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MAXINE N. PAUL*

**The Domestic Well Exemption in the West:
A Case Study of Santa Fe's Municipal Ordinance**

ABSTRACT

In the recent case of Bounds v. State of New Mexico, the New Mexico Supreme Court upheld the constitutionality of a statute that allows domestic wells to be permitted with less oversight than other water rights. The statute, known as the domestic well exemption, is common in various forms throughout the Western United States. Currently, there are an estimated 200,000 permitted domestic wells across the State of New Mexico, increasing at a rate of approximately 5,000 per year. Various scholars have argued for amendments to domestic well statutes or local regulations to make exempt well applications as rigorous as other water right applications. In consideration of local solutions this study addresses one of few municipal ordinances and three important controversies in domestic well management: the interaction between domestic well pumping and other water uses, the longevity of groundwater sources, and the “development loophole.” The City of Santa Fe’s domestic well ordinance is found to indirectly address concerns related to aquifer use and conservation, however, restricting well uptake in threatened areas that speak to specific, measurable goals, aligned with accurate databases, may better serve municipalities and counties in New Mexico as they do in other states.

I. INTRODUCTION

In July 2013, the New Mexico Supreme Court issued an opinion addressing a long-controversial aspect of western water law in *Bounds v. State of New Mexico*, upholding the constitutionality of the domestic well statute (DWS).¹ The statute is often referred to as an “exemption” from the prior appropriation regime as it allows domestic wells for individual household indoor use to be permitted with less restriction than other water rights. Such an exemption is commonplace in various forms throughout western, prior-appropriation regime states.

The DWS and similar statutes in other states² have been at the center of a debate on how

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¹ *Bounds v. State ex rel. D'Antonio*, 306 P.3d 457 (NM Sup. Ct. 2013).

² RCW 90.44.050, Alaska Admin Code tit. 11. Ariz. Rev. Stat. §§ 45-402, 45-454. Colo. Rev. Stat. Ann. § 37-90-105, 37-92-602. Idaho Code Ann. §§ 42-111, 42-227, 42-914. Kansas Statutes Ann. §§ 82a-701, 82a-703, 82a-703a, 82a-705a, 82a-728. Montana Admin. Rules, Rule 36.12.101. Mont. Code Ann. § 85-2-306. Neb. Rev. Stat. §§ 46-602, 46-714, 735 and 46-740. Nev. Rev. Stat. §§ 533.024, 533.370, 534.013, and 534.180. New Mexico Administrative Code § 19.27.5.14. NMSA 1978, §§ 72-12-1.1., 72-12-3. North Dakota Centennial Code §§ 61-04-01.1, 61-04-01.2, 61-04-02, 61-04-06.1, and 61-04-06.3. Oklahoma Statutes Title 82 §§ 1020.1, 1020.3.

much control managers can and need to have over these abundant, small, groundwater uses. The New Mexico statute known as the exemption was originally enacted as a State Engineer order to ease development during the WWII era as domestic wells make household water accessible away from municipal water and surface water sources.³ However, concerns related to water availability have grown in recent decades, as many basins are over-appropriated and western populations increase. The Director of the New Mexico Farm and Livestock Bureau summarized this fear of the impacts of domestic well proliferation as, “They’re issuing water rights when there is no water left.”⁴ In 1999, the City of Santa Fe issued an ordinance limiting the proliferation of domestic wells.⁵

Due to climate change and population growth in the Western United States, policies should be reviewed for their ability to supplement the domestic well exemption to address concerns of aquifer sustainability, interference between water uses, and responsible growth management. Most Western states have a domestic well exemption under the prior appropriation doctrine, including Alaska, Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, N. Dakota, Oklahoma, Oregon, S. Dakota, Texas Washington, Wyoming, and New Mexico.⁶ The *Bounds* decision may influence courts deciding exempt wells cases in these states.⁷ Exempt wells across the West may continue to be exempt and their regulation may fall into the hands of local governments.

This study uses the domestic well ordinance in the City of Santa Fe, other relevant policy, geological models and available well data to interpret the effectiveness of this piece of municipal legislation in the context of the domestic well exemption and recent case law. To consider how various local and regional regulations might better address concerns regarding domestic wells, the City of Santa Fe’s domestic well ordinance is analyzed to answer three questions associated with the exemption across the west:

- 1) Does the City of Santa Fe’s domestic well ordinance ensure protection for surface water rights and other groundwater rights from domestic well pumping?
- 2) Does the ordinance preserve aquifer levels and promote sustainable groundwater use?
- 3) Does the ordinance help prevent the use of the “development loophole”?

The following section provides an overview of problems associated with domestic wells in Western, prior-appropriation states. Section III expands upon the impact of the *Bounds* case for domestic well management in New Mexico. Sections IV explains the domestic well ordinance in Santa Fe in the context of city, county, and state-wide regulation. Sections V-VII provide hydrologic background and answer the three study questions. Section VIII is a review of various

³ T. Maddock III & P.W. Barroll, *Domestic Wells in New Mexico*, in WATER POLICY IN NEW MEXICO: ADDRESSING THE CHALLENGE OF AN UNCERTAIN FUTURE.(David. S. Brookshire, Hoshin Gupta eds. 2012). AT 209.

⁴ Justin Horwarth & Joey Peters. *Well, well: what the state’s supreme court new water-rights ruling means for New Mexicans*. The Santa Fe Reporter. July 30, 2013 available at: <http://www.sfreporter.com/santafe/article-7604-well-well.html>

⁵ Santa Fe, New Mexico, Municipal Code § 25-1.10, 2007-4.

⁶ Bracken. *Exempt Well Issues in the West* at 146.

⁷ See Richardson & Dowell *Implications* at 20.

domestic well management policies in other states. Finally Sections IX-XI recommend ways to mitigate these problems in Santa Fe, New Mexico, and throughout Western states.

II. CONCERNS RELATED TO DOMESTIC WELL MANAGEMENT

During the current climatic period, western states have experienced extreme drought conditions, as low snowpack levels and high temperatures have increased concerns about the reliability of water resources.⁸ The present drought is expected to persist.⁹ The rate at which permits for domestic wells are being issued in New Mexico against this climatic background provides reason for concern about the effect of these wells on water management strategies in the future.¹⁰ In the year 2000 there were a recorded 137,000 domestic wells across the state, increasing at a rate of approximately 5,000 permits per year, leaving an estimate today above 200,000 domestic wells in New Mexico.¹¹

The effect of localized domestic well pumping on surface water uses as well as other groundwater uses is of concern in New Mexico not only because potable water sources are relatively scarce, but they are often over-appropriated. There are 15 basins currently in the adjudication process, through which all water rights in a basin are quantified.¹² Adjudication of the Middle Rio Grande basin has not yet started, which accounts for the largest use of surface water in the state.¹³ Therefore, in New Mexico, water rights are managed with a degree of uncertainty. Domestic wells provide a second degree of uncertainty in groundwater use.

The power of the State of New Mexico to issue permits for domestic wells without regard to water availability will continue into the future due to the recent *Bounds* case. *Bounds* held that the domestic well statute does not facially cause senior water rights holders to be impaired by domestic wells. According to *Bounds*, domestic wells don't necessarily threaten senior water rights partially because of the possible applicability of various other legal controls such as local or regional limitations that can be made on domestic wells, e.g. the implementation of Critical Management Areas (CMAs).¹⁴ Yet, the controversy surrounding the domestic well exemption is

⁸ National Climate Assessment Report 2014, Southwest Region *See* Observed and Projected Temperature Changes, paragraph 4, and Figure 20.1 Projected Temperature Increases.

⁹ *Id.*

¹⁰ Frank Titus *On regulating New Mexico's domestic wells*. Nat. Resources J. 45 (2005): at 854.

¹¹ *See* Maddock & Barroll, *Domestic Wells in New Mexico at 204*; Paul Bossert, Domestic Wells, in UTTON TRANSBOUNDARY RES. CTR., UNIV. N.M. LAW SCH., WATER MATTERS! 11-5, 11-6 (2012), http://uttoncenter.unm.edu/pdfs/Water-Matters-2012/2012_water_matters_final_full-publication.pdf.

¹² Office of the State Engineer Active Cases http://www.ose.state.nm.us/legal_ose_active_cases.html last visited June 4th, 2014.

¹³ *Id.*

¹⁴ *Bounds v. State ex rel. D'Antonio*, 306 P.3d 457 (NM Sup. Ct. 2013). Critical Management Areas are location-based restrictions on wells implemented through an order by the State Engineer. They are implemented if it is determined that groundwater resources of the region are inadequate or may in the future be inadequate for sustained well production. Both the Middle Rio Grande and Estancia Basins have CMAs. For example, the CMA in the Estancia Basin is defined as all aquifers with average long-term water level declines of 1.5 feet per year, or those with less than 80 feet of remaining saturation by 2040. The State Engineer can include stipulations for domestic well permits including limiting their uptake. *See* Area of Origin – Critical Management Areas at 9-11 available at

due to additional water management issues, not only priority enforcement, and current protections for senior water rights holders may not be as effective as the court asserts.

The expedited permitting of domestic wells, which can be regulated by the state (and by local legislation) is a concern for responsible growth management strategies, aquifer sustainability, groundwater interaction between wells, and other water management efforts.¹⁵ Domestic wells are feared to consume enough water to impact rivers through hydrologically-connected surface flows.¹⁶ Although it has been shown that a few domestic wells are unlikely to negatively impact groundwater resources due to generally low pumping rates, thousands of unregulated wells in a basin may interact with other groundwater uses.¹⁷ Domestic wells in the West are often associated with management conflicts that are localized, for example, in a riparian zone, and may not be consistent throughout any hydrologic system.¹⁸ The implementation of effective conjunctive management of ground and surface water resources requires a greater understanding of the hydrologic and policy conflicts, as well as appropriate limits on the proliferation of these wells.

Unfortunately, there are various hydrologic and administrative unknowns associated with the management of exempt wells that create challenges for water managers. Often, actual pumping rates are unknown as many wells across New Mexico are not metered,¹⁹ and therefore, the cumulative effect on the water table, on riparian areas, and on other wells is uncertain. Some hydrologic models show that domestic wells do not constitute a large source of depletion nor significantly impact a groundwater source in a systematic way,²⁰ but many have recommended further hydrologic studies and policy evaluation in order to cultivate the most informed management decisions for these wells.²¹

Across New Mexico, domestic well use can contribute to management problems associated with over-appropriation, rural development and suburban growth.²² A few towns and suburbs in New Mexico have experienced domestic well conflicts related to groundwater

<http://www.ose.state.nm.us/Planning/RWP/Regions/MiddleRioGrande/App12-13-3-JyS-AreaOriginCriticalMgtArea.pdf>

¹⁵ Craig Bell and Jeff Taylor *Domestic well exemptions and their impact on growth management* Ch. 1-3, Western States Water Council, *Water Laws and Policies for a Sustainable Future: A Western States Perspective*. (2008) at 65
¹⁶ See Titus *On Regulating New Mexico's Domestic Wells* at 854, and Bell & Taylor *Domestic Well Exemptions* at 65.

¹⁷ W. Peter Balleau and Steven E. Silver *Hydrology and Administration of Domestic Wells in New Mexico* 45 Nat. Res. J. (2006) at 808 and Titus *On Regulating New Mexico's Domestic Wells* at 854-55.

¹⁸ See generally *Id.* at 809, 823, 833.

¹⁹ As of 2002, 40% of known wells were non-compliant in metering reports. See Balleau & Silver *Hydrology and Administration of Domestic Wells*. at 816.

²⁰ *Id.* at 823 – 826.

