

Report: Exempt Well Issues in the West
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EXECUTIVE SUMMARY

I. INTRODUCTION

There are over a million exempt domestic and livestock wells located throughout the West. Although these wells are an important source of water for a large number of water users, they also pose significant regulatory and administrative challenges that have the potential to impact the sustainability of water supplies, surface flows, and water quality.

In June 2008, the Western Governors' Association (WGA) and the Western States Water Council (WSWC) issued a report entitled *Water Needs and Strategies for a Sustainable Future: Next Steps*, which contained recommendations on how the states and federal government should address the ever-increasing challenges associated with water management in the West. Item 3(D) of the Next Steps report's Executive Summary recommends that states "should examine their related laws and institutions and evaluate the merits of . . . [permitting and monitoring] exempt domestic and livestock wells as part of water rights regulatory schemes." The WSWC's Legal Committee subsequently commissioned this Report, which addresses 1) the statutory and regulatory authority among WSWC member states regarding exempt domestic and livestock wells, 2) the ways in which these wells can complicate or compromise water resources allocation, administration, and quality, 3) the specific challenges WSWC member states are facing with respect to exempt wells, 4) the relative costs and benefits associated with monitoring wells that are currently exempt, and 5) the potential approaches to mitigate the adverse impacts of exempt wells.

II. STATUTORY AND REGULATORY AUTHORITY

Every WSWC member state with the exception of Utah and California, which do not have a statewide groundwater permitting process, exempts certain groundwater uses from its permitting and/or adjudication procedures. Although the specifics of these exemptions vary in each state, they generally allow landowners to withdraw small amounts of water for domestic or livestock purposes without obtaining a permit or subjecting their use to adjudication, monitoring, or reporting requirements. These exemptions typically restrict the amount of water that a well owner can withdraw (per minute, per day, per year, etc.) or limit the amount of acreage to which the water can be applied. The amount of water that can be withdrawn or used varies from state to state, but most exemptions allow landowners to install exempt wells without providing notice to other water users, and do not give other water users the option or ability to contest the installation of an exempt well. Many states enacted these exemptions decades ago with the belief that small domestic and stock uses were de minimis and were not worth the time or money needed to permit and regulate them.

In most states, landowners who install an exempt well must comply with the well-drilling requirements that govern the construction of nonexempt wells. Many states also require landowners to file well logs or to register their exempt wells, but the information that states require varies, with some states requiring little information and others requiring detailed reports and logs that describe the location, capacity, and construction of exempt wells. Some states also have laws or regulations that specifically apply to exempt well use in subdivisions. However, most do not. Moreover, some states have laws and regulations that do not specifically apply to exempt wells, but nevertheless limit or regulate their use in subdivisions. This Report describes those laws and regulations that specifically and indirectly govern exempt well use in subdivisions.

III. THE WAYS EXEMPT WELLS CAN COMPLICATE OR COMPROMISE WATER RESOURCES ALLOCATION, ADMINISTRATION, AND QUALITY

Exempt wells have the potential to cause a number of water quantity and quality problems. Most notably, there is a general concern that the cumulative effect of many exempt wells can equal the impact of a single large withdrawal that is not subject to the priority system or susceptible to monitoring and reporting requirements. A related concern is that most exemptions do not prevent landowners from installing exempt wells in closed basins and aquifers that are hydrologically connected to streams and wetlands with impaired surface flows. Such use in these areas may adversely impact surface flows, riparian habitats, aquifers, and senior water rights.

From an administrative perspective, there appears to be a general lack of knowledge across the West regarding the number of exempt wells in each state, the location of those wells, and the amount of water they withdraw. Many states also appear to lack the administrative resources needed to monitor exempt wells and to determine their impact, which has the potential to hinder state water plans and conservation efforts. Perhaps the single most common administrative challenge is the preference of some developers to use exempt wells to supply their subdivisions with water as a way of circumventing the permitting process needed to build community or public water systems. In some cases, such developers often install hundreds of wells in dense, concentrated subdivisions, and in many cases, these "exempt" subdivisions are located in closed basins where water supplies are already limited.

Exempt wells may also pose threats to water quality and can be conduits for pollutants. In particular, most domestic exempt wells are shallow, which makes them susceptible to nitrates, pesticides, and other contaminants that are located close to the land surface. In addition, well owners generally lack the knowledge and experience needed to properly maintain their wells or manage water quality threats. In some cases, they may also install their wells in improper locations that are too close to pollutants, such as septic tanks and mixing zones. In coastal areas, exempt wells may exacerbate seawater intrusion in sensitive aquifers by increasing withdrawals and lowering water tables.

IV. SPECIFIC CHALLENGES THAT WSWC MEMBER STATES FACE WITH RESPECT TO EXEMPT WELLS

The impact of exempt wells varies across the West and depends upon a number of factors, including water availability, the specific provisions of a state's exemption, a state's population, and the amount of growth that a state is experiencing. This means that exempt wells do not pose significant challenges in every western state. However, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, and Washington have experienced some challenges with respect to exempt wells. This Report describes those challenges.

V. RELATIVE COSTS AND BENEFITS ASSOCIATED WITH MONITORING WELLS THAT ARE CURRENTLY EXEMPT

There are a number of methods that states can use to monitor wells that are currently exempt, including 1) installing meters, 2) requiring self-reporting, 3) using aerial photography, and 4) using satellite (Landsat) imagery. The relative costs and benefits will depend upon the method used to monitor exempt wells and the individual circumstances of each state. This Report discusses the pros and cons associated with each of the above monitoring methods.

In general, the primary benefit of monitoring exempt wells is that water resources managers will have more information regarding exempt well use, which they can use to create more accurate water plans, implement conservation measures, and administer water rights. Monitoring may also provide exempt well users with an incentive to ensure that their withdrawals do not exceed the limits of their state's exemptions.

However, every monitoring method will require some administrative costs to collect and interpret the data it generates. When considering the costs and benefits associated with whether and how to monitor exempt wells, states should consider the following: 1) some reports indicate that most exempt wells do not use more water than the allowable amount, which means that monitoring would do little to curtail existing exempt use; 2) monitoring alone will not stop developers and other landowners from installing new exempt wells; 3) metering and self-reporting will only show the amount of water that exempt wells withdraw and will not show the amount of water those wells actually consume through outdoor irrigation and other consumptive uses; 4) monitoring methods will be ineffective if a state does not have sufficient data regarding the location and number of its exempt wells; and 5) each monitoring method will entail some type of initial or continuing expense that the state or exempt users will need to pay, and there may be political opposition to methods that assess fees to existing exempt well users or raise taxes to pay for increased administrative costs.

VI. POTENTIAL APPROACHES FOR MITIGATING THE ADVERSE IMPACTS OF EXEMPT WELLS

The viability of an approach to mitigate the adverse impact of exempt wells will depend upon the individual circumstances from a general perspective, even if existing wells are grandfathered, repealing the exemptions or drastically reducing a

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volume withdrawal limit on a statewide basis will likely be infeasible in most states. Specifically, there appears to be significant public resistance to this approach and it is likely that most states currently do not have the political capital needed to revoke their exemptions. From an administrative standpoint, many states may not have sufficient information to locate and permit existing wells, and revoking an exemption could overwhelm state permitting agencies with applications for small groundwater uses. Further, this approach could increase the cost of desired development in rural areas and closed basins, could potentially increase the demand for public water supplies, and would not prevent grandfathered wells from withdrawing water. Instead, the report recommends that states consider modifying their exemptions or adopting measures that specifically address their individual concerns regarding exempt wells. For example, if a state is concerned about exempt well use in subdivisions, it could modify its exemption to limit the types of developments and subdivisions that can use exempt wells, or modify the procedures used to approve subdivisions so that such "exempt" subdivisions are not installed without a determination that there is sufficient water available and that such development will not impair water quality. States can also limit the number and type of exempt uses, impose restrictions on exempt well use in areas where water supplies are limited, require limits for consumption rather than withdrawals, encourage voluntary metering and reporting, ensure that exempt wells are properly constructed, institute better recordkeeping procedures, and ban the installation of new exempt wells in areas where community systems are available. Each of these approaches has its limitations, but the general concept of modifying an exemption to mitigate specific adverse impacts will be less costly and more politically and administratively feasible than a total ban or drastic restriction on all new exempt uses. States may also be able to lessen political opposition to mitigation approaches by collaborating with stakeholders and interested parties to create negotiated solutions that address the adverse impacts of exempt wells but allow for responsible use of the exemptions. Moreover, the old adage "an ounce of prevention is worth a pound of cure" is applicable to exempt wells, and efforts to mitigate the impacts of existing exempt wells are likely more costly and administratively and politically difficult than prospective measures that prevent future adverse impacts.

VII. CONCLUSION

The debate over exempt wells is unlikely to subside as the demand for water in the West continues to grow. However, exempt wells may not pose a problem in every western state because exemptions, population growth, and water availability vary greatly across the West. In some states, the benefits that exempt wells provide, especially in allowing desired growth in rural areas, may outweigh their impacts. On the other hand, impacts from exempt wells may be too costly for other states not to curtail or limit their use. Therefore, there is no "one size fits all" approach for addressing exempt well use, and each state's individual circumstances will determine how and whether it will address this issue.

I. INTRODUCTION

Exempt domestic and livestock wells are an important source of water for large numbers of users throughout the West. However, they also pose significant regulatory and administrative challenges and have the potential to affect the sustainability of water supplies, surface flows, and water quality.^[1] With the exception of Utah and California, which do not have a statewide groundwater permitting process, every western state exempts certain groundwater uses from its permitting or adjudication procedures.^[2] In general, these exemptions allow land owners to withdraw small amounts of water for domestic or livestock purposes without obtaining a permit or subjecting their use to adjudication, monitoring, or reporting requirements. Most states created these exemptions decades ago with the belief that these uses have a de minimis impact and were not worth the time and expense needed to permit and regulate them.

However, as the West's population grows, the demand for water increases, and many landowners and subdivision developers have begun installing "exempt"^[3] wells in closed basins and other areas with strained water supplies to circumvent the costs and time associated with acquiring the necessary permits and water rights to build public water systems.^[4] This has resulted in large numbers of unregulated wells in highly concentrated areas without consideration of their potential impact.^[5] Some observers are concerned that the cumulative impact of these wells could impair senior water rights, create environmental problems, and threaten water quality and water supplies.^[6] This has led some to call for the restriction or repeal of these exemptions, while others have opposed restrictions, believing that exempt wells do not have an adverse impact, are a private property interest, and are vital to economic growth.^[7]

In June 2008, the Western States Water Council (WSWC), an affiliate and water policy advisor to the Western Governors' Association, issued a report entitled *Water Needs and Strategies for a Sustainable Future: Next Steps*, which recommended that states "evaluate the merits" of permitting and monitoring exempt wells as part of water right regulatory schemes.^[8] To this end, the WSWC's Legal Committee commissioned this Report to promote discussion of the concerns associated with exempt wells by evaluating 1) the statutory and regulatory authority regarding exempt wells and domestic well drilling, 2) the ways in which exempt wells can complicate or compromise water resources allocation, administration, and quality, 3) the specific challenges member states are facing with respect to exempt wells, 4) the relative costs and benefits associated with monitoring wells that are currently exempt, and 5) the potential approaches to mitigate the adverse impacts that exempt wells may have.^[9]

II. STATUTORY AND REGULATORY AUTHORITY REGARDING EXEMPT WELLS AND EXEMPT WELL DRILLING

The statutes and regulations that exempt groundwater use in the West vary considerably with respect to the quantity and uses of water that can be withdrawn without a permit. This Part will describe these exemptions and the requirements that govern the drilling of exempt wells in each WSWC member state. Where applicable, this Part will include a synopsis of those laws and regulations that govern the use of exempt wells in subdivisions.

A. Alaska

1. Exemption

Alaska does not distinguish between groundwater and surface water for water right purposes.^[10] and requires those seeking to install a groundwater well that will withdraw a "significant amount of water" to file a water right application with the Alaska Department of Natural Resources.^[11] It is a crime in Alaska to use a "significant amount of water from any source" without a permit, certificate, or other authorization.^[12] However, Alaska's Administrative Code provides a de facto exemption to this rule by not requiring applications for water uses that do not qualify as a "significant amount of water," which it defines as 1) "the consumptive use of more than 5,000 gallons of water from a single source in a single day," 2) "the regular daily or recurring consumptive use of more than 500 [gallons per day (gpd)] from a single source for more than 10 days per calendar year," 3) "the nonconsumptive use of more than 30,000 gpd . . . from a single source," or 4) "any water use that may adversely affect the water rights of other appropriators or the public interest."^[13] In addition, an exempt use does not acquire a water right or priority date, is subject to appropriation, and can be curtailed "in order to supply water to lawful appropriators . . . or to protect the public interest."^[14]

For those water uses that do require an application (water use that is less than a significant amount of water), Alaska's Administrative Code exempts applications to appropriate less than 5000 gpd of water from its public notice requirement.^[15] This is significant because the notice requirement mandates that the state's Department of Natural Resources publish notice of nonexempt applications in a newspaper of general circulation, while also serving individual notice via certified mail on prior appropriators who may be taking water from the proposed source.^[16]

It is important to note that any person using less than a significant amount of water is encouraged to file for water rights. Without a water right, even though the use is exempted, well owners have no legal standing to assert a right to water against a water user who may adversely affect their use of water.^[17]

2. Drilling

Alaska does not require a specific license or certification for a well driller and only mandates that well drillers have a general contractor's license.[18] However, general contractors can register as a water system specialty contractor and can obtain a specialty contractor registration certificate from the state.[19] Individuals who drill a well on their own property are not required to have a license.[20]

Once a contractor or a property owner has constructed a water well, he or she must file a report within forty-five days after completion with both the property owner and the Department of Natural Resources.[21] Among other things, the report must describe the location of the well, the anticipated use of the well, and the maximum well yield.[22]

B. Arizona

1. Exemption

In order to place Arizona's exemption in its proper context, some background regarding the state's Groundwater Management Act (GMA)[23] and Active Management Areas (AMAs)[24] is necessary. Arizona passed the GMA in 1980 to ensure that the state's most populated areas would achieve safe yield by 2025.[25] To accomplish this goal, the GMA created AMAs to manage excessive groundwater pumping for the state's most populous areas, including Phoenix, Prescott, and Tucson.[26] An AMA was also created to encompass the irrigated agricultural areas of Pinal County between Phoenix and Tucson.[27] Later, the southern portion of the Tucson AMA was separately established as the Santa Cruz AMA to address unique water resource issues in that area.[28]

Arizona assigned a safe yield management goal to the Phoenix, Prescott, and Tucson AMAs and a "planned depletion" goal for the Pinal AMA.[29] It also created the Arizona Department of Water Resources (ADWR) to administer the GMA and ensure that its groundwater management goals are achieved.[30] To help achieve the AMAs' management goals, the GMA places restrictions on new groundwater withdrawals and requires ADWR to establish mandatory conservation practices that apply to persons withdrawing, distributing, or using groundwater in the AMAs.[31]

Within this framework, Arizona regulates exempt wells depending upon 1) when the well was drilled, 2) the purpose for which the water is being used, and 3) whether the well is located in an AMA.[32] For exempt wells drilled after April 28, 1983, that are located within an AMA and used for a nonirrigation use other than domestic use or stock watering, pumping is capped at ten acre-feet per year, in addition to the maximum thirty-five gallon per minute (gpm) pump capacity.[33] Further, wells used for nonirrigation purposes are generally exempt from the regulatory provisions of the GMA so long as the pump capacity of the well does not exceed thirty-five gpm (up to fifty-six acre-feet per year if operated continuously).[34] Moreover, within AMAs, only one exempt well may be drilled or used to serve the same nonirrigation use at the same location unless approved by ADWR's director and the combined withdrawals do not exceed five acre-feet per year.[35]

With certain exceptions, exempt wells drilled after January 1, 2006, cannot be sited on land "within one hundred feet of the operating water distribution system of a municipal provider with an assured water supply designation within the boundaries of an active management area." [36] A landowner can obtain permission to install an exempt well within one hundred feet of the operating water distribution system of a municipal provider if he or she can demonstrate to the satisfaction of ADWR's director that the following applies: 1) the landowner submitted a written request for service to the municipal provider, and the provider did not provide the landowner with a written verification that service is available; 2) the total capital cost of connecting to a water distribution system will exceed the costs of drilling and fully equipping an exempt well; 3) in the event the applicant must obtain an easement across other land to connect to the municipal provider's system, the applicant sent the owner of the land a request for the easement and a) did not receive a response, or b) the request was denied; and 4) the landowner does not qualify under the previous three elements and provides written verification from the municipal provider that he or she shall not receive or request water service from the provider while the exempt well is operational. [37] With respect to the fourth element, the exemption will be revoked if the landowner or any subsequent landowner receives water service from the municipal provider. [38]

Outside of AMAs and Irrigation Non-Expansion Areas (INAs), there is no legal difference between exempt wells and nonexempt wells other than a well drilling permit because, generally, no authority is needed to withdraw groundwater, there is no requirement to comply with well spacing rules, there are no requirements to pay fees or use a measuring device, and except for community water systems, there is no requirement to file annual water use reports.[39] s

Within AMAs, exempt wells are not required to use a water measuring device, pay groundwater withdrawal fees, or file annual groundwater withdrawal reports.[40] Furthermore, individuals drilling exempt wells are exempt from ADWR's well spacing rules, although the rules protect exempt wells from unreasonably increasing damage caused by new nonexempt wells.[41] Likewise, exempt wells within INAs are not required to use a measuring device or file an annual groundwater withdrawal report.[42]

2. Subdivisions

In AMAs, developers typically must show that a subdivision will have an "assured water supply" before a city, town, or county can approve a subdivision plat, and before the developer can sell parcels.[43] In order to prove an assured water supply, a developer must obtain a Certificate of Assured Water Supply from the director of Water Resources or obtain a written commitment of water service for the subdivision from a city, town, or private company that the director has designated as having an assured water supply.[44] In regards to wells, Arizona law states that an "assured water supply" means that "[s]ufficient groundwater . . . will be continuously available to satisfy the water needs of the proposed use for at least one hundred years." [45] ADWR's Assured and Adequate Water Supply Rules provide that if an applicant for an assured water supply determination proposes to use groundwater, the applicant must demonstrate that after one hundred years of withdrawals, the depth-to-static water level at the well will not exceed 1000 feet below land surface (1100 feet in the Pinal AMA). In making this demonstration, the applicant must take into account existing pumping in the area, as well as pumping associated with any previously issued assured water supply determinations in the area.[46] Within this framework, exempt wells are not typically used to supply water to a subdivision that is required to comply with an "assured water supply" requirement.[47]

3. Drilling

Individuals drilling exempt wells must comply with statutory criteria before commencing operations. Regardless of whether the exempt well is located within an AMA or outside an AMA, prospective drillers must file a Notice of Intent to Drill with ADWR and pay a fee.[48] Furthermore, wells that will provide water for domestic purposes on parcels five acres or less must submit additional materials.[49] Well drilling can only "be performed under the direct and personal supervision of a well driller who holds a well driller's license" [50] and must comply with ADWR's minimum well construction standards.[51]

C. California

1. No Exemption

"Exempt" wells technically do not exist in California because the state does not have a comprehensive groundwater permitting process, and no state agency has the authority to regulate groundwater on a statewide basis. Instead, the California Water Code encourages water management decisions to be made at the local or regional level.[52] The California legislature has passed several acts that have given various local agencies some type of authority to manage groundwater.[53] An agency's authority depends upon the enabling act, and some agencies have the power to regulate groundwater extractions and the construction of new extraction facilities.[54] In

some cases, individual California counties have created limits for domestic wells.[55]

2. Subdivisions

California regulates water availability in subdivisions by requiring local governments to consider water supply assessments of specific plans as part of an environmental review process for new subdivisions that are larger than 500 units, while also mandating that local governments obtain written verification of a twenty-year supply before they can give final subdivision approval.[56] California law requires disclosure of water supply availability during the environmental review process for such large developments.[57]

3. Drilling

No person can drill a groundwater well without a Water Well Contractor's License,[58] and every person who drills a well shall file a report of completion with the California Department of Water Resources within sixty days of the date of construction.[59] The report must contain a variety of information, including "[a] description of the well site sufficiently exact to permit location and identification of the well" and the signature of the well driller.[60] Failure to comply with these requirements is a misdemeanor, but noncomplying parties must be given the opportunity to comply before a prosecution may commence.[61]

D. Colorado

1. Exemption

Colorado law follows the policy that the state's exemption to its laws regarding administration is "intended to allow citizens to obtain water supply in less densely populated areas for in-house and domestic animal uses where other water supplies are not available." [62] Colorado's exemption depends upon 1) the location of the well, 2) the date well production begins, 3) the rate of withdrawal, 4) the beneficial uses to which well water is put, and 5) for new wells, the size of the lot to be serviced by the well and, often, the legal process by which that lot was created.[63] The exemption criteria do not apply to "designated ground water basins," as these locations are subject to other regulations.[64] Further, Colorado prohibits exempt wells when a municipality or water district can provide water to the property.[65] In all remaining areas, the exemptions apply.

A well permit, approved and based on an evaluation of material injury, was not required for wells that were in production before May 8, 1972, and these wells may continue to operate without a well permit so long as 1) the rate of withdrawal does not exceed fifteen gallons per minute (gpm) (fifty gpm for wells in production as of May 22, 1971); and 2) the water has been "used for ordinary household purposes for not more than three single-family dwellings, fire protection, the watering of poultry, domestic animals, and livestock on farms and ranches, and for the irrigation of not over one acre of gardens and lawns." [66] The exemption can also apply to wells used for limited commercial purposes and for firefighting purposes.[67] Of note, exempt well users can adjudicate their water rights in the state's water courts and receive a priority date based on first use, as opposed to the filing date. [68]

Currently, and since May 8, 1972, exempt wells "may be constructed only upon the issuance of a permit." [69] At this time, applicants must also pay a filing fee of \$100. [70] It is worth noting that the state engineer must determine whether granting a permit will materially injure vested water rights or other existing wells.[71] If existing rights or wells will be materially injured, the engineer must deny the permit.[72] In instances where no material injury is found, the state engineer must issue the permit. [73]

There are several situations that allow "a presumption that there will not be material injury to the vested water rights of others or to any other existing well resulting from such well." [74] Wells with limited uses on lots created outside the statutory subdivision process, wells on lots of thirty-five acres or larger, or wells for cluster developments where the ratio of annual withdrawal does not exceed one-acre foot per each thirty-five acres within a cluster development, for example, enjoy a presumption of no material injury so long as return flows remain in the stream system.[75] The presumption can be rebutted by sufficient evidence.[76] Once the state engineer issues a permit, the permittee has two years to construct the well.[77]

It is also important to note that the Colorado constitution states that "those using water for domestic purposes shall have the preference over those claiming for any other purpose." [78] However, the Colorado Supreme Court has interpreted this clause not to be a right to call out senior appropriators with nondomestic uses, but as a right to condemn.[79]

2. Subdivisions

Colorado law requires each county in the state to create a county planning commission to develop, propose, and recommend subdivision regulations to the county's board of commissioners.[80] The board must adopt and enforce subdivision regulations for all unincorporated areas of the county and require developers to provide "[a]dequate evidence that a water supply that is sufficient in terms of quality, quantity, and dependability will be available to ensure an adequate supply of water for the type of subdivision proposed." [81] Evidence needed to show an adequate water supply may include

- (I) Evidence of ownership or right of acquisition of or use of existing and proposed water rights;
- (II) Historic use and estimated yield of claimed water rights;
- (III) Amenability of existing rights to a change in use;
- (IV) Evidence that public or private water owners can and will supply water to the proposed subdivision stating the amount of water available for use within the subdivision, and the feasibility of extending service to that area;
- (V) Evidence concerning the potability of the proposed water supply for the subdivision.[82]

Once a board of county commissioners has received a preliminary plan submission, they must provide a copy to the regional health department or the Colorado Department of Public Health and Environment for review of the adequacy of the proposed sewage treatment works to handle the estimated effluent.[83] Colorado law states, "No plan shall receive the approval of the board of county commissioners unless the department of public health and environment or county, district, or regional health department . . . has made a favorable recommendation regarding the proposed method of sewage disposal." [84]

Similarly, the State Engineer must receive copies of a preliminary plan submission in order to determine the "adequacy of [the] proposed water supply to meet requirements of the proposed subdivision" and whether "material injury [is] likely to occur" as a result of the subdivision's proposed water supply.[85] If the state engineer finds that injury will occur, he must issue a written opinion stating his findings and the amount of additional or exchange water that may be required to prevent injury.[86] A county's board of commissioners can approve a subdivision notwithstanding an adverse opinion, but the developer must provide all potential buyers with a copy of the opinion or a synopsis of the opinion prior to sale unless, in the opinion of the board of county commissioners, the developer has corrected the injury or inadequacy set forth in the opinion.[87]

Some Colorado counties along the state's Front Range, namely El Paso, Adams, Weld, and Larimer Counties, have been known to ask developers to reduce the number of housing units in a subdivision to satisfy water adequacy concerns, while higher densities are allowed if developers can demonstrate that their subdivisions will have access to alternative water sources, such as surface water transfers.[88]

3. Drilling

Colorado law requires that water well drilling contractors must be licensed through the Colorado Board of Examiners of Water Well Construction and Pump Installation.[89] The state does not require licenses for private drillers and pump installers,[90] which are defined as "any individual, corporation, partnership, association, political subdivision, or public agency that uses equipment owned by it" to drill a well for its own use upon property that it owns.[91] However, private drillers and installers must comply with Colorado's minimum well construction standards.[92]

Colorado's well construction standards mandate that well drillers file a well construction report within sixty days after completion of a well.[93] Well drillers must also adhere to the state's minimum construction standards for "all wells constructed to withdraw or inject water," regardless of whether the well is exempt from the state's permitting requirements.[94]

E. Idaho

1. Exemption

In Idaho, wells for domestic use are exempt from permits and fees.[95] Domestic uses or purposes are defined as

- (a) The use of water for homes, organization camps, public campgrounds, livestock and for any other purpose in connection therewith, including irrigation of up to one-half (1/2) acre of land, if the total use is not in excess of thirteen thousand (13,000) gallons per day, or
- (b) Any other uses, if the total use does not exceed a diversion rate of four one-hundredths (0.04) cubic feet per second and a diversion volume of twenty-five hundred (2,500) gallons per day.[96]

"Rights to ground water for such domestic purposes may be acquired by withdrawal and use." [97] In addition, domestic wells are also exempt from installing measuring devices and from measuring and reporting requirements.[98]

However, the exemption is not available for low temperature geothermal wells (85 °F to 212 °F) that are used for domestic purposes.[99] Instead, applicants must obtain a water right permit to use low temperature geothermal resources for domestic or other nonheating purposes. The applicant must show 1) there is no feasible alternative use of the resource; 2) there is no economically viable source of water having a bottom hole temperature of 85 °F or less in a well available; and 3) obtaining a water right permit is in the public interest.[100]

2. Subdivisions

Idaho's exemption states that domestic purposes and uses do "not include water for multiple ownership subdivisions, mobile home parks, or commercial or business establishments, unless the use meets the [exemption's] diversion rate and volume limitations," which limit the diversion to 0.04 cubic feet per second (cfs) and only 2500 gallons per day (gpd) instead of the 13,000 gpd.[101] It is also a misdemeanor in Idaho for one to offer a subdivision plat for recording or to record a subdivision plat without certifying that 1) the individual lots described in the plat will be served by individual wells; 2) all of the lots in the plat will be eligible to receive water from an existing water system; or 3) if a new water system will be created to serve the subdivision, it will have sufficient capital to provide service.[102]

If all or part of a proposed subdivision will be within the boundaries of an irrigation district or other irrigation entities, Idaho law also prevents cities and counties from accepting, recording, or approving subdivision plats or amendments to existing plats if the person proposing the subdivision has not "provided . . . a suitable system for lots of more than one (1) acre which will deliver water to those landowners within the subdivision." [103] Developers who are unable to comply with this requirement must advise the purchaser in writing that suitable water deliveries have not been provided and also that purchaser must remain responsible and subject to all assessments made by the irrigation entity, together with other required disclosures.[104]

Furthermore, a new modification to Idaho's Local Land Use Planning Act now requires those making a land use change "to use surface water, where reasonably available, as the primary water source for irrigation," [105] thus requiring developers to provide a "dual" watering system (potable and nonpotable) to a development where irrigation of yards occurs.

3. Drilling

Although domestic wells in Idaho are exempt from permitting, the actual drilling of wells must comply with the licensing provisions governed by statute.[106] Wells can only be drilled by licensed operators, using qualified drilling equipment.[107] Further, domestic wells "are subject to inspection by the department of water resources and the department of environmental quality." [108]

Well drillers who install a well must maintain a well log that is subject to inspection and includes the following information: 1) borehole lithology, 2) water bearing zones, 3) static water levels, 4) bottom hole temperature, 5) casing and sealing placement status, and 6) a description of problems encountered.[109] Drillers must also submit a well construction report within thirty days of completion and must keep the well log for at least one year following the submission of the report.[110]

F. Kansas

1. Exemption

Like most western states, wells used for domestic purposes in Kansas are exempt from the permits required for other types of appropriations.[111] Domestic use is

- the use of water by any person or by a family unit or household for household purposes, or for the watering of livestock, poultry, farm and domestic animals used in operating a farm, and for the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards and lawns.[112]

Household purposes are defined as "the use of water by a person for cooking, cleaning, washing, bathing, human consumption, rest room facilities, fire protection, and other uses normally associated with the operation of a household." [113] The watering of livestock is exempt as a domestic use if the use meets the following criteria: 1)

the livestock must be pastured and not confined to a feedlot; or 2) if the livestock are cattle in a confined feeding operation, they must number fewer than 1000; or 3) if the livestock are in a confined feeding operation and are not cattle, their total consumption of water must be less than fifteen acre-feet annually.[114] Despite the "or" between "household purposes" and "watering of livestock," these uses are not mutually exclusive. Interestingly, the limitation on domestic irrigation does not restrict the pumping rate or the total volume of water withdrawn, but rather the acreage of land to which the water is applied. While domestic use is exempt from the requirement to obtain a permit to appropriate water for beneficial use, domestic use on or before June 28, 1945, constitutes a vested right and domestic use after June 28, 1945, constitutes an appropriation right.[115] As with other water rights, domestic uses are subject to administration by priority in times of water shortage.[116]

2. Drilling

Well drilling contractors in Kansas must pay fees and obtain licenses before operating in the state.[117] The secretary of health and environment is charged with administering the drilling licensure program and must assess the qualifications of prospective well operators before issuing a license.[118] In addition, any licensed well driller who constructs or deconstructs a water well must file a well log with the secretary within thirty days of completion showing 1) the name and address of the landowner and a legal description of the location of the well, 2) the character and depth of the formation passed through or encountered, 3) the depth at which water is encountered, 4) the static water level of the completed well, 5) a copy of the record of pumping tests, if any, 6) the details of construction, including casing sizes, screen or perforation lengths and sizes, and the length and size of gravel packing, and 7) the amount, type, and placement of plug materials used in plugging a water well.[119] The contractor must also provide a water sample to the secretary, upon request, within thirty days of completion.[120]

G. Montana

1. Exemption

In Montana, a permit is not required before appropriating groundwater by means of a well or developed spring so long as 1) the well or spring is outside a controlled groundwater area; 2) the withdrawal rate does not exceed thirty-five gallons per minute; and 3) the annual withdrawal does not exceed 10 acre-feet per year.[121] However, once the well is complete, appropriators must file a notice of completion with the Montana Department of Natural Resources and Conservation (DNRC) within sixty days.[122] Groundwater appropriators who first put the water to beneficial use between 1962 and 1973, but did not file a notice of completion, must file a notice of completion with the county clerk to perfect the right.[123] DNRC must issue a certificate of water right upon receipt of a properly completed notice of completion.[124]

In addition to an exemption for wells, a permit is not required before constructing an impoundment or pit and appropriating water for livestock if 1) the maximum capacity of the pit is less than fifteen acre-feet; 2) the appropriation is less than thirty acre-feet per year; 3) the appropriation is a source other than a perennial flowing stream; and 4) the pit is located on a parcel of land forty acres or larger.[125] However, as with wells, the appropriator must file a notice of completion with the Department of Natural Resources and Conservation within sixty days.[126]

2. Subdivisions

Individuals seeking approval for a subdivision must submit an application to the state's Department of Environmental Quality (DEQ) that contains, among other things, evidence that the subdivision's water supply, wastewater, and storm water drainage facilities are in compliance with applicable local laws and regulations.[127] In regard to water supply, the applicant must show that 1) maximum contaminant levels will not be exceeded; and 2) proper flows for individual, shared, multiple family water supply systems, and public supply systems will be provided.[128] DEQ may also restrict the volume of water that a subdivision may withdraw from a proposed water source "to ensure that an adequate water supply will be available at all times." [129]

Montana also has regulations regarding nonpublic water systems that require applicants to demonstrate that water quality will be sufficient for the proposed subdivision. DEQ can choose not to approve a subdivision if there is evidence of any water quality problems that exceed human health standards.[130] Proposed nonpublic water systems must also meet design and construction requirements, and a registered professional engineer must design multiple user water systems that supply six or more connections.[131] As for water availability, applicants must show that groundwater quantity is sufficient for the proposed subdivision, and must show that certain minimum flows will be available for single-family water systems, shared water systems, and multiple-user water systems.[132] DEQ can also require applicants to submit information regarding the dependability of the groundwater supply, and applicants, at a minimum, must provide evidence that the aquifer can supply water to wells in an amount equal to the proposed groundwater withdrawals.[133]

