

Safeguarding California's Streams

HOW WELL PERMITTING CAN PROTECT WATER
FOR PEOPLE AND WILDLIFE



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Executive Summary

Managing groundwater in California is crucial. Groundwater is a primary source of drinking water for communities and contributes up to 60% of the state's water supply for farms and cities in dry years. Approximately 85% of Californians depend on groundwater for at least part of their water needs. Groundwater is also the primary source of dry-season surface water, which sustains streams and wetlands through the summer. If sustainably managed, groundwater can meet these needs with greater reliability while also serving as a buffer during droughts and providing essential streamflow for fish and wildlife.

Recent developments in California law and policy have increased the powers and duties of local governments to manage groundwater resources and extraction. Historically, California law treated surface water and groundwater as separate resources, with the permitting of surface water rights as the exclusive responsibility of state agencies. However, a precedent-setting 2018 court ruling regarding the Scott River (Scott River decision) fundamentally redefined responsibilities. The

Environmental Law Foundation (ELF) vs. State Water Resources Control Board (SWRCB) legal decision held that **California counties must ensure that their well permitting ordinances protect against undesirable impacts on "public trust resources," which refers to public values supported by surface waters, including fisheries, aquatic ecosystems, recreation, and navigation.**¹ County well ordinances that do not address potential impacts to existing water users and streamflow that supports fish and wildlife are unlikely to meet new requirements, and they are less likely to result in sustainable management of groundwater resources.

Coupled with the Sustainable Groundwater Management Act of 2014 (SGMA), this means local governments' role in groundwater management has significantly increased in the last decade. While the Scott River case may be less well known than SGMA, its precedent expands public trust considerations to all parts of a county where groundwater sustains streams, wetlands, and other public trust resources, not just areas covered by SGMA.²



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1 Environmental Law Foundation vs. State Water Resources Control Board, 26 Cal.App.5th 844, 237 Cal.Rptr.3d 393 (Cal. Ct. App. 2018).

2 Third Appellate District Extends Public Trust Doctrine to Groundwater, Finding That Counties Have a Duty to Administer the Trust in Issuing Ministerial Well Permits. Downey Brand LLP. (2025, March 7). <https://www.downeybrand.com/legal-alerts/third-appellate-district-extends-public-trust-doctrine-to-groundwater-finding-that-counties-have-a-duty-to-administer-the-trust-in-issuing-ministerial-well-permits/>

These newly defined legal duties place local governments in a new and complex role. Counties and cities generally have limited experience managing groundwater resources and often lack the technical expertise necessary to protect public trust resources. Assessing public trust resource impacts from groundwater extraction requires expertise in hydrology, geology, fisheries biology, and groundwater modeling. Several counties have undertaken efforts to update their well ordinances, including Sonoma County in 2023 and Santa Cruz County in 2025. Both focused on the impacts of new wells on streamflow needed to support salmon species but struggled with complex technical and policy questions in the absence of clear guidance from the state.

Updating well permitting ordinances is an important investment that strengthens community resilience and delivers long-term benefits, including:

- **Increasing water security and climate resilience** to ensure groundwater resources will be available in future droughts to meet the needs of communities and wildlife.
- **Avoiding or mitigating impacts to current water users** by ensuring that new wells don't undermine existing surface water rights or interfere with neighboring wells.
- **Achieving groundwater sustainability** by making certain that new wells do not exacerbate conditions in overdrafted areas and thereby increase the cost and challenges of attaining sustainability.
- **Safeguarding healthy rivers, fisheries, and wildlife** that provide social, economic, and environmental benefits that communities value.
- **Addressing gaps in the Sustainable Groundwater Management Act**, which does not apply to the majority of the state and its streams nor require protection of ecologically important flows.

Based on work with counties and water resource agencies, The Nature Conservancy (TNC) and partners, including Trout Unlimited and California Trout, have developed **a science-based approach to help local governments navigate and successfully complete changes to their well ordinances.**

By providing tools and technical guidance, our goal is to assist counties in better understanding these requirements and successfully updating well ordinances while also increasing water security, protecting the health of local streams, and helping fish populations recover.

This report will:

- Explain how the new requirements create opportunities for local governments to improve well permitting ordinances and ensure protection of public trust resources.
- Outline the benefits of integrating surface and groundwater management to water supply reliability.
- Provide local governments with guidelines for updating well ordinances.
- Direct interested parties to additional resources related to groundwater management.
- Provide recommendations for how state water resource agencies can support local agencies in developing updated well permitting ordinances.

Updating well ordinances to promote sustainable and ecologically protective permitting of new wells will increase water security for communities while also protecting the health of their streams, fish, and wildlife.

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If sustainably managed, groundwater can meet the needs of communities with greater reliability while also serving as a buffer during droughts and providing essential streamflow for fish and wildlife.