²¹ Titus *On Regulating New Mexico's Domestic Wells*, Bell and Taylor *Domestic Well Exemptions* (2008); Amy Lewis *Water Resource Inventory of the Española Basin (prepared for Santa Fe County)*. Sept. 17 2013. 4.3 domestic well water use 43-48. ; Amy Lewis. *Water Use and Conservation Potential for Domestic Wells in the Santa Fe Area*. 12th Annual Española Basin Technical Advisory Group Workshop, Santa Fe Community College (May 20-21 2013).

²² Jesse J. Richardson Jr. and Tiffany Dowell *The Implications of Bounds v. State of New Mexico*. 148 J. Contemp. Water Resear. & Ed. (2012) at 18, 21.

drawdowns, including Placitas, Santa Fe, and Truth or Consequences.²³ Placitas faced what is known as the “Development Loophole” in which housing developers used domestic well permits instead of community wells, which have more extensive construction and water quality standards than those imposed upon domestic wells.²⁴ Water levels near municipal wells in Santa Fe County have declined in association with domestic and city well use.²⁵

It is clear that domestic wells are an active concern across the state of New Mexico as part of conjunctive water management strategies, although many conflicts are unrecorded or poorly understood. Many consider that the long term impacts of alternative pathways need to be explored more thoroughly, as municipal ordinances and county codes in New Mexico are allowed to limit groundwater withdrawals and domestic well permitting, which they do to various extents.²⁶ In 2004 in Bernalillo County, the regional water plan committee recommended the establishment of a domestic well policy by the Office of the State Engineer (OSE) to reduce pumping from domestic wells and to restrict the drilling of new wells where surface water flows or an aquifer could be impaired, because “The region is seen to be significantly increasing its draw upon water resources in many areas due to the installation of new domestic wells and their associated consumptions.”²⁷

Although the detrimental effects of domestic wells are often unclear, prospective measures to prevent adverse effects of domestic wells are considered likely to be less costly and more politically and administratively feasible than allowing unlimited domestic well proliferation and mitigating conflicts as they arise.²⁸ There are two opposing general strategies that have been suggested to maintain aquifer sustainability and protect water rights. The Western Governor’s Association refers to attempting a broad approach, permitting and monitoring exempt wells as part of a state’s normal water right regulatory scheme.²⁹ This proposition would avert many problems associated with domestic wells as permitting would necessitate an analysis of their impacts on other water uses.³⁰ However, state-wide analysis of domestic well impacts may be an inefficient method to address domestic well problems that can occur at a small scale.³¹ Others argue that local regulations that vary from region to region can be the most effective, due to their political and administrative feasibility and focus on areas of

²³ Jocelyn Drennan *Lassoing the loophole: the need to rope in the use of the domestic well loophole by subdividers in New Mexico*. Nat. Resources J. 37 (1997) and T. Maddock III & P.W. Barroll, *Domestic Wells in New Mexico* in *Water Policy in New Mexico: Addressing the Challenge of an Uncertain Future*, (2013). At 203.

²⁴ Drennan *Lassoing the Loophole*. at 939.

²⁵ Jon Shomaker, president of John Shomaker & Associates, Inc. Domestic Well Depletions in the Rio Grande Basin, Address to the WRRRI Conference (1999) in WRRRI Conference Proceedings 1999 at at 3.

²⁶ Bell & Taylor *Domestic Well Exemptions*; N.M. Stat. § 72-12.1-1.1.

²⁷ See Water Supply Threatened For Private Wells. Corrales Comment Vol. xiii no. 1.24. Available at <http://www.corralescomment.com/index.php/archive/25-corrales-comment-volume-xiii-no-1-24/44-water-supply-threatened-for-private-wells> The regional water plan under discussion at the January 29 meeting includes the noted recommendation.

²⁸ Bracken *Exempt Well Issues in the West* (2010) at 253.

²⁹ Bell & Taylor *Water Laws and Policies* (2008) at iv, 36.

³⁰ Id. at 5.

³¹ Nathan S. Bracken. *Scalpels vs. Hammers: Mitigating Exempt Well Impacts*. J. of Contemp. Wat. Resear. & Ed.(2012) at 28 and Maddock & Barrell *Domestic Wells in New Mexico* at 211.

concern.³²

Specific regulations have been recommended to avoid conflicts associated with exempt wells. These include limiting uptake, requiring proper construction and testing, restrictions in specific geologic areas, requiring subdivisions to use community wells (in order to avoid exploitation of the loophole), requiring data collection, limits on consumptive use, mandatory connection to municipal water supply systems when available, monitoring, and implementing public education programs.³³ Restricting domestic well use to indoor-use only, state-wide required metering, and granting blanket authority to the Office of the State Engineer to deny exempt wells are approaches that tend to be rejected.³⁴ While Vinett and Jarvis³⁵ aptly stated that no single approach will be effective across the West due to differences in availability of water and population models, Santa Fe's Domestic Well Ordinance may provide guidance for western cities attempting to manage diverse water resources under the statutory exemption in a future impacted by climate change.

III. LEGAL CONTEXT OF LOCAL RULES

The majority of western states legal regimes follow the doctrine of prior appropriation, which is colloquially explained as “first in time, first in right,” meaning the oldest water uses have the superior water right. In New Mexico, as in other states, prior appropriation is based upon “beneficial use” of water. A person must apply to the State Engineer for a right to use a quantity of water for a specified use. Senior (older) users have priority over junior (newer) users, which is a theoretical right to the entire quantity of their water before a junior user receives any water.³⁶

Domestic wells are deemed an exemption from the prior appropriation regime, not because they cannot be included in priority enforcement, but rather in that they are issued by the State Engineer with no hearing, evaluation of their impacts, or public notice.³⁷ This exemption is found in the statutory language that describes the permitting process, that the State Engineer, “shall issue permits” for domestic wells.³⁸ Such language was interpreted to require the State Engineer, in almost all cases, to issue domestic well permits regardless of the availability of water.³⁹ The Office of the State Engineer (OSE) issues these permits for 1 acre-foot per year (AFY) of withdrawals: a relatively small amount.⁴⁰ In 2001, the state municipal code⁴¹ was

³² Bracken. *Scalpels* at 31.

³³ See Jesse J. Richardson. *Existing Regulation of Exempt Wells in the United States*. 146 J. of Contemp. Water Resear. And Ed. (2012) at at 4.

³⁴ See *Id.* at 4 and Bracken *Scalpels vs. Hammers* (2012) at 28.

³⁵ M.A. Vinett & T. Jarvis. *Conflicts Associated with Exempt Wells: A Spaghetti Western Water War*. J. of Contemp Water Resear. & Ed. (2012). 148(1), at 12 and Richardson & Dowell *Implications* at 18.

³⁶ In New Mexico, this right to make a call on the river is more theoretical than it is in some other states.

³⁷ Utton Transboundary Resource Center. *Domestic Wells, Water Matters! (2014)* at 12-1. Available at <http://uttoncenter.unm.edu/pdfs/water-matters-2014/12-domestic-wells.pdf>.

³⁸ N.M.S.A. § 19.27.5.14. NMSA 1978, §§ 72-12-1.1., 72-12-3.

³⁹ Utton Cnt. *Domestic Wells* at 12-1.

⁴⁰ Equivalent to 892 gallons per day.

⁴¹ N.M.S.A. 1978 § 3-53-1.1.

changed to give municipalities the authority to limit or restrict domestic well drilling.⁴² Overall, domestic wells are more loosely regulated than other water uses, as applying for the use of a domestic well is a quicker and easier process than applying for any other water right and permit applications do not undergo the same consideration of impacts.

To understand the legal controversy over domestic wells, consider how the process for obtaining a domestic well differs from the process for community wells. Community wells are communal methods to provide multiple households with potable water for indoor and outdoor use. For a community well application, the applicant must give public notice, describe the amount, the source, the proposed use, the proposed site, and show that it won't impair existing water rights, waste water or harm the public welfare.⁴³ An application to the Office of the State Engineer for a community well can be rejected. Domestic wells are considered "exempt" as they are exempt from the scrutiny that community well applications must undergo.⁴⁴ Although domestic wells are controlled by the prior appropriation doctrine, the Office of the State Engineer may issue domestic well permits without consideration of the availability of water in the basin, the seniority of water users in the immediate area, or any of the aforementioned rules for small community wells.⁴⁵

The significance of domestic well pumping that isn't quantified by managers is of concern for future water conservation because the quantification of water rights in New Mexico is not complete. The Santa Fe stream system is currently in the adjudication process.⁴⁶ In the Española basin, the watershed inclusive of the City of Santa Fe, 24% of the population (43,500 residents) use domestic wells, and contribute to the over-appropriation of water in the upper Rio Grande watershed.⁴⁷ Water rights in the Rio Grande basin are over-allocated, and the Rio Grande like other river basins in New Mexico has large flow variance with a standard deviation of annual flow at nearly half of the mean.⁴⁸ Shortages are frequent, with an average annual deficit in the Middle Rio Grande of 55,000 AFY.⁴⁹ Furthermore, there are examples within the past decade of domestic well use of over 3 AFY, the previous state-wide pumping limit, irrigating lands larger than 1 acre (the limit on outdoor irrigation use from a domestic well).⁵⁰

Bounds attempted to challenge this domestic well exemption in his lawsuit against the State Engineer. In the *Bounds* suit, farmer, senior water rights holder, and plaintiff Mr. Bounds alleged that his constitutional rights in New Mexico based on prior appropriation were violated by the domestic well statute.⁵¹ The New Mexico Supreme Court disagreed with the allegation

⁴² Utton Cnt. *Domestic Wells*. at 12-3.

⁴³ N.M.S.A. § 19.27.5.14; NMSA 1978, §§ 72-12-1.1., 72-12-3.

⁴⁴ *Id.*

⁴⁵ *Bounds v. State ex rel. D'Antonio*, 306 P.3d 457 (NM Sup. Ct. 2013).

⁴⁶ *Henry P. Anaya et al. v. Public Service Company of New Mexico, et al. v. State of New Mexico ex rel. S.E. Reynolds, State engineer, First Judiciation District Court, Co. Santa Fe, NO. 43,347 Santa Fe Stream System Adjudication.*

⁴⁷ *Lewis Water Resource Inventory* (2013) at 43.

⁴⁸ Pease. *Constraints to Water Transfers in Unadjudicated Basins: the Rio Grande as a Case Study*. 144 J. Contemp. Water Resear. & Ed. (2010) available at <http://ucowr.org/issue-144/constraints-to-water-transfers-in-unadjudicated-basins-the-middle-río-grande-as-a-case-study> at 37.

⁴⁹ *Id.*

⁵⁰ Balleau & Silver *Hydrology and Administration* at 816.

⁵¹ *Bounds v. State ex rel. D'Antonio*, 306 P.3d 457 (NM Sup. Ct. 2013).

that the permitting of domestic wells was unconstitutional on a facial challenge, due to the fact that the permitting of these wells doesn't necessarily and in all cases constitute impairment of other water rights, senior or junior.⁵² According to the court, the issuance of new permits for domestic wells is not defined as impairment, even in a fully appropriated basin.⁵³ Permits for domestic wells will continue to be issued because the definition of impairment and the domestic well statute won't change in the foreseeable future due to the *Bounds* decision upholding the exemption.