3. Drilling

Although individuals who construct wells must be licensed in order to do so, this requirement does not apply to exempt wells.[134] A license is also not required for individuals who drill wells on land that he or she owns, provided that 1) the land is used for farming, ranching, agricultural purposes, or as her residence; 2) the individual obtains a permit from the board; and 3) the well construction conforms to the minimum construction standards as set forth by the Montana Board of Well Contractors.[135] Licensed well drillers must prepare a well log for each well drilled and supply a copy of it to the well owner and relevant agencies[136] within sixty days of completion.[137] The well log must also use a required form and provide a location for the well using at least two methods as specified on the form.[138]

H. Nebraska

1. Exemption

In Nebraska, a well that is "designed and constructed to pump fifty gallons per minute or less" and used "for human needs as it relates to health, fire control, and sanitation or used to water range livestock" is generally not subject to regulation as long as it is not "commingled, combined, clustered, or joined with any other water well or wells or other water source, other than a water source used to water range livestock." [139]

Nebraska has twenty-three political subdivisions known as "natural resource districts" (NRDs) that have the authority to establish groundwater management areas (GMAs) in order to protect groundwater quantity and quality or to prevent conflicts between surface and groundwater users in areas where the water is hydrologically connected.[140] Any person who intends to construct a well in a GMA must first obtain a permit, but wells that meet the requirements stated in the above paragraph are exempted from this requirement.[141] Other types of wells that pump fifty gallons per minute or less may also be exempt, but that is determined by each NRD.[142] Of note, the Nebraska Code gives NRDs the authority to "[r]equire meters to be placed on any water wells for the purpose of acquiring water use data" regardless of whether or not any portion of the district is a GMA.[143]

The Nebraska Department of Natural Resources (NDNR) has the authority to determine that a river basin, subbasin, or reach has become fully or over appropriated.[144] When such a determination is made, moratoriums on new well drilling, expansion of irrigated acres from groundwater and surface water, and the granting of new surface water permits go into or continue in effect within the area designated.[145] NDNR and the NRDs then implement a joint-planning process, and the NRDs determine whether to continue the moratorium on well drilling.[146] However, such moratoriums do not affect wells that meet the description given in the first paragraph of this subsection.[147]

2. Drilling

All groundwater wells in Nebraska (new or existing) are required to be registered with NDNR, except for wells used solely for domestic purposes drilled prior to September 9, 1993.[148] Well drillers and landowners who construct wells, including domestic wells, must register the well within sixty days after completion of construction.[149] A well that is required to be registered and is not "shall be an illegal water well until it is registered with [NDNR]."[150] It is worth noting that the registration requirement is not the same as a permitting requirement for an appropriation. The NRDs provide copies to NDNR of all permits so that NDNR can be sure a well is permitted prior to registering the well.[151]

Nebraska's Department of Health and Human Services (DHHS) regulates the state's well driller licensure requirements and its standards for well installation and construction.[152] Water well drilling supervisors and contractors must apply for a license to engage in the trade, and DHHS will issue licenses to applicants that demonstrate professional competence by passing the corresponding examination.[153] In addition, individuals constructing water wells must comply with the rules, standards, and regulations promulgated by the state's Uniform Credentialing Act.[154] However, these rules do not prevent individuals from building wells on land where they live, and "an individual may construct a water well . . . on land owned by him or her and used by him or her for farming, ranching, or agricultural purposes or as his or her place of abode." [155] Such wells must also be constructed according to the DHHS rules.[156]

Any owner of a water well or a licensed water well contractor who drills a domestic well must keep and maintain an accurate well log, which they must make available for inspection and copying.[157] Such logs should contain a variety of information, including the well's location, depth and dimensions, casing information, static water level, pumping rate, gallons per hour or gallons per minute yield, and date of completion.[158] This information plus additional information is also provided to NDNR when registering the well.[159]

1. Nevada

1. Exemption

In Nevada, wells for domestic use are the only type of water wells that are exempt from the state's permitting process.[160] Exempt domestic use is defined as culinary use and household purposes related to a single-family dwelling, including the watering of a family garden and lawn and the watering of livestock and any other domestic animals or household pets[161] if the amount of water drawn does not exceed two acre-feet per year.[162] The strict statutory definition precludes the use of domestic wells for more than a single-family dwelling, but the exemption does allow for an "accessory dwelling unit" to a single family unit provided that the owner 1) obtains approval from the local governing body, 2) installs a water meter, and 3) ensures that the total withdrawal does not exceed two acre-feet per year.[163] The local governing body or local planning commission must report the approval of the accessory dwelling unit on a form provided by the state engineer, who "shall monitor the annual withdrawal of water" used to supply the accessory unit.[164]

Domestic wells in Nevada are a "protectable interest,"[165] and domestic well users also have the right to protest any water right application.[166] In fact, Nevada's Ground Water Code contains a legislative declaration that it is the policy of the state "[t]o recognize the importance of domestic wells as appurtenances to private homes, to create a protectable interest in such wells and to protect their supply of water from unreasonable adverse effects." [167] Moreover, domestic wells in Nevada also acquire a priority date,[168] and Nevada law prevents the state engineer from granting permit applications if the proposed use conflicts with "existing domestic wells." [169]

Nevada law also requires applicants for a proposed groundwater use to provide notice to owners of domestic wells that are located within 2500 feet if the proposed well is for municipal, quasi-municipal, or industrial use, and will have a "reasonably expected rate of diversion [that] is one-half cubic foot per second [(cfs)] or more." [170] Although not specifically addressed in the statutes, the Nevada state engineer has interpreted this requirement to require notice for any municipal or industrial application that would increase the diversion rate from a specific well each time the diversion rate exceeded the next 0.5 cfs.[171] For example, the state engineer would require notice to domestic well owners if a municipal or industrial well had permits totaling 0.4 cfs, and a new application proposed to add 0.12 cfs to the well.[172] Likewise, the state engineer would require notice the next time the well had proposed additions that exceeded 1.0 cfs.[173]

Further, if the state engineer grants a permit to an applicant later in time he must include a condition in the permit that "pumping water pursuant to the permit may be limited or prohibited to prevent any unreasonable adverse effects on an existing domestic well located within 2,500 feet of the well, unless the holder of the permit and the owner of the domestic well have agreed to alternative measures that mitigate those adverse effects." [174]

Although the state engineer does not formally review the drilling of a domestic well,[175] he does have the authority to require the registration of domestic wells in "any groundwater basin or portion thereof." [176] In instances where the state engineer chooses to exercise this discretion, individuals who drill domestic wells must also register the required information within ten days of completing the well.[177]

Lastly, the state engineer can limit the depth of domestic wells or even prohibit the drilling of such wells if water districts or municipalities can furnish water in the area.[178] Also, when the state engineer issues a temporary permit for groundwater use in an area where a domestic well has been drilled, he must file a notice with the county recorder in the county where the permit is issued or where the well is drilled indicating that the domestic well owner may be prohibited from deepening or repairing the well if and when a water district or municipality can provide water to the area.[179]

2. Subdivisions

Nevada law requires state review of all proposed subdivision maps for water supply, and mandates state approval prior to a final subdivision map.[180] For developments utilizing domestic wells, the state engineer has the authority to require that sufficient water rights be dedicated to the development to ensure that there is enough water to meet domestic needs.[181]

For subdivisions of four lots or less, developers must obtain a certificate from the Division of Water Resources of the State Department of Conservation and Natural Resources indicating that the parcel map is approved as to the quantity of available water if 1) any parcel in the map is within a designated basin that requires the state engineer's approval, 2) any parcel will be served by a domestic well, and 3) local ordinances do not require the dedication of water rights to ensure a sufficient supply of water.[182]

Of note, in 1997 the Nevada Attorney General's office issued an opinion for Humboldt County, which concluded that counties have the authority to regulate land use and development of land to promote health and safety and can use this authority to "enact ordinances regulating placement and testing of domestic wells to protect public health." [183] However, the opinion determined that only the state engineer has the authority to enact ordinances regarding the construction of domestic wells.[184]

3. Drilling

Well drillers in Nevada must obtain a license before drilling a well.[185] A well driller is defined as "any person who drills a well or wells, for compensation or

otherwise.^[186] There is no exception for domestic wells, and well drillers must file a notice of intent to drill with the Division of Water Resources three working days before drilling a domestic well.^[187] Once the well is complete, the well driller must file a well log with the state engineer within thirty days of completion containing 1) the date of beginning work, 2) the date of completion, 3) the length, size, and weight of the casing and how it is placed, 4) the size of the hole drilled, 5) where the hole is sealed off and the type of seal, 6) the name of the well driller and the type of drilling machine used, 7) the number of cfs or gallons per minute of flow for the well, and 8) the pressure in pounds per square inch if it is a flowing well, or the static water level and water temperature if it is a nonflowing well.^[188] Nevada's Administrative Code also establishes minimum requirements for well casings^[189] and requires well construction to prevent pollution and contamination of waste and groundwater.^[190]

Of note, the Nevada Attorney General has concluded that the state engineer has the authority to regulate the construction of domestic wells through his authority to license and regulate well drillers throughout the state.^[191]

J. New Mexico

1. Exception^[192]

Individuals or entities who want to use underground water in New Mexico for domestic purposes must obtain a permit from the state engineer.^[193] However, the plain language of New Mexico's domestic well statute does not give the state engineer the discretion to deny the application, and states that "[u]pon the filing of each application . . . the state engineer shall issue a permit to the applicant to use the underground waters applied for."^[194] The state engineer issued new regulations in 2006 that restrict new domestic use to one acre-foot per year per household, with a maximum of three acre-feet per year per well at a time when the well is used to serve multiple households.^[195] There is no restriction on the number of households a well may serve but the maximum diversion is set at three acre-feet per annum.^[196] However, permit holders can apply to transfer the point of diversion or place and purpose of use for other valid existing rights to the domestic well up to three acre-feet per year.^[197]

Domestic wells are not metered generally (except shared well owners who must meter and report their water use) nor are they subject to water quality assessment.^[198] All wells, including domestic wells, must be drilled by a licensed well driller, and must meet minimum standards in their drilling and construction.^[199] Owners are also not required to acquire water rights to offset the effect of their pumping so long as their pumping does not exceed the permit's limit.^[200]

Domestic uses include the use of water for household purposes and for irrigating up to one acre of noncommercial trees, lawns, and gardens.^[201] "Drinking and sanitary uses that are incidental to the operations of a governmental, commercial, or non-profit facility are included in this definition."^[202] Domestic use does not include the use of groundwater for livestock watering, which is subject to a separate statute, section 72-12-1.2.^[203]

Additionally, New Mexico law contains an exception that allows for the temporary use of no more than three acre-feet of groundwater for up to one year under section 72-12-1.3.^[204] The temporary use must be for "prospecting, mining or construction of public works, highways and roads or drilling operations designed to discover or develop the natural mineral resources of the state."^[205] A permit is required, and applicants must file an application with the state engineer, who will grant the application if the proposed use will not permanently impair existing rights.^[206] If the state engineer finds that the proposed use will impair existing rights, he or she shall publish notice of the application and conduct hearings as necessary.^[207] Some parties file applications on a yearly basis and have used this statute to acquire up to fifty years of temporary use permits.^[208]

Concerns over the effects of domestic well diversions on groundwater resources have prompted the development of rules and regulations that allow for the declaration of domestic well management areas (DWMAs). DWMAs are areas that overlie a stream-connected aquifer that "requires special water resource protection" by the state engineer.^[209] The purpose of the designation is to protect valid, existing surface rights.^[210] The state engineer is responsible for developing guidelines that establish diversion limitations for each DWMA and may declare all or part of a stream-connected aquifer as a DWMA.^[211] In order to create a DWMA, the state engineer must first provide notice, conduct a meeting in the area affected, and accept public comments that are filed in writing or made at a public meeting.^[212] However, no DWMAs have been designated to this point in time.^[213]

In some instances, the state engineer may require a meter 1) for new domestic wells within a DWMA, 2) when metering is required by the courts, 3) for drinking and sanitary domestic uses associated with a government, commercial, or non-profit facility, 4) for multiple household domestic use, 5) for supplemental domestic wells, and 6) for multiple use wells, for which domestic use is separately metered.^[214] Furthermore, the state engineer may exercise his discretion to require meters under the following circumstances: 1) as a condition for new single household domestic wells, 2) as a condition to a permit to repair or deepen an existing well, 3) as a condition of a permit to amend the type of use, and 4) as a condition to transfer a valid existing domestic well right.^[215]

In 2001, the New Mexico legislature enacted section 3-51-1.1, which authorizes municipalities to restrict new domestic wells in nonagriculturally zoned areas if 1) the applicant's property line is within three hundred feet of municipal water distribution lines and 2) the property is located within the exterior boundaries of the municipality.^[216] However, a municipality may not deny authorization if the total cost to the applicant of extending the municipal water district line to his home, including metering and hook-up expenses, exceeds the cost of drilling a new domestic well.^[217] Municipalities must also file any ordinance restricting the drilling of domestic wells with the state engineer.^[218] The state engineer will issue a permit to drill a domestic well in those areas but will inform the permittee that local restrictions may require additional permitting from the municipality, and may preclude drilling within the municipality.^[219]

New Mexico's exception has been the focus of litigation over the years, and the Supreme Court of New Mexico has held on two occasions that municipalities have the authority to regulate the drilling of domestic wells within their jurisdictions. First, in *Smith v. Santa Fe*,^[220] the court upheld a 1999 Santa Fe city ordinance that required any person wishing to drill a well within the city's municipal water service area to apply to the city for a domestic well permit with the city.^[221] The ordinance also prevented landowners from installing wells if their property boundaries were within 200 feet of a city water distribution line, which prompted a plaintiff who had been denied a permit from the city to seek a declaratory judgment, claiming that the city did not have authority to enact the ordinance.^[222] The court disagreed and found that as a home rule municipality, the city "had the authority to prohibit the drilling of domestic wells under its home rule authority, and that this authority was not preempted by existing state law."^[223]

Second, in *Stennis v. Santa Fe*,^[224] a similar 2008 case, a plaintiff challenged the Santa Fe ordinance, claiming that it did not track the language of section 31-51-1.1 and that the 2001 statute invalidated the ordinance.^[225] However, the court held that the ordinance was a valid exercise of the city's home rule authority and remained effective even after the enactment of section 3-53-1.1 "because (1) Section 3-53-1.1 does not require an ordinance to track its language and (2) the 1999 Ordinance could be applied to follow the procedural requirements of Section 3-53-1.1" if the city filed the ordinance with the state engineer.^[226]

As discussed in more detail in Part IV.F of this Report, New Mexico's Sixth Judicial District Court recently ruled that the state's domestic well statute is unconstitutional on due process grounds because it does not afford senior water users the ability to protect their rights.^[227] The district court's ruling has been stayed pending an appeal from the state engineer, but an appellate decision upholding the district court's decision could invalidate New Mexico's domestic well statute on a statewide basis.^[228]

2. Subdivisions

New Mexico law requires counties to adopt rules for subdivisions that include water supply quantity and quality requirements, and counties must set forth requirements that quantify the maximum annual requirements of subdivisions, assess water availability to meet maximum annual water requirements, and protect water supplies from contamination. [229] County commissioners must require developers to furnish documentation showing that there is sufficient water available for the subdivision and that the water will be of acceptable quality, while also providing documentation describing the means of liquid waste disposal, terrain management to protect against flooding, inadequate drainage, and erosion. [230] The county commissioners cannot approve a subdivision unless they determine that the developer can supply enough water to fulfill the proposed uses and that the proposed subdivision complies with state and county subdivision regulations. [231]

Once the county commissioners have determined that a preliminary plat is complete, they must request an opinion from the state engineer as to whether "water sufficient in quantity to fulfill the maximum annual water requirements of the subdivision" is available, and whether the developer can fulfill his or her proposals regarding water, with the exception of water quality. [232] County commissioners must also obtain opinions from the New Mexico Environment Department (NMED) to determine whether the developer can provide sufficient water quality and waste disposal facilities. [233] This assessment authority is even more limited when a developer proposes using domestic wells because the state engineer's office has determined that it is not authorized to review whether such wells will interfere with existing water rights or create excessive water table declines. [234] Counties must hire a private consulting firm to address these concerns. [235]

It is important to note that counties can approve a subdivision even if the state engineer or NMED finds that the subdivision does not satisfy water sufficiency and water quality requirements. [236] If the state engineer or NMED issue an adverse opinion, the developer will have thirty days after receiving notice of the adverse opinion to submit additional information to the public agency issuing the opinion. [237] After the public agency has had an additional thirty days to review the submitted materials, the county commissioners will hold a public hearing, at which time the developer will have the burden of showing that an adverse opinion is incorrect either as to factual or legal matters. [238] The commissioners can choose to side with the developer and may also condition plat approval upon the fulfillment of certain conditions, such as using a particular water supply system. [239]

For developments of five to one hundred parcels, developers must disclose information to prospective buyers about the water availability, water quality, the means of water delivery, and the means of liquid waste disposal. [240] The state engineer has recently enacted regulations in 2006 that prevent developers from having more than ten domestic well permits at one time. [241]

3. Drilling

It is unlawful for anyone to drill a water well of any type in New Mexico without a valid license from the state engineer, [242] and well drillers must file a well record within twenty days of completing a well. [243] The record must include a well log and, among other things, the following information: 1) the name and license number of the well driller, 2) the location of the well (reported in latitude and longitude using a global positioning system (GPS) receiver capable of five meters accuracy), 3) the dates when drilling began and ended, 4) the depth of the well, 5) the depth to water first encountered and the depth of water upon completion of the well, 6) the estimated well yield and the method used to estimate the yield, 7) the type and size of the casing, 8) the location of perforations, 9) the location of the sanitary seal, and 10) and any other information deemed necessary by the state engineer. [244]

K. North Dakota

1. Exemption

In North Dakota, a permit is required before constructing works to appropriate water unless the construction is for domestic purposes, livestock, fish, wildlife, and "other recreational uses." [245] The water user must immediately notify the state engineer of the location and capacity of the constructed works, and may apply for a permit with the state engineer to establish a priority date. [246] The statutory limit for withdrawals is 12.5 acre-feet per year. [247] It is important to note that the exemption only refers specifically to "constructed works, dams, or dugouts," and it is presumed that it applies to the construction of exempt wells. [248]

Domestic use is defined as

the use of water by an individual, or by a family unit, or household, for personal needs and for household purposes, including, but not limited to heating, drinking, washing, sanitary and culinary uses; irrigation of land not exceeding one acre . . . in area for noncommercial gardens, orchards, lawns, trees, or shrubbery; and for household pets and domestic animals for household sustenance and not for sale or commercial use, when the water is supplied by the individual or family unit. [249]

2. Drilling

Individuals that drill wells must comply with the rules of the state engineer, but no permit or license is explicitly required prior to drilling a domestic well. [250] Nevertheless, the state has established a state Board of Water Well Contractors. The applicability of the board's requirements to the drilling of exempt wells is not entirely clear, [251] but licensed water well contractors who install a well must provide the board "with an accurate record of well construction data," which should include "drill hole diameters and depths, assembled order of size and length of casings and liners, grouting depths, formations penetrated, water levels, location of blast shots, and pumping tests." [252]

L. Oklahoma

1. Exemption

Few states have a domestic well exemption more explicit than Oklahoma: "Any landowner has a right to take groundwater from land owned by him for domestic use without a permit. Wells for domestic use shall not be subjected to well spacing orders, but are subject to sanctions against waste." [253] Domestic use is defined as

the use of water by a natural individual or by a family or household for household purposes, for farm and domestic animals up to the normal grazing capacity of the land and for the irrigation of land not exceeding a total of three (3) acres in area for the growing of gardens, orchards and lawns, and for such other purposes, specified by Board rules, for which de minimis amounts are used. [254]

Water for domestic use can also be stored in an amount equal to two years' supply, [255] and Oklahoma municipalities have the authority to regulate or permit the drilling of domestic wells located within their corporate limits. [256]

2. Drilling

Any person engaged in the commercial drilling of groundwater wells, monitoring wells, or observation wells must apply for and obtain a license from the Oklahoma Water

Resources Board.[257] A landowner who drills his or her own domestic well does not need to obtain a license, but must construct the well to meet minimum standards to prevent pollution.[258] Commercial entities that drill domestic wells for private landowners must comply with the licensing requirements, including but not limited to minimum construction standards and the filing of well reports.[259]

M. Oregon

1. Exemption

Oregon exempts many uses from the normal water permitting process. "[N]o registration, certificate of registration, application for a permit, permit, certificate of completion or ground water right certificate . . . is required for the use of ground water for" 1) stockwatering purposes, 2) watering any lawn or noncommercial garden up to one-half acre in area, 3) single or group domestic purposes so long as daily use is not more than 15,000 gallons per day (gpd), and 4) any single industrial or commercial purpose not exceeding 5000 gpd.[260] Oregon's exemption also states that 1) the water must be used beneficially; 2) an exempt well "constitutes a right to appropriate ground water equal to that established by a ground water right certificate"; 3) the state can regulate exempt uses and can use the date indicated on the well log or other documentation provided by the owner showing when water use began; and 4) the state can require "any person or public agency using [exempt] ground water . . . to furnish information with regard to such ground water and the use thereof." [261]

Recently, in 2009, the Oregon Legislature passed a bill that amends the exemption to require owners of new exempt wells to file their exempt groundwater use with the Oregon Water Resources Department for recoding within thirty days after the well is completed.[262] Exempt users must also include a map of the well location (by tax lot), as well as a one-time \$300 recording fee.[263] The recording fees will be deposited into a "Water Resources Department Water Right Operating Fund," and will be used to evaluate groundwater supplies, conduct groundwater studies, and carry out groundwater monitoring.[264] The fees will also fund the data processing, administration, and enforcement costs associated with requiring exempt users to provide information on their water use, collecting well location maps, and recording exempt uses.[265]

It is also important to note that the Water Resources Commission (WRC) within the department may designate critical groundwater areas (CGWAs) if 1) water levels are declining excessively; 2) wells substantially interfere with one another; 3) there is substantial overdraft; or 4) there are reasonable water quality concerns in the basin. [266] CGWAs can affect exempt well regulation in the designated area, and WRC can regulate all wells—including exempt wells—if it finds that a well is causing wasteful use of groundwater, unduly interfering with other wells, or is polluting ground or surface water supplies.[267]

In addition, Oregon's regulations require that "the seller of the real estate shall, upon accepting an offer to purchase that real estate, have the well water tested for nitrates and total coliform bacteria." [268] The Oregon Department of Health can also require additional testing if the well is located in a designated area, but the failure on the part of the seller to comply with this requirement "will not interfere with the sale of the property." [269]

2. Drilling

All well drillers must obtain a water well constructor's license form and submit a report to WRC before drilling a well.[270] Licensed well drillers and any other person who constructs, alters, converts, or abandons a well must provide WRC with a well log within thirty days of completion.[271] The log must contain 1) the well owner, 2) the dates of construction, 3) the depth and diameter of the well, 4) the kind and amount of the casing and where placed in the well, 5) the flow in cubic feet per second or gallons per minute of a flowing well, and the shut-in pressure in pounds per square inch, 6) the static water level with reference to land surface, and the drawdown with respect to the amount of water pumped per minute, 7) the kind and nature of the material in each stratum penetrated, and 8) the temperature of the groundwater encountered and other characteristics.[272] Of note, well reports in Oregon are not confidential, and the Oregon Water Resources Department provides scanned images of all such reports to the public through its website.[273]

N. South Dakota

1. Exemption

South Dakota's exemption states that "[a]ny person desiring to make reasonable domestic use of water from any source may do so without obtaining a permit." [274] Water used for the following qualify as reasonable domestic uses so long as they do not withdraw more than 25,920 gallons per day (gpd) (eighteen gallons per minute (gpm) on an average daily basis) with a maximum pumping rate of twenty-five gpm: 1) individual farm or ranch use including livestock water, 2) individual household use for drinking, washing, sanitary, culinary, and other ordinary household purposes, 3) irrigation of a noncommercial family garden, trees, lawn shrubbery, or orchard that is not greater than one acre, 4) water uses in schools, parks, and other public recreation areas, 5) water used in providing geothermal heat for a single household, and 6) water used for noncommercial on-farm alcohol production.[275] Larger domestic wells in operation before July 1, 1983, are grandfathered under the statute, and domestic use also includes "use of water supplied by a water distribution system for the preceding purposes, for the occupants of schools, hospitals, and other custodial care facilities and for fire protection is a domestic use as against appropriative rights having a priority after June 30, 1978." [276] Commercial uses require a permit even if they pump less than eighteen gpm.[277]

Domestic users may pay a twenty-five dollar fee to register a domestic well with the South Dakota Water Management Board (WMB) "to document the location and output of their water supply and the quality of its water"; such registration is not subject to the state's prior appropriation procedures. [278] Registration is only available for wells that have been constructed in accordance with South Dakota's adequate well requirements, and landowners must submit a water quality analysis and a well driller's report regarding the well's construction signed by licensed well driller with their registration application.[279] It is unclear what benefits an exempt well owner will receive by registering his or her well.

South Dakota law also allows landowners to construct dams or dugouts that store twenty-five acre-feet or less without a permit if the dam or dugout is located on a dry draw or nonnavigable watercourse.[280] Landowners must file a location notice with the county Register of Deeds and WMB, which gives the landowner certain rights and a priority date.[281] Landowners cannot construct such dams if they will change the course of the water, interfere with vested water rights, or flood the lands of others unless an easement is obtained.[282] WMB cannot enforce limitation on domestic interference with water permits or rights on the same watercourse except in response to a written complaint from a person claiming interference.[283]

2. Drilling

All well drillers must have a valid license before drilling a well.[284] "No license may be issued unless the applicant is experienced and knowledgeable in good well construction methods." [285] For each well that they drill, well drillers must keep an accurate record and file all well construction records with the chief engineer within one month of completing the well.[286] The South Dakota Administrative Code also requires well drillers to submit a well log within thirty days of completing the well. [287]

South Dakota law also requires lots to be at least one acre in size for a well and septic tank to be on the same lot.[288] This can create problems when a well or septic

tank has to be replaced on a lot that predates the one-acre standard.[289] However, South Dakota requires all new exempt wells to be tested for nitrates, sodium, sulfate, conductivity, and bacteria.[290]

O. Texas

1. Exemption

Texas law prevents water districts from requiring "any permit issued" for wells "used solely for domestic use or for providing water for livestock or poultry on a tract of land larger than 10 acres" that are "incapable of producing more than 25,000 gallons of groundwater a day." [291] The exemption also prohibits districts from restricting the production of any well that satisfies the exemption criteria but requires that groundwater withdrawn from an exempt well that is "subsequently transported outside the boundaries of the district is subject to any applicable production and export fees." [292]

One notable exception to the above rule applies to exempt wells located in the Hill Country Priority Groundwater Management Area (Hill Country PGMA), which encompasses all or part of a number of counties in south-central Texas. [293] Under this exception, districts in the Hill Country PGMA can require permits and compliance with district rules if a well is "no longer used solely for domestic use or to provide water for livestock or poultry." [294] Only groundwater districts in the Hill Country PGMA may regulate domestic and livestock wells under this provision. [295]

It is also important to note that the Texas Water Code does not define the term "domestic use" as it applies to the exemption. [296] However, Title 30 of the *Texas Administrative Code* for the Texas Commission on Environmental Quality provides some guidance by defining "domestic use" as "[u]se of water by an individual or a household to support domestic activity (which) may include water for drinking, washing, or culinary purposes; for irrigation of lawns, or of a family garden and/or orchard; for watering of domestic animals; and for water recreation including aquatic and wildlife enjoyment." [297]

Lastly, although exempt wells do not require a permit, they must "be registered in accordance with rules promulgated by the district," and "be equipped and maintained" so that they conform to the district's local rules regarding the "installation of casing, pipe, and fittings," which should prevent the escape of "groundwater from a groundwater reservoir to any reservoir not containing groundwater." [298] Such casings, pipes, and fittings must also prevent the "pollution or harmful alteration" of the water located in any groundwater reservoir. [299]

2. Subdivisions

Texas's domestic and livestock exemption does not apply to wells that "supply water for a subdivision of land for which a plat approval is required" under Texas's Local Government Code. [300] This exemption applies only to counties that are located within fifty miles of an international border or are located within one hundred miles and contain the major portion of a city with a population of more than 250,000 (these counties must comply with model subdivision rules as a condition for plat approval). [301] Of note, Title 30 of the *Texas Administrative Code* implements statutory authority that authorizes municipal and county authorities to require certification by developers that adequate groundwater is available for a proposed subdivision if groundwater will be the source of the subdivision's water supply. [302]

3. Drilling

Any driller of an exempt well in Texas must file a "drilling log" with the district. [303] The Texas exemption does not specify criteria that the driller must follow in filing a drilling log, nor does it establish licensing requirements or specific knowledge on the part of the driller. [304] Water well drillers are regulated by the Texas Department of Licensing and Regulation under Chapter 1901 of the Occupations Code. [305]

P. Utah

1. No Exemption

Utah is the only western state that does not exempt small domestic groundwater uses from its permitting and adjudication processes. [306] Instead, all Utah waters, "whether above or under the ground," are public property, [307] and those seeking to drill a domestic well must obtain a right to use unappropriated groundwater from the state engineer, [308] or purchase a valid existing right and seek approval of a change application on that right. [309] There are no exceptions to this rule, and the Utah Supreme Court has consistently stated that it "has never adopted the so-called 'de minimus' theory . . . that an application either to appropriate or change the diversion or use of water should be approved if the effect on prior vested rights is so small that courts will not be concerned therewith." [310] Consequently, there is no separate permitting process for domestic wells.