Resources at Risk: Protecting Groundwater to Create Streamflow

Groundwater and surface water are **interconnected resources**. Groundwater inputs are often a substantial component of the water flowing in California streams, particularly during the dry season when groundwater can be the primary and sometimes sole source of streamflow. These groundwater contributions are crucial for moderating streamflow and providing water supply as well as recreational and ecological benefits. Groundwater-fed streamflow provides water needed to meet domestic and agricultural demands. Healthy flowing creeks are a vital community resource for recreation and quality-of-life benefits. And groundwater contributions to streamflow are essential for maintaining water quality to sustain habitat conditions and stream connectivity, which support fisheries, riparian habitat, recreation, tribal beneficial uses, and navigation. There is also a growing awareness of the critical role that groundwater contributions to streamflow play in providing habitat for endemic and critical-status species. In a future with a warming climate, groundwater resources provide a critical drought-resilient source of water for both people and river ecosystems.

Groundwater contributions to streamflow are declining for three main reasons:

- **Changes in land uses**—such as converting natural areas to agriculture or urban development—increase runoff, alter drainage patterns, and create impervious surfaces that prevent rainwater from soaking into the ground, significantly reducing groundwater recharge.
- **Growing populations and increasing water demands**, especially during prolonged droughts, have driven a surge in the drilling of new wells across California, particularly in rural and agricultural areas. Many communities and landowners turn to groundwater as a more reliable and drought-resilient source when surface water supplies become scarce or unpredictable.
- **Permitting of new wells** has often proceeded without evaluating impacts to existing water rights or the critical role groundwater plays in maintaining streamflow in rivers.



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Given this interconnection, groundwater can have profound effects on streamflow as well as water levels in surface waterbodies such as lakes and wetlands. Streamflow depletion from groundwater pumping can degrade habitat conditions for fishes and other species that comprise the food web and can cause a cascading series of impacts on ecosystem structure and function. Particularly in cases where streamflow is naturally low or during extreme dry years, groundwater pumping can even cause streams to go dry.

The lack of assessment of groundwater withdrawals on public trust resources and the sheer number of wells throughout much of California have led to many cases where ecosystems have already been degraded by unsustainable levels of groundwater pumping or are at

risk of significant impacts from further development pressure. Such conditions have become increasingly acute as the droughts the state has experienced in recent decades have increased in severity.

Seeking a more reliable source of water, many users have drilled new wells to meet their water demands. These conditions have played a role in spurring recent legislation (e.g., SGMA) and court decisions (e.g., Scott River decision) spelling out new powers and duties for local governments in the realm of managing the effects of groundwater extraction. **This represents not only a legal responsibility but also a valuable opportunity for local governments to lead in sustainably managing California's most vital resource: water.**

