer

REFERENCES

Balleau Groundwater, Inc., 1998, "Hydrologic Model of the Estancia Basin," consultant report to the Entramosa Water & Wastewater Cooperative.

Keyes, E.J. and Frost, J.P., 2001, "The Estancia Basin Ground Water Flow Model, OSE Model Design and Future Scenarios," OSE report.

Wilson, B.C., 2001, "Estancia Groundwater Basin, Quantification of Irrigation Water Requirements," OSE report.

GLOSSARY

Definitions in this glossary apply specifically to the Estancia Underground Water Basin Guidelines.

Abo/Yeso: Permian age formations about 280 million years old. The Yeso Formation contains beds of sandstone, limestone, siltstone and gypsum and is combined in the model with the Abo Formation that is predominantly red sandstone and shale. These formations yield a few gallons per minute and can sustain some wells. In rare instances, Yeso wells may produce as much as 500 gpm but may quickly lose their yield. Only small portions of these geologic layers are aquifers. These formations underlie a large part of the central basin.

Acre-foot: quantity of water that will cover one acre of land to a depth of one foot; 43,560 cubic feet or 325,851 gallons of water.

Adjudication: a formal court proceeding that results in the determination of all elements of a water right claim. The Estancia Basin has not been adjudicated.

Application to appropriate: application filed with the OSE requesting a permit to put water to beneficial use from a specific point of diversion, for a particular purpose and at a particular place. Applications to appropriate include applications filed under NMSA Sections 72-12-1 and 72-12-3 (see definitions below).

Application to change location (replace) of well: application filed with the OSE requesting a permit to drill a new well to replace an existing well. Replacing a well, which has lost the required yield, is an example of this application. The applicant must be the owner of the existing permitted or declared well.

Application to change place or purpose of use: application filed with the OSE requesting to change the place of use of an existing water right from one location to another. For example, a water right holder proposes to stop irrigating a permitted place of use and start irrigating another place of use that is not included in the original water right with the same well. The application may also be used to change the beneficial use to another beneficial use. For example, a water right holder proposes to change beneficial use from farming to industrial use using the existing well.

Application to change location of a well and place or purpose of use: application filed with the OSE requesting to move or transfer a water right from one diversion point to another and to change the place or purpose of use. For example, a water right holder proposes to stop irrigating acreage from a well and proposes to drill a new well for subdivision purposes at another location.

Application to repair or deepen well: application filed with the OSE requesting a permit to replace casing, deepen a well, re-perforate the casing or plug the well. Pump repairs, chemical treatments or casing scrubbing do not require an application to repair.

Application to supplement a well: application filed with OSE requesting an additional well to be used in conjunction with an already permitted well for the diversion of the permitted amount of water. As well yields decline with falling

water levels, supplemental wells often become necessary to replace the loss of yield necessary to irrigate the same area of farmland.

Aquifer: a saturated underground geologic formation of permeable materials, fractures or cavities capable of storing water and transmitting usable amounts of water to wells.

Aquifer depletion: the amount of water used and not returned to the aquifer

Aquifer parameters: estimates and measurements of the permeability (transmissivity or hydraulic conductivity), thickness and pore space (storage) of the aquifer.

Beneficial use: all uses not defined by court decisions or statute as being wasteful. All beneficial uses are equal under New Mexico law.

Block-inventory system: a procedure used in many areas of the state, including the Estancia Basin, to administer water rights on a regional scale. An underground basin is divided into blocks or cells of land and guidelines are applied as a way of determining which applications should be approved or denied based on a determination of whether unappropriated water is available and impact considerations. These determinations may be based on the volume of water in the block, or can be based on rates of water level decline and saturated thickness. The block-inventory system evaluates the wide-ranging or regional impacts due to an application for a designated time period of 40 years ending at a specified date.

Cell: the groundwater flow model divides the basin into a grid of cells or blocks of land for use in the block-inventory system.

Consumptive irrigation requirement (CIR): the amount of water a plant needs over the entire growing season for transpiration and for building plant tissues, plus evaporation from the soil surface. This calculation does not include the effective precipitation. Based on recent studies, the CIR for the Estancia Basin is 1.28 acre-feet per acre per annum.

Consumptive use (CU): is the CIR plus average annual effective precipitation during the irrigation season.

Critical management area (CMA): an area, which deserves special attention because the water resources may be inadequate for, sustained well production. For the Estancia Basin, CMAs are defined as all aquifers with average long-term water level declines greater than 1.50 feet per year, or those areas of the valley-fill aquifer with less than 80 feet of remaining saturation by the end of year 2040. Other areas having water supply problems may also be designated a CMA by the OSE.

Cumulative effects: the combined water level declines due to all water uses including effects from existing permitted wells and the effects due to newly approved applications.

Declared groundwater basin: an area designated by the state engineer as requiring management to prevent impairment to existing water rights and to ensure the orderly development of water rights. Following the declaration of a basin by the OSE, applications must be filed to appropriate groundwater. The Estancia Basin is a declared basin.