Those seeking to drill a domestic well must follow the same procedures as other potential water users by filing an application to appropriate or change application with the state engineer. [311] Among other things, the application must describe the nature of the proposed use; the quantity of water in acre-feet to be appropriated; the location of the diversion; and the dimensions, grade, shape, and nature of the proposed diversion. [312] The state engineer has the discretion to not publish notice of applications that seek to appropriate or permanently change "a small amount of water" if the proposed use will not impair other rights. [313] However, the state engineer must undertake a "thorough investigation of the application" and follow the same notice rules that apply to other applications if impairment is possible. [314] Specifically, he must publish notice "once a week for a period of two successive weeks" in the county where the water source is located and where the water is to be used. [315] Protestants typically have twenty days to file a protest with the state engineer, and a hearing will be held if necessary. [316]

After the notice and hearing requirements are satisfied, the state engineer will approve the application if it satisfies the following criteria, which apply to applications to appropriate and change applications: [317] 1) "there is unappropriated water in the proposed source"; 2) "the proposed use will not impair existing rights or interfere with the more beneficial use of the water"; 3) "the proposed plan is physically and economically feasible"; 4) "the applicant has the financial ability to complete the proposed works"; and 5) "the application was filed in good faith and not for purposes of speculation or monopoly." [318] Upon approval, the state engineer will then issue a "Start Card" authorizing the applicant to drill the proposed well with the help of a licensed well driller. [319]

The most important step in establishing a water right in Utah is to put the water to beneficial use. [320] Other important steps include filing proof with the state engineer to demonstrate that use [321] and obtaining a certificate from the state engineer to establish that the right is vested in the certificate holder's name. [322] The water right holder then has the continuing responsibility to put the right to beneficial use. [323] However, for wells that withdraw "a small amount of water," Utah law allows applicants rather than a licensed engineer or surveyor to submit proof that he or she has placed the water to use. [324]

2. How Utah Administers Its Domestic and Stock Permitting Processes

Given the concern in other states over the administrative costs of permitting small groundwater uses, it is worthwhile to discuss how many permit applications Utah

receives for domestic and stock uses and how it administers its permitting and monitoring processes. Utah receives approximately 1300 small domestic/stock groundwater permit applications per year, and there are about 41,000 such wells in the state.[325] The fee for a permit application is \$150 and most small domestic applications are routine.[326] In addition, protests typically pertain to issues that have been heard before, so hearings occur less frequently for domestic applications than for other types of applications.[327]

The amount of time it takes to process an application depends upon whether the state engineer publishes notice. If the state engineer decides that advertising is unnecessary, the application will receive approval in less than two months, with some applications obtaining approval in under two weeks.[328] However, applications that are advertised have a mandatory five week delay and take about three to five months to obtain approval.[329] Applications that require a hearing may take as long as a year because Utah only holds hearings twice a year in each water right area.[330]

According to Boyd Clayton, Deputy Engineer for the Utah's Division of Water Rights, Utah is able to permit small groundwater uses because "[t]he burden has always been there so we just consider it part of the necessary workload." [331] However, he reports that "[d]elays have been an issue for all water right applications and a backlog of 5000 applications has accumulated over a period of 25-30 years." [332] Clayton also reports "that there has been a significant push" during the past five years "to provide adequate funding to get the work done and focus on eliminating the backlog." [333] As a result, "[t]he backlog is now under 3000 applications and improved processes are in place which reduce time to process which will get even better once the workload decreases as a result of backlog elimination." [334] Of note, Clayton also reports that Utah does not monitor small domestic and groundwater wells "in most cases." [335] Utah relies heavily on a statewide groundwater monitoring program cooperatively operated with the United States Geological Survey to collect pertinent groundwater data, including water levels and estimated well withdrawals. [336]

Mr. Clayton also states that the absence of an exemption has generally not hindered development in rural areas of Utah, but that "complying with policy in areas closed to new appropriation has been a factor." [337] In these areas, those seeking to install a new domestic well must purchase an existing water right and file an application to change the right to the new domestic use. [338] It also "takes additional time and money to find a suitable existing water right," and the cost for purchasing such a right for a domestic use varies by region; it typically ranges from \$1000 to \$40,000, and in some areas can be substantially more. [339] This additional cost has created some controversy because "not all water rights are created equal" and "[i]t takes longer to process change applications because the existing water right must be evaluated." [340] Further, the change is limited to an equivalent use and water right owners become "much more protective of [their] rights once an area is closed because the water rights become significantly more valuable." [341]

3. Subdivisions

Utah does not treat small groundwater wells differently than other subdivision uses. [342] Nevertheless, local governments are "generally aware of water right requirements and will not issue building permits without an approved water right." [343]

4. Drilling

In Utah, all well drillers "shall obtain a license . . . before engaging in well drilling," and must file a bond with the state engineer's office. [344] The state engineer's office is vested with the authority to make rules establishing the amount of the well driller's bond and licensing requirements. [345] Among other requirements, well driller applicants must 1) be at least twenty-one years of age, 2) provide documentation showing two years of full-time well drilling experience or showing construction of sixteen wells under the supervision of a licensed well driller, 3) provide a copy of the well log for each well constructed, 4) and pass oral and written examinations. [346] A licensed well driller is not required for a well thirty feet deep or less. [347] Any wells in excess of thirty feet may only be drilled after authorization by the Utah Division of Water Rights. [348] A well log must be submitted on each well drilled. [349] These provisions are strictly enforced, and failure to comply could result in revocation of a well driller license. [350]

Q. Washington

1. Exemption

Washington's groundwater belongs to the public [351] and is subject to appropriation for beneficial use provided that a permit is first obtained from the state's Department of Ecology (Ecology). [352] However, Washington law does not require permits for withdrawals of groundwater for 1) "stock-watering purposes," 2) "the watering of a lawn or of a noncommercial garden not exceeding one-half acre in area," 3) "single or group domestic uses in an amount not exceeding five thousand gallons a day," and 4) "an industrial purpose in an amount not exceeding five thousand gallons a day." [353]

Once perfected, these exempt withdrawals are equal to a permitted right [354] and are not exempt from the other provisions of Washington's Water Code. [355] In particular, exempt wells are subject to the same priority system as other appropriators, [356] and must not impair surface water rights [357] or be used without an economic beneficial use. [358] As will be discussed in Part IV of this Report, the Washington Supreme Court has interpreted the "single or group domestic" use provision to mean that developers who intend to use exempt wells to supply water to a subdivision are limited to only one 5000 gallons per day (gpd) exemption for the entire project instead of one exempt well with a 5000 gpd exemption for each individual lot. [359]

The exemption does not specify a limit for stock water purposes, and there are conflicting interpretations as to whether such use is subject to any limitation. [360] However, as discussed further in Part IV of this Report, the Washington attorney general issued a formal advisory opinion in 2005 that interpreted the exemption as being unlimited. [361] Prior to the opinion, Ecology had consistently interpreted the stock watering exemption as being limited to 5000 gpd. [362] However, it has since changed its practices to conform to the opinion. [363]

The exemption also contains two provisions that further limit its scope. [364] First, the exemption authorizes Ecology to require exempt well users "to furnish information as to the means for and the quantity of [the] withdrawal," [365] thereby providing it with the ability to quantify the amount of water that exempt wells withdraw. [366] Second, the exemption gives users whose withdrawals do not exceed 5000 gpd the option of filing applications and declarations and obtaining permits and certificates "in the same manner and under the same requirements" that are used for nonexempt groundwater withdrawals. [367]

It is also important to note that Washington law allows any party to petition Ecology to adopt rulemaking procedures, [368] and authorizes Ecology to withdraw waters from additional appropriations if sufficient information is "lacking to allow for the making of sound decisions." [369] Likewise, all diversion owners, including exempt well owners, "shall maintain, to the satisfaction of the department of ecology, substantial controlling works and a measuring device constructed and maintained to permit accurate measurement and practical regulation of the flow of water diverted." [370] Ecology also has the authority to require metering and reports regarding the amounts of water being diverted, but generally does not meter exempt wells. [371] Nevertheless, Ecology has exercised this authority to limit the exemption or to require meters in a number of areas, including the Walla Walla River Basin, [372] the upper portion of Kittitas County, [373] and the Lower and Upper Skagit Water Resources Inventory

Areas.[374]

2. Subdivisions

Washington law states that cities, towns, and counties cannot approve a proposed subdivision without making written findings that "[a]ppropriate provisions" for potable water supplies, sanitary wastes, and other conditions are available, and that the public use and interest will be served by approving the subdivision.[375]

3. Drilling

Individuals drilling an exempt well must comply with Washington's statutory and regulatory standards.[376] Prospective well owners must file a notice of intent to drill at least seventy-two hours before starting work on a well and must pay a fee.[377] It is also unlawful "for any person to contract to engage in the construction of a well or to act as a well operator without first obtaining a license." [378] However, a license is not required for individuals who drill wells on land they own, lease, or in which they have a beneficial interest as contract purchasers so long as the individuals utilize the land "for farm or single-family residential use only." [379] These individuals must also comply with all other fees, notice and reporting requirements, and well construction standards.[380] Once a well is complete, "[a]ny person authorized . . . to construct . . . a well shall furnish a well report to the director [of Ecology] within thirty days after the completion of the construction . . . of a well." [381]

R. Wyoming

1. Exemption

Wyoming does not have a permitting exemption except for certain types of monitoring wells and dewatering wells.[382] Instead, any person who intends to drill a well must pay a fee and file an application for a permit with the state engineer before constructing a well.[383] Wyoming law also dictates that a groundwater application "shall be granted as a matter of course" unless the state engineer determines that granting the application "would not be in [the] public's water interest." [384] The state engineer may also cancel an application if "the proposed means of diversion or construction are inadequate" or the application is otherwise defective.[385]

However, Wyoming law does exempt domestic and livestock groundwater uses from ordinary adjudication.[386] In order to qualify for the exemption, the domestic use must pertain to "household use and the watering of lawns and gardens for noncommercial family use where the area to be irrigated does not exceed one (1) acre," and the maximum production does not exceed twenty-five gpm.[387] A domestic water right also allows water to serve up to three homes, but the total amount of lawn and garden to be watered cannot exceed one acre, while a stock water right covers up to four stock tanks within one mile of the well or spring.[388]

In addition, Wyoming law prohibits the construction of any subdivision water supply without a permit from DEQ, but exempts "subdivision water supplies consisting of individual wells serving individual lots of a subdivision" from this requirement.[389]

If a proposed well is in one of Wyoming's designated groundwater control areas, the state engineer will issue public notice and allow for the filing of objections before issuing a permit.[390] If objections are filed, a hearing will be held on the application before the appropriate control area advisory board and the state engineer or state Board of Control.[391] After receiving the advice of the control area advisory board, the state engineer must grant the application if 1) "there are unappropriated waters in the proposed source"; 2) "the proposed means of diversion or construction is adequate"; 3) the proposed location of the well "does not conflict with any well spacing or well distribution regulation"; and 4) the "proposed use would not be detrimental to the public interest." [392] If the application or petition "is incomplete or otherwise defective," the state engineer may return it for correction; if it is not corrected within ninety days, it will be rejected.[393] The exemption of domestic stock use wells from this process is significant because it allows for the permitting of such wells within a control area without public notice or a determination from the state engineer that unappropriated waters are available.[394]

Although domestic and stock use wells are generally not subject to Wyoming's adjudication process,[395] the state engineer, with the concurrence of Wyoming's Board of Control, has the discretion to order the adjudication of any groundwater appropriation, including domestic and stock wells.[396] The state engineer also has the discretion to "require the filing of a map signed by a Wyoming licensed professional engineer or land surveyor, showing the location of the well and the points and areas of use," and can order the inspection of an exempt well.[397]

It is also important to note that domestic and livestock wells "have a preferred right over rights for all other uses, regardless of their dates or priority." [398] If a well "shall interfere unreasonably with an adequate" domestic or livestock well, the operator of the domestic or livestock well can petition the state engineer to "order the interfering appropriator to cease or reduce withdrawals . . . unless [that] appropriator shall furnish at his own expense, sufficient water . . . to meet the need for domestic or stock use." [399] In cases of interference between two domestic or livestock wells, "the appropriation with the earliest priority shall have the better right." [400]

2. How Wyoming Administers Its Domestic and Stock Permitting Processes

Although Wyoming generally exempts domestic and stock uses from its adjudication process, the state is unique in that it does not have an exemption to its permitting process. As of October 2008, Wyoming had received approximately 70,723 domestic and stock permit applications, of which about 70,543 were approved to permit status.[401] Over the last six years, the state has received an average of 1566 domestic and stock permit applications per year and received 1476 applications in 2008.[402]

According to Lisa Lindemann, the administrator of the Ground Water Division within the Wyoming State Engineer's Office, "Application for a domestic/stock use is similar to any other use," including irrigation, municipal, industrial, miscellaneous, monitor/test wells, and coalbed methane wells.[403] Applicants must complete an "Application for Permit to Appropriate Ground Water," or "U.W. 5" form, and submit it to the state engineer along with an application fee of \$50.00.[404] The application form requires, among other things, information describing the location of the well, its estimated depth, the maximum instantaneous flow, the maximum annual volumetric quantity of water, and the identity of the owner of the land on which the well will be constructed.[405]

3. Subdivisions

Wyoming law vests the Board of County Commissioners in each county with the authority to regulate subdivisions in unincorporated areas.[406] As part of the subdivision permit application, developers proposing to use "individual on-lot wells" must provide county commissioners with a report demonstrating the safety and adequacy of the water supply system.[407] Such a report must include 1) the estimated number of gallons per day the subdivision will use, 2) information regarding the potential availability and quality of the proposed groundwater source, 3) documentation showing that the proposed water supply will be compatible with and will not be adversely affected by the subdivision's proposed sewage system, 4) a list of all surface and groundwater rights that will be used or may be impacted by the proposed subdivision, and 5) plans to mitigate any water rights conflicts that may result from the subdivision's proposed water use.[408]

Upon receipt of a completed subdivision permit application, county commissioners will forward the application to DEQ to review the safety and adequacy of the proposed sewage and water supply systems.[409] DEQ may request the assistance of the state engineer, the Wyoming Water Development Office, and any other state agency or

local government entity in preparing its review.[410] DEQ will issue its written comments and recommendations within thirty days after receipt of the application.[411] It has also enacted regulations regarding the review process,[412] which require 1) information describing the potential availability and quality of groundwater for applications proposing the use of "on-lot wells," 2) water quality data for a number of analytes, including nitrates, sulfates, calcium, lead, arsenic, and other contaminants for "on-lot well" subdivisions, 3) documentation of activities within one quarter mile of the subdivision that may adversely impact water quality, and 4) a demonstration to the administrator of the Water Quality Division that a qualified professional in surface and groundwater protection has reviewed all sewage or water supply systems.[413]

It is important to note, however, that Wyoming law gives county commissioners the authority to approve a subdivision permit application notwithstanding an adverse recommendation from DEQ, provided that the developer provides all potential buyers with a copy of the recommendation prior to sale.[414]

4. Drilling

It is unlawful for any person in Wyoming "to construct, alter or rehabilitate a water well . . . without a license." [415] However, this requirement does not apply to an individual who is "[d]rilling a well on land owned by him." [416] Once an exempt well is completed, the owner must report to the state engineer [417] by filing a "Statement of Completion and Description of Well or Spring," which provides the relevant well completion information, including the type of construction used to drill the well, the date of completion, information regarding the well's pump, the well depth, pump test results, and information describing the quality of the water.[418] The priority date of such wells "shall date from the filing or registration [of the well] in the state engineer's office." [419]

III. HOW EXEMPT WELLS CAN COMPLICATE OR COMPROMISE WATER RESOURCES ALLOCATION, ADMINISTRATION, AND QUALITY

As discussed below, the unquantified and unregulated nature of exempt wells poses possible challenges to 1) water resources allocation,[420] 2) administration,[421] and 3) water quality.[422] The purpose of this Part is to promote discussion of the *potential* challenges and problems that may result from exempt well use. Consequently, it should not be assumed that these challenges have occurred or will occur in every western state.

A. Water Resources Allocation

1. The Cumulative Effect of Many Exempt Wells May Equal the Impact of a Single Large Withdrawal

The underlying policy supporting exempt wells is the belief that they withdraw a de minimus amount of water, and that it is not worth the time and effort needed for small groundwater users to apply for permits and for states to permit such uses.[423] However, there are now over a million exempt wells throughout the West, and tens of thousands more are drilled each year.[424] Taken together, there is a possibility that the cumulative withdrawals from these wells are not de minimus, and therefore have the potential to impact water resource allocation.

Some states with large numbers of exempt wells include Arizona, with over 100,000 exempt wells[425] where 3000 new exempt wells are drilled each year;[426] Colorado, with an estimated 200,000 exempt wells;[427] Idaho, where about 4500 new wells are drilled each year;[428] Montana, where over 100,000 water right certificates have been issued for exempt wells[429] and where closed basins could see the installation of approximately 30,000 wells in the next twenty years;[430] New Mexico, where over 136,000 domestic wells exist[431] and 6000 to 8000 new permits are issued each year;[432] Oregon, where 230,000 exempt wells exist and approximately 3800 are drilled annually;[433] Washington, where an estimated 500,000 to 750,000 wells exist,[434] and 6000 to 9000 are drilled annually;[435] and Wyoming, with 70,543 domestic and stock wells in existence.[436] Exempt wells are also prominent at local levels, as demonstrated by the 9400 exempt wells in Arizona's Prescott Active Management Area (AMA), which constitute the third largest water use in the AMA.[437] Likewise, some estimates in New Mexico indicate that the total diversion of exempt wells in the Rio Grande drainage basin during 1995 was 19,318 acre-feet, which is equivalent to 2.9 percent of the basin's groundwater diversions and about 0.9 percent of groundwater and surface water diversions combined.[438]

Most reports indicate that exempt wells pump far less than their statutory allotments, and it is unlikely that every exempt well in a state would pump at full or even half capacity.[439] However, the potential exists for an expansion in use, and some have theorized that periods of economic distress could result in the increased use of exempt wells to irrigate food gardens, which could create a significant increase in depletions.[440] Therefore, depending upon a state's particular circumstances, it is possible that the cumulative impact of tens and hundreds of thousands of exempt wells could impact water rights and supplies.

Many times the problems that exempt wells pose do not stem from thousands of wells spread across a state, but from dozens or hundreds of concentrated wells pumping water from the same source, such as a subdivision.[441] In this scenario, the cumulative impact is significant even if each individual well only withdraws a de minimus amount of water. For example, Montana's Department of Natural Resources and Conservation's Water Management Bureau has concluded that "300 homes using exempt wells with 1/2 acre of lawn and garden irrigation will consume about 204 acre-feet of water" each year, which is about the equivalent of the estimated 207 acre-feet "consumed by one center pivot irrigating 138 acres of alfalfa." [442] The bureau also reports that "100 individual wells serving a subdivision will have the same magnitude of depletion as one or more larger non-exempt wells for a public water system serving the same number of households from the same aquifer." [443] Likewise, some reports in New Mexico indicate that water levels have declined several tens of feet over the years in areas with dense populations of exempt wells near Placitas, while water levels have declined for many individual wells in parts of southern Santa Fe County.[444]

If exempt wells have a large cumulative impact, it is possible the impact could create a number of problems in aquifers that are sensitive to pumping by depleting them at rates that exceed their safe yield. Aquifers compact as they are depleted, which permanently diminishes their storage capacity; makes groundwater more difficult and costly to extract as the water table lowers; and increases the likelihood of land subsidence, which can lead to fissures in the earth's surface that can damage roads, foundations, and even airport runways.[445]

Notwithstanding these concerns, exempt wells do not necessarily have a negative impact on groundwater supplies and aquifers in every instance. In particular, when subdivisions replace historically irrigated land, it is possible that the decline in irrigation uses can offset the increase in exempt well use.[446] It is also possible for subdivisions to decrease overall water consumption if their consumptive use is less than the irrigation uses they replace.[447] Even if the exempt wells use the same amount of water, some proponents have argued that there is little difference between using an exempt well to water a lawn or garden and using a nonexempt well to provide water for crops.[448] Moreover, some experts maintain that the amount of water exempt wells use is inconsequential when compared to stream flows and irrigation uses.[449]

It should be noted, however, that these "offsets" may not apply in every situation. First, there will be no irrigation offset if exempt wells are drilled on land in which the previous irrigation right was severed and sold to another irrigator for use on different lands. Second, new exempt uses are not offset by a decrease in irrigation if the subdivision is built on land that was not historically irrigated. Third, the new exempt uses may exceed the historic irrigation uses. This is probable in situations where the historic irrigation use 1) occurred during the early portion of the irrigation season, 2) was used for flood irrigation with a lower depletion rate than sprinkler irrigation, and 3) was so junior that a water commissioner typically curtailed its use early in a season.[450]

2. The Impacts of Exempt Wells upon Surface Flows, Habitats, and Aquifers

It is a basic hydrologic principle that groundwater and surface water are two manifestations of a unitary resource, and that an increase in the consumption of groundwater can reduce surface flows by intercepting water that would otherwise recharge a stream or by capturing water from the stream itself.[451] Moreover, a reduction in surface flows can threaten the flora and fauna that depend upon such flows to support the riparian habitats and wetlands in which they live.[452] This means that large numbers of exempt wells have the potential to deplete surface flows in the same proportion as regulated water users,[453] which could harm flora and fauna if they are concentrated in an aquifer that is sensitive to pumping and hydrologically connected to surface water sources.[454]

Exempt wells may pose a particular threat to rivers or streams with surface flows that are already impaired or are in danger of becoming impaired. This is possible because most western exemptions do not prevent landowners from installing exempt wells on aquifers that are hydrologically connected to streams and wetlands with impaired surface flows.[455] As more and more people use exempt wells to satisfy their need for water, the possibility that such wells will lower surface flows and harm flora and fauna habitat increases.

However, it is possible that exempt wells can enhance surface flows in some instances by reintroducing deeper levels of groundwater back to the surface.[456] Some well drillers also maintain that exempt wells use a relatively small amount of groundwater when compared with other uses, and that most of the water that is withdrawn returns and recharges the aquifer.[457] In those areas where subdivisions with exempt wells have replaced irrigated farmland, it is possible that the subdivisions may not impact stream flows[458] or may actually increase such flows, provided that they use an equal or lesser amount of water and the surface water rights are not severed from the land.

Nevertheless, some observers believe that there are instances where exempt wells have begun damaging underground sources for rivers and have damaged riparian habitats that depend upon subsurface and surface flows.[459] The fact that most exempt wells are not subject to replenishment obligations and other requirements needed to ensure safe-yield goals means that there is a risk that they will reduce surface flows and have a negative impact upon the environment.[460] Even if the relative number of exempt wells is not large, they can pose a significant threat to surface flows and riparian habitats if they are located in aquifers that are sensitive to pumping, or where any increase in groundwater depletion will decrease flows and impact habitats.[461]

Lastly, the unregulated nature of exempt wells could pose problems to aquifers themselves. If exempt wells are installed in an aquifer that has been closed and is sensitive to pumping, the cumulative withdrawal of the wells could theoretically lower the aquifer's water table below safe yield levels. This, in turn, could create habitat loss for the plants and animals that depend upon the aquifer, force other well users to drill deeper wells by lowering the water table, impair water quality, and cause overlying land to crack or subside.[462] In extreme cases, it is possible that drilling exempt wells in particularly sensitive aquifers could serve as a tipping point that results in the dewatering of an aquifer and the permanent loss of water supplies to other users and habitats. This risk is greater in aquifers that recharge slowly, such as those not connected to surface flows, because it can take hundreds of years for such aquifers to recharge.[463]

3. The Potential Impact of Exempt Wells upon Water Rights

One of the primary concerns associated with exempt wells is that they will pump water out of turn, thereby reducing the amount of water available to senior users.[464] This concern is elevated when exempt wells are used in closed basins or other hydrologically-stressed areas, and exempt withdrawals could force senior right holders to pay the price of the reduced aquifer life by decreasing the value of their rights or by forcing them to bear the burden of delivering water under interstate compacts.[465]

Most western exemptions provide senior users with limited recourse when an exempt well impairs their rights because exempt wells are typically not subject to standard permitting and adjudication procedures.[466] This means that senior users frequently do not receive notice, are not afforded the opportunity to object to the drilling of an exempt well, and have little means to stop an exempt well that impairs their rights from pumping. This problem is further compounded by the fact that most exemptions only provide limited guidance as to what steps a senior user should employ if an exempt well impairs his or her rights.[467]

In his presentation at the WSWC's 156th Council Meeting in Arlington, Virginia, New Mexico State Engineer John D'Antonio, Jr. spoke of this problem, stating that "[d]epletions due to Domestic Wells Statewide are Creating a Debt to Legitimate [water right] Owners that will Grow into the Future." [468] Similarly, Arizona attorney Rita Maguire has opined that subdivisions in north Phoenix that rely upon exempt wells "will likely reduce the amount of groundwater available to certificated subdivisions," and that "current [Arizona] law provides no protection from these unregulated pumps and no mechanism for reevaluating the available water supplies for a subdivision." [469] New Mexico and Arizona are not unique in this respect, and the potential for infringement upon senior rights exists in every state that exempts certain types of groundwater usage from its permitting or adjudication procedures.

Exempt wells may also have a negative impact upon other wells, both exempt and nonexempt, by withdrawing groundwater and lowering the water table in aquifers that are sensitive to pumping or overappropriated.[470] The fact that most exempt wells can be installed without any determination as to whether they will impact other wells creates an inherent risk that such wells could have a negative impact on existing, neighboring wells.[471] This raises issues of fairness between exempt well users who generally continue pumping in times of water shortages, and more senior, regulated water users whose usage can be curtailed in times of shortage. Although this issue has not been heavily litigated in the West, it is possible that western states could see an increase in litigation involving exempt wells as water supplies decrease and more exempt wells are used to satisfy demand for fresh water supplies.

Although New Mexico is the only state in which a court has found an exemption to be unconstitutional,[472] it is theoretically possible that courts in other states could reach the same conclusion. This is so because exemptions in most states do not provide senior users with an adequate mechanism to protect their rights.

4. Well Owners May Lack the Hydrologic Knowledge and Engineering Expertise to Develop a Long-Term Water Supply

When landowners drill exempt wells, they become their own de facto water supply managers.[473] However, unlike professional water managers, many exempt well owners do not have a hydrology background and may lack the information needed to understand aquifer conditions, their future water supply, or the effect their wells may have upon other water rights.[474] As a result, such landowners may be unable to create strategies for developing long-term water supplies, and their actions may create dry wells, well-to-well impacts, aquifer depletion, and other problems that may otherwise be avoided with a proper understanding of hydrology and the right information.[475]

B. Administration

1. There Is a Lack of Information Regarding Exempt Wells

Throughout the West, there is a general lack of adequate information regarding the number of exempt wells and the amount of groundwater they withdraw.[476] This could theoretically pose challenges to water resources managers as they create water budgets.[477] In particular, a lack of adequate information regarding exempt well impacts could frustrate the ability of state water resource managers to quantify available groundwater supplies, create comprehensive groundwater management plans, calculate the amounts of water needed for instream flows, administer water rights, and determine if water is available for appropriation.[478]

It is important to note that the exempt well statutes and water codes of many western states require well identification information such as well logs, notices of completion, or registration.[479] However, these documents may not always provide adequate information about how much water an exempt well actually withdraws or consumes in a given year,[480] and compliance is not always guaranteed.[481] For example, in Montana, well users must file a notice of completion after drilling a domestic well, but

some reports indicate that many users are unaware of this requirement, assume that the well log that the well driller files is the same as the notice of completion, or believe that the developer of the subdivision had the necessary authority to use the water.[482]

Moreover, many states have not always required well location information, and it may be difficult to locate those wells that were created before the enactment of reporting provisions.[483] In particular, Washington started collecting well identification information in the 1970s and reported in 2001 that it could identify about 250,000 of its estimated 500,000 to 750,000 exempt wells.[484] This lack of information regarding the location of exempt wells makes it difficult for states to quantify their withdrawals and their impact upon water resources.[485]

2. There Is a Lack of Administrative Resources for Exempt Well Monitoring and Enforcement

Every exempt well statute in the western states contains some type of limit or condition regarding the amount of water that individuals can withdraw without a permit or without being subject to adjudication.[486] However, ensuring that well users comply with statutory limitations may strain state agencies beyond their administrative capacity. For example, Washington's Department of Ecology stated in 2001 that it had "a little over three full time positions" dedicated to measuring the state's 222,000 existing water rights claims and 500,000 to 750,000 exempt wells, and "lacks the resources necessary to enforce measurement on exempt withdrawals." [487] Given this example, it is easy to see how a state's ability to monitor an exempt well can depend upon its available resources, which are often devoted to monitoring larger, nonexempt uses that have more direct and quantifiable impacts upon water rights, instream flows, and water supplies.[488]

State agencies attempting to monitor exempt wells must also determine who owns an exempt water right. This can be a time-consuming and difficult challenge because exempt water rights can be transferred along with sales of real estate, which means that determining ownership becomes more difficult if a parcel of land has been sold or subdivided multiple times.[489] Subdivision presents a particular challenge because it raises questions as to whether subdivided lots have ownership interests in an exempt well, and whether a single ownership interest has evolved into multiple ownership interests.[490] In some cases, states often do not require buyers and sellers to provide information regarding the sale of an exempt water right.[491] This creates record inaccuracies that may require state agencies to research each water right individually and compare it to land records to determine ownership.[492]

These administrative challenges, as well as the general lack of information regarding exempt well numbers and locations, are some of the reasons why many states do not monitor exempt wells or enforce statutory limitations on exempt use.[493] In turn, this absence of enforcement can create an incentive for exempt well users to pump more than the statutory limit, and one report in Washington's Walla Walla Basin has shown that some exempt well users have withdrawn up to two to five times the legal limit.[494]

3. The Challenges of Quantifying the Impacts of Exempt Wells

Quantifying the impacts of exempt wells can be a difficult challenge for water administrators due to the general lack of metering and knowledge regarding the location and withdrawal capacity of exempt wells.[495] Further, the amount of water an exempt well withdraws is not necessarily equal to its impact upon existing rights. This is due in part to the fact that exemptions are typically based on the amount of water that is *withdrawn*—not the amount of water that is consumed—and a portion of the water withdrawn is returned to the aquifer or stream when users drink, flush, or otherwise send it down a drain.[496]

Adding to this challenge is the fact that the amount of water consumed varies significantly depending upon how each individual well is used. [497] Some reports indicate that most of the water that exempt wells consume is consumed by either evapotranspiration from plants or evaporation from exposed surfaces.[498] This means that domestic wells that provide more water for the outdoor irrigation of lawns, gardens, and other vegetation will consume more water than wells that provide water for indoor use. Similarly, stock watering uses that entail a large groundwater pit or pond will likely consume more water through evaporation than other stock uses.[499] As a result, one cannot assume that the amount of water an exempt well withdraws is necessarily equal to the amount of water that it consumes, because some wells may return most of their water to an aquifer while other wells may not.

Further, a well that is close to, and hydrologically connected to, a stream will manifest its impact on surface flows more significantly during the irrigation season than a well that is substantially distant from the river.[500] This is so because the interaction between a well and surface flows becomes more uniform and steady with time as the distance between the well and the surface flow increases, thereby spreading a distant well's impact throughout the year.[501] For irrigators who consume the bulk of their allocated water during the irrigation season, this means that a distant well that consumes one-third of an acre-foot a year will only draw half this amount from a connected stream during the irrigation season, and will therefore not have the same impact as a closer well.[502]

It is also possible that measuring stream flow records or studying basin-scale water balances could be ineffective in quantifying the impacts of exempt wells because exempt well depletions are small relative to annual flows.[503] Exempt wells also typically exist outside of the priority system and will continue pumping after a call has been issued.[504] This means that the curtailment of junior water right holders during a call may offset the impact of exempt wells.[505] Moreover, depletions from wells, exempt and otherwise, can take months or years to dissipate after pumping is curtailed, thereby impacting the ability of stream flows to accurately reflect the impact of exempt wells.[506]

4. "Exempt" Subdivisions

From an administrative perspective, the use of exempt wells in subdivisions can pose a number of challenges because it occurs outside of the permitting process and increases the chance that developments are installed in areas where the aquifer could be damaged by additional pumping, or where there are no available water supplies. If the cumulative withdrawal of these subdivisions is large enough, large numbers of homes could be left without a reliable water supply, thereby lessening property values and creating substantial administrative problems for water resources managers.

The impact of exempt well subdivisions is likely to be more significant in closed basins, which oftentimes experience the most growth.[507] In some cases, a population increase in a closed basin may increase the number of subdivisions that rely upon exempt wells because the cost and difficulty of obtaining water rights to build a subdivision may give developers an incentive to use exempt wells to satisfy the demand for new housing. This has led some critics to claim that exemptions make good water management policies difficult to implement, while making it easier to utilize less desirable development practices.[508]

5. Exempt Wells Are Not Subject to Conservation Efforts

Exempt wells may also pose problems for public water supply operators who are attempting to implement conservation efforts. Since most exempt wells are unregulated, exempt well owners are often not subject to conservation efforts and may continue to withdraw water at unrestricted rates while the use of public supply users is curtailed. [509] In addition, conservation efforts may provide landowners with an incentive to install more exempt wells to avoid a reduction in their water use.[510] For example, some experts claim that efforts by Santa Fe, New Mexico, during a 1996 drought to curtail water use through rate increases led to the creation of new exempt wells.[511] As a result, the fact that exempt well users are not subject to conservation efforts could frustrate efforts to reduce reliance on groundwater supplies and implement conservation efforts.[512]

6. Coordination Among Agencies

City and county governments typically have jurisdiction over decisions to subdivide, zone, and issue construction permits, while water supply management is the responsibility of local water suppliers, or commonly known as utilities.[513] Some local governments may operate their own water departments, but such utilities are established as distinct public or private institutions whose physical boundaries may or may not overlap with city and county boundaries.[514]

Many states require some type of review of proposed subdivisions to determine if they will have an adequate water supply.[515] This review occurs regardless of whether the proposed subdivision will utilize exempt wells or a community water supply.[516] If city and county governments do not take into account exempt well impacts, or are unable to do so, it is theoretically possible that subdivisions without adequate water supplies could be approved. This possibility will likely increase if there is not sufficient communication, information sharing, or cross notification between the city and county governments responsible for approving subdivisions and the water permitting agencies or utilities that have the knowledge and expertise needed to quantify exempt well impacts or determine whether a proposed "exempt" subdivision will have an adequate water supply.[517]

C. Potential Water Quality Problems

Exempt wells can pose a number of water quality threats. Of note, a 2009 report from the National Water-Quality Assessment Program of the United States Geological Survey (USGS) assessed water-quality conditions for domestic wells in forty-eight states, finding that "[c]oncentrations of at least one chemical contaminant were greater than human-health benchmarks . . . in 23 percent of 1,389 domestic wells sampled." [518] In addition, about half of the wells (forty-eight percent) contained at least one contaminant at a level of concentration that exceeded the range of values that the Secondary Maximum Contaminant Levels (MCLs) of the United States Environmental Protection Agency (EPA) recommends for the aesthetic quality of water.[519] The other benchmarks to which the report refers are EPA's MCLs and USGS's Health-Based Screening Levels.[520]

In the West, exempt wells have the potential to impact water quality in the following ways: 1) naturally occurring inorganic contaminants,[521] 2) nitrification of groundwater,[522] 3) pesticide contamination,[523] 4) contamination related to maintenance or construction issues,[524] 5) seawater intrusion,[525] and 6) wastewater and septic tanks.[526]

1. Naturally Occurring Inorganic Contaminants

The USGS report found that naturally occurring inorganic chemicals were the contaminants that were most often found in domestic wells at concentrations greater than human-health benchmarks.[527] With the exception of nitrate, these contaminants were derived primarily from natural sources and include radon, arsenic, uranium, manganese, fluoride, strontium, and boron.[528]

With respect to radon, USGS found that concentrations of the gas were greater than EPA's proposed MCL (300 picocuries per liter (pCi/L)) in 65% of the sampled domestic wells, while 4.4% of the wells exceed USGS's proposed MCL (4000 pCi/L).[529] In the West, concentrations were highest in crystalline-rock aquifers located in central Colorado.[530] Health effects from radon in drinking water include an increased risk of cancer and primarily occur through inhalation after the gas is released from the solution, such as in the shower.[531]

The report also stated that arsenic concentrations exceeded EPA's MCL in 6.8% of domestic wells nationwide, and in 10% of wells in several aquifer types, including basin-fill aquifers in California, Nevada, Arizona, New Mexico, Texas, and Nebraska, as well as the Snake River basaltic-rock aquifers in Idaho.[532] Arsenic is toxic to humans, and elevated concentrations in drinking water can cause skin, bladder, and lung cancers.[533]

USGS found that uranium, which can cause possible harm to kidneys in drinking water, had the "highest concentrations" in the West and in crystalline-rock aquifers in the Rocky Mountains.[534] It also found relatively high concentrations in the groundwater of California's Central Valley.[535]

The report stated that "relatively high concentrations" of strontium, which can cause abnormal bone development, were most common in the southwest, including the Basin and Range basin-fill aquifer in Arizona, the southern High Plains basin-fill aquifer, and the Edwards-Trinity sandstone/carbonate aquifer in Texas.[536]

Similarly, USGS reported that high concentrations of boron were found "most often" in basin-fill aquifers in California, the southern High Plains basin-fill aquifer, and the Lower Tertiary/Upper Cretaceous sandstone aquifers underlying Wyoming's Yellowstone River Basin.[537] Boron is an accessory element in several common minerals, and elevated doses may have gastrointestinal, reproductive, and developmental effects.[538]

Of note, the report found that contaminants found in domestic wells "usually co-occurred with other contaminants as mixtures, rather than alone, which is a potential concern because the total toxicity of a mixture can be greater than that of any single contaminant." [539] While only 4% of the sample domestic wells had mixtures of two or more contaminants that exceeded a human-health benchmark, 73% "contained mixtures of multiple contaminants with concentrations greater than one-tenth of their individual benchmarks." [540] The most common mixtures were inorganic contaminants such as nitrate, arsenic, radon, and uranium.[541]

2. Nitrification of Groundwater Supplies

Nitrification of groundwater will occur when nitrates located above ground migrate into underlying aquifers.[542] Human activities such as crop fertilization and on-site sewage disposal typically cause nitrate concentrations, and the application of nitrogen fertilizers to fields is the primary source of nitrates in shallow groundwater.[543] The USGS report found that "[n]itrate is the most common nutrient in ground water and was the only nutrient that was found at concentrations with potential human-health effects." [544] According to the report, elevated concentrations of nitrates were found in the "Basin and Range and Central Valley basin-fill aquifers in the Southwest and in California, [and] the west-central glacial aquifers in the Upper Midwest." [545] Concentrations were also generally higher "in ground water near agricultural land." [546]

Also, some domestic well owners may use fertilizers and other products that contain nitrates near the well heads of domestic wells. In 1998, the Centers for Disease Control and Prevention (CDCP) and the National Center for Environmental Health conducted a survey of the water quality drawn from domestic wells in nine Midwestern states, including WSWC member states Kansas, Nebraska, North Dakota, and South Dakota.[547] The survey found that well owners reported using fertilizers (11.4 percent) and manure (7.8 percent) within the past five years and within one hundred feet of a domestic well.[548] These products are also associated with coliform bacteria and *Escherichia coli* (*E. coli*).[549]

Exempt wells have the potential of causing nitrification because they are typically drilled into the shallow portions of upper aquifers, where nitrates are the most concentrated.[550] For example, the USGS report found that an analysis of an additional 436 domestic wells targeted in shallow groundwater beneath relatively intense agricultural land use showed elevated concentrations of nitrate "in nearly 25 percent of the sampled wells." [551] Likewise, a report in Montana found that "ground water quality monitoring in some areas of high-growth rural subdivisions are showing gradually rising levels of nitrates." [552]

High nitrate levels in groundwater can threaten human health by causing a fatal blood disorder known as methemoglobinemia, more commonly known as "blue baby

disease."^[553] This disease can affect anyone, but it is particularly dangerous for children under six months of age, and some unconfirmed studies have suggested that nitrates may cause cancer and birth defects.^[554]

3. Pesticides

Like nitrates, shallow wells are also more susceptible to pesticide contamination and other chemicals that are applied to the land surface. This is possible because there is less distance between the land surface and the well, and because it is less likely that chemicals will break down through natural means, be absorbed by organic matter and minerals in the ground, or be diluted.^[555] A 1996 report from USGS of the Quincy and Pasco Basins in Washington found that 63% of wells with a depth of less than 125 feet contained pesticides.^[556] In addition, the CDCP survey found that 14.3% of the water users it studied reported using pesticides within one hundred feet of a domestic well.^[557] Since many exempt wells are shallow and draw water from shallow aquifers,^[558] the possibility exists that such wells could draw water containing unhealthy levels of pesticides.

