8

Not a Drop to Drink

Conceptualizing Environmental Justice in California Groundwater

8.1 INTRODUCTION

For anyone coming to California groundwater issues for the first time, it is not long before they see the grainy "telephone pole" picture.[1] Hydrologist Joseph Poland of the US Geological Survey stands beside a dirt road in the San Joaquin Valley of California, next to an impressively tall pole. The pole is marked with dates: at the top, nine meters up, and at about five times Mr. Poland's height, 1925; in the middle, 1955; and at his feet, 1977. The signs show how much the ground had sunk progressively due to overpumping of groundwater. They point to the problem at the heart of this chapter: groundwater depletion. But the focus here is how depletion affects what you can hardly see in the photo – off in the distance, blurs of small white houses, presumably part of a rural community that depends on aquifers for their drinking water.

This chapter analyzes how California law conceptualizes two dimensions of groundwater sustainability: first, groundwater depletion as a physical problem; and second, the effects of groundwater depletion in causing underprivileged households and communities to lose access to drinking water. Both dimensions are inherently cumulative: On one hand, the aggregate impacts of many groundwater withdrawals and drought cause physical depletion; and, on the other hand, communities experience an

[1] Richard Ireland, "Land Subsidence in the San Joaquin Valley (Photograph)" (U.S. Geological Survey, 1977) www.usgs.gov/media/images/land-subsidence-san-joaquin-valley, archived at https://perma.cc/R2P5-GYWQ.

accumulation of harm from socioeconomic vulnerabilities and environmental stresses, one of which is groundwater depletion that jeopardizes drinking water supplies. Conceptualizing what and who matter is a central function of regulating cumulative environmental problems.[2] *Conceptualization*, in turn, links to other functions for which law can provide: structuring what and where *information* is generated and shared, what types of *regulatory intervention* are used to deal with harm, and who is heard and involved in *coordination* to do these things (together, the CIRCle Framework of regulatory functions). This case study serves as an introduction to using the CIRCle Framework advanced by this book to assess legal mechanisms in a real-world context, by focusing on rules for conceptualization and their links with these other functions.

The key legal mechanism in focus here is statutory planning under California's 2014 Sustainable Groundwater Management Act (SGMA), the state's first attempt at a comprehensive statewide groundwater regulatory system. Locally developed and implemented groundwater sustainability plans under SGMA are broadly analogous to resource management plans used around the world.[3] Though recent, the plans have attracted great scholarly interest for how they relate to what are usually termed "disadvantaged communities" in California – a term that I also use here because of its statutory source, while acknowledging its sensitivity for some.[4] Existing work that has studied plan development reveals, for example, that few representatives from disadvantaged communities are represented on the local decision-making bodies that make the plans;[5] few small farmers, who are usually excluded from large agricultural groupings, participate;[6] and plans rarely discuss the quality of drinking water, which can be contaminated by nitrates and pose a

[2] See Chapter 4 on Conceptualization.

[3] See Section 3.2.3.

[4] A widely accepted alternative term has not yet emerged: Oceana Haaland and Pablo Ortiz, *Disadvantaged Communities Nomenclature within the State of California: Findings and Conclusions* (California Department of Water Resources 2022) 6, https://water.ca.gov/-/media/DWR-Website/Web-Pages/About/Tribal/Files/IRWM/URC-Nomenclature-Whitepaper.pdf, archived at https://perma.cc/8LEZ-8MP8.

[5] See generally, Kristin B. Dobbin and Mark Lubell, "Collaborative Governance and Environmental Justice: Disadvantaged Community Representation in California Sustainable Groundwater Management" (2021) 49 *Policy Studies Journal* 562–590.

[6] See generally, Linda Estelí Méndez-Barrientos and others, "Farmer Participation and Institutional Capture in Common-Pool Resource Governance Reforms. The Case of Groundwater Management in California" (2020) 33 *Society and Natural Resources* 1486–1507.

major concern for disadvantaged communities.[7] Scholars have also shown that planning efforts that better engage disadvantaged communities tend to produce quantified sustainability goals that seek to better protect those communities.[8] This chapter builds on this focus on disadvantaged communities from a legal perspective, emphasizing the Central Valley of California (see Figure 1.2), where these concerns are heightened.

Section 8.2 describes the importance of groundwater as drinking water, the challenges faced by disadvantaged communities that rely on groundwater, and how this context presents pronounced challenges for conceptualizing what and who matter in regulating cumulative harms. Section 8.3 demonstrates how, before the introduction of SGMA, the patchwork of groundwater-related laws that applied in California had a significant gap in its view of "what matters." It focused largely on groundwater pollution as a matter of concern, with groundwater depletion a notably threadbare patch. Across different laws, multiple different conceptualizations of "who matters" emerged. Some focused simply on low-income communities, and others focused on communities that faced significant cumulative environmental and socioeconomic burdens. Section 8.4 analyzes, in detail, the degree to which SGMA changes what and who matter in groundwater sustainability, and how its provisions for conceptualization link to other CIRCle Framework functions. It argues that while SGMA focuses strongly on groundwater depletion, its attention to disadvantaged communities is variable, showing differences between provisions that deal with different regulatory functions. In addition, by preferring a simple rather than cumulative view of who matters, SGMA misses an opportunity to maximize the likely effectiveness of interventions.

8.2 CONTEXT AND CHALLENGES

8.2.1 *The Threat to Community Drinking Water of Declining Groundwater Levels*

California's Central Valley is one of the world's thirty-seven "mega aquifers": very large subsurface reservoirs of underground water that generally span

[7] See generally, Emel G. Wadhwani, "Fertilizers and Nitrates in Drinking Water: State Water Board Tackles the Public Health Threat of Contaminated Groundwater" (2018) 24 *Hastings Environmental Law Journal* 237–251.

[8] See generally, Debra Perrone and others, "Stakeholder Integration Predicts Better Outcomes from Groundwater Sustainability Policy" (2023) 14:3793 *Nature Communications* 1–14.

political boundaries and, together, account for most of the world's groundwater resources.[9] Central Valley groundwater is notoriously overused,[10] and the most intensely depleted in the United States.[11] It supports one of the world's most productive agricultural regions and a growing population,[12] including many disadvantaged communities. Satellite data show that cumulative losses of Central Valley groundwater are accelerating, largely driven by agricultural withdrawals.[13] Yet California has historically taken a "hands-off" regulatory approach to groundwater use, including in the economically muscular agriculture sector. Rather than requiring a permit to pump groundwater (as do most western US states and nearly three-quarters of the world's nations),[14] California relies on ad hoc court-based processes to quantify rights to pump groundwater, which have not been used in the Central Valley.[15]

Groundwater depletion manifests as declining water table levels, which may put groundwater levels beyond the reach of wells such that they run dry, and water can no longer be pumped to the surface. The combined effect of groundwater withdrawals and drought caused around one-fifth of wells in the Central Valley to run dry between 2013 and 2018.[16] Because

[9] Jean Margat and Jac van der Gun, *Groundwater around the World: A Geographic Synopsis* (CRC 2013) 37, 44, 47, app 3.

[10] Ibid 135.

[11] Leonard F. Konikow, "Long-Term Groundwater Depletion in the United States" (2015) 53 *Groundwater* 2–9, 6–7.

[12] Thomas E. Reilly and others, *Ground-Water Availability in the United States*, US Geological Survey Circular 1323 (2008) 44.

[13] Pang-Wei Liu and others, "Groundwater Depletion in California's Central Valley Accelerates during Megadrought" (2022) 13:7825 *Nature Communications* 1–11, 6–7.

[14] John Kemoli Sagala and Zachary A. Smith, "Comparative Groundwater Management: Findings from an Exploratory Global Survey" (2008) 33 *Water International* 258–267, 262; see generally, Gabriel Eckstein and others, *Groundwater Laws and Regulations: Survey of Sixteen U.S. States*, vols. I and II (Texas A&M University School of Law 2022).

[15] California Department of Water Resources, *Sustainable Groundwater Management Act 2019 Basin Prioritization: Process and Results* (May 2020) app 5 (*SGMA Basin Prioritization*) https://data.cnra.ca.gov/dataset/13ebd2d3-4e62-4fee-9342-d7c3ef3e0079/resource/ffafd27b-5e7e-4db3-b846-e7b3cb5c614c/download/sgma_bp_process_document.pdf, archived at https://perma.cc/28VU-98ME. Note that under California's groundwater basin and subbasin numbering system, basins in the Central Valley all commence with the number 5: Department of Water Resources (California), *California's Groundwater: Working toward Sustainability: Bulletin 118 – Interim Update 2016* (2016) fig B-2, https://cawaterlibrary.net/wp-content/uploads/2017/05/Bulletin_118_Interim_Update_2016.pdf, archived at https://perma.cc/42W2-5X4X.

[16] Scott Jasechko and Debra Perrone, "California's Central Valley Groundwater Wells Run Dry during Recent Drought" (2020) 8:e2019EF001339 *Earth's Future* 1–12, 9 (based on wells constructed since 1975). See also Clara MacLeod and Linda Estelí Méndez-Barrientos,

small municipal and household wells tend to be relatively shallow, they are especially vulnerable to drying out as water levels decline. Deeper, high-capacity wells – typically agricultural wells – are less vulnerable: They can continue to withdraw significant volumes of groundwater, further increasing water level declines and worsening water quality problems.[17]

Depletion-related threats to drinking water may prove cumulatively more significant for households and communities that lack the resources to find alternatives and that face cumulative environmental burdens. Data from California's dry well reporting system illustrate the issues: One householder reports "well is dry (no longer producing water)," and that they lacked money to fix the well while battling stage 4 cancer;[18] many others who reported wells that were dry or "pumping sand" noted they were trucking in water, "getting water from our neighbors with a hose," purchasing bottled water, and frequently, that they "cannot afford to finance solutions."[19]

8.2.2 *Conceptualization and Its Links to Information, Intervention, and Coordination*

This chapter explores whether and how law conceptualizes groundwater availability ("what matters") for disadvantaged communities who depend on it ("who matters") (together, "the matter of concern") as the object of protection from cumulative harm. The "what matters" part of this conceptualization puts groundwater levels in focus, because the most straightforward way to ensure that groundwater is available is to make sure that levels do not fall below the base of wells[20] used to access it. If they do, wells will run dry.