The State Engineer does have some power over domestic wells, however, and local regulations are not the only pathways through which domestic well use can be curtailed. The New Mexico Supreme Court dicta of the *Bounds* opinion included highlighting the ability of the State Engineer to impose regulations that can limit domestic well uptake in order to, "ensure senior surface water users are not harmed by junior domestic wells".⁵⁴ The court reasoned that current regulations allow the OSE to, "Effectively deal with some of the practical effects [of domestic wells] ... including ways to mitigate the effects of domestic wells on water shortages." The court stated four ways in which senior water rights can be protected from domestic wells: 1) State Engineer's limit on pumping, 2) Domestic Well Management Areas (DWMAs)⁵⁵ and Critical Management Areas (CMAs),⁵⁶ 3) That permits are subject to further limitation by OSE through curtailing outdoor use in times of drought and 4) Municipal ordinances.⁵⁷

The presence of these methods in the *Bounds* decision in addition to the outcome, encourages local regulations on such wells or at least a shift in regulatory responsibility to local governments as management areas and state wide regulations are under-utilized by the OSE.⁵⁸ Only CMAs or DWMAs can address conflicts throughout a specific basin and few have been implemented and enforced across the state.⁵⁹ Outdoor use, which can be curtailed by the State Engineer, does not account for all domestic well use. Local ordinances appear to be the best available method to address domestic well concerns within a small geographical area.

⁵² Id. Furthermore, lowering the water table is not directly defined as impairment.

⁵³ Id. It was concluded that the exemption does not conflict facially with article XVI section 2 of the NM constitution.

⁵⁴ *Bounds v. State ex rel. D'Antonio*, 306 P.3d 457 (NM Sup. Ct. 2013).

⁵⁵ See *Utton Cnt. Domestic Wells* at 12-4. Domestic Well Management Areas allow domestic wells in a certain delineated area to have conditions imposed upon them by the Office of the State Engineer such as limiting pumping or requiring a transfer of a water right to drill.

⁵⁶ Critical Management Areas (CMAs) are designated in areas where groundwater resources may be insufficient for future well production. CMAs are locations where there is an estimated large future water-level decline based on average well water columns within a declared basin or subarea. CMAs are in affect in the Estancia and Middle Rio Grande basins See Memorandum from Laura H. Petronis and Jack Frost, Hydrology Bureau, Office of the State Engineer to Mary Young, Water Rights Division. On file with the Water Utility Division at Santa Fe County. August 15th 2013 at 10. See also Office of the State Engineer. *Area of Origin- Critical Management Areas* at 9-10 available at <http://www.ose.state.nm.us/Planning/RWP/Regions/MiddleRioGrande/App12-13-3-JyS-AreaOriginCriticalMgtArea.pdf>

⁵⁷ *Bounds v. State ex rel. D'Antonio*, 306 P.3d 457 (NM Sup. Ct. 2013) sec. 34-39.

⁵⁸ Statutes that give regulatory powers to other bodies than the OSE include § 3.53.1 that gives municipalities the power to regulate the use of wells, and § 3.53.1.1 N.M.S.A. 1978 to restrict drilling of new wells in certain areas and conditions (DWMAs and CMAs).

⁵⁹ The State Engineer has restricted well drilling in both the Middle Rio Grande and Estancia Basin CMAs. See Office of the State Engineer, *Area of Origin – Critical Management areas* at 10. As of 2013, there were no Domestic Well Management Areas designated by the Office of the State Engineer.

The assurances from the New Mexico Supreme Court in *Bounds* that domestic wells should not impair senior water rights have not been tested. In the absence of certainty of impairment on senior rights by domestic wells, New Mexican administrators must evaluate how to most effectively create and implement rules or ordinances within the statutory framework. The City of Santa Fe took up this challenge in 1999 and passed a Domestic Well Ordinance.

There is no question as to whether or not cities can regulate domestic wells under N.M.S.A. § 3.53.1.1 allowing municipalities to restrict the drilling of new domestic wells. The domestic well ordinance in Santa Fe has been challenged twice in *Smith vs. City of Santa Fe* and *Stennis v. City of Santa Fe*. In both cases, the municipal restrictions on domestic wells were upheld.⁶⁰ In *Smith*, plaintiffs Mr. and Mrs. Smith among others, whom had obtained domestic well permits from the OSE, applied for domestic well permits from the City of Santa Fe but were rejected.⁶¹ They subsequently filed for declaratory relief in district court.⁶² The court of appeals held that the City of Santa Fe had authority under home rule powers to prohibit the drilling of domestic wells within municipal boundaries.⁶³ The New Mexico Supreme Court concurred.⁶⁴ In *Stennis*, a very similar case, plaintiff Martha Stennis, a resident of the City of Santa Fe obtained a permit for a domestic well from the OSE.⁶⁵ She then filed a complaint in district court seeking a declaratory judgment that the City of Santa Fe did not have the authority to regulate domestic wells by municipal ordinance.⁶⁶ The court concluded again that domestic well drillers must obtain a city permit due to the ordinance and the state statute allowing for municipal ordinances, before using their domestic wells.⁶⁷

There is direction in these cases regarding the need to regulate domestic wells. The opinion in *Smith* highlights the fact that local regulations are necessary because they address different concerns than state law.⁶⁸ *Stennis vs. City of Santa Fe* (2008) reaffirmed the ability of municipalities to regulate new wells. According to this case law as well as the New Mexico Supreme Court and sections of the New Mexico State Code, an ordinance such as Santa Fe's is one of few current practical administrative options to manage domestic diversions from a limited water supply.

As courts urge local governments to take up the mantle of domestic well regulation, the Santa Fe region may be facing what has been defined as a governance gap: “a lack of integration in planning processes and a failure to examine and communicate the consequences of both land

⁶⁰ *Smith v. City of Santa Fe* 2007-N.M.S.C.-055, 142. N.M. 786, 171 P.3d. 300. The Ct. of Appeals in *Smith* decided, in tandem with Supreme Ct., that the domestic wells statute is, in its simplicity, encouraging regulations from other levels of local government by comparing and interpreting the difference between “shall” and “shall only” language in various statutes.

⁶¹ *Id.*

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Id.*

⁶⁵ *Stennis v. City of Santa Fe* 2008-N.M.S.C.-008, 143 N.M. 320, 176. P.3d. 309.

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ See *Smith on* N.M.S.A. § 3-53-1.1 “New Domestic Wells; municipal authority” and on N.M. Stat. § 72-12.1-1.1.

use and water choices at various levels of government.”⁶⁹ The Santa Fe area does not have OSE administrative guidelines that are required to set up a CMA, which could restrict domestic well uptake and construction, and therefore no formal CMAs have been designated nor implemented in Santa Fe since their inception in 2006.⁷⁰ As the domestic well exemption stands, *Stennis, Smith, and Bounds* called for local administration of domestic wells in order to curtail domestic well uptake. The city of Santa Fe’s ordinance can be viewed as an attempt to fill this regulatory gap, both to protect water rights and regulate other domestic well concerns.

IV. SANTA FE’S DOMESTIC WELL ORDINANCE

Few cities have taken up the power under N.M.S.A. § 3-53-1.1, which allows the restriction of domestic well drilling by municipal ordinance. However, Santa Fe has often been at the forefront of adapting water management to climate change in the West.⁷¹ The City of Santa Fe issued its domestic well ordinance in 1999,⁷² setting various constraints for new domestic wells within the city limits. Amendments were added in 2004.⁷³ The city is currently in the process of reviewing its management of domestic wells.⁷⁴

A. WATER RESOURCE MANAGEMENT AND CONSERVATION IN SANTA FE

Santa Fe’s Ordinance comes from a city that has actively managed its water scarcity problems by diversifying its potable and non-potable water sources.⁷⁵ Potable sources include two small reservoirs that are fed by the Santa Fe River and sit in the Sangre de Cristo Mountains, two well fields in the Tesuque Formation aquifer, (one within the heart of the city and one near the Rio Grande northwest of the municipal boundary) and surface water from the San Juan-Chama Project, which pipes water under the continental divide to the Rio Grande. On average, fifty percent of Santa Fe’s water is sourced from surface water from the Buckman Direct Diversion (The San Juan Chama Project), thirty percent comes from the two small reservoirs, fifteen percent comes from the Buckman well field, and the remaining five percent of the city’s water comes from its wells in the City well field.⁷⁶

⁶⁹ *Defined by*: Public Policy Research Institute, University of Montana. *Bridging the Governance Gap: Strategies to Integrate Water and Land Use Planning*. (2007) at 5.

⁷⁰ Memorandum, Office of the State Engineer hydrology Bureau, Laura Petronis and Jack Frost, August 6th 2013, at 10.

⁷¹ Santa Fe has been at the forefront of diversification of drinking water sources as well as water conservation, including a water conservation credit program, becoming a “WaterSense” partner with USEPA, and a long-range water supply plan which includes the use of multiple above and below ground sources for the city water utility. *See* 10 Places to Watch in 2010: Santa Fe, New Mexico.(2010) available at http://www.mayorsinnovation.org/pdf/13SantaFe_sample10PlacesToWatch.pdf

⁷² Santa Fe, New Mexico, Municipal Code § 25-1.10.

⁷³ *Id.* at S.4.

⁷⁴ City of Santa Fe Water Conservation Committee. *Memorandum*. (December 14th, 2013) *on file with the City of Santa Fe*.

⁷⁵ *See* J.T. McGucklin et al. *Pricing and Conservation* at 189-192.

⁷⁶ City of Santa Fe Water Conservation Committee. *Water Conservation in Santa Fe*. Address to City Council by Committee, Sept 25 2013.

Santa Fe has also implemented water resource planning and conservation incentives. For example, the City does not automatically provide new net water to developers. New uses of water (e.g. development) must buy water rights or water from a water conservation bank to provide offset water and they must submit water budgets. The City has various conservation ordinances that include water use restrictions and residential and commercial rebates for high efficiency toilets, rainwater harvesting, and other water-saving methods.⁷⁷ These conservation ordinances and credits could apply to water pumped from domestic wells.⁷⁸ Currently, the City Water Conservation Committee believes there is enough water for the city due to conservation, long-range planning, and a diverse source portfolio. Average per-capita use of municipal water is 107 gallons per day per person, a low value among southwestern cities.⁷⁹ The current 45-year conservation plan calls for a 20% reduction in total demand by 2045.⁸⁰ The city's water utility appears to have two major goals: to provide water for its customers, and to curtail use.

The implementation of the domestic well ordinance has also brought concerns about equity of the right to water for different types of water users in the City of Santa Fe. As most domestic wells are older than the ordinance and not metered, their water is priced differently as the sum of the price of installation, pumping, and repairs: rather than based on water use quantities, as it is for city users. City users are both incentivized by an increasing block rate structure and rewarded through tax incentives for conservation; well owners are not. Although domestic wells might provide more locations for access to a water source in a drought, some argue that they negatively impact water utility maximization, as the city lines could include more customers and provide more water for a lower total cost than the sum of the drilled wells and the utility costs. Municipal water use can also be considered more sustainable because water is consumed from multiple surface and groundwater sources in multiple locations rather than groundwater from one well.

B. STIPULATIONS OF THE ORDINANCE

Santa Fe's domestic well ordinance is applicable within the city limits. The ordinance does not limit uptake,⁸¹ rather, it is city practice to allow new wells that use less than 0.25 AFY per household. Drilling a new well is permissible when further than 300 feet from a water distribution line, or less than 300 feet if the cost to hook up to the city line is greater than the cost of drilling a well (known as the "300 ft. Rule").⁸² The ordinance requires monthly metering and annual reporting of use to the city. The city may add additional conditions of approval. For example, the ordinance specifies that certain wells in an area delineated by the city water authority must be drilled 50 feet into the Tesuque formation, and sealed to avoid contamination into or from the Ancha formation.⁸³ Also, wells must be constructed to city standards and by a

⁷⁷ Santa Fe, New Mexico, Municipal Code § 25-3.1-3.

⁷⁸ *Id.*

⁷⁹ *City of Santa Fe*, Water Conservation. Gallons of Water Used Per Person Per Day (GPCD) for Select Western Cities. Available at http://www.santafenm.gov/water_conservation.