However, it is important to note that the 2009 USGS report found that while man-made organic compounds (herbicides, insecticides, solvents, etc.) were found in 60% of the domestic wells sampled, the "concentrations were seldom greater than human-health benchmarks (less than 1 percent of wells)."^[559]

4. Contamination Related to Well Maintenance and Construction

The improper maintenance and construction of exempt wells has the potential to contaminate water supplies in a variety of ways.^[560] In the CDCP survey, 268 domestic wells in Nebraska had construction deficiencies, and 55.8% of the wells surveyed in all nine states studied in the survey did not have pitless adapters, which provide a seal between the well casing and the distribution system.^[561] In addition, 80% did not have backflow devices that prevent back siphoning of water.^[562] Those wells that had these devices had up to 20% fewer contaminated samples, while wells with cracks or holes in the well casings were seven times more likely to be contaminated than wells with intact casings.^[563]

There are a number of other reasons why the construction and maintenance of exempt wells can create water quality problems. First, as mentioned previously, the shallow nature of many exempt wells places them at risk of contamination because contaminants are often located in the shallow reaches of the ground. The CDCP survey found traces of *E. coli*, nitrates, and atrazine in samples taken from exempt domestic wells and that "[m]ost of the water samples with these pollutants were drawn from dug or bored wells that were old and shallow and had a large-diameter brick or concrete casing."^[564]

Second, exempt wells are frequently installed too close to sources of contaminants such as septic tanks and mixing zones.^[565] The CDCP survey found that "potential contamination sources were commonly found within 100 feet of the well head[s]" of domestic wells, and that wells owners reported that septic tanks (30.2%) and lateral fields (16.9%), which contain human fecal material, were the most common pollution sources.^[566] In addition, the survey found that "[l]ess than 1% of the wells had a sewage lagoon, silage storage, agricultural drain, or sink hole within 100 feet," and that "[o]ne-fourth of the wells not only had a contamination source within 100 feet but were also down gradient from that source."^[567]

Third, high concentrations of exempt wells may increase the risk of contamination by compromising natural barriers to contamination and creating more point sources for contaminants to infiltrate an aquifer, making an aquifer more vulnerable to contamination by increasing its susceptibility to surface activities.^[568] It is also harder for public health agencies to ensure that each individual well does not contaminate an aquifer as opposed to a single water system that is supplied by a consolidated supply of water.^[569] This is especially true when public safety agencies do not know of the number and location of exempt wells. As a result, many experts have argued that independent water systems that many developers have used to supply water to subdivisions are often the source of the highest percentage of water quality violations.^[570]

Fourth, some experts postulate that it can be assumed that most exempt wells are not plugged when they are abandoned and may serve as conduits for the movement of contaminated water into an aquifer.^[571] The risk of such contamination is likely to increase after the well casing has rusted away or collapsed.^[572]

5. Seawater Intrusion

For coastal states such as California, Oregon, and Washington, exempt wells have the potential to cause seawater contamination of groundwater supplies. In general, the water table of a coastal aquifer is higher than the sea level, and the fresh groundwater in an aquifer tends to move towards the coast, creating a natural equilibrium between the freshwater and the seawater.^[573] However, pumping and other human activities can disrupt this equilibrium by decreasing or reversing the flow of freshwater, which can allow seawater to move landward and infiltrate the aquifer.^[574] When seawater intrusion occurs in an aquifer, wells pumping from the aquifer can become contaminated with high concentrations of chloride, which can cause physiological effects in drinking water, corrode pipes and pumping equipment, and increase the cost of water treatment.^[575]

Any well that pumps groundwater with a hydrologic connection to seawater can increase the likelihood of seawater intrusion. However, exempt wells pose a particular threat because they are not regulated, and the possibility exists that they will be installed in aquifers that are susceptible to intrusion.^[576] Additionally, population increases along the coasts will likely increase the demand for freshwater, and it is possible that the cost and time associated with obtaining permits will provide an incentive for some developers to use exempt wells to satisfy this demand, thereby exacerbating seawater intrusion in susceptible aquifers.^[577]

On the other hand, some experts maintain that exempt wells may be an appropriate method of addressing seawater intrusion in areas where single, large-volume withdrawals cause up-coning of seawater in a more severe manner than multiple, small withdrawals.^[578] In this scenario, the net overdraft may be the same, but the diffusion of exempt wells as opposed to a large, single withdrawal may be better for the aquifer.^[579]

6. Wastewater and Septic Tanks

Many exempt wells are accompanied by septic tank wastewater systems rather than community wastewater systems. These private wastewater systems return effluent from the home back into the ground, and can pollute aquifers and other wells if the water table is shallow.^[580] Therefore, exempt wells and their accompanying septic systems could create situations where well owners are pumping each other's wastewater.^[581]

Further, unlike community water treatment systems, individual septic systems may not require long-term water quality monitoring and reporting, which can lead to water quality problems if the individual septic systems are not properly maintained.^[582] There also appears to be a general belief among water quality managers that individual septic systems are not as effective as community wastewater systems at treating wastewater or protecting water quality.^[583] This is due in part to the fact that individual septic systems are not always subject to the same approval and review processes, may lack minimum design or density requirements, and may not be subject to adequate monitoring and reporting requirements.^[584]

Additionally, exempt well owners are typically not trained as well operators, are often unfamiliar with water quality standards and procedures.^[585] This means that such well owners are less likely than trained well operators to properly manage water quality threats.^[586] Furthermore, exempt well users may also lack the resources of a

community water treatment system, which could lead to situations where such users "skimp" on repairs or forgo needed maintenance completely.[587] Consequently, some experts maintain that independent wastewater systems are often the highest source of water quality violations.[588]

IV. SPECIFIC CHALLENGES WSWC MEMBER STATES FACE WITH RESPECT TO EXEMPT WELLS

The impact of exempt wells varies from state to state depending upon a number of factors, including but not limited to: water availability, the specific provisions of an exemption, a state's population, the number of exempt wells in a given state, and the amount of growth a state is experiencing. This means that exempt wells can pose significant challenges in some states, but not in others. The available literature indicates that the following WSWC member states have experienced some challenges with respect to exempt wells: 1) Arizona,[589] 2) Colorado,[590] 3) Idaho,[591] 4) Montana,[592] 5) Nevada,[593] 6) New Mexico,[594] 7) Oregon,[595] and 8) Washington.[596] This Part will discuss those challenges.

A. Arizona

1. Managing Exempt Wells Within Active Management Areas (AMAs)

Within Arizona's Active Management Areas (AMAs), there is a lack of information regarding how many exempt wells exist, how much water they pump, and how many people they serve.[597] In addition, these wells are not subject to replenishment or conservation obligations and do not contribute to safe yield goals.[598] Given these concerns, one prominent Arizona water law attorney has stated, "It is . . . clear that they have begun damaging underground water sources for rivers and that they are draining sensitive aquifers and damaging riparian habitats dependent on subsurface flows." [599]

Some reports indicate that these problems are more pronounced in the Phoenix, Prescott, and Tucson AMAs where there is a general lack of information regarding exempt well impacts.[600] Exempt wells in the Phoenix AMA are estimated to comprise 1% of municipal use, while wells in the Prescott and Tucson AMA's comprise 10% and 2% respectively.[601] Although the volume of groundwater these wells pump in the Phoenix and Tucson AMAs is not large, they are located in sensitive areas of the aquifer, which has led some observers to believe that they pose a significant threat to adjacent wells and riparian habitats that are dependent upon subsurface flows.[602]

Exempt wells may also complicate the ability of AMAs to reach their safe yield goals by creating imbalances in water budgets and safe yield projections. A 2007 report from Trout Unlimited's Western Water Project concluded that the Prescott AMA will need to import surface water to reach its safe yield mandate as a result of its estimated 9400 exempt wells, which represent its third largest use.[603]

2. Water Quality

The extensive use of exempt wells has created a possibility for water quality problems in Arizona. The University of Arizona has cited a 2006 study that found that 90% of exempt wells from seven Arizona counties exceeded at least one drinking or water quality standard for contaminants such as nitrates, arsenic, and coliforms.[604] More specifically, 43% of the sampled wells were contaminated with waterborne pathogens and 33% had nitrate or arsenic levels exceeding EPA's drinking water standards.[605]

B. Colorado

1. Legal Questions

Although the issue of domestic wells has not garnered the same amount of attention in Colorado that it has in other states, the state's exemption does raise some questions. In particular, the exemption allows domestic water users to adjudicate their water rights and obtain a priority date, which raises questions regarding what effect the priority date will have.[606] For example, if a domestic well user has a priority date for a well that is not administered pursuant to the priority system, what importance will the priority date have in a proceeding in which the domestic well user complains of an injury to his or her right?[607]

In addition, article XVI, section 6, of the Colorado Constitution states that "[p]riority of appropriation shall give the better right as between those using the water for the same purpose." [608] This has prompted some observers to wonder whether domestic wells, which typically exist outside of the priority system, can exist alongside article XVI.[609]

C. Idaho

1. General Challenges

The Idaho Department of Water Resources (IDWR) has not conducted a comprehensive study of the domestic exemption, nor has it recommended changes.[610] However, Shelley Keen, the section manager for IDWR's Water Rights Section, identified a number of the advantages and disadvantages of the exemption during a presentation to the Idaho Water Users Association in November 2008. In particular, Ms. Keen stated that the primary advantages of the exemption are that it represents a "[q]uick, simple, convenient method to obtain water, [and is] [i]nexpensive to administer." [611]

On the other hand, Ms. Keen has identified the following disadvantages with the exemption: 1) it "[d]oes not allow for evaluation of the cumulative effects of small diversions," which is "[e]specially important for critical ground water areas, ground water management areas, and moratorium areas"; 2) it "[d]oes not allow for protests or other public input"; 3) it is "[p]otentially prone to abuse by those who would use more water than the statutory limits"; 4) it "[r]esults in the proliferations of wells," and "[e]ven carefully constructed wells are potential conduits for contaminants into the ground water supply"; and 5) it "[d]iscourages community wells and leaves unsuspecting homebuyers potentially vulnerable to wells going dry in water-short areas." [612]

2. Administrative Challenges

In addition to the aforementioned concerns, Ms. Keen also described a number of administrative challenges associated with the state's exemption. First, there are concerns that "[r]emoving or dramatically reducing the exemption could result in about 4500 new water right applications annually." [613] In contrast, Ms. Keen reports that IDWR currently processes about 400 applications for water rights each year, and that processing additional applications, maintaining paper and electronic files, and conducting field examinations, "would require more space, more equipment, and a much larger staff." [614]

Second, if the domestic exemption is removed, Ms. Keen states that "the only opportunity to establish a lawn or garden with a new home in a critical ground water area or ground water management area may be through the transfer process." [615] This could be problematic because IDWR's transfer backlog already exceeds the number it can process in one year, and the same would be true if the "half-acre" provision in the exemption is removed.[616]

Third, Ms. Keen reports that "[r]educing the daily volume on the exemption would not save water or protect the resource from contamination" because most users do not "approach anything close to 13,000 gpd anyway." [617] Further, Ms. Keen states that "IDWR has few resources to enforce the exemption volume," regardless of its size,

and Idaho law "exempts domestic water users from having to install measuring devices."^[618]

3. Exempt Well Use in Subdivisions

One of the largest challenges related to exempt well use in Idaho is the preference of some developers to install domestic wells to avoid the water right permitting requirements associated with constructing community wells.^[619] Moreover, some local governments do not require developers to install community wells because of concerns that they are prohibited from doing so under section 42-201(7) of the Idaho Code.^[620] This concern stems from the fact that section 42-201(7) delegates exclusive authority over the appropriation of surface and groundwater to IDWR, and explicitly prevents any "other instrumentality or political subdivision" from taking "any other action to prohibit, restrict or regulate the appropriation of the public surface or ground waters of the state."^[621] The provision also states that "any such action shall be null and void."^[622]

In some areas of Idaho, IDWR has issued moratorium orders that prohibit further consumptive uses of water. However, in an effort to avoid numerous individual domestic wells in a subdivision, IDWR does exempt subdivisions from the moratorium in cases where each unit served by a community well satisfies the exemption requirement.^[623] In some cases, subdivision developers have chosen to sell parcels without water to avoid protests to water right applications.^[624]

4. Issues for Further Discussion

Ms. Keen has identified a number of issues for further discussion. These include 1) whether the domestic exemption should be available in critical groundwater areas; 2) whether the exemption could be simplified by limiting it to any use that meets a diversion rate and volume threshold, which still raised the enforceability issues; and 3) further consideration of the role of Idaho's counties in determining whether a new subdivision should have a community water system or individual wells.^[625]

D. Montana

1. Exempt Well Use in Subdivisions

The main challenge that Montana faces with respect to exempt wells is that much of the state's growth is occurring in closed basins where water supplies are limited. As one former Montana state senator noted, "[T]he areas people wanted to move to were in closed basins like the Bitterroot and Gallatin Valley" and the cost of obtaining water rights in such basins "has made exempt wells the default choice of supplying water to homes in subdivisions."^[626] This growth has pitted environmentalists, water resource agencies, and regulated water users against developers, the Montana real estate industry, and well drillers.^[627]

On one hand, some experts are concerned that the increasing use of exempt wells in highly concentrated subdivisions in closed basins will have a cumulative impact that will drain the groundwater supplies that feed streams and impair the higher-priority rights of surface users.^[628] A February 2008 report by the Water Management Bureau of Montana's Department of Natural Resources and Conservation found that modeling showed that groundwater pumping in the state's closed basins would deplete surface flows and that "[e]xempt wells can cumulatively deplete surface water flows proportionally to permitted wells."^[629] The report further states that "[p]umping from exempt wells can increase the need to curtail more junior surface water right uses or for more voluntary reductions during perennial periods of water shortage in closed basins."^[630]

According to the report, the cumulative impact of exempt wells could pose problems to water availability because the number of exempt wells drilled in Montana's closed basins has increased steadily by a rate of approximately 1400 per year, and current rates of development indicate that around 30,000 new exempt wells could be added in closed basins during the next twenty years, resulting in an additional 20,000 acre-feet per year of water consumed.^[631] The report also estimates that Montana will see an increase of 70,000 exempt wells in closed basins and 47,000 acre-feet per year of water consumed by 2060.^[632] Although the report noted that some of the new exempt well consumption could be offset by reduced agriculture consumption, it found that much of the subdivision growth is occurring on lands that were not previously irrigated.^[633]

Proponents of exempt wells have opined that the impacts of exempt wells in Montana's closed basins is de minimis^[634] for the following reasons: 1) the evidence of cumulative impacts on stream flows from exempt wells in closed basins, such as the Galatin Valley, is questionable;^[635] 2) groundwater use from wells is inconsequential when compared to stream flows;^[636] 3) most of the development in closed basins has been offset by a decrease in irrigated agricultural uses;^[637] 4) basing projections on future growth and well consumption on current growth rates is speculative;^[638] 5) the impact of exempt wells is spread out over the entire area of a closed basin;^[639] 6) the amount of water exempt wells withdraw is not equal to its impact upon available water supplies because distances between wells and rivers distribute the wells' impact at a steady rate over time;^[640] and 7) little of the water exempt wells withdraw in Montana is lost to consumption and returns to the ground.^[641]

Proponents also believe that the exemption is essential to individual property rights, economic development, and maintaining affordable housing in rural areas and closed basins where the permitting costs associated with a public water supply system can be substantial.^[642] For example, one report from the Montana Association of Realtors found that the costs associated with obtaining a permit in a closed basin in Montana for subdivisions with forty to fifty lots with uncomplex geology, and subdivisions with one hundred or more lots with deep wells in complex geology, "ranged from \$43,100 on the low end to upwards of \$350,600 on the high end."^[643]

Of note, in 2006, state legislators introduced a bill entitled "An Act Revising the Ground Water Exemption from Permitting Requirements," which would have reduced the exemption for domestic or commercial use to an annual withdrawal of one acre-foot per year.^[644] Furthermore, the bill would have placed a one-quarter acre land limit on lawn and garden uses associated with a domestic or commercial use.^[645] However, the bill died in standing committee in 2007.^[646]

2. Groundwater Ponds

One final challenge relating to Montana's exemption pertains to excavated groundwater ponds, which do not require a permit under certain conditions.^[647] In particular, the surface of the pond and the water table may vary at different points of the year, with water flowing in both directions between the pond and the aquifer.^[648] This could create water quality problems if the water in the pond is contaminated, because such water could use the pond as a conduit to infiltrate the aquifer.^[649] Moreover, these types of ponds are not always subject to the construction measures that prevent contaminated surface water from entering the aquifer.^[650]

E. Nevada

1. Data Regarding Domestic Well Numbers

The Nevada State Engineer's Office maintains a database of well logs submitted since the 1940s.^[651] Until recently, this database did not include a complete inventory of domestic wells drilled in Nevada prior to 1984.^[652] According to Nevada's State Water Plan,

Without adequate information for quantifying the number of domestic wells in some areas, it may become difficult to estimate total and domestic well water use and total committed groundwater resources in a basin. . . . [T]he lack of data . . . impacts the State Engineer's decision process and may lead to an inadvertent over allocation of a basin's groundwater.[653]

The Plan also recognized that effective planning requires accurate knowledge of water use and that "[u]nder the existing system, this information is frequently not available." [654]

However, since the Plan's publication in 1999, Nevada's Division of Water Resources has completed the database to include more well logs.[655] These records, as well as careful regulation of well drillers, have created a much-improved database that contains a more complete record of wells drilled in Nevada during the last ten years.[656]

2. Water Quality

Most of the single family homes that use domestic wells also use individual septic tanks.[657] Although Nevada has well spacing requirements between septic tanks and domestic wells, septic tank discharges and other contaminants in some areas of Nevada have impaired the quality of water supplies for domestic wells.[658] Another aspect of this problem is that Nevada has funding programs to help public water supply systems comply with state and federal drinking water standards, but there is only limited funding for domestic well owners.[659]

3. Protecting Domestic Well Owners

Nevada law entitles domestic well owners to protest any water right application, while also requiring applicants seeking approval for a municipal or industrial well that will withdraw 0.5 cfs to notify all domestic well owners within 2500 feet of the proposed well.[660] Some applicants try to circumvent this requirement by filing multiple applications for wells that each withdraw less than 0.5 cfs but cumulatively withdraw more than this amount.[661] However, the state engineer counteracts these attempts by requiring notice for each proposed addition that would cause the rate of diversion for a municipal or industrial well to exceed 0.5 cfs.[662]

F. New Mexico

1. New Mexico's Sixth Judicial District Court Ruling

New Mexico's exemption requires individuals to apply to the state engineer for a permit to appropriate up to three acre-feet of groundwater, and requires the state engineer to grant the permit without considering the proposed well's effects upon existing water rights, public welfare, or water supplies.[663] In July 2008, New Mexico's Sixth Judicial District held that the state's exemption was unconstitutional because it "has no due process safeguards including, but not limited to, notice to senior water right owners, [and] a determination [of] whether an application, if approved, will impair existing rights or a hearing." [664] The court found this lack of protection for senior appropriators to be a violation of procedural and substantive due process and reasoned that "[i]t is not logical, let alone consistent with constitutional protections, to require the [state engineer] to issue domestic well permits without any consideration of the availability of unappropriated water or the priority of appropriated water." [665] As a result, the court ordered that the state engineer "shall administer domestic well applications the same as all other applications to appropriate water." [666] The state engineer, John D'Antonio, Jr., has appealed the ruling so that the legal foundations of the exemption are thoroughly reviewed.[667] The appeal stays the district court's decision, and the state engineer will continue to accept domestic well applications.[668]

Although the current ruling was issued in New Mexico's sixth district,[669] an appellate decision finding that the exception is unconstitutional could apply to the entire state. This could potentially overwhelm the state engineer with thousands of permit applications for small groundwater uses, which could require additional staff and create further administrative costs.[670] It could also prompt the legislature to reconsider abandoned past laws or create new legislation that could further conflicts between conservationists and the building industry.[671]

Many observers have also expressed concern that upholding the ruling could bring development to a standstill in rural areas.[672] This is possible for a number of reasons. First, rural homeowners and builders might have to purchase water rights from another user, which could cost \$15,000 or more per acre-foot.[673] Second, potential customers would have to buy water rights before they can submit a construction plan, and the costs of water rights and fees could total \$30,000 to \$40,000 in upfront costs, which many customers do not have.[674] Third, neighbors could object to applications for new wells, which could lead to litigation and additional paperwork that could take months or years to resolve before construction can begin.[675] Fourth, if potential buyers are required to purchase water rights, the price per acre-foot could increase, which could create affordable housing issues.[676] Fifth, an increase in the value of water rights could lead to an increase in agriculture-to-urban transfers and could pose additional problems to agricultural communities.[677]

There have been some twenty years of unsuccessful attempts to amend the exception in previous legislative sessions.[678] Most recently, a 2004 bill (S.B. 89) would have given the state engineer the authority to deny domestic well permits in areas where water supplies are strained, but the proposition ran into stiff opposition from developers and the real estate industry.[679] Although the bill passed the senate, it died in conference committee after the house amended it.[680] In 2006, the state engineer promulgated new regulations that limit new domestic wells to one acre-foot per year and provide for the declaration of domestic well management areas.[681] The New Mexico Homebuilders Association opposed some of the prior legislation, but supported the new regulations.[682]

2. Development on Land Where the Appurtenant Water Rights Have Been Severed

There have been some instances in New Mexico where subdivision developers have purchased land where the appurtenant water rights have been severed and then used domestic wells to provide water to new housing developments.[683] One state senator, Carlos Cisneros

(D-N.M.), who introduced S.B. 89 in 2004, has stated that this is a common practice that allows developers to reap a profit at the public's expense.[684] In addition, the state engineer has indicated that depletions due to domestic wells across the state are creating a debt to legitimate water right owners that will continue to increase into the future,[685] while other reports indicate that about a third of existing wells have inadequate water columns upon initial construction.[686]

Some experts believe that New Mexico's regulatory framework encourages the use of domestic wells, which they believe can lead to well interference, frustration of conjunctive management plans regarding ground and surface water, and interference with long-term water management plans.[687] Another concern is that several aquifers in New Mexico are being mined pursuant to depletion schedules adopted by the state engineer, and the use of domestic wells may hinder his ability to manage depletion through regulation of pumping levels and control over new appropriations.[688]

Conversely, some proponents of domestic wells maintain that groundwater modeling of local, regional, and statewide water systems implies that water supply services are fully sustainable in properly constructed domestic wells.[689] In their opinion, improper well construction—not domestic well interference—is the primary reason for most instances where domestic wells have created problems.[690] This has led some to conclude that the best way to address domestic well impacts is to improve well

construction, testing, and certification standards for domestic wells rather than through methods that limit new domestic wells.[691]

Proponents also maintain that domestic well use represents the smallest category of the major categories of water use in New Mexico and has the least impact upon water resources and interrelated streams.[692] They also believe that attempts to limit domestic well use would prompt domestic well users to use the public supply, which would not reduce water consumption.[693] Given that domestic wells support development and growth, some proponents believe that New Mexico's practice of granting domestic well permits without administrative review encourages positive economic activity and is compatible with the view that domestic water is a basic human right.[694]

G. Oregon

1. Land Use Laws Restricting Development in Rural Areas

Oregon's challenges regarding exempt wells pertain in part to statewide land use standards, or "goals," that create urban growth boundaries to contain development in cities and limit development in rural areas.[695] This has led to resistance among property rights advocates and rural land owners who oppose land use standards as they are applied to them individually.[696] In 2004, Oregon voters passed Ballot Measure 37, which required public entities to pay just compensation to private land owners if the public agency enacted or enforced new land use regulations that restricted the use of private real property and reduced the fair market value of the property.[697] If the public entity failed to pay compensation, affected landowners could obtain "Measure 37" waivers that allow them to disregard the regulation and develop their land as permitted at the time they acquired the property.[698]

Following the passage of Measure 37, the bulk of requested waivers sought approval to build low-density, large-lot subdivisions on farm and forest land outside of urban growth boundaries where zoning laws and other regulations would have otherwise prevented development.[699] Moreover, many of these subdivisions proposed using exempt wells instead of community water systems,[700] and some reports indicated that approving all Measure 37 waiver requests would have resulted in over 126,000 exempt wells in rural areas,[701] including 7500 to 10,000 wells in the Willamette River Basin.[702] This led to concerns that an increase in exempt well use would deplete groundwater supplies and impact water rights.[703]

In response to these concerns, Oregon voters approved Ballot Measure 49 in 2007, which modified Measure 37 to limit the number of homes landowners could build on their land as compensation for land use regulations.[704] This measure gave landowners impacted by land use regulations the option of 1) building up to three homes under an "express" option, 2) constructing up to ten homes by documenting how much land-use laws have reduced their property's value, and 3) completing a Measure 37 project (a thirty- to forty-lot subdivision) by proving that they have spent enough money and completed enough work to have a vested right to finish the development.[705] After the passage of Measure 49, the state gave claimants ninety days to select an option and those that did not lost their chance to develop their property.[706]

Reports indicate that Measure 49 has reduced the number of new homes that have been proposed in rural areas and the Oregon Department of Land Conservation and Development has reported that most landowners are now pursuing small developments of one to three homes.[707] A similar report from Portland State University found that the estimated number of new houses and potential new exempt wells that could be built in rural areas has declined to 13,000 under Measure 49.[708] However, it is unlikely that Measure 49's passage will end the political tug of war concerning rural growth in Oregon, and some reports indicate that opponents of Measure 49 are organizing a grassroots effort to repeal the measure,[709] which could increase the number of subdivisions and homes that would rely upon exempt wells instead of community water systems.

Most recently, a bill has been introduced in the Oregon House that would reduce the exemption for single or group domestic purposes from 15,000 gpd to 1000 gpd.[710] The bill would also exempt single or group domestic uses not exceeding 15,000 gpd "if any of the ground water use for domestic purposes commenced prior to the [bill's] effective date . . . or if the use is in replacement of a ground water use for domestic purposes that commenced in whole or in part prior to the [bill's] effective date." [711]

H. Washington

1. Use of "Six Pack" Group Domestic Wells in Subdivisions

When the Washington Legislature enacted its groundwater exemption in 1945, it did so to save appropriators and the Department of Ecology (Ecology) the time and expense of permitting small withdrawals that would not significantly impair the state's water supply or existing water rights.[712] However, since that time, land developers have used the exemption's "single or group domestic uses" clause to supply water to subdivision developments rather than acquiring a permit to create a water system for their developments.[713] In these instances, developers will drill an exempt well on each individual lot in a subdivision, or create "group B" or "six pack" wells by drilling a single exempt well to serve six homes.[714] In some cases, developers will connect "six pack" wells to each other to create an "exempt" water system without ever obtaining a permit.[715] Although each individual well withdraws less than 5000 gpd, the collective withdrawal from these wells often exceeds the 5000 gpd limit.

In 2002, the Supreme Court of Washington addressed this issue in *State v. Campbell & Gwinn, L.L.C. (Campbell)*[716] when it held that a group of commonly-owned lots only qualified for a total group domestic use of 5000 gpd under the exemption.[717] In *Campbell*, Ecology sued a developer who had proposed providing water to a subdivision by installing individual exempt wells that would collectively withdraw more than 5000 gpd.[718] The state claimed that the development could not cumulatively withdraw more than 5000 gallons of water per day without a permit regardless of whether each individual well withdrew less than 5000 gpd.[719] The court sided with Ecology, reasoning that the legislature did not "contemplate use of the exemption as a device to circumvent statutory review of permit applications,"[720] and that the "developer of a subdivision is, necessarily, planning for adequate water for group uses, rather than a single use, and accordingly is entitled to only one 5,000 gpd exemption for the project." [721] The court also rejected the developer's argument that the exemption applied because individual homeowners would eventually use the wells, stating "whether the exemption applies must be determined with regard to who is planning the construction of wells . . . because the permit process . . . must be determined prior to construction of wells." [722]

Despite providing some guidance regarding the exemption, *Campbell* raises new questions, including how does one determine whether a single lot is part of a group domestic use, when can a new subdivision within previously subdivided land qualify for a group domestic exemption, and how large must a parcel be for a new subdivision of that parcel to qualify for a new group domestic exemption?[723] This uncertainty has resulted in separate efforts in two counties to specify how the exemption will apply to subdivisions.

