Land subsidence is a problem that affects many areas of the world, with well-publicized case studies in Mexico City, Tokyo, and certain areas within California and Arizona. Extended drought conditions in the Western United States are causing additional groundwater demands that threaten additional land subsidence and related property damage. Although Arizona has actively managed groundwater withdrawals within its active management areas since the 1980s, the potential for land subsidence damage is still a serious concern in a number of areas within the state.

When subsidence damage occurs in Arizona as a result of groundwater withdrawals, is anyone liable to pay for such damage? This question still remains to be answered by Arizona's courts. This article briefly explores the status of Arizona law regarding potential liability for subsidence damage.

WHAT IS LAND SUBSIDENCE?
“Subsidence” is the settling or lowering of the surface of the land that results from the withdrawal of groundwater (or the withdrawal of other subterranean substances). See, e.g. A.R.S. § 45-402(36) (definition of subsidence). The water or other substance within the pore spaces between underground materials often plays a role in supporting the ground elevation, and when it is withdrawn from the pore spaces, the ground particles may consolidate, causing the surface to sink. Subsidence can be caused by human activities, including groundwater withdrawals, withdrawal of oil or gas, and mining activities, and also non-human causes such as drought, earth shifts, and dissolving salts.

Most people are unaware of land subsidence occurring, and if subsidence occurs evenly across a large area, it may not even cause visible damage. Did you know there are areas in Maricopa and Pinal Counties in Arizona that have subsided more than 18 feet since the early 1900s? See http://www.azwater.gov/AzDWR/Hydrology/Geophysics/LandSubsidenceInArizona.htm.[2] But, if land subsidence occurs unevenly across an area, the changes in the ground levels can result in earth fissures or even faulting. Uneven ground level changes can damage underground water and sewer pipes, wells, building foundations, and can also damage above-ground structures such as roads, bridges, canals, and buildings. Additionally, the loss of pore space (water storage space) in the ground is probably permanent.

WHO PAYS?
So who pays for subsidence damage after it occurs? There is no easy answer to this question. Statutory law regarding subsidence is very limited, and the answer will likely come in a future lawsuit. Discussed below are statutes and case law that may influence the answer.

Subsidence Statutes
Arizona has statutes and rules that address subsidence expressly, but the provisions relate to prevention. Arizona's water management and zoning statutes focus primarily on preventing subsidence from occurring (or worsening), or avoiding construction of infrastructure in areas prone to subsidence. See, for example, A.R.S. §§ 9-463.01(C)(4) (city ordinance shall determine that certain lands may not be subdivided), 27-652(D) (oil and gas conservation commission may require reinjection of water in geothermal well to prevent subsidence), 45-412 (subsidizes is a factor to consider in designating new groundwater active management area), 45-603 (director of department of water resources must consider land subsidence in developing well rules); see also A.A.C. R12-15-1305, 1306 (well spacing rules). None of these statutes expressly provides a private cause of action for subsidence damages.

Current statutes that might target financial responsibility for subsidence damage to third parties are those in Article
8 of Arizona's Groundwater Code that address specific types of groundwater transportation. The statutes specifically contemplate that there may be recovery of damages, attorney's fees, and costs in a court action. See A.R.S. § 45-545. For example, A.R.S. section 45-541(A) provides that damages are not payable when groundwater withdrawn pursuant to a grandfathered groundwater withdrawal right is transported within a sub-basin of an active management area, but transportation of groundwater withdrawn pursuant to a type 2 non-irrigation grandfathered right between sub-basins of an active management area is "subject to payment of damages."

The term "damages" is not defined in the groundwater transportation statutes, but A.R.S. section 45-545 specifically requires proof of injury or impairment to the groundwater supply. Injury to the groundwater supply may refer only to the loss of use of groundwater, which is a different type of injury from the loss of subjacent support that occurs when land subsides (an injury more in the nature of a trespass), although both types of injury are arguably related. Since land subsidence is not expressly mentioned as a potential injury in the groundwater transportation statutes, a court might find that it was not intended to be covered, or could find the opposite. If a court finds that the use of the word "damages" in these statutes includes land subsidence damages, then the recoverability of damages for subsidence injuries under any common law cause of action could be influenced by whether and how groundwater was transported per these statutes. The potential influence of the groundwater transportation statutes on common law causes of action brought in a court is discussed below.