⁸⁰ *Id.*

⁸¹ Santa Fe, New Mexico, Municipal Code § 25-1.10, 2007-4 sec. F(5).

⁸² The 300 foot rule is required by N.M.S.A. § 3.53.3 that allows cities to restrict domestic well drilling. As seen in Santa Fe, New Mexico, Municipal Code § 25-1.10 2004-7(D).

⁸³ Santa Fe, New Mexico, Municipal Code § 25-1.10 sec. F(1).

licensed well driller.⁸⁴ The ordinance demands well owners demonstrate offsets⁸⁵ or buy into a conservation program for their water use.⁸⁶ These rules provide limitations and guidelines to limit the effects of wells drilled after 1999, however, old wells, the total number of which the City assumes to be at least 700, are unaffected.⁸⁷ As pre-1999 wells apply for replacement well permits, the City has imposed some conditions of approval on them, such as limiting use, requiring a robust water column thickness, and imposing metering and reporting obligations.⁸⁸ Finally the ordinance allows the city to put further limitations on new wells “to prevent waste, conserve water, preserve health and safety and general welfare.”⁸⁹

C. THE ORDINANCE IN RELATION TO OTHER POLICIES

Statutory regulations for domestic wells are less stringent than the Domestic Well Ordinance in Santa Fe.⁹⁰ The DWS limits uptake to 1 AFY, and while the city ordinance does not state a stronger limit, in practice new permits are approved with a limit of 1/4th of that amount. Other aspects of the Santa Fe Domestic Well Ordinance are identical to state rules and carried out as such. The language for the 300 ft. rule, for example, is found in the statute allowing municipalities to regulate the drilling of domestic wells.⁹¹ The ordinance requires that new well drillers have been issued a permit by the OSE prior to applying for their well to the city, a stipulation also found in the statute that allows cities to regulate domestic wells. Overall, the ordinance helps conservation efforts in Santa Fe because of this extra obligation to apply to the City for a permit, which can be rejected.

The goal of the ordinance can be inferred from language in the last stipulation of the ordinance allowing the city to put further limitations on wells in order to promote conservation and protect the public health. Set in the context of the city’s water planning, the ordinance appears to address aquifer protection and conservation by requiring further stipulations for approval in comparison to statewide limits on domestic well pumping. The city has a vested interest in the aquifer from which domestic wells draw because it is one of the same sources the city uses for municipal water.⁹² Furthermore, the city is currently in the process of reviewing the

⁸⁴ Santa Fe, New Mexico, Municipal Code § 25-1.10sec. F(3).

⁸⁵ Santa Fe, New Mexico, Municipal Code § 25-12. Offsets can be made by buying into the Water Conservation Credit Program, the purpose of which is to increase system-wide water conservation, to facilitate offsetting impacts on the City's water supply system from new development and to supply water for other municipal uses. Water conservation credits are placed in the City’s water bank, and are used to offset the impact of the city’s water system.

⁸⁶ Id. Referencing Santa Fe, New Mexico, Municipal Code § 14-8.13(F).

⁸⁷ Santa Fe Code § 21-1.10, old wells.

⁸⁸ See City of Santa Fe Water Conservation Committee, *Private Wells in the City of Santa Fe*, draft report on file with Stephen Wiman, City of Santa Fe Water Conservation Committee.

⁸⁹ Santa Fe Code § 21.1-10.

⁹⁰ See Santa Fe, New Mexico, Municipal Code § 25-1.10 and N.M.S.A. § 19.27.5.14., § 3.53.3, NMSA 1978, §§ 72-12-1.1., 72-12-3. There are a few categories of wells in the city that require OSE oversight in addition to the municipal ordinance. Metered wells in the Española region, including Santa Fe, report their pumping to OSE if they serve more than 1 house, service incidental commercial uses, or are in the Aamodt settlement area.

⁹¹ See N.M.S.A. § 3.53.3.

⁹² Santa Fe Reporter, *Well, Well*. July 6th, 2004. The ordinance was created to some extent as the city felt the need to protect the water source for the city utility wells. Marcos Martinez : “because it sort of viewed the proliferation of these [domestic] wells as a potential impact on the city’s own well system—the city’s ability to provide a safe and

ordinance and the applicability of other regulations to domestic wells through the Water Conservation Committee's Domestic Well Working Group.⁹³ It therefore appears that Santa Fe is attempting to achieve conservation goals, protect their water source from other, un-quantified uses, and limit the number of applications for domestic wells that can be accepted.

V. INTERFERENCE

A. WELLS AND RIVERS

Interference refers to the ability of any well tapping into groundwater to affect other groundwater uses and surface water rights through cones of depression in unconfined aquifers. Cones of depression are a result of pumping rates that create conical groundwater depletions, which lower the local water table.⁹⁴ Cones of depression may cross one another, causing a decrease of the water level in each well, which can eventually result in both wells running dry.⁹⁵ Due to cones of depression in specific locations or high densities of wells that may result in overlapping cones of depression in a small land area, domestic wells may interfere with other ground or surface water rights and uses by drawing down the local water table.⁹⁶

Interference with rivers by domestic wells can occur due to the dynamics of groundwater flow in the local aquifer and the interconnected nature of surface and groundwater sources. The rate and timing of the effect on rivers by groundwater pumping, known as stream-flow reduction, depends on distance of the pumping source to the river as well as aquifer storage properties. Wells will either intercept groundwater base-flow that would flow into rivers, or pull water from the rivers through increased infiltration.⁹⁷ Stream-flow reduction can ensue to varying degrees based on discharge rate of a well and the periodicity of that discharge, as well as the location and depth of the well.⁹⁸ Minor tributaries, rather than interstate streams, are most likely to be in danger from domestic well pumping as domestic wells pump at relatively low rates.⁹⁹

Domestic wells that draw from riparian aquifers could adversely affect ecosystems that are dependent on available groundwater if they disrupt the underground water exchange balance.¹⁰⁰ Wetland health and riparian ecosystem viability rely on both surface and groundwater

available water supply to the city of Santa Fe.” Available online at <http://www.sfreporter.com/santafe/article-7604-well-well.html>.

⁹³ See Agenda, City Council of Santa Fe Water Conservation Committee Meeting, *On file with the City Clerk* August 8, 2013.

⁹⁴ See Drennan, *Lassoing the Loophole*, at 940.

⁹⁵ *Id.*

⁹⁶ *Id.* at 940

⁹⁷ Maddock & Barrell, *Domestic Wells in New Mexico* in WATER POLICY IN NEW MEXICO at 211.

⁹⁸ John Metesh, Montana Bureau of Mines and Geology, *Hydrology Related to Exempt Wells in Montana*, A Report to the 2010–2012 Water Policy Interim Committee of the Montana Legislature, Open file Report 612. Available at <http://www.mbmgs.mtech.edu/pdf-open-files/mbmg612.pdf> at 20

⁹⁹ *Id.* at 828

¹⁰⁰ R.H. Webb & S.A. Leake, *Ground-water surface-water interactions*. “A substantial withdrawal of groundwater [can] draw down the aquifer sufficiently to create a ‘water-level gradient’ in the opposite direction from the stream and floodplain... After a substantial period of pumping in excess of the rate of ground-water flow from upgradient areas, surface-water and groundwater systems may become disconnected if streamflow cannot provide enough

fluxes; riparian vegetation can die out due to excessive groundwater use, when the water table is lowered below the root depth of riparian flora for extended periods of time.¹⁰¹ The use of domestic wells, un-quantified and potentially in excess of the groundwater exchange balance, could increase the rate of depletion of surface water sources or lower the water table on shallow riparian aquifers that support riparian and hyporheic flora and fauna. In the Santa Fe area, long term reduction in aquifer storage in the Ancha Formation by various types of groundwater pumping threatens the existence and viability of wetlands on the lower Santa Fe River.¹⁰²

Depletions from streams that can and do occur are dependent on the variables of the specific hydro-geologic conditions and vary from area to area. However, domestic wells are likely to be near a stream and affecting a river's hydrologic balance. One quarter of domestic wells in New Mexico pump from within a mile of a stream, and half of all known wells as of 2005 are in a river-connected aquifer.¹⁰³ Although some of their use may be negated over time by return flows, wells in floodplains can create drawdowns from rivers used by senior water rights holders that rely on specific flow quantities.¹⁰⁴ Balleau and Silver estimated that in the year 2000, 11,780 acre-feet were depleted from interstate streams because of domestic wells, an estimate that nearly doubles by 2040.¹⁰⁵

B. INTERFERENCE IN SANTA FE

In Santa Fe, surface water is limited to small streams, storm-water runoff, and the Santa Fe River. Although Santa Fe River flows have been generally low for the lower reach of the river for the past decade,¹⁰⁶ the city code attempts to protect the river.¹⁰⁷ The Santa Fe River, running directly through the city with its headwaters in the Sangre de Cristo Mountains, while significantly urbanized, does include in its watershed a number of wetlands and ecosystems downstream of the city that are in need of protection. Santa Fe has codified a goal for a flowing

recharge to maintain water levels in the alluvial aquifer. [In this case], riparian vegetation can be strongly affected.” At 308 par 3 and 4.

¹⁰¹ R.H. Webb & S.A. Leake, *Ground-water surface-water interactions and long-term change in riverine riparian vegetation in the southwestern United States*. 320(3), *J. of Hydrology* (2006) At 308.

¹⁰² See Peggy S. Johnson New Mexico Bureau of Mines and Mineral Resources, *The Challenge of Sustainable Ground-Water Development*, NEW MEXICO DECISION MAKERS FIELD GUIDE. Water, Watersheds and Land Use in New Mexico: Santa Fe Region (2001) at 145, 147.

¹⁰³ W. Peter Balleau & Steven E. Silver *Hydrology and Administration of Domestic Wells in New Mexico* 45 *Nat. Resources J.* 807 (2005) at 817.

¹⁰⁴ See T. Maddock III & P.W. Barroll, *Domestic Wells in New Mexico* in *Water Policy in New Mexico: Addressing the Challenge of an Uncertain Future*, (2013) at 203; Titus *On regulating* at 857

¹⁰⁵ Balleau & Silver, *Hydrology and Administration of Domestic Wells*

¹⁰⁶ United States Geological Survey National Water Information System. Santa Fe River at Santa Fe, years 2000-2014. Santa Fe County, New Mexico Hydrologic Unit Code 13020201 Latitude 35°41'11.2", Longitude 105°50'37" NAD83 Drainage area 18.2 square miles Contributing drainage area 18.2 square miles Gage datum 7,720.00 feet above NGVD29.

¹⁰⁷ Santa Fe, New Mexico, Municipal Code § 25-13.3 Purpose. The purpose of Section 25-13 SFCC 1987 is to formalize the city's commitment to provide for a target flow within the Santa Fe River in order to enhance and further the objective of restoring the Santa Fe river as a living river by committing to use up to one thousand (1,000) acre-feet per year (AFY) of the city's water supply, depending upon hydrologic conditions in the Santa Fe River watershed. This section shall be interpreted to further this objective. (Ord. #2012-10, §4).

river – a target of 1000 AFY in “average years,” which is approximately 1/5th of the annual watershed yield.¹⁰⁸

A number of wells within damaging distance to the riparian zone may be entirely unregulated until they are in need of re-drilling or repair because the Domestic Well Ordinance only applies to wells drilled after 1999 and the state WATERS database does not include wells drilled before 1956. Although the Ancha formation that intersects with the hyporheic zone of the Santa Fe River is hydrologically disconnected from the Tesuque Aquifer in many areas, a large number of the known domestic, municipal and commercial wells in Santa Fe are close to the Santa Fe River on the east side of the City.¹⁰⁹ Additionally, metered reporting is not enforced by the city. As rivers can provide groundwater recharge, it is likely that old, unaccounted for wells are located closer to the river rather than farther away. Indeed, there is no method to guarantee that domestic wells near the Santa Fe River do not adversely affect both the flow and the riparian ecosystem downstream.