The first is a statutory pilot program in Whitman County. The program allows clustered residential developments with ten or more residences and population densities of one resident or less per ten acres to use up to 1200 gpd of groundwater for each residence without obtaining a permit.[724] The program also requires Ecology to report biannually to the legislature through 2016 regarding the water used under the program and its impact on water resources in the county, and no new right may be established for a clustered development where the first residential use of water for the development begins after December 31, 2015.[725] The legislature created the program in 2003 to allow for development because Whitman County is predominately rural and has some of Washington's strictest agricultural land protection ordinances, thereby making it difficult for developers to obtain water permits.[726]

The second effort stems from a petition that a private organization called Aqua Permanente filed with Ecology regarding exempt well use in Kittitas County, an area located in the Yakima Basin that is experiencing a large amount of growth.[727] The petition asked Ecology to impose a moratorium on new exempt wells in the upper portion of the County until more information becomes known about the effects of such wells on senior water rights and stream flows.[728] Washington law allows any party to petition any state agency, such as Ecology, to adopt rulemaking procedures,[729] and authorizes Ecology to withdraw waters from additional appropriations if sufficient information is "lacking to allow for the making of sound decisions." [730] In its petition, Aqua Permanente requested the moratorium because exempt wells had become "the most common method of obtaining water in Kittitas County" and water users were "potentially threatened by the continued drilling of permit-exempt wells without knowledge of water resources." [731]

Instead of imposing a moratorium, Ecology and Kittitas County created a memorandum of agreement (MOA) that provides for a comprehensive groundwater study that will provide the basis for the development of long-term strategies regarding the use of groundwater and exempt wells in the upper portion of the county.[732] The MOA also institutes a number of interim measures, including a measure that restricts new residential developments in the upper portion of the county to only one 5000 gpd groundwater exemption regardless of acreage or the number of wells, and requires developers to warn prospective purchasers that their water supply may be curtailed. [733] Further, all new development applications would show that the subdivision's residential and outdoor use will not exceed 5000 gpd, and the County would consider the environmental consequences of all "applications for division of land" under the State Environmental Policy Act (SEPA).[734] Lastly, Kittitas County would require water meters for all new residential connections.[735]

However, as of the date of this Report, Ecology has been unable to gain a commitment from Kittitas County that it is willing to move forward with the MOA.[736] The county is concerned that the proposed rule would hinder development, while also raising the possibility that Ecology may not have authority to limit exempt water usage. [737] As a result, Ecology issued an emergency rule in July 2009 that closes upper Kittitas County to all new groundwater withdrawals, including exempt wells, unless a proposed depletion will be fully mitigated by acquiring an existing water right from the same source.[738] Ecology has also launched a water exchange and an associated website designed to help groundwater users identify mitigation water for their projects.[739]

Notwithstanding the emergency rule, the parties resumed negotiations in July 2009 and are still working to adopt a permanent rule to co-manage groundwater in upper Kittitas County until more is known about aquifer conditions there.[740] A study designed to gain a better understanding of the connection between groundwater and surface water in the area will be funded by Washington and will commence soon.[741] During the study period, Ecology has proposed limiting groundwater withdrawals to "certain locations and reduced water volumes;" requiring metering of water use, including exempt wells, and requiring "notice to prospective property buyers of potential water shortages." [742]

Ecology also took similar steps in the Lower and Upper Skagit Water Resources Inventory Areas (WRIAs) when it created a rule that established instream flow requirements for the WRIAs, closed certain subbasins, and required that "[a]ll appropriations in each Upper Skagit tributary subbasin . . . are to be from ground water sources only and are cumulatively limited to a maximum average consumptive daily use of 25,851 gallons per day in each tributary basin." [743] However, the rule allows for groundwater appropriations, including exempt wells, which are not subject to closures and instream flow requirements. These appropriations must meet the following conditions: 1) the proposed use is nonconsumptive; 2) the water use qualifies for certain, specified reservations; 3) the applicant "elects to submit a scientifically sound mitigation plan" that Ecology approves; and 4) the proposed use "will not impair senior water rights or withdraw water from a legally closed basin." [744]

Applicants must also demonstrate that 1) "there are no other public water systems in the same proposed retail service area that can provide timely and reasonable water service"; 2) the proposed withdrawal "can be managed to avoid impairment" to the rule's instream flow requirements; and 3) the applicant's "water needs will be met when water use is curtailed." [745] In addition, "[a]ll future surface and ground water appropriations shall be measured through installation and maintenance of appropriate measuring device(s) (water source meters), except for permit exempt uses serving a single residence," and any authorization for new beneficial uses must require timelines that show "reasonable progress and due diligence." [746]

2. Whether Washington's Stockwatering Exemption Is Limited or Unlimited

Washington's exemption does not require a permit for stockwatering purposes and does not explicitly impose a limit on this use.[747] This has created conflicting interpretations among various state agencies and the public.[748] Originally, Ecology had determined that the exemption was limited to 5000 gpd because the first proviso of the exemption states that it can require an exempt well user to provide information regarding any such "small withdrawal," while the second proviso allows exempt users to obtain certificates for exempt uses not exceeding 5000 gpd.[749] Further, the state's Pollution Control Hearings Board reached a similar conclusion in a 2001 case.[750] However, in 2005, the Washington Attorney General issued a nonbinding opinion that the exemption was unlimited because stockwatering is the only unquantified use and the exemption's plain language does not require a limit.[751] Shortly thereafter, Ecology changed its interpretation to conform to the Attorney General's opinion.[752]

Some commentators have criticized the Attorney General's opinion and have argued that the exemption should be interpreted or amended to limit exempt stockwatering use to 5000 gpd.[753] In particular, these commentators believe that this new interpretation is incorrect because the historical circumstances and the context of the entire exemption and the Ground Water Code support a limited interpretation of the stockwatering exemption.[754]

Critics have also argued that the opinion will allow for large amounts of unregulated water consumption.[755] Specifically, when the exemption was enacted in 1945, the average family farm used 1500 gpd or less.[756] Since that time, large-scale farming operations have replaced many of the small family farms and have increased the usage of concentrated livestock operations.[757] More farming operations have also shifted from sheep to cattle, which consume more water.[758] This has resulted in an increase in the amount of water that livestock operations use, with some critics claiming that some stockwatering usage can amount to 45,000 gpd.[759] In turn, this had led to some concern that an unlimited stock watering exemption could directly impact eastern Washington communities that are dependent upon groundwater and could undermine the purposes of the state's groundwater code, which aim to protect senior water rights and manage groundwater in a sustainable manner.[760]

There is also some debate as to whether the phrase "stockwatering purposes" allows for all water use associated with operating a feedlot (e.g., irrigation and dust control) or if it only pertains to providing drinking water to livestock.[761] In 2008, a feedlot operator proposed using an exempt well to provide water for all uses associated with the operation of a feedlot that would contain 30,000 head of cattle and require 480 acre-feet per year.[762] Ecology ruled that the operation could only use the stockwatering exemption to provide drinking water to the cattle and that other uses, such as dust control, the cleaning of barns, and irrigation, are industrial uses that are limited to 5000 gpd under the exemption.[763] Ecology reasoned that the plain language of the exemption indicates that it only pertains to drinking water because it uses the term "stockwatering purposes" instead of "stockwatering and related purposes." [764] Ecology also reasoned that the term "stockwatering" only refers to the watering of stock and that the term "purposes" refers to the potential use of water for different types of livestock (chickens, pigs, sheep, etc.). [765]

Several agricultural groups have disagreed with the ruling and have asked the governor to repudiate Ecology's stance, stating that limiting the exemption is not needed because dairy cow numbers in the state have remained stagnant, while beef cattle numbers are on the decline.[766] They have also expressed concern that limiting the exemption will harm the state's cattle industry, and have cited the 2005 Attorney General's opinion as proof that the stockwatering exemption should not be limited.[767]

The issue appears likely to be headed to the Legislature. In December 2008, Ecology sent a letter to Washington lawmakers asking them to clarify the exemption and

stating its position that "stockwatering purposes" should be interpreted to exclude uses other than those needed to water livestock.[768]

V. RELATIVE COSTS AND BENEFITS OF MONITORING WELLS THAT ARE CURRENTLY EXEMPT

As exempt wells become more prominent and water supplies become more strained throughout the West, the calls to monitor such wells increase. This Part will discuss the possible methods of monitoring exempt well usage and the costs and benefits of each approach. However, it is important to note that the costs and benefits associated with monitoring existing exempt wells are not easily quantified and are likely to vary widely from state to state due to the variety of climates and water supplies that exist among the western states, as well as the differing number of exempt wells that are found in each state. For this reason, this Part will discuss these costs and benefits in general rather than specific terms.

A. Requiring Metering for Existing Exempt Wells

The most obvious way to monitor existing exempt well usage would be to install meters on each individual well. The principal benefit of this approach is that it would give water managers accurate information regarding water use patterns in-basin,[769] which would help them create accurate water budgets, review new appropriation requests, and ensure that exempt wells do not exceed the exemption limit. In addition, it is likely that meters will provide exempt well users with an incentive to ensure that they do not pump more than the allowable amount.

However, states should consider the following when determining whether to require meters for existing exempt wells. First, the costs associated with installing a meter on every existing exempt well within a state could be significant, especially in those states with a large number of wells.[770] Installing meters on existing wells also raises questions as to who will pay for this cost. If a state attempts to require well owners to install meters, such an action could generate a significant amount of public resistance from well owners who may object to the cost, view meters as a restriction on their water use, or fear that meters could provide the state with the means of requiring them to pay a fee for their use. On the other hand, states may not have sufficient funds to meter each existing exempt well themselves and the voting public may not support efforts to raise taxes or substantial increases in fees to pay for metering.

Second, the administrative costs of locating and metering each exempt well would be significant, especially in states where the location and number of wells are unknown.[771] Some hydrologists in New Mexico have estimated that metering and reporting costs for 6000 exempt wells would cost \$700 per well or about \$4 million per year.[772] Although these costs are likely to vary from state to state, the metering and reporting costs for tens or hundreds of thousands of wells would be substantial, which may mean that the monitoring and inspection of exempt wells could be rare if administrative resources are limited.[773]

Third, some hydrologists have argued that it is possible that metering exempt wells would not reduce water use because most exempt well users use far less than the various state exemptions allow and metering would not provide them with an incentive to use less.[774] Estimates regarding exempt well use vary, but some experts maintain that the average exempt domestic well uses seventy-nine gpd per person or 0.27 acre-feet per year for a three-person household[775]—well below the maximum amounts of most western exemptions, which can allow over 10,000 gpd or 14.5 acre-feet per year.[776] In sum, if most exempt well users are not pumping the maximum, it is unlikely that a meter will prompt them to pump less.

Fourth, only a few states, such as Nebraska, Oregon, and Washington, expressly allow states to install meters[777] and it is unclear whether most states have the statutory or regulatory authority to install meters on existing exempt wells. Moreover, in some states, such as Idaho, exemptions may specifically state that exempt wells are not subject to metering or monitoring requirements.[778]

However, notwithstanding these concerns, it would be less expensive for states to only require meters in areas where exempt wells pose a particular problem, as Washington has done in Kittitas County.[779] Although this approach would still require significant costs, it would not be as expensive or administratively challenging as metering all existing wells on a statewide basis. States could also offset the costs of managing the data that meters would provide through small fee increases, and could use financial or tax incentives to lessen political opposition to legislation or regulation that would require exempt wells owners to pay for the costs of installing meters.

B. Requiring Self-Reporting for Existing Exempt Wells

States can also monitor existing exempt wells by requiring well users to voluntarily report the amount of water their exempt wells' use. The principal benefit of this method is that it would cost significantly less than state-required metering because it would place the reporting burden upon each individual well user, thereby alleviating the state of the need to police and inspect each individual meter.

However, some reports indicate that self-reported well data is unreliable and biased.[780] For example, the National Academy of Sciences has reported that forty percent of water right holders are noncompliant when reporting their usage, which would devalue self-reporting as an effective way of monitoring exempt well use.[781] Even if self-reporting does provide accurate information, some experts have hypothesized that the cost of "accepting, collating, checking, storing, analyzing, and reporting volunteered data from well owners seems high when placed against its usefulness," regardless of how minimal.[782] Some observers also believe that most users will likely get very little benefit from reporting their groundwater usage, which means that they could be less willing to invest in the technology or time needed to properly monitor their wells.[783]

Nevertheless, self-reporting would be a relatively inexpensive monitoring method as compared with metering and would provide water managers with at least some information regarding exempt well use, even if it is not completely accurate. Given that most exempt well users use less water than most exemptions allow,[784] it is also possible that users would not have an incentive to intentionally provide misleading information regarding their use. Moreover, states could encourage participation by providing incentives for well owners to report their usage.

C. Infrared Aerial Photography

Most western states have exemptions that allow users to irrigate a limited amount of acreage, usually around one to three acres, for what are typically noncommercial purposes.[785] One way for water resource managers to monitor this use would be to compare well logs and other already existing information about exempt well locations with infrared aerial photographs to determine whether exempt well users are irrigating an excessive amount of acreage, or if they are using the water for nonexempt purposes.[786]

The principal benefit of infrared aerial photography is that this technology is already available and in use, and would not require the development of new technology or the cooperation of well users. For example, in a report on the impacts of exempt wells in Montana, the state's Water Management Bureau estimated the number of acres irrigated and the net consumption per household of exempt well users by evaluating infrared aerial photographs for lots associated with exempt wells in the Bitterroot, Helena, and Gallatin Valleys.[787] The Bureau utilized geographic information specialists who "delineated irrigated portions of selected properties associated with exempt wells by randomly selecting 100 exempt wells from each basin." [788] Further, the Bureau determined that this method yielded a "representative value for predicting overall consumption from future exempt well use." [789]

Although water managers could not use this data to calculate indoor uses, some experts maintain that the consumptive impact of exempt wells depends in large part upon how much outdoor irrigation the wells entail. [790] This belief is based upon the perception that indoor uses tend to return a higher percentage of water to an aquifer, while the outdoor irrigation of lawns, gardens, and other uses result in the consumption of water through evapotranspiration by vegetation.[791] As opposed to meters,

which only provide data on the amount of water pumped, determining how many acres an exempt well irrigates by using aerial photography could provide water managers with a better understanding of a well's consumptive impact.

However, like other monitoring techniques, using infrared aerial photography to monitor existing exempt wells will require some administrative costs. Someone will need to review and interpret the data and determine the location and ownership of exempt wells by reviewing well logs and property records. In addition, water managers will also need to determine whether an irrigated tract of land receives water from sources in addition to exempt wells in order to properly determine whether an exempt well's irrigated acreage is excessive. Of course, these costs could be offset by assessing fees on exempt well users or reduced by using the data to monitor existing well use in areas of concern, such as concentrated subdivision growth in a closed basin. Further, sporadic usage of this data to enforce acreage limits could provide a sufficient incentive for exempt well users to ensure that their exempt well usage conforms to established limits.

D. Landsat Thermal Band Data

In addition to providing ground cover images, the current Landsat satellite contains a thermal infrared sensor (TIRS) with a long waveband that provides data that water managers use to compute evapotranspiration, measure consumptive groundwater use, and manage the impact of groundwater pumping on the water table and natural vegetation.[792] It is possible to monitor and measure outside consumptive use from exempt wells using a TIRS on a thirty-meter scale if 1) the location of the wells is known, 2) the source of water or irrigation is known (surface or groundwater), 3) exempt wells are the sole water supply for a known area, and 4) there is a sufficient number of cold-free days during the growing season.[793]

If all of the above conditions are satisfied, this data could provide water managers with a means of calculating the outdoor consumptive use of exempt wells without installing meters or hardware or relying upon self-reported data. Although this approach would not enable monitoring of the specific outdoor use of an individual exempt well, it could be potentially useful for monitoring outdoor use in "exempt" subdivisions or other areas with large numbers of wells, and could characterize any problems or abuses, which water resources managers could address with more specific means. Further, thermal data would likely provide a more accurate picture of outside groundwater consumption than aerial surveys and ground images, and could entail substantial cost savings as opposed to on-the-ground monitoring methods.[794]

However, there are a number of practical and technical challenges and costs involved in using Landsat thermal data that could outweigh the value of the data it provides. First, this data would be subject to many of the same administrative costs associated with other methods, namely locating exempt wells, interpreting and collecting data, and determining whether an exempt well is the sole water supply. Second, determining the type of irrigation water used could add an additional administrative burden. Third, it would not be able to provide information regarding an exempt well's total consumption because it can only provide data regarding outdoor use. Fourth, the current Landsat satellites 5 and 7, with the TIRS, are functioning well-beyond their design life, and the timing of a replacement is not yet certain, which makes the future viability of this approach problematic.[795] In any event, it should be noted that more information is needed to determine whether using Landsat data to monitor existing exempt wells is practical.

E. Monitoring, Testing, and Assessing Exempt Well Water Quality

The quality and safety of water from domestic wells are generally not regulated by the states or by the federal government.[796] Since contaminants can use exempt wells as conduits to enter aquifers and other water supplies, there are significant benefits associated with the long-term monitoring, testing, and assessment of domestic wells with respect to water quality.[797]

Any such monitoring would require adequate information regarding the number and location of exempt wells found within a state. Also, the administrative costs associated with locating, monitoring, testing, and assessing the water quality of hundreds and thousands of exempt wells could be substantial. However, states could limit these costs by targeting their monitoring efforts in specific areas where 1) "concentrations of specific contaminants are highest in relation to human-health benchmarks" and 2) "high proportions of the population depend on [exempt] domestic wells." [798] For example, the Illinois State Water Survey recently worked with local counties to test 160 wells at the request of owners in a three-county area experiencing high levels of arsenic.[799]

Moreover, instead of conducting on-site testing, states could provide free or inexpensive testing services for exempt well owners. Such services would provide states with a better understanding of exempt well water quality, and states could educate well owners by providing them with reports and advice on how they can enhance the water quality of their wells. States could also reduce administrative costs associated with such services by limiting them to those areas of the state experiencing water quality problems.[800]

VI. POTENTIAL APPROACHES TO MITIGATE THE ADVERSE IMPACTS OF EXEMPT WELLS

Perhaps the most disputed aspect of exempt wells is how and whether to mitigate their impacts. In general, it appears that well-defined approaches that address specific problems in those areas of a state where such wells are creating problems are generally more politically and administratively feasible than broad efforts that have statewide applications. However, the specific steps that states should take to mitigate the adverse impacts of exempt wells will depend upon the individual conditions and laws of each state, and "one size fits all" approaches will likely be ineffective. This Part discusses possible methods of mitigating the impacts of exempt wells and categorizes these approaches as being generally 1) infeasible,[801] 2) feasible with respect to new exempt wells,[802] and 3) feasible with respect to both existing and new exempt wells.[803]

It is important to note that these categorizations are based upon whether a given approach would generally be feasible for most WSWC member states, and is not meant to imply that these approaches will necessarily be feasible or infeasible for every state. Furthermore, the purpose of this Part is to promote further discussion regarding the possible steps that states can take to mitigate exempt well impacts, and does not endorse any approaches with respect to any individual WSWC member state.

A. Generally Infeasible Approaches

1. Grandfather Existing Exempt Wells and Repeal or Dramatically Reduce the Exemptions for New Exempt Wells on a Statewide Basis

Many observers have proposed grandfathering existing exempt wells and repealing or dramatically reducing exemptions for new wells.[804] The principal reasoning for this approach is that exemptions are "loopholes" that should be eliminated so that water resource administrators have the authority to ensure that such uses will not impair water quality, existing water rights, surface flows, and habitats.[805] Although this approach would address a number of adverse impacts associated with exempt wells (unregulated growth, infringement on water rights, proliferation of wells, etc.), it is unlikely that most western states would be able to implement this approach or manage its consequences.

First, there appears to be significant public resistance to attempts to repeal or dramatically reduce exemptions on a statewide basis, and many states may lack the political capital needed to implement this approach. Recent and unsuccessful attempts in Montana and New Mexico to modify their exemptions indicate that current efforts to modify exemptions will likely be met with significant political resistance.[806] Part of this resistance appears to stem from a general belief among portions of the Western population that the ability to access groundwater supplies for domestic purposes without a permit is an essential individual property right that is needed for economic development.[807] Another component of this resistance may be a result of the recent population growth in the West, especially in closed basins where developers and landowners have begun using exempt wells to supply water to subdivisions.[808] Given the new demand for development in these basins, repealing the exemption could generate a significant amount of resistance from the real estate industry and developers because it would require them to acquire water rights and submit to permitting processes, which could increase the costs of development.

Second, this approach could create an unmanageable number of groundwater permits for state agencies to process and administer by requiring permits for all new small groundwater uses. In particular, a substantial increase in permits would require more space to store paper and electronic files, more equipment, and larger staffs, all of

which would require additional funding that many states may not have.^[809] For example, as mentioned previously, Idaho's Department of Water Resources (IDWR) currently processes about 400 applications per year for new water rights and would need to process about 4500 new water rights applications annually if its exemption were repealed.^[810] Moreover, if an exemption is removed, those seeking to drill new wells in closed basins would need to acquire existing water rights, which could increase the number of transfer applications that a state receives.^[811] However, it is important to note that the number of exempt wells that are currently installed would not necessarily equal the number of permit applications that would result if an exemption is repealed, and the number of applications may decrease. In particular, developers who install exempt wells in subdivisions to circumvent the permitting process would theoretically install community water systems once the exemption is removed, thereby lowering the number of small groundwater wells drilled in a given year.

Third, revoking or dramatically reducing an exemption on a statewide basis would likely increase the cost of development in rural areas and closed basins because landowners and developers would have to obtain permits or purchase existing water rights to drill new wells. In closed basins experiencing growth, existing home prices could increase due to the higher costs associated with new development (e.g., acquiring water rights and constructing community water systems). This could make affordable housing a problem or discourage growth. On the other hand, repealing an exemption could have the opposite effect in closed basins or rural areas that are not experiencing growth. If a given area is not growing or decreasing in population, the added costs of acquiring water rights for new development could slow growth and decrease property values, which could give landowners an incentive to oppose efforts to repeal an exemption.

Fourth, without the exemption, those seeking to install new wells in closed basins would need to purchase water rights, which could lead to an increase in demand for existing water rights and a corresponding increase in the value of such rights. In turn, farmers and other irrigators who own existing water rights may be more likely to sell their rights to developers if their rights increase in value, thereby leading to a possible rise in agriculture-to-urban transfers. In extreme cases, a large number of transfers could theoretically lessen agriculture production, damage agricultural economies, decrease the number of small family farms, and threaten environmental values.^[812]

Fifth, some hydrologists have theorized that repealing an exemption will not curtail water use and may actually increase water demand and draw down water supplies.^[813] In particular, new users who would otherwise have relied upon exempt wells may rely instead upon public water supplies, which often draw their water from the same regional aquifers.^[814] If the new users' per capita usage is the same as it otherwise would have been, there would be no curtailment in overall consumption.^[815] On the other hand, if their consumption is greater, the overall net consumption of water supplies could increase.^[816]

Sixth, repealing an exemption may not have any impact on existing, grandfathered wells, which would continue to pump water outside of the priority system. However, as discussed earlier, states may want to consider repealing the exemption with respect to prospective uses in those areas where exempt wells have become problematic, or with respect to certain abuses of their exemptions.^[817]

2. Reduce Flow Rates and Volume Withdrawals for Existing Exempt Wells

It also appears that it would be infeasible to lower volume withdrawals with respect to existing exempt wells. Although usage varies, some reports indicate that most households use less than one acre-foot per year, or less than 900 gpd.^[818] Every western state's exemption allows more than this amount, with some states allowing over 10,000 gpd.^[819] However, most exempt users already appear to withdraw less than the statutory limit, which means that reducing an exemption's volume limit will likely not have a significant impact upon exempt withdrawals. For example, IDWR reports that "[r]educing the daily volume on the exemption would not save water or protect the resource from contamination [because] most users don't approach anything close to [the state's limit of] 13,000 gpd."^[820] Likewise, some hydrologists in New Mexico have reported that most domestic users use only one-tenth of the state's three acre-feet per year withdrawal amount, and consume even less, which means that reducing the limit will only have a modest hydrologic effect.^[821]

It is also uncertain as to whether most states would have the legal authority to reduce volume withdrawal limits for existing wells, and such an effort may constitute an uncompensated taking. In some states, such as Kansas, Nevada, Oregon, and Washington,^[822] exempt wells could have a protectable interest or are considered to be equal to a permitted right. Even in states where the property status of exempt wells is less defined, it is likely that any effort to reduce existing well volume limits would result in substantial amounts of litigation, which could be expensive or administratively burdensome for state agencies to defend against.

Another factor that may limit the effectiveness of this approach is that states may not have sufficient administrative resources to locate existing exempt wells and enforce lower flow rates and volume withdrawal limits. Such is the case in Idaho, where IDWR reported that it "has few resources to enforce the exemption volume, whatever it is."^[823] Additionally, those exempt users who pump at the higher rates and would be impacted by a reduction in the exemption limit, could switch over to the public supply and resume consuming water at their previous levels.^[824]

Please note, however, that limiting withdrawal volumes as they pertain to *new* uses may be a viable way of mitigating some of the adverse impacts associated with exempt wells. This is discussed in greater detail below.^[825]

3. Metering All Existing and New Exempt Wells on a Statewide Basis

It appears that most states do not have sufficient administrative resources to meter all existing and new exempt wells. In particular, metering large numbers of wells will require significant administrative resources to locate existing wells and to ensure compliance. Further, once meters are installed, states would likely need increased administrative resources to process the data the meters generate.

Another complication is that the actual costs of installing meters on every well could be prohibitive depending upon the number of a state's exempt wells, and there are questions as to who would pay for the costs associated with metering. Many states may not have sufficient funds to pay for metering themselves. Meanwhile exempt well owners may resist efforts that would require them to pay for meters, even if the cost is minimal, because they may view meters as a first step towards requiring them to pay for their use, or as a way of restricting their use, without providing them any real benefit in return.^[826] This means that efforts to make exempt well owners pay for the costs associated with metering could be met with significant political opposition.

Further, although some states such as Nebraska and Washington allow for the monitoring of existing exempt wells,^[827] most states do not expressly allow for the metering of existing exempt wells. Consequently, it is uncertain as to whether most WSWC member states have the legal authority to meter existing exempt wells.

Nevertheless, as discussed in Part VI.B.3, states may be able to require meters in specific areas of concern or in limited circumstances with respect to new wells.

B. Generally Feasible Approaches for New Exempt Wells

1. Limit the Types of Development an Exemption Covers

Perhaps the largest concern associated with exempt wells is that some developers use them to provide water for large, concentrated subdivisions, thereby circumventing the prior appropriation system and installing large numbers of unregulated wells in concentrated areas. One possible way to mitigate the potential adverse impacts associated with new "exempt" subdivisions would be for states to modify their exemptions to restrict or prohibit the use of exempt wells in subdivisions. For example, Texas's exemption prevents the use of exempt wells in a subdivision located within fifty miles of an international border, or located within one hundred miles of an international border and containing the major portion of a city with a population of more than 250,000.^[828] Moreover, the successful 2007 passage of Ballot Measure 49 in Oregon, which had the effect of limiting "exempt" subdivisions, shows that this approach may be politically feasible in some states.^[829]

It is important to note that this approach would generate political opposition and could limit growth in closed basins and rural areas, but it would not ban all exempt

development and individual landowners would still be able to use exempt wells. Further, states do not necessarily need to ban the use of exempt wells in all new subdivisions, and may be able to modify their exemptions to focus on the most problematic aspects associated with this type of development. In particular, they could prevent subdivisions of certain sizes from installing exempt wells, place limitations on the number of exempt wells that a developer can install in a subdivision, prohibit developers from installing exempt wells on land where the water rights have been severed and put to another use,^[830] and place limits on the amount of water an exempt subdivision can withdraw. Moreover, this approach would still allow for exempt wells to be installed and would not generate the high number of permit applications that would result if a state were to repeal its exemption entirely.

2. Modify the Subdivision Approval Processes

As previously noted, city and county governments generally make decisions to subdivide land, zone, and issue construction permits.^[831] However, in many cases, a subdivision may be approved without a determination as to whether it will impair existing rights or if there is sufficient water available.^[832] Although some states, such as Arizona, require proof that sufficient groundwater will be available for a proposed subdivision,^[833] not all states have such requirements. Moreover, in states such as Colorado and New Mexico, county governments can approve subdivision permit applications notwithstanding an adverse recommendation from the state engineer or other reviewing authority regarding water availability.^[834]

One way to address the adverse impacts of exempt well use in subdivisions would be for states to require city and county governments to condition subdivision approval upon proof that the subdivision will have an adequate water supply and that it will not impair water rights, water quality, or surface flows, aquifers, or habitats.^[835] The type of required proof could be a determination from a state engineer or other relevant state agency, but could also be an unbiased determination from a qualified third party capable of evaluating a subdivision's potential impacts. If a subdivision failed to satisfy the above criteria, it would be denied a permit regardless of whether it would rely upon exempt wells or a community water system.

States may also want to restrict the ability of local and county governments to approve subdivisions over an adverse recommendation. One example of this approach is Arizona's "assured water requirement," which requires a determination from the Director of the Arizona Department of Water Resources that a proposed subdivision will have an adequate water supply before a city, town, or county can approve a subdivision plat, and before the developer can sell parcels.^[836]

The principal benefit of this approach is that it would allow states to determine whether to allow exempt wells in subdivisions without incurring the administrative costs of permitting each individual exempt well. For instance, if a proposed subdivision intends to drill one hundred exempt wells, this approach would only require state and local agencies to review the subdivision proposal as a whole instead of reviewing one hundred separate exempt well applications.

Admittedly, this approach would have some drawbacks. First, local planning authorities may want to encourage growth regardless of water supplies and may resist efforts to prevent them from approving subdivisions that would have an adverse impact. Second, adding water supply requirements to the subdivision approval process could increase the time needed to process subdivision applications or create increased administrative costs. However, while preventing local planning authorities from approving subdivisions over an adverse impact finding is preferable, it is not an indispensable element of this approach. For example, even if the subdivision is approved over a negative recommendation, requiring an investigation into the impacts of a proposed subdivision would still provide water resources managers with valuable information about how the development will impact water rights, supplies, and quality.

In regard to administrative costs, the subdivision approval process likely occurs in most states regardless of whether a proposed subdivision will rely upon exempt wells. Therefore, it is possible that ensuring that these processes evaluate the possible impacts of "exempt" subdivisions would not be prohibitively burdensome, and would likely be significantly less burdensome than permitting each individual well within an "exempt" subdivision.

3. Restrict New Exempt Wells in Areas of Concern

Another method of mitigating the impacts of new exempt wells is to restrict or ban their use in basins or areas with water availability problems. One way to do this would be to create management or controlled groundwater areas where permits and meters are required for any new groundwater use. Additionally, states could require certain distances between exempt wells and surface water sources or aquifers that are susceptible to pumping.^[837] Oregon's exemption uses a similar process and allows the state's Water Resources Commission to designate critical groundwater areas for certain reasons and allows the Commission to regulate exempt wells in designated areas.^[838] Similarly, Washington law gives its Department of Ecology the authority to withdraw water from appropriation in circumstances where it does not have sufficient information to make "sound decisions."^[839] In addition, Ecology's efforts in Kittitas County represent an example of how states can regulate exempt wells in areas of concern, without banning the exemption on a statewide basis or creating an overwhelming amount of permits.^[840]

It is important to note that this approach could generate significant opposition in those areas where increased restrictions are proposed. However, since the restrictions would be localized, it is also possible that the amount of opposition would not be sufficient to prevent states from implementing such measures.

4. Refine Exemptions to Allow for More Specific Applications

Those states with broad definitions of domestic and stock watering uses or that allow any beneficial use so long as the use does not exceed certain limits (e.g. Montana)^[841] may be able to limit the impact of new exempt wells by refining their exemptions to include more specific, limited applications. For example, states could redefine domestic use to indoor purposes and reduce irrigated acreage parameters, which would lessen the amount of water that exempt well users would use to irrigate lawns and outdoor uses. This could lessen impacts because indoor uses tend to return water while outdoor uses tend to consume water due to evapotranspiration by plants.^[842]

5. Reduce Flow Rates and Volume Withdrawals for New Exempt Wells

As previously mentioned, reducing flow rates and volume withdrawal limits as applied to existing exempt wells may not be feasible, but states may want to consider reducing their exemptions as applied to new wells. While most individual exempt well users may currently withdraw amounts of water that are far less than existing limits, this may not always be the case. Moreover, in states such as Washington, developers have used one exempt well to supply multiple homes, in which case the combined use could equal a volume withdrawal limit. Given that the majority of western states appear to have flow rates and volume withdrawal limits that exceed the needs of the average exempt well user,^[843] reducing these limits to correspond with average use could be a preventative measure that would allow states limit potential new abuses.

However, attempts to reduce volume flow rates and withdrawal limits may not be politically feasible if the proposed reduction is too drastic as applied on a statewide basis. As previously noted, in order to be politically feasible, such reductions may need to be applied to new exempt wells in specific areas of concern, as opposed to all new wells in a given state.^[844]

6. Require Limits for Consumption Instead of Withdrawals for New Exempt Wells

The primary concern with exempt wells appears to relate to the amount of water they *consume*—not the amount of water they withdraw and return for reuse.^[845] Therefore, it is possible that a flat limit on the amount of water an exempt well consumes could be a more direct way of addressing the impacts of exempt wells.^[846] Moreover, a flat consumption limit would give users the flexibility to determine how they want to consume their water.^[847] Since most consumption is associated with outdoor use, it is also possible that states could use aerial photography or Landsat TIRS data to monitor exempt well consumption in areas of concern.^[848] As mentioned in Part V.C-D of this Report, states could use these methods to characterize the extent of exempt well consumption in specific areas, and then implement more specific measures to address overconsumption or other problems.

7. Ensure Proper Well Construction

One way to address the water quality problems associated with exempt wells is to mandate stricter well construction requirements or strengthen existing requirements. In particular, states could require new exempt wells to have clay or cement seals around the casing above the water table or above the uppermost casing perforations.[849] States could also require abandoned wells to be properly decommissioned,[850] and mandate that exempt well owners have their wells tested at the time of construction and submit proof that their wells are in conformance with well construction requirements.

Similarly, problems with water availability may be the result of well design and construction rather than aquifer functions, and the proper construction of exempt wells could mitigate some water resource problems.[851] In some cases, especially in subdivisions that rely upon exempt wells, water availability problems can arise if wells are placed too close together or if a developer uses cost cutting procedures that make the well less efficient.[852] States could ensure that exempt wells are properly constructed by adequately reviewing well records and periodically testing wells to ensure that they comply with well construction and maintenance standards. If a well does not comply, the state could fine the well owner for maintenance violations, or impose sanctions against the well driller for construction violations. Admittedly, this approach could entail significant administrative costs, but states could reduce these costs by focusing their efforts on those areas where improper construction poses the greatest threat.