Lawuits, Lawsuits
The natural reaction of attorneys assisting property owners with land subsidence damage may be to sue responsible parties in court, requesting the payment of damages. Attorneys may attempt to sue under a variety of legal theories, including under "subjacent support" common law theories, negligence theories, public or private nuisance, water law, and government takings theories. The outcome of these theories will likely depend on the individual facts in each case, and the outcome remains to be seen as the common law regarding liability for land subsidence damage is not well developed in Arizona.[3]

The Common Law: The Right to Subjacent Support, the English Rule, and the American Rule
At statehood, Arizona officially adopted the "common law" that had been developed in prior years in various court cases, but "only so far as it is consistent with and adapted to the natural and physical conditions of this state and the necessities of the people thereof . . . “ and so long as it is not inconsistent with applicable law. A.R.S. § 1-201. In other words, Arizona courts are guided by common law cases from other states in the absence of other controlling laws, but are free to disregard such cases if they do not fit public policy in Arizona. In addition, the Arizona Supreme Court has recognized that the common law can change over time when circumstances change. See, for example, Ontiveros v. Borak, 136 Ariz. 500, 504, 667 P.2d 200, 204 (1983).

Common law cases recognized that property owners have a right of "subjacent support," meaning the support of the surface by the underlying strata of the earth. 1 Am Jur.2d, Adjoining Landowners § 83 (2014). In general, a person causing the loss of such subjacent support, such as a miner underneath the same property, or a neighboring landowner, was strictly liable to pay for related subsidence damages, whether or not the person was negligent in its activities. The English common law rule granted a privilege to violate this right to subjacent support through groundwater withdrawals, however, holding that a landowner had absolute ownership of the groundwater beneath its property, and was not liable for any damage to a neighboring property caused by its use [unless such use was malicious]. 1 Am. Jur. 2d Adjoining Landowners §87. Under the English rule, it did not matter how or why the groundwater was intercepted or used because the overlying landowner owned it absolutely. Id.

The English rule privilege to cause land subsidence to neighboring properties through withdrawal of groundwater was later modified in many cases to the "American rule," or at least some variation of the American rule. The American rule privileged only reasonable uses of groundwater, and only as long as subsidence damage was not negligently caused. Id. One variation of this common law change was reflected in an often-cited Texas Supreme Court case that newly authorized negligence claims in a jurisdiction previously following the English rule. Friendswood Development Company v. Smith-Southwest Industries, Inc., 576 S.W.2d 21 (1978). In Friendswood, landowners brought a class action against Friendswood Development Company (and its parent Exxon) for subsidence of their land allegedly caused by Friendswood's groundwater withdrawals on nearby land. The Texas Supreme Court applied the English rule in recognition that it was the controlling law in Texas at the time of the actions from which the case arose, but adopted a negligence exception for future cases. The court held the old English rule prevented any recovery for damage in that case under negligence and nuisance theories. 576 S.W.2d at 29. In describing the future Texas rule, the court looked to a Texas groundwater statute restricting the absolute ownership of groundwater as a Legislative policy shift supporting changing the old English rule's grant of immunity. The new rule would provide for recovery of damages "if the landowner's manner of withdrawing ground water from his land is negligent, willfully wasteful, or for the purpose of malicious injury, and such conduct is a proximate cause of the subsidence of the land of others... “ 576 S.W.2d at 30.
The Restatement of Torts, a document that attempts to restate general principles of case law, recognized a change in the privilege associated with groundwater withdrawals between its first and second editions similar to the change made by the Texas Supreme Court in the Friendswood case. In the first edition of the Restatement of Torts (1939), section 818 provided as follows:

“To the extent that a person is not liable for withdrawing subterranean waters from the land of another, he is not liable for a subsidence of the other’s land which is caused by the withdrawal.”

However, in the second edition of the Restatement of Torts (1979), section 818 changed to:

“One who is privileged to withdraw subterranean water, oil, minerals or other substances from under the land of another is not for that reason privileged to cause a subsidence of the other’s land by the withdrawal.”

This newer section broadens the substances covered and removes the old English rule privilege for groundwater withdrawals. The second edition of the Restatement of Torts continues to recognize strict liability for subjacent support in other cases. Restatement of Torts, §820 (1979).

It is doubtful an Arizona court would adopt the older English rule version of the Restatement. Arizona does not recognize absolute ownership of groundwater by an overlying landowner (see water law discussion below), and the Arizona Supreme Court already rejected a similar English rule in the context of determining a landowner’s right to use groundwater. See Bristor v. Cheatham, 75 Ariz. 227, 236, 255 P.2d 173, 179 (1953) (choosing the “reasonable use” doctrine over the correlative rights doctrine). Arizona courts could instead adopt the strict liability rule for subjacent support in the second edition of the Restatement, or recognize a limited privilege for reasonable groundwater withdrawals, negligent or non-negligent.

Water Law
Subsidence damage is an injury to real property. There is a significant distinction between laws allocating limited groundwater resources between competing users, and the law addressing a subsidence injury to an innocent landowner. Still, the policies underlying both areas of law are related, and have been discussed together in some case law.