Different sources in the hydrologic cycle should not be treated in isolation because groundwater and surface water are interconnected.¹¹⁰ The ordinance does mitigate interference (Ancha-Tesuque) interference with well standards of drilling at least 50 feet into the formation and a properly constructed seal in certain areas, but it is not clear where this applies, as the locations of this stipulation are not codified.¹¹¹ Without any restrictions of domestic well proximity to the river, the ordinance fails to directly address the conflict between a flowing river and domestic wells that could draw groundwater from nearby, a conflict that has been noted by Santa Fe’s Water Conservation Committee.¹¹²

The city ordinance does not directly address well interference with other wells either, as there is no rule regulating how close domestic wells can be to each other, except for a 10-to-20 foot easement for infrastructure.¹¹³ Although the ordinance states that wells must use the Tesuque formation, which narrows the use of domestic wells to one layer of geology, this specification impedes the mitigation of interference between users because the Tesuque is the same water-bearing formation that the city well field, for example, draws from. Realistically, there is no better formation to pump because using the Ancha formation on the other hand (connected to the Santa Fe River) could affect river flows through induced groundwater recharge.

The 300 ft. rule may minimally help avoid interference between wells as it requires users to hook up to the utility if it costs less than drilling a well, and in the absence of the 300 ft. rule, wells could be drilled in those locations instead. However, wells further away from the city’s

¹⁰⁸ Santa Fe, New Mexico. Municipal Code § 25-13.3.

¹⁰⁹ See Office of the State Engineer WATERS Database, Figure 7. Domestic wells in the Española Basin available on OSE WATERS database. in Lewis, *Water Resource Inventory of the Española Basin*; Santa Fe City Council Water Conservation Committee.

¹¹⁰ Winter TC (1999) Relation of streams, lakes, and wetlands to groundwater flow systems. *Hydrogeol J* 7:28–45.

¹¹¹ Santa Fe, New Mexico. Municipal Code § 25.1.10 at F(2).

¹¹² See Agenda, City Council of Santa Fe Water Conservation Committee Meeting, *On file with the City Clerk*. August 8, 2013 at 12.

¹¹³ Santa Fe, New Mexico, Municipal Code § 25-1.10 Ordinance 2004-7, sect. F(2). 9.

water lines or outside of the city's boundary are not under jurisdiction of the domestic well ordinance (as is the case for the domestic wells near the city's Northwest Well¹¹⁴). These wells still can have an effect on the Tesuque aquifer. The 300 ft. rule is required by state statute and duplicated in the ordinance.¹¹⁵

Other rules and legislation do not protect against interference between domestic wells and other water rights. The Aamodt Settlement,¹¹⁶ which allows for some domestic wells to use more water (based on their historic beneficial use) than their neighbors (regulated under the ordinance), in the short term, competes with the ability of the city to mitigate interference.¹¹⁷ The City might benefit from taking the settlement into account perhaps even restricting domestic wells in the same area to allow the aquifer to recover if necessary. Balleau and Silver argue that as long as domestic wells are more than 300 to 500 ft. from each other they should not cause significant harm on one another.¹¹⁸ DMWAs and CMAs may also provide pathways to restrict uptake and wells in certain locations if and when they are implemented, but ultimately interference between domestic wells and other ground and surface water uses goes largely unregulated in the City of Santa Fe.

VI. AQUIFER SUSTAINABILITY

A. DEFINING SUSTAINABILITY

Domestic well pumping on a large scale is feared to disrupt the balance between recharge and outflow from aquifers by consuming more water than is sustainable. However, without measurable parameters, "sustainability" is an empty term. In order to account for sustainability,

¹¹⁴ See *Petronis and Frost, Memorandum* (2013) at 2. Domestic wells may impact the pumping ability of the city's northwest well, and the northwest well may be causing a water level decline for domestic well users. In a dispute between the City of Santa Fe, the Office of the State engineer and a number of well owners, the well owners claimed that water table drawdowns they suffered were caused by the city's North Well. OSE monitoring wells have shown up to 3.2 feet of drawdown in the area affected by the well. However, it is unclear what's causing the drawdown since water table declines don't occur uniformly in relationship to the north well. The complex geology of the area may have confounding affects. In either scenario, water level declines will affect both the city and the domestic well users, providing an example of the need for well-to-well interactions to be examined and limited.

¹¹⁵ N.M.S.A. § 19.27.5.14. NMSA 1978, §§ 72-12-1.1 : 72-12-3.

¹¹⁶ See Office of the State Engineer. *Aamodt Water Rights Settlement*. Available at http://www.ose.state.nm.us/legal_ose_aamodt_info.html. The Aamodt settlement of water rights was a multi-party deal begun in 2000 and signed in 2013 between The State of New Mexico, The United States of New Mexico, the City of Santa Fe, Santa Fe County, The Pueblos of Nambé, Pojoaque, Tesuque and San Ildefonso as well as non-pueblo water right users. Santa Fe County is responsible for 1,500 acre-feet per year ear of water for non-pueblo users.

¹¹⁷ Under the settlement, affecting the area north of Santa Fe (Tesuque, Nambe and Pojoaque) Domestic wells were put into four categories: 1) pre-basin wells are allowed more than domestic use (Their adjudicated use is based on "historic" use), 2) wells permitted prior to 1983 moratorium, 3) wells signed as part of the 1982 well agreement (in acted in 1999), or 4) Wells that were not a party to the agreement. All wells can be protected from priority calls if they connect to the CWU eventually or to keep their well in perpetuity and reduce usage to varying degrees dependent on their categorization. See *Summary of Aamodt Settlement* available at http://www.santafecountynm.gov/userfiles/Aamodt_2013/Aamodt-SummaryofAamodtSettlement-DomesticWells2013.pdf at 1.

¹¹⁸ Balleau & Silver, *Hydrology and Administration* 2005, at 823.

managers must define a concrete time horizon as the benchmark for how long the resource can be sustained with specific pumping parameters.

There may not be an easy method to evaluate domestic well pumping effects on aquifer levels. “Safe Yield” is a commonly used metric for a sustainable rate of pumping from an aquifer. It was defined in 1959 as “the maximum quantity of water pumped while maintaining an unimpaired supply.”¹¹⁹ Yet the use of this concept, that dictates that pumping should not exceed aquifer recharge rates, has been criticized, as sustainability should be established based on hydrologic mass-balance concepts.¹²⁰ Safe yield may not accurately account for sustained water table levels or aquifer water content or long term outflows to seeps and streams.¹²¹ Surface recharge is often not the only inflow and pumping may not be the only outflow, as most aquifers are hydrologically connected to other pathways for water movement, above and below ground. Balleau argues hydrologists should consider instead a “transient analysis of boundary responses to superimposed stresses on the hydrologic system.”¹²² Some suggest the concept of “sustainable yield” defined as use of an aquifer dependent on sustainable development goals.¹²³ In this case, cities must consider their baseline –what water level they deem acceptable or “unimpaired.” The definition of “unimpaired supply” should be paired with an understanding of long term balances in aquifers. Natural recharge is balanced by discharge by evapotranspiration and exfiltration into streams, springs, and seeps. If pumping equals recharge, eventually streams, marshes, and springs may dry up.

Some have argued that the total quantity of domestic well drawdown should not have a significant effect on the total water budget for a large region because domestic wells draw very small quantities of water at low rates.¹²⁴ Hydrogeological studies show that domestic wells currently represent too small a portion of the budget for a significant negative impact on the aquifer used in Albuquerque, as an example.¹²⁵ Currently, domestic wells, according to the best available information, do not appear to be a threat to the sustainability of the aquifer below Santa Fe, due to their low rates of pumping and the thickness of the aquifer. Estimates of groundwater in the Tesuque Formation show values from 500 to 4000 ft. in saturated thickness.¹²⁶ The State Engineer limited the use of a domestic well to 1 AFY in 2005, and Santa Fe’s 1/4th of an AFY is a step closer approximation to average household use in Santa Fe, at 107 gallons per day (or 0.12 acre-feet per year).¹²⁷ Indoor uses in a household with efficient installations can use as little as

¹¹⁹ D. K. Todd. *Ground Water Hydrology*. (1959).

¹²⁰ M. Sophocleous, *From safe yield to sustainable development of water resources - The Kansas experience*. 235 J. of Hydrology: 1-2 (2000) 27-43.

¹²¹ W. Peter Balleau *The Policy of Pumping the Recharge is Out of Control*. 94 Eos, No. 1,1. (2013) at 4.

¹²² *Id.*

¹²³ W. M. Alley T. E. Reilly, and. O. E. Franke. (1999). [Sustainability of groundwater resources](#). U.S. Geological Survey Circular 1186, Denver, Colorado, at 79.

¹²⁴ Balleau. *The Policy of Pumping the Recharge* at 4.

¹²⁵ See generally Balleau & Silver *Hydrology and Administration*.

¹²⁶ Amy Lewis & Francis West. (1995). *Conceptual Hydrologic Systems for Santa Fe County*. New Mexico Geological Society Guidebook: 46 Field Conference, Geology of the Santa Fe Region. At 1.

¹²⁷ *City of Santa Fe*, Water Conservation. Gallons of Water Used Per Person Per Day (GPCD) for Select Western Cities. Available at http://www.santafenm.gov/water_conservation

45 gallons per day.¹²⁸ Outdoor watering varies from 8 to 32 gallons per square foot per day.¹²⁹ Amy Lewis estimated that in Santa Fe residential per capita demand, the sum of indoor and outdoor use, varies from 77 to 167 gallons per day depending on conservation appliances and garden types.¹³⁰ Clearly Santa Fe households can and do conserve.

However, it is also clear that a dramatic increase in domestic wells could affect the water table. One model shows a rate of 3 feet of drawdown in 40 years due to currently in-use domestic wells using pumping rates that are available in the state database.¹³¹ Although a very small portion of water pulled by domestic wells may be returned to the ground in return flows from effluent,¹³² this return flow will not make up for removed (consumed) water on the same time scale as the withdrawals due to evapotranspiration and the slow movement of groundwater. If cities have quantified goals for water table levels, domestic well pumping should be included in their estimates.

Maintaining water table levels is critical for Western cities because water resources are relatively scarce. In Santa Fe, when reservoir levels decline or surface water is unavailable due to quality concerns related to wildfire events, the city relies more heavily on groundwater sources. Furthermore, the Española basin gets very little aquifer recharge, which occurs mostly in the higher elevations of the region due to high evapotranspiration and temperature and low precipitation rates in the valleys. Drought can cause a lowering of the water table, up to 30 feet in mountainous regions, which are more sensitive to drought because areas of steeper water-table gradients will drain water faster.¹³³ Anderholm estimated 0.05 to 0.5 inches added to the water table from precipitation per year.¹³⁴ Sub-surface recharge is occurring in the Santa Fe River Basin at an approximate rate of 2.71 inches per year.¹³⁵ The Tesuque aquifer has also shown indications of being a leaky aquifer, in which some flows move to other basins.¹³⁶ Establishing a water table baseline for pumping to ensure groundwater uses are not causing rapid rates of depletion is an important and unfinished step towards establishing how much domestic wells can draw from the aquifer without long-term consequences.

Unfortunately, total domestic well uptake from the Tesuque aquifer below Santa Fe is unknown. Known domestic wells, numbering 8,200 in the Española basin pump approximately

¹²⁸ Amy Lewis. *Water Use and Conservation Potential for Domestic Wells in the Santa Fe Area*. 12th Annual Española Basin Technical Advisory Group Workshop, Santa Fe Community College (May 20-21 2013).