Declared water right: a statement of claim filed with the OSE that water was

applied to beneficial use prior to the declaration of the basin and that beneficial use has continued to the present.

Diversions: the amount of groundwater withdrawn by wells from an aquifer or from a surface water source.

Domestic wells: NMSA Section 72-12-1 permits used for household purposes.

Effective precipitation: rainfall occurring during the growing season that is available to plants.

EUWB: Estancia Underground Water Basin.

Extension of time: an application asking for additional time to place waters to beneficial use including reasons for the request. Typically permits are conditioned to require proof of application to beneficial use to be submitted up to four years following the permit approval date. If the application of water to beneficial use cannot be filed within the specified time, an application for extension of time may be filed.

Farm delivery requirement (FDR): the quantity of water that is diverted from a well or a surface water source to satisfy the consumptive irrigation requirement (CIR) of crops. For the Estancia Basin, the amount of water diverted is 2.13 acre-feet per acre per year.

Fully appropriated: when all available water has been reserved for existing water rights. No water is available for additional use without impairment to existing water rights.

Geologic formation: a regionally identifiable set of naturally formed rocks or sediments that are different from adjacent rocks and materials.

Glorieta/San Andres: the Glorieta aquifer is predominantly a clean-cemented sandstone whose permeability comes from fractures. The San Andres contains mostly limestone with solution cavities, and some fractured sandstone and siltstone; these formations are combined in the model. Wells in the Glorieta/San Andres yield water from 10's of gallons per minute to yields as high as 1000 gpm in highly fractured areas. Water quality may be poor.

Ground water: water located below the surface of the earth that is stored in pores of geologic sediments (sands and gravels), cracks and crevices of rocks (fractures) and solution cavities in limestone.

Groundwater-flow model, the OSE modified Balleau Model: a series of mathematical equations representing the aquifers in the area that are solved using a computer. Models are used to estimate the water level declines and remaining saturated thickness due to the use of wells. Models are composed of layers that represent a geologic formation that contains aquifers. The basin is divided into blocks using a grid and each block is assigned a set of aquifer parameters that describe the aquifer storage and the capacity of the aquifer to transmit water. In 1998, Balleau Groundwater, Inc., developed a groundwater model of the Estancia Basin in support of a water rights application. The OSE modified the Balleau Model to provide conservative estimates of water level declines for administration of the basin.

Groundwater mining: the practice of withdrawing groundwater at rates in excess of natural recharge. Groundwater mining is occurring in the Estancia Basin.

Guidelines: a statement of general procedure to be applied by OSE personnel to

any application to ensure a consistent set of guiding principles is used to evaluate all applications. Due to the wide variety of conditions inherent in the review of water rights applications, strict procedures cannot be prepared to address all applications. As an example, if site-specific information does not agree with the model, staff may use a computational procedure they find more reasonable.

Hydraulic conductivity: is the rate of flow of water through a unit area of aquifer.

Hydrogeologic: characteristics of geologic units that are able to store and transmit water.

Impairment: a finding by the state engineer based on water level change, remaining saturated thickness, priority of water rights, reduction in the life of wells or water quality or other relevant factors or facts.

Inactive model cells: areas of the model grid that extend beyond the aquifer system being represented or where the aquifer is eroded away. These cells are not part of the calculation performed by the model.

Licensed water right: water has been placed to beneficial use under an approved permit, *Final Proof of Application of Water to Beneficial Use* has been filed by the permittee and the OSE has issued a *License to Appropriate*.

Local impacts: effects on other wells and water rights as a result of pumping water from a proposed well taking into account site-specific conditions. An assessment will be performed to estimate the water level decline to the nearby wells, including wells permitted under NMSA Section 72-12-1, due to the proposed well diversion. The land area of consideration is selected by the reviewer to protect existing water rights. The OSE makes decisions based on the best available information and deviates from the standard model or water level decline restrictions when appropriate. Local assessments may also include considerations of potential water quality change and water right priorities.

Madera limestone: a 320 million year-old formation of fractured limestone with solution cavities and caverns that produce water at rates of less than 5 to 1000 gallons per minute to wells .

Model caution areas: areas of the basin where the groundwater-flow model under estimates water level declines or where groundwater production amounts are poor.

Model grid: the water producing areas of the basins are divided into cells (blocks) that form a model grid representing the aquifer. Stacking these cells in layers represents multiple aquifers.

New appropriation: a new diversion of groundwater that adds to the total water withdrawn from the basin. This term generally applies to wells under NMSA Section 72-12-3 but may also include wells under NMSA Section 72-12-1.

Non-CMA: areas of the aquifers that are not experiencing water level declines of 1.50 feet or greater and areas of the valley-fill aquifer with more than 80 feet of saturated thickness to the end of year 2040.

OSE: Office of the State Engineer

Pending application: any application that was filed with the OSE but has not been acted upon.

Permeability: a measure of an aquifer's ability to transmit water to a well.