Both the English rule regarding liability for land subsidence, and some variations of the American rule, described above, recognize degrees of privilege to cause subsidence damage without liability for injured property. Because this historic recognition of a degree of privilege to cause subsidence has been tied to a landowner’s ownership of, or right to use, groundwater, one would expect Arizona courts to at least consider the nature of the right to groundwater in Arizona in considering whether there should be a privilege to avoid liability for related land subsidence damage.

What is the nature of the right to use groundwater in Arizona? Arizona’s common law regarding groundwater allocation evolved from early cases recognizing that a landowner had a property interest in groundwater beneath the landowner’s surface estate. Howard v. Perrin, 8 Ariz. 347, 353, 76 P. 460, 462 (1904). Later cases clarified that the interest was more a right to use groundwater for the benefit of the overlying land, rather than ownership of the groundwater itself. Town of Chino Valley v. City of Prescott, 131 Ariz. 78, 82, 638 P.2d 1324, 1328 (1981). More recently, the Arizona Supreme Court in Davis v. Agua Sierra Resources, L.L.C., 220 Ariz. 108, 112, 203 P.3d 506, 510 (2009), confirmed after a review of intervening cases that a landowner has no property right to potential future use of groundwater that has never been captured.

Even though there is no ownership of groundwater before it is captured, a landowner still has a recognized right to use groundwater for the benefit of the overlying land (subject to any applicable restrictions in the Groundwater Code) -- a usufructuary right. Arizona courts adopted the common law “reasonable use doctrine” for allocation of groundwater resources statewide, and A.R.S. section 45-453(1) confirms the reasonable use doctrine still applies outside active management areas, subject to statutory groundwater transportation restrictions. The common law reasonable use doctrine provides that one may extract percolating groundwater for a reasonable, beneficial use of the land from which the water is taken. Bristor v. Cheatham, 75 Ariz. 227, 235, 255 P.2d 173, 178 (1953). Bristor established that a landowner has no duty to an adjacent landowner for the extraction of groundwater, even where there is a demonstrable injury to a neighbor’s water supply, as long as the water taken is reasonably used on the overlying land. In other words, as long as groundwater is reasonably and beneficially used on the overlying land from which it was withdrawn, the right is “first come, first served.” Later case law refined the limitation of use of groundwater off the land from which it was withdrawn if such use would cause damage to other landowners. See e.g. Farmers Investment Co. v. Bettwy, 113 Ariz. 520, 558 P.2d 14 (1976) (finding use of water on other lands by
mining companies and the City of Tucson unlawful in cases where both lands overly a common basin but are miles apart). The extent of the common law privilege to injure another's access to an underground water supply is therefore limited to uses of water on the overlying parcel.

Although Arizona common law allows uncompensated injuries to a neighboring water supply so long as groundwater is reasonably and beneficially used on the overlying land, it is not clear in Arizona law whether, or to what extent, a similar privilege might extend to injuries in the form of land subsidence. If Arizona adopts section 818 in the second edition of the Restatement of Torts (quoted above), then the privilege will extend only to lawful “non-negligent” withdrawals, with the potential result that even lawful and reasonable groundwater withdrawals might be determined negligent by a fact finder.

The next question is whether the extent of any privilege adopted by the Court under common law will be influenced by the restrictions in the Arizona Groundwater Code. If a person uses groundwater reasonably and beneficially in an active management area, but the use is unlawful under the Groundwater Code, is there a privilege to cause subsidence damage? Should the limitations in the Groundwater Code be applied only to injuries related to allocation of groundwater resources between competing users, and not to subsidence damage?

At least one federal court in Arizona has determined there is a privilege to injure a neighboring property owner's water supply even when Groundwater Code limitations are exceeded. In Brady v. Abbott, 433 F.3d 679 (2005), the Ninth Circuit was asked to determine whether Brady, a neighboring landowner, could recover under negligence or nuisance theories for losses associated with tree deaths due to the lowering of the groundwater table under its property that were caused by Abbott Laboratories' dewatering the ground for construction of a basement at a manufacturing facility on Abbott's land. The Ninth Circuit noted that the Brady negligence and nuisance claims in substance both involved the legal standard governing a landowner's right to use percolating groundwater underneath its property, which in Arizona is controlled by the reasonable use doctrine. 433 F.3d at 682, n. 2. The Ninth Circuit found that there could be no recovery for damage to the water supply under the reasonable use doctrine because, even though the quantity of the withdrawals exceeded Abbott's dewatering permit, the groundwater withdrawals were made for a reasonable and beneficial use of Abbott's land. 433 F.3d at 683. This Ninth Circuit opinion did not address a land subsidence claim, and is not binding on Arizona state courts, so it is now known whether it will be considered persuasive in determining a level of privilege, if any, for subsidence damage.