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ Stephen Wiman. Draft Report *Private Wells in Santa Fe*. On file with author.

¹³² Washington Water Trust *Dungeness Water Exchange FAQ*, estimates this at <10% (90% consumptive use outdoors) available at <http://www.washingtonwatertrust.org/dungeness-water-exchange-faqs>.

¹³³ Balleau & Silver *Hydrology and Administration* at 813.

¹³⁴ See Me Ada, D.P, and Wasiolek, Maryann, 1988, Simulation of the regional geohydrology of the Tesuque aquifer system near Santa Fe, New Mexico: U.S. Geological Survey Water- Resources Investigations Report 87-4056,71 (1998) At 33.

¹³⁵ Wasiolek, Maryann. *Subsurface recharge to the Tesuque Aquifer system from selected drainage basins along the western side of the Sangre de Cristo Mountains near Santa Fe, New Mexico*. US Department of the Interior, US Geological Survey, 1995. At 36.

¹³⁶ Keating, Elizabeth H., Velimir V. Vesselinov, Edward Kwicklis, and Zhiming Lu. "Coupling Basin-and Site-Scale Inverse Models of the Espanola Aquifer." *Ground water* 41, no. 2 (2003) at 203.

5,600 AFY, an average of 0.68 AFY per well.¹³⁷ 98% of domestic wells within the WATERS database for the state have no reported meter readings.¹³⁸ In the WATERS database there are 753 known wells (drilled after 1956) in the City of Santa Fe. One report estimates up to 350 AFY drawn from these domestic wells,¹³⁹ a small number in comparison to Santa Fe's municipal water demand at 10,000 AFY in 2011.¹⁴⁰ But multiple uses draw from the Tesuque Formation, including city wells. This lack of information contributes to the unfinished water budget accounting that the proliferation of unmetered domestic wells can exacerbate.

B. AQUIFER USE IN SANTA FE'S ORDINANCE

In the case of Santa Fe, the city's goal is to use the aquifer "sustainably,"¹⁴¹ in order to avoid over-use of the aquifer in the long run. The ways in which the city's ordinance is able to generally reduce uses include the following five rules: first, the necessity of an application to the city, which limits the proliferation of wells; second, the requirement of offsets that replenishes some of that consumed water; third, the efficiency of use through well construction regulations that help avoid waste by leaks; fourth, the requirement for metering new domestic wells that should help estimate total pumping rates; and finally, the city reserves the right to impose further conditions as necessary in order to conserve water and protect the welfare of citizens.¹⁴²

While these steps are necessary to regulate aquifer depletion, the city does not address declines in the water table directly, nor state a measured limit to depletions. Rather, the ordinance limits proliferation of new domestic wells within areas of the city that are supplied by city water lines. Some models have shown that curtailment of domestic well growth can reduce depletion across the state by up to 13.4 feet in 40 years.¹⁴³ A drawdown limit that applies to all users would be a way for the city to mitigate any affect that domestic wells may have, however such a limit may not be currently defined.

In addition, the sections of the ordinance that appear to address limiting aquifer use don't necessarily play out as they are written. Total depletion is not proportionally addressed through "offsets". Domestic well applicants must comply with 14-8.13(F)(3) SFCC 1987 requiring offsets to be purchased from the water bank to fund the conservation program for rebates for conservation on city water.¹⁴⁴ This conservation fund provides rebates (e.g. for installation of low water use toilets or appliances) as incentives for city water users to conserve. But the potable city water comes from multiple above and below ground sources: The San Juan Chama project and Buckman well field at the diversion in addition to city wells below Santa Fe and two reservoirs fed by the Santa Fe River. Ultimately, domestic well users are offsetting their use

¹³⁷ Lewis *Water Resource Inventory* 2013, at 6.

¹³⁸ *Id.* at 8.

¹³⁹ See Wiman, *Private Wells*, p. 2.

¹⁴⁰ See City of Santa Fe *Long Range Water Supply Plan* (2011) Water Supply and Demand Projections, at 5.

¹⁴¹ See *Id.* at 1-5.

¹⁴² Santa Fe Municipal Code § 25-1.10, 2004.

¹⁴³ Reductions; Balleau & Silver, *Hydrology and Administration*, at 826.

¹⁴⁴ See Offsets: Center for Natural Resources and Environmental Policy, *Bridging the Governance Gap*, at 25. Santa Fe's Water Budget Program is an attempt to have no net increase in total demand of water in the city. While these offsets don't address sources – and don't necessarily contribute to stability of the water table, businesses must offset their new uses, which is in line with what new domestic well users must do according to the ordinance.

through water from a combination of surface and groundwater flows, which do not recharge the aquifer at a 1:1 ratio. Unfortunately the implementation of this aspect of the ordinance is lacking as well: well users face no punishment if they do not purchase these required offsets. While water use quantities could be offset by the conservation fund, use from the Tesuque formation by domestic wells is not decreased proportionately.

The most limiting aspect related to assessing groundwater uptake from wells in the context of aquifer protection (as well as interference) is the lack of well data in the state WATERS database. Metering requirements, which would allow the city to have some sense of the use of the aquifer by domestic wells, have no enforcement stipulations and are not carried out. The OSE data provide only 71 metered wells that are connected to specific houses, serving 161 homes in the entire County of Santa Fe. Even using only this small portion of wells that have reported metering, there are an estimated 1,872 AFY of potential water savings considering conservation technology and landscapes of homes out of estimated 5637 AFY used by domestic wells.¹⁴⁵ Domestic wells can conserve even more than they currently do and owners appear to use more water per capita than those hooked up to municipal water.

The WATERS database, used by the City of Santa Fe, the county, and state is insufficient in multiple ways. It is statistically weak because most metering is reported voluntarily, which causes selection bias. Average use therefore may be larger than $\frac{1}{4}$ AFY.¹⁴⁶ As mentioned previously, there are examples where owners, using domestic wells, irrigate more than the acceptable 1-acre of land.¹⁴⁷ The database also does not include wells drilled before 1956. In Santa Fe, the number of wells that are currently being used may be underestimated. According to the WATERS database, there are 753 known domestic wells within the city boundary, including the recently annexed area of Santa Fe as of 2011.¹⁴⁸

Domestic wells cannot be fully accounted for by the city through cross-references; a query into homes that have waste pick up but are not hooked up to the city water utility won't solve the problem because it doesn't include those who do not use the city waste management service.¹⁴⁹ Therefore, the actual yield of these domestic wells total from the aquifer is unknown due both to lack of metering and lack of accurate well count. Anecdotally, the problem is not curtailed by the ordinance as unknown wells are still being found: a developer in Santa Fe found 6 domestic wells on a small parcel that were not included in the city database. However, the lifetime of a well is approximately 40 years,¹⁵⁰ and when old well owners cycle through and need re-drilling, they will fall under the ordinance.

There are some alternative policy routes to avoid drawdown in aquifers from domestic wells. One such method is to limit the density of wells, which consequentially limits their total

¹⁴⁵ Amy Lewis. *Water Use and Conservation Potential for Domestic Wells in the Santa Fe Area*. 12th Annual Española Basin Technical Advisory Group Workshop, Santa Fe Community College (May 20-21 2013).

¹⁴⁶ *Id.*

¹⁴⁷ Balleau & Silver *Hydrology and Administration* at 813; Lewis *Water Use and Conservation* (2013).

¹⁴⁸ Lewis *Water Use and Conservation* (2013).

¹⁴⁹ See City of Santa Fe, *Water Demand and Supply Projections: 2012 Annual Water Report* at 7, noting "estimated use". The last two City of Santa Fe Water Utility division water coordinators have seen between 5 and 10 new well applications annually. On file with City of Santa Fe Water Utility Division, 2012-2014.

¹⁵⁰ Balleau & Silver. *Hydrology and Administration* at 823.

numbers: San Diego County, California, the Front Range counties of Colorado, and Santa Fe have implemented low-density requirements of a minimum of 10 acres per lot in some areas.¹⁵¹ Aquifers, however, are complex geologic bodies that may be affected differently in different localities, depending on various properties such as the presence or absence of confining layers or the hydraulic conductivity of the material. Metering and a physical limit on pumping for the entire aquifer, (a specific amount of allowed water table decline) are stipulations not included in Santa Fe's domestic well ordinance, and although the ordinance limits proliferation of domestic wells that would cause dramatic drawdowns, it does not define what it means to protect the aquifer.

VII. THE DEVELOPMENT LOOPHOLE

Groundwater has historically been a large source of urban water in New Mexico cities.¹⁵² Santa Fe has correlated its growth management strategies with water availability. Domestic wells have provided a freedom to grow in that they can allow for suburban development away from city water lines. Balleau and Silver note domestic wells provide cheaper water.¹⁵³

However, low-priced water does not serve conservation goals in the west. Many have argued that making drinking water priced to incentivize conservation should be a goal of western cities.¹⁵⁴ For domestic well users, the price of obtaining water is not directly correlated to use, but to construction, energy costs and permitting. For multi-lot developers, domestic wells are also a way to avoid a community well water right and various fees.

Limited water availability in Santa Fe limits options for new developments. Santa Fe County added 1000 people to its current total of 147,400 in 2013.¹⁵⁵ The county is expected add another 16% of its current population in the next five years.¹⁵⁶ As was previously stated, the City of Santa Fe, as part of its conservation plan, does not provide "new net water" to new developments or businesses and requires them to purchase offsets or provide their own water. The City's goal is to reduce total water use by 20% by 2045, a goal that may be hampered by what's known as "double-dipping" which can be employed using "the loophole".

¹⁵¹ Bell & Taylor *Water Laws and Policies for a Sustainable Future: A western States Perspective* at 64.

¹⁵² See Bruce M. Thomson *Water Resources in New Mexico*; J.T. McGucklin et al. *The Pricing and Conservation of Water in Urban Areas*, in WATER POLICY IN NEW MEXICO. (Ed. Brookshire et al. 2012) at 26, 190. Over the last decade, the cities of Albuquerque and Santa Fe have enacted policy to decrease aquifer drawdown by acquiring surface flows as a larger portion of their municipal budgets through the San Juan Chama and Buckman Direct Diversion projects.

¹⁵³ Balleau & Silver *Hydrology and Administration* 2005.

¹⁵⁴ See J.T. McGucklin, Susan Kelly and Kyle Harwoo. *The Pricing and Conservation of Water in Urban Areas* in WATER POLICY IN NEW MEXICO (Ed. Brookshire et al. 2012). At 196; Bell & Taylor *Water Laws and Policies* at 75.