Permit: is an application that has been approved by the state engineer for a specific purpose, such as appropriating water, drilling or replacing a well, changing place or purpose of use, etc.

Permit conditions: measures imposed by the OSE to protect existing water rights which must be met by the permittee to place water to beneficial use. The state engineer may conditionally approve a permit. Common conditions include specifying the maximum amount that can be diverted, describing the place and purpose of use, requiring the filing of proof of beneficial use within a set time, metering and reporting, specific well construction requirements and water level monitoring.

Pre-basin well: a well drilled before the state engineer declared the basin. The central portion of the Estancia Basin was declared in 1960.

Predicted water level declines: are water level declines estimated by a groundwater-flow model.

Prior appropriation: A New Mexico constitutional provision that entitles the first person who diverts water and puts it to beneficial use to the primary right to water use: first in time, first in right.

Pumping effects: are water level or water quality changes on nearby wells due to pumping a well.

Pumping schedule: is a changing diversion rate with time.

Regional restrictions/methods: apply to the guidelines relating to allowable water level declines in model cells and application of the OSE model. The regional assessment considers the wide-ranging impacts to model cells and the CMA while the local impact analysis is focused upon the effects to nearby wells. The block-inventory system is a regional assessment.

Remanded: an application that is not acted on by the state engineer but instead is sent back to the Water Rights Division for further analysis, or an acted upon application returned to the agency by the District Court or an appellate court for further or different action or for the engineer to reconsider or supplement his decision.

Residual effects: water level changes following the cessation of pumping.

Retired water right: a water right withdrawn from use in one place for use in another. Water use ceases in the first location or is "retired."

Return flow plan: is a report based on factual and acceptable scientific measurements that shows a quantity and rate of groundwater or surface water that finds its way back to the intended source of water supply.

Saturated thickness: the underground zone in which the void spaces in the rocks and soils are filled with water. The saturated thickness of the valley fill aquifer is the saturated zone between the water level and base of the alluvial aquifer. As water levels decline, the saturated thickness also declines.

Section 72-1-9: New Mexico Statutes Annotated (NMSA) which allows municipalities, counties, state universities and public utilities supplying water to municipalities or counties to acquire water rights pursuant to a water development plan for reasonably projected water needs that will occur within 40

years.

Section 72-12-1 wells: the statute that regulates wells required for relatively small amounts of water for single or multiple households, livestock watering, drinking and sanitary uses in conjunction with a commercial operation and construction.

Section 72-12-3: the statute that regulates applications for new appropriation other than those applications filed under Section 72-12-1. Section 72-12-3 applications generally seek to obtain quantities of water greater than allowed by the OSE for Section 72-12-1 wells and often for other purposes.

Statutory: regulated by law.

Storativity: the volume of water an aquifer releases when a well is pumped.

Subdivision water supply: is water provided for a division of land regulated by the New Mexico Subdivision Act.

Supplemental well: see definition of application to supplement.

Surface water impacts: refers to springs and streams in the Estancia Basin or other adjacent basins that may be affected by well pumping. For applications located in the northern portion of the basin, it may be necessary to calculate stream impacts to Galisteo Creek.

Theis equation: an analytical method that calculates water level declines using one set of aquifer parameters. This method was used in the criteria for the Estancia Basin adopted in the 1960s. The method may still be applied, especially for local assessments, as required.

Transmissivity: the rate water moves through a unit width across the entire saturated thickness of the aquifer or model layer.

Transfer: is a general term that has no explicit basis in statute but is used to indicate a change in point of diversion or change of place or purpose of use of a water right.

Triassic formations: include the Chinle and Santa Rosa formations that are predominantly siltstones with a few thin sandstones and are generally not considered aquifers in the model. There are a few wells in the Triassic on the north rim of the basin that produce some water to wells from a perched water table zone.

Valley-fill aquifer: is composed of clay, silt, sand and gravel laid down by flowing water. These deposits are the uppermost aquifer in the center of the basin and are less than 1.6 million years old. Most of the wells in the basin are completed in the valley-fill with variable yield due to the irregularity of the saturated thickness and lithologic conditions. Irrigation wells may yield between 500 and 1000 gpm. Most of the underlying and adjoining bedrock aquifers are connected to the valley-fill aquifer.

Waste: is any diverted water not put to beneficial use.

Water column: is the thickness of water in a well calculated by subtracting the well depth from the depth to the water table. As water levels decline due to pumping, water columns and well yields also decline. Water column information is used to determine how much water level decline the basin can tolerate before

existing wells are negatively impacted.

Water quality assessment: is the analysis of potential water quality changes due to the use of a well. Assessments may be performed anywhere in the basin but are usually associated with wells near playa lakes in the center of the basin where saline water may intrude into a well.

Water right: the amount of water that can be legally placed to beneficial use by the water right claimant.

Water right permit: see definition of permit.

Water table: the groundwater surface usually measured in a well from land surface.

Well completion: the specific well construction information, such as the depth of a well, perforated interval, casing materials, surface seals, or other relevant data.