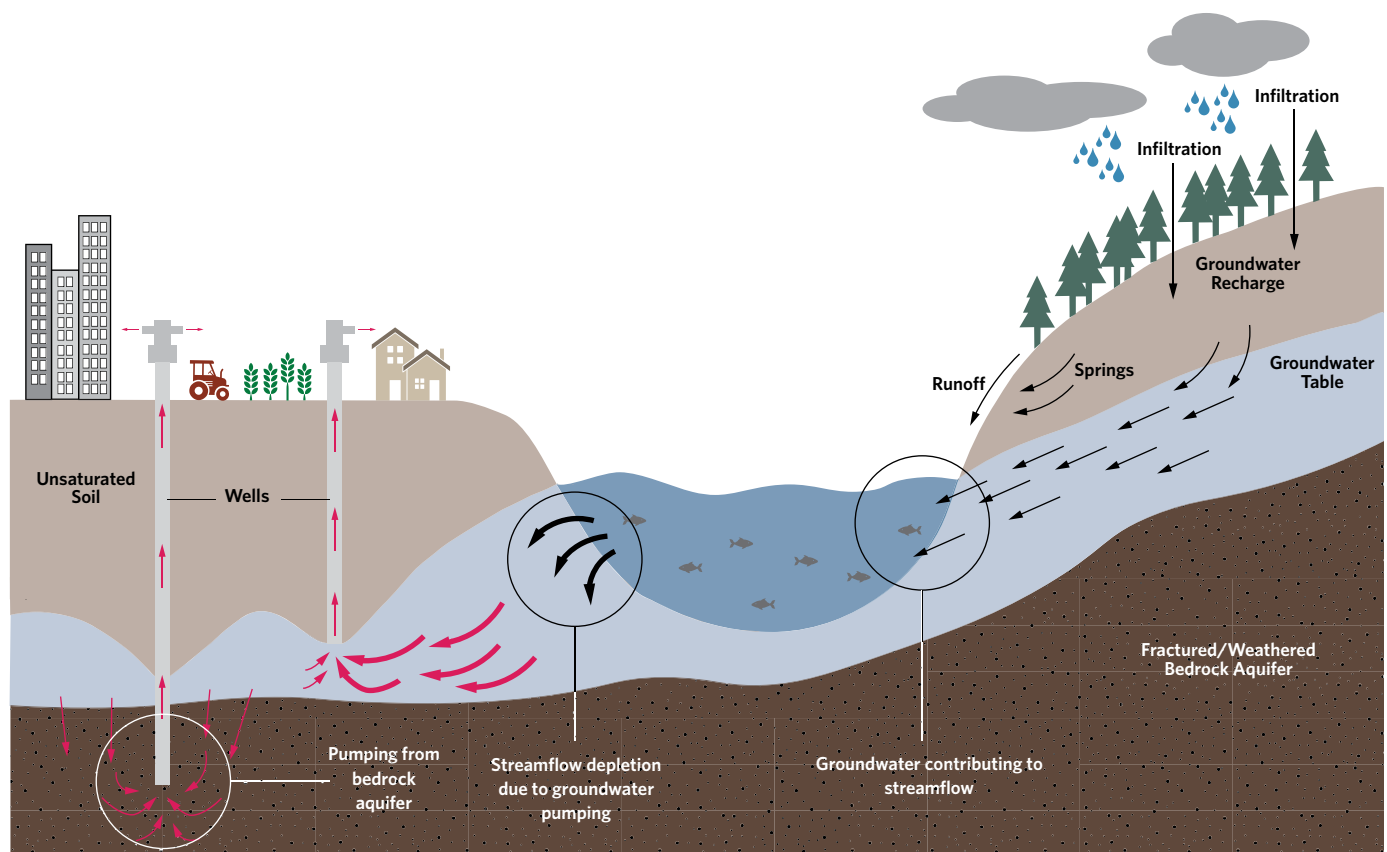


FIGURE 1. This illustration shows how water flows through natural systems and the impacts that well extractions can have as they deplete both groundwater and streamflow. © TNC

The Benefits of Updating Well Ordinances

Permitting new wells without avoiding or mitigating impacts to surface and groundwater users and dependent ecosystems will further worsen California's water crisis. Unsustainable uses decrease water security for communities and increase the vulnerability of people and nature to future droughts and climate change. Updating well ordinances provides a new opportunity to address this oversight and use science-based approaches that ensure water for people, farms, and nature—today and for generations to come.

Updating well permitting guidelines benefits local communities by:

Increasing Water Security and Climate Resilience

Improving sustainable management of groundwater resources ensures that groundwater will be available in future droughts to meet the needs of communities and wildlife. Groundwater is a primary source of drinking water for communities, contributing up to 60% of the state's water supply in dry years. Avoiding impacts of new wells on existing groundwater users is therefore essential for enhancing water security and building climate resilience for drinking water, agriculture, and the habitats of fish and wildlife, especially with increasing drought frequency and severity.

Avoiding Impacts to Current Surface Water Users

By making certain that new wells don't undermine existing surface water rights, permitting guidelines can benefit current water users. Wells can deplete streamflow that is otherwise allocated to existing water rights. Properly designed well ordinances can ensure that these rights are upheld, help prevent conflicts between water users, and promote fair use of water resources. With sustainable management, local governments can support agricultural activities, maintain ecological balance, and provide reliable water supplies for communities. This protection also helps in preserving the natural flow regimes of rivers and streams, which are vital for the health of aquatic ecosystems.

Protecting Existing Groundwater Wells from Impacts of New Wells

Protecting groundwater is vital for ensuring the longevity and reliability of water supplies. New wells can lead to a decline in water levels or interfere with water extraction at existing wells, making them less productive or even causing them to run dry. By implementing sustainable management practices, counties can prevent these negative impacts and ensure that groundwater wells remain a dependable source of water for domestic, agricultural, and industrial use. This protection also helps in maintaining the structural integrity of wells and reducing the costs associated with drilling new wells.



Safeguarding Healthy Rivers, Fisheries, and Wildlife

Healthy rivers provide social, economic, and environmental benefits that communities value. Many ecosystems, such as wetlands, rivers, and lakes, rely on groundwater to sustain their flora and fauna. By managing groundwater levels sustainably, counties can meet conservation goals as well as regulatory requirements related to protected species and their habitats. Protection of groundwater dependent ecosystems also supports recreational resources, promotes biodiversity, and enhances the resilience of ecosystems to environmental changes.

Addressing Gaps in the Sustainable Groundwater Management Act

While the vast majority of groundwater withdrawals occur within SGMA basins, most of the state—and the majority of the state’s streams—are not included.³ Avoiding impacts of new wells—whether inside a SGMA basin or not—is essential to managing groundwater levels sustainably, protecting groundwater dependent ecosystems, and promoting long-term water security and resilience against droughts and climate change impacts.



3 Thompson, B., M.M. Rohde, J.K. Howard, S. Matsumoto. 2021. Mind the Gaps: The Case for Truly Comprehensive Sustainable Groundwater Management. Water in the West. Stanford Digital Repository. Available at: <https://purl.stanford.edu/hs475mt1364>

A New Responsibility for Local Governments

The interconnection of groundwater and surface water has newly defined legal implications for local governments. Recent developments in California law and policy have increased the powers and duties of local governments to manage groundwater extraction and use to prevent undesirable impacts on surface waters and associated resources, including fisheries and aquatic ecosystems.

The primary way California regulates the use of surface water—including the protection of surface flow for fish, wildlife, and ecosystems—is **carried out at the state level** through the system of water rights administered by the SWRCB.⁴ That system requires applicants seeking new water rights to demonstrate that their proposed use will not take water already needed to satisfy existing uses, including water allocated to other users or water needed for fish and wildlife.