¹⁵⁵ United States Census Bureau *Santa Fe County, New Mexico* available at <http://quickfacts.census.gov/qfd/states/35/35049.html>

¹⁵⁶ New Mexico County Population Projections July 1 2010 to July 1 2040. Geospatial and Population Studies Group. Bureau of Business & Economic Research, Univ. of N. M. Last Revised: 12/4/12 available at <http://bber.unm.edu/demo/PopProjTable2.htm>

“Double dipping” can be defined as two rights to uses of water (one- a water right, and the other, domestic wells) on one property. Usually, the loophole that allows “double dipping” is employed on a property that was originally farmland. Developers then can sell their traditional water right and still have the ability to draw water from the same source as the original right through a domestic well (usually, a number of domestic wells).¹⁵⁷ Subdivision developers outside of the reach of municipal water systems can avoid the water right acquiring process, which is regulated comprehensively by the OSE, by using domestic wells instead.¹⁵⁸ These sub-dividers can then avoid water-efficiency construction guidelines, water rights acquisition, purchasing of offsets in adjudicated closed basins, costs associated with drilling (that fall on the purchaser of the lot) and water quality standards for community wells.¹⁵⁹

This development loophole has been a controversial issue across New Mexico for decades. However, recent amendments to county, state and municipal rules may have eliminated the majority of land that can be subject to the loophole. These include more extensive OSE oversight, and a decrease in the number of parcels from 20 to 10 that are subject to OSE review of adequacy of water, which were passed in 2013.¹⁶⁰ Currently subdivisions over 10 parcels of 2 acres or less must have other water rights instead of domestic wells, so only some subdivisions can employ the loophole.¹⁶¹ These changes are a significant limitation to the amount of developers who may employ the loophole. However, these recent amendments only apply to land from which appurtenant irrigation water rights are severed after the effective date of the bills, so there remain two ways that the loophole is still in affect: farmlands where water rights have been severed before 2013, and subdivisions with less than 10 parcels. The issue of irrigation water impairment surfaced in *Bounds* citing the legislative amendment that requires the OSE to be shown proof of a different type of water right than domestic wells, if water rights have been severed from the parcel, for approval of a subdivision plat.¹⁶²

Other policies within the city, county and state set guidelines for the use and sourcing of water in housing developments. These include the city’s economic development plan and the county’s low density requirements in certain areas, including a currently in-progress Sustainable Land Development Code.¹⁶³ Santa Fe County has created a zoning map associated with this code, which is currently in review; it limits lot sizes in certain areas. The OSE provides further oversight by examining proposed subdivisions in unincorporated areas to make sure that county plans will fulfill the anticipated maximum water requirements. The OSE’s analysis includes predicted water demand and availability for a 40-year planning period.¹⁶⁴

¹⁵⁷ See Drennan, *Lassoing the Loophole* at 923; Titus *On Regulating* at 859.

¹⁵⁸ See Drennan, *Lassoing the Loophole* at 923.

¹⁵⁹ Drennan, *Lassoing the Loophole* at 939.

¹⁶⁰ N.M.S.A. § 47-6-11.4, amended in 2013 by SB 479.

¹⁶¹ *Id.*

¹⁶² NMSA 1978, § 3-20-9.1; Slip Opinion ¶ 42; N.M.S.A. § 3-20-9.1 (2013).

¹⁶³ *Santa Fe County*. Santa Fe County Sustainable Land Development Code, adopted by Ordinance 2013-6. available at <http://www.santafecountynm.gov/userfiles/SLDC/ClickableSLDCwithOrdinance.pdf> and New Mexico State Senate SB 479 and SB 480 (2013) Peter Wirth available at <http://www.nmlegis.gov/Sessions/13%20Regular/bills/senate/SB0479.pdf> and <http://www.nmlegis.gov/Sessions/13%20Regular/bills/senate/SB0480.pdf>

¹⁶⁴ University of Montana, *Bridging the Governance Gap* at 21.

The use of the development loophole in general is a detriment to growth management goals like those of the City of Santa Fe that include conservation of water.¹⁶⁵ Unfortunately, because a majority of wells that are drilled under the loophole are not metered, it is impossible to know withdrawals from wells – causing total groundwater budgets to be inaccurate on a broad scale. The loophole consequentially makes it more difficult to address concerns of interference and aquifer protection as it allows the proliferation of wells that are unaccounted for. The loophole also complicates inter-governmental water management coordination efforts, as there remain areas outside of city boundaries that are hydrologically connected to the city’s groundwater sources, posing a threat to both the city water utilities and the suburban users pumping from the same source. City ordinances cannot directly address the management of water resources outside of their boundaries associated with housing developments.

Although Santa Fe’s domestic well ordinance does significantly narrow qualifications for a domestic well permit to be passed, there are no specific sections in the ordinance addressing municipal growth or the loophole.¹⁶⁶ No sections limit domestic wells on land parcels that already have other appurtenant water rights that have been severed from the land and sold off. It is unclear how important the loophole is within the city of Santa Fe or if landowners and developers have taken advantage of it, as there are few farms left within the city limits. However, considering that the remaining, albeit small way to take advantage of loophole can play out across the state, and that the City of Santa Fe is not facing dire consequences due to the loophole, the domestic well ordinance is not likely to be an effective political pathway for closing the loophole.

VIII. OTHER STATES

Other states in the West face many of the same management challenges related to domestic wells as New Mexico. Programs and initiatives in Montana, Washington and Oregon supply examples of various local regulations that represent alternative approaches to managing domestic wells in the presence of an exempt well statute. Approaches in these states have been able to address some of the concerns for aquifers and interference caused by domestic wells, especially related to stream flow reductions and well data.

A. REQUIRING MITIGATION OF PUMPING IMPACTS

The problem of domestic wells drawing down surface flows has been addressed more thoroughly in Washington State’s Dungeness Water Exchange Program (DWE) than it has by the Santa Fe Ordinance. Using the DWE, managers have attempted to mitigate the effect of groundwater depletions on small tributaries to the Dungeness River, a concern due to the impact of over-appropriation of the basins’ water and on four species protected by the federal Endangered Species Act.¹⁶⁷

¹⁶⁵ Bell & Taylor *Water Laws and Policies for a Sustainable Future* at 36.

¹⁶⁶ Santa Fe, New Mexico, Municipal Code § 25-1.10.

¹⁶⁷ Washington Water Trust *Dungeness Water Exchange*, available at <http://www.washingtonwatertrust.org/water-exchange>.

The DWE allows for more accurate water budgeting compared to the offsets rule in the domestic well ordinance in Santa Fe. Under the DWE, new users are required to report their pumping rates and this provides a complete set of data to quantify those users' impacts on the river. Exempt well users are also required to make up for all consumptive use (use that is not returned to groundwater in the form of return flows from effluent tanks or the small amount that seeps into the aquifer over time through irrigation of their garden). The mitigation requirement for domestic wells is quantified based on reported meter readings, considering indoor and outdoor usage, which offer a more accurate account of water consumed.¹⁶⁸ This may also allow the DWE to provide critical information used to reach sustainability goals, although the enforcement of the DWE is unclear.

The DWE additionally appears to allow for more flexible implementation than the ordinance in Santa Fe. In the DWE, well owners have options: they can make their own mitigation plan, purchase credits as required by the DWE, or work directly with the Department of Ecology to mitigate their consumed water.¹⁶⁹ Such options that give flexibility to domestic well users are not available in Santa Fe.

B. LIMITED ZONES

Limiting domestic wells by zone or area of concern may be one of the most effective ways to avoid surface to groundwater use interference, especially since most recorded issues related to domestic wells are confined to specific areas of concern, may they be near a stream, in an area with high groundwater depletions or high density development. Washington State's DWE is an example of a limited zone. Oregon addresses local domestic well limitations through groundwater "limited" and "restricted" areas, much like New Mexico's DWMAs or CMAs. In Oregon flow meters and reporting are required along with compliance with state well drilling standards. Like New Mexico, exempt uses outside of these zones avoid Oregon Water Resources Department¹⁷⁰ review process for interference with competing uses, over-appropriated surface waters, and protected waters.¹⁷¹

Limited zones allow for more efficiency in the regulation of domestic wells. In the state of Montana, there are 148,000 domestic wells on record and the growth of domestic wells is correlated with population growth.¹⁷² Montana domestic wells only amount to approximately 1% of all water uses and their estimated consumptive use is 0.2% of total consumptive water use in the state.¹⁷³ However, the consumptive use of groundwater by domestic wells localized to the southwestern portion of Montana ranges from 15 to over 50 percent of total water use.¹⁷⁴ This provides an example of how the importance of domestic well management may be of a much greater magnitude in a small subsection of a state than throughout.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ Equivalent of New Mexico's OSE.

¹⁷¹ *See* O.R.S. § 537.545 .

¹⁷² Metesh, *Hydrology Related to Exempt Wells* at 1, 4.

¹⁷³ *Id.* at 6.

¹⁷⁴ *Id.* at 7.

Creating regulations that are specific to geographical areas delineated by their hydrologic problem can also allow for better accuracy by limiting the extensiveness of data required, as geohydrologic parameters vary by location. The most promising idea that may help avoid river drawdowns from domestic wells in local areas is the concept of “Stream depletion zones” presented by John Metesh in a report to the Montana Legislature.¹⁷⁵ As the rate of stream depletion from groundwater pumping depends on the aquifer properties, the rate of pumping, and the distance to the stream, wells can be set back enough from riparian areas in outlined zones so that their peak depletion rates from the streams do not overlap with the peak of the growing season or critical timing for environmental flows. Additionally, septic draining systems can be placed closer to a stream so that recharge can offset consumption to some degree, in some examples up to 75%.¹⁷⁶ Similar proposals have been recommended by other authors.¹⁷⁷

C. ACQUIRING DATA ON WELL USE

In New Mexico, a major drawback for any program attempting to limit domestic well uptake can be the lack of data quantifying how much domestic wells actually pump. Metering requirements vary from area to area. A lack of regulation and missing information about the magnitude and locations of groundwater extraction by domestic wells may create conflicts with senior water rights holders and inefficiencies such as forcing homeowners to deepen their wells.¹⁷⁸ In Santa Fe, although new wells are required to install meters, this is unenforced, and most old wells go without any enforced pumping limit.

The State of Montana has explored all recorded challenges facing domestic well management in an extensive domestic well study.¹⁷⁹ Montana’s record of domestic wells appears more complete than New Mexico’s (the first well in the database has a date of 1850, New Mexico does not have wells included that were drilled before 1956).¹⁸⁰ Montana is an example where more data does not lead to an absence of uncertainty, as this recent study shows. State-wide databases without comprehensive information tailored to a threatened area may not be applicable for local concerns.

Oregon provides citizens and decisions makers with more up-to-date and more easily accessible water use data from domestic wells. Water level and well logs are supplied publicly by the state of Oregon Water Resources Department. Observation wells (of which there are

¹⁷⁵ Metesh *Hydrology Related to Exempt Wells* at 14-17.

¹⁷⁶ *Id.* at 16.

¹⁷⁷ Titus *On Regulating New Mexico’s Domestic Wells* at 859, ; Bracken *Scalpels vs. Hammers* at 27.

¹⁷⁸ University of Montana *Bridging the Governance Gap* at 13.

¹⁷⁹ The goals of the study include determining the number of existing wells and estimating how many wells may be drilled over the next decade, and may contribute to an argument that domestic wells are under-studied whether or not their impacts are large in terms of groundwater sustainability. The study attempts to address unknowns of: the legal quantity, accurate measurements of use, ways to ensure a limit on affects on other users from domestic wells including surface water appropriations, and what legal options exist to put a call on domestic wells in times of scarcity under prior appropriation. They consider other programs and mitigation, offset purchasing, as well as the relationship between land use decisions and alternatives to domestics, and their own rulemaking authority. (2011) available at <http://leg.mt.gov/content/Publications/Environmental/2012-wpic-brochure.pdf>

¹⁸⁰ Metesh *Hydrology Related to Exempt Wells* at 1.

16,564) in this database are measured quarterly.¹⁸¹ New Mexico utilizes the WATERS database, but local water table levels and metered rates are not publicly available at ease, as ArcGIS is required to access them. New Mexico administrators and the public would be better able to answer various questions of aquifer sustainability and interference if they were provided with a more complete database such as Oregon's, even though it is not likely to be the penultimate solution to all the problems associated with domestic well management, such as inputs to geographically small hydrologic models.

IX. LESSONS FROM SANTA FE

Oregon, Washington and Montana have all begun to address the protection of streams from domestic wells through various zone-based methods, targeted enforcement, and descriptive and accurate well databases. There are a number of specific changes that could be made to Santa Fe's Domestic Well Ordinance to limit the potential conflicts associated with domestic wells in Santa Fe. Other aspects of domestic well management can be better addressed at the county or state governance levels. Furthermore, other cities with more dire water demand scenarios may benefit from proactively implementing some of these measures.