"Groundwater Management in California's Central Valley: A Focus on Disadvantaged Communities" (2019) 3 *Case Studies in the Environment* 1, 1–2, 10.

[17] See generally, Zeno F. Levy and others, "Critical Aquifer Overdraft Accelerates Degradation of Groundwater Quality in California's Central Valley during Drought" (2021) 48 *Geophysical Research Letters* e2021GL094398.

[18] California Natural Resources Agency, "Dry Well Reporting System Data" (*California Natural Resources Agency*, 2024) (report ID #20240) https://data.cnra.ca.gov/dataset/dry-well-reporting-system-data, archived at https://perma.cc/F4UD-YF3N.

[19] See generally, ibid.

[20] To be precise, wells will run dry if groundwater levels fall below the level of the pump, which will be at least a little above the base of the well.

Recall Chapter 4 (Conceptualization)

Key design features of regulatory mechanisms for conceptualization are using rules to clearly and transparently specify, or provide a process for specifying: **what matters** and **who matters** (together, the "matter of concern") for restoration or protection from cumulative harm, and **how they are linked** (together, the "matter of concern"); their **spatial extent**; and **threshold acceptable conditions**, which may involve a temporal element (see Figure 8.1).

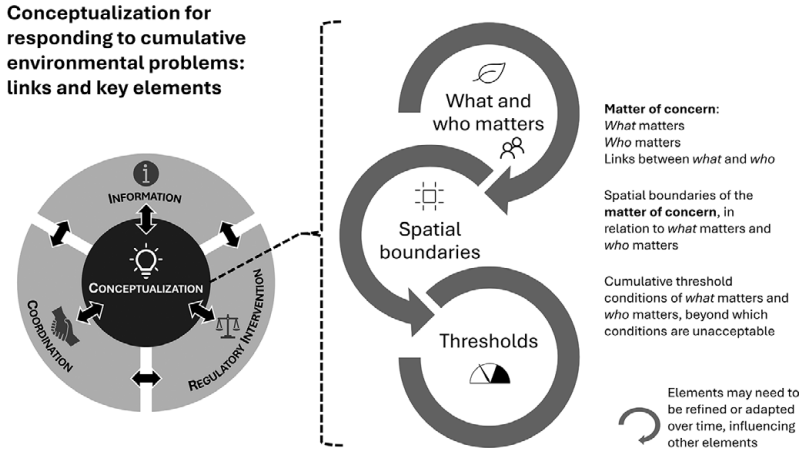

FIGURE 8.1 Conceptualization for responding to cumulative environmental problems: links and key dimensions, discussed further in Chapter 4

The "who matters" part of this conceptualization requires determining what constitutes a disadvantaged household or community that depends on groundwater, where they are, and which groundwater body they rely on. Where levels are currently declining, this signals potential intervention to stabilize or increase levels – either by artificially recharging the aquifer with floodwater or another source or foregoing some pumping.[21] Combining what and who matters lets us then conceptualize cumulative threshold conditions: groundwater levels, beyond which cumulative harm would be unacceptable. History makes setting threshold conditions challenging. The fact that groundwater levels across many parts of

[21] Nicola Ulibarri and others, "Assessing the Feasibility of Managed Aquifer Recharge in California" (2021) 57:e2020WR029292 *Water Resources Research* 1–18, 8, 14.

California's Central Valley have been declining for decades[22] means there is no obvious objective answer to the question of what a good groundwater level is. The answer depends on who groundwater is intended to benefit. Those with deep wells can maintain access to a declining groundwater resource for longer than those with shallow wells. Specifying these things clearly and transparently is the fundamental challenge of conceptualization.[23]

The way that law conceptualizes what and who matter centrally affects each of the other three regulatory functions of the CIRCle Framework for dealing with a cumulative environmental problem (Figure 8.1) – the information that is generated and shared about the matter of concern and threats to it, intervention to address threats, and coordination mechanisms that determine who is heard and who makes decisions about doing these things. Section 8.4.2 analyzes these links in more detail in the context of SGMA.

8.3 CONCEPTUALIZATION ACROSS THE REGULATORY LANDSCAPE

Until the passage of SGMA, a patchwork of statutes dealt with narrow elements of the issue of groundwater and drinking water supplies, each conceptualizing the matter of concern differently with respect to the physical characteristics of groundwater (what matters) and its end users (who matters). Together, these conceptualizations left a weakness: the risk of groundwater levels lowering, and its effects on disadvantaged communities and households reliant on groundwater. This part analyzes this patchwork of laws, and the various ways in which they conceptualize what and who matter. This has two purposes: First, to demonstrate surveying the regulatory landscape[24] (the preliminary stage of the analytical process to use the CIRCle Framework); and, second, to lay the foundation for the following analysis of the ways in which SGMA filled – and did not fill – this gap. Since many laws are involved, these analyses are necessarily brief.

8.3.1 *Conceptualizing What Matters: The Groundwater Level Gap*

Putting SGMA to one side, California's other groundwater-related laws primarily focus on the availability and quality of water supplied by larger water utilities ("piped water"), rather than water availability for those who lack a utility service. General water planning laws cover groundwater in specific contexts, such as agriculture, urban, and integrated water management. Land use and environmental impact assessment ("EIA") laws also deal with groundwater in relatively

[22] Liu and others, "Groundwater Depletion," 4–5.

[23] See Chapter 4 (Conceptualization)

[24] See Chapter 11 (Guidelines). Chapters 9 and 10 take a more detailed approach to this surveying process, using the "compass" approach presented in Figure 3.1 to analyze regulatory interventions: see Tables 9.1 and 10.1.

narrow ways. But before SGMA, other than an early voluntary form of planning, California lacked a generally applicable law that regulated groundwater sustainability, conceptualized as relating to groundwater levels. Traditionally, then, those with typically shallower wells – household well owners and smaller water suppliers – were exposed to the risks of falling groundwater levels and wells going dry.

8.3.1.1 Drinking Water Laws: Quality of Utility-Supplied (Piped) Water

The US Safe Drinking Water Act has long regulated the quality of drinking water from public water supply systems by establishing national primary drinking water regulations that limit contaminant levels.[25] California implements these federal rules[26] under its own Safe Drinking Water legislation. More recent California law creates a fund to support grants for expanding piped water service[27] and providing replacement water and system repairs where needed.[28] A legally required "aquifer risk" map, which influences how the fund is spent, includes groundwater quality and a drought-driven focus on aquifer levels but does not focus on depletion in general.[29] In this legal view, it is the quality of piped water that matters.

California's human right to "safe, clean, affordable, and accessible" water for consumption, cooking, and sanitary purposes further supports these laws.[30] State agencies are required to consider this "policy" when "revising, adopting, or establishing policies, regulations, and grant criteria" pertinent to water use. This right to "safe, clean" water clearly covers water quality, but "accessible" water only ambiguously links to water quantity; it is unclear whether the reference is to piped water service being available or to water in aquifers that is accessible because groundwater levels have not declined too far. A related "human right to water data tool" clearly emphasizes the quality of water supplied by small utilities.[31] It currently considers "accessibility" only as

[25] The federal Safe Drinking Water Act (Safe Drinking Water Act of 1974 (P.L. 93-523), as amended, codified as 42 U.S.C. §§300f to 300j-10) also protects aquifers used for drinking water from injection of contaminated fluids (42 U.S.C. §§ 300h to 300h-9), but this is a minor role that is not discussed further here.

[26] 42 U.S.C. § 300g-2 (state primary enforcement responsibility).

[27] Cal. Health and Safety Code §§ 116766, 116768 (purposes of fund expenditure plan), 116769 (contents of fund expenditure plan).

[28] Cal. Health and Safety Code §§ 116770, 116767 (definition of "replacement water").

[29] See State Water Resources Control Board, *2024 Aquifer Risk Map Methodology* (2024), www.waterboards.ca.gov/water_issues/programs/gama/docs/armmethods24.pdf, archived at https://perma.cc/2Z3H-CKXR.

[30] Cal. A.B. 685 of 2012 (Cal. Stats.2012, c. 524, §1), codified as Cal. Water Code §106.3.

[31] California Office of Environmental Health Hazard Assessment, "The Human Right to Water in California" (January 28, 2021) https://oehha.ca.gov/water/report/human-right-water-california, archived at https://perma.cc/L8ES-T3LB.

vulnerability to utility water outages,[32] though future amendments may include depletion.[33] Such amendments would align with evolving understandings of the human right to water internationally, which are shifting from considering the right as a water services issue, to considering the human right to "raw water at the source."[34] This move would expand the conceptualization of the matter of concern to include groundwater levels, beyond access to piped water.

8.3.1.2 Water Pollution Laws: Quality of Groundwater in Aquifers

Water pollution laws regulate discharges of pollution into waters. Both the federal Clean Water Act[35] and California's Porter-Cologne Act[36] regulate pollution discharges. These statutes require California's state and regional Water Boards to protect all beneficial uses of water, including municipal or domestic water sources,[37] using "total maximum daily loads" of pollutants[38] and a mix of planning and permitting tools, and funds for water pollution projects[39] and water treatment systems.[40] The federal Clean Water Act's permitting requirements are restricted to point source discharges to "waters of the United States," a category that excludes groundwater.[41] For present purposes, the law's main effect is to restrict federal funding for actions that may pollute designated sole source aquifers.[42] Only California's Porter-

[32] Carolina Balazs and others, *Achieving the Human Right to Water in California: An Assessment of the State's Community Water Systems* (Office of Environmental Health Hazard Assessment, California EPA, 2021) 49, https://oehha.ca.gov/sites/default/files/media/downloads/water/report/hrtwachievinghrtw2021f.pdf, archived at https://perma.cc/TW4S-CT68.