In most cases, the diversion and use of groundwater do not fall within SWRCB's permitting jurisdiction, or indeed within the surface water rights system. The right to use groundwater, therefore, generally lies with the owners of the overlying land, who are not required to obtain permits from SWRCB and who generally resolve disputes about the extent of their rights among themselves via private actions.

The exception is for groundwater considered to flow in “subterranean streams” or as the so-called underflow of streams, which requires a water-right permit when treated as a direct diversion of surface flows. The California Department of Fish and Wildlife also has permitting authority for surface water diversion under Section 1600 of the water code, which allows them to put terms and conditions on diversions to protect fish and wildlife.

In sum, two long-standing features of California water law are that:

1. Allocation and management of surface water for all uses are handled at the state level.
2. Groundwater is generally treated as unconnected to surface water and therefore outside the state's permitting jurisdiction.

However, two significant exceptions to these principles have emerged in the last decade: the Sustainable Groundwater Management Act (SGMA) in 2014 and the Scott River decision in 2018. Through the California Legislature, SGMA created a role for local governments in the management of groundwater for the protection of surface water in alluvial groundwater basins that are designated as medium or high priority. The Scott River decision is a separate but complementary ruling that requires different considerations about groundwater pumping impacts both inside and outside of SGMA basins, and it applies to local governments responsible for well permitting across the state.



⁴ Many aspects of water rights established prior to the creation of what is now the SWRCB in 1914, or that are appurtenant to the ownership of riparian land, are outside the jurisdiction of the SWRCB.

Sustainable Groundwater Management: Local Action in Priority Basins

In 2014, during one of the driest two-year periods in the state's history, the California Legislature enacted the Sustainable Groundwater Management Act (SGMA), which constituted the first significant regulation of groundwater use in many decades. SGMA was enacted with the broad goal of halting further degradation of groundwater levels and achieving groundwater sustainability by the year 2040. To meet this goal, the statute provides that all groundwater basins in the state be ranked by the current degree of sustainability and provides for local governments to form groundwater sustainability agencies (GSAs) for all basins ranked as medium or high priorities. The GSAs are charged with developing groundwater sustainability plans (GSPs) designed to bring groundwater basins into hydrologic balance with 2014 baseline conditions while preventing six undesirable results⁵ of groundwater depletion, including streamflow depletion in interconnected surface waters.⁶

SGMA creates a mechanism for cities and counties to become directly involved in the management of groundwater, and, indeed, many cities and counties have availed themselves of this opportunity and have actively participated in the formation and governance of GSAs. Because of the broad scope of GSPs, and because groundwater dependent ecosystems are considered a beneficial user under SGMA, SGMA represents an effective tool local governments can use to protect sensitive aquatic habitats from further harm because of excessive groundwater extraction within their jurisdictions.

In 1977, Dr. Joseph F. Poland stood beside a pole marking 28 feet of land subsidence in California's San Joaquin Valley—a striking example of groundwater overdraft impacts and the need for sustainable management.



© USGS/Public domain

⁵ Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin." [23 CCR §354.26(a)]

⁶ Interconnected surface water is defined as "surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted." [23 CCR § 351(o)]

The Scott River Decision: Counties Are Charged with Upholding the Public Trust Doctrine When Permitting New Wells

In 2018, in the case of Environmental Law Foundation vs. State Water Resources Control Board, 26 Cal.App.5th 844, the California Third Appellate District held that Siskiyou County's decision to issue permits to drill wells tapping aquifers that feed the Scott River was subject to the Public Trust Doctrine. This has **major implications for local governments, whose powers and duties regarding the protection of flow in surface waters are broader than many had previously thought them to be.**

The Public Trust Doctrine is a significant feature of water law in California. Although its content varies from state to state and at the federal level, the common theme underlying the doctrine is that **each state holds its navigable waters in trust for the benefit of its people.** In California, this means that whenever the State makes a decision affecting the flow of waters in navigable waterways, it must consider the impacts its decision will have on certain public uses supported by those waterways and mitigate those impacts to the extent feasible.

In the landmark 1983 case applying the Public Trust Doctrine, National Audubon Society vs. Superior Court, the California Supreme Court held that the SWRCB could not allow the City of Los Angeles to draw down the level of Mono Lake without considering the potential impacts to the public trust uses supported by the lake's waters, which included not only the traditional triad of navigation, commerce, and fishing, but also ecosystem values and air and water quality generally. **Importantly, the court held it did not matter that the actual tributaries the City of Los Angeles was diverting were non-navigable creeks flowing into the lake; rather, what mattered was the effect those diversions had on public trust uses of the lake itself, which is navigable.**

In the Scott River case, the court applied the reasoning of National Audubon Society to a county-level well permitting decision. The plaintiffs challenged Siskiyou County's decision to issue permits to drill wells tapping groundwater aquifers that feed surface flows in the Scott River, which supports imperiled runs of native salmon and steelhead trout. **The court held that the Public Trust Doctrine required the county to consider the potential impacts that streamflow depletion caused by the wells would have on fisheries in the Scott River before approving the permits.**



The Scott River and surrounding groundwater basin provide water to support endangered salmon runs and local agriculture.



The Nature Conservancy and local partners are protecting streamflow and managing groundwater along the Santa Clara River to support local water supplies and the recovery of steelhead trout.