8. Improve Well Record Information

One way to address the lack of information associated with exempt wells is to enact better well record reporting requirements with respect to new wells. In most Western states, exempt wells are subject to well drilling requirements and well drillers typically must file some type of record regarding the well's location and capacity.[853] However, many well records only contain general information about a well's capacity, and it can be difficult to determine whether the information the well driller provides is an estimate, a guess, or is based upon actual pumping.[854]

States could use the following methods to address this problem. First, they could require well drillers to use a GPS receiver to specify the precise location of an exempt well in a well record.[855] Although this would not indicate a well's elevation, the driller or someone else could determine the elevation by interpolating the GPS location with a topographical map.[856]

Second, states could require well drillers to provide a specific measurement of the well's capacity rather than simply providing an estimate or a guess.[857] They could also require well drillers to indicate how long they pumped the well to determine its capacity, "how the pumping rate was measured," and a "measurement of the depth to water" at the end of the pumping period.[858]

Third, states could also require developers who are using exempt wells for subdivisions to provide more information regarding water availability for their subdivisions. For instance, two hydrologists in New Mexico have proposed the following procedure for determining water availability for subdivisions: 1) "Drill and install a properly-constructed" exempt well; 2) "[p]ump the well under controlled conditions at a rate of 5 to 20 gpm for 24 hours"; 3) "[c]ollect water-level recovery data for three days after the end of pumping"; 4) calculate the test's radius of influence and determine if additional tests are needed for a "representative sample of the subdivided area"; and 5) "[d]rill and test as many wells as needed to cover the subdivision with a four-day radii of influence." [859] According to this method's creators, "one can then interpret the recovery data to show the four-day trend (one pumping and three of recovery) of transmissivity-dependent specific drawdown (feet per gpm/log cycle of time)," which can then be used to project water availability trends for individual wells.[860] This information can then be superimposed on a regional model of the water level trends that are generated by baseline wells and expected growth for the subdivision area.[861]

These approaches appear to be inexpensive to implement because they would not require a substantial investment in new technology or infrastructure and would mostly require more effort on the part of the well driller.[862] Although they would not provide information on the amount of water exempt wells consume, they could provide water resources managers with a better understanding of the number and location of new exempt wells and their capacities.[863]

9. Establish Priority for New Exempt Wells for Nondomestic Purposes

Colorado, Kansas, Nevada, North Dakota, Oregon, Washington, and Wyoming all have provisions that allow exempt wells to obtain priority dates, and other states might consider incorporating new exempt wells into the priority system for nondomestic purposes.[864] This approach could theoretically resolve one of the principal concerns associated with exempt wells—that older court-decreed water rights are curtailed in times of shortages while newer exempt wells continue pumping.[865] Moreover, states could use well logs and other records that are filed after the construction of an exempt well to determine its priority dates.

However, it is most likely that exempt domestic use should not be subject to priority date enforcement because most western states have designated domestic use as the highest priority. This enables the local or state agency in charge of managing and enforcing groundwater rights to theoretically protect domestic wells against even the most senior permitted appropriators.[866] Moreover, it may not be advisable to require large numbers of people who rely on exempt wells for domestic needs to curtail their use so that a small number of permitted senior right holders can continue using water for nondomestic purposes. Nevertheless, states could possibly subject other nondomestic exempt uses, such as outdoor irrigation, stock watering, industrial, and other uses, to the priority system.[867] Obviously, the determination of which uses qualify as nondomestic use will depend upon how each state defines "domestic use."

Enforcement is another consideration because states would need to make some determination regarding which exempt wells are adequately connected to the water source that is subject to a call, which could also entail some administrative costs.[868] However, regardless of enforcement, most new exempt wells would have very junior priority dates, which could have a chilling effect on the use of exempt wells in areas where such junior priority dates would not be sufficient to guarantee the availability of water.[869]

10. Ban New Exempt Wells in Areas Where Public Water Systems Are Available and Require Them to Hook Up to Public Systems When They Become Available

Another way to mitigate the impacts of exempt wells is to only allow new wells in areas where public water systems are available and require them to hook up to public systems when they become available. For instance, Arizona, Colorado, Nevada, New Mexico, and Oklahoma have laws that allow municipalities to regulate exempt wells or prohibit them in areas where a municipality or water district can furnish water.[870] This method may not have a significant impact on water use and consumption because exempt wells could possibly continue to use the same amount of water after hooking up to a municipal system. Moreover, it would not reduce the proliferation of exempt wells in areas where public water systems are not available.

However, this method would address a number of other concerns. First, it would address water quality concerns by reducing the number of exempt well owners, who are often ill-equipped to respond to water quality and quantity problems. Second, from an administrative standpoint, exempt wells that hook up to a public system would no longer be exempt, making them easier to regulate and monitor for compliance with conservation efforts. Third, this approach would limit unregulated exempt well use by preventing the installation of new exempt wells in areas where a public water supply is available. Fourth, as described in Part II.J of this Report, the fact that New Mexico was able to enact changes in 2001 regarding the ability of municipalities to restrict new domestic wells in nonagriculturally-zoned areas shows that this approach can be politically feasible.

However, it should be noted that hooking up existing exempt wells to public systems once such systems become available could entail significant costs and may not be logistically feasible in every case, especially with respect to large numbers of exempt wells in subdivisions that were built to circumvent the permitting process.[871] One way to limit these costs would be to establish a fund that would pay for a portion of the expenses associated with hooking up exempt wells to a public system. States that collect fees in conjunction with well-driller licensing, notices of intent to drill, and exempt well registration could allocate a portion of those fees to fill the coffers of such a fund. States could also consider allocating a portion of the fees that they collect through the permitting and registration of nonexempt wells.

C. Generally Feasible Approaches for Existing and New Exempt Wells

1. Update Exempt Well Information When Property Is Transferred

Those states with limited information regarding the locations and numbers of existing exempt wells could require sellers to test exempt wells on their property, to provide an update regarding the well when the property is transferred from one owner to another, or both.^[872] Furthermore, updates could include information about the well's specific location, capacity, construction, etc.

It is true that this approach would not provide information on every exempt well and enforcement could be an issue. Nevertheless, it is a fairly inexpensive approach that would provide states with some useful information regarding exempt wells and such information could be used to estimate well numbers and possible impacts. Moreover, Oregon, New Jersey, and Rhode Island require testing at the time of transfer, which seems to indicate that this approach may be politically feasible in some states.^[873]

2. Collaborative and Negotiated Approaches

It is likely that any attempt to mitigate the impacts of exempt wells will generate some type of political opposition. One way to lessen such opposition is for relevant state agencies, counties, environmental groups, and other interested parties to work with one another to create collaborative or negotiated approaches that address the adverse impacts of exempt wells, while allowing for responsible use of the exemptions. The memorandum of agreement between Washington's Department of Ecology and Kittitas County is one example of how parties with differing interests can work together to create such an approach.^[874]

Moreover, in those states that do not have the political capital to modify their exemptions, collaborative approaches may represent the most feasible way for such states to mitigate the adverse impacts of exempt wells. Although such approaches would likely require significant compromise, a politically feasible approach that addresses some, but not all, adverse impacts is preferable to those approaches that may be more effective but are politically infeasible. Moreover, in many cases, mitigating the adverse impacts of exempt wells will require ongoing cooperation between stakeholders with differing interests, and unilateral approaches that do not solicit or incorporate input from all interested parties may hinder cooperation and limit the effectiveness of a mitigation approach.

3. Utilize Monitoring Methods Other Than Metering

As discussed in Part V.A, it is unlikely that states will be able to install meters on every exempt well within their borders. However, states may want to consider utilizing infrared aerial photography, Landsat images, and self-reporting to monitor exempt well use. These methods are less expensive than requiring metering, and water resources managers could limit administrative costs by using them to focus on those areas where exempt wells are creating the greatest concern.

With respect to aerial photography and Landsat, these methods would not allow states to monitor individual exempt use, but would allow them to monitor areas of concern—such as "exempt" subdivisions—and characterize general problems. Once states have identified a general problem with these methods, they can utilize more specific methods to address the concern.

On the other hand, states could monitor individual exempt use by encouraging exempt well users to report their usage and provide information regarding their wells (capacity, location, date drilled, etc.) with some type of incentive to cooperate. The principle benefit of this method is that it would be relatively inexpensive and would provide water resources managers with information regarding exempt well numbers and withdrawals. Such a program could also ask well owners to provide information regarding the location, ownership, and condition of their wells, which managers could use to create more accurate water budgets, manage permit applications, and allocate available water resources. Obviously, this method would likely not provide water managers with a complete picture of how much water exempt wells consume because some self-reported data could be biased and inaccurate. Moreover, it is possible that such a program would not include all exempt well users, and those who are not in compliance would likely not participate. Nevertheless, this approach would provide water resource managers with at least some idea of exempt well usage without the costs associated with other more costly and administratively-intensive approaches, such as on-site inspections or metering.

Notwithstanding the above, requiring the installation of meters on new exempt wells in certain areas of concern may be a viable monitoring method depending upon the number of wells to be metered, the associated cost, and whether a state's laws allow for the metering of exempt wells. Those states that have the authority to meter new exempt wells may want to consider doing so in areas where exempt use has become problematic.

4. Public Education Programs

Given that most exempt well owners are typically not trained well operators, states could mitigate some of the adverse water quality impacts associated with the maintenance of exempt wells through public education programs aimed at helping well owners become better stewards of their wells and shared groundwater resources.^[875] All fifty states currently have web sites and other educational materials aimed at helping well owners, and additional proactive efforts to publicize these resources could be used to reach out to well owners through commercials, presentations, etc.^[876] Such programs may be particularly needed in areas where land use has changed from an agricultural to an urban purpose and man-made contaminants such as nitrates persist in the groundwater.^[877] States could also concentrate these efforts in areas where exempt wells have become problematic.

Although education programs would not ensure that well owners properly maintain their wells, such programs do not appear to be prohibitively expensive, and well owners have an incentive to ensure that their drinking water is safe. Therefore, it is possible that well owners would be willing to participate in education programs and implement maintenance techniques that are not overly complicated or expensive.^[878]

States could also utilize similar programs to educate exempt well users regarding the importance and need for them to reduce consumption or ensure that their use conforms to the relevant limits. Such programs would most likely not be mandatory, but it is possible that exempt well users would respond favorably to programs that show how compliance can directly benefit them through the preservation of shared groundwater supplies and the protection of water quality.

VIII. CONCLUSION

The debate over exempt wells is unlikely to subside as the West's population continues to grow. Although conditions vary across the West with respect to such wells, there are some observations that appear to be universal. First, as a state's population increases, the demand for water grows, thereby raising the costs and time associated with obtaining permits and providing an incentive to use exempt wells to supply water for new development. Second, well-defined mitigation approaches that focus on specific issues and areas where exempt wells are creating challenges appear to be more administratively and politically feasible than broad, statewide approaches. Third, in states where efforts to modify exemptions are likely to generate significant political resistance, states may want to utilize collaborative approaches that address specific concerns associated with exempt wells and allow for responsible exempt uses. Fourth, states should consider taking steps to ensure that they have sufficient well record information to make informed decisions about how and whether to mitigate the adverse impacts of exempt wells. Lastly, and perhaps most importantly, the old adage "an ounce of prevention is worth a pound of cure" is applicable here, and efforts to mitigate the impacts of existing exempt wells are likely to be more costly and administratively and politically difficult than prospective measures that prevent future adverse impacts.

In sum, there is no "one size fits all" approach for addressing exempt well impacts and each state's individual circumstances will determine how and whether it will address the issues associated with exempt groundwater use. It is important to note that exempt wells may not pose a problem in every western state given the fact that laws, population growth, and water availability vary greatly across the West. In some states, the benefits that exempt wells provide, especially in allowing desired growth in rural areas, may outweigh their impacts, while it may be too costly for other states not to curtail or restrict exempt well use. Nevertheless, those states that are not currently experiencing challenges with respect to exempt wells may want to examine their exemptions to identify potential problems that may arise in the future, and take steps to ensure that such problems do not occur.

- [1] W. GOVERNORS' ASS'N, WATER NEEDS AND STRATEGIES FOR A SUSTAINABLE FUTURE: NEXT STEPS 5 (2008).
- [2] For purposes of this Report, western states include Alaska, Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.
- [3] The terminology states use in their exemptions varies considerably throughout the West, with some states using the term "exempt well" and others using the term "domestic well." This Report will use the term "exempt well" when referring to any well that is not subject to a state's permitting and/or adjudication procedures, except in Parts III and IV when it will use the specific term used in each state.
- [4] See generally CRAIG BELL & JEFF TAYLOR, W. STATES WATER COUNCIL, WATER LAWS AND POLICIES FOR A SUSTAINABLE FUTURE: A WESTERN STATES' PERSPECTIVE 61-65 (2008) (discussing the problems associated with exempt wells).
- [5] See, e.g., Matthew Brown, *Montana Ranchers Seek to Curb Residential Wells*, S.F. GATE, Dec. 3, 2009, <http://www.sfgate.com/cgi-bin/article.cgi?f=/n/a/2009/12/03/national/a000103S25.DTL> (last visited Jan. 13, 2010) (stating almost 30,000 exempt wells were drilled in Montana between 2000 and 2008).
- [6] See *id.*
- [7] See *id.*
- [8] W. GOVERNORS' ASS'N, *supra* note 1, at III.
- [9] The WSWC addressed some of the issues associated with exempt wells in Chapter 1, Section 3 of its *Water Laws and Policies for a Sustainable Future* report. BELL & TAYLOR, *supra* note 4, at 61-65. However, the Legal Committee determined that the issue of exempt wells required additional research and authorized the creation of this Report.
- [10] Alaska Water Use Act, ALASKA STAT. § 46.15.030 (2008).
- [11] *Id.* § 46.15.040(b); see *id.* § 46.15.180 (criminalizing failure to obtain a permit when constructing works that use a significant amount of water).
- [12] *Id.* § 46.15.180(a)(1).
- [13] ALASKA ADMIN. CODE tit. 11, § 93.035(b)(1)-(4) (2005).
- [14] *Id.* § 93.035.
- [15] *Id.* § 93.100.
- [16] *Id.* § 93.080(1), (3). Written notice is also required for "any person known to the department to own land where the water is to be withdrawn or used, or over which the water is to be transported, or whose request to receive notice is on file with the department." *Id.* § 93.080(5).
- [17] E-mail from Gary Prokosch, Chief, Water Res. Section, Alaska Div. of Mining, Land & Water, to Nathan Bracken, Legal Counsel, W. States Water Council (Feb. 24, 2009, 16:14:00 MST) (on file with author).
- [18] ALASKA STAT. § 8.18.011(a) (2008).
- [19] ALASKA ADMIN. CODE tit. 12, § 21.200(35) (2007). A water system contractor is a contractor who "drills and constructs water wells and performs the work necessary for the installation, repair, or maintenance of water well system equipment." *Id.* § 21.550.
- [20] ALASKA STAT. § 8.18.161(10) (2008).
- [21] ALASKA ADMIN. CODE tit. 11, § 93.140(a) (2005).
- [22] *Id.* § 93.140(a)(3), (15)-(16).
- [23] Groundwater Management Act of 1980, ARIZ. REV. STAT. ANN. §§ 45-401 to -703 (2003).
- [24] *Id.* § 45-411.
- [25] Rita Pearson Maguire, *Patching the Holes in the Bucket: Safe Yield and the Future of Water Management in Arizona*, 49 ARIZ. L. REV. 361, 361 (2007). "Safe yield" means a long-term balance between the amount of groundwater withdrawn from an aquifer and the amount recharged through natural and artificial means. *Id.*
- [26] *Id.* at 362 n.3.
- [27] *Id.*
- [28] E-mail from L. William Staudenmaier, Shareholder, Ryley Carlock & Applewhite, P.A., to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 24, 2009, 15:04:00 MST) (on file with author) (referencing attached corrections to previous version of this Report); SHARON B. MEGDAL & KELLY MOTT LACROIX, WATER RES. RESEARCH CTR., UNIV. OF ARIZONA, WATER RESOURCE AVAILABILITY FOR THE TUCSON METROPOLITAN AREA 1 (2006), available at <http://cals.arizona.edu/azwater/files/megdal.az.water.resource.avail.for.tucson.pdf>.
- [29] E-mail from L. William Staudenmaier to Nathan Bracken, *supra* note 28 (referencing attached corrections to previous version of this Report).
- [30] Maguire, *supra* note 25, at 374.
- [31] See *id.* (outlining the permits required by the GMA).
- [32] Groundwater Management Act of 1980, ARIZ. REV. STAT. ANN. § 45-454(A) (Supp. 2008).

[33] *Id.* § 45-454(B).

[34] *Id.* § 45-154(A)(1). Generally, irrigation use is "the use of groundwater on two or more acres of land to produce plants or parts of plants for sale or human consumption, or for use as feed for livestock, range livestock or poultry, as such terms are defined in § 3-1201." *Id.* § 45-402(23)(a). Nonirrigation use is merely a use that does not satisfy the definition of an "irrigation use." *Id.* § 45-402(28).

[35] E-mail from Herbert Guenther, Dir., Arizona Dep't of Water Res., to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 27, 2009, 17:10:00 MST) (on file with author) (referencing attached corrections to previous version of this Report).

[36] ARIZ. REV. STAT. ANN § 45-454(C) (Supp. 2008).

[37] *Id.* § 45-454(D).

[38] *Id.* § 45-454(D)(4).

[39] EXEMPT WELLS 1-2 (2006), available at http://www.azwater.gov/azDWR/statewideplanning/SWAG/documents/Exempt_wells080406.pdf [hereinafter EXEMPT WELLS FACT SHEET].

[40] *Id.* at 1.

[41] *Id.*

[42] *Id.*

[43] ARIZ. REV. STAT. ANN §§ 32-2183(G), (I), 9-463.01(I), 45-576(A), 11-806.01(B) (Supp. 2008). A developer cannot record plats or sell parcels until the Arizona Department of Real Estate (ADRE) has issued a public report allowing such transactions, and the ADRE will not issue a report without a Certificate of Assured Water Supply. *Id.* § 11-806.01(B).

[44] *Id.* § 11-806.01(B).

[45] *Id.* § 45-576(J)(1).

[46] ARIZ. ADMIN. CODE § R12-15-716(B)(3) (West, Westlaw through Sept. 30, 2008).

[47] E-mail from L. William Staudenmaier to Nathan Bracken, *supra* note 28 (referencing attached corrections to previous version of this Report).

[48] ARIZ. REV. STAT. ANN. § 45-596 (2003 & Supp. 2008). The filing fee is \$150 dollars if the well is located within an INA or AMA. *Id.* § 45-596(L) (Supp. 2008). For exempt wells outside these areas, the filing fee is \$100. *Id.*

[49] *Id.* § 45-596(F) (2003 & Supp. 2008).

[50] *Id.* § 45-595 (2003).

[51] EXEMPT WELLS FACT SHEET, *supra* note 39, at 2.

[52] CAL. WATER CODE § 380(b)-(c) (West 2009).

[53] Ella Foley-Gannon, *Institutional Arrangements for Conjunctive Water Management in California and Analysis of Legal Reform Alternatives*, 6 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 273, 285, 290-91 (2000).

[54] *Id.* at 292.

[55] Ellen Hanak & Margaret K. Browne, *Linking Housing Growth to Water Supply: New Planning Frontiers in the American West*, 72 J. AM. PLAN. ASS'N 154, 159 n.5 (2006).

[56] CAL. GOV'T CODE § 66473.7(a)(1)-(2), (b)(1) (West 2009); Hanak & Browne, *supra* note 55, at 157; see also CAL. GOV'T CODE § 65302 (West Supp. 2009); California Environmental Quality Act, CAL. PUB. RES. CODE § 21104 (West 2007) (requiring consultation by lead state agency with other relevant agencies and city or county governments adjacent to proposed project).

[57] CAL. GOV'T CODE § 66473.7(b)(1) (West 2009); CAL. WATER CODE §§ 10910-10912 (West Supp. 2009); *id.* § 10631 (West 1992 & Supp. 2009).

[58] CAL. WATER CODE § 13750.5 (West 2009).

[59] *Id.* § 13751; see also Cal. Dep't of Water Resources, Well Completion Reports, http://www.water.ca.gov/groundwater/well_info_and_other/well_completion_reports.cfm (last visited Nov. 13, 2009) (explaining procedure for obtaining Well Completion Reports through the Department of Water Resources).

[60] CAL. WATER CODE § 13751 (West 2009).

[61] *Id.* § 13754.

[62] Conservancy Law of Colorado, COLO. REV. STAT. § 37-92-602(6) (2009).

[63] See generally *id.* § 37-92-602.

[64] *Id.* §§ 37-92-602(1)(a), 37-90-106. See generally 2 COLO. CODE REGS. § 410-1 (West, Westlaw through Oct. 2009) (regulating the management and control of designated groundwater).

[65] COLO. REV. STAT. § 37-92-602(6) (2009); DIV. OF WATER RES., COLO. DEPT OF NATURAL RES., GUIDE TO COLORADO WELL PERMITS, WATER RIGHTS, AND WATER ADMINISTRATION (2008), available at <http://water.state.co.us/pubs/wellpermitguide.pdf> (interpreting § 37-92-602(6)).

[66] COLO. REV. STAT. § 37-92-602(1)(e) (2009).

[67] *Id.* § 37-92-602(1)(c)-(d).

[68] *Id.* § 37-92-602(4) ("[T]he original priority date of any such well may be awarded regardless of the date of application therefor."); see also Sherry A. Caloia et al., *The Water Rights Determination and Administration Act of 1969: A Western Slope Perspective on the First Thirty Years*, 3 U. DENV. WATER L. REV. 39, 42-45 (1999).

[69] COLO. REV. STAT. § 37-92-602(2)-(3)(a)(II) (2009).

[70] *Id.* § 37-92-602(3)(a)(II).

[71] *Id.* § 37-92-602(3)(b)(I).

[72] *Id.*

[73] *Id.*

[74] *Id.* § 37-92-602(3)(b)(II)(A).

[75] *Id.*

[76] *Id.*

[77] *Id.* § 37-92-602(3)(d)(II).

[78] COLO. CONST. art. XVI, § 6.

[79] See *Strickler v. City of Colo. Springs*, 26 P. 313, 317-18 (Colo. 1891); *Black v. Taylor*, 264 P.2d 502, 506 (Colo. 1953).

[80] COLO. REV. STAT. § 30-28-133(1) (2009).

[81] *Id.* § 30-28-133(3)(d).

[82] *Id.*; see also Hanak and Browne, *supra* note 55, at 157 tbl.1 (listing section 30-28-133 of Colorado's 1972 Subdivision Act as one of several state water adequacy laws).

[83] COLO. REV. STAT. § 30-28-136(1)(g) (2009).

[84] *Id.*

[85] *Id.* § 30-28-136(1)(h)(I).

[86] *Id.*

[87] *Id.*

[88] Hanak and Browne, *supra* note 55, at 159 n.5.

[89] Conservancy Law of Colorado, COLO. REV. STAT. § 37-91-105(1) (2009).

[90] *Id.* § 37-91-106.

[91] *Id.* § 37-91-102(12)-(12.5).

[92] *Id.* § 37-91-106.

[93] 2 COLO. CODE REGS. § 402-2(17.1.1), (17.3) (West, Westlaw through Oct. 2009).

[94] *Id.* § 402-2(10.1).

[95] IDAHO CODE ANN. §§ 42-227, -221(K)(1) (2003).

[96] *Id.* § 42-111(1).

[97] *Id.* § 42-227.

[98] *Id.* § 42-701(7). During the 2008 legislative session, S. 1353 was introduced by the Resources and Environment Committee to amend this section. S.B. 1353, 59th Leg., 2d Reg. Sess. (Idaho 2008), <http://www3.state.id.us/oasis/2008/S1353.html> (last visited Nov. 11, 2009). The statement of purpose of the bill reads,

One concern that has arisen during the discussion of the proposed North Idaho Adjudication (NIA) is that people who have domestic wells would be

forced to place meters on them and that in time, ultimately, meters would allow the charging of money for the use of water from these wells. This legislation attempts to make it clear that [there is] no intention on the part of the Idaho State Legislature to place meters on domestic wells.

Id.

[99] IDAHO CODE ANN. § 42-233(1) (2003).

[100] *Id.*

[101] *Id.* § 42-111(2).

[102] *Id.* § 50-1334 (2009).

[103] *Id.* § 31-3805(1)(b) (2006).

[104] *Id.* § 31-3805(2)(a).

[105] Ground Water Quality Protection Act of 1989, IDAHO CODE ANN. § 67-6537(1) (2006).

[106] *Id.* § 42-227 (2003).

[107] *Id.* § 42-238. A driller's license can be obtained by filing an application, paying a \$200 application fee, and passing a written or oral examination. *Id.* § 42-238(4)-(5).

[108] *Id.* § 42-227.

[109] IDAHO ADMIN. CODE r. 37.03.10.050 (2008).

[110] *Id.*

[111] KAN. STAT. ANN. § 82a-728 (1997).

[112] *Id.* § 82a-701 (Supp. 2008).

[113] KAN. ADMIN. REGS. § 5-1-1(kk) (West, Westlaw through Dec. 31, 2009).

[114] *Id.* §§ 5-2-4, -1-1(aaaa)(1).

[115] KAN. STAT. ANN. § 82a-701(d) (1997 & Supp. 2008); *id.* § 82a-705a (1997).

[116] *Id.* § 82a-707(a)-(b) (1997).

[117] *Id.* §§ 82a-1205(b), -1206(a), (c).

[118] *Id.* §§ 82a-1203(e), -1207. Assessing a contractor's qualifications may include assessing his or her "[f]amiliarity with Kansas water laws, sanitary standards for water well drilling and construction of water wells and rules and regulations relating to water well construction, reconstruction, treatment and plugging," and "[k]nowledge of groundwater and subsurface geology in its relation to well construction." *Id.* § 82a-1207(a)-(b).

[119] *Id.* § 82a-1212.

[120] *Id.*

[121] MONT. CODE ANN. § 85-2-306(3)(a) (2009).

[122] *Id.* § 82-2-306(3)(b)(i).

[123] *Id.* § 82-2-306(4).

[124] *Id.* § 82-2-306(5).

[125] *Id.* § 82-2-306(6).

[126] *Id.* § 82-2-306(7)(a).

[127] MONT. ADMIN. R. 17.36.108 (LEXIS through Oct. 30, 2009).

[128] *Id.* R. 17.36.330.

[129] *Id.*

[130] *Id.* R. 17.36.331.

[131] *Id.* R. 17.36.333.

[132] *Id.* R. 17.36.332.

[133] *Id.*

[134] MONT. CODE ANN. § 37-43-302(1) (2009); see also E-mail from Candace F. West, Chief Legal Counsel, Mont. Dep't of Natural Res. & Conservation, to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 26, 2009, 16:01:00 MST) (on file with author) (referencing attached corrections to previous version of this Report).

[135] MONT. CODE ANN. § 37-43-302(2) (2009).

[136] *Id.* § 85-2-516.

[137] *Id.*

[138] *Id.*

[139] Nebraska Ground Water Management and Protection Act, NEB. REV. STAT. § 46-735(1) (2004).

[140] *Id.* § 46-712(1) (Supp. 2008).

[141] *Id.* § 46-735(1) (2004).

[142] *Id.* § 46-735(1).

[143] *Id.* § 46-707(3) (Supp. 2008).

[144] *Id.* §§ 46-713 to -714.

[145] *Id.* § 46-714(1)-(2).

[146] *Id.* § 46-714(4).

[147] *Id.* §§ 46-714(3), -735(1) (2004 & Supp. 2008).

[148] *Id.* § 46-602(9).

[149] *Id.* § 46-602(11) (Supp. 2008).

[150] *Id.* § 46-602(9) (2004 & Supp. 2008).

[151] *Id.* § 46-736 (2004).

[152] *Id.* § 46-1223 (2004 & Supp. 2008).

[153] *Id.* § 46-1229 (Supp. 2008).

[154] *Id.* § 46-1231.

[155] *Id.* § 46-1233(2).

[156] 178 NEB. ADMIN. CODE § 12-003 (West, Westlaw through Sept. 30, 2009).

[157] NEB. REV. STAT. § 46-1241 (2004).

[158] *Id.*

[159] *Id.* § 46-602(9) (2004 & Supp. 2008).

[160] *Id.* § 534.180 (2007).

[161] *Id.* § 534.013.

[162] *Id.*

[163] *Id.* § 534.180(4).

[164] *Id.*

[165] *Id.* § 533.024.

[166] *Id.* § 533.370(10).

[167] *Id.* § 533.024.

[168] *Id.* § 534.080(4). The priority date for a domestic well "is the date of completion of the well as: (a) [r]ecord[ed] by the well driller on the log he files with the State Engineer pursuant to NRS 534.170; or (b) [d]emonstrated through any other documentation or evidence specified by the State Engineer." *Id.* The priority date for the use of domestic water to supply an accessory dwelling unit "is the date of approval of the accessory dwelling unit by the local governing body or planning commission." *Id.* § 534.180(4)(d).

[169] *Id.* § 533.370(5).

[170] *Id.* § 533.360(3).

[171] E-mail from Jason King, Acting State Eng'r, Nev. Div. of Water Res., to Nathan Bracken, Legal Counsel, W. States Water Council (Feb. 24, 2009, 09:44:00 MST) (on file with author).

[172] *Id.*

[173] *Id.*

[174] NEV. REV. STAT. § 534.110(5) (2007).

[175] E-mail from Jason King to Nathan Bracken, *supra* note 171.

[176] NEV. REV. STAT. § 534.180(2) (2007).

[177] *Id.*

[178] *Id.* § 534.120(3)(c)-(d). Of note, the Nevada code gives the state engineer the authority "to make rules, regulations and orders when groundwater is being depleted in [a] designated area," and such authority includes "preferred uses of water; temporary permits to appropriate water; revocation of temporary permits; [and] restrictions placed on certain wells." *Id.* § 534.120. While a strict reading of section 534.120 could be interpreted to give the state engineer the authority to restrict the drilling of domestic wells, the "statute is normally interpreted as relating to what [Nevada terms] quasi-municipal permits that are often issued for a single well serving about 4 homes." See E-mail from Jason King to Nathan Bracken, *supra* note 171.

[179] NEV. REV. STAT. § 534.125 (2007).

[180] *Id.* §§ 278.335, .377, .461; see also Hanak and Browne, *supra* note 55, at 157 (referencing sections 278.335 and 278.377).

[181] NEV. REV. STAT. § 534.120(3)(e) (2007).

[182] *Id.* § 278.461(2).

[183] Nev. Op. Att'y Gen. No. 97-19, 85 (1997), available at http://ag.state.nv.us/publications/ago/archive/1997_AGO.pdf [hereinafter Nev. Op. Att'y Gen.].

[184] *Id.*

[185] NEV. REV. STAT. §§ 534.140, .160 (2007).

[186] *Id.* § 534.017.

[187] NEV. ADMIN. CODE § 534.320(1), (3) (West, Westlaw through July 31, 2009, Supp. 2009-1); see also Nev. Op. Att'y Gen., *supra* note 183, at 85 (citing Nevada administrative code section 534.320(1) and stating, "A well-driller must file a notice of intention to drill with the Division of Water Resources before drilling a water well, including domestic wells").

[188] NEV. REV. STAT. § 534.170(1)-(2) (2007).

[189] NEV. ADMIN. CODE § 534.360 (2009).

[190] See *id.* § 534.370(1)(b).

[191] Nev. Op. Att'y Gen., *supra* note 183, at 85.

[192] Rather than an "exemption," New Mexico's domestic wells fall under an "exception" because they are subject to regulation and permitting. They are "excepted" in the sense that New Mexico law does not provide the state engineer with discretion to deny an application for a domestic well. See E-mail from D.L. Sanders, Chief Counsel, N.M. Office of the State Eng'r, to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 31, 2009, 06:15:00 MST) (on file with author).

[193] N.M. STAT. § 72-12-1.1 (Supp. 2009).

[194] *Id.* (emphasis added). The only instance when the state engineer can reject an application for a domestic well permit is when the well is located in an area where the use of water has been restricted by a court, or when the well would be located in an area of water quality concern where a government entity has recommended against the drilling of new wells. N.M. CODE R. § 19.27.5.13A (West, Westlaw through Sept. 1, 2009).

[195] N.M. CODE R. § 19.27.5.9(D) (West, Westlaw through Sept. 1, 2009).

[196] E-mail from Arianne Singer, Litig. & Adjudication Program, N.M. Office of the State Eng'r, to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 30, 2009, 15:41:00 MST) (on file with author) (referencing attached corrections to previous version of this Report).

[197] PowerPoint: John D'Antonio Jr., N.M. State Eng'r, Presentation to the Western States Water Council: Domestic Wells in New Mexico 10 (Mar. 6, 2008) [hereinafter D'Antonio Presentation].

[198] Jocelyn Drennan, Comment, *Lassoing the Loophole: The Need to Rope in the Use of the Domestic Well Loophole by Subdividers in New Mexico*, 37 NAT. RESOURCES J. 923, 937-38 (1997). See generally N.M. CODE R. § 19.27.5.9(C) (West, Westlaw through Sept. 1, 2009) ("[D]omestic well permit[s] may be conditioned to allow the

diversion of water from an existing well previously permitted for livestock, irrigation, or any other beneficial purpose of use other than domestic use. The diversion of water from a multiple use well made pursuant to a . . . domestic well permit shall be separately metered.”).

[199] N.M. CODE R. § 19.27.4 (West, Westlaw through Sept. 1, 2009).

[200] *Id.* § 19.27.5.15.

[201] *Id.* § 19.27.5.7(E).

[202] *Id.*

[203] *Id.*; N.M. STAT. § 72-12-1.2 (Supp. 2009).

[204] N.M. STAT. § 72-12-1.3.

[205] *Id.*

[206] *Id.*

[207] *Id.*

[208] See Legal Comm., W. States Water Council, Minutes of the Legal Committee of the Western States Water Council 4 (Oct. 16, 2008) (on file with author).

[209] N.M. CODE R. § 19.27.5.7(F) (West, Westlaw through Sept. 1, 2009).

[210] *Id.* § 19.27.5.14.

[211] See D'Antonio Presentation, *supra* note 197, at 12.

[212] *Id.*

[213] E-mail from Arianne Singer to Nathan Bracken, *supra* note 196.