[33] Note that there are plans to incorporate additional indicators relating to sufficiency, continuity of supply, and vulnerability to drought in the future, including information about overdraft: ibid 58.

[34] Stefano Burchi, "The Future of Domestic Water Law: Trends and Developments Revisited, and Where Reform Is Headed" (2019) 44 *Water International* 258–277, 274.

[35] Federal Water Pollution Control Act Amendments of 1972, as amended (33 U.S.C. § 1251 et seq.).

[36] Porter-Cologne Water Quality Control Act (Cal. Water Code Div. 7, § 13000 et seq.)

[37] Cal. Water Code §§ 13241, 13263(a), 13050(f) and (h).

[38] 33 U.S.C. § 1313(d).

[39] Cal. Water Code Div. 7, esp. § ;13477 State Water Resources Control Board, "Financial Assistance Funding – Grants and Loans" (n.d.) www.waterboards.ca.gov/water_issues/programs/grants_loans/, last accessed March 20, 2025, archived at https://perma.cc/V33L-XN9J.

[40] Cal. Stats. 2017, c. 438 (A.B.277), now codified as Cal. Water Code §§ 13486–13489 (Water and Wastewater Loan and Grant Program).

[41] An exception applies in the narrow circumstance that pollutants discharged from a point source arrive at navigable waters through groundwater: *County of Maui, Hawaii v. Hawaii Wildlife Fund*, 140 S. Ct. 1462, 206 L. Ed. 2d 640 (2020).

[42] 42 U.S.C. § 300h-3(e) ("an aquifer which is the sole or principal drinking water source for the area").

Cologne Water Quality Control Act directly controls pollution discharges to groundwater, dealing with both point- and nonpoint sources such as agricultural nitrate pollution.[43] Nonpoint pollution is the main source of water quality impairment in California.[44] The Porter-Cologne Act is silent on groundwater levels. In this case, it is groundwater quality that matters.

8.3.1.3 Pre-SGMA Water Planning Laws: Quality and Availability of Piped Water

Water supply reliability emerges as a key concern through state legislation for integrated water resources planning, and planning for municipal and agricultural uses.[45] Integrated regional water management plans[46] identify water management demand and supply strategies, including "[g]roundwater storage and conjunctive water management" to provide "long-term, reliable, and high-quality water supply and protect the environment."[47] In relation to drinking water, though, the integrated planning legislation only focuses on water quality.[48] Other legislation provides for agricultural water management plans and urban water management plans, which are required of large water suppliers that provide service for these purposes, and focus on water quality, water use efficiency and supply reliability.[49] Drinking water for disadvantaged communities unserved by a utility is outside their scope.

[43] Cal. Water Code § 13263.

[44] Ellen Hanak and others, *Managing California's Water: From Conflict to Reconciliation* (Public Policy Institute of California 2011) 285. For this reason, some other laws relevant to water pollution are not considered here, e.g., the US federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, which deals with hazardous waste sites, and the US Toxic Substances Control Act of 1976, which regulates toxic chemicals.

[45] Note that I categorize well construction laws together with land use laws, since they do not deal with management of the resource in that they do not regulate the volume of water that can be withdrawn, as distinct from technical standards that apply to the construction of well casings, and so on.

[46] Cal. Water Code §§ 10530–10550 (Integrated Regional Water Management Planning Act), added by Stats.2007–2008, 2nd Ex.Sess., c. 1 (S.B.1).

[47] Cal. Water Code §§ 10534, 10537.

[48] Cal. Water Code § 10540(c)(2).

[49] Agricultural Water Management Planning Act of 1986 (Cal. Stats.1986, C. 954, §1), codified as Cal. Water Code §§ 10800–10853 (1986), especially §§ 10825, 10826 (quality and quantity of source water), 10853 (agricultural: supplying water to 25,000 irrigated acres or more); Urban Water Management Planning Act of 1983, Cal. Stats.1983, C. 1009, §1, codified as Cal. Water Code §§10610–10657 (1983), especially §§ 10617 (urban: supplying water for municipal purposes to more than 3,000 customers or more than 3,000 acre-feet of water annually), 10631 (groundwater, demand management), 10631(b) (quantify sources), 10634 (quality), 10635 (reliability).

8.3.1.4 Land Use and EIA Laws: Quality and Availability of Groundwater

Local land use-related laws influence groundwater by zoning and permitting land uses that may pollute groundwater or build over recharge zones, affecting groundwater availability. State land use planning laws require cities and counties to adopt general plans for land use that include conservation and open space elements.[50] These consider how development affects the quality and availability of groundwater in aquifers, though not expressly in a drinking water context.[51] Cities and counties may also regulate small-scale domestic septic systems and improperly constructed wells to prevent pollution.[52]

Federal and state EIA laws provide for assessing the impacts of individual projects that may use groundwater or have the potential to pollute it. The federal National Environmental Policy Act ("NEPA") obliges federal agencies to prepare statements on "environmental impacts" of proposed major federal actions.[53] This is purely procedural, not imposing a stand-alone approval requirement. The California Environmental Quality Act requires lead agencies to assess the impacts of any project "they propose to carry out or approve that may have a significant effect on the environment."[54] In this case, assessments are linked to a prohibition on agencies "approving projects with significant environmental effects if there are feasible alternatives or mitigation measures that would substantially lessen or avoid those effects."[55] Both groundwater quality and quantity are relevant to EIA laws that define "effects" and the "environment" broadly.[56]

8.3.2 *Conceptualizing Who Matters: Communities of Concern*

Groundwater-related legal provisions also adopt different broad approaches to describing who matters. Some are simple in the sense that they make a one-dimensional determination of who matters. This may take the form of "everyone matters," "low-income communities matter" (usually using the term

[50] Cal. Government Code § 65302(a), (d).

[51] Governor's Office of Planning and Research, *General Plan Guidelines Including Updated Element on Environmental Justice* (2020) 55, 112–114, 303, https://lci.ca.gov/docs/20200706-GPG_Chapter_4_EJ.pdf, archived at https://perma.cc/4P6U-K97K.

[52] E.g., Fresno County Code of Ordinances §§14.04.050, 14.09.030, 14.12.030.

[53] 42 U.S.C. § 4332.

[54] Cal. Public Resources Code §21100(a) (state agencies), 21151(a) (local agencies).

[55] Kamala D. Harris, *Environmental Justice at the Local and Regional Level* (State of California Department of Justice 2012) 4, https://oag.ca.gov/sites/all/files/agweb/pdfs/environment/ej_fact_sheet_final_050712.pdf, archived at https://perma.cc/GD2S-6MBB.

[56] 40 C.F.R. § 1508.1(i)(4); Cal. Public Resources Code § 21060.5.

"disadvantaged communities," defined as an area in which the median household income is less than 80 percent of the median household income level[57]), or "no-one in particular matters" (where a law is silent on the question). Only the second approach recognizes the special vulnerability of population subgroups, albeit based on the single criterion of income. A less common alternative to these simple approaches to determining who matters is the idea of "environmental justice communities," which describes populations that suffer a disproportionate cumulative burden of multiple kinds of impacts, including environmental burdens of which water-related stress is just one component, alongside pronounced socioeconomic vulnerability.[58] Importantly, as discussed later, there are varying legal and policy definitions of "environmental justice" and "disadvantaged communities," not only between state- and federal-level laws but also among different state-level laws and even within a single law. In practice, this incoherence in an important element of conceptualization creates significant confusion for communities.[59]

How a law describes who matters is important. It determines who the law "sees and hears" for the purposes of collecting information, designing interventions, and inviting them to participate and coordinate. The outcome might mean, for example, being eligible for a grant to restore your water supply (or not); explaining and having your community's circumstances considered in a water plan or a project assessment (or not); or being protected in regulating activities that affect groundwater (or not).

8.3.2.1 Simple Views of Who Matters

At one end of the spectrum of simple views of who matters, California's human right to "clean, safe, affordable, and accessible" water applies to all humans, implicitly with the same minimum standards for water quality, affordability, and accessibility for all. As written, the right does not highlight any particular population, though associated policy tools focus on low-income disadvantaged communities.[60]

[57] Cal. Health and Safety Code § 116275(aa). In a "severely disadvantaged community," the median household income is less than 60 percent of the statewide median household income: Cal. Water Code § 13476(j).

[58] Haaland and Ortiz, *Disadvantaged Communities Nomenclature*, 19–23.

[59] Ibid 4, 6, 8, 19–20.

[60] E.g., California's main drinking water fund, which prioritizes grants for disadvantaged communities, is expressed to be directed at realizing the human right to water: California State Water Resources Control Board, *2024 Drinking Water Needs Assessment* (2024) 18, 19, www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs.html, archived at https://perma.cc/8VXY-9N9T.

Many other groundwater-related laws focus expressly on disadvantaged communities defined solely with reference to income. This is common in the areas of drinking water, water information and resource management, and land use. Though drinking water quality standards do not distinguish between communities, grant-making provisions that aim to remedy noncompliance with these standards focus on disadvantaged communities. This is the case for federal programs[61] under which communities become eligible and are prioritized for funding.[62] Similarly, grants under California's main drinking water fund prioritize funding for failing water supply systems and domestic wells[63] based on disadvantage defined by income and groundwater pollution risks.[64] Smaller state grant programs[65] and information tools[66] adopt a similar focus.