© Barbara Wampole

In reaching its decision, **the court rejected the argument that the Public Trust Doctrine could not apply because the wells would divert groundwater rather than surface water.** The court found that although the aquifers in question are obviously not themselves navigable, the fact that they feed surface flow in the Scott River, which is navigable, makes the situation essentially identical to the one in the National Audubon Society case. In both cases, the question is whether the proposed diversions could have an effect on public trust uses in the navigable waterway. If so, then the permitting agency must consider the effects of the proposed diversion on those uses and protect those uses whenever feasible before issuing the permits.

The court also rejected the argument that SGMA preempted the application of the county well permitting ordinance to issues of water management and streamflow,

noting that while the scope and degree of protection provided by SGMA are different from those under the Public Trust Doctrine, they are not in conflict and there is no reason both cannot be applied at the same time.

The Scott River decision has broad implications for local governments across California. All waters that are capable of being navigated by small, hand-powered crafts such as canoes and kayaks are navigable under state law, and any county decision to issue a permit for a well in groundwater that feeds such waters would be subject to challenge under the holding of the case. Moreover, California cities, like counties, are generally defined as political subdivisions of the state, and their well permitting decisions are vulnerable to challenge as well.

Comparing SGMA and the Scott River Decision

While both SGMA and the Scott River decision provide avenues for local governments to be involved in managing groundwater to avoid surface water impacts, the two legal provisions are quite different in the protections they provide and the waters to which they apply. **The two should be thought of as separate and complementary tools** for protecting surface water ecosystems. Notable differences include:

1. Geographic scope.

SGMA does not apply to all groundwater across the state of California but rather only to a limited set of groundwater basins designated as high and medium priority.⁷ These areas largely exclude California's relatively undeveloped coastal and Sierra Nevada mountain ranges and the Mojave Desert, which include many ecologically diverse ecosystems, recreational areas, important fisheries, and rivers that support sensitive species protected under the federal and state Endangered Species Acts.

The Scott River decision applies across the state and therefore provides a broader tool for protecting aquatic resources, including salmon and steelhead, by virtue of the broad definitions of "navigable waters" and "public trust uses" under California law.⁸

2. Substantive level of protection.

SGMA applies to both proposed groundwater development and existing groundwater extraction, requiring that groundwater dependent ecosystems be protected from "unsustainable" levels of pumping from both. In practice, however, because SGMA defines sustainability with reference to groundwater levels as of the date the law was enacted in 2014, when many aquifers were already in a state of severe drawdown, the level of protection SGMA can provide is limited to preventing *further* undesirable results due to groundwater

management. **SGMA does not require restoring groundwater conditions that may have historically provided public trust benefits.**

The Scott River decision is more forward focused than SGMA; it **applies only to prospective decisions to issue permits for new or replacement wells**. Moreover, the standard for reviewing proposed wells is not sustainability, but only whether they will push existing levels of impairment to public trust uses to unacceptable levels. This broader requirement necessitates different considerations about the impacts that a proposed well might have, including both groundwater levels and depletion of streamflow, which may result in significant harm to fish and river ecosystems. Therefore, like SGMA, the Scott River decision provides a good tool for preventing future degradation of surface water ecosystems but is at best a limited remedy for addressing impacts from existing development.

Initial Efforts Highlight the Need for Guidance and Support

Since the Scott River decision, at least three counties—Sonoma County, Santa Cruz County, and Napa County—have taken steps to incorporate public trust considerations into their permitting processes. While all three counties share the goal of protecting instream flows, their methods reflect differing perceptions of the requirements of the Public Trust Doctrine and approaches to meeting them. These varied approaches underscore the need for uniform guidance to help counties address regulatory obligations more efficiently. Fundamentally, staffing and resource constraints are recognized as a major challenge for counties to undertake updates to their ordinances.

7 According to California Water Code 10933(b), the prioritization of basins is based on the following eight criteria in each basin, to the extent at which data are available: population, rate of current and projected population growth, number of public-supply wells, total number of wells, irrigated acreage, the degree to which groundwater is the primary source of water in the basin, documented impacts (such as overdraft, subsidence, saline intrusion, water quality degradation), and other relevant information determined by the California Department of Water Resources, including adverse impacts on local habitat and local streamflow.

8 While the decision is directly applicable only within the Third Appellate District (the counties of Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Glenn, Lassen, Modoc, Mono, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity, Yolo, and Yuba), it is based on a straightforward application of well-established provisions of California law and would constitute persuasive authority for appellate courts taking up the issue in other districts.