[214] N.M. CODE R. § 19.27.5.13(C)(1) (West, Westlaw through Sept. 1, 2009).

[215] *Id.* § 19.27.5.13 (C)(2).

[216] N.M. STAT. § 3-53-1.1(A) (2009 Supp.).

[217] *Id.* § 3-53-1.1(B).

[218] *Id.* § 3-53-1.1(D).

[219] E-mail from Arianne Singer to Nathan Bracken, *supra* note 196.

[220] *Smith v. City of Santa Fe*, 2007-NMSC-055, 171 P.3d 300.

[221] *Id.* ¶¶ 2, 7, 171 P.3d at 302-03.

[222] *Id.* ¶¶ 4-5, 171 P.3d at 302.

[223] *Id.* ¶ 29, 171 P.3d at 308. In *New Mexico*, a home rule municipality may generally exercise any power or perform any function not expressly denied by statute or its own charter. See N.M. CONST. art. X, § 6(D).

[224] *Stennis v. City of Santa Fe*, 2008-NMSC-008, 176 P.3d 309.

[225] *Id.* ¶ 16, 176 P.3d at 314.

[226] *Id.* at ¶¶ 23-26, 171 P.3d at 316. The case was remanded to the district court to determine whether the city filed the ordinance with the state engineer. *Id.* at ¶ 26, 171 P.3d at 316. On remand, the district court found that the city had filed the ordinance. Interview with D.L. Sanders, Gen. Chief Counsel, N.M. Office of the State Eng'g'r, in Park City, Utah (July 16, 2009).

[227] See *infra* Part IV.F.1.

[228] See *Litigation/Water Rights: Exempt Wells/New Mexico*, W. STATES WATER, Aug. 8, 2008, at 1, 1.

[229] N.M. STAT. ANN. § 47-6-9(A) (LexisNexis Supp. 2009).

[230] *Id.*

[231] *Id.* § 47-6-11(B)-(C).

[232] *Id.* § 47-6-11(F)(1).

[233] *Id.* § 47-6-11(F)(2). Opinions are also required from the New Mexico Department of Transportation, the relevant soil and conservation district, "each Indian nation, tribe or pueblo with a historical, cultural or resource tie with the county" that requests notification, and "such other public agencies as the county deems necessary." *Id.* § 47-6-11(F)(2)-(6).

[234] Drennan, *supra* note 198, at 934.

[235] *Id.*

[236] N.M. STAT. ANN. § 47-6-11(H) (LexisNexis Supp. 2009).

[237] *Id.*

[238] *Id.*

[239] *Id.* § 3-21-1 (1999 & Supp. 2009); *id.* § 4-37-1 (1992); *see also* Drennan, *supra* note 198, at 934 n.53 ("The ability of counties to condition plat approval is an implied power that stems from a county's general police powers.").

[240] N.M. STAT. ANN. § 47-6-17(B) (LexisNexis 1995).

[241] N.M. CODE R. § 19.27.5.9(F) (West, Westlaw through Oct. 1, 2009).

[242] N.M. STAT. ANN. § 72-12-12 (LexisNexis 1997); *see also* N.M. CODE R. § 19.27.4.8(4) (West, Westlaw through Oct. 1, 2009) (requiring any person who engages in the business of drilling a well in New Mexico to acquire a license issued by a state engineer).

[243] N.M. CODE R. § 19.27.4.29(K) (West, Westlaw through Oct. 1, 2009).

[244] *Id.*

[245] N.D. CENT. CODE § 61-04-02 (2003).

[246] *Id.*

[247] *Id.*

[248] *See id.*

[249] *Id.* § 64-04-01.1(3).

[250] *Id.* § 61-20-02.

[251] *See* N.D. ADMIN. CODE 90-01-01-01 to -02-04-04 (West, Westlaw through Supplement 333, July 1, 2009).

[252] *Id.* § 33-18-01-06(12).

[253] OKLA. STAT. ANN. tit. 82, § 1020.3 (West 1990).

[254] *Id.* § 1020.1(2) (West Supp. 2010).

[255] *Id.* § 105.2(A) (West 1990).

[256] *Id.* § 1020.21.

[257] *Id.* § 1020.16 (West 1990 & Supp. 2010).

[258] *See* OKLA. ADMIN. CODE § 785:35-7-1 (West, Westlaw through Nov. 2, 2009).

[259] *Id.* § 785:35-5-1.

[260] OR. REV. STAT. § 537.545(1) (2007). The exemption also applies to down-hole heat exchange purposes, land applications that meet certain criteria, and "[w]atering the lawns, grounds and fields not exceeding 10 acres in area of schools located within a critical ground water area." *Id.* § 537.545(1).

[261] *Id.* § 537.545(2)-(3).

[262] S.B. 788, 75th Leg. Assem., Reg. Sess. § 1 (Or. 2009).

[263] *Id.*

[264] *Id.*

[265] *Id.*

[266] OR. REV. STAT. § 537.730 (2007).

[267] *Id.* § 537.775.

- [268] OR. ADMIN. R. 333-061-0325(1) (2009).
- [269] *Id.* §§ 333-061-0325(1)-(2), 333-061-0310.
- [270] OR. REV. STAT. §§ 537.747(1), .762 (2007).
- [271] *Id.* § 537.765(1).
- [272] *Id.* § 537.756(3).
- [273] E-mail from Doug Woodcock, Manager, Groundwater Section, Or. Water Res. Dep't, to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 25, 2009, 15:36:00 MST) (on file with author); Or. Water Res. Dep't, Well Log Query, http://apps2.wrd.state.or.us/apps/gw/well_log/Default.aspx (last visited Nov. 15, 2009).
- [274] S.D. CODIFIED LAWS § 46-5-8 (2004).
- [275] *Id.* § 46-1-6(7); S.D. ADMIN. R. 74:02:01:01 (West, Westlaw through Oct. 18, 2009).
- [276] S.D. CODIFIED LAWS § 46-1-6(7) (2004).
- [277] S.D. ADMIN. R. 74:02:01:03 (West, Westlaw through Oct. 18, 2009).
- [278] S.D. CODIFIED LAWS § 46-5-8 (2004).
- [279] S.D. ADMIN. R. 74:02:01:05.02 (West, Westlaw through Oct. 18, 2009).
- [280] S.D. CODIFIED LAWS §§ 46-4-1, -4-3 to -4-6, -5-2 (2004).
- [281] *Id.* § 46-4-3.
- [282] *Id.* § 46-4-1.1.
- [283] *Id.* § 46-5-1.1.
- [284] *Id.* § 46-6-9.
- [285] *Id.*
- [286] *Id.* § 46-6-11.
- [287] S.D. ADMIN. R. 74:02:01:08.01 (West, Westlaw through Oct. 18, 2009).
- [288] E-mail from Garland Erbele, Chief Eng'r, Water Rights, S.D. Dep't of Env't & Natural Res., to Nathan Bracken, Legal Counsel, W. States Water Council (Feb. 9, 2009, 12:06:00 MST) (on file with author); see also S.D. ADMIN. R. § 74:53:01:19 (West, Westlaw through Oct. 18, 2009).
- [289] E-mail from Garland Erbele to Nathan Bracken, *supra* note 288.
- [290] *Id.*
- [291] TEX. WATER CODE ANN. § 36.117(b) (Vernon 2008).
- [292] *Id.* § 36.117(c), (k).
- [293] *Id.* § 36.117(d)(1). The Hill Country PGMA encompasses all of Bandera, Blanco, Gillespie, Kendall, and Kerr Counties, as well as parts of Comal, Hays, Travis, and Bexar Counties. TEX. GROUNDWATER PROT. COMM., WHAT IS A PRIORITY GROUNDWATER MANAGEMENT AREA (PGMA)? (2009), available at http://www.tgpc.state.tx.us/subcommittees/POE/FAQs/PGMAs_FAQ.pdf.
- [294] TEX. WATER CODE ANN. § 36.117(d)(1) (Vernon 2008).
- [295] See *id.*
- [296] See *id.* at § 11.002.
- [297] 30 TEX. ADMIN. CODE § 297.1(18) (West, Westlaw through Dec. 31, 2009).
- [298] TEX. WATER CODE ANN. § 36.117(h) (Vernon 2008).
- [299] *Id.* § 36.117(h)(2).
- [300] *Id.* § 36.117(j).
- [301] TEX. LOC. GOV'T CODE ANN. § 232.023(a), (b)(7) (Vernon 2005); see also E-mail from Ken Peterson, Chief Legal Counsel, Tex. Water Dev. Bd., to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 25, 2009, 16:26:00 MST) (referencing attached corrections to previous version of this Report) (on file with author).
- [302] 30 TEX. ADMIN. CODE ANN. § 230.1(a) (West, Westlaw through Dec. 31, 2009).

[303] TEX. WATER CODE ANN. § 36.117(i) (Vernon 2008).

[304] See *id.*

[305] TEX OCC. CODE ANN. § 1901 (Vernon 2004 & Supp. 2009).

[306] As explained in Part II, California does not have exempt wells because it does not have a comprehensive groundwater management program. See *supra* Part II.C. Utah is the only state with a comprehensive groundwater management program that does not contain an exemption for certain ground water uses.

[307] UTAH CODE ANN. § 73-1-1 (1989).

[308] *Id.* § 73-3-2(1)(a) (Supp. 2009).

[309] See *id.* §§ 73-3-3, -8 (1989 & Supp. 2009) (setting out methods for obtaining a change application, and the state engineer's duties upon filing of a change application); *id.* § 73-1-10 (Supp. 2009) (covering conveyances of water rights).

[310] Piute Reservoir & Irrigation Co. v. W. Panguitch Irrigation & Reservoir Co., 367 P.2d 855, 858 (Utah 1962) (refusing an application to change the use of appropriated surface water because "[i]f a 'de minimus' reduction of the waters available to the lower water users were allowed . . . over and over again, the damage to the lower users would be unbearable"); see also *Wayment v. Howard*, 2006 UT 56, ¶ 13 n.11, 144 P.3d 1147, 1151 n.11 (Utah 2006) ("We have not adopted the de minimus standard, but rather have stated that no impairment is acceptable.").

[311] See UTAH CODE ANN. § 73-3-5.6 (Supp. 2009); see also E-mail from Norman Johnson, Dir., Natural Res. Div., Utah Att'y Gen.'s Office, to Nathan Bracken, Legal Counsel, W. States Water Council (Feb. 3, 2009, 09:46:00 MST) (on file with author) ("Utah does not treat small groundwater wells differently than other subdivision uses.").

[312] UTAH CODE ANN. § 73-3-2(1)(b) (Supp. 2009).

[313] *Id.* § 73-3-5.6(2)-(3). "Small amount of water' means the amount of water necessary to meet the requirements of: (i) one residence; (ii) 1/4 acre of irrigable land; and (iii) a livestock watering right for: (A) ten cattle; or (B) the equivalent amount of water of [ten cattle] for livestock other than cattle." *Id.* § 73-3-5.6(1)(d).

[314] *Id.* § 73-3-5.6(2)-(3).

[315] *Id.* § 73-3-6(1)(a)(i).

[316] *Id.* § 73-3-7; see UTAH ADMIN. CODE r. 655-6-7(C) (2009), <http://www.rules.utah.gov/publicat/code/r655/r655-006.htm#T7> (last visited Nov. 30, 2009) (granting the Division of Water Rights discretion to hold a hearing if requested in a timely-filed protest).

[317] See *Bonham v. Morgan*, 788 P.2d 497, 500-01 (Utah 1989).

[318] UTAH CODE ANN. § 73-3-8(1)(a) (Supp. 2009). It is also important to note that the Utah Code states that "in times of scarcity . . . the use for domestic purposes, without unnecessary waste, shall have preference over use for all other purposes, and use for agricultural purposes shall have preference over use for any other purpose except domestic use." *Id.* § 73-3-21 (repealed 2009). However, there is some uncertainty in Utah as to what this provision means, due to the fact that most of Utah is a desert and one can argue is in a perpetual state of "scarcity." E-mail from Norman Johnson to Nathan Bracken, *supra* note 311. Consequently, there are some questions as to how to implement this provision in the event that a junior domestic water right holder were to claim that his or her right trumps a more senior nondomestic water right holder. *Id.*

[319] UTAH ADMIN. CODE r. 655-4-2 (2009), <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T2> (last visited Nov. 14, 2009).

[320] See UTAH CODE ANN. §§ 73-1-3, -3-1 (1989).

[321] *Id.* § 73-3-16(2) (Supp. 2009).

[322] *Id.* § 73-3-17(1).

[323] See *id.* § 73-1-4(2)(a).

[324] *Id.* § 73-3-5.6(4)-(6). Applicants can submit proof on a lapsed application if they can demonstrate that they constructed the works and were using the works on the date the application lapsed. E-mail from Boyd Clayton, Deputy Eng'r, Utah Div. of Water Rights, to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 21, 2009, 06:18:00 MST) (referencing attached question-and-answer sheet) (on file with author). In such cases, the priority date on the certificate that the state engineer will issue will be the date the applicant submitted proof. *Id.*

[325] E-mail from Boyd Clayton to Nathan Bracken, *supra* note 324.

[326] *Id.*

[327] *Id.*

[328] *Id.*

[329] *Id.*

[330] *Id.*

[331] *Id.*

[332] *Id.*

[333] *Id.*

[334] *Id.*

[335] *Id.*

[336] See U.S. Geological Survey, Utah Water Science Center: What We Do, <http://ut.water.usgs.gov/about/whatwedo.html> (last visited Nov. 11, 2009); U.S. Geological Survey, Stream Depletion – Uinta River Near Roosevelt, UT, <http://ut.water.usgs.gov/projects/streamdepletion> (last visited Nov. 11, 2009).

[337] E-mail from Boyd Clayton to Nathan Bracken, *supra* note 324.

[338] *Id.*

[339] *Id.*

[340] *Id.*

[341] *Id.*

[342] E-mail from Norman Johnson to Nathan Bracken, *supra* note 311.

[343] E-mail from Boyd Clayton to Nathan Bracken, *supra* note 324.

[344] UTAH CODE ANN. § 73-3-25(2) (Supp. 2009); see also E-mail from Boyd Clayton to Nathan Bracken, *supra* note 324.

[345] UTAH CODE ANN. § 73-3-25(3) (Supp. 2009). The current bond amount is \$5000. UTAH ADMIN. CODE r. 655-4-3.2.5 (2009), <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T3> (last visited Nov. 11, 2009).

[346] UTAH ADMIN. CODE r. 655-4-3.2 (2009), <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T3> (last visited Nov. 11, 2009); see also Utah Div. of Water Rights, Well Drillers License & Operation Registration, <http://nrwrt1.nr.state.ut.us/wellinfo/register.asp> (last visited Nov. 11, 2009).

[347] UTAH ADMIN. CODE r. 655-4-1.3.1 (2009), <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T1> (last visited Nov. 11, 2009); see also Utah Div. of Water Rights, Water Well Drilling Information, <http://nrwrt1.nr.state.ut.us/wellinfo/default.asp> (last visited Nov. 11, 2009).

[348] UTAH ADMIN. CODE r. 655-4-1.2.5 (2009), <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T1> (last visited Nov. 11, 2009).

[349] *Id.* r. 655-4-4.5.1, <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T4> (last visited Nov. 11, 2009).

[350] See *id.* r. 655-4-5, <http://www.rules.utah.gov/publicat/code/r655/r655-004.htm#T5> (last visited Nov. 11, 2009).

[351] WASH. REV. CODE § 90.44.040 (2008).

[352] *Id.* § 90.44.050.

[353] *Id.* The exemption does not mention the quantity of water that can be used for stock watering and lawn watering or noncommercial gardening purposes, and it appears that there is no limit for these uses.

[354] *Id.* (stating that exempt wells used "regularly and beneficially" are entitled to "a right equal to that established by a permit").

[355] Robert N. Caldwell, *Six-Packs for Subdivisions: The Cumulative Effects of Washington's Domestic Well Exemption*, 28 ENVTL. L. 1099, 1103–04 (1998) (describing the limitations of Washington's exempt well statute).

[356] See WASH. REV. CODE § 90.44.130 (2008) (applying the priority system to all appropriators of groundwater without distinction).

[357] *Id.* § 90.44.030 ("[T]he right of an appropriator and owner of surface water shall be superior to any subsequent right . . . to be acquired in or to ground water.").

[358] *Id.* § 90.44.110 ("No public ground waters that have been withdrawn shall be wasted without economic beneficial use.").

[359] State Dep't of Ecology v. Campbell & Gwinn, L.L.C., 43 P.3d 4, 10 (Wash. 2002).

[360] Kara Dunn, Comment, *Got Water? Limiting Washington's Stockwatering Exemption to Five Thousand Gallons Per Day*, 83 WASH. L. REV. 249, 263–64 (2008).

[361] *Id.* at 266.

[362] *Id.* at 267.

[363] *Id.*

[364] Caldwell, *supra* note 355, at 1104.

[365] WASH. REV. CODE § 90.44.050 (2008).

[366] Caldwell, *supra* note 355, at 1104.

[367] WASH. REV. CODE § 90.44.050 (2008); see also Caldwell, *supra* note 355, at 1104.

[368] Regulatory Reform Act of 1995, WASH. REV. CODE § 34.05.330 (2008).

- [369] Water Resources Act of 1971, WASH. REV. CODE § 90.54.050(2) (2008).
- [370] *Id.* § 90.03.360 (emphasis added); see also JEFF MARTI & LYNN COLEMAN, WATER RES. PROGRAM, WASH. STATE DEPT OF ECOLOGY, RESPONSIVENESS SUMMARY AND CONCISE EXPLANATORY STATEMENT: CHAPTER 173-173 WAC REQUIREMENTS FOR MEASURING AND REPORTING WATER USE 21 (2001), available at <http://www.ecy.wa.gov/pubs/0111016.pdf> (stating that Ecology has the authority to require exempt well users to measure their withdrawals because exempt wells are regarded as full water rights and the exemption authorizes Ecology to quantify withdrawals).
- [371] Caldwell, *supra* note 355, at 1104.
- [372] WASH. ADMIN. CODE § 173-532-050(2), (5) (2009) (requiring meters for new exempt wells and limiting water use to a maximum of 1250 gpd per residence for all uses, and a cumulative total of 5000 gpd for multiple residences).
- [373] Memorandum of Agreement Between Kittitas County and Wash. Dep't of Ecology Regarding Mgmt. of Exempt Ground Water Wells in Kittitas County 2-3 (Apr. 7, 2008), available at http://www.ecy.wa.gov/programs/WR/cro/images/pdfs/moa_kitt_eco482008.pdf [hereinafter Kittitas County Memorandum] (requiring meters for new exempt wells and restricting new residential developments to 5000 gpd regardless of acreage and the number of wells).
- [374] WASH. ADMIN. CODE § 173-503-060(5) (2009) (requiring monitoring of all wells except for permit-exempt wells serving a single residence, unless the department determines that monitoring of such wells is necessary).
- [375] WASH. REV. CODE § 58.17.110(2) (2008).
- [376] Washington Well Construction Act, WASH. REV. CODE § 18.104.030(1), (2) (2008).
- [377] *Id.* § 18.104.048.
- [378] *Id.* § 18.104.030(6). In the Washington Well Construction Act, an operator is defined as "a person who (a) is employed by a well contractor; (b) is licensed . . . ; or (c) who controls, supervises, or oversees the construction of a well or who operates well construction equipment." *Id.* § 18.104.020(15).
- [379] *Id.* § 18.104.180(1). The exemption also applies to a person "who performs labor or services for a well contractor in connection with the construction of a well at the direction and under the supervision and control of a licensed operator who is present at the construction site." *Id.* § 18.104.180(2).
- [380] *Id.* § 18.104.180(1).
- [381] *Id.* § 18.104.050.
- [382] E-mail from Sue Lowry, Adm'r, Interstate Streams Div., Wyo. State Eng'rs Office, to Nathan Bracken, Legal Counsel, W. States Water Council (Mar. 3, 2009, 15:04:00 MST) (on file with author) (referencing attached corrections to previous version of this Report); see also WYO. STAT. ANN. § 41-3-930(a) (2009) (requiring a permit of any person who intends to make beneficial use of ground water).
- [383] WYO. STAT. ANN. § 41-3-930(a) (2009); OFFICE OF THE STATE ENG'R, STATE OF WYO., APPLICATION FOR PERMIT TO APPROPRIATE GROUND WATER (2009), available at http://seo.state.wy.us/PDF/UW5_0909.pdf. Applications to appropriate groundwater within 15 miles of Yellowstone National Park are subject to additional requirements. WYO. STAT. ANN. § 41-3-930(b) (2009). Wyoming's Water Code also provides that nothing "shall be construed so as to interfere with the right of any person to use water from any existing well constructed prior to May 24, 1969 where the water is economically and beneficially used for stock or domestic use," so long as the user registered the right prior to December 31, 1972. *Id.* § 41-3-930(c).
- [384] WYO. STAT. ANN. § 41-3-931 (2009).
- [385] *Id.* Granting the application as a matter of course is also dependent upon the well not being located in a critical area and the use of the water being beneficial. *Id.*
- [386] *Id.* § 41-3-935(b).
- [387] *Id.* § 41-3-907.
- [388] OFFICE OF THE STATE ENG'R, *supra* note 383.
- [389] WYO. STAT. ANN. § 35-11-301(a)(v) (2009).
- [390] *Id.* § 41-3-932(a).
- [391] *Id.*
- [392] *Id.* § 41-3-932(c).
- [393] *Id.*
- [394] See *id.* §§ 41-3-932, -935(b).
- [395] *Id.* § 41-3-935(b).
- [396] *Id.*
- [397] *Id.*
- [398] *Id.* § 41-3-907.
- [399] *Id.* § 41-3-911(a).

[400] *Id.*

[401] E-mail from Lisa Lindemann, Adm'r, Ground Water Div., Wyo. State Eng'r's Office, to Nathan Bracken, Legal Counsel, W. States Water Council (Oct. 22, 2008, 11:02:00 MST) (on file with author).

[402] *See id.*

[403] *Id.*

[404] *See* OFFICE OF THE STATE ENG'R, *supra* note 383.

[405] *Id.*

[406] WYO. STAT. ANN. §§ 18-5-301, -308 (2009).

[407] *Id.* § 18-5-306(a)(vi)(C).

[408] *Id.*

[409] *Id.* § 18-5-306(c).

[410] *Id.* § 18-5-306(c)(i).

[411] *Id.* § 18-5-306(c)(iii).

[412] 020-080-023 WYO. CODE R. §§ 1-9 (Weil, LEXIS through Oct. 6, 2009).

[413] *Id.* §§ 8(d), 9(b).

[414] WYO. STAT. ANN. § 18-5-308(c) (2009). The developer does not need to provide potential buyers with a copy of an adverse recommendation if the board enters a written finding in the approval stating that the developer has corrected the inadequacy set forth in the recommendation. *Id.*

[415] *Id.* § 33-42-103(f).

[416] *Id.* § 33-42-112(f)(iii).

[417] *Id.* § 41-3-935.

[418] OFFICE OF THE STATE ENG'R, STATE OF WYO., STATEMENT OF COMPLETION AND DESCRIPTION OF WELL OR SPRING (2007), *available at* http://seo.state.wy.us/PDF/UW6_0107.pdf.

[419] WYO. STAT. ANN. § 41-3-936 (2009).

[420] *See infra* Part III.A.

[421] *See infra* Part III.B.

[422] *See infra* Part III.C.

[423] Robert Glennon, *High and Dry in the West: The Failure to Integrate Management of Ground- and Surface-Water Resources*, SW. HYDROLOGY, July-Aug. 2003, at 12, 13; *see also* Bill Clarke, *Exempt Wells—The End of the Controversy or Just the Beginning??*, AM. WATER RES. ASS'N, WASH. SECTION NEWSL., Jan.-Feb. 2002, at 2, *available at* <http://earth.golder.com/WAAWRA/PDF/2002-01-waarwranews.pdf>.

[424] Glennon, *supra* note 423, at 13; *see infra* text accompanying notes 426-36.

[425] ARIZ. STATE SENATE, ISSUE BRIEF: ARIZONA'S GROUNDWATER MANAGEMENT CODE: EXEMPT WELLS 2 (2008) (stating that Arizona has drill reports for 100,567 exempt wells and 113,191 notices of intent to drill).

[426] Janick F. Artiola & Kristine Uhlman, Univ. of Ariz., Arizona Well Owners Help: Introduction, <http://www.wellownerhelp.org/intro.html> (last visited Nov. 8, 2009).

[427] Blake Johnston et al., Conference Report, *Groundwater in the West*, 8 U. DENV. WATER L. REV. 328, 341 (2004).

[428] *See* PowerPoint: Shelley Keen, Section Manager, Idaho Dep't of Water Rights Water Rights Section, Presentation to the Idaho Water Users Ass'n: Idaho's Domestic Well Exemption (Nov. 6, 2008) (on file with author) [hereinafter Keen Presentation].

[429] CURT MARTIN, MONT. DEPT OF NATURAL RES. & CONSERVATION, MONTANA STATE WATER PLAN ISSUE/DISCUSSION PAPER: PERMITTING EXEMPTION FOR SMALL GROUND WATER DEVELOPMENTS 5 (2008) (on file with author).

[430] WATER MGMT. BUREAU, MONT. DEPT OF NATURAL RES. & CONSERVATION, EFFECTS OF EXEMPT WELLS ON EXISTING WATER RIGHTS 1 (2008); *see also* Walt Williams, *Report: Westerners Increasing Tapping Groundwater Supplies*, Bozeman Daily Chronicle, Mar. 16, 2007, at PIN.

[431] W. Peter Balleau & Steven E. Silver, *Hydrology and Administration of Domestic Wells in New Mexico*, 45 NAT. RESOURCES J. 807, 821 (2005).

[432] Frank B. Titus, *On Regulating New Mexico's Domestic Wells*, 45 NAT. RESOURCES J. 853, 854 (2005).

[433] OR. WATER RES. DEPT, 2008-09 ISSUE BRIEF: EXEMPT-USE WELLS 1 (2008).

[434] MARTI & COLEMAN, *supra* note 370, at 21.

[435] PowerPoint: Ken Slattery, Water Res. Program, Wash. Dep't of Ecology, Presentation at Citizens Workshop on Exempt Wells: Concepts for Clarifying Group Domestic Use 7 (May 31, 2008), available at <http://www.columbia-institute.org/pdf/proceedingsKenSlattery.pdf> [hereinafter Slattery Presentation].

[436] E-mail from Lisa Lindemann to Nathan Bracken, *supra* note 401 (referencing attached answers to author's questions).

[437] W. WATER PROJECT, TROUT UNLIMITED, GONE TO THE WELL ONCE TOO OFTEN: THE IMPORTANCE OF GROUND WATER TO RIVERS IN THE WEST 15 (2007), available at http://www.tu.org/atf/cf/%7B0D18ECB7-7347-445B-A38E-65B282BBB8A%7D/ground%20water%202ed_lores.pdf.

[438] John Shomaker, John Shomaker & Assocs., *Domestic Well Depletions in the Rio Grande Basin*, in 44TH ANNUAL NEW MEXICO WATER CONFERENCE PROCEEDINGS: THE RIO GRANDE COMPACT: IT'S THE LAW! 2 (1999), available at <http://wrri.nmsu.edu/publish/watcon/proc44/shomaker.pdf>.

[439] See, e.g., *id.* at 2-3.

[440] *Id.* at 3.

[441] WATER MGMT. BUREAU, *supra* note 430, at 2.

[442] *Id.* at 7.

[443] *Id.* at 2.

[444] Shomaker, *supra* note 438, at 3.

[445] Maguire, *supra* note 25, at 365.

[446] WATER MGMT. BUREAU, *supra* note 430, at 1-2 (stating that some of the increase in water consumption caused by exempt wells in Montana "will be offset by reduced historic consumption for agriculture where residential development is occurring on irrigated lands"); MONT. ASS'N OF REALTORS, ISSUE BRIEF: HOUSE BILL 104--REVISE EXEMPT WATER RIGHTS LAWS 3 (2007).

[447] MONT. ASS'N OF REALTORS, *supra* note 446, at 3; see also WATER MGMT. BUREAU, *supra* note 430, at 7 ("A new subdivision on land that was previously an irrigated alfalfa field may actually reduce the net depletion to the overall water balance of a basin if the irrigation water rights are forfeited and the new subdivision does not include irrigated lawns, gardens, and ponds.").

[448] See, e.g., WATER MGMT. BUREAU, *supra* note 430, at 2, 6-7; see also MONT. ASS'N OF REALTORS, *supra* note 446, at 3.

[449] See, e.g., WATER MGMT. BUREAU, *supra* note 430, at 2.

[450] See *id.* at 3.

[451] Laura S. Ziemer et al., *Ground Water Management in Montana: On the Road from Beleaguered Law to Science-Based Policy*, 27 PUB. LAND & RESOURCES LAW REV. 75, 77 (2006).

[452] W. WATER PROJECT, *supra* note 437, at 6.

[453] WATER MGMT. BUREAU, *supra* note 430, at 2.

[454] W. WATER PROJECT, *supra* note 437, at 3, 6.

[455] See generally *supra* Part II.

[456] Janine Shinkoskey-Brodine, *Aqua Permanente: Citizens Standing Up*, RIDGE LINE, Spring 2008, at 5.

[457] Mike Johnston, *Differing Opinions on Exempt Well Pact*, DAILY RECORD (Ellensburg, Wash.), March 21, 2008, <http://www.kvnews.com/articles/2008/03/22/news/doc47e4019683ad1119520764.txt> (last visited Nov. 18, 2009) (reporting the opinion of a well driller in Washington's Kittitas County that "the amount of groundwater used by exempt well users is extremely small, and 80 percent of the water drawn from these wells goes back into the aquifer to recharge it").

[458] MICHAEL E. NICKLIN, OVERVIEW OF HB 831 IN ITS CURRENT FORM 1 (2007).

[459] Maguire, *supra* note 25, at 379.

[460] *Id.*; see also *supra* Part I.

[461] See Maguire, *supra* note 25, at 379.

[462] W. WATER PROJECT, *supra* note 437, at 3.

[463] See W. WATER PROEJECT, *supra* note 433, at 3.

[464] WATER MGMT. BUREAU, *supra* note 430, at 1; see also BELL & TAYLOR, *supra* note 4, at 62.

[465] WATER MGMT. BUREAU, *supra* note 430, at 1; see also BELL & TAYLOR, *supra* note 4, at 62.

[466] See, e.g., WATER MGMT. BUREAU, *supra* note 430, at 1.

[467] *Id.*; see generally *supra* Part I.

[468] D'Antonio Presentation, *supra* note 197, at 5.

[469] Maguire, *supra* note 25, at 375.

[470] *Id.* at 380.

[471] *Id.* at 379–80.

[472] See *infra* Part IV.F.

[473] EXEMPT WELLS SUBCOMM., STATEWIDE WATER ADVISORY GROUP, PROPOSAL: WATER INFORMATION FOR WELL OWNERS 1 (2007), available at http://www.adwr.state.az.us/AzDWR/StatewidePlanning/SWAG/documents/Proposal_Well_Information.pdf.

[474] *Id.*

[475] *Id.* at 1–2.

[476] See, e.g., VICTORIA LEUBA, WASH. STATE DEPT OF ECOLOGY, POLICY OPTIONS FOR THE MANAGEMENT OF "EXEMPT" WELLS IN WASHINGTON STATE 2 (2007), available at <http://www.swwrc.wsu.edu/conference2007/12A-Leuba.pdf>; Maguire, *supra* note 25, at 379 ("No one is exactly sure how extensively exempt wells affect the aquifers they tap.").

[477] EXEMPT WELLS TOPIC PAPER 2 (Sheilagh Byler & Keith Higman eds., 2004), available at http://www.islandcounty.net/health/WatershedPlanning/WatershedPlanning/TopicPapers/Exempt%20Wells%20_final.pdf; see also Shomaker, *supra* note 438, at 5 ("One difficulty with [exempt wells in New Mexico] is that their characteristics, and particularly the amounts of water pumped from them, are only very poorly known.").

[478] See Caldwell, *supra* note 355, at 1105, 1108.

[479] See *supra* Part II.

[480] See *supra* Part II.

[481] See, e.g., MARTIN, *supra* note 429, at 3–4.

[482] *Id.* at 3–4 (stating that approximately 60–70% of domestic well users file notices of completion).

[483] See discussion *supra* Part II.D.2 (explaining that Colorado did not require permits for wells dug before 1972); see also MARTI & COLEMAN, *supra* note 370, at 21 (discussing the lack of information about exempt wells in Washington).

[484] MARTI & COLEMAN, *supra* note 370, at 21.

[485] See *id.*

[486] See *supra* Part II.

[487] MARTI & COLEMAN, *supra* note 370, at 21.

[488] *Id.* at 22.

[489] *Id.* at 21–22.

[490] *Id.*

[491] See, e.g., *id.* at 21.

[492] *Id.* at 22.

[493] *Id.*

[494] HDR, SNAKE RIVER REGION SALMON RECOVERY AND WALLA WALLA WATERSHED DETAILED IMPLEMENTATION PLAN 4-2 n.1 (2006), available at http://www.wallawallawatershed.org/old/_acrobat/WRIA32WatershedPlan/DIP/FINAL_DIP_FULL_JUNE_2006.pdf (stating that statutory exempt well limits in Washington's Walla Walla Basin "are not well-heeded due to lack of enforcement, and that water usage can often be 2–5 times higher than the limit throughout the irrigation season").

[495] See MARTIN, *supra* note 429, at 8.

[496] *Id.*

[497] *Id.* at 8–9.

[498] *Id.* at 8.