In the planning context, integrated regional water management plans must identify and consider the water-related needs of low-income "disadvantaged communities,"[67] and include them in public participation processes.[68] Projects that would benefit disadvantaged communities are prioritized,[69] with special attention to contaminated areas.[70] Finally, land use laws focus on disadvantaged communities[71] by requiring general plans to identify such communities outside city boundaries and

[61] 42 U.S.C. §§ 300j-12(a)(2)(G)(ii)(I), (d)(3), (d)(1)(A), (f)(1)(C) (Drinking Water State Revolving Fund), 300j-19a (Assistance for Small and Disadvantaged Communities Program); see also Misbah Husain and Melissa Scanlan, "Disadvantaged Communities, Water Justice and the Promise of the Infrastructure Investment and Jobs Act" (2022) 52 *Seton Hall Law Review* 1513–1530, 1519.

[62] E.g., 42 U.S.C. § 300j-19a(a)(2), (c)(2)(A), (d).

[63] Cal. Health and Safety Code § 116769.

[64] "Low income" is defined as "a single household with an income that is less than 200 percent of the federal poverty level": Cal. Health and Safety Code §§ 116767(k), 116769(b) ("needs assessment"), 116772 (aquifer risk map); State Water Resources Control Board, *2024 Aquifer Risk Map Methodology*; State Water Resources Control Board, Aquifer Risk Map, https://gispublic.waterboards.ca.gov/portal/apps/experiencebuilder/experience/?id=18c7d253f0a44fd2a5c7bcfb42cc158d, last accessed March 20, 2025, archived at https://perma.cc/US7Z-4MJW.

[65] E.g., Water and Wastewater Loan and Grant Program: Cal. Water Code §§ 13488, 13489 (requiring income at or below 120 percent of the statewide median household income).

[66] E.g., a nonstatutory "human right to water data tool" highlights disadvantaged communities defined by income: Balazs and others, *Achieving the Human Right to Water*, 105–108.

[67] Cal. Water Code §§ 10534, 10540(c)(7).

[68] Cal. Water Code § 10541(g)(12).

[69] Cal. Water Code § 10551. Note that this provision ceased to have effect on January 1, 2025.

[70] Cal. Water Code § 10545.

[71] "'Disadvantaged unincorporated community' means a fringe, island, or legacy community in which the median household income is 80 percent or less than the statewide median household income.": Cal. Government Code § 65302.10(a)(2).

their "water ... needs or deficiencies,"[72] and review financing options for extending services to them.[73]

A final, "simple" approach to defining who matters is to omit to say that anyone in particular matters, in favor of focusing on solely technical, physical issues. This is the approach of key elements of drinking water laws, water pollution laws, and water information and resource management laws. Federal sole source aquifer provisions make no reference to community vulnerabilities that might affect the importance of an aquifer to the population that depends on it. California's water pollution permitting provisions[74] mention no particular human population.[75] Agricultural water management planning processes require public participation without mentioning who should be involved.[76]

Some other laws inch toward recognizing people, but not in a way that really defines who matters. Although drinking water quality standards apply the same way everywhere, the standard setting process "may" consider physiologically vulnerable communities such as children and pregnant women.[77] Urban water suppliers preparing their plans must encourage the participation of "diverse social, cultural and economic elements of the population,"[78] but they need neither involve nor consider the circumstances of any specific population.

8.3.2.2 A Cumulative View of Who Matters: Environmental Justice Communities

Less commonly, rather than taking a "simple" view of who matters, groundwater-related laws focus on environmental justice communities defined by cumulative environmental burdens. That is, instead of using a single income criterion to decide who matters, they determine who matters by aggregating indicators of different kinds of environmental and socioeconomic stresses. Land use laws, a statutory drinking water fund, and EIA laws take this

[72] Cal. Government Code § 65302.10(b).
[73] Governor's Office of Planning and Research, *General Plan Guidelines*, 67. See also Nelia Sperka, *Technical Advisory: Senate Bill 244: Land Use, General Plans, and Disadvantaged Communities* (Office of Planning and Research (California) 2013), https://lci.ca.gov/docs/SB244_Technical_Advisory.pdf, archived at https://perma.cc/H5DY-65HV.
[74] Cal. Water Code Div. 7 chapter 4 ("regional water quality control").
[75] E.g., considerations relevant to the establishment of water quality objectives and waste discharge requirements: Cal. Water Code §§ 13241, 13263.
[76] Cal. Water Code §10841.
[77] Cal. Health and Safety Code § 116365.2. See also § 116365.
[78] Cal. Water Code § 10642.

approach, as discussed later. Overall, though, the idea of environmental justice communities advanced by these laws does not consider declining groundwater levels to be an environmental justice issue, focusing instead on pollution. Equally strikingly, there is no coherent idea of environmental justice communities across these legal areas, with differences in the indicators used at state and federal levels.

Of all the laws discussed here, California's land use laws use environmental justice most prominently. Local "general plans" for land use must include an environmental justice component that identifies "disadvantaged communities,"[79] this time defined cumulatively by demographic vulnerabilities, income, and environmental stressors.[80] The objectives and policies of a plan must aim to "reduce the unique or compounded health risks in disadvantaged communities," including by measures directed at pollution exposure, food access, and safe homes.[81]

In other laws, a cumulative conceptualization of environmental justice emerges more tangentially in a way that is specific to a regulatory function – information, regulatory intervention, or coordination. We turn first to EIA laws, which chiefly serve a regulatory information function. Before recently being revoked, NEPA regulations expressly defined and required consideration of environmental justice, drawing attention to income, race, color, national origin, tribal affiliation and disability, and "the cumulative impacts of environmental and other burdens, and the legacy of racism or other structural or systemic barriers" and "access to a healthy, sustainable, and resilient environment."[82] In its detail, and in linking environmental justice to a sustainable environment, this went significantly beyond older executive orders requiring consideration of environmental justice.[83] A US Environmental Protection Agency ("EPA") mapping tool, EJScreen,

[79] Cal. Government Code § 65302(h)(1).

[80] Cal. Government Code § 65302(h)(4)(A), (C), referring to definition in Cal. Health and Safety Code § 39711.

[81] Cal. Government Code § 65302(h)(1)(A).

[82] 40 C.F.R. § 1508.1(m). In February 2025, these regulations were revoked: Council on Environmental Quality (US), "Removal of National Environmental Policy Act Implementing Regulations" (February 25, 2025) 90 Federal Register (USA) 10610.

[83] William Clinton, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (February 11, 1994) 59 *Federal Register (USA)* 7629, s1–101; William Clinton, "White House Memorandum for the Heads of All Departments and Agencies: Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (February 11, 1994). See also US Environmental Protection Agency, "Environmental Justice and the National Environmental Policy Act" (n.d.) www.epa.gov/environmentaljustice/environmental-justice-and-national-environmental-policy-act, last accessed March 21, 2025, archived at https://perma.cc/RQB2-D6ZP.

supported considering environmental justice by showing spatial disparities in environmental, demographic, health, climate risk, and service gap indicators.[84] However, no clear resource sustainability indicators were included. At the time of writing, it appears that a federal administrative priority is to terminate all of these federal environmental justice tools and measures.[85]

Demonstrating the value for policy stability of policy redundancy across government levels,[86] California's EIA laws continue to embed environmental justice; they will likely provide a conceptual safety net for environmental justice concepts even with federal policy change. A California Attorney-General's memorandum sees environmental justice embedded in an EIA law provision under which a project may be deemed environmentally significant if it will cause "substantial effects on human beings,"[87] considering any human receptors more sensitive to the effect. That is, an effect will be more significant for populations already subject to other environmental stresses or vulnerabilities.[88] A California EPA mapping tool, CalEnviroScreen,[89] aggregates environmental, health, and socioeconomic indicators into scores that show how cumulative environmental burdens and vulnerabilities vary across space.[90] Confusingly, though, CalEnviroScreen uses different criteria from those in the US EPA's EJScreen.

Second, in the context of regulatory intervention as a function, environmental justice emerges in the design of "state rescue" mechanisms (which involve the state stepping in to deal with a cumulative problem, rather than seeking to

[84] See generally, US Environmental Protection Agency, *EJScreen Technical Documentation for Version* 2.3 (2024) www.epa.gov/system/files/documents/2024-07/ejscreen-tech-doc-version-2-3.pdf, archived at https://perma.cc/EZ6R-P2R7.

[85] Office of the Attorney General (US), Memorandum for All Department Employees: Rescinding "Environmental Justice" Memoranda (February 5, 2025) www.justice.gov/ag/media/1388551 archived at https://perma.cc/CZ2C-DWHU; Angela C. Jones, "Trump Administration Environmental-Justice-Related Executive Orders: Potential Implications for EPA Programs" (Congressional Research Service, February 24, 2025) www.congress.gov/crs-product/IF12922.

[86] See Section 7.1.2, especially n 26 and accompanying text.

[87] Cal. Public Resources Code, § 21083(b)(3); see also CEQA Guidelines, 2 Cal. Code Regs. § 15126.2.

[88] Harris, *Environmental Justice at the Local and Regional Level*, 3–4, citing *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d at 661, *Los Angeles Unified School Dist. v. City of Los Angeles* (1997) 58 Cal.App.4th 1019, 1025; see also CEQA Guidelines, 14 Cal. Code Regs. § 15300.2.

[89] California Office of Environmental Health Hazard Assessment, "Uses of CalEnviroScreen" (n. d.) https://oehha.ca.gov/calenviroscreen/how-use, last accessed March 20, 2025, archived at https://perma.cc/8KVY-G2F4.