Groundwater Management in California

Where It Is Managed in
SGMA Basins

Where It Is Not

Where It Is Needed to Protect Salmon
and Freshwater Biodiversity

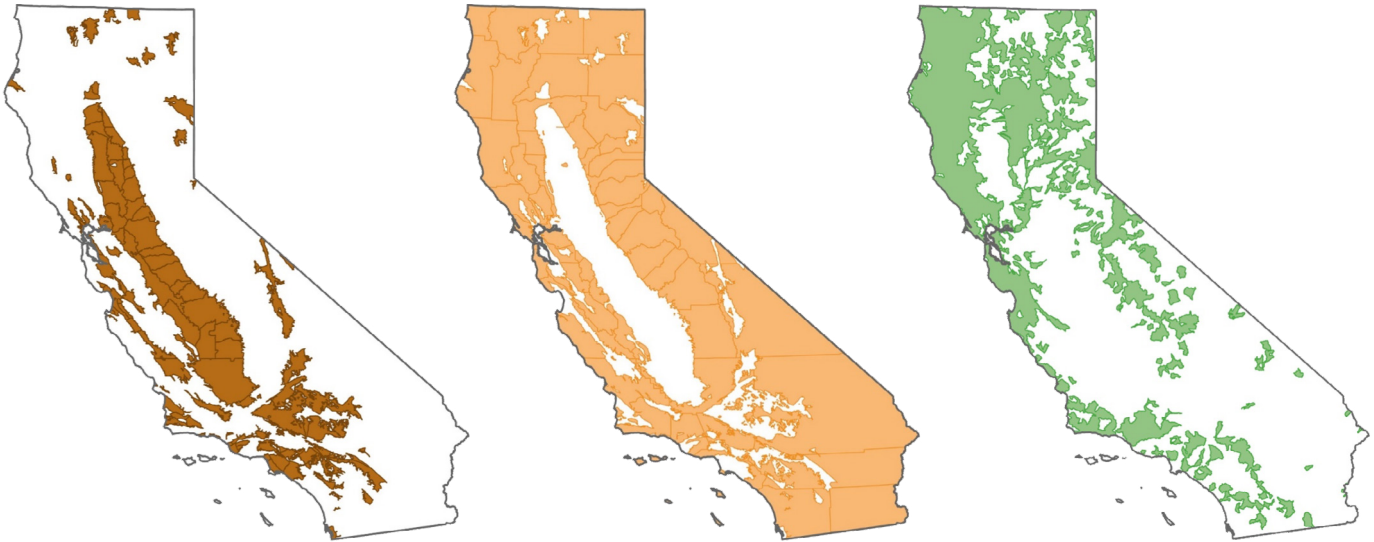


FIGURE 2. As we consider sustainable water management across the state, these three figures highlight where groundwater is managed currently under the Sustainable Groundwater Management Act, the majority of the state where it is not, and where [high-priority freshwater biodiversity](#) and [salmon populations](#) exist and are vulnerable to groundwater impacts.

3. Ability to address cumulative impacts from small wells.

Under SGMA, **domestic wells that extract less than two acre-feet of water per year are classified as having a *de minimis* impact and are therefore exempt from stricter regulatory and reporting requirements.** However, this relatively generous threshold can lead to unintended consequences. In rural areas where many homes rely on individual wells, the cumulative effect of these small-scale extractions can significantly reduce streamflow—especially in regions near smaller streams that provide critical habitat for salmon and steelhead.⁹ When these wells are concentrated near sensitive waterways, even modest withdrawals can degrade aquatic ecosystems and threaten the survival of these fish species.¹⁰

In contrast, **there is no requirement that counties establish a *de minimis* extraction threshold for new wells** when amending their well ordinances to meet the requirements of the Public Trust Doctrine as stated in the Scott River decision. In watersheds where existing levels of groundwater extraction have already caused unacceptable levels of impairment to surface waters, counties may (and arguably *must*) prohibit any new wells, no matter how small, or else require that their impacts be mitigated. As such, counties must develop well ordinances that include procedures for evaluating existing conditions, assessing cumulative impacts, and mitigating streamflow depletion to protect public trust resources. Applying a broad or overly permissive standard for *de minimis* wells—especially in watersheds already experiencing significant depletion or supporting listed aquatic species—is unlikely to provide adequate environmental protection.

9 Rohde MM, Saito L, Smith R. 2020. Groundwater Thresholds for Ecosystems: A Guide for Practitioners. Global Groundwater Group, The Nature Conservancy. https://www.groundwaterresourcehub.org/content/dam/tnc/nature/en/documents/groundwater-resource-hub/GroundwaterThresholdFramework_Final_updated_Dec2020.pdf

10 Thompson, B., M.M. Rohde, J.K. Howard, S. Matsumoto. 2021. Mind the Gaps: The Case for Truly Comprehensive Sustainable Groundwater Management. Water in the West. Stanford Digital Repository. Available at: <https://purl.stanford.edu/hs475mt1364>

Recommended Approach to Updating Local Well Ordinances

Based on work with counties and water resource agencies, The Nature Conservancy (TNC) and partners, including Trout Unlimited and California Trout, have developed a science-based approach to help local governments navigate and successfully complete changes to their well ordinances.