There is also an unanswered question whether the Arizona Legislature through legislative acts can expand the common law privilege to cause subsidence. As discussed above, the common law privilege in recent cases in other states, considering Arizona's reasonable use doctrine, could be limited in Arizona to non-negligent, reasonable, beneficial uses of groundwater on overlying property. However, certain statutes seem to expand such a common law privilege, but give no instruction as to the continued applicability of the common law. For example, A.R.S. section 45-541(A) authorizes grandfathered right holders in active management areas to transport groundwater within a sub-basin of the active management area “without payment of damages.” This statutory provision is inconsistent with the doctrine of reasonable use adopted in case law that limited groundwater uses to the property where groundwater was withdrawn. Abrogation by statute of the ability to recover damages for injuries to a water supply might be permissible, but abrogation of a right to recover damages for subsidence injuries caused by negligent or unreasonable acts, especially if the acts contributing to recent subsidence damage have continued for a long period of time, might encourage constitutional claims. See for example, San Carlos Apache Tribe v. Superior Court, 193 Ariz. 195, 972 P.2d 179 (1999) (legislation may not attach new legal consequences to events completed before its enactment); Town of Chino Valley v. City of Prescott, 131 Ariz. 78, 81-82, 638 P.2d 1324, 1327-1328 (1981) (recognizing that Legislation could modify the right to reasonable use of groundwater prospectively through the Groundwater Code). The scope of the privilege, if any, to cause land subsidence through groundwater withdrawals remains to be determined.

**Government Takings (Inverse Eminent Domain)**

Many large groundwater wells are operated by municipalities and other government bodies, raising the question whether a governmental takings claim might provide for recovery of damages to a landowner injured by related land subsidence. Article 2, section 17 of the Arizona Constitution states that “No private property shall be taken or damaged for public or private use without just compensation having first been made...” Is government-caused land subsidence a taking? No reported cases in Arizona directly address this issue. In order to be a taking, the property damage resulting from government action would need to significantly impair the use of the property, but one could imagine property uses significantly impaired by fissures. See, for example, A Tumbling-T Ranches v. Flood Control Dist. of Maricopa County, 222 Ariz. 515, 525-26, 217 P.3d 1220, 1230-31 (2009) (recognizing a taking may occur for increased risk of flooding if interference is substantial); see also Los Osos Valley Associates v. City of San Luis Obispo, 36 Cal.Rptr.2d 758 (1994) (finding city liable for subsidence damage caused by City's groundwater withdrawal program during drought).


4/5
In the water law context, the Arizona Supreme Court considered a takings theory in reviewing whether the government, over the private property owner's objection, could allow another person to use the bed of the Hassayampa River flowing through the private property for a groundwater storage project. West Maricopa Combine, Inc. v. Arizona Department of Water Resources, 200 Ariz. 400, 26 P.3d 1171 (2001). In determining whether a taking might occur in that case, the Court emphasized the importance of first determining whether a private party ever had the "right" at issue. 26 P.3d at 1180. In that case, the Court determined the private property owner never had the right to exclude such flows because the state reserved the natural channels to move and store water. Id. In the context of land subsidence, the right to subjacent support is a well-recognized property right, but, as discussed above, liability might still be excused by some degree of privilege for reasonable, beneficial, and/or non-negligent groundwater withdrawals. Government bodies may also have immunity arguments that, if successful, might negate the right to recover damages.

Proof, and All That
The relevance of each of the possible claims and issues discussed above will only be known through study of the facts of each case. Proof of the cause of subsidence damage will likely require qualified expert testimony. In addition, land subsidence may be caused by multiple causes or actors, and so one particular defendant may avoid potential liability for others' actions through Arizona's comparative fault statute for property damage. See A.R.S. § 12-2506. As a practical matter, recovery of damages for some land subsidence damage may be too difficult or expensive to pursue.

AND FINALLY, WHO SHOULD PAY?
Opinions will vary as to who should pay for land subsidence damage related to groundwater withdrawals in an arid environment. Economists may argue that groundwater users should pay for the damage to encourage a switch to other supplies or methods that are less costly to society. See discussion in 22 Ariz.L.Rev. 891, "Subsidence: An Emerging Area of the Law," p. 894-96 (1980). Others may argue that public policy supports insulation of some or even all withdrawals from potential liability. However the issue is ultimately resolved, a review of the available guidance in the sources reviewed in this article indicate that many arguments can be made and, at least as to planning for a future lawsuit, an ounce of prevention is likely worth a pound of cure.

END NOTES:
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[3] There are reported cases in Arizona regarding whether land subsidence damage is covered by various insurance policies, but the availability of insurance coverage is beyond the scope of this article. See, for example, Millar v. State Farm Fire and Cas. Co., 167 Ariz. 93, 804 P.2d 822 (1990).

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