[499] See *id.*

[500] Michael E. Nicklin, Nicklin Earth & Water, Inc., Presentation to Water Policy Interim Committee: Update on Evaluations Significance of Exempt Wells: Montana's Closed Basins 2 (Jan. 15, 2008), available at http://leg.mt.gov/content/Committees/Interim/2007_2008/water_policy/staffmemos/evaluationssignificance.pdf.

[501] *Id.*

[502] *Id.*

[503] WATER MGMT. BUREAU, *supra* note 430, at 3.

[504] *Id.* at 1.

[505] *Id.* at 1, 3.

[506] *See id.* at 1.

[507] *See* Jim Elliott, *More People, Less Water*, MONT. VIEWPOINT, Mar. 17, 2008, <http://www.jimelliott.org/HTML/Article%20Archives/2008/171-PeopleWater.html> (last visited Nov. 11, 2009).

[508] *See, e.g., id.*

[509] Shomaker, *supra* note 438, at 6.

[510] *See id.*

[511] *See id.*

[512] *Id.*

[513] Hanak & Browne, *supra* note 55, at 155.

[514] *Id.*

[515] *See infra* Part VI.B.

[516] *See infra* Part VI.B.

[517] *See* MARTIN, *supra* note 429, at 22.

[518] LESLIE A. DESIMONE ET AL., U.S. DEPT OF THE INTERIOR, QUALITY OF WATER FROM DOMESTIC WELLS IN PRINCIPAL AQUIFERS OF THE UNITED STATES, 1991-2004: OVERVIEW OF MAJOR FINDINGS 17 (2009), available at <http://pubs.usgs.gov/sir/2008/5227/includes/sir2008-5227.pdf>. The benchmarks to which the report refers are the U.S. Environmental Protection Agency's (EPA) Maximum Containment Levels (MCLs) and the USGS's Health-Based Screening Levels. *Id.* at 2.

[519] *Id.* at 32.

[520] *Id.* at 2.

[521] *See infra* Part III.C.1.

[522] *See infra* Part III.C.2.

[523] *See infra* Part III.C.3.

[524] *See infra* Part III.C.4.

[525] *See infra* Part III.C.5.

[526] *See infra* Part III.C.6.

[527] DESIMONE ET AL., *supra* note 518, at 18.

[528] *Id.*

[529] *Id.* at 18-19.

[530] *Id.*

[531] *Id.* at 18.

[532] *Id.* at 22.

[533] *Id.*

[534] *Id.* at 23.

[535] *Id.*

[536] *Id.* at 24.

[537] *Id.*

[538] *Id.*

[539] *Id.* at 3.

[540] *Id.*

[541] *Id.*

[542] Caldwell, *supra* note 355, at 1113.

[543] *Id.*

[544] DESIMONE ET AL., *supra* note 518, at 25.

[545] *Id.* at 25–26.

[546] *Id.* at 26.

[547] NAT'L CTR. FOR ENVTL. HEALTH, CTRS. FOR DISEASE CONTROL & PREVENTION, A SURVEY OF THE QUALITY OF WATER DRAWN FROM DOMESTIC WELLS IN NINE MIDWEST STATES 4 (1998), available at <http://www.cdc.gov/nceh/hsb/disaster/pdfs/A%20Survey%20of%20the%20Quality%20of%20Water%20Drawn%20from%20Domestic%20Wells%20in%20Nine%20Midwest%20States.pdf> (displaying page 1 of the Executive Summary section).

[548] *Id.* at 5 (displaying page 2 of the Executive Summary section).

[549] *Id.*

[550] See Caldwell, *supra* note 355, at 1115.

[551] DESIMONE ET AL., *supra* note 518, at 26.

[552] MARTIN, *supra* note 429, at 13.

[553] Caldwell, *supra* note 355, at 1114.

[554] *Id.*

[555] *Id.* at 1118.

[556] *Id.* (citing SARAH J. RYKER & ALEX K. WILLIAMSON, PESTICIDES IN PUBLIC SUPPLY WELLS OF THE CENTRAL COLUMBIA PLATEAU: U.S. GEOLOGICAL SURVEY FACT SHEET NO. 205-96 (1996), <http://wa.water.usgs.gov/pubs/fs/fs205-96> (last visited Nov. 23, 2009)).

[557] NAT'L CTR. FOR ENVTL. HEALTH, *supra* note 547, at 5 (displaying page 2 of Executive Summary section).

[558] See Caldwell, *supra* note 355, at 1118.

[559] DESIMONE ET AL., *supra* note 518, at 2 (emphasis omitted).

[560] NAT'L CTR. FOR ENVTL. HEALTH, *supra* note 547, at 22 (displaying page 2 of Well Water Discussion, Limitations, Conclusions, and Recommendations section).

[561] See *id.* at 5 (displaying page 2 of Executive Summary section).

[562] See *id.*

[563] *Id.*

[564] *Id.* at 6 (displaying page 3 of Executive Summary section).

[565] MARTIN, *supra* note 429, at 4.

[566] NAT'L CTR. FOR ENVTL. HEALTH, *supra* note 547, at 5 (displaying page 2 of Executive Summary section); see also MARTIN, *supra* note 429, at 13 ("[T]o the extent that septic systems are not adequately treating for nitrates and other contaminants, the current problem involves inadequate or failing existing systems and not just the addition of new ones.").

[567] NAT'L CTR. FOR ENVTL. HEALTH, *supra* note 547, at 5 (displaying page 2 of Executive Summary section).

[568] See Caldwell, *supra* note 355, at 1113.

[569] *Id.* at 1119.

[570] *Id.* at 1120.

[571] Shomaker, *supra* note 438, at 5.

[572] *Id.*

[573] Caldwell, *supra* note 355, at 1116.

[574] *Id.*

[575] *Id.*

[576] *Id.* at 1117.

[577] *Id.*

[578] EXEMPT WELLS TOPIC PAPER, *supra* note 477, at 1-2.

[579] *Id.* at 2.

[580] INTERSTATE STREAM COMM'N, N.M. OFFICE OF THE STATE ENGR, FACT SHEET: CAN YOU TELL ME ABOUT DOMESTIC WELLS IN NEW MEXICO?, available at <http://www.ose.state.nm.us/water-info/NMWaterPlanning/fact-sheets/domesticwells.pdf>.

[581] Shomaker, *supra* note 438, at 3.

[582] MARTIN, *supra* note 429, at 13 (noting that some of Montana's high-growth rural subdivisions have shown gradually rising levels of nitrates and traces of pharmaceutical chemicals).

[583] *Id.*

[584] See generally Caldwell, *supra* note 355, at 1118-20.

[585] Artiola & Uhlman, *supra* note 426.

[586] Caldwell, *supra* note 355, at 1119.

[587] See generally *id.* at 1118-19.

[588] *Id.* at 1120.

[589] See *infra* Part IV.A.

[590] See *infra* Part IV.B.

[591] See *infra* Part IV.C.

[592] See *infra* Part IV.D.

[593] See *infra* Part IV.E.

[594] See *infra* Part IV.F.

[595] See *infra* Part IV.G.

[596] See *infra* Part IV.H.

[597] Maguire, *supra* note 25, at 379-80.

[598] *Id.*

[599] *Id.* at 379.

[600] *Id.*

[601] *Id.* at 380.

[602] *Id.* at 379-80.

[603] W. WATER PROJECT, *supra* note 437, at 15.

[604] Artiola & Uhlman, *supra* note 426.

[605] *Id.*

[606] DIV. OF WATER RES., *supra* note 65, at 2.

[607] *Id.*

[608] COLO. CONST. art. XVI, § 6.

[609] See generally COLO. DIV. OF REAL ESTATE, DEPT OF REGULATORY AGENCIES, REAL ESTATE MANUAL (2006).

[610] Keen Presentation, *supra* note 428.

[611] *Id.*

[612] *Id.*

[613] *Id.*

[614] *Id.*

[615] *Id.*

[616] *Id.*

[617] *Id.*

[618] *Id.*

[619] E-mail from Jeff Peppersack, Chief, Water Allocation Bureau, Idaho Dep't of Water Res., to Nathan Bracken, Legal Counsel, W. States Water Council (Feb. 3, 2009, 11:13:00 MST) (on file with author).

[620] *Id.*

[621] IDAHO CODE ANN. § 42-201(7) (Supp. 2009); see also E-mail from Jeff Peppersack to Nathan Bracken, *supra* note 619.

[622] IDAHO CODE ANN. § 42-201(7) (Supp. 2009).

[623] E-mail from Jeff Peppersack to Nathan Bracken, *supra* note 619.

[624] *Id.*

[625] Keen Presentation, *supra* note 428.

[626] Elliott, *supra* note 507.

[627] Jennifer McKee, *Legislature Focuses on Zoning Bills*, MISSOULIAN, Mar. 6, 2007, http://www.missoulian.com/news/local/article_96129340-84a2-5732-bdd3-8ff6a51bd100.html (last visited Nov. 23, 2009).

[628] *Id.*

[629] WATER MGMT. BUREAU, *supra* note 430, at 7.

[630] *Id.*

[631] *Id.* at 6.

[632] *Id.* at 7.

[633] *Id.* at 1.

[634] Nicklin, *supra* note 500, at 5.

[635] Lindsay Drilling, Gallatin Valley Resources Evaluation, <http://www.lindsaydrilling.com/groundwater/article.asp?article=3915> (last visited Nov. 10, 2009).

[636] *Id.* ("[T]otal domestic (household) consumption of groundwater from exempt wells is negligible and equates to about 0.01% of Gallatin River flow entering the valley annually.").

[637] *Id.*

[638] NICKLIN, *supra* note 458, at 1.

[639] Nicklin, *supra* note 500, at 2-5.

[640] *Id.* at 2.

[641] MONT. ASS'N OF REALTORS, *supra* note 446, at 2 ("[A]n independent analysis of snowpack, precipitation, well, stream flow, and groundwater level data from the Gallatin Valley found extremely negligible impact from exempt wells on groundwater levels.").

[642] MARTIN, *supra* note 429, at 1; MONT. ASS'N OF REALTORS, *supra* note 446, at 1.

[643] Memorandum from Mont. Ass'n of Realtors to Water Policy Interim Comm. 1 (May 27, 2008), available at http://leg.mt.gov/content/committees/interim/2007_2008/water_policy/meetings/minutes/wpic06102008_ex02.pdf.

[644] H.B. 104, 60th Leg., Reg. Sess. § 2 (Mont. 2007).

[645] *Id.*

[646] See Mont. Legislature, Detailed Bill Information, [http://laws.leg.mt.gov/laws07/LAW0203W\\$BSRV.ActionQuery?P_BLTRP_BILL_TYP_CD=HB&P_BILL_NO=0104.01&P_BILL_DFT_NO=&P_CHPT_NO=&Z_ACTION=Find&P_SBJ_DESCR=&P_SBJT_SBJ_CD=&P_LST_NM1=&P_ENTY_ID_SEQ=](http://laws.leg.mt.gov/laws07/LAW0203W$BSRV.ActionQuery?P_BLTRP_BILL_TYP_CD=HB&P_BILL_NO=0104.01&P_BILL_DFT_NO=&P_CHPT_NO=&Z_ACTION=Find&P_SBJ_DESCR=&P_SBJT_SBJ_CD=&P_LST_NM1=&P_ENTY_ID_SEQ=) (last visited Nov. 23, 2009) (indicating that the bill died in standing committee on April 27, 2007).

[647] MARTIN, *supra* note 429, at 13.

[648] *Id.*

[649] *Id.*

[650] *Id.*

[651] NEV. DIV. OF WATER RES., NEVADA STATE WATER PLAN, at 1E-2 (1999), available at <http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt3-1e.pdf>.

[652] *Id.*

[653] *Id.* at 1E-2 to -3.

[654] *Id.* at 1E-3.

[655] E-mail from Richard A. Felling, Chief, Hydrology Section, Nev. Div. of Water Res., to Nathan Bracken, Legal Counsel, W. States Water Council (Feb. 10, 2009, 09:55:00 MST) (on file with author).

[656] See E-mail from Jason King to Nathan Bracken, *supra* note 171.

[657] NEV. DIV. OF WATER RES., *supra* note 651, at 1E-3.

[658] *Id.*

[659] *Id.*

[660] *Id.* at 1E-1; see also NEV. REV. STAT. § 533.360(3) (2007).

[661] NEV. DIV. OF WATER RES., *supra* note 651, at 1E-1.

[662] E-mail from Jason King to Nathan Bracken, *supra* note 171.

[663] Drennan, *supra* note 198, at 937.

[664] *Bounds v. New Mexico ex rel. D'Antonio*, No. CV-2006-166, slip op. at 4 (N.M. 6th Jud. Dist. July 10, 2008).

[665] *Id.* at 4-5.

[666] *Id.* at 5.

[667] *Litigation/Water Rights: Exempt Wells/New Mexico*, *supra* note 228, at 1.

[668] *Id.*

[669] *Bounds*, No. CV-2006-166, slip op. at 1.

[670] See Joel Gay, *Water Worries: Recent Court Decision Regarding Domestic Water Wells Could Have Enormous Implications Statewide*, N.M. INDEPENDENT, July 18, 2008, <http://newmexicoindependent.com/686/water-worries> (last visited Nov. 10, 2009).

[671] *Id.*

[672] *Id.*

[673] *Id.*

[674] *Id.*

[675] *Id.*

[676] *Id.*

[677] *Id.*

[678] *See id.*

[679] *Id.*; see also S.B. 89, 46th Leg., 2d Sess. § 2 (N.M. 2004) (as introduced), available at <http://legis.state.nm.us/Sessions/04%20Regular/bills/senate/SB0089.pdf>.

[680] Gay, *supra* note 670.

[681] *Id.*

[682] *Id.*

[683] Titus, *supra* note 432, at 859; Gay, *supra* note 670.

[684] Gay, *supra* note 670; see also S.B. 89, § 1(A)(4)-(5).

[685] D'Antonio Presentation, *supra* note 197, at 5.

[686] Balleau & Silver, *supra* note 431, at 833.

[687] See Drennan, *supra* note 198, at 940.

[688] *Id.* at 945.

[689] Balleau & Silver, *supra* note 431, at 833.

[690] *Id.*

[691] *Id.* at 834.

[692] *Id.* at 833.

[693] *Id.* at 833-34.

[694] *Id.* at 833.

[695] Peter Wong, *Measure 49 is New Chapter in Land Use, May Not Be Last*, STATESMAN J. (Salem, Or.), Oct. 21, 2007, available at <http://community.statesmanjournal.com/tools/pdf/pdfarticle.php?artid=710210312>.

[696] *Id.*

[697] OR. DEPT OF ADMIN. SERVS. & OR. DEPT OF LAND CONSERVATION & DEV., BALLOT MEASURE 37 (2004) & PROPOSED BALLOT MEASURE 49: QUESTIONS & ANSWERS 1 (2007), available at <http://library.state.or.us/repository/2007/200710181209574/index.pdf> [hereinafter ODAS].

[698] *Id.*

[699] PowerPoint: Todd Jarvis, Assoc. Dir., Or. State Univ. Inst. for Water & Watersheds, Oregon's Measure 37 & Communities of Dueling Experts (June 2007), available at http://water.oregonstate.edu/projects/2007/M37_June2007.pdf [hereinafter Jarvis Presentation]; see also Erik Mortenson, *Measure 49 Will Scale Back Rural Housing Development*, OREGONIAN, June 19, 2008, http://www.oregonlive.com/environment/index.ssf/2008/06/measure_49_will_drastically_cu.html (last visited Nov. 6, 2009); see also *Dropping Rural Oregon Groundwater Levels*, BEND BULLETIN, Mar. 14, 2007, <http://www.waterwatch.org/pressroom/press-clips/dropping-rural-oregon-groundwater-levels-causing-concerns> (last visited Nov. 6, 2009).

[700] *Dropping Rural Oregon Groundwater Levels*, *supra* note 699.

[701] OR. STATE UNIV., WELLS AND THE WELL-BEING OF OREGON: A ONE-DAY SYMPOSIUM (2008), available at <http://oregonstate.edu/conferences/wells2008/overview.pdf>.

[702] Jarvis Presentation, *supra* note 699, at 10.

[703] See generally *Dropping Rural Oregon Groundwater Levels*, *supra* note 699; Jo McIntyre, *Forum Raises Water Questions*, CAP. PRESS, May 18, 2007, available at http://archives.capitalpress.com/archive_detail.php?archiveFile=pubfiles/cps/archive/2007/May/18/News/cpa32352.xml&start=0&numPer=20&keyword=Forum+Raises+Water+Questions§ionSearch=&begindate=1%2F1%2F2002&enddate=11%2F6%2F2009&authorSearch=&IncludeStories=1&pubsection=&page=&IncludePages=1&IncludeImages=1&mode=allwords&archive_pubname=%0A++++++ (last visited Nov. 8, 2009).

[704] ODAS, *supra* note 697, at 1.

[705] *Id.* at 2; Mortenson, *supra* note 699.

[706] Mortenson, *supra* note 699.

[707] *Id.* ("Instead of having potentially more than 100,000 new houses built in the countryside, Oregonians will see about 13,000, according to state projections.")

[708] OR. STATE UNIV., *supra* note 701, at 1.

[709] *Id.*

[710] H.R. 2859, 75th Leg. Assem., Reg. Assem. (Or. 2009) (as introduced).

[711] *Id.*

[712] 1997 Wash. Op. Att'y Gen. No. 6 (1997), <http://www.atg.wa.gov/opinion.aspx?section=archive&id=9200> (last visited Nov. 14, 2009).

[713] Caldwell, *supra* note 355, at 1106.

[714] *Id.*

[715] *Id.*

[716] 43 P.3d 4 (Wash. 2002).

[717] *Id.* at 10

[718] *Id.* at 6-8.

[719] *Id.* at 8.

[720] *Id.* at 12-13.

[721] *Id.* at 10.

[722] *Id.* at 15.

[723] Slattery Presentation, *supra* note 435, at 6, 19.

[724] WASH. REV. CODE § 90.44.052 (2008).

[725] *Id.*

[726] H.R. REP. 2067-58, at 2 (Wash. 2003). At the time of the program's enactment, Whitman County's ordinances required farmland to lie idle for three years before it could be developed, and Ecology had not issued a water permit in the county for over a decade. *Id.* at 2.

[727] Kittitas County Memorandum, *supra* note 373, at 1; see also Philip Ferolito, *Agreement on New Kittitas County Wells Looks Shaky*, YAKIMA HERALD-REPUBLIC, Mar. 4, 2009, <http://www.yakima-herald.com/stories/2009/03/04/agreement-regulating-new-wells-looks-shaky> (last visited Dec. 1, 2009) (describing Kittitas County as "an area planned for much growth").

[728] Kittitas County Memorandum, *supra* note 373, at 1; see also Sarah Mack, *New Restrictions on Exempt Wells and Land Development Imposed in Kittitas County, Washington State*, 12 W. WATER LAW & POL'Y REP. 204, 204 (2008). According to an Ecology news release, "[s]ince 1998, nearly 3,000 wells have been drilled in Kittitas County, prompting concerns that groundwater pumping in the headwaters region of the county threatens senior water users and streamflows in the Yakima Basin." Press Release, Wash. Dep't of Ecology, *Emergency Rule Closes New Groundwater Withdrawals in Upper Kittitas County* (July 16, 2009), <http://www.ecy.wa.gov/news/2009news/2009-165.html> (last visited Dec. 1, 2009) [hereinafter Ecology Emergency Rule].

[729] WASH. REV. CODE § 34.05.330 (2008).

[730] *Id.* § 90.54.050(2).

[731] Aqua Permanente, Petition to Department of Ecology to Adopt RCW 90.54.050 Setting Aside or Withdrawing Ground Waters of Kittitas County 1, 3 (Sept. 10, 2007) (on file with author).

[732] Kittitas County Memorandum, *supra* note 373, at 1. Under the agreement, Ecology will hire a watermaster and the county will add new staff to monitor and collect groundwater use in the upper portion of the county. *Id.* at 5.

[733] *Id.* at 1-2, 4. The agreement does not apply to the historical use of existing wells, but will apply to existing wells "that will be utilized to serve additional lots or further development beyond their historical use." *Id.* at 8.

[734] *Id.* at 1. The agreement expressly allows developments to acquire existing water rights to supplement the 5000 gpd received from exempt groundwater wells. *Id.* at 2.

[735] *Id.* at 2-3.

[736] Ecology Emergency Rule, *supra* note 728.

[737] Ferolito, *supra* note 727.

[738] Press Release, Wash. Dep't of Ecology, *Ecology Launches Kittitas Water Exchange Website* (Aug. 31, 2009), <http://www.ecy.wa.gov/news/2009news/2009-214.html> (last visited Dec. 1, 2009). The rule will be in place for a maximum of 120 days and those with vested building permit applications and permits issued as of July 16, 2009 will not be subject to the closure. *Id.*; Ecology Emergency Rule, *supra* note 728.

[739] Press Release, Wash. Dep't of Ecology, *supra* note 738; see Wash. Dep't of Ecology, *New Ground Water Uses and the Upper Kittitas Water Exchange*, <http://www.ecy.wa.gov/programs/wr/cwp/wtrxchg.html> (last visited Nov. 14, 2009).

[740] *Id.*

[741] *Id.*

[742] Press Release, Wash. Dep't of Ecology, Ecology to Clarify Kittitas Groundwater Rule, Plans to Rejoin Kittitas Commissioners in Exempt Well Talks (July 24, 2009), <http://www.ecy.wa.gov/news/2009news/2009-176.html> (last visited Dec. 1, 2009).

[743] WASH. ADMIN. CODE §§ 173-503-051 to -052 (2009).

[744] *Id.* § 173-503-060(1).

[745] *Id.* §§ 173-503-060(2)-(3). Ecology will reject the water right application if domestic potable water can be provided by another public water system. *Id.* § 173-503-060(2).

[746] *Id.* §§ 173-503-060(5)-(6). Water users required to measure water must provide "a reasonable right of inspection, allow access for the meter to be read, and report the data to [Ecology] or a local entity [that Ecology] designates." *Id.* § 173-503-060(5). Ecology may also "require additional users to measure water use" if Ecology "determines that water supplies warrant further monitoring." *Id.*

[747] WASH. REV. CODE. § 90.44.050 (2008).

[748] Dunn, *supra* note 360, at 264-67.

[749] *Id.* at 264 (emphasis added).

[750] *Id.* at 265 (citing Dennis v. Wash. Dep't of Ecology, PCHB 01-073, 2001 WA ENV LEXIS 46, at *21 (Sept. 27, 2001)).

[751] *Id.* at 266-67 (citing 2005 Wash. Op. Att'y Gen. No. 17, 2 (2005)).

[752] *Id.* at 267.

[753] See, e.g., *id.* at 274.

[754] *E.g.*, *id.*

[755] *Id.* at 251.

[756] *Id.* at 257-58.

[757] *Id.* at 261-62.

[758] *Id.*

[759] *Id.* at 249.

[760] *Id.* at 284.

[761] Letter from Jay Manning, Dir., Wash. Dep't of Ecology, to Senator Lisa Brown et al. (Dec. 4, 2008), available at <http://www.washingtoncattlemen.org/documents/manning%20response%20to%20stockwater%20memoranda.pdf>.

[762] *Id.*

[763] *Id.*

[764] *Id.*

[765] *Id.*

[766] David Lester, *Stock Water Dust-Up Growing*, YAKIMA HERALD-REPUBLIC, Dec. 12, 2008, <http://www.yakima-herald.com/stories/2008/12/11/stock-water-dust-up-growing> (last visited Dec. 1, 2009).

[767] *Id.*

[768] Letter from Jay Manning to Senator Lisa Brown et al., *supra* note 761.

[769] Shomaker, *supra* note 438, at 5.

[770] Balleau & Silver, *supra* note 431, at 832; see also Shomaker, *supra* note 438, at 5 (stating that metering would be "very expensive to institute and administer").

[771] See generally Balleau & Silver, *supra* note 431, at 832 (explaining the high cost of metering wells).

[772] *Id.*

[773] Titus, *supra* note 432, at 861-62.

[774] See Shomaker, *supra* note 438, at 3; see also Keen Presentation, *supra* note 428 ("Most users don't approach anything close to [Idaho's] 13,000 gpd anyway.").

[775] Balleau & Silver, *supra* note 431, at 815; see also Shomaker, *supra* note 438, at 5.

[776] See *supra* Part II.

[777] See *supra* Parts II.H, II.M, II.Q.

[778] See *supra* Part II.E.

[779] See *supra* Part II.Q.

[780] Balleau & Silver, *supra* note 431, at 832; see also PowerPoint: Gary Woodard, Assistant Dir., Ctr. for Sustainability of Semi-Arid Hydrology & Riparian Areas, Gaining Insights on Domestic Water Demand Through Remote Sensing: Applications of Low-Cost Loggers, available at http://www.sahra.arizona.edu/research/TAS/loggers_web.pdf ("Efforts . . . based on micro-metering and self-reported usage logging suffer from [the] Hawthorne effect[,] self-selection bias[,] [and] small sample sizes").

[781] Balleau & Silver, *supra* note 431, at 816, 832 (citing NAT'L ACAD. OF SCI., ESTIMATING WATER USE IN THE UNITED STATES: A NEW PARADIGM FOR THE NATIONAL WATER-USE INFORMATION PROGRAM app. A, at 167 (2002)).

[782] Titus, *supra* note 432, at 861-62.

[783] Balleau and Silver, *supra* note 431, at 815-16, 832.

[784] See *id.* at 833; see also Keen Presentation, *supra* note 428.

[785] See, e.g., *supra* Parts II.B.1 (discussing Arizona), II.D.1 (discussing Colorado), II.E.1 (discussing Idaho), II.I.1 (discussing Nevada), II.M.1 (discussing Oregon), II.P.1 (discussing Utah), II.Q.1 (discussing Washington).

[786] Balleau & Silver, *supra* note 431, at 815-16 (stating remote sensing and aerial imagery suggests that "some tracts of land with domestic wells support more than one acre of healthy vegetation").

[787] WATER MGMT. BUREAU, *supra* note 430, at 5.

[788] *Id.*

[789] *Id.*

[790] MARTIN, *supra* note 429, at 9.

[791] *Id.* at 8-9.

[792] See, e.g., Kari Lydersen, *Water Measured from the Sky*, WASH. POST, Sept. 14, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/09/13/AR2009091302368.html> (last visited Jan. 14, 2009); see also LAURA ROCCHIO, NAT'L AERONAUTICS & SPACE ADMIN., PRECIOUS RESOURCES: WATER & LANDSAT'S THERMAL BAND (2007), available at http://landsat.gsfc.nasa.gov/pdf_archive/soc_0011.pdf.

[793] Interview with Anthony Willardson, Deputy Dir., W. States Water Council, in Midvale, Utah (Apr. 8, 2009).

[794] *Id.*

[795] *Id.*

[796] DESIMONE ET AL., *supra* note 518, at 1.

[797] *Id.* at 4.

[798] *Id.*

[799] KEVIN B. MCCRAY, NAT'L GROUND WATER ASS'N, CONGRESSIONAL BRIEFING: QUALITY OF GROUND WATER FROM PRIVATE DOMESTIC WELLS 9 (2009) (on file with author).

[800] See generally *id.*

[801] See *infra* Part VI.A.

[802] See *infra* Part VI.B.

[803] See *infra* Part VI.C.

[804] See generally Caldwell, *supra* note 355, at 1103-04.

[805] *Id.* at 1134-35.

[806] See *supra* Parts IV.D, IV.F.

[807] MARTIN, *supra* note 429, at 1; see also MONT. ASS'N OF REALTORS, *supra* note 446, at 3.

[808] See *supra* Part III.B.4.

[809] See Keen Presentation, *supra* note 428.

[810] *Id.*

- [811] *Id.* ("IDWR's transfer backlog already exceeds the number it can process in one year.")
- [812] See W. GOVERNORS' ASS'N, *supra* note 1, at 3.
- [813] Balleau & Silver, *supra* note 431, at 829.
- [814] *Id.*
- [815] See *id.*
- [816] *Id.* ("Public water supply users have higher per capita demand according to agency reports.")
- [817] See *infra* Part VI.B.
- [818] BELL & TAYLOR, *supra* note 4, at 61 n.503.
- [819] See *supra* Part II.
- [820] Keen Presentation, *supra* note 428.
- [821] Balleau & Silver, *supra* note 431, at 830.
- [822] KAN. STAT. ANN. §§ 82a-701(d), 82a-705 (2008); NEV. REV. STAT. §§ 534.080, .180 (2007); OR. REV. STAT. § 5377.545(2)-(3) (2007); WASH. REV. CODE § 90.44.050 (2008).
- [823] Keen Presentation, *supra* note 428.
- [824] Balleau & Silver, *supra* note 431, at 831.
- [825] See *infra* Part VI.B.5.
- [826] See Balleau & Silver, *supra* note 431, at 832; see also *supra* note 98 and accompanying text.
- [827] See *supra* Parts II.H, II.Q.
- [828] See TEX. LOC. GOV'T CODE ANN. § 232.022 (Vernon 2005); E-mail from Ken Peterson to Nathan Bracken, *supra* note 301.
- [829] See ODAS, *supra* note 697, at 11.
- [830] See Titus, *supra* note 432, at 859.
- [831] Hanak & Browne, *supra* note 55, at 155.
- [832] See MARTIN, *supra* note 429, at 13-14.
- [833] ARIZ. REV. STAT. ANN. § 45-108(B) (2002).
- [834] See COLO. REV. STAT. § 37-91-105(1) (2009); N.M. STAT. ANN. § 47-6-11(H) (LexisNexis 1995) (stating that an adverse finding as to whether the subdivision will have adequate water supply will trigger a procedural hearing, and the final decision to approve the subdivision falls on the Board of County Commissioners).
- [835] See MARTIN, *supra* note 429, at 9.
- [836] ARIZ. REV. STAT. ANN. § 32-2183(G), (I) (2007).
- [837] See *id.* § 45-454(C) (2008).
- [838] OR. REV. STAT. §§ 537.730, .775 (2007).
- [839] WASH. REV. CODE § 90.54.050 (2008).
- [840] See *supra* IV.H.1.
- [841] MONT. CODE ANN. § 85-2-306(3)a (2009).
- [842] MARTIN, *supra* note 429, at 11.
- [843] See *supra* Part V.A.
- [844] See *supra* Part VI.B.3.
- [845] MARTIN, *supra* note 429, at 20.
- [846] *Id.*

[847] *Id.*

[848] *See id.*

[849] Shomaker, *supra* note 438, at 5.

[850] *Id.*

[851] Balleau & Silver, *supra* note 431, at 818.

[852] *Id.*

[853] *See supra* Part III.B.1.

[854] Shomaker, *supra* note 438, at 5.

[855] *Id.*

[856] *Id.*

[857] *Id.*

[858] *Id.*

[859] Balleau & Silver, *supra* note 431, at 819.

[860] *Id.*

[861] *See id.*

[862] *See* Shomaker, *supra* note 438, at 5.

[863] *See id.*

[864] COLO. REV. STAT. §§ 37-92-602(4) (2009); KAN. STAT. ANN. § 82a-707(c) (2008); NEV. REV. STAT. § 534.080(4) (2007); N.D. CENT. CODE § 61-04-02 (2009); OR. REV. STAT. § 537.545(2)-(3) (2007); WASH. REV. CODE § 90.44.130 (2008); WYO. STAT. ANN. § 41-3-911(a) (2009). South Dakota also allows for the construction of dams of exempt dugouts that obtain a priority date. S.D. CODIFIED LAWS §§ 46-4-1.1; 46-4-3 to -4-6; 46-5-2 (2004).

[865] *See* MARTIN, *supra* note 429, at 21.

[866] BELL & TAYLOR, *supra* note 4, at 61-62.

[867] *See* MARTIN, *supra* note 429, at 21.

[868] *Id.*

[869] *Id.*

[870] ARIZ. REV. STAT. ANN. § 45-454C (2003); COLO. REV. STAT. § 37-92-602(6) (2009); NEV. REV. STAT. § 534.120(3)(d) (2009); N.M. STAT. § 3-51-1.1 (2009); OKLA. STAT. ANN. tit. 82, § 1020.21 (West 1990); *see also* Stephanie Taveres, *Water Officials to Crack Down on Overuse of Private Wells*, LAS VEGAS SUN, May 29, 2009, <http://www.lasvegassun.com/news/2009/may/29/water-officials-crack-down-overuse-private-wells> (last visited Nov. 10, 2009) ("[Nevada] law allows anyone with a home that has no access to municipal water to build a domestic well after informing the state engineer.").

[871] *See* Clarke, *supra* note 423, at 2-3; *see also* Balleau & Silver, *supra* note 431, at 834.

[872] *See* Balleau & Silver, *supra* note 431, at 834.

[873] N.J. STAT. ANN. § 58:12A-27 (West 2006); R.I. GEN. LAWS § 5-20.8-12 (2004); OR. ADMIN. R. 333-061-0325 (2009); 14-180-011 R.I. CODE R. § 11.1(b) (Well, LEXIS through Dec. 24, 2009).

[874] Kittitas County Memorandum, *supra* note 373.

[875] DESIMONE ET AL., *supra* note 518, at 4.

[876] MCCRAY, *supra* note 799, at 4.

[877] DESIMONE ET AL., *supra* note 518, at 4.

[878] *See generally* MCCRAY, *supra* note 799, at 6-7. Some inexpensive and simple well maintenance techniques include locating future gardens where pesticides or fertilizers will be applied away from the wellhead area, "checking the well casing above and below ground," and servicing "water treatment equipment according to the manufacturer's recommendations." *Id.*