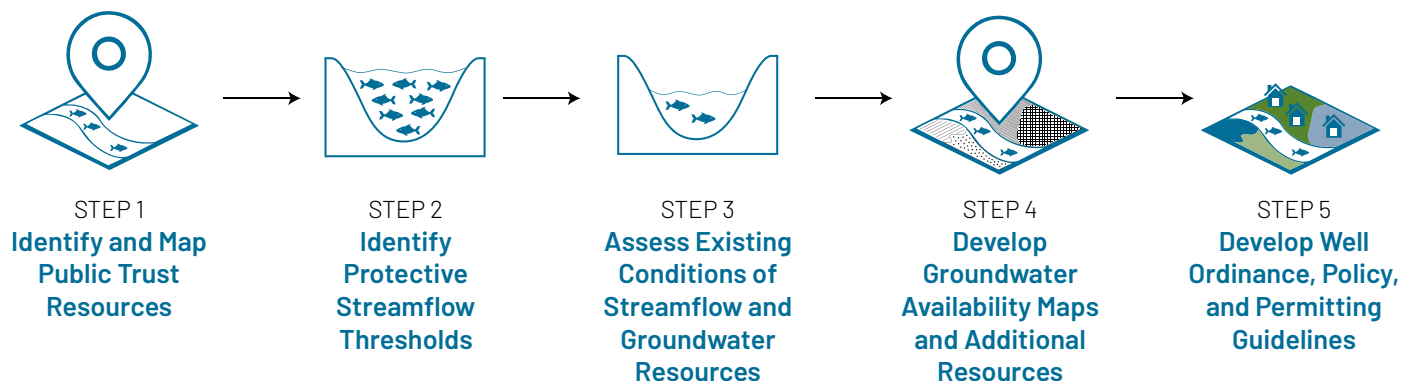
The following is an overview of a **five-step approach that integrates existing science, tools, and approaches to update well ordinances to protect streamflows** needed to support public trust resources. Emphasis is placed on addressing technical and policy-related issues that local governments may need to address to satisfy the public trust duties articulated in the Scott River decision. The goal of this report is to equip counties with the knowledge and tools to update well ordinances and successfully undertake efforts to strengthen water security, safeguard the health of local streams, and recover fish populations.

More information, including technical guidance for this framework, can be found online at the Groundwater Resource Hub: [Safeguarding California's Streams](#).

Five-Step Approach to Updating Well Ordinances

To bring their well ordinances into alignment with legal obligations established by the Scott River decision, counties need to integrate information about existing conditions, protective thresholds, hydrologic data, and regulatory requirements to ensure that new groundwater development does not compromise public trust resources or existing water rights. The following five steps outline a practical, science-based approach for counties to update their well permitting frameworks, balancing environmental protection with the needs of current well owners and water users.

A Five-Step Approach to Updating Well Ordinances





1. Identify and map public trust resources within the county where streamflow and groundwater dependent wildlife or ecosystems are at risk of negative impacts from additional well pumping.

Key initial steps in updating a well ordinance to protect public trust resources linked to surface waters are to: (1) identify the specific public trust uses supported by streamflow—such as fishing, navigation, and ecosystem health; and (2) map where these resources are located. While public trust protections are most clearly tied to navigable waters, local governments should include other surface waters that support sensitive or highly valued habitats, regardless of navigability. Several counties that have undertaken efforts to update their ordinances so far have focused on salmon and steelhead as their primary public trust resources to determine which streams and watersheds to assess for potential impacts from new wells. The logic for focusing on these fish, in addition to being state-listed species, is that they are present in all times of the year and flows that meet their life-history needs are likely to meet those of other species and support general ecosystem health.

i **Informational resources:** TNC mapped California's groundwater dependent ecosystems and high-priority rivers. This map and other resources can be easily accessed through the [Groundwater Resource Hub](#).



2. Identify protective streamflow thresholds for selected public trust resources to guide development of management goals, assessment of existing conditions, and establishment of protective standards.

To protect public trust resources and meet conservation goals, it's important to define when a reduction in surface flow would significantly harm key species or habitats. For new wells, this means identifying how much streamflow is needed to support healthy populations and ecosystem functions. Streamflow needs are complex because they naturally change with the seasons and vary from dry to wet years. However, this variability in flow—its timing, amount, and duration—is critical for freshwater ecosystems; many species have adapted key life processes, such as migration and spawning, to these patterns. Setting ecological flow thresholds is also essential for evaluating current conditions (Step 3) and for creating standards and permitting rules (Step 4) that will be included in the well ordinance framework (Step 5).



Informational resources: TNC's [Natural Flows Database](#) can help assess current stream conditions and flow needs even when there are no stream gages or data. TNC and partners developed the [California Environmental Flows Framework](#) to provide protective flow criteria and help managers determine how much water streams need for nature.



3. Assess existing conditions of streamflow and groundwater resources to determine if current streamflow meets ecologically protective thresholds, including demands from existing water rights for both surface and groundwater in all water year-types.

This assessment helps determine whether streamflows are meeting the ecological thresholds identified in Step 2 and how they align with management goals. This process is key to identifying when, where, and how much streamflow might still be available to support new wells without harming ecosystems. To evaluate the risk of new wells, it's important to have accurate data on streamflows across different types of water years. While some healthier streams may be able to handle small impacts, others already stressed by diversions, pumping, or land-use changes may be too impacted for additional unmitigated groundwater development.



Informational resources: The [California Environmental Flows Framework](#) provides information on existing streamflow conditions in some locations. TNC's [Gage Gap](#) tool provides an easy way to find streamflow gage data. To assess existing water rights, the SWRCB's [California Water Accounting, Tracking, and Reporting System](#) is a computer database developed to track information on water rights in California. For northern coastal watersheds, the [Water Availability Tool](#) is another source for information that can help assess whether there is water available for diversion without impacting existing water rights.