[90] E.g., cleanup sites, traffic impacts, pesticide use, drinking water contaminants: see generally, Lauren Zeise and Jared Blumenfeld, *CalEnviroScreen 4.0* (California Environmental Protection Agency 2021), https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf, archived at https://perma.cc/8YG9-FXCQ.

change behavior that causes cumulative harm[91]) that support communities. Statutory funds for drinking water projects invest in communities affected by cumulative burdens based on "geographic, socioeconomic, public health, and environmental hazard criteria."[92] The use of a power to consolidate underperforming utilities[93] expressly may be prioritized by considering historical overburden by "pollution and industrial development or … other environmental justice hurdles."[94] We also see environmental justice communities in regulatory enforcement policies, even if not directly in the corresponding laws. Thus, California's water quality enforcement policy requires enforcement to "integrate environmental justice consideration."[95] Among other things, this involves improving data about violations and enforcement for "minority communities and low-income populations"; considering informal approaches to compliance and enforcement to avoid economic hardships for these communities;[96] and prioritizing enforcing violations that contaminate drinking water sources.[97] More broadly, the California Department of Justice's Bureau of Environmental Justice, established in 2018, litigates to assist low-income and minority communities affected by disproportionate pollution.[98]

At the level of formal policy, the California EPA's environmental justice strategy[99] defines environmental justice as "the fair treatment of people of all races, cultures, and income levels, including minority populations and low-income populations in the state."[100] In line with its pollution-focused mission,[101]

[91] For discussion of state rescue mechanisms as a form of regulatory intervention, see Section 6.3.
[92] Cal. Health and Safety Code §§ 39711(a)), 39719(b)(3).
[93] Cal. Health and Safety Code § 116682.
[94] Cal. Health and Safety Code § 116682(l).
[95] State Water Resources Control Board, *Water Quality Enforcement Policy* (2017) 4, www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2017/040417_9_final%20adopted%20policy.pdf, archived at https://perma.cc/V2JS-JXXN.
[96] Ibid 4.
[97] Ibid.
[98] Xavier Becerra, *Attorney General Becerra Establishes Bureau of Environmental Justice* (February 22, 2018), https://oag.ca.gov/news/press-releases/attorney-general-becerra-establishes-bureau-environmental-justice, archived at https://perma.cc/5QFF-GVS6.
[99] Cal. Public Resources Code § 71113; California Environmental Protection Agency, *Intra-Agency Environmental Justice Strategy* (2004) 1, https://calepa.ca.gov/wp-content/uploads/2017/01/EnvJustice-Documents-2004yr-EnglishStrategy.pdf, archived at https://perma.cc/VZS9-UUBC. This applies to the State Water Resources Control Board, which is a department of CalEPA, and which implements the Porter-Cologne Water Quality Control Act.
[100] Cal. Public Resources Code § 71110(a); see also Cal. Government Code § 65040.12 (definition of environmental justice as related to "environmental laws, regulations and policies").
[101] E.g. "About Us" (n.d.) https://calepa.ca.gov/about/, last accessed March 23, 2025, archived at https://perma.cc/N4CU-PNQP.

the strategy's distributive justice elements focus on pollution (e.g., a "clean environment" and "health hazards").[102] Its only reference to resources depletion is to recite a statutory obligation to identify "differential patterns of consumption of natural resources" among different socioeconomic groups.[103]

Finally, several different coordination mechanisms expressly advance environmental justice by bringing together different levels of government or agencies across government in institutions. In California, this occurs pursuant to statute (through a function of the Office of Planning and Research)[104] as well as policy (under CalEPA's environmental justice strategy).[105] Until early 2025, multiple nonstatutory environmental justice groups existed at the federal level, including the Interagency Working Group on Environmental Justice,[106] US EPA's National Environmental Justice Advisory Council, and the White House Environmental Justice Advisory Council.[107] None, however, had an express mission related to groundwater.

Strikingly, across these numerous formal arrangements that recognize the cumulative burden of environmental stresses and socioeconomic disadvantage in defining who matters, the corresponding view of what matters is pollution. Pollution is the central and almost exclusive environmental focus. When it comes to protecting access to natural resources – preventing groundwater depletion to protect access – the concept of environmental justice is largely missing in action.

8.4 RECONCEPTUALIZING GROUNDWATER SUSTAINABILITY UNDER SGMA

When it was passed in 2014, SGMA filled a critical gap in conceptualizing what mattered in state groundwater-related law by focusing on "chronic lowering" of groundwater levels[108] as one of several elements of a

[102] California Environmental Protection Agency, *Intra-Agency Environmental Justice Strategy*, 8–9 ("environmental justice integration").
[103] Ibid 2.
[104] Cal. Government Code § 65040.12.
[105] E.g., California Environmental Protection Agency, *Intra-Agency Environmental Justice Strategy*, 10.
[106] Clinton, "Federal Actions to Address Environmental Justice," s1–s102.
[107] US EPA, "White House Environmental Justice Advisory Council" (n.d.) https://bidenwhitehouse.archives.gov/environmentaljustice/white-house-environmental-justice-advisory-council/, last accessed March 23, 2025 (referring to both the White House Environmental Justice Advisory Council and the National Environmental Justice Advisory Council); see also note 85 and accompanying text.
[108] Sustainable Groundwater Management Act of 2014, Cal. Stats. 2014, C. 346, §3, codified as Cal. Water Code, Div. 6, pt. 2.74 § 10721(x)(1).

multidimensional view of "sustainability."[109] As written, SGMA also facilitates identifying disadvantaged communities that rely on groundwater as part of "who matters" in groundwater management. However, rather than taking a cumulative view of vulnerability, in implementing SGMA, agencies have focused simply on low income. Considering links between conceptualization and the other regulatory functions under SGMA suggests that this difference may reduce its effectiveness.

Section 8.4.1 introduces the key elements of SGMA after reviewing a closely related predecessor groundwater law, which lay the foundations for how SGMA conceptualizes matters of concern relevant to groundwater levels. Section 8.4.2 then analyzes how SGMA provides for conceptualizing what and who matter in its different elements, and how these elements link conceptualization to the other regulatory functions of the CIRCle Framework: information, regulatory intervention, and coordination.

8.4.1 *Emergence of SGMA*

California's first, brief, voluntary groundwater management planning law appeared in 1992.[110] It established a template for maximum local control of groundwater, and an expectation that locals be responsible for determining what matters in their local jurisdiction through the development of management plans. SGMA followed this template, in modified form, over two decades later. The framework for these voluntary plans was comparatively less stringent than those under preexisting water planning laws.[111] The 1992 law allowed and incentivized, but did not require, local agencies to adopt groundwater management plans. Among other things, plans could provide for mitigating overdraft,[112] which causes declining groundwater levels. Though the law led to over 100 plans, local agencies tended to adopt plans to head off the risk of future state intervention in groundwater management, and to fulfill state funding requirements, rather than necessarily because they were committed to implementing the plans.[113] There seems to be no evidence that the legislation fundamentally changed groundwater sustainability outcomes.

[109] For more on multidimensional versus reductionist views of matters of concern, see Section 4.2.1.

[110] Groundwater Management Act, Cal. A.B. 3030 of 1992, Cal. Stats. 1992, C. 947, § 2, codified as Cal. Water Code Pt. 2.75 of Div. 6 (1992).

[111] Rebecca L. Nelson, "Assessing Local Planning to Control Groundwater Depletion: California as a Microcosm of Global Issues" (2012) 48:W01502 *Water Resources Research* 1–14, 4.

[112] Cal. Water Code § 10753.8.

[113] Nelson, "Assessing Local Planning to Control Groundwater Depletion," 4–5.

Then, during the southwest US "megadrought" of the early twenty-first century,[114] California passed its first laws for state-centralized monitoring of groundwater quality and levels.[115] This established the framework for conceptualizing and prioritizing groundwater basins that SGMA was to continue, and successfully focused the state's legislative mind on groundwater levels for the first time.

In 2014, the successful passage of SGMA created a new local groundwater planning mechanism with higher and more detailed minimum standards set by the state, relative to the earlier planning law. Continuing to emphasize local control,[116] SGMA provides for establishing local "groundwater sustainability agencies" (for brevity, "local agencies") for spatially defined groundwater basins, with one or more existing local agencies typically assuming the role.[117] Local agencies write groundwater sustainability plans that are either mandatory or discretionary, depending on the basin's "priority" status. The plans must be designed to achieve "sustainable groundwater management" over twenty years (and use a planning horizon of 50 years) which means avoiding "undesirable results"[118] in several categories, supported by monitoring and the possibility of state intervention. As explained next, multiple elements of SGMA contribute to conceptualizing what and who matter in pursuing groundwater sustainability, and, in doing so, these elements include regulatory mechanisms for information, regulatory intervention, and coordination.

8.4.2 *Conceptualizing What and Who Matter under SGMA*

SGMA provides for conceptualizing what and who matter through seven key elements (Figure 8.2), from delimiting and prioritizing groundwater basins, to the state potentially intervening to enforce minimum state requirements for local plans. In addition to determining what and who matter (summarized in Table 8.1), other linked elements of conceptualization – spatial boundaries

[114] See generally, A. Park Williams, Benjamin I. Cook and Jason E. Smerdon, "Rapid Intensification of the Emerging Southwestern North American Megadrought in 2020–2021" (2022) 12 *Nature Climate Change* 232–234.

[115] Groundwater Quality Monitoring Act of 2001, A.B. 599, Cal. Stats. 2001, C. 522, §2, as amended, codified as Cal. Water Code §§ 10780–10783 (2001); Groundwater Monitoring Program Act, Cal. S.B. 6 of 2009, Cal. Stats.2009–2010, 7th Ex.Sess., C. 1, §1, codified as Cal. Water Code §§10920–10936 (2009).

[116] Sustainable Groundwater Management Act of 2014, Cal. Stats.2014, C. 346, §3, codified as Cal. Water Code, Div. 6, pt. 2.74 § 10720.1.

[117] Cal. Water Code § 10723, 10723.6.

[118] Cal. Water Code § 10721(v); 23 Cal. Code of Regs. § 354.24.