SANTA FE'S ORDINANCE

1) Interference The ordinance does not directly address or account for interference. While the City of Santa Fe has codified conservation goals that include a reduction in total water use and the protection of the Santa Fe River, there remains a disconnect between the domestic well ordinance and other city-wide regulation. The ordinance does not specifically limit domestic wells based on the location of other wells or their proximity to streams. However, most wells tapping into the Tesuque aquifer are not a direct threat to the Santa Fe River as the Tesuque and Ancha formations are disconnected with most of the municipal boundary.¹⁸²

2) Aquifer Protection The ordinance does not directly protect water table levels, although limiting new applications does discourage proliferation. The lack of a quantitative limit on aquifer depletion means the city's conservation goals for groundwater are ineffective. Hydrologic models show a large depth of saturation in the Tesuque formation aquifer, suggesting that depletion is a long-term concern and not a current crisis.¹⁸³

3) The Loophole The ordinance does not and need not address the domestic well loophole. As the loophole applies to subdivisions, which, when not regulated under the 300 ft. rule, mostly occur outside the city boundary, state and county rules should suffice. The only

¹⁸¹ Oregon Water Resources Department *Water Level Data and Hydrographs* available at http://www.oregon.gov/owrd/pages/gw/well_data.aspx#View_Water_Level_Data

¹⁸² See Office of the State Engineer WATERS Database, Figure 7. Domestic wells in the Española Basin available on OSE WATERS database. in Lewis, *Water Resource Inventory of the Española Basin*; Santa Fe City Council Water Conservation Committee. And United States Geological Survey. Water Supply Paper 2205 "Mathematical Model of the Tesuque Aquifer System" at P. 7 Figure 4 "Saturated Thickness of the Tesuque Formation Represented in the Model."

¹⁸³ *Id.*

regulatory framework for limiting developments is the county’s new Sustainable Land Development Code¹⁸⁴, but it does not fill in the gap where the state does not regulate the loophole, and only applies in Santa Fe County outside of the municipal boundary.

SPECIFIC RECOMMENDATIONS

1) Stream Depletion Zones and Well Protection Zones

For Santa Fe

As Santa Fe’s Ordinance currently does not directly address interference, it could be updated to include zone-based protections that limit well uptake and well density in areas of concern for interference between wells, such as the North Well area, protecting both the well users from drawdown and the city wells. A stream-depletion zone, with more specific parameters than a CMA and administered by the city, could also be applied to the Santa Fe River Watershed in order to protect the more vulnerable tributaries from induced recharge by domestic wells to groundwater. First the City should determine if current wells pose a threat in any specific area, although an overall threat is considered unlikely to do disconnected state of the Ancha and Tesuque formations. Knowledge of the pumping quantity, depth and location within the stream depletion zone are needed for this policy recommendation, but generally the data requirements are less than state-wide or region-wide legislation would require as they are location-specific.

For Cities and States

As interference is a local issue affecting specific cones of depression and stream reaches, an ordinance should address these two concerns, although stream depletions must be holistically managed as most streams cross municipal boundaries. Therefore municipal ordinances will not suffice as stand-alone regulations. A stream depletion zone on the city level should be coordinated with the county and state to complete a stream zone that runs the length of the stream, or a well zone that encapsulates the radius of cones of depression. Cities with surface water and groundwater conservation ordinances should consider whether or not domestic well policy adversely affects the goals of such ordinances.

2) Aquifer Drawdown Limits

For Santa Fe

In Santa Fe, protecting the Tesuque aquifer should not be addressed as part of a vague concept of sustainability. Although hydrologically complex, aquifer drawdowns should be

¹⁸⁴ The Sustainable Land Development Code will soon provide some additional limitations to the propagation of domestic wells outside of the municipal boundary, which will become effective after the county zoning map is adopted. The Santa Fe board of county commissioners unanimously approved the ordinance to adopt the SLDC on December 10th, 2013. The County Zoning Map adoption process will include legal notice and a public process, which is anticipated to begin in early 2014. Various sections of the code address water availability and reporting, including a “water service availability report” for any development of potable water, allowing more oversight of new water use. *See* Santa Fe County Sustainable Development Code § 6.5.5.6., This code states a sustainability goal, as the domestic well ordinance does not as the longevity of the use of a well to at least 99 years, extending the OSE’s definition from a 40 year planning horizon. *See* N.M.S.A. § 7.13.1.6.6. The code could also help provide much needed information through its domestic well use metering program. *See* N.M.S.A. § 7.13.3.4.1 However this program only applies to properties where metering is a condition of plat approval.

regulated in the Española basin where Santa Fe is located because 30% of potable water use by the city is sourced from groundwater and so many individuals rely on domestic wells for their drinking water.¹⁸⁵ This is especially the case in the context of a changing climate with fewer available surface water sources.¹⁸⁶ Offset programs should be amended to not offset one source using another: so that the use of surface water is not considered a valid replacement for groundwater depletions. Furthermore, water table declines should be quantified, as a physical, direct limitation (such as amount of decline allowed per time) and as accurately as groundwater models allow. Not only would domestic wells then have a pumping limit based on the best available science, which could potentially allow them to pump more,¹⁸⁷ but the City would be able to include their use when evaluating aquifer sustainability. In Santa Fe this is a long-term concern, as the Tesuque aquifer is estimated to be relatively thick (between 500 to 4000 feet of saturation).¹⁸⁸

For Cities and States

Aquifers that cross borders should be regulated at a higher level of governance, but city ordinances can, by setting limits and coordinating with other authorities in the region, limit aquifer use by requiring all well owners to conserve as much as municipal water users do (In Santa Fe, 107 gallons per person per day). Aquifer budgeting should be coordinated among multiple levels of government that oversee a groundwater region. Planning conservatively about any use of an aquifer, no matter how small, may be the least risk option for water managers. In areas with critically low groundwater levels, offset programs should create offsets to groundwater at a 1:1 ratio and wells should be metered with pumping limitations relative to the sustainability goals for the aquifer.

3) Close the Loophole

For New Mexico

In Santa Fe, the most pressing problems related to domestic wells are their effect on the aquifer and the Santa Fe River's future flows, but the ordinance significantly limits any depletions by limiting proliferation. Other parts of New Mexico, however, are facing serious problems with the subdivision loophole. In the Zuni area, a developer is proposing hundreds of homes on 300 acres near the stream holding the scarce, and genetically isolated Zuni Sucker fish.¹⁸⁹ This is a prime example of the need to close the loophole as hundreds of new domestic wells could have a detrimental effect on a particular ecosystem. The remaining loophole, albeit small, should to be closed throughout the state.

¹⁸⁵ Water Conservation Committee, Santa Fe, New Mexico. *Water Conservation in Santa Fe*. Slide Show *On file with The City of Santa Fe*.

¹⁸⁶ National climate assessment 2014 southwest report.

¹⁸⁷ See Titus *On Regulating* at 855. "Finally, it probably is true that water-table drawdown due solely to domestic wells is nowhere great enough to preclude adding even more domestic wells...".

¹⁸⁸ United States Geological Survey. Water Supply Paper 2205 "Mathematical Model of the Tesuque Aquifer System" at P. 7 Figure 4 "Saturated Thickness of the Tesuque Formation Represented in the Model."

¹⁸⁹ See Donald Jaramillo. *Improving Zuni Bluehead Sucker Habitat*. Cibola Beacon, May 7 2013. Available at http://www.cibolabeacon.com/news/improving-zuni-bluehead-sucker-habitat/article_ba88e15a-b6cc-11e2-83e7-001a4bcf887a.html ; Stephanie M. Carman, New Mexico Department of Game and Fish. *Zuni Bluehead Sucker Recovery Plan* (December 2004) at 21.

For Cities and States

Although recent amendments to state law in New Mexico have decreased the likelihood of large detrimental effects through the use of the domestic well loophole, there remain small subdivisions and non-irrigation lands that can still employ it.¹⁹⁰ The best way to close the loophole is through amendments to both county and state-wide legislation. As the problem does not depend as much on hydrology as other issues do, it can be generalized. This would require water rights in any subdivision, no matter the size. Cities where the loophole could be employed should work in tandem with counties and the state to ensure that the effect of domestic wells in new developments is integrated into groundwater budgets.

4) Statistically accurate and efficient well databases

For Santa Fe and New Mexico

Ultimately, better databases – including well locations, depths, and meters - are needed for most domestic well management methods to both effectively monitor domestic well uptake and water table drawdown. The first step in creating a stream depletion zone in Santa Fe might require 10% of wells within one mile of a Santa Fe River Tributary to be metered to estimate the rate of induced recharge. However, to be statistically accurate, this random sample would have to apply to old wells, in order to represent all domestics excluded from statutory authority and the ordinance.

Lewis suggests employing more staff at the New Mexico OSE to track water use¹⁹¹ but overall, the concept of blanket metering and monitoring has been rejected as expensive and ineffective.¹⁹² At the OSE, better databases should instead include a metering sample, distributed randomly, i.e. within the radius of the cone of depression for the city wells and along defined stream depletion zones, as current uptake data is statistically biased.

For Cities and States

In New Mexico, many citizens want water monitoring and metering to inform management in specific cases.¹⁹³ To understand the effect of domestic wells sample metering should be imposed in areas of concern. As critical groundwater areas arise throughout the West, databases should be location and problem-specific, rather than state-wide, in order to address problems of the same scale.

X. CONCLUSIONS

In the case of New Mexico, the domestic well statute creates a governance gap, as courts have recommended local regulations limiting the adverse effects of domestic wells but few municipalities have taken up this responsibility. Cities and regions under a domestic well exemption statute would benefit by attempting to fill this regulatory gap both with domestic well ordinances and stronger regional regulations based on hydrologic data tailored to specific areas such as important tributaries or ecologically degraded riparian zones. The City of Santa Fe's

¹⁹⁰SB 479 (2013); Bell & Taylor *Water Laws and Policies* at 65 (2008).

¹⁹¹ Lewis, *Water Resource Inventory* at 7.

¹⁹² See Bracken *Exempt Well Issues in the West* at 241; Titus *On Regulating* at 861.

¹⁹³ New Mexico First. *Final Report, Town Hall on Water Planning, Development and Use*. (2014) at 9.

Domestic Well Ordinance can be seen as a tightening of state-wide regulations on domestic wells which begins to address domestic well issues on a local scale by limiting the proliferation of domestic wells in the City, even though groundwater levels are not yet at a critical low in Santa Fe. The challenge of domestic well regulation is exacerbated most significantly by the lack of reliable data on domestic wells in New Mexico. Metering and limits on pumping should be stipulations included in any policy initiative to protect an aquifer, stream, or other groundwater uses, as part of a geographically-specific water management approach. As groundwater hydrology is not bound by geopolitical boundaries, any ordinance or restricted zone should be coordinated with regional authorities to ensure that problems are addressed in their entirety.

In most states in the American West, irrigators, industry, cities and individuals rely upon the groundwater in aquifers to supplement scarce surface water supplies that are diminishing due to climate change.¹⁹⁴ Domestic well management is essential to specific areas of concern that have been deemed in need of remediation to protect aquifers, as well as rivers, surface water rights, and city water resources. It has been stated previously that the western domestic well exemption undermines water management planning and policy.¹⁹⁵ The exemption need not undercut water management, as localized rules –combined with improved metering and monitoring - can protect streams, other groundwater uses, and aquifers.

¹⁹⁴ See generally Alan F. Hamlet, Phillip P. Mote, Martyn P. Clarke, and Dennis P. Lettenmeir. *Effects of Temperature and Precipitation Variability on Snowpack Trends in the Western United States*. 18 no. 21 J. of Clim. (2005).

¹⁹⁵ Drennan *Lassoing the Loophole* at 939.