4. Develop groundwater availability maps and additional resources to aid in assessment and permitting decisions based on the degree of risk to public trust resources associated with further groundwater development throughout the county.

Counties can provide essential information and tools to support planning and permitting using the information from Steps 1–3 to identify areas where the addition of wells would not have a significant impact on a stream, depending on type, number, and size. In areas where additional wells pose significant risks, limits on pumping, mitigation requirements, and other measures can be developed. The process of developing groundwater availability maps and tools is complex and requires collecting data, analyzing them spatially, and assessing potential for streamflow depletion using hydrologic models.



Informational resources: To model the impacts of wells on streamflow across large geographies, TNC is developing an approach that pairs high- and low-resolution modeling tools. Low-resolution models (e.g., Analytical Depletion Function) require less data, time, and cost to develop and may be appropriate for large areas where depletion risks are low. Higher resolution models (e.g., USGS MODFLOW) might be necessary where the risk of streamflow depletion impacts on streamflow are higher.



5. Develop well ordinance, policy, and permitting guidelines that avoid negative impacts to communities, nature, and existing water users.

Cities and counties working to update their well ordinances can draw inspiration and practical insights from similar efforts by local governments throughout California. Valuable approaches include engaging stakeholders, forming technical advisory committees, integrating land-use planning, and establishing clear structures for policy development. To address uncertainty and data gaps, the permitting framework should be transparent, be adaptable to new information, and include clear reporting requirements to support compliance and the protection of public trust resources.

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When paired with land-use planning that enhances groundwater recharge, as well as robust monitoring and adaptive management, a well ordinance can help balance the need for water access with the responsibility to safeguard streamflows, wildlife, and existing water rights.

Riparian vegetation lines the Pajaro River corridor as it flows through agricultural and urban zones in Watsonville, where integrated surface and groundwater management supports sustainable water use.



Recommendations to Support Local Agencies

Updating well permitting ordinances is a critical step for counties, and state support is needed to amplify these efforts by driving consistency, expanding adoption, and maximizing benefits statewide. While TNC and its partners are working to improve the tools and strategies that support updating permitting approaches, we recommend the following additional actions to support local agencies:

Develop Statewide Technical Guidance

To help counties meet these new requirements, state agencies can partner with stakeholders to develop a **standardized technical guidance document or toolkit** that provides clarity and empowers local governments to succeed. Building on the five-step framework in the report, this guidance can help counties successfully update their well ordinances as needed, including by demonstrating how to assess streamflow thresholds, groundwater availability, and mitigation measures to avoid significant impacts. The State can address uncertainties and ensure well ordinances are aligned with other requirements related to SGMA by providing technical guidance on modeling depletions of interconnected surface waters from groundwater pumping, so that county and GSA efforts are complementary and make efficient use of limited resources.

Create a Model Well Ordinance Template

Counties and cities are implementing ordinance updates in varied ways, underscoring the need for clear guidance to reduce uncertainty and improve efficiency. The Department of Water Resources or SWRCB could develop a **model well permitting ordinance** that incorporates Public Trust Doctrine compliance, streamflow protection thresholds, permitting procedures for new wells, monitoring, and adaptive management requirements.

Provide Technical Resources

Counties need access to consistent, high-quality data on groundwater, streamflow, and water rights. Building on successful approaches in other states, California has an opportunity to develop a **decision-support tool** that integrates streamflow-gage data, groundwater levels, aquifer characteristics, water rights information, and ecological flow thresholds to enhance planning and resource management.¹¹

Provide Funding and Technical Assistance

Many counties lack the financial and staffing resources to conduct the necessary scientific assessments and ordinance updates. The State could establish a **state grant program or technical assistance fund** to support activities such as hydrologic modeling, mapping of public trust resources, and stakeholder engagement.



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11 See the Wisconsin Groundwater Withdrawal Assessment tool: <https://www.egle.state.mi.us/wwat/home>

Conclusion



Counties play a vital role in safeguarding the well-being of their communities, and one of the most important ways they can do so is by updating their ordinances to address emerging threats.

Proactive ordinance updates not only strengthen the security of local water supplies but also contribute to the protection of streams, fish, and wildlife that are essential to a healthy environment.

Acting now—before being compelled by external forces—offers counties the chance to shape their own approach to water management. Voluntarily updating well ordinances demonstrates their commitment to meeting legal obligations and protecting community interests. Taking a collaborative approach also allows for the inclusion of diverse stakeholder voices, increasing the likelihood of broad support and successful implementation.

By using the information and approach provided here, counties have a unique opportunity to lead the way in efficient, sustainable water management.

Updating ordinances is not just a necessity—it is a critical opportunity to secure the health and prosperity of communities and natural resources for generations to come. Through collaboration, innovation, and local leadership, counties can create meaningful change and inspire others to do the same.

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Updating ordinances is not just a necessity—it is a critical opportunity to secure the health and prosperity of communities and natural resources for generations to come.

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