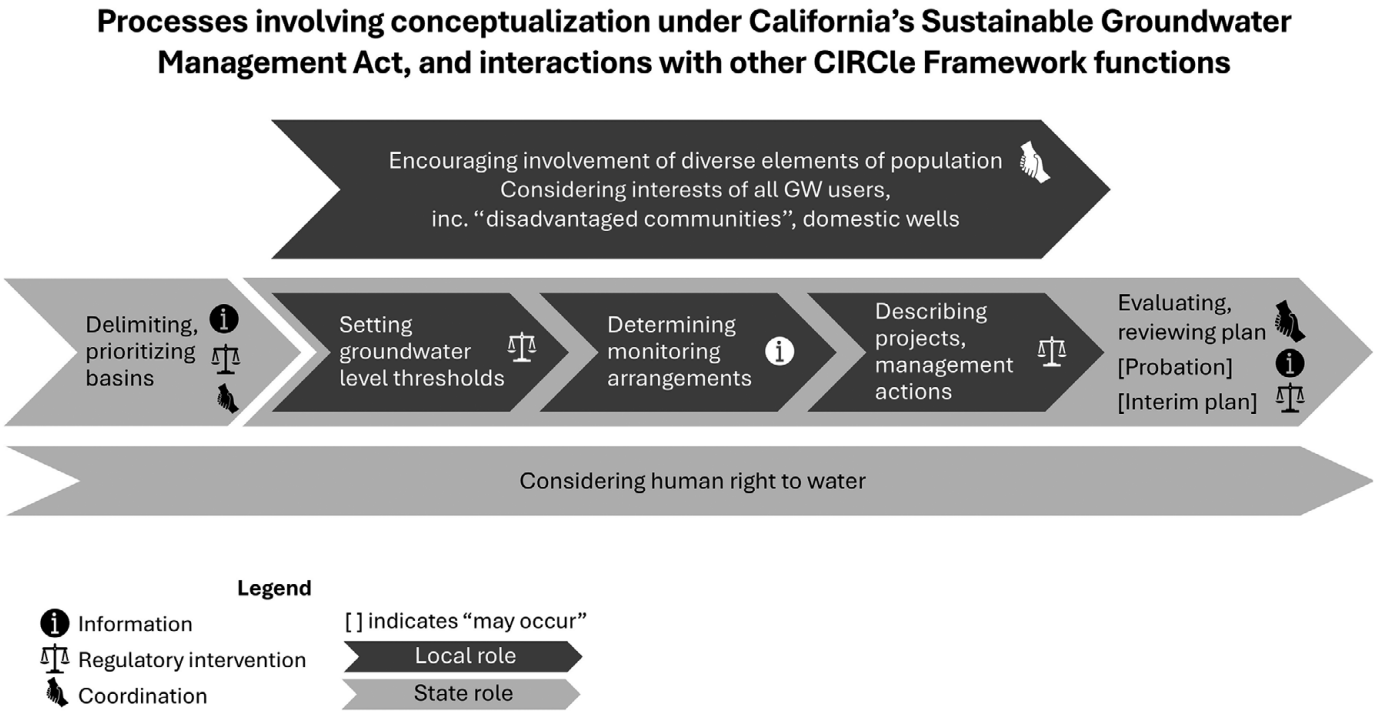

FIGURE 8.2 Elements of SGMA involved in conceptualizing what matters and who matters in groundwater sustainability, and links to other CIRCle Framework functions of information, regulatory intervention, and coordination

TABLE 8.1 *Conceptualizing groundwater (GW) levels and disadvantaged communities as a matter of concern under California's Sustainable Groundwater Management Act (SGMA)*

Element of SGMA	What matters: GW levels?	Who matters: those relying on drinking water wells, or disadvantaged communities?
(1) Spatially delimiting and prioritizing GW basins	Yes, California Department of Water Resources (DWR) considers overdraft in prioritization	DWR considers those who rely on GW and public supply wells, not expressly domestic wells or disadvantaged communities
(2) Involving stakeholders in formulating plan	N/A	"diverse social, cultural, and economic elements of the population" are encouraged to be involved; state promotes map of low-income communities
(3) Generally "considering" groundwater users	N/A	Everyone who relies on GW matters, expressly including low-income communities
(4) Defining sustainability goals/thresholds and where measured	Yes, GW level goals required; local agency decides local thresholds	All GW users
(5) Monitoring network	Yes, SGMA requires monitoring GW levels; local agency decides sites	All GW users
(6) Projects and management actions to achieve sustainability goal	Yes, applies to all sustainability indicators, including GW levels; local agency decides local actions	All GW users; state guidance focuses on drinking water wells
(7) State intervention re incomplete/ inadequate plan	Yes, applies to plan requirements in general	Applies to plan requirements in general

and thresholds – also emerge through these elements of SGMA, and intersect with other CIRCle Framework functions of information, regulatory intervention, and coordination (Figure 8.2). As the analysis here shows, while SGMA strongly expresses that groundwater levels matter, we see variation in the content and strength of its expressions of who matters. Indeed, in important respects, in seeking to achieve sustainability, SGMA leaves open the question

of "*for whom?*"[119] Moreover, it appears that these legal weaknesses are driving real-world risks for disadvantaged communities, briefly discussed here by drawing on earlier coauthored work analyzing 108 published plans, over half of which are in the Central Valley (for brevity, "Perrone and others work"[120]) and additional analysis.

8.4.2.1 Prioritizing Basins

A foundational aspect of SGMA is the spatial delimitation and prioritization of groundwater basins. Basin boundaries affect how local agencies form and coordinate, since multiple agencies overlying a basin must either coordinate their plans or come together in a partnership to develop a single plan.[121] Thus, though setting basin boundaries appears to be a dry, technical aspect of conceptualization (where are the limits of the aquifer?), rules[122] provide for adapting boundaries in response to both scientific criteria and to "promote[] sustainable groundwater management," including processes for public input (though without specifying any particular populations).[123] In practice, local political factors, such as local maneuvering to "get more heft or independence" and protect local agency "little fiefdoms" influenced basin boundaries.[124] Complex local decision-making included considering whether to coordinate or "go it alone" for the 190 single and 74 multiple-entity local agencies that ultimately formed.[125] In these processes, then, we see a link between delimiting basin boundaries, the spatial element of *conceptualizing* the matter of concern, and *coordination* among local agencies.

California's Department of Water Resources ("Department"), a technical agency, prioritized groundwater basins as high, medium, low, or very low

[119] This is a central point made in relation to domestic wells by Darcy Bostic and others, *Sustainable for Whom? The Impact of Groundwater Sustainability Plans on Domestic Wells* (Center for Regional Change at the University of California, Davis 2020).

[120] Perrone and others, "Stakeholder Integration."

[121] Cal. Water Code §§ 10723, 10727.6.

[122] Cal. Water Code § 10722.2, 23 Cal. Code Regs. §§ 340–346.6.

[123] 23 Cal. Code Regs. §§ 342.4, 343.12, 344.16.

[124] Felicity Barringer, "To Manage Groundwater, California Must First Get Basin Boundaries Right," *& The West* (November 29, 2016, Bill Lane Center for the American West, Stanford University) https://andthewest.stanford.edu/2016/to-manage-groundwater-california-must-first-get-basin-boundaries-right. For a database of boundary revisions, see California Department of Water Resources, "SGMA Portal – Basin Boundary Modification Request System" (n.d.) https://sgma.water.ca.gov/basinmod/modrequest/submitted, last accessed March 20, 2025.

[125] See generally, Anita Milman and others, "Establishment of Agencies for Local Groundwater Governance under California's Sustainable Groundwater Management Act" (2018) 11 *Water Alternatives* 458–480.

priority.[126] This determined whether a groundwater sustainability plan was mandatory (only for high- and medium-priority basins) and its due date, or voluntary[127] – a fundamental influence on regulatory intervention. The main statutory prioritization criteria were set by earlier groundwater monitoring legislation.[128] The criteria include overdraft (where withdrawals exceed recharge, leading to groundwater level declines[129]) and reliance on groundwater (including public supply wells, but not domestic wells[130]), but no particular human population.

The statute did permit the Department to consider other relevant factors when prioritizing basins,[131] but in practice, it did not consider disadvantaged communities,[132] even in the Central Valley, where disadvantage is so prominent. Thus, in prioritizing basins, we see the convergence of three regulatory functions: prioritization influences *regulatory intervention*, involves *conceptualizing* what matters in a way that includes groundwater levels, using monitoring *information* produced pursuant to a formal rule. However, the process provides little clarity about who matters as an element of conceptualization.

8.4.2.2 Engaging the Public

In developing and implementing a plan, SGMA requires an agency to "encourage the active involvement of diverse social, cultural, and economic elements of the population,"[133] and document how this was done.[134] The Department supports local agencies through professional facilitators,

[126] Cal. Water Code § 10722.4.
[127] Cal. Water Code § 10720.7.
[128] See Section 8.4.1.
[129] Cal. Water Code § 10933(b)(7); California Department of Water Resources, *SGMA Basin Prioritization*, 2; California Department of Water Resources, "Basin Prioritization" (n.d.) https://water.ca.gov/programs/groundwater-management/basin-prioritization, last accessed March 20, 2025, archived at https://perma.cc/865F-CRLL.
[130] Cal. Water Code § 10933(b)(3), (6).
[131] Cal. Water Code § 10933(b)(8).
[132] Department of Water Resources (California), *California Groundwater Elevation Monitoring: Basin Prioritization Process* (2014) app A (last table, column headed "other information comments," which related to issues such as impacts on fisheries, the importance of agriculture, and industrial growth), archived at https://web.archive.org/web/20190324094650/https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Basin-Prioritization/Files/CA_GW-Basin-Prioritization_07-10-14.pdf.
[133] Cal. Water Code § 10727.8.
[134] 23 Cal. Code Regs. § 354.10(d)(3).

translators, and interpreters, and guidance on stakeholder engagement.[135] The guidance makes a brief reference to "disadvantaged communities" and "environmental justice groups" as examples of stakeholder groups, with little elaboration on what these terms mean and how they differ.[136] This is problematic, given the confusion that attends the many different versions of these terms.[137] The guidance simply directs agencies to a tool that maps "disadvantaged communities" defined by low income.[138] A local agency may also appoint an advisory committee, but it need not include any specific stakeholder group.[139]

In this element, then, we see implementation tools designed to support linguistically diverse groups to participate and to help agencies identify the spatial locations of low-income communities (the "simple" view of disadvantaged communities). But we see no clear legislative view of who matters as a community of concern, and no reference to the cumulative view that would include other environmental burdens on communities, which is prominent in relation to pollution concerns.

8.4.2.3 Considering Groundwater Users

An overarching "consideration" requirement indirectly influences the substance of local groundwater sustainability plans. A local agency must describe in its plan,[140] and "consider the interests of all beneficial uses and users of groundwater," including agricultural users, domestic well owners, municipal well operators, public water systems, and "disadvantaged communities" reliant

[135] California Department of Water Resources, "Assistance and Engagement" (n.d.) https://water.ca.gov/Programs/Groundwater-Management/Assistance-and-Engagement, last accessed March 20, 2025, archived at https://perma.cc/HFF2-8NXD.

[136] California Department of Water Resources, *Stakeholder Communication and Engagement* (2018) 7, https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Assistance-and-Engagement/Files/Guidance-Doc-for-GSP—Stakeholder-Communication-and-Engagement.pdf, archived at https://perma.cc/XWX5-AD7W. See also California Department of Water Resources, "Guidance on Engaging and Communicating with Underrepresented Groundwater Users" (2021) https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Assistance-and-Engagement/Files/DWR—Underrepresented_Users_v3.pdf, archived at https://perma.cc/A78V-RUL5.

[137] See n 57 and accompanying text.

[138] California Department of Water Resources, "Mapping Tools: Disadvantaged Communities" (n.d.) https://water.ca.gov/Work-With-Us/Grants-And-Loans/Mapping-Tools, last accessed March 20, 2025, archived at https://perma.cc/27B8-FRB6; California Department of Water Resources, "Underrepresented Groundwater Users," 2.

[139] Cal. Water Code § 10727.8.

[140] 23 Cal. Code Regs. § 354.10(a).

on groundwater.[141] This element represents an "everyone matters" view of who matters. In practice, domestic use is widely recognized to be important: Perrone and others show that around 80 percent of plans describe domestic well users to varying degrees.[142] However, there is no direct, express link between this general obligation to "consider" and the other provisions described here.

8.4.2.4 Setting Groundwater Level Thresholds

A plan confronts the issues of groundwater levels and communities through its core enforceable sustainability goal, which links the cumulative threshold element of *conceptualization* to *interventions* to achieve the goal. A plan must describe current and historical groundwater levels[143] to inform the statutory sustainability goal of a plan, which is defined by the absence of "undesirable results" that are "significant and unreasonable."[144] SGMA sets out key general "sustainability indicators," which include degraded water quality and chronic lowering of groundwater levels.[145] Local agencies are left to quantify relevant thresholds, where they are measured, and what effects groundwater users can expect at these thresholds.[146] The legislation lacks minimum protections[147] or a hierarchy for considering user groups, even though state law in California has considered domestic water use the "highest" use of water for over eighty years.[148]

In practice, this approach to the sustainability goal has delivered weak protections for domestic wells, and even weaker protections for domestic wells in low-income communities. In the Central Valley's most critically overdrafted areas, plans may allow continued groundwater declines to 350 feet or more below ground level.[149] Perrone and others find that only 29 percent of

[141] Cal. Water Code § 10723.2; 23 Cal. Code Regs. § 354.26(b)(3) (potential effects of "undesirable results" on groundwater users).
[142] Perrone and others, "Stakeholder Integration," 4 (fig. 2).
[143] 23 Cal. Code Regs. § 354.16(a).
[144] Cal. Water Code § 10721(x); 23 Cal. Code Regs. § 354.24.
[145] Cal. Water Code § 10721(x); 23 Cal. Code Regs. § 354.26.
[146] 23 Cal. Code Regs. §§ 351(t), 354.28 (minimum thresholds). See also Cal. Water Code § 10727.2(b)(1), (2); 23 Cal. Code Regs. § 354.30 ("measurable objectives").
[147] The accompanying regulations state merely that the Department must consider the state policy on the human right to water when implementing the regulations: 23 Cal. Code Regs. § 350.4(g).
[148] Cal. Water Code § 106.
[149] EKI Environment & Water, "Estimated Numbers of Californians Reliant on Domestic Wells Impacted as a Result of the Sustainability Criteria Defined in Selected San Joaquin Valley Groundwater Sustainability Plans and Associated Costs to Mitigate Those Impacts (White Paper Prepared for the Water Foundation)" (*Water Foundation*, April 9, 2020) fig. 4, https://waterfdn.org/wp-content/uploads/2020/05/Domestic-Well-Impacts_White-Paper_2020-04-09.pdf archived at https://perma.cc/V2AD-NXPF.

plans adopt minimum thresholds that protect more than half of domestic wells in their territory, and many plan areas that fail to provide even this degree of protection are located in the Central Valley.[150] Significantly fewer domestic wells in (low-income) disadvantaged communities are protected than domestic wells in communities that are not so designated.[151] This is perhaps unsurprising, given that less than a quarter of all plans consider stakeholders in setting minimum thresholds, as opposed to factors such as lowest historical well levels.[152]

8.4.2.5 Monitoring Groundwater Levels

A plan must provide for a monitoring network to monitor groundwater conditions relative to enforceable goals, including those related to groundwater levels, and to monitor impacts on groundwater users.[153] These requirements are closely linked to minimum thresholds, and link *information* to *intervention*. The locations of sites chosen for monitoring contribute to the spatial element of *conceptualization*. These locations matter because groundwater levels vary across a basin. Levels that are monitored far from a community and deemed acceptable do not necessarily reliably describe conditions for that community. This means that monitoring sites "cover" the surrounding communities, but not others, in the sense of revealing declining groundwater levels relevant to compliance with enforceable goals.[154]

SGMA's monitoring provisions do not expressly require that monitoring locations be chosen to shed light on the groundwater conditions being experienced in disadvantaged communities, though the density and frequency of the sites and measurements must be based on impacts to groundwater users in a general sense.[155] Empirically, though, there is little difference between the percentage of wells in low-income communities close to key monitoring sites compared to wells outside these communities[156] – although, as described earlier, domestic wells within disadvantaged communities are less protected by minimum thresholds.

[150] Perrone and others, "Stakeholder Integration" 5, fig. 3.
[151] Ibid 8, fig. 6, supplementary table 4.2.
[152] Ibid 5.
[153] Cal. Water Code § 10727.2(e), (f); 23 Cal. Code Regs. § 354.34(b)(2), (3), (c)(1). See also 23 Cal. Code Regs. § 354.38(e)(3) (monitoring management action effectiveness where there are adverse impacts to groundwater users).
[154] Perrone and others, "Stakeholder Integration," 2.
[155] 23 Cal. Code Regs. § 354.34(f)(3).
[156] Perrone and others, "Stakeholder Integration," 8.

8.4.2.6 Designing Interventions

Having set sustainability goals, a plan must describe projects and management actions (*intervention*) to achieve them, including those that would be triggered when locally determined minimum thresholds are exceeded or "undesirable results have occurred or are imminent."[157] In other words, what interventions will prevent threshold conditions being exceeded (linking *conceptualization* to *intervention*)? These provisions do not expressly distinguish between disadvantaged and other groundwater users, but the Department has issued formal, though nonbinding, guidance on identifying and addressing impacts on drinking water wells.[158] Even so, it mentions disadvantaged communities only once, suggesting that a local agency should, at minimum, "disclose anticipated conditions" such as risks of wells going dry, and "work with" other entities to respond, or "implement projects and management actions to assist the identified users or avoid the adverse conditions."[159] The guidance document recommends adopting measures to "promote long-term sustainability," rather than short-term projects such as providing bottled water to households that lose access to drinking water.[160] The guidance further cautions that agencies pursuing programs to mitigate impacts for those who lose access to drinking water from wells not "arbitrarily or inequitably" exclude users based on the characteristics of their well, "socioeconomic status, demographics, and other relevant factors."[161]

To the extent that this guidance counsels a strategy to intervene to reduce cumulative impacts (reducing groundwater level decline) rather than just help communities cope with greater declines, such a strategy would better protect those that face cumulative stresses. Intervention to reduce cumulative impacts would deal with the root problem (declining groundwater levels) rather than depending on coping mechanisms that are potentially unreliable or practically inaccessible given other forms of disadvantage, such as language and health barriers.

[157] 23 Cal. Code Regs. § 354.44(a), (b).
[158] California Department of Water Resources, "Considerations for Identifying and Addressing Drinking Water Well Impacts" (2023) https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/DrinkingWater/Files/ConsiderationsForIdentifyingandAddressingDrinkingWaterWellImpacts.pdf, archived at https://perma.cc/83QL-W2C3.
[159] Ibid 6–7.
[160] Ibid 14.
[161] California Department of Water Resources, "Considerations for Identifying and Addressing Drinking Water Well Impacts," 11.

In practice, though, plans in the Central Valley sometimes include coping mechanisms that rely on uncertain future funding and that may be unfeasible for cumulatively burdened communities. Such measures may involve lowering a pump or deepening or replacing a well. This may require a tenant to persuade the landowner to be a claimant; and a claimant to be confident enough to approach a government entity (which may not be the case for undocumented residents), to have sufficient data to verify a claim, to fill out a claim form and to understand and sign legal agreements.[162] Using these approaches reduces the comprehensiveness of intervention if those who need them cannot take them up.[163] In addition, pumping from deeper down can involve more maintenance, higher pumping costs, and the need to treat lower-quality water.[164] In other words, the coping mechanism may place an ongoing burden on claimants if it is even accessible in the first place, fundamentally changing its effectiveness.

8.4.2.7 Coordinating across Levels and State Oversight

While most of the activity under SGMA is at the local level, the state has guidance, enforcement, and ongoing review roles. This also brings in the overlay of considering the human right to water, discussed earlier.[165] The Department evaluates plans and may find that a plan is incomplete and requires resubmission, or that it is inadequate if deficiencies are not remedied.[166] In evaluating plans, the Department must consider whether the local agency has considered groundwater users' interests (expressed generally).[167] If a local agency fails to resolve deficiencies, the State Water Resources Control Board (a department of the EPA) may place a basin in "probationary" status to resolve deficiencies, ultimately with the potential to use an interim

[162] See, e.g., "Delano-Earlimart Irrigation District GSA Mitigation Plan, Version 4.0" (*Delano-Earlimart Irrigation District*, July 2024) www.deid.org/wp-content/uploads/2023/03/deid-gsa-pilot-mitigation-plan-and-tm-122222.pdf, archived at https://perma.cc/WQ2Z-FPSW; Lower Tule River Irrigation District Groundwater Sustainability Agency and Pixley Irrigation District Groundwater Sustainability Agency, "Groundwater Sustainability Plan Impact Mitigation Plan" (n.d.) www.ltrid.org/wp-content/uploads/2023/06/ltrid-mitgation-plan-updated-6.29.23.pdf, archived at https://perma.cc/FT2H-XCZY.

[163] See Section 6.5.2.3.

[164] EKI Environment & Water, "Estimated Numbers of Californians Reliant on Domestic Wells," 3, 9.

[165] See Section 8.3.1.1.

[166] 23 Cal. Code Regs. § 355.2.

[167] 23 Cal. Code Regs. §§ 355.4(b)(4), 355.6(c)(4).

plan written by the state to collect further information and intervene to comply with the sustainability goal.[168]

In practice, it is this state–local *coordination* through oversight that has shone the most powerful spotlight on disadvantaged communities who risk losing access to their drinking water supplies due to declining groundwater levels. The Department found that multiple plans in six basins – all in the Central Valley – were deficient in their goals for groundwater levels and their consideration of disadvantaged communities.[169] In some cases, this led to corrections to plans that the Department later accepted as adequate.[170] In other cases (as of January 2025), the State Board emphasized considerations of equity and disadvantage and, at the time of writing, appears poised to declare "probationary" basins.[171] It considers that "[t]he primary intent of SGMA is to protect people who live in the basins from the devastating consequences of losing access to groundwater."[172] This has the potential to ensure that, at least in those basins, SGMA produces a conceptualization of what matters that includes not only groundwater levels but also disadvantaged communities that rely on the resource – though apparently taking a simple rather than a cumulative view of the burden they face.

Overall, as summarized in Table 8.1, legal provisions for each of these SGMA elements clearly focus on groundwater levels as a matter of concern. This fills a crucial gap in how California's legal system conceptualizes groundwater sustainability. Local agencies are empowered to define the

[168] Cal. Water Code § 10735.2.

[169] California State Water Resources Control Board, "Groundwater, the Sustainable Groundwater Management Act, and State Intervention" (October 12, 2023) 8–9, www.waterboards.ca.gov/water_issues/programs/sgma/docs/groundwater-sgma-state-intervention-faqs.pdf, last accessed March 20, 2025, archived at https://perma.cc/W37V-KLMD.

[170] E.g., Letter from Paul Gosselin to Ronnie Samuelian, "Re: Approved Determination of the Revised Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kings Subbasin" (*California Department of Water Resources*, August 4, 2023) https://sgma.water.ca.gov/portal/gsp/assessments/22, archived at https://perma.cc/64T9-56RR.

[171] E.g., State Water Resources Control Board, "Kern County Subbasin Probationary Hearing Final Staff Report" (January 2025) 42–43, 124, www.waterboards.ca.gov/water_issues/programs/sgma/docs/kern/202501-kern-final-staff-report.pdf, archived at https://perma.cc/AU6F-ELNM (noting the potential for disproportionate impacts on economically disadvantaged communities and communities of color caused by overdraft affecting shallow wells); State Water Resources Control Board, "Continuation of Hearing Regarding Designation of the Kern County Groundwater Subbasin as Probationary Under the Sustainable Groundwater Management Act," Resolution No. 2025–0007 (February 20, 2025), www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2025/rs2025-0007.pdf.

[172] California State Water Resources Control Board, "Groundwater, the SGMA and State Intervention," 9.

amount of decline that matters in a local context, but there is no state "safety net" of maximum decline.

Provisions that define who matters, though, are expressed weakly in relation to disadvantaged communities. Disadvantaged communities were ignored in prioritizing basins, with the risk that groundwater declines that are significant enough to affect shallow wells, but not other users, will escape the groundwater planning mandate that only applies to high- and medium-priority basins. Where groundwater planning is required, local agencies must "consider" low-income disadvantaged communities and "encourage" diverse participation, but no outcome is mandated. Provisions dealing with intervention – controlling cumulative harm from declining groundwater levels – do not expressly protect vulnerable communities, though policy guidance points weakly in this direction. Considering low-income disadvantaged communities might lead to protections for domestic wells to prevent them going dry. Statutory "best management practices" guidance suggests somewhat tentatively that a local agency "may decide, for example, that … basinwide loss of domestic well pumping capacity due to lowering of groundwater levels are both significant and unreasonable conditions."[173] Perhaps it is more surprising that the opposite conclusion is also apparently possible.

Though SGMA includes low-income disadvantaged communities in its view of "who matters," it does not reliably protect them from falling groundwater levels, and it fails to take a cumulative view of burdens in determining who matters. The cumulative approach would recognize that losing access to drinking water may compound other environmental burdens that communities experience and contribute to environmental injustice more generally. This contrasts with the cumulative view of who matters taken by other groundwater-related laws and policies, as in the contexts of EIA, land use laws, statutory drinking water project grants, and EPA enforcement policy.[174] Notably, California's EIA legislation does not apply to the preparation and adoption of groundwater sustainability plans,[175] so environmental justice considerations under that legislation[176] are not engaged. Taking a simple (income-based) rather than cumulative view of who matters risks

[173] This guidance is still in draft as at January 2025: California Department of Water Resources, "Best Management Practices for the Sustainable Management of Groundwater: Sustainable Management Criteria (Draft)" (2017) https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19, archived at https://perma.cc/N7SL-VCLG, 6.

[174] See Section 8.3.2.2.

[175] Cal. Water Code § 10728.6.

[176] See Section 8.3.2.2.

exacerbating vulnerabilities for communities of concern, because it ignores factors that reduce the feasibility of interventions in cumulatively burdened communities, such as education, language, and health.

8.5 CONCLUSION

In California's traditional regulatory landscape for groundwater as drinking water, what matters is groundwater pollution and how it might impact people who receive water service from a utility. The question of who matters in this landscape, when it comes to disadvantaged communities, is answered in different ways. A key distinction is between a "simple view" of disadvantaged communities based mostly or solely on low income and a "cumulative view" that sees the aggregate burden posed by multiple forms of socioeconomic disadvantage and environmental stresses.

This pre-SGMA view of what and who matter was largely silent on groundwater levels. SGMA tried to fill that silence, answering that groundwater levels matter too. But, in the end, despite its detailed provisions and processes for conceptualization, and their links to information, intervention, and coordination, the SGMA view of who matters is, at best, expressed vaguely and at varying volume through its various key elements. It also seems entirely to overlook the cumulative view of disadvantaged communities. This is important, because a solution that might effectively support a low-income householder who has lost access to their drinking water supply may not work for someone who also faces the other kinds of burdens that pollution-oriented laws consider under the banner of "environmental justice," such as poor health, language barriers, low educational attainment, and other environmental stressors. SGMA does not expressly prevent a local agency setting its groundwater level goals at the lowest recorded historical level, or lower, and promising to mitigate impacts on affected disadvantaged communities by "coping" measures that might simply prove infeasible for cumulatively burdened communities. Using the lens of environmental justice to understand the cumulative burdens that communities experience can help evaluate the real-world feasibility of these measures.

The implementation of SGMA's state–local coordination provisions, which allow the state to step in to remedy inadequate local plans, seems to be giving a louder voice to concerns about vulnerable communities losing access to their drinking water than does SGMA on paper. At the same time, federal termination of environmental justice initiatives shows that it may be preferable to rely on strong, clear, and coherent formal laws for conceptualizing "who matters" rather than relying heavily on agency willpower to provide structure and

certainty. This raises the possibility of expanding SGMA's conceptualization of who matters in the context of groundwater depletion, and making this conceptualization coherent across its provisions. Expanding "who matters" to reflect a cumulative, environmental justice view, as occurs in the context of groundwater quality concerns, would guide the state to more calibrated solutions to groundwater depletion problems for those most vulnerable to its effects.

In the scheme of this book, the analysis of California's traditional regulatory landscape for groundwater illustrates the first phases of an evaluation of how a legal system responds to a cumulative environmental problem.[177] The analysis of SGMA illustrates how conceptualization centers and links to regulatory functions for information, regulatory intervention, and coordination, which are explored in the case studies that follow. It shows the potential for incoherent approaches (such as ignoring disadvantaged communities in prioritizing basins, but not in public participation processes), to which regulatory designers should be alert.

Beyond this, the California case study also suggests the value of conceptualizing what matters for the purposes of addressing a cumulative environmental problem in a way that is, itself, cumulative. Environmental justice indices that aggregate socioeconomic and environmental stressors, and inform regulatory schemes, are a prominent example of this approach. California's environmental justice index is currently limited to socioeconomic burdens and pollution-oriented environmental stressors, but indicators of access to natural resources, such as groundwater, would be a valuable extension. Outside the groundwater context, and in other places, a similar cumulative approach could embrace other access issues, from access to urban green space to access to resources for adapting to climate change. An ecological take on this approach is to map cumulative exposure to different forms of stress, an approach discussed in the Great Barrier Reef case study.[178] Ultimately, though, it is not just how a matter of concern is conceptualized, but how it links to the other regulatory functions required to address cumulative environmental problems that influences how laws can protect it from a thousand cuts.

[177] See Chapter 11 (Guidelines).
[178] See Section 9.4.2.